



Task 3

# Final Existing and Future Conditions Memo

April 30, 2020



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# Table of Contents

- 1. Executive summary ..... 9**
- 2. Introduction..... 12**
- 3. Existing Rail Lines and Rail Line Capacity Analysis ..... 16**
  - 3.1 Rail Lines in the Study Area..... 16
    - 3.1.1 Union Pacific Railroad Coast Line..... 16
    - 3.1.2 Santa Cruz Branch Line..... 17
    - 3.1.3 Monterey Branch Line..... 18
    - 3.1.4 Hollister Branch Line..... 19
    - 3.1.5 Santa Maria Valley Railroad..... 19
  - 3.2 Rail Line Capacity Analysis..... 19
    - 3.2.1 UP Coast Line ..... 19
    - 3.2.2 Santa Cruz Branch Line.....23
    - 3.2.3 Monterey Branch Line.....23
    - 3.2.4 Hollister Branch Line.....23
  - 3.3 Rail Operators in the Study Area.....23
    - 3.3.1 Union Pacific Railroad.....23
    - 3.3.2 Amtrak .....24
    - 3.3.3 Pacific Surfliner .....25
    - 3.3.4 Caltrain .....26
    - 3.3.5 Santa Maria Valley Railroad.....26
    - 3.3.6 Saint Paul & Pacific Railroad .....26
  - 3.4 Passenger Shared-Use Agreements.....26
  - 3.5 Freight Shared-Use Agreements.....27

**4. Existing Transit Operations..... 27**

4.1 Local Transit Services.....28

4.1.1 Monterey-Salinas Transit.....28

4.1.2 Santa Clara Valley Transportation Authority.....29

4.1.3 Santa Cruz Metropolitan Transit District .....29

4.1.4 San Benito County Express .....30

4.1.5 San Luis Obispo Regional Transit Authority.....30

4.1.6 San Luis Obispo Transit.....31

4.1.7 Intercity Buses/Shuttle Services .....31

4.2 Bike Network.....32

4.2.1 Regional Bike Network.....32

4.2.2 Bike Connections to Rail.....33

**5. Summary of Recent Studies And Plans ..... 35**

5.1 Around the Bay Rail Study, TAMC and RTC,1998 .....35

5.2 Coast Daylight Implementation Plan, CRCC, 2000 .....35

5.3 Caltrain Extension to Monterey County Passenger Rail Stations Project Study Report, TAMC, 2006.....36

5.4 Alternatives Analysis for the Monterey Peninsula Fixed Guideway Corridor Study, TAMC, 2011 .....36

5.5 Coast Daylight Service Development Plan, Caltrans, 2013.....37

5.6 Pacific Surfliner North Corridor Service Development Plan, Caltrans, 2013.....37

5.7 Santa Cruz Branch Rail Line Rail Transit Feasibility Study, RTC, 2015 .....38

5.8 Marina-Salinas Multimodal Corridor Plan, 2015 .....39

5.9 Coast Daylight Route, Service Ridership & Financial Evaluation, Amtrak, 2016.....39

5.10 San Benito Regional Transportation Plan, 2018 .....39

5.11 California State Rail Plan, Caltrans, 2018.....40



5.12 Monterey Bay Area Feasibility Study of Bus on Shoulder Operations on State Route 1 and the Monterey Branch Line, MST, 2018 ..... 41

5.13 Unified Corridor Investment Study, RTC, 2019 ..... 41

**6. Summary of Future Conditions ..... 42**

6.1 Monterey County Rail Extension Project..... 42

6.2 Monterey Peninsula Fixed Guideway..... 43

6.3 Coast Daylight..... 43

    6.3.1 Near-Term Improvements..... 43

    6.3.2 Long-Term Improvements ..... 44

6.4 Santa Cruz Branch Rail Line..... 45

6.5 California State Rail Plan, 2018 ..... 45

    6.5.1 2022 Rail Capital Projects:..... 45

    6.5.2 2027 Rail Capital Projects:..... 46

    6.5.3 2040 Rail Capital Projects:..... 46

**7. Opportunities to Reduce Highway Congestion ..... 46**

7.1 Highway Capacity..... 46

    7.1.1 Major North-South Highway Connections ..... 46

    7.1.2 Major East-West Highway Connections..... 47

    7.1.3 Other Highway Connections ..... 47

7.2 Highway Travel Demand ..... 48

    7.2.1 Major North-South Highway Connections ..... 48

    7.2.2 Major East-West Highway Connections..... 48

**8. Opportunities to Serve Underserved Communities ..... 50**

    8.1.1 Monterey County..... 50

    8.1.2 Santa Cruz County..... 50

<b>9. Environmental Resiliency and Threats to Existing and Planned Services .....</b>	<b>53</b>
9.1 State Climate Change Guidance and Resources .....	54
9.2 Climate Stressors .....	55
9.3 Climate Change Vulnerability Assessment .....	56
9.4 Other Studies .....	60
9.4.1 Central Coast Highway 1 Climate Resiliency Study - Elkhorn Slough .....	60
9.4.2 Caltrans Climate Change Vulnerability Assessment – District 5 .....	60
9.4.3 City of Monterey Sea Level Rise and Vulnerability Analyses, Existing Conditions and Issues Report, 2016.....	60
<b>10. Summary .....</b>	<b>61</b>
<b>Appendix A – MST System Map.....</b>	<b>62</b>
<b>Appendix B – Santa Cruz System Map .....</b>	<b>63</b>
<b>Appendix C – San Benito County Express System Map.....</b>	<b>64</b>
C.1 Intercounty Service.....	64
C.2 Fixed Route Services .....	65
<b>Appendix D – San Luis Obispo Regional Transit Authority System Map .....</b>	<b>66</b>
<b>Appendix E – Socioeconomic Data Sources Table .....</b>	<b>67</b>

## List of Tables

Table 1. UP Coast Line Capacity..... 22

Table 2. Summary of Climate Stressors ..... 55

Table 3. Summary of Transportation Infrastructure Exposure to Sea Level Rise Impacts..... 57

Table 4. Summary of Transportation Infrastructure Located in Areas Vulnerable to Wildfire Exposure 58

## List of Figures

Figure 1a. Study Area Extent – North ..... 13

Figure 2. Peak-Hour Average Travel Speed on Major Highways During a Peak Commute Period  
49

Figure 3a. Low Income and Disadvantaged Communities – Region North..... 51

## Acronyms and Abbreviations

AADT	Average Annual Daily Traffic
ACE	Altamont Corridor Express
ACS	U.S. Census Bureau’s American Community Survey
AMBAG	Association of Monterey Bay Area Governments
BUILD	Better Utilizing Investment to Leverage Development
CalSTA	California State Transportation Agency
Caltrans	California Department of Transportation
CPUC	California Public Utilities Commission
CRCC	Coast Rail Coordinating Council
CSUMB	California State University, Monterey Bay
EIR	Environmental Impact Report
DMU	Diesel Multiple Unit
FAST	Fixing America’s Surface Transportation
FEMA	Federal Emergency Management Agency
FORTAG	Fort Ord Regional Trail and Greenway
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FY	Fiscal Year
GHG	Greenhouse Gas Emissions

Final Existing and Future Conditions Memo

April 30, 2020

GIS	Geographic Information Systems
IPCC	Intergovernmental Panel on Climate Change
ITC	Intermodal Transit Center
LOSSAN	Los Angeles – San Diego – San Luis Obispo Rail Corridor
LPA	Locally Preferred Alternative
MP	Mile Post
MPO	Metropolitan Planning Organization
MST	Monterey Salinas Transit
MTC	Metropolitan Transportation Commission
NEPA	National Environmental Policy Act
PCJPB	Peninsula Corridor Joint Powers Board
PTC	Positive Train Control
ROW	Right of Way
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
SBCOG	Council of San Benito County Governments
RTC	Santa Cruz County Regional Transportation Commission
Metro	Santa Cruz Metropolitan Transit District
SDP	Service Development Plan
SFO	San Francisco International Airport
SJC	Used for both Norman Y. Mineta San Jose International Airport and San Jose Diridon Train Station
SLOCOG	San Luis Obispo Council of Governments
SLORTA	San Luis Obispo Regional Transit Authority
SMV	Santa Maria Valley Railroad
SR	State Route
TAMC	Transportation Agency for Monterey County
TDA	Transportation Development Act
TIRCP	Transit and Intercity Rail Capital Program
UP	Union Pacific Railroad
VTA	Santa Clara Valley Transportation Authority



# 1. EXECUTIVE SUMMARY

The Transportation Agency for Monterey County (TAMC), in coordination with other state and regional stakeholders, has led planning efforts for several decades to meet the goal of establishing increased passenger rail connections north to the San Francisco Bay Area and south to San Luis Obispo. These efforts have been confirmed and bolstered by Caltrans' 2018 California State Rail Plan (Rail Plan), which articulates a strategic vision and priorities for developing new regional rail service in Monterey County and on the Central Coast.

Building on the Rail Plan's vision, TAMC is developing a Network Integration Study of passenger rail in the Monterey Bay Area. As a first step toward planning for increased rail connectivity, TAMC performed a review of existing conditions in the study area, which is documented in this memo. The Existing and Future Conditions Memo provides a foundation upon which to build a plan for future service.

## Existing Rail Lines and Rail Line Capacity Analysis

Existing rail lines in the study area include:

- the **Union Pacific Railroad (UP) Coast Line**, connecting between Oakland and Las Positas through San Jose, Gilroy, Salinas, and San Luis Obispo. Freight traffic is limited to four to six trains a day; passenger services include Amtrak's Coast Starlight and Pacific Surfliners, as well as Caltrain commuter trains. The practical capacity of the line is up to 30 trains per day, given a 5,000-foot minimum siding length.
- the **Santa Cruz Branch Line**, connecting between the UP Coast Line at Pajaro, Santa Cruz and Davenport. Much of the line is out of service, but freight and tourist trains are operated on its active segments. The Line is owned by the Santa Cruz County Regional Transportation Commission. The capacity of the line is about four trains per day.
- the **Monterey Branch Line**, connecting between the UP Coast Line at Castroville and Monterey. The line has been dormant for over forty years and is has been owned by TAMC since 2003. Capacity is constrained by grade crossings with local roads.
- the **Hollister Branch Line** in San Benito County and the **Santa Maria Valley Railroad** in San Luis Obispo County host freight operations.

## Existing Transit Operations

The study area is served by six public transit services: **Santa Clara Valley Transportation Authority (VTA)**, **Monterey-Salinas Transit (MST)**, **Santa Cruz Metropolitan Transit District (Metro)**, **San Benito County Express**, **San Luis Obispo Regional Transit Authority (SLORTA)**, and **San Luis Obispo Transit**. While not a major service, the **Guadalupe Flyer** connects riders from Santa Maria and Guadalupe to the Guadalupe-Santa Maria Station. **Amtrak Thruway** service, **Greyhound Lines** and the **Monterey Airbus** provide intercity bus service in the study area as well.

Bike connections to rail and transit are provided to the Gilroy, Salinas and San Luis Obispo stations. A separated bike trail parallel to the Monterey Branch Line in Marina connects north to Castroville and south to Monterey. Bike networks are in place in Santa Cruz County and San Luis Obispo County.

## Summary of Recent Studies and Plans

Over a dozen studies and plans have been prepared over the past two decades to consider new rail and transit services in the study area, including:

- Additional long-distance service on the UP Coast Line was studied in the **Coast Daylight Implementation Plan** (2000), the **Coast Daylight Service Development Plan** (2013), the **Pacific Surfliner North Corridor Service Development Plan** (2013), and the **Coast Daylight Route, Service Ridership & Financial Evaluation** (2016).
- New service on the UP Coast Line connecting the San Francisco Bay Area to the Monterey Bay Area was studied in the **Around the Bay Rail Study** (1998) and the **Caltrain Extension to Monterey County Passenger Rail Stations Project Study Report** (2006).
- New rail service on the Monterey Branch Line and/or Santa Cruz Branch Line was studied in the **Around the Bay Rail Study** (1998), the **Alternatives Analysis for the Monterey Peninsula Fixed Guideway Corridor Study** (2011), the **Santa Cruz Branch Rail Line Rail Transit Feasibility Study** (2015), and the **Unified Corridor Investment Study** (2019).

The **California State Rail Plan** (2018) sets forth a vision for an integrated regional rail network reflecting all the above services. Other studies have considered rail service on the Hollister Branch Line as well as various bus transit and multimodal corridor plans.

## Summary of Future Conditions

Recent rail studies and plans call for future service and line improvements in the study area, including:

- Rehabilitation of the Salinas station and new hub stations at Castroville and Pajaro/Watsonville, a layover facility at Salinas, and track improvements between Gilroy and Salinas, as included in the Monterey County Rail Extension Project;
- A busway along the Monterey Branch Line to build ridership demand for future rail service in the corridor, which would require track reconstruction, new stations and replacement of the Salinas River bridge;
- Track and signal upgrades, grade crossing improvements, sidings and new stations on the UP Coast Line; and
- Track replacement, grade crossing upgrades and new stations to support rail service on the Santa Cruz Branch Line.

## Opportunities to Reduce Highway Congestion

The major north-south highway connections in the study area are State Route 1 between Santa Cruz and Monterey and US Route 101 between Gilroy and San Luis Obispo. Major east-west highway connections include SR 156 between Castroville, Prunedale, and San Juan Bautista; SR 68 between the Monterey Peninsula and Salinas; and SR 152 between Watsonville and Gilroy. Peak-hour congestion is most pronounced on SR 1 between Santa Cruz and Watsonville and on SR 68 between Monterey and Salinas.

## Opportunities to Serve Underserved Communities

In Monterey County, around 70 percent of the labor force works in the service, sales, and maintenance industries, which rely on trades and skills that often require the worker to be present at the workplace, indicating more necessary commuting. In Santa Cruz County, where this figure is 60 percent, the public transportation modal share is 2.8 percent, potentially indicating a high ridership capture rate if new transit services were implemented.

## Threats to Services from Climate Change and Sea Level Rise

A number of studies have been conducted by the State as well as the Association of Monterey Bay Area Governments (AMBAG) and the City of Monterey to enhance the understanding of climate change impacts in the study area. Climate stressors include sea level rise, temperature and precipitation. Portions of the UP Coast Line and Monterey Branch Line are threatened by sea level rise, which would increase the incidence of temporary storm flooding and daily tidal

inundation. In addition, portions of the UP Coast Line are exposed to moderate to high wildfire hazard, and are subject to impacts from extreme heat.

This Existing and Future Conditions memo provides a basis for understanding the existing conditions in the study area. This foundation is crucial for informing the demands, opportunities, and challenges for implementing additional passenger rail service and complementing transit service in the study area and will be integrated into the final Network Integration Study.

## 2. INTRODUCTION

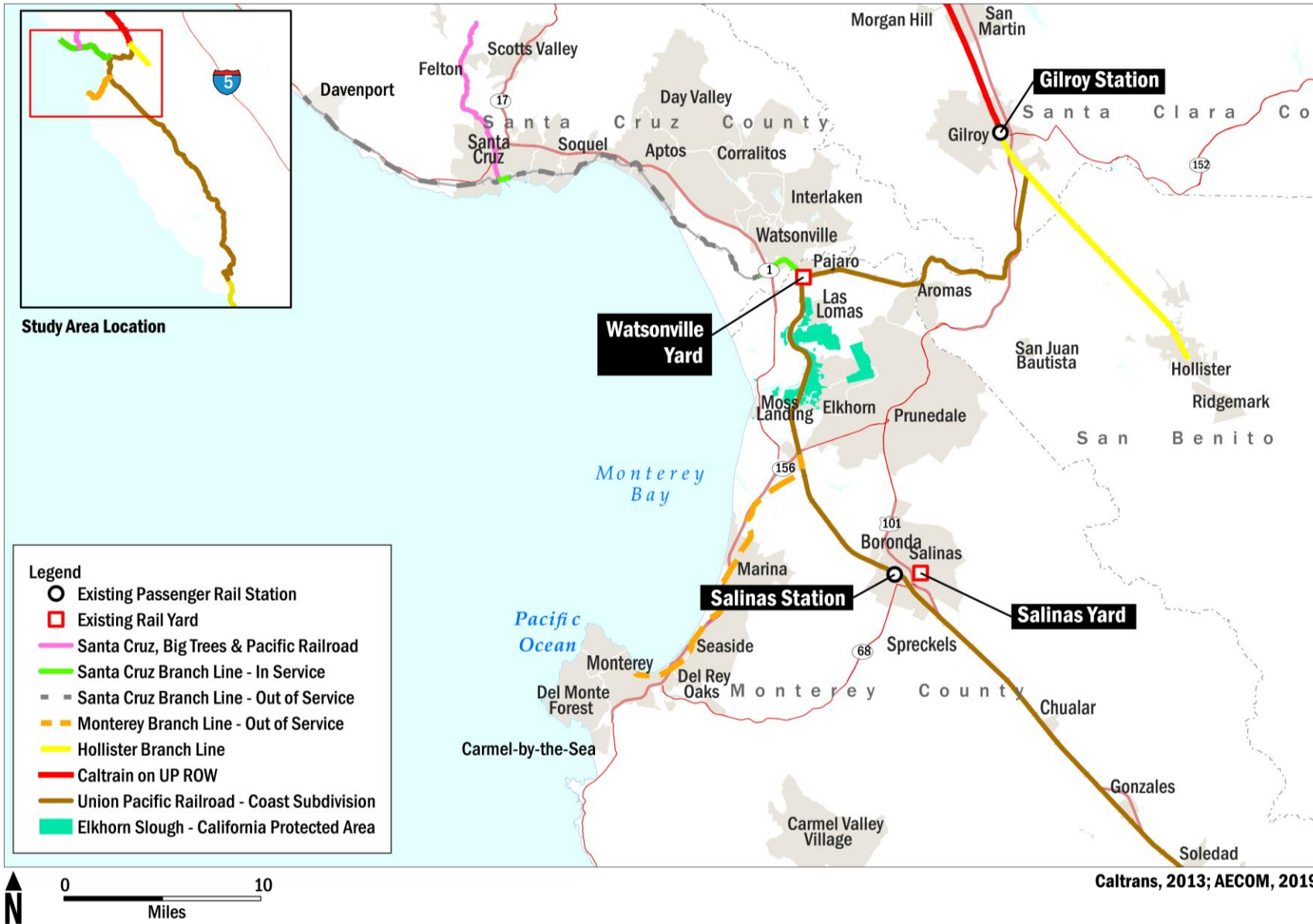
Following the vision set forth by Caltrans' 2018 California State Rail Plan (Rail Plan) for integrated passenger rail service throughout California, TAMC is developing a Network Integration Study for passenger rail in the Monterey Bay Area. TAMC was awarded a state Transit and Intercity Rail Capital Program (TIRCP) grant to complete the study, which will lay the groundwork for implementing the Rail Plan in the Monterey Bay Area, identifying potential service corridors and characteristics, governance, and infrastructure and equipment improvements that would be required for increased rail service in the study area (Gilroy to San Luis Obispo). The study area includes the corridors connecting Monterey County to Santa Clara County, San Benito County, Santa Cruz County, and San Luis Obispo County – all linked by the Union Pacific Railroad's (UP) Coast Line (see **Figure 1**).

