Task 4.4:

Service Implementation Plan

Appendix A: Communications and Engagement Plan

SLOCOG Coast Rail Corridor Study

May 13, 2021

SLOCOG CRCC coast rail coordinating council COAST RAIL CORRIDOR STUDY

CONTENTS

1 Introduction

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 Engagement Program focused on development of effective communications tools and strategies to build awareness, understanding and active engagement in the Study. The Program included development and implementation of traditional tools and activities like information materials, survey distribution, blended with digital communications and engagement strategies including social media, media, interactive websites and virtual meetings. A critical component of the Program was the stakeholder engagement which includes two key committees, the Technical Advisory Committee and the Community Working Group. These committees allowed 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 Draft SIP.

2 Property Owner/Stakeholder Database

HDR worked in collaboration with SLOCOG to develop a property owner/stakeholder contact database to ensure all interested parties, specifically those in disadvantaged communities, were appropriately informed of the project. The stakeholder list included diverse regional representatives from business, residential, advocacy, educational, and medical communities. Following are the parameters of the searches, which produced 11,659 parcels:

- 500 ft. of rail line from Paso Robles station to Guadalupe station (5,271 parcels)
- Atascadero: 0.25-mile radius down center of disadvantaged area (540 parcels)
- Paso Robles (west side): 0.25-mile radius down center of disadvantaged area (1,751 parcels)
- Paso Robles (east side): two disadvantaged areas closest to rail line (317 parcels)
- Grover Beach: 0.25-mile radius of rail line (1,384 parcels)
- San Miguel: 0.25-mile radius down center of disadvantaged area (954 parcels)
- Nipomo: 0.25-mile radius of Highway 101 within disadvantaged areas (767 parcels)
- San Luis Obispo: 0.25-mile radius down center of largest disadvantaged cluster (675 parcels)

3 Project Branding & Messaging

A unique Study brand was developed to set the Study apart from other regional planning efforts. The brand complimented the SLOCOG brand and creates consistency in look and feel of all communications and information distributed about the study. The branding also includes clear, concise and consistent messaging.

4 Project-Specific Website

A project-specific website (coastrailstudy.com) has been developed as the main source of information for the public to obtain study updates. This interactive website is linked back to SLOCOG's parent site and provides resources and alerts as well as opportunity to share input. Inquiries and comments submitted through the website are documented and addressed as appropriate.

- **Website Visits:** 5,537 users
- **Average time on site:** 1:55
- **Total sessions by device**
  - Desktop: 48%
  - Mobile: 48%
  - Tablet: 4%
- **Acquisition by channel**
  - Direct: 59%
  - Referral: 18%
  - Via Social: 11%
  - Via Search: 9%
  - Via Emails: 3%

4.1 Fact Sheet

A bilingual fact sheet serves as an effective educational tool, is housed on the website and downloadable for distribution. The fact sheet provides general information about the study background, goals, responsible parties, milestones, funding and how to participate/engage.

4.2 Electronic Notifications

As an additional means to broadly disseminate information and keep the public informed, a project email (info@coastrailstudy.com) is being utilized to communicate with project stakeholders and interested public.

5 Social Media & Media Relations

SLOCOG's existing Facebook account is a critical communication tool for building public awareness and timely notification of Study news and events. As project milestones occur, social media posts are disseminated to SLOCOG's channels. In addition, press releases are distributed to garner input from the adjacent counties.

Two press releases have been distributed to date:

- SLOCOG Awarded $2.2 Million in Funding to Expand Rail Service on the Central Coast (March 2019)
- New study looks at increasing rail options for the Central Coast (Sept. 2020)

As a result of media coordination, two articles have been published, including:

- New Times: SLOCOG to host virtual meeting on commuter rail transit study (Sept. 2020)
- Paso Robles Daily News: New study looks at increasing rail options for the Central Coast (Sept. 2020)

6 Survey

An online survey was conducted from mid-June to early-October 2020 through SurveyMonkey to gather demographics and public input into the study options. A total of 451 participants completed the survey and one lucky participant won a $100 Amazon gift card. Below is a breakdown of top results:

Table 6-1. Survey Results

Question	Results		
Location		Home	Work/School
	SLO County	377	365
	Santa Barbara County	29	29
	Santa Cruz County	7	6
	Monterey County	11	13
	Other/Out of State	27	38
Age	65+ (14%) 50-64 (30%) 40-49 (15%) 25-39 (22%) 18-24 (4%) N/A (15%)		
Gender	Female (47%) Male (37%) N/A (16%)		
Most desirable station	SLO (32%) Paso Robles (21%) Grover Beach (16%) Atascadero (15%) Santa Maria (12%) Guadalupe (4%)		
Reasons for using public transit	Carbon footprint (17%) Stress relief (13%) Inexpensive option (11%) Accessible (11%)		
Commuter stats (would consider using if…)	Bi-directional (40%) Connected between Paso Robles and SLO (38%) Linked Santa Maria, Guadalupe to SLO (22%)		
Intercity Rail Stats	Would consider if direct connect between SF & SLO (55%) More trains daily to SoCal (53%) Travel on train took less time (50%) More trains daily to Bay Area (46%)		

7 Stakeholder & Public Meetings

7.1 Board Meeting

The study team presented to the SLOCOG Board at their December 2, 2020 meeting (item A-1 Coast Rail Corridor Study Update). The presentation included:

- Overview of the Study (study area map, goals, and implementation strategy)
- Engagement, Analysis Activities and Key Milestones
- Initial Range of Options (Intercity Rail/Bus)
- Initial Range of Options (Commuter Rail)
- Modeling Analysis

7.2 Coast Rail Coordinating Council (CRCC)

The Study was also presented to the CRCC twice on July 17, 2020 and March 19, 2020.

7.3 Technical Advisory Committee (TAC)

The Technical Advisory Committee was established to create timely and direct engagement with critical partners on the development of the SIP. The TAC has met virtually a total of three times on July 29, 2020, December 17, 2020 and March 4, 2021 and consists of representatives from the following agencies:

- California State Transportation Agency (CalSTA)
- Caltrain
- Caltrans District 5
- Caltrans Division of Rail and Mass Transportation (DRMT)
- Cities of Grover Beach, King, Paso Robles, San Luis Obispo, and Santa Maria
- Coast Rail Coordinating Council (CRCC)
- Guadalupe Transit
- LOMPOC Transit
- LOSSAN Rail Corridor Agency
- Monterey-Salinas Transit (MST)
- San Luis Obispo Council of Governments (SLOCOG)
- Santa Barbara County Association of Governments (SBCAG)
- Santa Barbara Metropolitan Transit District (MTD)
- Santa Maria Valley Railroad (SMVRR)
- SLO Regional Rideshare
- SLO Regional Transportation Authority (RTA)
- SLO Transit
- Transportation Agency of Monterey County (TAMC)
- Union Pacific Railroad (UPRR)

7.4 Community Working Group (CWG)

The Community Working Group was developed to directly engage with diverse community-based representatives at key milestones and has met virtually three time on July 29, 2020, December 16, 2020, and May 4, 2021. The CWG consists of representatives from the following community groups and organizations:

- Atascadero State Hospital
- Atascadero Chamber of Commerce
- BikeSLO County
- California Polytechnic State University
- City of SLO Bicycle Advisory Committee
- Coalition for Sustainable Transportation (COAST)
- Coalition of Labor Agriculture & Business of San Luis Obispo County (COLAB)
- Community Action Partnership of San Luis Obispo (CAPSLO)
- Economic Vitality Corporation (EVC)
- Environmental Center of San Luis Obispo (ECOSLO)
- Friends of 40 Prado
- Healthy Communities Work Group
- Home Builders Association of the Central Coast

- Hourglass Project/REACH
- Land Conservancy of SLO County
- San Luis Obispo Council of Commerce
- San Luis Obispo Council of Governments (SLOCOG)
- Santa Barbara Bicycle Coalition
- Santa Barbara County Association of Governments (SBCAG)
- Santa Maria Valley Chamber of Commerce
- SLO Bike Coalition
- SLO County Air Pollution Control District (APCD)
- SLO County Commission on Aging
- SLO Railroad Museum
- SLO Regional Rideshare
- South County Chambers of Commerce
- U.S. Representative Salud Carbajal's Office
- Visit SLOCal

Also invited to participate include:

- Community Foundation
- County Real Property Services
- Cuesta College
- Downtown SLO
- Go831 Smart Commute Rideshare Program
- Healthy Eating Active Living SLO (HEALSLO)
- IQMS
- Latino Outreach Council
- National Association for the Advancement of Colored People (NAACP)
- Northern Chumash Tribal Council
- Paso Robles Chamber of Commerce
- San Luis Obispo Regional Transit Authority (SLO RTA)
- SLO Farm Bureau
- The Nature Conservancy

7.5 Virtual Public Meeting

An initial public meeting was conducted virtually via Webex on Sept. 30, 2020 from 5:30-7 p.m. The meeting was intended to build awareness about the study and seek initial input from the larger public. To promote the meeting a postcard invitation was mailed to the contact database, promoted on the website, via social media and media as well as through electronic emails. A total of 42 participants attended the meeting, including project team staff and consultants.

The meeting was recorded and available on the website along with the presentation. A second public meeting is scheduled for May 18, 2021 to present the draft SIP and Passenger Rail Improvements Study (PRIS or Commuter Rail Study).

Tasks 4.4 and 5.4:

Appendix B: Potential Funding Sources

SLOCOG Coast Rail Corridor Study

May 13, 2021

SLOCOG CRCC COAST RAIL CORRIDOR STUDY

In Association With:
AMMA Transit Planning
Verdin Marketing

CONTENTS

1 Introduction

This chapter initiates the funding analysis component of the Coast Rail Corridor Study. Specifically, this chapter provides summary descriptions of existing and potential Federal, state, and local sources and value capture approaches, which could be used to support implementation and operation of a new commuter rail or expanded Amtrak service. To provide context for potential sources discussed throughout this chapter, Table 1-1 provides case studies of financial strategies for recently implemented commuter rail lines across the country. For most of these projects, the implementing agency obtained funding from a variety of Federal, state, and local sources. More specifically, in these examples, federal sources accounted for up to 80 percent of total project costs, but most commonly hovered around 50 percent. States contributed in approximately half (seven of 13) of the projects, and the most frequently used local sources in these examples are contributions from local jurisdictions (seven) and dedicated sales taxes (six). The Redlands Rail Passenger Rail project (Arrow) in San Bernardino provides a California example that combined the following 10 sources:

- Federal Sources
  - Federal Transit Administration (FTA) Capital Investment Grant – Small Starts Category
  - Federal Highway Administration (FHWA) Flexible Funds – Congestion Mitigation and Air Quality Program (CMAQ) – programmed by the San Bernardino County Transportation Authority
  - United States Department of Transportation (USDOT) Transportation Investment Generating Economic Recovery (TIGER) Grant
- State Sources
  - State Transit Assistance (STA) Fund
  - Public Transportation Modernization & Service Enhancement Account
  - Transit and Intercity Rail Capital Program
  - California Transit Security Grant
- Local Sources
  - Sales Tax Measure I
  - Cash contributions from the cities of Loma Linda, Redlands, and San Bernardino
- Private Contributions
  - Private Contributions from the University of Redlands and the Environmental Systems Research Institute (ESRI)

While Table 1-1 provides a frame of reference, there is no one-size-fits-all for commuter rail funding, and the eventual financial strategy for the Coast Rail project will be tailored to the project's definition, costs, and local funding environment. Additionally, as described in Section 2, it will be important to consider competitive grant programs from the Federal Railroad Administration (FRA), as these have been the primary source for intercity passenger rail improvements.

Following this introduction, Section 2 summarizes potential Federal sources, including the difference in eligible expenses for each source depending on the service (commuter rail or intercity passenger rail) for which the funds would be pursued. Section 3 reviews potential state and local sources. Section 4 summarizes value capture approaches, including examples from other transit projects around the country. Finally, while further analysis will be needed to narrow this list of potential funding sources into a comprehensive strategy to support implementation of the commuter rail project and intercity rail improvements, Section 5 provides an initial assessment of the most promising sources and a conceptual range of funding that may be available for each source.

Table 1-1: Commuter Rail Funding Case Studies ($, in millions)

	SunRail Phase I (FL)	North Star (MN)	Front Runner North (UT)	Front Runner South (UT)	Music City Star (TN)	A-Train (TX)[1]	MetroRail (TX)	Rail Runner (NM)	Sounder (WA)	SMART Regional Rail (CA)	SunRail Phase II North (FL)	Double Track Northwest Indiana (IN)	Redlands Passenger Rail (CA)[2]
Federal													
FTA Capital Investment Grant	$179	$157	$489		$24				$100	$23	$34	$173	$80
FHWA Funds		$5			$8								
USDOT TIGER Grant													$9
State													
State Appropriation/ Grants	$89	$99			$4			$125			$17	$200	$61
Local													
Local Jurisdictions	$89	$51			$3			$10			$17	$40	$3
Regional Funds										$20		$43	
Dedicated Sales Tax			$82	$368		$48	$105		$301				$87
MPO Programmed Funds		$6			$2								$35
Right-of-Way Value			$40										
Private Contributions													$2
Concessionaire Payment						$190							
Total	**$357**	**$317**	**$612**	**$368**	**$41**	**$238**	**$105**	**$135**	**$401**	**$43**	**$69**	**$456**	**$276**

[1] In exchange for the opportunity to construct, operate, and maintain a 26-mile toll road for 52 years, a private concessionaire, the North Texas Tollway Authority (NTTA), paid the region $3.2 billion. The Regional Transportation Council (RTC) used these funds to expedite about 200 transportation projects, one of which was Denton County Transportation Authority's A-train. In April 2008, the RTC approved funds for the purchase of railcars, and in August 2008, $190.2 million was approved for the completion of the A-train.

[2] State of California programs for the Redlands Passenger Rail included State Transit Assistance Program ($27.3 M); Public Transportation Modernization, Improvement, and Service Enhancement Account ($19.1 M – note this program is no longer active); Transit and Intercity Rail Capital Program ($9.2 M); and Transit Security Grant ($5.1 M – note this program is no longer active).

2 Federal Sources

The Coast Rail system's preferred service definition will determine which federal programs to target. Since the Coast Rail corridor is considering investments in both commuter rail and intercity passenger rail, there is an opportunity to leverage eligible funding sources for both services within the corridor.

Intercity passenger rail systems (Amtrak) fall under the jurisdiction of the Federal Railroad Authority (FRA). Until 2009, the FRA did not provide grant funds to support intercity passenger rail systems. While grant programs have continued since 2009 (see Section 2.1), the FRA annually provides less than $1 billion in grants nationally for eligible expenses that span planning, engineering, and construction. This level of grant awards indicates that federal funding is limited for intercity passenger rail systems, and states, regions, and local jurisdictions are the primary sources of funding for these types of projects.

Historically, significantly more funding has been provided for the planning, construction, and asset management of transit systems. Transit systems fall under the jurisdiction of the Federal Transit Administration (FTA) and include commuter rail, bus, light rail, streetcar, and ferry services. In fiscal year (FY) 2020, the FTA allocated the following annual funding to eligible transit systems, including commuter rail services, across the country:

- Formula funds (Urbanized Area and State of Good Repair programs): approximately $8.0 billion in FY 2020; eligible expenses include planning, capital investments, construction, and asset management.
- Discretionary grants (Capital Investment Grants program): approximately $2.0 billion in FY 2020; eligible expenses include planning, engineering, and construction. Federal participation is typically constrained at 50 percent of total project costs with funding provided on a reimbursement basis that could be years after the expenses are incurred.

Additionally, annual formula funds from the Federal Highway Administration (FHWA) are eligible to be transferred or "flexed" to support transit systems. These funds are programmed by metropolitan planning organizations (MPOs), councils of government (COGs), and Caltrans and include the Congestion Mitigation and Air Quality Improvement (CMAQ) program and the Surface Transportation Program (STP).

Table 2-1 summarizes potential federal sources by agency and eligibility for commuter rail and/or intercity rail projects. The remainder of this section expands on these sources.

Table 2-1: Summary of Potential Applicable Federal Sources

	Grant	Description	Eligible for Commuter Rail	Eligible for Intercity Rail
Federal Railroad Administration	Consolidated Rail Infrastructure and Safety Improvements Program (CRISI)	Invests in a wide range of construction projects to improve railroad safety, efficiency, and reliability; mitigate congestion at intercity and freight rail chokepoints; enhance multi-modal connections; and lead to new or substantially improved intercity passenger rail transportation corridors.		X
	Federal-State Partnership for State of Good Repair Program	Funds intercity passenger rail projects that repair, replace, or rehabilitate qualified railroad assets to reduce the state of good repair backlog and improve service performance.		X
	Restoration and Enhancement Grants Program	Provides operating assistance to initiate, restore, or enhance intercity passenger rail service.		X
Federal Transit Administration	Section 5309: Capital Investment Grant Program	Funds transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit projects. Projects with capital costs greater than $300 million and funding requests greater than $100 million follow the requirement for the New Starts funding category, and projects with capital costs less than $300 million and funding requests less than $100 million follow the requirement for the Small Starts funding category.	X	
US Department of Transportation	Better Utilizing Investments to Leverage Development (BUILD)	Supports innovative projects that would be otherwise difficult to fund through traditional federal programs. Projects should catalyze long-lasting, positive changes in safety, economic competitiveness, quality of life, environmental sustainability, innovation, and partnerships with a broad range of stakeholders.	X	X
	Infrastructure for Rebuilding America (INFRA)	Creates opportunities for all levels of government and the private sector to fund infrastructure, using innovative approaches to improve the processes for building significant projects, and increasing accountability for the projects that are built.	X	X
Federal Financing Programs	Private Activity Bonds (PABs)	Offers tax-exempt debt issued by state or local governments whose proceeds are used to construct projects with significant private involvement.	X	X
	Railroad Rehabilitation and Improvement Financing (RRIF)	Offers long-term, low-cost loans to railroad operators, with particular attention to small freight railroads, to help finance improvements to infrastructure and investments in equipment.	X	X
	Transportation Infrastructure Finance and Innovation Act (TIFIA)	Provides credit assistance in an effort to support state and local governments seeking to finance large-scale transportation projects and programs with forms of user-backed revenue.	X	X

2.1 Federal Railroad Administration (FRA)

The following provides an overview of the three FRA grant programs that could be targets for any planned Coast Rail intercity passenger rail service investments.

2.1.1 Consolidated Rail Infrastructure and Safety Improvements Program (CRISI)

Description: The goal of this competitive grant program is to support safety enhancements and general improvements to infrastructure for both intercity passenger and freight railroads by leveraging private, state, and local funding. The CRISI program invests in a wide range of construction projects to improve railroad safety, efficiency, and reliability; mitigate congestion at both intercity passenger and freight rail chokepoints; enhance multi-modal connections; and lead to new or substantially improved intercity passenger rail transportation corridors. Additionally, the program includes rail safety projects, such as grade crossing enhancements and rail line relocations and improvements. Preconstruction activities are also eligible expenses including: regional and corridor planning, environmental analyses, and workforce development.

Evaluation criteria include key FRA objectives such as supporting economic vitality; leveraging federal funds to attract other sources of funding; preparing for project life-cycle costs; using innovative approaches to improve safety and expedite project delivery; and holding recipients accountable for achieving specific, measurable outcomes.

Eligible Expenses: There are four categories (tracks) within the CRISI program. In the near term, the Coast Rail could target Tracks 1 and 2 to further service development and environmental planning activities. Track 3 could be a future target for final design and construction activities.

- Track 1: Planning – Track 1 consists of eligible rail planning projects. Examples include the technical analyses and associated environmental analyses that support the development of state rail plans, regional rail plans, and corridor service development plans, including: identification of alternatives, rail network planning, market analysis, travel demand forecasting, revenue forecasting, railroad system design, railroad operations analysis and simulation, equipment fleet planning, station and access analysis, conceptual engineering and capital programming, operating and maintenance cost forecasting, capital replacement and renewal analysis, and economic analysis.

- Track 2: Eligible Preliminary Engineering (PE) / National Environmental Policy Act (NEPA) – Track 2 consists of eligible PE/NEPA projects. PE examples include: PE drawings and specifications (scale drawings at the 30 percent design level, including track geometry as appropriate); design criteria, schematics and/or track charts that support the development of PE; and work that can be funded in conjunction with developing PE, such as operations modeling, surveying, project work/management plans, preliminary cost estimates, and preliminary project schedules.

- Track 3: Final Design (FD) / Construction – Track 3 consists of eligible projects for FD, construction, and project implementation and deployment activities. Applicants must complete all necessary planning, PE, and NEPA requirements for FD/construction projects. FD funded under this track must: resolve remaining uncertainties or risks associated with changes to design scope; address procurement processes; and update and refine plans for financing the project or program to accurately reflect the expected year-of-expenditure costs and cash flow projections.

  FD examples include: drawings at the 100 percent design level, interim design drawings that support development (e.g., drawings at the 60 percent design level), project work/project

management plan, cost estimates, project schedules, and right-of-way acquisition and relocation plans. Construction examples include: additions, improvements, replacements, renovations and/or repairs to track, bridge, station, rail yard, signal, and communication system infrastructure, or other railroad safety technology.

- Track 4: Research, Safety Programs and Institutes (non-railroad infrastructure) – Track 4 includes workforce development activities, research, safety programs or institutes designed to improve rail safety that clearly demonstrates the expected positive impact on rail safety. Examples include: initiatives for improving rail safety, training, public outreach, and education.

Revenue Potential: This program accepted grant applications the last several fiscal years with annual funding ranging from $65 million to $320 million. The CRISI program does not have any minimum or maximum thresholds for awards. However, on average, individual grant awards are less than $10 million. Additionally, while the program provides funding for freight and intercity passenger rail projects, the majority of the awards to date have gone to freight-related improvements.

California has been awarded numerous CRISI grants in the last few years. In FY 2020, the City of Tulare was awarded $2.2 million for pedestrian and vehicle safety enhancements at a Union Pacific Railroad intersection. In FY 2019, the Southern California Regional Rail Authority was awarded $10.7 million for speed and safety improvements in the Burbank corridor.

Most Recent Application Cycle: The FY 2020 Notice of Funding Opportunity (NOFO) was published on April 20, 2020, grant applications were due on June 19, 2020, and awards were announced on September 23, 2020.

2.1.2 Federal-State Partnership for State of Good Repair Program

Description: This competitive grant program funds intercity passenger rail projects that repair, replace, or rehabilitate qualified railroad assets to reduce the state of good repair backlog and improve service performance. The Partnership Program grants are intended to benefit publicly- or Amtrak-owned or controlled passenger rail infrastructure, equipment, and facilities in rural and urban American communities. Additionally, FRA encourages the submission of track and equipment safety applications focused on grade-separation and/or other enhancements at highway-rail grade crossings.

Applications must address key FRA objectives including enhancing economic vitality; leveraging federal funding; using innovative approaches to improve safety and expedite project delivery; and holding grant recipients accountable for achieving specific, measurable outcomes. The federal share of a project's total costs must not exceed 80 percent, although preference is given to those projects where the proposed federal share is 50 percent or less.

Eligible Project Categories: As there are a wide range of capital costs that are eligible to be funded through this grant program, the project team will determine which elements of the intercity passenger rail improvements could be targeted. Examples of eligible capital costs include track, ballast, switches and interlockings, bridges, communication and signal systems, power systems, highway-rail grade crossings, and other railroad infrastructure and support systems used in intercity passenger rail service; stations, including station buildings, support systems, signage, and track and platform areas; equipment, including passenger cars, locomotives, and maintenance-of-way equipment; and facilities, including yards and terminal areas and maintenance shops.

Revenue Potential: Nationwide, applicants competed for grant funding totaling $272 million in 2018, $396 million in 2019, and $291 million in 2020. Twelve projects received grants in 2019 with awards ranging between $6.5 million and $80 million. Two of these 2019 awards went to projects in California: $11.6 million to the San Diego Association of Governments for the Coastal Bluff track bed stabilization

and seismic improvements, and $6.8 million to the Southern California Regional Rail Authority for the rehabilitation and scour mitigation of four rural rail bridges. In the 2020 application cycle, 11 projects received awards, including two in California: $9.8 million to the North County Transit District for the San Diego Next Generation Signaling and Grade Crossing Modernization project, and $31.8 million to the Southern California Regional Rail Authority for the Pacific Surfliner Corridor Rehabilitation and Service Reliability project.

Most Recent Application Cycle: The FY 2020 NOFO was published on June 10, 2020, grant applications were due on July 27, 2020, and awards were announced on October 28, 2020.

2.1.3 Restoration and Enhancement Grants Program

Description: The FRA Restoration and Enhancement Grants Program provides operating assistance to initiate, restore, or enhance intercity passenger rail service. Projects eligible for funding include: additional frequency of current service, offering new on-board services, establishing new service, extending current service or restoring previously operated service. The FRA will prioritize funding to projects that:

- Show completed or nearly completed planning, design, environmental reviews, negotiation of agreements, acquisition of equipment, construction, and other actions necessary for initiation, restoration, or enhancement of service;
- Restore service over routes formerly operated by Amtrak;
- Provide daily or daytime service over routes where such service did not previously exist;
- Include funding or other significant participation by state, local, and regional governmental and private entities;
- Include a funding plan that demonstrates the intercity rail passenger service will be financially sustainable beyond the three-year grant period;
- Provide service to regions and communities that are underserved or not served by other intercity public transportation;
- Foster economic development, particularly in rural communities and for disadvantaged populations;
- Provide other non-transportation benefits, such as livability benefits; or
- Enhance connectivity and geographic coverage of the existing national network of intercity rail passenger service.

