Section 6
Revisions to the Draft EIR

This section consists of text and graphics changes to the Draft EIR either as a result of comments or requests by BART staff to correct any inaccuracies. These changes are made to correct or update information in the Draft EIR. The revisions are organized by sections according to their order in the Draft EIR. Pages with revisions are reproduced here as they appear in the Draft EIR, with new text underlined and deleted text denoted with ~~strike-through~~. If the revision causes the text to extend beyond the original page, a letter suffix is added to the page number to indicate a continuation of the original page.

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Summary

How do passengers transfer between the DMU and the BART trains?

Simulated view of the transfer platform in SR 4 median looking east

Passengers would transfer between the DMU and BART trains via the proposed Pittsburg/Bay Point Transfer Platform. This transfer platform would be constructed in the SR 4 median within the current tailtrack area of the existing Pittsburg/Bay Point BART Station platform. Passengers on eBART seeking to board BART would ride the DMU train and get off at the transfer platform, walk across the platform, and board BART. There would be emergency ingress and egress at the west end of the platform.

How will passengers access the Transfer Platform?

Use of the transfer platform at the Pittsburg/Bay Point Station would be limited to passengers transferring between BART and the DMU trains so that there would be no pedestrian access from the existing BART station platform or from either side of SR 4. The transfer platform would not need to be equipped with stairs, escalators, parking, or a concourse area for public use. However, there would be emergency ingress and egress at the west end of the platform.

How will the passengers access eBART stations in the SR 4 median?

Access to the Railroad Avenue Station platform would be from the sidewalks on the west and east sides of the Railroad Avenue overpass, where one stairway and one elevator on each side of the overpass would descend to the DMU platform below. ~~A pedestrian bridge from the east end of the station platform to the south side of the freeway over the eastbound lanes of SR 4 is also being planned, although it may not be constructed as part of the initial construction.~~

Access to the Hillcrest Avenue Station platform would be via a pedestrian overcrossing from the parking area that would be on the north side of SR 4. The pedestrian concourse linking the parking area and station platform over the westbound lanes of SR 4 would be elevated over the traffic lanes. The station's parking area would be accessible by pedestrians, bicycles, and buses.

What will the stations be like?

The eBART stations would consist of a platform with sheltered areas for passengers, informational signage, and benches. Parking would be available near eBART stations, and the stations would be accessible by pedestrians, bicyclists, and patrons transferring from the astern ontra osta Transit Authority Tri Delta Transit . The stations would be integrated visually and functionally with the surrounding land uses and circulation network as part of the Ridership Development Plans ~~being~~ prepared by the cities of Pittsburg and Antioch.

How many passengers will use the system?

The Proposed Pro ect is expected to open for service in the year . By the year , the Proposed Pro ect from Pittsburg/Bay Point BART Station to Hillcrest Avenue is expected to attract , daily, one way passenger trips entrances and exits . f these trips, ,4 would be made by new transit riders. Table S provides a breakdown of pro ected daily DMU ridership for the years and .

How will eBART help reduce congestion?

An eBART train would carry as many people as cars, greatly reducing the number of cars on the road. During the peak period, the number of vehicles taken off the road because of eBART would be equivalent to one lane of traffic.

Table S-1
Projected Daily DMU Ridership, 2015 and 2030

Year	Weekday Proposed Project Trips	Trips by New Transit Riders[a]
	,	,
	,	,4

Source ilbur Smith Associates, .

ote

a. ew transit riders are those who were not previous BART or Tri Delta Transit users in the SR 4 corridor.

Will parking be available at the stations?

Parking would be provided at the Railroad Avenue Station at the existing BART park and ride lot located on the south side of SR 4, between SR 4 and Bliss Avenue, approximately , feet east of Railroad Avenue. This parking lot would provide up to parking spaces for DMU passengers however, no additional parking would be provided as part of the Proposed Pro ect, and no improvements to the existing parking lot are planned.

Approximately , parking spaces ultimately would be constructed at the Hillcrest Avenue Station. onstruction of the parking lot would take place in

two phases approximately , spaces would be constructed by year and the remainder by . ncluded in the , parking spaces would be spaces designed to be accessible for persons with disabilities, in compliance with the Americans with Disabilities Act.

How long will it take to ride from the Hillcrest Avenue Station to the Pittsburg/Bay Point BART Station?

The DMU running time would be a total of minutes from the Hillcrest Avenue Station to the existing Pittsburg/Bay Point BART Station platform. This time includes the short trip on BART from the Pittsburg/Bay Point BART Station transfer platform, the three minute transfer period at the transfer platform, and a minute stop at the Railroad Avenue Station.

How much will it cost to ride the DMU?

ares for eBART would be consistent with BART's current distance based fare policy. are collection on eBART would be much like the BART smart card system. Stored value fare cards would be purchased in advance or from ticket machines on the platform. Advanced technology fare collection techniques would be used similar to the Translink fare system that would allow a single fare collection system to be used for the combined BART and DMU system.

How much will it cost to build and operate eBART? Who will pay for the system?

The total estimated capital cost for the Proposed Pro ect is approximately 4__— million in dollars . At the midpoint of construction, the cost is estimated to be _– million. ith the help of east ontra osta ounty voters, the eBART pro ect has secured a total of million of funding from state, regional, and local sources. BART is confident that the pro ect can be implemented with the resources available. igure S presents a chart illustrating the distribution of funding sources for the Proposed Pro ect.

Annual operating costs for the DMU system are estimated to be . million in dollars .

Table S-2
Features of the Hillcrest Avenue Station Options

Station Option	Location	Net Additional Daily Ridership[a,b]	Construction Cost[c]	Operational Cost[c]
Median Station	ithin SR 4 Median , ft east of Hillcrest Ave.	4	4 —	.
orthside est Station ption	orth of SR 4 , ft east of Hillcrest Ave.		4	.
orthside ast Station ption	orth of SR 4 , ft east of Hillcrest Ave.	,		.
Median Station ast ption	ithin SR 4 Median , ft east of Hillcrest Ave.			.

Source PBS , BART and SA, .

otes

a. By year .

b. et Additional Daily Ridership added one way transit trips due to new housing/employment in excess of estimates from ABA Pro ections .

c. stimated costs for the pro ect with this station option, in millions dollars .

S.3 PROJECT BACKGROUND, PURPOSE, AND NEED

Is this project a new idea?

Did you know?

The BART system consists of 104 total miles, and maintains 43 stations throughout the Bay Area running from Pittsburg/Bay Point and Richmond in the north to Fremont and Millbrae in the south and to Dublin/Pleasanton in the east.

Since the BART system began service in , there has been discussion about extending the rail system into east ontra osta ounty. ith the opening of the Pittsburg/Bay Point BART Station in , BART extended its service into east ounty. This station offered east ontra osta ounty residents a transit alternative to travel between the ity of Pittsburg and the rest of the BART service area. Since opening, the station and line has witnessed heavy use, as an average of , persons enter and exit the BART system each weekday at the Pittsburg/Bay Point BART Station. BART's commitment to east ontra osta ounty continues with the eBART pro ect, which would extend the rail system miles further into east ontra osta ounty, with an opportunity to expand even further in the future.

What is BART's System Expansion Policy?

BART's System Expansion Policy

BART adopted a System Expansion Policy as part of its Strategic Plan in 1999. The policy identifies a uniform set of criteria to be applied to all extensions of BART service. The Proposed Project is the first application of this BART policy.

BART's System xpansion Policy, adopted in , defines goals that should be met with any new expansion pro ect. Those goals are

- nhance regional mobility, especially access to obs
- enerate new ridership on a cost effective basis
- Demonstrate a commitment to transit supportive growth and develop ment
- nhance multi modal access to the BART system
- Develop pro ects in partnership with communities that will be served
- mplement and operate technology appropriate service and
- Assure that all pro ects address the needs of the District's residents.

onsistent with BART System xpansion Policy, the Proposed Pro ect would extend transportation services to communities currently underserved by transit. Stations would be designed to provide intermodal regional links to bus, shuttle, automobile, bicycle, and pedestrian networks. The Proposed Pro ect would enhance the public's access to obs, schools, shopping, and social activities throughout the Bay Area.

RDPs

The cities of Pittsburg and Antioch ~~are~~ have prepared~~ing~~ Ridership Development Plans for an area approximately one-half mile around the proposed stations at Railroad Avenue and near Hillcrest Avenue, respectively. The RDPs by the cities are ~~being proposed~~ in the form of Specific Plans, ~~which will be adopted by the local jurisdictions prior to the BART Board's consideration of the Proposed~~ which identify land use changes and access improvements supportive of local development goals and enhanced transit ridership.

The Proposed Pro ect is utili ing the Ridership Development Plan RDP process as prescribed in BART's System xpansion Policy. This pro ect marks the first time BART has employed the policy to provide guidance to cities, staff and the BART Board of Directors, and the first time a pro ect has supported urisdictions in creation and adoption of RDPs.

The policy has a number of criteria that are used by the BART Board in considering whether to advance a pro ect to construction. Pro ect advancement criteria are

- transit supportive land use and access
- creation and adoption of a Ridership Development Plan
- cost effectiveness
- regional network connectivity
- system and financial capacity and
- partnerships.

An RDP is a comprehensive station area plan that is created by a local urisdiction where planning for a new BART station is underway. The purpose of the RDP is to evaluate and adopt changes to land use and access near a

station that can enhance ridership to the station and to the pro ect. n the eBART corridor, both the cities of Pittsburg and Antioch ~~are engaged in completing~~ have prepared RDPs in the form of Specific Plans~~, which will be adopted prior to the BART Board's consideration of the Proposed Pro ect~~. The Proposed Pro ect's ridership, based on expected regional growth consistent with current land use plans, even without the increased development density to be provided under the cities' respective Specific Plans, will satisfy the ridership threshold established under the System xpansion Policy.

The cities originally anticipated that their Specific Plans would be completed prior to the BART Board of Directors' consideration of the Proposed Pro ect. The ity of Pittsburg is scheduled to consider the Railroad Avenue Station Area Specific Plan in May . The ity of Antioch is scheduled to consider its Hillcrest Station Area Specific Plan prior to the date the BART Board is scheduled to consider the Proposed Pro ect. Therefore, as of the publication of this document, it is anticipated, but not certain, that the ity of Antioch will have taken final action enabling the BART Board to rely on the adoption of the Specific Plan. Regardless of the status of either city's Specific Plan, the analysis in the R demonstrates that the System xpansion Policy ridership threshold for the Proposed Pro ect would be met by expected growth consistent with current land use plans for the two station areas, without taking into account any additional growth that would be allowed under the Specific Plans.

Wasn't this project extending to Byron/Discovery Bay?

BART would like to extend transit service through akley and Brentwood to Byron/Discovery Bay in the future. However, funding for this full system is undefined at this time, ma or questions are unresolved regarding the alignment route, station locations and local plans for development, and it is highly speculative when such improvements could be implemented. As a result, expansion along the full pro ect corridor is likely to occur over multiple phases, with this Draft R analy ing the environmental effects of the initial segment.

Why not conventional BART?

onventional BART is not proposed for several reasons. irst, BART wants to bring rail service to east ontra osta ounty as quickly as possible. onventional BART to Hillcrest Avenue would cost approximately two and one half times as much as the DMU technology, and it could take years to find the funds to build the pro ect. Secondly, the direction of the System xpansion Policy to generate new ridership on a cost effective basis suggests bringing rail service to lower density and lower ridership communities at a lower capital cost. The suburban land use pattern of east ontra osta ounty is expected to

generate ridership that can be handled on a person DMU train, and not require a person capacity BART train. Third, conventional BART facilities are much larger than those for a DMU. Although the station could be accommodated in the median of SR 4, the acre maintenance facility would need to be located north of SR 4. The land necessary for BART facilities would substantially reduce the amount of developable land that the ity of Antioch is proposing for transit oriented development.

What are the cities of Antioch and Pittsburg doing to support ridership?

n an effort to support ridership and fulfill BART's System xpansion Policy, the ity of Pittsburg has prepared a Draft Railroad Avenue Specific Plan for the area within a one half mile radius of the proposed DMU station site. The purpose of the plan is to guide future development in the area, which in turn will increase ridership. About , 4 residential units and over one million square feet of commercial floor area are proposed in convenient walking distance of the station.

The ity of Antioch also ~~is preparing~~ has prepared a specific plan for approximately acres of undeveloped land east of Hillcrest Avenue and on both sides of the Union Pacific Railroad right of way UP R , which parallels SR 4 approximately 4 feet to the north. The undeveloped area would be transformed into a mid to higher intensity mix of residential, commercial, and public uses. Antioch envisions future development in the Hillcrest Station Area Specific Plan ~~station~~ area ~~between and~~ of up to , residential units and up to approximately ,– _, ~~million~~ square feet of retail and office uses.

or both station areas, surface parking lots would be provided as part of the Proposed Pro ect. However, it is anticipated that future development, which will be proposed and evaluated separately, may convert the surface parking lots to parking structures and develop the freed up land.

What is Caltrans' role in the Proposed Project?

Recent altrans improvements to SR 4 have provided sufficient width in the median of SR 4 for a transit system from the Pittsburg/Bay Point BART Station to the overidge Road interchange.

altrans, in cooperation with the ontra osta Transportation Authority TA , is planning the expansion of the SR 4 median to accommodate a transit system from the overidge Road interchange to the SR interchange. n the already constructed Pittsburg/Bay Point to overidge Road interchange segment of SR 4, altrans has provided a widened median, median subgrade, underdrains in portions , and median barriers in portions of the SR 4 alignment.

onstruction of the eBART pro ect has been scheduled to occur concurrently with the altrans and TA widening of SR 4 between overidge Road and SR . This integration of construction schedules will allow more efficient construction of elements common to both pro ects, reduce overall costs of each, and minimi e the construction period which would reduce inconvenience to motorists and nearby land uses.

S.4 PURPOSE OF THE EIR

CEQA

The California Environmental Quality Act is a statute that requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible.

What is the EIR and what is its purpose?

An R is a document that analy es the environmental impacts of a proposed pro ect on the physical environment. ts main purposes are to inform governmental decision makers and the public about the potential significant

environmental effects of proposed activities identify ways that environmental impacts can be avoided or significantly reduced require changes in pro ects through the use of alternatives or mitigation measures when feasible and disclose to the public the reasons why a pro ect was approved if significant environmental effects are involved. Responsible agencies also will consider the R when taking action on permits, funding, and other issues related to implementation of the pro ect.

Although the R does not control the ultimate decision on whether to approve the Proposed Pro ect, the BART Board of Directors must consider the information in the R and public comments on significant impacts identified in the R. The BART Board of Directors will use the inal R which will include the Draft R and responses to public comments , along with the ~~adopted~~ Ridership Development Plans and other information, to determine whether to approve, modify, or disapprove the Proposed Pro ect, and to specify any applicable mitigation measures as part of pro ect approval.

or the purposes of this R, BART is the designated lead agency, and is responsible for conducting the requisite environmental review, approving, and implementing the pro ect.

Lead Agency

A lead agency is the public agency that has the primary responsibility for carrying out or approving a project that is subject to CEQA.

Responsible Agency

A responsible agency is a public agency other than the lead agency that has discretionary approval authority over a project.

Significance

A significant environmental effect occurs when a project causes a substantial, or potentially substantial, adverse change in the physical conditions within the area affected by the project.

Mitigation Measure

A mitigation measure is a requirement that is placed on a project to reduce or eliminate environmental impacts that will be caused by building the project. One example would be to build a sound wall between a housing development and a busy street to reduce the noise level.

S.5 PROJECT IMPACTS

What significant impacts might occur under the Proposed Project?

A summary of the impacts and mitigation measures for the Proposed Pro ect is presented in Table S at the end of this section. The significant and potentially significant impacts identified in Table S include both operational and construction related impacts of the Proposed Pro ect.

Can the impacts be reduced or eliminated?

or every significant impact identified in the Draft R, mitigation measures are proposed to reduce or eliminate the impact. A summary of these measures is contained in Table S . n some instances, the proposed mitigation would not reduce the impact to a less than significant level. n these cases, the impact remains significant and is said to be unavoidable.

What are the significant and unavoidable impacts of the Proposed Project?

Before the pro ect can be adopted, BART will be required to examine each of the significant and unavoidable impacts of the Proposed Pro ect and determine whether the benefits associated with the pro ect outweigh those impacts. As

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
3.2 Transportation			
TR . Under Proposed Pro ect conditions, five intersections would operate at unacceptable levels during one of the peak periods, and one intersection would operate at unacceptable levels during both the AM and PM peak periods. ompared to the o Pro ect conditions, the Proposed Pro ect would worsen the level of service at four of these intersections, a significant effect.	~~S~~	~~*TR- Improve Davison Drive illcrest Avenue Deer alley Road* The intersection operations could be improved to a / ratio of . and S D during the AM peak hour through the coordination of the intersection, optimi ation of signal timing plans, and overlapping of westbound right turning movements. BART would contribute its fair share to upgrade intersection operations to acceptable levels, reducing the impacts to less than significant.~~	~~TS~~
	S	*TR- Improve Sunset Drive illcrest Avenue* The intersection operations could be improved to a / ratio of . 4 and S D during the PM peak hour through the provision of an exclusive right turn lane at the northbound approach and an additional exclusive left turn lane at the westbound approach. This would also require the addition of a third receiving lane along the southern leg of the intersection. BART would contribute its fair share of the actual cost of these improvements.	TS
	S	*TR- 2 Improve akley Road eroly Road* The intersection operations could be improved to a / ratio of . and S B during the PM peak hour through the signali ation of the intersection. BART would contribute its fair share ~~to upgrade intersection operations to acceptable levels.~~ of the actual costs of this improvement. t should be noted that traffic volumes at this intersection are expected to decline by the ear , reducing the impacts to less than significant.	TS
	S	*TR- illcrest Avenue Interchange Area Traffic Signal Improvements* The traffic signals of the Hillcrest Avenue interchange area shall be interconnected and a coordinated traffic signal optimi ation plan which is designed to limit the queuing on the SR 4 eastbound off ramp shall be implemented. The intersections to be included are Hillcrest Avenue/Ar ate ane P Service enter Driveway, Sunset Drive/Hillcrest Avenue, SR 4 estbound Ramps/Hillcrest Avenue, SR 4 astbound Ramps/Hillcrest Avenue, arkspur Drive/Hillcrest Avenue, and Davison Drive/Hillcrest Avenue Deer alley Road. Modification of the above signal operations by year is the responsibility of the ity of Antioch. BART would contribute its fair share of the actual costs of signal interconnection and development of an optimi ation plan. n the year , the intersection of SR 4 estbound Ramps/Hillcrest Avenue would no longer exist due to the planned interchange improvements and a new intersection at SR 4 estbound/Sunset Drive would be added to the signal system.	~~TS~~ SU

Legend: (S) Significant (PS) Potentially Significant (LTS) Less Than significant (SU) Significant and Unavoidable

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
		The TA and altrans have plans to improve the Hillcrest Avenue interchange as a part of the SR 4 widening pro ect. These plans eliminate the intersection of SR 4 estbound Ramps/Hillcrest Avenue by providing a new northbound to westbound loop on ramp and improve and widen the approaches to the SR 4 astbound Ramps/Hillcrest Avenue intersections. These improvements would mitigate the impacts at the SR 4 estbound Ramps/Hillcrest Avenue intersections but would not mitigate the impacts at the SR 4 astbound Ramps/Hillcrest Avenue intersection. These improvements are prohibitively costly and there is no identified funding that would allow this pro ect to be completed by the ear . t is expected, however, that these improvements would be funded and in place by the ear . urther improvements to address the conditions at the SR 4 astbound Ramps/Hillcrest Avenue intersection have been studied by the ity of Antioch but have been ruled to be infeasible due the potential displacement of homes and commercial property. perational improvements that involve signal timing and coordination among the intersections in the Hillcrest Avenue interchange area would reduce pro ected queues and improve levels of service however, the impacts would remain significant and unavoidable.	

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
TR . ith the Proposed Pro ect in ear , ~~eight~~ seven intersections would operate at unacceptable levels during one of the peak periods, and ~~three intersections~~ one intersection would operate at unacceptable levels during both the AM and PM peak periods. ompared to the o Pro ect conditions, the Proposed Pro ect would worsen the level of service at three of these intersections, a significant effect.	S	*TR-2 Improve illcrest Avenue E 8th Street* The intersection operations could be improved to a / ratio of . and S D during the PM peak hour through the provision of an exclusive right turn lane along the eastbound approach. BART would contribute its fair share ~~to upgrade intersection operations to acceptable levels.~~ of the actual costs of this improvement.	TS
		~~*TR 2 2 Improve Sunset Drive illcrest Avenue* The intersection operations could be improved to a / ratio of . and S D during the PM peak hour through the provision of an exclusive right turn lane at the northbound approach and an additional exclusive left turn lane at the westbound approach. BART would contribute its fair share to upgrade intersection operations to acceptable levels.~~	~~TS~~
	S	or the reasons identified in the mitigation discussion for mpact TR , physical improvements to reduce impacts at the intersection of SR 4 astbound Ramps/Hillcrest Avenue are considered infeasible. Mitigation Measure TR . earlier would be effective at reducing queues, and the only difference to circumstances in ear is that in ear the intersection of SR 4 estbound Ramps/Hillcrest Avenue would no longer exist due to the planned intersection improvement and the new intersection SR 4 estbound/Sunset Drive that would be added to the signal system. The impacts would still be significant however. t is the intent of BART, altrans, and the ity of Antioch to continue to work towards a traffic solution for this interchange. n light of the continuing efforts, the measure below is proposed, although given the uncertainty about the ability to identify a mutually acceptable solution, ~~As a result,~~ the impact at this intersection would be reduced, but would be remain significant and unavoidable. ~~SU~~ *TR-2 2 Contribute to illcrest Avenue Interchange Improvements* BART shall pay its fair share of reasonable and feasible physical or operational improvements at the Hillcrest Avenue interchange which are developed and agreed to by BART, altrans, and the ity of Antioch in order to address the identified impacts.	SU
TR . Under Proposed Pro ect conditions, a parking shortfall of spaces at the Railroad Avenue Station in ear would result in a significant impact.	S	*TR- Implement parking monitoring program and institute appropriate parking controls if necessary* BART shall institute an annual monitoring program on streets ad acent to the Railroad Avenue Station. A baseline survey of parking conditions in the vicinity of the station will be conducted prior to commencement of Proposed Pro ect operations. The baseline survey will establish parking conditions in the vicinity of the station during the first six months of operation to verify if spillover parking is occurring. Such monitoring will be based on field surveys and any complaints received by BART and local parking authorities. A follow up survey will occur once a year. BART ommunity Relations staff will respond to parking complaints and BART would investigate such complaints to verify parking concerns.	TS

Legend: (S) Significant (PS) Potentially Significant (LTS) Less Than significant (SU) Significant and Unavoidable

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
		f a parking spillover problem is confirmed by this monitoring program, BART staff will assist the ity of Pittsburg in implementing a parking management program. The program would incorporate appropriate parking control measures based on BART's Parking Management Toolkit, which is included as Appendix to this R. This toolkit identifies a detailed process for understanding local parking issues, evaluating parking conflicts, and implementing specific parking control measures. These measures could include time limits and time based restrictions, increased enforcement, or parking fees, all of which have proven effective at existing BART stations. The residents of the area could also utili e the process that is already in place in the ity to request implementation of a Residential Permit Parking one. The parking management program would be implemented by the ity of Pittsburg. BART staff will assist to ensure	

Legend: (S) Significant (PS) Potentially Significant (LTS) Less Than significant (SU) Significant and Unavoidable

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
		that the parking control measures, adapted as appropriate for site-specific conditions, are implemented and are achieving the necessary effect. BART staff would also continue discussions as necessary with the City to help adjust any parking control measures in response to issues that may arise during implementation of such measures.	
TR-8. The Proposed Project would generally not affect existing or planned pedestrian or bicycle circulation or accessibility in the project corridor; however, sidewalks and bicycle lanes at the Hillcrest Avenue/Sunset Drive intersection could be impacted. Accordingly, the Proposed Project would have a potentially significant effect on pedestrians and bicyclists.	PS	*TR-8.1 Construct sidewalks and bicycles lanes along Hillcrest Avenue and Sunset Drive~~Slatten Ranch Road~~.* For the Hillcrest Avenue Station, the Hillcrest Avenue/Sunset Drive intersection will be improved as required in Mitigation Measure TR-~~2~~1.1~~2~~. In addition to the improvements required by TR-~~2~~1.1~~2~~, improvements shall include a sidewalk along the east side of Hillcrest Avenue and a southbound bicycle lane in the areas affected by the construction of the other required intersection improvements. BART shall contribute its fair share of the intersection improvements. In addition, BART shall provide safe and convenient bicycle and pedestrian access from the Sunset Drive/Hillcrest Avenue intersection to the station platform area. ~~The portion of Slatten Ranch Road to be constructed by BART shall include sidewalks and bicycle lanes.~~	LTS
TR-9. Construction of the Proposed Project would potentially result in significant temporary impacts on SR 4, local streets, and circulation around the proposed station areas.	S	*TR-9.1 Develop and implement a Construction Phasing and Traffic Management Plan.* BART will ensure that a Construction Phasing and Traffic Management Plan is developed and implemented by the contractor. The plan shall define how traffic operations, including construction equipment and worker traffic, are managed and maintained during each phase of construction. The plan shall be developed in consultation with the cities of Pittsburg and Antioch, Contra Costa County, BART, Caltrans, CCTA, and local transit providers, including Tri Delta Transit. The contractor shall also consult with Caltrans and the highway patrol in the development of the plan in order to address any issues and minimize disruption to the flow of traffic along SR 4. This plan shall also be coordinated with plans to maintain access and parking for adjacent businesses and residences that may be affected. To the maximum practical extent, the plan shall include the following measures: a) Specify predetermined haul routes from staging areas to construction sites and disposal areas by agreement with the cities of Pittsburg and Antioch prior to construction. The routes shall follow streets and highways that provide the safest route and have the least possible impact on traffic. b) Identify construction activities that, due to concerns regarding traffic safety or congestion, must take place during off-peak hours.	LTS

Legend: (S) Significant (PS) Potentially Significant (LTS) Less Than significant (SU) Significant and Unavoidable

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
		c Provide a plan for lane closures along Railroad Avenue, Hillcrest Avenue, and SR 4, and require information be provided to the public on lane closures using signs, press releases, and other media tools. d dentify a telephone number that the public can call for information on construction scheduling, phasing, and duration, as well as for complaints. Such information shall also be posted on BART's website. e Provide safe access and circulation routes for vehicles, bicycles, pedestrians, and emergency response vehicles during construction of the Pittsburg/Bay Point Transfer Platform and the Railroad Avenue and Hillcrest Avenue Stations. f Provide parking replacement where construction results in temporary displacement of parking.	
TR . onstruction of the Proposed Pro ect would potentially result in significant impacts on Tri Delta Transit services around the proposed station areas.	S	*TR- 0 Plan schedule and coordinate construction activities to reduce effects on local transit bus lines* BART shall ensure that the onstruction Phasing and Traffic Management Plan, developed under Mitigation Measure TR . , includes consultation with Tri Delta Transit. The Plan shall include specific measures to minimi e possible detour and other impacts on Tri Delta Transit service resulting from Proposed Pro ect construction related activities. These measures shall limit, to the maximum extent possible, rerouting of bus routes and changes to bus stops. Any proposed changes to routes, service, and other operations shall be announced to the public using signs, press releases, on bus posters, and other media tools.	TS
TR . The orthside est, orthside ast, and Median Station ast options would substantially worsen operations at two intersections in the vicinity of the station compared to the Proposed Pro ect.	S	hile the impact at the Hillcrest Avenue/Sunset Drive intersection could be mitigated with implementation of Mitigation Measure TR –_._—to less than significant, no feasible mitigation has been identified for the Hillcrest Avenue/SR 4 astbound Ramps.	TS/SU
TR . f Slatten Ranch Road has not been completed in accordance with the Antioch eneral Plan by the time the Proposed Pro ect commences operation	S	As noted under mpact TR , no feasible mitigation has been identified for the SR 4 astbound Ramps/Hillcrest Avenue intersection.	SU

Legend: (S) Significant (PS) Potentially Significant (LTS) Less Than significant (SU) Significant and Unavoidable

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
H . peration of the Proposed Pro ect would increase the pollutant load of stormwaters that could affect water quality in local water bodies	PS	- *Implement stormwater management B Ps* BART shall ensure that its contractor implements stormwater BMPs in accordance with the PD S ndustrial eneral ~~ndustrial~~ Permit. As required by the permit, a S PPP shall be prepared in order to document and identify pollutants and describe BMPs to reduce stormwater pollution. Through the S PPP, the permit regulates stormwater discharges associated with equipment fueling, maintenance, and waste disposal. BMPs that could be included in the S PPP and implemented for the Proposed Pro ect include • strip retention system to treat runoff prior to discharge • oil/water separators to prevent contaminated stormwater from entering drainage system • construction of additional detention basins and/or use of pervious pavement in order to allow infiltration of stormwater into the soil where runoff could be filtered naturally and pollutants removed and • installation of rain barrels near the roofs at the median station and/or maintenance facilities.	TS
H . onstruction of the Proposed Pro ect would involve ground disturbing activities, which could result in soil erosion and siltation that could exacerbate and/or cause flooding.	PS	- *Develop and implement a S PPP outlining specific erosion and sediment B Ps* BART shall ensure that the contractor obtains an PD S permit and prepares a S PPP prior to construction. The S PPP shall identify specific erosion and sediment BMPs to be implemented during construction to control and minimi e erosion impacts. Measures that could be implemented include, but are not limited to • Use of erosion blankets and silt fences and sedimentation ponds to remove suspended fine material from runoff • Temporary and permanent seeding of disturbed areas and soil stockpiles • Stabili ation of construction area entrances and exits • Use of straw rolls, sediment fences, straw bales, and/or sediment traps to prevent sediment laden runoff from leaving the construction area • Use of temporary dikes to re direct or control runoff • onstruction scheduling, such as phasing and season avoidance, to minimi e erosion and sediment • Perimeter protection such as straw wattles or silt fences • heck dams to prevent gully erosion and/or slow runoff flow rates to allow sediment to settle out	TS

Legend: (S) Significant (PS) Potentially Significant (LTS) Less Than significant (SU) Significant and Unavoidable

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
		includes a Spill Prevention Plan outlining measures to control ha ardous materials storage. This plan would include, at a minimum, the following measures • Periodic inspection of ha ardous materials storage area to ensure containers are properly labeled, containers are securely covered, containers are stored on secondary containment, and each site is equipped with spill kits • mployee ha ardous materials training and awareness • Spill reporting procedure and • Storage of ha ardous materials at a considerable distance from the site of the tunnel.	
H . peration of the remote maintenance facility would substantially increase impervious acreage in the ast Antioch atershed, further increasing runoff to local storm drains.	PS	The following measures, in combination with Mitigation Measure H . , would reduce runoff impacts of the remote maintenance facility to less than significant. - *Prepare and implement drainage plan* BART shall ensure that the contractor prepares a hydraulic analysis and drainage plan for the Hillcrest Avenue Station option, for review by the ity of Antioch, ~~and~~ the D, and the D. The drainage plan shall include a drainage study hydrologic analysis for review by the D. The purpose of the drainage plan is to help control the additional surface water runoff expected from the pro ect in accordance with the PD S . provisions and input from the local agencies. BART will then ensure that the contractor implements the drainage plan to safely and efficiently convey stormwaters from the remote maintenance facility. - *2 Implement permanent vegetated swales at the remote maintenance facility* To minimi e storm and flood capacity impacts, BART shall ensure that its contractor diverts and controls stormwater runoff by using permanent swales. egetated swales would have multiple functions as they would allow infiltration of the stormwater runoff from parking areas and the rooftop of the maintenance facilities to the maximum extent practicable, reduce post construction storm flow rate, and contribute towards groundwater recharge. The vegetated swales shall be frequently monitored at least bi annually or as frequently as needed to maintain their effectiveness. requency and recommended monitoring activities are outlined below • nspect grass along side slopes for erosion and formation of rills or gullies and correct • Remove accumulated trash and debris	TS

Legend: (S) Significant (PS) Potentially Significant (LTS) Less Than significant (SU) Significant and Unavoidable

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
		• nspect and correct erosion problems in the sand/soil bed of dry swales • f original grass cover has not been successfully established, plant alternative grass species • Replant wetland species for wet swale if not sufficiently established • Remove sediment build up within the bottom of the swale once it has accumulated to percent of the original design volume and • Mow grass to maintain a height of 4 inches.	
~~H . The tracks associated with the proposed remote maintenance facility for the orthside ast and orthside est options would not encroach into a year floodplain.~~	~~PS~~	~~*0 Elevate structures above the flood one* The tracks shall be elevated above the flood elevation to minimi e flood ha ards.~~	~~TS~~
H . onstruction of the orthside ast Station option, and to a lesser degree the Median Station ast option, would involve extensive ground disturbing activities that could cause siltation into ast Antioch reek and the unnamed creek. Siltation could also affect the recreated wetland at the site of the remote maintenance facility and reduce the flood storage capacity	PS	mplementation of Mitigation Measures H . , H . , and H . would reduce erosion, siltation, and flooding construction impacts of the orthside ast Station and Median Station ast options to less than significant. Mitigation Measure H . proposes development and implementation of a S PPP outlining stormwater discharge BMPs, Mitigation Measure H . proposes development and implementation of a S PPP outlining measures to prevent and control ha ardous material releases during construction, and Mitigation Measure H . recommends the preparation and implementation of a drainage plan.	TS

Legend: (S) Significant (PS) Potentially Significant (LTS) Less Than significant (SU) Significant and Unavoidable

Table S-3
Summary of Significant and Potentially Significant Impacts and Mitigation Measures

Impacts	Impact Significance Without Mitigation	Mitigation Measures	Impact Significance With Mitigation
3.9 Biological Resources			
B . onstruction and operation of the Proposed Pro ect may result in the filling or adverse modification of urisdictional wetlands, other waters of the U.S., or waters of the State.	PS	*BI -2 a erify that final locations of train control huts do not affect wetlands waters of the S or waters of the State* Prior to approval of the final design and location of the train control huts, BART shall ensure that the huts would not be located on wetlands, waters of the U.S. and waters of the State. BART or its contractor shall retain a biologist qualified in wetland delineations to verify that the proposed sites do not have these features. f the biologist determines that a train hut location could directly or indirectly affect a wetland, water of the U.S., or water of the state, BART shall identify an alternative location that avoids affecting the resource. *BI -2 b Comply with permit re uirements of the S Army Corps of Engineers and or state agencies* f an alternative location is not feasible, BART shall ensure that the orps' Section 4 4 permit requirements or requirements of state agencies, as applicable, are followed, as described later in Mitigation Measure B . .	TS
B . onstruction and operation of the Proposed Pro ect would result in the loss of foraging habitat for the Swainson's hawk.	PS	BART would be required to comply with either Mitigation Measure B . *or* Mitigation Measure B . , which would effectively reduce potential impacts on foraging habitat to less than significant. *BI - Compensate for loss of Swainson s hawk foraging habitat*. BART shall ensure that an appropriate number of acres ~~as approved by D~~ of agricultural land, annual grasslands, or other suitable raptor foraging habitat are preserved off site within ontra osta, Sacramento and/or Solano counties ~~at a to . habitat lost to preserved~~ at a . or ratio. iven the proximity of the nest site to Sacramento and Solano counties, it is acceptable to have this off site preservation outside of ontra osta ounty. Preserve areas should be established prior to pro ect construction, if feasible, and may occur through at least one of the following options a Purchase of mitigation credits at an approved D mitigation bank that is within east ontra osta ounty, lower Sacramento ounty, or Solano ounty. The service area of the mitigation bank must include the pro ect corridor.	TS

Legend: (S) Significant (PS) Potentially Significant (LTS) Less Than significant (SU) Significant and Unavoidable

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Section 1
Introduction

define expectations, timelines, roles and responsibilities for key stages of the transit pro ect development process.

Meeting the corridor level housing thresholds requires that, within one half mile of all stations, a combination of existing land uses and planned land uses meets or exceeds the overall corridor threshold for housing. The corridor level thresholds, which are listed below, vary depending on the type of service proposed. MT considers the proposed DMU technology a type of commuter rail and, thus, requires an average of , housing units per station, including existing housing units near the current end station at Pittsburg/Bay Point, to meet the MT corridor level thresholds.

Proposed Project Attainment of MTC Resolution #3434 Ridership Targets. A review of the existing eneral Plans of Pittsburg and Antioch was performed to determine whether the existing and future number of housing units would satisfy the MT target of , housing units for commuter rail service. The one half mile radius was delineated around each station and the existing and future development for those traffic analysis ones falling within this radius was totaled. Table shows the development within one half mile of the proposed Railroad Avenue and Hillcrest Avenue Stations by , as well as the existing Pittsburg/Bay Point BART Station. According to the eneral Plan and Ridership Development Plan pro ections, the average number of housing units near the proposed stations would exceed MT 's target of an average of , units per station. The Ridership Development Plans direct additional development around the proposed stations and would increase the average number of dwelling units within one half mile of the Pittsburg/Bay Point, Railroad Avenue, and Hillcrest Avenue stations from , to ,4 .

~~**Table 1-1**~~
~~**Comparison of MTC Resolution #3434 Targets with Proposed Project Station Area Development**~~

~~Station~~	~~Housing Units in 2030[a]~~	
~~MT Target~~	~~,~~	
~~Pittsburg/Bay Point[b]~~	~~,~~	
~~Railroad Avenue[c]~~	~~4,~~	~~Per Station Average ,~~
~~Hillcrest Avenue[c]~~	~~,4~~	

~~*Source: Pittsburg eneral Plan, Antioch eneral Plan, TA, and ehr Peers Associates.*~~

~~*otes:*~~

~~a. Housing units within one-half mile of station sites; however, housing units do not include Ridership Development Plan.~~

~~b. Pittsburg/Bay Point BART Station Area Specific Plan inal R, December , identifies , housing units at buildout.~~

~~c. These figures are derived from the TA traffic model. Data were based on the adopted eneral Plan and compiled for applicable Traffic Analysis ones, which included those within one-half mile of a station.~~

Table 1-1
Comparison of MTC Resolution #3434 Targets with Proposed Project Station Area Development[a]

Station	Housing Units in 2030 without RDP	Housing Units in 2030 with RDP
MT Target	,	,
Pittsburg/Bay Point[b]	,	,4
Railroad Avenue	4, [c]	,44
Hillcrest Avenue	, [c]	,
Per Station Average	**2,920**	**3,433**

Source ity of Pittsburg, *Pittsburg Bay Point BART Station Area Specific Plan Final EIR* December , ity of Pittsburg, *Railroad Avenue Station Area Specific Plan Draft EIR* ebruary , ity of Antioch, *illcrest Station Area Specific Plan anuary 200*

otes

a. Housing units within one half mile of station sites.

b. Pittsburg/Bay Point BART Station Area Specific Plan inal R, December , identifies , housing units at buildout. The Pittsburg/Bay Point Specific Plan, , contains updated info , existing and , planned housing units for a total of ,4 .

c. These figures are derived from the TA traffic model. Data were based on the adopted eneral Plan and compiled for applicable Traffic Analysis ones, which included those within one half mile of a station. or the Railroad Avenue Station area, the estimate of future housing units was based on maximum allowable eneral Plan land use densities. However, the estimate of future housing units with the RDP was based on the mid point of the density ranges for the proposed residential land uses. This change in methodology explains why the housing units in the Railroad Avenue Station area appear to be less with the RDP.

Ridership Development Plans. As provided by BART's System xpansion Policy, in determining whether to adopt a system expansion pro ect and where to locate new stations, BART shall consider whether RDPs developed for each station can collectively demonstrate that the pro ect will achieve a threshold ridership level along with meeting the goals of the System xpansion Policy, unless the corridorwide ridership threshold is met under existing conditions. f that is not the case, s~~S~~trategies for boosting ridership include planning and implementation of transit supportive land uses, improvements in local transportation programs and infrastructure, increases in transit feeder services and development of additional auto serving parking facilities including parking in the station area. The cities along the proposed extension must collectively demonstrate that the ridership threshold for the pro ect can be achieved. hether an individual station achieves its share of the corridorwide threshold by land use changes or access improvements or some combination of the two is at the full discretion of the local urisdiction as long as the corridorwide ridership threshold is achieved.

hen the BART Board of Directors decides whether to adopt the Proposed Pro ect, the Board will evaluate whether the Proposed Pro ect is consistent with the System xpansion Policy and whether the proposed new stations can collectively meet the corridorwide ridership threshold of , daily riders entries and exits established by BART. As part of the ridership evaluation, the Board will consider the pro ect's expected ridership under existing land use plans and policies, as well as increased ridership that is anticipated from the cities' respective RDPs.

BART and the cities originally anticipated that the RDPs would be completed prior to the certification of the inal R and adoption of the Proposed Pro ect by the BART Board of Directors. As a result of unforeseen delays, the ity of Pittsburg did not complete the process of Specific Plan adoption in time for the scheduled consideration of the Proposed Pro ect by the BART Board. n addition, as of the publication of this document, it is anticipated, but not certain, that the ity of Antioch will have taken final action enabling the BART Board to rely on the adoption of the Specific Plan.

onstruction of the Proposed Pro ect would need to correspond with construction of the altrans SR 4 widening pro ect see pages 4 to 4 of the Draft R therefore, it would not be feasible to delay the Proposed Pro ect. However, the S P ridership threshold for the Proposed Pro ect would be met by expected growth consistent with current land use plans for the two station areas, without taking into account any additional growth that would be allowed under the RDPs, as demonstrated by the results shown in Tables and . . Accordingly, it is not necessary for the Specific Plans to be finali ed in order for BART to find that the S P goals are met. evertheless, BART anticipates further increases in ridership, beyond those under currently existing land use plans, attributable to implementation of the Specific Plans.

Proposed Project Attainment of BART System Expansion Policy Ridership Targets. The planning process in the cities is led by city staff, with cooperation and assistance from BART. The RDP is obligated to address three component areas and Use, Access, and Station Plans. n satisfaction of the RDP requirement, the cities of Pittsburg and Antioch prepared ~~are~~

~~completing~~ Specific Plans around the station locations. These plans are described in greater detail in Section . , and Use, which evaluates the land use effects of the Proposed Pro ect.

uture ridership is presented in detail in Section . , Transportation, and shows that the Proposed Pro ect satisfies BART's corridor wide ridership for DMU. Table compares BART's ridership targets with the pro ected ridership of the Proposed Pro ect. The pro ected weekday ridership of , for the pro ect corridor would satisfy the BART System xpansion Policy target.

Table 1-2
Comparison of BART System Expansion Policy Ridership Target with Proposed Project Ridership Forecasts (weekday entries and exits in 2030)

System Expansion Policy Target	**5,801**
Proposed Project Ridership[a]	
Railroad Avenue	,
Hillcrest Avenue	,
Total Corridor Ridership	**10,100**

Source Arup for the Ridership Target, ilbur Smith Associates for Proposed Pro ect ridership, .

ote

a ~~These ridership figures include the Ridership Development Plans~~ These ridership figures are based on ABA Pro ections and current land use plan assumptions for the two station areas, without taking into account additional growth allowed under Ridership Development Plans.

Supporting Technical Studies

Studies prepared in support of this R include the following reports that are included by reference as part of this R

- Archaeological/Historical onsultants, Archaeological Survey Report ast ontra osta BART xtension Pro ect, September .
- Archaeological/Historical onsultants, Historical Resources valuation Report San Pablo Tulare Railroad/ entral Pacific Railroad, ebruary .
- Bay Area conomics, eBART Pro ect Direct, ndirect, and nduced mployment rowth Technical Report, September .
- RM est, eBART Pro ect R Air uality Technical Report, August .
- RM est, eBART Pro ect R oise Technical Report, August .
- RM est, eBART Pro ect R Records Search for Ha ardous Sites in the Pro ect orridor, August .
- T ngineering Services, ilbur Smith Associates, P H ong ngineering nc., eBART Phase Pro ect to Hillcrest Terminal DMU and R omparison, August .
- PBS , eBART Pro ect R Biological Resources Technical Report, August .
- ilbur Smith Associates, eBART Pro ect R Transportation Technical Report, .
- R , ast ontra osta BART xtension eBART , Hydrology Report, March .

Related Projects

The development of the Proposed Pro ect has been coordinated with the development of two other key pro ects under the urisdiction of other public agencies the Ridership Development Plans by the cities of Pittsburg and Antioch and the altrans SR 4 ast idening Pro ect. ach of these pro ects is prominent in the cumulative analyses, presented in Section , nvironmental Analysis, of this report. Because of their importance, they are introduced and described here, but more detailed information can be found in Section . , ntroduction to nvironmental Analysis.

Ridership Development Plans

The cities of Pittsburg and Antioch, along with TA and Tri Delta Transit, have entered into a Memorandum of Understanding with BART that commits them to a process intended to help attain the corridorwide ridership target established by the BART System xpansion Policy see

earlier discussion in Section .4, Transit System xtensions in the Bay Area . f the corridorwide ridership threshold is not already pro ected to be met under existing land use plans and policies, tThe target is to be achieved by adopting transit supportive land use plans and/or making access improvements at the proposed stations. These land use plans and access improvements, to be prepared and approved by the local urisdiction, are presented in a RDP for each station. Ridership Development Plans incorporating land use changes and/or access improvements ~~are being~~ have been prepared by the cities of Pittsburg and Antioch in the form of Specific Plans. The development and access improvements proposed by the RDPs are not part of the Proposed Pro ect and will be sub ect to separate A evaluation, but are considered together with the Proposed Pro ect for purposes of evaluating cumulative impacts. At the time of the Draft R publication, preliminary land use and development assumptions were made for each city's RDP. Those assumptions regarding future development in the eBART station areas are consistent with the land use and development programs that are contained in the ity of Pittsburg's Draft Railroad Avenue Station Area Specific Plan ebruary and the ity of Antioch's Draft Hillcrest Station Area Specific Plan anuary . Under BART's System xpansion Policy, these RDPs must be prepared by the local urisdictions in order to support BART's approval of the Proposed Pro ect. ~~approved by the local urisdictions before BART can approve the Proposed Pro ect.~~

State Route 4 Widening Project

SR 4 was originally constructed in the late s and early s as an east west connector between the San rancisco Bay Area and the entral alley. SR 4 is the primary east west transportation corridor in ontra osta ounty and the only highway connection between central and eastern ontra osta ounty. umerous studies have been prepared which document the need to widen SR 4 from four to eight lanes including an H lane and three mixed flow lanes in each direction . These road widening pro ects have often accommodated the development of a future extension of BART east of SR 4 as far as Hillcrest Avenue in Antioch. The altrans Route oncept Report for SR 4 recommended road widening and increased transit access and in ovember ounty voters endorsed these actions with the approval of Measure .

The SR 4 widening pro ect has been divided into segments for planning, design, and construction. The widening pro ect has been completed between Bailey Road and Railroad Avenue. The remaining segments, between Railroad Avenue and SR , are programmed and funded. n , the ederal Highway Administration H A , altrans, and TA adopted a egative Declaration and inding of o Significant mpact S for the SR 4 ast idening Pro ect from overidge Road to SR . At that time, H A, altrans, and TA anticipated that the future transit alignment would exit SR 4 east of overidge Road and continue eastward on the UP Mococo ine, as proposed in the SR 4 ast orridor Transit Study. However, use of the UP Mococo ine is no longer considered a viable option for the Proposed Pro ect. Accordingly, the SR 4 ast idening Pro ect has been modified to further widen the highway segment from overidge Road to east of Hillcrest Avenue in order to provide additional median width to accommodate future transit service. Basic elements of the SR 4 ast idening Pro ect intended to accommodate a future transit pro ect include

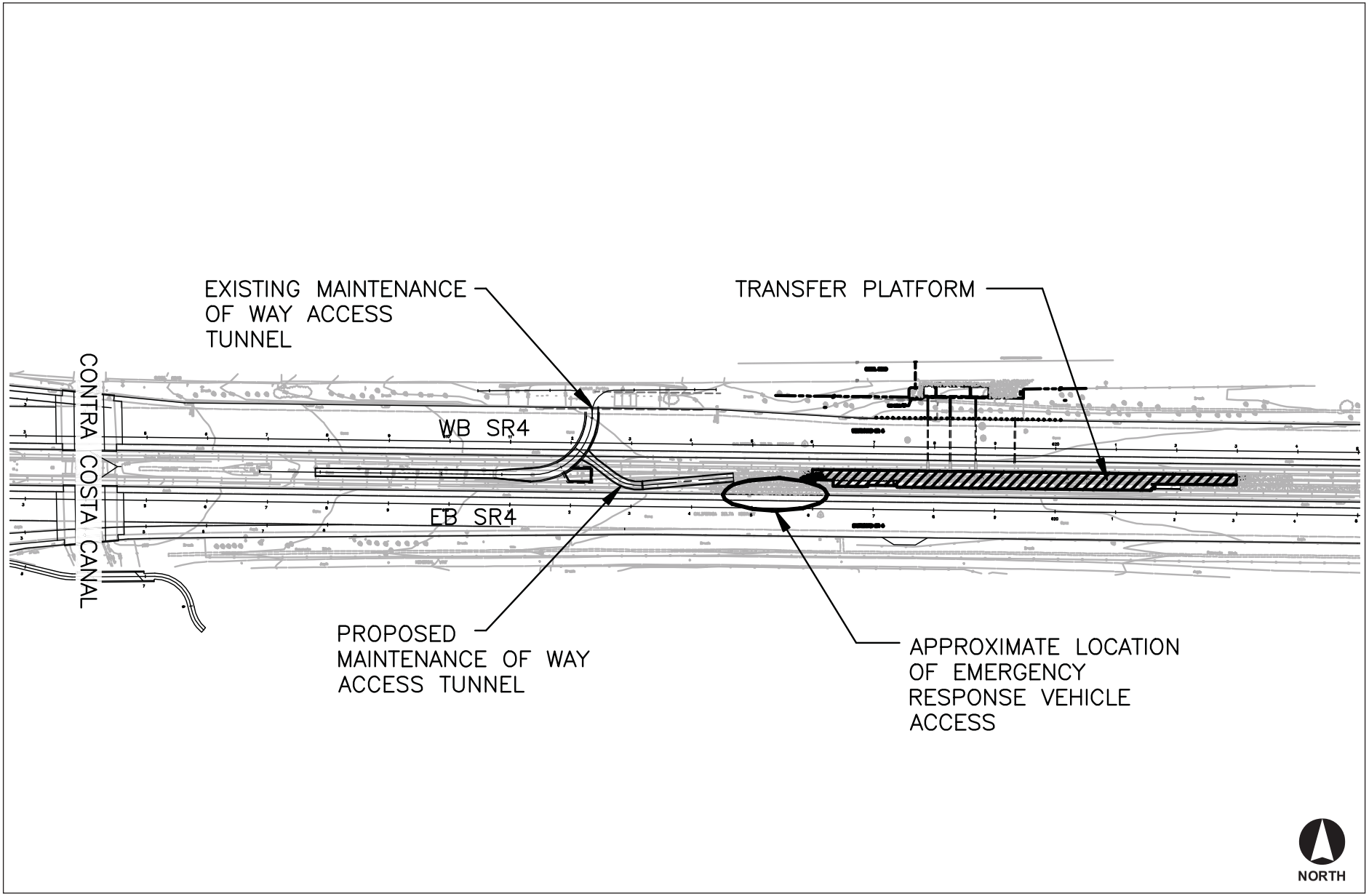
widening the median and construction of retaining walls, median subgrade, median ~~drainage~~ inlets that will drain to existing or proposed crossings, and median barriers. These elements are not specific to the Proposed Pro ect and would accommodate any alternative evaluated in this R or any other transit pro ect in the SR 4 median. Because these elements were not anticipated to be needed east of overidge Road at the time of H A, altrans, and TA prepared the egative Declaration/ S for the SR 4 widening pro ect, the agencies have prepared a revalidation of the egative Declaration/ S to

Table 1-3
Agencies with Permit and/or Approval Authority Over Proposed Project

Agency	Statutory Authority	Permit or Approval Jurisdiction, Actions Covered	Documentation or Prior Approvals Required
Local			
BART	A	ead agency for R approval of pro ect and expenditure of funds	ertification of R and approval of indings and Statement of verriding onsiderations
ity of Antioch	ncroachment Permit	Possible encroachment permit for construction within ity owned right of way	Proposed Pro ect plans
ity of Pittsburg	ncroachment permit	Possible encroachment permit for construction within ity owned right of way	Proposed Pro ect plans
ontra osta Transportation Authority	A	Review pro ect for conformance with TA's transportation plans, approval of expenditure of Measure funds and co sponsor of RM funds.	Review of this R
ontra osta ounty lood ontrol ater District	A	Review pro ect for conformance with D requirements	Proposed Pro ect plans, including hydraulic design
ast Bay Municipal Utility District	Property wner	Right of entry	Proposed Pro ect plans
Tri Delta Transit	A	Review pro ect for conformance with Tri Delta's transit plans	Review of this R

Source PBS , .

Section 2
Project Description



Source: PGH Wong, BART, PBS&J, 2009.

