

# Memorandum

To: Laura Prickett, Horizon Water and Environment

From: Analette Ochoa and Wana Chiu, WRECO

CC: Parag Mehta, Kimley Horn

Date: October 10, 2017

Re: Santa Cruz Route 1 Tier I and Tier II HOV Lane/TSM Widening Project – Addendum to the 2013 Drainage Report

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## 1.0 Purpose and Organization of this Addendum

The purpose of this Addendum to the 2013 Drainage Report for the Santa Cruz Route 1 Tier I and Tier II HOV Lane/TSM Widening Project is to provide an updated description of the Tier I Corridor Alternatives, in order to clarify that all project activities will avoid impact to the upland habitat of the Santa Cruz long-toed salamander (SCLTS). Since the completion of the Drainage Report, the description of the Tier I Corridor Alternatives has been modified to assure avoidance of this habitat, in the southern portion of the alignment. The complete, updated description of the Tier I Corridor Alternatives is provided in Attachment 1. The modifications to the description of these alternatives include the proposed elimination of the widening of some ramps at the Rio Del Mar Boulevard, Freedom Boulevard, and San Andreas Road interchanges. In the vicinity of these three interchanges, all improvements associated with the proposed project, such as local HOV bypass lanes, road improvements, retaining walls, and the stormwater treatment facilities associated with the improvements, will be included only if the proposed design fully avoids upland habitat for SCLTS, as determined during environmental review of future Tier II projects.

This Addendum focuses on Section 3, Offsite Hydraulics, and Section 4, Onsite Roadway Drainage, of the Drainage Report. Specifically, Section 3 discusses cross drainage systems, and Section 4 discusses on-site drainage systems – including such measures as may be installed at the Rio Del Mar Boulevard, Freedom Boulevard and San Andreas Road interchanges. This Addendum focuses on these sections of the Drainage Report in order to clarify that all project activities will avoid impact to the upland habitat of the Santa Cruz long-toed salamander (SCLTS).

This Addendum includes the Project Description (Section 2.0), followed by a review of Sections 3 and 4 of the Drainage Report (Section 3.0), and a Statement Regarding the Drainage Report Findings and Recommendations Relative to Changes in the Project Description (Section 4.0).

## 2.0 Project Description

The California Department of Transportation (Caltrans), in cooperation with the Federal Highway Administration (FHWA) and the Santa Cruz County Regional Transportation Commission (RTC), proposes improvements to State Route 1 (Route 1) in Santa Cruz County. This project is divided into two components: the Tier I component from approximately 0.4 mile south of the San Andreas-Larkin Valley

Road interchange to 0.3 mile north of the Morrissey Boulevard interchange, a distance of approximately 8.9 miles; and the Tier II component from 41st Avenue to Soquel Avenue/Drive.

### **Tier I Project**

The Drainage Report addressed two build alternatives for the Tier I Project: a Tier I Corridor High-Occupancy Vehicle (HOV) Lane Alternative and a Tier I Corridor Transportation Systems Management (TSM) Alternative. Since the completion of the Drainage Report, the description of the Tier I Corridor Alternatives has been modified to assure avoidance of the upland habitat of the SCLTS, in the southern portion of the alignment. The complete, updated project description is provided in Attachment 1. The modifications of the project description include the proposed elimination of the widening of some ramps at Rio Del Mar Boulevard, Freedom Boulevard, and San Andreas Road; other project features, such as shoulder paving and retaining walls associated with ramp widening along the project corridor south of Rio Del Mar Boulevard, might be eliminated if, during future environmental review of other Tier II projects, the project features cannot be designed to avoid impact to upland habitat for the SCLTS.

#### ***Tier I HOV Lane Alternative***

The Tier I Corridor HOV Lane Alternative would expand the existing four-lane highway to a six-lane facility by adding one HOV lane in each direction next to the median and an auxiliary lane on the outside in each direction. Expanding the highway from four lanes to six lanes would be achieved by building the new lane in each direction in the existing freeway median and widening the freeway footprint in those locations where the median is not wide enough to fit the new lane. The Tier I Corridor HOV Lane Alternative would modify or reconstruct all nine interchanges within the project limits to improve merging operations and ramp geometry. The Bay Avenue/Porter Street and 41st Avenue interchanges would be modified to operate as one interchange, with a frontage road to connect the two halves of the interchange. Where feasible, design deficiencies on existing ramps would be corrected. Ramp metering and HOV bypass lanes and mixed-flow lanes would be added to Route 1 on-ramps within the project limits. The Tier I Corridor HOV Lane Alternative would include an auxiliary lane in each direction between Freedom Boulevard and Bay Avenue/Porter Street and between 41st Avenue and Soquel Avenue/Drive. Transportation Operations System infrastructure, such as changeable message signs, highway advisory radio, microwave detection systems, and vehicle detection systems, would also be provided under the Tier I Corridor TSM Alternative. The Tier I Corridor HOV Alternative would not construct a northbound auxiliary lane between State Park Drive and Park Avenue.