Eligible Project Categories: The Coast Rail Corridor Study is considering increasing frequency of the current service for which the costs are eligible for funding under this program. More specifically, eligible operating expenses include: staffing costs for train engineers, conductors, and on-board service crew; diesel fuel or electricity costs associated with train propulsion power; station costs such as ticket sales, customer information and train dispatching services; station building utility and maintenance costs; lease payments on rolling stock; routine planned maintenance costs of equipment and train cleaning; host railroad costs; train yard operating costs; general and administrative costs; and management, marketing, sales, and reservation costs.

Revenue Potential: Three projects received awards as part of the FY 2018-2020 cycle, averaging $7.5 million.

Most Recent Application Cycle: The FY 2018-2020 NOFO was published on November 6, 2019, grant applications were due on February 6, 2020, and three projects were awarded grants on May 5, 2020. The

grant award amounts were $4.4 million, $5.5 million, and $12.6 million and totaled $22.4 million. These three projects spanned eight states and were located in Opportunity Zones. None of these projects included rail service in California.

2.2 Federal Transit Administration (FTA)

For the potential commuter rail component of the Coast Rail system, FTA's Capital Investment Grant (CIG) program would be the primary funding program to support implementation.

2.2.1 Section 5309: Capital Investment Grant Program

Description: This FTA discretionary grant program funds transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit. There are two funding categories within the CIG program that could be applicable for the Coast Rail project – New Starts or Small Starts.

- New Starts: Projects with a total cost greater than $300 million and that are requesting CIG funding participation of at least $100 million. The maximum CIG funding participation allowed is 60 percent of total costs.
- Small Starts: Projects with a total cost less than $300 million and that are requesting CIG funding participation of less than $100 million. The maximum CIG funding participation allowed is 80 percent of total costs.

Federal law requires transit agencies seeking CIG funding to address a series of project justification criteria and local financial commitment requirements over several years in order to obtain a construction grant agreement. The Project Justification criteria are based largely on ridership forecasts for the proposed project. The local financial commitment requirements reflect the implementing agency's ability to obtain increasing levels of the matching funds (non-CIG funds) during the project development and engineering process.

Eligible Project Categories: Eligible expenses include planning, engineering, and construction with federal funding provided on a reimbursement basis that could be years after the expenses are incurred.

Revenue Potential: The FAST Act authorized approximately $2.3 billion annually between 2016 and 2020. While the maximum CIG share of total project costs allowed for New Starts projects is 60 percent, typically the FTA will not award grants greater than 50 percent. Examples of commuter rail projects that have received or are pursuing CIG funding include:

New Starts

- Denver Eagle P3 Project: $2.2 billion in eligible costs; awarded $1.0 billion New Starts grant (45 percent)
- Orlando Sun Rail: $360 million in eligible costs; awarded $180 million New Starts grant (50 percent)
- Fort Worth TEX Rail: $1.0 billion in eligible costs; awarded $499 million New Starts grant (48 percent)
- Northern Indiana Double Track Improvement Project: $486 million in eligible costs; awarded $174 million New Starts grant (36 percent)
- Northern Indiana West Lake Corridor: $933 million in eligible costs; awarded $355 million New Starts grant (38 percent)

Small Starts

- SMART Regional Rail – San Rafael to Larkspur Extension: $42.5 million in eligible costs; awarded $22.5 million Small Starts grant (53 percent)
- SunRail Phase II North: $68.7 million in eligible costs; awarded $34.3 million Small Starts grant (50 percent)
- Redlands Passenger Rail: $276.2 million in eligible costs; awarded $80.0 million Small Starts grant (29 percent)

Most Recent Application Cycle: Ongoing – project sponsors may apply to enter the CIG process at any time during the year.

2.3 US Department of Transportation (USDOT)

2.3.1 Better Utilizing Investments to Leverage Development (BUILD)

Description: The BUILD program, formerly known as the Transportation Investment Generating Economic Recovery (TIGER) program, is one of USDOT's largest multimodal discretionary grant programs and supports innovative projects that would be otherwise difficult to fund through traditional federal programs. USDOT seeks projects that will catalyze long-lasting, positive changes in safety, economic competitiveness, quality of life, environmental sustainability, innovation, and partnerships with a broad range of stakeholders. Prior rounds of BUILD/TIGER have prioritized projects seeking to improve access to reliable, safe, and affordable transportation to enhance connectivity and provide ladders of opportunity for communities in urban, suburban, and rural areas.

While there have been annual appropriations for BUILD/TIGER every FY since 2009, including the most recent BUILD NOFO released in April 2019, the program is not specifically authorized in federal legislation.

Eligible Project Categories: Eligible projects include surface transportation infrastructure improvements that will have a significant local or regional impact. This includes projects that support roads, bridges, transit, rail, ports, or intermodal transportation.

Revenue Potential: In the 2020 application cycle, 70 transportation projects in 44 states were awarded a total of $1 billion. The capital awards ranged from $4.0 million to $25.0 million. The maximum grant award is $25 million, and no more than $100 million can be awarded to a single state. Two California projects received awards in 2020: $16 million to Tulare County Association of Governments for an interchange project and $20 million to Caltrans for grade separation of the Union Pacific Railroad and BNSF Railway mainlines in Stockton. San Bernardino County won an $8.7 million TIGER award in 2016 for the Redlands Passenger Rail project.

Most Recent Application Cycle: For the 2020 application cycle, the notice of funding opportunity was published in February 2020, applications were due in May 2020, and awards were announced in September 2020.

2.3.2 Infrastructure for Rebuilding America (INFRA)

Description: INFRA advances a grant program established in the 2015 Fixing America's Surface Transportation (FAST) Act. INFRA discretionary grants support USDOT's commitment to fixing the nation's infrastructure by creating opportunities for all levels of government and the private sector to fund infrastructure, using innovative approaches to improve the processes for building significant projects, and increasing accountability for the projects that are built. In addition to providing direct federal funding, the

INFRA discretionary grant program aims to increase the total investment by state, local, and private partners.

INFRA is a highly competitive program; demand for INFRA grants far exceeded available funds. In the 2020 application cycle, USDOT evaluated 173 eligible applications from 47 states, as well as U.S. territories and the District of Columbia, who collectively requested approximately $7.4 billion in grant funds—more than eight times the funding available.

Eligible Project Categories: While intercity passenger rail and commuter rail are not the focus of the INFRA program and are not considered eligible costs, there may be an opportunity to pursue grant funds for freight rail improvements that would also benefit intercity passenger and commuter rail services. Examples of the types of eligible freight rail projects for INFRA grants under this concept include:

- Railway-highway grade crossing or grade separation projects; or
- A freight project that is 1) an intermodal or rail project, or 2) within the boundaries of a public or private freight rail, water (including ports), or intermodal facility. A project within the boundaries of a freight rail, water (including ports), or intermodal facility must be a surface transportation infrastructure project necessary to facilitate direct intermodal interchange, transfer, or access into or out of the facility and must significantly improve freight movement on the National Highway Freight Network.

Revenue Potential: The INFRA program includes categories for large and small projects. For a large project, the minimum INFRA grant must be at least $25 million. For a small project, including both construction awards and project development awards, the grant must be at least $5 million. For each fiscal year of INFRA funds, 10 percent of available funds are reserved for small projects and 90 percent are reserved for large projects.

In the 2020 application cycle, 20 transportation projects in 20 states were awarded a total of $906 million. The awards ranged from $6.2 million to $135 million and averaged $45 million. California did not receive any INFRA awards in the 2020 cycle, but received four awards between 2016 and 2019 ranging from $47 million to $50 million.

Most Recent Application Cycle: For the 2020 application cycle, the notice of funding opportunity was published in January 2020, applications were due in February 2020, and awards were announced in June 2020.

2.4 Federal Financing Programs

This section summarizes federal financing programs that could potentially be pursued to support implementation of increased rail service along the Coast Rail Corridor. As noted below, a long-term, dedicated revenue source is required to apply for any of these financing programs.

2.4.1 Private Activity Bonds (PABs)

Description: Private Activity Bonds (PABs) are debt instruments issued by state or local governments whose proceeds are used to construct projects with significant private involvement. Transportation infrastructure became eligible for PAB financing in 2005 with the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA – LU). This change allows private activity on infrastructure projects while maintaining the tax-exempt status of the bonds. Providing private developers and operators with access to tax-exempt interest rates lowers the cost of capital significantly, and increasing the involvement of private investors in transportation projects. Encouraging the use of PABs reflects the federal government's desire to increase private sector investment in U.S. transportation infrastructure and the corresponding goal to generate new sources of money, ideas, and project implementation efficiency.

PABs are issued when state or local governments issue tax-exempt debt on behalf of the private entity undertaking the transportation improvement project. The private entity finances and delivers the project and is responsible for debt service on the PABs. There is a time limit on the funds—federal legislation requires that at least 95 percent of the net proceeds of bond issues be expended for qualified projects within a five-year period from the date of issue. If this does not occur, the issuer must use all unspent proceeds to redeem bonds of the issue within 90 days after the conclusion of the five-year period, or the issuer may request an extension of the five-year period if it can establish that the failure to expend the funds was due to circumstances beyond its control.

Depending on market demand, PABs financing may be more expensive than traditional tax-exempt bonds or other alternatives. However, PABs provide assistance to projects which are beneficial to the public but have too much private involvement to qualify for tax-exempt financing. The level of financing costs with PABs may also enable innovative project procurement. Finally, though project elements funded with federal funds must follow all federal-aid requirements, not all elements of the PAB project may have to follow all federal-aid requirements.

Eligible Projects: Any surface transportation project which receives Title 23 assistance is qualified to benefit from PABs, including projects that receive TIFIA credit assistance. However, the law limits the total amount of PABs to $15 billion and directs the Secretary of Transportation to allocate this amount among qualified facilities. The $15 billion in exempt facility bonds is not subject to any individual state's volume cap, and state and local projects receiving a PAB allocation must also receive assistance under Title 23 or Title 49, United States Code (U.S.C.).

As of September 2020, about $12.3 billion in PABs had been issued, and $2.4 billion in PAB allocations has also been approved. As shown in Table 2-2, projects similar to the rail services being evaluated along the Coast Rail Corridor that have received PABs include: Denver RTD Eagle Project, the Purple Line Light Rail Project in Maryland, the Brightline Intercity Passenger Rail in Florida, and the Brightline West Passenger Rail Project that will connect Las Vegas and Southern California.

Table 2-2: PAB Pipeline (as of September 2020)

State	Project	Amount
Bond Issuances		
VA	Capital Beltway HOT Lanes	$589,000,000
TX	North Tarrant Expressway	$400,000,000
TX	IH 635 (LBJ Freeway)	$615,000,000
CO	Denver RTD Eagle Project	$397,835,000
IL	CenterPoint Intermodal Center, Joliet	$150,000,000
IL	CenterPoint Intermodal Center, Joliet	$75,000,000
VA	Downtown Tunnel/Midtown Tunnel, Norfolk	$675,004,000
VA	I-95 HOV/HOT Project	$241,950,000
IN	East End Crossing, Ohio River Bridges	$676,805,000
TX	North Tarrant Expressway 3A and 3B	$274,030,000
NY	Goethals Bridge	$460,915,000
CO	U.S.36 Managed Lanes/BRT Phase 2	$20,360,000
IN	I-69 Section 5	$243,845,000
PA	Rapid Bridge Replacement Program	$721,485,000
OH	Portsmouth Bypass	$227,355,000
NC	I-77 Managed Lanes	$100,000,000
IL	CenterPoint Intermodal Center, Joliet	$100,000,000
TX	SH-288	$272,635,000
IL	CenterPoint Intermodal Center, Joliet	$130,000,000
MD	Purple Line	$313,035,000
VA	I-395 Express Lanes	$232,995,000
VA	Transform 66	$737,000,000
FL	AAF-Brightline Phase 1	$600,000,000
CO	Central 70	$114,660,000
MI	I-75 Modernization Segment 3	$610,300,000
FL	AAF-Brightline Phase 2	$1,150,000,000
FL	AAF-Brightline Phase 2	$950,000,000
VA	Fredericksburg Express Lanes Extension	$262,000,000
TX	North Tarrant Expressway 3C	$653,865,000
OK	Gilcrease Expressway West Turnpike Project	$125,000,000
IL	CenterPoint Intermodal Center, Joliet	$150,000,000
	Subtotal	*$12,270,074,000*
Bond Allocations		
AL	I-10 Mobile River Bridge and Bayway Project	$420,000,000
DC	DC Smart Lighting	$160,000,000
NV/CA	Brightline West Passenger Rail Project	$1,000,000,000
NY	NY State Thruway System Service Areas P3	$350,000,000
GA	SR 400 Express Lanes Project	$503,000,000
	Subtotal	*$2,433,000,000*
	Issuances and Allocations, Total	**$14,703,074,000**

Source: https://www.transportation.gov/buildamerica/financing/private-activity-bonds-pabs/private-activity-bonds

2.4.2 Railroad Rehabilitation and Improvement Financing (RRIF)

Description: The RRIF program was established by Congress to offer long-term, low-cost loans to railroad operators, with particular attention to small freight railroads, to help finance improvements to infrastructure and investments in equipment. However, intercity passenger rail and commuter rail projects

are also eligible under this program. USDOT is authorized to provide direct loans and loan guarantees to eligible applicants for up to $35.0 billion to support the development of railroad infrastructure.

Unlike the TIFIA program, RRIF requires loan recipients to pay a credit risk premium intended to offset the risk of a default on their loan and helps the program comply with a congressional requirement that federal loan assistance programs operate at no cost to the federal government. This may make RRIF loans less attractive to borrowers than other types of federal, state, or private financing.

Loan proceeds may be used to acquire, improve, or rehabilitate intermodal or rail equipment or facilities, and establish new intermodal or railroad facilities. It may also reimburse planning and design expenses related to or refinance outstanding debt incurred for the development of railroad infrastructure.

Direct loans can fund up to 100 percent of a railroad project with repayment periods of up to 35 years and interest rates equal to the cost of borrowing to the government. The FRA will give priority to projects that provide public benefits, including benefits to public safety, the environment, and economic development.

Eligible borrowers include railroads, state and local governments, government-sponsored authorities and corporations, limited option freight shippers that intend to construct a new rail connection, and joint ventures that include at least one of these entities.

USDOT is authorized to issue loans up to $35 billion. As of October 2020, $6.29 billion in loan agreements have been executed. Examples of recent recipients for capital investments similar to what is being considered for the Coast Rail corridor include:

- Dallas Area Rapid Transit in Texas for the Cotton Belt Corridor Regional Rail Project ($908 million RRIF loan);
- Amtrak for new trains and improvements to Amtrak's high-speed Acela service from Washington, D.C., to Boston ($2.45 billion RRIF loan);
- Massachusetts Bay Transportation Authority for the MBTA Positive Train Control Project ($220 million RRIF Loan);
- Metropolitan Transportation Authority in New York for the Positive Train Control Systems on the tracks operated by the Long Island Rail Road Company and Metro-North Commuter Railroad Company ($967 million RRIF loan); and
- Denver Union Station Project Authority (DUSPA) for the redevelopment of the site in the lower downtown of Denver as an intermodal transit district ($155 million RRIF Loan).

2.4.3 Transportation Infrastructure Finance and Innovation Act (TIFIA)

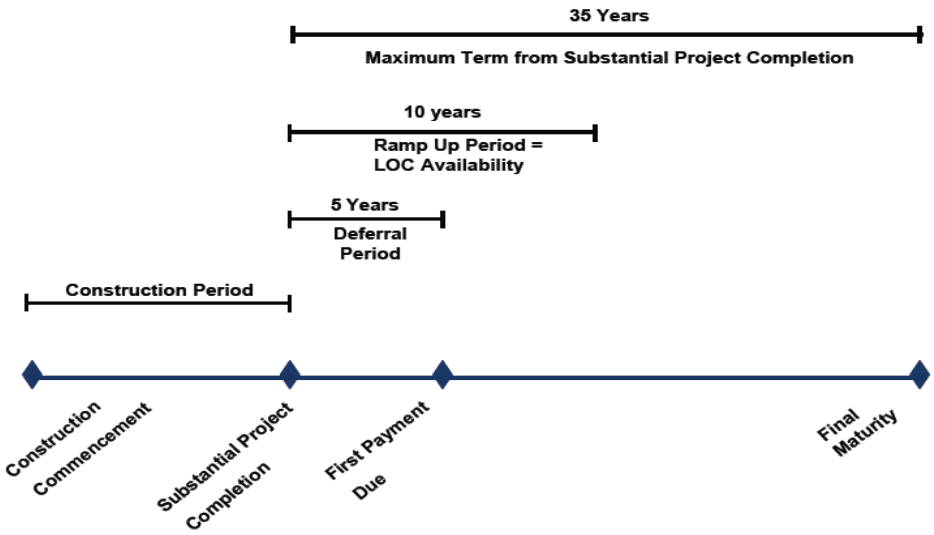
Description: The program's fundamental goal is to leverage federal funds by attracting substantial private and other non-federal co-investment in critical improvements to the nation's surface transportation system. TIFIA was established to provide credit assistance in an effort to support state and local governments seeking to finance large-scale transportation projects and programs with forms of user-backed revenue. Prior to the creation of the TIFIA program in 1998, project sponsors had difficulty obtaining financing at reasonable rates due to the uncertainties associated with user-backed revenue streams. These revenues, such as tolls and innovative revenue sources including value capture mechanisms (tax increment finance districts or benefit assessment districts), are difficult to predict during the initial "ramp-up" years after construction of a new infrastructure improvement, though they can become a predictable revenue source over the long term. The TIFIA program helps address this challenge. In addition to user-backed revenues, applicants can also apply for TIFIA financing backed by dedicated revenue sources, including sales tax.

TIFIA credit assistance offers the following advantages relative to traditional financing approaches:

- Long-term loans at the comparable U.S. Treasury yield (State and Local Government Series ("SLGS") rate plus one basis point) – with interest rates earlier this year at less than 2.0 percent for a 35-year loan as of April 1, 2020;
- Ability to lock in the interest rate several years in advance of a drawdown, without any additional cost;
- Right to prepay loan drawdowns in whole or in part at any time, without penalty;
- Potential willingness of USDOT to accept more flexible terms, such as backloading;
- Debt service to reflect anticipated growth in the pledged revenue stream, and thinner debt service coverage margins than otherwise required to obtain an investment-grade rating in the capital markets;
- Diversified source of debt capital (U.S. Treasury as lender), reducing market saturation;
- Lower transaction costs; and
- Ability to include multiple related improvement projects in one application, as long as the individual components meet TIFIA eligibility requirements and the related projects are secured by a common pledge (revenue source).

As shown in Figure 1, the maximum maturity of TIFIA credit instruments is the lesser of either 35 years after a project's substantial completion or the useful life of the project. Additionally, there is the potential to defer the first TIFIA payment up to five years after substantial project completion.

Figure 2-1. Illustrative TIFIA Repayment Structure as Permitted by Statute



Source: USDOT TIFIA Program Guide

While there are a number of advantages related to the TIFIA program, there are also several challenges in pursuing credit assistance:

- Nationwide demand may exceed funding supply. Therefore, applications are on a competitive basis. Additionally, while federal legislation allows for financing up to 50 percent of total project costs, the maximum level of financing provided is 33 percent;
- Availability of funds are subject to Congressional appropriation, which may impact project schedule;
- Project sponsors must pay fees in the amount of $250,000 before USDOT hires financial and/or legal advisors as part of the Letter of Interest review process. In addition, there is a credit processing fee at loan execution of $400,000 to $700,000, and an ongoing annual agency fee of $13,000. These transaction costs are in addition to a TIFIA loan's annual debt service payments; and
- An investment grade rating is required for facilities senior to the TIFIA loan.

Eligible Project Categories: Any type of project that is eligible for federal assistance through existing surface transportation programs (highway projects and transit capital projects) is eligible for the TIFIA credit program, including intelligent transportation systems (ITS) improvements. Related to the Coast Rail Corridor, this includes intercity passenger rail facilities and vehicles. Additionally, the FAST Act expanded eligible uses to include transit-oriented development (TOD) projects. Specifically, eligible costs related to TOD projects include: property acquisition; demolition of existing structures; site preparation; utilities; building foundations; walkways; pedestrian and bicycle access to a public transportation facility; renovation and improvement of historic transportation facilities; open space; safety, and security equipment (including lighting, surveillance, and related ITS applications); facilities that incorporate community services such as daycare or healthcare; a capital project to improve equipment or a facility for an intermodal transfer facility or transportation mall; and construction of space for commercial uses. TOD project cost must be greater than $10 million.

Finally, the projects listed below are examples that have received TIFIA financing backed by value capture revenue sources:

- Denver Union Station: Project cost - $519 million; TIFIA financing - $146 million; revenue pledge – real estate tax increments;
- San Francisco Transbay Transit Center: Project cost - $1.2 billion; TIFIA financing - $171 million; revenue pledge – real estate tax increments; and
- Chicago Red Purple Line Modernization: Project cost - $2.0 billion; TIFIA financing - $622 million; revenue pledge – real estate tax increments.

3 State & Local Sources

This section summarizes relevant state funding sources that could be targeted as part of the larger financial strategy for the Coast Rail system. These sources are separated into programs funded through Senate Bill 1 (SB1), cap-and-trade, the Transportation Development Act, and other programs. The sources are first summarized in Table 3-1, and additional details on these revenue streams and funding programs are provided further in this section.

Table 3-1: Summary of Potential Applicable State & Local Sources

	Grant	Description	Eligible for Commuter Rail	Eligible for Intercity Rail
SB1 Programs	State Rail Assistance Program (SRA)	Provides operating and capital assistance for commuter and intercity rail agencies. Eligible activities cover a full range of transportation planning and mass transportation purposes, with the direction that rail agencies spend these funds in a cost-effective manner to provide operations and capital improvements for the benefit of the public.	X	X
	Solutions for Congested Corridors Program (SCCP)	Provides funding to achieve a balanced set of transportation, environmental, and community access improvements to reduce congestion throughout the state.	X	X
	State of Good Repair Program	Provides funds to keep transit systems in a state of good repair, providing approximately $105 million annually to transit operators in California for eligible transit maintenance, rehabilitation, and capital projects.		
	Trade Corridor Enhancement Program (TCEP)	Provides funding for infrastructure improvements on federally designated Trade Corridors of National and Regional Significance, on California's portion of the National Highway Freight Network, as identified in California Freight Mobility Plan, and along other corridors that have a high volume of freight movement.	X	X
	Local Partnership Program (LPP)	Provides funding to counties, cities, districts, and regional transportation agencies in which voters have approved fees or taxes dedicated solely to transportation improvements or that have imposed fees, including uniform developer fees, dedicated solely to transportation improvements.		
Cap-and-Trade Programs	Local Carbon Transit Operations Program (LCTOP)	Provides operating and capital assistance for transit agencies to reduce greenhouse gas emission and improve mobility, with a priority on serving disadvantaged communities.	X	
	Affordable Housing and Sustainable Communities Program (AHSC)	Provides grants and/or loans to projects that achieve GHG emission reductions and benefit Disadvantaged Communities, Low-Income Communities, and Low-Income Households through increasing accessibility of affordable housing, employment centers and Key Destinations via low-carbon transportation resulting in fewer VMT through shortened or reduced vehicle trip length or mode shift to transit, bicycling or walking.	X	
Transportation Development Act Programs	Local Transportation Fund (LTF)	Provides funds from a ¼ cent of statewide sales tax for public transit, administration and planning, street and road improvements, pedestrian and bicycle facilities, and other transportation projects.	X	
	State Transit Assistance Program (STA)	Provides funds to public transit operators and other eligible recipients for the sole purpose of planning, administering, operating, and providing capital needs in support of public transportation service delivery.	X	

Table 3-1: Summary of Potential Applicable State & Local Sources (cont'd.)