EMERGENCY VEHICLE ACCESS
FIGURE 2-3A

Access. Access to the DMU station platform would be from the sidewalks on the west and east sides of the Railroad Avenue overpass, where one stairway and one elevator on each side of the overpass would descend to the DMU platform below. ~~A pedestrian bridge from the east end of the station platform to the south side of the freeway over the eastbound lanes of SR 4 is also being planned, although it may not be constructed as part of the initial construction.~~

Vehicle Access and Parking. The existing Park and Ride ot at Railroad Avenue has spaces located on the south side of SR 4, between SR 4 and Bliss Avenue, approximately , feet east of Railroad Avenue see igure . urrently, the lot is not fully utili ed however, in the year of opening, the lot would be reconfigured to provide spaces. o additional parking lots would be provided as part of the Proposed Pro ect.

Station Area Development. The ity of Pittsburg has prepared the Railroad Avenue Specific Plan for the area within a one half mile radius of the proposed DMU station site. The purpose of the plan is to guide future development in the area. Although not a part of the Proposed Pro ect, transit oriented development is being proposed by the ity of Pittsburg as part of the Railroad Avenue Specific Plan. The Railroad Avenue Specific Plan fulfills the requirement for a Ridership Development Plan in accordance with BART's System xpansion Policy, which is discussed in greater detail in Section . , and Use, of this Draft R.

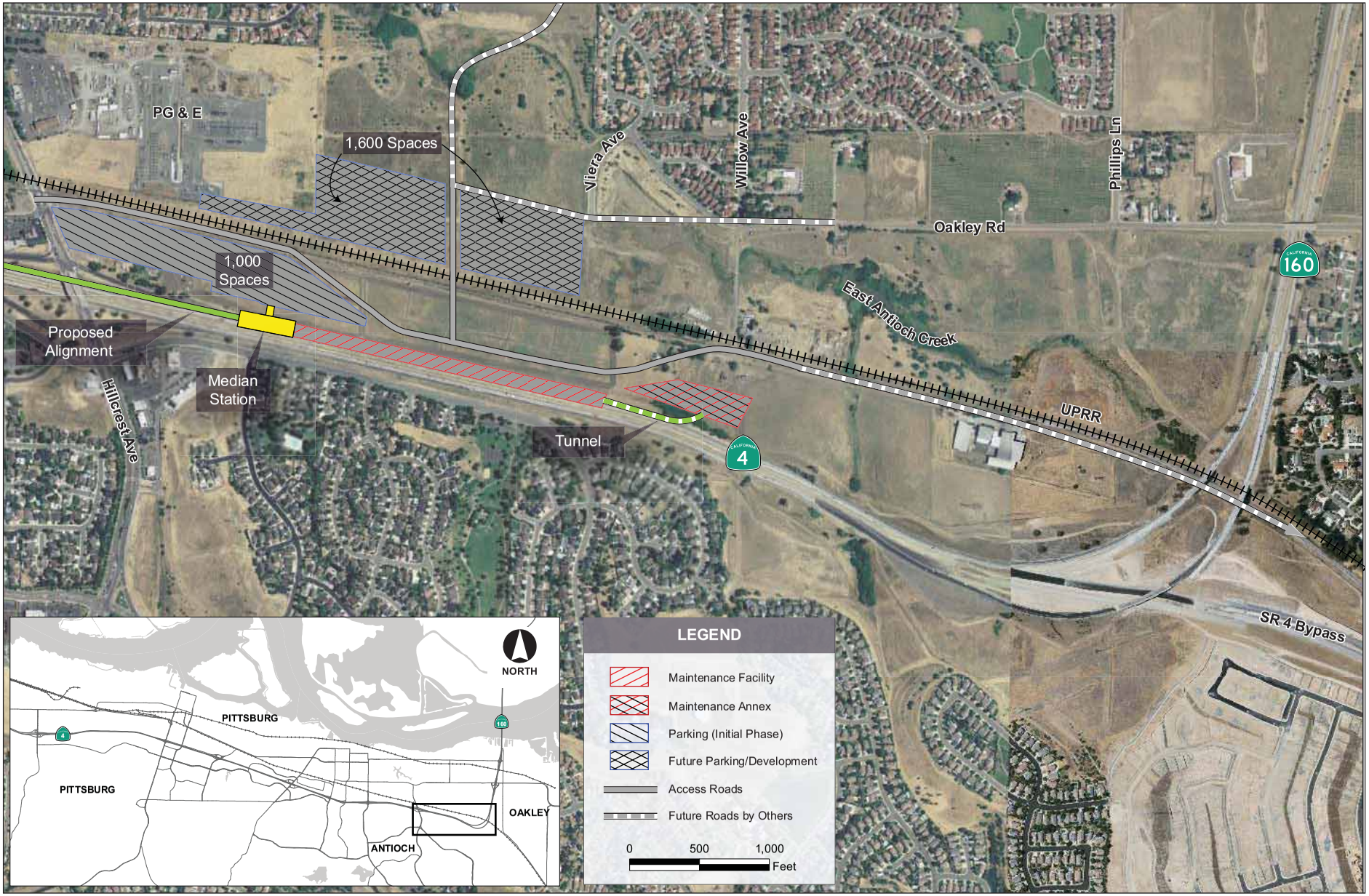
The ity of Pittsburg envisions a transit village south of SR 4 and east of Railroad Avenue. The transit village would include a mix of residential and commercial uses with development focused around the Railroad Avenue Station. At some point in the future, once future development provides sufficient replacement parking in the pro ect area, the space existing BART park and ride lot would be integrated with the planned transit village. The paving and site amenities at the existing Bliss Avenue BART Park and Ride ot likely would be removed, and the site redeveloped as part of the future transit village. Access would continue to be by means of pedestrian walkways to access the DMU station stairways and elevators at the center of the overpass.

Ancillary Facilities. The Railroad Avenue Station would include a train control room. The train control room would be located either at the Railroad Avenue Station or east of the platform in the median. The train control room would be approximately square feet in si e.

Hillcrest Avenue Median Station

Location. The Proposed Pro ect includes a DMU station in the median of SR 4, , feet . 4 miles east of the intersection of Hillcrest Avenue and SR 4 in the ity of Antioch, and this station would be the terminus for the Proposed Pro ect see igure .

There are three station location options for the Hillcrest Avenue Station in addition to the Median Station a station north of SR 4, approximately , feet . miles east of Hillcrest



Source: PGH Wong, 2008; PBS&J 2008.

HILLCREST AVENUE MEDIAN STATION AREA AND CONCEPTUAL STATION PLAN

FIGURE 2-8

Avenue (Northside West Station); a station north of SR 4, approximately 6,800 feet (1.29 miles) east of Hillcrest Avenue (Northside East Station); and a station in the median of SR 4, approximately 2,175 feet (0.38 miles) east of Hillcrest Avenue (Median Station East). These three station location options also are evaluated in this Draft EIR.

Facilities/Design. The DMU platform for a maximum three-car train is a concrete structure 410 feet long, 27 feet wide, and approximately 2 feet high. The platform would have power and communication utilities (public address system and closed circuit television). It would also contain benches, windscreens, signage, trash receptacles, lighting, canopies, and cabinets for maps and schedules.

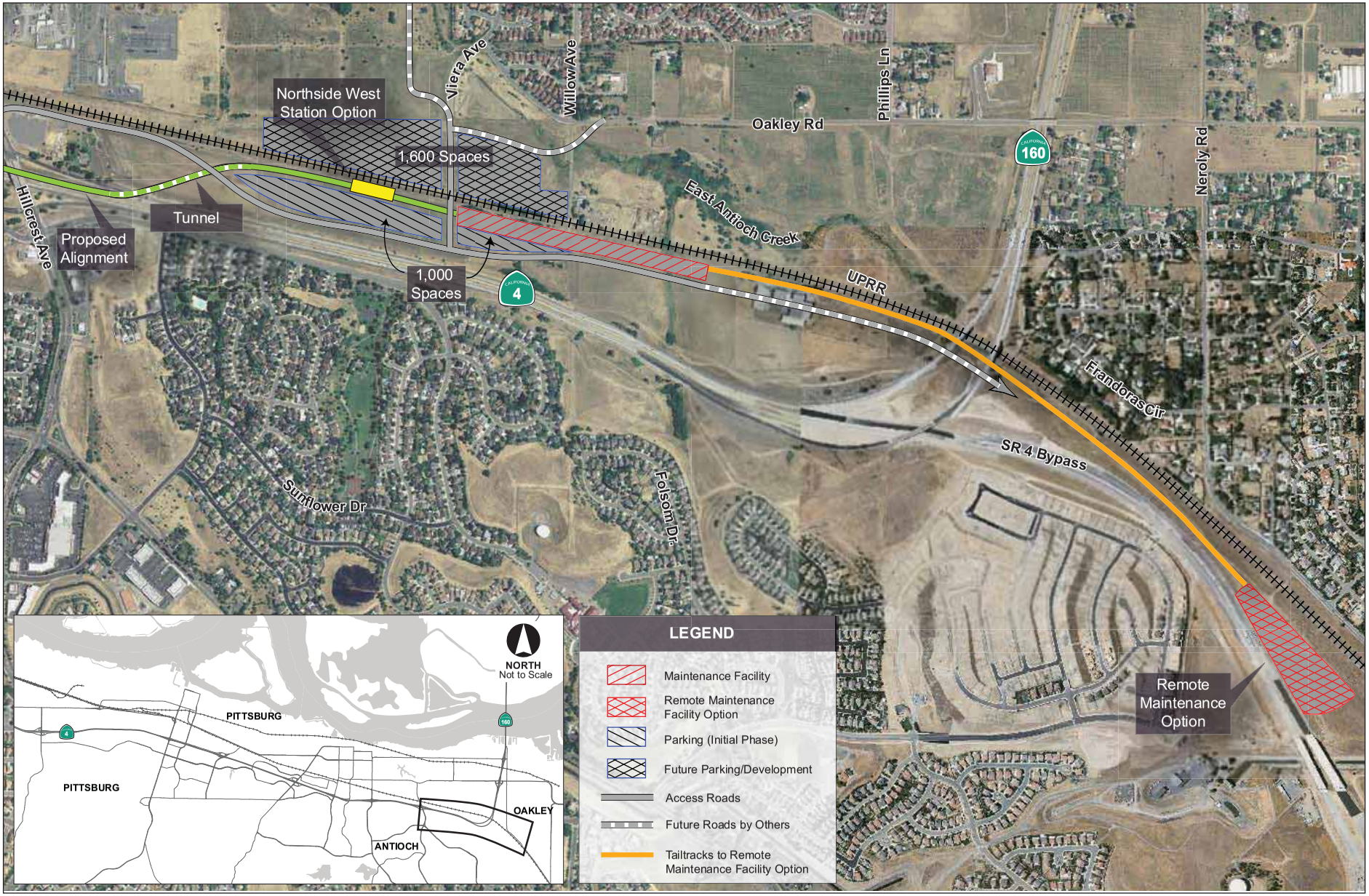
Vehicle Access and Parking. An approximately 40-acre parking area for 2,600 parking spaces is planned on the north side of SR 4. Construction of the parking would take place incrementally; approximately 1,000 spaces (including 20 ADA spaces) on approximately 20 acres would be constructed as part of the initial phase (by the year 2015) and the remainder by 2030 (see Figure 2-8). The parking area is located in the northeast quadrant of the SR 4/Hillcrest Avenue interchange, near the current BART park-and-ride lot. The Proposed Project would provide access to the Hillcrest Avenue Station from the intersection of Hillcrest Avenue and Sunset Drive. Sunset Drive is currently a dedicated road from that intersection to the existing park-and-ride lot. The existing roadway would be improved to accommodate the initial 1,000-space parking area and provide enhanced bus, bicycle, and pedestrian access to the parking lot and station. From the new parking area, a road may extend far enough to the east to serve the maintenance annex, but would not extend beyond that. Additional access road extensions would be made in the future, as necessary, to provide access to the additional 1,600 parking space north of the UPRR, if the City's anticipated road network is not realized by the time additional parking is required.

The City's Specific Plan envisions the integration of the future surface parking lots with future development by satisfying parking demand through structured parking rather than surface lots. ~~The future surface parking lots may be integrated with future development envisioned by the City's Ridership Development Plan, or satisfied on the site designated for parking provided during the year of opening through structural parking rather than surface lots.~~ Antioch has agreed to work with BART and others to secure funding for Hillcrest Station-related parking and access. ~~As part of the Proposed Project,~~ The City of Antioch has planned access improvements that include an extension of Slatten Ranch Road from Hillcrest Avenue to Lone Tree Way and an extension of Viera Avenue to connect with Slatten Ranch Road. ~~would be constructed to provide access to the parking lot~~. ~~Slatten Ranch Road would extend east only far enough to serve the DMU station and maintenance area but is not planned to extend further as part of the Proposed Project.~~ Construction of the station and station access would not preclude the future construction of Slatten Ranch Road as outlined in the City's plan, and Slatten Ranch Road could be constructed economically as part of the project, if additional funding by others

was made available. The construction of Slatten Ranch Road is considered in this document in order to analyze the worse case scenario.

Platform Access. Patron access to the Median Station platform would be via an entrance structure from the parking area adjacent to the north side of SR 4. The pedestrian concourse linking the parking area and station platform would be elevated over the westbound traffic lanes of SR 4 (see Figure 2-9). The pedestrian concourse would include elevators and stairways at each end of the pedestrian overpass.

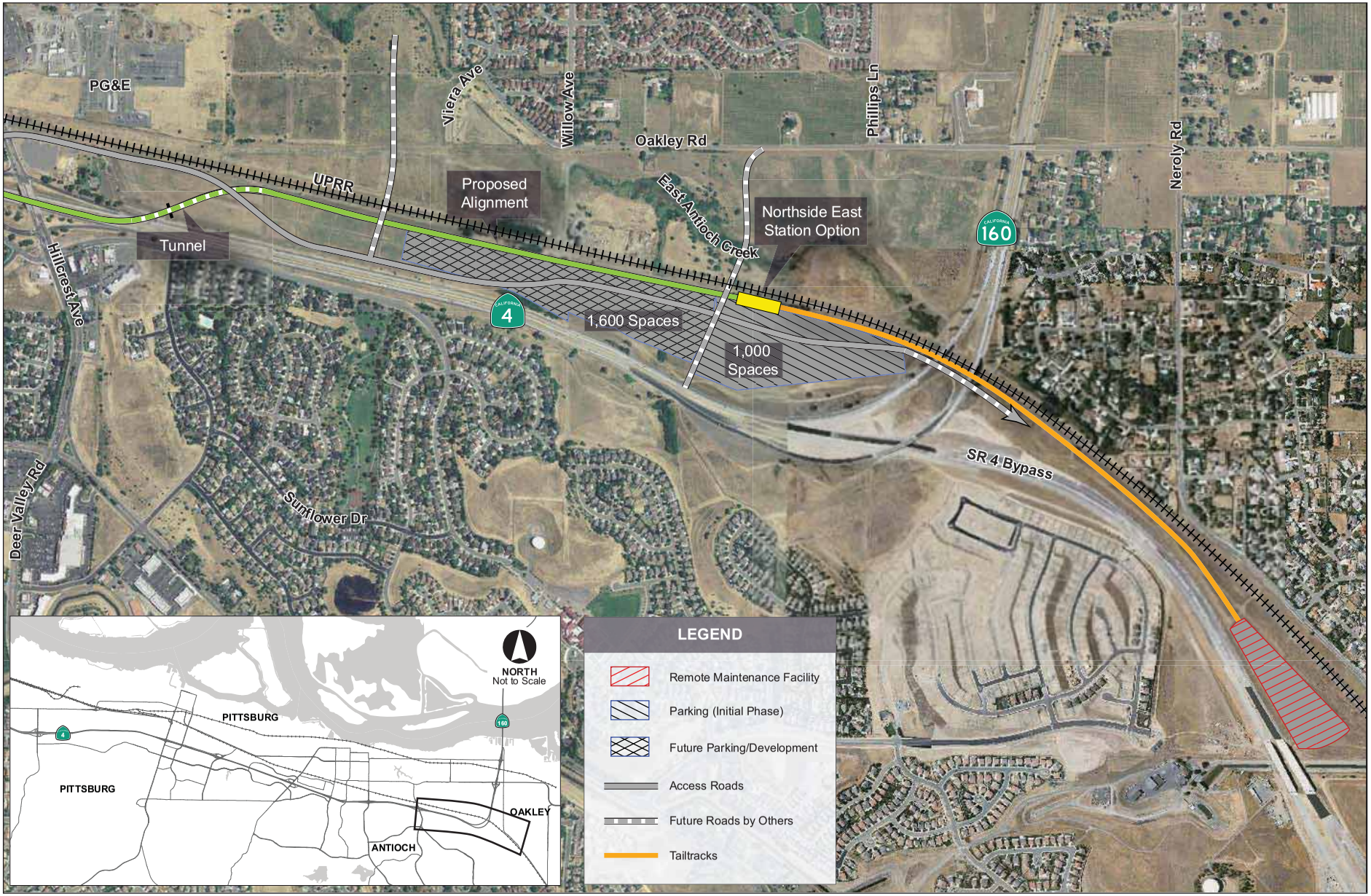
Station Area Development. The City of Antioch is anticipating development of the Hillcrest Avenue Station area and is preparing a specific plan for approximately 375 acres of undeveloped land immediately north of SR 4 and on both sides of the Union Pacific Railroad right-of-way (UP ROW), which parallels SR 4 approximately 450 feet to the north. The undeveloped area would be transformed into a mid- to higher-intensity mix of residential, commercial, and public uses. Like the Railroad Avenue Specific Plan in Pittsburg, the Hillcrest Station Area Specific Plan in Antioch will fulfill the BART System Expansion Policy requirement for local jurisdictions to prepare transit-oriented development plans and access improvements to enhance system ridership. The Hillcrest Station Area Specific Plan is discussed in further detail in Section 3.3, Land Use.



Source: PGH Wong, 2008; PBS&J 2008.

NORTHSIDE WEST STATION OPTION AREA AND CONCEPTUAL STATION PLAN

FIGURE 2-11



Source: PGH Wong, 2008.

NORTHSIDE EAST STATION OPTION AREA AND CONCEPTUAL STATION PLAN
FIGURE 2-13

Facilities/Design. The platform would be similar to the platform proposed for the Median Station and would have power and communication utilities (public address system and closed circuit television). It would also contain benches, windscreens, signage, trash receptacles, lighting, canopies, and cabinets for maps and schedules. Similar to the Proposed Project, the Median Station East option would provide for a pedestrian overcrossing of SR 4 to connect the station platform with the parking areas north of SR 4.

Vehicle Access and Parking. Vehicular access to the Median Station East and its parking areas would be via the extension of Slatten Ranch Road. Approximately 1,000 parking spaces would be arrayed on either side of the pedestrian overcrossing, between SR 4 and the extension of Slatten Ranch Road. Future surface parking, approximately 1,600 spaces, would occupy additional acreage north of the UP ROW as shown in Figure 2-14, although this area is proposed for development by the Ridership Development Plan and would not be needed for surface parking if future parking needs could fully or partially be satisfied in the future development or in structured parking on the area shown in Figure 2-14 as Parking (Initial Phase).

Ancillary Facilities. Unlike the Proposed Project, the Median Station East option would have all of its maintenance activities and functions performed at a yard north of SR 4, adjacent to the UP ROW. A maintenance tunnel under westbound SR 4 would connect the Median Station East with the maintenance facility. The maintenance facility, which would be approximately 7 acres and house the same structures, equipment, and activities as the earlier described maintenance yards and shops, would generally be sited in the vicinity of the Northside East Station platform, as shown in Figure 2-14.

Future Phased Option

The Phased Option would allow the construction of the Median Station, which is largely funded, followed by the eventual construction of the Northside East Station, at such time as the additional funding is available for that station. In this scenario, the future eBART station in the vicinity of the Northside East Station option would be developer funded. The distance between the two stations allows the tracks to be extended from the Median Station to the location of the Northside East platform. The Median Station could continue to operate and would provide service to the park-and-ride passengers using the parking areas near the median station, as well as any transit-related development in the area. The Northside East Station would provide service for the new mixed-use development and TOD areas located around it. Maintenance facilities associated with the Median Station would be abandoned and would be replaced by facilities at the remote maintenance facility east of SR 160. This option would preserve the land use opportunities represented by an out-of median station location for a time when those opportunities could be realized.

machines on the platform. Access to the vehicles would be unimpeded by platform pay gates or on-train fare collection.

Interface with Existing Transit Services. Tri Delta Transit would provide local transit connections to the DMU stations. These connections would require a reconfiguration of the existing Tri Delta Transit route system. The changes to the system would involve the elimination of routes that would duplicate the proposed service and initiation of new bus service to the DMU stations, as well as other improvements to local bus transit services. Figure 2-14A provides an overview of the proposed service plan. This plan was developed in coordination with Tri Delta Transit.

Bus routes that currently run along SR 4 from the Pittsburg/Bay Point BART Station to the Antioch/Hillcrest park-and-ride lot would be targeted for replacement by the DMU service. These include Tri Delta Transit Routes 200, 300, 391, and 393. The elimination of these routes would allow for a restructuring of Tri Delta Transit services that would involve the creation of new routes and the modification of existing routes. Some of these routes would be truncated at the Hillcrest Avenue Station and adjusted to provide improved coverage to the more easterly portions of the County. For example, Route 300 would terminate at the Hillcrest Avenue Station and would be modified to provide commute period express service via the SR 4 Bypass and Balfour Road to Downtown Brentwood. A number of new shared use park-and-ride facilities are proposed to be developed by Tri Delta Transit in coordination with the property owners. These include facilities along the SR 4 Bypass at Laurel Road and Lone Tree Way and in Byron, Brentwood, and Oakley. These facilities would involve shared use of existing retail commercial parking and would not involve new construction.

Feeder bus service to Pittsburg/Bay Point BART Station would not be significantly changed; however, many of these routes would be shortened and modified to provide service to the Railroad Avenue Station also. ~~and the proposed stations at~~ Service to the Railroad Avenue Station would be provided by Routes 387, 380B, 388C, 380A, 310. ~~and~~ Service to the Hillcrest Avenue Station would include the following Tri Delta Transit Routes 388A, 388B, 380A, 391A, 391B, 300, 395, 386, and the D 1 2. ~~201, 380, 383, 384, 385, 387, 388, 389, 390, 392, and 394.~~

There is an existing Amtrak California Station in Downtown Antioch which is about three miles from the proposed Hillcrest Avenue Station. The Antioch Amtrak Station connects rail passenger service from Oakland to the Stockton area, north to Sacramento, and south to all the major cities in the San oaquin Valley, Los Angeles, and on to San Diego. In order to provide a connection to Downtown Antioch and the Antioch Amtrak Station, Route 388 would be modified into two routes, one of which would become Route 388A. Route 388A would provide direct service to the Downtown and the Amtrak Station.

Many of the existing routes would be broken into shorter routes with one or more connections to the BART or DMU stations. This would allow increased local transit service

coverage and improved schedule reliability. In particular, there would be better coverage in Oakley, the southeastern portion of Antioch, Brentwood, and Bryon/Discovery Bay.

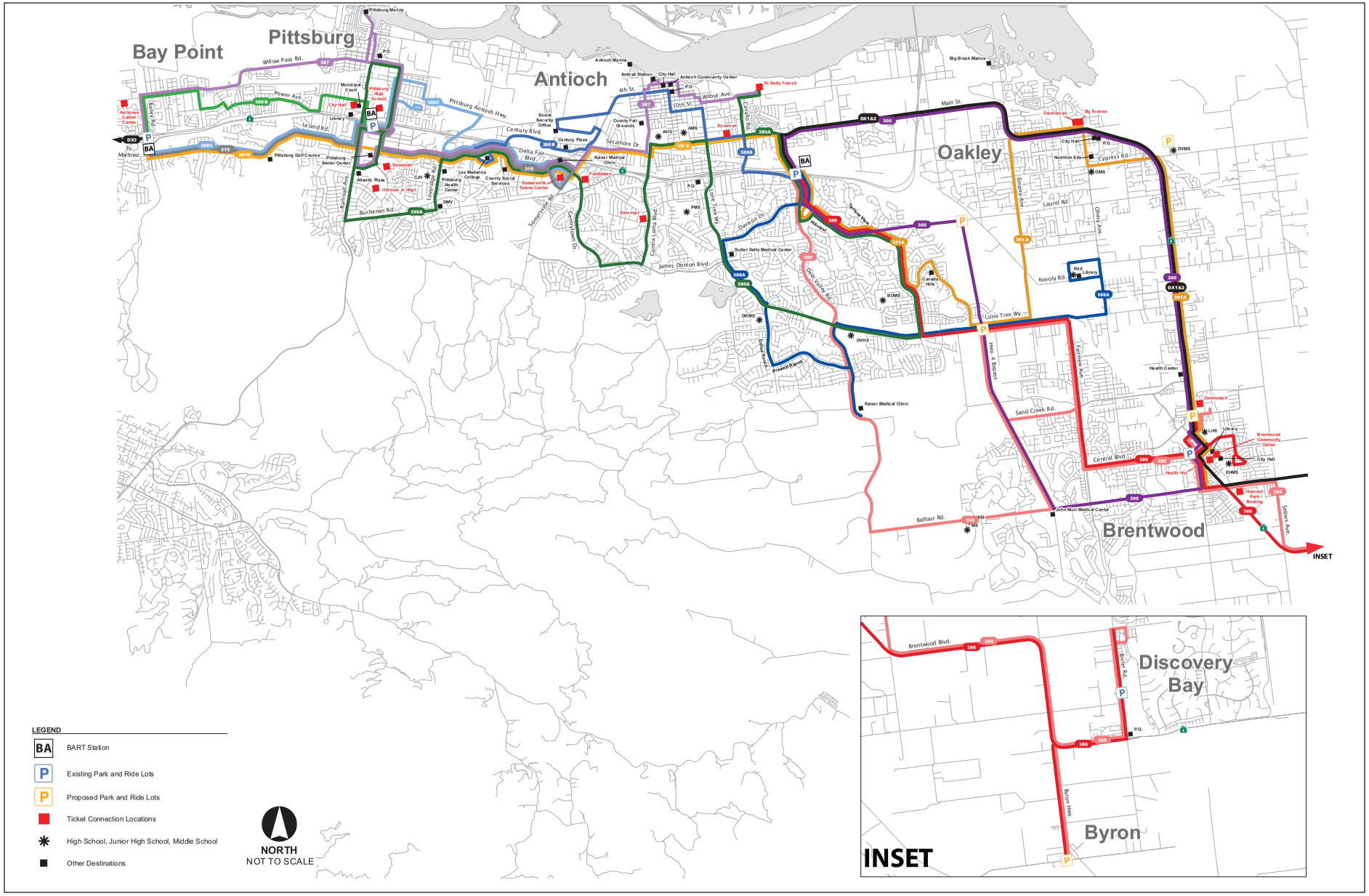
Project Timing and Schedule. The Proposed Project is expected to begin construction in 2009. Construction would continue in phases until 2015. The first year of eBART operation is expected to be 2015. However, construction of the Proposed Project is predicated on Caltrans widening the median of SR 4 to a point east of Hillcrest Avenue. Any delay in the highway widening will also delay completion of the Proposed Project.

2.7 PROJECT COSTS AND FUNDING

The estimated costs of the Proposed Project and station options are summarized below. Cost estimates were based on the Preliminary Engineering for the Proposed Project. These estimates are presented in 2009 dollars.

Capital Costs

Proposed Project. The total estimated capital cost for the Proposed Project is approximately 479~~86~~ million (2009 dollars). Escalated to the midpoint of construction, the cost to construct would be 502~~9~~ million. The estimated capital costs of the Proposed Project are summarized in Table 2-3. The table groups the costs into several categories Environmental Review and Preliminary Engineering, Project Components, Project Contingency, and Caltrans/CCTA costs to accommodate eBART in the median.



Source: WSA, 2009.

PROPOSED TRI DELTA TRANSIT SYSTEM MODIFICATIONS

FIGURE 2-14A

Table 2-3
Proposed Project – Estimated Capital Costs (2009 Dollars)[a]

Line Item Description	DMU Project Cost ($Million)	Project Components Funded by Others[b]	
		Component	Cost ($Millions)
Preliminary Engineering and Environmental Review	26	--	--
Project Components		--	--
Transfer Platform	~~37~~ 36	--	--
Railroad Avenue Station	--	Station	22
Hillcrest Avenue Station (median)	~~24~~ 23	~~Parking/Access~~	~~24~~
Hillcrest Parking Lot and Access	14	--	--
uideway Systems	~~152~~ 147	--	--
Aerial Structures	~~27~~ 26	--	--
Vehicles (8)	65	--	--
S btota	~~305~~ 311		
Subtotal	**~~$331~~ $337**		
Project Contingency	~~30~~ 17		
Project Subtotal	**~~$361~~ 354**		
Caltrans/CCTA Additional Cost to Accommodate eBART in Median[c]	125		
TOTAL PROJECT COST[d]	**~~$486~~ $479**		

So rce BART, 200~~8~~9.

otes

a. Estimates based on preliminary engineering.

b. ~~Pittsburg has agreed to fund the Railroad Avenue Station. Antioch has agreed to work with BART and others to secure funding for Hillcrest Station-related parking and access.~~ Pittsburg has agreed to fund design and construction of the Railroad Avenue Station. Negotiations for a funding agreement are underway.

c. Cost for widened median and construction of median barrier.

d. When costs are escalated to the midpoint of construction, project cost would escalate to an estimated 502~~9~~ million.

Operating and Maintenance Costs

Proposed Project. Annual operating costs for the DMU system are estimated to be 8.3 million (2009 dollars). The operating and maintenance costs are based upon the service and fleet assumptions described above in Section 2.6.

Station Location Options. Construction of the station at optional locations would cost more than the Proposed Project based on a variety of factors, including increased track length, tunnels required to exit the median, and additional acreage required to accommodate maintenance activities outside the median. Table 2-4 illustrates the estimated cost to construct a DMU to the three station options compared to the Proposed Project. The cost to construct the DMU to the Northside West Station option would be approximately 548 million dollars (an additional 69~~2~~ million); to the Northside East Station option approximately 568 million (an

an additional 892 million); and to the Median Station East option approximately 530 million (an additional 51 44 million).

Table 2-4
Hillcrest Avenue Station Options – Estimated Capital Costs

Station Options	Station Option Cost ($Million)	Additional Cost Compared to the Proposed Project ($Million)
Proposed Project (Median Station)	486 479	--
Northside West Station	548	62 69
Northside East	568	82 89
Median Station East	530	44 51

So rce BART, 20098.

The operating and costs for the optional station locations are slightly higher than the Proposed Project based on costs to maintain the additional length of track and tunnels. The operating cost for the Northside West Station would be approximately 8.7 million annually; for the Northside East Station option, 11.7 million annually; and for Median Station East option, 8.7 million annually.

Project Funding

Project funding is provided by a combination of revenues from Contra Costa County's transportation sales tax (Measure) and State and regional funds. These sources would fund the 509 million escalated capital costs of the Proposed Project. As identified in MTC's Regional Transit Improvement Program, adopted as Resolution No. 3839, the Proposed Project's funding plan involves the sources listed in Table 2-5. The largest single source of funding comes from the CCTA Measure funds, which would provide approximately 175 million to the Proposed Project, net of program and finance costs as reflected in the Measure Strategic Plan. The costs for any additional phases of the project are not included in the funding plan.

The Proposed Project currently has approximately 502 million in secured project funding. Figure 2-15 presents a chart illustrating the distribution of funding sources for the Proposed Project.

The funding sources and amounts available for the Proposed Project are identified below.

- **Regional Measure 1, $52M** In November 1988, Bay Area voters approved Regional Measure 1 (RM 1), which authorized a standard auto toll of 1 for all seven state-owned Bay Area toll bridges. The revenues generated by the toll increase were identified for use for certain highway and bridge improvements, public transit rail extensions, and other projects that reduce congestion in the bridge corridors.

Table 2-5
Proposed Project Funding Plan (2009 Dollars)

Fund Sources	$Million
Secured Funding	
Regional Measure 1	52
Regional Measure 2	96
Measure [a]	175
Traffic Congestion Relief Program	5
Proposition 1B	34
AB 1171	115
State Transportation Improvement Program[b]	13
Subtotal	**$490**
Funding Committed, Timing Uncertain	
East Contra Costa Regional Fee and Finance Authority[~~b~~c]	6
Proposition 1B[~~c~~d]	6
Subtotal	**$12**
TOTAL	**$502**

So rce BART, 2009~~7~~.

otes

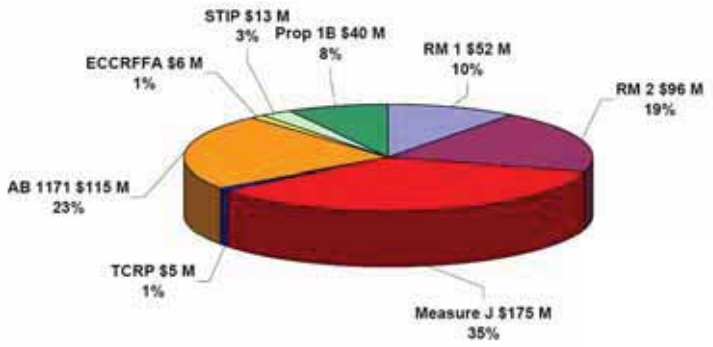
a. The Measure Strategic Plan includes a third bond issuance of approximately 135.6 million in F 2015, dedicated exclusively to eBART.

b. BART will request non-federalized STIP funds. STIP funds will be programmed in the next available cycle. CCTA has committed to put this project first when funding becomes available (assumed to be 2014).

~~b~~c. Request for 12 million made uly 2006, pending approval.

~~c~~d. 6 million from State Transit Assistance Spillover Account at a future date.

Figure 2-15: Proposed Project Funding Plan — $502 Million



So rce BART, 2008

RM 1	Regional Measure 1 (Bridge Tolls)
RM 2	Regional Measure 2 (Bridge Tolls)
AB 1171	Assembly Bill 1171 (Bridge Tolls)
Prop 1B	Proposition 1B (State Funds)
STIP	State Transportation Improvement Program (State Funds)
TCRP	Traffic Congestion Relief Program (State Funds)
Measure J	Measure J (Regional)
ECCRFFA	East Contra Costa Regional Fee and Financing Authority (Regional)

Table 2-6
Proposed Project Construction Phasing and Schedule

Phase	Location	Start Date	Duration	End Date
1A	Pittsburg/Bay Point BART Station to Loveridge Road	2009	24 months	2011
1B	Loveridge Road to Hillcrest Avenue	2013	24 months	Late 2014

Source BART, 2008, P H Wong Engineering, *East Contra Costa County Transit Project eBART Construction Implementation Report Preliminary Engineering*, November 30, 2007.

Phase 1B is the segment between Loveridge Road and Hillcrest Avenue. It would include construction of the eastern portion of the guideway and Hillcrest Avenue Station. Construction of Phase 1B would also last approximately 24 months. Caltrans would need to widen the median in Segment 1B before construction for DMU can commence. This time schedule is consistent with, and based on, the Caltrans timeframe for construction of the planned SR 4 widening and median improvements.

Interim Improvements to Hillcrest Station Park-and-Ride Lot

The Hillcrest Avenue Median Station parking lot for the Proposed Project would incorporate the existing park-and-ride lot at Hillcrest Avenue and Sunset Avenue (Hillcrest Park-and-Ride Lot). BART, in cooperation with the Eastern Contra Costa Transit Authority (Tri Delta Transit), may implement interim operational and aesthetic improvements to the Hillcrest Park-and-Ride Lot, prior to the construction of the Proposed Project. Using adjacent available parcels of land, the interim improvements would add approximately 100-150 additional parking spaces, expand and improve the bus loading area, and provide additional passenger amenities, including, but not limited to, bus shelter or canopy, benches, and minimal landscaping. Funding for the improvements would be provided by Tri Delta Transit, enabling BART to utilize this source of funds for improvements that, in part, would ultimately benefit the Proposed Project.

Coordination with Caltrans

Caltrans is planning to widen SR 4 from approximately the Loveridge Road interchange east to the SR 160 flyover. Certain elements within this segment will be constructed to accommodate potential future transit. These elements include the bridge abutments and footings for roadway crossings, barriers, and retaining walls between highway lanes and the median that is being preserved for future transit use. ~~Also, drainage facilities for future transit will be designed to tie into inlets that discharge into cross drains that are part of the freeway facilities.~~ Caltrans will place drainage inlets in the median approximately 500 to 800 feet apart. Drainage facilities for future transit will be designed to tie into these inlets and will drain to either existing or proposed crossings. These elements are components of the Caltrans project, which are designed to accommodate any form of future transit in the widened highway median, including but not limited to the Proposed Project. Incorporating these elements in the highway

widening project will help ensure that the highway design and construction do not preclude a future extension of transit in the median, even if the Proposed Project is not adopted.

In the interest of overall efficiency and reducing construction impacts along SR 4, and if the timing is appropriate, Caltrans has expressed willingness to construct project-related improvements during the median widening. This would keep project costs lower than they would be otherwise and minimize the duration of potential construction impacts to both local residents and the traveling public.

Throughout construction, primary access to the median work areas and median station sites would be through interior SR 4 east and westbound traffic lanes. Temporary openings would be constructed in the existing concrete barriers to allow vehicle and equipment access. These openings, wherever they are necessary, would be subject to the direct authorization from Caltrans for configuration and traffic safety. In work areas that do not have existing barriers,

Section 3.2
Transportation

Traffic conditions on the freeways serving the project vicinity were also studied. The following mainline segments along SR 4 were analyzed for this project and are shown in Figure 3.2-4

1. West of Bailey Road (Pittsburg/Bay Point BART)
2. Between Bailey Road and Railroad Avenue
3. Between Railroad Avenue and Loveridge Road
4. Between Loveridge Road and Somersville Road
5. Between Somersville Road and Contra Loma Boulevard/L Street
6. Between Contra Loma Boulevard/L Street and Street
7. Between Street and Lone Tree Way/A Street
8. Between Lone Tree Way/A Street and Hillcrest Avenue
9. Between Hillcrest Avenue and E. 18th Street/Main Street
10. East of E. 18th Street/Main Street

Methodology for Evaluating Traffic Operations

Traffic operations were evaluated based on methodologies in the 2000 Highway Capacity Manual (HCM 2000).

Intersection Analysis. LOS is a qualitative description of the performance of an intersection based on the average delay per vehicle. Intersection levels of service range from LOS A, which indicates free flow or excellent conditions with short delays, to LOS F, which indicates congested or overloaded conditions with extremely long delays. The HCM 2000 method calculates LOS values based on the average delay in seconds at the intersection, which is converted to an LOS value. ~~The CCTA Technical Procedures' guidelines permit this approach to deriving LOS using HCM 2000 methodologies (and Synchro 7 traffic analysis software), and this approach has been used in this EIR analysis.~~ The CCTA s Technical Procedures require local jurisdictions to analyze development projects in their communities using the Authority s CCTALOS methodology. This methodology is based on the Circular 212 Planning and Operations Method. Local jurisdictions may use other methods in addition to the CCTALOS methodology, including the HCM 2000 methodology. However, as a regional transit operator, BART is not explicitly subject to the Technical Procedures.

Signa i ed Intersections The average delay for study area signalized intersections was calculated using the Synchro analysis software and is correlated to LOS as shown in Table 3.2-1.

Unsignalized Intersections. Unsignalized intersections were evaluated using the HCM 2000 methodology. In this case, the LOS is based on the weighted average control delay expressed

in seconds per vehicle as illustrated in Table 3.2-2. Control delay includes the sum of all the individual movements that a vehicle might go through at an unsignalized intersection, including initial deceleration delay, queue move-up time, stopped delay, and final acceleration.

i o A en e is a two-lane, north-south residential street running between E. 18th Street and Oakley Road. There are sidewalks on both sides of the street.

P i ips ane Dirt Dri e ay is a north-south residential street running between E. 18th Street and Oakley Road in the City of Antioch. It runs parallel to Willow Avenue and continues past E. 18th Street as a dirt driveway. There are sidewalks along the southern half.

Other Roadways. The facilities described below provide access from neighboring cities to the study area.

State Ro te Bypass is a large regional transportation project being constructed in ~~three~~ segments. Segment 1 extends from just east of the SR 4/Hillcrest Avenue interchange to Lone Tree Way in the City of Antioch and will consist of a 6-lane freeway between existing SR 4 and the Laurel Road interchange and a 4-lane freeway from there to Lone Tree Way. Segment 2~~, which is currently completed and open to traffic,~~ is a two-lane expressway between Lone Tree Way and Balfour Road ~~(existing). There are plans to convert it to a full freeway with interchanges at Sand Creek Road and Balfour Road.~~ Segment 3 extends from Balfour Road south to Marsh Creek Road as a 2-lane expressway, then along Marsh Creek Road (East-West Connector) as a 2-lane conventional highway, connecting to existing SR 4 (Byron Highway).

Brent ood Bo e ard also known in Brentwood as SR 4, is a north-south roadway that connects Balfour Road to Central Boulevard and runs essentially parallel to the existing SR 4 Bypass. Brentwood/SR 4 makes a series of right turns to maneuver through Brentwood downtown. The Brentwood Park-and-Ride Lot is located at Oak and Walnut directly off Brentwood Boulevard. Class II bicycle lanes are provided along much of this segment of Brentwood Boulevard, but are discontinuous in some areas.

Intersection Operating Conditions. Existing intersection operating conditions were evaluated for the morning peak hour (7 00 a.m. to 9 00 a.m.) and evening peak hour (4 00 p.m. to 6 00 p.m.) using Synchro software. Existing commute peak hour traffic volumes at key intersections were derived from counts of the various turning maneuvers possible at the intersection by Wilbur Smith Associates in anuary-March 2007. The traffic movements were counted and recorded by traffic surveyors in 15-minute intervals during the peak commute periods. These counts were then analyzed to determine the peak one-hour traffic volumes at each intersection.

A total of 31 intersections were analyzed, of which 20 are signalized, eight are Two-Way Stop-Controlled (TWSC) intersections, and three are All-Way Stop-Controlled (AWSC) intersections. Figure 3.2-5 and Figure 3.2-6 show the geometric configurations at the study intersections and exhibit the AM and PM peak hour turning movement volumes under existing conditions. The existing lane configurations and peak hour turning movement volumes were used to calculate the LOS (see Table 3.2-6), and the calculation worksheets to derive the LOS are included in the Transportation Technical Report, available for review at the BART Planning Office.

Table 3.2-6
Study Intersection Operations – Existing Conditions

#	Intersection	Threshold			AM Peak			PM Peak		
		Control	Jurisdiction	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue W.17th Street/Davi Avenue	AWSC	City of Pittsburg	E		7.8	A		8.2	A
2	Power Avenue/Davi Avenue	TWSC	City of Pittsburg	E	0.05 (SB)	12.1 (SB)	B	0.11 (SB)	13.5 (SB)	B
3	Railroad Avenue/Civic Avenue	Signal	~~CCTA~~ TRANSPLAN	D[b]	0.46	15.7	B	0.38	13.8	B
4	Railroad Avenue/Center Drive	TWSC	City of Pittsburg	E	0.59 (EB)	27.3 (EB)	D	0.87 (EB)	34.6 (EB)	D
5	Railroad Avenue/SR 4 Westbound On-Ramp	Signal	Caltrans	C/D[a]	**1.2**	**>80**	**F**	0.65	16.6	B
6	Railroad Avenue/SR 4 Eastbound Ramps	Signal	Caltrans	C/D[a]	0.66	17.3	B	**1.08**	**52.2**	**D**
7	Railroad Avenue/Bliss Avenue	Signal	~~CCTA~~ TRANSPLAN CMP	E	0.55	15.3	B	0.73	18.1	B
8	Railroad Avenue/Leland Road	Signal	~~CCTA~~ TRANSPLAN CMP	E	0.8	33.7	C	0.97	48.2	D
9	Leland Road/Harbor Street	Signal	~~CCTA~~ TRANSPLAN	D[b]	0.76	33.6	C	0.88	42.8	D
10	Leland Road/Freed Avenue	TWSC	City of Pittsburg	E	0.31 (SB)	42.1 (SB)	E	**0.94 (NB)**	**>50 (NB)**	**F**
11	Leland Road/Loveridge Road	Signal	~~CCTA~~ TRANSPLAN	D[b]	0.67	34.8	C	0.77	31.2	C
12	Loveridge Road/SR 4 Eastbound Ramps	Signal	Caltrans	C/D[a]	0.53	15	B	0.59	9.8	A
13	California Avenue/SR 4 Westbound Ramps	Signal	Caltrans	C/D[a]	0.56	27.3	C	**0.85**	**49.1**	**D**
14	Harbor Street/California Avenue	Signal	~~CCTA~~ TRANSPLAN	D[b]	0.64	30.9	C	0.82	35.5	D
15	Harbor Street/Bliss Avenue	TWSC	City of Pittsburg	E	**2.04 (EB)**	**>50 (EB)**	**F**	**2.05 (EB)**	**>50 (EB)**	**F**
16	Hillcrest Avenue/E. 18th Street	Signal	~~CCTA~~ TRANSPLAN	D[b]	0.8	43.8	D	0.87	49.6	D
17	Hillcrest Avenue/Arzate Lane P E Service Center Driveway	TWSC	City of Antioch	D[c]	0.05 (WB)	17.4 (WB)	C	0.01 (EB)	16.9 (EB)	C
18	Sunset Drive/Hillcrest Avenue	Signal	~~CCTA~~ TRANSPLAN	D[b]	0.5	21	C	0.51	24.5	C

Table 3.2-6
Study Intersection Operations – Existing Conditions

#	Intersection	Threshold			AM Peak			PM Peak		
		Control	Jurisdiction	LOS	V/C	Delay	LOS	V/C	Delay	LOS
19	SR 4 Westbound Ramps/Hillcrest Avenue	Signal	Caltrans	C/D[a]	0.96	32.3	C	0.88	16.7	B
20	SR 4 Eastbound Ramps/Hillcrest Avenue	Signal	Caltrans	C/D[a]	0.98	26.5	C	**1.17**	**68.3**	**E**
21	Larkspur Drive/Hillcrest Avenue	Signal	~~CCTA~~ TRANSPLAN	D[b]	0.79	26.4	C	0.86	46.7	D
22	Davison Drive/Hillcrest Avenue Deer Valley Road	Signal	~~CCTA~~ TRANSPLAN	D[b]	0.89	43.7	D	0.86	45.4	D
23	E. 18th Street/Viera Avenue	Signal	~~CCTA~~ TRANSPLAN	D[b]	**0.95**	**63.3**	**E**	0.54	18.4	B
24	E. 18th Street/Willow Avenue	TWSC	City of Antioch	D[c]	0.64 (NB)	32.7 (NB)	D	0.35 (NB)	25.5 (NB)	D
25	Oakley Road/Willow Avenue	AWSC	City of Antioch	D[c]		9.6	A		8.5	A
26	Phillips Lane/Oakley Road	TWSC	City of Antioch	D[c]	0.06 (SB)	11.7 (SB)	B	0.09 (SB)	11.6 (SB)	B
27	E. 18th Street/Phillips Lane Dirt Driveway	TWSC	City of Antioch	D[c]	0.02 (NB)	12.5 (NB)	B	0.05 (NB)	11.4 (NB)	B
28	SR 4 Westbound Ramps -Mart Driveway/Main Street	Signal	Caltrans	C/D[a]	**0.88**	**76.5**	**E**	**0.84**	**38.3**	**D**
29	Main Street/SR 160 Northbound Ramps	Signal	Caltrans	C/D[a]	0.62	11.7	B	0.93	32.8	C
30	Main Street/Neroly Road Bridgehead Road	Signal	~~CCTA~~ TRANSPLAN CMP	E	0.86	36.6	D	**1.26**	**>80**	**F**
31	Oakley Road/Neroly Road	AWSC	City of Oakley[d]	D		**>50**	**F**		**>50**	**F**

Source Wilbur Smith Associates, February 2007.

Notes

AWSC All-way Stop Control

TWSC Two-way Stop Control

Signal Traffic Signal

Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldface type indicates unacceptable values.

a. Represents a target LOS at the transition between LOS C and LOS D.

b. For an Urban Area V/C ratio must be between 0.85 and 0.89.

c. V/C ratio must be between 0.80 and 0.84.

d. This jurisdiction does not define standard for unsignalized intersections, LOS D threshold has been utilized.

Under the existing AM peak hour conditions, 26 of the 31 study intersections operate at acceptable conditions; i.e., at an LOS better or equal to the threshold defined by the applicable jurisdiction. The following five intersections operate at unacceptable conditions

- Railroad Avenue/SR 4 Westbound On-Ramp
- Harbor Street/Bliss Avenue
- E. 18th Street/Viera Avenue
- SR 4 Westbound Ramps -Mart Driveway/Main Street
- Oakley Road/Neroly Road

Under existing PM peak hour conditions, eight study intersections operate at unacceptable LOS. The remaining intersections operate at acceptable conditions. The intersections operating at unacceptable conditions are

- Railroad Avenue/SR 4 Eastbound Ramps
- Leland Road/Freed Avenue
- California Avenue/SR 4 Westbound Ramps
- Harbor Street/Bliss Avenue
- SR 4 Eastbound Ramps/Hillcrest Avenue
- SR 4 Westbound Ramps -Mart Driveway/Main Street
- Main Street/Neroly Road Bridgehead Road
- Oakley Road/Neroly Road

Traffic Service Objectives. The ability of the current freeway and roadway network to meet the Traffic Service Objectives for the Regional Routes of Significance set forth in the East County Action Plan of 2000 was evaluated. Twenty-one of the 31 study intersections are on routes of regional significance. Of these intersections, the following 12 intersections currently fail to satisfy the Traffic Service Objectives

- 4 Railroad Avenue/Center Drive
- 5 Railroad Avenue/SR 4 Westbound On-Ramp
- 6 Railroad Avenue/SR 4 Eastbound Ramps
- 8 Railroad Avenue/Leland Road
- 9 Leland Road/Harbor Street
- 10 Leland Road/Freed Avenue
- 16 Hillcrest Avenue/East 18th Street
- 20 SR 4 Eastbound Ramps/Hillcrest Avenue
- 22 Davison Drive/Hillcrest Avenue Deer Valley Road
- 23 East 18th Street/Viera Avenue

- 29 Main Street/SR 160 Northbound Ramps
- 30 Main Street/Neroly Road Bridgehead Road

In addition the freeway portion of SR 4 does not meet the vehicle occupancy or delay index standards.

Public Transit Services

Two major public transit operators provide service within or adjacent to the study area, BART and the Eastern Contra Costa Transit Authority, or Tri Delta Transit. Limited services are also provided by other transit agencies that mainly serve areas further from the study area. Existing services provided by these operators are described below.

BART Service. The Pittsburg/Bay Point BART service terminates at the southwest quadrant of the SR 4/Bailey Road interchange. During weekdays, scheduled trains complete over 80 outbound trips from the Pittsburg/Bay Point BART Station to other Bay Area destinations. In F 2007, the station had an average of 4,986 weekday patron exits. The SFO Pittsburg/Bay Point line, also referred to as the Concord Line, provides direct service to and from San Francisco and runs from 4 00 a.m. to 12 00 a.m. daily. With the exception of three trains in the morning peak period, weekday service frequencies on trains originating from Pittsburg/Bay Point are at 15 minutes throughout the day. During peak periods, additional trains originating

Contra Costa Transportation A t ority CCTA All Contra Costa jurisdictions, including the cities of Pittsburg and Antioch, participate in the Measure C-1988 rowth Management Program. Measure C requires, among other things, that each jurisdiction adopt level of service standards for Basic Routes based on the eneral Plan land use designations adjoining the routes and adhere to Traffic Service Objectives for Routes of Regional Significance. The Routes of Regional Significance and the Traffic Service Objectives are identified in the East County Action Plan, published by the CCTA in 2000. Measure C specifies that the standards listed in Table 3.2-12 be applied to all signalized intersections on Non-regional Routes.

The year 2000 update of the East County Action Plan sets forth the proposed objectives of the plan. The Proposed Project would be directly supportive of several of the identified actions Action 1 Implement Regional Transportation Improvements, Action 7 Explore Commuter Rail Transit Options, Action 8- Park-and-Ride Lots, and Action 11- Provide Intermodal Transit Centers. In addition, the Proposed Project would not conflict with any of the actions contained the East County Action Plan.