As a first step toward planning for increased rail connectivity, TAMC performed a review of existing conditions in the study area. This Existing and Future Conditions Memo includes a catalog of existing rail lines and their current capacity; existing transit operations; previously completed transportation studies and plans; gaps in service and opportunities to serve underserved communities; and threats to existing and planned services from climate change and sea level rise. The Existing and Future Conditions Memo creates a foundation from which a plan for future service can be built. Below is a summary of the sections included in this report:

- **Existing Rail Lines and Rail Line Capacity Analysis** – Lists the existing rail services and infrastructure in the study area including an overview of the shared-use agreements held by passenger and freight railroads in the study area.
- **Existing Transit Operations** – Shows how people get around the region today using existing transit operators, routes, and service corridors in the study area, including rail and bus transit.
- **Summary of Recent Studies and Plans** – Catalogues existing transportation plans, service implementation plans, feasibility studies, and business plans related to rail and transit in the study area.



Figure 1a. Study Area Extent – North



**Figure 1b. Study Area Extent – Central**

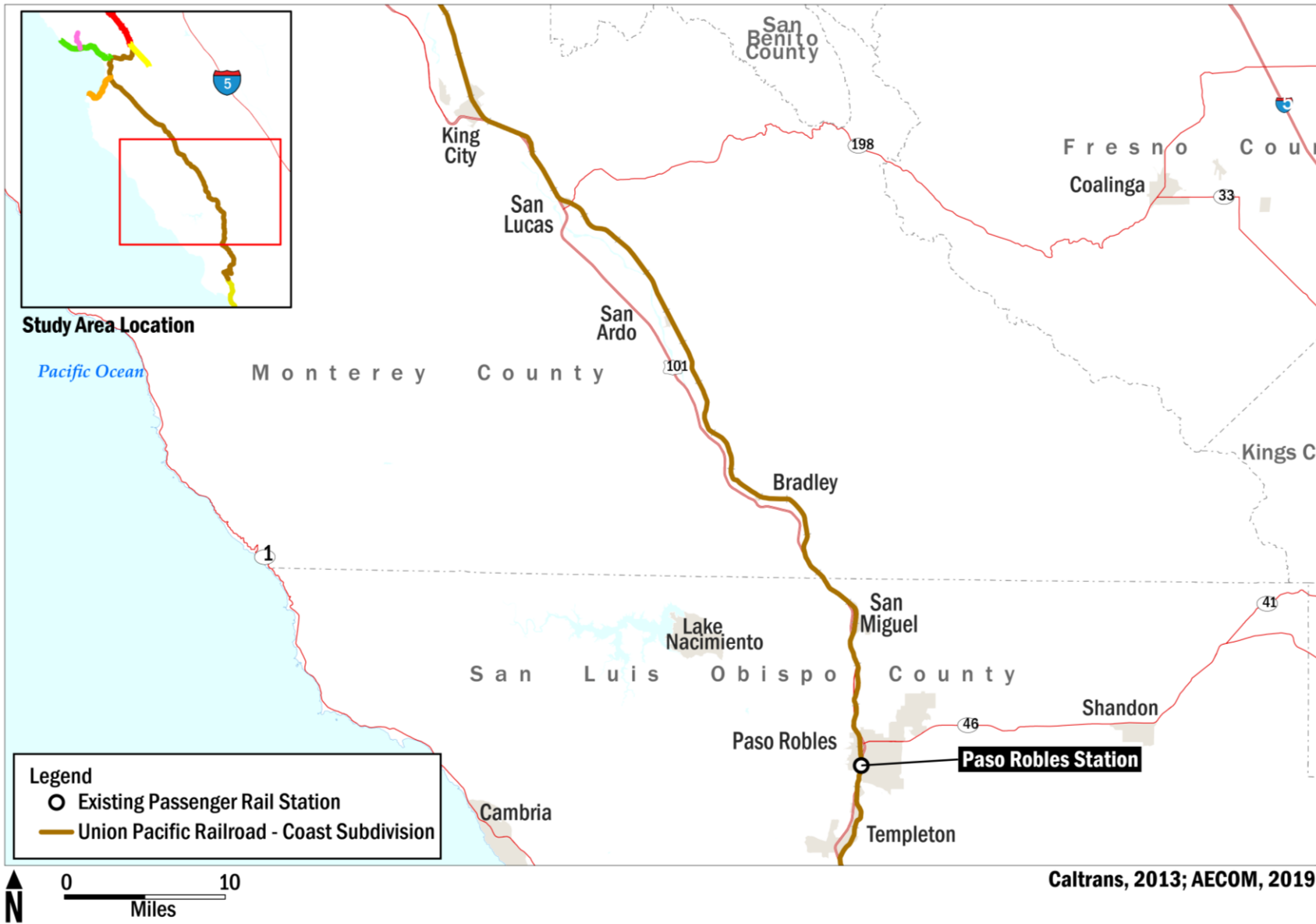
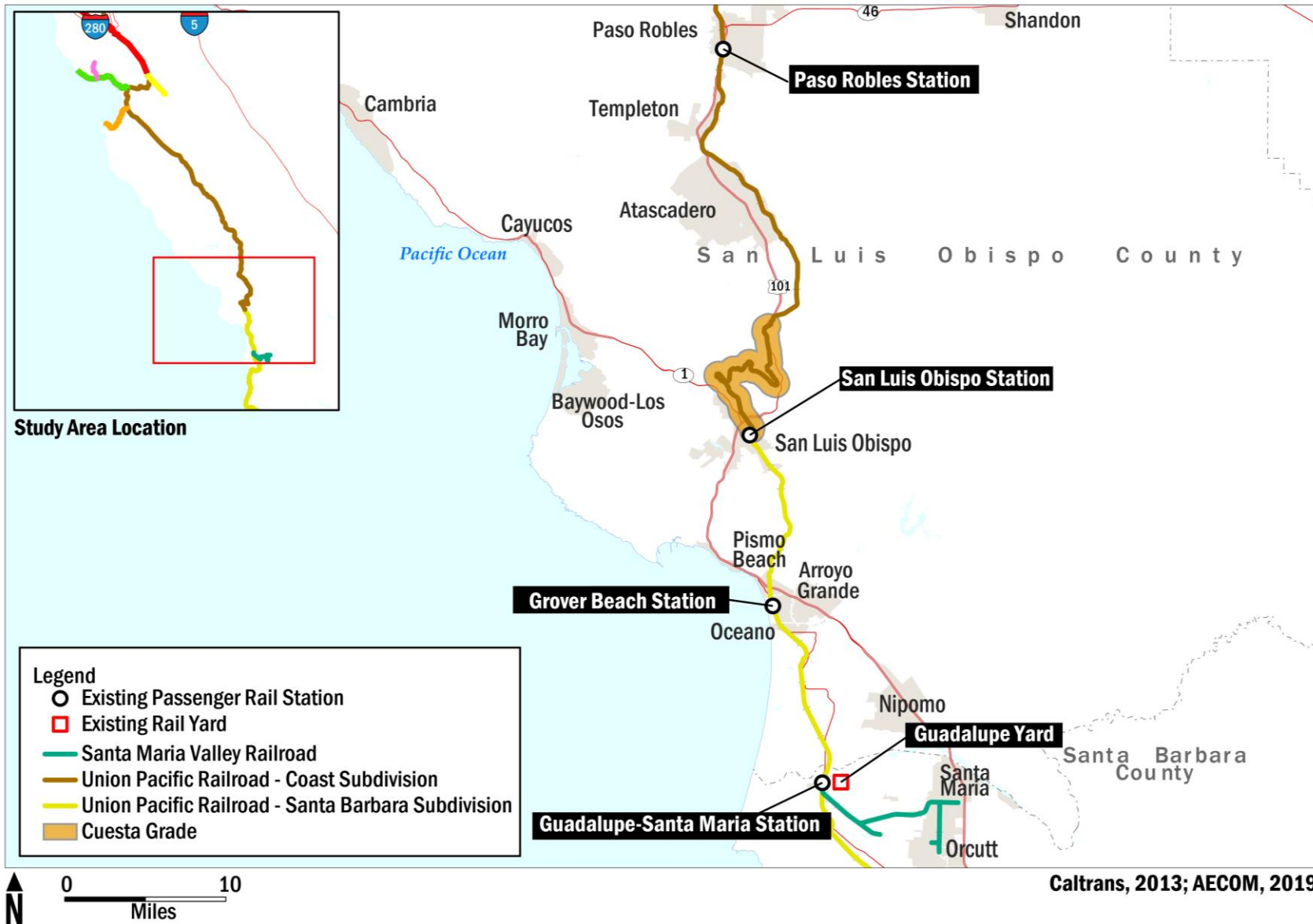




Figure 1c. Study Area Extent – South



- **Summary of Future Conditions** –Summarizes planned and proposed improvements to rail infrastructure and service operations as described in select recent studies and the capacity for current infrastructure to accommodate those plans.
- **Opportunities to Reduce Highway Congestion and Serve Underserved Communities** – Outlines the demographic and socioeconomic qualities of the study area.
- **Threats to Services from Climate Change and Sea Level Rise** – Explains the current expectations as to the influence of climate change and sea level rise on rail infrastructure in the region.

## 3. EXISTING RAIL LINES AND RAIL LINE CAPACITY ANALYSIS

### 3.1 Rail Lines in the Study Area

#### 3.1.1 Union Pacific Railroad Coast Line

In the study area, the UP Coast Line consists of two segments: the Coast Subdivision (Oakland-San Luis Obispo) and the Santa Barbara Subdivision (San Luis Obispo-Guadalupe-Las Positas). The Coast Line track configuration consists of single-track with passing sidings. It is operated by Centralized Traffic Control, Automatic Block Signals, or Track Warrant Control. Centralized Traffic Control utilizes a dispatcher in a remote location who controls trains along the line using wayside signals and radio commands. Automatic Block Signals automatically closes a block, or short line segment, to opposing trains with a red wayside signal once the train shunts the electric current run through the rail by entering the block. With Track Warrant Control, dispatchers give train engineers verbal permission to enter a block via radio. Positive Train Control (PTC), which is designed to automatically stop a train to avoid certain accidents related to human error, will soon be implemented on the Coast Line from Oakland to San Luis Obispo.

The highest maximum allowable speed on the Coast Line is 70 mph for passenger trains and 60 mph for freight trains. The slowest section of the main line is on Cuesta Grade, which climbs 1,200 feet at a 1.5 percent grade for 14.4 miles between San Luis Obispo and Cuesta Pass. Maximum allowable speeds on most of this grade are 25 mph for passenger trains and 20 mph for freight trains. The Chittenden Pass between Gilroy and Pajaro is another slow point in the corridor.



UP traffic in the study area is light, consisting of four to six trains a day through most of the study area, per data gathered for the *California State Rail Plan*. In addition, UP runs local trains south from the Bay Area and north from the Los Angeles area several times a week. Local trains from Warm Springs drop carloads off at Pajaro Yard near Watsonville for distribution on the Santa Cruz Branch Line, the Hollister Branch Line, in Salinas, and at shippers farther south in the Salinas Valley. Locals from Colton Yard east of Los Angeles work the Coast Line north of Los Angeles to Guadalupe. Larger UP facilities and shippers in the study include switching yards in Pajaro, Salinas, and Guadalupe.

In addition, the Coast Line hosts the daily Amtrak Coast Starlight long-distance trains from Los Angeles to Seattle, Pacific Surfliner trains from San Diego to San Luis Obispo, and Caltrain commuter trains from Gilroy to San Jose.

### 3.1.2 Santa Cruz Branch Line

The Santa Cruz Branch Line runs 31.9 miles between Pajaro (the junction with the UP Coast Line) and Davenport. UP served a cement plant in Davenport with carloads of coal inbound. However, the plant closed in 2010, ending the major source of rail freight traffic on the branch line.

UP sold the line to the Santa Cruz County Regional Transportation Commission in 2012. Following the sale, RTC hired Iowa Pacific Holdings to provide freight service as well as operate tourist trains on the line. Iowa Pacific Holdings created the Santa Cruz & Monterey Bay Railway to provide these services, but a storm in the winter of 2016-17 washed out the line at Mile Post 5 (MP 5), terminating freight and passenger service just west of Watsonville. RTC switched rail operators in mid-2018, and today the St. Paul & Pacific Railroad Company, a subsidiary of Progressive Rail, began to serve freight customers between Pajaro and MP 3 in Watsonville.

UP interchanges carloads with St. Paul & Pacific in UP's Watsonville Yard in Pajaro Monday through Friday at around 11:00 AM. The interchange ranges between two and 10 cars. Hauling about 100 cars nightly to Pajaro, a UP local based in Warm Springs delivers and picks up St. Paul & Pacific traffic at night, along with traffic for other UP locals serving shippers in Hollister and Salinas and further south in the Salinas Valley. These locals work out of the Watsonville Yard.

The line is out of service for approximately 17 miles between Watsonville at MP 3 and the Santa Cruz Boardwalk at MP 19.8. The Santa Cruz, Big Trees & Pacific Railway operates tourist trains for approximately one mile on the Branch Line between MP 19.8 and MP 20.7, its junction with the branch line. Santa Cruz, Big Trees & Pacific Railway tourist trains run between Felton in the Santa Cruz Mountains and the Santa Cruz Boardwalk during the

summer and other times during the year, such as at Halloween and Christmas. The line is out of service again for about 11 miles from MP 20.7 to Davenport at MP 31.9.

The portions of the line that remains in service is maintained to Federal Railroad Administration (FRA) Class 1 standards, with a maximum allowable speed of 10 mph for freight trains and 15 mph for passenger trains.

RTC reported that St. Paul & Pacific has been successful in interesting a former shipper near Watsonville to restart rail shipments. St. Paul & Pacific has plans for a transload facility (where freight can be transferred between railcars and trucks) in Watsonville. RTC indicated that St. Paul & Pacific plans to initiate a demonstration tourist passenger service between Santa Cruz and Capitola (MP 15.7) and in the longer term between Santa Cruz and Davenport.

Furthermore, RTC is implementing a recreational trail on portions of the branch line right-of-way. Roughly 40 percent, close to 13 miles, of the rail-with-trail (or "rail trail") project is now underway in segments north of Santa Cruz, on the west side of Santa Cruz, in Live Oak, and in Watsonville.

### **3.1.3 Monterey Branch Line**

The Monterey Branch Line stretches 15 miles between Castroville, the junction with the UP Coast Line, to downtown Monterey (Customs House Plaza). There are no rail operations on the line today. As freight and passenger rail traffic declined nationwide, service on the line was cut back. Passenger service ended in 1971, while freight services continued for another seven years until the branch was reduced to Seaside. Since 1978, the line has since been dormant. UP has removed the switch to the line in Castroville. TAMC purchased the line from UP in 2003 for \$9.3 million.

The Monterey Bay Coastal Trail has been built on the corridor between Customs House Plaza in Monterey and Canyon Del Ray Boulevard in Seaside. Tracks are still in place north of Canyon Del Ray Boulevard, though some businesses have encroachments over the rails. From Sand City to Castroville, the line is unencumbered, and the track is in place. The major structure on the line is the antiquated steel truss bridge spanning the Salinas River. A minor structure spans Tembladero Slough in Castroville.

TAMC has plans for restoring the line and implementing light rail service between Castroville and Customs House Plaza. The service would have 10 intermediate stops in Monterey, Seaside, Sand City, and Marina. TAMC is currently working with MST to implement a busway in the corridor between Marina and Monterey.

### 3.1.4 Hollister Branch Line

The Hollister Branch Line runs 12.5 miles between Carnadero, just south of Gilroy on the UP Coast Line, and Hollister. The maximum operating speed on the line is 10 mph. UP serves the line with a local based out of the Watsonville Yard in Pajaro. In 2013, UP sold the Hollister Branch to San Benito Rail LLC of Palo Alto. The potential for commuter rail service on the line was studied in the 2000 Business Plan, Hollister/Gilroy Caltrain Extension. The study was sponsored by the San Benito County Council of Governments (SBCOG). SBCOG is currently engaged in another study evaluating bus or rail on the corridor.

### 3.1.5 Santa Maria Valley Railroad

The Santa Maria Valley Railroad (SMV) is a private freight railroad system consisting of 14 miles of main line track. SMV interchanges with the UP in Guadalupe and serves Santa Maria and the Santa Maria Valley. All operations are west of US 101 in Santa Maria. SMV operates seven days a week.

## 3.2 Rail Line Capacity Analysis

In this section, the capacities of the various line segments in the study area are discussed. The segments are the UP Coast Line from Gilroy to Guadalupe, the Santa Cruz Branch Line, the Monterey Branch Line, and the Hollister Branch Line. Developing future service plans and implementation strategies depends on a sound understanding of existing traffic patterns, signal systems, and infrastructure. Quantifying capacity – particularly estimates of future capacity – depends on dynamic assumptions and variables including service patterns, operating rules, signal systems, rolling stock, and infrastructure. As such, the same physical infrastructure can and will have entirely different capacity, based on what assumptions are made about service patterns, train length, train speed, and rolling stock type. In determining future capacity need, those assumptions will be developed through the Monterey Bay Area Network Integration Study process and its Network Advisory Committee.