	Grant	Description	Eligible for Commuter Rail	Eligible for Intercity Rail
State Transportation Improvement Program (STIP)	Interregional Transportation Improvement Program (ITIP)	Provides funds to improve interregional mobility for people and goods across the state on highway and passenger rail corridors of strategic importance.	X	X
	Regional Transportation Improvement Program (RTIP)	Provides funds for capital improvement projects including local roads, public transit, intercity rail, pedestrian and bike facilities, grade separations, transportation system management, transportation demand management, sound walls, intermodal facilities, and safety.	X	X
Other Programs	Transit and Intercity Rail Capital Program (TIRCP)	Funds transformative capital improvements that modernize California's intercity rail, bus (including feeder buses to intercity rail services, as well as vanpool services that are eligible to report as public transit to the FTA), ferry, and rail transit systems.	X	X
	Congestion Mitigation and Air Quality (CMAQ)	Provides funds for transportation projects likely to contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution and congestion.	X	X
	Surface Transportation Block Grant Program (STBG)	Promotes flexibility in state and local transportation decisions and provides flexible funding to best address state and local transportation needs.	X	X
	Locally Imposed General Taxes / Cost Allocation Methodology	Each jurisdiction within the corridor could contribute funding for an equitable share of capital costs from their respective locally imposed general taxes or other preferred local funding sources.	X	
	Sustainable Transportation Equity Project (STEP)	Provides funding to address community residents' transportation needs, increase access to key destinations, and reduce greenhouse gas emissions by funding planning, clean transportation, and supporting projects.	X	X
	Sustainable Transportation Planning Grant Program	Provides funding to support regional sustainable communities' strategies and ultimately achieve the State's greenhouse gas reductions targets of 40 and 80 percent below 1990 levels by 2030 and 2050, respectively.	X	X

3.1 SB1 Programs

California transportation programs are largely funded by SB1, or the Road Repair and Accountability Act of 2017, which was signed into law in April 2017. The entire package consists of $54 billion over 10 years, and includes funding for roads, bridges, safety, and other transportation investments in addition to transit and rail.

3.1.1 State Rail Assistance Program (SRA)

Description: SB1 created the SRA by directing a portion of new revenue specifically to intercity rail and commuter rail.

- SB1 directs a 0.5 percent portion of new diesel sales tax revenue for allocation: half to the 5 commuter rail providers and half to intercity rail corridors.
- Half of revenue is allocated in equal shares to commuter operators through FY 2019-2020, and via guidelines thereafter (about $10.5 million to each total over three years).
- Half of revenue is allocated to intercity rail corridors such that each of the existing three corridors receives at least 25 percent of the intercity rail share (about $13.1 million to each over three years).
- Funding is available for capital and operations.

This revenue is estimated to be $25 million in FY 2017-2018, $39 million in FY 2018-2019, and $41 million in FY 2019-2020. The majority of program funding is directed by statutory formula to rail operators, with guidelines defining process and timeline for agencies to obtain funding.

Eligible Project Categories: SRA was created to provide operating and capital assistance for commuter and intercity rail agencies. Eligible activities cover a full range of transportation planning and mass transportation purposes, with the direction that rail agencies spend these funds in a cost-effective manner to provide operations and capital improvements for the benefit of the public. Transportation planning efforts include, but are not limited to, service development plans, environmental reporting, feasibility studies, alternative analysis, strategic plans, ridership modeling, multi-agency integration efforts, schedule optimization, and long-and short-range transit planning.

Revenue Potential: As of July 2020, CRCC and SLOCOG had received two awards from the SRA Program: $75,000 to support completion of the Coast Rail Corridor Service Implementation Plan and $1.5 million for pre-construction activities to support implementation of a King City passenger rail platform.

Within the commuter rail category, five agencies have received funding for 14 projects since the SRA was created. The awards ranged from $0.5 million to $10.5 million and averaged $3.8 million.

Within the intercity rail category, five agencies have received funding for 22 projects since the SRA was created. The awards ranged from $75,000 to $12.0 million and averaged $2.1 million.

Most Recent Application Cycle: For the FY 2019-2020 application cycle, the California State Transportation Agency (CalSTA) provided expected funding levels in February 2020, transit agencies submitted their allocation requests to CalSTA in July 2020, and CalSTA approved the project list in August 2020.

3.1.2 Solutions for Congested Corridors Program (SCCP)

Description: The purpose of the SCCP is to provide funding to achieve a balanced set of transportation, environmental, and community access improvements to reduce congestion throughout the state.

This statewide, competitive program makes $250 million available annually for projects that implement specific transportation performance improvements and are part of a comprehensive corridor plan by

providing more transportation choices while preserving the character of local communities and creating opportunities for neighborhood enhancement.

SB1 requires preference to be given to comprehensive corridor plans that demonstrate collaboration between Caltrans and local or regional partners, reflecting a comprehensive planning approach. No more than half the available funding each year can be awarded to projects nominated exclusively by Caltrans.

Eligible Project Categories: Regional transportation planning agencies, county transportation commissions, and Caltrans are eligible to apply for program funds through the nomination of projects. All projects nominated must be identified in a currently adopted regional transportation plan and an existing comprehensive corridor plan. The California Transportation Commission is required to score and select submitted applications based on the following criteria:

- Safety;
- Congestion;
- Accessibility;
- Economic development, job creation and retention;
- Air pollution and greenhouse gas emission reductions;
- Efficient land use;
- Level of matching funds; and
- The ability to complete the project in a timely manner.

Eligible project elements within the corridor plans may include improvements to state highways, local streets and roads, rail facilities, public transit facilities, bicycle and pedestrian facilities, and restoration or preservation work that protects critical local habitat or open space. Program funds cannot be used to construct general purpose lanes on a state highway. Capacity increasing projects on the state highway system are restricted to high-occupancy vehicle lanes, managed lanes, and other non-general purpose lane improvements for safety and/or operational improvements for all modes of travel. Examples are auxiliary lanes, trucks climbing lanes, or dedicated bicycle lanes.

Revenue Potential: During the 2020 application cycle, spanning two years of programmed funding, seven projects were awarded grants totaling $500 million, or an average of $71 million per project. These awards ranged from $25 million to $150 million. Although none of these projects were for commuter rail, there were two transit-focused projects: $60 million for BART's train control modernization program and $65 million for a BRT project along the I-10 corridor in San Bernardino.

Most Recent Application Cycle: The 2020 application cycle programmed funds in FY 2021-2022 and FY 2022-2023. The application cycle was announced on January 29, 2020, and had an application deadline of July 17, 2020. Awards were announced on November 16, 2020.

3.1.3 State of Good Repair Program

Description: This program has the specific goal of keeping transit systems in a state of good repair, providing approximately $105 million annually to transit operators in California for eligible transit maintenance, rehabilitation, and capital projects. This can include the purchase of new transit vehicles and the maintenance and rehabilitation of both existing vehicles and transit facilities. These new investments will lead to cleaner transit vehicle fleets, increased reliability and safety, and reduced greenhouse gas emissions and other pollutants.

These funds are distributed to eligible agencies using the State Transit Assistance Program formula. This formula distributes half of the State of Good Repair funds according to population and half of the State of Good Repair funds according to transit operator revenues.

Eligible Project Categories: The only entities eligible to receive a direct allocation of State of Good Repair funds from the State Controller's Office are:

- A transportation planning agency, county transportation commission, and Metropolitan Transit System.

The regional entities listed above shall then sub-allocate funds to:

- Transit operators listed on the State of Controller's Office's State of Good Repair Allocation Estimate letter.
- Any entity defined as eligible to receive State Transit Assistance Program funds.

State of Good Repair funds are made available for capital projects that maintain the public transit system in a state of good repair. Projects eligible for State of Good Repair funding are:

- Transit capital projects or services to maintain or repair a transit operator's existing transit vehicle fleet or transit facilities, including the rehabilitation and/or modernization of the existing vehicles or facilities.
- The design, acquisition, and construction of new vehicles or facilities that improve existing transit services.
- Transit services that complement local efforts for repair and improvement of local transportation infrastructure.

Revenue Potential: In the FY 2019-2020 allocation, SLOCOG received $0.40 million in State of Good Repair funds, which it disbursed to three agencies: City of Morro Bay ($0.19 million), City of San Luis Obispo ($0.19 million), and San Luis Obispo Regional Transit Authority ($0.02 million). Additionally, these funds would not provide support for initial commuter rail capital investments, but could be a source for ongoing state of good repair needs once the service is implemented.

Most Recent Application Cycle: The State of Good Repair program operates on an annual basis. Each year, the State Controller's Office releases estimated amounts for each potential recipient agency for the upcoming FY no later than January 31 and releases revised estimates on August 1. It is up to the regional entities to choose a process and timeline for local agencies to request funding. The regional entities must submit project lists for use of funds to Caltrans by September 1.

3.1.4 Trade Corridor Enhancement Program (TCEP)

Description: The purpose of the Trade Corridor Enhancement Program is to provide funding for infrastructure improvements on federally designated Trade Corridors of National and Regional Significance, on California's portion of the National Highway Freight Network, as identified in California Freight Mobility Plan, and along other corridors that have a high volume of freight movement. The Trade Corridor Enhancement Program will also support the goals of the National Highway Freight Program, the California Freight Mobility Plan, and the guiding principles in the California Sustainable Freight Action Plan.

This statewide, competitive program will provide approximately $300 million per year in state funding and approximately $515 million in National Highway Freight Program funds, if the federal program continues under the next federal transportation act.

Eligible applicants apply for program funds through the nomination of projects. All projects nominated must be identified in a currently adopted regional transportation plan.

Eligible Project Categories: While intercity passenger rail and commuter rail are not the focus of TCEP and are not considered eligible costs, there may be an opportunity to pursue grant funds for freight rail

improvements that would also benefit intercity passenger and commuter rail services. Examples of the types of eligible freight rail projects for TCEP grants under this concept include:

- Freight rail system improvements to enhance the ability to move goods from seaports, land ports of entry, and airports to warehousing and distribution centers, including grade separations.
- Advanced Technology – Projects that employ advanced and innovative technology to improve the flow of freight, such as Intelligent Transportation Systems (ITS), public infrastructure (excluding vehicles) that enables zero emission or near-zero emission goods movement, real time information systems, weigh-in-motion devices, electronic screening/credentialing systems, traffic signal optimization, work zone management and information systems, ramp metering, electronic cargo and border security technologies.

Revenue Potential: In the 2020 application cycle (spanning three years of programmed funds), 47 projects applied for over $1.7 billion in grant funds. Of these, 28 projects were awarded nearly $1.4 billion, or an average of $48.5 million per project. The 2020 application cycle identified funding targets by region, though these are neither minimums, maximums, nor guarantees. These targets include 2 percent or $16.7 million for the Central Coast.

Most Recent Application Cycle: The 2020 application cycle provided three years of programming in FY 2020-2021 through FY 2022-2023. The application cycle was announced on March 25, 2020, and had an application deadline of August 3, 2020. Awards were announced on November 16, 2020, including five projects with rail components (primarily freight rail).

3.1.5 Local Partnership Program (LPP)

Description: The primary objective of this program is to provide funding to counties, cities, districts, and regional transportation agencies in which voters have approved fees or taxes dedicated solely to transportation improvements or that have imposed fees, including uniform developer fees, dedicated solely to transportation improvements. Consistent with the intent behind SB1, the Commission intends this program to balance the need to direct increased revenue to the state's highest transportation needs while fairly distributing the economic impact of increased funding.

Eligible Project Categories: The LPP provides funding to local and regional agencies to improve aging infrastructure, road conditions, active transportation, transit and rail, and health and safety benefits.

Revenue Potential: At this time, SLOCOG does not collect a dedicated fee or tax for transportation improvements. Because of this, funding from the LPP is not a potential funding source. As noted in the 2019 SLOCOG Financial Summary Report, in November 2016, the San Luis Obispo County Measure J-16 failed to reach the required 2/3rds for approval with 66.3 percent supporting it. Passage of the 'Self-Help' measure would have garnered an LPP formula-distribution of approximately $1.5 million per year for street and road maintenance and repair for the County of San Luis Obispo on top of $25 million annually, locally generated from Measure J, for transportation purposes.

3.2 Cap-and-Trade Programs

The cap-and-trade program is another state program that offers both a revenue stream and multiple funding programs. Legislation authorized, and the California Air Resources Board to collect fees from the state's largest greenhouse gas (GHG) emitters. The program is designed to provide a financial incentive for companies to pollute less. It requires oil refineries, power plants, food processors and other facilities to buy permits to release greenhouse gas emissions into the atmosphere.

3.2.1 Local Carbon Transit Operations Program (LCTOP)

Description: The Low Carbon Transit Operations Program (LCTOP) is one of several programs that are part of the Transit, Affordable Housing, and Sustainable Communities Program established by the California Legislature in 2014 by Senate Bill 862.

The LCTOP was created to provide operating and capital assistance for transit agencies to reduce greenhouse gas emission and improve mobility, with a priority on serving disadvantaged communities. Approved projects in LCTOP will support new or expanded bus or rail services, expand intermodal transit facilities, and may include equipment acquisition, fueling, maintenance and other costs to operate those services or facilities, with each project reducing greenhouse gas emissions. For agencies whose service area includes disadvantaged communities, at least 50 percent of the total moneys received shall be expended on projects that will benefit disadvantaged communities.

Eligible Project Categories: Funding is available to provide transit operating or capital assistance that meets any of the following:

- Expenditures that directly enhance or expand transit service by supporting new or expanded bus or rail services, new or expanded water-borne transit, or expanded intermodal transit facilities, and may include equipment acquisition, fueling, and maintenance, and other costs to operate those services or facilities.
- Operational expenditures that increase transit mode share.
- Expenditures related to the purchase of zero-emission buses, including electric buses, and the installation of the necessary equipment and infrastructure to operate and support these zero-emission buses.

Caltrans, in coordination with California Air Resources Board (CARB) will review the application to determine if the project supports at least one of the above-listed criteria, decreases GHG emissions, and benefits a low-income community and/or low-income residents and/or a disadvantaged community, if applicable.

Revenue Potential: In the FY 2019-2020 application cycle, among capital projects, awards ranged from $14,000 to $39.2 million. Across both capital and operating projects, $146.1 million was awarded.

Most Recent Application Cycle: For the FY 2019-2020 application cycle, the call for projects was released in January 2020, applications were due in March 2020, and awards were announced in June 2020.

3.2.2 Affordable Housing and Sustainable Communities Program (AHSC)

Description: The AHSC Program is administered by the Strategic Growth Council and implemented by the California Department of Housing and Community Development.

The AHSC Program provides grants and/or loans to projects that achieve GHG emission reductions and benefit Disadvantaged Communities, Low-Income Communities, and Low-Income Households through increasing accessibility of affordable housing, employment centers and Key Destinations via low-carbon transportation resulting in fewer vehicle miles traveled (VMT) through shortened or reduced vehicle trip length or mode shift to transit, bicycling or walking. Three Project Area types have been identified to implement this strategy: 1) Transit Oriented Development (TOD) Project Areas, 2) Integrated Connectivity Project (ICP) Project Areas, or 3) Rural Innovation Project Areas (RIPA).

Eligible Project Categories: The AHSC Program funds capital projects and eligible program costs within TOD, ICP, and RIPA Project Areas. Eligible capital projects include affordable housing development, housing-related infrastructure, sustainable transportation infrastructure, and transportation-related

amenities. Eligible program costs include active transportation programs, transit ridership programs, criteria air pollutant programs, workforce development programs, and carshare programs.

Revenue Potential: The FY 2019-2020 application cycle awarded grants to 26 projects ranging from $7.5 million to $30.0 million and averaging $21.2 million.

Most Recent Application Cycle: For the FY 2018-2019 application cycle, the notice of funding availability was released in November 2019, applications were due in February 2020, and awards were announced in July 2020. The draft guidelines for the FY 2019-2020 application cycle were released in September 2020.

3.3 Transportation Development Act Programs (TDA)

The Mills-Alquist-Deddeh Act (State Bill 325) was enacted by the California Legislature to improve existing public transportation services and encourage regional transportation coordination. Known as the TDA of 1971, this law provides funding to be allocated to transit and non-transit related purposes that comply with regional transportation plans.

TDA established two funding sources; the Local Transportation Fund (LTF), and the State Transit Assistance (STA) fund, both described below. Further, SB1 provides additional funding of $250 million annually for the STA program which is allowing the program to expand beyond the original funding parameters.

Within the study area, the San Luis Obispo Regional Transit Authority (RTA) receives LTF and STA funding. Coordination with the RTA would be required if the decision is made to pursue funding from either program to support implementation of the commuter rail service.

3.3.1 Local Transportation Fund (LTF)

Description: LTF is one of two funding sources established by the Transportation Development Act and is administered by the Caltrans Division of Rail and Mass Transportation. LTF is derived from a ¼ cent of the general sales tax collected statewide. The State Board of Equalization, based on sales tax collected in each county, returns the general sales tax revenues to each county's LTF. Each county then apportions the LTF funds within the county based on population.

Eligible Project Categories: Funds are available for pedestrian and bicycle facilities, for public transit, administration and planning, street and road improvements, and other transportation projects. These funds are apportioned among the municipalities within San Luis Obispo County on a population basis after making "off-the-top" contributions for regional planning and administration, ridesharing, and specialized transportation programs that benefit all the municipalities and communities in the region.

Providing certain conditions are met, counties with a population under 500,000 (according to the 1970 federal census) may also use the LTF for local streets and roads, construction and maintenance.

Most Recent Application Cycle: Funding requests are reviewed on an annual basis. At the June Board meeting, SLOCOG adopts a resolution conditionally approving all claims to be submitted over the course of the next six months. The Board authorizes the Executive Director to review each claim as it is submitted for accuracy and completeness, and either approve the claims or return them for more information.

It is the claimant's responsibility to identify the total amount approved by SLOCOG in June, file a claim, and meet the associated reporting requirements.

3.3.2 State Transit Assistance Program (STA)

Description: STA funds are appropriated by the legislature to the State Controller's Office (SCO). The SCO then allocates the tax revenue, by formula, to planning agencies and other selected agencies. Statute requires that 50 percent of STA funds be allocated according to population and 50 percent be allocated according to transit operator revenues from the prior fiscal year.

SB1 augments the base of the State Transit Assistance program essentially doubling the funding for this program.

Eligible Project Categories: Funds are distributed to public transit operators and other eligible recipients for the sole purpose of planning, administering, operating, and providing capital needs in support of public transportation service delivery. Such funds cannot be used for pedestrian, bikeway, or streets and roads projects. As part of the overall funding strategy for the Redlands Passenger Rail project, this source provided $27 million to support implementation of the project.

Most Recent Application Cycle: Funding requests are reviewed on an annual basis. At the June Board meeting, SLOCOG adopts a resolution conditionally approving all claims to be submitted over the course of the next six months. The Board authorizes the Executive Director to review each claim as it is submitted for accuracy and completeness, and either approve the claims or return them for more information.

It is the claimant's responsibility to identify the total amount approved by SLOCOG in June, file a claim, and meet the associated reporting requirements.

3.4 State Transportation Improvement Program (STIP)

The STIP funds new construction projects that add capacity to the transportation network and reflects a mix of state, federal, and local taxes and fees. On August 14, 2019, the California Transportation Commission adopted the 2020 STIP Fund Estimate (FE). The STIP FE is a biennial estimate of all resources available for the state's transportation infrastructure over the next five-year period, and establishes the program funding levels for the STIP. The 2020 STIP FE period covers FY 2020-2021 through 2024-2025, with FY 2019-2020 included as the base year. The Road Repair and Accountability Act of 2017 (also known as SB1) replaced the price-based excise tax with the incremental excise tax effective with the start of FY 2019-2020 and set the rate at 17.3 cents per gallon with the provision to adjust annually for inflation. With the transition from the price-based excise tax to the incremental excise tax, the revenues for the State Highway Account directed to fund the STIP are stabilized.

STIP capacity over the 2020 five-year FE period decreased compared to the capacity in the 2018 five-year FE period, going from $3.3 billion in the 2018 FE to $2.6 billion in the 2020 FE. The decrease is primarily attributable to a high level of pre-existing STIP project commitments for allocated and programmed projects.

The STIP consists of two broad programs, the Regional Transportation Improvement Program (RTIP) funded from 75 percent of new STIP funding and the Interregional Transportation Improvement Program (ITIP) funded from 25 percent of new STIP funding. The 2020 STIP FE includes resources provided by SB1. It includes a total of $2.6 billion in STIP programming capacity, of which $569 million is the new capacity available for new programming. The 2020 FE provides capacity for $517 million of Regional shares and $52.4 million of Interregional shares. The lower than 25 percent share for ITIP in the 2020 cycle is due to the payback of Interregional shares for over-programming of projects using regular shares and for programming pre-construction project components using Advance Project Development Element (APDE) shares in the 2018 ITIP.

3.4.1 ITIP Funding Capacity

Description: The ITIP's purpose is to improve interregional mobility for people and goods across the state on highway and passenger rail corridors of strategic importance. The 2020 Fund Estimate provides $52.4 million in new, additional ITIP funding capacity beyond the $573.0 million carried forward from the 2018 ITIP. These new funds are available in FY 2024-2025. This provides a combined $625.4 million in ITIP funding capacity for the 2020 cycle. Examples of projects similar to the Coast Rail corridor that are in the 2020 cycle include:

- LINK Union Station Project: $60.8 million
- Mini-High Platform Improvements (multiple counties): $5 million
- San Joaquin Corridor Second Platforms Project: $20 million
- Stockton Diamond Grade Separation Project: $20.8 million
- Stockton Regional Rail Maintenance Facility Expansion Project: $15.0 million
- Coast Subdivision Rail Corridor Improvements Project: $11.5 million

The next opportunity for the Coast Rail corridor to pursue ITIP funding would be during the 2022 programming cycle.

3.4.2 RTIP Funding Capacity

Description: RTIP funds are the region's primary source of funding highway improvements. Allowable uses also include capital improvement projects including local roads, public transit (including buses), intercity rail, pedestrian and bike facilities, grade separations, transportation system management, transportation demand management, sound walls, intermodal facilities, and safety. With the increase in STIP funding as a result of SB1, it is estimated that SLOCOG will receive approximately $7 million annually in RTIP funding.

Projects included in SLOCOG's 2020 RTIP reflect a combination of highway capacity, highway operations, and active transportation projects.

3.5 Other Programs and Approaches

3.5.1 Transit and Intercity Rail Capital Program (TIRCP)

Description: The TIRCP was created to fund transformative capital improvements that modernize California's intercity rail, bus (including feeder buses to intercity rail services, as well as vanpool services that are eligible to report as public transit to the Federal Transit Administration), ferry, and rail transit systems to achieve all of the following policy objectives:

- Reduce emissions of greenhouse gases
- Expand and improve transit service to increase ridership
- Integrate the rail service of the state's various rail operations, including integration with the high-speed rail system
- Improve transit safety

Additionally, TIRCP has a programmatic goal to provide at least 25 percent of available funding to projects that provide a direct, meaningful, and assured benefit to disadvantaged communities.

Finally, while TIRCP is an existing program, SB1 provides additional funding of $250 million annually which is allowing the program to expand beyond the original funding parameters.

Eligible Project Categories: Projects eligible for funding under TIRCP include, but are not limited to:

- Rail capital projects, including intercity rail, commuter rail, light rail, and other fixed guideway projects. Additionally, the acquisition of rail cars and locomotives, and the facilities to support them, that expand, enhance, and/or improve existing rail systems and connectivity to existing and future transit systems, including the high-speed rail system.
- Intercity, commuter, and urban rail projects that increase service levels, improve reliability, or decrease travel times, infrastructure access payments to host railroads in lieu of capital investments, efforts to improve existing rail service effectiveness with a focus on improved operating agreements, schedules, and minor capital investments that are expected to generate increased ridership, as well as larger scale projects designed to achieve significantly larger benefits.
- Rail, bus, and ferry integration implementation, including:
    - Integrated ticketing and scheduling systems and related capital investments (including integration with bus or ferry operators)
    - Projects enabling or enhancing shared-use corridors (both multi-operator passenger only corridors as well as passenger-freight corridors)
    - Related planning efforts focused on, but not limited to, delivery of integrated service not requiring major capital investment
    - Other service integration initiatives

This source provided $9 million as part of the overall funding strategy for the Redlands Passenger Rail project.

Revenue Potential: The 2020 application cycle awarded grants to 17 projects to be programmed over a five-year period. These awards ranged from $1.1 million to $107.1 million and averaged $29.4 million.

Most Recent Application Cycle: The 2020 application cycle programmed projects from FY 2020-2021 through FY 2024-2025. The call for projects was released in October 2019, applications were due in January 2020, and awards were announced in April 2020.

3.5.2 Congestion Mitigation and Air Quality (CMAQ)

Description: CMAQ funds are available for transportation projects likely to contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution and congestion. More specifically, to be eligible for CMAQ funding, a transportation project must generate an emissions reduction, and it must be located in or benefit a nonattainment or maintenance area. In 2012, the eastern portion of San Luis Obispo County was designated as non-attainment for ozone. This area had an ozone concentration that exceeded the established federal levels.

Eligible Project Categories: The formula for distribution of funds, which considers an area's population by county and the severity of its ozone and carbon monoxide problems within the non-attainment or maintenance area, assigns greater weight to areas that are both carbon monoxide and ozone non-attainment/maintenance areas. CMAQ program funding may be used for Transportation Control Measures (TCMs), including transit projects, Vehicle to Infrastructure communication equipment (new), and projects that are likely to contribute to an air quality standard in ozone and carbon monoxide non-attainment areas classified by the 1990 Clean Air Act Amendments.

Revenue Potential: In FY 2019-2020, Caltrans provided SLOCOG with an estimated $2.6 million in CMAQ funding based on the distribution formula.

Most Recent Application Cycle: Funds are disbursed on an annual basis according to the federal fiscal year.

3.5.3 Surface Transportation Block Grant Program (STBG)

Description: The FAST Act converted the long-standing Surface Transportation Program into the Surface Transportation *Block Grant* Program acknowledging that this program has the most flexible eligibilities among all Federal-aid highway programs and aligning the program's name with how FHWA has historically administered it. The STBG promotes flexibility in state and local transportation decisions and provides flexible funding to best address state and local transportation needs.