#### ***Tier I TSM Alternative***

The Tier I Corridor TSM Alternative proposes to add an auxiliary lane along the highway between major interchange pairs from Morrissey Boulevard to Freedom Boulevard, provide ramp metering, construct an HOV bypass lane and mixed-flow lane on on-ramps, and improve nonstandard geometric elements at various ramps, in both directions. The Tier I Corridor TSM Alternative also would include Transportation Operations System electronic equipment as described for the Tier I Corridor HOV Lane Alternative. In addition, the Tier I Corridor TSM Alternative would reconstruct the north and south Aptos railroad bridges and lower Route 1 in Aptos to achieve standard vertical clearance; reconstruct the State Park Drive, Capitola Avenue, and 41st Avenue overcrossings; widen the Aptos Creek Bridge; and construct three new pedestrian/ bicycle overcrossings over Route 1 at Mar Vista Drive, Chanticleer Avenue, and Trevethan Avenue. All of the aforementioned reconstructed bridges would include improvements to pedestrian and bicycle facilities. The Tier I Corridor TSM Alternative shares many features with the Tier I

Corridor HOV Lane Alternative; the major exceptions are the absence of an HOV lane and a reconfiguration of only the Soquel Drive/Soquel Avenue interchange. The Tier I Corridor TSM Alternative would include a northbound auxiliary lane between State Park Drive and Park Avenue.

## **Tier II Project**

### ***Tier II Auxiliary Lane Alternative***

One build alternative is evaluated for the Tier II Project: the Tier II Auxiliary Lane Alternative. This alternative would add an auxiliary lane to both the northbound and southbound directions of Route 1 between the 41st Avenue and Soquel Avenue/Drive interchanges. In addition, an Americans with Disabilities Act-compliant pedestrian and bicycle overcrossing would be constructed at Chanticleer Avenue. The total roadway widening would be approximately 1.4 miles along Route 1. The new auxiliary lanes would be 12 feet wide. In the southbound direction, the width needed for the new lane would be added in the median, and the median barrier would be shifted approximately 5 feet toward the northbound side of the freeway to make room for the new lane and a standard 10-foot wide shoulder. Where the new southbound lane meets the existing ramps, outside shoulder widening would occur to achieve standard 10-foot wide shoulders. In the northbound direction, the project proposes to pave a 10-foot-wide median shoulder and widen to the outside to add the 12-foot wide auxiliary lane and a new 10-foot wide shoulder.

The pedestrian/bicycle overcrossing constructed at Chanticleer Avenue would connect to a new 360-foot long by 6-foot wide sidewalk on Chanticleer Avenue on the south side of Route 1. The sidewalk, located along the south side of Soquel Drive, would be separated from the street by a 4-foot wide park strip. Retaining walls would be constructed as part of the roadway widening along Route 1, with a total of four separate walls: three on the north side of the roadway and one on the south side. One of the retaining walls would start after the 41st Avenue on-ramp and extend approximately 150 feet; two other retaining walls on the northbound side would be 375 feet and 408 feet. On the southbound side, a 350-foot-long wall would be constructed along the highway mainline and Soquel Avenue, over the Rodeo Creek Gulch culvert.

### **No Build Alternative**

The No Build Alternative offers a basis for comparing the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative in the future analysis year of 2035. Although the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative are separate projects, the assumptions regarding the No Build Alternative conditions are the same. Both assume no major construction on Route 1 through the Tier I corridor project limits or Tier II project limits other than currently planned and programmed improvements and continued routine maintenance. Planned and programmed improvements that are assumed in the No Build Alternative are the following, as contained in the 2014 Regional Transportation Plan:

- Installation of median barrier on Route 1 from Freedom Boulevard to Rio Del Mar Boulevard.
- Installation of a Class 1 bicycle and pedestrian facility on Morrissey Boulevard over Highway 1.
- Implementation of single interchange improvements at 41st Avenue and Bay Avenue/Porter Avenue as detailed and expensed in the Highway 1 HOV Project (RTC 24) as a standalone project, if the RTC project does not proceed.

The No Build Alternative also includes planned improvements to roadways and roadsides on Rio Del Mar Boulevard from Esplanade to Route 1, which includes the addition of bike lanes, transit turnouts, left-turn pockets, merge lanes, and intersection improvements. Road work includes major rehabilitation and maintenance of road and roadsides.

### 3.0 Review of Sections 3 (Offsite Hydraulics) and 4 (Onsite Roadway Drainage) of the Drainage Report

This Addendum focuses on reviewing Section 3, Offsite Hydraulics, and Section 4, Onsite Roadway Drainage, of the Drainage Report in order to clarify that all project activities will avoid impact to the upland habitat of the Santa Cruz long-toed salamander (SCLTS).

#### Tier I TSM Alternative

The modifications to the description of the Tier I TSM Alternative include the proposed elimination of the widening of some ramps and associated improvements at the Rio Del Mar Boulevard, Freedom Boulevard, and San Andreas Road interchanges to protect SCLTS upland habitat. During the environmental review of future Tier II projects, more detailed information would be available to determine whether there may be design approaches that could include the improvements at the three interchanges while achieving full avoidance of SCLTS upland habitat. The potential elimination of the widening of the ramps and the associated improvements at the three interchanges would not create additional drainage impacts and would not change the original assessment as described in the Drainage Report. If the elimination of the widening of the ramps and the associated improvements is found to be necessary to avoid impacts to the SCLTS upland habitat, there would be a reduction in added impervious surfaces that would otherwise occur with the widening of the ramps. This would reduce the need for on-site drainage systems in the avoidance areas.