Table 3.2-12
Level of Service Standards for Signalized Intersections on Non-Regional Routes

Land Use Type	LOS Standard
Rural	LOS (low) C
Semi-Rural	LOS (high) C
Suburban	LOS (low) D
Urban	LOS (high) D
CBD[a]	LOS (low) E

So rce Contra Costa Transportation Authority, *Tec nica Proced res pdate*, 2006.

ote

a Central Business District

The ~~only~~ following are the Routes of Regional Significance in the study area, which ~~is~~ are evaluated according to different criteria than Basic Routes~~, is SR 4.~~

- SR 4
- SR 160
- Deer Valley Road
- East 18th Street
- Hillcrest Avenue
- Leland Road
- Railroad Avenue
- SR 4 Bypass

The Traffic Services Objectives which apply to these routes are shown in Table 3.2 -12A below

Table 3.2-12A
Summary of Traffic Service Objectives for Regional Routes of Significance

Regional Route	Traffic Service Objectives
State Route 4 (freeway)	1. Vehicle Occupancy of 1.2 persons per vehicle or higher during the morning peak hour 2. Delay Index of less than 2.5 3. Transit Ridership increase of 25 by year 2010 compared to year 2000
State Route 4 (State Route 160 to Balfour Road)	1. Level of Service D or better at signalized intersections 2. Level of Service E or better at unsignalized intersections 3. Delay index less than 2.5
Deer Valley Road East 18th Street Hillcrest Avenue Leland Road Railroad Avenue State Route 4 Bypass	1. Mid-Level of Service D or better at intersections (volume to-capacity ratio of 0.85 or less), except intersections on East 18th Street Bailey Road from West Leland Avenue to Canal, where objective is Level of Service E 2. Delay Index less than 2.0

Source Contra Costa Transportation Authority, *East County Action Plan*, 2000.

CCTA recognizes traffic impacts to be significant if the project-related traffic

- Worsens intersection operating conditions by more than one degree of LOS; or
- Worsens intersection operating conditions to LOS E or F.

The CCTA is also the Congestion Management Agency (CMA) for the County, with the responsibility for preparing and monitoring the preparation of the CMP. The CMP is one part of an aggressive overall strategy to reduce congestion and improve mobility in the county. Within the study area, parts of Railroad Avenue (south of SR 4) and SR 4 (Main Street) east of its interchange with SR 160 are designated within the CMP network. CCTA has established a standard of LOS E for all parts of the CMP network except those that were already operating at worse levels of service in 1991. Along SR 4, all segments from Bailey Road to SR 160 have a standard of LOS F during peak periods in both the eastbound and westbound directions since they currently operate at this level of service.

In the absence of established local criteria to describe the operating conditions of intersections, freeway segments, and ramp-freeway junctions, LOS D or better is typically considered to be acceptable for peak hours, while LOS E or worse are considered undesirable conditions.

Scenario ong-Term F t re ear it o t Project Conditions ear 20 0 includes analysis of ear 2030 traffic volumes obtained by applying a linear growth factor to the results obtained from the ear 2035 CCTA models. This scenario does not include any traffic that would be associated with the Proposed Project.

Scenario ong-Term F t re ear it Project Conditions ear 20 0 includes analysis of ear 2030 traffic volumes obtained by applying a linear growth factor to the results obtained from the ear 2035 CCTA models plus traffic volumes that would be generated due to the Proposed Project.

Potential traffic impacts of the Proposed Project are assessed relative to existing and future No Project conditions in 2015 and 2030. Impacts are identified when the analyses indicate that future conditions with the Proposed Project are degraded as compared to the future baseline or future no project conditions. A summary of traffic operations for the No Project scenarios is presented later under Future (No Project) Conditions.

Transit Ridership. Estimated ridership for the Proposed Project was based on the modified CCTA model. The percentages of riders accessing eBART stations by different modes (i.e., walking, bicycling, driving, riding transit) used in the model were generated from projected total ridership, and the percentage splits reflect similar BART stations based on planned land use around the proposed stations. These percentages were applied to the total ridership forecasts to determine the impacts on different modes. It should be noted that parking demand at the Hillcrest Avenue Station was based on unconstrained projections (i.e., not constrained by a fixed number of available parking spaces), which allows a more realistic assessment of the potential parking demand. At the Railroad Avenue Station, the parking demand was purposely constrained to reflect the desire of the City to develop a transit village with limited parking in the vicinity of the station, and to acknowledge that parking would be available at the nearby Pittsburg/Bay Point BART Station once the Proposed Project was implemented. The forecasting model was specifically coded to recognize the constraint on parking at Railroad Avenue and to accommodate those who might have desired to park at Railroad Avenue at the Pittsburg/Bay Point BART Station. As a result, the analysis considers the impact that constrained parking at Railroad Avenue would have on parking and traffic demand at Pittsburg/Bay Point. It also considers the potential impact of existing unserved latent parking demand that could be accommodated at the Pittsburg/Bay Point BART Station when the Proposed Project is in place and many existing users of the Pittsburg/Bay Point BART Station use the Proposed Project instead.

BART System Capacity. Potential impacts to the operation of the BART system were based on estimates of future line loads and projections of new transit trips. Line loads were calculated across the existing BART network for the 2030 No Project and Proposed Project scenarios in the AM and PM peak periods. This forecasting model, known as the Dovetail Model, is used by BART to develop estimates of future peak hour passenger loadings on each segment of the BART system.

Future (No Project) Conditions

As required by CE A, existing traffic conditions in the study area are described above. However, other projects and modifications to the roadway network are assumed to be in place before the Proposed Project is implemented, and further regional growth is anticipated during that period. Accordingly, the Proposed Project's impacts would not be accurately represented by comparison with conditions existing in 2007. Instead, in accordance with professional

standards for traffic impact analysis, the Proposed Project's impacts are compared to projected future conditions if the Proposed Project were not built (i.e., No Project conditions, or future conditions without the project). For purposes of this comparison, No Project conditions were examined for two future time periods, known as horizon years. The horizon years selected for this analysis are ear 2015, when the Proposed Project would be operational, and ear 2030, a longer term examination that would capture impacts when the system has been fully operational for some time.

It is important to understand that in this analysis the land use development in the station area is considered to be part of the traffic growth forecast under the No Project Alternative. The difference between the Proposed Project and the No Project Alternative is strictly due to the changes in traffic volumes attributable to the transit project. These volumes relate to increased traffic generation to and from the stations, and reductions in traffic on SR 4 and the parallel surface streets due to diversion of auto trips to transit.

For use in future travel activity, information was provided by the cities of Pittsburg and Antioch about approved and proposed projects within the study area. Only those projects that would impact at least one study intersection were included in the analysis. Trips generated by these projects were assigned to the street network along the most reasonable paths based on the existing intersection locations. There are also several proposed changes to the roadway network within the transportation study area; some are roadway changes, such as widenings, while others are changes to the intersection geometry. These projects include those that are regionally funded through the CCTA and have already been incorporated in the CCTA travel forecasting model. No Project conditions for ear 2015 and 2030 are described below.

Roadway Network Changes. Under the future No Project conditions, changes are anticipated to both SR 4 and to local roads as described below.

State Ro te There are plans to continue widening SR 4 from four mixed-flow lanes to eight lanes, including one HOV lane and three mixed flow lanes in each direction. The median will be widened as well to accommodate future public transit improvements. Within the study area, freeway widening has already been completed on the segment from Bailey Road to Loveridge Road. The next proposed segment for widening, from Loveridge Road to ~~SR 160~~ Somersville Road is expected to be completed by ~~2015~~ 2013. By 2015 the CCTA expects that the widening will be complete to Hillcrest Avenue. Major freeway interchanges along this portion will also need to be expanded, namely at Hillcrest Avenue, where there are plans to construct a new westbound onramp and an auxiliary ~~eastbound~~ off-ramp accessing Sunset Drive. ~~However, the Hillcrest Avenue interchange reconstruction project is not yet fully funded, and for that reason, it is not included in the ear 2015 scenario.~~

The eastbound ramps would retain the diamond configuration, but the off-ramp would be widened to two lanes from the mainline, extending to four lanes at the intersection with Hillcrest Avenue. This improvement is expected to be completed by 2015 and has thus been

included in both the 2015 and 2030 future scenarios. Additionally, the overpass between the east- and westbound ramps along Hillcrest Avenue would be reconfigured to provide an additional left turn lane for the southbound approach at this intersection.

Also, an interchange at Range Road between Bailey Road and Railroad Avenue has been included in the ear 2030 model, while the interchange at Street has been removed in both ear 2015 and 2030 scenarios.

State Ro te Bypass The Bypass Authority is currently preparing design plans for the proposed SR 4/Sand Creek Road interchange and the proposed Bypass widening to a 4-lane freeway facility from Lone Tree Way to Sand Creek Road~~. The State Route 4 Bypass is under construction and is expected to be completed by 2009. Segment 2 of the Bypass project already been completed and is described in Existing Conditions, while Segments 1 and 3 are under construction. Segment 1 will extend from just east of the SR 4/Hillcrest Avenue Interchange to Lone Tree Way in the City of Antioch and will consist of a 6-lane freeway between existing SR 4 and the Laurel Road Interchange and a 4-lane freeway from there to Lone Tree Way. Segment 3 will extend from Balfour Road south to Marsh Creek Road as a 2-lane expressway, then along Marsh Creek Road (East West Connector) as a 2-lane conventional highway, connecting to existing~~

~~SR 4 (Byron Highway). The southerly limits of the project (now called the Vasco Road Extension) are from Marsh Creek Road to Vasco Road at Walnut Boulevard.~~

oca Road ays A ~~small~~ number of intersection and lane configuration changes are expected to be in place by the ear of Opening (2015) and the Long-Term Future ear (2030). These changes to future intersection configurations, which were taken into account in the model, are shown for the Railroad Avenue Station area and the Hillcrest Avenue Station area in Figure 3.2-9 and Figure 3.2-10, respectively. ~~The~~ Near the Railroad Avenue Station, the intersection of Harbor Street/Bliss Avenue will be signalized under future conditions.

Also, in both the ear 2015 and ear 2030 scenarios, the intersection at Railroad Avenue/Center Drive would no longer exist. In the ear 2030 scenario, the reconfiguration of the SR 4/Hillcrest Avenue interchange is expected to be completed, and this redesign is included in the analysis of the project and no project scenarios. T~~t~~he intersection at SR 4 Westbound Ramps/Hillcrest Avenue ~~would no longer exist but would be replaced by the planned improvements to the Hillcrest/SR 4 interchange~~ will be reconfigured to include a two-lane loop on-ramp, replacing the existing westbound off-ramp, for vehicles traveling from northbound Hillcrest Avenue to westbound SR 4. The off-ramp will be diverted onto Sunset Drive, at a location just east of Hillcrest Avenue, and access would also be provided from Sunset Drive to the loop on-ramp. The eastbound off-ramp at Hillcrest Avenue will also be widened to two lanes, and the westbound approach of the SR 4 Eastbound Ramps/Hillcrest Avenue intersection would provide a total of four lanes. Additionally, the overpass between the east- and westbound ramps along Hillcrest Avenue would be reconfigured to provide an additional left turn lane for the southbound approach at this intersection.

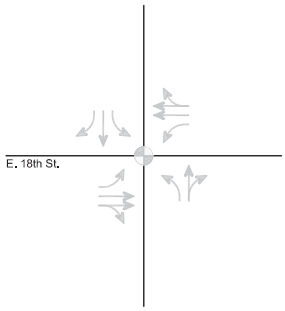
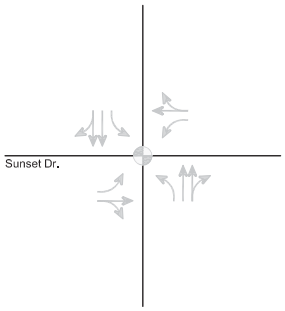
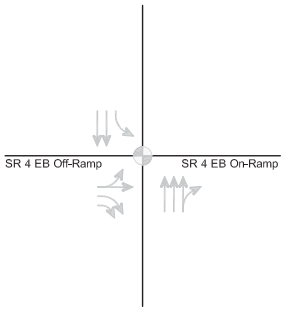
A small number of widening projects are planned along major arterials in the study area, including a portion of Hillcrest Avenue, south of SR 4, and E. 18th Street from Hillcrest Avenue ~~into~~ to Oakley. Also the City of Oakley is sponsoring the Main Street widening project which extends from the SR 160/Main Street interchange to Big Break Road. These projects include the addition of lanes, turn lanes, medians, and bike lanes.

Slatten Ranch Road, as planned by the City of Antioch, will extend from Hillcrest Avenue, just north of SR 4, east to Lone Tree Way. It was also assumed that Willow Road would be extended south to Slatten Ranch Road connecting East 18th Street with Slatten Ranch Road. This project is being planned by the City of Antioch and has been included in its eneral Plan and the station area Ridership Development Plan.

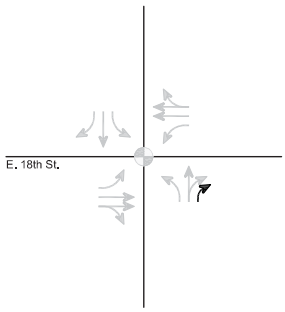
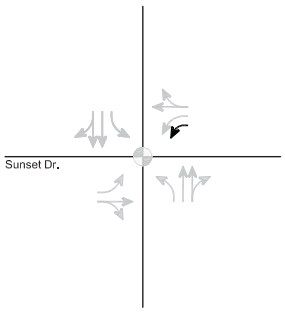
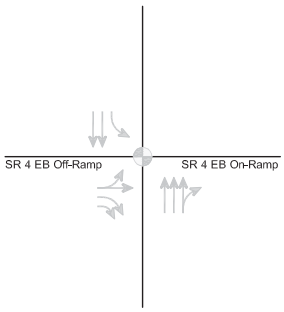
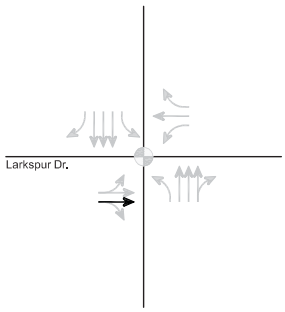
Intersection Operations in Year 2015. Under the Opening ear No Project AM peak hour conditions, 26 of the 30 study intersections operate at acceptable conditions; i.e., at an LOS better or equal to the thresholds for the applicable jurisdiction. The following four intersections operate at unacceptable levels (the number identifier refers to the intersection number in the intersection tables and figures in this section)

- 10 - Leland Road/Freed Avenue
- 16 - Hillcrest Avenue/E. 18th Street
- 19 - SR 4 Westbound Ramps/Hillcrest Avenue
- 22 - Davison Drive/Hillcrest Avenue Deer Valley Road

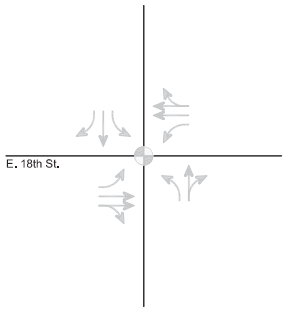
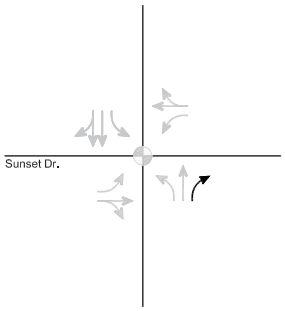
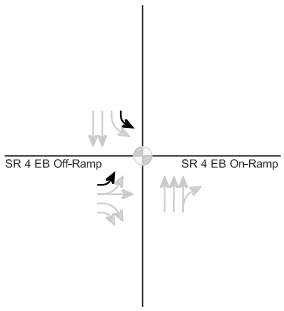
EXISTING CONDITIONS

6. E. 18th St./Hillcrest Ave.	18. Sunset Dr./Hillcrest Ave.	20. SR 4 EB Ramps/Hillcrest Ave.	21. Larkspur Dr./Hillcrest Ave.
			

2015 CONDITIONS

6. E. 18th St./Hillcrest Ave.	18. Sunset Dr./Hillcrest Ave.	20. SR 4 EB Ramps/Hillcrest Ave.	21. Larkspur Dr./Hillcrest Ave.
			

2030 CONDITIONS

6. E. 18th St./Hillcrest Ave.	18. Sunset Dr./Hillcrest Ave.	20. SR 4 EB Ramps/Hillcrest Ave.	21. Larkspur Dr./Hillcrest Ave.
			

Source: WSA, 2008.

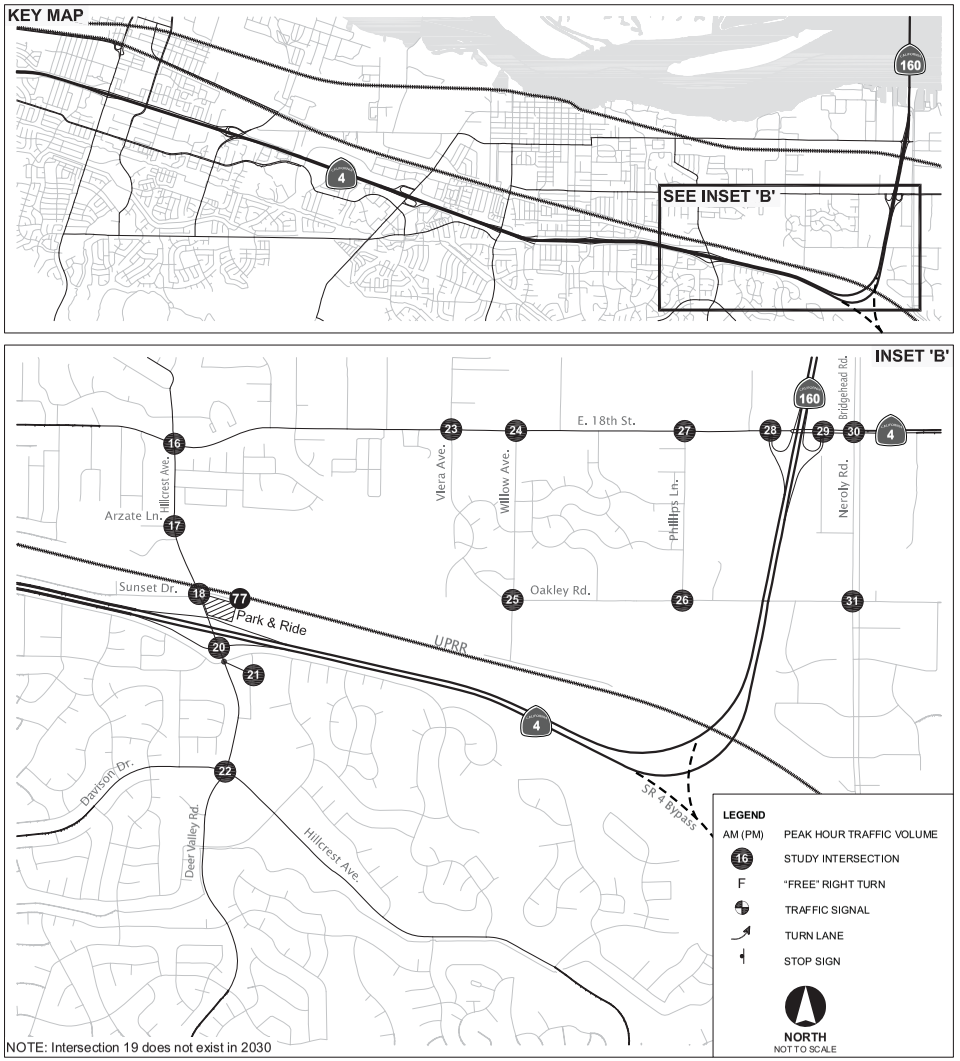
LEGEND

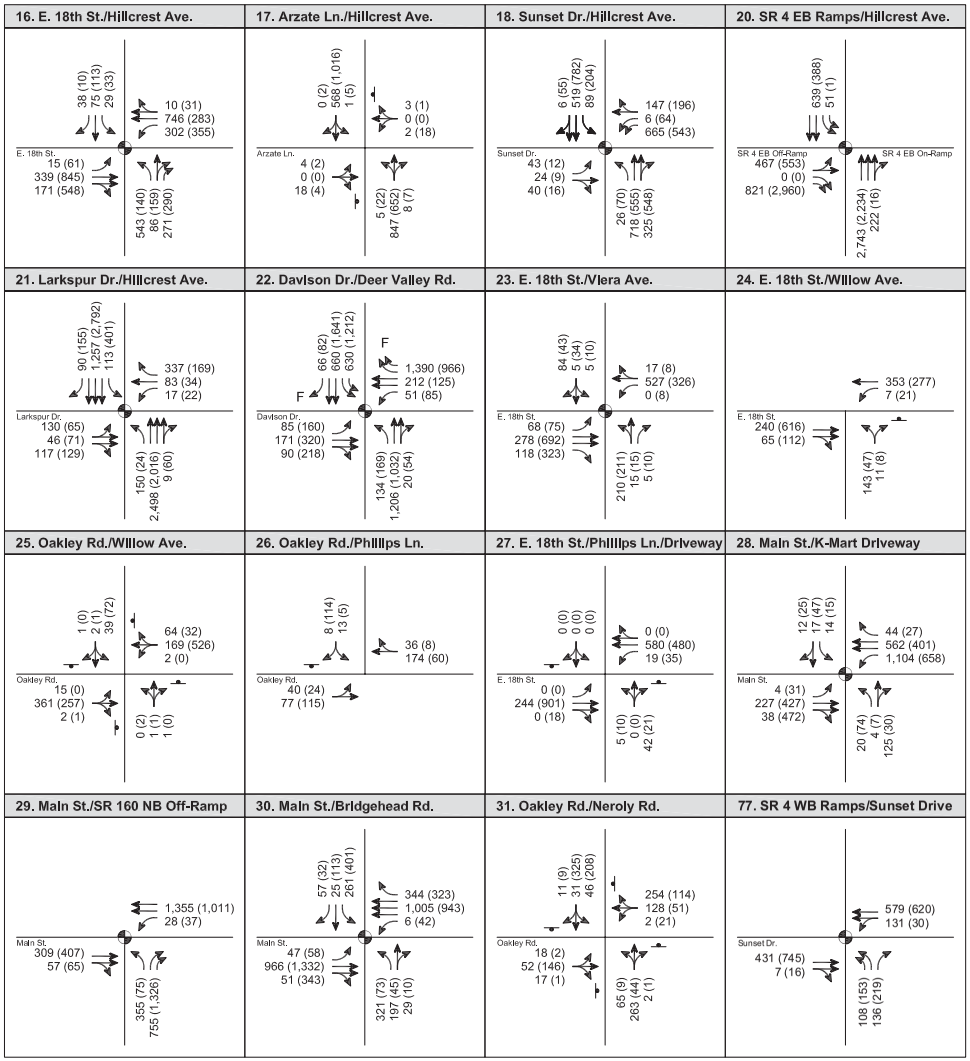
- Existing Traffic Signal
- Future Traffic Signal
- Existing Turn Lane
- Future Turn Lane
- Existing Stop Sign

Source: WSA, 2008.

HILLCREST AVENUE STATION AREA - FUTURE INTERSECTION GEOMETRICS

FIGURE 3.2-10





Source: WSA, 2008.

HILLCREST AVENUE STATION AREA INTERSECTIONS - 2030 NO PROJECT CONDITIONS

FIGURE 3.2-14

eneral Plan has also identified a planned bicycle lane along Power Avenue and a Class I bicycle path along Contra Costa Canal, east of Railroad Avenue. A southbound bicycle lane along Hillcrest Avenue north of SR 4 is being planned, as there is currently a Class II facility on only one side of the street.

Proposed Project Ridership

Ridership Forecasts. Table 3.2-13 provides a summary of forecasted ridership numbers for the two analysis years and represents bi-directional volumes. It is estimated that most of the Proposed Project passengers would be transferring directly to/from the BART system. The projected total weekday transit trips forecast as a result of the Proposed Project include transfers from/to the Proposed Project as shown in the table. Trips that do not involve transfers to or from BART are trips that occur totally on the Proposed Project, for example, trips from the Hillcrest Station to either the Railroad Avenue or Pittsburg/Bay Point Stations.

In the year 2015, the ridership demand for the Hillcrest Avenue Station would have the following distribution of origin Antioch 46 percent, Oakley 22 percent, Brentwood 25 percent, and Byron/Discovery Bay 7 percent. In the year 2030, the forecast ridership distribution would change slightly to Antioch 43 percent, Oakley 22 percent, Brentwood 28 percent, and Byron/Discovery Bay 7 percent. The distribution for the Railroad Avenue Station would be 66 percent from Pittsburg and 34 percent from Antioch in both 2015 and 2030.

The new transit trips shown in the last row of Table 3.2-13 represent trips that would have been made by auto, and as such represent a decrease in auto travel. Based on the estimated corridor auto occupancy of 1.06 persons per vehicle, these new transit trips represent a reduction of 1,900 auto trips in the year 2015 and 5,100 auto trips in the year 2030.

Table 3.2-13
Proposed Project Daily Ridership, 2015 and 2030

	2015	2030
Proposed Project Weekday Trips	3,900	10,100
Transfers from/to the Proposed Project[a]	3,700	9,750
Entries and Exits[b]		
Railroad Avenue Station	750	1,900
Hillcrest Avenue Station	3,150	8,200
New Transit Trips[c]	2,050	5,400

So rce Wilbur Smith Associates, 2008.

otes

a. Daily passengers transferring between Proposed Project and BART at the Pittsburg/Bay Point Transfer Platform.

b. Daily passengers entering and exiting the new Proposed Project stations.

c. New transit riders are those who were not previous BART or Tri Delta Transit users in the SR 4 corridor.

The remaining transit trips, after deducting the new trips, represent existing and future transit users that are predicted to use BART with or without the Proposed Project. These individuals would take advantage of the improved accessibility offered by the Proposed Project and would no longer travel to the Pittsburg/Bay Point Station to access BART. As a result, the demand

Railroad Avenue Station, a significantly higher percentage is expected to walk to the station, while only 40 percent of riders would use the park-and-ride lot, partly due to the limited availability of parking. The proposed Transit Village envisioned by the City of Pittsburg Railroad Avenue Specific Plan (Ridership Development Plan) is also expected to result in greater amounts of bicycle and pedestrian activity.

Project-Specific Environmental Analysis

Operationa pa ts

Impact TR-1 nder 201 Proposed Project conditions fi e intersections o d operate at nacceptab e e e s d ring one of t e pea periods and one intersection o d operate at nacceptab e e e s d ring bot t e A and P pea periods Compared to t e o Project conditions t e Proposed Project o d orsen t e e e of ser ice at fo r of t ese intersections a significant effect S

During the Opening ear with the Proposed Project, ~~three~~ two out of the 30~~1~~ study intersections operate at unacceptable levels during the AM peak hour. However, one of the intersections, Hillcrest Avenue/E. 18th Street, would operate better under the Proposed Project conditions compared to the No Project conditions. This is due to vehicle trips which are diverted to the transit system under the Proposed Project, representing reduced traffic in the SR 4 corridor compared to the No Project conditions. The remaining ~~two~~ intersection~~s~~ would experience operational conditions worse than No Project conditions

- **SR 4 Westbound Ramps/Hillcrest Avenue** Under 2015 Proposed Project conditions, this intersection would operate at a V/C ratio of ~~1.14~~ 1.13 and LOS E during the AM peak hour, which is worse than both existing and No Project conditions. About 6.0 percent of the volume at this intersection could be attributed to the Proposed Project.
- ~~**Davison Drive/Hillcrest Avenue – Deer Valley Road** Under 2015 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.04 and LOS E during the AM peak hour, which is worse than both existing and No Project conditions. About 1.7 percent of the volume at this intersection could be attributed to the Proposed Project.~~

During the PM peak hour, ~~four~~ five study intersections would operate at unacceptable levels, but one of them, Leland Road/Freed Avenue would operate better under the Proposed Project conditions than under the No Project conditions. Two other intersections, California Avenue/SR 4 Westbound Ramps and Main Street/Neroly Road, would improve from unacceptable

conditions under the No Project scenario to acceptable conditions under the Proposed Project. Significant impacts would occur at ~~three~~ four intersections

- **Sunset Drive/Hillcrest Avenue** Under 2015 Proposed Project conditions, this intersection would operate at a V/C ratio of 0.75 and LOS F during the PM peak hour, which is worse than both existing and No Project conditions.
- **SR 4 Westbound Ramps/Hillcrest Avenue** Under 2015 Proposed Project conditions, this intersection would operate at a V/C ratio of ~~0.95~~ 0.94 and LOS D during the PM peak hour, which is worse than both existing and No Project conditions. About 12.2 percent of the volume at this intersection could be attributed to the Proposed Project.
- **SR 4 Eastbound Ramps/Hillcrest Avenue** Under 2015 Proposed Project conditions, this intersection would operate at a V/C ratio of ~~1.79~~ 1.15 and LOS F during the PM peak hour, which is worse than both existing and No Project conditions. About 3.4 percent of the volume at this intersection could be attributed to the Proposed Project.
- **Oakley Road/Neroly Road** Under 2015 Proposed Project conditions, this intersection would operate at LOS F during the PM peak hour, which is the same as existing conditions but worse than No Project conditions. About 6.4 percent of the volume at this intersection could be attributed to the Proposed Project.

Intersection configurations and turning movement volumes with the Proposed Project are shown for the Railroad Avenue Station area and the Hillcrest Avenue Station area in Figure 3.2-15 and Figure 3.2-16, respectively.

A comparison of existing conditions and the ear 2015 Proposed Project and No Project scenarios is presented in Table 3.2-16 (AM Peak) and Table 3.2-17 (PM Peak). Based on the standards of significance and the approach to determining impacts, the Proposed Project would result in a significant intersection impact at four intersections ~~one intersection in the AM peak period (Davison Drive/Hillcrest Avenue – Deer Valley Road), two~~ three intersections in the PM peak period (Sunset Drive/Hillcrest Avenue, SR 4 Eastbound Ramps/Hillcrest Avenue and Oakley Road/Neroly Road), and one intersection in both the AM and PM peak periods (SR 4 Westbound Ramps at Hillcrest Avenue).

Under the ear 2015 conditions, eight of the 31 study intersections would not satisfy the Traffic Service Objectives in the East County Action Plan for both the Proposed Project and No Project conditions. One additional intersection, Railroad Avenue/SR 4 Eastbound On-Ramps, would not satisfy the objectives

for the No Project condition but would satisfy them for the Proposed Project condition. The intersections that would not meet the Traffic Service Objectives are

- 6 Railroad Avenue/SR 4 Eastbound Ramps
- 8 Railroad Avenue/Leland Road
- 9 Leland Road/Harbor Street
- 10 Leland Road/Freed Avenue
- 16 Hillcrest Avenue/East 18th Street
- 19 SR 4 Westbound Ramps/Hillcrest Avenue
- 20 SR 4 Eastbound Ramps/Hillcrest Avenue
- 22 Davison Drive/Hillcrest Avenue Deer Valley Road
- 30 Main Street/Neroly Road Bridgehead Road

The Proposed Project would worsen conditions at one of these intersections, SR 4 Westbound Ramps/Hillcrest Avenue, as has been already discussed.

MITI ATION MEASURES. The following measures would improve operations at two of the four impacted intersections to acceptable LOS. BART would need to participate and coordinate with local jurisdictions in implementing these improvements and, if necessary, contribute its fair share of funding. As a result, the impacts at ~~Davison Drive/Hillcrest Avenue Deer Valley Road~~ Sunset Drive/Hillcrest Avenue and at Oakley Road/Neroly Road would be reduced to less than significant. (LTS)

Table 3.2-16
2015 AM Peak Hour Intersection Operations with and without the Proposed Project

#	Intersection	Existing Conditions			2015 No Project			2015 Proposed Project		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue W.17th Street/Davi Avenue		7.8	A		15.4	C		14.8	B
2	Power Avenue/Davi Avenue	0.05 (SB)	12.1 (SB)	B	0.34	10.9	B	0.32 (SB)	10.7 (SB)	B
3	Railroad Avenue/Civic Avenue	0.46	19.5	B	0.71	31.7	C	0.68	30.6	C
4	Railroad Avenue/Center Drive	0.59 (EB)	27.3 (EB)	D	Not present in future			Not present in future		
5	Railroad Avenue/SR 4 Westbound On-Ramp	**1.2**	**>80**	**F**	0.99	29.5	C	0.97	31.4	C
6	Railroad Avenue/SR 4 Eastbound Ramps	0.66	17.2	B	0.7	20.2	C	0.73	25.5	C
7	Railroad Avenue/Bliss Avenue	0.55	15.4	B	0.67	9.2	A	0.56	18.7	B
8	Railroad Avenue/Leland Road	0.8	33.7	C	0.92	40.5	D	0.82	31.9	C
9	Leland Road/Harbor Street	0.76	33.6	C	0.81	29.2	C	0.78	28.2	C
10	Leland Road/Freed Avenue	0.31 (SB)	42.1 (SB)	E	**0.54 (SB)**	**>50 (SB)**	**F**	0.42 (NB)	44.4 (NB)	E
11	Leland Road/Loveridge Road	0.67	34.8	C	0.65	37.8	D	0.64	28.7	C
12	Loveridge Road/SR 4 Eastbound Ramps	0.53	15	B	0.57	8.2	A	0.51	7.9	A
13	California Avenue/SR 4 Westbound Ramps	0.56	27.3	C	0.60	16.9	B	0.38	17.6	B
14	Harbor Street/California Avenue	0.64	30.9	C	0.87	43.9	D	0.75	32	C
15	Harbor Street/Bliss Avenue	**2.04 (EB)**	**>50 (EB)**	**F**	0.90	23.5	C	0.55	6.0	A
16	Hillcrest Avenue/E. 18th Street	0.8	43.8	D	**1.10**	**>80.0**	**F**	**1.00**	**69.1**	**E**
17	Hillcrest Avenue/Arzate Lane P E Service Center Driveway	0.05 (WB)	17.4 (WB)	C	~~0.10~~ 0.11 (WB)	~~15.6~~ 17.2 (WB)	C	~~0.08~~ 0.09 (WB)	~~13.4~~ 14.6 (WB)	B
18	Sunset Drive/Hillcrest Avenue	0.5	21	C	0.62	~~23.4~~ 25.6	C	~~0.78~~ 0.77	~~22.9~~ 23.8	C
19	SR 4 Westbound Ramps/Hillcrest Avenue	0.96	32.3	C	0.94	~~**39.3**~~ 31.5	~~**D**~~ C	~~**1.14**~~ 1.13	~~**59.6**~~ **65.8**	**E**
20	SR 4 Eastbound Ramps/Hillcrest Avenue	0.98	26.5	C	~~0.96~~ 0.84	~~29.2~~ 31.0	C	~~0.94~~ 0.84	~~22.2~~ 15.4	~~C~~ B

Table 3.2-16
2015 AM Peak Hour Intersection Operations with and without the Proposed Project

		Existing Conditions			2015 No Project			2015 Proposed Project		
#	Intersection	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
21	Larkspur Drive/Hillcrest Avenue	0.79	26.4	C	~~0.88~~ 0.77	~~32.9~~ 34.3	C	~~0.84~~ 0.75	~~23.8~~ 23.5	C
22	Davison Drive/Hillcrest Avenue Deer Valley Road	0.89	43.7	D	~~**1.01**~~ **0.97**	~~**74.2**~~ **61.1**	**E**	~~1.04~~ 0.96	~~79.0~~ 50.1	~~E~~ D
23	E. 18th Street/Viera Avenue	**0.95**	**63.3**	**E**	0.73	27.7	C	0.84	42.2	D
24	E. 18th Street/Willow Avenue	0.64 (NB)	32.7 (NB)	D	0.36 (NB)	15.5 (NB)	C	0.35 (NB)	15.0 (NB)	B
25	Oakley Road/Willow Avenue		9.6	A		8.6	A		9.1	A
26	Phillips Lane/Oakley Road	0.06 (SB)	11.7 (SB)	B	0.17 (SB)	14.1 (SB)	B	0.17 (SB)	14.4 (SB)	B
27	E. 18th Street/Phillips Lane Dirt Driveway	0.02 (NB)	12.5 (NB)	B	0.27 (NB)	12.5 (NB)	B	0.20 (NB)	11.5 (NB)	B
28	SR 4 Westbound Ramps -Mart Driveway/Main Street	**0.88**	**76.5**	**E**	0.84	28.7	C	0.81	28.2	C
29	Main Street/SR 160 NB Ramps	0.62	11.7	B	0.55	22.9	C	0.55	18.6	B
30	Main Street/Neroly Road Bridgehead Road	0.86	36.6	D	0.75	52.1	D	0.75	43.1	D
31	Oakley Road/Neroly Road		**>50**	**F**		29.1	D		33.4	D

So rce Wilbur Smith Associates, April 2008.

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Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldfaced type indicates unacceptable values.

Table 3.2-17
2015 PM Peak Hour Intersection Operations with and without the Proposed Project

		Existing Conditions			2015 No Project			2015 Proposed Project		
#	Intersection	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue W.17th Street/Davi Avenue		8.2	A		17.2	C		13.7	B
2	Power Avenue/Davi Avenue	0.11 (SB)	13.5 (SB)	B	0.33	10.3	B	0.26 (SB)	9.5 (SB)	A
3	Railroad Avenue/Civic Avenue	0.38	13.8	B	0.77	24.8	C	0.67	24	C
4	Railroad Avenue/Center Drive	0.87 (EB)	34.6 (EB)	D	Not present in future			Not present in future		
5	Railroad Avenue/SR 4 Westbound On-Ramp	0.65	16.6	B	0.64	14.8	B	0.57	11.7	B
6	Railroad Avenue/SR 4 Eastbound Ramps	**1.08**	**52.2**	**D**	1.04	47.1	D	0.89	26.7	C
7	Railroad Avenue/Bliss Avenue	0.73	18.1	B	0.77	23.9	C	0.63	20.4	C
8	Railroad Avenue/Leland Road	0.97	48.2	D	1.07	63.5	E	0.96	42.3	D
9	Leland Road/Harbor Street	0.88	42.8	D	0.89	37.6	D	0.75	31.3	C
10	Leland Road/Freed Avenue	**0.94 (NB)**	**>50 (NB)**	**F**	**1.45**	**>50 (NB)**	**F**	**0.75 (NB)**	**>50 (NB)**	**F**
11	Leland Road/Loveridge Road	0.77	31.2	C	0.60	25.2	C	0.53	36.1	D
12	Loveridge Road/SR 4 Eastbound Ramps	0.59	9.8	A	0.48	6.8	A	0.43	6.0	A
13	California Avenue/SR 4 Westbound Ramps	**0.85**	**49.1**	**D**	**0.96**	**40.8**	**D**	0.74	21.2	C
14	Harbor Street/California Avenue	0.82	35.5	D	1.00	52.7	D	0.64	33.3	C
15	Harbor Street/Bliss Avenue	**2.05 (EB)**	**>50 (EB)**	**F**	0.59	10.7	B	0.51	13.2	B
16	Hillcrest Avenue/E. 18th Street	0.87	49.6	D	**0.97**	**64.8**	**E**	0.88	48.2	D
17	Hillcrest Avenue/Arzate Lane P E Service Center Driveway	0.01 (EB)	16.9 (EB)	C	0.20 (EB)	28.6 (EB)	D	0.26 (WB)	20.6 (WB)	C
18	Sunset Drive/Hillcrest Avenue	0.51	24.5	C	~~0.57~~ 0.58	~~23.7~~ 30.8	C	~~0.78~~ **0.75**	~~31.5~~ **>80**	~~C~~ **F**
19	SR 4 Westbound Ramps/Hillcrest Avenue	0.88	16.7	B	~~**0.88**~~ **0.87**	~~**37.8**~~ **38.5**	**D**	~~**0.95**~~ **0.94**	~~**53.2**~~ **41.0**	**D**
20	SR 4 Eastbound Ramps/Hillcrest Avenue	**1.17**	**68.3**	**E**	~~**1.34**~~ **1.19**	**>80**	**F**	~~**1.58**~~ **1.15**	**>80**	**F**

Table 3.2-17
2015 PM Peak Hour Intersection Operations with and without the Proposed Project

		Existing Conditions			2015 No Project			2015 Proposed Project		
#	Intersection	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
21	Larkspur Drive/Hillcrest Avenue	0.86	46.7	D	~~0.75~~ 0.74	~~27.7~~ 24.9	C	~~0.70~~ 0.67	~~24.0~~ 21.5	C
22	Davison Drive/Hillcrest Avenue Deer Valley Road	0.86	45.4	D	~~0.91~~ 0.89	~~54.0~~ 48.3	D	0.84	47.4	D
23	E. 18th Street/Viera Avenue	0.54	18.4	B	0.59	22.2	C	0.57	20.6	C
24	E. 18th Street/Willow Avenue	0.35 (NB)	25.5 (NB)	D	0.17 (NB)	16.0 (NB)	C	0.18 (NB)	16.6 (NB)	C
25	Oakley Road/Willow Avenue		8.5	A		9.3	A		10.4	B
26	Phillips Lane/Oakley Road	0.09 (SB)	11.6 (SB)	B	0.13 (SB)	9.2 (SB)	A	0.13 (SB)	9.2 (SB)	A
27	E. 18th Street/Phillips Lane Dirt Driveway	0.05 (NB)	11.4 (NB)	B	0.23 (NB)	15.0 (NB)	B	0.19 (NB)	15.4 (NB)	C
28	SR 4 Westbound Ramps -Mart Driveway/Main Street	**0.84**	**37.5**	**D**	0.70	21.6	C	0.62	25.9	C
29	Main Street/SR 160 Northbound Ramps	0.93	32.8	C	0.87	27.4	C	0.78	27.2	C
30	Main Street/Neroly Road Bridgehead Road	**1.26**	**>80**	**F**	**1.15**	**>80**	**F**	1.05	77.8	E
31	Oakley Road/Neroly Road		**>50**	**F**		**44**	**E**		**>50**	**F**

So rce Wilbur Smith Associates, April 2008.

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Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldfaced type indicates unacceptable values.

~~*TR-1 1 Improve Davison Drive/Crest Avenue/Deer Valley Road* The intersection operations could be improved to a V/C ratio of 0.78 and LOS D during the AM peak hour through the coordination of the intersection, optimization of signal timing plans, and overlapping of westbound right turning movements. BART would contribute its fair share to upgrade intersection operations to acceptable levels, reducing the impacts to less than significant.~~

TR-1 1 Improve Sunset Drive/Crest Avenue The intersection operations could be improved to a V/C ratio of 0.64 and LOS D during the PM peak hour through the provision of an exclusive right turn lane at the northbound approach and an additional exclusive left turn lane at the westbound approach. This would also require the addition of a third receiving lane along the southern leg of the intersection. BART would contribute its fair share of the actual cost of these improvements.

TR-1 2 Improve Walnut Valley Road/Ferry Road The intersection operations could be improved to a V/C ratio of 0.68 and LOS B during the PM peak hour through the signalization of the intersection. BART would contribute its fair share ~~to upgrade intersection operations to acceptable levels.~~ of the actual costs of this improvement. It should be noted that traffic volumes at this intersection are expected to decline by the year 2030, reducing the impacts to less than significant.

The CCTA and Caltrans have plans to improve the Hillcrest Avenue interchange as a part of the SR 4 widening project. These plans eliminate the intersection of SR 4 Westbound Ramps/Hillcrest Avenue by providing a new northbound to westbound loop on-ramp and improve and widen the approaches to the SR 4 Eastbound Ramps/Hillcrest Avenue intersections. These improvements would mitigate the impacts at the SR 4 Westbound Ramps/Hillcrest Avenue intersections but would not mitigate the impacts at the SR 4 Eastbound Ramps/Hillcrest Avenue intersection. These improvements are prohibitively costly in the near term and there is no identified funding that would allow this project to be completed by the year 2015. It is expected, however, that these improvements would be funded and in place by the year 2030. Further improvements to address the conditions at the SR 4 Eastbound Ramps/Hillcrest Avenue intersection have been studied by the City of Antioch. ~~but have been determined to be infeasible due the potential displacement of homes and commercial property.~~ The most comprehensive evaluation of alternative improvements for the Hillcrest Avenue interchange is the City of Antioch's Northeast Antioch Circulation and Access Study dated May 2,

2005. The following excerpts offer a summary of the alternative improvements that were evaluated in that report

- A-1 *CCTA Ro te i crest En Doc Impro ements B oop on-ramp and reconstr ct EB off-and on-ramps* This is the planned SR 4 widening project for the interchange. The analysis indicated that it would be sufficient to accommodate ear 2030 traffic.

- A-2 *i crest oop ramp co ector distrib tor system it rea igned ar sp r Trega as* The report indicated that the cost of this improvement would be approximately 50 million and that it would have major impacts to an existing commercial center, church, and vacant developable property.

- A-3 *Reconstr ct i crest interc ange as a sing e-point rban interc ange* The report indicated that the cost of this improvement would be approximately 100 million and that it would have insufficient operations benefit on Hillcrest due to the close spacing of the required intersections.

- A-4 *Reconstr ct i crest interc ange a ong an a ignment perpendic ar to Ro te* This option involved the construction of a completely new interchange located to the east of the current interchange. The cost of this project was reported as 150 million and it would involve realignment of Larkspur/Tregallas and acquisition of church, office, commercial, and vacant commercial property (greater than with A-2).

- A-5 *A-1 constr ct a oca nort so t o er-crossing o er Ro te to re ie e i crest traffic* The cost of this option was placed at less than 50 million. It would involve realignment of Larkspur/Tregallas and acquisition of church, office, commercial, and vacant commercial lands.

- A-6 *A-1 constr ct iera A en e ndercrossing* - The cost of this option was placed at less than 50 million. It would involve acquisition of single-family homes and Hillcrest Park parking lot to accommodate the lowering of Larkspur Drive at Viera undercrossing. It would provide no long-term improvement to the Hillcrest interchange.

The study also identified two potential new interchange concepts to address the problem

- B-1 *Re ocate i crest interc ange east to i crest Par* - The cost of this project was identified as approximately 100 million. It would involve tremendous impacts to a residential area due to the new connection with

- Hillcrest Avenue, realignment of local roads and topography, and a major design exception for non-standard interchange spacing.

- B-2 *Ro te Ro te 1 0 Interc ange it oca interc ange P i ips ane* This project involves a new interchange in addition to the Hillcrest Avenue interchange. The cost was identified as less than 150 million. Unlike the other projects A-2 through A-6 and B-1, it would not involve acquisition of existing developed properties south of the freeway, but would require purchase of vacant lands north of the freeway. It would involve a design exception for interchange spacing. The City of Antioch is currently pursuing the approvals to implement this project.

The report also evaluated a series of improvements involving creation of a new interchange at Oakley Road and SR 4/SR 160, coupled with improvements at the East 18th Street interchange. Five of the six options involve new freeway ramps connecting to Oakley Road. The report notes that each of these options involves a major design exception for interchange spacing. Only option C-6, which is termed the *SB East Eig teent ain St oo Ramp option*, would not involve design exceptions. This option involves construction of a new roadway link running parallel to and west of SR 160 between East 18th Street and Oakley Road. The southbound SR 160 on and off-ramps at East 18th Street would then be rebuilt as hook ramps that intersect with this new roadway. This would simplify the East 18th Street interchange and provide a back door access route to the Hillcrest Avenue Station area. Traffic using this new route to access the station would not have to use the Hillcrest Avenue interchange. However, because the roadway network assumed for the ear 2030 in the Draft EIR already assumed a connection from East 18th Street to Oakley Road and Slatten Ranch Road via either Viera Street or Phillips Lane, the traffic forecasts already include the sub-regional benefit of this improvement. There would be a localized improvement in conditions at the East 18th Street interchange, but no improvement at the Hillcrest Avenue interchange beyond that already accounted for in the Draft EIR due to the new connection between East 18th Street and Oakley Road that the City of Antioch is planning. Based on the evaluation of all of the above options, the study concluded that there were three primary options to improve freeway access

1. Major modifications to the SR 4/Hillcrest Avenue interchange, with minor modifications to the SR 160/East Eighteenth interchange;

2. A new interchange at SR 4 and the Phillips Lane extension; and

3. Major modifications to the SR 160/East Eighteenth interchange, with minor modifications to the Hillcrest Avenue interchange.

The City of Antioch and the CCTA have reviewed all of the alternatives that fall under option 1 above for improvements at the SR 4/Hillcrest Avenue interchange. It was concluded that only option A-1 which is the interchange improvement project assumed in this EIR for the ear 2030 is feasible. Option A-2 would provide substantial mitigation beyond that provided by Option A-1, but it has been rejected because of its high cost and major disruption to commercial and residential property in the area. Option A-3, which requires a new freeway ramp connection to Oakley Road, involves significant design exceptions and would only provide minor relief in term of mitigation at the Hillcrest Avenue interchange.

Based on these findings, the City of Antioch has elected to pursue option 2, a new interchange, to be constructed at the extension of Phillips Lane and SR 4 (the Phillips Lane/SR 4 Interchange). While this improvement would help to accommodate the projected traffic growth in the Hillcrest Avenue Station Area, it would not fully mitigate the impacts at the Hillcrest Avenue interchange. As a follow up to this analysis, the City in 2007 initiated the preparation of a Project Study Report with Caltrans for a new interchange to be constructed at the future extension of Phillips Lane and SR 4.

It is important to acknowledge that the proposed Phillips Lane interchange is still speculative, because action on the interchange is still pending before Caltrans, and no funding has been secured for the construction of the interchange. For these reasons, this project was not viewed as a feasible mitigation for the impacts at the SR 4 Eastbound Ramps/Hillcrest Avenue.

During the preparation of the EIR, another alternative was identified to address the impacts at the SR 4 Eastbound Off-Ramp/Hillcrest Avenue intersection. This alternative would involve a realignment of Tregallas Road to bring its eastern terminus at Hillcrest Avenue directly into the intersection of the eastbound SR 4 ramps and Hillcrest Avenue. This would create an intersection which five legs or approaches. In addition

- The signal timing would be designed so that right-turn movements from the SR 4 eastbound off-ramp, Tregallas Road and Larkspur Drive would overlap with through/left-turn movements to improve operations.

- Larkspur Drive would be changed to a right-in/right-out operation only. Hence, the southbound left turn from Hillcrest Avenue into Larkspur Drive would be eliminated along with the eastbound turn movement along the SR 4 eastbound off-ramp and Tregallas Drive.

This alternative would provide improved traffic operations and prevent queues on the eastbound SR 4 ramps from extending into the mainline of the freeway.

It would adversely impact access and egress for the residential neighborhood served by Larkspur Drive. It also would conflict with one of the towers supporting the high voltage electrical lines which pass through the area.

A queuing analysis was performed by conducting traffic simulations of the operation of all the study intersections in the Hillcrest Avenue interchange area. This analysis also allows the optimization of the signal timing and coordination in the area. The analysis indicated that the queuing on the SR 4 Eastbound ramps in the PM peak hour could be reduced substantially with signal improvements. With implementation of the mitigation measures below, the impacts would be reduced. For example, the ramp would be 1,360 feet in length and the maximum estimated queue would be 820 feet, no longer extending into the mainline of the freeway. Without the signal timing improvements, the estimated queues were over 2,400 feet in length. However, even with the signal timing improvements, the level of service at the SR 4 Eastbound Ramps/Hillcrest Avenue intersection would remain at level of service F. As a result, the impacts at this location would be substantially reduced but would still be significant and unavoidable.

It is important to note that BART, the CCTA, and the City of Antioch continue to work with Caltrans to seek solutions to the traffic impacts at this interchange. Plans for the widening of SR 4 in this area are subject to review and refinement to address funding issues and the need to accommodate the Proposed Project. Also, the recent opening of the SR 4 Bypass has altered traffic patterns in the area. Once these changes are better understood, minor changes in geometrics and traffic signal timing and coordination modifications may serve to lessen the impacts at this location. However, all the parties involved have yet to find a feasible solution to the cumulative growth in traffic at this location. Thus, the impact at these two intersections is assumed to remain significant and unavoidable in the ear 2015. (SU)

TR-1 *i crest A en e Interc ange Area Traffic Signa Impro ements*. The traffic signals of the Hillcrest Avenue interchange area shall be interconnected and a coordinated traffic signal optimization plan which is designed to limit the queuing on the SR 4 eastbound off-ramp shall be implemented. The intersections to be included are Hillcrest Avenue/Arzate Lane P E Service Center Driveway, Sunset Drive/Hillcrest Avenue, SR 4 Westbound Ramps/Hillcrest Avenue, SR 4 Eastbound Ramps/Hillcrest Avenue, Larkspur Drive/Hillcrest Avenue, and Davison Drive/Hillcrest Avenue Deer Valley Road. Modification of the above signal operations by year 2015 is the responsibility of the City of Antioch. BART would contribute its fair share of the actual costs of signal interconnection

and development of an optimization plan. In the year 2030, the intersection of SR 4 Westbound Ramps/Hillcrest Avenue would no longer exist due to the planned interchange improvements and a new intersection at SR 4 Westbound/Sunset Drive would be added to the signal system.