FHWA apportions funding as a lump sum for each state then divides that total among apportioned programs, including Transportation Alternatives, State Planning and Research, and off-system bridges. In FY 2020, 55 percent of a state's STBG apportionment (after set-asides) was required to be obligated in the following areas in proportion to their relative shares of the state's population:

- *Urbanized areas with population greater than 200,000:* This portion is to be divided among those areas based on their relative share of population, unless the Secretary approves a joint request from the State and relevant MPO(s) to use other factors.
- *Areas with population greater than 5,000 but no more than 200,000:* The State is to identify projects in these areas for funding, in consultation with regional planning organizations, if any.
- *Areas with population of 5,000 or less.*

The remainder of suballocated amounts may be used in any area of the state.

Eligible Project Categories: As mentioned previously, STBG is intended to be flexible to allow states and local agencies to determine how best to use the funding. Funding may be used for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects.

Revenue Potential: In FY 2019-2020, Caltrans provided SLOCOG with an estimated $3.9 million in STBG funding based on the distribution formula. According to the funding split by population identified above, SLOCOG's STBG funds are eligible for use in any area.

Most Recent Application Cycle: Funds are disbursed on an annual basis according to the federal fiscal year.

3.5.4 Locally Imposed General Taxes / Cost Allocation Methodology

Description: As of November 2014, all seven cities within the SLOCOG area (Arroyo Grande, Atascadero, Grover Beach, Morro Bay, Paso Robles, Pismo Beach, and San Luis Obispo) have voter-approved, ½ percent, sales taxes that flow into their respective General Funds. Each city council determines the amount that is used for transportation purposes. Grover Beach allocates zero percent and Atascadero and Paso Robles allocate 100 percent of their respective sales tax revenues toward transportation projects.

Eligible Project Categories: varies by city

Revenue Potential: With regard to funding participation from local jurisdictions, based on experience of other multijurisdictional transit services, development and adoption of an equitable capital cost allocation methodology could facilitate funding decisions for the commuter rail project. Based on the results of a potential cost allocation methodology, each jurisdiction would be responsible for funding their share of capital costs from their respective locally imposed general taxes or other preferred local funding sources. As a starting point, potential cost allocation approaches could reflect the following options or a combination of these options:

1. Allocate all capital costs equally among the jurisdictions: Based on the experiences of regions that have implemented multi-jurisdictional rail programs, while this approach provides a simple, easy to understand cost allocation methodology, it may be perceived as inequitable to some jurisdictions. Examples would be jurisdictions with more capital assets (stations, track, signals, maintenance-of-way equipment, etc.) within their geographic boundary would pay the same as those with fewer assets. However, this approach has been successful in allocating capital costs that benefit the entire system such as the costs of the maintenance and storage facility and rolling stock.
2. Develop a capital cost allocation methodology that distributes costs equitably among the jurisdictions based on specified variables: The methodology would reflect a percentage of costs for specific items based on the level of capital infrastructure within a specific jurisdiction. These variables could include, but not be limited to, track miles, stations, ticket vending machines, at-grade crossings/grade separations, and/or other localized improvements.

Most Recent Application Cycle: N/A

3.5.5 Sustainable Transportation Equity Project (STEP)

Description: STEP is a new transportation equity pilot that aims to address community residents' transportation needs, increase access to key destinations, and reduce greenhouse gas emissions by funding planning, clean transportation, and supporting projects.

STEP's overarching purpose is to increase transportation equity in disadvantaged and low-income communities throughout California via two types of grants: Planning and Capacity Building Grants and Implementation Grants. Within these two grant types, CARB currently has up to $19.5 million available, with Implementation Grants accounting for $17.75 million of available funding.

Eligible Project Categories: Within the Planning and Capacity Building Grants category, eligible project types include community transportation needs assessments, community engagement activities, land use and mobility plans, and other planning efforts. Within the Implementation Grants category, eligible project types include infrastructure, capital, operations, planning, policy-making, and outreach projects.

Revenue Potential: The program sets aside less than $2 million for Planning and Capacity Building Grants, which is split among numerous awards. The Implementation Grants are awarded to one to three projects per year, splitting the total allocation of $17.75 million.

Most Recent Application Cycle: For the 2020 application cycle, the call for projects was released in June 2020 and applications were due in August 2020. As of October 2020, awards had not yet been announced.

3.5.6 Sustainable Transportation Planning Grant Program

Description: The Sustainable Transportation Planning Grant Program includes:

- Sustainable Communities Grants ($29.5 million) to encourage local and regional planning that furthers state goals, including, but not limited to, the goals and best practices cited in the Regional Transportation Plan Guidelines adopted by the California Transportation Commission.
- Strategic Partnerships Grants ($4.5 million) to identify and address statewide, interregional, or regional transportation deficiencies on the State highway system in partnership with Caltrans. A sub-category funds transit-focused planning projects that address multimodal transportation deficiencies.

It is envisioned that these planning grants will provide much needed funding to support regional sustainable communities' strategies and ultimately achieve the State's greenhouse gas reductions targets of 40 and 80 percent below 1990 levels by 2030 and 2050, respectively.

Eligible Project Categories: Projects eligible for the Sustainable Communities Grants include, but are not limited to:

- Studies, plans or planning methods that advance a community's effort to reduce single occupancy vehicle trips and transportation related GHG through strategies including, but not limited to, advancing mode shift, demand management, travel cost, operational efficiency, accessibility, and coordination with future employment and residential land use
- Studies, plans or planning methods that assist transportation agencies in creating sustainable communities and transit-oriented development
- Studies that promote greater access between affordable housing and job centers
- Identification of policies, strategies, and programs to preserve transit facilities and optimize transit infrastructure
- Studies that evaluate accessibility and connectivity of the multimodal transportation network
- Studies to improve access to social services and other community destinations for disadvantaged communities
- Transit planning studies related to accessible transit, paratransit, mobility management, etc.
- Station area planning

Projects eligible for the Strategic Partnerships – Transit Grants include, but are not limited to:

- Identification of policies and procedures to integrate transit into the transportation system and planning process
- Statewide transit planning surveys and research
- Identification of policies, strategies, and programs to preserve transit facilities and optimize transit infrastructure
- Projects that evaluate accessibility and connectivity of the multi-modal transportation network
- Transit technical planning studies to optimize system performance

Revenue Potential: The Sustainable Communities Grants category provides funds through competitive and formula grants. On the competitive side, the grant maximum is $1.0 million. On the formula side, $12.5 million is available for MPOs throughout the state. In FY 2020-2021, SLOCOG received $0.2 million. The Strategic Partnership Grants transit set-aside has a maximum grant award of $0.5 million.

Most Recent Application Cycle: For the FY 2021-2022 application cycle, Caltrans released the draft application guide in October 2020. The call for projects will be released in November 2020, applications will be due in January 2021, and awards will be announced in June 2021.

4 Value Capture

Value capture is generally defined as the public recovery of a portion of increased property value created as a result of public infrastructure investment. As described in the sections below, there are a variety of strategies or mechanisms for providing funding to major transportation projects from the value induced as a result of their implementation. Advancement of these strategies requires collaboration among:

- Transit agencies/rail authorities: responsible for planning, implementing and operating the transit/rail line, stations, and systems;
- Local jurisdictions: responsible for amending / modifying existing land use regulations and zoning policies (density maximums, height restrictions, parking requirements, allowable adjacent land uses) to support implementation of station area development plans;
- Developers: invest in real estate development in response to new transportation capacity and access as well as supporting development regulations.

There is additional collaboration required between the transit agency/rail authority and local jurisdictions related to how the revenue generated through value capture will be used. Specifically, these jurisdictions are responsible for deciding whether all value capture revenue will be used to support the implementation and operation of the transit/rail project or if a portion will be used to construct the public infrastructure surrounding the stations to accelerate implementation of the station area development plans.

4.1 Overview

From the Transit Cooperative Research Program Research Report 190: *Guide to Value Capture Financing for Public Transportation Projects* (*TCRP Research Report 190*), capturing a portion of the induced value to fund implementation and ongoing operations and maintenance is an increasingly viable option, subject to a number of enabling conditions including:

- Real estate market vitality;
- Accommodative zoning and land use entitlements;
- Statutory authority enabling use of value capture mechanisms;
- Articulation of a compelling business case for value capture to public and private partners and to the financial markets on which they depend;
- Development of project- and context-specific financial strategies that are feasible and incentivize and reinforce value creation; and
- Institutional capacity on the part of transit agencies/rail authorities, local governments, developers, and other partners working together to maximize value creation and value capture.

Key conclusions from *TCRP Research Report 190* that provide guidance for future Coast Rail station area development plan efforts include:

- **Value capture opportunities and strategies vary significantly due to context.** The type and composition of real estate from which transit agencies and local governments may capture value vary from one circumstance and market location to another. The American Public Transportation Association's (APTA's) 2009 *Defining Transit Areas of Influence* highlighted that value capture techniques can generate revenue from within transit benefit areas that extend beyond the traditional half-mile-radius "transit areas of influence." More specifically, areas benefitting from enhanced mobility, transit/rail accessibility, improved bicycle and pedestrian access, and other transit-induced amenities may extend two miles or more from station locations.

- **Value capture is frequently contemplated in the context of transit-oriented development (TOD) projects.** TOD is one specific type of the many potential forms of transit-influenced

development. TOD is typically composed of vibrant mixed-use development that is amenity-rich and features proximity to transit. Many multimodal features are included in TOD, including pedestrian and bicycle improvements. Numerous studies have demonstrated that under certain circumstances, TOD can command higher sales prices and rents for a variety of property types.

- **The opportunity for value creation and subsequent value capture will vary by transportation network and station characteristics.** Unique characteristics of each transit line and station area will influence the potential for value creation and capture. Significantly different value capture strategies may be appropriate along the same transit line within a single jurisdiction. For example, transit lines and stations in mature and dense urban areas will lend themselves to different value capture strategies than those in greenfield or suburban redevelopment areas.

- **Land use regulations and zoning can support and incentivize both value creation and value capture strategies.** However, regulations that are ill-conceived, inadequate, or over-abundant may act as barriers to value creation. Realizing value creation potential related to transit projects requires that local planning, zoning, and development entities adopt rules that allow for and encourage optimization of the opportunity, including:
    - Replacing density maximums with minimums,
    - Modifying or eliminating rules requiring segregation of various land uses,
    - Reduction of minimum parking requirements, and
    - Use of development agreements or similar mechanisms that allow for negotiation of complex value exaction and policy-objective–specific entitlements.

- **Subject to market constraints, new transportation capacity and access create opportunity for increased development.** The cornerstone of successful value capture implementation is the clear identification of the economic opportunity associated with (1) real estate projects and (2) embracing a value capture strategy that optimizes benefits both for public and private partners. Developers respond to transit agency investment in infrastructure by evaluating market opportunity for value creation induced by new transportation capacity (or anticipation of such capacity).

- **From the developer's perspective, the business case for value capture relates to the balance between market opportunity and the cost burden of value capture.** Care must be taken to ensure that the amount of value captured does not exceed consumers' perceived transit-related/rail-related value premium. In an efficient real estate market, value capture costs exceeding consumers' increased willingness to pay for transit/rail amenities creates a competitive disadvantage and can disincentivize investment in development and value creation. In practice, these considerations are complicated further by real estate land acquisition, entitlement, development, construction, and financing costs, many or all of which may be higher than those in less complex projects of lower development intensity.

- **From the perspective of local government, the business case for value capture rests on its ability to fund or finance elements of a transit/rail project, municipal infrastructure, or other public needs.** Value capture strategies can allow local government to invest in further enhanced transportation infrastructure, transit supportive infrastructure, expanded transit service, and various public amenities, which can induce additional value creation.

Value capture is already occurring within the SLOCOG area by way of development impact fees. Development impact fees are imposed, by local jurisdictions, to pay for improvements and facilities required to serve new development or otherwise reduce the impacts of new development on a

community. These fees cover one-time capital improvements and community amenities. Although every jurisdiction collects developer impact fees, each jurisdiction collects them for a variety of different purposes, such as: police, fire, parks, transportation (whether circulation or signal improvements), storm drainage, wastewater, water supply, community centers, libraries, or open space. The total amount of fees collected are tied to the amount per unit and the number of units constructed.

Opportunity for value capture may be maximized to the extent that public and private stakeholders successfully cooperate in strategic value creation. Additional value may be created, and additional public policy objectives may be achieved, through strategic planning and partnership with other public agencies or not-for-profits such as workforce or affordable housing providers. Costs and benefits associated with development of affordable or workforce housing, parks, parking, or municipal infrastructure may be allocated between the parties in the context of development agreements negotiated toward maximizing mutually beneficial value creation.

4.2 Value Capture Typology

Typical value capture approaches that have been used or considered in station areas and along transit corridors in the United States are summarized below and reflect the definitions provided in *TCRP Research Report 190*. As indicated in Table 4-1, it is important to note that most of these can be used as part of a combination of multiple value capture approaches (joint application).

Table 4-1: Major Value Capture Approaches and Potential Application

Value Capture Approach	Exclusive Use	Joint Application
Impact Fees	X	
Joint Development / Air Rights		X
Land Value Taxation		X
Naming Rights		X
Negotiated Exactions	X	
Sales Tax District		X
Special Assessment District/ Improvement District		X
Tax Increment Financing		X

Source: TCRP Research Report 190

Within California, current state statutes allow value capture revenue to be collected through two categories of Special Districts:

- **Enhanced Infrastructure Finance Districts (EIFD):** In California, TIF is allowed through the creation of EIFDs. This type of local funding involves the creation of a special taxing district that captures incremental changes in property tax revenues. The tax base is frozen at predevelopment levels, and all or a portion of property tax revenues derived from increases in assessed values (the tax increment) is applied to a special fund created to retire tax-exempt bonds issued for development of the district. TIF revenues are small initially, but grow over time as the redevelopment project increases in value, which often results in additional economic growth and increased property values in the district. TIF districts are generally created for a set period of time, often for 20 to 30 years.

- **Improvement Districts:** An improvement district is a defined area where businesses are required to pay an additional tax or fee to fund projects within the district's boundaries. These districts typically fund services that are perceived by some businesses as being inadequately performed by government with its existing tax revenues. Potential investments funded by improvement district revenues might include additional security, capital improvements (e.g., high capacity transit service), construction of pedestrian and streetscape enhancements, or general marketing of the area. In California, the two types of improvements districts are benefit

assessment districts and community facilities districts (CFD). Both such districts generally utilize special assessments, which are charges that government imposes against property to recoup the cost of providing improvements to a defined land area or district.

4.3 Value Capture Approaches

A description of each value capture approach identified in Table 4-1 is provided below.

- **Impact Fees:** Assessed by local governments against new development, impact fees offset the public sector costs related to providing infrastructure and service for the development. Impact fees commonly finance roadways, water and wastewater utilities, schools, libraries, and other municipal services and more recently, impact fees have been used to finance transportation infrastructure.

  A policy challenge with impact fees is that they add costs to new development. Everything else being equal, impact fees could result in reduced competitiveness with similar properties if the associated benefits—higher-quality infrastructure, schools, and other amenities—are not cost-effectively delivered and the value is not clearly communicated (Fogarty and America, 2008).

- **Joint Development / Air Rights:** Joint development is typically a public-private partnership among a transit agency/rail authority, a developer, and/or a local government. In the partnership, the private sector will develop land owned by the transit agency/rail authority or local government, often within half a mile of the transit facility.

  Joint development projects are generally beneficial to the private and public partners as they typically lead to increased revenue for real estate owners, decreased costs for constructing or maintaining transit/rail systems, increased transit ridership, and potentially enhanced complementary infrastructure and passenger amenities.

  Revenue is provided to transit agencies/rail authorities through either a revenue sharing arrangement associated with the real estate development or through a cost-sharing agreement where the developer agrees to contribute directly to the implementation and/or ongoing maintenance of the public infrastructure investment.

  Depending on applicable legislative authority, the public sector may also be able to sell air rights to developers—including developable volume above or below a station. In general, air rights are applicable in dense urban areas where the additional costs of air rights construction can be borne by higher prices and rents.

  The FTA is a strong proponent of joint development and includes a wide range of joint development activities as eligible expenses under all of the Agency's capital grant programs. These eligible expenses include: property acquisition and preparation, relocation of utilities, construction of building foundations, bicycle and pedestrian improvements, open space, safety and security equipment, community service facilities and transit parking, and procurement of professional services, such as design, engineering and environmental analysis.

  Similar to the discussion in the Potential Federal Funding Section, if the Coast Rail system is defined as Intercity Passenger Rail, FTA funding could not be pursued for these joint development related expenses. If the system or components of the system are considered Commuter Rail, FTA grant funds could be pursued to support joint development projects.

- **Land Value Taxation:** This form of property tax is a levy on the unimproved value of land only. The type or level of development on the land is not part of the tax equation. From the TCRP Research 190 Report:

  > *Many economists and policy advocates have lauded the merits of land value taxation. The underlying premise is that unlike the value of vertical building improvements such as housing or office space, which are subject to many private choices and investment decisions, the economic value of unimproved land is more directly reflective of the value of public investment in infrastructure. This makes land value the most logical, and perhaps most equitable, source of public revenues. Advocates of land value taxation suggest that emphasizing ad valorem taxation on land rather than building improvements could have wide-ranging benefits with respect to investment behavior and social and economic consequences. Land value taxation is much discussed, and various versions have been implemented in many places throughout the world and in U.S. states such as Pennsylvania and Connecticut. Nevertheless, land value taxation remains uncommon in the United States (Gurdgiev, 2012).*

- **Naming Rights:** This form of revenue reflects private participation provided through the provision of equity investments for a project. In return, sponsors receive a combination of advertising, and promotion of their brand or image. Sponsorships have become an increasingly important mechanism for funding large public projects, such as stadiums, aquariums, and major transit programs that attract large attendance and/or provide high visibility. San Diego Metropolitan Transit System (MTS) provides a local example of this. In 2015, University of California San Diego Health agreed to pay MTS $30 million for naming rights to the Blue Line, including three stations along the line, to last 30 years. During this 30-year agreement period, the transit route is called the UC San Diego Blue Line.

- **Negotiated Exactions**: This value capture approach involves direct payments or in-kind contributions by developers to local governments that are similar to impact fees in that they are viewed as a means of having development pay for the costs associated with its impacts. Exactions that are negotiated can include infrastructure improvements (roadway paving, traffic signals) as well as contributions of equipment or facilities. Typically, negotiated exactions are a condition for granting approvals to develop a specific property or area plan.

  Negotiated exactions require two legal precedents: (1) a relationship (nexus) between the exaction requested and public sector service needed because of the development; and (2) appropriate proportionality between the exaction and the impact imposed by the development.

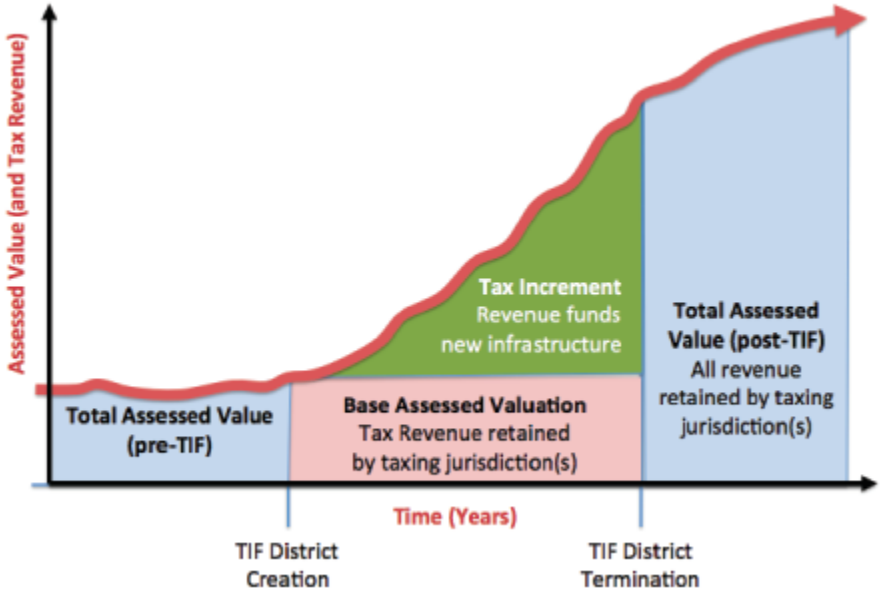
- **Sales Tax District**: Under this approach, retail entities and other commercial enterprises within a voter approved boundary are charged an incremental increase in the sales tax rate that is then dedicated to the transit/rail project. If the effective sales tax rate is not significantly higher than surrounding and/or competing neighborhoods or developments, sales tax districts may not negatively impact real estate markets. A recent example of a sales tax district is the Kansas City Downtown Streetcar Transportation Development District. This district was formed pursuant to the Missouri Transportation Development District Act and then approved by the residents within the district boundaries. In addition to the sales tax increment, this district collects revenues from multiple value capture approaches.

- **Special Assessment District/Improvement District:** To create a special assessment/improvement district, property owners within a defined boundary vote to implement a fee assessed against real property parcels that will or are benefitting from public investments.

Creation of a district commonly requires a majority vote of property owners within the proposed boundaries and the term of the district typically has a sunset/termination date. Typically, the assessments is levied against existing properties as well as new developments and must be proportional and directly related to the cost of the infrastructure or service and the benefit to the property owner.

- **Tax Increment Finance District (TIF):** As demonstrated in Figure 5-1, within a TIF district established by the local jurisdiction, property tax revenues collected by the local government are capped for a defined time period (typically 10 to 30 years). During this time period, property tax revenues resulting from increases in assessed value—the "increment" induced as a result of the public infrastructure investment—are used to reimburse infrastructure investment either directly or via bond debt service payments. Following the conclusion of the TIF district period, the revenue generated by the total assessed value is returned to the local government.

Figure 5-1: Tax Increment Finance Value Capture Approach



Source: TCRP Research Report 190.

Before establishing a TIF district, analysis is required to demonstrate that anticipated development or redevelopment would not occur except for the infrastructure investment facilitated through TIF. As described above, California allows the creation of EIFDs to collect the increment.

TIF has been used extensively in the United States to finance a wide variety of infrastructure, including in a few of the value capture examples described in the following section.

4.4 Value Capture Examples

For the Coast Rail system, if value capture is included in the overall financial strategy, it is possible that the type of value capture and fee assumptions could vary among the station areas, or one value capture approach could be implemented within a set radius of the entire alignment. The value capture examples summarized below are intended to support near-term discussions on potential approaches that could be evaluated in collaboration with station area development planning, as well as pre-construction activities across the entire corridor.

- **Transit TIF District: Chicago Transit Authority (CTA):** In 2016, the Illinois General Assembly passed new legislation that allowed for the creation of TIF Districts for redevelopment project areas around transit facility improvements to fund capital improvement projects and associated debt service. The new law, Public Act (PA) 99-0792, became effective on August 12, 2016 when Governor Rauner signed it. A TIF district captures the property value increase in a redevelopment project area that arises in part from being near upgraded transit stations and facilities. Within the legislation, "transit facility" is defined as an existing or proposed transit passenger station, existing or proposed transit maintenance, storage or service facility, or existing or proposed right of way for use in providing commuter rail or urban mass transit service.

  The legislation reflects the concept that existing facilities and proposed transit improvements will further increase property values and tax revenue, creating a cycle where transit facilities will improve, more transit oriented development will occur and property values will increase. The legislation requires that 80 percent of the revenue generated by these TIF districts (after whatever portion by law is paid to the municipality's school district) would be earmarked for development or redevelopment of transit-related facilities. Specific transit facility improvement areas and projects named in the legislation include:
  - CTA's Red and Purple Modernization Program;
  - CTA's Blue Line Modernization and Extension,
  - CTA's Red Line Extension; and
  - Chicago Union Station Master Plan.

  A "transit facility improvement area" as defined in the legislation is an area whose boundaries are no more than one-half mile in any direction from the location of a mass transit facility; provided that the length of any existing or proposed right of way included in any transit facility improvement area shall not exceed six miles. The legislation also gave a TIF district created for a transit facility improvement area a maximum term of 35-years.

  Transit capital expenses or servicing debt issued for transit capital expenditures are the only eligible expenses for transit TIF district revenue. "Transit facility improvement area redevelopment project costs" means those costs that are "costs related to the construction, reconstruction, rehabilitation, remodeling or repair of any existing or proposed transit facility, whether publicly or privately-owned".

  In 2016, the City of Chicago implemented a Transit TIF District for $2.1 billion Red and Purple Line Modernization (RPM) Project - Phase One. The Transit TIF District was established along the Red Line corridor from Devon Avenue to North Avenue and encompassed one large redevelopment project area. The CTA, through an Intergovernmental Agreement with the City of Chicago is using the TIF revenue to repay a $620 million TIFIA loan that was used as part of the RPM's financial strategy.