#### HOV Lane Alternative

The modifications to the description of the Tier I HOV Lane Alternative include the proposed elimination of the widening of some ramps and associated improvements at the Rio Del Mar Boulevard, Freedom Boulevard, and San Andreas Road interchanges to protect SCLTS upland habitat. During the environmental review of future Tier II projects, more detailed information would be available to determine whether there may be design approaches that could include the improvements at the three interchanges while achieving full avoidance of SCLTS upland habitat. The potential elimination of the widening of the ramps and the associated improvements at the three interchanges would not create additional drainage impacts and would not change the original assessment as described in the Drainage Report. If the elimination of the widening of the ramps and the associated improvements is found to be necessary to avoid impacts to the SCLTS upland habitat, there would be a reduction in added impervious surfaces that would otherwise occur with the widening of the ramps. This would reduce the need for on-site drainage systems in the avoidance areas.

#### No Build Alternative and Tier II Auxiliary Lane Alternative

No changes have been made to the description of the No Build Alternative or the description of the Tier II Auxiliary Lane Alternative. Therefore, there are no changes in the findings of the Drainage Report with regard to these alternatives.

#### 4.0 Statement Regarding the Drainage Report Findings and Recommendations Relative to Changes in the Project Description

The potential elimination of the widening of the ramps and the associated improvements at the three interchanges would not create additional drainage impacts and would not change the original assessment as described in the Drainage Report. If the elimination of the widening of the ramps and the associated improvements is found to be necessary to avoid impacts to the SCLTS upland habitat, there would be a reduction in added impervious surfaces that would otherwise occur with the widening of the ramps. This would reduce the need for on-site drainage systems in the avoidance areas.

# ATTACHMENT 1

## **Updated Description of the Tier I Corridor Alternatives**

The following text supersedes the description of the Tier I Corridor HOV Lane Alternative and the Tier I Corridor TSM Alternative, included in the Drainage Report dated December 2013.

### ***Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives***

The Tier I HOV Lane and TSM Alternatives share many features, such as: the addition of auxiliary lanes, new pedestrian/bicycle overcrossings over Route 1, and Transportation Operations System elements. These common design features are described below.

#### *Auxiliary Lanes*

Auxiliary lanes are designed to reduce conflicts between traffic entering and exiting the highway by connecting the on-ramp of one interchange to the off-ramp of the next; they are not designed to serve through traffic. Auxiliary lanes would be constructed to improve merging operations at the locations listed below:

- Freedom Boulevard and Rio Del Mar Boulevard – northbound and southbound
- Rio Del Mar Boulevard and State Park Drive – northbound and southbound
- State Park Drive and Park Avenue – both directions in the TSM Alternative; southbound only in the HOV Lane Alternative
- Park Avenue and Bay Avenue/Porter Street – northbound and southbound
- 41st Avenue and Soquel Avenue/Drive – northbound and southbound

#### *New Pedestrian/Bicycle Overcrossings*

Both Tier I alternatives would construct new pedestrian/bicycle overcrossings of Route 1 at the following locations:

- Mar Vista Drive – A crossing of Route 1 is proposed at Mar Vista Drive in the unincorporated community of Aptos. A potential design approach is included in the Draft Environmental Document, in Appendices G, Tier I Corridor HOV Lane Alternative Plan Drawings and H, Tier I Corridor TSM Alternative Plan Drawings, which would include ramps with switchbacks on both sides of Route 1. Multiple configurations are possible, and the final design would be determined as part of the Tier II design/environmental analysis of this facility.
- Chanticleer Avenue – The crossing would start at the Chanticleer Avenue cul-de-sac on the north side of Route 1 and run parallel the highway for approximately 400 feet to the west and then cross Route 1 and Soquel Avenue (frontage road) on a curved alignment, terminating just west of Chanticleer Avenue on the south side of the highway and Soquel Avenue (frontage road).

- Trevethan Avenue – A potential design approach for the crossing at Trevethan Avenue is included in the Draft Environmental Document, in Appendices G, Tier I Corridor HOV Lane Alternative Plan Drawings and H, Tier I Corridor TSM Alternative Plan Drawings, which would cross Route 1 on an angle and continuing along the banks of the western tributary to Arana Gulch to terminate close to Harbor High School. However, multiple configurations are possible, and the final design would be determined as part of the subsequent Tier II design/environmental analysis of this facility.

#### *Other Common Features of the Tier I Corridor Alternatives*

The Tier I Corridor Alternatives would include reconstruction of the Santa Cruz Branch Rail Line bridges over Route 1 and the State Park Drive, Capitola Avenue, 41st Avenue, and Soquel Avenue overcrossings. The Santa Cruz Branch Line railroad underpass structures are proposed to be modified or replaced to accommodate highway widening to match the ultimate six-through-lane concept, including shoulder and sidewalk facilities to accommodate pedestrians and bicycles. These modifications will lower the highway profile to provide standard clearances. In addition the Aptos Creek Bridge would be widened.

