Task 5.11:

DRAFT Passenger Rail Improvement Study

SLOCOG Coast Rail Corridor Study

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SLOCOG CRCC COAST RAIL CORRIDOR STUDY

HDR

In Association With:
AMMA Transit Planning
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Appendices

Executive Summary

With continued growth in population and employment, the communities of the Greater San Luis Obispo Area experience growing travel demand and congestion which are exacerbated by jobs-housing imbalances. Continued employment growth in job centers like the city of San Luis Obispo and newer housing in outlying areas mean workers live farther away from their jobs and make longer commutes.

Rail transit is a potential solution for these transportation needs, providing a fast, comfortable and environmentally-friendly alternative to long commutes by automobile. The region is home to an active railroad corridor upon which intercity and freight services operate, but the potential application of rail transit for regional travel within the Greater San Luis Obispo Area has not been studied for almost three decades. This Passenger Rail Improvement Study (PRIS) evaluates the feasibility of introducing a commuter/regional passenger rail service and identifies potential phasing of the new service. The analysis includes assessment of the following:

- Potential rail vehicle technologies
- Potential station locations
- Service levels
- Infrastructure needed to support the new service
- Ridership potential
- Capital and operating costs
- Potential governance structures and funding sources
- Integration with intercity service and local transit

Stakeholder Engagement

Due to the regional size and community diversity of the study area, implementation of a comprehensive, strategic communications and public outreach program was essential to understanding needs and creating feasible plans to meet those needs for future rail travel. The program focused on a series of effective communications tools and strategies to build awareness, understanding and active engagement in the study process, such as a project website, survey, virtual public meeting, fact sheet, and email and social media communications. Two key committees, the Technical Advisory Committee (TAC) and the Community Working Group (CWG), were formed to allow the team to directly engage with community representatives and leaders to foster relationships and share timely information and input at key milestones within the development of the PRIS.

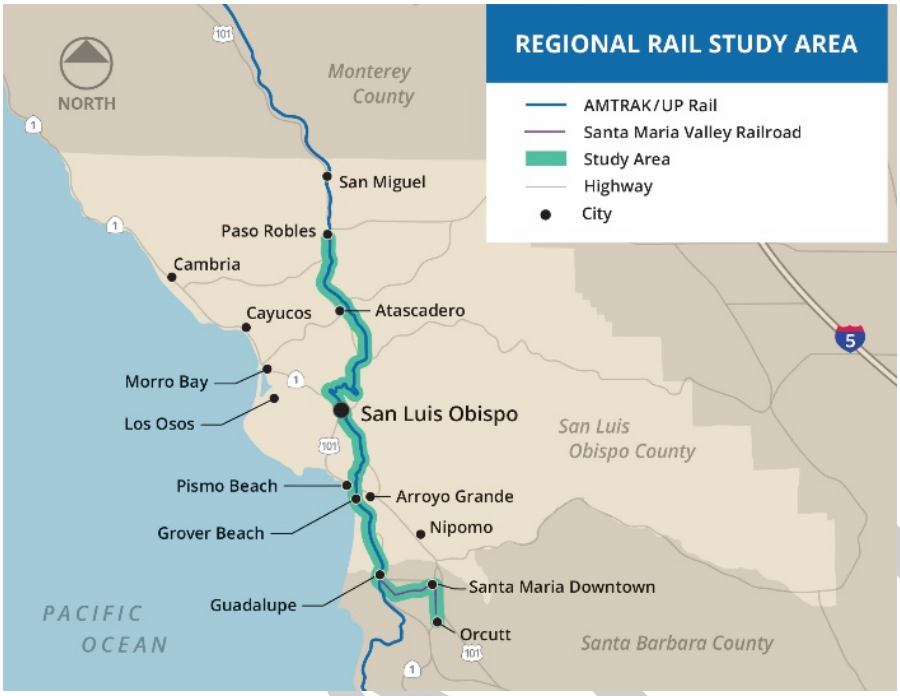
Study Area

The study area consists of the existing rail corridor from Santa Maria to Paso Robles and the cities along it. The rail corridor includes portions of the Union Pacific Railroad (UP) mainline Santa Barbara and Coast subdivisions, which travel roughly parallel to US 101. In addition, a branch line owned by the Santa Maria Valley Railroad (SMVRR) connects Santa Maria to the UP mainline in Guadalupe.

UP's railroad is currently used by freight and intercity passenger rail. Within the study area, there are four existing passenger rail stations currently served by intercity rail: Paso Robles, San Luis Obispo, Grover Beach, and Guadalupe. Existing passenger rail services include the state supported Pacific Surfliner and the long-distance Amtrak Coast Starlight.

The study area is home to over 330,000 people, with the majority living south of the Cuesta Grade, the crossing of the Saint Lucia Mountains that separates northern San Luis Obispo County from the central and southern portions of the county. Approximately 41 percent of corridor residents live in Santa Barbara county, with the Santa Maria Valley home to the largest population center in the study area.

Figure ES-1. Study Area



Service Options

To capture a range of service options, four scenarios of ascending levels of investment were assessed. These are detailed in Table ES-1 and Figures ES-2 through ES-4.

Table ES-1. Commuter/Regional Rail Service Options

Option	Termini	Stations	Weekday Peak-Period Service (6-9 am, 4-7 pm)	Off-Peak Service	Weekend/ Holiday Service
Option 1	SLO - Guadalupe	3	Two round trips	-	-
Option 2	SLO - Guadalupe	3	Every 30 minutes	Every 60 minutes	✓
Option 3	Cal Poly – Santa Maria West	5	Every 30 minutes	Every 60 minutes	✓
Option 4	Paso Robles – Santa Maria Downtown	8	Every 30 minutes	Every 60 minutes	✓

Figure ES-2. Options 1 and 2: Short Route Option

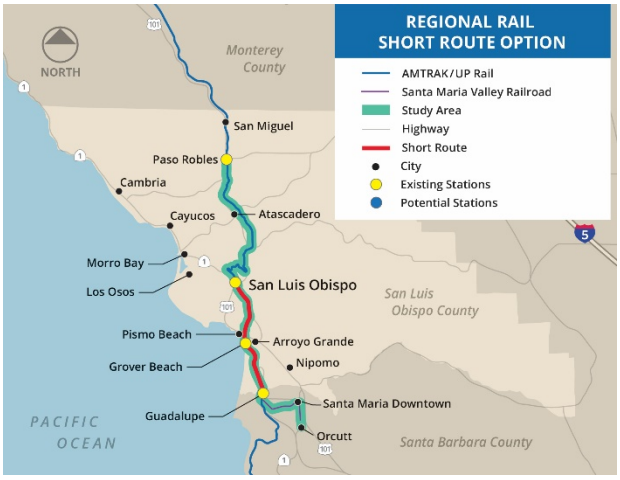


Figure ES-3. Option 3: Intermediate Route Option

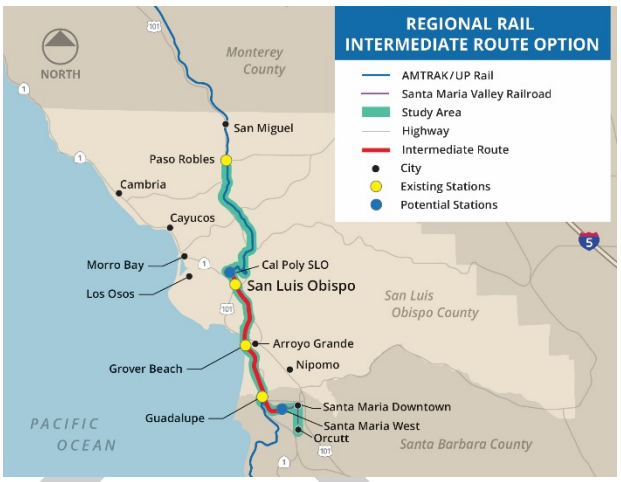
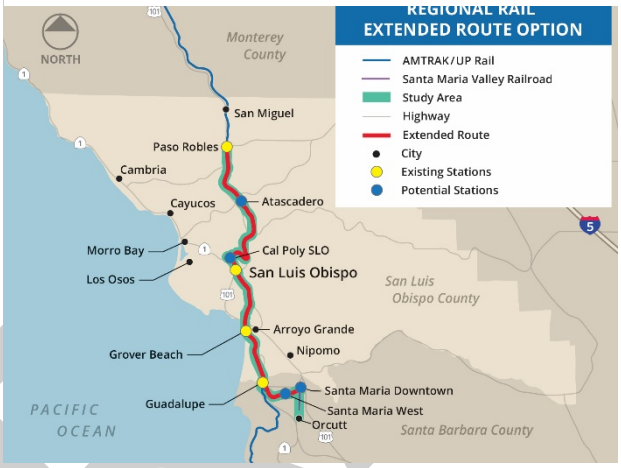


Figure ES-4. Option 4: Extended Route Option



Assessment of Service Options

Technology Options

Regional rail systems in the united states utilize a variety of technologies. Power is normally derived from burning diesel fuel or from electricity delivered by third rail or overhead catenary, but alternative technologies are emerging. It is assumed that conventional electrification (via third rail or overhead catenary) would not be feasible along the corridor. Thus, a diesel option or one of the currently emerging alternative technologies could be chosen, such as battery-electric or hydrogen fuel cell powered trains. Due to the evolving nature of the technological landscape, this study does not recommend a specific power source for a rail service likely to be implemented decades in the future.

Trains can consist of unpowered passenger cars (coaches) pulled by an engine (locomotive) or self-propelled cars called multiple units. Locomotive hauled coaches are more expensive, but they provide high seating capacity (500+ seats per train) more cost effectively than multiple units. Based on the forecasted average ridership per train in each option, multiple units are recommended for this corridor, as they provide sufficient seating capacity at lower cost. Historically, multiple unit trains have not been operated on rail lines owned by Union Pacific (UP), so an operating agreement with UP for regional rail service would need to include provisions to accommodate this type of vehicle. Any multiple unit train used

on this corridor would need to conform to applicable FRA safety regulations to operate on tracks shared with heavier conventional trains.