- **TIF District: Denver Union Station (DUS):** DUS is viewed nationally as a successful example of value capture within an innovative overall financial strategy. Specifically, the use of value capture supported the implementation of the regional mobility hub, including light rail, passenger rail, and regional bus infrastructure investments totaling approximately $500 million. The innovative financial strategy included a combination of federal and state grants, property sales proceeds, RTD sales tax, a TIFIA loan, and a $155 million Railroad Rehabilitation and Improvement Financing (RRIF) loan that will be repaid over a 30-year period using TIF revenue from the planned real estate development that would occur on the 40-acre district that surrounds DUS.

In 2008, the TIF district was established with the creation of the Denver Downtown Development Authority (DDA) and the DUS Metropolitan Districts (Met Districts).

- ***DDA*:** Created by statute, the DDA's TIF district is comprised of 44 acres in the Central Platte Valley. The DDA was provided statutory authority to use TIF for a 30-year period. The DDA plan area included the DUS project area (19.5 acres) plus an additional 25 acres. DDA entered into an agreement with the City and County of Denver to remit TIF to DDA, which the DDA then pledged to repay debt (the RRIF loan) incurred as part of DUS.

- ***DUS Met Districts*:** The City and County of Denver established "Met Districts," statutory metropolitan districts that levied property taxes. The districts had the following characteristics:
  - These Met Districts were not-for-profit corporations organized by the City and County of Denver for managing, financing, and implementing the DUS.
  - They were defined as "enterprises" under Colorado's Taxpayer Bill of Rights, each with authority to issue revenue bonds and operate "on behalf of issuer" for federal tax purposes (allowing issuance of tax-exempt debt).
  - During the TIF period, revenues generated from the 20 mills of incremental property tax would be payable through DDA, and thereafter for an additional 11 years, payable through the Districts.

- **Benefit Assessment District: Los Angeles Streetcar:** On December 2, 2012, private property owners along the proposed Los Angeles Streetcar alignment voted to implement a benefit assessment district (referred to as a Communities Facility District (CFD) in California). According to Los Angeles Streetcar, Inc., (LASI), the streetcar CFD will place a special tax on land owned by all downtown private property owners located within the district, including condominium owners, with tax amounts tiered based on a property's proximity to the proposed route.

  The initial assessment rates were established to issue approximately $65 million in bonds to cover the non-federal share of the streetcar project's costs. The rates are prorate based on a 10,000 square foot parcel that would be taxed annually:
  - $4,490 if located directly on the proposed streetcar line;
  - $3,640 if located one to two blocks away from the streetcar; and
  - $1,730 if located approximately three blocks away.

  Condominium units will be charged their unit's proportional share of the underlying land, similar to the structure of most homeowner association fees. The majority of condominium units within the streetcar CFD will be charged $100 or less per year, with a median cost of $60 annually.
  The LA Streetcar is currently pursuing an FTA Small Starts Grant.

- **Joint Application: Kansas City Streetcar:** On December 12, 2012, property owners in downtown Kansas City approved the creation of the Downtown Transportation Development District (TDD) to support implementation of the proposed streetcar system. The Downtown TDD is an approximately 2.2-mile-long corridor that generates revenue through the following special annual assessments:
  - 1 percent sales tax on sales within the TDD boundary;
  - Special assessment on real estate within the TDD boundary, with the following maximum annual rates:
    - $0.48 for each $100 of assessed value for commercial property ($1,536 for each $1,000,000 of market value)
    - $0.70 for each $100 of assessed value for residential property ($133 for each $100,000 of market value)

    - $1.04 for each $100 of assessed value for property owned by the City (approximately $810,000 annually)
  - A supplemental special assessment on surface pay parking lots within the TDD boundary excluding private lots or lots dedicated to residences and businesses. The rate is $0.15 per pay parking space.
  - A $0.40 cost for each $100 of assessed value for property with non-profit uses. However, because the first $300,000 of market value is excluded, most non-profits will have no streetcar costs. There is also no streetcar assessment on market value greater than $50,000,000 for non-profit uses.

On an annual basis, total revenues from the Downtown TDD are approximately $14 million per year (2020$). To date, these revenues have been used to issue bonds to support construction of the Starter Line Streetcar and to cover annual O&M costs (there is no fare to ride the streetcar). Based on the success of the Starter Line, in 2017, a 3.5-mile extension of the Downtown TDD was approved by residents to implement and operate the Main Street Extension Project. With the expansion of the TDD, the revenues generated (approximately $15 million annually (2021$)) will allow the City to issue $175 million in bonds to provide the local match for the $350 million streetcar extension project. Additionally, the revenue from the TDD expansion will continue to allow the entire streetcar system to operate fare free. Service on the Main Street Extension is anticipated to start in 2024.

4.5 Planning For Value Capture Success

If value capture approaches could be a component of the overall financial strategy for the Coast Rail corridor, it is important to consider station area planning activities during this early stage of program development. Setting a development vision and framework years before construction started can result in extensive development around the station and a revenue stream to support rail infrastructure investments.

- Station Location: While there are a variety of factors that will determine where stations will be located, with respect to a future value capture approach, it is important that development potential as well as the location of successful existing development be factored into this process. The objective is to balance “fitting in” a station location along an alignment with evaluating location options where the station could act as a catalyst for development based on surrounding land use patterns that complement the facility or a location where the station could support expansion of existing successful real estate anchors.

- Station Typology (Placemaking): Concurrent with evaluating station locations, there should be an analysis of the type of station and station area development that could occur. The objective is to evaluate the type of place the station area should become. For example, is the location an urban destination that would support a dense mixed use development pattern or is it a suburban or smaller urban area that is better suited to primarily be a residential development?

- Design Scenarios, Value Capture Studies and Policy Requirements: Once the typology decisions are made for each location, the next step would be to evaluate potential urban design scenarios. In addition to visual simulations, these scenarios would provide estimated development levels by land use type. Development estimates would provide the inputs for the analysis and comparison of different value approaches including potential annual revenue levels and financing capabilities. Additionally, the urban design scenario would provide the ability to determine what land use and zoning regulations would need to be changed to support implementation of both the passenger rail and station visions.

5 Preliminary Findings and Next Steps

The Federal, state, and local sources and value capture strategies provided herein are solely to present an array of potential funding options for the proposed commuter rail project and intercity passenger rail improvements within the Coast Rail corridor. For the purposes of facilitating future funding discussions, Table 5-1 and Table 5-3 provide an initial reasonableness assessment for each source for intercity passenger rail improvements and the commuter/regional rail project, respectively. 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 tables include 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 the intercity passenger rail improvements and the commuter/regional rail project.

Furthermore, Section 5.1 provides a potential strategy for funding implementation of new commuter or regional system and summarizes the additional analyses that will be needed to pursue these major funding sources.

Table 5-1: Initial Assessment of Potential Intercity Passenger Rail Funding Sources

	Grant	Description	Initial Assessment	Conceptual Funding Range	Potential Eligible Costs	Most Recent Application Cycle
Federal Programs						
Federal Railroad Administration	Consolidated Rail Infrastructure and Safety Improvements Program (CRISI)	Invests in a wide range of construction projects to improve railroad safety, efficiency, and reliability; mitigate congestion at intercity and freight rail chokepoints; enhance multi-modal connections; and lead to new or substantially improved intercity passenger rail transportation corridors.	High	Average award: $10 M	PE & NEPA; Final Design; or Construction	June 19, 2020
	Federal-State Partnership for State of Good Repair Program	Funds intercity passenger rail projects that repair, replace, or rehabilitate qualified railroad assets to reduce the state of good repair backlog and improve service performance.	High	Range: $6.5 M to $80 M; Recent CA Awards: $7 M to $12 M	Construction	July 27, 2020
	Restoration and Enhancement Grants Program	Provides operating assistance to initiate, restore, or enhance intercity passenger rail service.	Low (only 3 grants awarded)	Range: $4 M to $13 M	O&M	February 6, 2020
US Department of Transportation	Better Utilizing Investments to Leverage Development (BUILD)	Supports innovative projects that would be otherwise difficult to fund through traditional federal programs. Projects should catalyze long-lasting, positive changes in safety, economic competitiveness, quality of life, environmental sustainability, innovation, and partnerships with a broad range of stakeholders.	Low (very competitive program; application would need to benefit multiple modes)	Range: $4 M to $25 M	Planning & Construction	May 2020
	Infrastructure for Rebuilding America (INFRA)	Creates opportunities for all levels of government and the private sector to fund infrastructure, using innovative approaches to improve the processes for building significant projects, and increasing accountability for the projects that are built.	Low (very competitive program; application would need to benefit multiple modes)	Average award: $45 M	Construction	February 2020

Table 5-2: Initial Assessment of Potential Intercity Passenger Rail Funding Sources (cont'd.)

	Grant	Description	Initial Assessment	Conceptual Funding Range	Potential Eligible Costs	Most Recent Application Cycle
State & Local Programs						
SB 1 Programs	State Rail Assistance Program (SRA)	Provides operating and capital assistance for commuter and intercity rail agencies. Eligible activities cover a full range of transportation planning and mass transportation purposes, with the direction that rail agencies spend these funds in a cost-effective manner to provide operations and capital improvements for the benefit of the public.	High	Average award: $2 M	Planning & Construction	July 2020
	Solutions for Congested Corridors Program (SCCP)	Provides funding to achieve a balanced set of transportation, environmental, and community access improvements to reduce congestion throughout the state.	Moderate	Average award: $71 M	Construction	July 2020 (note: covered two years of programming)
	Trade Corridor Enhancement Program (TCEP)	Provides funding for infrastructure improvements on federally designated Trade Corridors of National and Regional Significance, on California's portion of the National Highway Freight Network, as identified in California Freight Mobility Plan, and along other corridors that have a high volume of freight movement.	Low (application would need to be for freight projects that benefit passenger rail)	Average award: $48.5 M	Construction	August 2020 (note: covered three years of programming)
State Transportation Improvement Program (STIP)	Interregional Transportation Improvement Program (ITIP)	Provides funds to improve interregional mobility for people and goods across the state on highway and passenger rail corridors of strategic importance.	Moderate	Range: $5 M to $61 M	Construction	Next opportunity will be part of the 2022 programming cycle
	Regional Transportation Improvement Program (RTIP)	Provides funds for capital improvement projects including local roads, public transit, intercity rail, pedestrian and bike facilities, grade separations, transportation system management, transportation demand management, sound walls, intermodal facilities, and safety.	Moderate	SLOCOG anticipated to receive $7 M annually	Construction	Annual programming

Table 5-2: Initial Assessment of Potential Intercity Passenger Rail Funding Sources (cont'd.)

	Grant	Description	Initial Assessment	Conceptual Funding Range	Potential Eligible Costs	Most Recent Application Cycle
State & Local Programs (cont'd.)						
Other Programs	Transit and Intercity Rail Capital Program (TIRCP)	Funds transformative capital improvements that modernize California's intercity rail, bus (including feeder buses to intercity rail services, as well as vanpool services that are eligible to report as public transit to the FTA), ferry, and rail transit systems.	High	Average award: $29 M	Construction	January 2020 application cycle programmed funds through FY 2024-2025
	Congestion Mitigation and Air Quality (CMAQ)	Provides funds for transportation projects likely to contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution and congestion.	Moderate	SLOCOG anticipated to receive $2.6 M annually	PE & NEPA; Final Design; or Construction	Annual programming
	Surface Transportation Block Grant Program (STBG)	Promotes flexibility in state and local transportation decisions and provides flexible funding to best address state and local transportation needs.	Moderate	SLOCOG anticipated to receive $4.0 M annually	Construction	Annual programming
	Locally Imposed General Taxes / Cost Allocation Methodology	Each jurisdiction within the corridor could contribute funding for an equitable share of capital costs from their respective locally imposed general taxes or other preferred local funding sources.	High	TBD	PE & NEPA; Final Design; or Construction	Annual programming
	Sustainable Transportation Equity Project (STEP)	Provides funding to address community residents' transportation needs, increase access to key destinations, and reduce greenhouse gas emissions by funding planning, clean transportation, and supporting projects.	Low	Annual funding: $18 M (split between one to three projects)	Construction	August 2020
	Sustainable Transportation Planning Grant Program	Provides funding to support regional sustainable communities' strategies and ultimately achieve the State's greenhouse gas reductions targets of 40 and 80 percent below 1990 levels by 2030 and 2050, respectively.	Low	Maximum award: $1.0 M	PE & NEPA; Final Design; or Construction	January 2021
	Value Capture	The public recovery of a portion of increased property value created as a result of public infrastructure investment.	Moderate (requires a multi-year effort to establish a district and start collecting revenue)	TBD	O&M or Construction	TBD

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5.1 Regional Rail Funding Strategy

Based on the Passenger Rail Improvement Study's capital cost and ridership estimates, and to initiate funding discussions with potential State and Federal partners, Table 5-2 provides a conceptual funding strategy for the commuter rail scenarios based on the capital sources that rated High, along with the FTA CIG Program for the Intermediate and Extended scenarios. (note that, based on the ridership estimates, the two Short Route scenarios would likely not be competitive for the FTA CIG Program). Assumptions used in the table include:

- For the Intermediate and Extended scenarios, the FTA CIG program would provide 40 to 50 percent of total funding
- Based on the scale of the proposed investments and grants previously awarded from the program, the TIRCP would provide between $10 and $20 million for the Short Route scenarios and between $30 and $50 million for the Intermediate and Extended scenarios. Note that actual grant requests would reflect the specific project element(s) in a TIRCP application.
- Similarly, based on grants previously awarded from the program for Commuter Rail Projects, the SRA would provide between $3 and $10 million for all scenarios. Note that actual grant requests would reflect the specific project element(s) in an SRA application.
- The Other/Local category reflect the remaining funding that would be needed based on the above assumptions. Finally, it is important to note that for the Intermediate and Extended scenarios, 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 is important to keep in mind based on 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

It is recommended that SLOCOG conduct additional planning and conceptual engineering to make a more informed decision on whether to pursue the two largest potential funding sources: FTA's CIG Program and CalSTA's TIRCP. A decision on these two sources will also support efforts in pursuing the other grant and funding opportunities identified in Table 5-2 and potentially additional sources summarized in Table 5-3.

A key input to evaluate the Coast Rail Corridor's competitiveness for the CIG and TIRCP grant programs will be a refined ridership forecast. For the FTA CIG Program, which requires the use of FTA's Simplified Trips-on-Project Software (STOPS) Model or a regional travel demand model, the ridership forecast is a primary input for four of the six project justification criteria (mobility improvements, cost effectiveness, congestion relief, and environmental benefits), as well as the fare revenue forecast for the required Financial Plan. For the CalSTA TIRCP, the ridership forecast addresses two of the program's objectives, to reduce emissions of greenhouse gases and expand and improve transit service to increase ridership.

Other critical path items to determine the competitiveness for both grant programs are the capital and annual O&M cost estimates. Refinements and additional analysis of both cost estimates will support efforts to estimate what the FTA CIG Program's cost-effectiveness and environmental benefit ratings

would be for each scenario. For the capital cost estimate, the more detailed analysis should include an evaluation of current construction bid trends in the transportation industry. For O&M costs, the revised estimate should reflect the results of a governance analysis to define roles and responsibilities for implementing, operating, and maintaining the commuter rail project. Once these refined cost estimates are developed, a more detailed evaluation of the other funding sources and the need for local funding should be conducted.

Table 5-3: Initial Assessment of Potential Regional Rail Funding Sources

	Grant	Description	Initial Assessment	Conceptual Funding Range	Potential Eligible Costs	Most Recent Application Cycle
Federal Programs						
Federal Transit Administration	Section 5309: Capital Investment Grant Program	Funds transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit projects. Projects with capital costs greater than $300 million and funding requests greater than $100 million follow the requirement for the New Starts funding category, and projects with capital costs less than $300 million and funding requests less than $100 million follow the requirement for the Small Starts funding category.	Moderate (depends largely on ridership forecast)	Up to 50% of total costs	Construction	Ongoing application process
US Department of Transportation	Better Utilizing Investments to Leverage Development (BUILD)	Supports innovative projects that would be otherwise difficult to fund through traditional federal programs. Projects should catalyze long-lasting, positive changes in safety, economic competitiveness, quality of life, environmental sustainability, innovation, and partnerships with a broad range of stakeholders.	Low (very competitive program; application would need to benefit multiple modes)	Range: $4 M to $25 M	Planning & Construction	May 2020
	Infrastructure for Rebuilding America (INFRA)	Creates opportunities for all levels of government and the private sector to fund infrastructure, using innovative approaches to improve the processes for building significant projects, and increasing accountability for the projects that are built.	Low (very competitive program; application would need to benefit multiple modes)	Average award: $45 M	Construction	February 2020

Table 5-3: Initial Assessment of Potential Regional Rail Funding Sources (cont'd)

	Grant	Description	Initial Assessment	Conceptual Funding Range	Potential Eligible Costs	Most Recent Application Cycle
State & Local Programs						
SB1 Programs	State Rail Assistance Program (SRA)	Provides operating and capital assistance for commuter and intercity rail agencies. Eligible activities cover a full range of transportation planning and mass transportation purposes, with the direction that rail agencies spend these funds in a cost-effective manner to provide operations and capital improvements for the benefit of the public.	High	Range: $0.5 M to $10.5 M; Average: $3.8 M	Planning & Construction	July 2020
	Solutions for Congested Corridors Program (SCCP)	Provides funding to achieve a balanced set of transportation, environmental, and community access improvements to reduce congestion throughout the state.	Moderate	Average award: $71 M	Construction	July 2020 (note: covered two years of programming)
	Trade Corridor Enhancement Program (TCEP)	Provides funding for infrastructure improvements on federally designated Trade Corridors of National and Regional Significance, on California's portion of the National Highway Freight Network, as identified in California Freight Mobility Plan, and along other corridors that have a high volume of freight movement.	Low (application would need to be for freight projects that benefit passenger rail)	Average award: $48.5 M	Construction	August 2020 (note: covered three years of programming)
Cap-and-Trade Programs	Local Carbon Transit Operations Program (LCTOP)	Provides operating and capital assistance for transit agencies to reduce greenhouse gas emission and improve mobility, with a priority on serving disadvantaged communities.	Moderate	Range: $14,000 to $39.2 M	O&M or Construction	March 2020
	Affordable Housing and Sustainable Communities Program (AHSC)	Provides grants and/or loans to projects that achieve GHG emission reductions and benefit Disadvantaged Communities, Low-Income Communities, and Low-Income Households through increasing accessibility of affordable housing, employment centers and Key Destinations via low-carbon transportation resulting in fewer VMT through shortened or reduced vehicle trip length or mode shift to transit, bicycling or walking.	Moderate (if can demonstrate project benefits disadvantaged or low-income communities	Range: $7.5 M to $30.0 M; Average: $21.2 M	Construction	February 2020

Table 5-3: Initial Assessment of Potential Regional Rail Funding Sources (cont'd)

	Grant	Description	Initial Assessment	Conceptual Funding Range	Potential Eligible Costs	Most Recent Application Cycle
State & Local Programs (cont'd.)						
Transportation Development Act Programs	Local Transportation Fund (LTF)	Provides funds from a ¼ cent of statewide sales tax for public transit, administration and planning, street and road improvements, pedestrian and bicycle facilities, and other transportation projects.	Low (depends on other SLOCOG annual funding needs)	TBD	Planning & Construction	Annual Budget Process
	State Transit Assistance Program (STA)	Provides funds to public transit operators and other eligible recipients for the sole purpose of planning, administering, operating, and providing capital needs in support of public transportation service delivery.	Moderate (depends on other SLOCOG annual funding needs)	TBD (note: Redlands Passenger Rail include $27 M in STA Funds)	Planning & Construction	Annual Budget Process
State Transportation Improvement Program (STIP)	Interregional Transportation Improvement Program (ITIP)	Provides funds to improve interregional mobility for people and goods across the state on highway and passenger rail corridors of strategic importance.	Moderate	Range: $5 M to $61 M	Construction	Next opportunity will be part of the 2022 programming cycle
	Regional Transportation Improvement Program (RTIP)	Provides funds for capital improvement projects including local roads, public transit, intercity rail, pedestrian and bike facilities, grade separations, transportation system management, transportation demand management, sound walls, intermodal facilities, and safety.	Moderate	SLOCOG anticipated to receive $7 M annually	Construction	Annual programming

Table 5-3: Initial Assessment of Potential Regional Rail Funding Sources (cont'd)

	Grant	Description	Initial Assessment	Conceptual Funding Range	Potential Eligible Costs	Most Recent Application Cycle
State & Local Programs (cont'd.)						
Other Programs	Transit and Intercity Rail Capital Program (TIRCP)	Funds transformative capital improvements that modernize California's intercity rail, bus (including feeder buses to intercity rail services, as well as vanpool services that are eligible to report as public transit to the FTA), ferry, and rail transit systems.	High	Average award: $29M	Construction	January 2020 application cycle programmed funds through FY 2025
	Congestion Mitigation and Air Quality (CMAQ)	Provides funds for transportation projects likely to contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution and congestion.	Moderate	SLOCOG anticipated to receive $2.6 M annually	PE & NEPA; Final Design; or Construction	Annual programming
	Surface Transportation Block Grant Program (STBG)	Promotes flexibility in state and local transportation decisions and provides flexible funding to best address state and local transportation needs.	Moderate	SLOCOG anticipated to receive $3.9 M annually	Construction	Annual programming
	Locally Imposed General Taxes / Cost Allocation Methodology	Each jurisdiction within the corridor could contribute funding for an equitable share of capital costs from their respective locally imposed general taxes or other preferred local funding sources.	High	TBD	PE & NEPA; Final Design; or Construction	Annual programming
	Sustainable Transportation Equity Project (STEP)	Provides funding to address community residents' transportation needs, increase access to key destinations, and reduce greenhouse gas emissions by funding planning, clean transportation, and supporting projects.	Low	Annual funding: $18 M	Construction	August 2020
	Sustainable Transportation Planning Grant Program	Provides funding to support regional sustainable communities' strategies and ultimately achieve the State's greenhouse gas reductions targets of 40 and 80 percent below 1990 levels by 2030 and 2050, respectively.	Low	Maximum award: $1.0 M	PE & NEPA	January 2021
	Value Capture	The public recovery of a portion of increased property value created as a result of public infrastructure investment.	Moderate (requires a multi-year effort to establish a district and start collecting revenue)	TBD	O&M or Construction	TBD

Passenger Rail Improvement Study

Appendices

SLOCOG Coast Rail Corridor Study

May 13, 2021

In Association With:
AMMA Transit Planning
Verdin Marketing

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Task 5.1:

Appendix E: Comparison of Comparable Commuter Rail Corridors

SLOCOG Coast Rail Corridor Study

June 15, 2020

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Introduction

The San Luis Obispo Council of Governments (SLOCOG), in cooperation with its partner agencies, is conducting the Coast Corridor Rail Service Study for improving rail and transit connectivity and frequency through the Central Coast area. This is a two-pronged study which will ultimately produce two integrated reports – the Service Implementation Plan (SIP) and the Passenger Rail Improvement Study (PRIS). The goal of the SIP is to develop an integrated plan for providing the potential expanded rail and transit frequencies through the Central Coast area as outlined in the 2018 California State Rail Plan (CSRP). The goal of the PRIS is to develop a phased implementation plan for commuter rail in the greater San Luis Obispo County area.

The purpose of this memorandum is to identify real-world points of comparison for evaluating the costs and benefits of commuter rail service options in the San Luis Obispo area. This memo identifies a number of commuter rail corridors in California and around the country that have similarities in demographic and geographic characteristics to the San Luis Obispo area, and compares those corridors to each other and to the SLO area in terms of demographics, corridor physical characteristics, corridor commuting characteristics, and rail service characteristics.

The corridors that were selected for this analysis have currently operating commuter rail type service that runs on freight rail tracks using either locomotive-hauled coaches (LHC) or diesel multiple units (DMU). Three corridors in various stages of development (but not yet in operation) were also included because they have similar characteristics to the SLO corridor. The metropolitan areas served by most of the corridors are under one total million population, though a few of the corridors serve regions or counties that are adjacent to larger metro areas; these were included because they have similar geographic and service characteristics to the SLO corridor.

The nine systems analyzed include six existing operations, and are as follows:

- Sonoma-Marin Area Rail Transit (SMART) (Sonoma and Marin Counties, California)
- Redlands Passenger Rail Project (RPRP, known as the Arrow Service) – under construction (San Bernardino County, California)
- North County Transit District (NCTD) Sprinter (North San Diego County, California)
- A-Train (Denton County, Texas, north of Dallas)
- New Mexico Rail Runner Express (Albuquerque/Santa Fe, New Mexico)
- Music City Star (Nashville area, Tennessee)
- SunRail (Orlando area, Florida)
- Triangle Commuter Rail (Raleigh-Durham area, North Carolina) – under study
- Treasure Valley High Capacity Corridor (Boise area, Idaho) – under study

For each corridor, the following data were obtained and the results are presented in the table on the next two pages. The analysis on subsequent pages highlights the key findings in each of the five subject areas.