Both build alternatives would include Transportation Operations System elements such as changeable message signs, closed-circuit television, microwave detection systems, and vehicle detection systems. In addition, ramp metering and HOV on-ramp bypass lanes with highway patrol enforcement areas would be constructed on the Route 1 ramps within the Tier I project limits; however, only the HOV Lane Alternative would include HOV lanes on the mainline.

Table 1-1 summarizes the major features of the Tier I Corridor Alternatives.

#### **Tier I Corridor HOV Lane Alternative**

The Tier I Corridor HOV Lane Alternative includes the following main components, which are discussed in detail below:

- Highway mainline to include northbound and southbound HOV lanes throughout the project limits;
- Auxiliary lanes;
- Highway interchange reconfigurations and improvements such as ramp metering, on-ramp HOV bypass lanes and California Highway Patrol enforcement areas, and stormwater drainage/treatment facilities;
- Construction of three pedestrian/bicycle overcrossings;
- Reconstruction of two Santa Cruz Branch Rail Line overcrossings in Aptos;
- Widening of the Aptos Creek Bridge;
- Replacement of the Capitola Avenue overcrossing;
- Retaining walls;
- Soundwalls; and
- Traffic signal coordination and other transportation operation system improvements.



**Table 1-1 Major Project Features Tier I Project Alternatives**

<b>Project Features</b>	<b>HOV Lane Alternative</b>	<b>TSM Alternative</b>	<b>No Build Alternative</b>
<b>Highway Mainline Changes</b>			
HOV lanes	X		
Lower highway profile at Santa Cruz Branch Line bridge crossings <sup>1</sup>	X	X	
<b>Auxiliary Lane Improvements</b>			
Northbound and southbound between Freedom Boulevard and Rio Del Mar Boulevard	X	X	
Northbound and southbound between Rio Del Mar Boulevard and State Park Drive	X	X	
Northbound between State Park Drive and Park Avenue		X	
Southbound between State Park Drive and Park Avenue	X	X	
Northbound and southbound between Park Avenue and Bay Avenue/Porter Street	X	X	
Northbound and southbound from 41st Avenue to Soquel Avenue/Drive	X	X	
<b>Highway Interchange Improvements</b>			
Reconfigure all nine interchanges within project limits	X		
Reconstruct State Park Drive, 41st Avenue, and Soquel overcrossings		X	
Ramp metering	X	X	
On-ramp HOV bypass lanes <sup>2</sup>	X	X	
On-ramp California Highway Patrol enforcement areas	X	X	
Stormwater drainage and treatment facilities	X	X	
<b>New Pedestrian/Bicycle Overcrossings</b>			
Mar Vista Drive Crossing	X	X	
Chanticleer Avenue Crossing	X	X	
Trevethan Avenue Crossing	X	X	
<b>Santa Cruz Branch Line Bridges Replacement</b>			
<b>Aptos Creek Bridge Widening</b>	X	X	
<b>Capitola Avenue Overcrossing Replacement</b>	X	X	
<b>Retaining Walls</b>	X	X	
<b>Soundwalls</b>	X	X	
<b>Traffic Signal Coordination</b>	X	X	X
<b>Transportation Operations System</b>	X	X	X
<b>Transit-Supportive Improvements</b>	X		
<sup>1</sup> Existing highway profile does not meet vertical clearance standards for railroad bridge crossings.  <sup>2</sup> At three interchanges (Rio Del Mar Boulevard, Freedom Boulevard and San Andreas Road) on-ramps and associated improvements such as local road improvements and retaining walls, will be included only if the proposed design fully avoids upland habitat for Santa Cruz long-toed salamander, as determined during environmental review of future Tier II projects.			

The Tier I Corridor HOV Lane Alternative would expand the existing four-lane highway to a six through-lane facility by adding HOV lanes in both the northbound and southbound directions. HOV lanes would be constructed entirely within the existing median where possible. In those areas where the median is not wide enough to accommodate additional lanes, widening would occur outside of the existing freeway footprint. In the southernmost 1.5 miles of the project limits, the HOV lane would be constructed inside the existing median. Extension of the median barrier south of its current terminus at Freedom Boulevard would be designed to provide for passage of Santa Cruz long-toed salamander individuals attempting to cross the highway. From approximately Freedom Boulevard to Soquel Drive, the existing median is not wide enough to accommodate an HOV lane, so the space needed for the additional lanes would be achieved through a combination of median conversion within existing right-of-way and acquisition of property adjacent to the freeway.

A mandatory standard median width (22 feet) set by Caltrans in its Highway Design Manual is proposed through most of the project corridor, north of Freedom Boulevard. The mandatory standard median width comprises two 10-foot-wide inside shoulders and a 2-foot-wide barrier. Where meeting the mandatory median width standard would result in acquiring property on the non-highway side of existing frontage roads, inside shoulder widths of 5 feet are proposed to reduce property requirements and impacts. Five feet is a nonstandard inside shoulder width for a Caltrans facility. This exception to shoulder-width design standards has received conceptual review in meetings between Caltrans and the project sponsor. All projects requiring design exceptions must ultimately be approved by Caltrans.