Infrastructure

As shown in Table ES-2, infrastructure needs increase with service level. The Option 1 analysis demonstrates that it is possible to implement a minimal service level with no capacity or station improvements, but the higher levels of service require corresponding increases in investment.

Table ES-2. Capital Needs by Service Option

Recommended Infrastructure	Option 1	Option 2	Option 3	Option 4
Track Capacity Improvements				
New Santa Maria Siding			✓	✓
Power Guadalupe Siding		✓	✓	✓
Add universal crossover to Guadalupe siding			✓	✓
Power Grover siding		✓	✓	✓
Extend Chorro siding*				✓
New Siding in Atascadero				✓
New Siding in Paso Robles				✓
Stations				
Second platform at Guadalupe		✓	✓	✓
Second platform at Grover Beach		✓	✓	✓
Second platform at Paso Robles				✓
Station in Atascadero (2 platforms)				✓
Station by Cal Poly (1 platform)			✓	✓
Santa Maria - West Station (1 platform)			✓	✓
Santa Maria - Downtown Station (1 platform)				✓
Fleet and Facilities				
2-car DMU vehicles	2	5	12	24
Maintenance Facility	✓	✓	✓	✓
Layover facility (capacity in cars)	4-car	10-car	24-car	48-car

*If extending Chorro siding is not feasible, a siding could be added north of Cal Poly instead.

Cost and Ridership

Table ES-3 summarizes the ridership and cost metrics associated with each service option. Ridership and necessary investment increase with service. Option 1 is most cost effective in terms of operating cost per trip, while Option 3 achieves the lowest capital cost per boarding.

Table ES-3. Performance by Service Option

	Option 1	Option 2	Option 3	Option 4
Weekday Boardings	400-500	600-800	3,700-5,000	4,500-6,000
Saturday Boardings	N/A	300-400	1,700-2,300	2,100-2,800
Sunday/Holiday Boardings	N/A	200-300	1,200-1,600	1,400-2,000
Annual Ridership	102,000-127,500	180,200-242,200	1,101,500-1,487,400	1,337,900-1,791,600
Annual Fare Revenue	$312,000-$390,000	$551,000-$740,000	$3,365,000-$4,544,000	$4,088,000-$5,474,000
Annual Operating Cost	$1,458,000	$10,532,000	$30,067,000	$61,112,000
Annual Operating Subsidy	$1,068,000-$1,146,000	$9,792,000-$9,981,000	$25,523,000-$26,702,000	$55,638,000-$57,024,000
Farebox Recovery Ratio	21-27%	5-7%	11-15%	7-9%
Operating Cost per Trip	$11.44-$14.29	$43.48-$58.45	$20.21-$27.30	$34.11-$45.68
Subsidy per Boarding	$8.38-$11.24	$40.43-$55.39	$17.16-$24.24	$31.06-$42.62
Capital Cost	$54,960,000	$123,518,000	$257,826,000	$535,738,000
Capital Cost per 2045 Boarding*	$431-$539	$510-$685	$173-$234	$299-$400

*This metric provides a divides total capital costs by the annual ridership in the forecast year (2045) to provide a high-level comparison of capital cost effectiveness between alternatives.

Governance

New service would need to be managed by an agency. Existing regional rail systems in California utilize one of two models: joint powers authorities (JPAs) or special purpose districts. JPAs are formed by government agencies, such as cities or county transportation commissions, that agree to collectively administer services at a regional level, and have powers defined by the joint use of powers agreement between the member agencies, allowing flexibility in institutional characteristics. Special purpose districts are created by state legislation and are independent of other agencies, with powers defined by the state legislature.

For implementation of regional rail in the Greater San Luis Obispo area, institutional capacity could be built within an existing agency, such as the San Luis Obispo Regional Transit Authority, or a new JPA or special purpose district could be created. Utilizing an existing agency may provide some administrative efficiency and facilitate coordination with other modes, while creating a new agency could allow the representation of constituents to be aligned best with the corridor service area. Creating a JPA provides the greatest institutional flexibility and would allow local policymakers to establish the agency or change its structure without requiring state legislation.

Funding

Funding to support potential regional rail implementation may be available at the federal, state and local levels. The PRIS evaluated multiple funding options and rated them as High, Moderate, or Low in terms reasonableness to support regional rail in the study area. Three sources were rated High: the State Rail Assistance Program, the Transit and Intercity Rail Capital Program, and revenue generated from locally imposed taxes. In addition, based on the ridership forecasts presented in Section 4.4, Options 3 and 4 could potentially be candidates for the Federal Transit Administration (FTA) Capital Investment Grant (CIG) Program. To chart a path towards implementation, a detailed Implementation and Funding Strategy study is recommended as a next step in the planning process.

Conclusion and Next Steps

Table ES-4 shows a comparison of the service options. The analysis indicates both Options 1 and 3 expected to have operating costs per trip below the average for comparable systems. Option 1 would require the higher capital cost per trip, since the startup costs would not be shared across a large number of trips. In contrast, Option 3 achieves high ridership with slightly higher operating cost per trip, but the lowest capital cost per trip. Options 2 and 4 compare poorly to other systems in operating cost effectiveness. Option 2 performs worst on capital cost effectiveness, while Option 4 performs moderately.

Should the region pursue implementation of regional rail, Option 3 provides the best balance of costs and benefits. Options 1 and 2 are less expensive to implement but generate little ridership and do not provide access to some of the corridor's main origins and destinations. Option 4 generates the highest ridership overall, but due to the additional cost of lengthening the route and inability of rail transit to provide competitive travel times across the Cuesta Grade, the cost of this option is approximately double that of Option 3 without a corresponding doubling in projected ridership.

The subsequent implementation and funding strategy for regional rail service could consider the options as phases rather than discrete alternatives. Service could potentially begin between the three existing stations between Guadalupe and San Luis Obispo while the stations and improvements necessary for Option 3 are under development. Service north of the Cuesta Grade is not sufficiently cost-effective to consider implementation as part of the initial system, although future extensions may be considered.

Table ES-4. Comparison of Service Options

	Option 1	Option 2	Option 3	Option 4
Ridership Potential	Low	Medium-Low	High	High
Total Capital Cost	Low	Medium	High	Very High
Total Operating Cost	Low	Medium-Low	Medium-High	High
Capital Cost per Boarding	Medium-High	High	Low	Medium
Operating Cost per Boarding	Low	High	Medium-Low	Medium-High

More advantageous ⟷ Less advantageous

With appropriate investment and institutional change, it is feasible to implement regional rail in the greater San Luis Obispo Area. Several actions are needed to plan, develop, and deliver these improvements:

1. Policymakers along the Central Coast must consider the relative costs and benefits implementing regional rail, and determine if the large level of investment required aligns with regional goals
2. Performing an Implementation and Funding Study will lay out potential funding sources and provide a path to implementation
3. Track access must be secured from UP. This will require negotiations to refine specific capital investments that will be necessary and agreement on a track access fee
4. One of the following governance structures must be chosen for the new service
    a. Management by an existing agency (e.g. SLORTA)
    b. Creation of a new JPA
    c. State legislation to establish a new special purpose transit district
5. Operating funds must be secured
6. Additional equipment must be acquired
7. For service options beyond Option 1, capital funding must be secured to deliver the necessary infrastructure improvements

1 Introduction

With continued growth in population and employment, the communities of the Greater San Luis Obispo Area experience growing travel demand and congestion which are exacerbated by jobs-housing imbalances. Continued employment growth in job centers like the city of San Luis Obispo and newer housing in outlying areas mean workers live farther away from their jobs and make longer commutes. Rail transit is a potential solution for these transportation needs, providing a fast, comfortable and environmentally friendly alternative to automobile travel.

An existing rail corridor passes north-south through San Luis Obispo County and is used for both freight operations and intercity passenger rail service to other regions of the state. Instituting a new regional rail service on this corridor could serve the intra-regional travel market within the Greater San Luis Obispo Area, while increased intercity passenger rail service on this corridor is being studied concurrently within the Service Implementation Plan.

This Passenger Rail Improvement Study (PRIS) evaluates the feasibility of introducing a commuter/regional passenger rail service and identifies potential phasing of the new service. The analysis includes assessment of the following:

- Potential rail vehicle technologies
- Potential station locations
- Service levels
- Infrastructure needed to support the new service
- Ridership potential
- Capital and operating costs
- Potential governance structures and funding sources
- Integration with intercity service and local transit

1.1 Study Purpose

The San Luis Obispo Council of Governments (SLOCOG) 2019 Regional Transportation Plan (RTP) includes the need to conduct research to assess the potential for commuter or regional rail service within the region, noting that implementation may be feasible near the 2045 horizon year of the RTP. Limited funds for highway expansion and the region's commitment to environmental stewardship necessitate investigating alternatives to meet growing travel demand within the region. Since the feasibility of regional rail has not been studied for decades, this PRIS was undertaken to provide decision makers with current information on the costs and benefits of a potential regional rail system and the steps required to implement the service.

The following goals of the SLOCOG RTP form the foundation of this study:

- Preserve the transportation system
- Improve intermodal mobility and accessibility for all people
- Support a vibrant economy
- Improve public safety and security
- Foster livable, healthy communities and promote social equity
- Practice environmental stewardship
- Practice financial stewardship

While regional rail in the San Luis Obispo area is not included in the California State Rail Plan, the goals of the RTP and this study align with the State Rail Plan.

1.2 Study Need

Development of the region has spread housing further away from the city of San Luis Obispo, but employment is still concentrated; the Central County planning area, which consists of the City of San Luis Obispo and unincorporated communities in its vicinity, contains 40 percent of the county's jobs but only 20 percent of the population.[1] The fastest population growth is expected in the North County planning area (north of the Cuesta Grade), due to resource constraints in the rest of the county. Overall, population and employment within San Luis Obispo County are forecast to grow by 15.1 percent and 15.9 percent, respectively by 2045.