Corridor Physical Characteristics	Demographics	Corridor Commuting Characteristics	Rail Service Characteristics	Governance
• Length of corridor • Primary corridor city • Proximity to another major urban area	• Population: o County o Main terminus city o Key corridor cities o Corridor total • Proximity to another major urban area	• Rail travel time • Highway free-flow travel time • Highway peak hour travel time • Connecting rail/transit to adjacent urban area	• Rail service status • Service type, vehicles • Ridership • Trains per day • Operating costs • Vehicle revenue hours	Responsibility for: • Management • Operations

				Main Terminus City							
Corridor	Length of Corridor (miles)	Counties	Population	Name	State	Population	Other Key Cities in Corridor	Population	Est. Total Corridor Population	Service Status	Governance
Santa Maria-SLO	32	SLO	280,000	SLO	CA	47,000	Santa Maria Arroyo Grande	107,000 18,000	240,000	Existing long distance and intercity rail only (3 round trips/day)	
Paso Robles-SLO	30	SLO	280,000	SLO	CA	47,000	Paso Robles Atascadero	31,000 30,000	110,000	Existing long distance rail only (1 round trip/day)	
Sonoma-Marin (SMART)	46	Sonoma Marin	500,000 260,000	San Rafael Larkspur	CA	59,000 12,300	Santa Rosa Petaluma Novato	175,000 60,000 55,000	400,000	Service initiated Aug-2017 Santa Rosa to San Rafael; extended to Larkspur Dec-2019	The Sonoma-Marin Area Rail Transit (SMART) District (comprised of representatives from the various cities) is responsible for train operations and maintenance.
Redlands-San Bernardino (RPRP)	9	San Bernardino	2,180,000	San Bernardino	CA	216,000	Redlands Loma Linda	72,000 24,000	250,000	Opening scheduled for 2022	
Oceanside - Escondido (NCTD Sprinter)	22	San Diego	3,338,000	Oceanside	CA	176,000	Vista San Marcos Escondido	101,000 97,000 152,000	500,000	Service initiated Sep-2008	NCTD contracts with Bombardier Transportation to operate the Sprinter service. Bombardier operates the trains and maintains the equipment, track, signals, and facilities.
A-train	21	Denton Dallas	887,000 2,636,000	Lewisville	TX	107,000	Denton Carrollton	139,000 137,000	400,000	Launched in June 2011	DCTA contracts with First Transit to carry out rail operations and maintenance, and maintenance of way.
New Mexico Rail Runner Express	97	Valencia Benarillo Sandoval Santa Fe	77,000 679,000 147,000 150,000	Belen Santa Fe	NM	7,000 84,000	Albuquerque	560,000	700,000	Opened in phases between 2006-2008	Rio Metro is responsible for operating the Rail Runner on behalf of New Mexico DOT. Rio Metro contracts with Herzog Transit Services to carry out train operations and maintenance, and maintenance of way.
Music City Star	32	Davidson Wilson	693,000 145,000	Nashville	TN	693,000	Lebanon Mt Juliet	35,000 36,000	650,000	Service began in 2006	The Tenessee Regional Transportation Authority (RTA) oversees operation of the Music City Star. RTA contracts with Transit Solutions Group for train operations.
SunRail	49	Volusia Seminole Orange Osceola	553,000 472,000 1,393,000 376,000	Sanford Kissimmee	FL	60,000 74,000	Orlando	286,000	600,000	Service begain in May 2014 for 32 mile corridor with 17 mile extension in 2018	The Central Florida Commuter Rail Commission (CFCRC) (comprised of elected leaders from the local funding partners) acts in an advisory capacity to the Florida DOT, which is responsible for all operations and maintenance for the first 7 years of operation. CFCRC will take over all SunRail responsibilities after 7 years. FDOT/CFCRC contracts with Bombardier for operations and maintenance, and with Herzog for signal maintenance of way.
Proposed Commuter Rail Systems being Studied											
Triangle commuter rail	37	Durham Orange Wake	321,000 148,000 1,112,000	Raliegh	NC	469,000	Cary Durham	168,000 274,000	950,000	Proposed commuter rail on ROW ownded by North Carolina Railroad Company. Amtrak, Norfolk Southern and CSX currently operate on the corridor. An exploratory study was completed in May 2019. Further study is under way to identify infrastructure improvements needed and develop detailed cost estimates and ridership forecasts	
Treasure Valley High Capacity Corridor	~29	Ada Canyon	482,000 230,000	Boise	ID	229,000	Caldwell Meridian	57,000 107,000	400,000	A High Capacity Transit Study was completed in 2009, with commuter rail on the Boise Cutoff as one of 14 mode/route alternatives and one of 6 recommended for further study. The regional planning agency (COMPASS) is currently updating this study as part of its long range transportation plan update. Study completion is expected in Summer 2020.	

					Highway Travel Time			Ridership			2018 NTD Operating Statistics					Morning peak		Midday		Afternoon peak		Evening	
Corridor	Service Type (per APTA)	Vehicles	Parallel Key Highway	Rail Travel Time	Free Flow	AM Peak (7:30)	PM Peak (4:30)	2019 Avg. Weekday	2019 Total Ridership	Rail Terminus has rail/transit connection to major urban area	Annual Operating Expenses	Annual Vehicle Revenue Hours	Cost per passenger	Cost per Revenue Hour	Total trains per day (total of both directions)	In	Out	In	Out	In	Out	In	Out
Santa Maria-SLO			US-101		0:30	0:30 - 0:50	0:40 - 1:05			No													
Paso Robles-SLO			US-101		0:30	0:30 - 0:45	0:30 - 0:40			No													
Sonoma-Marin (SMART)	Comm. Rail	Diesel Multiple Units (DMU)	US-101	1:19	0:50	1:00 - 1:40	1:10 - 1:50	N.A.	714,000	Yes	$ 23,901,114	43,959	$ 33.47	$ 544	39	6	3	7	7	7	6	0	3
Redlands-San Bernardino (RPRP)	N.A.	Diesel Multiple Units (DMU)/ Hydrogen-electic Multiple Units	I-10	0:17	0:12	0:12-0:20	0:12-0:20	--	--	Yes	N/A	N/A			46	7	7	5	5	7	9	3	3
Oceanside - Escondido (NCTD Sprinter)	Light Rail	Diesel Multiple Units (DMU)	SR-78	0:53	0:24	0:26-0:45	0:26-0:45	7,800	2,475,800	Yes	$ 19,770,818	32,516	$ 7.99	$ 608	64	11	11	9	9	9	9	3	3
A-train	Comm. Rail	Diesel Multiple Units (DMU)	I-35	0:39	0:22	0:24-0:35	0:22-0:35	1,500	382,000	Yes	$ 13,680,466	13,208	$ 35.81	$ 1,036	62	10	11	6	7	11	10	4	3
New Mexico Rail Runner Express	Comm. Rail	Locomotive Hauled Coaches (LHC)	I-25	2:25	1:25	1:25-1:50	1:25-2:00	2,400	744,000	Yes	$ 31,845,079	35,999	$ 42.80	$ 885	22	5	4	1	1	4	5	1	1
Music City Star	Comm. Rail	Locomotive Hauled Coaches (LHC)	I-40	0:55	0:35	0:40-1:00	0:35-1:00	N.A.	292,500	No	$ 4,498,288	7,803	$ 15.38	$ 576	12	3	3	0	0	3	3	0	0
SunRail	Comm. Rail	Locomotive Hauled Coaches (LHC)	I-4, US-17	1:33	0:50	0:55-1:25	1:05-2:00	6,300	1,571,800	No	$ 35,153,063	24,067	$ 22.36	$ 1,461	38	7	7	4	4	6	6	2	2
Proposed Commuter																							
Triangle commuter rail			I-40, NC-147							No					16-48, depending on scenario								
Treasure Valley High Capacity Corridor			I-84	est. 0:41	0:30	0:35-0:50	0:30-0:50			No					N/A								

Corridor Physical Characteristics

Length of corridor

- Most of the corridors are between 20-50 miles in length, with the exceptions being Redlands Rail (nine miles) and New Mexico Rail Runner (97 miles). For comparison, the length of a Santa Maria-SLO corridor would be 32 miles, a Paso Robles-SLO corridor would be 30 miles, and a Santa Maria-Paso Robles corridor would be 62 miles.

Location of primary corridor city

- In most cases, the primary corridor city is located at one terminus of the rail corridor. The exceptions are in Sonoma-Marin where the largest corridor city (Santa Rosa) is located toward the northern end of the corridor, in Florida where the largest city (Orlando) is located near the middle of the SunRail corridor, and in New Mexico where the largest city (Albuquerque) is located in the southern half of the corridor. So there is precedent for a corridor like Santa Maria-Paso Robles where the main commuting destination would be in the middle of the corridor.

Proximity to another major urban area

- Several of the studied rail corridors lie near the edge of a major metropolitan area that is outside the corridor's service area. For example, Sonoma and Marin Counties lie north of San Francisco, San Bernardino County lies east of Los Angeles, Oceanside-Escondido is in the suburban northern part of San Diego County, and Denton County is north of Dallas, Texas. In this respect the SLO area is more like the Nashville and Orlando areas which do not have a larger urban area nearby.

Demographics

Primary city population

- The population of the primary city in the nine studied corridors varies significantly – three of the primary cities are between 100,000-200,000 population, three are between 200,000-300,000, and three are over 300,000. For comparison, SLO itself has a population of 47,000 and the largest population city is Santa Maria with 107,000.

Estimated corridor population

- Most of the studied corridors include a total population between 400,000-950,000, with the lone exception being Redlands-San Bernardino with a corridor population of about 250,000 along its nine-mile length. For comparison, the Santa Maria-SLO corridor contains about 240,000 people and the Paso Robles-SLO corridor contains about 110,000.

Proximity to another major urban area

- The corridors with the smaller populations (500,000 and under) are all close to another major urban area (with the exception of Boise, which does not have an existing commuter rail service).

Corridor Commuting Characteristics

Commuting time through the corridor

- Free-flow driving times through the corridors are commensurate with their length, ranging from 12 minutes between Redlands-San Bernardino to almost 90 minutes between Santa Fe-Belen, New Mexico.

Highway congestion

- All of the parallel highway corridors experience traffic congestion during peak commute hours, so driving time during commute hours usually exceeds the free-flow driving time.

Rail travel times

- Travel times on the existing commuter rail services are generally competitive with the congested travel times on the parallel highway.

Terminus connection to another major urban area

- For the corridors which are near another major urban area, there is another rail/transit service available at the corridor terminus to take passengers into the urban area.

Rail Service Characteristics

Technology/rail equipment

- Of the six systems currently in operation, three use DMU technology and three use LHC technology. The Redlands Rail project will open in 2022 with DMU vehicles but is in the process of procuring clean-fuel hydrogen-electric multiple units to put into service in 2024.

Duration and frequency of service

- Four of the six existing systems operate trains throughout the day in both directions of travel, with the total number of train trips ranging from 38 to 64 over the course of a typical weekday. Two systems (in New Mexico and Nashville) operate almost exclusively during peak hours, with daily totals of 22 and 12 trains, respectively.

Ridership

- Total annual ridership (2019) for the six systems ranges from 292,500 for the A-Train (Denton County, TX) to 2,475,800 for NCTD Sprinter (North San Diego County).

Operating cost and service hours

- Annual operating costs range from $4.5M (Nashville) to $35M (SunRail). The number of service hours provided annually ranges from 7,800 (Nashville) to 44,000 (Sonoma-Marin).

Average operating cost per passenger and per revenue hour

- The average cost per passenger ranges from about $8.00 (NCTD Sprinter) to $42.80 (New Mexico) and the average cost per revenue hour ranges from $544 (SMART) to $1,461 (SunRail).

Governance

Management

- For all six operating systems, a transit authority or commission is responsible for management and oversight.

Operations

- For five of the six operating systems the managing authorities contract with private companies to operate and maintain the service. The lone exception is in Sonoma-Marin where the SMART District is responsible for managing and operating the system.

Task 5.5:

Appendix F: Passenger Rail Technology Options

SLOCOG Coast Rail Corridor Study

December 14, 2020

SLOCOG CRCC COAST RAIL CORRIDOR STUDY

In Association With:
AMMA Transit Planning
Verdin Marketing

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1 Introduction

The Passenger Rail Improvement Study (PRIS) will evaluate potential options to introduce regional rail service in the greater San Luis Obispo area. Task 5.5 will define service scenarios that will be analyzed for feasibility and performance in supporting the goals and objectives of the study as defined in Task 5.2. A key element of each service scenario is the rail vehicle technology that would be used. This memo begins with a general overview of existing rail motive power options, then summarizes the vehicle technologies considered for inclusion in the service scenarios.

2 Rail Motive Power Generation and Storage

Trains require significant amounts of energy to move, due to their large mass. The methods of generating and storing energy impact the operational characteristics of trains, including speed/acceleration, range that can be travelled, and emissions produced. The dominant sources of rail power in the United States are diesel combustion and electricity.

2.1 Internal Combustion

Internal combustion engines produce power by burning fuels such as diesel or natural gas that are stored on board the train. Power is then transmitted to electric motors on the wheels of the train to make it move. The combustion of fuel onboard produces emissions of greenhouse gases (GHGs) and criteria pollutants in the area in which a train operates. Using dense fuels provides the capacity to store large amounts of energy on a train, allowing trains to travel long distances without refueling.

The primary combustion fuel used in rail operations is diesel, but alternative fuels can be used, such as biofuels and natural gas. These alternative fuels have different emissions and energy density characteristics but can generally be used in diesel engines with minor modifications. For the purposes of the PRIS, diesel will be the assumed fuel for combustion engine alternatives since alternative combustion fuels will have similar operational implications as diesel in comparison to the non-combustion motive power options described below.

2.2 Conventional Electrification

Electric trains also utilize an electric motor to power their wheels, but generally do not store energy onboard. Electric passenger trains in operation in the United States are provided external power along their route, either via overhead catenary or a third rail aside the rails. Overhead catenary is the primary electrification method used for light rail and is also used for some higher frequency commuter rail operations. Third rail is reserved for fully grade separated corridors such as subways or elevated railroads, due to the safety risks to people crossing the right of way.

The power supplied by conventional electrification can be generated a number of ways, including both renewable sources and combustion of fossil fuels. Emissions impacts depend on the source of power generation but are located at the site of power generation rather than train operations. Conventional electrification is generally limited to high demand, high frequency corridors, due to the high capital cost of constructing the infrastructure to supply power along the route.

2.3 Battery Electric

Battery electric trains are an emerging technology that enables electric operation without fully electrifying a rail corridor by providing onboard storage of electric energy. Like conventional electrification, it allows operation with no GHG or criteria pollutant emissions at the tailpipe. In contrast to combustion fuels, batteries are not energy-dense, requiring orders of magnitude more space and mass to store a given amount of energy. Furthermore, recharging batteries is a slower process than refilling fuel tanks.

Battery technologies are being tested in Europe, but no battery-only electric passenger rail operation currently exists in the United States.

2.4 Hydrogen Fuel Cell

Hydrogen fuel cells utilize chemical reactions between hydrogen and oxygen to produce electricity to power electric motors. Like conventional or battery electrification, fuel cells do not produce GHG or criteria pollutant emissions at the tailpipe, but emissions offsite depend on the source of hydrogen fuel. In terms of storage capacity, hydrogen provides a middle ground between fossil fuels and batteries, enabling lower emission or zero-emission operation over longer ranges, but with more operational limitations than diesel.

Hydrogen power has a short, recent history of use in Europe and will be introduced in the United States with the upcoming Arrow service in Redlands, CA, implemented by the San Bernardino County Transportation Authority (SBCTA) using hydrogen-battery hybrid trains.

2.5 Combinations

Trains can be designed to use a combination of the above power supply methods. For example, a train can use overhead electrification on part of its route and supplement with diesel or battery on non-electrified segments. In the case of the Arrow pilot service, the hydrogen fuel cell provides longer range operation than battery alone, while the battery allows energy from regenerative braking to be stored.

3 Rail Technology Options

The analysis of comparable systems performed in Task 5.1 identified three vehicle technologies in use, or planned to be used, on similar corridors as the Santa Maria-Paso Robles study corridor. Technologies currently in use are Locomotive Hauled Coaches (LHC) and Diesel Multiple Units (DMU). The Arrow service in Redlands will initiate service with DMU trains in 2022 but will introduce service using Hybrid Hydrogen Fuel Cell Multiple Units (Hybrid FCMU) in 2024. These technology options are briefly summarized below.

3.1 Locomotive Hauled Coaches (LHC)

LHC trains consist of unpowered passenger cars (coaches) pushed or pulled by one or more engine vehicles (locomotives). This is the vehicle type currently used on the Coast Corridor by Amtrak's Pacific Surfliner and Coast Starlight, as well as large commuter railroads in California, including Metrolink, Caltrain, and COASTER. A typical commuter rail train consists of one locomotive and four to six two-level coaches. Locomotives can be powered by the variety of sources described above, but all comparable systems reviewed utilize diesel-fueled locomotives. On some high frequency routes in large metro areas, electric locomotives drawing power from overhead catenary are also used. As discussed in Section 4.2, conventional electrification has been excluded for the PRIS, so only diesel powered LHC will be considered for the PRIS.

3.2 Rail Multiple Units

In contrast to LHC (where separate vehicles provide motive power and carry passengers), each car of a Multiple Unit is self-propelled, containing both space for passengers and the engine to move the train. Compared to LHC, Multiple Units provide superior acceleration and deceleration, which is advantageous on routes with frequent stops or steep grades.

Multiple Units trains typically consist of two to four single level cars, and thus have lower capital and operating costs than LHC. Since each car powers itself, cars can be added to meet demand without sacrificing performance. This makes Multiple Unit service well suited to situations where the higher seating capacity of long LHC trains is not needed.

Like LHC, Multiple Units can use a variety of power sources. The review of comparable systems identified diesel as the primary power source for most operators and hydrogen fuel cells as a pilot technology on the upcoming Arrow service in Redlands. In addition, battery electric technology is in the early stage of use on European railroads.

Multiple Units face restrictions in operating on corridors shared with heavier trains. First, vehicles must comply with Federal Railroad Administration (FRA) safety regulations discussed in Section 4.1. Second, they must be approved for use by the owner of the railroad. Although various Multiple Unit models are currently operating in revenue service in the United States, none are operating on Union Pacific Railroad (UPRR) lines, which is the preferred route for much of the proposed service. UPRR currently prohibits Multiple Unit operations, due in part to their concerns about safely operating lightweight passenger vehicles alongside heavy freight trains. As multiple unit trainsets gain wider acceptance in the United States and establish a solid record of safe operation, UPRR may, at some point, reevaluate their position.

3.2.1 Diesel Multiple Units (DMU)

DMU are a well-established vehicle type used to implement urban transit service without the capital investment and impacts on shared operations of conventional electrification. While DMU are a cost-effective option for smaller commuter rail operations, LHC provide economies of scale when longer trains are needed, since power from one locomotive may be more efficient than multiple power sources on long DMU trains. As shown in Table 5-1, capital and operating costs of LHC are approximately double those of DMU, but a 4-coach train can seat more than four times as many passengers as a typical 2-car DMU.

3.2.2 Battery Electric Multiple Units (BEMU)

Electric trains are an option for operating rail service with no emissions. Battery power is used by electric trains in Europe and Japan, primarily to bridge short gaps on otherwise electrified railroads. Battery-only operations are possible but limited to short corridors by vehicle range. For example, Stadler's Flirt Akku vehicles are estimated to have a range of 94 miles under optimal conditions, which is insufficient to complete a round trip on the mountainous, approximately 60-mile corridor between Santa Maria and Paso Robles.[1] Travelling longer distances requires en-route charging. This can be done at stations, but may require longer dwell times, thus increasing overall travel times and reducing operational flexibility. The use of batteries to store energy has the advantage of allowing regenerative braking to recapture energy as trains decelerate. In addition, eliminating the diesel engine reduces a significant amount of the noise produced by rail operations.

Battery-only electric trains remain an unproven technology, with no existing operations in the United States. As a result, it is unlikely that SLOCOG could procure an existing model "off the shelf," and would probably need to fund design to ensure that vehicles are FRA compliant. Furthermore, Buy America requirements for federally assisted projects pose an additional challenge for technologies not yet manufactured in the United States.

3.2.3 Hybrid Fuel Cell Multiple Units (Hybrid FCMU)

Hydrogen fuel cell vehicles are an emerging technology that has no operational GHG or criteria pollutant emissions but does not require electrification of the rail corridor. The use of hydrogen as fuel provides denser energy storage than batteries, with similar operating range as diesel. For example, Alstom's Coradia iLINT has a range of approximately 625 miles, an order of magnitude above the 75-mile range of the battery-electric Coradia Continental.[2]While hydrogen fuel cells offer the possibility to significantly

[1] Source - https://www.stadlerrail.com/en/media/article/stadler-supplies-55-battery-operated-flirt-trains-for-theschleswig-holstein-local-transport-association/522/
[2] Sources - https://www.railwayage.com/passenger/commuterregional/alstom-coradia-ilint-passes-tests/, https://www.alstom.com/press-releases-news/2020/2/alstom-signs-first-contract-battery-electric-regional-trains-germany

reduce emissions, they remain an emerging technology and have the associated challenges. The first implementation of hybrid FCMU for passenger service began in Germany in September 2018. The first use in the United States will be the Arrow, with hybrid FCMU planned to enter service in 2024. SBCTA selected vehicles that will be powered by a combination of battery storage and electricity generated by a hydrogen fuel cell. The inclusion of a battery allows regenerative braking to improve fuel efficiency.

SBCTA's existing relationship with Stadler gives FCMU an advantage over BEMU in regulatory compliance. First, the vehicles are being designed to be FRA compliant for shared operation with freight and intercity rail. Second, Stadler is opening a new manufacturing facility in Utah to comply with Buy America provisions. The primary challenge is the provision of hydrogen fuel, which must be delivered or produced on site. Unlike Southern California, the San Luis Obispo area does not have an existing network of hydrogen fueling stations for automobiles to which hydrogen is delivered. Like battery electric operation, the GHG reductions associated with use of hydrogen fuel vary based on the method of generating the hydrogen fuel used.

Since the study area is not in a federal nonattainment area for any criteria pollutants, the air quality benefits of zero-emission train operations may not contribute to grant competitiveness as much as in other parts of the state.

4 Options Excluded from Consideration

Additional rail technologies are common in the United States but excluded from consideration. The study corridor is an active freight and intercity line owned primarily by UPRR. As a result, two types of technology options were excluded from consideration: technologies that do not meet FRA safety regulations, and technologies that require conventional electrification.

4.1 FRA Non-Compliant Technologies

Light rail vehicles used in urban transit do not meet safety standards set by the FRA for shared operation on railroads with heavier locomotive hauled trains in service. Since the Coast Rail Corridor is an active freight and intercity rail line, any technology implemented must comply with these regulations.

An exception to these safety requirements can be made via temporal separation, where non-compliant vehicles are allowed to operate over the same tracks as heavier vehicles if they exclusively operate at different times of day. For example, the North County Transit District's SPRINTER service in northern San Diego County utilizes non-compliant DMU passenger vehicles during the day and restricts freight operations to nighttime. Given that both freight and intercity passenger rail operations on the Coast Corridor occur during the day, this would not be a feasible option for service in San Luis Obispo.

4.2 Conventional Electrification

The use of electric trains, both locomotives and multiple units, is a well-established, proven technology, but power must be delivered along the rail route. This can be done by overhead catenary or third rail. Third rail is not safe for rail corridors that are not fully grade separated, such as the Coast Corridor. It is assumed that overhead catenary along the UPRR Coast Corridor would not be feasible due to cost and required institutional agreements and may not be preferred due to potential visual impacts of construction. Therefore, no alternatives using conventional electrification were considered.

5 Comparison of Technology Options

Table 5-1 provides a comparison of the operating characteristics, advantages, and disadvantages of LHCs, DMUs, FCMUs, and BEMUs.

Table 5-1: Comparison of Vehicle Types

	Locomotive Hauled Coach (LHC)	Diesel Multiple Unit (DMU)	Hydrogen Fuel Cell Multiple Unit (FCMU)	Battery Electric Multiple Unit (BEMU)
Typical Characteristics of Each Technology				
Local Example(s)	Amtrak, Metrolink	SMART, Arrow	Arrow	N/A
FRA Compliant	Yes	Yes	Yes	Likely Possible
Typical Consist	1 locomotive, 4-6 passenger coaches	2-3 cars	2 cars plus power pack	2-3 cars
Seated Capacity	500 (4 coach set)	118 (2-car Stadler Flirt DMU)	108 (2-car Stadler Flirt H2)	124 (2-car Stadler Flirt Akku)
Capital Cost	$21 million (4 coach set) [3]	$10.3 million (2-car Stadler Flirt DMU)[4]	$12 million (2-car Stadler Flirt H2)[5]	Similar to other multiple units[6]
Operating Cost[7]	$87 per revenue train mile $2,560.53 per revenue train hour	$45.25 per revenue train mile $1,023.26 per revenue train hour	Similar to DMU[8]	Similar to DMU[8]
Advantages	• Flexibility in types of passenger cars (ex. bike car, quiet car) • Staff and facility needs would be similar to existing Amtrak service in the area • Equipment could be shared with other Amtrak services • Lower capital cost if high seating capacity is needed • Existing market of older vehicles • Approved for operation on UPRR	• Higher acceleration improves travel time, particularly on routes with frequent stops and curves or steep grades • Scalability – each car can propel itself, so train length can be modified based on demand • Existing market of older vehicles	• No tailpipe emissions (except water) • Battery enables regenerative braking to reduce energy consumption • Higher acceleration improves travel time, particularly on routes with frequent stops and curves or steep grades • Scalability – each car can propel itself, so train length can be modified based on demand • Operates with very little noise • Can travel farther than battery vehicles without refueling	• No tailpipe emissions • Battery enables regenerative braking to reduce energy consumption • Higher acceleration improves travel time, particularly on routes with frequent stops and curves or steep grades • Scalability – each car can propel itself, so train length can be modified based on demand • Operates with very little noise • Does not require hydrogen delivery or conventional electrification
Disadvantages	• Produces tailpipe emissions • Not fuel efficient if only short trainset is needed • High capital costs if large seating capacity is not needed	• Produces tailpipe emissions • Higher capital cost and worse fuel-efficiency than LHC for long trainsets where high seating capacity is needed • Not currently approved for operation on UPRR	• Hydrogen fuel must be delivered or produced on-site • New technology carries more uncertainty • There are no used vehicles available for purchase • High capital cost if high seating capacity is needed • Not currently approved for operation on UPRR	• Limited range and charging time limit operational flexibility • Unproven technology • There are no used vehicles available for purchase • High capital cost if high seating capacity is needed • Not currently approved for operation on UPRR
Typical service pattern	• Limited service focused on peak hours • Stations 2.5-10 miles apart	• Moderate frequency across the day • Stations 1.5-5 miles apart	• Limited use in similar patterns as DMU	• Limited use in similar patterns as DMU and on partially electrified railroads

[3] Based on SCRRA procurement of 40 EMD F-125 locomotives beginning in 2013 and MBTA procurement of 80 Hyundai-Rotem bi-level coaches in 2019

[4] Based on SBCTA procurement of 3 DMUs for $31M in 2018

[5] Based on SBCTA procurement of 1 2-car Stadler Flirt H2 in December 2019

[6] While there are no recent US procurements of BEMU, SBCTA's ZEMU Concept Feasibility Study estimated cost of $10.2 million for BEMU, compared to $11.2 million for FCMU (lower than the final procurement at $12 million). Battery-only technology would generally be slightly cheaper than combining battery and hydrogen energy systems, but a similar order of magnitude, likely between DMU and FCMU.

[7] For LHC and DMU, median costs from FTA's 2019 National Transit Database for all commuter or hybrid rail operations using exclusively the respective vehicle.

[8] SBCTA's ZEMU Concept Feasibility Study estimated annual fuel related costs for FCMU of $540,000 to $1,154,000 and a range of $690,000 to $769,000 for BEMU, in comparison to $750,000 for DMU. Costs not related to fuel would be similar for all multiple units, regardless of motive power.

Task 5.11:

Passenger Rail Improvement Study

Appendix G: Regional Rail Operations Modeling

SLOCOG Coast Rail Corridor Study

May 13, 2021

SLOCOG CRCC COAST RAIL CORRIDOR STUDY

HDR

In Association With:
AMMA Transit Planning
Verdin Marketing

CONTENTS

1 Introduction

This Appendix details methodology and results of the regional rail operations modeling conducted for the Coast Corridor Rail Service Study, in support of the Passenger Rail Improvement Study.

Determining the most cost-effective approach to support increased passenger rail service in the region is critical to the ability to successfully implement the service and ensure its long-term success. Overestimating the infrastructure required to support both future freight and passenger service would negatively impact the ability to secure sufficient funding to implement those improvements. Conversely, underestimating the infrastructure requirements may inhibit the new service from operating at the high service level needed to both attract and retain new customers.

Conducting a rail simulation analysis helps determine the optimal infrastructure level needed to support future freight and passenger rail services long before final design and construction commences. The simulation replicates, in a virtual environment, future train operations and infrastructure, and can test and validate whether proposed improvements provide the benefit intended. The simulation can also help compare various infrastructure scenarios to help determine the most cost-effective solution.

Conceptual cost estimates for capital improvements identified in this Appendix are provided in **Appendix H**.

2 Rail Operations Modeling Methodology

There are several software products that perform rail simulation analysis, including the Viriato Timetable Planning Tool, developed by SMA, which is used by agencies and rail operators throughout California to determine existing and future schedules and infrastructure requirements. Another tool, Rail Traffic Controller (RTC), developed by Berkeley Simulation Systems LLC, also tests and validates service plans and infrastructure improvements and is used by the Federal Railroad Administration and most Class I railroads, including Union Pacific Railroad (UP). RTC excels at simulating random delay events that are representative of typical of day-to-day railroad operations.

UP has an RTC model of the project area and has graciously allowed the use of their model to assist in development of the SIP. The model was updated as part of the SLOCOG Service Improvement Plan (SIP) with recently completed infrastructure improvements and proposed mid-term state-supported 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.

2.1 Assumptions and Methodology

The assumptions and methodology used in the simulation process are summarized below.

1. Model limits are the UP Santa Barbara and Coast Subdivisions between Santa Barbara and Salinas.
2. The passenger train consist used in the model is one Stadler FLIRT 3-section Diesel Multiple Unit (DMU) railcar. 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.
3. Test and validate the base model to ensure accuracy. This task was performed during the SIP analysis, as described in **Appendix C**.
4. Infrastructure improvements agreed upon by the Los Angeles-San Diego-San Luis Obispo Rail Corridor Agency (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.

5. For both Scenarios, the intercity service schedules produced during the SIP analysis for Options B and C in the mid-term horizon were assumed.
6. Develop Short Route, Peak Only model (Scenario 1):
    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 infrastructure improvements between Guadalupe and SLO, if required, into model.
    c. Re-run model to gauge the effectiveness of the added infrastructure improvements.
7. Develop Extended Route, All Day model (Scenario 2):
    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 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 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, Pacific Surfliner state-supported service, and the proposed new service connecting SLO to the Monterey Bay Area, 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.

The analysis will include:

1. Hypothetical passenger train schedules for each model.
2. Time-distance (stringline) graphs for each modeling case.

Scenario 1 was used to determine infrastructure needs for Service Option 1 (Short Route, Peak Only). Scenario 2 was used to identify the infrastructure needs for each all day service option (Options 2 through 4). The model limits for Scenario 2 correspond to the Extended Route of Option 4. For the Short and Intermediate Route options (2 and 3, respectively), infrastructure requirements were identified by subtracting the improvements outside the proposed route for that option. For example, Option 2 does not include service north of San Luis Obispo or east of Guadalupe, so improvements that are only required to enable extension of service to those areas are excluded.

3 Service Scenarios

Two regional rail service scenarios were analyzed, representing a range of service levels and corresponding levels of investment:

1. Scenario 1: Short Route, Peak Period Service Only – Service limited to two peak direction trips during peak commute hours from Guadalupe to SLO
2. Scenario 2: Extended Route, All Day Service – Bidirectional service every 30 minutes during peak hours, and hourly off-peak, 7 days a week between Santa Maria and Paso Robles, with additional infill stations

3.1 Stations

Scenario 1 would serve the Short Route (Figure 3-1) consisting of three existing stations: San Luis Obispo, Grover Beach, and Guadalupe. Scenario 2 would use an Extended Route (Figure 3-2) to the existing Paso Robles station, and serve new stations in Atascadero, at the California Polytechnic State University, on the western edge of Santa Maria, and in downtown Santa Maria.

Figure 3-1. Short Route

Figure 3-2. Extended Route

4 Base Infrastructure

In 2018, the CalSTA awarded LOSSAN funding for the LOSSAN North Improvement Program through the Transit and Intercity Rail Capital Program (TIRCP). The program consists of improvements to increase frequency and on-time performance between Los Angeles, Santa Barbara, and SLO, including enabling a third round trip to SLO. In 2020, LOSSAN, CalSTA, and UP reached agreement on infrastructure improvements between Santa Barbara and SLO. These improvements include:

- Complete installation of Centralized Traffic and Positive Train Control systems (105 miles)
- Powering selected sidings for train meets. Sidings within the study area converted to powered, controlled sidings include:
  - Callender, Milepost (MP) 266.3-268.1 (Callender is also extended to 9000 feet)
  - Guadalupe, MP 272.7-273.6

These improvements were incorporated into the Base infrastructure model. There are other improvements in the agreement, including capacity siding improvements south of the study area and non-capacity improvements such as replacing rail, ties, and corridor hardening (slope stabilization, fencing, etc.), but these improvements do not impact train performance or line capacity in the model for the study area.

5 Scenario 1: Short Route, Peak Period Service Only

5.1 Proposed Schedules

The RTC model was used to determine hypothetical schedules that would provide two northbound trips to San Luis Obispo during morning peak hours and two southbound trips during afternoon peak hours, while utilizing existing infrastructure to the maximum extent possible. In addition, the schedules were designed to minimize interference with proposed mid-term Pacific Surfliner and Coast Starlight schedules.

The schedules were designed with sufficient time to turn the same trainset at Guadalupe and SLO, meaning that one trainset could perform all four daily round trips.

Figure 5-1 shows the hypothetical schedule for the proposed Scenario 1 service.

Figure 5-1. Scenario 1 Schedule (San Luis Obispo - Guadalupe)

Northbound	Regional Rail	Regional Rail	New Intercity	Pacific Surfliner	Coast Starlight	Regional Rail	Regional Rail	Pacific Surfliner
Train number	901	909	759	765	14	937	943	777
GUADALUPE	05:55	07:55	09:57	13:57	-	14:55	16:25	19:57
GROVER BEACH	06:11	08:11	10:16	14:16	-	15:11	16:41	20:16
SAN LUIS OBISPO	06:31	08:31	10:45	14:45	15:19	15:31	17:01	20:45

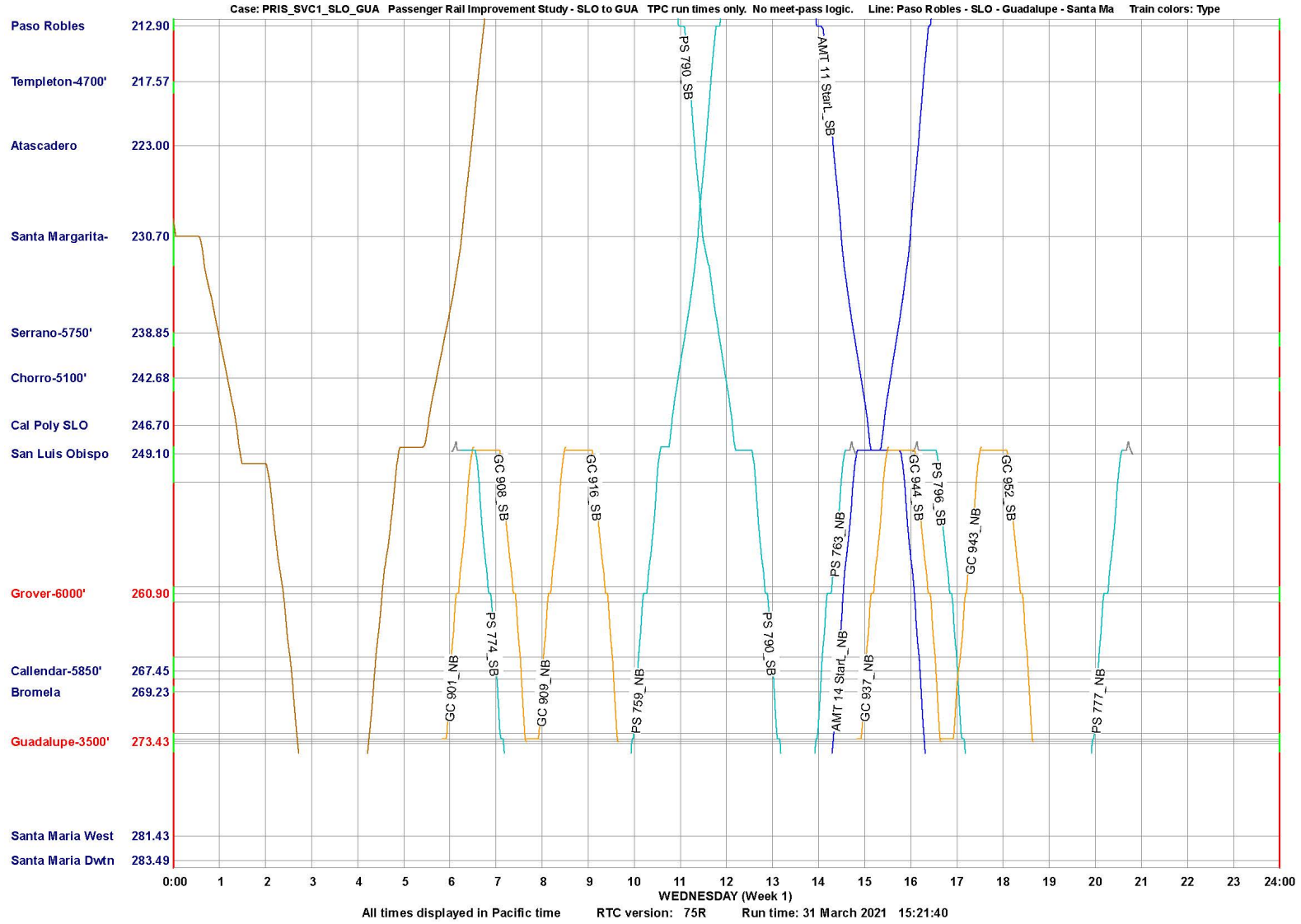
Southbound	Pacific Surfliner	Regional Rail	Regional Rail	New Intercity	Coast Starlight	Regional Rail	Pacific Surfliner	Regional Rail
Train number	774	908	916	790	11	944	796	952
SAN LUIS OBISPO	06:33	07:05	09:05	12:33	15:45	16:05	16:33	18:05
GROVER BEACH	06:53	07:25	09:25	12:53	-	16:25	16:53	18:25
GUADALUPE	07:09	07:41	09:41	13:09	-	16:41	17:09	18:41

Stringline diagrams depict the operation of all trains over a route for a specific time period.

- The horizontal axis represents time of day
- The vertical axis portrays the stations (highlighted in red) and siding locations along the route
- Each line represents the operation of a single train.
    - When the lines cross it indicates the location where trains meet and pass each other. This indicates that the schedule must utilize a second track at this location.
    - When a line is horizontal it indicates when a trainset is stopped at a location for a station stop, work event, or layover.
    - If the horizontal line is dotted, it indicated unscheduled dwell or delay.
- Individual train types are color-coded by type: (Amtrak long-distance, Pacific Surfliner, UP freight, and UP maintenance of way crews)

Figure 5-2 shows the stringline diagram for the proposed Scenario 1 service.

Figure 5-2. Stringline Diagram, Scenario 1 Minimal Service (San Luis Obispo - Guadalupe)



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5.2 Recommended Infrastructure Improvements

With the planned infrastructure improvements incorporated from the LOSSAN North Improvement Program, no additional infrastructure is needed to support this level of service. Provisions will need to be made, however, for the midday and overnight layover and servicing of the trainsets supporting this service. If the layover/service facility is located in or near SLO, a trainset will need to deadhead to Guadalupe in the morning to be in position for the first revenue train, and deadhead back to SLO after the final revenue run of the night.

5.3 Impacts on UP Freight Service

Given the short distance (25 miles) and planned frequency (four daily round trips) for this service, along with the slated improvements to the Callender and Guadalupe sidings, there will most likely be minimal impacts to UP freight service. If UP's freight service frequency increases through this corridor, additional improvements may need to be analyzed, including converting the existing Grover siding at MP 260.9 to powered and controlled.

5.4 Impacts on Other Passenger Services

The Scenario 1 Model includes Pacific Surfliner mid-term service levels of 3 daily round trips between Goleta and SLO. The model also includes Amtrak's Coast Starlight long-distance service. Schedules for both services are subject to change, and final Scenario 1 schedules may need to be adjusted to minimize potential conflicts with the other services.

5.5 Equipment Needs

Although the schedules are designed to be supported using one trainset, an additional trainset should be procured as a spare to allow for periodic maintenance without impacting the service.

6 Scenario 2: Extended Route, All Day Service

For Scenario 2, the RTC model was used to determine hypothetical schedules that would provide bidirectional service throughout the day between Paso Robles and Santa Maria, with two trains per hour during peak periods and one train per hour during the midday and evening. This service differs from the Scenario 1 in several key areas.

Route length: Whereas Scenario 1 modeled service between Guadalupe and SLO, a distance of 25 rail miles, Scenario 2 extends from Santa Maria to Paso Robles, a distance of 70 miles.

Route infrastructure: The Scenario 1 route includes three powered sidings (Guadalupe, Callender and San Luis Obispo). The Scenario 2 route includes this corridor segment plus the following segments:

- Santa Maria Valley Railroad, (SMVRR) between Santa Maria and Guadalupe: This is a 10-mile long short line railroad with no sidings.
- Union Pacific Coast Subdivision, between SLO and Paso Robles: This 36-mile segment has numerous curves and significant grades and has four sidings (Templeton, Santa Margarita, Serrano and Chorro), none of which are currently powered.

Schedule time: Using the current speed limits on the UP segment and proposed speeds on the SMVRR, the estimated schedule time between Santa Maria and Paso Robles is 2 hours and 4 minutes in both directions, compared to 36 minutes for the Scenario 1 between Guadalupe and SLO.

Service frequency: Scenario 2 provides all day bi-directional service, with bi-directional 30 minute peak and hourly off-peak frequencies, compared to two round trips each in the AM and PM peak periods with Scenario 1.

6.1 Proposed Schedules

The RTC model was used to determine hypothetical schedules that would provide bi-directional 30-minute service during morning and afternoon peak hours, and hourly off-peak service, while utilizing existing infrastructure to the maximum extent possible. In addition, the schedules were designed to minimize interference with proposed mid-term Pacific Surfliner, Coast Daylight and Coast Starlight schedules.

Figure 6-1 shows the hypothetical schedule for the proposed Scenario 2 service. The stringline diagrams were split into separate AM and PM figures, due to the expanded length of the route and greater train frequency. Figure 6-2 shows the AM stringline diagram for the proposed Scenario 2 service, and Figure 6-3 shows the PM stringline diagram for the proposed Scenario 2 service.

Figure 6-1. Scenario 2 Schedule (Santa Maria- Paso Robles)

Northbound	Reg	Reg	Reg	Reg	Reg	Reg	Reg	New IC	Reg	Reg	Reg	Reg	Pacific Surfliner	Reg	Coast Starlight	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Pacific Surfliner	Reg
Train number	901	903	905	907	909	911	913	759	917	921	925	929	765	933	14	937	939	941	943	945	947	949	951	955	777	959
SANTA MARIA DOWNTOWN	05:52	06:22	06:52	07:22	07:52	08:22	08:52		09:52	10:52	11:52	12:52		13:52		14:52	15:22	15:52	16:22	16:52	17:22	17:52	18:22	19:22		20:22
SANTA MARIA WEST	05:58	06:28	06:58	07:28	07:58	08:28	08:58		09:58	10:58	11:58	12:58		13:58		14:58	15:28	15:58	16:28	16:58	17:28	17:58	18:28	19:28		20:28
GUADALUPE	06:10	06:40	07:10	07:40	08:10	08:40	09:10	09:57	10:10	11:10	12:10	13:10	13:57	14:10	-	15:10	15:40	16:10	16:40	17:10	17:40	18:10	18:40	19:40	19:57	20:40
GROVER BEACH	06:26	06:56	07:26	07:56	08:26	08:56	09:26	10:16	10:26	11:26	12:26	13:26	14:16	14:26	-	15:26	15:56	16:26	16:56	17:26	17:56	18:26	18:56	19:56	20:16	20:56
SAN LUIS OBISPO	06:46	07:16	07:46	08:16	08:46	09:16	09:46	10:45	10:46	11:46	12:46	13:46	14:45	14:46	15:19	15:46	16:16	16:46	17:16	17:46	18:16	18:46	19:16	20:16	20:45	21:16
CAL POLY SLO	06:52	07:22	07:52	08:22	08:52	09:22	09:52		10:52	11:52	12:52	13:52		14:52		15:52	16:22	16:52	17:22	17:52	18:22	18:52	19:22	20:22		21:22
ATASCADERO	07:40	08:10	08:40	09:10	09:40	10:10	10:40		11:40	12:40	13:40	14:40		15:40		16:40	17:10	17:40	18:10	18:40	19:10	19:40	20:10	21:10		22:10
PASO ROBLES	07:56	08:26	08:56	09:26	09:56	10:26	10:56	11:51	11:56	12:56	13:56	14:56		15:56	16:21	16:56	17:26	17:56	18:26	18:56	19:26	19:56	20:26	21:26		22:26

Southbound	Pacific Surfliner	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	New IC	Reg	Reg	Reg	Coast Starlight	Reg	Pacific Surfliner	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg
Train number	774	902	904	906	908	910	912	914	918	922	790	926	930	934	11	938	796	940	942	944	946	948	950	952	956	960
PASO ROBLES		05:58	06:28	06:58	07:28	07:58	08:28	08:58	09:58	10:58	11:05	11:58	12:58	13:58	14:03	14:58		15:28	15:58	16:28	16:58	17:28	17:58	18:28	19:28	20:28
ALTASCALDERO		06:13	06:43	07:13	07:43	08:13	08:43	09:13	10:13	11:13		12:13	13:13	14:13		15:13		15:43	16:13	16:43	17:13	17:43	18:13	18:43	19:43	20:43
CAL POLY SLO		07:01	07:31	08:01	08:31	09:01	09:31	10:01	11:01	12:01		13:01	14:01	15:01		16:01		16:31	17:01	17:31	18:01	18:31	19:01	19:31	20:31	21:31
SAN LUIS OBISPO	06:33	07:08	07:38	08:08	08:38	09:08	09:38	10:08	11:08	12:08	12:33	13:08	14:08	15:08	15:45	16:08	16:33	16:38	17:08	17:38	18:08	18:38	19:08	19:38	20:38	21:38
GROVER BEACH	06:53	07:28	07:58	08:28	08:58	09:28	09:58	10:28	11:28	12:28	12:53	13:28	14:28	15:28	-	16:28	16:53	16:58	17:28	17:58	18:28	18:58	19:28	19:58	20:58	21:58
GUADALUPE	07:09	07:43	08:13	08:43	09:13	09:43	10:13	10:43	11:43	12:43	13:09	13:43	14:43	15:43	-	16:43	17:09	17:13	17:43	18:13	18:43	19:13	19:43	20:13	21:13	22:13
SANTA MARIA WEST		07:55	08:25	08:55	09:25	09:55	10:25	10:55	11:55	12:55		13:55	14:55	15:55		16:55		17:25	17:55	18:25	18:55	19:25	19:55	20:25	21:25	22:25
SANTA MARIA DOWNTOWN		08:02	08:32	09:02	09:32	10:02	10:32	11:02	12:02	13:02		14:02	15:02	16:02		17:02		17:32	18:02	18:32	19:02	19:32	20:02	20:32	21:32	22:32

Figure 6-2. Stringline Diagram, Scenario 2 AM Schedule (Santa Maria- Paso Robles)

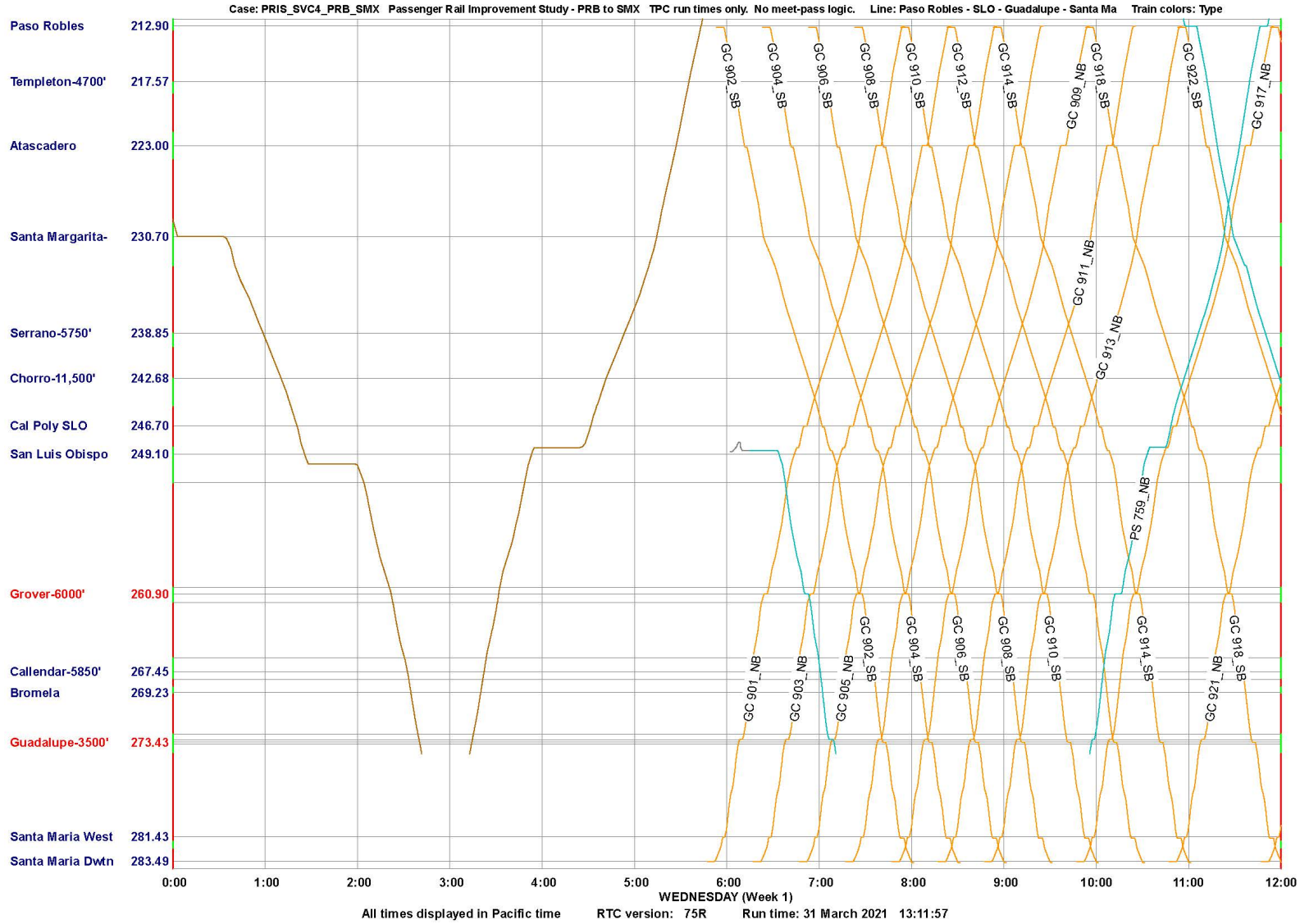
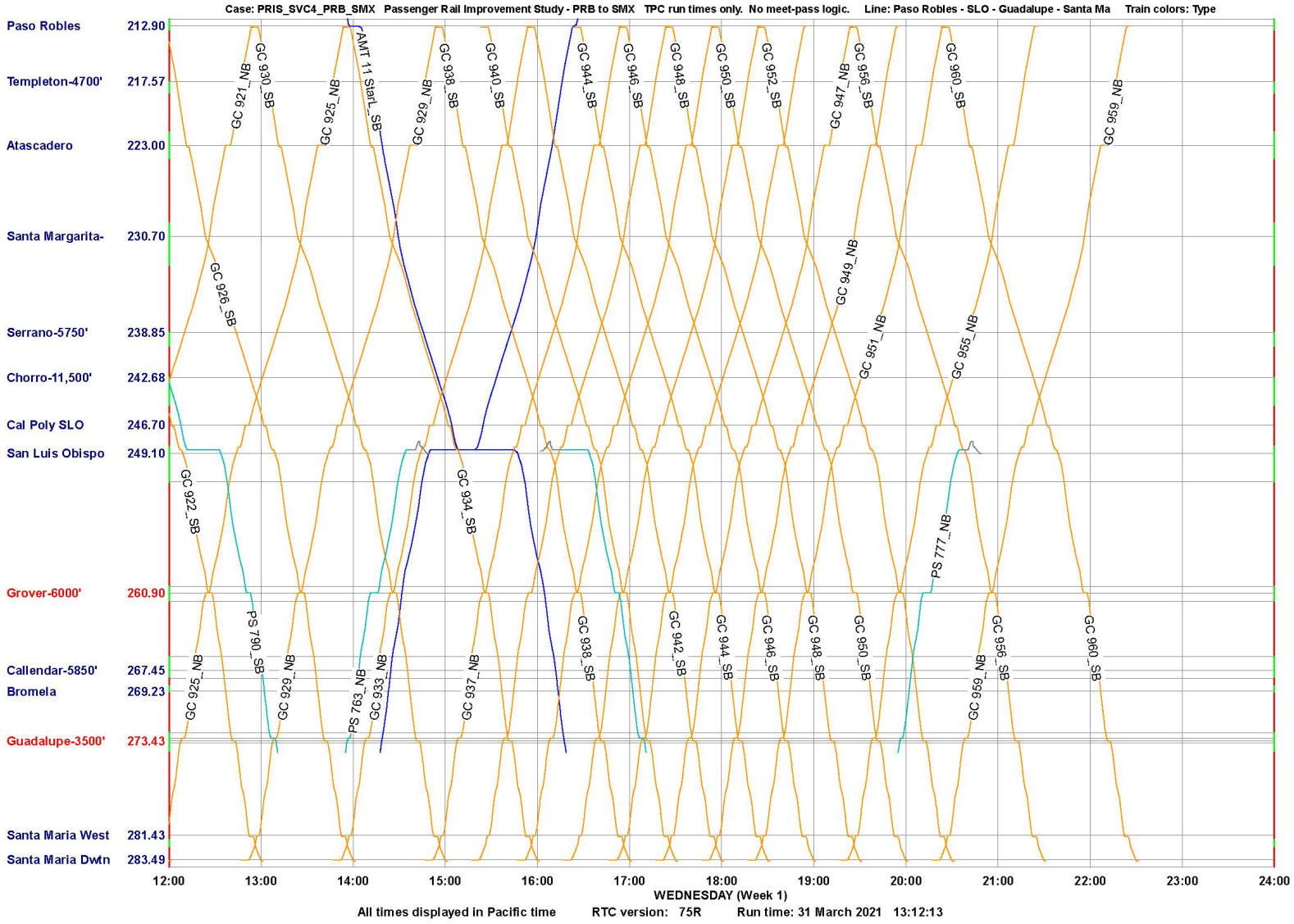


Figure 6-3. Stringline Diagram, Scenario 2 PM Schedule (Santa Maria- Paso Robles)



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6.2 Recommended Infrastructure Improvements

With the increased level of service, there are more meet conflicts with Pacific Surfliner and Amtrak long-distance services, particularly north of SLO. Since the Pacific Surfliner schedules from the SIP are hypothetical, and the Amtrak Coast Starlight schedules may change significantly over the next few years, some of the meet events are not resolved in this model. It is assumed that some Pacific Surfliner service increases will be in place before Scenario 2 service is implemented, as well as schedule adjustments to the Coast Starlight. The commuter schedules, along with the proposed levels of services, will need to be re-evaluated again to determine the optimal balance between service levels and cost.

The improvements listed below will support bi-directional 30-minute peak and hourly off-peak services, but additional improvements or service adjustments may be needed, depending on other future passenger and freight services. Recommended improvements are listed from south to north.

- **Extend to Santa Maria**
  - Santa Maria Downtown
    - Construct a passenger platform adjacent to the track in downtown Santa Maria
  - Santa Maria Siding track, MP7.41 to MP8.07
    - Create a passing siding between Santa Maria West and Downtown Santa Maria. The siding location is based upon the SMVRR being upgraded to match the maximum speed of 70 mph on the UP Coast and Santa Barbara Subdivisions.
  - Santa Maria West
    - Construct a passenger platform adjacent to the track on the western edge of the city
  - Guadalupe
    - Install a universal crossover between the main track and siding to allow movement of passenger trains from existing passenger platform to the Santa Maria extension.
- **Guadalupe-San Luis Obispo**
  - Guadalupe
    - Install power switches and dispatcher control of the siding.
    - Build an additional passenger platform on the siding.
  - Grover
    - Install power switches and dispatcher control of the siding.
    - Build an additional passenger platform on the siding.
  - Chorro
    - Extend existing siding south to MP245 and upgrade speed. This may not be possible due to its location on the first loop of the Cuesta Grade. As an alternative, a powered and controlled siding may need to be constructed at or directly north of the Cal Poly-SLO stop.
- **Extend to Cal Poly**
  - Cal Poly Station
    - Construct a passenger platform adjacent to the track in the vicinity of Cal Poly
- **Extend to Paso Robles**
  - Atascadero
    - Create a new powered, controlled siding and double platform from MP221.9 to MP224.1
  - Paso Robles
    - Create a new powered, controlled siding and add second platform on the industrial lead.

In addition to track and station improvements, layover facilities with capacity to store the fleet overnight would be required, and a facility would be needed for maintenance of the fleet.

Conceptual cost estimates for these improvements are provided in **Appendix H**.

6.3 Impacts on UP Freight Service

Given the high number of passenger trains, operating at bi-hourly and hourly intervals on a single-track mountainous railroad, there would be significant impacts to UP freight service, particularly local freight. In order to support future freight service at acceptable parameters to UP, additional improvements may need to be analyzed to mitigate impacts to UP freight service.

6.4 Impacts on Other Passenger Services

As described in Section 6.2, schedules for both Pacific Surfliner and Amtrak long-distance services are subject to change, and final Scenario 2 schedules may need to be adjusted to minimize potential conflicts with the other services.

6.5 Equipment Needs

The schedules were developed with the primary task of minimizing infrastructure costs required to support the service, as opposed to minimizing the equipment cost. Given the small number of existing sidings and their locations, plus the desire to offer service as close to clockface as possible, equipment requirements were not the primary consideration. Figure 6-4 shows a hypothetical equipment rotation plan for Scenario 2. Each color indicates the use of one trainset during the service day.

Under this schedule scenario, a total of 10 trainsets would be required, plus spare trainsets. The requirement to maintain close to clockface service, the use of existing sidings where possible, and the need to meet other services' passenger trains during the day impacts the ability to turn equipment efficiently at either end of the route. In addition, the requirement to have 30-minute AM and PM peak frequencies, with hourly frequencies during the day, means that some equipment used during the peak periods will not be needed during non-peak periods. Some service alternatives, such as operating 30-minute directional peak service and hourly directional reverse-peak services, may require fewer trainsets to support.

Figure 6-4. Hypothetical Equipment Rotation, Scenario 2 Schedule

Northbound	SM	SM	SM	SM	SM																		
	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg
Train number	**901**	**903**	**905**	**907**	**909**	**911**	**913**	**917**	**921**	**925**	**929**	**933**	**937**	**939**	**941**	**943**	**945**	**947**	**949**	**951**	**955**	**959**	
SANTA MARIA DOWNTOWN	05:52	06:22	06:52	07:22	07:52	08:22	08:52	09:52	10:52	11:52	12:52	13:52	14:52	15:22	15:52	16:22	16:52	17:22	17:52	18:22	19:22	20:22	
SANTA MARIA WEST	05:58	06:28	06:58	07:28	07:58	08:28	08:58	09:58	10:58	11:58	12:58	13:58	14:58	15:28	15:58	16:28	16:58	17:28	17:58	18:28	19:28	20:28	
GUADALUPE	06:10	06:40	07:10	07:40	08:10	08:40	09:10	10:10	11:10	12:10	13:10	14:10	15:10	15:40	16:10	16:40	17:10	17:40	18:10	18:40	19:40	20:40	
GROVER BEACH	06:26	06:56	07:26	07:56	08:26	08:56	09:26	10:26	11:26	12:26	13:26	14:26	15:26	15:56	16:26	16:56	17:26	17:56	18:26	18:56	19:56	20:56	
SAN LUIS OBISPO	06:46	07:16	07:46	08:16	08:46	09:16	09:46	10:46	11:46	12:46	13:46	14:46	15:46	16:16	16:46	17:16	17:46	18:16	18:46	19:16	20:16	21:16	
CAL POLY SLO	06:52	07:22	07:52	08:22	08:52	09:22	09:52	10:52	11:52	12:52	13:52	14:52	15:52	16:22	16:52	17:22	17:52	18:22	18:52	19:22	20:22	21:22	
ATASCADERO	07:40	08:10	08:40	09:10	09:40	10:10	10:40	11:40	12:40	13:40	14:40	15:40	16:40	17:10	17:40	18:10	18:40	19:10	19:40	20:10	21:10	22:10	
PASO ROBLES	07:56	08:26	08:56	09:26	09:56	10:26	10:56	11:56	12:56	13:56	14:56	15:56	16:56	17:26	17:56	18:26	18:56	19:26	19:56	20:26	21:26	22:26	
																		PR	PR	PR	PR	PR	

Southbound	PR	PR	PR	PR	PR																		
	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg
Train number	**902**	**904**	**906**	**908**	**910**	**912**	**914**	**918**	**922**	**926**	**930**	**934**	**938**	**940**	**942**	**944**	**946**	**948**	**950**	**952**	**956**	**960**	
PASO ROBLES	05:58	06:28	06:58	07:28	07:58	08:28	08:58	09:58	10:58	11:58	12:58	13:58	14:58	15:28	15:58	16:28	16:58	17:28	17:58	18:28	19:28	20:28	
ALTASCALDERO	06:13	06:43	07:13	07:43	08:13	08:43	09:13	10:13	11:13	12:13	13:13	14:13	15:13	15:43	16:13	16:43	17:13	17:43	18:13	18:43	19:43	20:43	
CAL POLY SLO	07:01	07:31	08:01	08:31	09:01	09:31	10:01	11:01	12:01	13:01	14:01	15:01	16:01	16:31	17:01	17:31	18:01	18:31	19:01	19:31	20:31	21:31	
SAN LUIS OBISPO	07:08	07:38	08:08	08:38	09:08	09:38	10:08	11:08	12:08	13:08	14:08	15:08	16:08	16:38	17:08	17:38	18:08	18:38	19:08	19:38	20:38	21:38	
GROVER BEACH	07:28	07:58	08:28	08:58	09:28	09:58	10:28	11:28	12:28	13:28	14:28	15:28	16:28	16:58	17:28	17:58	18:28	18:58	19:28	19:58	20:58	21:58	
GUADALUPE	07:43	08:13	08:43	09:13	09:43	10:13	10:43	11:43	12:43	13:43	14:43	15:43	16:43	17:13	17:43	18:13	18:43	19:13	19:43	20:13	21:13	22:13	
SANTA MARIA WEST	07:55	08:25	08:55	09:25	09:55	10:25	10:55	11:55	12:55	13:55	14:55	15:55	16:55	17:25	17:55	18:25	18:55	19:25	19:55	20:25	21:25	22:25	
SANTA MARIA DOWNTOWN	08:02	08:32	09:02	09:32	10:02	10:32	11:02	12:02	13:02	14:02	15:02	16:02	17:02	17:32	18:02	18:32	19:02	19:32	20:02	20:32	21:32	22:32	
																		SM	SM	SM	SM	SM	

7 Equipment Estimates by Service Option

As discussed in Sections 5.5 and 6.5, hypothetical equipment rotations were developed for the conceptual schedules modeled for Scenarios 1 and 2, corresponding to the number of trains in daily service for Service Options 1 and 4. For the intermediate service options, equipment needs were estimated based on the number of daily train miles compared to the average number of train miles per trainset in Scenario 2 (311 miles). Consist length was determined by comparing average passenger loads to the capacity of a typical 2-car articulated DMU (110-130 seats). Table 7-1 shows the estimates equipment needed for each service option.

Table 7-1. Equipment Requirements by Service Option

	Option 1	Option 2	Option 3	Option 4
Daily Train Miles	195	1071	1528	3106
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 estimate)	63	18	114	136
Cars per Train	2	2	4	4
Total Cars	4	10	24	48

8 Summary of Infrastructure Required

Table 8-1 summarizes the improvements identified to support each service option. Note that the schedules assumed for intercity services as subject to change and may necessitate changes to the conceptual schedules or recommended improvements. 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. Furthermore, additional improvements may also be necessary to mitigate impacts to freight rail operations, pending negotiations with host railroads.

Table 8-1. Infrastructure Improvements 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.

Task 5.11:

Passenger Rail Improvement Study

Appendix H: Regional Rail Infrastructure Cost Estimates

SLOCOG Coast Rail Corridor Study

May 13, 2021

SLOCOG CRCC COAST RAIL CORRIDOR STUDY

HDR

In Association With:
AMMA Transit Planning
Verdin Marketing

CONTENTS

1 Introduction

This Appendix summarizes the methodology and results of rough order-of-magnitude cost estimates prepared for the Passenger Rail Improvement Study.

1.1 Required Infrastructure Improvements

Track and station infrastructure improvements to enable four options representing progressive service expansion were identified through rail simulation modeling, as described in **Appendix G**. In addition, it is assumed that a maintenance facility and layover facilities will be required, with the layover capacity needed determined by the size of the vehicle fleet, including spares. The recommended improvements are listed in Table 1-1.

Table 1-1. Infrastructure 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)				✓
Support Facilities				
Maintenance Facility	✓	✓	✓	✓
Layover facility (capacity in cars)	4-car	10-car	24-car	48-car

2 Methodology and Assumptions

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. The recommended improvements were categorized into the following project types in order to identify unit costs:

- Powered Siding: converting an unpowered siding to a powered, controlled siding
- New or Extended Siding: construction of new track beside existing track to create a new siding or lengthen an existing siding
- Universal crossover: addition of switches that allow trains to cross between either of two tracks in both directions
- Station platforms: construction of a passenger platform allowing passengers to board trains at a new or existing station
- Non-platform station elements: for new stations, additional elements would be needed for information systems and passenger access to platforms
- Layover facility: facilities would be needed to store trains while not in service
- Maintenance facility: a facility would be required for regular and heavy maintenance of the vehicles used in service

The unit costs shown in Table 1-2 were developed by sampling relevant HDR projects and referencing recent projects on other regional railroads.

Table 1-1. Unit Costs by Infrastructure Type ($2021)

Infrastructure Type	Unit	Unit Cost
Powered Siding	Mile	$9,822,700
New/extended Siding	Mile	$24,818,400
Universal Crossover	Each	$6,912,000
Station platform	Each	$5,567,500
New stations (non-platform elements)	Lump Sum	$6,942,100
Layover facility	Car	$504,700
Maintenance facility	Lump Sum	$30,757,500

The unit costs for powered sidings, universal crossovers, and layover facilities were estimated based on the cost estimates developed for the Service Implementation Plan, divided by the selected unit (ex. miles of track).

Costs for new sidings were based on the average cost per mile of four recent or planned siding and double track projects on the Metrolink network.

Station platform costs were based on analysis of Redlands Passenger Rail Project construction bid documents performed for the Riverside County Transportation Commission's ongoing Next Generation Rail Study. Non-platform elements were based on the average station cost estimated for the Coachella Valley-San Gorgonio Pass Rail Corridor Service Study that is currently underway, excluding platform elements.

The maintenance facility cost was based on the Denton County Transportation Authority's Operations and Maintenance Facility constructed in 2011 to support the A-train service.

All unit costs were inflated to 2021 dollars at a rate of 2.5 percent annually.

3 Cost Estimates

Table 3-1 shows the calculation of high-level infrastructure cost estimates for each recommended infrastructure improvement based on the unit costs described above. All costs were rounded to the nearest thousand. Table 3-2 shows the total of these costs by service option, based on which improvements are necessary for each option.

Table 3-1. Estimated Rough Order-of-Magnitude Cost by Recommended Improvement

Recommended Infrastructure	Unit	Quantity	Unit Cost	Cost
Support Facilities				
Maintenance Facility	LS	1	$ 30,757,500	$30,758,000
Layover facilities				
4-car	Car	4	$ 504,600	$2,019,000
10-car	Car	10	$ 504,600	$5,046,000
24-car	Car	24	$ 504,600	$12,112,000
48-car	Car	48	$ 504,600	$24,223,000
Track Capacity Improvements				
New Santa Maria Siding	Mile	0.65	$ 24,818,400	$16,132,000
Power Guadalupe Siding	Mile	0.88	$ 9,822,700	$8,644,000
Add universal crossover to Guadalupe siding	EA	1	$ 8,448,000	$8,448,000
Power Grover siding	Mile	1.27	$ 9,822,700	$12,475,000
Extend Chorro siding*	Mile	1.29	$ 24,818,400	$32,016,000
New Siding in Atascadero	Mile	2.2	$ 24,818,400	$54,600,000
New Siding in Paso Robles	Mile	0.4	$ 24,818,400	$9,927,000
Station Improvements				
Second platform at Guadalupe	EA	1	$ 5,567,500	$5,567,000
Second platform at Grover Beach	EA	1	$ 5,567,500	$5,567,000
Second platform at Paso Robles	EA	1	$ 5,567,500	$5,567,000
Station in Atascadero				$18,077,000
Platforms	EA	2	$ 5,567,500	$11,135,000
Non-platform	LS	1	$ 6,942,100	$6,942,000
Station by Cal Poly				$12,510,000
Platforms	EA	1	$ 5,567,500	$5,567,000
Non-platform	LS	1	$ 6,942,100	$6,942,000
Santa Maria - West Station				$12,510,000
Platform	EA	1	$ 5,567,500	$5,567,000
Non-platform	LS	1	$ 6,942,100	$6,942,000
Santa Maria - Downtown Station				$12,510,000
Platform	EA	1	$ 5,567,500	$5,567,000
Non-platform	LS	1	$ 6,942,100	$6,942,000

Table 3-2. Rough Order-of-Magnitude Infrastructure Costs by Service Option

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**

Task 5.11:

Passenger Rail Improvement Study

Appendix I: Regional Rail Ridership Forecasts

SLOCOG Coast Rail Corridor Study

May 13, 2021

SLOCOG CRCC COAST RAIL CORRIDOR STUDY

HDR

In Association With:
AMMA Transit Planning
Verdin Marketing

CONTENTS

1 Introduction

This Appendix summarizes the methodology and results of sketch planning ridership forecasts prepared for the Passenger Rail Improvement Study.

2 Methodology and Assumptions

Weekday boardings were estimated by calculating overall person trips between station catchment areas derived from the San Luis Obispo Council of Governments (SLOCOG) and Santa Barbara County Association of Governments (SBCAG) travel demand models and applying estimated mode splits for each service option.

The SLOCOG model was used for calculating trips within San Luis Obispo (SLO) County. A five-mile catchment area around each station in SLO County was used to extract person trips from the travel demand model for the 2045 forecast. If a traffic analysis zone fell within the catchment area of two stations, the person trips for the zone were equally divided between the two catchment areas.

The SBCAG model was used for calculating boardings between stations in Santa Barbara County and San Luis Obispo County. Person trips were extracted for five-mile catchment areas around Santa Barbara County stations, and all of SLO County was considered one catchment area for intercounty trips. SBCAG does not have a 2045 forecast year, so trip counts were extracted for 2035 and 2040. The growth rate over those five years was 4.8 percent, and this rate was then applied to the 2040 person trips to estimate trips for 2045.

Weekday boardings for each scenario were estimated by applying a mode split to the number of person trips between catchment areas for the station pairs served in each scenario. Mode splits were adjusted based on service levels in each scenario, and a travel time elasticity was applied for stations north of the Cuesta Grade to account for reduced speeds that make rail less competitive with other modes, based on the conceptual schedules included in **Appendix G**. Table 2-1 lists the service assumptions for each scenario.

Table 2-1. Service Parameters by Scenario

		Scenario 1	Scenario 2	Scenario 3	Scenario 4
Stations Served	Santa Maria Downtown				✓
	Santa Maria West			✓	✓
	Guadalupe	✓	✓	✓	✓
	Grover Beach	✓	✓	✓	✓
	SLO Downtown	✓	✓	✓	✓
	Cal Poly SLO			✓	✓
	Atascadero				✓*
	Paso Robles				✓*
Service Provided	Days of Service	Mon-Fri	Daily	Daily	Daily
	Daily Service Duration	6-9 AM, 4-7 PM	6 AM-10 PM	6 AM-10 PM	6 AM-10 PM
	Direction of Travel	Both	Both	Both	Both
	Service Frequency	2 round trips in AM, 2 round trips in PM	30-min peak, 60-min off-peak	30-min peak, 60-min off-peak	30-min peak, 60-min off-peak
	Trains per Day (one way)	8	44	44	44

*Travel time elasticity applied.

For Scenarios 2 through 4, 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 for the Rail Runner Express were applied to the weekday boardings estimated for each service option to produce estimates for weekend boardings. Ridership on holidays was assumed to be similar to ridership levels on Sundays.

To capture the uncertainty associated with ridership forecasts, a 15 percent adjustment in each direction was applied to express the forecasted weekday and weekend boardings as a range, with upper and lower bounds rounded to the nearest hundred. Annual ridership estimates were calculated by multiplying weekday, Saturday, and Sunday/holiday boardings by the number of service days shown in Table 2-2.

Table 2-2. 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

3 Ridership Forecasts

Table 3-1 summarizes the resulting ridership forecast for each scenario.

Table 3-1. Ridership Forecasting Results

Scenario		Scenario 1	Scenario 2	Scenario 3	Scenario 4
Daily Ridership					
Average Weekday Boardings	Low	400	600	3,700	4,500
	High	500	800	5,000	6,000
Average Saturday Boardings	Low	N/A	300	1,700	2,100
	High	N/A	400	2,300	2,800
Average Sunday Boardings	Low	N/A	200	1,200	1,400
	High	N/A	300	1,600	2,000
Average Weekday Riders per Train	Low	50	14	84	102
	High	63	18	114	136
Annualized Ridership					
Total Weekday Boardings	Low	102,000	153,000	943,500	1,147,500
	High	127,500	204,000	1,275,000	1,530,000
Total Saturday Boardings	Low	N/A	15,600	88,400	109,200
	High	N/A	20,800	119,600	145,600
Total Sunday Boardings	Low	N/A	11,600	69,600	81,200
	High	N/A	17,400	92,800	116,000
Total Annual Boardings	Low	102,000	180,200	1,101,500	1,337,900
	High	127,500	242,200	1,487,400	1,791,600