The Tier I Corridor HOV Lane Alternative would modify or reconstruct all nine interchanges within the project corridor to improve merging operations and ramp geometry by increasing the length of lanes for acceleration and deceleration, adding HOV bypass lanes and mixed-flow lanes to on-ramps, and improving sight distances. The Bay Avenue/Porter Street and 41st Avenue interchanges would be modified to operate as one interchange with frontage roads connecting the two interchanges. Where feasible, design deficiencies on existing ramps would be corrected to meet current design standards. Ramp metering and HOV bypass lanes would generally be provided on all Route 1 on-ramps; however, the design of interchanges at Rio Del Mar Boulevard, Freedom Boulevard, and San Andreas Road may exclude HOV bypass lanes on some on-ramps and associated improvements, such as retaining walls and improvements to local roads, if during environmental review of future Tier II documents, the elimination of these features is necessary to avoid impact to Santa Cruz long-toed salamander (SCLTS) upland habitat. During the environmental review of future Tier II projects, more detailed information would be available to determine whether there may be design approaches that could include the HOV bypass lanes while achieving full avoidance of SCLTS upland habitat.

This alternative would include auxiliary lanes between all interchange ramps (with the exception of a northbound auxiliary lane between State Park Drive and Park Avenue) and Transportation Operations System elements, such as changeable message signs, microwave detection systems, and vehicle detection systems. Bridge structures and the Capitola Avenue overcrossing would be modified or replaced to accommodate the HOV lanes. New and widened highway crossing structures would include shoulder and sidewalk facilities to accommodate pedestrians and bicycles. The HOV Lane Alternative would include three new pedestrian/bicycle overcrossings of Route 1. The two existing Santa Cruz Branch Line structures over Route 1 in Aptos would be replaced with longer bridges at the same elevation, and the highway profile would be lowered to achieve standard vertical clearance under the bridges to make room for the HOV and auxiliary lanes. In addition, this design configuration would reduce

environmental impacts. The existing Route 1 bridge over Aptos Creek would be widened on the outside to accommodate the HOV lanes in each direction. The existing Capitola Avenue overcrossing would be replaced with a longer structure.

Retaining walls would be constructed to minimize property acquisitions and reduce environmental impacts. At locations where frontage roads are adjacent to Route 1, concrete barriers would be constructed to separate the highway and frontage road.

*Changes to Highway Mainline with the Tier I Corridor HOV Lane Alternative*

- Route 1 would be expanded to allow for two standard-width (12-foot) mixed-flow lanes, one standard-width (12-foot) HOV lane, and standard-width outside (10-foot) shoulders in each direction.
- The proposed lanes would be constructed within the existing 45-foot median. In locations where the existing median width is less than 45 feet, widening would occur both in the median and at the outside, generally within the existing Route 1 right-of-way.
- Where auxiliary lanes are proposed, widening by approximately 12 feet outside of the existing highway footprint would occur.
- A mandatory standard median width of 22 feet is proposed through most of the corridor.
- The highway centerline would be shifted northward in the vicinity of the Santa Cruz Branch Line crossings in Aptos to reduce impacts to wetlands. The bridge over Aptos Creek would be widened to allow for four new lanes: two HOV, two auxiliary, and pedestrian/bicycle facilities.
- Route 1 would be lowered to obtain vertical clearance at the Santa Cruz Branch Line crossings in Aptos. A mandatory standard median width of 22 feet is proposed to minimize impact to the railroad bridge.
- At three locations, median and inside shoulder widths would be nonstandard to reduce impacts to adjacent streets. The three locations are: McGregor Drive, Cabrillo College Drive, and Kennedy Drive. At these three constrained locations, the inside shoulder in the constrained direction would be a nonstandard 5 feet, and the median would be a nonstandard 17 feet.

*Auxiliary Lane Improvements with the Tier I Corridor HOV Lane Alternative*

The auxiliary lane improvements are discussed above in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives.

*Interchange Improvements with the Tier I Corridor HOV Lane Alternative*

All nine interchanges within the project corridor would be modified under the Tier I Corridor HOV Lane Alternative, including overcrossing and undercrossing widening or replacement. These modifications would improve merging operations and ramp geometrics, and accessibility and safety for pedestrians and bicyclists. Major interchange improvements would include the following:

- Reconfiguration of intersections, including replacement or widening of highway overcrossings and undercrossings.
- Intersections of freeway ramps with local roads would be modified to shorten the pedestrian and bike crossing distances. Additionally, free right turns would be eliminated where feasible and traffic signals installed to improve traffic flow and slow vehicle traffic speeds through the bike and pedestrian crossing areas.
- Local roadways would be widened at the interchanges to accommodate the anticipated travel demand.
- Drainage and stormwater runoff treatment facilities would be provided.

Interchange improvements and design reconfigurations proposed for each interchange are listed in Table 1-2.