### 3.2.1 UP Coast Line

This summary presents a high-level overview of current rail operations and capacity constraints between Gilroy and Guadalupe on the UP Coast Line.

#### Coast Line Details

The Coast Line corridor under study is the approximately 196-mile section between Gilroy in the north and Guadalupe in the south. The corridor is largely single-tracked, with intermittent

sidings and yard facilities that allow trains to pass safely. Signal systems mostly include dispatcher-controlled Centralized Traffic Control or Automatic Block Signals.

There are 15 passing sidings in the study area longer than 5,000 feet, and seven sidings longer than 8,000 feet. There is an extended 88-mile section between Soledad and Santa Margarita that lacks sidings longer than 8,000 feet long. There are several other such segments. These segments can only be traversed by a single 6,000-foot-long train until it passes an opposing train waiting on a siding. This paucity of long sidings is a critical constraint to overall capacity and flexibility in train operations.

### Existing Freight Train Traffic

There are four to six freight trains operating per day on the Coast Line through most of the study area. These trains consist of longer through trains operating between the Bay Area and Los Angeles and shorter local trains. Train volume is slightly higher between San Jose, Gilroy, Watsonville, and Salinas due to local freight trains operating to and from the Watsonville Yard in Pajaro.

### Existing Passenger Train Traffic

The Coast Line is served by a single daily round trip passenger train, the Coast Starlight, connecting Seattle and Los Angeles as part of Amtrak's long-distance network. The train's schedule is 36 hours end-to-end. Traveling the study area between Gilroy and Guadalupe takes approximately 5 hours. Coast Starlight trains are typically 1,000 to 1,200 feet long, depending on the consist, which varies throughout the year. Not included in the following analysis are three Caltrain commuter train round trips between Gilroy and San Jose on weekdays, as this analysis is focused on Gilroy south.

### One-Way Grid Time Analysis

The National Highway Research Program Report 773, *Capacity Modeling Guidebook for Share-Use Passenger and Freight Rail Operations* provides a process for estimating capacity of rail corridors based on physical track infrastructure and length of sidings<sup>1</sup>. The process is known as one-way grid time analysis and provides a high-level methodology for assessing line capacity, that is, how many trains can use the line within a 24-hour period. Theoretical capacity, as opposed to practical capacity, describes the number of trains, under a given set of operating assumptions, that can utilize a rail line in a given day under ideal conditions. Practical capacity is a subset of theoretical capacity, where real-world conditions (track condition, switch operations, dispatching, weather, track maintenance, etc.) are assumed to limit track capacity below the theoretical capacity limit.

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<sup>1</sup> [Capacity Modeling Guidebook for Shared-Use Passenger and Freight Rail Operations](#)

Performing the grid time analysis of a single-track line segment used by opposing trains requires several sequential steps, based on schematic measurements of track infrastructure:

- Measure overall length of the corridor
- Identify sidings, stations, and yards that can allow for safe passings of trains
- Measure the length of the passing locations to determine maximum train lengths that can safely use the facilities and allow other trains to pass
- Measure the distance between passing opportunities (segments)
- Apply an average speed (30 mph) to estimate travel time across individual segments

From this exercise, it is possible to know (a) the number and length of sidings, (b) the number and length of single-track segments, and (c) the average time it takes for a train to traverse each segment between appropriately long sidings. By doubling the time to traverse each segment (estimating the minimum time it would take for two trains travelling in opposing directions to cross the segment), the one-way grid time can be established. Dividing a 24-hour day by the one-way grid time for each segment establishes the number of cycles each segment can handle in a given day. The number of cycles is then multiplied by two for an estimate of the theoretical train capacity of each segment, i.e. two opposing trains per cycle. Finally, applying an efficiency multiplier (for example, between 50 percent and 75 percent based on local conditions and track maintenance) to the theoretical capacity will provide an estimate for the practical capacity of each segment. The overall capacity of the corridor is defined by the most constrained segment.

For example, a 15-mile segment would take 30 minutes for a single train to traverse. That results in a 60-minute cycle time for two opposing trains to clear the segment. In a 24-hour day, that results 24 cycles per day, enough for 48 trains (24 round trips) to be able to pass through the segment under theoretical capacity. Applying a multiplier of 75 percent to this segment would reduce the practical capacity to 36 trains (18 round trips) under more realistic conditions.

Utilizing the Caltrans track schematics for the Coast Line and measuring the lengths of sidings and the distances in between them, it is possible to perform a grid time analysis in the study area. Capacity depends on several assumptions, most notably for this analysis is the minimum length of sidings that can be assumed to safely hold trains for passing traffic. The analysis was performed assuming both 5,000-foot and 8,000-foot as minimum siding lengths. The longer siding length was chosen specifically based on accommodating train lengths of approximately

6,000 feet, per estimates provided in the Union Pacific Corporation 2018 Investor Fact Book<sup>2</sup>. That noted, UP runs shorter local trains on the corridor, and the *Coast Starlight* is shorter still.

As a single-track corridor, the Coast Line is constrained by the longest segment between longer, 8,000-foot sidings, i.e. the segment between Soledad and Santa Margarita.

The results are noted below and shown in **Table 1**.

- The 8,000-foot assumption greatly restricts corridor capacity, to as few as six trains per day.
- A 5,000-foot assumption allows for somewhat more capacity, up to 30 trains per day through the corridor.

This analysis is in line with the currently observed operations in the study area of four to six trains per day, according to the 2018 *California State Rail Plan*.

**Table 1. UP Coast Line Capacity**

Assumptions	Minimum Siding	Limiting Segments	Practical Capacity (75%)
<ul style="list-style-type: none"> <li>• Alternating bi-directional service</li> <li>• Conventional rolling stock</li> <li>• 30 mph average speed</li> <li>• Static assumptions for signaling and infrastructure</li> <li>• Practical capacity at 75 percent of theoretical capacity</li> </ul>	5,000'	~35-mile section (Soledad - San Ardo)	30 trains per day
	8,000'	~88-mile section (Soledad - Santa Margarita)	6 trains per day

**Constraints**

The 88-mile section from Soledad to Santa Margarita is the longest single-track section in the corridor without an 8,000-foot siding to allow for passing of longer trains. In effect, this segment becomes the critical limiting factor for the entire corridor. The segment has enough capacity for current needs, but it would need capacity enhancements (new sidings, extended sidings, or long sections of double track) to accommodate significant future expansion of service of passenger or freight trains.

<sup>2</sup> [Union Pacific Corporation 2018 Investor Fact Book](#)

### 3.2.2 Santa Cruz Branch Line

The branch line runs nearly 32 miles between Watsonville Junction in Pajaro to Davenport. The line is single tracked with no passing sidings, and the maximum allowable speed is 10 mph. The time to run from one end of the line to the other would require just over three hours. The line's capacity is limited by the lack of sidings; a train cannot enter the line until an opposing train leaves the line. Accordingly, the capacity of the line is about four trains per day (two trains in each direction), assuming all trains run from end-to-end and the line is out of service 12 hours a day for maintenance purposes.

### 3.2.3 Monterey Branch Line

The branch line has been dormant since the 1970's and is in public ownership as TAMC bought it from UP in 2003. The right-of-way stretches 15 miles from Customs House Plaza in Monterey to the junction with the Coast Line in Castroville. The line has largely been paved over with a recreational trail between Monterey and Seaside. North of that point, the track is still in place, though in deteriorated condition. Capacity on the largely single-tracked line is constrained at the points of intersection with local roads.

### 3.2.4 Hollister Branch Line

The Hollister Branch Line is a 12.5-mile long single track with no sidings, running from the junction with the UP Coast Line at Carnadero to end of track in Hollister. There is no signalization on the line and train movements are controlled with dispatcher instructions via radio. The maximum operating speed is 10 mph.

There is one shipper on the north end of the line at Bolsa. The line is served by UP on weekdays by about one train per day. The Hollister Local begins and ends its run to the Hollister Branch from the Watsonville Yard in Pajaro. The line's capacity is consumed once that local enters the branch. No other trains can work the line while the local is delivering and picking up carloads on the line.

## 3.3 Rail Operators in the Study Area

Discussed below are the freight and passenger operators on the UP Coast Line, the Santa Cruz Branch Line, the Hollister Branch Line, and the Monterey Branch Line.

### 3.3.1 Union Pacific Railroad

UP is the largest railroad company in the United States, operating over 32,100 route miles. UP owns the Coast Line, the mainline that runs 196 miles between Gilroy and Guadalupe, and

beyond to the north of Gilroy and to the south of Guadalupe. The proposed extension of Caltrain service from Gilroy to Salinas and the implementation of the proposed Coast Daylight corridor service between Los Angeles and San Francisco would use the Coast Line. UP provides local service on the Hollister Branch line, and interchanges rail traffic with the St. Paul & Pacific Railroad in Pajaro (Watsonville Junction) and the Santa Maria Valley Railroad in Guadalupe.

### 3.3.2 Amtrak

Amtrak operates the long-distance Coast Starlight intercity service on the Coast Line through the study area. The Coast Starlight operates one round trip daily between Seattle, Oakland, and Los Angeles. The train has three stops in the study area: Salinas, Paso Robles, and San Luis Obispo. Amtrak is owned by the federal government but is operated as a private enterprise.

#### Salinas Station

The Salinas Station is located in downtown Salinas, one block north of Market Street and adjacent to UP's Salinas Yard. Dating back to 1942, the station depot is owned by the city of Salinas and was renovated in 2014. UP owns the platform and track. Same-day and overnight parking is available. Baggage handling and ticketing services are available during opening hours, between 10:00 AM and 2:00 PM for southbound trains and again between 3:00 PM and 8:00 PM for northbound trains. The station is wheelchair accessible, with no barrier between station and train. Greyhound and Amtrak Thruway buses provide connecting bus service.



#### Paso Robles Station

The Paso Robles Transportation Center is located just south of downtown Paso Robles. The center was built in 1998, next to the original restored depot which now houses small retail shops. The center includes space for Amtrak, intercity buses, car rental agencies and local and regional buses. The depot is owned by the city of Paso Robles, and the platform and track are owned by UP. Both same-day and overnight parking are available. The station is unstaffed but is wheelchair accessible, with no barrier between station and train. MST and SLORTA provide connecting bus service.





### San Luis Obispo Station

Built in 1941, the San Luis Obispo Station hosts both Amtrak's long-distance Coast Starlight and Pacific Surfliner corridor trains. The entire facility, including depot, platform, and tracks, are owned by UP. Same-day and overnight parking is available. Baggage handling and ticketing services are available during opening hours, between 5:45 AM and 9:00 PM. The station is wheelchair accessible, with no barrier between station and train. SLO Transit and Amtrak Thruway buses provide connecting bus service. Evening Pacific Surfliner trains overnight at the station.



### 3.3.3 Pacific Surfliner

The Pacific Surfliner trains, sponsored by the Los Angeles – San Diego – San Luis Obispo Rail Corridor (LOSSAN) Rail Corridor Agency, run between San Luis Obispo, Santa Barbara, Los Angeles, and San Diego. Two round trips are offered each day in the study area. These trains use the Coast Line between San Luis Obispo and Los Angeles. The trains stop at three stations in the study area: San Luis Obispo, Grover Beach, and Guadalupe-Santa Maria. Supplementing the trains are Amtrak Thruway buses, stopping at San Luis Obispo and Grover Beach and connecting to other Pacific Surfliner trains at Santa Barbara.

### Grover Beach Station

Sited on West Grand Avenue, the Grover Beach Station is located west of downtown Grover Beach and just east of Pismo State Beach. The depot is owned by the city of Grover Beach, and the platform and track are owned by UP. Same-day and overnight parking is available. The station is unstaffed, but is wheelchair accessible, with no barrier between station and train. South County Transit and Amtrak Thruway buses provide connecting bus service.



### Guadalupe-Santa Maria Station

Serving both Guadalupe and nearby Santa Maria to the east, the station is located just to the southeast of historic downtown Guadalupe. The depot, platform, and track are owned by UP. Both same-day and overnight parking are available. The station is unstaffed, but is wheelchair accessible, with no barrier between station and train. The Guadalupe Flyer provides connecting bus service between Guadalupe and Santa Maria on an on-demand basis.



### 3.3.4 Caltrain

Caltrain, operated by the Peninsula Corridor Joint Powers Board (PCJPB), runs three round trips between Gilroy, San Jose, and San Francisco on weekdays. There is no Caltrain service at Gilroy on weekends and holidays. The trains overnight at Gilroy, which has three layover tracks at the station.

#### Gilroy Station

The Gilroy Station is located on the east side of historic downtown Gilroy, adjacent to the Coast Line between West 7th Street and West 10th Street. The station offers 471 free parking spaces and 13 bike racks, as well as 30 bike lockers provided by VTA. Intercity buses serve the station, as well as three transit services: VTA, San Benito County Express, and MST Route 55, operating between Monterey, Gilroy, and San Jose.



### 3.3.5 Santa Maria Valley Railroad

SMV interchanges railcars four times a week with UP at the Guadalupe Yard. SMV has no other operations touching the Coast Line.

### 3.3.6 Saint Paul & Pacific Railroad

St. Paul & Pacific switches cars between Santa Cruz Branch Line shippers in Pajaro and Watsonville and the UP's Watsonville Yard in Pajaro. St. Paul & Pacific has no other operations touching the Coast Line.

## 3.4 Passenger Shared-Use Agreements

Formally known as the National Rail Passenger Corporation, Amtrak was organized to operate intercity passenger rail service in the United States. The National Rail Passengers Act of 1970 relieved most freight railroads from their obligations to provide intercity passenger rail service. That obligation fell to Amtrak, which began operating a nationwide rail passenger system on May 1, 1971. In exchange for giving up unprofitable passenger rail services to Amtrak, freight railroads were required to allow Amtrak to operate intercity trains on their lines.

Today Amtrak operates on UP mainlines, other major freight railroads, some short line freight railroads, and on commuter railroads. The Amtrak route in the study area is the Coast Starlight, which operates between Los Angeles and Seattle and through the Central Coast, stopping at San Luis Obispo, Paso Robles, and Salinas on the UP Coast Line.

While Amtrak's shared use of the Coast Line is ensured by federal statute, railroads are free to grant shared-use agreements, sometimes called trackage rights, to other operators, both freight and passenger. The former Southern Pacific Railroad, which built and owned the Coast Line until its acquisition by UP in 1996, granted the State of California the right to operate one corridor round trip on the Coast Line to and from San Luis Obispo in 1995. Today that service consists of two daily Pacific Surfliner round trips to and from San Luis Obispo, which are managed by the LOSSAN Rail Corridor Agency.

In 1992, Southern Pacific Railroad granted the Peninsula Corridor Joint Powers Board the right to run five Caltrain commuter rail round trips between San Jose and Gilroy on weekdays. Today, the service level includes three round trips.

The Santa Cruz, Big Trees and Pacific Railroad has a right to run tourist trains on the Santa Cruz Branch Line between MP 20.7 and MP 19.8, traveling to the Santa Cruz Beach Boardwalk from Felton in the Santa Cruz Mountains.

### 3.5 Freight Shared-Use Agreements

UP has agreed to allow two short line freight railroads to access its facilities in the study area. The St. Paul & Pacific Railroad, which is the contract operator for freight service on the Santa Cruz Branch, is permitted to pick up and deliver railcars at UP's Watsonville Yard in Pajaro. The Santa Maria Valley Railroad is permitted to pick up and deliver railcars at UP's Guadalupe Yard. UP has a right to pick up and deliver freight cars on the Hollister Branch Line, which is owned by San Benito Rail LLC.

## 4. EXISTING TRANSIT OPERATIONS

This section outlines existing transit operations in the study area, spanning the southern portion of Santa Clara County (Gilroy), Santa Cruz County, San Benito County, Monterey County, and San Luis Obispo County. The Guadalupe-Santa Maria Station lies just inside the Santa Barbara County Line.

The study area is served by six public transit services: Santa Clara Valley Transportation Authority (VTA), Monterey-Salinas Transit (MST), Santa Cruz Metropolitan Transit District (Metro), San Benito County Express, San Luis Obispo Regional Transit Authority (SLORTA), and San Luis Obispo Transit. While not a major service, the Guadalupe Flyer connects riders from Santa Maria and Guadalupe to the Guadalupe-Santa Maria Station. Amtrak Thruway service, Greyhound Lines and the Monterey Airbus provide intercity bus service in the study area.

These bus services offer connections for rail passenger services along the Coast Corridor.

## 4.1 Local Transit Services

### 4.1.1 Monterey-Salinas Transit

The primary transit service provider in Monterey County is Monterey-Salinas Transit. MST serves the Monterey Peninsula (Monterey, Carmel, and surrounding communities), as well as inland portions of the county (Salinas, Soledad, and King City). Several routes continue beyond county lines, providing connections that extend to Santa Cruz along SR 1, Gilroy and San Jose via US 101 north, and Paso Robles and Templeton via US 101 South. **Appendix A** includes a detailed map of MST operations.

#### Ridership

MST had a systemwide ridership of 425,636 total ridership for FY 2018<sup>3</sup> at a rate of 16.36 passengers per revenue hour.

#### Existing Operations

MST has four main route types: local, primary, regional, and commuter. Key regional routes with existing or potential future rail connections include the following:

- Lines 27 (Watsonville – Marina), 28 (Watsonville – Salinas), and 29 (Watsonville – Prunedale – Salinas) connect to Santa Cruz Metro, which serves Santa Cruz County, at Watsonville Transit Center. These lines might also serve the future Pajaro/Watsonville multimodal transit hub.
- Line 55 (commuter) connects to Caltrain and VTA buses at the Gilroy Transit Center / Gilroy Caltrain Station and at San Jose (Diridon) Caltrain Station. Diridon Station is a rail hub for Caltrain, Altamont Corridor Express (ACE), Amtrak, the Capitol Corridor, and Santa Clara Valley Transportation Authority (VTA) light rail. It is served by Greyhound and other regional/intercity bus services.
- Line 78 (Presidio – Santa Cruz) runs from Monterey to the Santa Cruz Metro Center, where riders can connect to Santa Cruz Metro service and Greyhound service today, and in the future might connect to service on the Santa Cruz Branch Line.
- Line 85 (Fort Hunter Liggett – Templeton) connects Fort Hunter Liggett and Camp Roberts in Monterey County with San Miguel, Paso Robles and Templeton along the US

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<sup>3</sup> [MST Board Stats FY 2018](#)

101 corridor in San Luis Obispo County. The stop at the North County Transportation Center serves the Paso Robles train station.

- Line 86 (San Jose – King City) runs from King City at 1st Street and Pearl Street (adjacent to the Coast Line) to San Jose International Airport. In the future, this bus line might also serve the King City train station.

The Salinas Transit Center is the primary transit hub that connects Monterey County with the state rail network. The Salinas Transit Center is located at the intersection of Salinas Street and Center Street, approximately five minutes (walking distance) from the Salinas train station. The train station is served by Greyhound, and MST will provide timed bus connections once passenger rail service is increased at the station. Sixteen regional and local MST routes serve the Salinas Transit Center.

#### 4.1.2 Santa Clara Valley Transportation Authority

The Santa Clara Valley Transportation Authority (VTA) serves Santa Clara County. For the purposes of this report this analysis will focus on VTA's operations serving the Gilroy Transit Center/Caltrain station. VTA runs eight regional and local routes that connect with the Gilroy Transit Center.

#### 4.1.3 Santa Cruz Metropolitan Transit District

The Santa Cruz Metropolitan District (Metro), serves Santa Cruz County. **Appendix B** shows a regional system map for Metro. Metro connects to MST service at the Watsonville Transit Center and Santa Cruz Metro Center (Pacific Station). Route 17 connects downtown Santa Cruz to VTA and rail services in San Jose at Diridon Station.

### Ridership

Metro<sup>4</sup> service had an annual ridership of 5,048,512 in FY 2018 at a rate of 24.31 passengers per revenue hour.

### Existing Operations

Metro serves the cities of Scotts Valley, Watsonville, Capitola, Santa Cruz, and their outlying communities. Metro operates eight routes in Watsonville, including four local routes, three intercity routes, and one commuter express route – these routes might also serve the future Pajaro/Watsonville multimodal transit hub. Local service routes include:

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<sup>4</sup> [Santa Cruz Metro FY 14-FY 18 Transit Fact Sheet](#)

- Route 72 (to Corralitos), Route 74 (to Ohlone Parkway/Rolling Hills), Route 75 (to Green Valley), and Route 79 (to Eastlake).

The intercity service operates exclusively within the South County area and includes:

- Route 69A (Capitola Road/Watsonville via Airport Blvd.), Route 69W (Capitola Rd./Cabrillo/Watsonville), and Route 71 (Santa Cruz/Watsonville). The commuter service (i.e. Route 91X) connects Santa Cruz and Watsonville.

#### 4.1.4 San Benito County Express

San Benito County Express serves Hollister locally and operates intercounty service to Gilroy directly from Hollister and by way of San Juan Bautista. At the Gilroy Transit Center riders can connect to Caltrain, VTA bus service, MST, and Greyhound.

##### Ridership

San Benito County Express<sup>5</sup> had an annual ridership of 126,555 in FY 2015 at a rate of 5.6 passengers per revenue hour.

##### Existing Operations

The Intercounty<sup>6</sup> service operates two weekday-only routes and one weekend-only route, with five to 10 roundtrips daily per route. Schedules vary on a seasonal basis with less service in the summer and more service in the fall. Service is more frequent during the commute periods. The system map and fare structure for intercounty and fixed (local) routes are provided in **Appendix C**.

#### 4.1.5 San Luis Obispo Regional Transit Authority

San Luis Obispo Regional Transit Authority (SLORTA) provides regional bus service in San Luis Obispo County. SLORTA operates South County Transit, which serves the southern region of San Luis Obispo County, between San Luis Obispo and Santa Maria. **Appendix D** shows the SLORTA service map.

##### Ridership

SLORTA had an annual ridership of 1,118,532 in FY 2017 at a rate of 19.4 passengers per revenue hour.

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<sup>5</sup> [Triennial Performance Audit of San Benito Local Transportation Authority – FY 2013 – 2015](#)

<sup>6</sup> [San Benito County Express Intercounty Service Webpage](#)

## Existing Operations

SLORTA has six fixed routes and five South County routes. These routes connect the hub transfer point of San Luis Obispo Transit Center to Morro Bay, Paso Robles and Santa Maria, with service to Los Osos, San Simeon, San Miguel, and Orcutt. Route 9 meets MST Line 85 in Templeton.

### 4.1.6 San Luis Obispo Transit

San Luis Obispo Transit<sup>7</sup> operates local bus service within the city of San Luis Obispo.

#### Ridership

San Luis Obispo Transit<sup>8</sup> (SLO Transit) had an annual ridership of 1,131,879 in FY 2017 at a rate of 32.6 passengers per revenue hour.

## Existing Operations

The San Luis Obispo Downtown Transit Center is located at the intersection of Palm Street and Osos Street, approximately 0.7 mile (15 minutes on foot) from the San Luis Obispo Station, where passengers can connect with the Coast Starlight and Pacific Surfliner, as well as Amtrak Thruway buses.

### 4.1.7 Intercity Buses/Shuttle Services

#### Amtrak Thruway

Amtrak Thruway bus service makes stops many locations in the study area. In relation to rail stations and existing rail service (i.e. the Coast Starlight and Pacific Surfliner), Thruway buses stop at Gilroy, Salinas, Paso Robles, San Luis Obispo, Grover Beach, Guadalupe, and Santa Maria. These services are often operated by the local transit agencies, under contract to Amtrak.

#### Greyhound Lines Inc.

Greyhound Lines operates private intercity buses in the study area with stops at San Jose Diridon Station, Gilroy Transit Center, Santa Cruz Transit Center, Watsonville Transit Center, Salinas train station, Castroville, King City, and Santa Maria Transit Center.

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<sup>7</sup> [San Luis Obispo Transit System Map and Timetables](#)

<sup>8</sup> [NTD Report 2017 Metrics](#)

## Monterey Airbus

Monterey Airbus is a private shuttle bus company that primarily serves to connect riders in Monterey County with San Francisco International Airport (SFO) and Norman Y. Mineta San Jose International Airport (SJC). The service offers door to door service to hotels, restaurants, and similar destinations in Monterey. The service carries over 75,000 passengers a year. The pick-up locations are in Marina at the corner of Beach Road and Reservation Road, the Monterey Shuttle Station near the Monterey Transit Plaza, and the Prunedale Park and Ride located at the junction of SR 156 and US 101. While this service today does not serve rail stations, it might in the future.

## Guadalupe Flyer

The Guadalupe Flyer provides transit service between Santa Maria and Guadalupe and is operated by SMOOTH, Inc., sponsored by the city of Guadalupe. The service picks up and delivers riders at the Guadalupe train station upon request.

## 4.2 Bike Network

### 4.2.1 Regional Bike Network

Bike users can travel throughout central Monterey County between communities along the Monterey Peninsula to the west and Salinas to the east, through Marina and California State University, Monterey Bay (CSUMB) along the coast. Most of the existing bike infrastructure is designated as Regional Bike Routes, offering a higher level of protection from traffic and regional connections. While there are pockets of bike networks in other communities in northern and southern Monterey County, there are no formal bike infrastructure connections between them. Instead, some parts of the state highway network (e.g., SR 1, SR 68, and US 101) are recommended as Cross-County Bike Routes. Future regional bike connections are planned, such as the contiguous Monterey Bay Sanctuary Scenic Trail<sup>9</sup> connecting Monterey and Santa Cruz, and the Fort Ord Regional Trail and Greenway project<sup>10</sup>, a 24-mile continuous bicycle and pedestrian trail through the former Fort Ord military base.

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<sup>9</sup> [Monterey Bay Sanctuary Scenic Trail Monterey Bay Sanctuary Scenic Trail Master Plan](#)

<sup>10</sup> [Fort Ord Regional Trail and Greenway Project](#)



## Route Classification

The 2016 Monterey County Bike Map<sup>11</sup> classifies and categorizes routes and paths available for bike users traveling within and between communities of Monterey County. Bike routes in Monterey County are classified as follows:

- **Cross County Bike Routes** – High-speed roadways where bikes are allowed due to lack of a parallel bike path.
- **Regional Bike Routes** – Bike routes (paths, lanes, and routes) connecting cities.
- **Separated Bike Path** – Bike routes that are closed to cars and motorcycles.
- **Bike Lane** – Bike routes that are on roadways, but with a dedicated, separate lane.

### 4.2.2 Bike Connections to Rail

#### Monterey County

##### Salinas

Dedicated bike lanes on Monterey Street, Front Street, Sherwood Drive and East Alisal Street serve Downtown Salinas. Portions of bike lanes in downtown Salinas are dedicated bike trails. While near downtown Salinas, bike users have to cross SR 183 (West Market Street) to access the Salinas Station.

##### Marina / CSU Monterey Bay

A separated bike trail parallel to Del Monte Boulevard and the Monterey Branch Line serves as a north-south spine and major arterial bike route for Marina; the northern end of the trail continues to Castroville and the southern end of the trail connects to the Coastal Trail into Monterey. Dedicated bike lanes stem from Del Monte Boulevard westward to Marina State Beach and eastward to Ford Ord Natural Reserve on Reservation Road. Bus connections are available to riders at the Marina Transit Exchange on Reservation Road. Reservation Road bike lanes continue east along Blanco Road to Salinas. CSUMB is served by both shared and separated bike lanes.

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<sup>11</sup> [Monterey County Bike Map](#)

## Monterey Peninsula

The Monterey Peninsula is served by both dedicated and separated bike lanes along the coast, which include the Coastal Trail, part of the Monterey Bay Sanctuary Scenic Trail, parallel to the Monterey Branch Line.

## Santa Cruz County

### Santa Cruz / Capitola / Aptos

The city of Santa Cruz has dedicated bike paths on either bank of the San Lorenzo River, which runs through the middle of the city, and along the coastline from Natural Bridges State Beach to the Santa Cruz Beach Boardwalk. The city also has bike lanes along most major streets and good bike network connectivity to nearby Capitola and Aptos.

### Watsonville

Watsonville has limited connections to the rest of the Santa Cruz County bike network, with the only routes into the city on Freedom Boulevard and on San Andreas Road / Beach Street.

## San Luis Obispo County

### San Luis Obispo

The city of San Luis Obispo has a comprehensive bike network, with Class II lanes on the surrounding arterial roads and Class III lanes in the downtown core. A mix of Class I and buffered lanes comprise the rest of the network. A Class I facility along the UP Coast Line connects the city's Amtrak station with neighborhoods to the south. Class III lanes along Railroad Avenue and Osos Street connect to a Bike Boulevard north along Morro Street into downtown.

### Surrounding San Luis Obispo County

In the cities of Avila Beach, Pismo Beach, Paso Robles, Grover Beach and Nipomo, there is a limited network of Class II bike lanes on some major thoroughfares. Most of the bike routes surrounding urbanized areas are classified as recreational routes; as such, they are on rural roads or along highways, often in proximity to high-speed vehicular traffic. Shoulder widths vary and grades can be steep.

### Pacific Coast Bike Route

The Pacific Coast Bike Route follows SR 1 along the coastline through San Luis Obispo County and continues into Santa Barbara County. The route is primarily on the shoulder and often in proximity to high-speed vehicular traffic.

## 5. SUMMARY OF RECENT STUDIES AND PLANS

This section includes summaries of studies prepared over the last two decades that explore the potential for new passenger rail services in Monterey, Santa Cruz, San Benito, and San Luis Obispo Counties. The studies are listed below by year of completion.

### 5.1 Around the Bay Rail Study, TAMC and RTC, 1998

In 1998, TAMC and RTC prepared the *Around the Bay Rail Study*<sup>12</sup>. The study's purpose and objectives were to address the increasing congestion between the Monterey Bay Area and the San Francisco Bay Area by studying the feasibility of rail service to provide alternatives to single occupancy vehicles in the region. The focus was on three main opportunities: intercity weekend passenger rail service from San Francisco or San Jose to Monterey and/or Santa Cruz, daily around the bay rail service, and self-propelled diesel multiple unit (DMU) service compared with conventional diesel trains.

The study outlined rolling stock, a service plan, ridership forecasts, funding requirements and financial planning, and a service implementation plan. It concludes that Santa Cruz County would be best suited for seasonal weekend passenger rail service provided by Caltrain or Capitol Corridor, with service starting at San Jose. It finds that Monterey County would best be suited for year-round extended weekend service with service starting at Caltrain's 4th and King Station in San Francisco.

### 5.2 Coast Daylight Implementation Plan, CRCC, 2000

In 2000 the Coast Rail Coordinating Council (CRCC) prepared the *Coast Daylight Implementation Plan*<sup>13</sup>, which investigated the potential for reestablishing intercity rail service between Los Angeles and San Francisco using the Coast Line. At the time, the corridor was served by the Coast Starlight and San Diegan trains. In the same year that the study was published, the San Diegan service transitioned to its new name, the Pacific Surfliner. The study stated that the purpose of the Coast Daylight service was to resurrect intercity passenger service between downtown San Francisco and downtown Los Angeles, which ceased operations during the 1970s; the train was succeeded by the Coast Starlight, which serves Oakland and Emeryville instead of San Francisco. Secondly, it was to link the major population, economic, and cultural centers of Northern and Southern California. Finally, it would bridge a gap in the passenger rail program by increasing service north of San Luis Obispo.

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<sup>12</sup> [Around the Bay Rail Study 1998](#)

<sup>13</sup> [Coast Daylight Implementation Plan 2000](#)

The *Coast Daylight Implementation Plan* included a schedule, a ridership forecast, cost estimates, a financial plan spanning the first three years of operations, a plan for establishing agreements between operators and UP, feedback on the operating plan from local communities, and next steps to implement the service. The study concluded that implementing service was feasible, and the three main steps going forward were to secure equipment and funding, negotiate operating agreements, and to lobby the effort to maintain urgency for the project.

### **5.3 Caltrain Extension to Monterey County Passenger Rail Stations Project Study Report, TAMC, 2006**

In February 2006, TAMC prepared the *Caltrain Extension to Monterey County Passenger Rail Stations Project Study Report*<sup>14</sup> (PSR). The report examined the extension of Caltrain service from Gilroy to Monterey County, specifically to Pajaro, Castroville, and Salinas. The service would accommodate a portion of intercounty, commute-oriented traffic and provide capacity for future travel demand increases. The need for the project was rooted in the imbalance of jobs and housing in the Bay Area, namely between the job centers of the San Francisco Bay Area counties and the employees commuting there from Monterey County, which has resulted in increased interregional traffic on US 101.

The PSR was the basis for a Draft and Final Environmental Impact Report (EIR), which determined that the Locally Preferred Alternative (LPA) service would consist of two passenger rail round trips per weekday running from Salinas to Gilroy. Service would be increased to four or more round trips after five years, or as passenger demand requires. Several station sites and layover facilities were evaluated, with the preferred layover facility located north of the Salinas train station. The Final EIR was certified by the TAMC Board on August 23, 2006 and approved by the California Transportation Commission on August 17, 2006.

### **5.4 Alternatives Analysis for the Monterey Peninsula Fixed Guideway Corridor Study, TAMC, 2011**

In 2011, TAMC prepared the *Alternatives Analysis for the Monterey Peninsula Fixed Guideway Corridor Study*<sup>15</sup>. The study focuses on the 15-mile Monterey Branch Line rail corridor between Castroville and Monterey. The adopted LPA proposed a two-phase approach. The first phase would restore 10 miles of track along the Monterey Branch Line and implement light rail

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<sup>14</sup> [Caltrain Extension to Monterey County Passenger Rail Stations Draft Environmental Impact Report](#)

<sup>15</sup> [Alternatives Analysis for the Monterey Peninsula Fixed Guideway Study](#)

service between downtown Monterey and north Marina. Bus service would continue to Castroville on surface streets. The second phase consists of repairing or replacing the Salinas River Bridge and extending the light rail service from Marina to the Castroville rail station.

The Monterey Branch Line Fixed Guideway project is currently delayed due to insufficient funding to progress to the environmental review phase. Since the time this study was conducted, another related study has been written, the *Monterey Bay Area Feasibility Study of Bus on Shoulder Operations on State Route 1 and the Monterey Branch Line*, MST, 2018, described below.

## 5.5 Coast Daylight Service Development Plan, Caltrans, 2013

In 2013, the California Department of Transportation (Caltrans) prepared *The Coast Daylight Service Development Plan*<sup>16</sup> (SDP) as part of the 2013 *California State Rail Plan*. The plan identifies proposed service expansion and operational improvements on the 474-mile Coast Corridor from San Francisco to Los Angeles. The plan outlines a need for expanded passenger rail service, breaks down required infrastructure costs, and summarizes the proposed improvements.

The plan included two new stations in Soledad and King City; the purchase of rolling stock; and the implementation of Centralized Traffic Control, whereby a dispatcher in a remote location manages train movement through wayside signals and radio, between McKay (a siding located north of San Miguel) and Santa Margarita. Service would include one round trip between San Francisco and Los Angeles daily, with plans to expand service to two daily trips. The study concluded that the corridor's existing rail network was not capable of accommodating the corridor's future travel demand without track capacity improvements. The required improvements were found to have a minimal environmental impact and were both technically and economically feasible to implement.

## 5.6 Pacific Surfliner North Corridor Service Development Plan, Caltrans, 2013

In 2013, Caltrans prepared the *Pacific Surfliner North Corridor Service Development Plan* (SDP) as part of the 2013 *California State Rail Plan*<sup>17</sup>. The SDP focused on the northern portion of the Los Angeles – San Diego – San Luis Obispo Rail Corridor (LOSSAN), also known as the

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<sup>16</sup> [Coast Daylight Service Development Plan 2013](#)

<sup>17</sup> [LOSSAN Service Development Plan 2013](#)

Pacific Surfliner Corridor. The SDP outlines existing services in the corridor and identifies proposed service and infrastructure improvements, as well as the investments needed to support growth and deliver said improvements through 2040.

The SDP proposed two additional daily round trips between Los Angeles and Goleta, and two additional daily round trips between Los Angeles and San Luis Obispo. Currently there are five daily round trips between Los Angeles and Goleta, and two daily round trips between Los Angeles and San Luis Obispo. This increased frequency would provide more reliable service that would be more attractive to potential riders, thereby increasing the service revenue potential. The plan calls for the addition of one round trip between San Luis Obispo and San Francisco, thus implementing the Coast Daylight service.

## **5.7 Santa Cruz Branch Rail Line Rail Transit Feasibility Study, RTC, 2015**

In November 2015, RTC prepared the *Santa Cruz Branch Line Rail Transit Feasibility Study*<sup>18</sup>. The purpose of the study was to analyze the potential service that could utilize the Santa Cruz Branch Line and determine possible station locations that would best serve Santa Cruz County. The study identifies and evaluates short-term and long-term service options, ridership potential, capital and operating and maintenance costs, and connectivity with other modes of transportation. It assesses how the service could meet or exceed the sustainable communities and environmental protection goals included in the California Global Warming Solutions Act of 2006 (AB 32) and Sustainable Communities and Climate Protection Act of 2008 (SB 375).

The study concludes that DMU vehicles, or self-propelled railcars, similar to those used to operate eBART in Contra Costa County or SMART in Sonoma and Marin Counties, would be the most cost-effective and readily available technology for the corridor. The study identifies three potential service scenarios: Westside Santa Cruz to Capitola, Westside Santa Cruz to Aptos Village, and Westside Santa Cruz to Watsonville. The third scenario would have the highest ridership at 1.5 million passengers annually, on par with the Altamont Corridor Express (ACE), which at the time of the study had an annual ridership of 1.2 million passengers between Stockton and San Jose.

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<sup>18</sup> [Santa Cruz Branch Line Rail Transit Feasibility Study 2015](#)

## 5.8 Marina-Salinas Multimodal Corridor Plan, 2015

The Marina-Salinas Multimodal Corridor Plan<sup>19</sup>, adopted by TAMC in the summer of 2015, focuses on the creation of a transit, bicycle, pedestrian, and auto corridor connecting Marina and Salinas. The preferred corridor alignment in the study follows Imjin Parkway to Reservation Road, then South Davis Road to Alisal Street. The plan includes potential features such as dedicated bus rapid transit (BRT) facilities, transit-prioritized signalization at intersections, bike lanes and sidewalks/paths.

The Plan seeks to enhance connectivity to Salinas from outlying communities, as the majority of jobs and housing in Monterey County are located in Salinas. Current connectivity to Salinas is limited, with most travelers using SR 68 and Highway 1 and a combination of local streets, which are often congested during peak travel times.

## 5.9 Coast Daylight Route, Service Ridership & Financial Evaluation, Amtrak, 2016

In April 2016, Amtrak prepared the *Coast Daylight Route, Service, Ridership & Financial Evaluation* in response to a request from TAMC made on behalf of the Coast Rail Coordinating Council (CRCC)<sup>20</sup>. The report evaluates adding Amtrak intercity passenger service frequency between San Diego, Los Angeles, San Jose, and San Francisco. The service would be called the Coast Daylight and would share the Coast Line south of San Jose with the Coast Starlight service that operates between Seattle, San Jose, and Los Angeles. Service between San Diego and San Jose is evaluated as an alternative scenario.

Annual ridership is estimated at 125,000 for the entire route between San Diego and San Francisco. Annual operating and maintenance costs are estimated \$3.2 million. Capital costs are comprised of a layover facility at the north end of the service totaling \$800,000 along with mobilization costs of \$750,000. While operated by Amtrak, the service would be sponsored by the State of California.

## 5.10 San Benito Regional Transportation Plan, 2018

The Council of San Benito County Governments is evaluating options for a county express commuter rail service along the Hollister Branch Line to Gilroy in order to connect with Caltrain service and the work centers of the San Jose and the San Francisco Peninsula. UP sold

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<sup>19</sup> [Marina-Salinas Multimodal Corridor Plan, 2015](#)

<sup>20</sup> [Coast Daylight Route, Service, Ridership & Financial Evaluation](#)

the Hollister Branch line to San Benito Rail LLC in 2013; therefore, negotiations must be conducted with San Benito Rail. Because funding for the project has not been identified, it has been included in the 2040 *San Benito Regional Transportation Plan* as an unconstrained project., based on the 2000 *Hollister/Gilroy Caltrain Extension* report. That report presents two operating scenarios: two daily round trips between Hollister and San Francisco, and three round trips between Hollister and San Francisco. Both scenarios assume use of existing Caltrain crews, cars, and locomotives that operate to and from Gilroy.

## 5.11 California State Rail Plan, Caltrans, 2018

In 2018, Caltrans completed the 2018 *California State Rail Plan*<sup>21</sup>. This plan sets forth a vision for integrated passenger rail service in California. It includes a vision for passenger rail in the Central Coast region, including Santa Cruz County, Monterey County, San Benito County, San Luis Obispo County, and Santa Barbara County.

The short-term (2022) goals for the Central Coast region include two intercity trains per day connecting the San Francisco Bay Area to Salinas by way of San Jose and construction of new stations at Pajaro/Watsonville and Castroville. Investments in stops at Soledad and King City are mentioned for immediate use by the *Coast Starlight*. Express bus service that operates on a bi-hourly basis connecting San Jose, Salinas, San Luis Obispo, and Santa Barbara communities not on the existing rail line is another key part of the short-term goals. The plan calls for an enhanced connection to the Central Valley via express bus service to and from Paso Robles, and express bus service connecting Hollister, Monterey, and Santa Cruz to the state rail network.

Mid-term (2027) goals for the plan seek to connect services in the Central Coast region to the first phase of High-Speed Rail in Gilroy and to the LOSSAN Corridor in San Luis Obispo and Santa Barbara. Priorities include at least hourly peak period regional rail service between Gilroy and San Jose, integrated with the statewide rail system at both Gilroy and San Jose. Integrated Express Bus service is a major component of the mid-term goals, with the plan seeking to implement connections to key stations between Gilroy and San Jose in the off-peak, increase frequency of regional bus service, and implement a frequent Express Bus connection to the Central Valley at Paso Robles.

The Rail Plan's long-term goals set for 2040 and beyond include expansion of service along the Coast Line with higher frequency on a regular, if limited, schedule. The 2040 Vision supports establishment of a regional rail network on the Central Coast, providing timed connections from Santa Cruz, Monterey, and Salinas to the state network at Gilroy, with hub

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<sup>21</sup> [California State Rail Plan, 2018](#)



stations at Pajaro/Watsonville and Castroville. The long-term goals include hourly integrated intercity rail and express bus service from Salinas to San Luis Obispo.

## 5.12 Monterey Bay Area Feasibility Study of Bus on Shoulder Operations on State Route 1 and the Monterey Branch Line, MST, 2018

In June 2018, Monterey-Salinas Transit (MST) and the Santa Cruz Metropolitan Transit District (Metro) prepared the *Monterey Bay Area Feasibility Study of Bus on Shoulder Operations on State Route 1 and the Monterey Branch Line*<sup>22</sup>. The purpose of the study was to analyze the feasibility of running bus on shoulder operations along State Route 1 (SR 1) between Santa Cruz and Aptos and on SR 1 or in the parallel Monterey Branch Line corridor between the Marina Transit Exchange and the Monterey Transit Plaza, with the objective of relieving traffic congestion during the peak commute periods.

The study determined that implementing the service would result in significant operating speed improvements and the reduction of millions of annual vehicle miles traveled for all build scenarios. The study finds that development of bus on shoulder operations is consistent with statewide, regional, and local land use and transportation plans and policies in the study area; that funding sources are available; and that construction would be feasible with the notable significant challenges of widening certain sections of local highways for high-occupancy vehicle lanes and widening bridge shoulders. It finds that the Monterey Branch Line corridor would be cheaper to implement compared to widening SR 1 shoulders between Monterey and Sand City. As a result of this study, MST and TAMC are applying for funds to implement the "SURF!" express busway on the Monterey Branch Line, to match \$15 million set aside in the TAMC Measure X Transportation Safety and Investment Plan.

## 5.13 Unified Corridor Investment Study, RTC, 2019

In January 2019, RTC conducted the *Unified Corridor Investment Study*<sup>23</sup>. The study investigates the need to respond to the growing population and resulting congestion in Santa Cruz County. The report cites the Association of Monterey Bay Area Governments (AMBAG) 2018 Regional Growth Forecast prediction of a 10 percent growth in population in Santa Cruz County by 2035. The study focuses on the corridor between Santa Cruz and Watsonville and six scenarios that utilize roadway enhancements to SR 1, Soquel Avenue/

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<sup>22</sup> [Final Project Report Monterey Bay Area Feasibility Study of Bus on Shoulder Operations on State Route 1 and the Monterey Branch Line](#)

<sup>23</sup> [Final Unified Corridor Investment Study, January 2019](#)

Freedom Boulevard, the Santa Cruz Branch Line, and bike trail improvements to reduce congestion and serve the transportation needs of the community.

The six scenarios examined involve varying combinations of modes: bus, bike, pedestrian, highway lane modifications, and rail transit. The preferred scenario has a Year 2035 time horizon and includes rail transit between Watsonville and Santa Cruz. The study states that “funding availability for transit capital projects at the state level, particularly rail transit, is on an upward trend due to the ability of transit to provide new transportation options, so funding such a project would be feasible.”

## 6. SUMMARY OF FUTURE CONDITIONS

This section lists planned and proposed rail service and line improvements from recent rail studies and plans.

### 6.1 Monterey County Rail Extension Project

The Monterey County Rail Extension project calls for specific improvements at the Salinas train station, at Watsonville Junction (Pajaro), and in Castroville. These include:

- Rehabilitation and expansion of the Salinas train station
- Construction of a train layover facility at Salinas
- Construction of new hub stations at Castroville and Pajaro/Watsonville
- Track improvements between Gilroy and Salinas
- Limited equipment acquisition

The full buildout project is included in the 2018 Monterey County Regional Transportation Plan (RTP) project list at an estimated \$135.7 million in 2018 dollars.<sup>24</sup>

The Monterey County Rail Extension Project Phase 1, known as the Kick Start project, is underway with a total capital cost estimated at \$81.5 million. The construction is divided into three packages: Salinas Station, Salinas Layover Facility, and Gilroy Station and Track Improvements. The Salinas Station package, consisting of an extension of Lincoln Avenue for signalized access, circulation, and parking improvements, is currently under construction. The Salinas Layover Facility package is currently at a 75 percent design level and is pending

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<sup>24</sup>[2018 Monterey County Regional Transportation Plan](#)

railroad negotiations, with final design and right-of-way (ROW) acquisition to follow. The Gilroy Station and Track Improvements package is currently at a 75 percent design level and pending railroad negotiations, with final design to follow.

## 6.2 Monterey Peninsula Fixed Guideway

The 2018 Monterey County RTP unconstrained (i.e., unfunded) project list includes the Monterey Peninsula Fixed Guideway project at an estimated \$255 million in 2018 dollars. Phase 1 includes reconstruction of tracks, construction of stations, purchase of vehicles and operating costs for service between Monterey and Marina. Phase 2 includes reconstruction of tracks to connect to the planned commuter rail station in Castroville and include operating costs to Castroville and increased frequencies. The RTP also includes the replacement of the Salinas River bridge as a separate project at an estimated \$15 million. As there is no funding on hand to implement the light rail project, TAMC is coordinating with MST to implement a busway along the rail corridor to build ridership demand for future light rail transit. TAMC dedicated \$15 million to the busway project in the Measure X Transportation Safety and Investment Plan.

## 6.3 Coast Daylight

Below is a list of near-term and long-term improvements cited in the 2013 Coast Daylight Service Development Plan. All capital cost estimates for these improvements are from the 2001 Amtrak 20-Year Plan and are thus outdated.

### 6.3.1 Near-Term Improvements

- Gilroy to San Luis Obispo track upgrades: continuous welded rail, tie replacement, ballasting, track surfacing, track structure realignment, rehabilitation of Salinas and Soledad sidings, turnout replacement (\$115 million)
- Gilroy to San Luis Obispo signal upgrades: Centralized Traffic Control from Gilroy to Soledad and from San Lucas to Bradley (\$100 million)
- Sargent to Aromas curve realignments (\$180 million)
- Watsonville Wye curve realignments (\$16 million)
- New station at King City (no cost estimate)
- New multi-modal station at Soledad (no cost estimate)

- New San Lucas siding at Mile Post (MP) 168.2 (\$11 million)
- Extension of Bradley siding (\$12 million)
- Cuesta Grade second main track (\$170 million)
- Rolling stock – two modern, tilt-capable trainsets (\$40 million)
- Rolling stock – two modern trainsets with locomotives (\$40 million)
- Grade crossing safety and mobility enhancements (\$20 million)

### **6.3.2 Long-Term Improvements**

- Install powered switches at existing sidings: Corporal, Logan, Watsonville Junction, Castroville, North Salinas, Salinas, Gonzales, Soledad, San Ardo, McKay, and Santa Margarita (no cost estimate)
- Moss Landing curve realignments (\$3.7 million)
- Extension of Castroville siding (\$9 million)
- New Spence siding, MP 122.4 (\$22 million)
- Harlem to Metz track realignment (\$40.0 million)
- New Chalone Creek siding, MP 148.0 (\$23 million)
- Coburn curve realignment (\$1 million)
- Extension of King City siding (no cost estimate)
- Track realignments (\$30 million)
- Getty to Bradley curve realignments (\$36 million)
- McKay to Wellsona curve realignments (\$15 million)
- New Wellsona siding, MP 206.6 (\$21 million)
- Wellsona to Paso Robles curve realignments (\$94 million)
- Templeton to Henry curve realignments (\$107 million)
- Henry to Santa Margarita curve realignments (\$45 million)

## 6.4 Santa Cruz Branch Rail Line

The 2015 *Santa Cruz Branch Line Rail Transit Feasibility Study* lays out several operating scenarios for rail service on the Santa Cruz Branch Line. There are between 6.6 and 22.1 miles of track on the branch line in need of replacement based on each service scenario, the shortest being from Santa Cruz to Capitola and the longest being Santa Cruz to Pajaro. The proposed project is primarily comprised of track tie replacement, with the replacement figures ranging from 5,700 to 19,200 ties depending on the scenario. Turnout (i.e. rail switches) replacement and new passing sidings will be needed. Below is the list of physical improvements required to implement this plan; no cost estimates were included in the study.

- Positive Train Control
- Drainage improvements near Watsonville and grade crossings
- Grade crossing replacements
- 20,000 tons of new ballast
- 1,000 feet of complete track replacement
- Clearing of vegetation
- New railroad crossing devices
- New stations
- Quiet zones

The 2019 Unified Corridor Investment Study incorporated these improvements to facilitate passenger rail service on the Santa Cruz Branch line.

## 6.5 California State Rail Plan, 2018

Below is the list of rail capital projects and service goals for 2022 (short-term), 2027 (mid-term) and 2040 (long-term) included in the Rail Plan's sections for the Central Coast Planning Area, which is defined as the Coast Corridor from Gilroy to Goleta.

### 6.5.1 2022 Rail Capital Projects:

- Central Coast network and service integration project development
- Central Coast layover facility and station expansion

- King City rail station
- Soledad rail station
- Monterey County Rail Extension project:
  - Kick Start project
  - Pajaro/Watsonville hub station
  - Castroville hub station

### **6.5.2 2027 Rail Capital Projects:**

- Bi-hourly rail service from Salinas to Gilroy
- San Luis Obispo-Salinas intercity rail increase and bi-hourly integrated service
- Santa Barbara-San Luis Obispo intercity rail increase and bi-hourly integrated service

### **6.5.3 2040 Rail Capital Projects:**

- Hourly integrated rail service from Salinas to Gilroy
- Regional rail connecting Monterey and Santa Cruz to the statewide rail network
- Central Coast rail service from Salinas to Santa Barbara

## **7. OPPORTUNITIES TO REDUCE HIGHWAY CONGESTION**

This section describes current highway capacity and travel demand on major regional highway corridors in the study area.

### **7.1 Highway Capacity**

#### **7.1.1 Major North-South Highway Connections**

##### **State Route 1 (SR 1) – From Santa Cruz to Monterey**

Along the Monterey Bay between Santa Cruz and Monterey, SR 1 is mostly a limited, controlled-access highway except in the rural, agricultural area between Watsonville and Castroville where the highway segment includes a center turn lane. In this section, SR 1

continues as a two-lane rural road through Moss Landing. In other segments, SR 1 is a four-lane highway with limited access and a divided median. In some segments in Monterey, the highway is six lanes to accommodate additional through and merging traffic. SR 1 parallels the Monterey Branch Line between Monterey and Castroville.

### **US Route 101 (US 101) – From Gilroy to King City and further South**

From Gilroy to Salinas, US 101 is mostly a four-lane, limited, controlled-access highway in Monterey County. In some segments between Prunedale and Salinas, the highway has six lanes. South of Salinas toward King City and beyond, US 101 becomes a rural four-lane highway with limited access where merging/diverging traffic is mostly controlled by an unsignalized center turn lane. In cities south of Salinas, US 101 is accessed via grade-separated on/off ramps. US 101 parallels the Coast Rail Line between Gilroy and the Monterey/Santa Clara county line, and then again between Salinas and San Luis Obispo.

#### **7.1.2 Major East-West Highway Connections**

Between Watsonville and Gilroy, SR 152 is a two-lane rural road crossing the Santa Cruz Mountains connecting Watsonville and points to its east. A mountain pass, SR 152 is labeled as Hecker Pass Highway/Road.

Between Castroville and Prunedale, SR 156 West is a four-lane highway with limited, controlled-access and a divided median. SR 156 West connects to SR 1 in Castroville and to US 101 in Prunedale. SR 156 East connects Prunedale to San Juan Bautista and beyond.

SR 68 East (Monterey-Salinas Highway) serves as a major highway between the Monterey Peninsula and Salinas. From SR 1 eastbound, SR 68 is mostly a two-lane road with signalized intersections and some center turn lanes, designed to accommodate about 16,000 vehicles a day. Just south of the City of Salinas, SR 68 becomes a four-lane urban arterial corridor, continuing into downtown Salinas and connecting to US 101. SR 68's northern end is close to the Salinas train station.

#### **7.1.3 Other Highway Connections**

SR 25 connects Gilroy to Hollister to its southeast. It is a two-lane rural road with a center divider in this area. SR 25 connects to SR 156 near Hollister Airport and to US 101 in Gilroy. SR 25 parallels the Hollister Branch Line.

SR 183 connects Salinas to Castroville, paralleling the Coast Rail corridor. SR 183 is known as Market Street in Salinas and as Merritt Street in Castroville.

## 7.2 Highway Travel Demand

This section describes traffic volumes and travel demand on major highways in the Monterey Bay area using Caltrans' 2017 Average Annual Daily Traffic (AADT) traffic volumes.

### 7.2.1 Major North-South Highway Connections

SR 1 and US 101 carry most of the north-south traffic in the region, with AADT ranging between 40,000 and 80,000, depending on roadway segments.

SR 1 between Santa Cruz and Watsonville carries about 67,000 vehicles a day. Between Marina and Monterey, SR 1 carries about 79,000 vehicles a day.

The US 101 segment between Gilroy and Prunedale carries about 70,000 vehicles a day, whereas the segment between Prunedale and Salinas carries about 61,000 vehicles a day. South of Salinas, traffic on US 101 tapers down to about 45,000 vehicles a day in Gonzalez, 30,000 in Greenfield, and 15,000 in King City.

Between Gilroy and Hollister, SR 25 serves about 27,000 vehicles a day.

### 7.2.2 Major East-West Highway Connections

Between Castroville and the US 101 connection in Prunedale, SR 156 carries the most east-west traffic in the area, serving 62,000 to 78,000 vehicles a day.

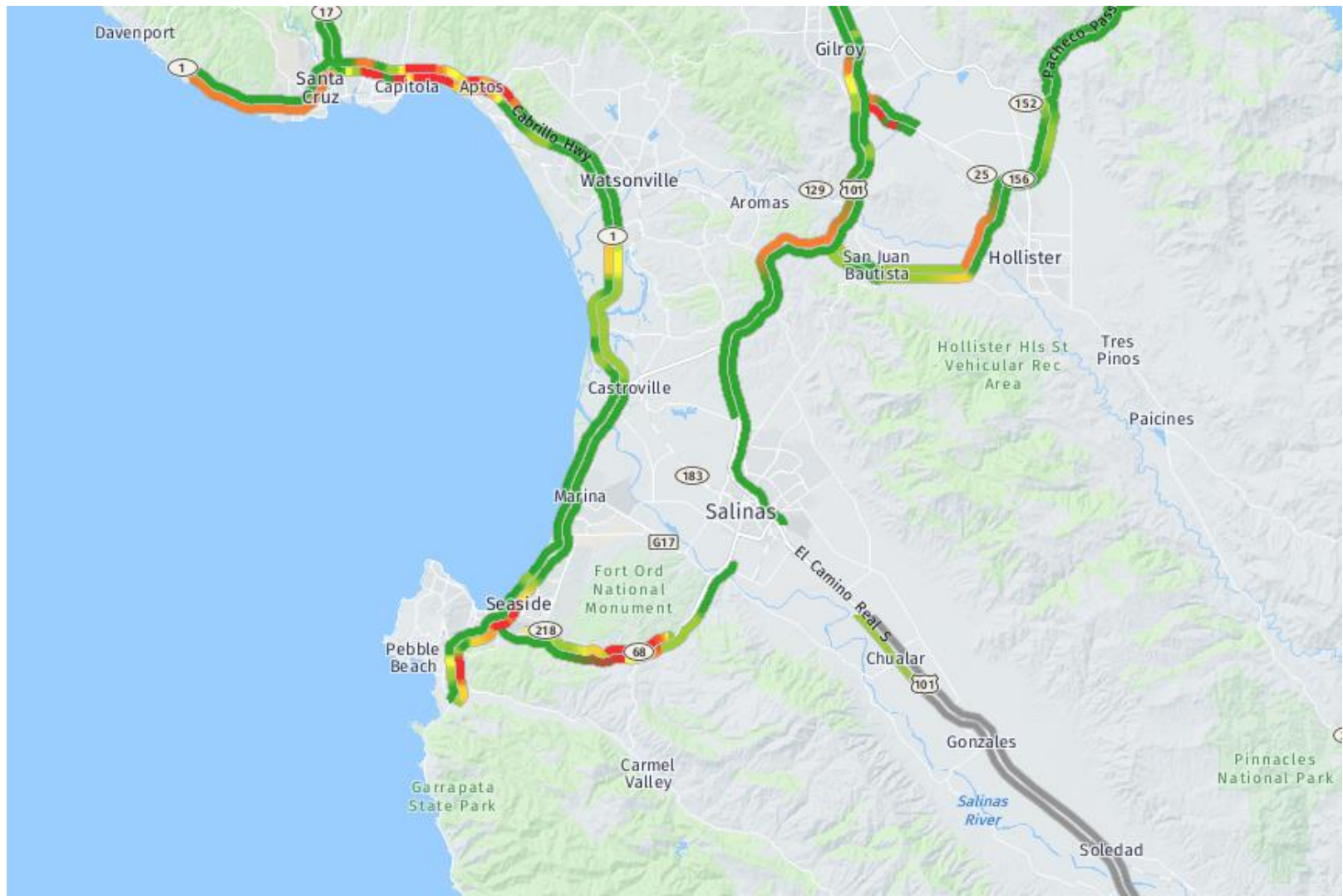
To the north, SR 152 (Hecker Pass Highway/Road) between Watsonville and Gilroy crosses the Santa Cruz Mountains, carrying about 6,000 vehicles a day.

To the south, SR 68 connects Monterey and Salinas, serving about 25,000 vehicles a day, well above its design limits.

**Figure 2** illustrates in color coding the average travel speed on major highways in the Monterey Bay area. The red and orange sections on segments of SR 1 between Santa Cruz and Watsonville, and Marina and Monterey, highlight peak-hour congestion on SR 1.



Figure 2. Peak-Hour Average Travel Speed on Major Highways During a Peak Commute Period



Source: Caltrans Performance Measurement System (PeMS) Data

60+	55-59	50-54	45-49	40-44	35-39	≤ 35
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## 8. OPPORTUNITIES TO SERVE UNDERSERVED COMMUNITIES

The Coast Line, Santa Cruz Branch Line, and Monterey Branch Line pass through agricultural, parks and recreation, mixed commercial, and mixed residential land use areas and zones. Data on Low-Income Communities and Disadvantaged Communities in the study area (from the California Environmental Protection Agency websites for Assembly Bill (AB) 1550 and State Bill (SB) 535) will help in future grant applications for the State of California's climate investments from the state cap-and-trade program, to benefit Disadvantaged Communities.

### 8.1.1 Monterey County

The following are key findings and demographics from the recent U.S. Census Bureau's American Community Survey (ACS) for Monterey County from 2013 through 2017.<sup>25</sup> Most of the adult labor force commute via single occupancy vehicle and drive alone to work at 71.1 percent of the modal share of total commute trips, while 10.7 percent carpool. The current public transportation modal share, including taxicab usage for commuting, is 1.7 percent. Around 70 percent of the labor force works in the service, sales, and maintenance industries. These sectors rely on trades and skills that often require the worker to be present at the workplace, indicating more necessary commuting and less flexibility for working from home.

### 8.1.2 Santa Cruz County

The following are key findings and demographics from the recent ACS for Santa Cruz County from 2013 through 2017.<sup>26</sup> In Santa Cruz County, most of the adult labor force in the region commutes via single occupancy vehicle and drives alone to work at 69.2 percent of the modal share of total commute trips. The current public transportation modal share, including taxicab usage for commuting, is 2.8 percent. The modal share of public transportation is on average relatively high and could potentially indicate a high ridership capture rate potential if new public transit services were deployed in the area. Around 60 percent of the labor force works in the service, sales, and maintenance industries. These sectors rely on trades and skills that

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<sup>25</sup> [ACS Narrative Profile - Monterey County](#)

<sup>26</sup> [ACS Narrative Profile - Santa Cruz County](#)

often require the worker to be present at the workplace, indicating more necessary commuting and less flexibility for working from home.

**Figure 3** shows the regions of the study area, indicating the locations of low income and disadvantaged communities.

**Figure 3a. Low Income and Disadvantaged Communities – Region North**

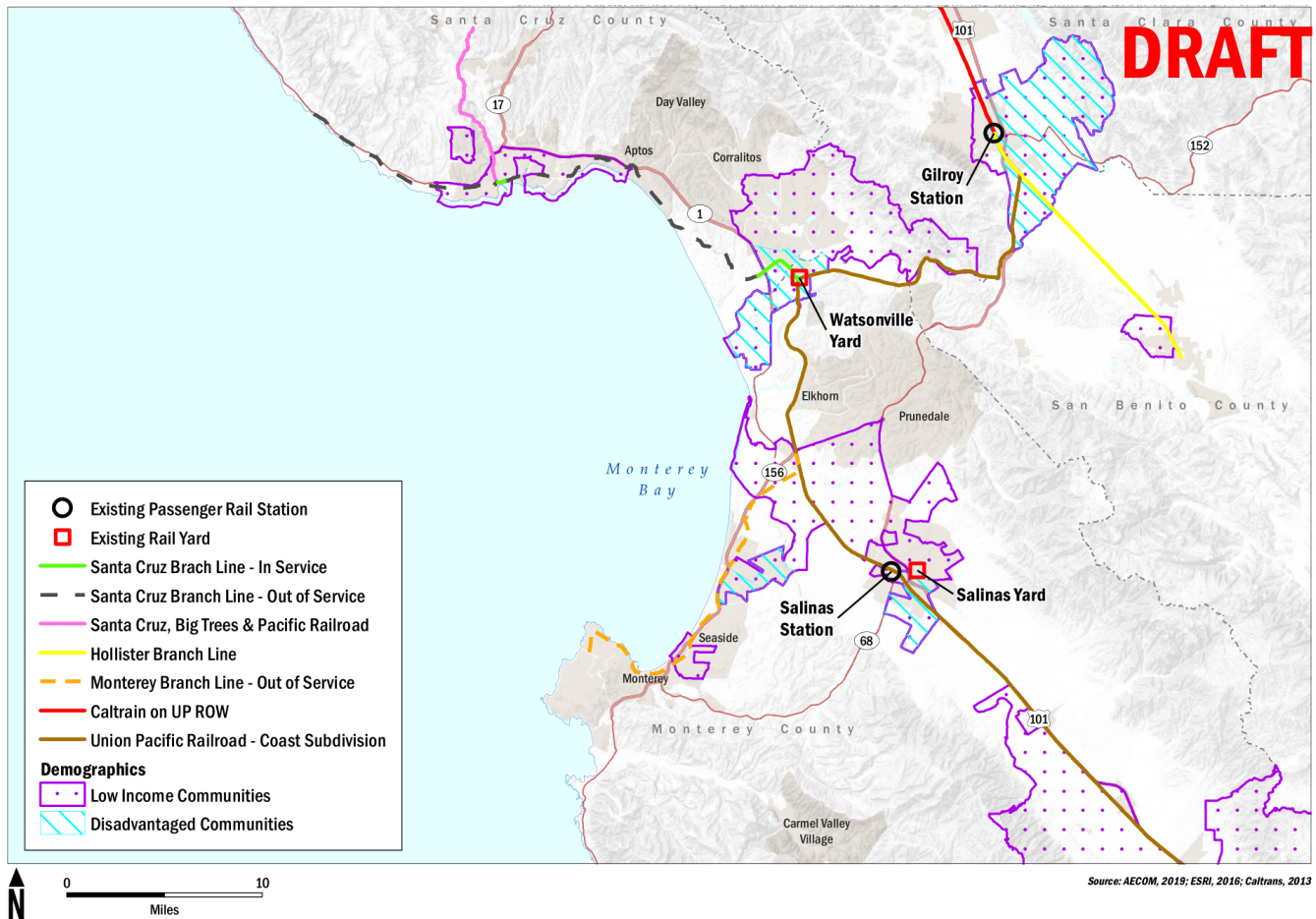


Figure 3b. Low Income and Disadvantaged Communities – Region Central

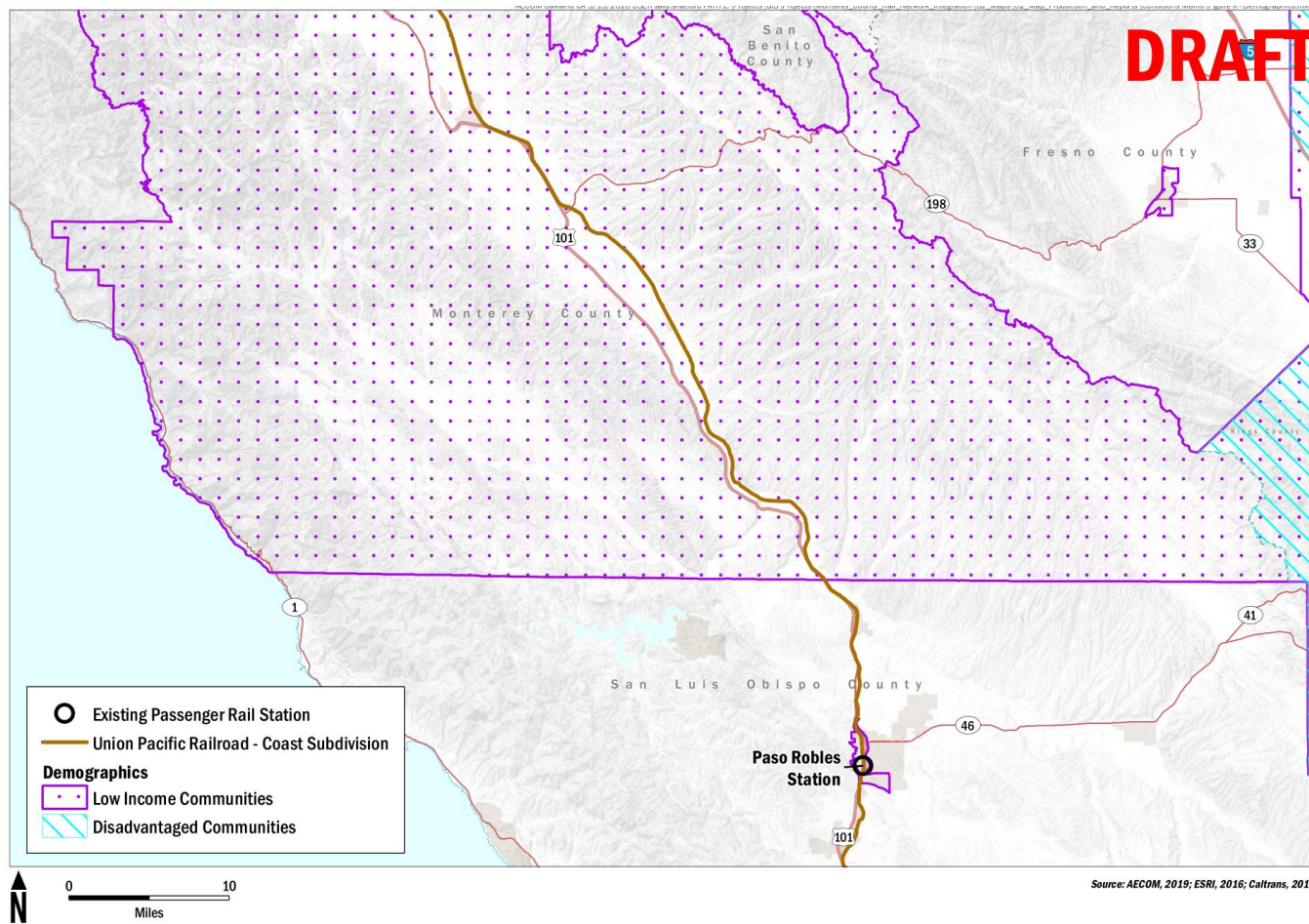
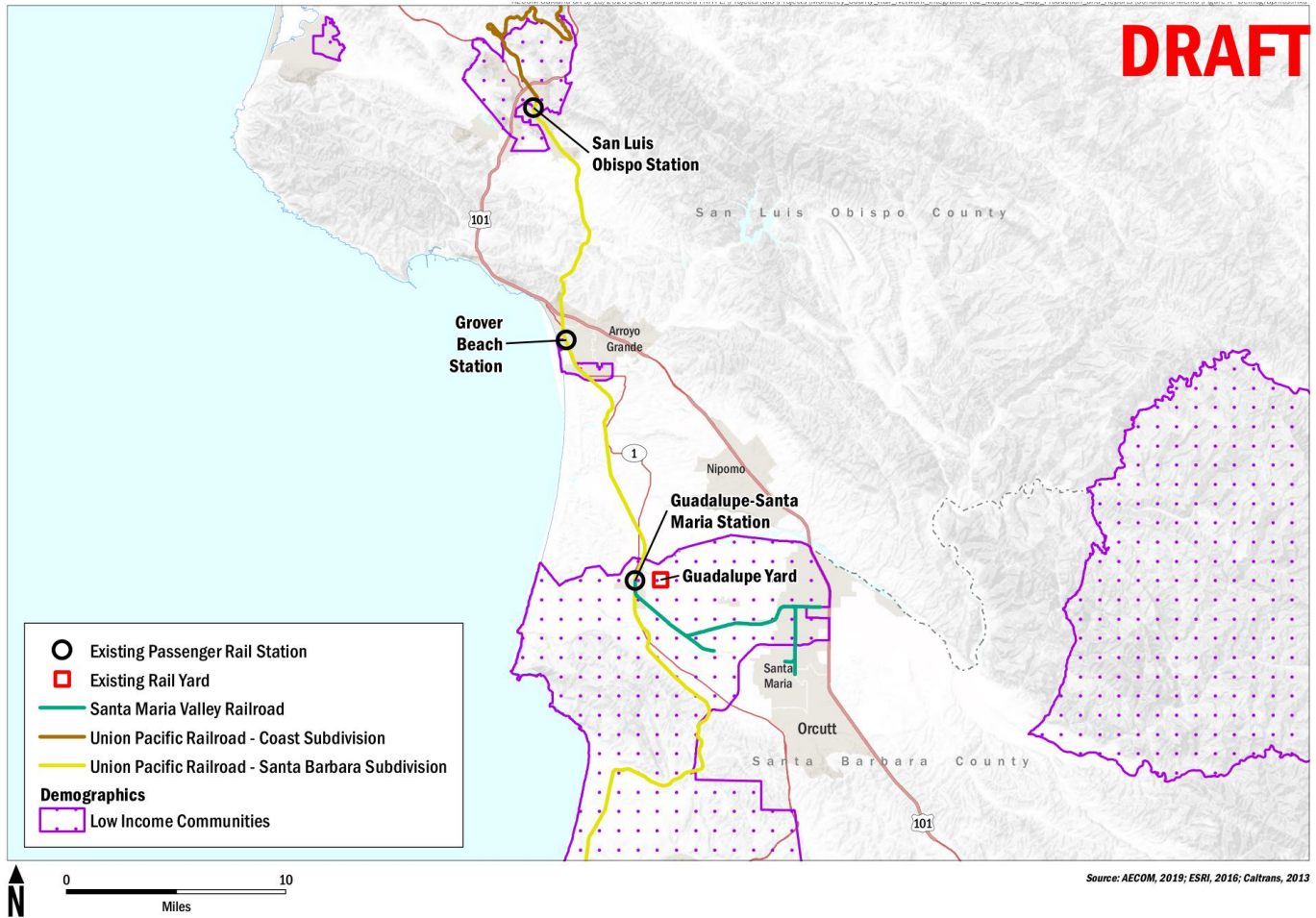


Figure 3c. Low Income and Disadvantaged Communities – Region South



## 9. ENVIRONMENTAL RESILIENCY AND THREATS TO EXISTING AND PLANNED SERVICES

In the study area, climate change vulnerability affects rail infrastructure primarily in Monterey County and Santa Cruz County. This section includes a high-level climate change vulnerability assessment of the rail and roadway infrastructure in these counties and a brief discussion of other studies of the climate change vulnerability of these transportation assets.

## 9.1 State Climate Change Guidance and Resources

The State of California has developed a series of guidance documents and studies to enhance the understanding of climate change impacts at a regional scale and directly inform vulnerability assessments and adaptation strategies. The studies below summarize state resources leveraged for the regional assessment of Monterey County's climate stressors.

### California's Fourth Climate Change Assessment - Central Coast Region Report, 2018

Through a coordinated effort among the Governor's Office of Planning and Research, the Energy Commission, and the Natural Resources Agency, the State of California developed a statewide assessment of climate change impacts to investigate vulnerability and inform climate adaptation planning based on consistent and best-available science. As a part of this effort, the state created a series of 12 tailored regional reports to assist local governments' planning for regional climate impacts unique to each area of the state. The *Central Coast Regional Report* includes the counties of Santa Cruz, Monterey, San Luis Obispo, San Benito, and Santa Barbara.

### Ocean Protection Council Sea Level Rise Guidance, 2018

In 2018, the California Ocean Protection Council adopted a guidance report from its Science Advisory Team Working Group, who compiled, reviewed, and summarized the latest research on sea level rise: *Rising Seas in California: An Update on Sea-Level Rise Science*. The guidance presents the latest peer-reviewed projections of sea level rise, describes an extreme scenario for sea level rise caused by rapid loss of the West Antarctica ice sheet, and scenario selections using risk-based (probabilistic) planning capabilities. The guidance lays out preferred approaches to planning for vulnerable assets, natural habitats, and public access.

### Cal-Adapt, 2017

Cal-Adapt is an interactive geospatial tool for localized climate projections in California. The tool allows users to explore projected changes in temperature, extreme heat, precipitation, snowpack, wildfire, and sea level rise across the state based on a variety of climate models and future emission scenarios. The tool includes high-resolution local climate projections.

## 9.2 Climate Stressors

**Table 2** summarizes climate projections for sea level rise, temperature, and precipitation. In general, sea levels will continue to rise at an accelerated rate through the next century. Similarly, maximum temperatures will continue to increase, with greater increases experienced in inland areas. Average precipitation is expected to increase by a relatively small amount, but annual variability increases substantially by the end of the century.

**Table 2. Summary of Climate Stressors**

	Low Emissions			High Emissions	
	Historical (1961-1990)	Mid-Century (2040-2069)	End-of-Century (2070-2099)	Mid-Century (2040-2069)	End-of-Century (2070-2099)
<b>Sea Level Rise (feet)</b>	NA	NA	2.3 to 5.5	1.1 to 1.9	3.3 to 6.9
<b>Temperature Annual Average (degrees F)</b>	70	73.7	74.9	74.9	77.5
<b>Temperature Number of Extreme Heat Days</b>	4.3	14	19	19	34
<b>Precipitation Annual Average (inches)</b>	19.3	21.1	21.2	21.4	24.4

### Sea Level Rise

Based on the latest climate science, Monterey County sea levels are likely (67 percent probability) to rise between 0.5 and 1.1 inches by mid-century and between 0.9 and 3.3 feet by the end of the 21st century. The Ocean Protection Council recommends using the upper limit of the likely range for projects with a high tolerance to flooding (e.g., parks or natural areas).<sup>27</sup>

In the worst case scenario, there is a 0.5 percent probability (1-in-200 chance) that sea level rise will reach or exceed 1.9 feet by mid-century and 6.9 feet by the end of the century. The

<sup>27</sup> [OPC, State of California Sea Level Rise Guidance 2018 Update](#)

Ocean Protection Council recommends using these projections when planning for assets with a lower tolerance to flooding, such as major transportation corridors.<sup>28</sup>

### Temperature

Temperatures are expected to increase significantly for the Central Coast area over the next century. Annual average temperatures are expected to increase by 4.9 degrees by mid-century and 7.5 degrees by end-of-century. Changes in the number of extreme heat days, defined as days with temperatures above the 98th percentile of observed daily maximum temperatures, is projected to increase by 15 days by mid-century and 30 days by end-of-century.<sup>29</sup>

### Precipitation

There is a projected increase of year-to-year variability along the Central Coast with fewer days of precipitation, but an increase in the amount of precipitation occurring on rainy days. The largest changes are expected to occur in coastal areas, where precipitation on the wettest day of the year may increase by up to 30 percent in Monterey County by end of the century. Average annual precipitation for the County shows an increase of 2.1 inches by mid-century and 5.1 inches by end-of-century when compared to historical conditions.<sup>30</sup>

## 9.3 Climate Change Vulnerability Assessment

This section describes results of a high-level vulnerability assessment focused on potential exposure and climate change impacts to Monterey and Santa Cruz County's rail infrastructure. The results described here are based on the findings of a high-level mapping evaluation of infrastructure located in areas vulnerable to sea level rise flooding and wildfire exposure.

### Sea Level Rise

Sea level rise exposure of the rail infrastructure occurs throughout the Elkhorn Slough, in Monterey along Del Monte Avenue adjacent to the marina, along the Pajaro River, and in the Santa Cruz area. By mid-century large portions of the Elkhorn Slough's low-lying salt marshes are flooded, exposing numerous stretches of rail lines. Small areas of flooding also occur in the Santa Cruz area and along the Pajaro River. By end-of-century, flooded areas of Elkhorn Slough, Pajaro River, and Santa Cruz area expand and flooding is initiated in low-lying areas of the City of Monterey along Del Monte Avenue. **Table 3** summarizes the analysis of sea level inundation exposure of rail lines with approximate mileage of the exposed network.

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<sup>28</sup> Ibid.

<sup>29</sup> California's Fourth Climate Change Assessment: Central Coast Region Report 2018

<sup>30</sup> Ibid.



**Table 3. Summary of Transportation Infrastructure Exposure to Sea Level Rise Impacts**

Monterey County Rail Assets	Sea Level Rise Scenario					
	2-foot SLR (Mid-Century)		3-foot SLR (End-of-Century)		7-foot SLR (End-of-Century)	
	Daily Tidal Inundation	Temporary Storm	Daily Tidal Inundation	Temporary Storm	Daily Tidal Inundation	Temporary Storm
<b>Amtrak-Coast Starlight (Elkhorn Slough area)</b>	✓ 8.7 Miles	✓ 13.7 Miles	✓ 11.3 Miles	✓ 13.7 Miles	✓ 13.7 Miles	✓ 13.7 Miles
<b>Monterey Branch Line (Elkhorn Slough Area)</b>	✓ 0.1 Miles	✓ 0.1 Miles	✓ 0.1 Miles	✓ 0.1 Miles	✓ 0.4 Miles	✓ 2.0 Miles
<b>Monterey Branch Line (Monterey Area)</b>	NA	NA	NA	NA	✓ 0.5 Mile	✓ 1.0 Mile
<b>Santa Cruz Branch Line (Pajaro Area)</b>	NA	✓ 0.9 Miles	NA	✓ 1.5 Miles	✓ 1.7 Miles	✓ 1.9 Miles
<b>Santa Cruz Branch Line (Santa Cruz Area)</b>	✓ 0.1 Miles	✓ 0.1 Miles	✓ 0.1 Miles	✓ 0.1 Miles	✓ 0.3 Miles	✓ 2.0 Miles
<b>Santa Cruz Big Trees &amp; Pacific Rail (Santa Cruz Area)</b>	NA	NA	NA	NA	NA	✓ 0.3 Miles

Potential impacts for rail lines include:

*Temporary Storm Flooding*

- Delayed or canceled rail freight and passenger service during large storm events
- Damage to railway power switches, derails, and signals
- Scour of railway foundation due to high-velocity storm flows

*Daily Tidal Inundation*

- Suspension of rail service due to long-term inundation, affecting the regional and state economy via loss of public transportation option and damages / delays to cargo shipments, and society at large via loss of access to jobs in the region
- Erosion of railway foundation

**Wildfire**

Wildfire risk is generally highest along the north coast of Monterey County between the Carmel Highlands and Lucia (Big Sur) and along the mountain crests west of Salinas Valley. High and moderate wildfire risk exists primarily along the southern inland areas of Monterey County. In Santa Cruz County, wildfire risk is highest along the northwest coast and along the inland mountain ranges. **Table 4** summarizes the analysis of wildfire exposure of rail lines with approximate mileage of the exposed network.

**Table 4. Summary of Transportation Infrastructure Located in Areas Vulnerable to Wildfire Exposure**

Monterey County Transportation Assets	Wildfire Hazard Severity Zones		
	Moderate	High	Very High
<b><i>Rail Lines</i></b>			
<b>Amtrak-Coast Starlight (Elkhorn Slough area, East of Salinas River near Harlem, Metz, and San Ardo)</b>	✓ 21.0 Miles	✓ 16.4 Miles	NA
<b>Monterey Branch Line</b>	NA	NA	NA
<b>Santa Cruz Branch Line</b>	✓ 0.5 Miles	✓ 0.5 Miles	NA
<b>Santa Cruz Big Trees &amp; Pacific Rail</b>	✓ 1.8 Miles	✓ 4.6 Miles	NA

Potential impacts for rail lines include the following:

- Delayed or canceled Amtrak and UP service during fires
- Damage to railway power switches, derails, and signals
- Railway damage due to landslides induced by fire events
- Damage to wooden railway ties located in direct line of wildfire
- Suspension of rail service due to wildfires, affecting the regional and state economy via loss of public transportation option and damages / delays to cargo shipments, and society at large via loss of access to jobs in the region

Potential impacts for roadways (highway and major roads) include the following:

- Roadway closures due to wildfire and smoke
- Decreased emergency response times due to road closure
- Limited access to neighborhoods or commercial areas during and after fires
- Roadway damage due to landslides induced by fire events
- Extended travel time due to bypasses or detours around areas impacted by fires
- Large-scale effects on commercial shipping dependent on roadway corridors

### Extreme Heat

Extreme heat days are defined as days with temperatures above the 98th percentile of observed daily maximum temperatures. Increasing temperatures can have considerable impacts on rail infrastructure, when temperatures exceed conditions for which the system has been designed. Rail lines traversing inland areas are particularly vulnerable to extreme heat, because inland areas have higher temperatures than coastal areas. Potential impacts on rail lines include:

- Railway buckling or kinking because of metal expansion
- Possible derailment from railway deformation
- Increased maintenance, repair, and inspection costs
- Delayed passenger or freight service during heat speed restrictions, which may become more frequent and occur for longer durations

## 9.4 Other Studies

### 9.4.1 Central Coast Highway 1 Climate Resiliency Study - Elkhorn Slough

AMBAG is developing a study to assess the risks and threats related to climate change and sea level rise on the SR 1 and Coast rail corridor through Elkhorn Slough. The study will propose potential strategies to increase the resilience of both the transportation infrastructure and natural wildlife habitats along the study area. The study will assess solutions to meet the growing travel demand and transportation needs in the Monterey Bay Area.

### 9.4.2 Caltrans Climate Change Vulnerability Assessment – District 5

As part of a series of climate change vulnerability assessments for each Caltrans District across California, the District 5 report identifies the primary areas of risk and their related hazards, including temperature increases, flash flooding and mudslides, wildfire, and sea level rise. This study is in the draft stage and has not yet been published. The scope of the study focuses on how to coordinate with federal and state resource agencies regarding climate data, identifying locations where Caltrans assets may be exposed to extreme weather hazards, laying the foundation for minimizing potential damage, and identifying a prioritization method for investments in Caltrans infrastructure.

### 9.4.3 City of Monterey Sea Level Rise and Vulnerability Analyses, Existing Conditions and Issues Report, 2016

In 2016, the City of Monterey published a coastal vulnerability study to determine and understand the threats of coastal hazards occurring due to climate change, particularly sea level rise. Coastal flood hazards analyzed in the study include wave flooding/ponding, barrier beach flooding, tidal inundation, and long-term and storm-induced coastal erosion, including cliff and dune erosion. The vulnerability assessment determined potential impacts on natural resources and urban areas and infrastructure, including wastewater systems, public transportation, emergency services, and other public facilities.

The following are key findings identified as a result of analyses in this report<sup>31</sup>:

- Coastal hazards with five feet of sea level rise pose greater risk to the city than a Federal Emergency Management Agency (FEMA) mapped 500-year storm event.

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<sup>31</sup> [City of Monterey - Sea Level Rise & Vulnerability Analyses Report](#)

- Coastal flooding poses the largest vulnerability to public transportation, with the Monterey Bay Coastal Recreational Trail, Monterey Branch Line, and Del Monte Avenue bus routes being the most vulnerable.
- Vulnerabilities to all public transportation metrics show a threshold between about one and two feet of sea level rise during which coastal flooding and erosion impacts escalate rapidly.
- Evacuation impacts occur primarily along the Del Monte Avenue corridor.

The City of Monterey is now engaged in a Transportation Adaptation Plan that will identify transportation infrastructure vulnerable to climate change and provide transportation improvements and adaptation strategies to preserve the transportation network.<sup>32</sup>

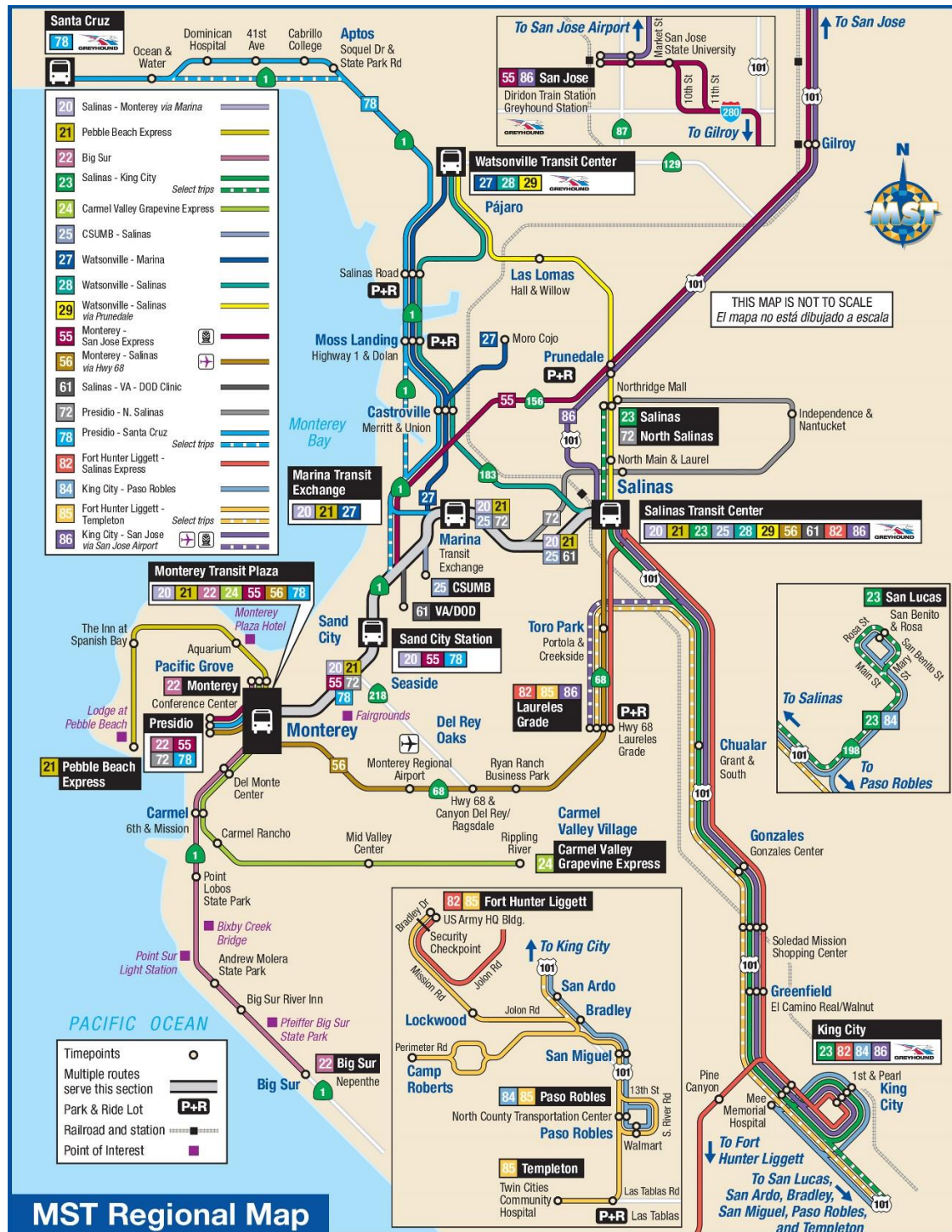
## 10. SUMMARY

This memo provides a basis for understanding the existing conditions in the study area, which is crucial for informing the demands, opportunities, and challenges for implementing additional passenger rail service and complementing transit service in the study area. Understanding existing travel patterns and mapping the demographic and socioeconomic distribution of residents in the study area informs where the most useful station locations could be, where riders are coming from and where they are going, and what barriers for using rail might exist and how they can be mitigated. A comprehensive catalog of existing transit operations and bike networks is critical to planning for future rail service, so that transit service and bike networks can be integrated. Key to planning for future passenger rail service is understanding the potential for sea level rise for affecting the rail corridors to design a service that is resilient to climate changes over the coming decades. Understanding rail operations, shared use-agreements, and the roles rail operators in the study area is critical to moving forward with new service concepts. This review of existing conditions and findings will be integrated into the final Network Integration Study.

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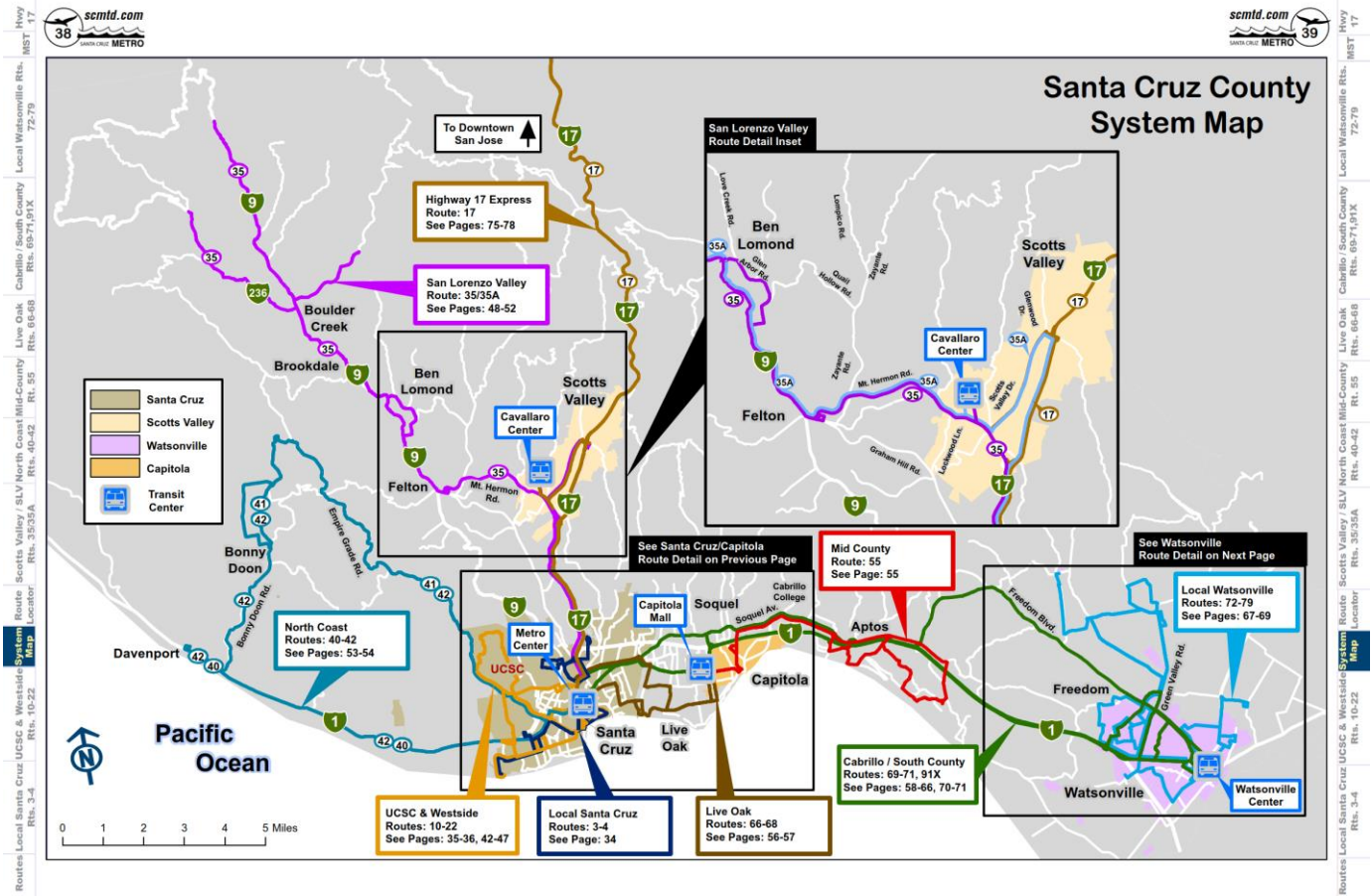
<sup>32</sup> [City of Monterey Transportation Adaptation Plan](#)

Appendix A – MST System Map



Source: Monterey Salinas Transit

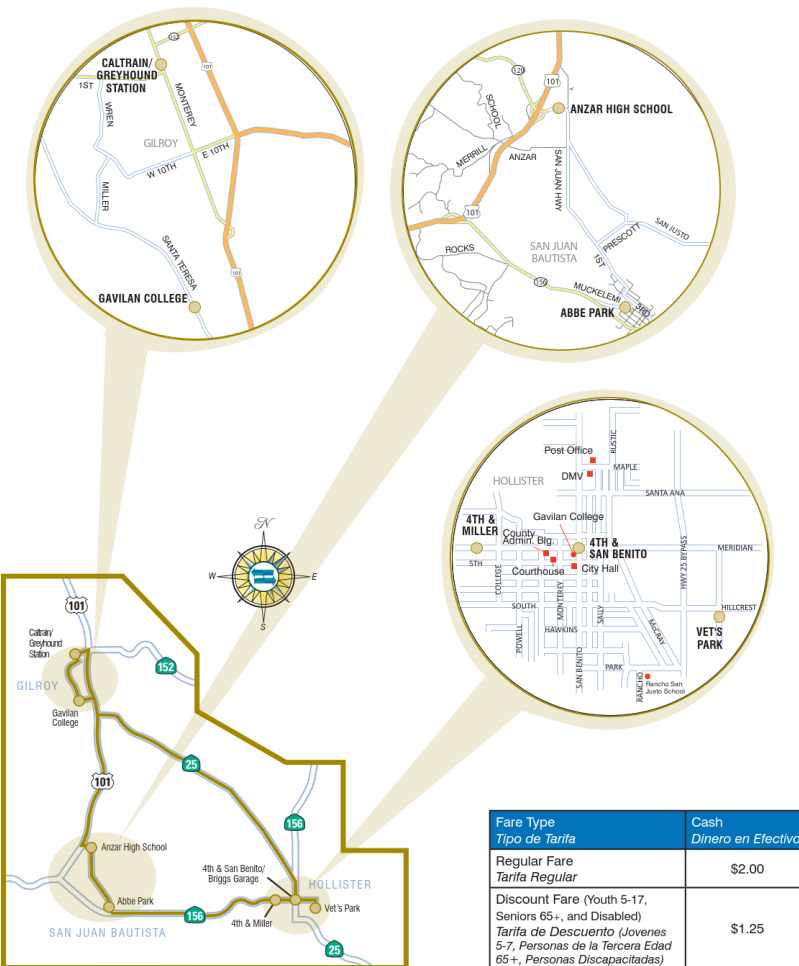
## Appendix B – Santa Cruz System Map



Source: [Santa Cruz Metro Bus Rider's Guide](#)

## Appendix C – San Benito County Express System Map

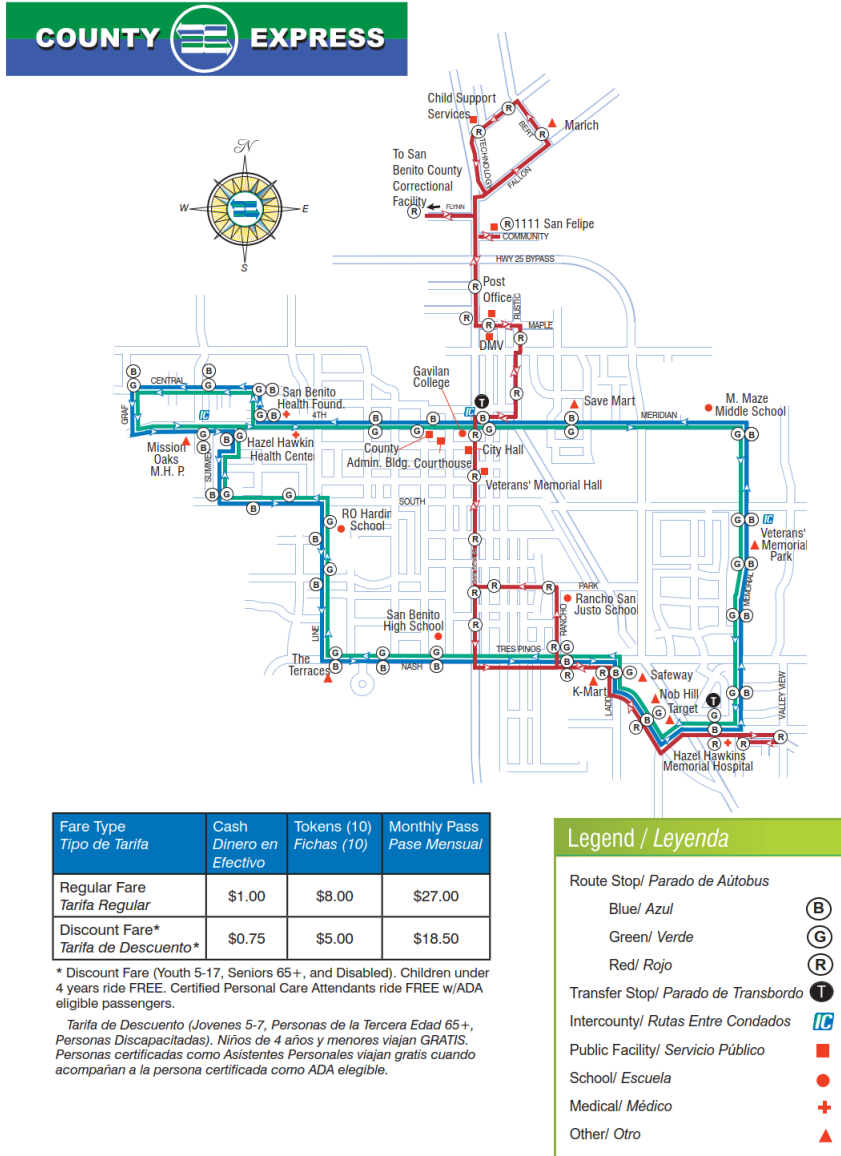
### C.1 Intercounty Service



Source: San Benito County Express

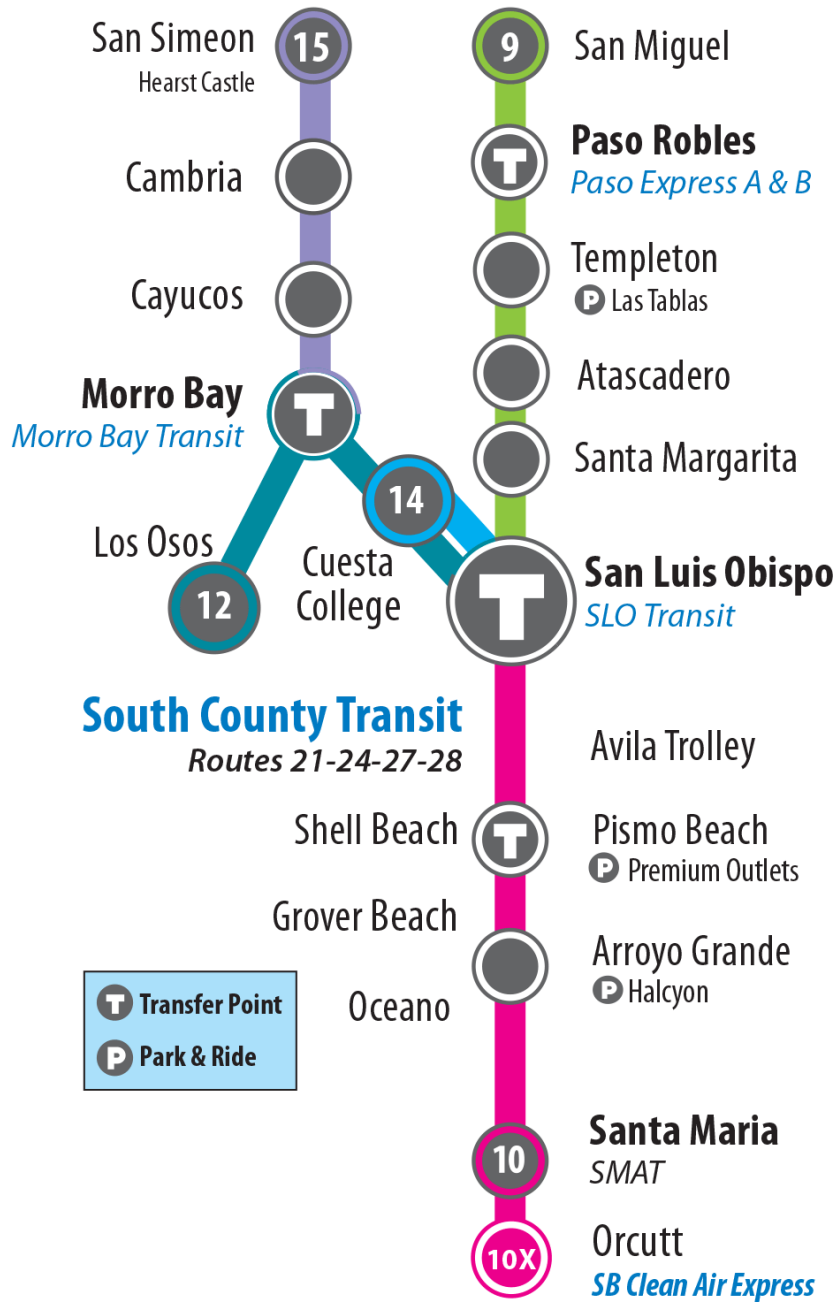


## C.2 Fixed Route Services



Source: [San Benito County Express](#)

**Appendix D – San Luis Obispo Regional Transit Authority System Map**



Source: [San Luis Obispo Regional Transit Authority](#)

## Appendix E – Socioeconomic Data Sources Table

Data	Data Type	Source	Year	URL
Quiet Zone Locations	PDF	FRA	2016	<a href="#">Quiet Zones FRA</a>
County Traffic Volume - AADT	PDF	Monterey County	2018	<a href="#">Monterey County AADT</a>
California AADT	GIS	Caltrans	2017	n/a
Low-Income Communities	GIS	AB 1550	2016	<a href="#">AB 1550 LIC</a>
Disadvantaged Communities	GIS	SB 535	2018	<a href="#">SB 535 DAC</a>
Clinics	GIS	Monterey County	2015	<a href="#">Monterey County Open GIS Portal</a>
County Facilities - Misc.	GIS	Monterey County	2014	<a href="#">Monterey County Open GIS Portal</a>
Fire Stations	GIS	Monterey County	1969	<a href="#">Monterey County Open GIS Portal</a>
Hospitals	GIS	Monterey County	1969	<a href="#">Monterey County Open GIS Portal</a>
Medical Facilities	GIS	Monterey County	2017	<a href="#">Monterey County Open GIS Portal</a>
Police Stations	GIS	Monterey County	2014	<a href="#">Monterey County Open GIS Portal</a>
Public Libraries	GIS	Monterey County	1969	<a href="#">Monterey County Open GIS Portal</a>
Schools - Private	GIS	Monterey County	2018	<a href="#">Monterey County Open GIS Portal</a>
Schools - Public	GIS	Monterey County	2018	<a href="#">Monterey County Open GIS Portal</a>
Urgent Care Facilities	GIS	Monterey County	2017	<a href="#">Monterey County Open GIS Portal</a>
Land Use - Monterey County	GIS	Monterey County	2010	<a href="#">Monterey County Open GIS Portal</a>
Land Use - Monterey County LCP	GIS	Monterey County	2018	<a href="#">Monterey County Open GIS Portal</a>

Final Existing and Future Conditions Memo  
 April 30, 2020

Zoning - Monterey County	GIS	Monterey County	2018	<a href="#">Monterey County Open GIS Portal</a>
Archaeological Sensitivity	GIS	Monterey County	2016	<a href="#">Monterey County Open GIS Portal</a>
Historical Sites	GIS	Monterey County	1969	<a href="#">Monterey County Open GIS Portal</a>
Parcels	GIS	Monterey County	2017	<a href="#">Monterey County Open GIS Portal</a>
Census Block Groups	GIS	Monterey County	2010	<a href="#">Monterey County Open GIS Portal</a>
Census Blocks	GIS	Monterey County	2014	<a href="#">Monterey County Open GIS Portal</a>
TAMC Development Fee Zones	GIS	Monterey County	2014	<a href="#">Monterey County Open GIS Portal</a>
Traffic Impact Fee Areas	GIS	Monterey County	2014	<a href="#">Monterey County Open GIS Portal</a>
Affordable Housing Overlay	GIS	Monterey County	2016	<a href="#">Monterey County Open GIS Portal</a>
Land Use - MTC Counties	GIS	MTC	2018	<a href="#">MTC GIS Portal</a>
Zoning - City of Salinas	GIS	City of Salinas	2019	<a href="#">Salinas Open Data Portal</a>
Land Use - Santa Cruz County	GIS	Santa Cruz County	2019	<a href="#">Santa Cruz County Open GIS Portal</a>
Land Use - San Luis Obispo County	GIS	San Luis Obispo County	2018	<a href="#">San Luis Obispo County Open GIS Portal</a>