Impact TR-2 *it t e Proposed Project in ear 20 0 ~~eig t~~ se en intersections o d operate at nacceptab e e e s d ring one of t e pea periods and ~~t ree intersections~~ one intersection o d operate at nacceptab e e e s d ring bot t e A and P pea periods Compared to t e o Project conditions t e Proposed Project o d orsen t e e e of ser ice at t ree of t ese intersections a significant effect S*

During the ear 2030 AM peak hour, future conditions with the Proposed Project would result in unacceptable levels of service at ~~four~~ two of the study area intersections. However, ~~three~~ both of the intersections, Leland Road/Freed Avenue~~,~~

~~Larkspur Drive/Hillcrest Avenue,~~ and Davison Drive/Hillcrest Avenue Deer Valley Road, would operate better under the Proposed Project conditions than under the No Project conditions. Thus, no significant impacts would occur at any of the study intersections during the AM peak under 2030 Proposed Project conditions. ~~Three other intersections, Railroad Avenue/SR 4 Westbound Ramps, Hillcrest Avenue/E. 18th Street, and Harbor Street/California Avenue, would improve from unacceptable conditions under the No Project scenario to acceptable conditions under the Proposed Project. A significant impact would occur at the following intersection~~

- ~~**SR 4 Eastbound Ramps/Hillcrest Avenue** Under 2030 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.12 and LOS E during the AM peak hour, worse than both existing and 2030 No Project conditions. About 4.2 percent of the volume at this intersection could be attributed to the Proposed Project.~~

During the PM peak hour, the Proposed Project in 2030 would result in unacceptable levels of service at seven of the study area intersections. However, four of the intersections, Leland Road/Freed Avenue, California Avenue/SR 4 Westbound Ramps, Harbor Street/California Avenue, and Davison Drive/Hillcrest Avenue Deer Valley Road, would operate better under the Proposed Project conditions than under the No Project conditions. Two other intersections, Railroad Avenue/SR 4 Eastbound Ramps and Leland Road/Harbor Street, would improve from unacceptable conditions under the No Project scenario to acceptable conditions under the Proposed Project. Significant impacts would occur at three intersections

- **Hillcrest Avenue/E. 18th Street** Under 2030 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.00 and LOS E during the PM peak hour. The intersection would operate worse than both existing and 2030 No Project conditions. About 0.6 percent of the volume at this intersection could be attributed to the Proposed Project.
- **Sunset Drive/Hillcrest Avenue** Under 2030 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.11 and LOS F during the PM peak hour. This intersection would operate worse than both existing and 2030 No Project conditions. About 17.2 percent of the volume at this intersection could be attributed to the Proposed Project.
- **SR 4 Eastbound Ramps/Hillcrest Avenue** Under 2030 Proposed Project conditions, this intersection would operate at a V/C ratio of 1.72 and LOS F during the PM peak hour. This intersection would operate worse than both existing and 2030 No Project conditions. About 7.9 percent of the volume at this intersection could be attributed to the Proposed Project.

Only one of these intersections, Sunset Drive/Hillcrest Avenue, would operate significantly worse (i.e., a degradation of one or more levels of service) than under No Project conditions and deteriorate from existing conditions. The intersections of Hillcrest Avenue/E. 18th Street and SR 4 Eastbound Ramps/Hillcrest Avenue would also operate worse under the Proposed Project compared to the No Project conditions. Intersection configurations and turning movement volumes are shown in Figure 3.2-17 and Figure 3.2-18 for the Railroad Avenue and Hillcrest Avenue area intersections, respectively. A comparison of existing conditions and the ear 2030 with and without project scenarios is presented in Table 3.2-18 (AM Peak) and Table 3.2-19 (PM Peak).

Under the ear 2030 conditions, ten of the 31 study intersections would not satisfy the Traffic Service Objectives in the East County Action Plan for both the Proposed Project and No Project conditions. One additional intersection, Railroad Avenue/SR 4 Eastbound Ramps, would not satisfy the objectives for the No Project condition but would satisfy them for the Proposed Project condition. The intersections that would not meet the Traffic Service Objectives are

- 5 Railroad Avenue/SR 4 Westbound On-Ramp
- 6 Railroad Avenue/SR 4 Eastbound Ramps
- 8 Railroad Avenue/Leland Road
- 9 Leland Road/Harbor Street
- 10 Leland Road/Freed Avenue
- 16 Hillcrest Avenue/East 18th Street
- 18 Sunset Drive/Hillcrest Avenue
- 20 SR 4 Eastbound Ramps/Hillcrest Avenue
- 21 Larkspur Drive/Hillcrest Avenue
- 22 Davison Drive/Hillcrest Avenue Deer Valley Road
- 30 Main Street/Neroly Road Bridgehead Road

The Proposed Project would worsen conditions at two of these intersections, SR 4 Eastbound Ramps/Hillcrest Avenue and Sunset Avenue/Hillcrest Avenue, as has been already discussed.

MITI ATION MEASURES. The following measures, along with Mitigation Measure TR-1.1, above, would improve operations at two of the three congested intersections to acceptable LOS. BART would need to participate and coordinate with local jurisdictions in implementing these improvements and, if necessary, contribute its fair share of funding. As a result, impacts at

Hillcrest Avenue/E. 18th Street and Sunset Drive/Hillcrest Avenue would be reduced to less than significant. (LTS)

TR-2.1 Improve Hillcrest Avenue/E. 18th Street The intersection operations could be improved to a V/C ratio of 0.87 and LOS D during the PM peak hour through the provision of an exclusive right turn lane along the eastbound approach. BART would contribute its fair share ~~to upgrade intersection operations to acceptable levels.~~ of the actual costs of this improvement.

~~*TR-2.2 Improve Sunset Drive/Hillcrest Ave.* The intersection operations could be improved to a V/C ratio of 0.81 and LOS D during the PM peak hour through the provision of an exclusive right turn lane at the northbound approach and an additional exclusive left turn lane at the westbound approach. BART would contribute its fair share to upgrade intersection operations to acceptable levels.~~

For the reasons identified in the mitigation discussion for Impact TR-1, physical improvements to reduce impacts at the intersection of SR 4 Eastbound Ramps/Hillcrest Avenue are considered infeasible. However, a queuing analysis was performed by conducting traffic simulations of the operation of all the study intersections in the Hillcrest Avenue interchange area. This analysis also allows the optimization of the signal timing and coordination in the area. The analysis indicated that the queuing on the SR 4 Eastbound ramps in the PM peak hour could be reduced substantially with signal improvements as recommended by Mitigation Measure TR-1.3 earlier. The only difference to circumstances in year 2015 is that in year 2030 the intersection of SR 4 Westbound Ramps/Hillcrest Avenue would no longer exist due to the planned intersection improvement and the new intersection SR 4 Westbound/Sunset Drive that would be added to the signal system. The impacts would still be significant; for example, the ramp would be 1,360 feet in length, and the maximum estimated queue would be 1,430 feet, extending into the mainline of the freeway. The simulation also showed that these extended queues would be experienced for a relatively short portion of the peak hour. Without the signal timing improvements the estimated queues were over 2,200 feet in length. It is the intent of BART, Caltrans, and the City of Antioch to continue to work towards a traffic solution for this interchange. In light of these continuing efforts, Mitigation Measure TR-2.2 is proposed, although given the uncertainty about the ability to identify a mutually acceptable solution, ~~As a result,~~ the impact at this intersection would remain significant and unavoidable. (SU)

TR-2.2 Contribute to Hillcrest Avenue Interchange Improvements BART shall pay its fair share of reasonable and feasible physical or operational improvements at the Hillcrest Avenue interchange which

are developed and agreed to by BART, Caltrans, and the City of Antioch in order to address the identified impacts.

Impact TR- *nder 201 Proposed Project conditions t o of t e free ay st dy segments o d operate orse t an S E d ring t e estbo nd A pea o r o e er a segments o d operate at an S e a to or better t an 201 o Project conditions Conse ent y t e Proposed Project o d a e a beneficia impact on t e f t re base ine free ay conditions in 201 B*

Freeway segment operating conditions in ear 2015 with and without the Proposed Project are summarized in Table 3.2-20 for the AM peak hour and in Table 3.2-21 for the PM peak hour. During the Opening ear with the Proposed Project, two of the study segments in the westbound direction would operate at unacceptable levels during the AM peak hour

- West of Bailey Road
- Bailey Road Railroad Avenue

However, these segments operate no worse under Proposed Project conditions than under the No Project scenario. The remaining segments show an improvement in LOS compared to No Project conditions. The improvement in LOS would occur due to trips on SR 4 that would be diverted to the new transit service offered by the Proposed Project. This diversion would be the result of the new transit trips associated with the Proposed Project, as well as trips by existing BART users that would opt to use the Hillcrest Avenue or Railroad Avenue Stations instead of driving to the Pittsburg/Bay Point Station.

During the PM peak hour, no segments would operate at unacceptable levels. In the Proposed Project scenario, all segments would perform better than under the No Project scenario. As a result, during the PM peak hour, the Proposed Project would have a beneficial effect on freeway operations. As such, the Proposed Project would support the Traffic Service Objectives for SR 4 in the East County Action Plan. The reduced traffic due to the project would improve the delay index and would increase transit ridership.

Impact TR- nder 20 0 Proposed Project conditions eig t of t e free ay st dy segments o d operate orse t an S E d ring t e estbo nd A pea o r and six segments o d operate orse t an S E d ring t e eastbo nd P pea o r o e er a segments o d operate at an S e a to or better t an 20 0 o Project conditions As a res t t e Proposed Project o d a e a beneficia impact on free ay operations compared to t e o Project conditions in 20 0 B

Under Proposed Project conditions in ear 2030, the same eight segments that operate at unacceptable LOS in the No Project scenario also operate at unacceptable LOS with the Proposed Project in the AM peak hour. During the PM peak hour, six of the segments operate at unacceptable levels under Proposed Project conditions in ear 2030. However, these same six segments would also operate at unacceptable levels under No Project conditions. Most of the remaining segments show improvement in operating LOS compared to No Project conditions for both AM and PM peak hours. The freeway segment operating conditions are summarized in Table 3.2-22 (AM peak) and Table

3.2-23 (PM peak). Based on the standards of significance, the Proposed Project would not result in freeway impacts in the ear 2030, since freeway operations would be the same or better compared to No Project conditions. In

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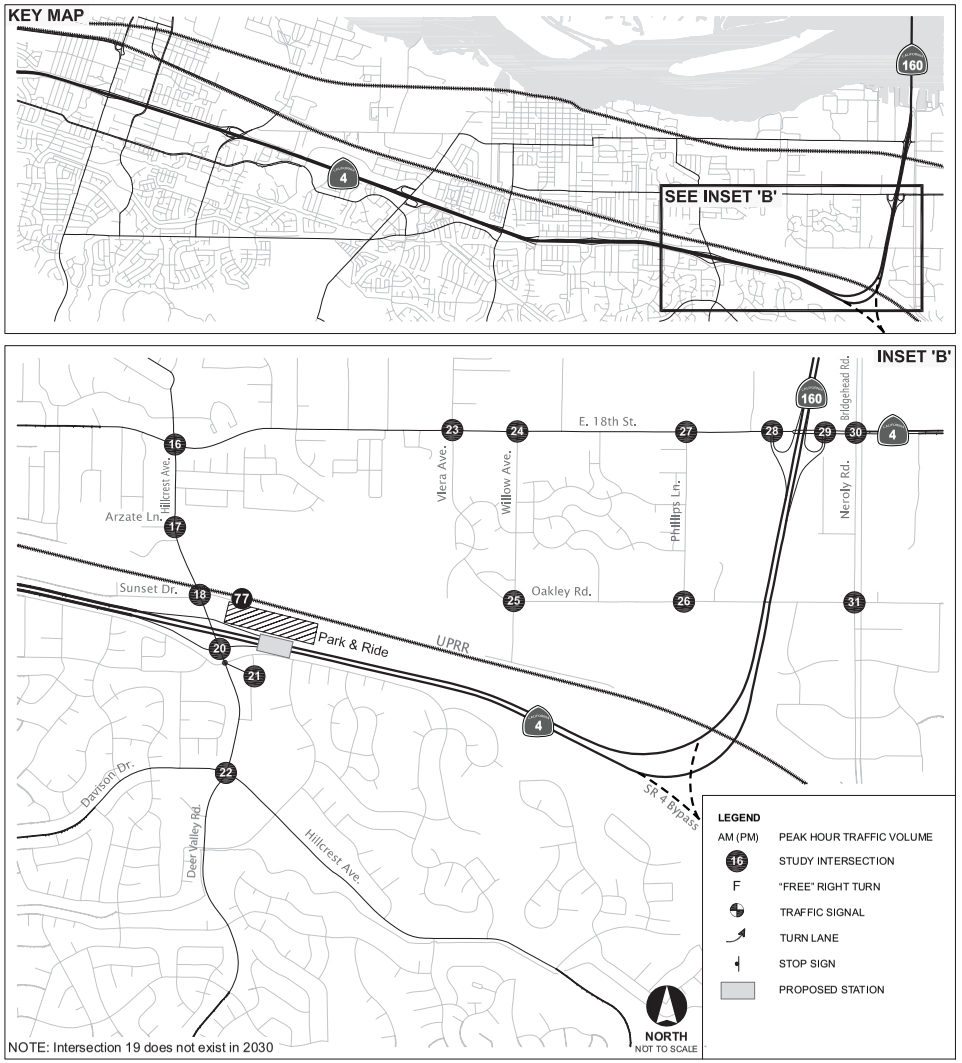

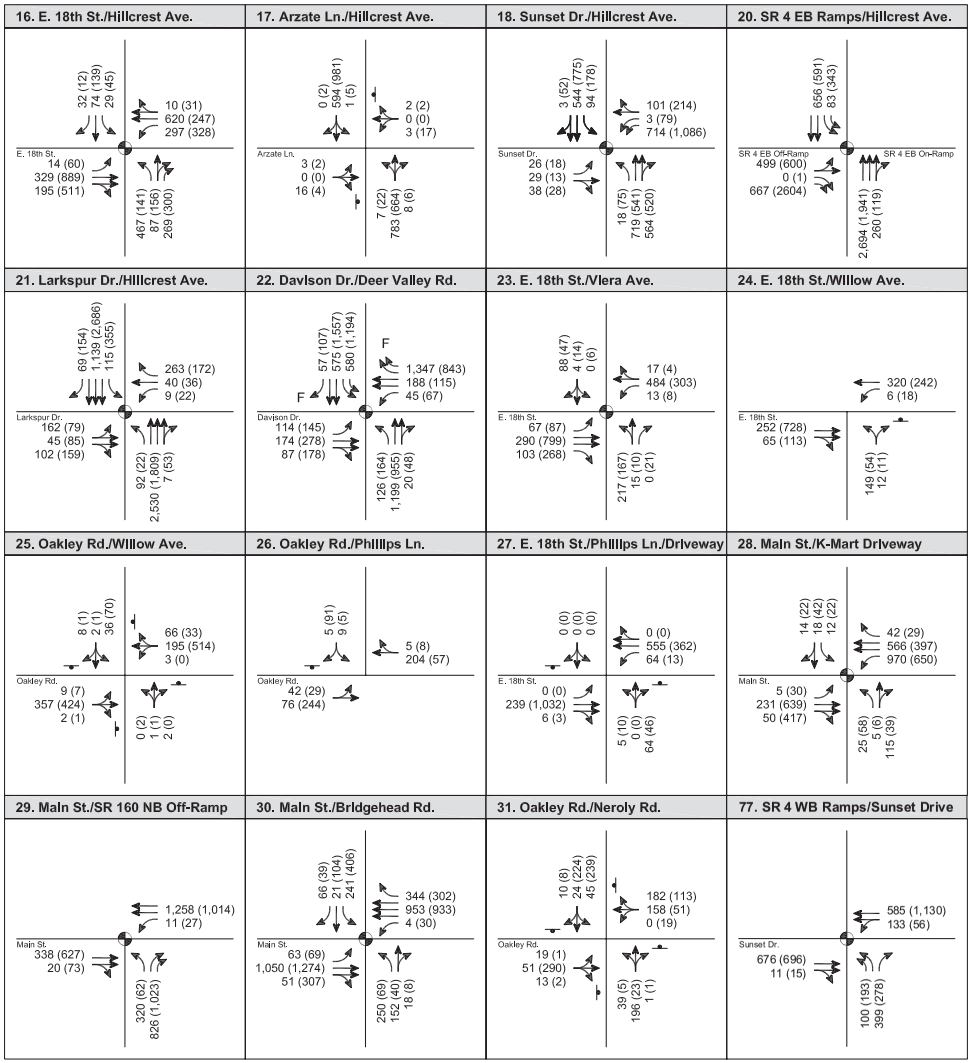

Source: WSA, 2008.

HILLCREST AVENUE STATION AREA INTERSECTIONS - 2030 PROPOSED PROJECT CONDITIONS

FIGURE 3.2-18

Table 3.2-18
2030 AM Peak Hour Intersection Operations with and without the Proposed Project

		Existing Conditions			2030 No Project			2030 Proposed Project		
#	Intersection	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue W.17th Street/Davi Avenue		7.8	A		27.2	D		19.7	C
2	Power Avenue/Davi Avenue	0.05 (SB)	12.1 (SB)	B	0.44	12.4	B		11.5	B
3	Railroad Avenue/Civic Avenue	0.46	15.7	B	0.85	43.2	D	0.74	31.9	C
4	Railroad Avenue/Center Drive	0.59 (EB)	27.3 (EB)	D	Not present in future			Not present in future		
5	Railroad Avenue/SR 4 Westbound On-Ramp	**1.2**	**>80**	**F**	**1.33**	**>80**	**F**	1.05	45	D
6	Railroad Avenue/SR 4 Eastbound Ramps	0.66	17.3	B	0.85	21.4	C	0.75	21.3	C
7	Railroad Avenue/Bliss Avenue	0.55	15.3	B	0.94	23.7	C	0.69	18.7	B
8	Railroad Avenue/Leland Road	0.8	33.7	C	0.93	55.6	E	0.9	45	D
9	Leland Road/Harbor Street	0.76	33.6	C	**1.15**	**>80**	**F**	0.91	40.8	D
10	Leland Road/Freed Avenue	0.31 (SB)	42.1 (SB)	E	**3.18**	**>50 (SB)**	**F**	**1.41 (SB)**	**>50 (SB)**	**F**
11	Leland Road/Loveridge Road	0.67	34.8	C	0.75	42.6	D	0.7	40.6	D
12	Loveridge Road/SR 4 Eastbound Ramps	0.53	15	B	0.77	13.2	B	0.64	10.2	B
13	California Avenue/SR 4 Westbound Ramps	0.56	27.3	C	0.81	36.1	D	0.71	20.5	C
14	Harbor Street/California Avenue	0.64	30.9	C	**1.09**	**>80**	**F**	0.83	41.4	D
15	Harbor Street/Bliss Avenue	**2.04 (EB)**	**>50 (EB)**	**F**	1.05	47.1	D	0.63	9.6	A
16	Hillcrest Avenue/E. 18th Street	0.8	43.8	D	**0.93**	**60.2**	**E**	0.9	47.7	D
17	Hillcrest Avenue/Arzate Lane P E Service Center Driveway.	0.05 (WB)	17.4 (WB)	C	~~0.03~~ 0.04 (WB)	~~12.4~~ 14.8 (WB)	B	~~0.09~~ 0.04 ~~(EB)~~ (WB)	~~11.7~~ 15.5 ~~(EB)~~ (WB)	~~B~~ C
18	Sunset Drive/Hillcrest Avenue	0.5	21	C	~~0.78~~ 0.89	~~31.7~~ 47.3	~~C~~ D	~~0.87~~ 0.91	~~32.3~~ 53.0	C

Table 3.2-18
2030 AM Peak Hour Intersection Operations with and without the Proposed Project

		Existing Conditions			2030 No Project			2030 Proposed Project		
#	Intersection	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
19	SR 4 Westbound Ramps/Hillcrest Avenue	0.96	32.3	C	Not present in future			Not present in future		
20	SR 4 Eastbound Ramps/Hillcrest Avenue	0.98	26.5	C	~~1.04~~ 0.90	~~52.8~~ 24.4	~~D~~ C	~~1.12~~ 0.91	~~56~~ 30.2	~~E~~ C
21	Larkspur Drive/Hillcrest Avenue	0.79	26.4	C	~~**1.09**~~ **0.96**	~~**67.1**~~ **35.5**	~~**E**~~ **D**	~~**1.04**~~ 0.90	~~**63.4**~~ 30.0	~~**E**~~ C
22	Davison Drive/Hillcrest Avenue Deer Valley Road	0.89	43.7	D	~~**1.15**~~ **1.16**	**>80**	**F**	**1.15**	**>80**	**F**
23	E. 18th Street/Viera Avenue	**0.95**	**63.3**	**E**	0.85	47.1	D	0.85	44.9	D
24	E. 18th Street/Willow Avenue	0.64 (NB)	32.7 (NB)	D	0.54 (NB)	26.1 (NB)	D	0.54 (NB)	25.1 (NB)	D
25	Oakley Road/Willow Avenue		9.6	A		14.2	B		14.3	B
26	Phillips Lane/Oakley Road	0.06 (SB)	11.7 (SB)	B	0.05 (SB)	10.9 (SB)	B	0.04 (SB)	11.0 (SB)	B
27	E. 18th Street/Phillips Lane Dirt Driveway	0.02 (NB)	12.5 (NB)	B	0.09 (NB)	10.4 (NB)	B	0.14 (NB)	10.5 (NB)	B
28	SR 4 WB Ramps -Mart Driveway/Main Street	**0.88**	**76.5**	**E**	0.84	26.0	C	0.76	18.8	B
29	Main Street/SR 160 Northbound Ramps	0.62	11.7	B	0.73	19.3	B	0.67	21.8	C
30	Main Street/Neroly Road Bridgehead Road	0.86	36.6	D	0.79	42.0	D	0.77	36.4	D
31	Oakley Road/Neroly Road		**>50**	**F**		15.6	C		12.1	B
77	SR 4 Westbound Ramps/Sunset Drive		Not present		0.33	9.5	A	0.56	11.8	B

So rce Wilbur Smith Associates, December 2007.

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Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldfaced type indicates unacceptable values.

Table 3.2-19
2030 PM Peak Hour Intersection Operations with and without the Proposed Project

#	Intersection	Existing Conditions			2030 No Project			2030 Proposed Project		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1	Civic Avenue W.17th Street/Davi Avenue		8.2	A		32.4	D		17	C
2	Power Avenue/Davi Avenue	0.11 (SB)	13.5 (SB)	B	0.38	11	B		10.3	B
3	Railroad Avenue/Civic Avenue	0.38	13.8	B	0.74	26.4	C	0.62	25.3	C
4	Railroad Avenue/Center Drive	0.87 (EB)	34.6 (EB)	D	Not present in future			Not present in future		
5	Railroad Avenue/SR 4 Westbound On-Ramp	0.65	16.6	B	0.9	24.2	C	0.7	18.5	B
6	Railroad Avenue/SR 4 Eastbound Ramps	**1.08**	**52.2**	**D**	**1.11**	**56.4**	**E**	0.99	32	C
7	Railroad Avenue/Bliss Avenue	0.73	18.1	B	0.93	30.1	C	0.93	33.1	C
8	Railroad Avenue/Leland Road	0.97	48.2	D	**1.27**	**>80**	**F**	1.15	67.8	E
9	Leland Road/Harbor Street	0.88	42.8	D	**1.03**	**71.7**	**E**	0.91	41	D
10	Leland Road/Freed Avenue	**0.94 (NB)**	**>50 (NB)**	**F**	**7.38**	**>50 (NB)**	**F**	**2.65 (NB)**	**>50 (NB)**	**F**
11	Leland Road/Loveridge Road	0.77	31.2	C	0.71	32.8	C	0.59	26.7	C
12	Loveridge Road/SR 4 Eastbound Ramps	0.59	9.8	A	0.71	7.2	A	0.47	8.9	A
13	California Avenue/SR 4 Westbound Ramps	**0.85**	**49.1**	**D**	**1.24**	**>80**	**F**	**1.10**	**77.9**	**E**
14	Harbor Street/California Avenue	0.82	35.5	D	**1.3**	**>80**	**F**	**1.09**	**73.9**	**E**
15	Harbor Street/Bliss Avenue	**2.05 (EB)**	**>50 (EB)**	**F**	0.7	17.3	B	0.51	15.3	B
16	Hillcrest Avenue/E. 18th Street	0.87	49.6	D	**0.99**	**72.9**	**E**	**1.00**	**73.7**	**E**
17	Hillcrest Avenue/Arzate Lane P E Service Center Dwvy.	0.01 (EB)	16.9 (EB)	C	**0.19 (WB)**	**19.5 (WB)**	**C**	0.18 (WB)	19.0 (WB)	C
18	Sunset Drive/Hillcrest Avenue	0.51	24.5	C	0.88	~~40.6~~ 39.7	D	~~**1.11**~~ **1.17**	**>80**	**F**
19	SR 4 Westbound Ramps/Hillcrest Avenue	0.88	16.7	B	Not present in future			Not present in future		

Table 3.2-19
2030 PM Peak Hour Intersection Operations with and without the Proposed Project

#	Intersection	Existing Conditions			2030 No Project			2030 Proposed Project		
		V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
20	SR 4 Eastbound Ramps/Hillcrest Avenue	**1.17**	**68.3**	**E**	~~**1.64**~~ **1.14**	**>80**	**F**	~~**1.72**~~ **1.21**	**>80**	**F**
21	Larkspur Drive/Hillcrest Avenue	0.86	46.7	D	0.9	~~38.4~~ 28.8	~~D~~ C	~~0.85~~ 0.84	~~33.5~~ 23.7	C
22	Davison Drive/Hillcrest Avenue Deer Valley Road	0.86	45.4	D	**0.98**	**67.0**	**E**	**0.92**	**55.6**	**E**
23	E. 18th Street/Viera Avenue	0.54	18.4	B	0.57	18.2	B	0.57	17.2	B
24	E. 18th Street/Willow Avenue	0.35 (NB)	25.5 (NB)	D	0.25 (NB)	22.0 (NB)	C	0.29 (NB)	23.0 (NB)	C
25	Oakley Road/Willow Avenue		8.5	A		29.6	D		34.8	D
26	Phillips Lane/Oakley Road	0.09 (SB)	11.6 (SB)	B	0.15 (SB)	9.4 (SB)	A	0.13 (SB)	9.3 (SB)	A
27	E. 18th Street/Phillips Lane Dirt Driveway.	0.05 (NB)	11.4 (NB)	B	0.20 (NB)	26.4 (NB)	D	0.29 (NB)	23.6 (NB)	C
28	SR 4 Westbound Ramps -Mart Driveway/Main Street	**0.84**	**38.3**	**D**	0.80	36.7	D	0.85	32.2	C
29	Main Street/SR 160 Northbound Ramps	0.93	32.8	C	0.76	35.7	D	0.66	18.4	B
30	Main Street/Neroly Road Bridgehead Road	**1.26**	**>80**	**F**	0.93	50.6	D	0.88	48.8	D
31	Oakley Road/Neroly Road		**>50**	**F**		24.6	C		23.2	C
77	SR 4 Westbound Ramps/Sunset Drive		Not present		0.46	10.0	B	0.65	15.0	B

So rce Wilbur Smith Associates, December 2007.

otes

Delay presented in seconds per vehicle.

Delay and LOS presented for worst approach for two-way stop controlled intersections.

Boldfaced type indicates unacceptable values.

fact, because some segments would operate better than under No Project conditions, the Proposed Project would have a beneficial effect on freeway operations in 2030. The improvement in LOS would occur because trips on SR 4 would be diverted to the new transit service offered by the Proposed Project. As such, the Proposed Project would support the Traffic Service Objectives for SR 4 in the East County Action Plan. The reduced traffic due to the project would improve the delay index and would increase transit ridership.

Impact TR- *T e projected 20 0 BART riders ip it t e Proposed Project o d not exceed t e practica capacity of t e Concord ine bet een Pittsb rg Bay Point and SF ic is expected to carry t e greatest n mber of riders from t e Proposed Project TS*

To estimate future demands on BART capacity, the number of passengers on a given train at specific points in time (known as line loads) were calculated using system ridership projections without the Proposed Project. Line loads refer to the number of passengers on a given train at specific points in time. Table 3.2-24 presents trips during the AM peak hour along the Concord Line in the westbound direction, which runs from Pittsburg/Bay Point to Daly City; Table 3.2-25 shows the PM peak hour trips in the opposite direction (from Daly City to Pittsburg/Bay Point). It should be noted that as of anuary 2008, the Concord Line runs past Daly City to SFO. Both tables show the future condition of the system in 2030 and compare the ridership levels for the No Project and Proposed Project scenarios. In the year 2030 it was assumed that there would be ten trains, each ten cars in length, during the peak hour in the peak direction on the Concord Line. This assumption is based on a system total of 31 trains per hour in the peak direction in the Transbay Tube which is considered the current maximum number of trains that the Transbay Tube can accommodate.

According to Table 3.2-24, the maximum load point for the morning commute would be between the 19th and 12th Street/Oakland Stations, while Table 3.2-25 shows the segment between West Oakland Station and the 12th Street/Oakland Station as the highest load point for the afternoon commute. The Proposed Project would increase the ridership by 557 passengers during the AM peak hour in Downtown Oakland, or a roughly 5 percent increase in total ridership during peak hour. Figure 3.2-19 and Figure 3.2-20 show the difference between No Project and Proposed Project scenarios in the average train load and the number of passengers boarding/alighting at each station. These figures reflect the additional passengers that would result from the Proposed Project.

Additionally, these figures show that most of the new riders would board and/or alight in the Downtown Oakland area, including the MacArthur, 19th

Street/Oakland, and 12th Street/Oakland City Center Stations, and in the San Francisco Financial District, including the Embarcadero and Montgomery Street Stations. As expected, the average train load would be higher at the

each side of the car next to the new doors be removed for a total reduction of eight seats per vehicle, resulting in a total of 59 seats in each vehicle. The new open area, including the area vacated by the removed seats, and the more efficient use of the contiguous aisle area would increase the number of passengers that could be accommodated. As a result, a net increase of 12 additional persons per vehicle could be accommodated, increasing the practical capacity of each vehicle to 124 persons. This increases the acceptable load factor to 2.10.

- **Increased Train Frequencies –** The ability to move trains through the Transbay Tube in large part determines the overall capacity of the BART system. Currently, BART is able to move 21 22 trains per hour through the tube in the peak direction. Efforts are underway at BART to increase this volume to 31 trains per hour.

As shown in Table 3.2-26, during the AM peak hour, the system would not exceed the practical capacity load factor of 2.10 with a load factor of 1.91 with the proposed project. The highest load factor would occur in the PM peak hour traveling eastbound, when trains departing the Embarcadero under the Proposed Project condition would have an estimated load factor of 2.02, compared to 1.95 for the No Project condition. Thus, the forecast load conditions in the year 2030 would not exceed the load factor of 2.10 which represents practical system capacity and impacts on BART system capacity would be less than significant.

Impact TR- oca transit ser ices o d not experience decreased ser ice a ity or prod cti ity as a res t of t e Proposed Project TS

Ridership on buses along or near the project corridor, particularly on express services between the Pittsburg/Bay Point BART Station and the Pittsburg and Antioch Park-and-Ride Lots, are expected to decline as riders shift to the Proposed Project. On the other hand, ridership on feeder routes to the Proposed Project stations is expected to increase. In coordination with Tri Delta Transit, a conceptual plan for service revisions was developed that would eliminate competing bus service on SR 4, provide connections to the proposed DMU stations, and improve overall transit connectivity in the East County. More information on this plan is provided in Section 2, Project Description (see Interface with Existing Transit Service). Tri Delta Transit is planning to reconfigure existing routes to provide increased service to the Proposed Project's stations in response to this demand. ~~Tri Delta Transit is planning to reconfigure existing routes to provide increased service to the proposed eBART stations in response to this demand.~~ These changes would involve the elimination of existing express bus services on SR 4 between the Pittsburg/Bay Point BART Station and the new Hillcrest Avenue Station. Tri Delta plans to

use the buses removed from SR 4 express services to improve bus service to the Railroad Avenue and Hillcrest Avenue Stations, as well as to improve other local transit services. As a result, local transit services, including those routes operated by Tri Delta Transit, would not experience increased ridership exceeding system capacity.

Impact TR-8 *The Proposed Project would generally not affect existing or planned pedestrian or bicycle circulation or accessibility in the project corridor; however, sidewalks and bicycle lanes at the Hillcrest Avenue/Sunset Drive intersection could be impacted. Accordingly, the Proposed Project would have a potentially significant effect on pedestrians and bicyclists. (PS)*

The Proposed Project alignment, station locations, parking, and maintenance facilities would neither disrupt existing pedestrian or bicycle pathways nor impede the planned improvements identified in Table 3.2-11 and Figure 3.2-8 (Proposed Bicycle Facilities). This includes the Delta De Anza Regional Trail, which crosses the project corridor west of the Proposed Project, and other EBRPD facilities. As a result, the Proposed Project would not adversely affect pedestrian or bicycle travel.

Railroad Avenue Station Area. The Proposed Project is expected to generate a significant number of walking and biking trips to and from the stations (see Table 3.2-15). These modes of access to the station are especially notable at the proposed Railroad Avenue Station, which is expected to have 30 percent of the Proposed Project passengers arriving and departing by non-motorized modes. In the year 2030, this represents 266 pedestrian round trips and 19 bicycle round trips arriving at the station each weekday. In addition, the passengers arriving by auto would be walking to the station from where they parked or were dropped off. Both sides of Railroad Avenue have access to the DMU platform with stairs and elevator (see Figure 2-7). However, t~~T~~he design of the Railroad Avenue Station recognizes that the sidewalk along the west ~~east~~ side of the Railroad Avenue overcrossing of SR 4 is only 5 feet in width. The proposed station design provides additional sidewalk width in the vicinity of the station entrances. Though the station design includes safety railings that would occupy 6 to 8 inches along each sidewalk curb, the design ~~and~~ avoids construction of other physical elements that would reduce the effective width of the existing sidewalk. Also, the layout of the station platform makes it more convenient to access the station from the east side of Railroad Avenue where the sidewalk is 10 feet wide.

As identified earlier, there are a number of street segments in the vicinity of the Railroad Avenue Station that lack sidewalks either on one or both sides. The Railroad Avenue Specific Plan prepared by the City of Pittsburg calls for a comprehensive program of sidewalk improvements which would result in construction of sidewalks for all the identified sidewalk gaps and upgrading the existing sidewalks in the area to a 10-foot width (with the exception of the sidewalk on the west side of the Railroad Avenue bridge over SR 4). If widening this sidewalk, which is now 5 feet in width, required a physical widening of the bridge, it could be prohibitively expensive. Other design

solutions, such as narrowing the traffic lanes to expand the sidewalk, may be feasible. BART is committed to cooperating with the City of Pittsburg and others in their efforts to enhance safety and security on the Railroad Avenue overpass sidewalks. There are currently sidewalks in the station area on both sides of the primary streets that provide access to the station. One notable exception is Bliss Avenue which lacks sidewalks on either side between Railroad Avenue and Harbor Street. As the park-and-ride parking facility for the station is located on this street segment, it would be critical that the north side sidewalks on this street are completed by the time the Railroad Avenue Station opens.

The Specific Plan also calls for improvement to bicycle facilities on Railroad Avenue which in coordination with the existing bicycle lanes on Harbor Street would link the Railroad Avenue Station with the major existing and planned east-west bicycle facilities located both north and south of the station.

~~The Proposed Project along with the cities of Pittsburg and Antioch that will adopt transit oriented development plans that specifically call for strong linkages between the surrounding development and the stations are expected to enhance the network of pedestrian and bicycle facilities.~~

Hillcrest Avenue Station Area. The primary access route for pedestrians and bicyclists to the Hillcrest Avenue Station would be Hillcrest Avenue. The linkage to the station from Hillcrest Avenue would be via improvements to existing Sunset Drive by BART. Hillcrest Avenue lacks a sidewalk along its western side between Sunset Avenue and East 18th Street. While it would be desirable to complete this sidewalk, there is an adequate sidewalk along the east side of the street which is closest to the Hillcrest Avenue Station. The City of Antioch has prepared a Ridership Development Plan for the Hillcrest Station Area. This plan includes new roadway facilities such as Slatten Ranch Road, Phillips Lane, and Viera Avenue that will provide access to the Hillcrest Avenue Station. These new roads are planned to have sidewalks on both sides and bicycle lanes. The CCTA is planning a redesign of the Hillcrest Avenue interchange with SR 4. This redesign takes into consideration the needs of pedestrians and bicyclists; however, with the plan to locate the Hillcrest Avenue Station near this interchange, it is important that the new design for the interchange include adequate sidewalks and facilities for bicyclists.

MITIGATION MEASURE. The following measure to be implemented along with Mitigation Measure TR-~~2~~1.1~~2~~, which calls for improvements at the Hillcrest Avenue/Sunset Drive intersection, would reduce the pedestrian and bicycle impact at the Hillcrest Avenue Station to a less-than-significant level. (LTS)

TR-8.1 Construct sidewalks and bicycles lanes along Hillcrest Avenue and Sunset Drive~~Slatten Ranch Road~~. For the Hillcrest Avenue Station, the Hillcrest Avenue/Sunset Drive intersection will be improved as required in Mitigation Measure TR-~~2~~1.1~~2~~. In addition to the improvements required by TR-~~2~~1.1~~2~~, improvements shall include a sidewalk along the east side of Hillcrest Avenue and a southbound bicycle lane in the areas affected by the construction of the other required intersection improvements. BART shall contribute its fair share of the intersection improvements. In addition, BART shall provide safe and convenient bicycle and pedestrian access from the Sunset Drive/Hillcrest Avenue intersection to the station platform area.

~~improvements. The portion of Slatten Ranch Road to be constructed by BART shall include sidewalks and bicycle lanes.~~

onstru tion pa ts

Impact TR-9 Constr ction of t e Proposed Project o d potentia y res t in significant temporary impacts on SR oca streets and circ ation aro nd t e proposed station areas S

Construction activities, duration, and sequencing, as summarized in Section 2.8, Project Description Construction Scenario, would result in temporary, construction-related traffic impacts, as well as possible impacts to the existing BART system. Construction vehicles and equipment would use SR 4 and local roadways to access construction sites along the project alignment. Trucks and equipment traffic could temporarily disrupt existing local traffic patterns during the construction of the project. Construction traffic would include heavy equipment such as bulldozers, dump trucks, cranes, and excavators. Workers driving to the construction site would also represent additional traffic to the local and regional network.

Construction of station areas would require staging areas that are located on local streets. Four potential construction yards and staging areas have been identified that might be used during project construction. The western yard is on currently vacant land near the Bailey Road overpass. The central yard near Railroad Avenue would be located at a site south of SR 4, in a vacant lot owned by CCTA. The eastern yard would be located at Hillcrest Avenue near the existing parking lot. An additional staging area would be located south of SR 4 adjacent to the east side of Pittsburg/Bay Point BART Station parking lot, in a vacant lot. During Construction Phase 1a, the first two construction staging areas mentioned above would be used for approximately a 24-month period. About 7,620 truckloads of ballast, sub-ballast, and cast-in-concrete concrete are projected to be transported during this construction phase. During Construction Phase 1b, the central and eastern yards would be used for approximately a 24-month period. About 13,400 truckloads are estimated for this phase. These trucks would use SR 4 and local streets to access the staging areas, adding to existing congestion and vehicular delays.

The project alignment would allow much of the construction activity to occur within the SR 4 median, with direct access to the construction site provided by the westbound and eastbound interior lanes through openings made in the concrete traffic barriers. However, temporary lane closures would be required for delivery and haul truck access. Depending on the locations and times of day of lane closures, disruption to regular traffic circulation could be significant. Lane closures may also be necessary along Railroad Avenue and

Hillcrest Avenue for certain construction activities and material deliveries. The overpass walkway along Railroad Avenue would need to be closed occasionally during station construction, although this would be done on only one side at a time and for brief periods of time.

MITIGATION MEASURE. The following measure would reduce construction-related traffic impacts to less than significant. (LTS)

TR-9.1 Develop and implement a Construction Phasing and Traffic Management Plan BART will ensure that a Construction Phasing and Traffic Management Plan is developed and implemented by the contractor. The plan shall define how traffic operations, including construction equipment and worker traffic, are managed and maintained during each phase of construction. The plan shall be developed in consultation with the cities of Pittsburg and Antioch, Contra Costa County, BART, Caltrans, CCTA, and local transit providers, including Tri Delta Transit. The contractor shall also consult with Caltrans and the highway patrol in the development of the plan in order to address any issues and minimize disruption to the flow of traffic along SR 4. This plan shall also be coordinated with plans to maintain access and parking for adjacent businesses and residences that may be affected. To the maximum practical extent, the plan shall include the following measures

a) Specify predetermined haul routes from staging areas to construction sites and disposal areas by agreement with the cities of Pittsburg and Antioch prior to construction. The routes shall follow streets and highways that provide the safest route and have the least possible impact on traffic.

b) Identify construction activities that, due to concerns regarding traffic safety or congestion, must take place during off-peak hours.

c) Provide a plan for lane closures along Railroad Avenue, Hillcrest Avenue, and SR 4, and require information be provided to the public on lane closures using signs, press releases, and other media tools.

d) Identify a telephone number that the public can call for information on construction scheduling, phasing, and duration, as well as for complaints. Such information shall also be posted on BART's website.

MITI ATION MEASURE. While the impact at the Hillcrest Avenue/Sunset Drive intersection could be mitigated with implementation of Mitigation Measure TR-~~2~~1.~~1~~2 ~~–~~to less than significant (LTS), no feasible mitigation has been identified for the Hillcrest Avenue/SR 4 Eastbound Ramps. (SU)

Opening Year Impacts without Slatten Ranch Road

In the ear 2015 when the Proposed Project initiates service, it is possible that Slatten Ranch Road and the planned connection of Viera Avenue to Slatten Ranch Road from E. 18th Street would not be completed. In that case, the portion of Slatten Ranch Road between Hillcrest Avenue and the entrance to the Hillcrest Avenue Station would be constructed and would provide the only access to the station. This would mean that all station traffic would flow through the Hillcrest Avenue/Sunset Drive intersection. It would also mean that development that was assumed to occur in the station area by the ear 2015 could not occur, because there would be no street access to the parcels along Slatten Ranch Road.

Impact TR-1 *If S atten Ranc Road as not been comp eted in accordance it t e Antioc enera P an by t e time t e Proposed Project commences operation in ear 201 t e intersections of i crest A en e and t e SR estbo nd and eastbo nd ramps o d operate at nacceptab e e e s of congestion S*

Table 3.2-30 provides information on the impacts of the Proposed Project in the ear 2015 with and without the completion of Slatten Ranch Road.

Table 3.2-30
Comparison of 2015 AM/PM Peak Hour Intersection Operations –
With and Without Slatten Ranch Road

		With Slatten Ranch Road			Without Slatten Ranch Road		
No.	**Intersection**	**V/C**	**Delay**	**LOS**	**V/C**	**Delay**	**LOS**
18	Sunset Drive/ Hillcrest Ave.	0.78 (0.78)	22.9 (31.5)	C (C)	0.66 (0.67)	17.3 (28.7)	C (C)
19	SR 4 Westbound Ramps/ Hillcrest Ave.	**1.14 (0.95)**	**59.6 (53.2)**	**E (D)**	**1.02 (0.84)**	**43.7 (31.9)**	**D (D)**
20	SR 4 Eastbound Ramps/ Hillcrest Ave.	**0.94 (1.58)**	**22.2 (>80.0)**	**C (F)**	**1.03 (1.59)**	**69.1 (>80.0)**	**D (F)**

So rce Wilbur Smith Associates, une 2008.

otes

Boldfaced type indicates unacceptable values.

0.5 (0.65) AM (PM)

SR 4 interchange complex. The analysis indicated that these queues would prevent the free movement of traffic to and from the SR 4/Hillcrest Avenue interchange ramps. This would cause traffic to queue on the eastbound and westbound off-ramps. These queues would extend onto the mainline of SR 4 causing delays for through traffic on the freeway as it attempts to pass this location. Average delays at the Hillcrest Avenue/Sunset Drive intersection during the AM peak hour when the train is passing through the crossing would be 4.5 minutes per vehicle. ~~would increase from 15.9 seconds per vehicle to 28.6 seconds per vehicle~~. During the PM peak hour, delays would also increase substantially. The vehicle queues from these train operations would block access and egress to the Hillcrest Avenue Station as well as to other existing and planned development in the area.

MITI ATION MEASURE. While the precise extent of the increase of UP train operations and the magnitude of the impact is speculative at this time, the potential cumulative traffic impact that would result is nevertheless being conservatively identified here as significant and unavoidable. In order to avoid this cumulative impact, a grade separation could be constructed at Hillcrest Avenue (e.g., the train tracks could be elevated over the road or lowered under the road, or Hillcrest Avenue could be elevated over the train tracks or lowered to pass under) to eliminate the projected traffic queuing that would result if the tracks and Hillcrest Avenue continued to cross one another. However, UP would be the primary source of such a cumulative impact, to which the Proposed Project would add only a minor contribution. Therefore, construction of a grade separation is not included as part of the Proposed Project or as a mitigation measure. Since no grade separation is now proposed, and the implementation of a grade separation by others at some future date is uncertain, the cumulative impact to traffic remains significant and unavoidable. (SU)

Cumulative Analysis

The transportation projections for the Proposed Project were based on the CCTA travel demand model. Inputs to the model include local and regional government projections of land use and employment intensities and locations, along with programmed highway, street, and transit improvements. As noted before, the CCTA model output for ear 2015 and 2030 conditions was adjusted to reflect roadway improvements in the immediate study area that were not included in the original model.

Since the transportation impact analyses are based upon the adopted regional land use forecasts for the ears 2015 and 2030, the 2015 and 2030 transportation assessments include cumulative development and identify the combined effects of future background growth in conjunction with the Proposed Project.

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Section 3.3
Land Use

to favor investment in a proposed expansion project. The System Expansion Policy is intended to both guide BART's review of proposed projects and to help local jurisdictions identify ways to effectively achieve the ridership necessary to support a BART expansion project. The System Expansion Policy was adopted with the intention of guiding evaluation of all future BART expansion projects. In order to demonstrate sufficient anticipated ridership for the Proposed Project, BART's System Expansion Policy provides that a Ridership Development Plan (RDP) be prepared and implemented by the local jurisdiction in which stations are proposed.

The Proposed Project is the first BART expansion project subject to the System Expansion Policy. In August 2005, BART entered into a Memorandum of Understanding (MOU) with the cities of Antioch, Brentwood, Oakley and Pittsburg; Contra Costa County; the Contra Costa Transportation Authority (CCTA); and Tri Delta Transit to provide the process for developing and funding the RDPs. In 2008, BART entered into a First Amendment to the MOU that recognizes the revised scope of the Phase 1 Proposed Project and requires that the cities of Antioch and Pittsburg prepare RDPs for the proposed stations in their respective jurisdictions. The cities must also provide the requisite environmental clearance under CE A for these plans, as the cities are the public agencies responsible for approving and implementing the plans. The development and access improvements proposed by the RDPs are not part of the Proposed Project but are obviously related.

The RDPs are meant to demonstrate sufficient anticipated ridership to support the proposed new BART stations, and to support development of that ridership by adopting transit supportive land uses and/or making access improvements in the area of the proposed transit stations. These plans~~, which~~ can be in the form of general plan amendments, specific plans, or zoning revisions.~~, must be approved by the local jurisdictions before BART can approve the Proposed Project.~~ Hence, the cities of Pittsburg and Antioch have undertaken planning efforts as described more fully below.

The compatibility of a new use, like a transit station, with existing and proposed future development is dependent on how the new use alters the character of the neighborhood, district, city, etc. Integral elements of community character include traffic patterns, air quality and noise levels, visual quality, and adequacy of public services, which are addressed in following sections of this EIR. This analysis focuses specifically on land use conflicts and consistency with existing plans and policies, as well as the anticipated changes in land use that would result from the cities of Antioch and Pittsburg adopting the required RDPs. The analyses that follow were initially prepared for the Draft EIR based on the existing land use and development assumptions in the City of Pittsburg first Draft Railroad Avenue Specific Plan (anuary 2008) and in the City of Antioch Alternatives Scenarios Report (May 2008) and existing eneral Plan. These assumptions were reevaluated following the release of the Draft Railroad Avenue Specific Plan (February 2009) and the Draft Hillcrest Station Area Specific Plan (anuary 2009). This reevaluation confirmed that the development potential surrounding each of the eBART stations, assumed in this section based on information prior to the Draft

EIR, is consistent with development as proposed under each city's Specific Plan as released subsequent to the Draft EIR.

Comments in response to the Notices of Preparation from 2005 and 2008 (see Appendix A) identified concerns about effects on prime farmland. These comments are addressed in this section.

eligible for Measure funds. In November 2006, County voters approved Measure L, which extended the term of the ULL to 2026; required voter approval to expand the ULL by more than 30 acres; adopted a new ULL map; and added new review procedures. The most recent ULL map, which was adopted in November 2006, shows that the project corridor is located entirely within the ULL.[3] In fact, the ULL extends beyond the area surrounding the project corridor and includes the cities of Oakley and Brentwood.

Future Development Pattern. With increasing pressure to accommodate anticipated future growth while preserving at least 65 percent of the County's lands for agricultural, open space, and recreational areas, Contra Costa County has focused planning efforts on the development of more efficient planning practices and trends. These practices include transit-oriented development (TOD), which places housing and commercial and employment centers in close proximity to transit service; an overall denser, mixed-use development pattern so that residents can walk to services and transit, rather than using cars; and infill development of underutilized and vacant properties. The RDPs ~~being~~ developed by the cities of Antioch and Pittsburg pursuant to the MOU entered into to implement BART's System Expansion Policy also focus on TOD in and around the proposed new station areas to guide and intensify development in those areas and support transit services. The development of TODs around future transit stations can aid in preserving open space, reducing traffic congestion, and minimizing environmental impacts.

Existing Land Uses in the Project Corridor

The project corridor traverses the East County, generally along SR 4. The greatest residential densities in the project corridor are concentrated in the Pittsburg and Antioch areas. Table 3.3-1 and Figure 3.3-1 show the distribution of land uses within one-quarter mile of the project corridor. As seen in Table 3.3-1, even though there is more acreage in the City of Antioch than in the City of Pittsburg, land in the City of Pittsburg within the project corridor is more developed. Large proportions of the City of Pittsburg are developed with single family residential, commercial, and transportation uses. By contrast, in the City of Antioch, the most predominant land uses within the project corridor are undeveloped lands, single family residential, and transportation uses. The land uses in the City of Oakley are overwhelmingly single family. The affected land uses in unincorporated Contra Costa County are limited to those in the area around the existing Pittsburg/Bay Point BART Station, which are primarily single family residential. There is also a park, some open space, some multifamily residential uses, a small area of commercial uses, and an elementary school. Existing land uses within one-half mile of each proposed station area are described in detail below. Overall, the predominant land uses within the project corridor are single family residential, followed by transportation uses and undeveloped land.

[3] Contra Costa County, Urban Limit Line map, updated November 6, 2006, http //www.co.contra-costa.ca.us/depart/cd/current/advance/ULL/ULLMap11x17.pdf

related facilities, and parking proposed to be construction and funded by the Proposed Project. The Station Plan will present conceptual-level designs for station platforms, vertical circulation (stairs and escalators), and fare equipment. It will also address station property and circulation and automobile and bicycle parking. The RDPs for each of the proposed stations are described below.

Railroad Avenue Ridership Development Plan. ~~As of publication of the Draft EIR, t~~The City of Pittsburg has released the Draft Railroad Avenue Specific Plan, which ~~will~~ serves as the RDP for the proposed station at Railroad Avenue. The Specific Plan provides development standards and guidance for an area encompassing an approximately one-half mile radius from the proposed Railroad Avenue Station, and would include land use changes within 11 identified sub-areas. Some land uses within the one-half mile radius of the proposed station would remain the same, but the Specific Plan would add new land use designations, including TOD Residential, High Intensity Mixed-Use, and Medium Intensity Mixed-Use. The Specific Plan also calls for the development of the vacant and underutilized parcels within the plan area. More intense uses would be concentrated around the proposed station itself. Most existing single family residential areas would remain as is, while some multifamily residential areas may be redistributed so that they center on the proposed station. Some areas designated as Multifamily Residential would remain as they are, but their land use designations would change to High Density Residential, allowing for additional or new development. The Specific Plan would result in more housing placed in an efficient development pattern, as well as better access to employment centers, both by providing areas for the development of employment centers and by placing housing near transit, which would aid residents in commuting to other areas. Ultimately, the Specific Plan provides opportunities for the development of nearly 1,845 new residential units and approximately 1,004,000 square feet of new commercial space within a compact mixed-use development district surrounding the proposed Railroad Avenue Station.

The Draft Railroad Avenue Specific Plan includes a variety of improvements to promote and facilitate the safe and efficient circulation of all modes of non-vehicular transportation. These improvements are consistent with the goals of the City of Pittsburg eneral Plan and enhance pedestrian and bicycle connectivity between the Specific Plan Area and the greater City. The circulation system is designed to promote safe and efficient pedestrian and bicycle access through the application of sidewalks and pathways. Direct, wide sidewalks and paths provide line-of-sight linkage between residential, commercial, civic, and public uses throughout the Specific Plan Area.

An important programmatic aspect of the Plan includes coordinating with the Tri-Delta bus service and existing Tri-Delta bus routes 380, 387, 388, 390, and 391 to support the desired circulation pattern and connect the Transit Village to the Pittsburg/Bay Point BART Station and other sub-regional locations. It is envisioned that, during peak hours, service is to be provided using 10-minute headways, with longer headways during non-peak hours. Existing Tri-Delta bus routes 70 and 387 could follow the same circulation pattern and connect the Transit Village to Old Town Pittsburg and other local destinations. As ridership increases and housing units

continue to develop in Old Town Pittsburg, additional transit connections may be required. To further supplement service, a new direct shuttle is envisioned to connect the Transit Village with Old Town during peak commute times. A two-way bus driveway is also proposed between arcia Avenue and Bliss Avenue to facilitate passenger pick-up and drop-off without requiring buses to idle on any of the public streets in the Transit Village sub-area. The proposed 60-foot right-of-way will accommodate extra-wide sidewalks for passenger circulation and queuing, with space remaining for wayfinding signage and schedule information.

The plan is consistent with City, BART, and Metropolitan Transportation Commission (MTC) goals and policies. ~~Adoption~~ Consideration of the Railroad Avenue Specific Plan by the City of Pittsburg is ~~expected by late 2008 or early~~ scheduled for May 2009.

Hillcrest Avenue Ridership Development Plan. ~~The City of Antioch has commenced preparation of the Hillcrest Station Area Specific Plan that will include policies and guidelines promoting TOD and will evaluate the area surrounding the proposed Median Station and the three Hillcrest Avenue Station options. The proposed Specific Plan is consistent with the City's eneral Plan, which identifies the Hillcrest Avenue Station area as a key transit hub, and as proposed would provide opportunities to develop between 650 and up to 2,500 residential units, depending on the station option selected, and up to 2,150,000 square feet of office and retail uses.~~

~~As of publication of this Draft EIR, the City of Antioch's preliminary documents concerning development of the Hillcrest Station Area Specific Plan, reveals that the overall intent of the proposed development surrounding the proposed Hillcrest Avenue Station would locate the most intense, highest-density development and employment centers immediately surrounding the proposed station options. This is consistent with the City's eneral Plan, as well as BART and MTC policies and goals. The City of Antioch expects to adopt the Specific Plan by early 2009.~~

The Hillcrest Station Area Specific Plan area in the City of Antioch is a rectangular 375-acre area in the northwest quadrant of the junction of SR 4 and SR 160. The Specific Plan released in anuary 2009 includes circulation and access to the station-area development and to the Proposed Project's Hillcrest Avenue Station (Median Station), and considers two optional Hillcrest Avenue Station locations evaluated in this EIR, including a variant of Median Station East option and the Northside East Station option as a potential future eBART station. The station area presents an opportunity for high quality, transit-oriented development with great visibility from two freeways. The Specific Plan presents a strategy for creating a mixed-use community that includes high-density housing, new office and commercial development, and a well-planned, linked circulation and infrastructure backbone. The station area can be transformed into a signature area of Antioch, with high quality development and interesting pedestrian areas that add to the City's quality of life.

The Specific Plan framework defines three development areas that would be subject to master plans. The western portion of the station area is a transit village designed around the station. The eastern portion of the station area is planned as a mixed-use town center around the potential future Phillips Lane Interchange; it could also include another optional eBART station, the Northside East Station option, located adjacent to the Union Pacific right-of-way (UP ROW). The area between SR 4 and the UP ROW in the western portion of the station area has a more auto-oriented character.

Buildout projections of the Hillcrest Station Area Specific Plan include a maximum of 2,500 residential units; the majority of the housing would be in multi-unit structures, some of which would be in mixed-use buildings. The land use designations support up to 2.5 million square feet of commercial uses with approximately 5,600 new jobs based on the buildout projections. Up to 1.2 million square feet of office space could be built in the station area, most of which is designated in the Transit Village area. Up to 1.0 million square feet of retail space is projected at buildout of the station area. The majority of the retail space is anticipated to be constructed in the Town Center area.

The plan is consistent with City, BART, and Metropolitan Transportation Commission (MTC) goals and policies, as well as the development assumptions made in the Draft EIR. The Specific Plan is scheduled for consideration by the City of Antioch in mid-April 2009.

Project Components in the City of Oakley. The City of Oakley is not preparing a RDP since the Proposed Project does not include a station within Oakley's jurisdiction. However, a portion of the project corridor could be located within the City of Oakley to accommodate the remote maintenance facility option that could be developed under the Northside West or Northside East Station options. Only a very small area of the one-half mile station area radius surrounding the Northside East Station option would fall within the City of Oakley's jurisdiction, but this area is physically separated from the remainder of the station area by SR 160 and the Mococo Line, so that it is unlikely that this area would be greatly influenced by development of this station location option.

Sensitive Land Uses

Sensitive land uses are those that would be most affected by changes in land use, such as schools, hospitals, retirement communities, etc. As stated above under the descriptions of the various segments of the Proposed Project, the project corridor contains six elementary schools,

Land Use Policy 2.1.8: Discourage development that results in land use incompatibility. Specifically, require buffers between uses where appropriate and discourage locating sensitive uses (residential) adjacent to existing potentially objectionable uses or locating potentially objectionable uses adjacent to sensitive uses.

Land Use Policy 2.2.3: Protect existing residential areas from intrusion of incompatible land uses and disruptive traffic to the extent reasonably possible.

Land Use Policy 2.2.4: Promote, in areas where different land uses abut one another, land use compatibility by utilizing buffering techniques such as landscaping, setbacks, screening and, where necessary, construction of sound walls.

Agricultural Resources Goal 6.1: Allow agriculture to continue as a viable use of land that reflects the community's origins and minimizes conflicts between agricultural and urban uses.

Impact Assessment and Mitigation Measures

This analysis focuses on potential project effects on adjacent land uses, including long-term (operational) effects, as well as consistency with relevant planning documents and goals. Effects related to construction, traffic, noise and dust are not specifically addressed in this land use analysis because those impacts are short-term, whereas impacts associated with changes in land use occur over long periods of time and are not directly associated with construction activities. Future TOD impacts are not part of this analysis. ~~The cities of Pittsburg and Antioch will undertake their own environmental review process for the Railroad Avenue and Hillcrest Station area Specific Plans, respectively, that will provide opportunities for public review and comments once impacts are assessed.~~ The City of Pittsburg has completed a Draft EIR of its RDP and is scheduled to consider certification in May 2009. The City of Antioch likewise has completed a Draft EIR of its RDP and is scheduled to consider certification in mid-April 2009. As noted earlier, the analyses that follow were initially prepared for the Draft EIR prior to the release of the Draft Railroad Avenue Specific Plan (February 2009) and the Draft Hillcrest Station Area Specific Plan (anuary 2009). A review of these documents confirms that the development potential surrounding each of the eBART stations, assumed in this section based on information prior to the Draft EIR, is consistent with development as proposed under each city's Specific Plan as released subsequent to the Draft EIR.

An adverse land use impact can be manifested in many ways. New development can increase traffic and result in localized congestion; noise, vibration, and air pollution that can degrade the quality of the surrounding land uses; development of physical structures can alter the aesthetics of the existing setting or result in displacement of private property or recreational areas. Other sections of this document address these various concerns, and the reviewer is directed to Section 3.2, Transportation; Section 3.4, Population and Housing (including land acquisition

and displacement); Section 3.5, Visual uality; Section 3.10, Noise and Vibration; Section 3.11, Air uality; and Section 3.13, Community Services.

Pursuant to California overnment Code Section 53090, BART is exempt from local land use plans, policies, and zoning ordinances. Therefore, were the Proposed Project inconsistent with such local regulations, such inconsistency would not be determined to be a significant impact and mitigation would not be required. BART nevertheless wishes to emphasize to the public and to local jurisdictions the extent to which the project is consistent with local plans, policies and zoning ordinances.

- Corridor working groups that bring together Congestion Management Agencies (CMAs), city and county planning staff, transit agencies, and other key stakeholders to define expectations, timelines, roles and responsibilities for key stages of the transit project development process.

Meeting the corridor-level housing thresholds requires that, within one-half mile of all stations, a combination of existing land uses and planned land uses meets or exceeds the overall corridor threshold for housing. The corridor-level thresholds, which are listed below, vary depending on the type of service proposed. MTC considers the proposed DMU technology as a type of commuter rail and, thus, requires 2,200 housing units per station, including existing housing units near the current end station at Pittsburg/Bay Point, to meet the MTC corridor-level thresholds. The Proposed Project complies with this corridor-level threshold, as illustrated in Table 3.3-5, both with and without the RDPs.

Table 3.3-5
Comparison of MTC Resolution #3434 Targets
with Proposed Project Station Area Development

Station	Housing Units in 2030[a]	
MTC Target	2,200	
Pittsburg/Bay Point[b]	2,195	
Railroad Avenue[c]	4,591	Per Station Average 2,755
Hillcrest Avenue[c]	1,479	

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a. Housing units within one-half mile of station sites; however, housing units do not include Ridership Development Plan.

b. Pittsburg/Bay Point BART Station Area Specific Plan Final EIR, December 2001, identifies 2,195 housing units at buildout.

c. These figures are derived from the CCTA traffic model. Data were based on the adopted eneral Plan and compiled for applicable Traffic Analysis ones, which included those within one-half mile of a station.

Table 3.3-5
Comparison of MTC Resolution #3434 Targets with Proposed Project Station Area Development[a]

Station	Housing Units in 2030 without RDP	Housing Units in 2030 with RDP
MTC Target	2,200	2,200
Pittsburg/Bay Point[b]	2,195	3,468
Railroad Avenue	4,591[c]	3,445
Hillcrest Avenue	1,975[c]	3,387
Per Station Average	**2,920**	**3,433**

So rce City of Pittsburg, *Pittsb rg Bay Point BART Station Area Specific P an Fina EIR* December 2001, City of Pittsburg, *Rai road A en e Station Area Specific P an Draft EIR* February 25, 2009; City of Antioch, *i crest Station Area Specific P an an ary 2009*

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a. Housing units within one-half mile of station sites.

b. Pittsburg/Bay Point BART Station Area Specific Plan Final EIR, December 2001, identifies 2,195 housing units at buildout. The Pittsburg/Bay Point Specific Plan, 1997, contains updated info 1,873 existing and 1,595 planned housing units for a total of 3,468.

c. These figures are derived from the CCTA traffic model. Data were based on the adopted eneral Plan and compiled for applicable Traffic Analysis ones, which included those within one-half mile of a station. For the Railroad Avenue Station area, the estimate of future housing units was based on maximum allowable eneral Plan land use densities. However, the estimate of future housing units with the RDP was based on the mid-point of the density ranges for the proposed residential land uses. This change in methodology explains why the housing units in the Railroad Avenue Station area appear to be less with the RDP.

The cities of Pittsburg and Antioch have engaged in local station area plans to foster transit-oriented development and access improvements. These plans have been ~~are being~~ prepared as Specific Plans, pursuant to the California overnment Code, and contain detailed guidelines and standards for station area land uses, circulation, and design, consistent with the second element of the MTC's regional TOD policy.

Finally, in addition to satisfying the station area development target for transit extensions, significant collaboration among key stakeholders, including BART, CCTA (the local Congestion Management Agency), and the individual cities

has occurred in compliance with the third element of the MTC's regional TOD policy. These entities, along with representatives from other public agencies, have formed an eBART Partnership Policy Advisory Committee that has met regularly throughout the planning and development of the Proposed Project. The committee has been integral to the funding and advancement of the proposed DMU service.

The existing and projected development around the stations, the preparation of Specific Plans around each of the stations in the project corridor, and the ongoing participation by local and regional stakeholders in helping to implement the Proposed Project, combine to satisfy each of MTC Resolution 3434's criteria for transit investment to east Contra Costa County.

Consistency with BART System Expansion Policy. BART adopted a System Expansion Policy as part of its Strategic Plan in 1999. The policy identifies a uniform set of criteria to be applied to all extensions of BART service. The Proposed Project is the first application of this BART policy. Among the chief elements of the policy is the requirement that one or more Ridership Development Plan (RDP) be undertaken for all proposed expansion projects of the existing BART system. The RDP(s) must demonstrate that a corridor-wide ridership threshold can be achieved through measures such as transit-supportive land uses and investment in access programs and projects. Prior to adopting a system expansion project or planning new station locations, BART must consider whether RDPs developed for each station can collectively demonstrate that the project will achieve a threshold ridership level, and will meet the goals of the System Expansion Policy.

Threshold estimates can be established at both the corridor-wide and station level, but it is the corridor-wide ridership threshold that is considered under the BART System Expansion Policy. In the case of the Proposed Project, this threshold has been defined as 5,801 ~~10,100~~ entries and exits by 2030. Although an individual station may not reach its individual threshold estimate, the corridor-wide threshold estimate must be met in order for the Proposed Project to be favorably evaluated under the System Expansion Policy. In this case, the Proposed Project does meet the corridor-wide threshold, as illustrated in Table 3.3-6.

Overall, the Proposed Project is consistent with applicable local development policies, including the eneral Plans, development goals and policies of the cities of Pittsburg, Antioch, and Oakley, as well as Contra Costa County; the MTC; and BART.

Table 3.3-6
Comparison of BART System Expansion Policy
Ridership Target with Proposed Project Ridership Forecasts
(weekday entries and exits in 2030)

System Expansion Policy Target	5,801
Proposed Project Ridership[a]	
Railroad Avenue	1,900
Hillcrest Avenue	8,200
Total Corridor Ridership	10,100

So rce Arup for the Ridership Target, 2008; Wilbur Smith Associates for Proposed Project ridership, 2008.

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a ~~These ridership figures include the Ridership Development Plans~~ These ridership figures are based on ABA Projections 2003 and current land use plan assumptions for the two station areas, without taking into account additional growth allowed under Ridership Development Plans.

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Changes in land uses associated with a project generally occur over long periods of time and would not typically change as a direct result of construction activities. Construction impacts tend to be associated with short-term increases in traffic, noise, dust, and air emissions surrounding a site, which generally do not have substantial long-term impacts on surrounding land uses. In addition to their limited term, construction impacts would not result in conflicts with existing uses because staging areas would not be located in areas where the character of surrounding uses would be adversely affected by construction activities. Construction of the Proposed Project would eventually encourage the changes in land uses along the project corridor, specifically in the areas surrounding the proposed stations. The evaluation of construction impacts is more appropriate for other technical analyses that would have separate impacts associated with construction alone. Those analyses are found within the appropriate technical sections of this EIR.

Hillcrest Avenue Station Options Analysis

Impacts associated with the Hillcrest Avenue Station options in general would be the same as described under the Proposed Project. Although most impacts would result in the same conclusion as for the Proposed Project, additional analysis pertaining to specific land uses around each station option below describes differences between the Median Station and the Northside West, Northside East, and Median Station East options.

Similar to the Proposed Project, development of the station options for the Hillcrest Avenue Station would result in short-term construction-related changes to surrounding land uses. Analyses of construction impacts associated with the development of the Hillcrest Avenue Station Options are found in the appropriate technical sections elsewhere in this EIR.

Section 3.4
Population and Housing

Applicable Policies and Regulations

Ridership Development Plans. As discussed in detail in Section 3.3, Land Use, BART's System Expansion Policy requires transit expansion projects to achieve corridor-wide ridership targets by 2030. To implement this goal, BART has entered into a Memorandum of Understanding with the cities of Pittsburg and Antioch, along with Contra Costa Transportation Authority (CCTA) and Tri Delta Transit that commits those cities to implementing land use plans that will contribute to the attainment of the corridor-wide ridership target. Pittsburg and Antioch are developing Ridership Development Plans (RDPs) incorporating land use changes and/or access improvements. The cities must also provide the requisite environmental clearance under CE A for these plans, as the cities are the public agencies responsible for approving and implementing the plans. The development and access improvements proposed by the RDPs are not part of the Proposed Project but are obviously related. ~~The RDPs must be approved by the local jurisdictions before BART can approve the Proposed Project.~~

~~As of the release of this Draft EIR, t~~The City of Pittsburg has released ~~a~~ the Draft Railroad Avenue Specific Plan, which serves as the RDP ~~(Ridership Development Plan)~~ for the Railroad Avenue Station area. This Specific Plan intends to channel growth into the Railroad Avenue area in order to achieve a community desire for the development of a compact, mixed-use district in the area. The Specific Plan envisions the development of approximately 1,845 new residential units and 1,004,000 square feet of new commercial space within a district surrounding the proposed Railroad Avenue Station. The station area is part of a Redevelopment Project Area, and the Pittsburg Redevelopment Agency has expressed an intention to assist with the implementation of the Specific Plan. While implementation of the Specific Plan is likely to move forward more quickly should improved transit service occur in the area, the Plan specifically indicates that it is not dependent on the Proposed Project or any particular mode of transit.[1]

The City of Antioch's eneral Plan, adopted in 2003, envisions the Hillcrest Avenue Station area as the site of a key transit node and allows for significant development in the area. In keeping with this vision, the City's Draft Hillcrest Station Area Specific Plan is proposing ~~considering several~~ development ~~options that could permit~~ up ~~from 650~~ to 2,500 additional dwelling units and 2,~~1~~500,000 square feet of commercial, office, and retail uses. ~~The City is preparing a Hillcrest Station Area Specific Plan to accommodate this desired growth, which will be adopted prior to adoption of the Proposed Project by the BART Board of Directors.~~ This area of Antioch is viewed as a key development site by the City and property owners, given its central location and attractive freeway frontage. As such, it is expected to see intensive development regardless of the Proposed Project.[2]

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1 City of Pittsburg, *Rai road A en e Specific P an* Revised Administrative Draft, October 2007.

2 City of Antioch, *enera P an* November 2003. http //www.ci.antioch.ca.us/City ov/CommDev/PlanningDivision/docs/Antioch Adopted eneral Plan.pdf

The cities originally anticipated that the RDPs would be completed prior to the BART Board of Directors' consideration of the Proposed Project, including the eBART EIR. However, delaying consideration of the Proposed Project until the cities have completed the RDP process is not feasible due to the need to coordinate the Proposed Project construction with the construction of the Caltrans SR 4 widening project. Furthermore, based on expected regional growth consistent with current land use plans, as well as with the increased development density to be provided under the cities' respective Specific Plans, the ridership threshold established under BART's System Expansion Policy would be satisfied. Based on these facts, the BART Board can evaluate the Proposed Project in accordance with the System Expansion Policy prior to the cities' final actions to adopt their RDPs.

Informed by these planning efforts, the projected households and employment within these station areas that could result under development of the proposed Ridership Development Plans is identified in Table 3.4-4. These station area plans are acknowledged in the cumulative assessment.

Table 3.4-4
Projected Station Area Households and Employment under Proposed Ridership Development Plans, 2030[a,b]

	Railroad Avenue Station	Hillcrest Avenue Station[c]	Combined[c]
Households	~~3,322~~ 1,845	~~1,649 - 2,899~~ 2,500	~~4,971 - 6,221~~ 4,345
Employment	~~8,857~~ 3,500	~~5,366 - 6,616~~ 5,600	~~14,223 - 15,473~~ 9,100

So rce ~~Fehr & Peers Associates traffic modeling numbers, reviewed by CCTA and the cities;~~ City of Pittsburg Draft Railroad Avenue Station Area Specific Plan, 2009; City of Antioch, Hillcrest Station Area Specific Plan, 2009.

otes

a. Station Area means the land within a one-half-mile radius of the proposed station location.

b. These numbers ~~in~~exclude existing development within the station area ~~plus~~ and only reflect possible development under the Ridership Development Plans ~~that are currently prepared~~.

~~c. Hillcrest Avenue Station and combined numbers vary depending on the station option.~~

California Relocation Assistance and Real Property Acquisition Guidelines. The California overnment Code requires that relocation assistance be provided to any person, business, or farm operation displaced because of the acquisition of real property by a public entity for public use (Title 25 California Code of Regulations, Chapter 6, Section 6000 et seq.). In addition, comparable replacement properties must be available for each displaced person within a reasonable period of time prior to displacement. The California Relocation Assistance uidelines mandate that certain relocation services and payments be made available to eligible residents, businesses, and nonprofit organizations displaced by construction and operation of transit-related projects. The uidelines establish uniform and equitable procedures for land acquisition, and provides for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by state and state-assisted programs.

Impact Assessment and Mitigation Measures

This analysis focuses on potential project effects on population, housing, and employment, including long-term (operational) effects. Population-driven effects related to construction are not specifically addressed in this population and housing analysis because those impacts are temporary, whereas impacts associated with changes in population related to project operations occur over long periods of time and are not directly associated with construction activities. Future TOD impacts are not part of this analysis. The cities of Pittsburg and Antioch have~~will undertake~~ their own environmental review process for the Railroad Avenue and Hillcrest Avenue Station area specific plans, respectively~~, that will provide opportunities for public review and comments once impacts are assessed~~.

private land; however, some are located on state right-of-way. In the proposed Hillcrest Avenue Station area, the land is largely undeveloped, although there are limited residential and light industrial uses.

In total, the Proposed Project could affect ~~16~~ 17 privately-owned parcels in the vicinity of the Median Station as listed in Table 3.4-5. During subsequent design and engineering of the Proposed Project, the list of affected privately-owned parcels will become clearer, as well as whether all or just a portion of a parcel might need to be acquired. iven the uncertainty of the siting for project facilities, this assessment conservatively assumes that the entire parcel would be acquired if affected by a project feature; in reality, some parcels may only need to be partially acquired to accommodate the Proposed Project. Thus, this assessment likely overstates the land acquisition impact.

Of the parcels potentially affected, Assessors Parcel Numbers (APN) 052-030-013 and 052-030-015 are developed with single family dwellings. Assuming both parcels might require full acquisition and displacement, the number of persons that could be displaced would be seven (using the 2006 average household size for dwelling units within one-half mile of the Median Station). Site visits to APN 052-030-013 indicate that this property was vacant as of late 2007. If the property were vacant at the time of land acquisition, the Proposed Project would result in displacement of about four persons. In addition to the two residential parcels, there is one parcel that is occupied by a light industrial business on APN 052-030-006. According to the Assessor's office, this structure, which appears to be a warehousing facility, is vacant and thus would not involve displacement of any employees.

Displacement of residences, business activities, and/or reduction or loss of available parking, at existing development on privately-owned land is considered a significant impact. Because the Proposed Project could displace occupants in one residential dwelling, the Proposed Project would result in a significant displacement impact.

Table 3.4-5
Land Acquisition for the Proposed Project and Hillcrest Avenue Station Options

			Northside West Station			
Assessors Parcel Number (APN)	**Existing Use**	**Median Station**	**Maintenance Facility**	**Remote Maintenance Facility Option**	**Northside East Station**	**Median Station East**
Train Control Hut Parcels						
086-020-006[a]	Undeveloped/Vacant					
087-341-020[a]	Undeveloped/Vacant					
074-080-028	Undeveloped/Vacant					
067-341-037[b]	Undeveloped/Vacant					
067-342-017[b]	Undeveloped/Vacant					
068-252-045	Undeveloped/Vacant					
Hillcrest Avenue Station Options Parcels						
041-021-025	Undeveloped/Vacant	-	-	-		-
041-022-002	Undeveloped/Vacant	-				-
041-022-004	Undeveloped/Vacant	-	-			-
051-160-001	Undeveloped/Vacant		-	-	-	
051-160-005	Undeveloped/Vacant		-	-	-	
051-170-052	Undeveloped/Vacant		-	-		-
051-170-054	Undeveloped/Vacant		-	-	-	
052-011-013	Undeveloped/Vacant					
052-030-013	Unoccupied Dwelling					
052-030-015	Occupied Dwelling					
052-030-016	Undeveloped/Vacant					
052-030-017	Undeveloped/Vacant					
052-030-018	Undeveloped/Vacant					
052-030-021	Undeveloped/Vacant				-	
052-051-008	Undeveloped/Vacant	-				-
052-052-002	Light Industrial/Vacant	-				-
052-052-006	Light Industrial/Vacant					
052-052-008	Undeveloped/Vacant	-				-
052-052-010	Undeveloped/Vacant	-				-
052-052-015	Undeveloped/Vacant	-	-			-
052-052-017	Undeveloped/Vacant	-				-
052-052-018	Undeveloped/Vacant				-	
052-061-049	Undeveloped/Vacant	-				-
Total Number of Parcels Acquired[c]		~~16~~ 17	~~19~~ 20	~~21~~ 22	~~21~~ 22	~~15~~ 16

So rce BART, 2008.

otes

This table excludes state right-of-way, including the staff building and property owned by BART and Caltrans.

Indicates parcels to be acquired per station option.

a. Either APN 086-020-006 or APN 087-341-020 would be acquired for a train control hut along SR 4 near Power Avenue or Frontage Road in Pittsburg.

b. Either APN 067-341-037 or APN 067-342-017 would be acquired for a train control hut near SR 4 and the Contra Loma Boulevard/L Street interchange in Antioch.

c. Total numbers of parcels to be acquired do not add up to total parcels tallied in each column because they only consider one parcel to be acquired per general location of three train control huts, as described under notes a and b.

MITI ATION MEASURE. Mitigation for displacement impacts is based on the California Relocation Assistance and Real Property Acquisition uidelines. These guidelines set forth mandatory minimum requirements for acquisition, appraisal, and relocation payments and services to compensate for displacements resulting from public agency projects. Implementation of the following mitigation measure would ensure that impacts related to displacement of the affected properties are addressed as stipulated by applicable state laws, and would reduce them to a less-than-significant level. (LTS)

P -2 1 Ac ire property and re ocate affected residents and b sinesses BART's Real Estate Department shall implement an acquisition and relocation program that meets the requirements of applicable state acquisition and relocation law. Acquisition will involve compensation at fair market value for properties, and relocation assistance would include, but is not limited to, down payments or rental supplements, moving costs, business reestablishment reimbursement, and goodwill offers as appropriate. All benefits will be provided in accordance with the California Relocation Assistance and Real Property Acquisition uidelines.

Hillcrest Avenue Station Options Analysis

Impacts associated with the Hillcrest Avenue Station options are the same as described under the Proposed Project, with the exception of impacts to specific properties that could be acquired under each option. The differences specific to the three station options are presented in Table 3.4-5 and described below.

Impact P - T e i crest A en e Station options o d re ire t e ac isition of ario s properties for se as stations rig ts-of- ay par ing areas and a maintenance faci ity For affected pri ate y-o ned property and b siness o ners t ese impacts co d be significant and o d re ire mitigation in accordance it app icab e state a S

Similar to the Median Station, Northside West, Northside East, and Median Station East Station options would require private property acquisition, resulting in a significant impact. A list of affected properties for each option is provided in Table 3.4-5. The Northside West Station option would require the acquisition of ~~19~~ 20 to ~~21~~ 22 privately-owned parcels, depending on which maintenance facility option is selected. These parcels include one occupied residence, one unoccupied residence, and two light industrial properties with vacant buildings. The Northside East Station option would require the acquisition of 21 parcels involving the same developed properties as the Northside West Station option. The Median Station East option would require the possible acquisition of ~~15~~ 16 parcels, including two developed residential

properties and one industrially developed property. Since the Hillcrest Avenue Station options would require acquisition of residences and businesses, they would result in a significant land acquisition impact.

MITI ATION MEASURE. Mitigation Measure PH-2.1, which calls for BART to carry out an acquisition and relocation program in accordance with applicable state law, would reduce acquisition impacts of the Hillcrest Avenue Station options to a less-than-significant level. (LTS)

Cumulative Analysis

This cumulative analysis for population and housing considers the potential for the Proposed Project, in combination with the projected growth for the project station areas and eastern Contra Costa County, and increased capacity due to the SR 4 widening project to result in impacts to the physical environment. Potential physical impacts assessed are inducement of substantial housing and employment growth and displacement due to land acquisition.

Impact P -C - *T e Proposed Project in combination it proposed station area de e opment and f t re gro t projected by ABA is not expected to create additiona demand for o sing and emp oyment in t e affected comm nities beyond at is identified by t e affected cities as part of ongoing p anning efforts TS*

Based on station area plans that ~~are being~~ developed by the cities of Pittsburg and Antioch, a greater level of development and associated population than anticipated by the ABA forecasts would occur in the immediate environs around the stations. While this level of growth is substantial (about 1,845 dwelling units and one million square of commercial space around the Railroad Avenue Station, and up to 2,500 dwelling units and 2,~~1~~500,000 square feet of commercial space around the Hillcrest Avenue Station), it is consistent with adopted and draft City plans because this growth would redirect growth from other areas within those cities to the proposed station areas. Therefore, the Proposed Project would not induce unplanned growth. As described in Impact PH-1, the Proposed Project is a growth-accommodating project that responds to the existing need for transit services and future growth anticipated by development under the RDPs. The Proposed Project, in combination with the ongoing widening of SR 4, would add considerable additional commuting capacity along the project corridor and would support new growth projected for Pittsburg and Antioch. While the amount of new growth could be substantial, the specific planning processes ~~underway~~ by the cities of Pittsburg and Antioch promote new development around the Proposed Project stations to accommodate growth in a more compact, transit-oriented configuration. The Proposed Project would help serve the travel demand generated by this new development, as well as alleviate the travel demand that is forecast under No Project conditions (see Section 3.2, Transportation, of this document). The

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Section 3.5
Visual Quality

Project are less than significant. The photomontage reveals that the proposed platform in this segment would not create substantial visual change, either positively or adversely affecting the perceived aesthetic value or conditions of the setting. The Proposed Project would not result in new structures or buildings that visually encroach on existing structures, spaces, landscaping, or other features of development nor would the project introduce obtrusive elements substantially out of character with the setting. Therefore, the Proposed Project would be visually compatible with the SR 4 setting.

Railroad Avenue to L Street Segment. Similar to the Pittsburg/Bay Point BART Station to Railroad Avenue segment, the Railroad Avenue to L Street segment highway median would first be reconstructed by Caltrans to accommodate the installation of new vehicular lanes and public transit. New construction for the Proposed Project would consist of median surface grading to accommodate installation of the station platform beneath the Railroad Avenue overcrossing, guideway, and electrical/mechanical equipment.

This landscape segment would include the installation of a station beneath the Railroad Avenue overcrossing of SR 4. Parking for this station would be provided on a 3.1-acre site already used as a park-and-ride lot. This parking area would offer 300 parking spaces by 2015 and is on the north side of Bliss Avenue immediately west of the Harbor Street/SR 4 overpass. No changes to the existing parking area would occur under the Proposed Project. ~~The Railroad Avenue Station could also include construction of a pedestrian bridge connecting the eastern portion of the station platform and the Transit Village Subarea of the Draft Railroad Avenue Specific Plan. This subarea is south of SR 4 near the existing park-and-ride lot off Bliss Avenue~~.

This portion of the Proposed Project would not constitute substantial visual change either positively or adversely affecting the perceived aesthetic value or existing conditions. The physical layout of the Railroad Avenue Station elements (platform, canopy, lighting fixtures) would be considerably smaller in scale than the existing facilities at the Pittsburg/Bay Point BART Station and would not encroach on existing structures and spaces or other features of development. The ground-level station platform would not introduce obtrusive visual elements substantially out of character with existing conditions of the SR 4 setting. This setting consists of eight highway lanes plus highway shoulders and embankments extending beyond Railroad Avenue to Loveridge Road. The station stairways and elevators connecting the station platform with the Railroad Avenue overcrossing would blend with the mass of the superstructure that currently supports the overpass over SR 4. The new roof canopy would add new mass rising above the center of the Railroad Avenue overpass; however, the canopy height rises slightly above the existing fencing

along the overpass and would not block any hillside views. Thus, the addition of the Railroad Avenue Station would not be expected to significantly alter the appearance of the overpass. From a visual standpoint, the station platform placed within the highway median would be visually compatible and fitting with the SR 4 median.

~~The pedestrian bridge that may in the future connect the Railroad Avenue Station platform to development south of SR 4 has not been designed, but it is assumed that it would be designed similarly to the pedestrian bridge proposed for the Median Station at Hillcrest Avenue. Based on this assumption, the Railroad Avenue Station pedestrian bridge would be contemporary in design, defined by a glass enclosure. The bridge would be of greater visual interest than the existing concrete highway overpasses that occur at regular intervals along SR 4, such as the existing Railroad Avenue overcrossing. Because the pedestrian bridge is of similar height and in close proximity to the Railroad Avenue overcrossing, eastbound motorists' views of the pedestrian bridge would largely be blocked by the existing Railroad Avenue overcrossing and the proposed Railroad Avenue Station structures. Likewise, views from westbound motorists are defined by the highway corridor itself, including the travel lanes, the occasional overcrossings, and in this segment, the embankments on either side of SR 4. The pedestrian overcrossing would be viewed by these westbound motorists as part of the highway infrastructure, in context with and similar in height and mass to the Railroad Avenue overcrossing. Furthermore, SR 4 in this vicinity is depressed below the surrounding area grade and, therefore, the pedestrian bridge would not greatly intrude into the fields of view of viewers on either side of SR 4. As such, this future possible feature of the Railroad Avenue Station would not significantly impact sensitive visual receptors.~~

Continuation of the existing three-foot-high concrete safety barrier along the outer edges of the median would be expected to obstruct views to the station platform and guideway from all except the highest vehicles that travel SR 4, such as large SUVs and trucks. Like the landscape segment to the west, the rail guideways would have no substantial adverse effect on visual conditions. The concrete safety barrier with fencing would be a continuation of existing conditions along the project corridor as an element that partially defines the visual conditions of the highway environment. There would be no significant change in views from areas outside the highway environment since the highway is depressed below the surrounding landscape in the vicinity of the Railroad Avenue, Harbor Street, and Loveridge Road overcrossings. Visual and aesthetic conditions of the local setting would remain essentially as they were prior to station platform and guideway installation.

Section 3.8
Hydrology and Water Quality

Other Major ~~Surface~~ Waterways. In addition to these watersheds and multiple unnamed drainages, the project corridor also crosses the following surface water bodies or water facilities, as shown in Figure 3.8-2

- Contra Costa Canal (partially surface waterway and partially buried water conveyance facility)
- Los Medanos Wasteway (surface waterway functioning as a floodway)
- Mokelumne Aqueduct (underground water pipelines)
- ~~Main Canal~~

Flooding

100-Year Floodplain. The Federal Emergency Management Agency (FEMA) has mapped areas that may be flooded in a 100-year and 500-year storm. Statistically, a 100-year flood has a one-percent chance of occurring in any given year (a flood that would equal or exceed the highest flood recorded in the last 100 years). Similarly, the 500-year flood has a 0.2-chance change of occurring any given year. FEMA Flood Insurance Rate Maps (FIRM) for Contra Costa County were reviewed to identify areas that would be inundated by a 100-year flood. The Proposed Project alignment traverses ~~four~~ five major floodplain locations in the segment between the Pittsburg/Bay Point BART Station and SR 160 (see Figure 3.8-2 and 3.8-3)

- irker Creek and Old irker Creek Crossing at Loveridge Road Overcrossing
- A narrow strip along Los Medanos Wasteway
- Markley Creek (predominantly on the southeast quadrant of the SR 4/Contra Loma-L Street Interchange)[6]
- West Antioch Creek Crossing at Contra Loma Boulevard/L Street
- West Branch of East Antioch Creek

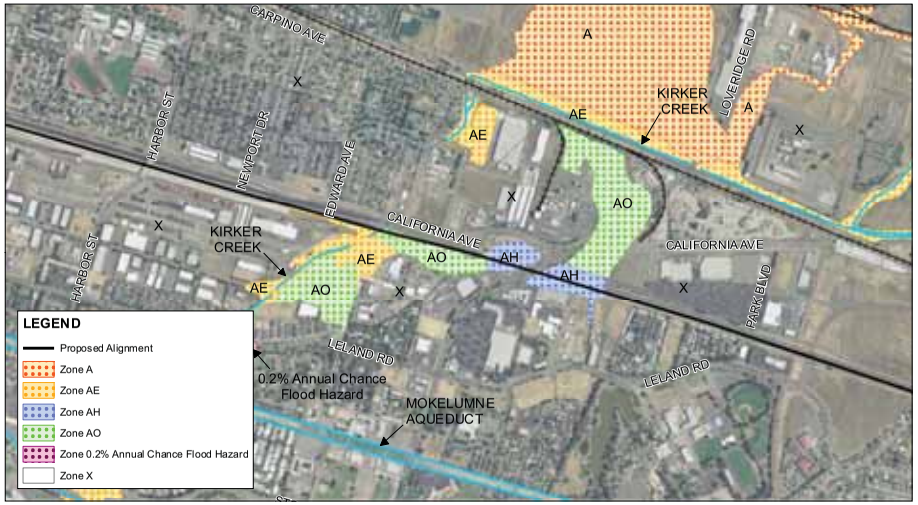
The SR 4 profile at Loveridge Road interchange is depressed, and the low point of the road is below the 100-year water surface elevation of the irker Creek and Old irker Creek Crossing. The existing pump at Loveridge Road ~~is~~ was originally designed for a 50-year storm. ~~and would need to be upgraded to handle a 100-year storm.~~ As a result, the Loveridge Road area has historically experienced flooding. The 1997 and 1998 floods resulted in extended closures of SR 4.[7] To address this, the SR 4 widening project (Loveridge Road interchange) proposes a pump at Loveridge Road and a culvert at Old irker Creek designed

[6] Department of Transportation, *State Ro te East idening Project o eridge Road to State Ro te 1 0 En ironmenta Assessment Initia St dy* 1994.

[7] irker Creek Watershed Planning roup, Contra Costa Resource Conservation roup, *ir er Cree aters ed anagement P an* 2004.

for a 100-year storm. However, the benefit of the Old irker Creek culvert upgrade would not be fully realized until the City of Pittsburg implements capacity improvements downstream of SR 4.

In the Los Medanos Wasteway, Markley Creek, and West Antioch Creek floodplains, there are cross culverts made of reinforced concrete boxes or reinforced pipes. The ~~roadway~~ ground elevations at these ~~low~~ points are above the 100-year water surface elevations at the closest creek crossings of SR 4 and, thus, SR 4 does not flood at these locations. ~~at these elevations are similar to surrounding ground elevations and therefore~~



A. Kirker Creek Crossing SR 4

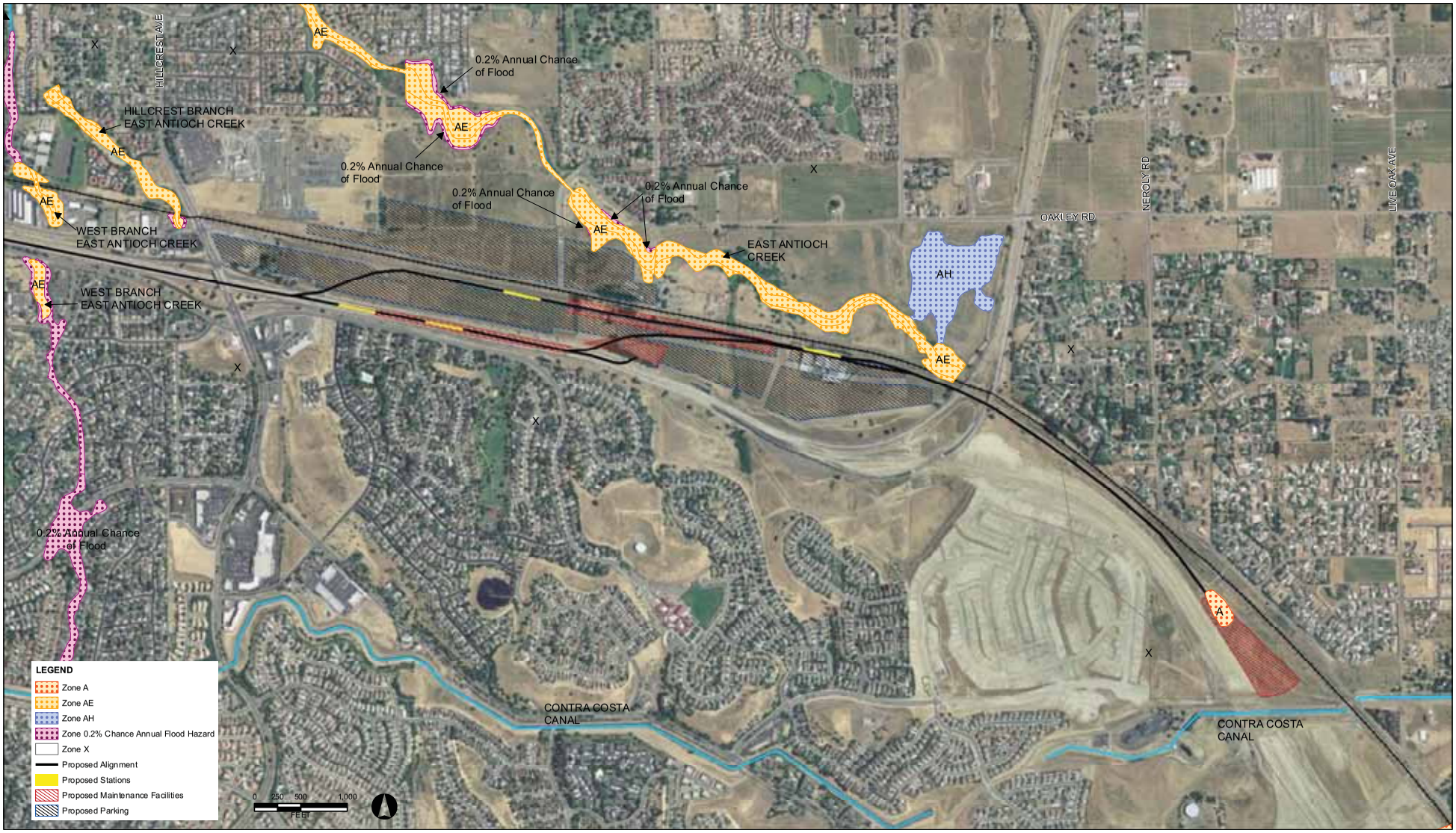
B. Los Medanos Wasteway and Markley Creek Crossing SR 4

C. West Antioch Creek Crossing SR 4

D. West and Hillcrest Branch of East Antioch Creek Crossing SR 4

Source: MAPIX (FEMA) Proof DFIRM Database, October 2008

FLOOD HAZARDS ALONG PROJECT CORRIDOR
FIGURE 3.8-2



Source: MAPIX (FEMA) Proof DFIRM Database, October 2008

FLOOD HAZARDS IN THE HILLCREST STATION AREA
FIGURE 3.8-3

~~experience minor flooding.~~[8] Information on flood hazards and the flooding condition for the 100-year flood within the project corridor is presented in Table 3.8-1.

Table 3.8-1
Floodplain Hydraulic Data in the Project Corridor

Reach	100-Year Peak Discharge in cubic feet per second (cfs)	U/S WS[a] Elevation (ft)	D/S WS[b] Elevation (ft)	Flooding Condition for 100-year flood	SR 4 Encroachment into Floodplain (sq ft)
Kirker Creek	~~2,168~~ 2,880	62.5	54.5	Does not o~~O~~vertop~~s~~	113,600
Old Kirker Creek	1,090	N/A	N/A	Overtops	Combined with above estimate for Kirker Creek
Los Medanos Wasteway	~~290~~ 600	55	51.5	Does not overtop	1,200
Markley Creek	~~470~~ 1,060	49	42.5	Does not overtop	1,200
West Antioch Creek	~~1,380~~ 2,660	38	34	Does not overtop	2,400

Source: WRECO*, East Contra Costa BART Extension Hydrology Report*, 2008; Contra Costa County Flood Control District, 2008.

Notes:

a. U/S WS = Upstream Water Surface Elevation

b. D/S WD = Downstream Water Surface Elevation

Data were not available for the West Branch of East Antioch Creek.

Each of the above floodplains is rated by FEMA according to risk of flooding and depth of flooding. Several areas of flood hazard are commonly identified on the FIRM. One of these areas is the Special Flood Hazard Area (SFHA), which is defined as the area that will be inundated by the flood event having a one-percent chance of being equaled or exceeded in any given year. The one-percent-annual-chance flood is also referred to as the "base flood." SFHAs are labeled as Zone A, Zone AE, Zone AH, and Zone AO.[8a] The relevant flood hazard zones in the project corridor are described below.

- ~~**Zone X** areas protected from a 500 year flood, areas where average depth of 100 year flood is less than one foot, and areas where the 100-year flood would expand less~~

[8] WRECO, *East Contra Costa BART Extension Draft Hydrology Report*, 2008.

[8a] Federal Emergency Management Agency. National Flood Insurance Program. www.fema.gov/business/nfip/fhamr.shtm. Accessed March 23, 2009.

~~than one square mile and be protected by levees. The majority of the project corridor is classified as FEMA Floodplain one .~~

- **Zone A** 100-year floodplains (area in which one-percent chance of flooding may occur), where no base flood elevations have been determined. Base flood elevations are computed elevations to which floodwater is anticipated to rise.
- **Zone AE** 100-year floodplains for which base flood elevations have been determined, which includes irker Creek, Los Medanos Wasteway, Markeley Creek, West Antioch Creek crossings and East Antioch Creek as outlined in Figure 3.8-2 and Figure 3.8-3.
- **Zone AH** areas that would result in shallow ponding (average depth of one to three feet) during a 100-year flood. This zone includes SR 4 at Loveridge Road Overcrossing.
- **Zone AO** areas of shallow flow in a 100-year flood, which is usually sheet flow or, in sloping terrain, areas with water elevation between one and three feet.
- **0.2-percent-annual-chance of flood Zone** areas of moderate flood hazard located between the limits of the base flood and the 0.2-percent-annual-chance of flood area (formerly known as the 500-year flood zone).
- **Zone X** areas outside the 0.2-percent-annual-chance floodplain.

Drainage and Flood Control. Drainage facilities in the project corridor are under the jurisdiction of local cities, the County for unincorporated areas, ~~and~~ the Contra Costa County Flood Control and Water Conservation District (CCCFCWCD), and the California Department of Transportation (Caltrans). The CCCFCWCD has prepared and adopted drainage plans for cities and unincorporated areas of the County. Drainage infrastructure is financed through a variable drainage area flood control improvement fee on new development.

The City of Pittsburg has initiated a SR 4 flood relief project (Stormwater Management Plan) that proposes improvements to all undersized pipes, culverts, and channels located upstream of the Pittsburg-Antioch Highway. The flood relief project would be designed to accommodate a 100-year storm event. At Loveridge Road, the flood relief project would accommodate and convey up to a 100-year storm (3,210 cfs).[9]

In the City of Antioch, shallow flooding often occurs due to insufficient culvert capacity.[10] Flood hazard zones within the project corridor are intermittently located adjacent to East Antioch Creek, and north of the proposed Hillcrest Avenue Station area (see Figure 3.8-3). CCCFCWCD has proposed to enlarge the capacity of the existing Oakley Detention Basin and construct a new detention basin (Trembath Detention Basin). Funding for these drainage improvements has been secured; however, a schedule for implementation has yet to be determined. The two basins would have a combined capacity to accommodate the 100-year peak flows for the entire East Antioch Creek Watershed.

Surface Water Quality

Beneficial Uses. The San Francisco Bay and Central Valley Regional Water uality Control Boards (RW CBs) are responsible for developing and enforcing surface water and groundwater quality objectives and implementing plans that will best protect beneficial uses of the waters of the state in the project corridor. The RW CBs are required to prepare Basin Plans, which determine the beneficial water uses to be protected, water quality objectives needed to protect the designated beneficial water use, and strategies and time schedules for achieving the water quality objectives.

There are no listed beneficial uses for any of the receiving water bodies within the project corridor. According to the San Francisco and Central Valley RW CBs, where specific water bodies are not identified, the beneficial uses identified in the Basin Plan for the downstream waters are applicable to the water body into which discharge occurs.[11] The Sacramento-San

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[9] irker Creek Watershed Planning roup, Contra Costa Resource Conservation roup, *ir er Cree aters ed anagement P an* 2004.

[10] City of Antioch *F ood Ins rance St dy* 1987-revised.

[11] California Regional Water uality Control Board, Central Valley Region, NPDES Waste Discharge Requirements eneral Order No. 5-00-175 for Dewatering and other Low Threat Discharge to Surface Waters, 2000.

- **Industrial Stormwater General Permit.** The Industrial Stormwater eneral Permit (eneral Permit Order No.97-03-DW), also referred to as the Industrial eneral ~~Industrial~~ Permit, regulates discharges associated with 10 broad categories of industrial activities, including transportation maintenance and rail yard facilities. The Industrial eneral ~~Industrial~~ Permit requires the implementation of management measures that will achieve the performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT). The Industrial eneral ~~Industrial~~ Permit also requires the development of a SWPPP and a monitoring plan. Through the SWPPP, the permit regulates stormwater discharges associated with equipment fueling, maintenance, and waste disposal (as applicable to the Proposed Project). In addition, the SWPPP identifies sources of pollutants and describes the means to manage the sources to reduce stormwater pollution. The Industrial eneral ~~Industrial~~ Permit requires that an annual report be submitted each uly 1. To obtain the Industrial Stormwater Permit, a complete NOI package to discharge stormwater, and a Notice of Termination must be filed with each RW CB that has jurisdiction over the project.

Contra Costa County Agencies Multiple agencies, departments, and divisions are responsible for regulating flooding and drainage, and maintaining water quality in the County.

Contra Costa Public Works Department County Flood Control Engineering Division in cooperation with local municipalities oversees flood control within Contra Costa County. This Division provides technical support to the CCCFCWCD, which controls flood and stormwaters in the County. The CCCFCWCD develops drainage plans, specifying flood control improvements needed to serve planned development in the area. Staff coordinates and assists in the development and implementation of storm drainage systems; sets drainage fees; and reviews drainage aspects of land development applications, and flood control and drainage permit applications.

Contra Costa Clean Water Program (CCCWP) encompasses Contra Costa County, 19 incorporated cities, and CCCFWCD. The program monitors the NPDES program and the Storm Water Utility areas for most of Contra Costa County. The CCCWP develops and implements specific programs to meet NPDES requirements and consists of a comprehensive plan to reduce the discharge of pollutants to the maximum extent practicable. The CCCWP obtained a oint Municipal NPDES permit from the San Francisco Bay and Central Valley RW CBs and have been adopted by the cities of Pittsburg and Antioch.

The San Francisco and Central Valley RW CBs added Provision C.3 to the NPDES permit governing discharges from the municipal storm drain systems in the cities of Contra Costa County. The C.3 requirements are separate from, and in addition to, requirements for erosion and sediment control and pollution prevention measures. The provisions require that developers detain or infiltrate runoff so that peak flows and flow durations match pre-project

Project-Specific Environmental Analysis

Operationa pa ts

Impact -1 T e Proposed Project o d not s bstantia y increase imper io s areas except in t e icinity of t e i crest A en e edian Station ere t e par ing access impro ements and maintenance annex o d introd ce considerab y more imper io s acreage contrib te to additiona r noff and potentia y create a f ood a ard PS

SR 4 Median. Project elements proposed within the SR 4 median include the Pittsburg/Bay Point Transfer Platform, the Railroad Avenue Station, and the Hillcrest Avenue Median Station and maintenance facility (with its associated tailtracks).

The Pittsburg/Bay Point Transfer Platform and the Railroad Avenue Station would consist of at-grade station platforms. These two stations and the associated surface parking lots at the Railroad Avenue Station would be sited on existing developed land, and as such, would not contribute more impervious acreage. Additionally, the Proposed Project includes construction of staff building either at the east end of the transfer platform or on the narrow strip of land between SR 4 and Canal Road near the transfer platform. The staff building would include a parking lot, which would also be sited on the strip of land between SR 4 and Canal Road. The staff building and associated parking lot would be sited next to already developed land (SR 4, Canal Road, and an existing parking lot) and would require a relatively small area; therefore, would not contribute impervious acreage that would substantially increase local runoff. As such, the Pittsburg/Bay Point Transfer Platform, the staff building and associated parking lot, and Railroad Avenue Station would not result in additional runoff that could exceed the existing drainage capacity of the stormwater drainage system and result in a flood hazard.

~~Drainage along the SR 4 median consists of a longitudinal underdrain system collecting stormwater flow and discharge points at various existing highway cross culverts.~~ Deficiencies in culvert capacity have been identified at East irker Creek and east of Loveridge Road, due to downstream constrictions. However, the City of Pittsburg and Contra Costa Transportation Authority (CCTA) are proposing storm drain improvements ~~in the SR 4 median~~ as part of the SR 4 widening project which would improve the existing system

deficiencies. Proposed drainage improvements along the SR 4 median include a longitudinal underdrain system to collect stormwater flow and discharge points at various existing highway cross culverts. The upgraded storm drain improvements would provide adequate system infrastructure to accommodate a 100-year storm. [24,25]

Minimal surface runoff is expected as a result of operational activities from the Median Station and maintenance facility proposed within the SR 4 median. The proposed station and maintenance facility would encompass 0.2 and 3.7 acres, respectively. Drainage for the proposed guideway would be designed for a 100-year storm, as indicated in the Hydrology Report for the Proposed Project.[26] The longitudinal underdrains that would drain the proposed guideway would be designed to tie into the several inlets that provide discharge into the SR 4 cross drains. The SR 4 widening project would upgrade ~~all~~ some culverts crossing beneath the proposed guideway in the SR 4 median, and would make use of existing crossings where reasonable. Additionally, runoff collected from the project alignment would filter through the pervious ballast and flow into the median underdrain pipe running along SR 4.

Therefore, the Proposed Project elements within the SR 4 median would not substantially increase stormwater runoff as a result of increased impervious areas. No flood hazards are expected as a result of project operations within the SR 4 median, and impacts of increased runoff volumes would be less than significant.

Outside of SR 4 Median. The Proposed Project would site the maintenance annex and surface parking north of the SR 4. In addition~~,~~ to the Proposed Project, ~~would extend~~ Slatten Ranch Road and Viera Avenue could be extended to provide access to the parking areas for the Median Station if funding becomes available. The additional impervious surface area from these components total approximately 51 acres, of which approximately 14 acres would be for year-of-opening parking, 9.8 acres for the extension of Slatten Ranch Road and Viera Avenue, 2.8 acres for the maintenance annex, and another 24 acres for future parking lots. (These impacts refer to the effects associated with the BART proposed access to serve the Hillcrest Avenue Station, parking lot, and maintenance facility. The Proposed Project would not

[24] irker Creek Watershed Planning roup, Contra Costa Resource Conservation roup, *ir er Cree aters ed anagement P an* 2004.

[25] This number is based on the CCCFCWD's Hydro6 and Hydro2 rainfall/runoff program, which computes peak flow rates, runoff volumes and flood hydrographs for storms of various frequencies. It is based on a built-out land use from the 1988 City of Pittsburg eneral Plan.

[26] WRECO, *East Contra Costa BART Extension Draft ydro ogy Report*, 2008.

include the construction of Slatten Ranch Road, unless funding is provided by others to cover the additional costs. Construction of the access road by BART would not preclude future construction of Slatten Ranch Road as outlined in the City of Antioch RDP.)

Furthermore, the Proposed Project would require train control huts along the project corridor to enable the vehicles to be tracked. The train control huts would be located approximately every 1.5 miles along the project alignment and accessible from public roads. The huts would be placed in fenced areas, each approximately 384 square feet. Eight potential locations for train control

huts have been identified. All eight huts would cover approximately 0.07 acres.

These undeveloped lands that are proposed for Proposed Project facilities are not served by a municipal storm water drainage system. Existing drainage at these sites either percolates into the soil or flows into nearby drainages; in the case of the Hillcrest Station area, from south to north into culverts that pass under the Mococo Line and discharge into East Antioch Creek. The additional acres of impervious surface at Hillcrest Station would contribute significant surface water runoff which would result in the potential exacerbation of existing constraints in the stormwater drainage system, resulting in local flood hazards. The additional impervious surfaces resulting from the train control huts would be minimal and would not result in local flood hazards.

The project design for the year-of-opening surface parking lot would include bioswales at both ends of the parking lot. The bioswales are proposed to capture and treat surface water runoff from the surrounding parking lot, thereby reducing surface runoff. While the bioswales would capture some of the runoff, there is a potential that additional runoff would drain into the stormwater drainage system.

Furthermore, the additional runoff from the parking lots, maintenance annex, and Slatten Ranch Road would be accommodated by a proposed CCCFWCD detention basin the Trembath Basin, which would serve to reduce peak runoff into the main channel of East Antioch Creek during periods of heavy rainfall. The proposed Trembath Basin anticipated urban development in this area of the East Antioch Watershed, providing for an estimated storage of 100 acre-feet at maximum level that would be sufficient to accommodate a 100-year flood event. Construction of the Trembath basin ~~is anticipated to commence in 2008~~ will not commence for several years. [27]

While compliance with the C.3 provisions would maintain peak runoff volumes at existing levels, the drainage facilities for the parking areas and access roads have not yet been designed. During the next stage of design, BART will be responsible for quantifying runoff volumes and rates and designing the detention and drainage facilities to comply with C.3 requirements. In the absence of that information, this EIR conservatively assumes that the increase in runoff could contribute to localized flood hazards in the area north of SR 4 and east of Hillcrest Avenue. This would be a potentially significant impact.

~~[27] CCCFWCD website, http //www.co.contra-costa.ca.us/depart/pw/design/Project 20Info/trembath.htm. accessed May 22, 2008.~~

Impact - T e proposed t nne bet een t e maintenance faci ity and t e maintenance annex o d not affect oca gro nd ater f o TS

The Median Station would include a tunnel under SR 4 for access between the maintenance facility in the SR 4 median and the maintenance annex just north of SR 4. The tunnel depth would be up to 30 feet deep.[28] roundwater in the vicinity of the Median Station is encountered at approximately 70 feet bgs.[29] The maintenance annex would be built on hilly terrain at a higher elevation than the Median Station and maintenance facility. As a result, it is unlikely that the tunnel between the maintenance facility and the maintenance annex would encounter groundwater.

However, in the unlikely case that groundwater is present (at some point) during the operation of the tunnel, impacts are not anticipated. This is because during construction, BART would require that exterior membrane waterproofing be applied to the subway box. Any potential leakage into the tunnel through the walls would be conveyed away by the track drainage. Therefore, the tunnel between the maintenance facility and the maintenance annex would have less-than-significant impacts on groundwater flow.

Impact - T e Proposed Project o d not p ace peop e and property it in a 100-year f ood a ard area TS

The DMU guideway in the SR 4 median traverses four floodplain areas irker Creek and Old irker Creek Crossing at Loveridge Road, Los Medanos Wasteway, Markley Creek, and West Antioch Creek at L Street/Contra Loma Boulevard. Stormwaters~~The floodplains~~ associated with Los Medanos Wasteway, Markley Creek, and West Antioch Creek ~~are minor floodplains and stormwaters~~ would not overtop ~~the banks of these waterways~~ SR 4 during a 100-year storm. A 100-year storm would, however, affect the local streets at West Antioch Creek. These three floodplains would not significantly affect the Proposed Project facilities or operations.

At Loveridge Road, SR 4 is below the 100-year storm elevation of irker Creek and Old irker Creek. During a 100-year storm, the depressed area at the Loveridge Road interchange normally floods. As indicated in the Hydrology Report,[30] the SR 4 profile at this location would result in stormwaters overtopping SR 4 during the 50-year storm. As a result, Proposed Project passengers could be exposed to a flood hazards in this stretch of the alignment.

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28 Don Dean, BART Contractor, email to PBS , May 21, 2008.
29 Don Dean, BART Contractor, email to PBS , May 21, 2008.
30 WRECO, *East Contra Costa BART Extension Draft ydro ogy Report*, 2008.

The SR 4 widening project was evaluated for flood impacts as part of that project's Initial Study/Environmental Assessment (IS/EA). The section of SR 4 at Loveridge Road is depressed and is bounded by irker Creek to the west and Old irker Creek to the east. A 100-year storm would cause Old irker Creek to overtop SR 4 and inundate this depressed section of the freeway, inlets, pipes, and underdrain system. Because of ~~potential~~ this known flood hazard~~s~~, the SR 4 widening project at the Loveridge Road interchange proposes measures ~~were identified to upgrade~~ upgrading the existing pump station at the Loveridge Road interchange that drains the section of the SR 4 at Loveridge Road, as well as ~~to~~ the culvert at Old irker Creek (to provide SR 4 with protection from a 100-year storm). Other measures include~~,~~ improvinge the existing outfall for the Loveridge drainage system, and aggressively cleaning out the box culverts and pipes downstream of SR 4. ~~In addition, Caltrans would install box culverts designed for a 100-year storm at the Loveridge Road interchange.~~

Furthermore, in recognition of this flood hazard and separate from the Caltrans proposal, the City of Pittsburg has initiated a SR 4 flood-relief project to alleviate flooding impacts at the Loveridge Road interchange and other surrounding areas. At Loveridge Road, the flood relief project would be designed to accommodate and convey up to a 100-year storm (3,210 cfs).[31]

In recognition of the flood hazards at this low point in the SR 4 profile, BART has designed the vertical alignment of the project guideway so that the sub-ballast would be above the surface water elevation of the 100-year storm of irker Creek.[32] In addition, the sub-ballast would be permeable, which would allow the surface water runoff to seep into the subsurface and/or drain into the surface water inlets~~, reducing the potential for flooding~~. The longitudinal underdrains that would provide drainage for the DMU guideway would tie into several inlets, which provide discharge into the SR 4 crossdrains.

In summary, given the proposed design features for the project alignment and the on-going drainage facility upgrades, the Proposed Project is not expected to exacerbate flooding and/or place people and structures in a flood hazard area. Therefore, the Proposed Project would have less-than-significant impacts with regards to the potential of exposing people and/or properties to a flood hazard area.

[31] irker Creek Watershed Planning roup, Contra Costa Resource Conservation roup, *ir er Cree aters ed anagement P an* 2004.

[32] WRECO, *East Contra Costa BART Extension Draft ydro ogy Report*, 2008.

Impact - peration of t e Proposed Project o d increase t e po tant oad of storm aters t at co d affect ater a ity in oca ater bodies PS

During the operation of the Proposed Project, major sources of pollutants that can be conveyed by stormwater runoff include contaminants that have accumulated on impervious surfaces such as parking lots and pedestrian walkways; paved areas and rooftops of the station, maintenance facility, and maintenance annex; and railroad tracks (including tailtracks). The transport of

- 1 *Imp ement storm ater management B Ps* BART shall ensure that its contractor implements stormwater BMPs in accordance with the NPDES Industrial eneral ~~Industrial~~ Permit. As required by the permit, a SWPPP shall be prepared in order to document and identify pollutants and describe BMPs to reduce stormwater pollution. Through the SWPPP, the permit regulates stormwater discharges associated with equipment fueling, maintenance, and waste disposal. BMPs that could be included in the SWPPP and implemented for the Proposed Project include

  - strip retention system to treat runoff prior to discharge;
  - oil/water separators to prevent contaminated stormwater from entering drainage system;
  - construction of additional detention basins and/or use of pervious pavement in order to allow infiltration of stormwater into the soil where runoff could be filtered naturally and pollutants removed; and
  - installation of rain barrels near the roofs at the Median Station and/or maintenance facilities.[33]

onstru tion pa ts

Impact - Constr ction of t e Proposed Project o d in o e gro nd-dist rbing acti ities ic co d res t in soi erosion and si tation t at co d exacerbate and or ca se f ooding PS

Construction activities, such as site clearing, grading, and excavation, can expose soil to erosion. If transported by wind or water, silt from erosion can accumulate in storm drains and local water bodies, restricting stormwater flow and reducing capacity. Accumulation of silt in storm drains and water bodies can exacerbate and/or result in localized flooding.

Construction within the SR 4 Median. The Pittsburg/Bay Point Transfer Platform would consist of an at-grade, 700-foot station platform and no parking. The Railroad Avenue Station would also consist of an at-grade station platform and parking on land that is currently developed as a park-and-ride lot. round-disturbing activities at these two facilities would not expose soil to substantial erosion since the areas are already disturbed or relatively small in size. Construction activities from these project elements would have less-than-significant impacts on potential flooding caused by soil erosion and siltation.

[33] Aboveground water storage container that captures runoff from the roof.

In addition to the construction of the transfer platform and the Railroad Avenue Station, construction of the Proposed Project within the SR 4 median would involve site clearing, grading, and minor excavation for the installation of track sub-ballast, ballast, ties, rails, and an underdrain system along portions of the corridor,[34] and construction of aerial and bridge structures and pedestrian walkways. Project components proposed in the SR 4 median include the Median Station and maintenance facility.

Caltrans is currently widening SR 4 between Loveridge Road and SR 160. The highway widening would involve installation of piles and foundations for the aerial structures and bridges at Loveridge Road, on the west side of Century Boulevard, and at Somersville Road, L Street, A Street, Cavallo Road, and the utility corridor. These activities would not disturb natural ground surfaces, and thus would not result in significant erosion and sedimentation during construction such that eroded soils could obstruct waterways and cause flooding. Therefore, construction of the Proposed Project within the SR 4 median would result in a less-than-significant impact with regards to potential flooding caused by erosion and sedimentation.

Construction outside the SR 4 Median. Outside the SR 4 median, the Proposed Project would involve construction of a pedestrian bridge for access to the Median Station, approximately 40 acres of surface parking, a 2.8-acre maintenance annex northeast of the Median Station, and 9.8 acres for extensions of Slatten Ranch Road and Viera Avenue to access the station and parking areas. (These impacts refer to the effects associated with the BART proposed access to serve the Hillcrest Avenue Station, parking lot, and maintenance facility. The Proposed Project would not include the construction of Slatten Ranch Road, unless funding is provided by others to cover the additional costs. Construction of the access road by BART would not preclude future construction of Slatten Ranch Road as outlined in the City of Antioch RDP.) Existing stormwater runoff in this area of the Proposed Project flows from south to north into culverts that pass under the Mococo Line and discharges into East Antioch Creek. CCCFCWD is proposing to construct the Trembath Basin, which would accommodate stormwater flows from East Antioch Creek and the surrounding area, which includes the Median Station area. Construction of the basin is proposed to commence in 2008 and would be in place by the opening of the Proposed Project in 2015.

[34] P H Wong Engineering, Inc., *East Contra Costa Co nty Transit Project eBART Ser ice from Pittsb rg to i crest A en e Constr ction Imp ementation Report*, 2007.

Construction of these project components could have significant erosion and siltation impacts from construction because the activities would temporarily disturb a substantial area (approximately 51 total acres) and expose soils and soil stockpiles to erosion. Eroded silt could accumulate and clog culverts to the north, restricting runoff into East Antioch Creek and causing localized flooding upstream of the Mococo Line. As such, erosion during construction activities for project components outside the SR 4 median could result in potentially significant flood impacts.

-9 1 Prepare and imp ement drainage p an BART shall ensure that the contractor prepares a hydraulic analysis and drainage plan for the Hillcrest Avenue Station option, for review by the City of Antioch~~,~~ ~~and~~ the CCCFCWCD, and the CCWD. The drainage plan shall include a drainage study (hydrologic analysis) for review by the CCCFCWD. The purpose of the drainage plan is to help control the additional surface water runoff expected from the project in accordance with the NPDES C.3 provisions and input from the local agencies. BART will then ensure that the contractor implements the drainage plan to safely and efficiently convey stormwaters from the remote maintenance facility.

-9 2 Imp ement permanent egetated s a es at t e remote maintenance faci ity To minimize storm and flood capacity impacts, BART shall ensure that its contractor diverts and controls stormwater runoff by using permanent swales. Vegetated swales would have multiple functions as they would allow infiltration of the stormwater runoff from parking areas and the rooftop of the maintenance facilities to the maximum extent practicable, reduce post-construction storm flow rate, and contribute towards groundwater recharge.

The vegetated swales shall be frequently monitored at least bi-annually or as frequently as needed to maintain their effectiveness. Frequency and recommended monitoring activities are outlined below

- Inspect grass along side slopes for erosion and formation of rills or gullies and correct;
- Remove accumulated trash and debris;
- Inspect and correct erosion problems in the sand/soil bed of dry swales;
- If original grass cover has not been successfully established, plant alternative grass species;
- Replant wetland species (for wet swale) if not sufficiently established;
- Remove sediment build-up within the bottom of the swale once it has accumulated to 25 percent of the original design volume; and
- Mow grass to maintain a height of 3 - 4 inches.

Impact -10 T e trac s associated it t e proposed remote maintenance faci ity for t e ort side East and ort side est options o d not encroac into a 100-year f oodp ain ~~PS~~ I

The tracks associated with the remote maintenance facility for the Northside East Station and the Northside West Station options would not cross the 100-year floodplain in the vicinity of the SR 160 and SR 4 interchange. While these tracks would not cross the 100-year floodplain, Caltrans, as part of the SR 4 widening, may still improve the culvert capacity at the SR 160 crossing, in the vicinity of the east branch of East Antioch Creek, to address flood hazards. ~~While passengers would alight the trains at the Hillcrest Avenue Station and thus not be on the trains in this segment, train operators would direct the trains into the remote maintenance facility, exposing the operators, vehicles, and trackwork to the 100-year flood hazards, a potentially significant impact.~~ Neither passengers nor train operators would be exposed to a 100-year flood hazard in the vicinity of SR 4/SR 160 interchange. Therefore, no flood hazard impacts would occur associated with the tracks for the proposed maintenance facility for the Northside East and Northside West options.

~~MITI ATION MEASURE. The following mitigation would ensure that operational impacts of the Northside West and Northside East Station options related to flood hazards are reduced to less-than-significant levels. (LTS)~~

~~*10 1 E e ate str ct res abo e t e f ood one* The tracks shall be elevated above the flood elevation to minimize flood hazards.~~

onstru tion pa ts

Impact -11 Constr ction of t e ort side East Station option and to a esser degree t e edian Station East option o d in o e extensi e gro nd-dist rbing acti ities t at co d ca se si tation into East Antioc Cree and t e nnamed cree Si tation co d a so affect t e created et and at t e site of t e remote maintenance faci ity and red ce t e f ood storage capacity. PS

Construction activities, such as site clearing, grading, and excavation, can result in potential soil erosion. If transported by wind or water, silt can accumulate in storm drains and local water bodies, restricting stormwater flow and reducing storage capacity.

Existing runoff at the sites proposed for the remote maintenance facility, parking lots, and access roads either flows north into the unnamed creek and/or into an existing culvert. From the location of the proposed remote maintenance facility, the culvert extends northwest, crosses under the Mococo Line and conveys drainage through the Hillcrest Avenue development area, and into the City of Antioch's stormwater system. The site clearing, grading, and excavation activities would disturb a substantial amount of land for station area components. In particular, the surface parking lots for the Northside East Station option would require grading two hills along the northside of SR 4, which would involve considerably more earthwork than any of the other Hillcrest Avenue Station options. This option would also involve either a short

related road access, would result in even more impervious surface area, and runoff to water bodies and storm drain facilities than the Proposed Project.

The forecasted growth projected by the Ridership Development Plans and ABA , in combination with the SR 4 widening project, would increase the amount of surface area dedicated for buildings, parking areas, walkways, and roadways. The entire area between SR 4 and East Antioch Creek is planned for commercial development, according to the Antioch eneral Plan. The Ridership Development Plan under preparation by the City is envisioning up to 2,150,000 square feet of commercial space and up to 2,500 dwelling units in the 375 acres between Hillcrest Avenue and SR 160, north of SR 4. Runoff from this area that would have otherwise percolated into the ground would be released as additional runoff to storm drains, East Antioch Creek, and could potentially exceed flood capacity. The expected development would convert this largely undeveloped area of ruderal and pasture land to impervious surfaces associated with urban development and, thus, increase runoff to local water bodies and storm drain facilities. While ~~CCWD~~ CCCFCWD is proposing to improve detention capability (detention basins), the increased runoff could potentially exceed the storm drain system's capacity.

MITI ATION MEASURE. Implementation of Mitigation Measure H -1.1 would reduce operational impacts of the Proposed Project related to stormwater runoff to less than cumulatively considerable. Mitigation Measure H -1.1 calls for the implementation of BMPs to control surface water runoff such as construction of additional basins and/or swales, flow-through planters, in-ground planters, bioretention areas, among others. Other projects would also be required to implement similar mitigation measures under the Stormwater eneral Permits. The measures implemented by the Proposed Project and by the other projects would reduce the cumulative impacts to less than significant. (LTS)

Impact -C -1 *T e Proposed Project in combination it ot er foreseeab e de e opment projects and t e SR idening project o d not p ace peop e and property in f oodp ains and ca se significant c m ati e f ooding impacts t at co d expose peop e and property to f ood a ards TS*

As indicated under Impact H -11, the tracks associated with the remote maintenance facility for the Northside East Station and the Northside West Station options would cross the 100-year floodplain in the vicinity of the SR 160 and SR 4 interchange. This component of the Proposed Project would expose people and/or structures to potential flood hazards.

The SR 4 widening project would also have the potential to expose people and structures to flood hazards. The FIRM maps indicate ~~the~~ that the SR 4 improvements would cross ~~five~~ four floodplains (see Figure 3.8-2 and Figure 3.8-3). However, Caltrans, as part of the SR 4[36] widening, ~~would~~ may improve the culvert capacity along SR 4 and may improve the cross culvert near SR 160 in the vicinity of the east branch of East Antioch Creek, which would address the flood hazards.[36]

The City of Antioch's eneral Plan Flood Protection Policy (Section 11.4.2 (a)) prohibits all development within the 100-year floodplain, unless mitigation measures consistent with the National Flood Insurance Program are provided.[37] The City of Pittsburg's eneral Plan also contains policies that would ensure adequate flood protection for planned development. Under the eneral Plan's Flood Control Policy 10- -7, the City of Pittsburg requires that development be located outside of the flood-prone areas unless mitigation of flood risk is assured.[38] These policies govern planned future developments to minimize flooding impacts to people and property .

Additionally, the City of Pittsburg is currently developing a Ridership Development Plan for the potential development of 1,845 new residential units and about one million square feet of commercial space near the Railroad Avenue Station, and the City of Antioch is preparing a plan that envisions up to approximately 2,500 new residential units and 2,150,000 square feet of commercial space near the Hillcrest Avenue Station. While portions of this development would occur in floodplains associated with irker Creek in the City of Pittsburg and East Antioch Creek in the City of Antioch, and therefore expose people and structures to a flood hazard, the cities of Pittsburg and Antioch each have local development policies and regulations to protect development from identified flood hazards. In addition, each jurisdiction has coordinated with CCCFWCD so that new development is required to implement flood control improvements and necessary stormwater detention facilities. For example, the proposed Trembath Basin would serve to reduce peak runoff into the main channel of East Antioch Creek during periods of heavy rainfall and is to be upgraded to accommodate a 100-year flood.

The above mentioned policies and facility upgrades related to the anticipated growth in the cities of Pittsburg and Antioch are aimed at reducing flood impacts. While the Proposed Project would have the potential of placing people and structures in a floodplain, as indicated under Impact H 10, these impacts are reduced to a less-than-significant level by incorporating Mitigation

[36] Caltrans, State Route 4 Widening Project, Loveridge Road to SR 160, Environmental Assessment Study, uly 2005.

[37] City of Antioch, *enera P an* 2003.

[38] City of Pittsburg, *enera P an Pittsb rg 2020 A ision for t e 21st Cent ry* 2004.

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Section 3.9
Biological Resources

- Preliminary Wetland Delineation and urisdictional Determination for the County Crossings Development, Antioch, uly 2005; U.S. Army Corps of Engineers' Verification Number 2005-0115;[5] ~~and~~
- Insect and Invertebrates Site Assessment for the County Crossings Development, Antioch, August 2005~~.~~;[6] and
- Special Status Animal Species Report for the County Crossings development, Antioch, September 2008.[7]

Existing Conditions

Regional Overview and Survey Methods

The project corridor lies within highly urbanized landscapes in the eastern portion of Contra Costa County. Ornamental and ruderal (weedy) habitat is the most commonly encountered habitat type along State Route 4 (SR 4) and adjacent undeveloped areas. Outside these areas, landscapes are urban or semi-rural and consist of agricultural areas, wetlands, and open space. Approved and planned urban development in the City of Antioch, as well as the construction of the SR 4 Bypass through eastern Antioch, has already reduced much of the remaining open space in this portion of the project corridor.

Topographically, the project corridor starts at an elevation of approximately 125 feet above mean sea level (msl) at its western terminus in the City of Pittsburg, and drops to approximately 70 feet above msl at its eastern terminus at the proposed Hillcrest Avenue Station. The overall slope and aspect of the project corridor generally falls towards Suisun Bay to the north, and all drainages lie within the San oaquin Delta and Suisun Bay watersheds (see Section 3.8, Hydrology and Water uality, for more detailed information on local drainages).

The project corridor crosses several waters of the U.S., including Willow Creek, irker Creek, Los Medanos Wasteway, Markley Canyon Creek, West Antioch Creek, East Antioch Creek, and several unnamed tributaries. All of these watercourses have been historically channelized and culverted to some extent beneath SR 4.

A number of surveys were conducted by PBS biologists throughout the spring and early summer of 2006, winter 2007, and spring 2008, and are summarized below. The principal biological databases, including the California Department of Fish and ame (CDF) California Natural Diversity Database (CNDDB), California Native Plant Society (CNPS) Online

[5] RCL Ecology, County Crossings Development Preliminary Wetland Delineation and urisdictional Determination, Antioch, Contra Costa County, California, uly 2005.

[6] Entomological Consulting Ltd., County Crossings Development, Insect and Invertebrates Site Assessment, Antioch, Contra Costa County, California, August 2005.

[7] Live Oak Associates, Inc., County Crossings Special Status Animal Species Report, Antioch, Contra Costa County, California, September 10, 2008.

Electronic Inventory of Rare and Endangered Vascular Plants of California, and the United States Fish and Wildlife Service (USFWS) Online Species List of Federal Endangered and Threatened Species queries, were queried before field surveys were conducted.[8]

[8] The CNDDB, CNPS, and USFWS database query results in the Biological Resources Tech Report are available for review at the BART Planning Office.

Table 3.9-1
Plant Communities and Plant and Wildlife Species Observed in the Project Corridor

Plant Community	Plant Species	Wildlife Species
Ruderal	wild oat (*A ena fat a*), rip-gut brome (*Brom s diandr s*), soft chess (*Brom s ordeace s*), hare barley (*orde m m rin m* ssp. *eporin m*), Italian ryegrass (*o i m m tif or m*), sweet fennel (*Foenic m gare*), wild radish (*Rap an s sati s*), prickly sow-thistle (*Sonc s asper*), Italian thistle (*Card s pycnocep a s*), black mustard (*Brassica nigra*), yellow star-thistle (*Centa rea so stitia is*), purple star-thistle (*Centa rea ca citrapa*), California bur-clover (*edicago po ymorp a*), red-stem filaree (*Erodi m cic tari m*), filaree (*Erodi m botrys*), prickly lettuce (*act ca serrio a*), wild blue lettuce (*act ca irosa*), hairy vetch (*icia sati a*), milk thistle (*Si yb m marian m*), field bindweed (*Con o s ar ensis*), fiddleneck (*Amsinc ia men iesii* var. *intermedia*), annual fireweed (*Epi obi m brac ycarp m*), flowering almond (*Pr n s d cis*), blackwood acacia (*Acacia me anoxy on*), eucalyptus (*E ca ypt s* spp.), toyon (*eterome es arb tifo ia*), Peruvian peppertree (*Sc in s mo e*), coyote brush (*Bacc aris pi aris*) giant reed (*Ar ndo donax*), artichoke thistle (*Cynara card nc s*), and pampas grass (*Cortaderia se oana*).	monarch butterfly (*Dana s p exipp s*), western fence lizard (*Sce opor s occidenta is*), gopher snake (*Pit op is catenifer*), black phoebe (*Saynoris nigricans*), Brewer's blackbird (*E p ag s cyanocep a s*), killdeer (*C aradri s ocifer s*), meadowlark (*St rne a neg ecta*), western kingbird (*Tyrann s ertica is*), mourning dove (*enaida macro ra*), house finch (*Carpodac s mexican s*), goldfinch (*Card e is psa tria*), house sparrow (*Passer domesticat s*), tree swallow (*Tac ycineta bico or*), northern mockingbird (*im s po yg ottos*), California quail (*Ca ipep a ca ifornica*), pheasant (*P asian s co c ic s*), western scrub jay (*Ap e ocoma coer escens*), ~~northern shrike (*ani s exc bitor*)~~ loggerhead shrike (*ani s do ician s*), summer tanager (*Piranga r bra*), American robin (*T rdis migratori s*), American crow (*Cor s brac yr ync os*), black-tailed hare (*ep s ca ifornic s*), Botta's pocket gopher (*T omomys bottae*), coyote (*Canis atrans*), California ground squirrel (*Spermop i s beec eyi*), red-tailed hawk (*B teo jamaicensis*), red-shouldered hawk (*B teo ineat s*), turkey vulture (*Cat artes a ra*), Swainson's hawk (*B teo s ainsoni*), western burrowing owl (*At ene c nic aria yp gea*).
Non-native rassland	rip-gut brome, hare barley, Italian ryegrass, Italian thistle, yellow star-thistle, prickly lettuce, field bindweed, fiddleneck, annual fireweed, blue wild-rye (*E ym s g a c s*), curly dock (*R mex crisp s*), crown brodiaea (*Brodiaea coronaria*), gumplant (*rinde ia campor m* var. *campor m*), blow-wives (*Ac yrac aena mo is*), California poppy (*Esc sc o ia ca ifornica*), English plantain (*P antago anceo ata*), rose clover (*Trifo i m irt m*), owl's clover (*Casti eja exserta*), turkey mullein (*Croton setiger s*), narrow-leaved milkweed (*Asc epias fascic aris*), California buckwheat (*Eriogon m fascic at m* var. *fo io os m*), and purple needlegrass (*ase a p c ra*).	kingsnake (*amprope tis get s ca iforniae*), barn swallow (*ir ndo r stica*), black phoebe, western kingbird, meadowlark, mourning dove, California quail, American crow, black-tailed hare, Botta's pocket gopher, coyote, California ground squirrel, red-tailed hawk, red-shouldered hawk, and turkey vultures.

Occupancy of suitable burrowing owl habitat can be verified at a site by observation of a pair of burrowing owls during their breeding season (March to August) or, alternatively, by the presence of molted feathers, cast pellets, prey remains (rodents, small reptiles, and large insects), eggshell fragments, or excrement (guano or must), near or at a burrow. There are known CNDDB occurrences for this species within one mile of the project corridor. A number of active burrows were identified during the various field surveys conducted by PBS in May and une 2006. While a few active burrows were found in ruderal habitats adjacent to the UP ROW, this species was observed readily using ground squirrel burrows embedded within the gravel ballast of the UP tracks.

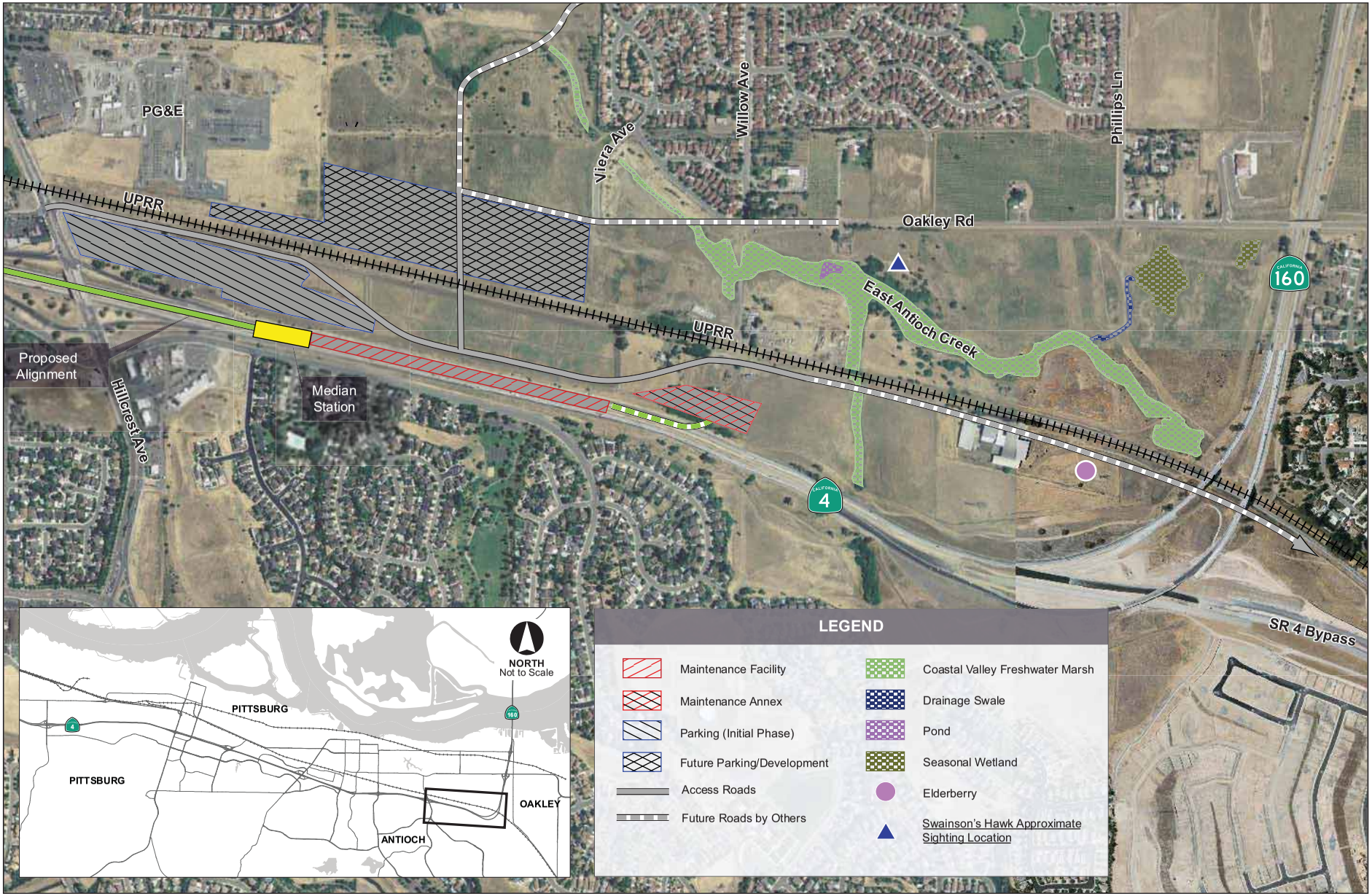
Burrowing owl is covered by the ECCC HCP/NCCP. The ECCC HCP/NCCP contains Conservation Measures that can be implemented to reduce potential impacts to this species.

SF S

S ainson s a B teo s ainsoni is state listed as threatened. They are found during the breeding season throughout the Central Valley where suitable nesting and foraging habitat is available. Swainson's hawks often nest within or peripheral to riparian areas, adjacent to suitable foraging habitat as well as in single or stands of trees in agricultural fields. They are open country birds that forage in large, open grasslands and agricultural fields, especially after the fields have been disced or harvested. Swainson's hawks can forage as much as 10 miles from the nest. Ruderal habitats along the project corridor provide suitable foraging habitat. A single individual was observed foraging over a ruderal field north of the UP ROW in Antioch during a field survey conducted in une 2006. Live Oak Associates reported finding a Swainson's hawk nest on May 30, 2008[12] between Oakley Road and the north side of East Antioch Creek north of the Northside East Station option. The nearest recorded CNDDB nest occurrence is approximately 3 miles east of the project corridor.

The inventory area of the ECCC HCP/NCCP is at the western edge of this species' range, which is covered by the ECCC HCP/NCCP. The ECCC HCP/NCCP contains Conservation Measures that can be implemented to reduce potential impacts to this species.

[12] Live Oak Associates, Inc. 2008.



Source: PBS&J, 2008.

SENSITIVE HABITAT IN THE VICINITY OF THE MEDIAN STATION
FIGURE 3.9-4

BI -2 1b Comp y it permit re irements of t e S Army Corps of Engineers and or state agencies If an alternative location is not feasible, BART shall ensure that the Corps' Section 404 permit requirements or requirements of state agencies, as applicable, are followed, as described later in Mitigation Measure BIO-8.1.

Impact BI - Constr ction and operation of t e Proposed Project o d res t in t e oss of foraging abitat for t e S ainson s a PS

SR 4. There is no suitable Swainson's hawk foraging habitat within the median of SR 4 between the Pittsburg/Bay Point BART Station and the Hillcrest Avenue Station (a stretch encompassing the transfer platform, the Railroad Avenue Station, and the Median Station). Therefore, no impact would occur to foraging habitat along this portion of the project corridor.

Median Station Area. The non-native grassland/ruderal area north of the proposed Hillcrest Avenue Median Station could provide suitable foraging habitat for Swainson's hawk. The nearest Swainson's hawk nest to the proposed Hillcrest Avenue Station area is approximately three miles. CDF considers a 10-mile flight distance between active nest sites and suitable foraging habitats as a standard for direct impact analysis. ~~Their recommended mitigation ratio for the loss of foraging habitat located between one and five miles from an active nest is 1 to 0.75 (that is, for each acre impacted, 0.75 acre of preserved land is required).~~ For projects within 1 mile of an active nest tree, CDF provides two options for mitigation. The first option would require one acre of Habitat Management (HM) lands for each acre of development authorized (1 1 ratio). CDF would require that at least 10 percent of the HM land requirements be met by fee title acquisition or a conservation easement allowing for the active management of the habitat, with the remaining 90 percent of the HM lands protected by a conservation easement acceptable to the Department on agricultural lands or other suitable habitats which would provide foraging habitat for Swainson's hawk. The second option would require a one-half acre of HM land for each acre of development authorized (0.5 1 ratio). Under this option, CDF would require that all of the HM land requirements be satisfied by fee title acquisition or a conservation easement acceptable to the Department which allows for the active management of the habitat for prey production on the HM lands. The potential Swainson's hawk foraging habitat loss due to the construction of the Proposed Project would total ~~39.51~~ 40.52 acres (including ~~23.9~~ 24.29 acres of habitat from future parking). Loss of foraging habitat due to the implementation of the Proposed Project would be considered a potentially significant impact.

MITI ATION MEASURE. The following measures would reduce the loss of Swainson's hawk foraging habitat to a less-than-significant level. Mitigation

Measure BIO-3.1 would ensure that an appropriate acreage of suitable raptor foraging habitat is preserved to compensate for the loss of foraging habitat due to the construction of the Proposed Project by one of the following mitigation Options 1) the purchase of mitigation credits, 2) payment of mitigation fee at an approved CDF mitigation bank, or 3) purchasing conservation easements or fee titles in east Contra Costa County or an area within 10 miles of the nearest Swainson's hawk nest to the Proposed Project. Alternatively, Mitigation Measure BIO-3.2 recommends protection in accordance with the ECCC HCP/NCCP if BART chooses to participate in the ECCC HCP/NCCP. BART would be required to comply with either Mitigation Measure BIO-3.1 or Mitigation Measure BIO-3.2. As the Proposed Project would be constructed in

an initial phase, followed by subsequent phases, mitigation would be implemented in a manner proportional to each phase. This would effectively reduce potential impacts on foraging habitat to less than significant. (LTS)

BI - 1 Compensate for oss of S ainson s a foraging abitat BART shall ensure that an appropriate number of acres ~~(as approved by CDF)~~ of agricultural land, annual grasslands, or other suitable raptor foraging habitat are preserved off site within Contra Costa, Sacramento and/or Solano counties ~~at a 1 to 0.75 (habitat lost to preserved)~~ at a 0.5 1 or 1 1 ratio. iven the proximity of the nest site to Sacramento and Solano counties, it is acceptable to have this off site preservation outside of Contra Costa County. Preserve areas should be established prior to project construction, if feasible, and may occur through at least one of the following options

a) Purchase of mitigation credits at an approved CDF mitigation bank that is within east Contra Costa County, lower Sacramento County, or Solano County. The service area of the mitigation bank must include the project corridor.

b) Payment of a mitigation fee to a habitat development and management company, through a negotiated agreement between said company, BART, and CDF . The lands must be within 10 miles of the nearest Swainson's hawk nest, unless otherwise approved by CDF (consistent with CDF guidelines).

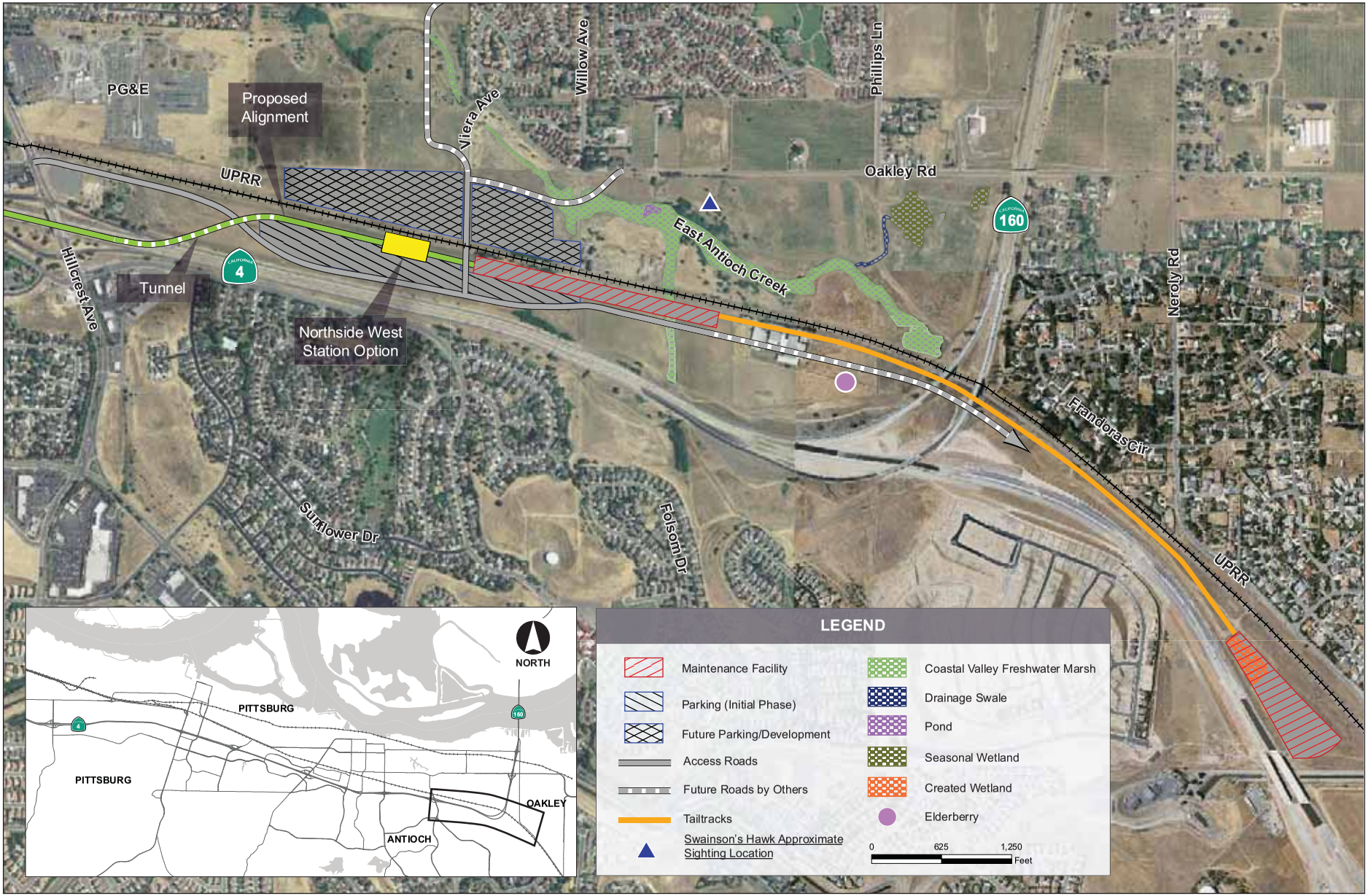
c) Purchase of conservation easements or fee title in east Contra Costa County, Lower Sacramento County, or Solano County. This mitigation must occur within 10 miles of the nearest Swainson's hawk nest, unless otherwise approved by CDF (consistent with CDF uidelines).

OR

BIO-3.2 *Participate in t e ECCC CP CCP* If BART chooses to participate as a Participating Special Entity in the ECCC HCP/NCCP, it will pay a development fee, based on the acreage of land that is permanently lost. This fee would offset any impacts to foraging habitat.

Impact BI - Constr ction and operation of t e Proposed Project co d res t in t e dist rbance of specia -stat s nesting birds PS

A variety of special-status birds are likely to be present throughout the project corridor; some are resident species and some are migratory species that breed within the area. These special-status birds include the Swainson's hawk, white-



Source: PBS&J, 2008.

SENSITIVE HABITAT IN THE VICINITY OF THE NORTHSIDE WEST STATION OPTION
FIGURE 3.9-5

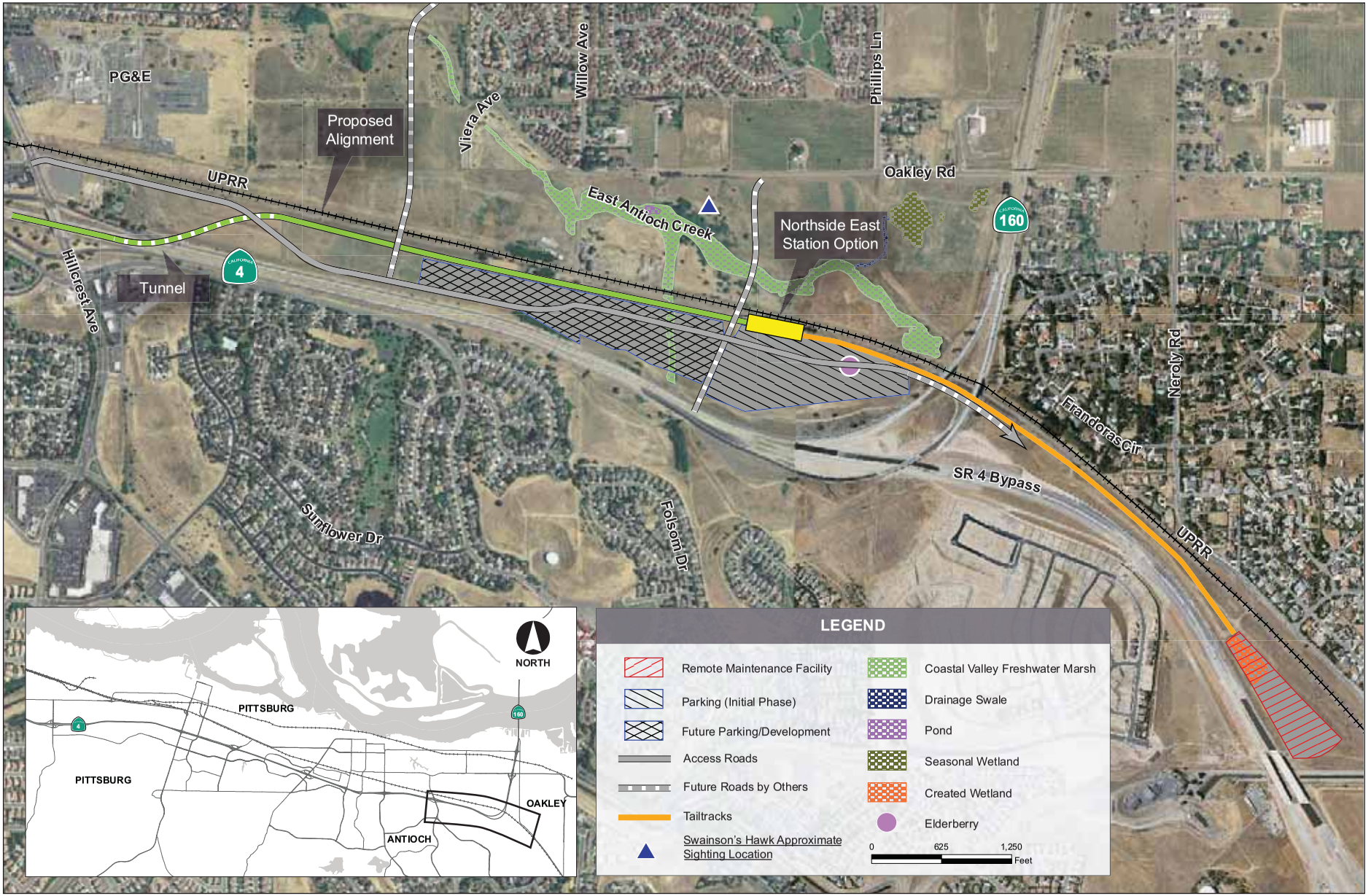
east of SR 160 and the SR 4 Bypass near the Contra Costa Canal (remote maintenance facility) (see Figure 3.9-5). For the maintenance facility immediately east of the station, the proposed construction would permanently impact approximately 0.12 acres of coastal/valley freshwater marsh and 0.01 acres of a pond (connected to the coastal/valley freshwater marsh) (see Table 3.9-5). This impact would be considered significant. The remote maintenance facility option and its associated tracks could impact an existing created wetland (approximately 1.36 acres), coastal/valley freshwater marsh (0.01 acres), and pond habitat (0.01 acres). Additionally with either option, access to the stations would be along Slatten Ranch Road ~~would need to be constructed~~, impacting 0.04 acres of coastal/valley freshwater marsh habitat. (This impact refers to the effects associated with the BART proposed access to serve the Hillcrest Avenue Station, parking lot, and maintenance facility. The Proposed Project does not include the construction of Slatten Ranch Road, unless funding is provided by others to cover the additional costs. Construction of the access road by BART would not preclude future construction of Slatten Ranch Road as outlined in the City of Antioch RDP.) These impacts would be considered significant.

Table 3.9-5
Acreage of Wetlands at the Hillcrest Northside West Station, Northside East Station and Median Station East Options

Station Option	Coastal/Valley Freshwater Marsh	Pond	Created Wetland	Total
Northside West Station				
Parking	0	0	0	0
Slatten Ranch Road	0.04	0	0	0.04
Maintenance Facility Option and Tailtracks (east of Station)	0.12	0.01	0.0	0.13
Remote Maintenance Facility Option and Tailtracks	0.01	0.01	1.36	1.38
Total (Maintenance Facility east of Station/Remote Maintenance Facility)	**0.16/0.05**	**0.01/0.01**	**0.0/1.36**	**0.17/1.42**
Northside East Station				
Future Parking	0.45	0	0	0.45
Slatten Ranch Road	0.08	0	0	0.08
Remote Maintenance Facility and Tailtracks	0.01	0.01	1.36	1.38
Total	**0.54**	**0.01**	**1.36**	**1.91**
Median Station East				
Maintenance Facility and Tailtracks	0.19	0	0	0
Slatten Ranch Road	0.04	0	0	0
Total	**0.23**	**0**	**0**	**0.23**

So rce PBS , 2008.

Northside East Station Option. Under this option, the proposed remote maintenance facility would be constructed on a created wetland, affecting approximately 1.36 acres of jurisdictional wetlands (see Table 3.9-5 and Figure 3.9-6). The tailtracks would also impact 0.01 acres of coastal/valley freshwater marsh habitat and 0.01 acres of pond habitat. Additionally, the future parking would impact 0.45 acres of coastal/valley freshwater marsh



Source: PBS&J, 2008.

SENSITIVE HABITAT IN THE VICINITY OF THE NORTHSIDE EAST STATION OPTION

FIGURE 3.9-6

habitat. Finally, 0.08 acres of coastal/valley freshwater marsh habitat would be affected by the construction of Slatten Ranch Road. This station option would affect a total of 1.91 acres of jurisdictional wetlands, resulting in a significant impact. As with the Proposed Project, the Northside East Station option would not include the construction of Slatten Ranch Road, unless funding is provided by others to cover the additional costs.

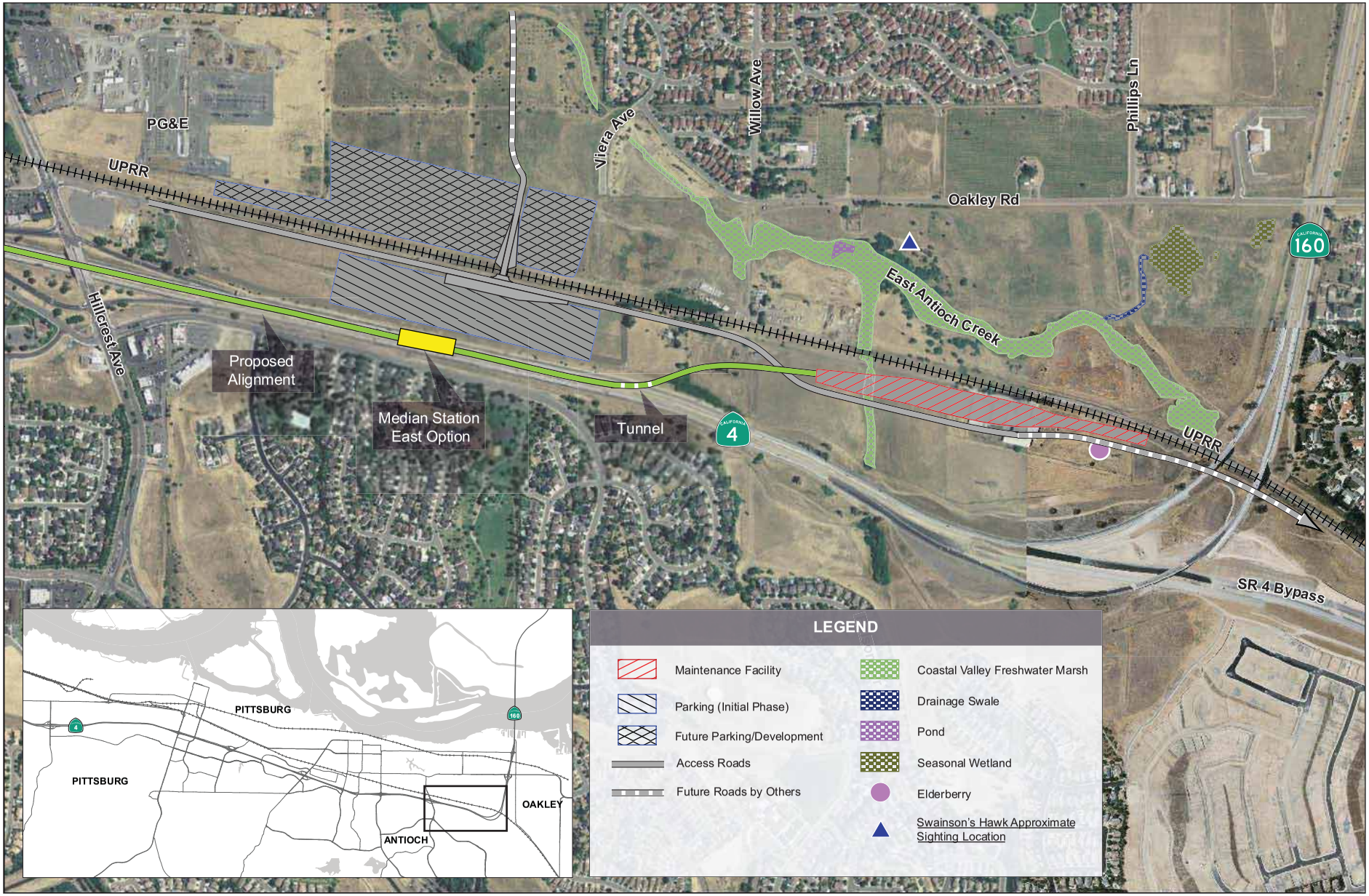
Median Station East Option. The proposed maintenance facility for the Median Station East option would affect approximately 0.19 acres of coastal/valley freshwater marsh habitat (see Table 3.9-5 and Figure 3.9-7). Additionally the construction of Slatten Ranch Road would affect 0.04 acres of coastal/valley freshwater marsh habitat. The remaining facilities, including the station platform, tracks, maintenance annex and parking would not affect any wetlands or waters of the U.S. This station option would affect a total of 0.23 acres of jurisdictional wetlands, resulting in a significant impact. As with the Proposed Project, the Median Station East option would not include the construction of Slatten Ranch Road, unless funding is provided by others to cover the additional costs.

MITI ATION MEASURES Implementation of the mitigation measures below would reduce impacts to wetlands from the Hillcrest Avenue Station options to a less-than-significant level. Mitigation Measure BIO-8.1 requires BART to comply with the 404 permitting process. Mitigation Measure BIO-8.2 provides mitigation measures that would satisfy the requirements of the ECCC HCP/NCCP, in the event that BART decides to participate as a special entity. If BART chooses to participate in the ECCC HCP/NCCP, compliance with Mitigation Measures BIO-8.1 and BIO-8.2 would be required; if not, then compliance with Mitigation Measure BIO-8.1 would be required. (LTS)

BI -8 1 Comp y it permit re irements of t e S Army Corps of Engineers and or state agencies For wetland habitats where the Corps takes jurisdiction, an accurate estimate of the acres of fill shall be identified and submitted to the Corps along with concept plans for mitigation, as outlined below.

a) BART shall, where feasible, avoid the maximum amount of existing wetlands and establish a minimum 75-foot buffer around all sides of these features. The buffer will help prevent indirect and temporary impacts to the wetland features. In addition, the final project design shall not cause significant changes (i.e., alter the hydrology such that the wetland areas no longer function as wetlands) to the pre-project hydrology, water quality, or water quantity in any wetland that is to be avoided. This shall be

accomplished by avoiding or repairing any disturbance to the hydrologic conditions supporting these wetlands, as verified through wetland protection plans that will be required during the permitting process.



Source: PBS&J, 2008.

SENSITIVE HABITAT IN THE VICINITY OF THE MEDIAN STATION EAST OPTION
FIGURE 3.9-7

- Where feasible, stream crossings will be located in stream segments without riparian vegetation, and bridge footings will be built outside the stream banks (i.e., clear span structures).

- Herbicide will not be applied within 100 feet of wetlands, ponds, streams, or riparian woodland/scrub; however, where appropriate to control serious invasive plants, herbicides that have been approved for use by EPA in or adjacent to aquatic habitats may be used as long as label instructions are followed and applications avoid or minimize impacts on covered species and their habitats. In seasonal or intermittent stream or wetland environments, appropriate herbicides may be applied during the dry season to control nonnative invasive species (e.g., yellow star-thistle). Herbicide drift should be minimized by applying the herbicide as close to the target area as possible.

Impact BI -9 Constr ction and operation of t e ort side est Station t e ort side East Station and t e edian Station East options o d res t in t e oss of potentia foraging abitat for t e S ainson s a PS

The non-native grassland/ruderal area around the proposed Hillcrest Avenue Station options could provide suitable foraging habitat for Swainson's hawk. ~~As described for the Proposed Project, the CDF recommends a mitigation ratio for the loss of foraging habitat located between one and five miles from an active nest of 1 to 0.75; the nearest known nest is three miles from the project corridor.~~ As described for the Proposed Project, CDF provides two options for mitigation, for projects within 1 mile of an active nest tree. The first option would require one acre of Habitat Management (HM) lands for each acre of development authorized (1 1 ratio). CDF would require that at least 10 percent of the HM land requirements be met by fee title acquisition or a conservation easement allowing for the active management of the habitat, with the remaining 90 percent of the HM lands protected by a conservation easement acceptable to the Department on agricultural lands or other suitable habitats which would provide foraging habitat for Swainson's hawk. The second option would require a one-half acre of HM land for each acre of development authorized (0.5 1 ratio). Under this option, CDF would require that all of the HM land requirements be satisfied by fee title acquisition or a conservation easement acceptable to the Department which allows for the active management of the habitat for prey production on the HM lands. Table 3.9-6 summarizes the potential Swainson's hawk foraging habitat loss due to the construction of the Hillcrest Avenue Station options. Loss of foraging

habitat due to the construction of the station option would be considered a potentially significant impact.

Table 3.9-6
Potential Swainson's Hawk Foraging Habitat Loss per Station Option

Hillcrest Avenue Station Option	Habitat Loss (acres)[a]	~~Mitigation Acreage Required~~
Northside West Station	~~44.6~~56.1	~~33.5~~
Northside West Station with Remote Maintenance Facility	60.38	
Northside East Station	~~46.3~~ 56.60	~~34.7~~
Median Station East	~~46.3~~ 43.17	~~34.7~~

So rce PBS , 2008.

otes

a. Acreage includes footprint of station platforms, track system, tailtracks, maintenance facilities and parking lots, including future parking.

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Section 3.11
Air Quality

Local Topography and Meteorology. The topographical feature that has the greatest influence on project corridor meteorology is the Carquinez Strait, which runs from Rodeo to Martinez, just west of the project corridor. The Carquinez Strait is the only sea-level gap in the mountain ranges that separate the San Francisco Bay Area from the Central Valley. During the summer and fall, high pressure offshore, coupled with low pressure in the Central Valley, causes marine air to flow from the west through the Carquinez Strait. In the late fall and winter, the wind pattern shifts with the passage of storm systems, and the predominant wind direction is from the east. During the winter stormy periods, inversions (layers of warmer air over colder air) are weak or nonexistent, winds are moderate, and air pollution potential is low.

During the summer, the wind is strongest in the afternoon; wind speeds of 15 to 20 miles per hour are common throughout the Carquinez Strait region on summer afternoons. Wind speeds range from 7 miles per hour in winter to 14 miles per hour in summer.[1] Summer mean maximum temperatures reach about 90 degrees Fahrenheit in the project corridor. Mean minimum temperatures in the winter are in the high 30s.[2] Many industrial facilities with significant air pollutant emissions, e.g., chemical plants and refineries, are upwind of the corridor, to the west. High wind speeds often moderate the pollution potential of this area. The proximity of State Route 4 (SR 4) to the project corridor also contributes to carbon monoxide, particulate matter, and diesel particulate matter emissions.

Criteria Pollutants and Local Air Quality

Federal and State Ambient Air Quality Standards. Existing air quality conditions in the project corridor can be characterized in terms of the ambient air quality standards that the State of California and the federal government have established for several different pollutants known as criteria pollutants. These standards have been set to protect public health. The criteria pollutants include ozone (O_3), carbon monoxide (CO), nitrogen oxides (NO), sulfur oxides (SO), inhalable particulate matter less than 10 microns in diameter (PM_{10}) and less than 2.5 microns in diameter ($PM_{2.5}$), and lead. The state is divided into air districts, which are characterized by whether their ambient pollutant levels are greater than or less than these standards. For each criteria pollutant, those areas having pollutant levels less than the standards are called attainment areas, and those with pollutant levels greater than the standards are called nonattainment areas. The attainment status of the SFBAAB is presented in Table 3.11-1 and discussed below.

[1] California Air Resources Board, *Ca ifornia S rface ind C imato ogy*, 1984.
[2] Bay Area Air uality Management District (BAA MD), *CE A ide ines* December 1999.

The pollutants of greatest concern in the project corridor are CO, O_3, PM_{10}, and $PM_{2.5}$. The Bay Area does not attain the state ~~or~~ and federal O_3 standards, the federal $PM_{2.5}$ standard[3] nor the state PM_{10} ~~or~~ and $PM_{2.5}$ standards. The Bay Area does attain the state and federal CO standards; however, CO is still a concern because it is the predominant pollutant from passenger vehicles. SO is no longer considered a

[3] Former EPA Administrator ohnson on December 22, 2008 signed a Federal Register notice (final rule) promulgating the area designations (attainment, nonattainment, unclassified) for the version of the federal $PM_{2.5}$ standard adopted in 2006. Pursuant to an order issued anuary 20, 2009 by the Office of the President, the $PM_{2.5}$ area designations are under review by new EPA Administrator ackson. The nonattainment designation for the San Francisco Bay Area is not expected to change after review, and will be effective 60 days after the notice is published in the Federal Register.

Table 3.11-1
State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State Standard[a] Concentration	State Standard[a] Attainment Status	National Standard[b] Concentration	National Standard[b] Attainment Status	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Fine Particulate Matter ($PM_{2.5}$)	24 Hour Annual	— 12 $\mu g/m^3$	N	~~65~~ 35 $\mu g/m^3$ 15 $\mu g/m^3$	~~A~~N A	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning. Also formed from photochemical reactions of other pollutants, including NO_x, $S0_2$, and organics.
Lead	Monthly Quarterly	1.5 $\mu g/m^3$	A	— 1.5 ug/m^3	A	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing and recycling facilities. Past source: combustion of leaded gasoline.

So rce BAAQMD internet site http://www.baaqmd.gov/pln/air_quality/ambient_air_quality.htm, accessed February 14, 2008.

otes

A = Attainment

N = Nonattainment

U = Unclassified (insufficient data collected to determine classification; generally indicates low concern for the pollutant levels)

ppm = parts per million

$\mu g/m^3$ = micrograms per cubic meter

a. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe CO, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour, or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that California Air Resources Board determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the state standard.

b. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent 3-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 $\mu g/m^3$. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than ~~65~~ 35 $\mu g/m^3$.

c. The federal 1-hour ozone standard was revoked on June 15, 2005.

problem pollutant in California, as the ambient levels are fairly low, and the state has attained this standard for some time. SO emissions have decreased substantially over the past 30 years due to improved industrial source controls and use of natural gas instead of fuel oil for electric generation. In addition, SO emissions from mobile sources have decreased due to lower sulfur content in fuels. Reactive organic gases (RO s) are not criteria pollutants, but their emissions are of concern as they and NO are precursors to O_3. Table 3.11-1 shows the state and federal standards of all the criteria pollutants.

Ambient Concentrations. The existing air quality conditions in the project corridor can be characterized by monitoring data collected in the region. The Bay Area Air uality Management District (BAA MD) maintains two pollutant-monitoring stations in the project vicinity one in the City of Pittsburg and the other on Bethel Island. These are the two stations closest to the project corridor. The Pittsburg/Bay Point BART Station is at the western boundary of the project corridor and the Bethel Island station is 6 miles east of the project corridor before it turns southward. These stations are representative of the project corridor, as there are no topographical features that would affect the project corridor differently from the monitoring stations. Data from these two stations for years 2004 through 2006 are summarized in Table 3.11-2.

The State of California has designated the SFBAAB, which includes all nine Bay Area counties, as nonattainment for O_3, PM_{10} and $PM_{2.5}$ state standards. The U.S. Environmental Protection Agency (US EPA) has designated the SFBAAB as nonattainment for the federal 8-hour O_3 standard (without classification) and for the federal 24-hour $PM_{2.5}$ standard (although this designation is not yet effective). In une 2005, the US EPA revoked the federal 1-hour O_3 standard. The US EPA has designated the SFBAAB as attainment for the federal CO, NO , SO , PM_{10}, and annual $PM_{2.5}$ standards. As seen from Table 3.11-2, some violations of the state O_3 and PM_{10} standards and federal $PM_{2.5}$ standards in the project vicinity occurred during the last three years.

Pollutants of Concern. As noted above, the four criteria pollutants of most concern are O_3, PM_{10}, $PM_{2.5}$, and CO. The SFBAAB does not attain either the O_3, PM_{10}, or $PM_{2.5}$ state standards or the O_3 and 24-hour $PM_{2.5}$ federal standards. CO is a pollutant of concern because its main sources in the project corridor are gasoline-fueled vehicles. Although the SFBAAB is in attainment of both state and federal CO standards, the number of motor vehicles and vehicle miles traveled in the area continue to grow, and the potential for elevated levels of CO remains. reenhouse gases are a concern due to their effect on the earth's climate.

one O_3 is a respiratory irritant and oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials. O_3 is a severe eye, nose, and throat irritant. It also attacks synthetic rubber, textiles, and other materials. O_3 causes extensive damage to plants by leaf discoloration and cell damage.

Table 3.11-2
Ambient Air Quality in the Vicinity of the Project Corridor
(from the Pittsburg and Bethel Island Air Quality Monitorings)

Pollutant	Pittsburg			Bethel Island		
	2004	**2005**	**2006**	**2004**	**2005**	**2006**
Ozone (O_3)						
Maximum 1-hour concentration (ppm)	0.090	0.094	0.105	0.103	0.089	0.116
No. Days CAA S (1-hour) of 0.09 ppm	0	0	0	1	0	9
Maximum 8-hour concentration (ppm)	0.081	0.078	0.093	0.081	0.077	0.09
No. Days NAA S (1-hour) of 0.08 ppm	0	0	1	0	0	0
Carbon Monoxide (CO)						
Maximum 1-hour concentration (ppm)	4.1	3.3	3.3	1.2	1.1	1.3
No. Days CAA S (1-hour) of 20 ppm	0	0	0	0	0	0
Maximum 8-hour concentration (ppm)	1.91	1.73	1.92	0.91	0.91	1.04
No. Days NAA S and CAA S (8-hour) of 9.0 ppm	0	0	0	0	0	0
Nitrogen Dioxide (NO_2)						
Maximum 1-hour concentration (ppm)	0.048	0.058	0.052	0.034	0.038	0.044
No. Days CAA S (1-hour) of 0.25 ppm[a]	0	0	0	0	0	0
Annual Average Concentration (ppm)	0.011	0.010	0.011	0.008	0.007	0.008
Particulate Matter (PM_{10})						
Maximum 24-hour concentration ($\mu g/m^3$)	**64.0**	**57.0**	**58.9**	**42.3**	**63.5**	**84.3**
Average arithmetic mean concentration ($\mu g/m^3$)	21.1	19.5	19.4	18.9	17.9	18.8
Average geometric mean concentration ($\mu g/m^3$)	21.7	20.1	19.9	19.5	18.5	19.4
No. Days NAA S (24-hour) of 150 $\mu g/m^3$	0	0	0	0	0	0
No. Days CAA S (24-hour) of 50 $\mu g/m^3$	1	1	2	1	0	1
Particulate Matter ($PM_{2.5}$)[b]						
Maximum 24-hour concentration ($\mu g/m^3$)	~~73.7~~ N/A	~~48.9~~ 40.9	~~62.1~~ 16.0	N/A	N/A	N/A
Average arithmetic mean concentration ($\mu g/m^3$)	~~11.5~~ 10.7	~~9.3~~ 9.0	~~10.0~~ 9.3	N/A	N/A	N/A
No. Days NAA S (24-hour) of ~~65~~ 35 $\mu g/m^3$[c]	~~1~~N/A	~~0~~ 1	0	N/A	N/A	N/A

So rce California Air Resources Board, *S mmaries of Air a ity Data*, ~~2004,~~ http //www.arb.ca.gov/adam/cgi-bin/db2www /adamtop4b.d2w/start; ~~EPA Air Data, accessed anuary 29, 2008, *ttp epa go air data/geosel.html*~~ Bay Area Air uality Management District, *Ann a Bay Area Air a ity S mmaries*, http //www.baaqmd.gov/pio/aq summaries/index.htm.

otes

Values in **bold** exceed the air quality standard.

N/A data not available.

a. The CAA S for NO_2 were updated in February 2007 to 0.18 ppm for the 1-hour averaging period and 0.03 ppm for the annual averaging period, as indicated in Table 3.11-1. The monitored ambient NO_2 values in this table are for the three-year period prior to the standards being updated; therefore, they are being compared to the NO_2 standards that existed when the concentrations were monitored. Data from the year 2007 are not yet available; 2006 is the most recent year data are summarized.

b. Monitored at the Concord station.

c. Lowered from 65 μg *m* to 35 μg *m* in 2006.

are not required for areas that violate the state PM_{10} standards. This is discussed further below.

The California CAA requires that the state air quality standards be met as expeditiously as practicable, but, unlike the federal CAA, does not set precise attainment deadlines. Instead, the act established increasingly stringent requirements for areas that will require more time to achieve the standards.

The role of the CARB is to establish state air quality standards, maintain oversight authority in air quality planning, develop programs for reducing emissions from motor vehicles, develop air emission inventories, collect air quality and meteorological data, and approve SIPs.

Local Air Quality Management Programs. The BAA MD has jurisdiction over air quality issues within the SFBAAB. Responsibilities of air districts include permitting stationary sources, maintaining emissions inventories, maintaining air quality monitoring stations, overseeing agricultural burning permits, and reviewing air quality-related sections of environmental documents required by the California Environmental uality Act (CE A).

The California CAA substantially added to the authority and responsibilities of air districts. The act designates air districts as lead air quality planning agencies, requires air districts to prepare air quality plans, and grants air districts authority to implement transportation control measures.

The BAA MD prepares air quality plans with control measures for nonattainment pollutants. It prepares updates to O_3 attainment plans, which are plans designed to attain the federal O_3 standard, and it prepares triennial updates to Clean Air Plans, which are designed to attain state standards.

The BAA MD has prepared both federal and state air quality plans to bring the SFBAAB into attainment with federal and state O_3 standards. The Bay Area does not attain either the federal or state O_3 standards. Currently, there are two plans for the Bay Area

- 2001 Ozone Attainment Plan, which describes the Bay Area's strategy for compliance with the federal 1-hour O_3 standard. Although the US EPA revoked the federal 1-hour O_3 standard on une 15, 2005, the emission reduction commitments in the plan are still being carried out by the BAA MD.
- The Bay Area 2005 Ozone Strategy, which is the Bay Area's current, adopted plan describing the strategy for compliance with the state 1-hour O_3 standard and is the most current triennial update to the 1991 Clean Air Plan.

The Bay Area also does not attain either the state PM_{10} standard or the federal $PM_{2.5}$ standard. There ~~is~~ are currently no PM_{10} ~~plan~~ or $PM_{2.5}$ attainment plans in place, but there is a framework ~~schedule~~ for bringing the Bay Area into compliance with the standards. ~~Compliance was mandated by~~ SB 656, which was enacted by the California Legislature in 2003

and codified as Health and Safety Code Section 39614, . ~~SB 656~~ seeks to reduce public exposure to PM_{10} and $PM_{2.5}$ (collectively referred to as PM). It requires the CARB, in consultation with local air pollution control and air quality management districts (air districts), to develop and adopt, by anuary 1, 2005, a list of the most readily available, feasible, and cost-effective control measures that could be used by the CARB and the air districts to reduce PM. The goal is to make progress toward attainment of state and national PM standards.

The proposed control measures are to be based on rules, regulations, and programs existing in California as of anuary 1, 2004 to reduce emissions from new, modified, and existing stationary, area, and mobile sources. SB 656 requires the CARB and air districts to adopt implementation schedules for appropriate CARB and air district measures. Finally, no later than anuary 1, 2009, the CARB must prepare a report describing actions taken to fulfill the requirements of the legislation as well as recommendations for further actions to assist in achieving the state PM standards. The bill requirement will sunset on anuary 1, 2011, unless extended.[8]

Toxic Air Contaminants. TACs do not have ambient standards below which no adverse health effects are assumed. TACs from mobile sources are regulated by the CARB and the US EPA. The CARB has responsibility for control of emissions from most mobile sources. All new diesel-powered, on- and off-road motor engines and vehicles sold in California are required to meet both federal and state emissions certification requirements. Heavy-duty diesel vehicles that travel in California but are registered in other states are subject only to federal emissions certification standards.[9]

The US EPA and CARB have developed regulations for diesel engines and diesel fuel. The regulations that could be applicable to the Proposed Project are listed below

- **Federal Off-Road Diesel Engine Emissions Control Program (40 CFR Part 89).** This program applies to diesel-powered engines. This is a tiered approach established by the US EPA to lower the emissions standards for several categories of off-road engines (e.g., diesel-powered trains), in which each tier is phased in over several years by engine power category – Tier 1 1996-2005, Tier 2 2001-2010, Tier 3 2006-2010, and Tier 4 2008-2015.
- **State Heavy-Duty Off-Road Compression Ignition Engine Program (13 CCR Chapters 1956.1 – 1956.4, 1956.8).** This state rule established exhaust emissions standards for off-road heavy-duty diesel engines that have become increasingly more stringent based on the horsepower and model year, and complements the US EPA program described above.

[8] BAA MD, http //www.baaqmd.gov/pln/pm/, accessed une 23, 2008.

[9] California Air Resources Board (CARB), *Ris Red ction P an to Red ce Partic ate atter Emissions from Diese -F e ed Engines and e ic es*, October 2000.

would be 600 million metric tons of carbon dioxide. Therefore, greenhouse houses gases need to be reduced by about 173 million metric tons of carbon dioxide equivalent.[10]

To help achieve these reductions, the CARB has identified several early action measures classified as either discrete or non-discrete. Discrete early action measures are regulations that would be adopted and enforceable by anuary 1, 2010. The other early action measures must be initiated between 2007 and 2012 and may be regulatory or non-regulatory. The CARB evaluated over 100 possible measures and on October 25, 2007 and approved nine discrete action measures and 35 additional measures. These measures are expected to reduce greenhouse gases by 42 million metric tons of carbon dioxide equivalent by 2020, which is about 25 percent of the needed reduction. Examples of transportation related discrete action measures are identified below

- Require the use of technologies to improve the efficiency of certain heavy-duty vehicles;
- Develop requirements to ensure tire pressures on older vehicles are properly maintained;
- Reduce carbon intensity of transportation fuels in California by at least 10 percent by 2020; and
- Strengthen light-duty vehicle standards.

AB 32 also requires that the CARB adopt a scoping plan by anuary 1, 2009, indicating how emissions reductions will be achieved via regulations, voluntary actions, monetary and non-monetary incentives, market mechanisms, and other actions. On une 26, 2008, the CARB issued its draft scoping plan. Among other measures to achieve the targeted H emission reductions by 2020, the scoping plan identifies reductions of approximately 2 million metric tons of CO_2 equivalent from local and regional government actions, including regional level transportation planning to establish preferred land use and transportation scenarios that meet the recommended targets while addressing housing needs and other goals. ~~The~~ CARB ~~will consider adoption of~~adopted the final scoping plan in November 2008.

AB 1493, enacted in 2002, directs the CARB to develop and implement regulations that achieve the maximum feasible reduction of greenhouse gas emissions from passenger vehicles, light-duty trucks, and other noncommercial vehicles. Pursuant to AB 1493, in 2004 the CARB approved regulations limiting the amount of greenhouse gases released from motor vehicles. On March 6, 2008, the US EPA published a notice in the Federal Register of its decision denying California's request for waiver of preemption of its state motor vehicle

[10] CARB website, http //www.arb.ca.gov/cc/inventory/1990level/1990level.htm, accessed une 18, 2008.

emission control standards pursuant to the federal CAA. California has sued US EPA seeking reversal of that decision. In a notice published in the Federal Register on February 12, 2009, EPA initiated reconsideration of its March 2008 denial of the waiver request.

Senate Bill (SB) 97, signed in August 2007, acknowledges that climate change is an important environmental issue that requires analysis under CE A. This bill requires the overnor's Office of Planning and Research (OPR) to prepare and develop guidelines for the feasible mitigation of greenhouse gas emissions, or the effects of greenhouse gas emissions, by uly 1, 2009. The guidelines would then need to be certified and adopted by anuary 1, 2010.

SB 97 also provides that, for certain projects, the failure of an EIR to adequately analyze the effect of greenhouse gas emissions otherwise required to be reduced under AB 32 cannot be challenged in court as a violation of CE A. The projects covered by this provision include transportation projects funded under the Highway Safety, Traffic Reduction, Air uality and Port Security Bond Act of 2006, commonly referred to as Proposition 1B (see CE A Section 21097). As discussed in Section 2.7 of this EIR, the Proposed Project has secured substantial funding from Proposition 1B funds and therefore is subject to this provision. Nevertheless, for informational purposes, BART wishes to disclose to the public and to decision-makers the climate change considerations and in particular the greenhouse gas reduction benefits associated with the Proposed Project.

Impact Assessment and Mitigation Measures

Standards of Significance

The Proposed Project would have a significant air quality impact if it were to

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Expose sensitive receptors to substantial pollutant concentrations;
- Create objectionable odors affecting a substantial number of people;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the region or subregion in which the project is located is in non-attainment under an applicable federal or state ambient air quality standard; or
- Expose the public to TACS that would increase the probability of contracting cancer for the maximally exposed individual that exceeds 10 in one million.

corridor. The CALINE4 model was used for the analysis, following the guidelines contained in the Transportation Project-Level Carbon Monoxide Protocol.[12] In general, this protocol states that for projects in areas that have been re-designated as CO attainment areas, intersections experiencing congestion at level of service (LOS) E or F must be analyzed to evaluate CO concentrations for comparison to ambient air quality standards.

The CALINE4 model is a aussian line-source dispersion model that was written by the California Department of Transportation. This model uses emission factors from the CARB EMFAC model, which is updated periodically and reflects changes in the vehicle fleet and emission standards. CALINE4 predicts 1-hour and 8-hour CO concentrations for comparison to the 1-hour and 8-hour state and/or federal CO standards. Peak hour vehicle volumes, conservative wind speed and atmospheric stability values are used to predict the maximum hourly concentrations, based on the wind angle that produces the highest result. Eight-hour concentrations are derived from the modeled 1-hour concentrations by applying a persistence factor of 0.7.[13]

CO concentrations were modeled at congested intersections near the proposed stations having LOS E or F, and at the largest (worst-case) proposed parking lot. Parking lots are a source of substantial cold start emissions, due to many vehicles starting cold in a short period of time.

Background ambient CO levels were added to the modeled CO concentrations to obtain total CO concentrations near the modeled intersections and parking lots. The model only calculates the portion of the total CO concentrations that result from the local traffic volumes input to the model. It does not incorporate background CO levels that are the cumulative result of CO emitted from more distant sources in the area. These 1-hour and 8-hour CO background concentrations were obtained from the most recent monitoring data at the Pittsburg monitoring station. The highest 1-hour and 8-hour background monitored values added to the modeled CO increase are 4.1 ppm and 1.9 ppm, respectively (Table 3.11-2). These are values monitored in the year 2004; ambient CO levels have decreased with time due to improvements in vehicle technology and fuels, and they are expected to continue to decrease. Nevertheless, the 2004 values were conservatively used to evaluate the impact for the years 2015 and 2030. Emission factor data and model output files are included in the Air uality Technical Report available for review at the BART Planning Office.

PM_{10} Hotspot Analysis. The EPA and FHWA have developed guidance for analysis of PM_{10} and $PM_{2.5}$ hotspots in federal nonattainment and maintenance areas. The Proposed Project is in an area that is designated as attainment of federal PM_{10} and annual $PM_{2.5}$ standards, and that is designated nonattainment for the 24-hour $PM_{2.5}$ standard. The $PM_{2.5}$ nonattainment designation was not signed by EPA until after the analysis for this project was completed, and is not yet in effect. Thus, a $PM_{2.5}$ hotspot analysis was not required. However, since the Proposed Project would create a new source of diesel particulate emissions, impacts from diesel particulate are addressed in the health risk assessment, the findings of which are presented below.

[12] UC Davis, *Transportation Project- e e Carbon onoxide Protoco* , 1997.
[13] UC Davis, *Transportation Project- e e Carbon onoxide Protoco* , 1997.

In addition, the Proposed Project would not create CO hot spots resulting in a violation of the federal CO standards (NAA S). This assessment is presented in detail under Impact A -2. Because the Proposed Project would not result in an exceedance of CO standards, it also satisfies the second US EPA Transportation Conformity criterion.

Impact A - peration of t e Proposed Project o d increase expos re to indi id a s i ing near t e project corridor from diese partic ate matter ca sing a potentia increase in cancer ris T is increase o e er o d be be o t e significance t res o d TS

The Proposed Project would add a source of diesel particulate matter emissions, the DMUs, to the SR 4 median. Many residences and businesses are located very close to SR 4 and would be exposed to diesel particulate matter. The Proposed Project would use trains that are EPA Tier 3- and Tier 4-compliant. Tier 3 and 4 standards are US EPA emissions standards that are intended to reduce emissions from newer diesel engines. Tier 3-compliant engines would be used at the project opening in year 2015, and by 2030 Tier 4-compliant engines would be used. By the time Tier 4 standards are in effect (and they would phase in beginning in 2014), PM and NOx emissions would be reduced by about 90 percent or more from engines meeting these standards, compared to engines meeting the current standards.[25]

Modeling was performed to evaluate the health risk associated with the DMUs in the SR 4 median. The risk was analyzed at the residences closest to SR 4 where the impact would be the highest. The maximum modeled cancer risk from exposure to DMU particulate matter emissions is 3 in one million at the maximally exposed individual (MEI). The MEI is the location of highest modeled impact at a residence and assumes an individual would be present at this location for 70 years. The location of the MEI is at a residence along Belle Drive in the City of ~~Pittsburg~~ Antioch. The cancer risk at the MEI is below the significance threshold of 10 in one million. The model, CAL3 HCR, is an EPA model that is used by the FHWA for air quality analyses for mobile sources. CAL3 HCR is approved for modeling PM_{10} (unlike CALINE4). This modeled impact is based on 27,840 DMU trips per year, two DMU engines per trip for the year 2015, and three DMU engines per trip for the year 2030. The Air uality Technical Report[26] includes emission factors, emission calculations, and model output files used in the health risk assessment. Because the increased exposure is below the threshold limits (as modeled),

[25] U.S. EPA nonroad emission standards, http //www.epa.gov/nonroad-diesel/2004fr.htm, accessed March 7, 2008 and une 17, 2008.

[26] ERM, eBART Corridor EIR Air uality Technical Report, dated uly 2008.

Hillcrest Avenue Station Options Analysis

Operationa pa ts

Impacts from operation of the Proposed Project under the Hillcrest Avenue Station options, which include Northside West, Northside East, and Median Station East options, would generally be the same as those for the Median Station. CO concentrations around intersections would still be well below ambient air quality standards. reenhouse gas and regional criteria pollutant emissions under any of the station options would be similar ~~the same~~ as for the Median Station, because the number of riders (and consequently their avoided private motor vehicle trips) and energy use by the Proposed Project would be similar among the Hillcrest Avenue Station options, ~~independent of these options~~, and all options would have air emissions lower than those under the No Project Alternative. Odors and air emissions from operations and construction activity would be the same in magnitude for all station options. However, air quality and odor impacts would be dependent on maintenance facility location.

The westernmost maintenance facility for the Northside West Station option would be located farther from residences than the maintenance facility of the Median Station of the Proposed Project. Compared to the other station options, the maintenance facility for the Median Station East option would be located the farthest from residences. The remote maintenance facility for the Northside West and Northside East Station options would be located 250 to 300 feet from a residential area along Neroly Road. However, the activities and associated emissions from the maintenance facilities are expected to be minor, as described for the Proposed Project.

Under both the Northside West and Northside East Station options, the DMUs would leave the SR 4 median to access the stations, around which future residential and commercial development is planned. As with the Median Station under the Proposed Project, the DMUs for the Median Station East option would remain in the SR 4 median and would run closer to residences currently located in the area. Individuals could perceive diesel odors from the DMUs; however, the DMUs would be using clean, EPA Tier 3 and Tier 4 compliant engines, and this is expected to reduce odors to a less-than-significant level.

The probability of cancer risk was modeled under Proposed Project conditions at the residence located closest to SR 4, on Belle Drive, approximately 95 feet from the median. The risk was found to be three in one million. This location is in the City of Pittsburg and would be affected regardless of the Hillcrest Avenue Station option selected. None of the station options is proposed at a location closer to a residential unit, so the worst-case impact would be that predicted for the residence along Belle Drive. In the vicinity of Hillcrest Avenue, the Median Station of the Proposed Project and the Median Station East option have identical health risk impacts because the DMUs follow an identical alignment in the median of SR 4. Where the DMUs leave the median to access either the Northside West or Northside East Station options,

Section 3.12
Public Health and Safety

Project facilities. BART security services for existing BART facilities are provided by the BART Police Department, which investigates all reported crimes that occur on BART property. Additional information on BART Police and passenger safety can be found in Section 3.13, Community Services, of this report.

Comments in response to the Notices of Preparation from 2005 and 2008 (see Appendix A) identified concerns regarding the potential of exposure of the public to soil and groundwater contamination. These issues are addressed in this section.

Existing Conditions

The project corridor is adjacent to industrial, commercial, residential, and agricultural areas within the cities of Pittsburg and Antioch. Industrial facilities, pipelines, railyards, and gas stations exist within the vicinity of the project corridor and are among the sites that have resulted in potential soil and groundwater contamination in the project area.

Database Search

A search of regulatory agency databases listing hazardous material sites within a half mile of the project corridor was requested from Environmental Data Resources, Inc. (EDR) for this EIR. An additional search near the Hillcrest Avenue Station with an expanded radius of 2 miles was also conducted to include all station options. The EDR reports for the project corridor and Hillcrest Avenue Station options are presented in the Public Health and Safety Technical Report.[2]

The potential for hazardous material sites to impact the project corridor was determined by the expected direction of groundwater flow in relation to the project corridor (if a site is located upgradient or downgradient from the corridor), the proximity of sites to the project corridor, and the cleanup status of hazardous material sites. Based on local topography, the general groundwater flow direction along the project corridor is most likely north/northeast toward the San Joaquin-Sacramento River Delta. Therefore, sites that are south/southwest of the project corridor would have the potential to impact the corridor. In addition, sites that are within one-eighth mile of the project corridor and have not received regulatory case closure were determined to have a potential impact on the corridor. Regulatory case closure status indicates that cleanup has been completed or is unnecessary.

The EDR reports, dated December 2007, indicate that five sites have the potential to impact the project corridor, stations, and/or maintenance facilities, given the location of the sites relative to groundwater flow, the proximity of the sites to the project corridor, and/or the regulatory cleanup status of the site. In addition, a review of the State Water Resource Control Board's Geotracker website in November 2008 indicates that two sites associated with former crude-oil

[2] Environmental Data Resources Inc., *EDR Data Map Corridor Study*, December 28, 2007. ERM, *eBART Project EIR Records Searches for Hazardous Sites in the Project Corridor*, August 2008.

transportation pipelines, the Old Valley Pipeline (OVP) and the Tidewater Associated Oil Company (TAOC) dual pipeline system, are also currently under investigation as of August 2008 under Central Valley Regional Water uality Control Board (RW CB) oversight.[3,4,5] The sites are listed in Table 3.12-1 and are shown in Figure 3.12-1. The sites may

[3] State Water Resources Control Board, *eotrac er, C e ron TA C A Street C e ron TA C e o e P mp Station*, Accessed on November 24, 2008 at http //geotracker.swrcb.ca.gov/search.asp.

[4] Science Applications International Corporation (SAIC), *n-Site Soi and ro nd ater In estigation Report 220 A Street -Antioc Antioc Ca ifornia* une 2008.

[5] SAIC, *Soi and ro nd ater In estigation Report ic son- er ey Site Antioc Contra Costa Co nty Ca ifornia* March 2008.

Table 3.12-1
Hazardous Materials Sites Listed in Federal, State, and Local Agency Databases with Potential to Affect the Project Corridor

Map ID - Figure 3.12-1	Site Name	Address	Approximate Distance from Project Corridor	Summary of Environmental Conditions
1	Super-7/ Southland 17847	1220 California Avenue, Pittsburg	Approximately 100 feet north	The site is listed in the Cortese database. No other information was provided about the site in the EDR report.
2	Exxon S/ S 7-3615	2610 Contra Loma Boulevard, Antioch	Approximately 350 feet south	The site is listed in the LUST database as a result of a gasoline release that occurred in uly 1987. Pollution characterization is being conducted at the site.
3	Unocal Service Station 5963	2701 Contra Loma Boulevard, Antioch	Approximately 550 feet south	The site is listed in the LUST database as a result of a gasoline release that occurred in September 1989. A preliminary site assessment is underway.
~~4~~	Shell Service Station	1800 and 1809 A Street, Antioch	Approximately 2,400 feet north	The site is listed in the LUST database as a result of potential groundwater contamination from petroleum hydrocarbons and trichloroethene. Previous reports indicate that groundwater flows to the north at approximately 0.004 feet per foot.
~~5~~	~~County Crossings~~	~~North SR-4, west of SR 160~~	~~Adjacent to the Proposed Project alignment, including the Hillcrest Avenue Station area~~	~~This area contains a site listed in the LUST database as a result of containing fertilizer chemicals (ammonia and sulfur). The property was the site of numerous industrial activities including the unregulated removal of LUSTs (buried railroad tanker car) and contaminated soil in 1994. Sludge was reported within the vicinity of the LUST during removal. Data indicate that the groundwater beneath the property has been contaminated with petroleum hydrocarbons.~~

Table 3.12-1
Hazardous Materials Sites Listed in Federal, State, and Local Agency Databases with Potential to Affect the Project Corridor

Map ID - Figure 3.12-1	Site Name	Address	Approximate Distance from Project Corridor	Summary of Environmental Conditions
5	Chevron, Former Hickson- erley/County Crossings, Antioch	N/A	Adjacent to the Proposed Project alignment, including the Hillcrest Avenue Station area	The site is listed on the eotracker website as a Cleanup Program Site. The site is currently under investigation in association with OVP and TAOC pipelines. This area is also within County Crossings, which is listed in the LUST database as a result of containing fertilizer chemicals (ammonia and sulfur). The property was the site of numerous industrial activities including the unregulated removal of LUSTs (buried railroad tanker car) and contaminated soil in 1994. Sludge was reported within the vicinity of the LUST during removal. Data indicate that the groundwater beneath the property has been contaminated with petroleum hydrocarbons.
6	TAOC New Love Pump Station/County Crossing, Antioch	N/A	Adjacent to the Proposed Project alignment, including the Northside West and Northside East Station options area.	The site is listed on the eotracker website as a Cleanup Program Site. The site is currently under investigation in association with former TAOC pipelines. This area is also within County Crossings, which is listed in the LUST database as a result of containing fertilizer chemicals (ammonia and sulfur). The property was the site of numerous industrial activities including the unregulated removal of LUSTs (buried railroad tanker car) and contaminated soil in 1994. Sludge was reported within the vicinity of the LUST during removal. Data indicate that the groundwater beneath the property has been contaminated with petroleum hydrocarbons.

Table 3.12-1
Hazardous Materials Sites Listed in Federal, State, and Local Agency Databases with Potential to Affect the Project Corridor

Map ID - Figure 3.12-1	Site Name	Address	Approximate Distance from Project Corridor	Summary of Environmental Conditions
7	P E Metering, Antioch	N/A	Near the intersection of Oakley Road and Phillips Lane, Antioch	This site is listed as having petroleum hydrocarbons and PCBs in soil and groundwater. roundwater wells and vapor extraction wells were installed on site; recent monitoring reports (2006) indicate limited residual. roundwater monitoring is still ongoing.
8	Chevron TAOC A Street	2205 A Street, Antioch	Approximately 900 feet north	The site is listed on the eotracker website as a Cleanup Program Site. The site is currently under investigation in association with former OVP and TAOC pipelines.

So rce Environmental Data Resources, Inc., December 2007; State Water Resources Control Board, eotracker Website, November 2008; SAIC, une 2008; and SAIC, March 2008.

have hydrocarbon-contaminated soils and/or groundwater that could be encountered during construction within the project corridor. In addition, the sites are listed in the Leaking Underground Storage Tank (LUST) database or the Cortese database. The LUST database is an inventory of reported leaking underground storage tank (UST) incidents. The Cortese database identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with USTs having a reportable release, and all solid waste disposal facilities from which there is known migration.

Soil and Groundwater Investigations

Two sites in the vicinity of the Hillcrest Avenue Station are the subject of on-going soil and groundwater investigations conducted by SAIC in association with former crude-oil transportation pipelines.[3,4] The location of the two sites under investigation (Chevron TAOC A Street; and Chevron, Hickson- erley, Antioch), and the location of the former pipelines are shown in Figure 3.12-1.

According to two reports conducted in March and une 2008 by SAIC, Chevron's Old Valley Pipeline (OVP) and the former Tidewater Associated Oil Company (TAOC) pipelines were located in the vicinity of the sites. The OVP and associated pump stations operated from 1903 until the early to mid 1930s, and carried San oaquin Valley crude oil north from the ern River Oil Fields to the Richmond Refinery. The TAOC system, which transported heated crude oil from Bakersfield to the Bay Area, was constructed in 1907 and operated until the 1970s when the pipelines were abandoned.

The une 2008 Investigation Report includes information on soil and groundwater sampling at the Chevron TAOC A Street site, which is located at 2205 A Street, approximately 900 feet north of the project corridor. According to the report, soil and groundwater sampling indicated that the Chevron former crude-oil pipelines may have affected the site. The report recommends further soil characterization to determine the lateral extent of affected soil and groundwater related to the former Chevron pipelines. In addition, the report states that a product release at a Valero service station upgradient of the site has also impacted the site, and other constituents unrelated to the former pipelines were encountered in soil and groundwater samples at the site.

The March 2008 Investigation Report includes information on soil and groundwater sampling at the Chevron, Hickson- erley, Antioch site. The site is located near facilities for the Proposed

[3] Science Applications International Corporation (SAIC), *n-Site Soi and ro nd ater In estigation Report 220 A Street -Antioc Antioc Ca ifornia* une 2008.

[4] SAIC, *Soi and ro nd ater In estigation Report ic son- er ey Site Antioc Contra Costa Co nty Ca ifornia* March 2008.

Project, which includes the Hillcrest Avenue Station area, and would be adjacent to components of the Northside West and Northside East Station options. According to the report, soil and groundwater sampling which detected hydrocarbons at the site suggest a separate source other than the former pipelines. The report recommends additional sampling to delineate the extent of affected groundwater to the west. At the time the report was written, SAIC planned to describe additional investigation activities in an addendum to an existing work plan that was to be submitted to the RW CB. SAIC also planned to implement the additional characterization activities after regulatory acceptance of the proposed work plan addendum.

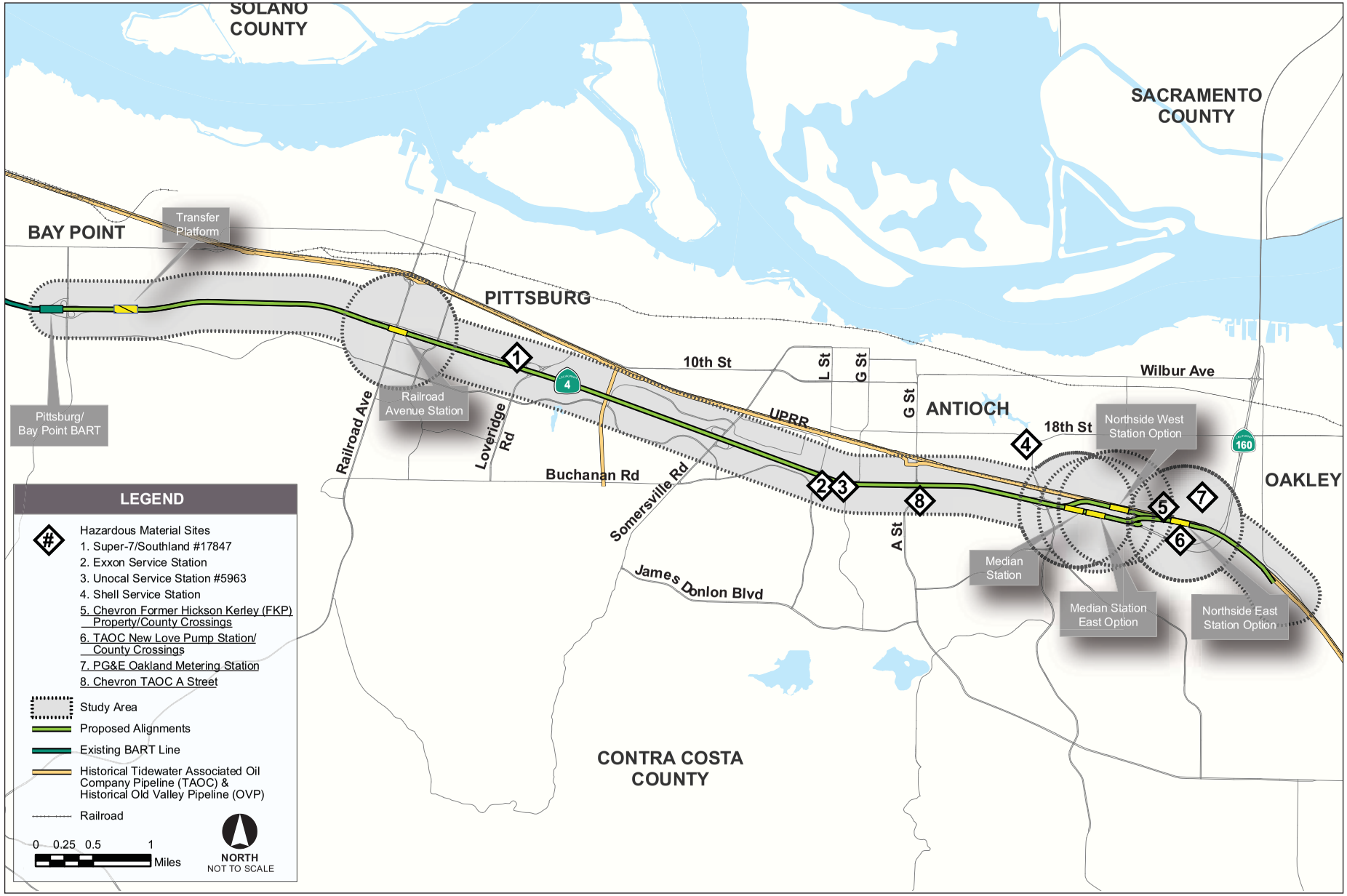
Phase I Environmental Site Assessments

Several reports on potential environmental contamination within and near the project corridor have been conducted in recent years.

UP ROW/SR 4. A Phase I Environmental Site Assessment (ESA) was completed in uly 2003 to identify potential hazardous material sites within a half mile of the 100-foot right-of-way along the Union Pacific Right-of-way (UP ROW) from Loveridge Road in the City of Pittsburg to the City of Tracy.[5] The UP ROW is approximately a half mile north of the project corridor. The Phase I ESA provided general findings for the project corridor and vicinity, which are summarized below.

- **Aerially Deposited Lead (ADL).** Vehicle traffic on SR 4 may have contaminated the project corridor with ADL from past use of automotive leaded gasoline.
- **Historical Agricultural Operations.** Most of the project area was historically used as farmland. Agricultural chemicals such as pesticides and herbicides most likely were applied to the surrounding area. Surface soil may retain residual chemicals at concentrations that may be considered hazardous. Therefore, there is a likelihood that residues of agricultural chemical exist along the project corridor.
- **Historical Railroad Operations.** Unidentified chemicals transported by the railroad (petroleum hydrocarbons and chlorinated solvents), lead, and petroleum hydrocarbons from historical railroad activity may have resulted in residual contamination in soil along the railroad portion of the project alignment.
- **Petroleum Pipelines.** Leaking petroleum pipelines have impacted soil in known portions of the right-of-way, and undiscovered leaking pipelines or contaminated areas may exist. Files for some of the sites with known contamination are located at the Central Valley RW CB office in Fresno, California.

[5] URS Corporation, *P ase I En ironmenta Site Assessment SR East Corridor Transit St dy*, uly 2003.



Source: ERM, 2008.

HAZARDOUS MATERIALS SITES POTENTIALLY AFFECTING PROJECT CORRIDOR

FIGURE 3.12-1

The construction of the Proposed Project would involve grading and soil excavation. Therefore, there is a potential that workers or others may be exposed to hazardous materials if contaminated soils and groundwater are encountered during construction activities.

In addition, a Phase I ESA conducted in October 2007 by EN EO, Inc. for the County Crossings Property in the Hillcrest Avenue Station area documents significant soil or groundwater contamination due to releases from an historical agricultural chemical facility, active or former petroleum pipelines, and a former P E metering station. Soil and groundwater have been impacted with constituents including sulfates, ammonia, manganese, petroleum hydrocarbons, and PCBs. Remediation and monitoring activities are currently ongoing at these sites.

Furthermore, a current investigation of the Chevron, Hickson- erley, Antioch site is being conducted by SAIC in association with former crude-oil transportation pipelines. According to a March 2008 Investigation Report, soil and groundwater sampling which detected hydrocarbons at the site suggest a separate source other than the former pipelines. Further investigation is recommended to delineate the extent of affected groundwater to the west.

Construction of the Median Station would involve a station and train service/storage in the median of SR 4, but also a tunnel accessing a maintenance annex, parking areas, access roadways, and a maintenance annex to the north of SR 4, in the area investigated by Engeo for the County Crossings Property and by SAIC for the Chevron, Hickson- erley, Antioch site. As a result, there is a potential that workers or others may be exposed to hazardous materials if contaminated soils and groundwater are encountered during construction, which would result in a potentially significant impact.

MITI ATION MEASURES. Implementation of the following mitigation measures would ensure that potential exposure to environmental contamination in the project corridor during construction is reduced to less than significant. (LTS)

S-8 1 Cond ct additiona fi e re ie and a P ase I ESA prior to project constr ction BART shall ensure that additional research, including a file review with Contra Costa County Health Services and the RW CB, and a Phase I ESA for the project footprint is performed during the final design phase of the project to ensure that the identified LUST, UST, and County Crossings sites, as well as other potential sites, do not have an adverse impact on the Proposed Project. If the file review reveals no potential impact from environmental contamination, no further action to remedy soil or groundwater contamination would be necessary.

S-8.2 Conduct further soil and groundwater investigations prior to any construction activities If the file review under Mitigation Measure HS-8.1, above, reveals potential environmental contamination along or beneath the project alignment or other facilities from the LUST, UST, and County Crossings sites, BART

Section 3.14
Utilities

Table 3.14-1
Major Utility Locations along the Project Corridor

Location	From	To	Description of Utility	Direction	Comments	Type	Relocate
Route 4	243 65	243 65	Electrical Line	TR			No
Route 4	243 60	258 60	Transmission Line	LE	21 kilovolt (kV), 60kV		es
California Avenue	100 50	103 50	Electrical Line	PA		Includes six new poles	es
California Avenue	104 10	104 70	Electrical Line	TR		Includes two new poles	es
SR 4	40 00	45 00	Pipeline	TR	Mokelumne Aqueduct	Underground	No
SR 4	244 05	256 90	as Line	LE/PA	24	24 , relocate to the north side of California Avenue and between North Park Blvd and Westbound SR 4	es
SR 4	247 10	247 10	Water	TR	10	Relocate 18 ACP to avoid conflict with pumping plant	es
SR 4	248 60	249 20	Water	TR	10	10 pipe may have to be extended to the north	No
SR 4	248 65	250 20	Sanitary sewer	TR	36	Underground	No
SR 4	250 20		Sanitary sewer	TR	8	Underground	No
SR 4	250 70	252 10	Sanitary sewer	TR	36	Underground	No
				TR	*ui on* 18 4 crude oil-(8 casing)	Underground	
SR 4	258 40		Oil lines		*he ron* 12 oil 8 oil (idle) 10 oil (idle) 6 oil (1951 as builts)	Overhead	No

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Section 4
Other CEQA Considerations

growth-inducing effect by accelerating planned growth in a more compact, transit-oriented form, particularly in and around the proposed station areas. Additionally, changes in land use designations ~~that are currently being initiated and~~ proposed by the cities of Pittsburg and Antioch as part of their respective Specific Plans in the areas around the proposed station areas would allow for more mixed-use development and would directly encourage growth.

Although the indirect growth caused by the Proposed Project in the local area is not considered adverse in itself, it could cause indirect adverse growth-related impacts associated with construction and implementation of new development projects in the local project area (i.e., air and noise impacts from construction of new housing or other development, etc.). Any potential future growth that could result from implementation of the Proposed Project is under the jurisdiction of the cities of Pittsburg and Antioch. The cities have prepared ~~are preparing~~ Specific Plans (Ridership Development Plans) for the Railroad Avenue Station and Hillcrest Avenue Station. ~~These~~ EIRs have been prepared for these Specific Plans that ~~must undergo environmental review, and will have~~ document~~ed~~ the physical changes to the environment changes in land use intensity, traffic generation, development massing and heights, demand for services and utilities, and air and noise emissions. Thus, the indirect effects of the Proposed Project are ~~would be~~ addressed in ~~through~~ the environmental documents~~review process~~ for the Specific Plans.

Indirect Positive Contribution to Smart Growth Patterns in the Local Project Area. A major objective of the Proposed Project is to improve regional transit access and transportation services to accommodate planned and future growth in east Contra Costa County. As outlined in Section 1, Introduction, of this document, the objectives of the Proposed Project reflect BART's cooperation with other government entities, and serve to advance multi-jurisdictional efforts to plan and implement transit-oriented development.

New development, defined through the creation of Specific Plans (Ridership Development Plans) for areas surrounding the proposed stations, is intended to reflect a more pedestrian-oriented, compact, and mixed-use development. The Proposed Project access plans providing multi-modal access to regional rail emphasize public space and infrastructure improvements that are designed to encourage private sector developers, who increasingly specialize in transit-oriented projects around BART and other rail stations. In essence, the Proposed Project's stations become catalysts to support local development plans promoted by the cities of Pittsburg and Antioch.

Proximity to ~~a~~ one of the Proposed Project stations offers major incentives to attract business, entertainment, commercial/retail, and other employment-generating land uses, along with unique opportunities for meeting local growing housing needs. While development may occur without the Proposed Project, it most likely will be auto-oriented and thus will not be smart growth. The Proposed Project thus meets the major policy goals of smart growth being endorsed by state, regional, and county agencies by providing an incentive for local transit-oriented planning, which is being led by the cities of Pittsburg and Antioch. The

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Section 5
Alternatives

4 near the Pittsburg/Bay Point BART and Hillcrest Avenue Stations to merge through general freeway traffic to access the existing on and off-ramps. The time required to make these transition movements in general traffic would vary with the nature of traffic conditions and the amount of congestion on each given day. As a result, BRT Option A would be significantly less reliable in terms of travel time than BRT Option B and the project alternatives.

The BRT Alternative could utilize off-vehicle fare collection and low-floor vehicles with multi-door boarding and alighting, all leading to faster loading and unloading and thus smaller dwell times at stops. These features would allow better schedule adherence.

Schedule and Headways. Table 5-3 shows the assumed service characteristics for each of the four BRT routes. The figures reflect an assumption that the BRT system would have the same hours of service as the BART system. The travel times shown in Table 5-3 are for Option A. For Option B which has improved connections to the BRT stations at both Pittsburg/Bay Point BART and Hillcrest Avenue Station, the one-way travel times would be reduced by about 5 minutes and the round trip travel times would be reduced by 10 minutes over what is shown in the table.

Fleet Size. The proposed peak period operating schedule for the BRT service would require 23 buses. A total fleet of 28 buses would be acquired, allowing five spare vehicles to adjust for vehicle breakdowns/routine maintenance and spikes in peak hour usage.

Fares and Collection. In-station (off vehicle) fare cards would be purchased in advance and access to the vehicles would be unimpeded by fare collection on the vehicle. E Rider cards are now available for use by BART. E Rider cards are smart cards that riders only need to touch to the top of the fare gate to operate it. This would allow a single integrated fare collection system to be used for the combined BART and BRT system. The BRT fares would be consistent with BART's current distance-based fare policy. Under this policy, the current fare from Hillcrest to Pittsburg/Bay Point BART Station on BRT would be 3.40. The fare from Hillcrest Avenue Station to downtown San Francisco would be 6.40.

Table 5-3
BRT Alternative Option A - Route Features and Proposed Service Headways

	One-Way Length		Round Trip	Proposed Headways (minutes)			
Route	Miles	Minutes	Minutes	Peak Period Peak Direction	Off Peak/ Base	Evening Period	Sat/ Sun
Route A Hillcrest	9	~~25~~ 13	~~50~~ 25	12	12	0	-
Route B Lone Tree	14	~~74~~ 37	~~148~~ 74	6	15	30	60
Route C Brentwood/ Discovery Bay Peak	24	~~84~~ 42	~~168~~ 84	15	30	30	-
Route D Brentwood/ Discovery Bay Local	24	~~138~~ 69	~~276~~ 138	30	30	60	60

So rce Wilbur Smith Associates, 2008.

Propulsion. Light rail vehicles receive power from overhead catenary systems, which transfer electrical current to the vehicles' electric motors. Along the route, six traction power substations, similar to those required by the BART trains, would be distributed along the route to power the trains.

Route. The route for the LRV Alternative would be identical to that described for the Proposed Project.

Stations. The transfer platform and LRV stations would be identical to those described for the Proposed Project.

Ridership. Ridership forecasts for the LRV Alternative would be identical to that described for the Proposed Project.

Reliability. The reliability of the LRV Alternative would be identical to that described for the Proposed Project with the exception that localized electrical power failures could impact LRV services. A larger regional power alternative would impact all of the alternatives as the BART system would be disrupted.

Schedules and Headways. The operating plan for the LRV Alternative would be identical to that described for the Proposed Project.

Fleet Size. The number of vehicles required for the LRV Alternative would be identical to that described for the Proposed Project.

Fares and Collection. These features of the LRV Alternative would be identical to those described for the Proposed Project.

Maintenance and Servicing Facilities. These facilities and associated activities of the LRV Alternative would be identical to those described for the Proposed Project.

Cost. This option is estimated to cost 5~~28~~21.0 million in capital costs in year 2009 dollars. This cost is higher than the costs of the Proposed Project due to the added cost of the overhead wiring and electrical power distribution system, although the LRV vehicles would be slightly less expensive than the DMU vehicles.

Table 5-10
Summary Comparison of eBART Project Alternatives

Feature/ Component	Proposed Project	No Project	BRT	LRV	BART
Technology	 Diesel Multiple Unit	 Continuation of existing Tri Delta Transit buses and BART	 Modern Bus	 Light Rail Vehicles	 BART
Route	About 10 miles from existing Pittsburg/Bay Point BART Station to terminus east of Hillcrest Avenue in Antioch	Continuation of existing Tri Delta transit routes	Four routes A in the SR 4 median between the Pittsburg/Bay Point BART Station and Hillcrest BRT Station B in the SR 4 median between Pittsburg/Bay Point BART Station, then exiting and proceeding on Lone Tree Way, then along the SR 4 Bypass to Laurel Road and then back C in the SR 4 median between Pittsburg/Bay Point BART Station, past Hillcrest Avenue, onto the SR 4 Bypass, exiting at Balfour Road, and then following the existing 385 bus route through downtown Brentwood and terminating at the existing Brentwood Park-and-Ride Lot D in the SR 4 median from Pittsburg/Bay Point BART Station to Hillcrest Avenue, and then along SR 4 where it would make local stops through Oakley, Brentwood, and Discovery Bay	About 10 miles from existing Pittsburg/Bay Point BART Station to terminus east of Hillcrest Avenue in Antioch	About 10 miles from existing Pittsburg/Bay Point BART Station to terminus east of Hillcrest Avenue in Antioch
Stations/Stops (parking spaces in 2030)	• BART DMU transfer platform • Railroad Avenue (300) • Hillcrest Avenue (2,600)	No change to existing local and express stops	Major stop at Hillcrest Avenue, multiple local and express stops along routes • Railroad Avenue (300) • Hillcrest Avenue (1,800)	• BART LRV transfer platform • Railroad Avenue (300) • Hillcrest Avenue (2,600)	• Hillcrest Avenue (3,500)
Ridership (daily in 2030)	10,100; 5,400 new transit riders		• Option A 10,400; 5,900 new transit riders • Option B 12,000; 6,500 new transit riders	10,100; 5,400 new transit riders	12,000; 6,600 new transit riders
Travel Times					
• Hillcrest to Pittsburg/ Bay Point	10 minutes	21 minutes	Opt. A-13 min. Opt. B, 11 min.	10 minutes	8 minutes
• Hillcrest to Oakland City Center	53 minutes	64 minutes	Opt. A-56 min. Opt. B, 52 min.	53 minutes	48 minutes
• Hillcrest to SF Embarcadero	65 minutes	76 minutes	Opt. A-68 min. Opt. B, 64 min	65 minutes	60 minutes
Fleet Size	8 DMU vehicles, including 2 spares		28 buses, including 5 spares	8 LRV trains, including 2 spares	23 BART cars, including 3 spares
Maintenance Facility	DMU facility to be located east of Hillcrest Avenue Station	Existing BART facility at Concord	BRT facility to be located east of Hillcrest Avenue Station	LRV facility to be located east of Hillcrest Avenue Station	Additional BART facility to be located east of Hillcrest Avenue Station
Capital Costs (in millions of dollars, 2009)	47986.0		• Option A 393.0 • Option B 611.0	52821.0	1,173
Operational And Maintenance Costs (in millions of dollars, 2009)	8.3		• Option A 10.2 • Option B 11.0	6.9	14.0

Source Wilbur Smith Associates, 2008; PBS , 2008.

threshold for Option A, adjusted for the cost of the system, of 4,709 daily riders. Likewise, the BRT Alternative Option B is projected to deliver 12,000 daily riders in 2030 and would, therefore, satisfy the BART System Expansion Policy ridership threshold for Option B of 7,321 daily riders.

With respect to the Metropolitan Transportation Commission (MTC) Transit Oriented Development (TOD) policy (Resolution 3434), the BRT Alternative would have a per-station target threshold of an average of 2,750 dwelling units within a one-half mile radius of each station. According to the Pittsburg/Bay Point BART Station Area Specific Plan Final EIR and the ~~Pittsburg and Antioch eneral Plans~~ Railroad Avenue Station Area and Hillcrest Station Area Specific Plans, the Pittsburg/Bay Point Station, Railroad Avenue Station, and Hillcrest Avenue Station areas would have ~~2,195~~ 3,468 dwelling units, ~~4,591~~ 3,445 dwelling units, and ~~1,975~~ 3,387 dwelling units, respectively, within one-half mile of the station. The average of all three stations would be ~~2,920~~ 3,433 units with~~out~~ the proposed Ridership Development Plans (RDPs). Consequently, this alternative would satisfy the MTC Resolution 3434 threshold of an average of 2,750 units within a one-half mile radius of the stations for BRT.

This alternative would support TOD in east Contra Costa County by extending BART transit services along the SR 4 corridor. This alternative would still allow for the development of RDPs, which would increase density and provide affordable housing around the proposed BRT stations. In fact, because the BRT Alternative would extend farther into east Contra Costa County than the other alternatives, this would help further increase ridership and aid in smart growth in the areas surrounding the proposed BRT routes.

Local goals and policies would also be met by this alternative, including Contra Costa County eneral Plan Roadway and Transit goals 5-H and 5- , which call for compatibility of major transportation facilities with adjacent land uses and basic mobility to be provided to all sectors of the public including the elderly, disabled, and transit dependent, respectively, as well as Roadway and Transit Policy 5-3, which calls for transportation facilities to use public and semi-public rights-of-way where feasible. The City of Pittsburg eneral Plan includes Land Use Railroad Avenue oal 20 -20, which calls for the extension of BART to Railroad Avenue and for the surrounding area to be developed as mixed-use transit-oriented development. The City of Antioch eneral Plan includes Land Use Policy 4.3.2a, which promotes close land use and transportation relationships that promote alternative transportation systems to minimize single-occupant vehicle travel. Antioch also has Circulation Policy 7.5.2a, which calls for the development of a transit oasis that could include rail transit centers, priority transit lanes, and dedicated travel lanes. Many of these policies specifically call for rail services, so that the BRT Alternative would not directly meet these policies, although a BRT system could still meet the policies seeking improved mobility and connectivity. As noted above, the BRT stations would not be regarded as conducive to transit-oriented development as rail systems.

For BRT Alternative Routes B, C, and D, bus operations would occur on existing roads and at existing park-and-ride lots. New bus stops would involve minimal grading or other land disturbance. As a result, for these portions of the BRT Alternative that extend transit services to Oakley, Brentwood, and Discovery Bay, no impacts to wetlands or waters of the U.S. are expected.

In summary, none of the BRT facilities, including the parking and maintenance areas would affect a wetland, waters of the U.S. or waters of the State. **(NI)**

Swainson's Hawk Foraging Habitat. Potentially suitable foraging habitat for the Swainson's hawk exists within the non-native grassland/ruderal vegetation communities of the proposed Hillcrest Avenue BRT Station area. The nearest Swainson's hawk nest to the proposed Hillcrest Avenue BRT Station is ~~approximately 3 miles~~ less than 1 mile. The California Department of Fish and ame (CDF) considers a 10-mile flight distance between active nest sites and suitable foraging habitats as a standard for direct impact analysis. ~~Their recommended mitigation ratio for the loss of foraging habitat located between 1 and 5 miles from an active nest is 1 to 0.75~~ As described for the Proposed Project, CDF provides two options for mitigation, for projects within 1 mile of an active nest tree. The first option would require one acre of Habitat Management (HM) lands for each acre of development authorized (1 1 ratio). CDF would require that at least 10 percent of the HM land requirements be met by fee title acquisition or a conservation easement allowing for the active management of the habitat, with the remaining 90 percent of the HM lands protected by a conservation easement acceptable to the Department on agricultural lands or other suitable habitats which would provide foraging habitat for Swainson's hawk. The second option would require a one-half acre of HM land for each acre of development authorized (0.5 1 ratio). Under this option, CDF would require that all of the HM land requirements be satisfied by fee title acquisition or a conservation easement acceptable to the Department which allows for the active management of the habitat for prey production on the HM lands. ~~Therefore, for each acre impacted, 0.75 acre of preserved land is required.~~ The potential Swainson's hawk foraging habitat loss due to the construction of the BRT Alternative would be ~~Loss of 33.2~~ 30.6 acres of foraging habitat under BRT Alternative Option A or ~~33.95~~ 33.23 acres under BRT Alternative Option B. The loss of Swainson's hawk foraging habitat ~~F~~from construction of the parking area, maintenance facility and access roads would be considered a significant impact, similar to the Proposed Project. **(S)**

> MITI ATION MEASURE. Either Mitigation Measure BIO-3.1 or Mitigation Measure BIO 3.2 recommended for the Proposed Project would reduce this impact to less than significant. Mitigation Measure BIO-3.1 calls for compensating for the loss of Swainson's hawk foraging habitat by providing an appropriate number of acres (as approved by CDF) of agricultural land, annual grasslands, or other suitable raptor foraging habitat. Mitigation Measure BIO-3.2 would require participation in the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan

(ECCC HCP/NCCP), which would require payment of a development fee that would offset any impacts to foraging habitat. (LTS)

Disturbance to Special-Status Nesting Birds. Suitable nesting habitat for special-status birds has been identified within the proposed Hillcrest Avenue Station areas for the BRT Alternative. These special-status birds include, but are not limited to, Swainson's hawk, burrowing owl, and loggerhead shrike. The tri-colored blackbird is not impacted by this alternative since no suitable marsh habitat for this species occurs within this alternative.

During site visits, burrowing owls, white-tailed kites, northern harriers, and red-tailed hawks were observed foraging within the proposed Hillcrest Avenue BRT Station area. The presence of foraging birds indicates the potential for nesting activity within the project area. Construction of the Hillcrest Avenue BRT Station, parking lot, and maintenance facility would involve grading and thus removal of suitable habitat for these species. Implementation of the

Farmland of Local Importance if the remote maintenance facility for either the Northside West or the Northside East LRV Station option is selected for the proposed Hillcrest Avenue Station. However, this area is no longer economically viable for agricultural production. Consequently, conversion of these farmlands would be a less-than-significant impact, similar to the Proposed Project. **(LTS)**

Consistency with Local Land Use Policies. Pursuant to California overnment Code Section 53090, BART is exempt from local land use plans, policies, and zoning ordinances. Therefore, were the LRV Alternative implemented by BART and inconsistent with such local requirements, such inconsistency would not be determined to be a significant impact and mitigation would not be required. BART nevertheless provides this information to disclose to the public and to local jurisdictions the extent to which the project is consistent with the local plans and policies.

The LRV Alternative would extend transit services into east Contra Costa County, which is consistent with the development goals and policies of the cities of Pittsburg, Antioch, and Oakley, as well as Contra Costa County, that concern promoting Transit Oriented Development (TOD) in order to address many of the Bay Area's issues, such as availability of housing, lack of mobility, and loss of open space. In addition to these local policies, the LRV Alternative, like the Proposed Project, is also consistent with the BART System Expansion Policy. The LRV Alternative is projected to deliver 10,100 daily riders in 2030 and would, therefore, satisfy the BART System Expansion Policy ridership threshold, adjusted for the cost of the system, of 6,327 daily riders. This alternative would also be consistent with this policy, because it would provide the same ridership and support for TOD as the Proposed Project.

With respect to MTC Resolution 3434, the LRV Alternative would have a per-station target of 3,300 dwelling units within a one-half mile radius of the stations. According to the Pittsburg/Bay Point BART Station Area Specific Plan Final EIR and the Pittsburg and Antioch eneral Plans, the Pittsburg/Bay Point Station, Railroad Avenue Station, and Hillcrest Avenue Station areas would have 2,195 dwelling units, 4,591 dwelling units, and 1,975 dwelling units, respectively. Thus, the resulting average of 2,920 dwelling units per station would not satisfy the MTC threshold of 3,300 dwelling units per station. However, with the development assumptions contained in the Specific Plans prepared by the cities of Pittsburg and Antioch, a greater concentration and intensity of development is projected for the areas around the stations. The resulting increase in future residential units within one-half mile of the stations would raise the average dwelling units per station to 3,433, which would satisfy the MTC threshold. ~~Even if the maximum development under consideration in the Antioch ridership Development Plan for the Hillcrest Avenue DMU Station options were taken into consideration (Northside East Station option), the per-station average number of housing units would be 3,230. This would still not satisfy the MTC Resolution 3434 threshold of an average of 3,300 units within a one-half mile radius of the stations.~~

As explained above, under Farmland Conversion, the easternmost portion of the project corridor contains land designated as Farmland of Local Importance, but this area is no longer economically viable for agricultural production and, therefore, designation of this parcel as Farmlands of Local Importance appears outdated. Conversion of agricultural lands within the County could be considered to be inconsistent with Contra Costa County eneral Plan goals and policies aimed at preserving productive agricultural land outside the County's adopted

Urban Limit Line. However, as noted for the Proposed Project, the entire project corridor is within the County's Urban Limit Line, so that development of the LRV Alternative would not extend growth-inducing transit infrastructure or development into productive agricultural areas that are meant to be conserved.

In summary, the LRV Alternative would support local and regional public policies regarding land use and satisfy the BART ridership threshold and the MTC housing target with the Ridership Development Plans. ~~However, this alternative would not achieve the MTC Resolution 3434 threshold~~.

Population and Housing

Induced Housing and Employment. As with the Proposed Project, investment in the LRV Alternative would support existing and proposed local development policies meant to foster economic development and higher-intensity mixed uses around transit stations. The LRV Alternative would enable the cities of Pittsburg and Antioch to alter the development pattern in the cities to increase development intensities around the Railroad Avenue and Hillcrest Avenue LRV Stations. The amount and intensity would be determined by local planning efforts, such as those underway with the Ridership Development Plans for the Proposed Project. This planned development would likely seek to induce new housing and employment into these areas, similar to the Proposed Project. In terms of employment, the LRV Alternative would create 13 indirect and 15 induced jobs in Contra Costa County, which is two indirect and three induced jobs less than the 15 indirect and 18 induced jobs created with the Proposed Project. Therefore, the LRV Alternative would result in the same less-than-significant effects on population and employment growth as described for the Proposed Project. **(LTS)**

Land Acquisition/Displacement. The LRV Alternative would have the same station locations and follow the same alignment as the Proposed Project. As with the Proposed Project, the Hillcrest Avenue LRV Station could be at one of four locations in the median of SR 4 or at the alternate Northside West, Northside East, or Median Station East locations. To accommodate these station location options, the LRV Alternative would require land acquisition similar to that identified for the Proposed Project, resulting in the same potential displacement of existing residents and businesses. In addition, the LRV Alternative would require the acquisition of properties for power substations (see Table 5-24), all of which are currently vacant. **(PS)**

> MITI ATION MEASURE. Implementation of Mitigation Measure PH-2.1, which was identified for the Proposed Project and provides compensation and relocation assistance in accordance with state relocation laws, would reduce this impact of the LRV Alternative to a less-than-significant level. **(LTS)**

Wetland features are located in the vicinity of the Hillcrest Avenue LRV Station options. As with the Proposed Project, no wetlands would be impacted under the Median LRV Station option. The Northside West LRV Station option would impact 0.17 acres of wetlands with the maintenance facility and extension of Slatten Ranch Road. Alternatively if the remote maintenance facility were constructed, 1.42 acres of wetlands could be impacted. The Northside East LRV Station option would have the greatest wetland impacts of the Hillcrest Avenue LRV Station options as both the parking areas and the maintenance facility would encroach into wetland areas and impact 1.91 acres of wetland habitat, which is the same situation as for the Proposed Project. Finally, the Median LRV Station East would impact 0.23 acres of wetlands due to the construction of the maintenance facility. Depending on the Hillcrest LRV Station option and the selected sites for the traction power substations, the LRV Alternative would have a potentially significant impact on wetlands and waters of the U.S. **(PS)**

> MITI ATION MEASURES. The same mitigation measures identified for the Proposed Project would be effective for the LRV Alternative and would reduce wetland impacts to less than significant. Mitigation Measure BIO-8.1 and/or Mitigation Measure BIO-8.2 would require securing either a Clean Water Act Section 404 permit or applicable approvals from state agencies. If BART chooses to participate in the ECCC HCP/NCCP, compliance with Mitigation Measure BIO-8.1 and BIO-8.2 would be required; if not, then compliance with Mitigation Measure BIO-8.1 would be required. **(LTS)**

Swainson's Hawk Foraging Habitat. The non-native grassland/ruderal area around the Hillcrest Avenue LRV Station options could provide suitable foraging habitat for Swainson's hawk. The LRV Alternative would result in the same loss of Swainson's hawk foraging habitat as the Proposed Project (Median LRV Station; ~~39.51~~ 40.52 acres). Under the different Hillcrest Avenue LRV Station options, the loss of foraging habitat would be Northside West LRV Station, ~~44.6~~ 56.13 acres; Northside East LRV Station, ~~46.3~~ 56.60 acres; and Median LRV Station East, ~~46.3~~ 43.17 acres. Loss of this habitat would be a potentially significant impact, similar to the Proposed Project. **(PS)**

> MITI ATION MEASURES. The same mitigation measures recommended for the Proposed Project would apply to the LRV Alternative. Either Mitigation Measure BIO-3.1 or BIO-3.2 would reduce this impact to less than significant. Mitigation Measure BIO-3.1 calls for compensating for the loss of Swainson's hawk foraging habitat by providing an appropriate number of acres (as approved by CDF) of agricultural land, annual grasslands, or other suitable raptor foraging habitat. Mitigation Measure BIO-3.2 would require participation in the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECCC HCP/NCCP), which would require payment of a development fee that would offset any impacts to foraging habitat. **(LTS)**

Disturbance to Special-Status Nesting Birds. Suitable nesting habitat for special-status birds has been identified within the proposed staging/construction yard east of Bailey Road and north

Petroleum Demand. Unlike the Proposed Project, which would consume about 500,000 gallons of diesel fuel in 2030, the LRV Alternative would not consume diesel fuel to operate the LRV vehicles, which are electrically powered. The DMUs, in contrast, would consume about 550,000 gallons of diesel fuel per year. Overall, petroleum consumption would decrease; however, because riders would not be driving their private automobiles on the road. Thus, to a greater extent than the Proposed Project, the LRV Alternative would result in a net benefit by reducing petroleum consumption. **(B)**

Electricity Demand. The impact to electricity demand from the LRV Alternative would be greater than from the Proposed Project. Electricity would be needed not only to operate the station and maintenance facility but also to power the LRV. The ability of electricity suppliers to satisfy electricity demand depends not only on generating capacity but also on transmission capacity. With regard to generating capacity, P E is required to have an approximately 15 percent reserve margin to meet peak load. ~~However, there is much uncertainty regarding the ability of California's transmission system to handle peak demand, and the Cal-ISO expects reliable transmission service to the San Francisco Bay Area only until 2010. Considering the construction of the LRV Alternative, if selected, would occur after 2010, some uncertainty exists about the state of the transmission service when operation begins.~~ There is uncertainty regarding the ability of California's transmission system to handle peak demand under extreme conditions and, thus, this represents a potentially significant impact that would not occur with the Proposed Project. Locally, Cal-ISO conducted a recent study showing that in 2013 and 2018 the reater Bay Area (which includes the Proposed Project study area) is expected to have sufficient internal generation resources and transmission capability under normal summer peak operating conditions when all transmission systems are in service. However, Cal-ISO believes that under contingency conditions (when summer peak demand occurs during an existing loss of one or two elements associated with the transmission system), certain transmission lines and transformers may overload. As a result, Cal-ISO has proposed measures that would ensure the system can handle the contingency conditions. Nine projects have already been approved to address some of the recommended measures, and seven additional projects were considered feasible projects that will be considered in Cal-ISO's next year's planning window (2010). More importantly, BART is not likely to experience a loss of power during a planned outage. BART's lines are on an outage Block 50, which serves essential services such as certain large hospitals. P E normally exempts this Block from rotating outages. In addition, BART's stations have two feeds (that are not on Block 50) and each feed is on a different outage block so both feeds would not be simultaneously blacked out.

For the LRV Alternative, peak hours of service and, hence, electricity demand are expected to be between 6 00 a.m. to 9 00 a.m. and 4 00 p.m. to 7 00 p.m. Peak statewide demand is typically in the late afternoon during hot summer months. Therefore, peak electricity demand from the LRV Alternative may coincide with the statewide peak demand. P E's peak load

in 2006 was about 19,000 MW.[1] BART system-wide peak load in 2006 was 84 MW, less than 0.5 percent of the P E peak load. Based on the design of the LRV, three LRVs running on maximum power could demand about 2.7 MW (assuming an efficiency of 92 percent) which represents less than 0.02 percent of the P E peak load. Nevertheless, because of long-term uncertainties with transmission reliability and the possibility that peak demand for the LRV Alternative may occur during the statewide peak demand, impacts to peak electricity demand may be significant. **(PS)**

MITI ATION MEASURE. Implementation of energy conservation measures to reduce electricity demand would be necessary to help deal with the uncertainty of electrical transmission. BART customarily adopts energy conservation techniques and would apply these to the LRV Alternative. Such techniques include operation of fewer cars during off-peak hours to reduce the load, low power consuming light bulbs, and achieving a level of energy performance above that required by CCR Title 24 (Building Energy Efficiency Standards). However, given the uncertainty of electricity supplies, the LRV Alternative would still be expected to have a potentially significant and unavoidable impact on peak electricity demand. **(SU)**

[1] California Energy Commission. Accessed une 9, 2008, http //www.energy.ca.gov/electricity/index.html demand, 2006 Annual Non-Coincident Peak Loads

promotion of alternative transportation systems to minimize single-occupant vehicle travel. Also, Circulation Policy 7.5.2a calls for the development of a transit oasis that could include rail transit centers, priority transit lanes, and dedicated travel lanes. The BART Extension Alternative would not conflict with Contra Costa County Land Use Policy 3-10 and Agricultural Resources oal 8-H, aimed at protecting agricultural interests in the County by preventing the extension of growth-inducing infrastructure and conserving productive agricultural lands outside the County's adopted Urban Limit Line. Since the entire project corridor is located within the Urban Limit Line, the BART Extension Alternative is consistent with applicable goals and policies.

Unlike the Proposed Project, the BART Extension Alternative would not include a station at Railroad Avenue in Pittsburg. As a result, TOD benefits from this station in the City of Pittsburg and the policies calling for BART to be extended to Railroad Avenue would not materialize under the BART Extension Alternative.

The BART Extension Alternative would expand transit services into east Contra Costa County and provide a link between this area and the greater San Francisco Bay Area, satisfying certain aspects of the BART System Expansion Policy. Although the BART Extension Alternative ridership would be greater than the Proposed Project with 12,000 daily riders, it would not meet the BART System Expansion Policy threshold, adjusted for the cost of the system, of 14,000 riders. With respect to the MTC Resolution 3434, the BART Extension Alternative requires a per-station threshold of 3,850 dwelling units within a one-half mile radius of the stations. According to the Pittsburg Bay Point BART Station Area Specific Plan Final EIR and the ~~Antioch eneral Plan~~ Hillcrest Station Area Specific Plan, the Pittsburg/Bay Point BART Station and the Hillcrest Avenue Station would have ~~2,195~~ 3,468 dwelling units and ~~1,975~~ 3,387 dwelling units, respectively. The resulting average of ~~2,085~~ 3,428 units ~~riders~~ per station would not satisfy the MTC threshold. ~~Even if the Hillcrest Avenue Station option with the greatest number of dwelling units being considered by Antioch in its RDP process were used (Northside East Station option with up to 2,900 dwelling units), the average number of dwelling units for the two stations would be 2,550. Therefore, this alternative would not satisfy the MTC Resolution 3434 per-station threshold of 3,850 units within one-half mile of the stations.~~

In summary, the BART Extension Alternative would support local and regional public policies regarding land use. However, this alternative would not achieve the BART System Expansion Policy, MTC Resolution 3434 thresholds, or the City of Pittsburg transit-oriented and mixed use development policies around Railroad Avenue.

Population and Housing

Induced Housing and Employment. Like the Proposed Project, the BART Extension Alternative would support the City of Antioch's development policies to promote economic development and orient higher-intensity mixed uses around transit stations. The BART

Biological Resources

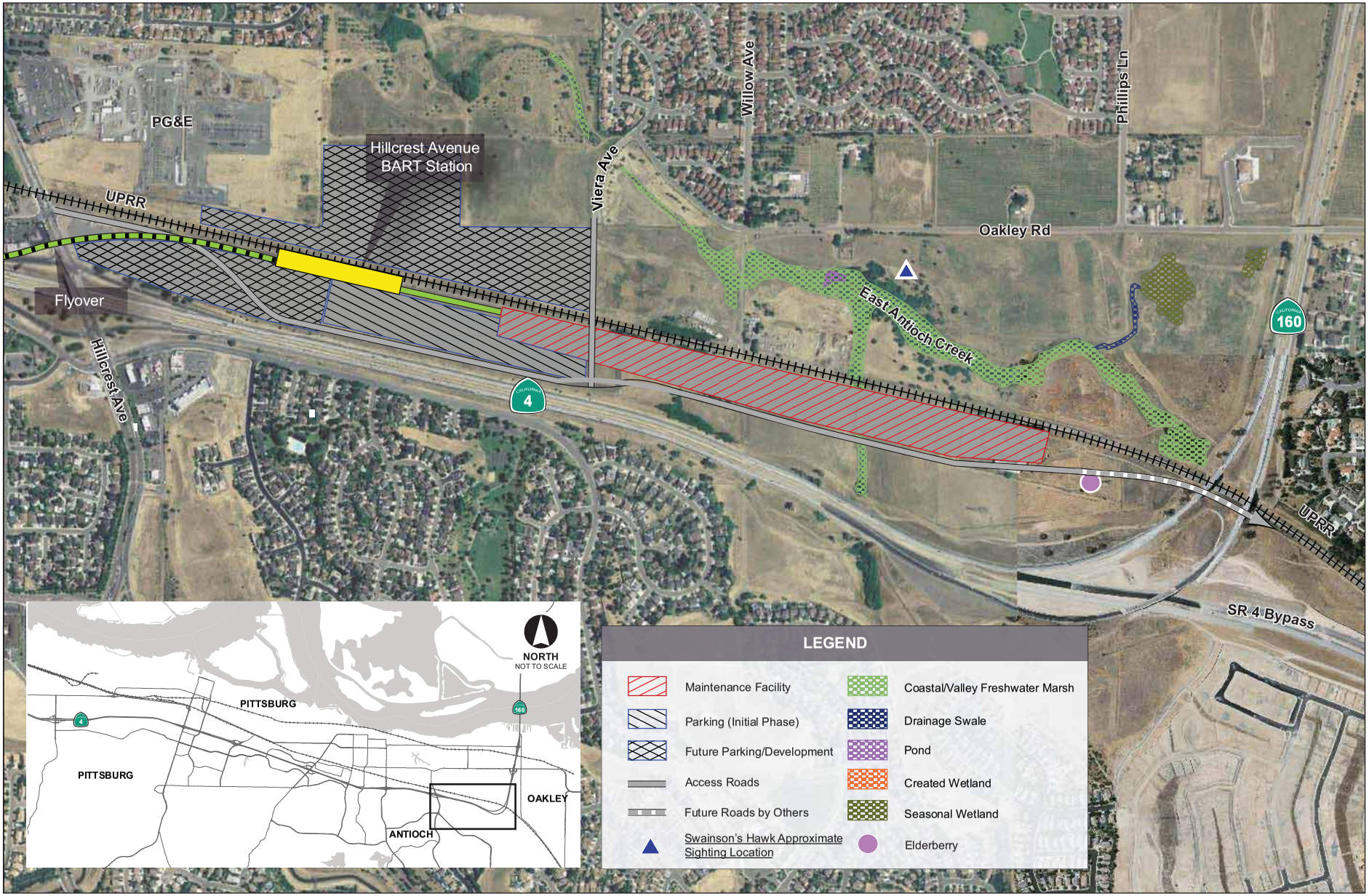
Wetlands, "Waters of the U.S." and "Waters of the State" Within the SR 4 right-of-way, the BART Extension Alternative would be identical to the Proposed Project in terms of impacts to wetlands, waters of the U.S. and waters of the State. The sole difference is the additional land needed for traction power substations under the BART Extension Alternative. SR 4 intersects several waters of the U.S. including Willow Creek, irker Creek, Los Medanos Wasteway, Markley Canyon Creek, Marsh Creek, West Antioch Creek, East Antioch Creek, and several unnamed tributaries. All of these watercourses have been historically channelized and culverted to some extent beneath the SR 4 (in either reinforced concrete boxes or concrete pipes). The existing highway culverts for these waters of the U.S. would be modified or extended prior to the construction of the rail line for the BART Extension Alternative by the SR 4 widening project. Runoff from the BART Extension Alternative would connect to existing storm drain systems. BART would have to comply with the Contra Costa Clean Water Program (CCCWP) Phase 1 National Pollutant Discharge Elimination System (NPDES) Permit.

Within the Hillcrest Avenue BART Station area, the BART Extension Alternative would potentially affect 0.44 acres of coastal/valley freshwater marsh and 0.01 acres of a pond (see Figure 5-16). The potential fill of these resources would be a significant effect. **(S)**

> MITI ATION MEASURES. The same mitigation measures identified for the Proposed Project would be effective for the BART Extension Alternative. Mitigation Measure BIO-8.1 would require either securing a Clean Water Act Section 404 permit, or applicable approvals from state agencies. Mitigation Measure BIO-8.2 calls for compliance with the ECCC HCP/NCCP. Either measure would reduce wetlands impacts to less than significant. **(LTS)**

Swainson's Hawk Foraging Habitat. The non-native grassland/ruderal area around the Hillcrest Avenue BART Station parking area and maintenance facility could provide suitable foraging habitat for Swainson's hawk ~~(approximately 50 to 60 acres)~~ (74.74 acres). Loss of foraging habitat due to the implementation of the BART Extension Alternative would be considered a significant impact. **(S)**

> MITI ATION MEASURES. Either of the two mitigation measures recommended for the Proposed Project would apply to the BART Extension Alternative. Mitigation Measure BIO-3.1 calls for compensating for the loss of Swainson's hawk foraging habitat by providing an appropriate number of acres (as approved by CDF) of agricultural land, annual grasslands, or other suitable raptor foraging habitat. Mitigation Measure BIO-3.2 would require participation in the ECCC HCP/NCCP, and payment of a development fee that would offset any impacts to foraging habitat. **(LTS)**



Source: WSA, 2008.

SENSITIVE HABITAT IN THE VICINITY OF THE HILLCREST AVENUE BART STATION
FIGURE 5-16

Table 5-38 presents the estimated energy consumed in 2015 and 2030 under the BART Extension Alternative. Energy consumption by BART cars is based on electricity consumption data collected for calendar year 2006 as provided by BART.[34] BART provided electricity consumed (kWh) by the BART cars and total car miles traveled for the whole system in 2006. A system-wide average kWh per car mile is estimated by dividing the 2006 kWh data by the total BART car miles (4.51 kWh/mile). To account for the fact that more energy is consumed than produced when generating electricity, the kWh per mile value is multiplied by a Btu per kWh factor to arrive at a Btu per mile factor for BART cars. The resulting factor is 46,600 Btu per mile.

The BART Extension Alternative would have a Hillcrest Avenue BART Station and a maintenance facility located north of SR 4. A flyover would connect the station with the tracks on the median of SR 4. The direct energy consumption from the stations and maintenance facilities for the BART Extension Alternative is not known at this time. However, for the purposes of this EIR, energy consumption by the single Hillcrest Avenue BART Station is based on the energy consumption at the existing Orinda BART Station. The Orinda BART Station energy consumption is adjusted to account for the additional parking spaces (Orinda Station has about 1,400 parking spaces while the Hillcrest Avenue Station for the BART Extension Alternative would have 3,500 parking spaces). The BART maintenance facility is conservatively assumed to consume the same amount as the Hayward ard, which was one of the higher energy-consuming BART facilities in 2006. Actual energy consumed by the BART maintenance facility is expected to be less than assumed in Table 5-38. The Proposed Project is expected to reduce overall energy consumption (combining the increase due to project operations and the reduction due to reduced automobile usage); the BART Extension Alternative would likewise reduce overall energy consumption and net benefits would be less than those identified for the Proposed Project. **(B)**

Petroleum Demand. Unlike the Proposed Project, the BART Extension Alternative would not consume diesel fuel to operate the BART vehicles. In fact, petroleum consumption would decrease by reducing the number of automobiles on the road. Thus, to a greater extent than the Proposed Project, the BART Extension Alternative would result in a net benefit by reducing petroleum consumption. **(B)**

Electricity Demand. The impact to electricity demand from the BART Extension Alternative would be greater than from the Proposed Project. Electricity would be needed not only to operate the station and maintenance facility but also to power the BART trains. The ability of the electricity suppliers to satisfy electricity demand depends not only on generating capacity but also on transmission capacity. With regard to generating capacity, P E is required to have an approximate 15 percent reserve margin to meet peak load. ~~However, there is much uncertainty regarding the ability of California's transmission system to handle peak demand, and the Cal-ISO expects reliable transmission service to the San Francisco Bay Area until at least 2010 only. Considering the construction of the BART Extension Alternative, if selected,~~

[34] Emails from BART to ERM dated December 27, 2007, and anuary 8, 2008.

~~would occur after 2010, some uncertainty exists about the state of the transmission service when the BART Extension Alternative is in operation.~~ There is uncertainty regarding the ability of California's transmission system to handle peak demand under extreme conditions and, thus, this represents a potentially significant impact that would not occur with the Proposed Project. As noted previously under the LRV Alternative, the Cal-ISO has taken steps to relieve this uncertainty and P E's electrical services to BART is similar to other essential services, so that power outages are unlikely. Nevertheless, in spite of these circumstances, the potential impacts during extreme conditions are considered significant and unavoidable.

Table 5-38
Energy Consumption of the BART Extension Alternative

Category	Energy Consumption (Billion Btu/year)	
	2015	2030
Direct		
Increase from Operation of BART Cars [a]	151.7	151.7
Increase from Station Operation [b]	17.7	17.7
Increase from Maintenance Facility Operation [c]	59.8	59.8
Decrease from Reducing Automobile Miles Traveled [d]	-281.2	-481.1
Indirect		
Increase from Maintenance of BART Cars [e]	23.0	23.0
Decrease from Reducing Maintenance of Automobiles [f]	-85.2	-156.2
Net of nown Consumption	-114.2	-385.1

So rce ERM, 2008.

otes

a. Equal to annual miles traveled multiplied by energy intensity factor of 46,600 Btu/mile.

b. Based on existing Orinda Station.

c. Based on existing South Alameda ard.

d. Equal to annual miles traveled multiplied by energy intensity factor of 4622 Btu/mile in 2015 and 4313 Btu/mile in 2030. Passenger automobile fleet average fuel economy is assumed to increase linearly based on fuel economy standard for new passenger cars. Standard in 2004 was 27.5 miles per gallon (mpg) and standard in 2020 will be 35 mpg.

e. Equal to annual miles traveled multiplied by energy intensity factor of 7,060 Btu/mile (assumed equivalent to LRV factor from Caltrans, *Energy and Transportation Systems Tab e E-1* uly 1983).

f. Equal to annual miles traveled multiplied by energy intensity factor of 1,400 Btu/mile.

For the BART Extension Alternative, peak hours of service and, hence, electricity demand are expected to be between 6 00 a.m. to 9 00 a.m. and 4 00 p.m. to 7 00 p.m. Peak statewide demand is typically in late afternoon during hot summer months. Therefore, peak electricity demand from the BART Extension Alternative may coincide with the statewide peak demand. P E's peak load in 2006 was about 19,000 MW.[35] BART system-wide peak load in 2006 was 84 MW, less than 0.5 percent of the P E peak load. Currently, BART typically runs 54 trains during peak hours. The BART Extension Alternative may add two trains during the

[35] California Energy Commission website accessed une 9, 2008, http //www.energy.ca.gov/electricity/ index.html demand, 2006 Annual Non-Coincident Peak Loads.

BART system's peak hours potentially increasing peak hours electricity demand by four percent (about 3 MW) This increase would represent less than 0.02 percent of the P E peak load. Nevertheless, because of long-term uncertainties with transmission reliability and the possibility that peak demand for the BART Extension Alternative occurring during the statewide peak demand, impacts to peak electricity demand may be significant. **(PS)**

Proposed Project and would be feasible. On the other hand, Option B is about 286 percent more expensive than the Proposed Project at 611 million in 2009 dollars. In order to advance this option, additional funding sources would be needed. Accordingly, Option A satisfies the objective of financial feasibility but Option B does not.

The BRT Alternative would not satisfy one of the principal project objectives promoted by the eBART Partnership Policy Advisory Committee to balance short and long-term strategies for the corridor by constructing less expensive transit improvements that can be funded in the near term, but are readily adaptable to BART technology at a later date if funding becomes available and the projected ridership would justify the greater the cost. The BRT Alternative involves construction of busway pavement and freeway bus-only lanes that would have to be removed if BRT were replaced by BART technology in the future. In addition, the station facilities at either end of the corridor for both BRT Options A and B would not be directly usable with BART technology and would need to be replaced. Construction of the BRT Alternative would also be inconsistent with Measure passed by the County voters, which calls for extension of rail transit into East County.

As shown earlier in Section 5.3, the BRT Alternative would effectively protect and enhance the environment, similar to the Proposed Project. Option B would result in a greater diversion of motorists to transit and achieve greater reductions in air emissions and energy consumptions than the Proposed Project. As a result, the BRT Alternative (both options) rate high in terms of protecting the environment.

With respect to the final project objective of providing a cost effective, technology appropriate system, both Options A and B would achieve this objective. The BRT technology is appropriate for the ridership opportunities, the intensity of development, and the service plan envisioned for the eBART corridor. The number of BRT Alternative vehicles in operation can be readily scaled to satisfy varying demand. Likewise, given the number of riders delivered for the capital costs, the BRT options are as cost effective, if not more so, than the Proposed Project.

In summary, the BRT Alternative meets most of the project objectives but would not implement Measure or support short, medium, and long-term strategies. Further, Option A would not achieve a seamless, or enhanced, connection to BART at the Pittsburg/Bay Point BART Station. Option B would require additional funding sources and would not be financially feasible.

BART System Expansion Policy and MTC Resolution #3434

Both options of the BRT Alternative would satisfy the BART System Expansion Policy ridership threshold, adjusted for the differing costs of the two options. Specifically, Option A would deliver 10,400 daily trips, compared to the ridership threshold of 4,709; Option B would deliver 12,000 daily trips, compared to the ridership threshold of 7,321.

The BRT Alternative would meet the criteria of MTC threshold which establishes a per-station housing threshold of 2,750 units for BRT service. According to the Pittsburg/Bay Point BART Station Area Specific Plan Final EIR and the Railroad Avenue Station Area and Hillcrest Station Area Specific Plans, the average number of dwellings units within a one-half mile radius of the three stations (Pittsburg/Bay Point, Railroad Avenue, and Hillcrest Avenue) would be 3,433 ~~2,920~~, which would meet the MTC ridership threshold for bus transit.

Light Rail Vehicle Alternative

Project Objectives

The Light Rail Vehicle (LRV) Alternative is similar to the Proposed Project and would satisfy nearly all of the project objectives to the same degree. The principal difference concerns the project objective of being financially feasible. The LRV Alternative involves construction of overhead catenary lines and traction power substations that raise the cost of this technology relative to the Proposed Project. Accordingly, the LRV Alternative is not recommended at this time for cost reasons. However, BART may wish to further consider the LRV Alternative in the event that additional funding becomes available at a future date. The environmental analysis in the Final EIR provides a full evaluation of the LRV Alternative should such funding become available. ~~As a result, the LRV Alternative would require additional funding if it were to be advanced. This alternative would not be financially feasible with current funding sources.~~

BART System Expansion Policy and MTC Resolution #3434

The LRV Alternative would satisfy the BART System Expansion Policy ridership threshold, adjusted for the costs of the system. Specifically, the LRV Alternative would deliver 10,100 daily trips, compared to the ridership threshold of 6,327.

According to MTC Resolution 3434, the threshold for LRV technology is an average of 3,300 dwelling units per station area. According to the Pittsburg/Bay Point BART Station Area Specific Plan Final EIR and the Railroad Avenue Station Area and Hillcrest Station Area Specific Plans ~~Pittsburg and Antioch eneral Plans~~, the three stations along the corridor would average ~~2,920~~ 3,433 dwelling units within a one-half mile radius of the stations, which would meet the MTC ridership threshold for light rail transit. ~~not justify the extension per MTC criteria. If the Hillcrest Station option with the greatest number of dwelling units were taken into account (i.e., using the Ridership Development Plan estimates for the Northside East Station option, rather than the City of Antioch eneral Plan), the average would increase to approximately 3,230 dwelling units. Under these assumptions, the LRV Alternative would still not satisfy the MTC threshold.~~

BART Extension Alternative

Project Objectives

The BART Extension Alternative would satisfy seven of the ten project objectives. This alternative would offer the highest level of ridership, system connectivity (without the need to transfer from BART to a DMU, BRT or LRV), diversion of motorists to transit, and reduction in SR 4 congestion. The significant investment in a BART station in the City of Antioch would be attractive to, and an incentive for, private developers to making long-term real estate

investments in the transit-oriented development sought by the City in its eneral Plan and in the Ridership Development Plan that is currently being prepared. The City of Antioch and the region would realize economic and fiscal benefits with the sizeable investment and infrastructure that would be associated with the Hillcrest Avenue BART Station. Although this alternative would not include a station in the City of Pittsburg, the City has indicated that its planning efforts around Railroad Avenue are not dependent on a rail extension.

In contrast, because of the cost of investing in heavy-rail BART technology, the BART Extension Alternative would not satisfy the project objectives related to cost effectiveness and affordability. In particular, this alternative would not enhance financial feasibility; balance short, medium, and long-term strategies, or provide a cost-effective technology. This alternative does not balance short and long-term strategies for the corridor because it requires construction of the most costly transit improvements that are not currently fundable, rather than constructing less costly improvements in the near term that are adaptable to BART technology at a later date. In addition, the BART Extension Alternative would terminate outside the SR4 median, at a location north of SR4 and alongside the Union Pacific Railroad (UPRR) right of way. Future extensions to serve the rest of East County would have to travel parallel to the UPRR Mococo Line, where land acquisition costs and displacements would be significant, or would need to utilize the UPRR right of way, which may be difficult given the UPRR's intent to increase freight service activity on the corridor. Thus, while satisfying Measure and extending BART service, this alternative has limited options for future phases. The cost for this alternative of 1.173 billion is about two and one-half times more than the Proposed Project, and would require substantial additional funding sources.

BART System Expansion Policy and MTC Resolution #3434

While the BART Extension Alternative has the highest projected potential ridership, this increased ridership is not enough to justify the increased cost of investing in heavy-rail BART technology. Specifically, the projected ridership of 12,000 daily trips for the BART Extension Alternative does not satisfy BART's System Expansion Policy ridership threshold of 14,000 daily trips for conventional BART technology.

With respect to MTC Resolution 3434, the target number of dwelling units per station is 3,850, for heavy rail systems, like BART. According to the Pittsburg/Bay Point BART Station Area Specific Plan Final EIR and the ~~Antioch eneral Plan~~ Hillcrest Station Area Specific Plan, the average number of dwelling units within a one-half mile radius of the this alternative's two stations (Pittsburg/Bay Point and Hillcrest) would be 3,428 ~~2,085~~ units. As a result, this alternative would not satisfy the MTC threshold of 3,850 housing units. ~~Even if the Hillcrest Avenue Station option with the greatest number of dwelling units were taken into account (i.e., using the Ridership Development Plan estimates for the Northside East Station option, rather than the City of Antioch eneral Plan), the average would increase to about 2,550 units, still not enough to achieve the minimum target.~~

cumulative noise impact specific to the locations of the rail switches (Impact NO-CU-14), which are planned at four sites along the 10-mile corridor. Thus, the benefit of avoiding or reducing these cumulative impacts is minimal.

Compared to the Proposed Project with Northside West, Northside East and Median Station East Station options, the BRT Alternative also avoids two additional significant and unavoidable noise impacts: Impact NO-11 (traffic noise associated with the Northside East Station option) and Impact NO-CU-16 (operational noise from the remote maintenance facility in combination with other noise sources). With respect to traffic-related noise, additional traffic associated with the Northside East Station option and the potential development at this station location would increase noise levels along local roads between the Union Pacific Railroad right-of-way and 18th Street. The magnitude of the traffic volume increase suggests that the cumulative noise levels may significantly affect residences that front onto the local streets. The Hillcrest Avenue BRT Station would provide some impetus for transit-oriented development and hence traffic and vehicular noise, but the amount of new development would not be as intense and, hence, generate as much traffic and noise as the DMU station. In terms of the cumulative noise effects associated with the remote maintenance facility, the major contributor to the cumulative noise impacts is traffic along the SR 4 Bypass and local streets. Thus, even without the remote maintenance facility, nearby sensitive noise receptors would be affected by traffic noise.

The BRT Alternative also results in slight reductions in the magnitude of various less-than-significant impact areas, as well as somewhat greater environmental benefits for regional air quality and energy consumption, resulting from the increased transit ridership it offers. While the BRT Alternative would offer an efficient, high quality transit service, it would not be as successful as the Proposed Project in promoting transit-oriented land use initiatives and policies; balancing short, medium, and long-term strategies; and implementing the mandate of the Contra Costa County voters as described in Measure J.

LRV and BART Extension Alternatives

The LRV Alternative would have environmental effects similar to the Proposed Project, because the route, stations, and facilities would be identical. The principal difference is the additional visual impact from the overhead catenary system to supply power and the additional land and related impacts to accommodate the traction power substations. While these represent additional impacts that would not occur under the Proposed Project, these impacts are considered less than significant. ~~While these impacts are considered less than significant, they represent additional impacts that would not occur with the Proposed Project.~~ The LRV Alternative would provide a comparable level of service and ridership as the Proposed Project. However, the LRV Alternative would cost more and require more funding than what is currently available. One of the project objectives is to achieve financial feasibility, and this alternative would not satisfy this objective.

The BART Extension Alternative would result in more environmental effects at the Hillcrest Avenue Station because of additional land requirements for station facilities. Furthermore, this alternative, while offering the most seamless connection to existing BART service, the greatest

ridership potential, and, thus, the most enhanced mobility in the SR 4 corridor, would be far more costly and additional funding would need to be identified.

Summary

Of the build alternatives, the BRT Alternative is technically the environmentally superior alternative, because it avoids the Proposed Project's significant and unavoidable traffic impacts at a single intersection and lessens cumulative noise impacts in the vicinity of the rail switches. The difference between the BRT and the DMU with the Hillcrest Avenue Station options is somewhat greater, however, because the BRT Alternative avoids additional potentially significant and unavoidable cumulative traffic-related noise impacts specific to the Northside West, Northside East, and Median East Station options. The LRV Alternative would have similar environmental impacts to the Proposed Project, while the BART Extension Alternative would have greater environmental impacts than either the Proposed Project or the BRT Alternative due to the need for greater land area. The LRV and BART Extension Alternatives, in turn, would have greater environmental impacts than either the Proposed Project or the BRT Alternative, primarily due to the catenary power line needed for the former and greater land area needed for the latter. Since, as a practical matter, the difference between environmental impacts of the Proposed Project and the BRT Alternative is not substantial, the comparison between the Proposed Project and the BRT Alternative, in terms of ability to attain project objectives, assumes greater importance. As shown in Table 5-40, the BRT Alternative would not be as effective as the Proposed Project in attaining the project objectives. The BRT Alternative would provide effective transit service to East County, but it would not satisfy the County's Measure policy of providing rail service and it would not satisfy the eBART Partnership Policy Advisory Committee's policy to construct a system that could readily be adapted to BART technology.

5.7 ALTERNATIVES CONSIDERED BUT WITHDRAWN

The range of alternatives required in an EIR is limited to those that would avoid or substantially lessen any of the significant effects of the project. Among the factors that may be taken into account when addressing the feasibility of alternatives are suitability, economic viability, availability of infrastructure, plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives. An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative.

2002 BART Feasibility Study

Initial List of Alternatives

In 2004, the SR 4 East Corridor Transit Study was implemented to look at transit-related alternatives that would serve to reduce congestion in east Contra Costa County as well as