**Table 1-2: Interchange Improvements and Reconfigurations  
Tier I Corridor HOV Lane Alternative**

<b>Route 1 Interchange Location</b>	<b>Project Plan Sheet No.</b>	<b>Tier I Corridor HOV Lane Alternative Features</b> (Features shown in <b>bold</b> would be included only if the design fully avoids upland habitat for Santa Cruz long-toed salamander, as determined during future Tier II environmental review)
San Andreas / Larkin Valley Roads Interchange <sup>1</sup>	HOV-20	<b>The existing northbound cloverleaf off-ramp free right-turn onto Larkin Valley Road would be eliminated in favor of a signalized 90-degree intersection.</b>
		<b>A signalized intersection would be provided at the San Andreas Road ramps and the free right-turns would be eliminated.</b>
		<b>The existing northbound and southbound on-ramps would be widened to accommodate HOV bypass lanes.</b>
		<b>The southbound Route 1 bridge over San Andreas/Larkin Valley Road would be widened into the median to accommodate the HOV lanes.</b>
		<b>San Andreas/Larkin Valley Roads would be widened within the Tier I project limits to add turn lanes (including bridge widening).</b>
		<b>New sidewalks would be added along San Andreas/Larkin Valley Roads within the Tier I project limits.</b>
	HOV-18	<b>The existing ramp termini at Freedom Boulevard would be modified to provide less-skewed intersections with Freedom Boulevard. These</b>

<sup>1</sup> HOV bypass lanes at three interchanges (Rio Del Mar Boulevard, Freedom Boulevard and San Andreas Road) and associated improvements, such as retaining walls and improvements to local roads, will be included only if the proposed design fully avoids upland habitat for Santa Cruz long-toed salamander, as determined during environmental review of future Tier II projects.

**Table 1-2: Interchange Improvements and Reconfigurations  
Tier I Corridor HOV Lane Alternative**

Route 1 Interchange Location	Project Plan Sheet No.	Tier I Corridor HOV Lane Alternative Features (Features shown in <b>bold</b> would be included only if the design fully avoids upland habitat for Santa Cruz long-toed salamander, as determined during future Tier II environmental review)
Freedom Boulevard Interchange <sup>1</sup>		<b>intersections would be signalized, and free right-turns would be eliminated.</b>
		<b>The southbound off-ramp would be widened to two exit lanes.</b>
		The existing northbound on-ramp would be widened to accommodate HOV bypass lanes.
		<b>The existing southbound on-ramp would be widened to accommodate HOV bypass lanes.</b>
		<b>Freedom Boulevard would be widened within the Tier I project limits to add turn lanes.</b>
		<b>The Freedom Boulevard/Bonita Drive intersection would be enlarged to add turn lanes and achieve acceptable level of service.</b>
		<b>The Freedom Boulevard bridge would be replaced with a wider structure that would accommodate a new turn lane on Freedom Boulevard and the new HOV lanes on Route 1.</b>
		<b>New sidewalks would be added along Freedom Boulevard within the Tier I project limits.</b>
Rio Del Mar Boulevard Interchange <sup>1</sup>	HOV-16	The northbound on-ramp would be realigned to form the north leg of a four-way intersection with Rio Del Mar Boulevard and the northbound off-ramp. This intersection would be signalized and free right turns would be eliminated
		The northbound off-ramp would be widened to two exit lanes.
		<b>The southbound on-ramp would be widened to accommodate an HOV bypass lane.</b>
		The southbound off-ramp would be widened, the intersection with Rio Del Mar Boulevard signalized, and free right-turns eliminated.
		The existing northbound on-ramp would be widened to accommodate an HOV bypass lane.
		Soquel Drive would be shifted northward to accommodate the roadway widening along the northbound off-ramp.
		<b>Rio Del Mar Boulevard would be widened within the Tier I project limits to add turn lanes and a through lane in each direction.</b>

**Table 1-2: Interchange Improvements and Reconfigurations  
Tier I Corridor HOV Lane Alternative**

Route 1 Interchange Location	Project Plan Sheet No.	<b>Tier I Corridor HOV Lane Alternative Features</b> (Features shown in <b>bold</b> would be included only if the design fully avoids upland habitat for Santa Cruz long-toed salamander, as determined during future Tier II environmental review)
		<p>The Rio Del Mar Boulevard bridge over Route 1 would be replaced with a longer, wider bridge to accommodate a new turn lane and a through lane in each direction on Rio Del Mar Boulevard and the new HOV lanes on Route 1.</p> <p>Sidewalk would be added along eastbound Rio Del Mar Boulevard within the Tier I project limits; the sidewalk on westbound Rio Del Mar Boulevard would be retained.</p>
State Park Drive Interchange	HOV-13	<p>The existing northbound cloverleaf on-ramp free-right turn would be changed to a signalized right turn.</p> <p>The existing northbound off-ramp terminus would be modified to form, together with the realigned northbound on-ramp terminus, the south leg of a signalized intersection with State Park Drive.</p> <p>The northbound and southbound off-ramps would be widened to two exit lanes.</p> <p>The existing on-ramps would be widened to accommodate HOV bypass lanes.</p> <p>State Park Drive would be widened within the Tier I project limits to add turn lanes and a through lane in each direction.</p> <p>The State Park Drive bridge over Route 1 would be replaced with a longer, wider bridge to accommodate a new through-lane in each direction on State Park Drive and the new HOV lanes on Route 1.</p> <p>Sidewalk would be added along eastbound State Park Drive within the Tier I project limits; the sidewalk along westbound State Park Drive would be retained.</p>
Park Avenue Interchange	HOV-10	<p>The existing diamond interchange ramp design would be retained and ramps would be widened.</p> <p>The northbound and southbound off-ramps would be widened to two exit lanes.</p> <p>The existing on-ramps would be widened to accommodate HOV bypass lanes.</p> <p>Park Avenue would be widened within the Tier I project limits to add turn lanes.</p> <p>The two Route 1 bridges over Park Avenue would be replaced with one, wider structure to accommodate the new HOV lanes on Route 1.</p> <p>Sidewalk would be added within the Tier I project limits along westbound Park Avenue; the sidewalk along eastbound Park Avenue would be retained.</p>