As population, employment, and tourism in the region grow, so too will travel demand. Accommodating this increase in travel demand with highway expansion along the environmentally sensitive coast is costly and inconsistent with regional and state goals to preserve the natural environment, improve air quality, and reduce vehicle miles traveled. Rail transit provides an alternative to driving that reduces environmental impacts and expands mobility to those who cannot or do not wish to drive. By making strategic investments on an existing railroad right of way, capacity can be added with less environmental impact than widening highways.

1.3 Stakeholder Engagement

Due to the regional size and community diversity of the study area, implementation of a comprehensive, strategic communications and public outreach program was essential to understanding needs and creating feasible plans to meet those needs for future rail and bus travel. The program focused on development of effective communications tools and strategies to build awareness, understanding and active engagement in the study process. More information on stakeholder engagement is included as **Appendix A**.

The engagement process included:

- **Comprehensive property owner/stakeholder database** including business, residential, advocacy, educational, and medical interests
- **Project branding and messaging** which provided a standardized look and feel to project communications
- **A project-specific website** hosting up-to-date materials and linking to key resources
- **Bilingual fact sheet**
- **Email notifications** using a standardized project email address
- **Social media and media relations campaigns** utilizing SLOCOG's Facebook account, press releases, and news articles
- **Online survey** available from mid-June to early October 2020, which garnered 451 responses

Two key committees, the Technical Advisory Committee (TAC) and the Community Working Group (CWG), were formed to allow the team to directly engage with community representatives and leaders to foster relationships and share timely information and input at key milestones within the development of the PRIS.

- The TAC included members from local and regional governments and transportation providers, including LOSSAN and SMVRR. Three TAC meetings were held in July 2020, December 2020, and March 2021.

[1] SLOCOG. 2019. *SLOCOG 2019 Regional Transportation Plan*. https://www.dropbox.com/s/oc6i8wshikuirsh/__FINAL%202019%20RTP.pdf?dl=0

- CWG membership included local business, medical, educational, environmental, and transportation advocacy representatives. Two CWG meetings were held in July 2020 and December 2020, and May 2021.

In addition to the committee meetings, the SLOCOG Board and the Coast Rail Coordinating Committee received project updates at key intervals. A virtual public meeting was held on September 30, 2020 via Webex, which was intended to build study awareness and seek initial input from a broad base of interested parties.

Through discussion with the TAC and with input from other key stakeholders throughout the study area, a list of objectives was developed for a potential regional rail service the area. These objectives correspond directly with SLOCOG RTP goal areas and are described in Table 1-1.

Table 1-1. Study Service Objectives

Goal	Service Objective(s)
Preserve the transportation system	Maximize the efficiency of the existing transportation system (primarily US-101) by shifting trips from private automobiles to transit
	Maintain resilience to projected climate change impacts (e.g., extreme weather, landslides) in the development of increased passenger rail service along the Coast Corridor
Improve intermodal mobility and accessibility for all people	Increase transit mode share among commuters
	Provide rail service that is reliable and competitive with automobile travel time (especially to colleges/universities, jobs, and tourist destinations)
	Develop a rail system that complements other transit services by enabling convenient transfers within San Luis Obispo County and northern Santa Barbara County
	Plan for a rail service that will be well used, with projected ridership comparable to similar regional rail systems elsewhere
	Ensure that all stations and trains are ADA-accessible
Support a vibrant economy	Connect housing and jobs by providing transit service to areas with high employment and population densities
	Improve mobility and accessibility for tourists and other visitors to Central Coast communities
	Avoid impacting freight rail operations with introduction of commuter rail service
Improve public safety and security	Reduce the likelihood of transportation-related injuries and fatalities
	Provide sufficient capacity to allow social distancing to slow spread of diseases like the COVID-19 Pandemic
	Provide passenger rail service that operates safely and efficiently with freight operations
Foster livable, healthy communities and promote social equity	Provide a reliable and competitive alternative to driving, to address the long commute times resulting from the jobs-housing imbalance
	Expand travel options for populations who cannot or do not drive (i.e. seniors, people with disabilities, people who don't own a car, students)
	Provide affordable access to economically or socially disadvantaged groups
	Encourage walking and biking
	Locate stations in areas with affordable housing
	Support transit-oriented development
Practice environmental stewardship	Support state climate goals by reducing vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions
	Improve air quality by reducing criteria emissions
	Promote alternative, energy-efficient rail technologies that reduce GHG emissions and improve air quality
	Preserve neighborhood character by reducing need for new parking and roadway expansions
Practice financial stewardship	Plan a regional rail system that is well-positioned to compete for local, state, and federal funds
	Plan for a cost-effective rail system
	Generate fare revenue by providing attractive rail service

2 Existing Conditions

2.1 Study Area

The study area consists of the existing rail corridor from Santa Maria to Paso Robles and the cities along it. The rail corridor includes portions of the Union Pacific (UP) Railroad mainline Santa Barbara and Coast subdivisions, which travel roughly parallel to US 101. In addition, a branch line owned by the Santa Maria Valley Railroad (SMVRR) connects Santa Maria to the UP mainline in Guadalupe.

2.1.1 Union Pacific Railroad

The UP Santa Barbara Subdivision runs from Ventura to San Luis Obispo, where it continues north as the Coast Subdivision, crossing over the Saint Lucia Mountains via the Cuesta Grade en route to northern California. The mainline currently serves freight rail and intercity passenger rail. Within the study area, there are four existing passenger rail stations currently served by intercity rail: Paso Robles, San Luis Obispo, Grover Beach, and Guadalupe. Existing passenger rail services on UP's corridor are described in section 2.2.1.

2.1.2 Santa Maria Valley Railroad

SMVRR is a short line railroad that connects freight customers in the Santa Maria Valley to the UPPR's national network. The mainline travels east from Guadalupe to downtown Santa Maria, with an additional line from downtown Santa Maria to the industrial area north of the Santa Maria Airport.

2.1.3 Corridor Communities

The study area is home to over 330,000 people, with the majority living south of the Cuesta Grade. Table 2-1 shows the population of each city and census designated place along the corridor from north to south.

Table 2-1. Corridor Population by Community (North to South)

Community	County	Incorporation	Population
Paso Robles	San Luis Obispo	Incorporated city	31,820
Templeton	San Luis Obispo	Census designated place	7,840
Atascadero	San Luis Obispo	Incorporated city	30,130
Garden Farms	San Luis Obispo	Census designated place	400
Santa Margarita	San Luis Obispo	Census designated place	1,120
San Luis Obispo	San Luis Obispo	Incorporated city	47,300
Los Ranchos	San Luis Obispo	Census designated place	1,640
Edna	San Luis Obispo	Census designated place	170
Pismo Beach	San Luis Obispo	Incorporated city	8,180
Grover Beach	San Luis Obispo	Incorporated city	13,540
Arroyo Grande	San Luis Obispo	Incorporated city	18,030
Oceano	San Luis Obispo	Census designated place	7,490
Los Barros	San Luis Obispo	Census designated place	530
Callendar	San Luis Obispo	Census designated place	1,220
Blacklake	San Luis Obispo	Census designated place	850
Woodlands	San Luis Obispo	Census designated place	2,030
Nipomo	San Luis Obispo	Census designated place	17,600
Guadalupe	Santa Barbara	Incorporated city	7,450
Santa Maria	Santa Barbara	Incorporated city	106,220
Orcutt	Santa Barbara	Census designated place	31,120
Total			**334,680**

Source: US Census Bureau, 2019 American Community Survey 5-year estimates

The study area crosses the county line, and the communities of the Santa Maria Valley (Santa Maria and Orcutt) comprise the largest population center on the corridor, accounting for over 40 percent of study area population. Northern Santa Barbara County has strong ties with San Luis Obispo, with more trips between the Santa Maria Valley and San Luis Obispo County than between northern and southern Santa Barbara County.[2]

Within San Luis Obispo County, the imbalance of jobs to housing results in recurring congestion on US 101, with the Central County planning area accounting for more than twice as many jobs as housing units. Also located in Central County is the California Polytechnic State University (Cal Poly), which is one of the region's largest employers and had a student body of 21,812, of whom 7,744 lived on campus, as of Fall 2018.[3]

Given the natural amenities of the region, tourism contributes heavily to the economy of the San Luis Obispo Area. In 2017, 7.2 million visitors to San Luis Obispo County spent $1.7 billion that supported the local economy.[4] Current intercity rail services provide an opportunity for tourists to travel to the region from other areas without automobiles, and a new regional rail service could provide transportation for these visitors within the region during the course of their stays.

2.2 Existing Services

Intercity rail service currently operates on the rail corridor within the study area, with regional and local transit provided by bus operators.

2.2.1 Intercity Services

2.2.1.1 Pacific Surfliner

The Pacific Surfliner is a state-supported intercity rail service operated by Amtrak and managed by the Los Angeles – San Diego – San Luis Obispo (LOSSAN) Rail Corridor Agency. It is the third highest ridership Amtrak service in the country. Two daily Pacific Surfliner round trips operate between San Luis Obispo and Los Angeles, with intermediate stops including Grover Beach and Guadalupe.

2.2.1.2 Coast Starlight

The Amtrak Coast Starlight provides daily long-distance service between Los Angeles and Seattle, including stops in San Luis Obispo and Paso Robles.

2.2.1.3 Amtrak Thruway

Amtrak provides Thruway bus service in the study area to connect to the three state-supported rail services in California:

- Pacific Surfliner: Route 17 (four round trips per day) connects to Pacific Surfliner trains, three in Santa Barbara and one in SLO, and travels to Salinas and beyond
- Capitol Corridor: Route 21 (one round trip per day) connects to the Capitol Corridor in San Jose and extends to Santa Barbara
- San Joaquins: Route 18 (two round trips per day) connects to San Joaquins trains in Hanford and travels to Santa Maria via Paso Robles

[2] Fehr & Peers. 2016. *Central Coast Origin-Destination Survey*. http://www.sbcag.org/uploads/2/4/5/4/24540302/central_coast_o-d_survey_final_report_7-8-2016.pdf
[3] California Polytechnic State University. n.d. *Cal Poly Quick Facts*. https://calpolynews.calpoly.edu/quickfacts.html
[4] Tourism Economics. 2018. *Economic Impact of Tourism in San Luis Obispo County, California – 2017*. https://assets.simpleviewinc.com/simpleview/image/upload/v1/clients/slocal/SLO_CAL_Economic_Impact_Report_22d17f05-ebae-488f-bc4b-9e830174d08d.pdf

Previously, Thruway services in California were intended to be used to connect to trains, and passengers could only purchase tickets as part of a journey that includes a rail trip. However, recent state legislation - Senate Bill (SB) 742 - opened the possibility for rail joint powers authorities (JPAs) managing Thruway service to allow passengers to board without having to purchase a rail ticket. This creates the potential for existing Thruway services to play a larger role in regional travel.

2.2.2 Regional Services

The San Luis Obispo Regional Transit Authority (SLORTA) operates regional, limited-stop bus services connecting the communities of San Luis Obispo County and the Santa Maria Valley.

2.2.2.1 SLORTA Route 9

Route 9 connects northern San Luis Obispo County to the city of San Luis Obispo via US 101, roughly parallel to the railroad, with stops in San Miguel, Paso Robles, Templeton, Atascadero, Santa Margarita, and San Luis Obispo. It operates hourly throughout the day on weekdays, with reduced weekend service.

2.2.2.2 SLORTA Route 10

Route 10 is roughly parallel to the southern portion of the rail corridor, utilizing US 101 from Santa Maria to San Luis Obispo, with intermediate stops in Nipomo, Arroyo Grande, and Pismo Beach. It operates hourly throughout the day on weekdays, with additional express service during peak periods and reduced frequency on weekends.

2.2.3 Local Services

2.2.3.1 Paso Express

The City of Paso Robles provides two circulator routes through the city that stop at the Paso Robles rail station, where connections to SLORTA Route 9 and the Coast Starlight are available.

2.2.3.2 SLO Transit

The City of San Luis Obispo provides eight circulator routes within the city and surrounding areas. Routes 3A and 3B connect the existing Amtrak station to Cal Poly and the western portion of the city. Through a funding agreement between Cal Poly and the City, students, faculty, and staff of the university are allowed fare-free use of the system.

2.2.3.3 SoCo Transit

Under the brand name SoCo Transit, SLORTA provides circulator service within the Five Cities area, which consists of the cities of Pismo Beach, Grover Beach and Arroyo Grande, unincorporated Oceano, and Shell Beach (a community within the city of Pismo Beach). Routes 21 and 24 serve the existing Grover Beach Amtrak station, providing connections to Pismo Beach and Arroyo Grande. SoCo Transit was previously governed by a separate agency, which was consolidated into SLORTA in 2020.

2.2.3.4 Guadalupe Transit

Provided by the City of Guadalupe, the Guadalupe Flyer connects Santa Maria to Guadalupe, where it serves the existing Amtrak station and a loop within the city.

2.2.3.5 Santa Maria Area Transit

The City of Santa Maria provides eight local routes serving Santa Maria and Orcutt, which all connect at the Santa Maria Transit Center in the city's downtown.

3 Commuter/Regional Rail System Options

Rail transit systems include a variety of service patterns, technologies, and target markets. These factors interact to determine the cost of establishing and operating the service, as well as the ridership and associated benefits that the system will achieve. The use of an existing freight rail corridor limits these options to those suitable for shared operation, but a range of service patterns and technologies could be operated on the corridor with the appropriate level of investment.

3.1 Comparable Systems

To provide real-world points of comparison for evaluating costs and benefits of regional rail in the San Luis Obispo Area, several regional rail corridors in California and around the country were identified that have similarities in demographic and geographic characteristics to the San Luis Obispo area. Six existing systems and three in various stages of development were identified. Table 3-1 summarizes the location, length, population, and vehicle type for the corridors identified, and more information is provided in **Appendix E**.

Table 3-1. Comparable Corridors

Service/Corridor	Length (miles)	Main City	Estimated Population	Vehicle Type	2019 Ridership
Existing Systems					
Sonoma-Marin Area Rail Transit (SMART)	46	San Rafael, CA	400,000	DMU	714,000
SPRINTER	22	Oceanside, CA	500,000	DMU	1,362,800
New Mexico Rail Runner Express	97	Albuquerque, NM	700,000	LHC	744,000
A-train	21	Lewisville, TX	400,000	DMU	382,000
Music City Star	32	Nashville, TN	650,000	LHC	292,500
SunRail	49	Orlando, FL	600,000	LHC	1,571,800
Planned or Proposed Systems					
Redlands Passenger Rail Project	9	San Bernardino, CA	250,000	DMU/FCMU	N/A
Triangle Commuter Rail	37	Raleigh, NC	950,000	TBD	N/A
Treasure Valley High Capacity Corridor	29	Boise, ID	400,000	TBD	N/A
Study Corridor					
Santa Maria-Paso Robles	71	San Luis Obispo, CA	335,000	TBD	N/A

LHC = Locomotive hauled coaches, DMU = Diesel Multiple Unit, FCMU = Hydrogen Fuel Cell Multiple Unit

3.2 Technology

A number of rail vehicle technologies are available and in use across the United States. Regional rail systems generally use either diesel fuel stored on trains or electricity provided by a third rail or overhead wire to the trains, but there are emerging alternative technologies currently being tested. Trains can consist of unpowered passenger cars (coaches) pulled by an engine (locomotive) or self-propelled cars called multiple units. Further detail on these vehicle technologies considered is provided in **Appendix F**.

Conventional electrification (via third rail or overhead catenary) is unlikely to be feasible along this corridor; thus, a diesel option or one of the currently emerging alternative technologies could be chosen, such as battery-electric or hydrogen fuel cell powered trains. State and regional policy goals support

reducing emissions through the use of new technologies; however, due to the evolving nature of the technological landscape, this study does not recommend a specific power source for a rail service likely to be implemented a decade or more in the future.

The primary practical difference between locomotive hauled coaches (LHC) and multiple units is that LHC trainsets are typically much larger, providing greater seating capacity (500+) but more costly to purchase and operate. In contrast, multiple units are often operated in short trains that have fewer seats (100-250) but are cheaper to purchase and operate. Operationally, LHC train performance changes as cars are added, since the power of the locomotive is spread over more cars, but multiple unit performance does not, because each car is able to power itself.

Where high seating capacity is necessary, LHCs are generally more cost effective, but when the capacity is not needed, service can be provided at lower cost with smaller multiple unit trains. As discussed in Section 4.2.2, the average number of passengers per train is not expected to exceed the capacity that can be accommodated with multiple units, so these are recommended over LHCs.

Given the nature of the corridor, which is owned by UP and hosts operation of heavy freight and intercity rail services, the vehicles chosen would need to comply with FRA safety regulations, which prohibit small vehicles (such as traditional light rail vehicles) from sharing tracks with larger freight and conventional intercity rail trains. While not all multiple units are FRA-compliant, models are available that do meet these standards. However, it is important to note that UP has not yet approved operation of multiple units on the corridor, and the model selected must, in addition to being FRA-compliant, be approved by UP during negotiations for track access.

3.3 Potential Stations

The study corridor contains four existing intercity rail stations (Paso Robles, San Luis Obispo, Grover Beach, and Guadalupe), and additional locations for potential new stations were identified based on proximity to population and employment, as well as input from public engagement. New stations would improve access to residents and jobs, increasing opportunities to utilize the system. However, additional stations can also slow down the rail service, resulting in increased travel times for riders that must stop more often before reaching their destination. This is a particularly important consideration when stations are close together, since the delay from additional stops can outweigh the convenience of local access. In addition, new stations require funding and often land acquisition to construct.

In addition to the four existing stations, potential additional stations were identified in the following locations:

- San Miguel, a census designated place north of Paso Robles
- Templeton, a census designated place between Paso Robles and Atascadero
- Atascadero, the second-largest population center north of the Cuesta Grade
- Santa Margarita, a census designated place just north of the Cuesta Grade
- San Luis Obispo
    - Adjacent to Cal Poly
    - At Tank Farm Road, near the San Luis Obispo County Regional Airport
- Pismo Beach, north of US 101
- Oceano, at the historic train depot
- Santa Maria
    - On the western edge of the city
    - In downtown, near Highway 135
    - Near the Santa Maria Airport by the border with Orcutt

Table 3-2 summarizes the approximate distance of each station from the station before it (north to south) and the population of each station's service area. Due to their proximity, stations in the Five Cities area are grouped, since the stations would have overlapping catchment areas.

Four of the proposed stations were carried forward into the route options considered due to their proximity to large employment or population centers: Atascadero, Cal Poly, Santa Maria - West, and Santa Maria - Downtown. A station in San Miguel would significantly extend the length of the study area, and the town itself has a small population, so it was not considered at this time. Since the potential Santa Maria – Downtown and Santa Maria Airport/Orcutt stations are located on different SMVRR spur lines, it would operationally inefficient to serve both stations; the downtown station was selected given its more central location in the city and proximity to the Santa Maria Transit Center. Preliminary ridership estimation efforts indicated that the travel time penalty of adding stations beyond those identified would outweigh the potential ridership benefit.

Table 3-2. Potential Stations: Spacing and Population by Service Area

Service Area	Station(s)	Miles from Prior Station	Area Population
San Miguel	*San Miguel*	N/A	2,900
Paso Robles	Paso Robles Intermodal Station	9.1	31,800
Templeton	*Templeton*	5	7,800
Atascadero	*Atascadero*	5.4	30,100
Santa Margarita	*Santa Margarita*	8.6	1,100
San Luis Obispo[1]	*Cal Poly*	14	
	Amtrak Station	2	
	Tank Farm/SLO Airport	2.25	55,000
Five Cities[2]	*Pismo Beach*	8.25	
	Grover Beach	1.7	
	Oceano Train Depot	1.5	47,200
Guadalupe	Guadalupe	10.8	7,500
Santa Maria/ Orcutt	*Santa Maria - West*	7.7	
	Santa Maria - Downtown	2	
	Santa Maria Airport/Orcutt	3.3	137,300

Potential stations in italics

[1]San Luis Obispo Population includes Cal Poly on-campus housing

[2]Five Cities population includes Pismo Beach, Grover Beach, Arroyo Grande, Oceano, and Shell Beach (part of the City of Pismo Beach).

3.3.1 Route Length

The route length of the proposed regional rail service is a significant determinant of cost, determining where capacity improvements are needed and the number of train miles that will be operated. To capture a range of investment and service coverage, three routes of ascending length were identified.

The segment of the Study Corridor from Guadalupe to San Luis Obispo is currently most suited for regional rail service, with three existing stations and a large portion of San Luis Obispo County's population. Service between these three stations was identified as the "short route" for consideration.

The SMVRR currently does not have passenger rail service, but extending service from Guadalupe to Santa Maria would add the largest population center of the corridor. Similarly, a short extension to the north of the Downtown San Luis Obispo Station to Cal Poly would provide connections to one of the

region's largest destinations and the home of students who have generally lower rates of car ownership. In fact, Cal Poly prohibits freshmen living on campus from bringing personal vehicles during their first year unless they demonstrate a "compelling need" to do so.[5] Thus, Cal Poly to Santa Maria was identified as the "intermediate route."

Extending north to Paso Robles entails crossing the Cuesta Grade and doubling the length of the route. This "extended route" would provide service to the largest area but would also require the most investment.

3.4 Service Levels

Regional rail systems in the United States provide a range of service levels. Some focus primarily on the traditional commuter market, providing a handful of trains during the morning and afternoon peak hours, often in a single direction (suburb to city in the morning, back in the afternoon), hence the usage of the term "commuter rail." Music City Star in Nashville is an example of this type of service. The highest service level of the comparable systems analyzed was for NCTD's SPRINTER, which operates every 30 minutes throughout most of the day, with reduced weekend service. This frequency and service span enables a wider range of customers to use the service for a broad range of trip purposes.

To assess a range of service provision and associated operating cost, two service levels were used in defining service options. The "Peak Only" service level consisted of two round trips during each weekday peak period (four round trips per day), with no weekend or holiday service. This service level was paired with the Short Route to provide an option with reduced cost but was not used for the longer route options.

The "All Day" service level consists of service every 30 minutes during weekday peak periods (6am-9am and 4pm-7pm) and service every hour during off peak times and weekends between 6am and 10pm. An option at this service level for each route length was assessed. All-day service would broaden the potential market for service beyond just peak commute hours, which may be particularly useful for a corridor with major tourism and education destinations.

3.5 Service Options Analyzed

To capture a range of service options, four scenarios of ascending levels of investment were assessed.

3.5.1 Option 1: Short Route, Peak Only Service

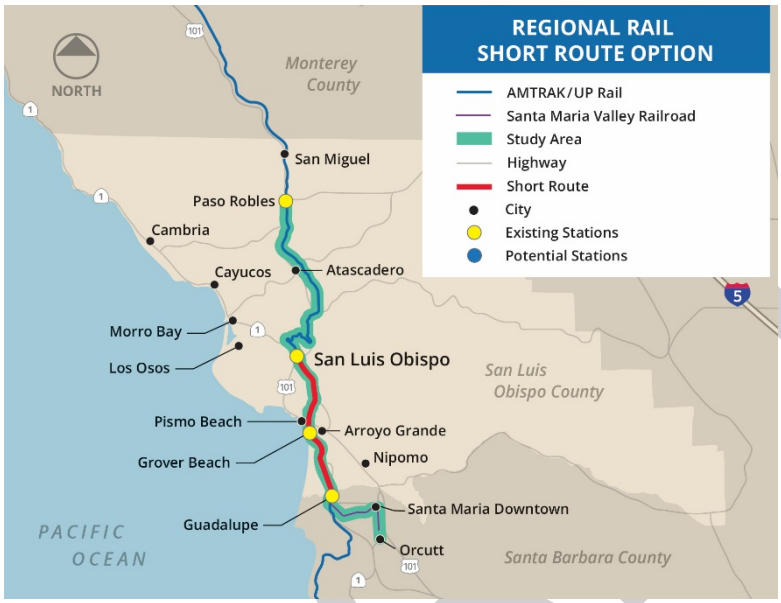
To minimize capital and operating cost, Option 1 would utilize existing stations and provide service only during morning and afternoon peak periods (four round trips daily). As shown in Figure 3-2, stations would include Guadalupe, Grover Beach, and San Luis Obispo. No weekend service would be provided.

[5] California Polytechnic State University. n.d. *Resident Parking as a First Time Freshman*. https://afd.calpoly.edu/parking/students/

3.5.2 Option 2: Short Route, All Day Service

Option 2 would use the same route as Option 1 (see Figure 3-2), but with a higher level of service. Trains would operate every hour from 6am to 10pm each day, with a second train per hour (every 30 minutes) during peak periods on weekdays (6am-9am, 4pm-7pm).

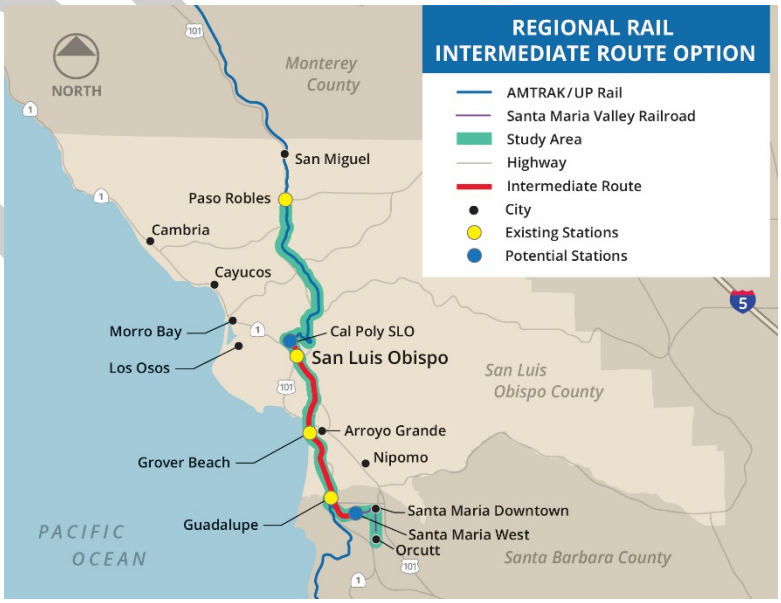
Figure 3-1. Short Route Option



3.5.3 Option 3: Intermediate Route, All Day Service

Option 3 would use the same service level as Option 2 (every 30 minutes during peak periods, every hour off-peak). In addition to existing stations in Guadalupe, Grover Beach, and San Luis Obispo, it would include new stations at Cal Poly and Santa Maria – West.

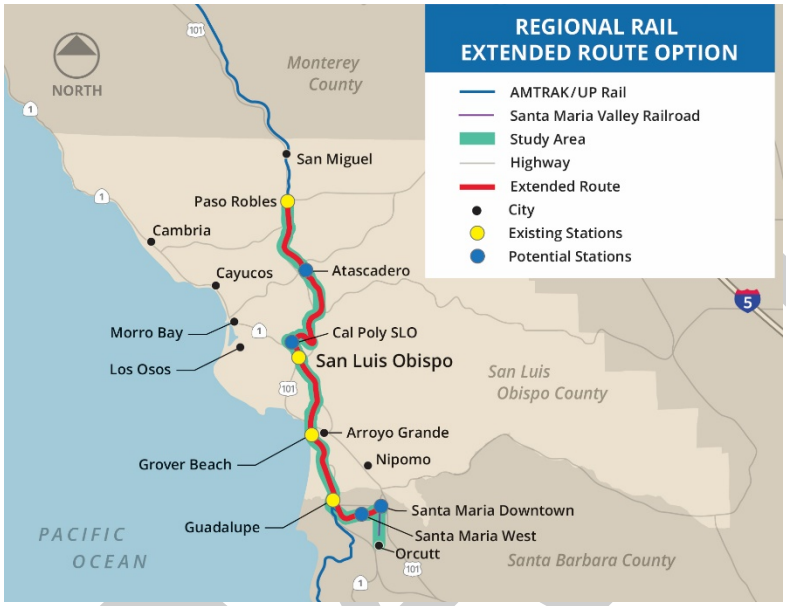
Figure 3-2. Intermediate Route Option



3.5.4 Option 3: Extended Route, All Day Service

Option 4 would use the same service level as Option 2 and 3 (every 30 minutes during peak periods, every hour off-peak). Station stops would include all four existing stations on study corridor (Guadalupe, Grover Beach, San Luis Obispo, and Paso Robles) and four new stations: Atascadero, Cal Poly, Santa Maria – West, and Santa Maria – Downtown.

Figure 3-3. Extended Route Option



4 Evaluation of Options

4.1 Methodology and Assumptions

4.1.1 Operations Modelling

This section provides an overview of the modeling methodology; additional detail on the methodology and results are provided in **Appendix G**.

To conceptually identify infrastructure improvements, hypothetical schedules were developed and tested through rail simulation analysis using Rail Traffic Controller (RTC), a software used by the Federal Railroad Administration and most Class I railroads, including UP. UP's existing RTC model of the project area provided valuable input to the development of this SIP. As part of the Service Implementation Plan (SIP) developed concurrently with this PRIS, the model was tested, validated, and updated with recently completed infrastructure improvements and proposed mid and long-term regional and long-distance passenger train schedules. The SMVRR portion of the model was developed using GIS data publicly available from CA.GOV for the California Rail Network.

Model limits spanned from Santa Maria to Paso Robles. As discussed in Section 4.1.2, multiple units are the recommended vehicle type. While no specific fuel type or manufacturer has been recommended at this time, a Stadler FLIRT DMU railcar was used for modelling purposes (more information provided in Section 4.1.2). It should be noted that UP currently has a minimum 30 axle requirement for passenger trains operating on its network and has not approved the operation of DMUs on its system. The intercity service levels assumed were based on the mid-term horizon of the SIP.

The modelling process included the following steps:

1. Test and validate the base model to ensure accuracy. This task was performed during the SIP analysis.
2. Infrastructure improvements agreed upon by LOSSAN, the California State Transportation Agency (CalSTA), and UP between Santa Barbara and San Luis Obispo (SLO) were added to the model during the SIP analysis.
3. Develop Short Route, Peak Only (Option 1) model:
    a. Insert early implementation schedule: Operate one trainset, with two round trips during peak hours between Guadalupe and SLO in the morning and two in the afternoon.
    b. Insert additional conceptual infrastructure improvements between Guadalupe and SLO, if required, into model.
    c. Re-run model to gauge the effectiveness of the added infrastructure improvements.
4. Develop Extended Route, All Day (Option 4) model:
    a. Add SMVRR infrastructure into the model.
    b. Develop bi-hourly peak and hourly off-peak schedules between Santa Maria and Paso Robles.
    c. Insert additional conceptual infrastructure improvements between Santa Maria and Paso Robles, if required, into model.
    d. Re-run model to gauge the effectiveness of the added infrastructure improvements.

For Options 2 and 3, which utilize shorter routes than Option 4 but have the same service level, infrastructure needs outside the service area were subtracted from the conceptual infrastructure identified for Option 4.

For all simulations, the primary goal is to validate that the proposed infrastructure improvements not only support the new services, but also maintain on-time performance for Amtrak's Coast Starlight long-distance service and Pacific Surfliner regional service, as well as the ability of UP freight trains to serve

online industries. The intercity service levels reflect the SIP mid-term horizon, and implementation of higher intercity service levels in conjunction with regional rail may require additional improvements beyond those identified in this analysis.

4.1.2 Capital Costs

Conceptual capital costs for necessary infrastructure improvements were estimated based on typical unit costs from industry experience. For example, the costs of new or extended sidings were estimated by multiplying the number of track miles by typical cost per track mile. Subsequently, a percentage increase was applied to account for overhead costs, such as design, project management, and flagging along the railroad. Further detail on the assumptions, methodology, and resulting cost estimates is provided in **Appendix G**.

Conceptual equipment costs were estimated based on the unit cost from the recent San Bernardino County Transportation Authority (SBCTA) procurement of three 2-car Stadler FLIRT DMUs in 2018, escalated to 2021 dollars at 2.5 percent per year. While the Stadler FLIRT was used for operational modeling and cost estimation, this should not be construed as a recommendation for a specific vehicle model or manufacturer. A spare ratio of 20 percent was applied to the maximum number of trains required for daily service. Train consist length was determined for each option based on the average ridership per train.

Table 4-1. Equipment Unit Cost – 2018 SBCTA Procurement

Equipment Units	Cost
Total Cost ($2018)	$30,900,000
Trains Procured (Stadler FLIRT DMU)	3
Unit Cost ($2018)	$10,300,000
Unit Cost ($2021)	$11,092,000

4.1.3 Operating Costs

Conceptual operating costs were estimated based on annual vehicle revenue miles using unit costs derived from the 2019 National Transit Database for the comparable systems identified that utilize DMUs. The average cost per vehicle revenue mile of these three systems was escalated to 2021 dollars at 2.5 percent per year. For these systems, a vehicle represents two articulated cars of a multiple unit.

Table 4-2. Cost per Vehicle Revenue Mile for Comparable Systems

Comparable System	Cost per Vehicle Revenue Mile ($2019)	Cost per Vehicle Revenue Mile ($2021)
Sonoma-Marin Area Rail Transit District	$29.78	$31.29
North County Transit District	$31.06	$32.63
Denton County Transportation Authority	$23.01	$24.18
Average	$27.95	$29.37

Source: 2019 National Transit Database

4.1.4 Ridership and Revenue

Weekday boardings were estimated based on overall person trips between station catchment areas derived from the SLOCOG and SBCAG travel demand models, and applying estimated mode splits for each service option. Mode splits were adjusted based on service level, and a travel time elasticity was applied for stations north of the Cuesta Grade to account for reduced speeds that make rail less

competitive. Catchment areas were defined as the Traffic Analysis Zones within 5 miles of a station. For zones that fall within multiple catchment areas, trips were equally divided between stations.

Person trips were extracted from the SLOCOG model for the 2045 forecast year. SBCAG does not have a 2045 forecast year, so trip counts were extracted for 2035 and 2040. The growth rate of 4.8 percent over those 5 years was then applied to the 2040 person trips to estimate trips for 2045.

For options with weekend service, weekend ridership was estimated based on peer information from New Mexico's Rail Runner Express service, which is one of the peer systems discussed in **Appendix E**. The ratios of Saturday and Sunday boardings to weekday boardings were applied to the weekday boardings estimated for each option. Ridership was annualized based on the number of service days shown in Table 4-3.

To capture the uncertainty associated with ridership forecasts, a 15 percent adjustment in each direction was applied to express the forecasts as a range. The ridership forecasts utilized typical regional rail mode shares based on pre-COVID travel patterns. While the pandemic has reduced rail and transit ridership, the 2045 forecast year is decades removed from these impacts. It is possible that lingering effects of the pandemic may still impact ridership far into the future, but, conversely, changes in state and regional policy supporting alternative transportation may also serve to bolster transit ridership.

Table 4-3. Annual Service Days by Option

Option	Weekdays	Saturdays	Sundays and Holidays
1: Short Route, Peak Only	255	N/A	N/A
2: Short Route, All Day	255	52	58
3: Intermediate Route, All Day	255	52	58
4: Extended Route, All Day	255	52	58

Potential fare revenue was estimated based on average fare revenue per trip for the three comparable DMU systems reported to the National Transit Database and inflated to 2021 dollars at 2.5 percent per year. Note that there is variability in fare policy between rail systems across the county, and this is a significant factor that determines fare revenue.

Table 4-4. Fare Revenue per Trip for Comparable Systems

Comparable System	Fare Type	Revenue per Trip ($2019)	Revenue per Trip ($2021)
Sonoma-Marin Area Rail Transit District	Zonal	$5.71	$6.00
North County Transit District	Flat Fare	$1.12	$1.18
Denton County Transportation Authority	Flat Fare	$1.89	$1.99
Average		$2.91	$3.06

Source: 2019 National Transit Database

4.2 Capital Cost

4.2.1 Infrastructure Requirements

The recommended conceptual infrastructure improvements and associated conceptual costs for each option are shown in Table 4-5. As service and route length increase across the options, so does the cost of necessary infrastructure. The track improvements shown accommodate train meets between regional trains in the hypothetical schedule, and some meets with intercity trains were not resolved in the model. Since future intercity schedules are uncertain and likely to change, the conceptual schedules will need to

be reevaluated as implementation nears. The intercity schedules reflect service levels for the mid-term horizon of the SIP; if intercity service levels above the mid-term frequencies are implemented, additional improvements would likely be required for to support both regional and intercity rail on the corridor. For Options 2 through 4, operating hourly service throughout the day on a largely single-track railroad would impact UP freight operations, and additional improvements may be necessary to mitigate these impacts, pending negotiations with UP.

Table 4-5. Infrastructure Costs by Option – Rough Order-of-Magnitude

Recommended Infrastructure	Cost	Option 1	Option 2	Option 3	Option 4
Support Facilities					
Maintenance Facility	$30,758,000	✓	✓	✓	✓
Layover facilities (4-cars)	$2,019,000	✓			
Layover facilities (10-cars)	$5,046,000		✓		
Layover facilities (24-cars)	$12,112,000			✓	
Layover facilities (48-cars)	$24,223,000				✓
Track Capacity Improvements					
New Santa Maria Siding	$16,132,000			✓	✓
Power Guadalupe Siding	$8,644,000		✓	✓	✓
Add universal crossover to Guadalupe siding	$8,448,000			✓	✓
Power Grover siding	$12,475,000		✓	✓	✓
Extend Chorro siding*	$32,016,000				✓
New Siding in Atascadero	$54,600,000				✓
New Siding in Paso Robles	$9,927,000				✓
Station Improvements					
Second platform at Guadalupe	$5,567,000		✓	✓	✓
Second platform at Grover Beach	$5,567,000		✓	✓	✓
Second platform at Paso Robles	$5,567,000				✓
Station in Atascadero (2 platforms)	$18,077,000				✓
Station by Cal Poly (1 platform)	$12,510,000			✓	✓
Santa Maria - West Station (1 platform)	$12,510,000			✓	✓
Santa Maria - Downtown Station (1 platform)	$12,510,000				✓
Total Infrastructure Cost		**$32,776,000**	**$68,058,000**	**$124,722,000**	**$269,531,000**

*If extending Chorro siding is not feasible, a siding could be added north of Cal Poly instead.

4.2.2 Equipment

Table 4-6 shows estimated equipment needs for each option. For Options 1 and 2, the seating capacity of a typical 2-car DMU vehicle far exceeds the expected average number of riders per train. For Options 3 and 4, the forecasted average passenger loads are close to the capacity of a typical 2-car articulated DMU (approximately 110-130 seats). As demand fluctuates across the day, demand for some trips would exceed the capacity, resulting in overcrowding. Therefore, trainsets are assumed to consist of two 2-car articulated DMUs in order to accommodate fluctuations in demand.

Table 4-6. Equipment Costs by Option

	Option 1	Option 2	Option 3	Option 4
Trains in daily Service	1	4	5	10
Spare Ratio	20%	20%	20%	20%
Total Trains Required	2	5	6	12
Average riders per train (high)	63	18	114	136
Cars per Train	2	2	4	4
Cost	$22,184,000	$55,460,000	$133,104,000	$266,207,000

4.3 Operating Cost

Table 4-7 shows the estimated conceptual operating costs by service option, which increase with the level of service provided. The combination of frequency, route length, service days, and consist length leads to an approximate 40-fold difference between Option 1 and Option 4, with the other options falling in between. As discussed in Section 4.4 below, these increases in operating cost come with associated increases in ridership as more service is provided.

Table 4-7. Conceptual Operating Costs by Option

	Option 1	Option 2	Option 3	Option 4
Route Miles	24.33	24.33	34.73	70.59
Weekday Round Trips	4	22	22	22
Weekend/Holiday Round Trips	0	16	16	16
Weekdays per year	255	255	255	255
Weekend/holiday schedule days per year	N/A	110	110	110
Vehicles per Train	1	1	2	2
Annual Vehicle Revenue Miles	49,633	358,624	1,023,840	2,080,993
Operating Cost ($2021)	$1,458,000	$10,532,000	$30,067,000	$61,112,000

4.4 Ridership and Revenue

As shown in Table 4-8, ridership is projected to be higher in scenarios with higher service levels, but the relationship is not linear. Option 2 has almost tenfold the service provided in Option 1 but is forecast to attract a smaller relative amount of ridership. From Option 2 to 3, however, the addition of stations at Cal Poly and in Santa Maria leads a large increase in expected ridership, despite identical frequency. This demonstrates the value of serving these key regional hubs.

From Option 3 to the Option 4, train miles double due to the length of the route, but ridership change is less pronounced. This reflects lower population density in northern San Luis Obispo County and the travel time penalty faced by rail transit across the Cuesta Grade. More information on ridership estimation is included in **Appendix H**.

Table 4-8. Ridership and Fare Revenue by Option

	Option 1	Option 2	Option 3	Option 4
Weekday Boardings	400-500	600-800	3,700-5,000	4,500-6,000
Saturday Boardings	N/A	300-400	1,700-2,300	2,100-2,800
Sunday/Holiday Boardings	N/A	200-300	1,200-1,600	1,400-2,000
Annual Ridership	102,000-127,500	180,200-242,200	1,101,500-1,487,400	1,337,900-1,791,600
Annual Fare Revenue	$312,000-$390,000	$551,000-$740,000	$3,365,000-$4,544,000	$4,088,000-$5,474,000

4.5 Subsidy Requirement and Cost Effectiveness

The estimated fare revenue would be insufficient to cover the costs of operating the proposed service for all options, requiring additional subsidy funding from state and local sources. The absolute subsidy requirement grows along with service provision, as does ridership. In deciding to fund transportation improvements, it is important to consider relative costs and benefits in addition to absolute costs. Table 4-9 summarizes the absolute cost and subsidy requirements, as well relative to revenue and ridership. For comparison, the average cost per trip and subsidy per trip among comparable systems, adjusted to 2021 dollars, are $29.84 and $26.91, respectively.

Option 1 is the most cost effective from an operating perspective, comparing favorably to the comparable systems that were assessed. However, it requires high capital investment per boarding, as the startup costs are not spread over as much service and resulting ridership.

Option 2 is the least cost effective from in terms of both operating and capital costs. The investment required to implement all day frequency is difficult to recoup when only three stations are served.

Option 3 scores well on each measure of cost effectiveness, combining robust frequency and service coverage from major regional population and employment centers. While higher than Option 1, the estimated ranges for cost and subsidy per boarding compare favorably to those for comparable systems.

Option 4 is relatively cost effective from a capital perspective but has high operating cost per trip. Doubling the length of the route increases cost but does not improve ridership considerably due to the uncompetitive travel times across the Cuesta Grade.

Table 4-9. Subsidy and Cost Effectiveness by Option

	Option 1	Option 2	Option 3	Option 4
Annual Ridership	102,000-127,500	180,200-242,200	1,101,500-1,487,400	1,337,900-1,791,600
Annual Fare Revenue	$312,000-$390,000	$551,000-$740,000	$3,365,000-$4,544,000	$4,088,000-$5,474,000
Annual Operating Cost	$1,458,000	$10,532,000	$30,067,000	$61,112,000
Annual Operating Subsidy	$1,068,000-$1,146,000	$9,792,000-$9,981,000	$25,523,000-$26,702,000	$55,638,000-$57,024,000
Farebox Recovery Ratio	21-27%	5-7%	11-15%	7-9%
Operating Cost per Boarding	$11-$14	$43-$58	$20-$27	$34-$46
Subsidy per Trip	$8-$11	$40-$55	$17-$24	$31-$43
Capital Cost	$54,960,000	$123,518,000	$257,826,000	$535,738,000
Capital Cost per 2045 Boarding*	$431-$539	$510-$685	$173-$234	$299-$400

*This metric provides a divides total capital costs by the annual ridership in the forecast year (2045) to provide a high-level comparison of capital cost effectiveness between alternatives.

4.6 Summary of Findings

The conceptual analysis indicates both Options 1 and 3 expected to have operating costs per trip below the average for comparable systems. Option 1 would require the higher capital cost per trip, since the startup costs would not be shared across a large number of trips. In contrast, Option 3 achieves high ridership with slightly higher operating cost per trip, but the lowest capital cost per trip. Options 2 and 4 compare poorly to other systems in operating cost effectiveness. Option 2 performs worst on capital cost effectiveness, while Option 4 performs moderately.

Table 4-10. Service Option Comparison

	Option 1	Option 2	Option 3	Option 4
Ridership Potential	Low	Medium-Low	High	High
Total Capital Cost	Low	Medium	High	Very High
Annual Operating Cost	Low	Medium-Low	Medium-High	High
Capital Cost per Boarding	Medium-High	High	Low	Medium
Operating Cost per Boarding	Low	High	Medium-Low	Medium-High

More advantageous ⟷ Less advantageous

Options 1 and 2, while less costly to implement, generate low levels of overall ridership and do not connect to some of the corridor's key markets, such as the city of Santa Maria and Cal Poly. Option 4 generates the highest ridership overall, but its cost is approximately double Option 3 without generating a corresponding doubling of projected ridership. Of the options evaluated, Option 3 provides the best balance between costs and benefits.

5 Institutional Considerations

5.1 Governance

5.1.1 Existing Governance Models

Existing regional rail services within California are currently governed using one of two models: joint powers authorities (JPAs) composed of local jurisdictions, or special purpose districts. JPAs are formed by local agencies through joint use of powers agreements to provide public services over a larger area by collectively exercising any power common to the agencies that is stipulated in the agreement, including the power to levy taxes.

Special purpose districts are independent of local governments and created by state legislation to serve a particular purpose, with powers defined by statute. However, the JPAs and special purpose transit districts are generally governed by a board of directors composed of local officials.

Table 5-1. Governance Models for Regional Rail Service

Service	Location	Vehicle Type	Agency	Type of Agency
Altamont Corridor Express	Stockton-San Jose	LHC	SJRRC	JPA of local municipalities
Caltrain	San Francisco-Gilroy	LHC[1]	PCJPB	JPA of county transportation commissions
Metrolink	Greater Los Angeles	LHC[2]	SCRRA	JPA of county transportation commissions
COASTER	San Diego County	LHC	NCTD	Sub-county special purpose district
SPRINTER	Northern San Diego County	DMU		
SMART	Sonoma and Marin Counties	DMU	SMART District	Cross-county special purpose district
eBART	Eastern Contra Costa County	DMU	BART	Cross-county special purpose district

[1] Will operate Electric Multiple Units with overhead catenary after completion of the electrification of the corridor.
[2] Diesel and hydrogen multiple unit operations are planned for portions of the system.
LHC = Locomotive hauled coaches, SJRRC = San Joaquin Regional Rail Commission, PCJPB = Peninsula Corridor Joint Powers Board, SamTrans =San Mateo County Transportation Authority, SCRRA = Southern California Regional Rail Authority, NCTD = North County Transit District, DMU = Diesel Multiple Unit, SMART = Sonoma-Marin Area Rail Transit, eBART = East Contra Costa County BART extension, CCTA = Contra Costa Transportation Authority, BART = Bay Area Rapid Transit District

5.1.1.1 Service Outside JPA Jurisdiction

While JPAs provide opportunities for regional governance that offers representation to communities across multiple jurisdictions, the service area does not need to be limited to the jurisdictions that are members of the JPA. However, regional rail services that serve other communities generally come with interagency agreements governing the service extension.

The San Joaquin Regional Rail Commission's (SJRRC) member agencies are the County of San Joaquin and cities within it, but the Altamont Corridor Express operates in Alameda and Santa Clara counties as well. The SJRRC has cooperative agreements with the county transportation commissions of Alameda and Santa Clara, which contribute to funding of the service.

A portion of two Metrolink lines extend into San Diego, and the Southern California Regional Rail Authority has entered into agreements with the North County Transit District (NCTD) governing use of their railroad facilities.

Similarly, TAMC is currently partnering with the Peninsula Corridor Joint Powers Board to plan a future extension of Caltrain service into Monterey County.

5.1.2 Governance Options

Since no regional rail service currently operates in the study area, there is no agency with established administrative capacity for managing a rail service. There are several options to manage the service, but administrative capacity must be developed regardless of whether an existing agency manages the service, or a new agency is created.

- Entrusting management of the service to SLORTA would enable the new service to be well integrated with existing regional and local bus services. There may be some reduction in administration duplication by managing multiple services together, but this benefit is limited by the dissimilarity of rail and bus operations. The communities of northern Santa Barbara County, which house a large portion of the corridor's population, are not represented among SLORTA's member agencies, but the agency could enter agreements with jurisdictions in Santa Barbara County as necessary and already provides regional bus service to Santa Maria.
- A new special purpose district could be formed to manage the new service. This would require state legislation to establish the agency and define its powers. Establishing a new agency would allow the boundaries to be drawn to encompass all communities served by the proposed rail service.
- Similar to creation of a special purpose district, creating a new JPA to manage the service could allow all communities of the corridor to be represented, but this could be done without the need for state legislation and would allow the local jurisdictions to define the details of the agency's structure. It would also provide institutional flexibility, because amending the joint powers agreement would not require legislation at the state level.

5.2 Funding

The federal, state, and local sources and value capture strategies provided herein include an array of potential funding options for the proposed regional rail improvements within the Coast Rail corridor. For the purposes of facilitating future funding discussions, Table 5-2 provides an initial reasonableness assessment for each source for regional rail improvements, with more detailed information included in **Appendix B**. Specifically, each source has been rated as either High, Moderate, or Low in terms of how reasonable it would be to pursue the source in the future.

Additionally, the table includes a summary of the range of funding or an average funding amount for each source based on recent data and indicates when the most recent application cycle occurred (if applicable). These details provide a realistic indication of the potential level of funding that could be expected from each program and to support future grant pursuit efforts in terms of planning for developing applications or funding requests. As the planning and design process progresses, the assessment of these sources may change, and additional analysis will likely be needed to refine this list of potential sources in order to create alternative funding strategies for regional rail.

The three sources that have high potential for use in funding a potential regional rail service in greater San Luis Obispo are the State Rail Assistance Program, the Transit and Intercity Rail Capital Program, and revenue generated from locally imposed taxes. In addition, based on the ridership forecasts presented in Section 4.4, Options 3 and 4 could potentially be candidates for the Federal Transit Administration (FTA) Capital Investment Grant (CIG) Program.

Table 5-2 provides a conceptual funding strategy for each service option using these four sources. This strategy is hypothetical, and actual funding will reflect the specific elements of grant applications based on refined analysis of costs and benefits, the availability of funds at the state and federal, and the ability

of the region to provide matching funds. Note if the FTA CIG program is pursued, the funding strategy can include other federal grant programs and the total federal share can be up to 80 percent. This could include potential additional near-term federal funding that may become available from the proposed American Jobs Act and the Transportation Reauthorization Bill.

Table 5-2: Conceptual Regional Rail Funding Strategy Ranges – For Discussion Purposes Only (Millions of 2021 Dollars)

Commuter Rail Scenarios	Capital Costs	FTA CIG		TIRCP		SRA		Other/Local	
1: Short Route, Peak Only	$55	N/A		$10	$20	$3	$10	$42	$25
2: Short Route, All Day	$124	N/A		$10	$20	$3	$10	$111	$94
3: Intermediate Route, All Day	$258	$103	$129	$30	$50	$3	$10	$122	$69
4: Extended Route, All Day	$536	$214	$268	$30	$50	$3	$10	$289	$208

Table 5-3. Assessment of Potential Funding Sources

Program	Initial Assessment	Conceptual Funding Range	Potential Eligible Costs	Most Recent Application Cycle
Federal				
Section 5309: Capital Investment Grant Program	Moderate	Up to 50% of total costs	Capital	Ongoing application process
Better Utilizing Investments to Leverage Development (BUILD)	Low	Range: $4 M to $25 M	Capital	May-20
Infrastructure for Rebuilding America (INFRA)	Low	Average award: $45 M	Capital	Feb-20
State and Local				
State Rail Assistance Program (SRA)	High	Range: $0.5 M to $10.5 M; Average: $3.8 M	Capital and O&M	Jul-20
Solutions for Congested Corridors Program (SCCP)	Moderate	Average award: $71 M	Capital	July 2020 (note: covered two years of programming)
Trade Corridor Enhancement Program (TCEP)	Low	Average award: $48.5 M	Capital	August 2020 (note: covered three years of programming)
Local Carbon Transit Operations Program (LCTOP)	Moderate	Range: $14,000 to $39.2 M	Capital and O&M	Mar-20
Affordable Housing and Sustainable Communities Program (AHSC)	Moderate	Range: $7.5 M to $30.0 M; Average: $21.2 M	Capital	Feb-20
Transit and Intercity Rail Capital Program (TIRCP)	High	Range: $3M to $107M; Average award: $29M	Capital	January 2020 application cycle programmed funds through FY 2025
Congestion Mitigation and Air Quality (CMAQ)	Moderate	SLOCOG anticipated to receive $2.6 M annually	Capital	Annual programming
Surface Transportation Block Grant Program (STBG)	Moderate	SLOCOG anticipated to receive $3.9 M annually	Capital	Annual programming
Locally Imposed General Taxes	High	TBD	Capital and O&M	Annual programming
Sustainable Transportation Equity Project (STEP)	Low	Annual funding: $18 M	Capital	Aug-20
Sustainable Transportation Planning Grant Program	Low	Maximum award: $1.0 M	Planning/ Environmental	Jan-21
Value Capture	Moderate	TBD	Capital and O&M	TBD

5.3 Local Connectivity and Transit Integration

If the proposed service is implemented, it will be important to recognize that the rail system will exist in the context of other transit options which are necessary to make the final connections between rail stations and trip origins or destinations. Local connections will vary by station and area, likely influenced by two important factors:

- **Local markets** – what types of travelers are likely to utilize a given station. These could include students, employees, tourists making leisure trips; markets unique to each station's surrounding area. For example, a potential Cal Poly station would be expected to serve a large number of students, whose schedules are not anchored around a 9 to 5 job. Local operators will be most aware of these markets and potential markets and the locations to or from which they need connections.
- **Local resources** – the opportunity for local connections will be greatly influenced by the public transit services that currently exist at each station. Some stations currently have more connecting transit options than others, and potential stations that do not currently exist may need entirely new services. Local operators will need to program these connections into their Short-Range Transit Plans and longer-term planning processes.

In addition to transit connections, other first-mile, last-mile modes to support local travel of passengers will also be appropriate at different stations along the route. These could potentially include:

- Subsidized fares to Transportation Network Companies, such as Uber or Lyft, to provide connections within a certain circumference of a station
- Bike or scooter rentals for those open to active transportation, particularly in high tourism areas
- Carsharing and short-term rentals, such as Zipcar, Car2Go, Turo and more, where there is a sufficient local market to support the necessary infrastructure and integrated technology is available to invite intercity train and bus travelers to place a car reservation

The seamlessness of connections between modes is crucial to making these systems an attractive alternative to driving. Alignment of fare payment platforms and customer information between operators should be pursued to help riders to navigate the multimodal transit system with ease. This extends to the provision of real-time information on bus and train arrival times.

6 Conclusions

The analysis indicates that regional rail service can be provided in the Greater San Luis Obispo region with appropriate capital improvements, and that, for Options 1 and 3, it is likely to operate with similar subsidy requirements per trip as comparable systems.

6.1 Recommended Service Option

Table 6-1 compares the performance of each option in terms of ridership potential and cost effectiveness. Ridership potential increases with greater service in each scenario. Both Options 1 and 3 are expected to have operating costs per trip below the average for comparable systems, demonstrating feasibility of rail in the region. However, Option 1 would require a relatively high capital cost per trip, since the startup costs would not be shared across a large number of trips, whereas Option 3 is most cost effective in terms of capital cost.

Should the region pursue implementation of regional rail, Option 3 provides the best balance of costs and benefits. Options 1 and 2 are less expensive to implement but generate little ridership and do not provide access to some of the corridor's main origins and destinations. Option 4 generates the highest ridership overall, but due to the additional cost of lengthening the route and inability of rail transit to provide competitive travel times across the Cuesta Grade, the cost of this option is approximately double that of Option 3 without a corresponding doubling in projected ridership.

The subsequent implementation and funding strategy for regional rail service could consider the options as phases rather than discrete alternatives. Service could potentially begin between the three existing stations between Guadalupe and San Luis Obispo while the stations and improvements necessary for Option 3 are under development. Service north of the Cuesta Grade is not sufficiently cost-effective to consider implementation as part of the initial system, although future extensions may be considered.

Table 6-1. Service Option Comparison

	Option 1	Option 2	Option 3	Option 4
Ridership Potential	Low	Medium-Low	High	High
Total Capital Cost	Low	Medium	High	Very High
Total Operating Cost	Low	Medium-Low	Medium-High	High
Capital Cost per Trip	Medium-High	High	Low	Medium
Operating Cost per Trip	Low	High	Medium-Low	Medium-High

More advantageous ⟷ Less advantageous

6.2 Next Steps

With appropriate investment and institutional change, it is feasible to implement regional rail in the greater San Luis Obispo Area. Several actions are needed to achieve the increases in rail frequency targeted in the CSRP:

1. Policymakers along the Central Coast must consider the relative costs and benefits implementing regional rail, and determine if the large level of investment required aligns with regional goals
2. Performing an Implementation and Funding Study will lay out potential funding sources and provide a path to implementation. In order to pursue the largest funding sources, key components of this study should include:
    a. Refined ridership forecast using FTA STOPS model or similar regional demand model
    b. Refined capital and operating cost estimates

3. Track access must be secured from UP. This will require negotiations to refine specific capital investments that will be necessary and agreement on a track access fee
4. One of the following governance structures must be chosen for the new service
    a. Management by an existing agency (e.g. SLORTA)
    b. Creation of a new JPA
    c. State legislation to establish a new special purpose transit district
5. Operating funds must be secured
6. Additional equipment must be acquired
7. For service options beyond Option 1, capital funding must be secured to deliver the necessary infrastructure improvements