**Table 1-2: Interchange Improvements and Reconfigurations  
Tier I Corridor HOV Lane Alternative**

Route 1 Interchange Location	Project Plan Sheet No.	<b>Tier I Corridor HOV Lane Alternative Features</b> (Features shown in <b>bold</b> would be included only if the design fully avoids upland habitat for Santa Cruz long-toed salamander, as determined during future Tier II environmental review)
Bay Avenue/ Porter Street and 41st Avenue Interchanges	HOV-7	Improvements at the Bay Avenue/Porter Street and 41st Avenue interchanges would be designed so that these two interchanges would work as a single interchange connected by a collector/frontage road running between the interchanges.
		The freeway ramps would be reconstructed to form less-skewed intersections with Bay Avenue/Porter Street.
		The existing southbound Route 1 off-ramp to Bay Avenue/Porter Street would be eliminated. Southbound traffic bound for Bay Avenue/Porter Street would exit at the 41st Avenue two-lane off-ramp and continue on a new southbound collector/frontage road to Bay Avenue/Porter Street.
		The existing two-lane on-ramp from Porter Street to northbound Route 1 would be modified to become a northbound collector/frontage road serving traffic bound for 41st Avenue or northbound Route 1.
		Northbound traffic exiting Route 1 would either bear right to intersect with Porter Street and continue north, or stay left and continue on a new structure over Porter Street, join the northbound collector/frontage road, and end at a new signalized intersection at 41st Avenue.
		At 41st Avenue, southbound on- and off-ramps would be eliminated and replaced with a diagonal off-ramp and a collector/frontage road serving traffic bound for Bay Avenue/Porter Street or southbound Route 1. The new ramp and collector/frontage road would form a signalized intersection with 41st Avenue.
		At 41st Avenue, the northbound on-ramps would be realigned.
		New on-ramps would include HOV bypass lanes.
		41st Avenue would be widened within the Tier I project limits to add turn lanes and eastbound through lanes over Route 1.
		Bay Avenue/Porter Street would be widened to add right-turn lanes at the on-ramps.
		A new bridge over Soquel Creek and Soquel Wharf Road would be constructed for the new southbound collector/frontage road from 41st Avenue to Bay Avenue/Porter Street.

**Table 1-2: Interchange Improvements and Reconfigurations  
Tier I Corridor HOV Lane Alternative**

Route 1 Interchange Location	Project Plan Sheet No.	<b>Tier I Corridor HOV Lane Alternative Features</b> (Features shown in <b>bold</b> would be included only if the design fully avoids upland habitat for Santa Cruz long-toed salamander, as determined during future Tier II environmental review)
Soquel Avenue/ Drive Interchange	HOV-3	The northbound off-ramp would be realigned to a signalized 90-degree intersection with Soquel Drive. The existing access to Commercial Way would be eliminated.
		The westbound Soquel Drive on-ramp to northbound Route 1 would be modified to eliminate the free right-turn access.
		The existing northbound loop on-ramp from eastbound Soquel Avenue would be realigned and its free-right terminus would become a signalized 90-degree intersection.
		A new, wider southbound diagonal off-ramp that adds turn lanes at its terminus and a new loop on-ramp would form the north leg of a signalized intersection at Soquel Avenue.
		The existing southbound hook on-ramp would be widened to add an HOV bypass lane and realigned to be made standard.
		The northbound and southbound off-ramps would be widened to two exit lanes.
		All new on-ramps would include HOV bypass lanes.
		Soquel Avenue within the Tier I project limits would be widened to add an eastbound through lane and turn lanes.
		Salisbury Lane would be shifted eastward to form an intersection with the realigned northbound off-ramp and loop on-ramp.
		The Soquel Drive bridge over Route 1 would be replaced with a longer, wider bridge to add an eastbound through lane and a turn lane to Soquel Drive and accommodate the new HOV lanes on Route 1.
		The culvert at Arana Gulch would be extended underneath the widened Route 1 and new southbound off-ramp.
Sidewalk would be added along eastbound Soquel Drive within the Tier I (and Tier) project limits; the sidewalk along westbound Soquel Drive would be retained.		
Morrissey Boulevard Interchange	HOV-1	The southbound exit would be realigned to terminate at a new signalized intersection with Morrissey Boulevard.
		The existing southbound on-ramp would be eliminated and replaced with a new, wider diagonal ramp with a signalized terminus.



**Table 1-2: Interchange Improvements and Reconfigurations  
Tier I Corridor HOV Lane Alternative**

Route 1 Interchange Location	Project Plan Sheet No.	<b>Tier I Corridor HOV Lane Alternative Features</b> (Features shown in <b>bold</b> would be included only if the design fully avoids upland habitat for Santa Cruz long-toed salamander, as determined during future Tier II environmental review)
		The existing southbound off- and on-ramp at Elk Street would be eliminated.
		The existing northbound loop on-ramp would be eliminated, as would access to Rooney Street from this northbound loop.
		The northbound off-ramp would be widened to two exit lanes.
		New on-ramps would include HOV bypass lanes.
		Morrissey Boulevard is being replaced with a wider bridge to add an eastbound through lane and turn lanes, and realigned to form a straight line between its intersections with Fairmont Avenue and Rooney Street.
		The Morrissey Boulevard bridge is being replaced with a longer, wider bridge to accommodate a new eastbound through lane and turn lanes on Morrissey Boulevard and new HOV lanes on Route 1.
		Sidewalk would be added along eastbound Morrissey Boulevard within the Tier I project limits; the sidewalk along westbound Morrissey Boulevard would be retained.
Transit- Related Facilities	N.A.	Both on-ramps and both off-ramps at the reconfigured Park Avenue interchange include options for bus pads and bus shelters.
		Ramps and collectors at the Bay Avenue/Porter Street and 41 Avenue interchanges include options for bus pads and shelters.

*Transit Supportive Planning and Design*

The Tier I Corridor HOV Lane Alternative would not preclude the development of the following features from being added in the future to facilitate freeway-oriented transit services and operations:

- The reconfigured Park Avenue and Bay Avenue/Porter Street/41st Avenue interchanges would allow for future bus pads and bus stop shelters to be constructed as part of a separate project.
- Future park-and-ride lots are under consideration by RTC at the Larkin Valley Road/San Andreas Road and 41st Avenue interchanges, to be coordinated with the bus facilities as part of a future project.

The aforementioned features are not part of the proposed project and would be subject to future environmental clearance. The proposed Tier I project is simply taking into consideration potential future transit projects as a collaborative planning effort.

### *New Pedestrian/Bicycle Overcrossings*

The proposed pedestrian/bicycle overcrossings are discussed above in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives.

### **Tier I Corridor TSM Alternative**

The Tier I Corridor TSM Alternative was formulated to provide Route 1 improvements that would partially address the purpose and need, and could be achieved at lower cost and with fewer impacts than the Tier I Corridor HOV Lane Alternative. TSM strategies typically consist of improvements that can benefit the operations of existing facilities without increasing the number of through lanes.

As discussed in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives, the Tier I Corridor TSM Alternative proposes to add auxiliary lanes, ramp metering and HOV on-ramp bypass lanes; improve existing nonstandard geometric elements at various ramps; and incorporate other TSM elements, such as changeable message signs, closed circuit television, microwave detection systems, and vehicle detection systems.). In short, the TSM Alternative shares many of the Tier I Corridor HOV Lane Alternative features, except HOV lanes would not be constructed along the mainline and the Soquel Drive interchange would be the only interchange reconfigured.

### *Auxiliary Lanes*

The majority of auxiliary lane improvements are discussed above under the heading, Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives. In addition, the TSM Alternative would have both a southbound and northbound auxiliary lane between State Park Drive and Park Avenue — improvements that are not included in the HOV Lane Alternative.

### *Interchange Improvements*

Improvements to interchanges proposed under the Tier I Corridor TSM Alternative include the following:

- The Soquel Avenue northbound off-ramp from Route 1 would be realigned and widened from one to two exit lanes for a distance of approximately 1,300 feet, widening to four lanes at its intersection with Soquel Drive. The northbound off-ramp/Commercial Way connection would be eliminated, and Commercial Way would become a cul-de-sac north of the realigned ramp. The intersection of the northbound off-ramp with Soquel Drive would be enlarged to achieve an acceptable level of service for the anticipated traffic volume.
- Improve existing nonstandard geometric elements at various ramps.
- Provide HOV bypass lanes on ramps other than the northbound Morrissey Boulevard on-ramps; bypass lanes on ramps at the San Andreas/Larkin Boulevard, Freedom Boulevard, and Rio del Mar Boulevard interchanges would not be constructed if Santa Cruz long-toed salamander upland habitat cannot be avoided.
- Add California Highway Patrol enforcement areas at on-ramps with HOV bypass lanes.

*New Pedestrian/Bicycle Overcrossings*

The proposed pedestrian/bicycle overcrossings are discussed above in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives.

*Other Improvements*

The details of the other improvements are included above, under the heading, Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives.