FINAL

Alternatives Analysis

Coachella Valley-San Gorgonio Pass Rail Corridor Service Study

Coachella Valley, CA

July 25, 2016

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ACRONYMS

ACEC	Area of Critical Environmental Concern
ACOE	U.S. Army Corps of Engineers
ADT	Average Daily Traffic
BCI	Agua Caliente Band of Cahuilla Indians
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMI	Morongo Band of Mission Indians
BNSF	BNSF Railway
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
Caltrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
CEQ	Council for Environmental Quality
CEQA	California Environmental Quality Act
CNDDB	California Native Diversity Database
CP	Canadian Pacific Railway
CVAG	Coachella Valley Association of Governments
CV-SGP	Coachella Valley-San Gorgonio Pass
DMU	Diesel Multiple Unit
ED	Environmental Documentation
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FAQ	Frequently Asked Questions
FRA	Federal Railroad Administration
GIS	Geographic Information Systems
GPSCVB	Greater Palm Springs Convention and Visitors Bureau
IE-OC	Inland Empire-Orange County Line
JPA	Joint Powers Agreement
LATC	Los Angeles Transportation Center
LAUS	Los Angeles Union Station
LAX	Los Angeles International Airport
LBV	Least Bell's Vireo
LOSSAN	Los Angeles – San Diego – San Luis Obispo Rail Corridor
Metro	Los Angeles County Metropolitan Transportation Authority
NEPA	National Environmental Protection Act
O&M	Operating and Maintenance
OCTA	Orange County Transportation Authority
PeMS	Caltrans Performance Measurement System
PRIIA	Passenger Rail Investment and Improvement Act
RCTC	Riverside County Transportation Commission
ROW	Right-of-way
RPRP	Redlands Passenger Rail Project
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SANBAG	San Bernardino Associated Governments
SCAG	Southern California Association of Governments
SCRIP	Southern California Regional interconnector Project
SCRRA	Southern California Regional Rail Authority
SDP	Service Development Plan

ACRONYMS (Continued)

TAC	Technical Advisory Committee
TPC	Train Performance Calculation
UP	Union Pacific Railroad
USFWS	United States Fish and Wildlife Service
VA	Veterans Administration

ES Executive Summary

The Coachella Valley – San Gorgonio Pass Rail Corridor Service Study (the Study), undertaken by the Riverside County Transportation Commission (RCTC) in coordination with the California Department of Transportation (Caltrans) and the Federal Railroad Administration (FRA), is studying the potential implementation of daily intercity passenger rail service between Indio in the Coachella Valley through San Gorgonio Pass to Los Angeles Union Station (LAUS) in Los Angeles, California. The first phase of this Project involves initial service development planning and completion of an Alternatives Analysis to identify potential routes in the Coachella Valley – San Gorgonio Pass Corridor (the Corridor).

RCTC, leading the study effort, is responsible for planning mobility improvements and managing the funding and coordination of all public transportation services within Riverside County. Additionally, RCTC is a member of the Southern California Regional Rail Authority (SCRRA), a joint-powers agency operating Metrolink commuter rail service. As part of these responsibilities, RCTC has entered into a shared use agreement with BNSF Railway (BNSF) that includes terms and conditions under which rail passenger service is operated on the BNSF line through Riverside. RCTC is also a member of the LOSSAN Rail Corridor Agency which oversees intercity passenger rail services in Southern California.

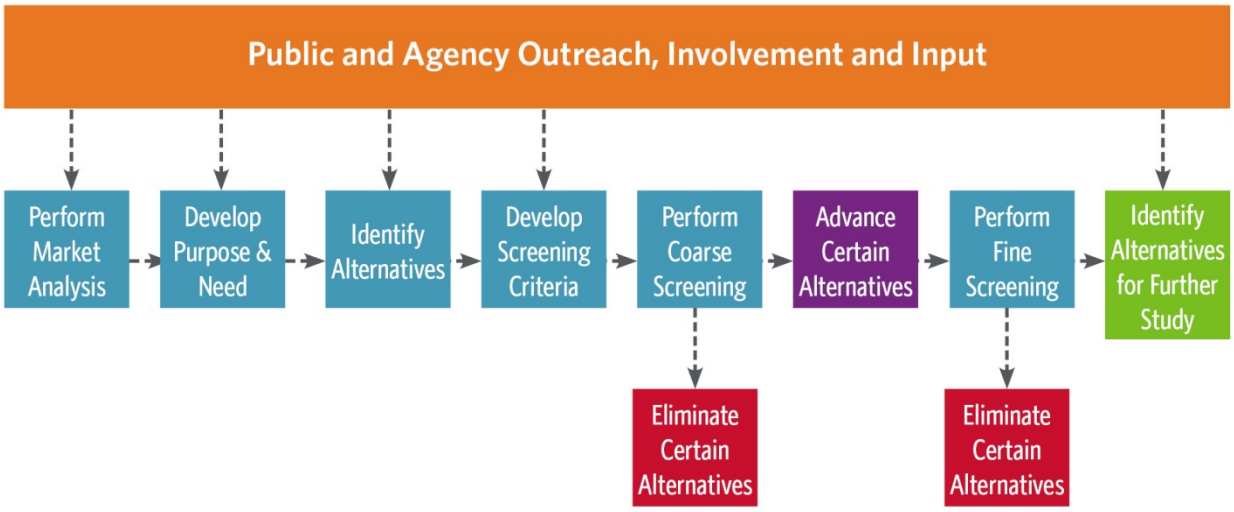
The goal of this Alternatives Analysis is to consider reasonable buildable alternatives for daily intercity rail service to the Coachella Valley, and determine which alternatives demonstrate superior performance and are worthy of more detailed evaluation in the subsequent Service Development Plan (SDP). In accordance with FRA guidance, planning for intercity rail projects must be supported by a rational planning process that establishes the Purpose and Need of the proposed project and evaluates a range of reasonable alternative improvement strategies that can meet the identified needs and accomplish the objectives.

This Alternatives Analysis involves six elements:

1. Performing a market analysis to understand the current and future travel demand in the Corridor;
2. Defining the project need and purpose;
3. Identifying a range of service alternatives;
4. Developing screening criteria;
5. Conducting a two-step screening analysis; and
6. Identifying alternatives to carry forward for additional study.

Stakeholder outreach was an essential element throughout the study and informed key decisions such as the Purpose and Need, alternatives identification and screening methodology. Figure ES-1 illustrates the Alternatives Analysis process.

Figure ES-1. Alternatives Analysis Process



This Alternatives Analysis report describes the project market analysis, the stakeholder and public outreach process, the Purpose & Need statement, the initial range of route alternatives proposed for consideration, the two-step screening methodology and criteria used to evaluate these route alternatives, and the results of the alternatives analysis. Through the two-step screening process, preliminary service planning elements were analyzed to identify the range of route alternatives that will be considered in the next phase.

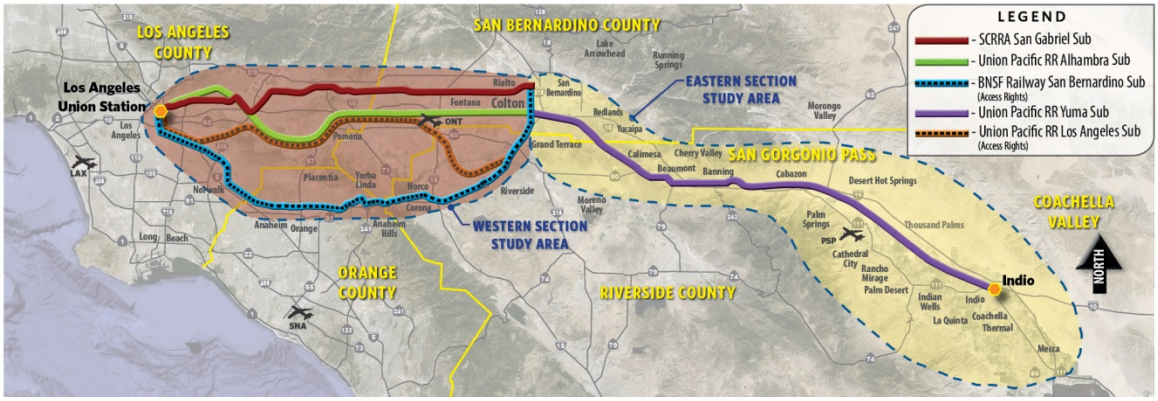
ES.1 Study Area

The Study Area extends from an eastern terminus in Indio, California, to LAUS in downtown Los Angeles, California, in the west. The Study Area consists of two sections, depicted in Figure ES-2, which also shows the ownership of the various rail corridor subdivisions throughout the project area and access rights:

- The Eastern Section is approximately 71 miles long between Indio and Colton, California, and includes the only existing rail route alternative for that section of the Corridor, the Union Pacific Railroad's (UP) Yuma Subdivision; and
- The Western Section between Colton and LAUS contains four existing primary rail lines that vary in length between 58 and 70 miles.

Throughout this report, the term Los Angeles Basin is used to describe the greater Los Angeles urbanized area which encompasses five counties in Southern California, extending from Ventura County in the west to San Bernardino County and Riverside County in the east, with Los Angeles County in the center and Orange County to the south. The Inland Empire is a geographic subset of the Los Angeles Basin, and generally includes the western urbanized area of Riverside and southwestern San Bernardino Counties, and excludes the Coachella Valley. The Coachella Valley, in central Riverside County, is a desert valley that extends approximately 40 miles southeast from the San Bernardino Mountains to the northern shore of the Salton Sea.

Figure ES-2. Study Area



ES.2 Market Analysis

A detailed market analysis of the Corridor was performed for this study, looking at demographics, existing transportation facilities and services, existing and future travel volumes and trip patterns, and how the transportation system performs both now and in the future.

A strong economic, demographic, and cultural connection exists between the Coachella Valley and the Los Angeles Basin – every day 130,000 people travel between the two regions, and that number increases on weekends. As the Los Angeles Basin population continues to increase and the Coachella Valley is expected to experience even greater population growth, the connection will become even stronger, with a projected 47% increase in travel over the next 20 years (SCAG 2012 RTP/SCS).

The four counties comprising the Corridor (Los Angeles, Orange, Riverside, and San Bernardino) have a current population of approximately 17 million, and by 2035, the population is projected to increase by 23 percent, adding more than 4 million new residents for a total of 20.8 million residents. The permanent population of the Coachella Valley (443,000 in 2008) is projected to double to 884,000 by 2035. The population of the San Gorgornio Pass Area is 77,000 and is projected to increase by 134% by 2035 with a forecast population approaching 175,000.

Virtually all of the travelers drive on I-10 through San Gorgonio Pass because few alternatives to driving and few road options exist to the freeway. Corridor travelers experience significant recurring highway congestion through many parts of the Corridor, but have limited public transportation alternatives: one Amtrak long-distance train connecting Palm Springs to Los Angeles three days per week with arrival and departures in the middle of the night; two commuter bus routes that operate weekdays only, one connecting the San Gorgonio Pass Area to San Bernardino, and one connecting the central Coachella Valley to Riverside; one Amtrak Thruway bus operating two daily round-trips that connects the Coachella Valley with the Pacific Surfliner train in Fullerton, and private intercity bus service operated by Greyhound. The lack of available transportation options leaves the Corridor underserved, yet travel demand is expected to increase in the future.

Corridor travel data show that multiple trip purposes comprise the Corridor's weekday travel market, and a combination of social/recreational and visitor trips increases the travel volumes on Fridays and weekends (AirSage, 2014).

As detailed in the Market Analysis chapter, the numbers support a need for a convenient, reliable, and affordable alternative to driving in the Los Angeles-Coachella Valley Corridor. The projected population and employment growth, existing and future travel demand patterns, recurring congestion, and scarcity of existing public transit options all suggest that an intercity rail alternative to driving the I-10 corridor could be successful.

ES.3 Outreach

At the outset of the Alternatives Analysis process, a comprehensive outreach plan was developed to serve as the blueprint for community engagement and stakeholder input. Key components of the project outreach efforts include:

- Engaging agency partners through Technical Advisory Committee (TAC) meetings
- Hosting stakeholder briefings for elected officials
- Hosting public outreach meetings using in-person and webcast formats
- Development and ongoing maintenance of a contact database
- Updating existing RCTC website pages and responding to inquires via the website
- Creation of fact sheets and frequently asked questions (FAQ)
- An ongoing social media campaign on Facebook and Twitter

Stakeholder outreach was a critical element of the Alternatives Analysis, and the feedback helped to inform key decisions including defining the Purpose and Need, identifying alternatives, and developing and endorsing the screening methodology.

ES.4 Purpose and Need for the Study

The Study's Purpose and Need, approved by the RCTC Board of Directors in July 2015, was developed using the information from the Market Analysis and stakeholder input from the outreach process. The market analysis established the data-driven basis for the project's Need and Purpose, supported by feedback from collaboration with multiple agencies, elected officials, and public meetings and surveys.

Need for Transportation Improvements

1. For interregional travel between the Coachella Valley and the Los Angeles Basin there are very limited options to driving a private vehicle, so people who cannot afford to own and operate a private vehicle, or choose not to, have very limited ability to travel between the regions, and people who might prefer not to drive and do not have a viable alternative.

2. Congested highway conditions in the Los Angeles Basin cause delays and unreliability for longer-distance Corridor driving trips. Emergency closures of I-10 through San Gorgonio Pass further undermine the reliability of the Corridor's transportation system. Future growth will result in more congestion and even longer travel times, and more unreliability. Thus driving is an increasingly unattractive and inconvenient mode of travel through the Corridor.

Purpose and Objectives for Transportation Improvements

The transportation service improvements should achieve the following objectives:

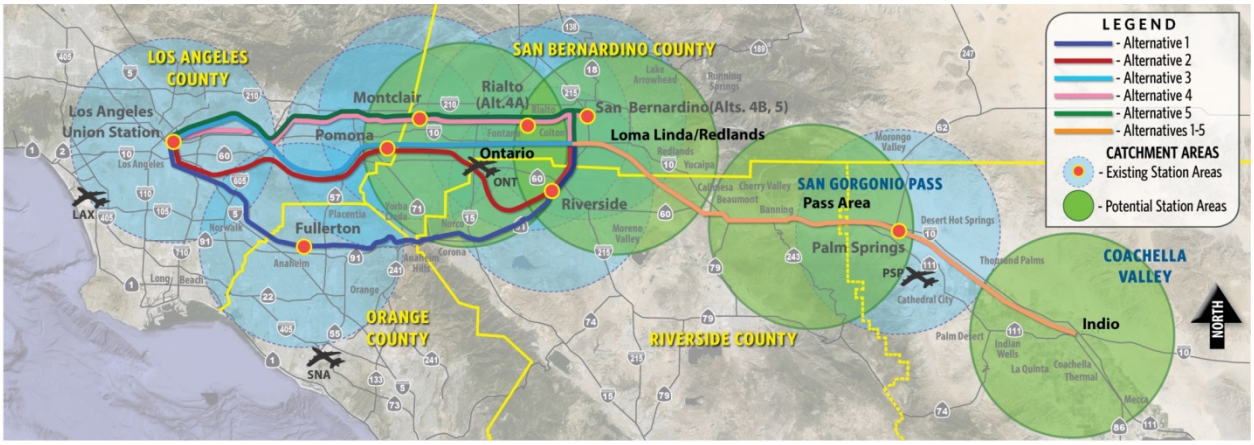
1. Provide travelers between the Coachella Valley and the Los Angeles Basin with a public transportation service that offers more convenient and competitive trip times, better station access, and more frequency, than currently-available public transportation services;
2. Provide travelers between the Coachella Valley and the Los Angeles Basin with an alternative to driving that offers reliable travel schedules;
3. Provide travelers between the Coachella Valley and the Los Angeles Basin with a transportation service that is affordable.
4. Serve a range of trip purposes traveling between the Coachella Valley and the Los Angeles Basin, particularly including business, social, medical, leisure, and recreational trips;
5. Improve regional travel opportunities between the Coachella Valley and the Los Angeles Basin for transit dependent people;
6. Is planned to serve the expected population growth in the Coachella Valley and the Los Angeles Basin;
7. Does not preclude, by choice of alignment or technology, a possible future Corridor expansion between the Coachella Valley and Phoenix.

ES.5 Identify Range of Route Alternatives

The Study identified potential route alternatives and service options for the Corridor based on the Purpose and Need Statement, review of previous studies, and ideas or concepts that were suggested by resource agencies or the public during the outreach process.

Six intercity rail route alternatives were identified, as shown in Figure ES-3. For the Eastern portion of the alignment, all of the alternatives utilized the Union Pacific Railroad's (UP) Yuma Subdivision between Indio and Colton. The Western portion used various combinations of four existing rail lines between Colton and Los Angeles. Rail routes on new track alignments were not considered as alternatives because they would be excessively costly and would involve high levels of environmental impacts. New express bus service and short line rail service options were not considered as alternatives because they would not effectively achieve the Purpose and Need objectives.

Figure ES-3. Coachella Valley – San Gorgonio Pass Rail Corridor Route Alternatives



Route Alternatives 1 through 3 use the UP Yuma Subdivision between Indio and Colton and then follow three of the four rail lines west of Colton, as described below.

- **Route Alternative 1** uses the BNSF Railway (BNSF) San Bernardino Subdivision from Colton through Riverside and Fullerton to reach LAUS;
- **Route Alternative 2** uses the UP Los Angeles Subdivision from Colton through Riverside and Pomona to reach LAUS;
- **Route Alternative 3** uses the UP Alhambra Subdivision from Colton through Ontario and Pomona to reach LAUS.

Route Alternative 4 uses the UP Yuma Subdivision between Indio and Colton, the SCRRA Short Way Subdivision between Colton and San Bernardino, and the Metrolink San Gabriel Subdivision (owned by Los Angeles Metro (Metro) and the San Bernardino Associated Governments (SANBAG) between San Bernardino and Los Angeles. It has two variations between San Bernardino and Los Angeles.

- **Route Alternative 4-A** uses the Metrolink San Gabriel Subdivision through Rialto and Montclair to reach LAUS, but does not travel east to serve the new E Street Station in downtown San Bernardino that is currently under construction, making its length approximately 4 miles shorter than Alternative 4-B;
- **Route Alternative 4-B** also uses the Metrolink San Gabriel Subdivision, but travels east from the SCRRA Short Way Subdivision to serve the new E Street Station in San Bernardino so its route is approximately four miles longer than Alternative 4-A.

Route Alternative 5 also uses the UP Yuma Subdivision between Indio and Colton and a combination of rail lines west of Colton, as described below.

- **Route Alternative 5** uses the SCRRA Short Way Subdivision between Colton and San Bernardino, the SCRRA San Gabriel Subdivision between San Bernardino and El Monte, and the UP Alhambra Subdivision between El Monte and Los Angeles.

ES.6 Description of the Proposed Service

For purposes of this analysis the assumed endpoints of the proposed passenger rail service are Indio and Los Angeles. The proposed maximum speed of the service is 79 miles per hour (mph), which would result in scheduled one-way travel times between Indio and Los Angeles of approximately three to three and a half hours, depending upon the route alternative and the number of station stops. Comparatively, during non-congested periods, a driving trip between LAUS and Indio along I-10 takes approximately two hours, and during peak travel periods such as Friday evenings, driving may take up to three and a half hours. Of the two potential endpoints, only the Los Angeles station location has been identified at this time (LAUS). Intermediate station stops would be located on each route alternative at some of the larger intermediate cities; however, specific sites have not been identified in this Alternatives Analysis and will be studied in the subsequent SDP. The frequency of the proposed passenger rail service has been initially defined as two daily round trips between Indio and Los Angeles. Although the proposed passenger rail service would use existing infrastructure, additional infrastructure (such as track, wayside signals, drainage and grade-separation structures, and stations) is likely to be necessary, to varying degrees, for each route alternative.

ES.7 Screening Criteria and Methodology

The screening process, developed in consultation with the FRA, included two steps: an initial coarse-level screening to identify whether any route alternative is hindered by major challenges (and would thus be eliminated from subsequent fine-level screening), and a fine-level screening to evaluate the remaining route alternatives in greater quantitative and qualitative detail. This two-step screening process evaluated the route alternatives on the basis of specific criteria in the following categories:

1. Purpose and Need
2. Environmental Constraints
3. Technical Feasibility
4. Economic Feasibility

Alternatives that are clearly inferior in terms of meeting the Purpose and Need, environmental constraints, technical or economic feasibility are eliminated so the next step in the study process (the SDP) can focus on the route alternatives that are clearly most deserving of detailed evaluation.

ES.8 Coarse-Level Screening

The coarse-level screening concluded that two of the six route alternatives, Route Alternatives 2 and 3, were not reasonable and feasible. Both are high-density freight lines, with substantial sections of single track that would require costly expansion projects to create the additional capacity needed to reliably operate the proposed Coachella Valley passenger rail service and mitigate effects on freight rail capacity and reliability. Both routes also experience freight-train congestion and serve freight terminals where trains enter and exit at low speeds. The remaining

four route alternatives were carried forward for more detailed consideration in the fine-level screening.

For the Eastern Section of the Corridor, the UP Yuma Subdivision was also evaluated in the coarse-level screening to determine if there were any significant "fatal flaws" that could render the existing rail line as an unreasonable or infeasible route alternative. Based on the results of the coarse-level screening, the Yuma Subdivision was carried forward into the fine screening as the only reasonable and feasible Eastern Section for each of the remaining route alternatives.

ES.9 Fine-Level Screening

The fine-level screening concluded that one of the four remaining alternatives is to be carried forward from the Alternatives Analysis based on its comparison to the other three in terms of all four screening criteria categories (Purpose and Need, Environmental Constraints, Technical Feasibility, and Economic Feasibility). Route Alternative 1 demonstrated superior performance in the following ways:

1. Meeting Purpose and Need
    - Serving the largest population catchment area (two million people more than each of the other alternatives)
    - Having the highest ridership and revenue forecast (17-19% higher ridership forecast than the next-best alternative)
    - Offering a competitive travel time (comparable travel time to the next-best alternative, and 17-22 minutes less than the other two alternatives).
2. Reducing Environmental Constraints
    - No impact to environmental resources (all of the other alternatives have potential impacts to parkland, schools, Superfund sites and historic properties).
    - No right-of-way concerns (all other alternatives require property acquisition causing potential displacement of commercial and residential uses).
3. Offering Technical Feasibility
    - Available and adequate passenger and freight capacity (8.8-13.4 miles of new track for the other alternatives)
    - No major alignment changes needed (two new track connections for the other alternatives).
    - No new major structures or grade crossings required (new San Bernardino flyover and 24-28 grade crossing improvements for the other alternatives).
4. Affording Economic Feasibility
    - Lowest capital cost of all alternatives (approximately $100-$250 million less than the other alternatives)
    - Uses available operating rights

ES.10 Conclusion and Next Steps

The purpose of this Alternatives Analysis was to consider alternatives for improving intercity transit between the Coachella Valley and Los Angeles, and to identify the alternatives that demonstrate superior performance for more detailed evaluation. Based on the Alternatives Analysis results, Route Alternative 1 will be carried forward for analysis in the Tier 1 Environmental Impact Statement (EIS)/Programmatic Environmental Impact Report (EIR) and a SDP because, when compared to other route alternatives considered, it:

- Meets the project Purpose and Need
- Has relatively low construction complexity and low construction costs by exercising operating rights and leveraging public agency railroad capital investments
- May not require a flyover above an active rail line
- Has a competitive passenger-train travel time
- Serves the largest population
- Has the highest ridership and revenue forecast
- Has no unreasonable environmental resource issues

A No-Build Alternative will also be carried forward for analysis in the Tier 1 EIS because evaluation of No Action is required by the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), and the alternative serves as a basis of comparison for likely impacts of constructing and operating the Coachella Valley-San Gorgonio Pass Rail Corridor service. The Tier 1 EIS analysis will provide a basis for selecting the service level (station stops and frequency) that will best meet the Purpose and Need for the new passenger rail service.

1 Introduction

The Introduction Section describes the Study Area and provides an overview of the Alternatives Analysis review process.

The Coachella Valley – San Gorgonio Pass Rail Corridor Rail Service Study (the Study), undertaken by the Riverside County Transportation Commission (RCTC) in coordination with the California Department of Transportation (Caltrans) and the Federal Railroad Administration (FRA), will identify the possibility for implementation of an intercity passenger rail service between Indio in the Coachella Valley through San Gorgonio Pass to Los Angeles Union Station (LAUS) in Los Angeles, California. The major work during the first phase of this Project is completion of an Alternatives Analysis and initial service development planning for potential routes in the Coachella Valley – San Gorgonio Pass Corridor (the Corridor). If RCTC decides that the Project is viable after completion of the first phase, a second phase will commence to prepare Environmental Documentation (ED) and a Service Development Plan (SDP). All work for this Project will be consistent with FRA requirements and expectations on previous Tier 1 (Service) Environmental Impact Statement (EIS)/Programmatic Environmental Impact Report (EIR) and SDP service level studies and subsequent FRA guidance for planning of intercity passenger rail corridors.

This report describes the initial range of route alternatives proposed for consideration for the Study, the screening methodology and criteria used to evaluate these route alternatives, the results of the alternatives analysis, and agency and public input on the alternatives analysis. Through a two-step screening process, preliminary service planning elements were analyzed to identify the range of route alternatives that will be considered in the ED and SDP, which will be prepared to comply with the National Environmental Policy Act of 1969 (NEPA) and the California Environmental Quality Act (CEQA). The ED will evaluate potential impacts of route alternatives carried forward from the screening process for detailed analysis and comparison. In addition, a No-Build Alternative will be retained for analysis in the ED to serve as the baseline for comparison of the route alternatives carried forward, and will also help decision makers and the public understand the consequences of taking no action. Ultimately, RCTC, Caltrans and FRA will select one route alternative based on the detailed evaluation in the ED and input from resource agencies and the public.

This report is organized as follows:

- Section 1, Introduction - Describes the Study Area and provides an overview of the alternatives analysis review process.
- Section 2, Market Analysis - Discusses current Corridor travel patterns and conditions, existing transportation facilities and services, and needs for new service in the Corridor.
- Section 3, Outreach - Describes the process for obtaining input from agencies, stakeholders, elected officials, and the public.

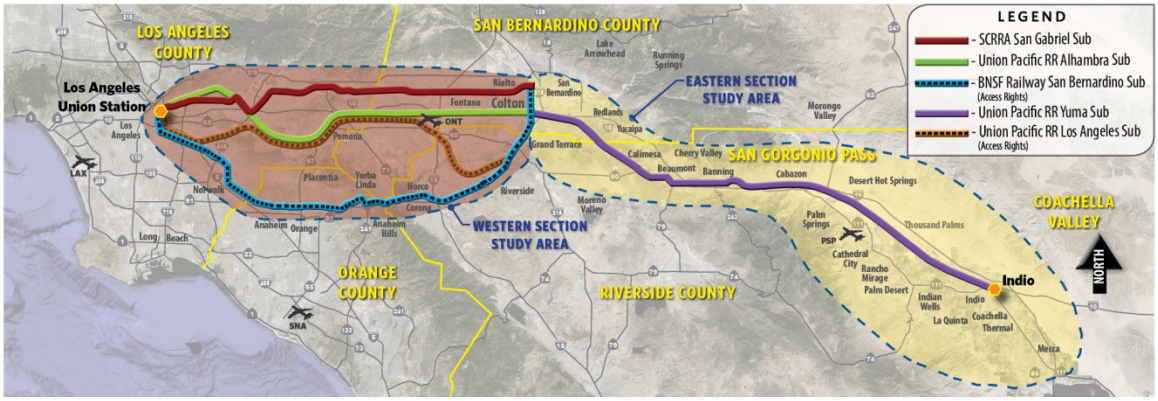
- Section 4, Purpose and Need for the Study - Defines the need for transportation improvements and the objectives of the new service, based on the market analysis and outreach process.
- Section 5, Identification of a Range of Route Alternatives - Identifies possible service options based on Corridor needs and public outreach; compares the service options with the Purpose & Need objectives to determine which merit inclusion in the Alternatives Analysis
- Section 6, Description of the Proposed Service - Describes the proposed passenger rail service to be evaluated in the screening of alternatives.
- Section 7, Screening Methodology - Describes the methodology and criteria to be applied in the two-step process for screening Corridor alternatives.
- Section 8, Coarse-Level Screening - Presents the first level of evaluation which compares the route alternatives to identify excessive costs, impacts, or other factors that would warrant removing alternatives from further consideration.
- Section 9, Fine-Level Screening - Presents the second level of evaluation which compares the remaining route alternatives in further detail to determine which alternatives are carried forward for evaluation in the ED.
- Section 10, Reasonable and Feasible Alternatives Carried Forward - Documents which alternatives have justified advancement into the Service Development Plan and the Tier 1 Service NEPA/CEQA analysis.
- Section 11, References - Provides detailed information on the sources used to prepare this Alternatives Analysis Report.

Study Area

The Corridor extends from an eastern terminus in Indio, California to LAUS in downtown Los Angeles, California, in the west. The Study Area consists of two sections, depicted in Figure 1, which also shows the ownership of the various rail subdivisions throughout the project area and access rights:

- The Eastern Section is approximately 71 miles long between Indio and Colton, California, and the Union Pacific Railroad (UP) Yuma Subdivision is the only established rail route alternative for that section of the Corridor; and
- The Western Section between Colton and Los Angeles contains four established rail routes – two owned by UP, one by BNSF Railway (BNSF), and the fourth by member agencies of the Southern California Regional Rail Authority (SCRRA) which operates the Metrolink commuter rail services in Southern California. The four routes in the Western Section vary in length between 58 and 70 miles.

Figure 1. Study Area



The Eastern Section of the Corridor extends from Colton easterly through the Coachella Valley, and operates through urban, suburban, and rural areas with a terminus assumed to be in Indio for purposes of this Alternatives Analysis, though the exact location of the terminus has not been determined. This portion of the Corridor is situated in one of the fastest-growing areas of the Southern California region, owing to increased residential development that has resulted in a doubling of population between 1990 and 2010 (SCAG 2012 RTP/SCS). In addition, the Coachella Valley has a large number of tourist destinations that attract regional visitors from Southern California as well as national and international visitors, including Palm Springs, Desert Hot Springs, and Joshua Tree National Park. The Eastern Section traverses San Bernardino and Riverside counties.

The Western Section extends from Colton to Los Angeles, a densely developed region with many residential communities and employment centers. All four route alternatives in this section have a western terminus at LAUS, which is a hub for passenger and commuter rail services in Southern California, as well as local light rail, rail rapid transit, and bus transit serving Los Angeles County, including the FlyAway express bus service to Los Angeles International Airport (LAX).

The four established passenger rail routes in the Western Section to be evaluated are numbered from south to north. For each route, the counties traversed are indicated in Table 1.

Table 1. California Counties Traversed by Routes in the Study Area's Western Section

1 BNSF San Bernardino Sub	2 UP Los Angeles Sub	3 UP Alhambra Sub	4 SCRRA San Gabriel Sub
San Bernardino	San Bernardino	San Bernardino	San Bernardino
Riverside	Riverside	Los Angeles	Los Angeles
Orange	Los Angeles		
Los Angeles			

2 Market Analysis

A Market Analysis was conducted to identify current and future Corridor travel patterns and conditions, existing transportation facilities and services, and evaluate the need for new service in the Corridor. Multiple sources of information have been used in order to present a comprehensive current and future transportation picture within the Study Area. The market analysis is presented in four sections:

- Corridor Demographics
- Transportation Facilities and Services
- Travel Volumes and Trip Patterns
- Transportation System Performance

The Market Analysis describes the corridor's travelers and trip making (corridor demographics, travel volumes, and trip patterns) as well as the corridor transportation system (facilities, services, and performance).

Each section summarizes key points to highlight information that is especially significant to the understanding of Corridor travel. References and data sources are listed in Section 11.

2.1 Corridor Demographics

2.1.1 Overall Population and Employment

The current and future population and employment levels in the four Southern California counties that encompass the Corridor comprise the underlying basis for travel demand through the area. According to the Southern California Association of Governments (SCAG) 2012 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), the four counties (Los Angeles, Orange, Riverside, and San Bernardino) have a current total population of approximately 17 million, as shown in Figure 2. Between 2008 and 2035, the population is projected to increase by 23 percent, adding more than 4 million new residents for a total of 20.8 million residents, as shown in Table 2.

Figure 2. Area Population

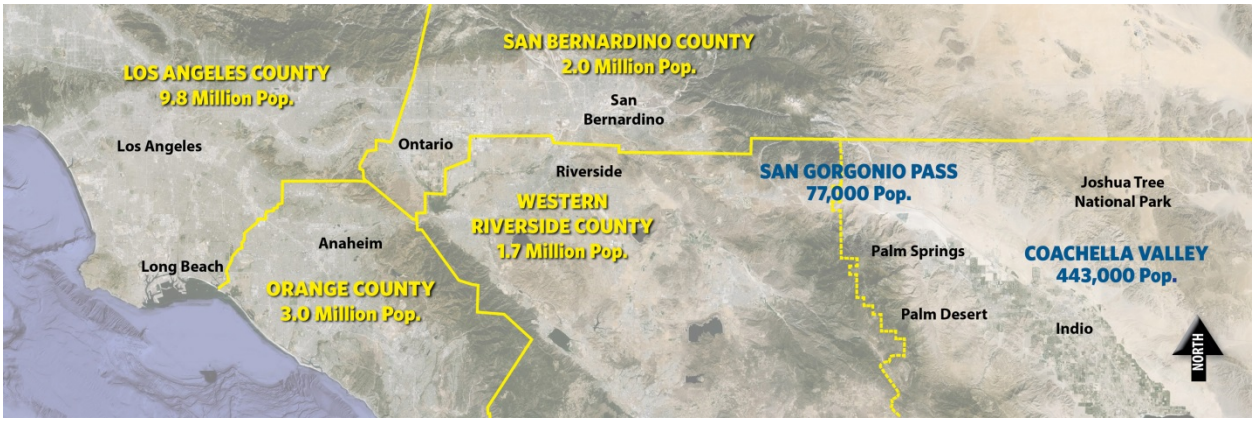


Table 2. Four-County Area Population and Density Forecasts (2008-2035)

	2008	2020	2035	% Change
Total Population (Thousands)	16,911	18,530	20,848	23%
Population Density (Pop./sq. mile)	526	577	649	23%

Source: SCAG 2012 RTP/SCS

Table 3 shows the population growth forecast by county in 2035. The permanent population of the Coachella Valley (443,000 in 2008) represents 21% of Riverside County, and is forecast to grow at an even faster rate than the County as a whole, with a projected doubling of population by 2035. The population of the San Gorgonio Pass Area (Banning, Beaumont, Calimesa, and the unincorporated community of Cabazon) is 77,000 and is also projected to grow by more than double by 2035 with a forecast population approaching 175,000. (SCAG 2012 RTP/SCS)

Table 3. Population Forecasts by County (2008-2035)

County	2008	2035	% Growth
Los Angeles	9,778,000	11,353,000	16%
Orange	2,989,000	3,421,000	14%
Riverside	2,128,000	3,324,000	56%
Coachella Valley	443,000	884,000	100%
San Gorgonio Pass Area	77,000	175,000	134%
San Bernardino	2,016,000	2,750,000	36%

Source: SCAG 2012 RTP/SCS, US Census 2010

Total employment in the Corridor's four counties exceeds 7 million, and is forecast to increase by 22% by 2035, as shown in Table 4.

Table 4. Four-County Area Employment Forecasts (2008-2035)

Four Counties	2008	2020	2035	% Change
Total Employment	7,329,000	7,933,000	8,908,000	22%

Source: SCAG 2012 RTP/SCS

Table 5 shows future total employment growth rate by county through 2035. The Coachella Valley's employment (168,000) represents 25% of the Riverside County total, and is projected to increase 83% by 2035. The San Gorgonio Pass Area employment (including Banning, Beaumont, and Calimesa, as employment figures for Cabazon are not available separately) is currently 15,000 and projected to grow by more than 125%.

Table 5. Employment Forecasts by County (2008-2035)

County	2008	2035	% Growth
Los Angeles	4,340,000	4,827,000	11%
Orange	1,624,000	1,779,000	10%
Riverside	664,000	1,243,000	87%
Coachella Valley	168,000	308,000	83%
San Gorgonio Pass Area	15,000	34,000	127%
San Bernardino	701,000	1,059,000	51%

Source: SCAG 2012 RTP/SCS

2.1.2 Tourism

The Market Analysis evaluates tourism as a distinct ridership market segment because tourism is a major industry in the Coachella Valley, which serves as is a major destination for recreation and leisure travel for residents of the Los Angeles Basin.

The Greater Palm Springs Convention and Visitors Bureau (GPSCVB) reported 12.2 million annual visitors to the Coachella Valley in the 2013 Economic Impact Report. Of those annual visitors, approximately 45% stayed overnight, and the average length of stay was 2-4 days. The GPSCVB also tracks conventions, and approximately 40%, or just under 70,000, of the convention / meeting room nights in 2013 were occupied by visitors from California.

Major festivals and events, as well as local attractions, attract millions of visitors each year. Joshua Tree National Park receives 1.4 million annual visitors (NPS.gov, accessed August 2015). A sample of the larger events is listed in Table 6. The economic impact of the highest grossing events, the Coachella and Stagecoach Festivals, exceeds $254 million annually (SCPR.org, accessed August 2015).

Table 6. Major Events in Coachella Valley

Event	Month	Location	Duration	2013 Attendance
Humana Challenger (PGA Golf) and LPGA Major Championship	January and April	La Quinta and Rancho Mirage	5 days and 4 days	135,000[a]
Riverside County Fair & National Date Festival	February	Indio	7 day	294,864
Tour de Palm Springs Bike Event	February	Palm Springs	1 day	10,000
BNP Paribas Open Tennis Tournament	March	Indian Wells	14 days	340,000
El Paseo Fashion Week	March	Palm Desert	7 days	11,000
Palm Desert Food & Wine Festival	March	Palm Desert	2 days	2,334
The Dinah Shore Weekend Festival	April	Palm Springs Area	2 days	15,000
Coachella Valley Music & Arts Festival	April	Indio	6 days (2 weekends)	158,000
Stagecoach Country Music Festival	April	Indio	2 days	55,000
Modernism Week	October	Palm Springs Area	11 days	30,000

Sources: Greater Palm Springs Convention and Visitors Bureau 2013 Economic Impact Report; Greater Palm Springs Convention and Visitors Bureau 2013 Annual Report; Coachella Valley Association of Governments (CVAG) 2004 Origin-Destination Travel Survey

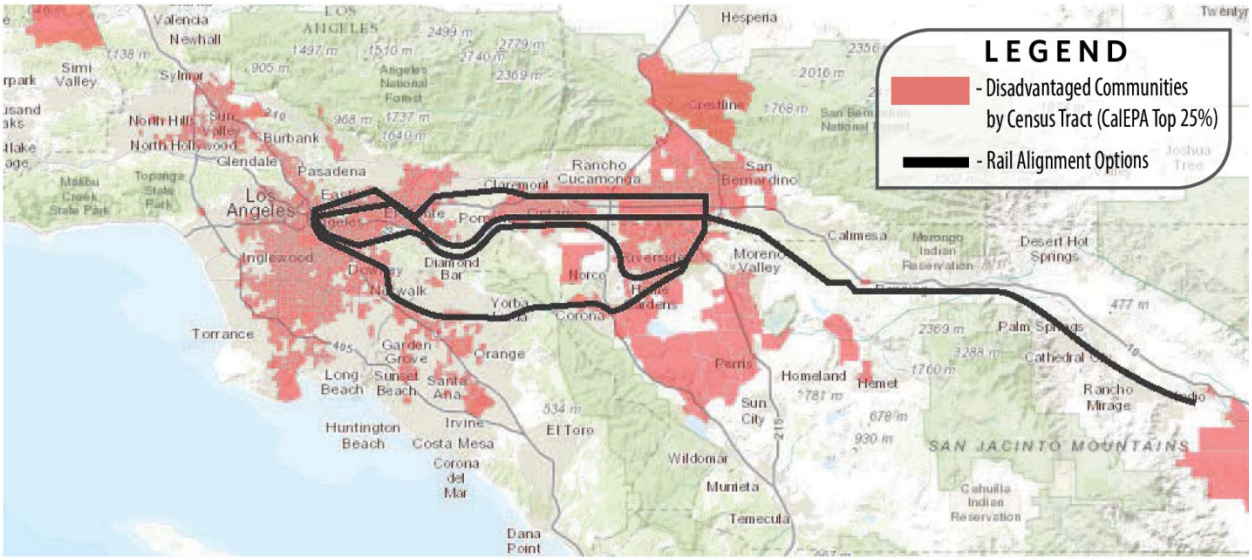
[a] combined total of PGA and LPGA golf events

2.1.3 Disadvantaged Communities

The market analysis provides an in-depth understanding of who will benefit from the proposed service, and members of the Corridor's disadvantaged communities will benefit both in terms of improved regional transit accessibility for zero-vehicle households and health benefits of reduced emissions in and around their communities. Disadvantaged communities in California are defined at the Census tract level by the California Environmental Protection Agency (CalEPA) using a combination of socioeconomic and environmental factors, including area median income, levels of educational attainment, community health indicators (such as hospitalization rates for asthma), and exposure to environmental hazards. Many of these disadvantaged communities are located within or adjacent to the Corridor, as shown below in Figure 3, with the red shaded areas representing the 25% highest scoring census tracts as designated by CalEPA.

Portions of the Corridor have also been identified as Non-Attainment and Attainment-Maintenance Areas for ozone, Respirable Particulate Matter (PM10), Fine Particulate Matter (PM2.5), Carbon Monoxide (CO), and Nitrogen Dioxide (NO2) under federal and state air quality conformity requirements.

Figure 3. CalEnviroScreen 2.0 Overlay on Coachella Valley Rail Alignment Options



Source: California Environmental Protection Agency, 2015

Enhanced intercity passenger rail service is consistent with State and regional efforts to mitigate pollution impacts on disadvantaged communities along the Corridor, including the Coachella Valley, by reducing mobile source emissions associated with highway and truck traffic on parallel highways from Los Angeles to Indio including I-10.

Population and Income

Household income and poverty rate data were also reviewed to identify communities in the Coachella Valley and San Gorgonio Pass with high concentrations of low-income residents, who would benefit from the improved regional accessibility of an affordable regional transit service.

As shown in Table 7, four of the nine incorporated cities in the Coachella Valley, containing over 40% of the Valley's population, have poverty rates exceeding the county, state, and federal average of 14%, and in two of them the poverty rate exceeds 25%. Two of the unincorporated communities of the Coachella Valley have poverty rates approaching 50% (Mecca and Oasis). Two of the three San Gorgonio Pass Area cities, containing 85% of the San Gorgonio Pass Area population, have poverty rates exceeding the county, state, and federal average of 14% (Banning and Beaumont), and in Beaumont the poverty rate exceeds 22%. The unincorporated community of Cabazon also has a poverty rate that exceeds 22%.

Table 7. Coachella Valley and San Gorgonio Pass Area Cities – Population and Poverty Rates

	Population	Poverty Rate
City	**(2008 Population)**	
Cathedral City (Coachella Valley)	50,200	18.8%
Coachella (Coachella Valley)	38,200	26.3%
Desert Hot Springs (Coachella Valley)	25,200	25.6%
Indian Wells (Coachella Valley)	4,800	4.4%
Indio (Coachella Valley)	73,300	21.0%
La Quinta (Coachella Valley)	36,100	7.7%
Palm Desert (Coachella Valley)	47,100	8.7%
Palm Springs (Coachella Valley)	43,400	13.3%
Rancho Mirage (Coachella Valley)	16,900	11.4%
Banning (San Gorgonio Pass Area)	28,900	18.0%
Beaumont (San Gorgonio Pass Area)	33,600	22.8%
Calimesa (San Gorgonio Pass Area)	7,700	13.4%
Community	**(2010 Population)**	
Thousand Palms (Coachella Valley)	7,700	9.1%
Desert Palms (Coachella Valley)	7,000	3.0%
Mecca (Coachella Valley)	8,600	47.8%
Oasis (Coachella Valley)	6,900	48.5%
Bermuda Dunes (Coachella Valley)	7,300	7.0%
Cabazon (San Gorgonio Pass Area)	2,500	22.1%
Region	**(2010 Population)**	
USA	309.3 million	14.3%
California	37.4 million	14.4%
Riverside County	2.2 million	14.2%

Source: SCAG 2008; 2010 U.S. Census

2.1.4 Key Points: Corridor Demographics

- The four counties connected by the Corridor have a very large population (17 million people) and employment base (7 million jobs).
- The Corridor is projected to continue growing at a robust rate, with the Coachella Valley and San Gorgonio Pass Area expected to be two of the most rapidly growing parts of the state.
- The Coachella Valley is home to a large tourism industry that attracts millions of visitors annually from Southern California and around the world.
- A number of disadvantaged communities exist within the Corridor that could benefit from a significant improvement in regional mobility and a health benefit from reduced vehicle emissions from an intercity passenger rail service.

2.2 Transportation Facilities and Services

This section describes the existing transportation facilities and services within the Corridor. These include the highway network, bus and rail systems, and freight and air travel.

The Coachella Valley is connected with the Greater Los Angeles area to the west via the San Gorgonio Pass, a major transportation corridor that includes I-10 and the Union Pacific Railroad. The only other connecting roads travel through the mountains and carry a small volume of travelers.

2.2.1 Highway System Serving the Corridor

The key regional highways serving the Corridor are highlighted in Figure 4. In the western portion of the Corridor the three most important east-west regional highways serving the Corridor include Interstate 10 (I-10), State Route 60 (SR 60), and State Route 91 (SR 91). Within the Coachella Valley, the main roadways that carry vehicles to the San Gorgonio Pass are I-10 and State Route 111 (SR 111). I-10 runs along the northeastern rim of the Coachella Valley while SR 111 runs for about 30 miles along the southwestern rim of the Coachella Valley and serves as the main arterial highway between almost all Coachella Valley cities.

Figure 4. Key Corridor Highways

I-10 is the only roadway that traverses the San Gorgonio Pass to connect the Coachella Valley with the Los Angeles Basin. I-10 is the southernmost transcontinental highway in the American Interstate Highway System, which stretches from the Pacific Ocean at State Route 1 (Pacific Coast Highway) in Santa Monica, California to Interstate 95 in Jacksonville, Florida. Between downtown Los Angeles and Indio, I-10 varies from 6 to 14 lanes, with 6 to 8 lanes through the majority of the Coachella Valley.

State Route 60 (SR 60) also connects Los Angeles with the Coachella Valley, tying into I-10 at Beaumont. SR 60 runs from I-10 near the Los Angeles River in Los Angeles east to I-10 in Riverside County, with overlaps at State Route 57 (SR 57) and Interstate 215 (I-215). The highway varies from six to eight lanes in width, with some segments of two high occupancy vehicle (HOV) lanes as well.

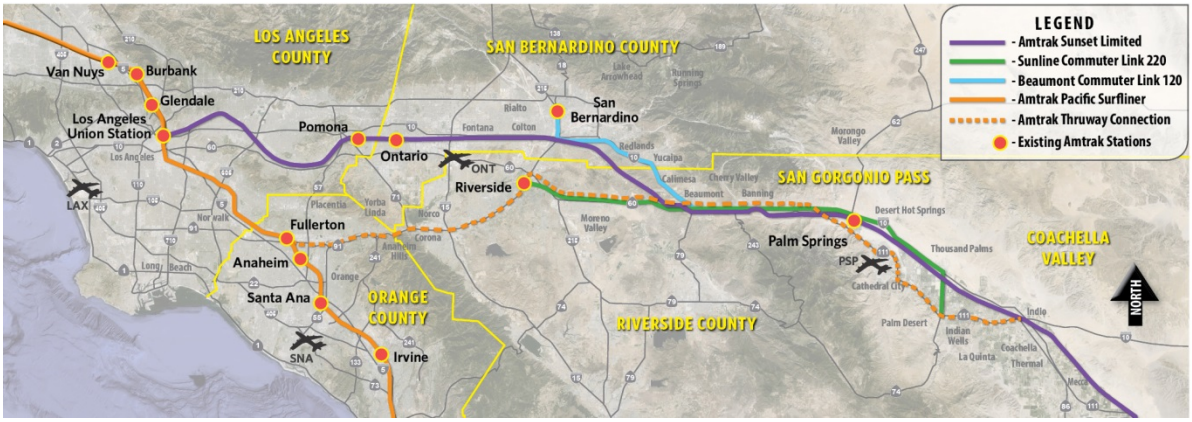
State Route 91 (SR 91) is the east-west freeway route that carries Orange County travelers to the Coachella Valley, tying into SR 60 in the City of Riverside. SR 91 varies from six to ten lanes in width, also with two HOV lanes through much of its length and four express lanes from SR 55 to the Riverside County line.

State Route 111 (SR 111) is the main arterial highway through the Coachella Valley, which runs from the U.S.-Mexico border crossing in Calexico to I-10 at White Water. SR 111 enters the southeast corner of the Coachella Valley as a two-lane highway. SR 111 continues northwest as a major arterial road, four lanes or wider, through the Coachella Valley cities. The highway enters Palm Springs where it swings north and then west to bypass downtown. SR 111 Business passes through the congested downtown Palm Springs area. The highway widens from an arterial road to a divided expressway as it exits Palm Springs just northwest of San Rafael Drive. SR 111 ends at an interchange with I-10 just east of the San Gorgonio Pass.

2.2.2 Transit System Connecting Coachella Valley and Los Angeles Basin

This section describes the bus and rail transit services operating within the Corridor. Figure 5 shows intercity rail and bus transit services.

Figure 5. Intercity Rail and Bus Services within the Corridor

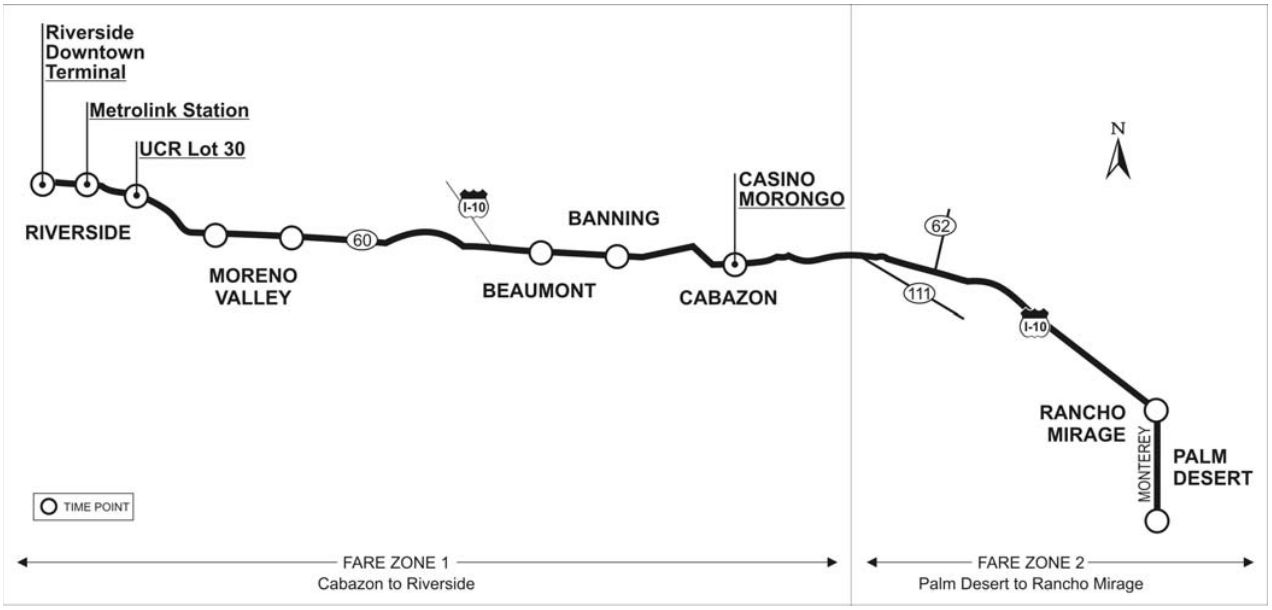


Bus Transit Service

Public transportation in the Coachella Valley is provided by the SunLine Transit Agency, a Joint Powers Authority created in 1977 to provide public transit service to its member cities and unincorporated communities in the Coachella Valley. SunLine's service area is 1,120 square miles, with transit service offered throughout the urbanized areas and larger unincorporated communities of the Coachella Valley. SunLine offers fixed route and paratransit services. (SunLine Transit Agency, June 2014)

SunLine's Commuter Link, Line 220, introduced in September 2012, offers service between the Coachella Valley and Western Riverside County. Two trips are operated weekday mornings westbound, with two trips returning eastbound weekday afternoon/evenings. As shown in Figure 6, the route is 73 miles long, and has stops in the Coachella Valley, the San Gorgonio Pass Area (Morongo Casino/Cabazon, Banning, Beaumont), Moreno Valley, the University of California Riverside, and the downtown Riverside Metrolink train and bus stations, where riders can transfer to travel to other parts of the Los Angeles Basin. The one-way fare is $6.00 with a scheduled trip time from Palm Desert to Riverside Metrolink station of 2 hours 10 minutes (SunLine Transit Agency, June 2014).

Figure 6. SunLine Route 220

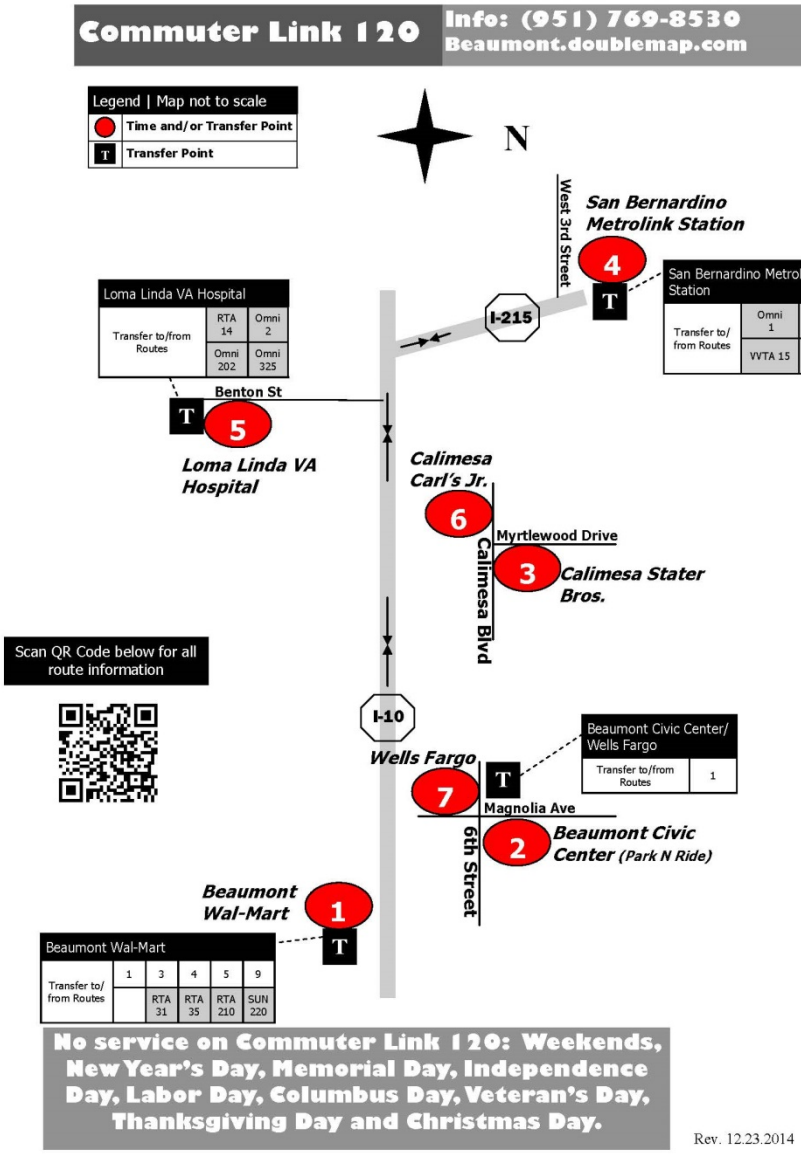


Source: SunLine Transit Agency, 2013

Beaumont Commuter Link 120 provides express bus service between Beaumont and the San Bernardino Metrolink station, with stops in Calimesa and at the Loma Linda Veterans Administration (VA) Hospital. The service makes seven round trips throughout the day each weekday (no weekend service), with the first bus leaving Beaumont at 5:35 AM and the last bus arriving back in Beaumont at 7:25 PM. In San Bernardino riders can catch Metrolink trains to travel to other parts of the Los Angeles Basin. This service originates in the western part of the San Gorgonio Pass Area, so it does not directly serve Banning, Cabazon, or the Coachella

Valley. The route map for Commuter Link 120 is shown in Figure 7. The one-way fare is $3.00 and scheduled trip time from Beaumont to San Bernardino Metrolink ranges between 40 and 55 minutes. (City of Beaumont, June 2014)

Figure 7. Beaumont Transit Commuter Link 120



Source: City of Beaumont, June 2014

Intercity Rail and Bus

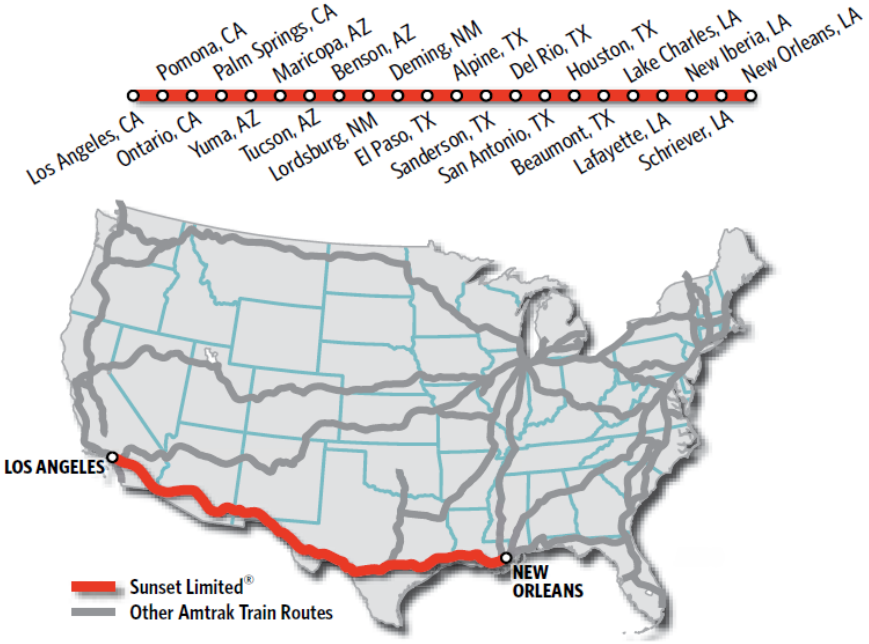
Amtrak Rail

The National Railroad Passenger Corporation, also known as Amtrak, is a publicly funded passenger railroad operated and managed as a for-profit corporation. Amtrak began operations

on May 1, 1971, to provide long-distance and intercity passenger rail service in the United States.

In Southern California, Amtrak shares right of way with freight railroads and Metrolink commuter rail. One Amtrak train serves the Coachella Valley – the Sunset Limited – a long-distance train that travels between Los Angeles and New Orleans with three roundtrips per week, as shown in Figure 8. The westbound Sunset Limited is scheduled to stop in Palm Springs at 2:02 AM on Monday, Wednesday, and Friday en route to a 5:35 AM arrival in Los Angeles, and the eastbound Sunset Limited is scheduled to depart Los Angeles at 10:00 PM and stop at Palm Springs at 12:36 AM on Monday, Thursday, and Saturday en route to New Orleans. The Palm Springs station is unstaffed and located in a fairly isolated location with no local transit access. A one-way fare from Palm Springs to Los Angeles is $27.00. (Amtrak, June 2014)

Figure 8. Amtrak Sunset Limited Route



Source: Amtrak, June 2014

As a transportation hub, Los Angeles Union Station is also served by Amtrak's long-distance Coast Starlight (daily service between Seattle and Los Angeles) and Southwest Chief (daily service between Chicago and Los Angeles) trains, and the Pacific Surfliner, operating 23 daily trips between San Diego and Los Angeles/Santa Barbara/San Luis Obispo. The Pacific Surfliner service is managed by the LOSSAN Rail Corridor Agency, a joint-powers authority with oversight responsibilities for the state-funded intercity rail service.

Amtrak Thruway

Thruway Motorcoach is Amtrak's system of Amtrak-owned intercity motorcoaches, locally contracted transit buses, through-ticketed local bus routes, and taxi services to connect Amtrak train stations to areas not served by its railroads. Train and Thruway Motorcoach tickets are

purchased together from Amtrak for the length of a passenger's journey, and the connections are timed for convenient dedicated transfers between the two services. In addition to providing connecting service to unserved rail areas, some Thruway Motorcoaches operate as redundant service along well-established passenger rail corridors to add extra capacity. California has an extensive network of Thruway Motorcoaches; however, due to California state law, tickets are sold only as part of train journeys. A typical one-way fare of Thruway bus and Pacific Surfliner rail service from Indio to Los Angeles is $21.00 and the scheduled trip time is 4 hours 5 minutes. (Amtrak, June 2014)

Eight daily Thruway buses on two routes serve portions of the Coachella Valley (stops are listed in parentheses) and the travel times for each route are provided in Figure 9.

- Bus 4968: Fullerton to Palm Springs (Fullerton, Riverside, Cabazon, Palm Springs Downtown, Palm Springs Airport). Pacific Surfliner Trains 768, 769, and 572 connect with this Route in Fullerton. This bus makes one one-way trip per day.
- Bus 4984: Fullerton to Indio (Fullerton, Riverside, Cabazon, Palm Springs Downtown, Palm Springs Airport, Palm Desert, La Quinta, Indio). Pacific Surfliner Trains 784 and 785 connect with this Route in Fullerton. This bus makes one one-way trip per day.
- Bus 4969: Indio to Fullerton (Indio, La Quinta, Palm Desert, Palm Springs Airport, Palm Springs Downtown, Cabazon, Riverside, Fullerton). Pacific Surfliner Trains 769 and 572 connect with this Route in Fullerton. This bus makes one one-way trip per day.
- Bus 4985: Palm Springs to Fullerton (Palm Springs Airport, Palm Springs Downtown, Cabazon, Riverside, Fullerton). Pacific Surfliner Trains 785 and 784 connect with this Route in Fullerton. This bus makes one one-way trip per day.
- Bus 5402: Bakersfield to Indio (Bakersfield, La Crescenta, Pasadena, Claremont, Ontario, Riverside, San Bernardino, Cabazon, Palm Springs Downtown, Palm Springs Airport, Palm Desert, La Quinta, Indio). San Joaquin Train 702 connects with this Route in Bakersfield. This bus makes one one-way trip per day.
- Bus 5414: Bakersfield to Indio (Bakersfield, La Crescenta, Pasadena, Claremont, Ontario, Riverside, San Bernardino, Cabazon, Palm Springs Downtown, Palm Springs Airport, Palm Desert, La Quinta, Indio). San Joaquin Train 714 connects with this Route in Bakersfield. This bus makes one one-way trip per day.
- Bus 5415: Indio to Bakersfield (Indio, La Quinta, Palm Desert, Palm Springs Airport, Palm Springs Downtown, Cabazon, San Bernardino, Riverside, Ontario, Claremont, Pasadena, La Crescenta, Bakersfield). San Joaquin Train 715 connects with this Route in Bakersfield. This bus makes one one-way trip per day.
- Bus 5403: Indio to Bakersfield (Indio, La Quinta, Palm Desert, Palm Springs Airport, Palm Springs Downtown, Cabazon, San Bernardino, Riverside, Ontario, Claremont, Pasadena, La Crescenta, Bakersfield). San Joaquin Train 703 connects with this Route in Bakersfield. This bus makes one one-way trip per day.

In summary, the eight Amtrak Thruway busses combine to provide two daily round trips between the Coachella Valley and Fullerton by way of Riverside, and two daily round trips

between the Coachella Valley and Bakersfield by way of San Bernardino, Ontario, and Pasadena. Figure 9 shows Amtrak Thruway Schedules.

Figure 9. Amtrak Thruway Route Schedules

Bakersfield • Palm Springs • Indio • Hemet

702	712	714	716	San Joaquin Connecting Train Number			713	715	717	703
5402	5412	5414	5416	Thruway Number			5413	5415	5417	5403
Daily	Daily	Daily	Daily		Days of Operation		Daily	Daily	Daily	Daily
12 10P	1 50P	4 20P	7 30P	Dp	Bakersfield, CA–Amtrak Station	Ar	9 50A	1 05P	3 30P	6 05P
D2 00P	D3 40P	D6 10P	D9 20P		La Crescenta, CA–I-210 Fwy. at Honolulu & Lowell		R7 40A	R10 50A	R1 20P	R3 40P
D2 15P	D3 55P	D6 25P	D9 35P		Pasadena, CA–Hilton		R7 10A	R10 25A	R12 55P	R3 15P
D3 05P	D4 45P	D7 15P	D10 25P		Claremont, CA–Metrolink Station		R6 25A	R9 45A	R12 15P	R2 40P
D3 20P	D5 00P	**D7 30P	**D10 40P		Ontario, CA–Amtrak Station		R6 05A	R9 20A	R11 50A	R2 15P
D4 10P	*D5 50P	D8 20P	D11 05P		Riverside, CA–Metrolink Station		R5 40A	R8 55A	*R10 55A	R1 55P
MD3 50P	MD5 25P	D7 55P	D11 25P		San Bernardino, CA–Amtrak Station		5 20A	MR8 35A	MR11 25A	MR1 35P
D4 50P		D9 00P			Cabazon, CA–Morongo Casino			R7 30A		R12 40P
D5 20P		D9 25P			Palm Springs, CA–Downtown SunLine Transit			R7 05A		R12 05P
D5 25P		D9 30P			Palm Springs, CA–Airport			R7 00A		R12 00N
D5 55P		D9 55P			Palm Desert, CA–SunLine Transit Stop			R6 30A		R11 30A
D6 05P		D10 05P			La Quinta, CA–SunLine Transit Stop			R6 20A		R11 20A
6 15P		10 15P			Indio, CA–behind Denny's Restaurant			6 10A		11 10A
	D6 15P				Moreno Valley, CA–RTA Bus Stop				R10 35A	
	D6 30P				Perris, CA–Check with Agent				R10 20A	
	D6 45P				Sun City/Menifee, CA–Menifee Comm. Cupboard				R10 05A	
	D7 05P 7 10P			Ar	Hemet, CA–Coco's Restaurant –Simpson Center	Dp			R9 40A 9 30A	

M Meal and rest stop.
* Northbound Bus 5417 stops at Riverside before San Bernardino. Southbound Bus 5412 stops at Riverside after San Bernardino.
** Buses 5414 and 5416 also stop at Andy's Burgers in Ontario (late-night alternative stop).

Pacific Surfliner Thruway Bus Connections

Fullerton • Palm Springs • Indio

768/572/769	784/785	Connecting Train Number			769/572	785/784
4968	4984	Thruway Number			4969	4985
Daily	Daily		Days of Operation		Daily	Daily
11 55A	6 20P	Dp	Fullerton, CA–Trans. Ctr.	Ar	11 20A	5 25P
D12 45P	D7 05P		Riverside, CA–Metrolink Station		R10 25A	R4 25P
D1 25P	D7 45P		Cabazon, CA–Morongo Casino		R9 35A	R3 35P
D1 50P	D8 15P		Palm Springs, CA –Downtown SunLine Transit		R9 05A	R3 10P
2 00P	D8 20P		Palm Springs, CA–Airport		R9 00A	3 05P
	D8 50P		Palm Desert, CA–SunLine Transit		R8 30A	
	D9 00P		La Quinta, CA–SunLine Transit		R8 15A	
	9 10P	Ar	Indio, CA–Hwy. 111 at Monroe	Dp	8 05A	

NOTE—All Pacific Surfliner Thruway Bus Connections above require reservations.

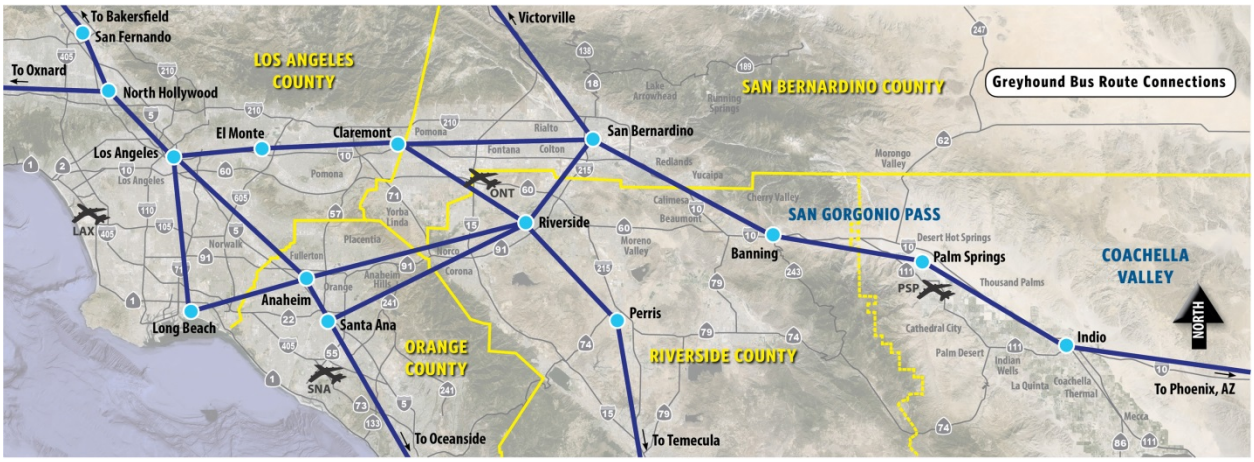
Source: Amtrak, June 2014

Greyhound Bus

Founded in 1914, Greyhound Lines, Inc. is the largest provider of intercity bus transportation, serving more than 3,800 destinations across North America. Greyhound serves nearly 18 million passengers each year in the United States and Canada. Greyhound is owned by FirstGroup plc.

Greyhound operates direct service between Los Angeles and Indio, with seven weekday trips from Los Angeles to Indio and six from Indio to Los Angeles. An average one-way fare from Indio to Los Angeles is $23.00 and the scheduled trip time for daytime service ranges from 3 to 4 hours (late-night non-stop service makes the trip in 2½ hours). About half of these trips extend to Phoenix. Intermediate stops are made on some of these trips in El Monte, Claremont, Riverside, San Bernardino, Banning, and the Palm Springs Amtrak station. From three stations, Greyhound provides connecting service to six other locations throughout the Los Angeles Basin – Perris, Anaheim, Santa Ana, Long Beach, North Hollywood, and San Fernando. Figure 10 shows the Corridor cities connected by Greyhound service. (Greyhound.com, June 2014)

Figure 10. Greyhound Service Connections



Metrolink Rail

Metrolink was created in 1992 to provide commuter rail operations in Southern California. Metrolink currently serves three lines and 55 stations over a 512 route-mile network. The Southern California Regional Rail Authority (SCRRA) operates Metrolink service, which is funded through a Joint Powers Agreement (JPA) between the five Southern California transportation commissions. The Metrolink system map is shown in Figure 11. (SCRRA, June 2014)

Metrolink commuter rail service does not operate within the Coachella Valley. However, three of the four rail lines west of Colton being considered for the Coachella Valley rail service currently have Metrolink service. These include the San Bernardino Line (LAUS to San Bernardino), the Riverside Line (LAUS to Riverside), and the 91 Line (LAUS to Riverside, via Orange County). Two additional Metrolink routes also operate on tracks shared with portions of the 91 Line: the Orange County Line (LAUS to Oceanside) and the Inland Empire-Orange County Line (San Bernardino to Oceanside).

The San Bernardino Line runs on the SCRRA San Gabriel Subdivision on headways ranging from 10 to 95 minutes, providing 19 round trip trains on weekdays. Stations served include Los Angeles, Cal State L.A., El Monte, Baldwin Park, Covina, Pomona (North), Claremont, Montclair, Upland, Rancho Cucamonga, Fontana, Rialto, and San Bernardino. On Saturdays, 10 trains running at approximately 90-minute headways provide round trip service, and on Sundays, seven round trip trains operate at approximately 2 to 3-hour headways. An average one-way fare from San Bernardino to Los Angeles is $13.25 and the trip takes about 1 hour and 35 minutes. (SCRRA, June 2014)

The Riverside Line operates on the Union Pacific Railroad (UP) Los Angeles Subdivision, serving stations in Los Angeles, Montebello/Commerce, Industry, Downtown Pomona, East Ontario, Pedley, and Riverside. On weekdays, six trains travel from Riverside to LAUS, primarily in the morning, and six return in the afternoon/evening. The service does not operate on weekends. Headways vary from approximately 30 minutes to 2 hours. An average one-way fare from Riverside to Los Angeles is $13.00 with a typical scheduled travel time of 1 hour 25 minutes. (SCRRA, June 2014)

Figure 11. Metrolink System Map

Source: Metrolink, 2014

The 91 Line swings to the south on the BNSF Railway (BNSF) San Bernardino Subdivision, which is also used by Metrolink's Orange County Line and Inland Empire-Orange County Line commuter trains, Amtrak's Pacific Surfliner intercity passenger trains and the long-distance Southwest Chief between LAUS and Chicago. Between LAUS and Fullerton, the segment hosts twelve Amtrak trains in each direction, and between Fullerton and San Bernardino, one Amtrak train in each direction uses the line segment. Metrolink's Riverside Line commuter trains also

use a small portion of the San Bernardino Subdivision. Stations served by 91 Line commuter trains include Norwalk, Buena Park, Fullerton, West Corona, North Main Corona, Riverside La Sierra, and Riverside Downtown. On weekdays, four trains operate west, primarily in the morning, and five trains operate east, primarily in the evening. On weekends, two 91 Line trains operate in each direction. The one-way fare from Riverside to Los Angeles is $13.00 with a typical scheduled travel time of 1 hour 38 minutes. (SCRRA, June 2014)

Table 8 illustrates the number of Metrolink trains operating on each subdivision (includes portions of each right of way).

Table 8. Metrolink Service by Direction

Subdivision, Line, and Service Area	Number of Metrolink Trains		
	Weekdays	Saturday	Sunday
SCRRA San Gabriel Subdivision			
San Bernardino Line (L.A.-San Bernardino)			
Westbound	19	10	7
Eastbound	19	10	7
UP Los Angeles Subdivision			
Riverside Line (L.A.-Riverside)			
Westbound	6	0	0
Eastbound	6	0	0
BNSF San Bernardino Subdivision			
L.A.-Fullerton [a]			
Westbound	14	6	6
Eastbound	14	6	6
Fullerton-Anaheim Canyon [b]			
Westbound	4	2	2
Eastbound	5	2	2
Anaheim Canyon-Riverside [b]			
Westbound	12	4	4
Eastbound	13	4	4
Riverside-San Bernardino [b]			
Westbound	4	2	2
Eastbound	4	2	2

Source: SCRRA, 2015

[a] This line segment also hosts 12 Amtrak trains in each direction, in addition to Metrolink trains.

[b] This line segment also hosts 1 Amtrak train in each direction, in addition to Metrolink trains.

Other Transportation

Aviation in the Coachella Valley is served by the Palm Springs International Airport in Palm Springs (PSP), Jacqueline Cochran Regional Airport in Thermal, and Bermuda Dunes Municipal Airport in Bermuda Dunes. Commercial flights serve the Palm Springs International Airport, while the other two are general aviation airports. The only scheduled air passenger flights in the Corridor operate between PSP and Los Angeles International Airport (LAX). The average number of daily flights between LAX and Palm Springs (all operated by United) varies seasonally – in 2014 it ranged from 9.0 flights per day (total both directions) in August to 13.5 flights per day in March. The advance one-way fare is more than $500 (Spring 2015). (United.com, May 2015) LAX Flyaway bus service offers a direct connection to LAX from downtown Los Angeles at Union Station.

Freight rail operations on the UP and BNSF lines described previously are high-volume, with over 40 freight trains daily operating on each. The Yuma Subdivision, Los Angeles Subdivision, and Alhambra Subdivision carry UP's transcontinental freight traffic while the San Bernardino Subdivision carries BNSF's transcontinental freight traffic. Additional details on freight rail service and infrastructure, specific to each subdivision, are provided in the route alternative screening analysis.

2.2.3 Key Points: Transportation Facilities and Services

- I-10 is the only highway facility connecting the Coachella Valley with the Los Angeles Basin through the San Gorgonio Pass.
- Other key highways serving the Corridor include SR 60 and SR 91 in the Los Angeles Basin, and SR 111 in the Coachella Valley.
- Rail and bus connections are limited, consisting of:
    - SunLine Route 220 commuter bus service with two weekday peak trips each way between the Coachella Valley and Riverside;
    - Beaumont Commuter Link 120 bus service with seven weekday round trips between Beaumont, Loma Linda, and the San Bernardino Metrolink station;
    - Amtrak Sunset Limited long-distance passenger train, stopping in Palm Springs with three roundtrips per week in the middle of the night;
    - Amtrak Thruway bus service, with two daily trips each way to connect to Amtrak trains in Fullerton and two daily trips each way to connect to connect to Amtrak trains in Bakersfield; and
    - Greyhound intercity bus service, with seven daily trips between Los Angeles and the Coachella Valley.
    - Metrolink commuter rail service operating one route daily from San Bernardino to Los Angeles with 19 weekday round trips, 10 Saturday round trips and 7 Sunday round trips; one route daily from Riverside to Los Angeles with nine weekday trips and four weekend trips, and a different weekday only route from Riverside to Los Angeles operating six weekday round trips.

- The only scheduled air passenger service connecting the Los Angeles Basin with the Coachella Valley involves daily flights (ranging from 9 to 13.5 daily flights at different times of the year) between Los Angeles and Palm Springs.

2.3 Travel Volumes and Trip Patterns

Traffic data on I-10 was obtained from the Caltrans Performance Measurement System (PeMS) to determine traffic volumes and peaking patterns through the San Gorgonio Pass Area. AirSage was contracted to provide trip origins and destinations of I-10 users who travel through the Banning Pass, using a proprietary cell phone tracking program. SCAG 2012 RTP/SCS regional model data was used to identify existing and future trip origins and destinations by trip purpose. Weekday volumes include Monday through Thursday, while weekend volumes include Friday through Sunday.

2.3.1 Daily Travel Volumes

As noted in the transportation system description, travel on I-10 through San Gorgonio Pass constitutes virtually all of the trips between the Coachella Valley and the Los Angeles Basin. Vehicle counts on I-10 in the San Gorgonio Pass were obtained from PeMS to determine travel volumes on weekdays, Fridays, Saturdays, and Sundays. (Caltrans PeMS, December 2014) Table 9 shows the average daily traffic (ADT) volume over a 12-month period, as well as the ADT during this Study's Focus Period when AirSage data was obtained to determine trip origin-destination patterns (April 29 to May 14, 2014) and the peak weekend (April 18-21, 2014, during the Coachella Music Festival). (AirSage, June 2014) As the table shows, observed traffic volumes during the Focus Period were consistent with the annual average volumes.

Table 9. Average Vehicles on I-10 Freeway through San Gorgonio Pass

Annual Average				
	Weekday	**Friday**	**Saturday**	**Sunday**
Number of Vehicles	92,352	114,938	98,748	102,333
% Eastbound	51%	54%	52%	44%
% Westbound	49%	46%	48%	56%
Focus Period (April 29 – May 14, 2014)				
	Weekday	**Friday**	**Saturday**	**Sunday**
Number of Vehicles	90,878	114,882	99,160	106,681
% Eastbound	50%	54%	52%	42%
% Westbound	50%	46%	48%	58%
Peak Weekend (Coachella Festival, 2014)				
	Friday	**Saturday**	**Sunday**	**Monday**
Number of Vehicles	137,195	103,354	120,021	130,930
% Eastbound	57%	51%	41%	40%
% Westbound	43%	49%	59%	60%

Source: Caltrans PeMS data, accessed July 2, 2014 and AirSage, June 2014.

The typical weekday volume through the San Gorgonio Pass is approximately 92,000 vehicles. The average Friday volume is 24% higher than the average weekday volume (Monday through Thursday), with the directional split indicating heavier eastbound volumes traveling to the desert for the weekend. The average Saturday volume is 7% higher than the weekday volume, but lower than the Friday volume and slightly heavier in the eastbound direction. The average Sunday volume is 8% higher than the weekday volume and slightly higher than the Saturday volume, with a heavy westbound component as travelers return to the Los Angeles Basin from their weekend trip.

The peak weekend volumes show that the heaviest Friday has 49% more person-trips than a typical Friday, and the return traffic is spread over Sunday and Monday. Nearly 25,000 additional vehicles travel I-10 on the Friday of the peak weekend, 15,000 additional vehicles on Sunday, and 40,000 additional vehicles on Monday, when compared to both the Annual Average and the Focus Period counts.

The approximately 92,000 weekday vehicle trips through the San Gorgonio Pass represent a total of about 130,000 person-trips (Caltrans PeMS data, July 2014). Table 10 shows the composition of person-trips in terms of their eastern terminus – 55% in the Coachella Valley, 27% to the east on I-10, 14% in the High Desert along SR 62, and 4% in the Imperial Valley.

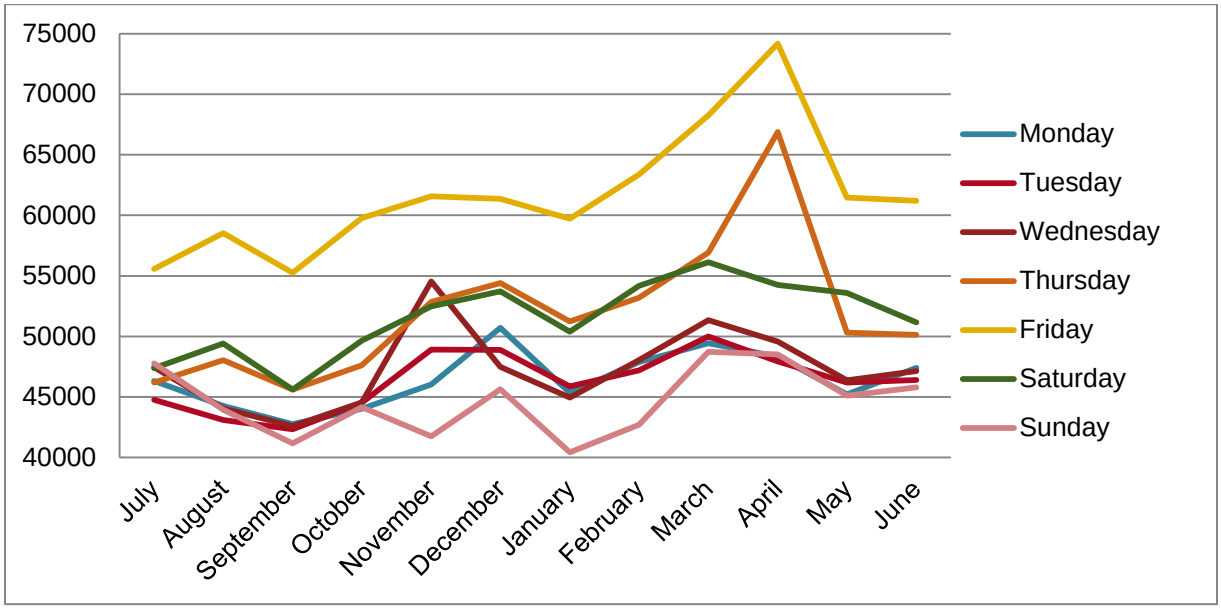
Table 10. Weekday Person-Trips through San Gorgonio Pass

Terminus	Trips	%
Coachella Valley	69,949	55%
I-10 (Palo Verde Valley & Arizona)	35,190	27%
High Desert (SR 62 Corridor)	17,486	14%
Imperial Valley	5,628	4%
Total	**128,253**	**100%**

Source: SCAG Model, Caltrans 2012 Traffic Volumes

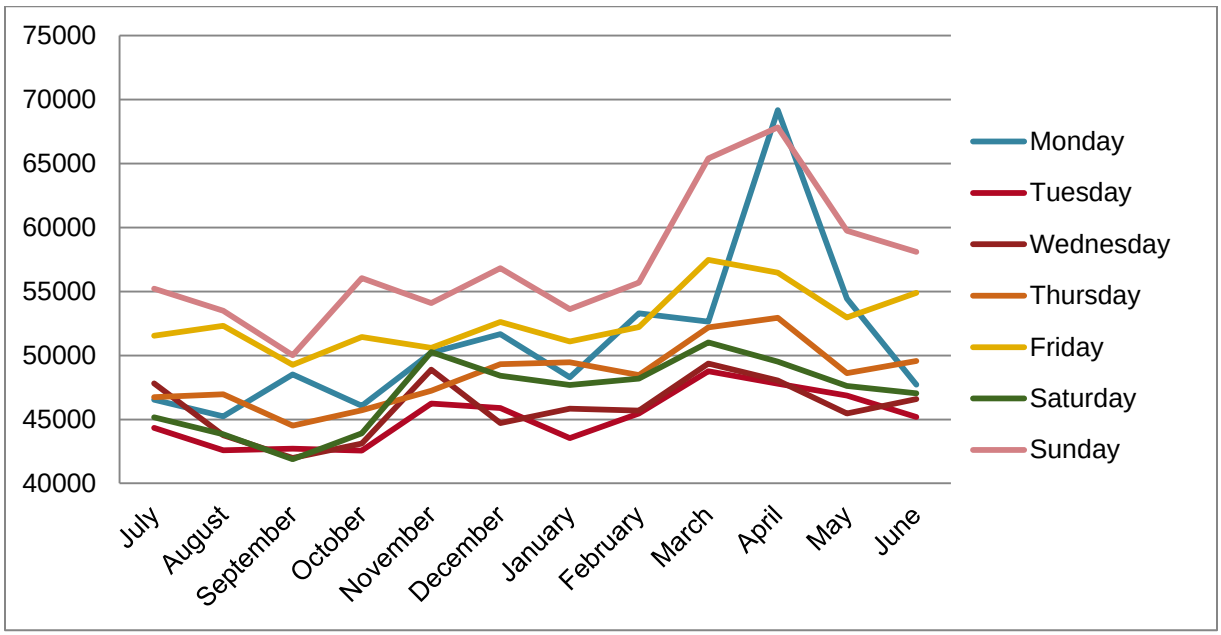
Figures 12 and 13 depict the average daily traffic volumes (number of vehicles) through San Gorgonio Pass, illustrating seasonal fluctuations in traffic volumes by day of the week. Fridays consistently have the highest eastbound traffic volumes as commuters and visitors share the roadway, with a seasonal peak in April for spring break, the Coachella Festival, Stagecoach Festival, and other events. The graphs also indicate substantial travel on the Thursday prior to the events. At the conclusion of the events, attendees depart on Sunday and Monday. Westbound travel is highest on Sundays throughout the year, followed by a peak on Mondays in April from event traffic.

Figure 12. I-10 Eastbound Daily Traffic Volumes – Monthly Average by Day of Week (vehicles)



Source: Caltrans Performance Measurement System

Figure 13. I-10 Westbound Daily Traffic Volumes – Monthly Average by Day of Week (vehicles)

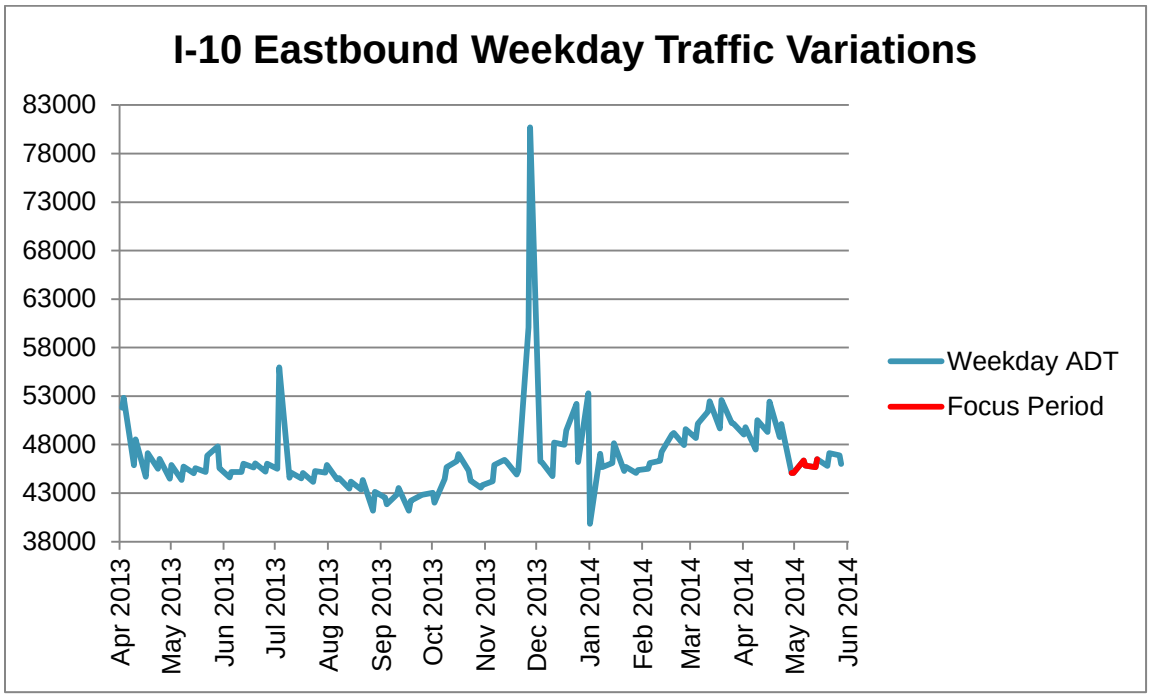


Source: Caltrans Performance Measurement System

The daily and seasonal variations of weekday traffic volumes (number of vehicles), and the relationship between the Focus Period volumes and the rest of the year, are shown in Figures 14 (eastbound traffic) and 15 (westbound traffic). The figures show the fluctuations in travel patterns over the course of 15 months (April 2013 – June 2014), and the trend during the Focus Period. Travel volumes during the Focus Period approximate the average weekday

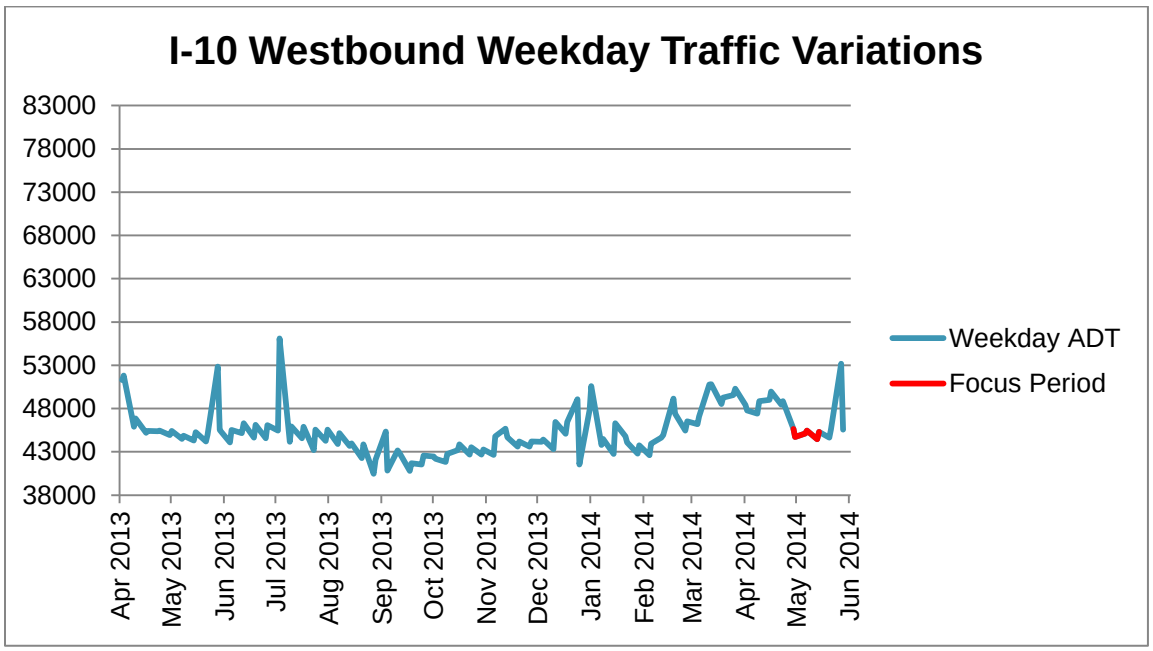
volumes over the course of a year. (Note, the 80,000 ADT data point represents the beginning of the Thanksgiving weekend travel on Wed. Nov. 27, 2013.)

Figure 14. I-10 Eastbound Weekday Traffic Variations (vehicles)



Source: Caltrans Performance Measurement System

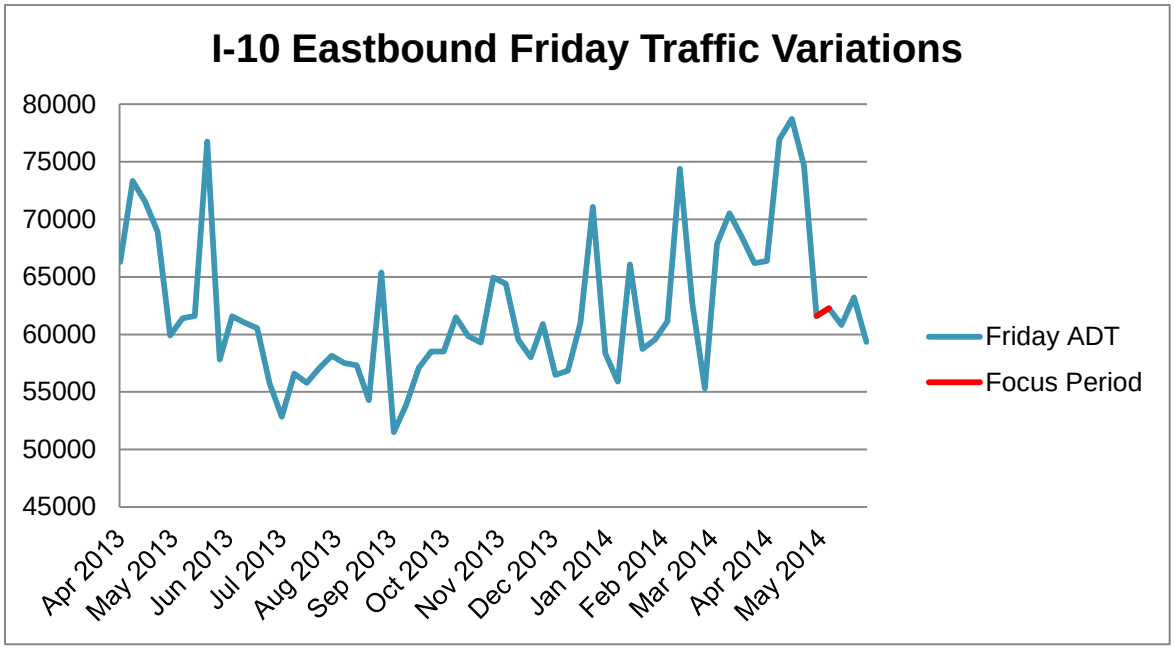
Figure 15. I-10 Westbound Weekday Traffic Variations (vehicles)



Source: Caltrans Performance Measurement System

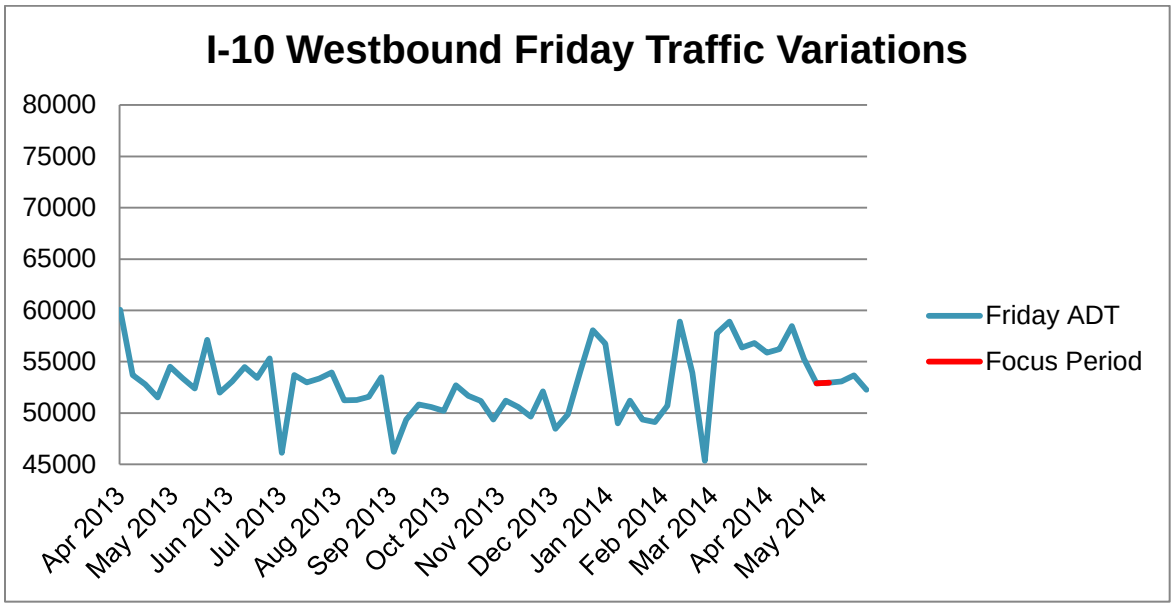
Figures 16 and 17 show the weekly and seasonal variations of Friday traffic volumes (number of vehicles), and the relationship between the Focus Period and the rest of the year. On Fridays, eastbound travel varies much more than weekday travel (Monday through Thursday) and westbound travel, in accordance with weekend events in the Coachella Valley. Friday travel volumes during the Focus Period approximate the average Friday volumes over the course of a year.

Figure 16. I-10 Eastbound Friday Traffic Variations (vehicles)



Source: Caltrans Performance Measurement System

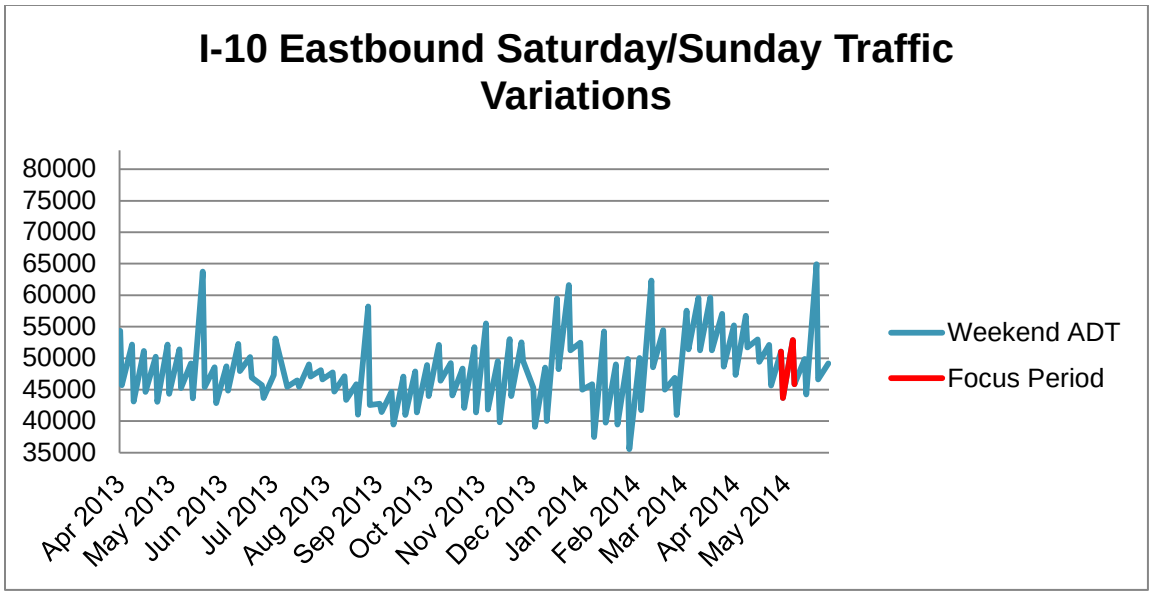
Figure 17. I-10 Westbound Friday Traffic Variations (vehicles)



Source: Caltrans Performance Measurement System

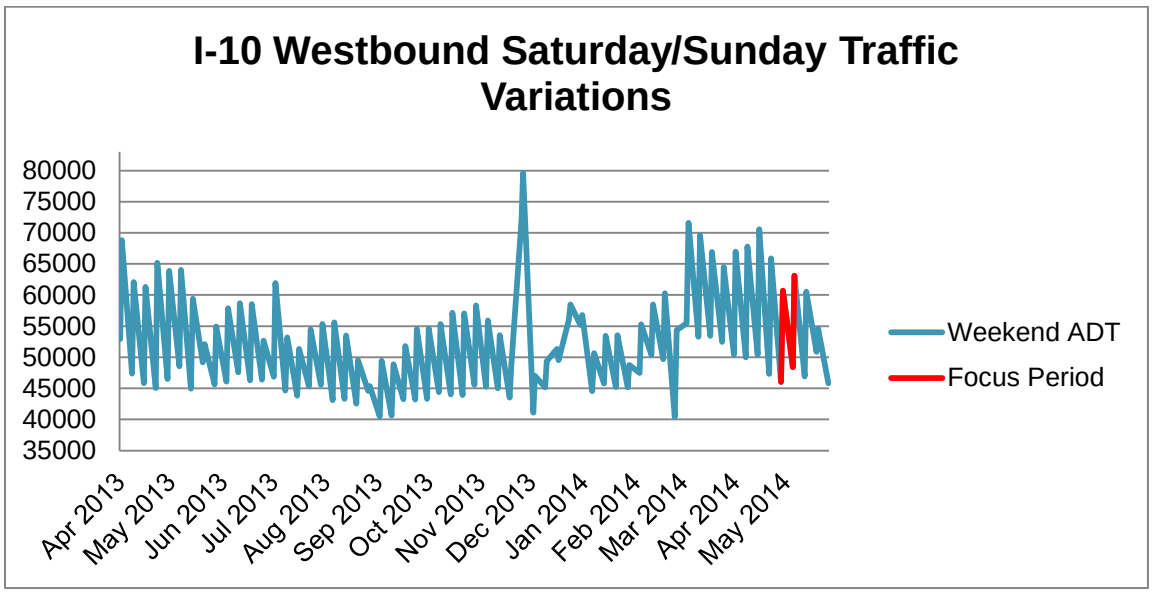
Figures 18 and 19 show the weekly and seasonal variations of Saturday and Sunday traffic volumes (number of vehicles), and the relationship between the Focus Period and the rest of the year. The constant up-and-down fluctuation caused by consistently higher Saturday volumes than Sunday volumes in the eastbound direction, and consistently higher Sunday volumes than Saturday volumes in the westbound direction. Weekend travel volumes during the Focus Period approximate the average Saturday and Sunday volumes over the course of a year. The heavier westbound traffic volumes on Sundays indicate a return trip for the traffic that traveled east earlier in the week. Figure 19 also shows the corresponding westbound spike in travel over the 2013 Thanksgiving weekend that is reflected for eastbound travel in Figure 14.

Figure 18. I-10 Eastbound Saturday/Sunday Traffic Variations (vehicles)



Source: Caltrans Performance Measurement System

Figure 19. I-10 Westbound Saturday/Sunday Traffic Variations (vehicles)



Source: Caltrans Performance Measurement System

2.3.2 Hourly Volumes and Peaking Characteristics

Peak hours of travel through the San Gorgonio Pass are shown in Table 11. Peak hours identified during the Focus Period are similar to the annual average peak hours, while those on the peak weekend vary slightly due to the different profile of traveler during that period. On weekdays, the traffic peak occurs during typical commute hours, with the higher volume eastbound toward Coachella Valley in the morning and westbound in the afternoon. Notably, the peak hours represent only 6.4-7.4% of total daily traffic, meaning that traffic volumes are spread out over the course of the day, rather than having a concentrated peak during commute hours. (Caltrans PeMS data, accessed July 2, 2014.)

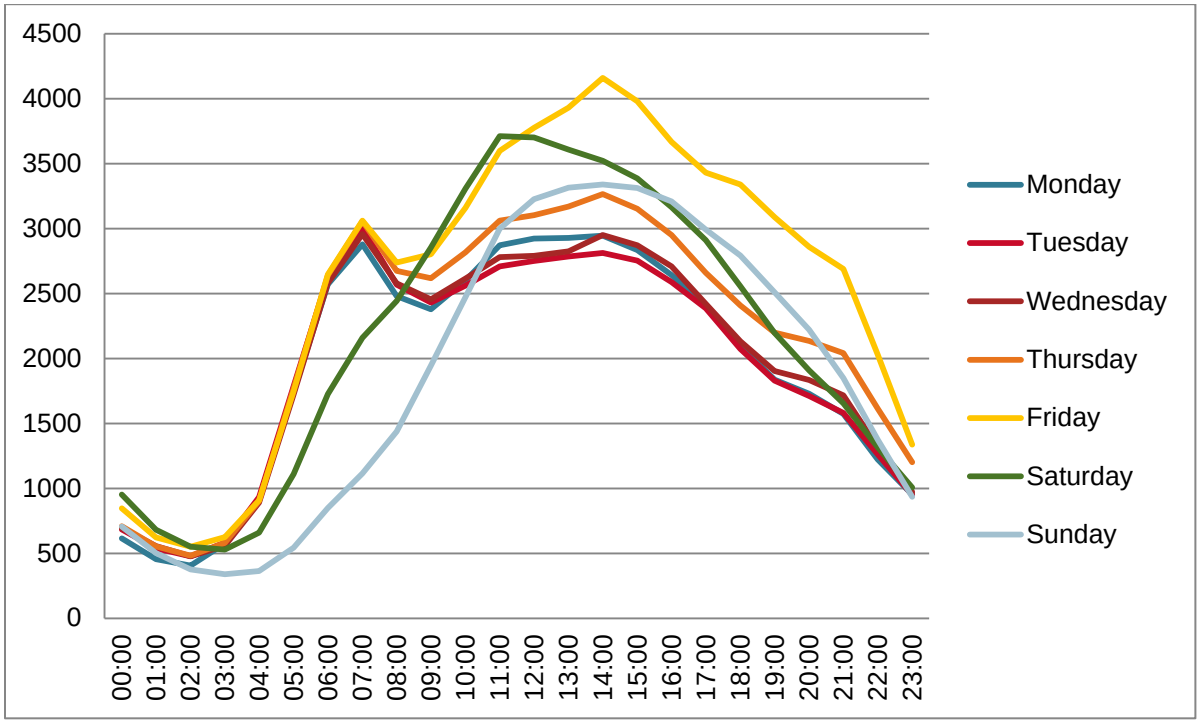
Table 11. Peak Hours of Travel

	Eastbound I-10		Westbound I-10	
	Peak Hour	% of Daily Traffic	Peak Hour	% of Daily Traffic
Annual Average				
Weekday	7-8 AM	6.4%	3-4 PM	7.4%
Friday	2-3 PM	6.8%	3-4 PM	7.4%
Saturday	11 AM-12 PM	7.2%	11 AM-12 PM	7.0%
Sunday	2-3 PM	7.5%	12-1 PM	7.8%
Focus Period				
Weekday	7-8 AM	6.8%	5-6 PM	7.4%
Friday	2-3 PM	6.6%	3-4 PM	7.2%
Saturday	12-1 PM	7.1%	10-11 AM	7.0%
Sunday	3-4 PM	7.4%	12-1 PM	7.9%
Peak Weekend				
Friday	12-1 PM	7.5%	11 AM-12 PM	7.0%
Saturday	5-6 PM	7.5%	12-1 PM	7.0%
Sunday	11 AM-12 PM	6.7%	11 AM-12 PM	7.1%
Monday	11 AM-12 PM	6.7%	11 AM-12 PM	7.1%

Source: Caltrans, PeMS data, accessed July 2, 2014

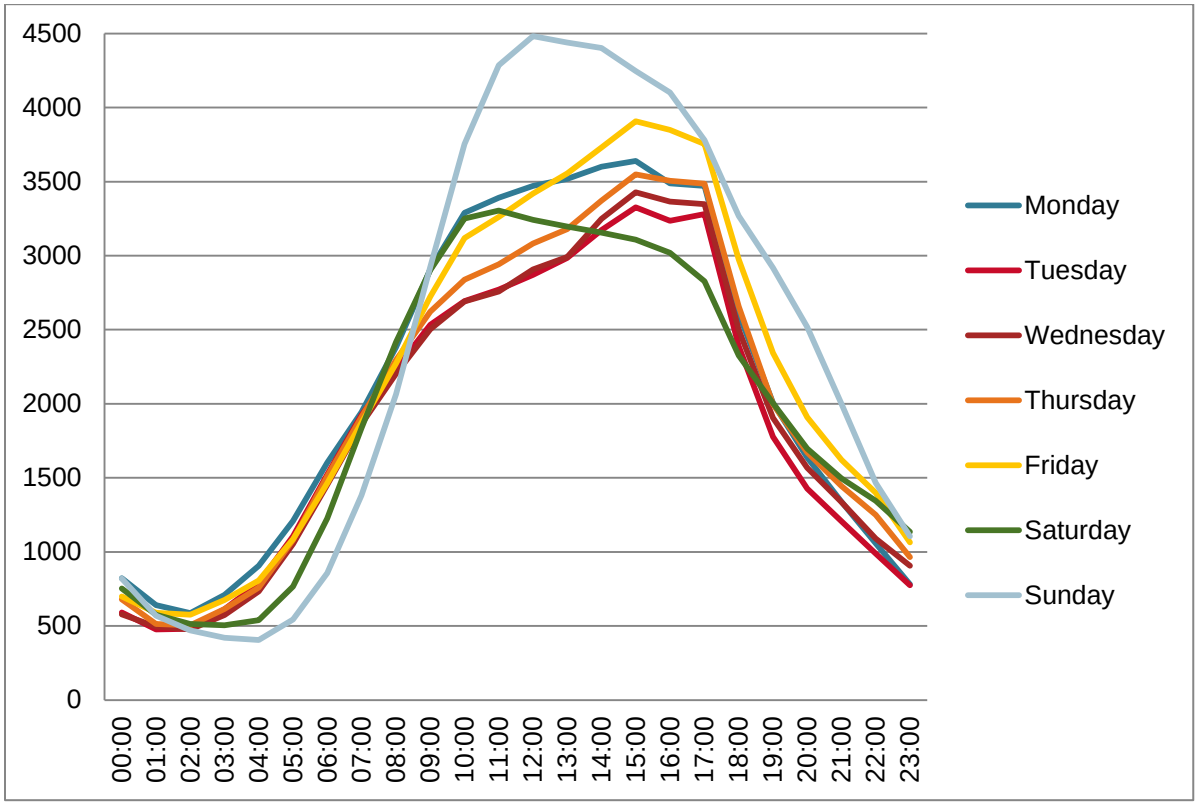
Figures 20 and 21 show I-10 hourly volumes through the San Gorgonio Pass by day of the week based on annual averages, and Figures 22 through 27 show volumes observed through the San Gorgonio Pass on days during the Focus Period. Figures 20 and 21 depict the average volume of traffic along the I-10 at hourly intervals for each day of the week in both eastbound and westbound directions. Peak volumes occur on Friday afternoons in the eastbound direction and on Sunday midday in the westbound direction, indicating that the highest travel periods coincide with weekend visitor travel.

Figure 20. I-10 Eastbound Average Hourly Traffic Volumes by Day of Week (vehicles)



Source: Caltrans Performance Measurement System

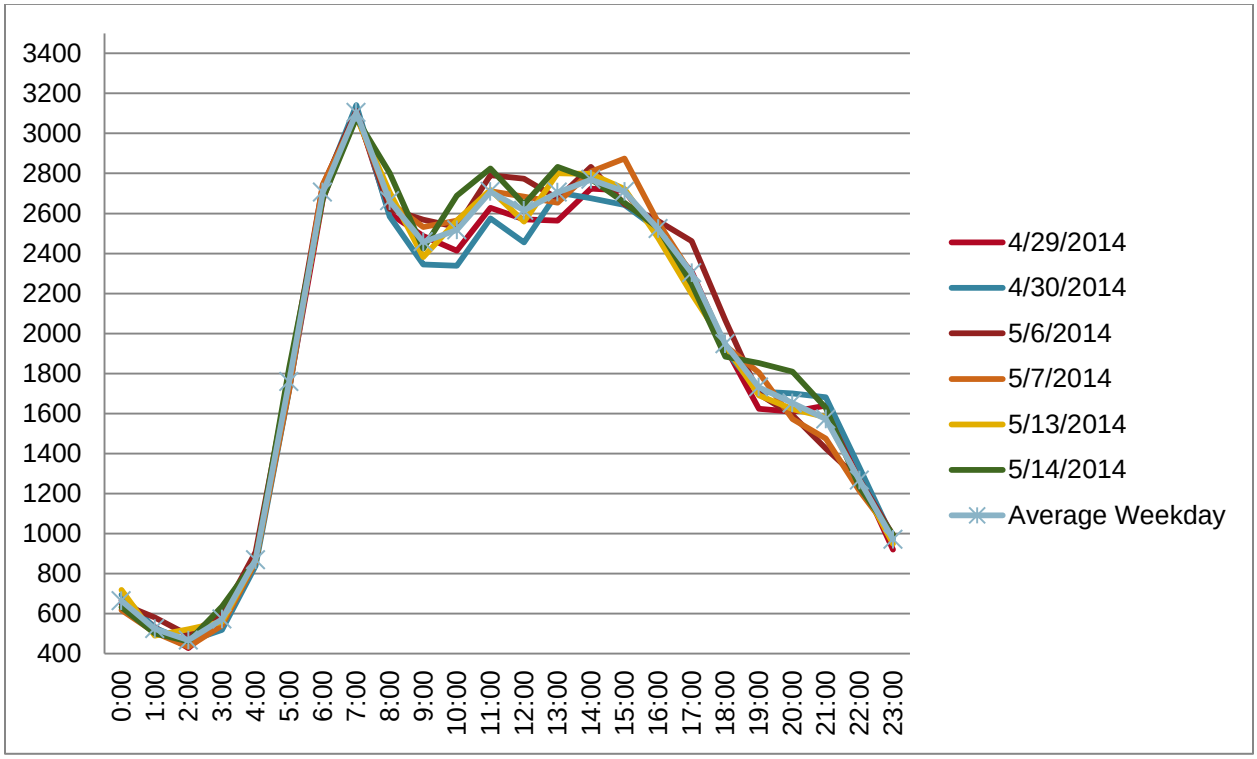
Figure 21. I-10 Westbound Average Hourly Traffic Volumes by Day of Week (vehicles)



Source: Caltrans Performance Measurement System

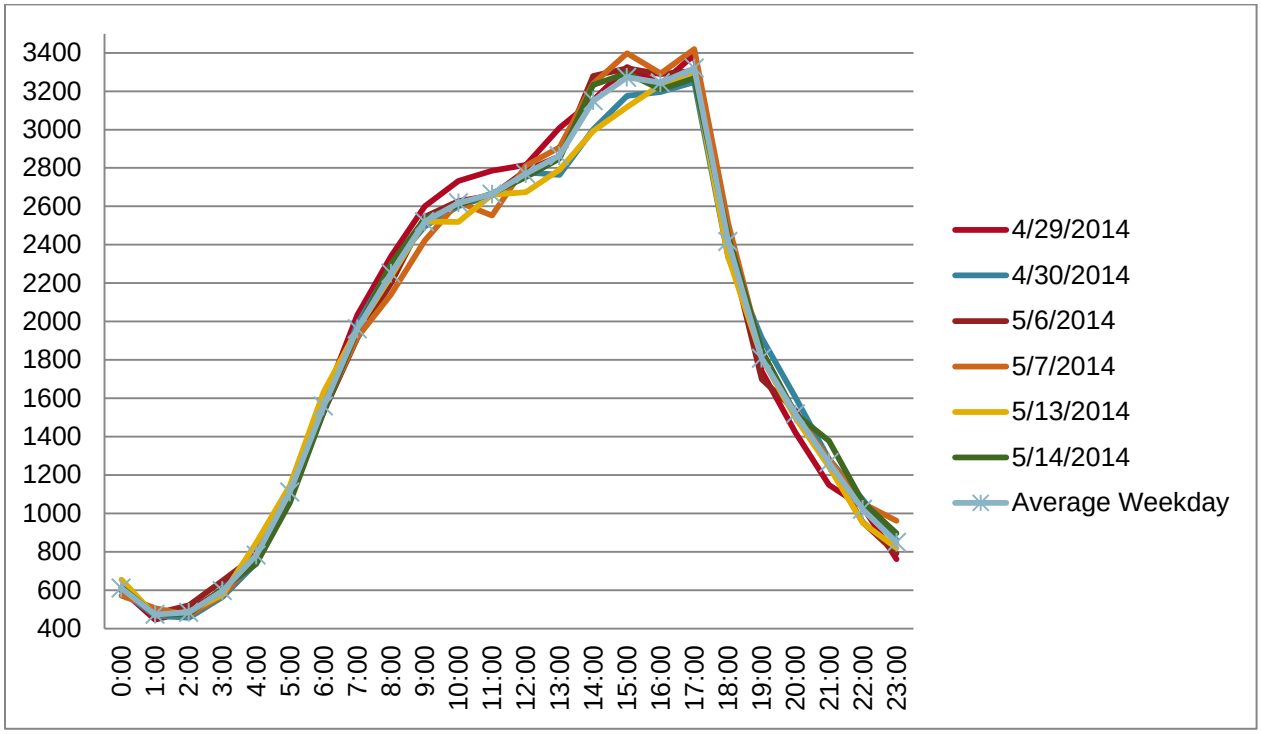
Figures 22 and 23 depict the traffic volumes along the I-10 through the San Gorgonio Pass at hourly intervals for Tuesdays and Wednesdays during the three-week Focus Period of April 29, 2014 through May 14, 2014 in both eastbound and westbound directions. The figures show the midweek peak in the eastbound direction occurs in the morning while the westbound peak occurs in the late afternoon. This indicates a directional commute pattern east into the Coachella Valley in the morning and west in the evening, consistent with the peak hour numbers in the table above.

Figure 22. I-10 Eastbound Tuesday and Wednesday Hourly Traffic Volumes, Focus Period (vehicles)



Source: Caltrans Performance Measurement System

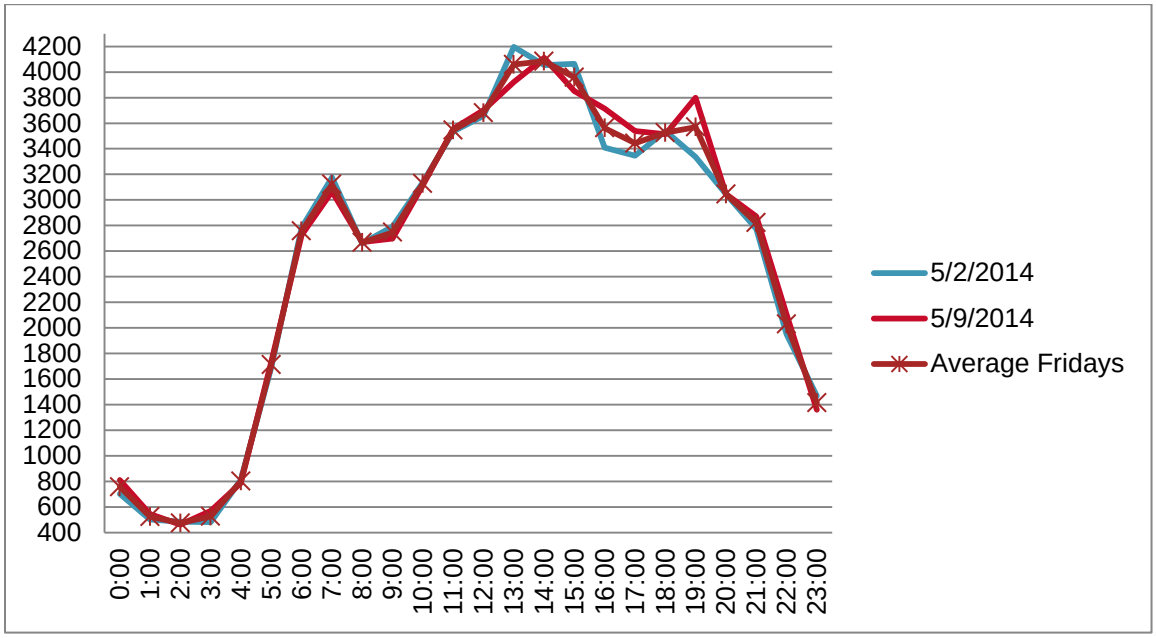
Figure 23. I-10 Westbound Tuesday and Wednesday Hourly Traffic Volumes, Focus Period (vehicles)



Source: Caltrans Performance Measurement System

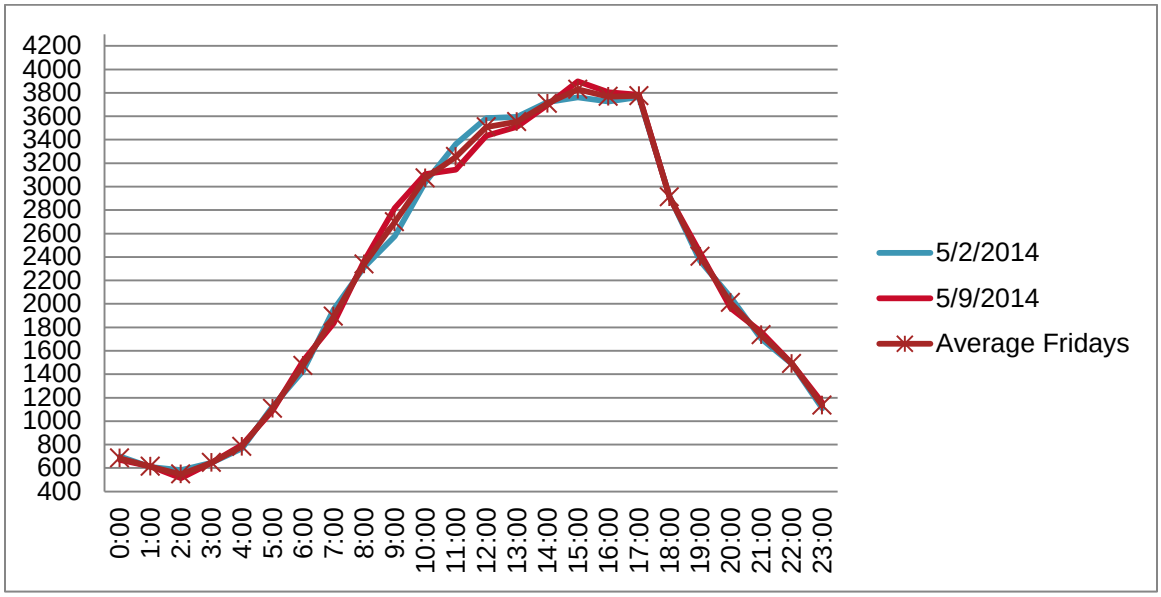
Figures 24 and 25 depict the Friday hourly traffic volumes along I-10 through the San Gorgonio Pass observed during the Focus Period on May 2, 2014 and May 9, 2014. Fridays during the Focus Period were analyzed to determine how peak traffic volumes differ from those during the weekdays. While weekdays showed clear commute directionality (morning peaks in the eastbound direction and evening peaks in the westbound direction), Fridays show multiple peaks in the eastbound direction: a morning commute peak, and early afternoon and evening peaks, presumably by visitors en route to Coachella Valley and points east. The westbound direction shows a more consistent peak in line with weekday commutes.

Figure 24. I-10 Eastbound Friday Hourly Traffic Volumes, Focus Period (vehicles)



Source: Caltrans Performance Measurement System

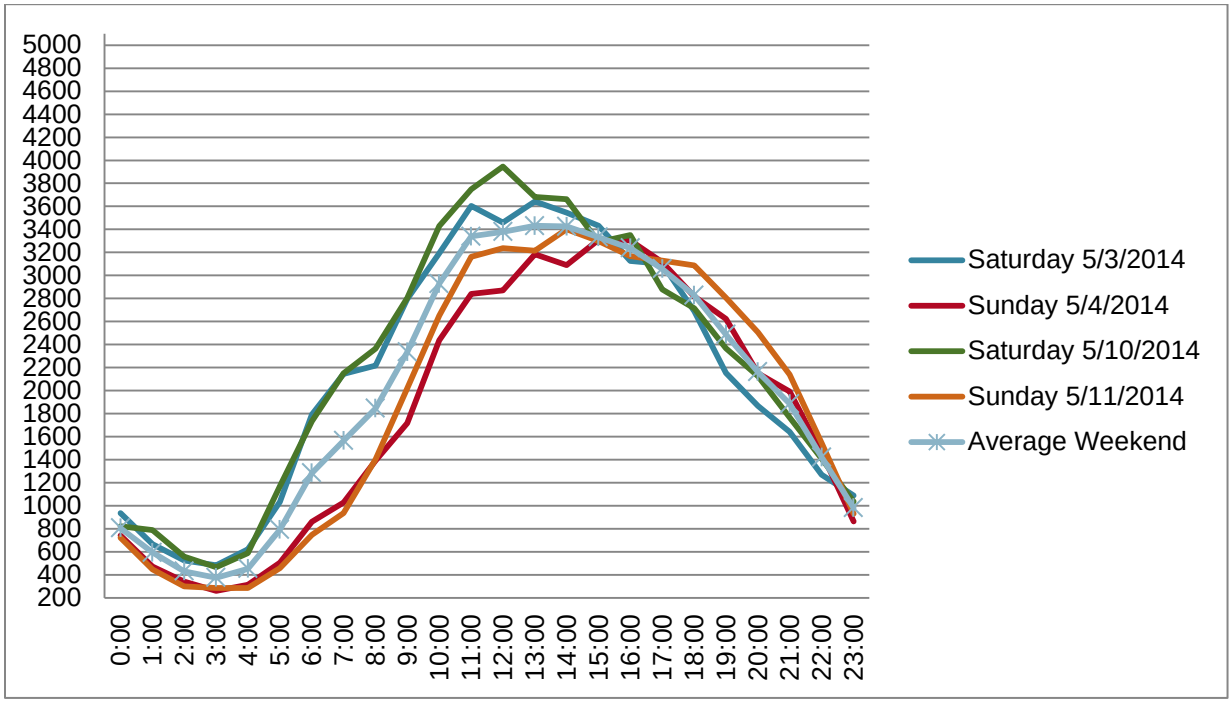
Figure 25. I-10 Westbound Friday Hourly Traffic Volumes, Focus Period (vehicles)



Source: Caltrans Performance Measurement System

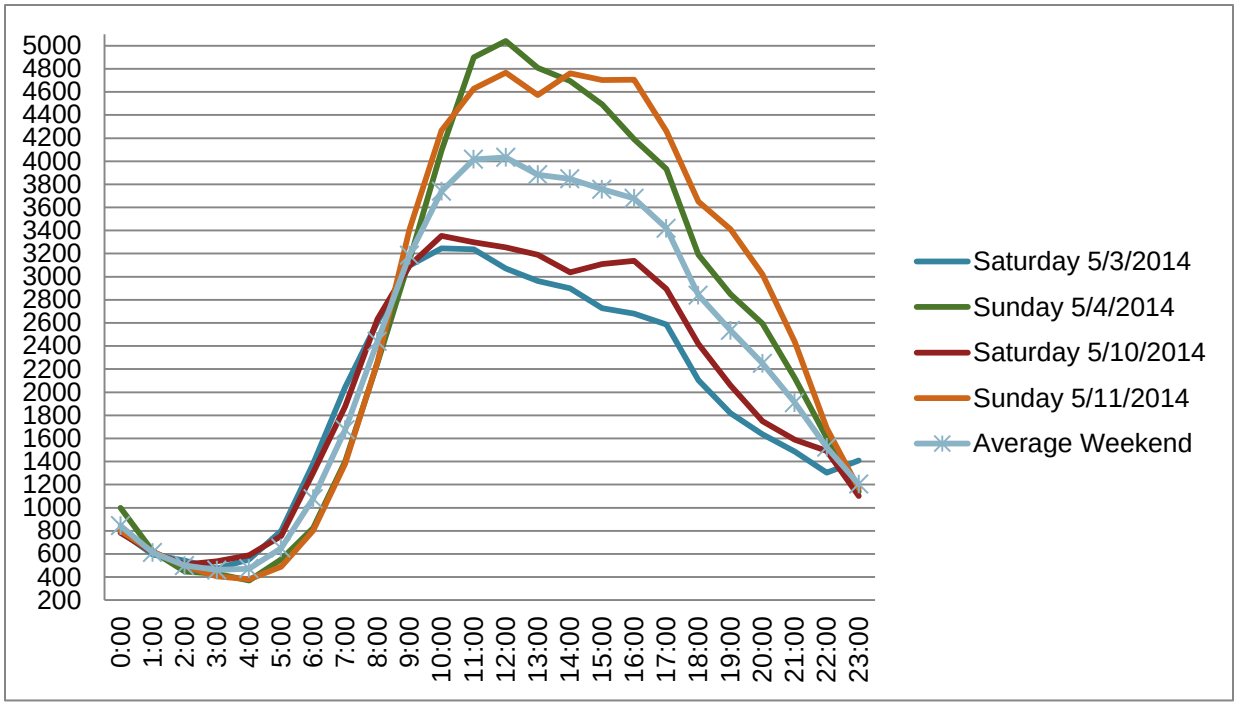
Figures 26 and 27 depict the weekend (Saturday and Sunday) traffic volumes along the I-10 through the San Gorgonio Pass at hourly intervals during the Focus Period between May 3, 2014 and May 11, 2014 in both eastbound and westbound directions. Traffic volumes peaked at midday in both directions during this period, with higher eastbound volumes on Saturday and higher westbound volumes on Sunday.

Figure 26. I-10 Eastbound Hourly Weekend Traffic Volumes, Focus Period (vehicles)



Source: Caltrans Performance Measurement System

Figure 27. I-10 Westbound Hourly Weekend Traffic Volumes, Focus Period (vehicles)



Source: Caltrans Performance Measurement System

2.3.3 Origin-Destination Patterns

To analyze the regional travel patterns of trips between the Coachella Valley and the Los Angeles Basin, mobile phone data was obtained from AirSage for users traveling through the San Gorgonio Pass, and used to determine origins and destinations of travelers going through the San Gorgonio Pass. Tables 12 and 13 show the number of person-trips into and out of the Coachella Valley by county. In addition, several maps have been prepared to illustrate the origin-destination patterns on different days during the Focus Period. In Figures 28 through 34, the distribution of the Coachella Valley end of the trips (either the origin or the destination) is shown in blue, while the distribution of the Los Angeles Basin end of the trips (either the origin or destination) is shown in red. Each figure depicts travel distribution in only one direction (eastbound or westbound). The numbers on the maps indicate the number of trips in thousands to or from that area, and the various shades of red and blue are used to indicate the percentage of total trips through the San Gorgonio Pass that start or end in that area.

Table 12. Distribution of Person-Trips into Coachella Valley (Eastbound)

Origin County	Weekday	Typical Friday	Saturday	Peak Friday
Ventura	1,517 2%	2,684 2%	2,814 2%	7,164 4%
Los Angeles	19,526 25%	36,048 31%	44,836 38%	86,600 46%
Orange	9,332 12%	16,047 14%	19,337 16%	25,906 13%
San Bernardino	16,186 21%	21,220 19%	19,086 16%	26,927 14%
Riverside	31,185 40%	38,444 34%	32,632 27%	42,987 23%
Total	**77,746**	**114,443**	**118,705**	**189,584**

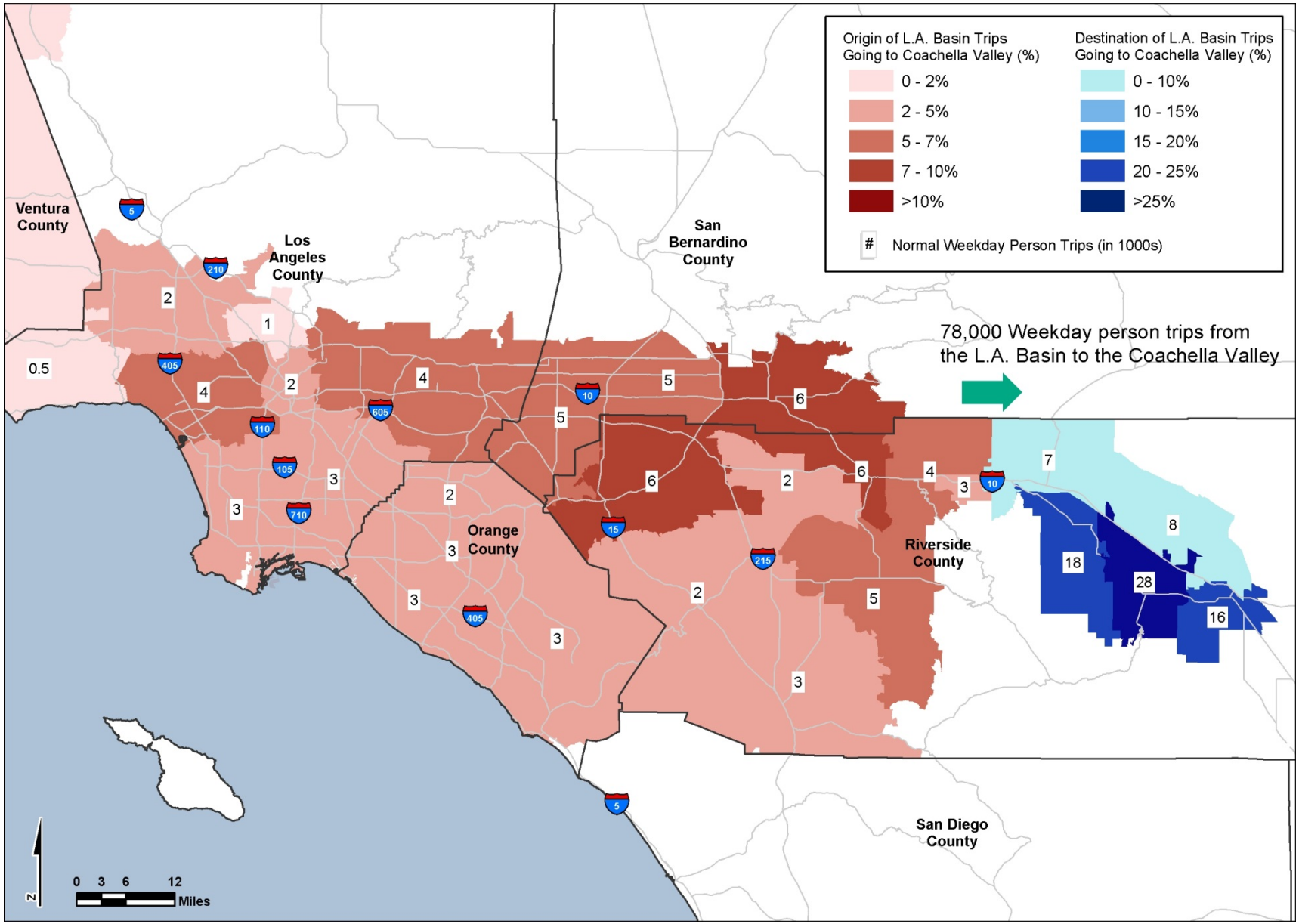
Source: AirSage, 2014: Note: AirSage data for typical Sunday was not obtained as the distribution falls within range indicated for typical Friday/Saturday

Table 13. Distribution of Person-Trips leaving Coachella Valley (Westbound)

Origin County	Weekday	Typical Friday	Saturday	Peak Friday
Ventura	1,570 2%	2,671 2%	3,094 3%	5,283 3%
Los Angeles	18,756 24%	32,303 30%	41,027 37%	66,193 42%
Orange	9,312 12%	18,150 17%	18,804 17%	24,004 15%
San Bernardino	16,002 21%	18,924 17%	18,202 16%	21,452 14%
Riverside	31,635 41%	37,087 34%	30,115 27%	40,701 26%
Total	**77,275**	**109,135**	**111,242**	**157,633**

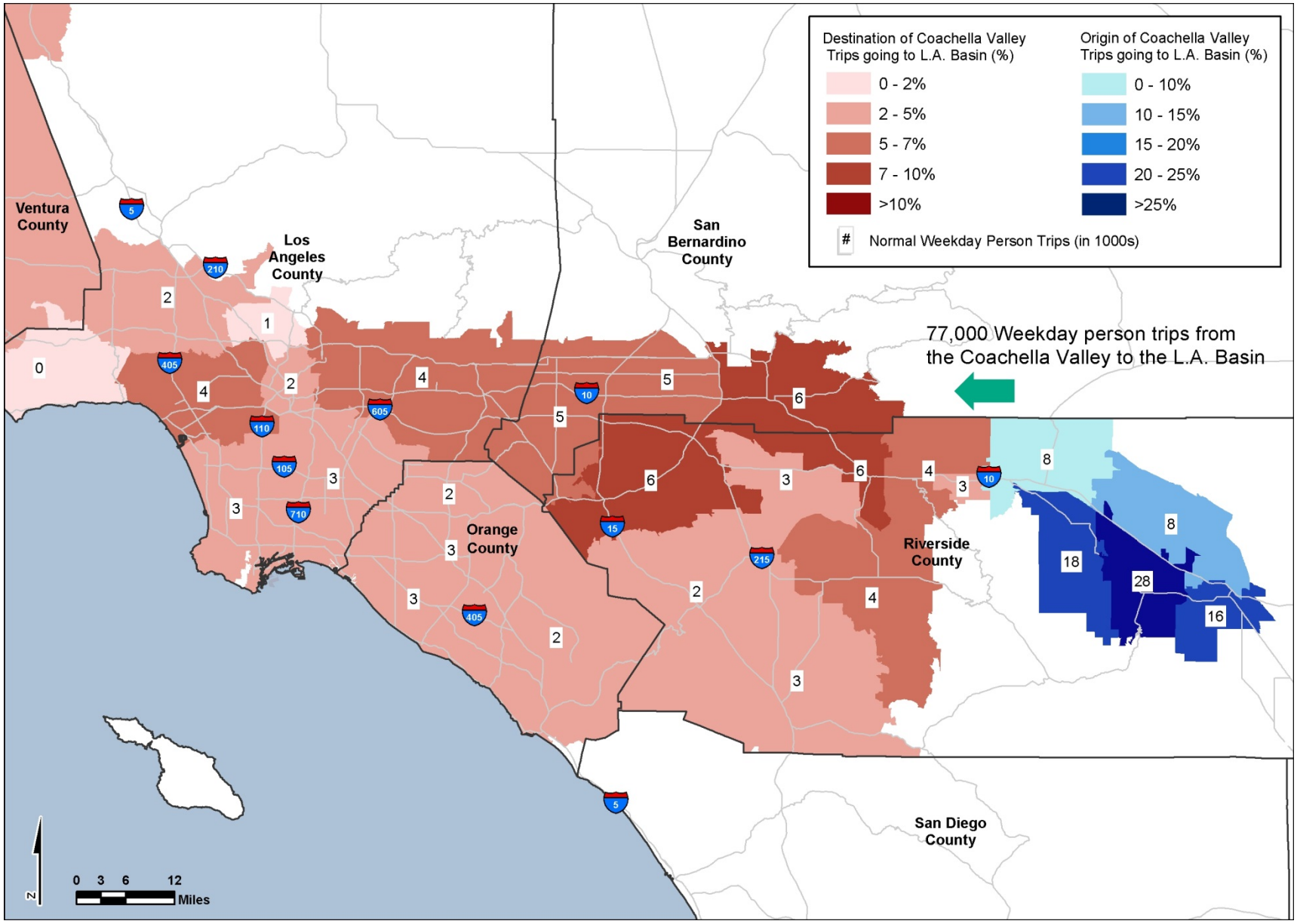
Source: AirSage, 2014 Note: AirSage data for typical Sunday was not obtained as the distribution falls within range indicated for typical Friday/Saturday

Figure 28. Normal Weekday Trips into Coachella Valley



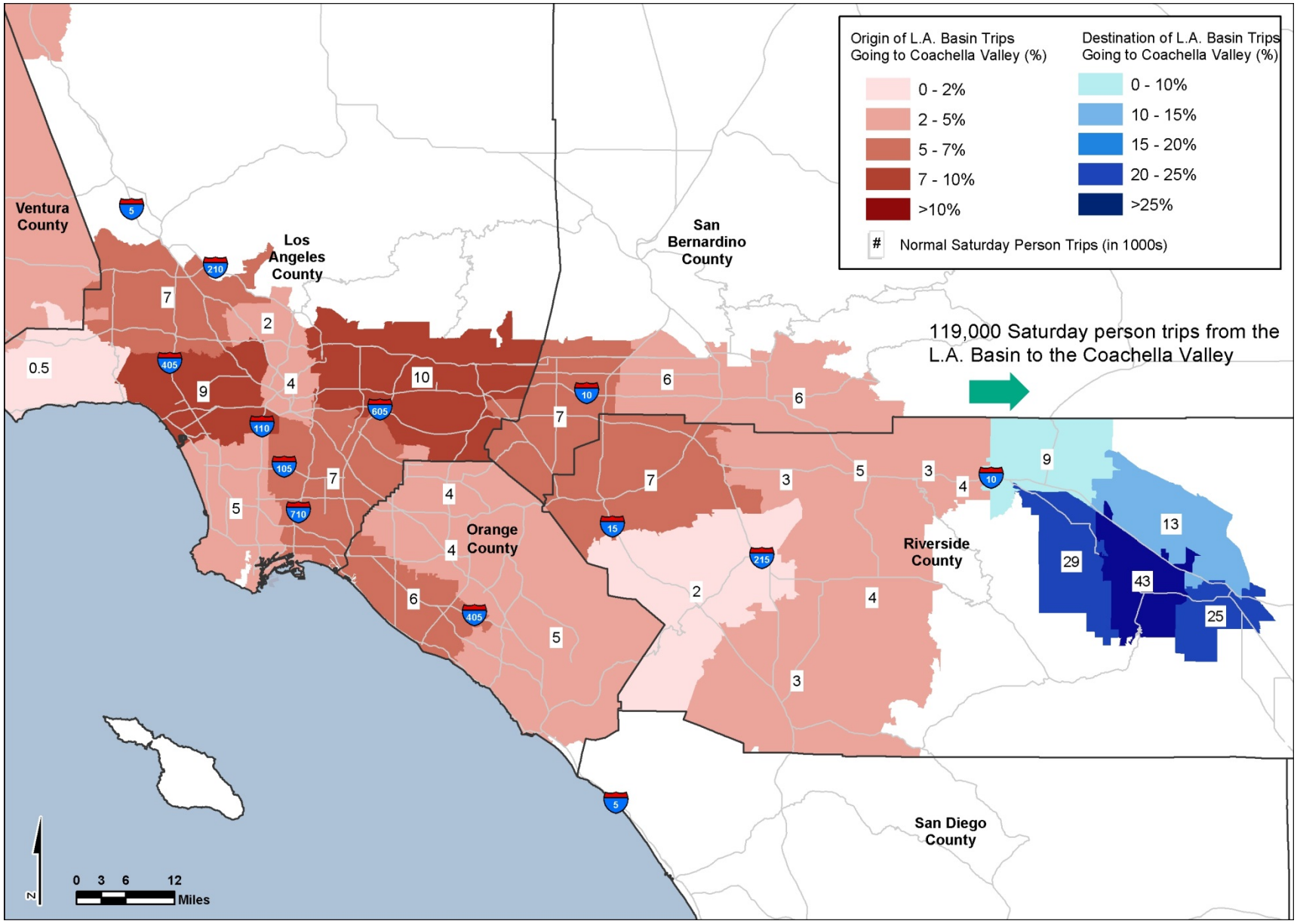
Source: AirSage, 2014

Figure 29. Normal Weekday Trips out of Coachella Valley



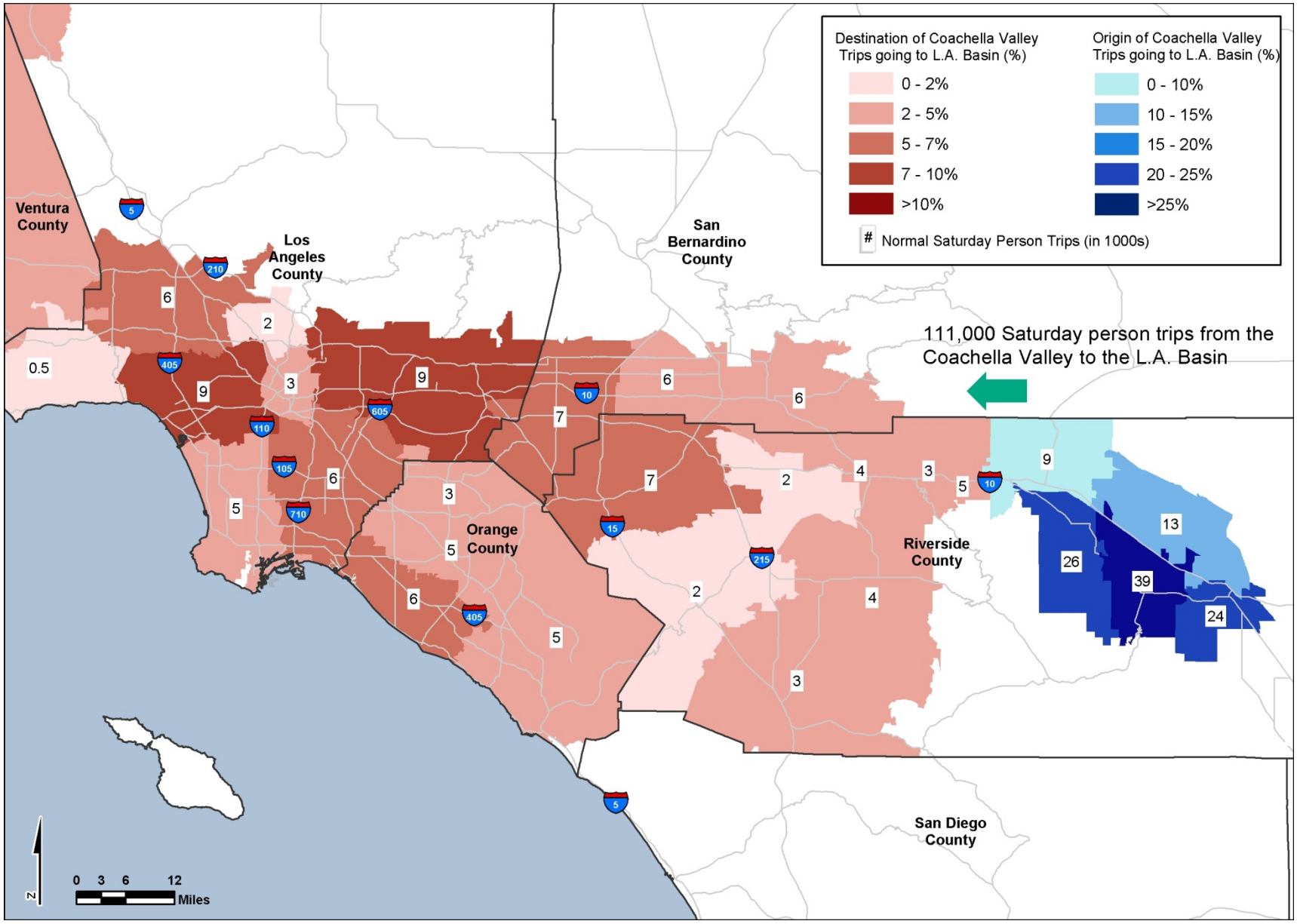
Source: AirSage, 2014

Figure 30. Normal Saturday Trips into Coachella Valley



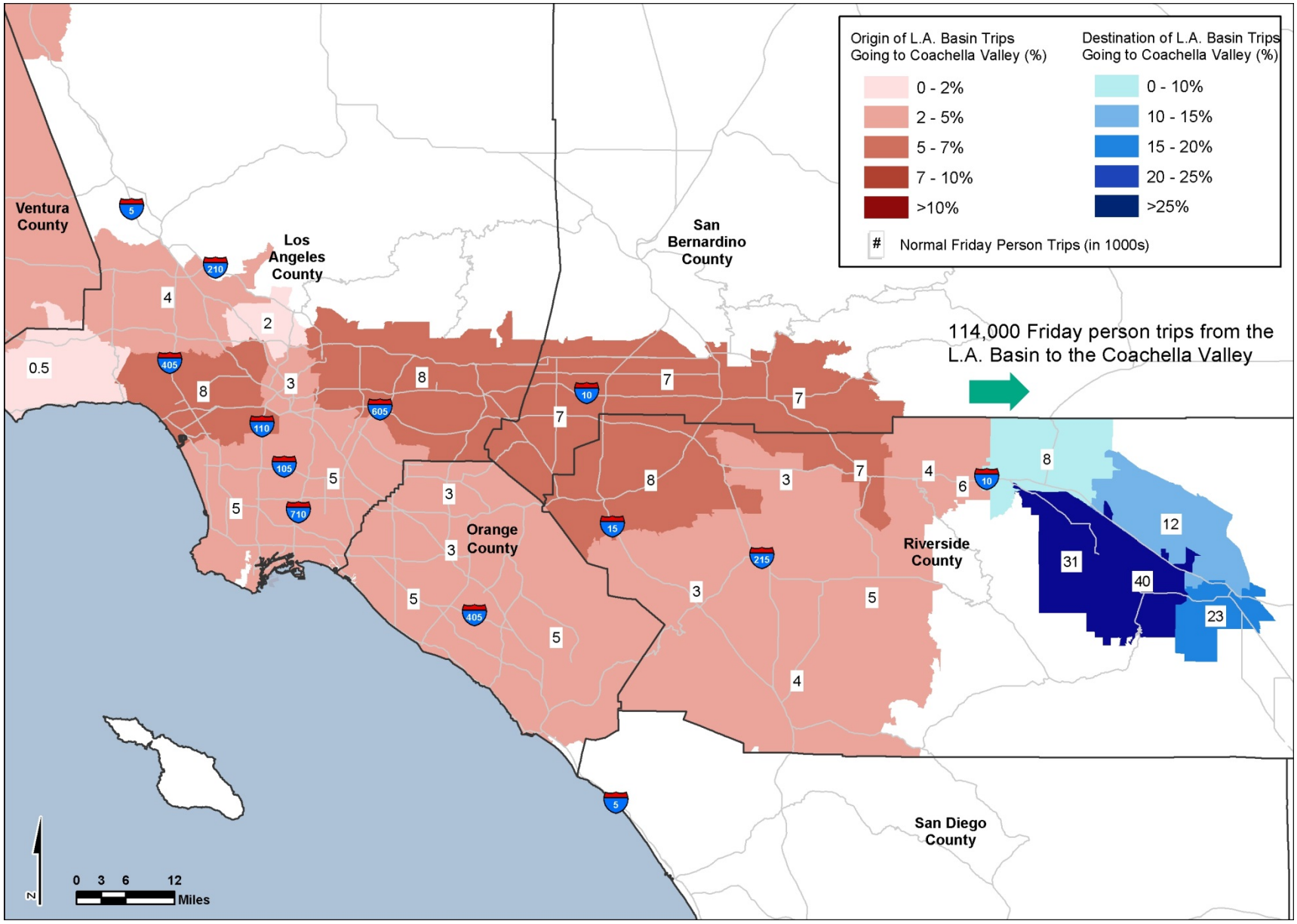
Source: AirSage, 2014

Figure 31. Normal Saturday Trips out of Coachella Valley



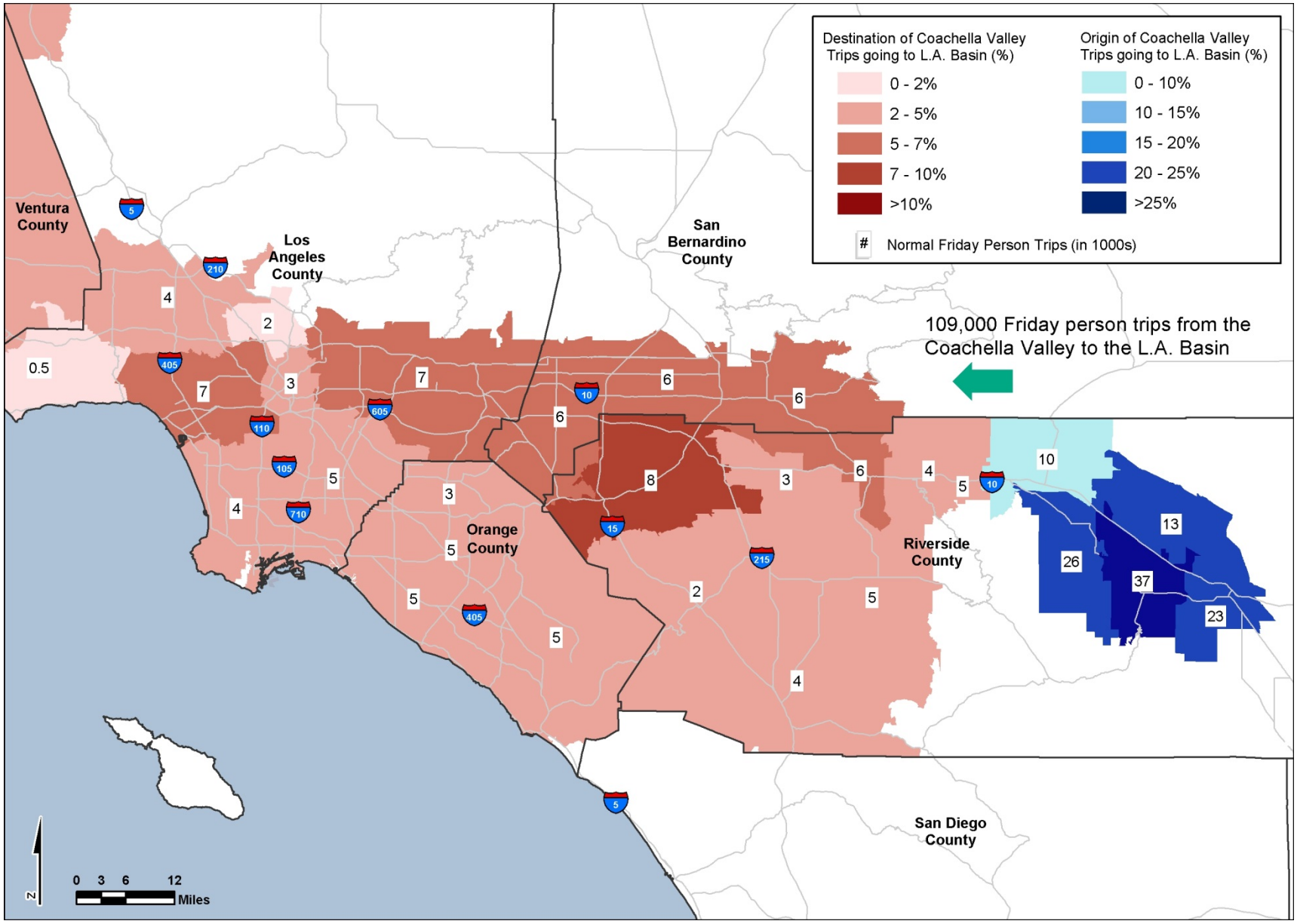
Source: AirSage, 2014

Figure 32. Normal Friday Trips into Coachella Valley



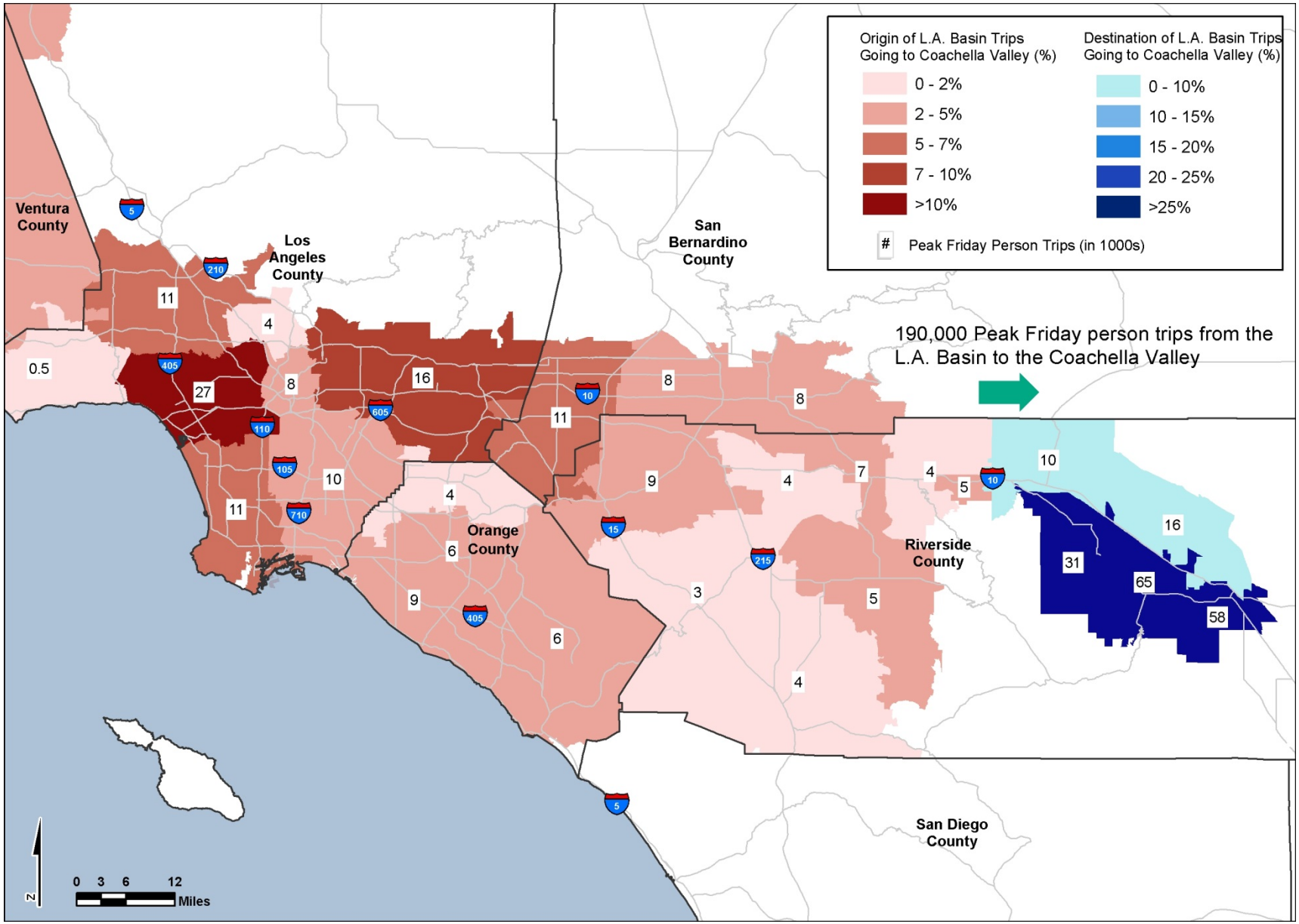
Source: AirSage, 2014

Figure 33. Normal Friday Trips out of Coachella Valley



Source: AirSage, 2014

Figure 34. Peak Friday Trips into Coachella Valley



Source: AirSage, 2014

Figures 28 through 34 show the distribution of trips traveling through the San Gorgonio Pass on different days during the Focus Period. Figures 28 and 29 illustrate the distribution of typical weekday trips, when the majority of trips originate or terminate in the Inland Empire, a regional term for portions of the combined Riverside and San Bernardino counties and a sub-set of the larger Los Angeles Basin geographic area. Figures 30 and 31 show typical Saturday trips, and indicate a higher proportion of travel to the San Gabriel Valley and West Los Angeles. Normal Friday trips, shown in Figures 32 and 33, are spread throughout the Inland Empire, San Gabriel Valley, and West Los Angeles. On the peak Fridays studied during this analysis (Easter weekend and the Coachella Festival), the highest concentration of trips into the Coachella Valley came from West Los Angeles and the San Gabriel Valley, as shown in Figure 34.

2.3.4 Trip Purposes

Data on the purpose of Corridor trips can be used to evaluate the relative importance of commute travel through the San Gorgonio Pass, and was obtained from three sources: the SCAG regional travel demand forecast model, the AirSage data for weekday trips during the Focus Period and the market analysis for the 2013 California State Rail Plan. While the reference studies and data show variability on home-to-work commute trips as a percent of total weekday trips, all demonstrate that a variety of reasons exist for people travelling throughout the Corridor, and accordingly, it operates as a multi-purpose corridor and not primarily as a commuter corridor.

For instance, the SCAG model provided estimates of the number and origin/destination of weekday commute trips between the Coachella Valley and the Los Angeles Basin, as well as the direction of travel (identifying the “home” end of the trip and the “work” end) (SCAG Model, Base Year (2008) trip data). Table 14 shows the weekday trips to and from the Coachella Valley. The SCAG model estimates that on a normal weekday, a total of 13,755 commute trips travel between the Coachella Valley and the Los Angeles Basin, representing approximately 39% of total weekday trips. The majority (74%) of the commute trips to the Coachella Valley are from Western Riverside County. The commute trips originating in the Coachella Valley are more widely distributed with 42% to Western Riverside County, 22% to the San Bernardino County Valley area, and 18% to Los Angeles County.

Comparatively, AirSage identifies commute trips by cell phone movement patterns that stay in one place overnight and then travel during the day to another location where it stays for several hours. The AirSage data in Table 15 indicate a similar total number of daily commute trips to that estimated by SCAG. The AirSage one-way trip volume of 12,710 trips occurs during the AM peak period, whereas the SCAG estimate of 13,755 one-way trips covers the entire day. Extrapolation of the AirSage data shows commute trips constitute around 29% of total weekday trips between the Coachella Valley and the Los Angeles Basin. Additionally, AirSage indicates a greater number of commute trips starting in the Los Angeles Basin and traveling to work in the Coachella Valley, which is consistent with the hourly traffic patterns observed with the PeMS data for I-10 discussed in Section 2.3.2.

Table 14. Weekday Commute Trips between the Coachella Valley and Los Angeles Basin: SCAG

		Weekday Home-to-Work Trips (one-way)			
		Coachella Valley Work End		Coachella Valley Home End	
		#	%	#	%
Trips to/from:	Orange County	85	2%	1,166	14%
	Los Angeles County	213	4%	1,499	18%
	Western Riverside County	4080	74%	3,464	42%
	San Bernardino County -- Valley Area	938	17%	1,820	22%
	Victor Valley	212	4%	201	2%
	Ventura County	12	0%	67	1%
	Total	**5,540**	**101%***	**8,217**	**100%**

Source: SCAG Model, Base Year (2008) trip data *Total percentage exceeds 100% due to rounding

Table 15. Weekday Commute Trips between the Coachella Valley and Los Angeles Basin: AirSage

		Weekday AM Peak Home-to-Work Trips (one-way)			
		Coachella Valley Work End		Coachella Valley Home End	
		#	%	#	%
Trips to/from:	Orange County	681	9%	815	15%
	Los Angeles County	1,319	18%	1,589	30%
	Western Riverside County	4,217	57%	1,962	37%
	San Bernardino County – Valley Area	1,122	15%	885	17%
	Ventura County	70	1%	51	1%
	Total	**7,409**	**100%**	**5,302**	**100%**

Source: AirSage trip data for 4/29/14-5/14/14

Furthermore, a market analysis prepared for the 2013 California State Rail Plan estimated that 27% of the trips in the Coachella Valley Corridor involve travel for business or commute purposes, and due to the changing demographics in the Corridor this percentage would increase to 30% by 2030. Table 16 compares Coachella Valley Corridor trip purposes with those for travel in the southern portion of the Pacific Surfliner Corridor (LAUS to San Diego), to illustrate the similarity in trip purpose characteristics of the two travel corridors.

Table 16. Existing and Forecast Coachella Valley Corridor Trip Purpose (2000 to 2030)

	Coachella Valley		Pacific Surfliner South	
Trip Purpose	2000	2030	2000	2030
Business/Commute	27%	30%	30%	31%
Recreation/Other	73%	70%	70%	69%

Source: CSRP Market Analysis, March 19, 2012

2.3.5 Future Travel Demand Growth

The Corridor's existing travel market is substantial, with more than 58 million daily person trips in the four-county area, and projections for 10 million additional daily trips by 2035. The current volume of travel through the San Gorgonio Pass is approximately 130,000 daily person trips, and is projected to increase by 47 percent by 2035 (SCAG 2012 RTP/SCS).

Table 17 identifies the total daily person trips for all travel modes between the Coachella Valley and the five counties to the west (does not include trips through the San Gorgonio Pass that come from the High Desert, I-10, and the Imperial Valley), and Table 18 presents the projected rate of growth.

Table 17. Total Daily Person Trips for All Travel Modes between the Coachella Valley and the Los Angeles Basin

	Los Angeles	Orange	Ventura	San Bernardino	Riverside (West)	Total Daily Trips
2008	10,952	6,209	419	17,175	35,194	**69,949**
2035	15,507	8,089	637	27,903	50,778	**102,914**

Source: SCAG 2012 RTP/SCS all travel modes

Table 18. Percent Growth in Total Daily Person Trips for All Travel Modes between the Coachella Valley and the Los Angeles Basin (2008 to 2035)

	Los Angeles	Orange	Ventura	San Bernardino	Riverside (West)	Total Daily Trips
Riverside (Coachella Valley)	42%	30%	52%	62%	44%	**47%**

Source: SCAG 2012 RTP/SCS all travel modes

2.3.6 Key Points: Travel Volumes and Trip Patterns

A strong travel demand connection exists between the Coachella Valley and the Los Angeles Basin – every day 130,000 people travel between the two regions, and that number increases on weekends. As the Los Angeles Basin population continues to increase and the Coachella Valley is expected to experience even greater population growth, the connection will become even stronger, with a projected 47% increase in travel over the next 20 years.

- On a typical weekday, 130,000 people travel through the San Gorgonio Pass, with just over half (55%) of the trips having their eastern terminus in the Coachella Valley. The remaining trips have their eastern terminus either in the High Desert areas of Yucca Valley and Twentynine Palms (14%), east to Blythe and Arizona (27%), or south to the Imperial Valley (4%). (SCAG Model, Base Year (2008) trip data)
- The trips encompass a variety of purposes, with work commute trips representing between 29% - 39% of the weekday travel total trips between the Coachella Valley and the Los Angeles Basin. (SCAG Model, Base Year (2008) trip data; AirSage trip data for 4/29/14-5/14/14)

- Nearly two-thirds of weekday commute and business trips through the San Gorgonio Pass travel between the Coachella Valley and the Inland Empire. (AirSage trip data for 4/29/14-5/14/14)
- Weekday travel through the San Gorgonio Pass exhibits a modest bi-directional commuter peaking pattern, with the eastbound peak occurring from 7-8 AM and the westbound peak from 3-4 PM. On Fridays the peak travel hours typically occur in mid to late afternoon (2-5 PM). On weekends, the peak typically occurs in the middle of the day (11 AM – 1 PM). (Caltrans PeMS data, June 2014)
- Leisure and social/recreational trips increase the Corridor travel flows on weekends, with 45% more trips made through the San Gorgonio Pass on a typical Friday than a typical midweek day. As a result, Friday afternoon is the peak travel day for eastbound trips, and Sunday midday is the peak travel day for westbound trips. (Caltrans PeMS data, June 2014)
- Weekday trip patterns to and from the Coachella Valley are primarily oriented to the Inland Empire, which represents 61% of the daily travel volume, while Los Angeles County has 25% and Orange County 12%. Weekend trips include a greater percentage traveling longer distances – the Inland Empire drops to 53% of the trips, while Los Angeles County increases to 31% and Orange County to 14%. (AirSage trip data for 4/29/14-5/14/14)
- Corridor weekday travel is projected to increase by 47% by the year 2035, with a higher percentage growth in trips to San Bernardino and Western Riverside Counties. (SCAG 2012 RTP/SCS)

2.4 Transportation System Performance

2.4.1 Regional Highway Congestion

Figure 35 illustrates the areas of recurring weekday congestion (in either the eastbound or westbound directions) on I-10 and other regional freeways, which primarily occur in the western half of the Corridor, while the eastern half is relatively congestion-free unless an incident closes lanes.

Figure 35. Areas of Recurring Weekday Congestion

Source: PeMS, Caltrans, Accessed: 10/28/2014

Appendix A contains “heat maps” which figures denote the average observed speeds in the eastbound direction along the Corridor, as reported by PeMS, and provide a visual representation of where congestion occurs, how slowly the traffic is moving, and how long the congestion lasts (purple, blue, and black shading indicate slower speeds and increasing congestion).

In summary, the Eastbound I-10 has congested areas between Alhambra and Pomona during typical weekday afternoons, with longer durations and slower speeds on Friday afternoons. The eastern half of the Corridor has minimal areas with reduced speeds throughout the day on typical weekdays and Fridays. Saturdays show some congested areas in the western half of the Corridor and no congestion in the eastern half.

For the sake of comparing typical conditions with worst-case conditions, congestion charts were obtained from PeMS for the peak weekend that in 2014 included Easter and the Coachella Festival (included in Appendix A). I-10 eastbound speeds on the Friday leading into the peak weekend show a pattern of congestion similar to the normal Friday. Westbound I-10 travel speeds on the Monday following the Coachella Festival show that traffic is particularly congested between Indio and Banning through most of the morning and afternoon, with congestion present from 9:00 am to 6:00 pm. In the western half of the Corridor, westbound I-10 exhibits typical commute congestion between Pomona and Alhambra in the morning hours, as well as periodic slowing in several areas at different times throughout the afternoon.

Much of the SR-60 is congested from East Los Angeles to Rowland Heights, from Pomona to East Ontario, and from Rubidoux to Moreno Valley on normal weekday afternoons. On normal Fridays the congestion through these areas intensifies. The eastbound SR-91 is congested for much of its length from North Long Beach to Anaheim and from Orange to Riverside during most of the afternoon on normal weekdays and Fridays.

2.4.2 Travel Times

Table 19 shows typical driving times between Indio and four cities in the Los Angeles Basin: Los Angeles, Fullerton, Chino, and Claremont. These cities are sample locations near the Corridor’s three key highways: I-10, SR 60, and SR 91. The data indicate substantial variability in travel times depending on day of week, time of day, and direction of travel. Data was obtained from three sources: Caltrans PeMS, Google Maps, and TomTom. Caltrans PeMS collects traffic data from over 39,000 detectors across the state of California and archives the information for ten years. Google Maps calculates driving times based on a variety of data including official and recommended speed limits, historical average speed data, actual travel times from previous users, and real-time traffic information. TomTom operates a database of more than nine trillion anonymously collected data points that allows the software to predict driving behavior across the road network.

Table 19. Typical Driving Times for Selected Trips (minutes)

Origin	Destination	Source	Weekday (4/29)		Friday (5/2)		Saturday (5/3)
			AM Peak (7:00 AM)	PM Peak (5:00 PM)	AM Peak (7:00 AM)	PM Peak (5:00 PM)	Midday (noon)
Los Angeles	Indio	*PeMS*	114	139	112	165	119
		Google Maps	120 - 150	120 - 200	120 - 150	120 - 200	120 - 150
		TomTom	120	142	120	146	118
Indio	Los Angeles	*PeMS*	141	114	130	119	116
		Google Maps	120 - 200	120 - 150	120 - 160	120 - 150	120 - 160
		TomTom	127	120	121	121	117
Fullerton	Indio	*PeMS*	89	110	90	116	98
		Google Maps	110 - 140	110 - 180	110 - 130	110 - 190	110 - 130
		TomTom	112	128	112	130	110
Indio	Fullerton	*PeMS*	114	94	124	95	103
		Google Maps	110 - 160	110 - 130	110 - 140	110 - 130	110 - 140
		TomTom	116	113	112	113	109
Chino	Indio	*PeMS*	75	81	75	85	77
		Google Maps	85 - 110	85 - 150	85 - 110	85 - 150	85 - 110
		TomTom	89	100	90	102	88
Indio	Chino	*PeMS*	82	76	80	76	76
		Google Maps	85 - 120	85 - 110	85 - 110	85 - 110	85 - 110
		TomTom	93	90	91	91	87
Claremont	Indio	*PeMS*	85	88	84	96	85
		Google Maps	90 - 110	90 - 140	90 - 110	90 - 150	90 - 110
		TomTom	92	99	92	104	99
Indio	Claremont	*PeMS*	89	86	85	88	84
		Google Maps	90 - 120	90 - 110	90 - 110	90 - 110	90 - 110
		TomTom	94	93	92	93	99

Source: PeMS, Caltrans, Accessed December 15, 2014; Google Maps, accessed August 10, 2015; TomTom (http://routes.tomtom.com), accessed August 10, 2015

Existing travel times using rail and transit can be much longer than highway travel because the trip is indirect, involves intermediate stops, and may require mode transfers. Table 20 illustrates each existing service's current travel time between Los Angeles and the Coachella Valley / San Gorgonio Pass Area. Trip times were calculated assuming that Metrolink service is used for the

portion of the SunLine and Beaumont trips between Downtown Los Angeles and the respective western bus route terminus.

Table 20. Travel Times Using Rail and Transit (minutes)

	Western Terminus	Eastern Terminus	Travel Time (minutes)
Sunset Limited	Los Angeles	Palm Springs	156
Amtrak Thruway	Los Angeles	Indio	240
SunLine CL 220 + Metrolink	Los Angeles	Palm Desert	234
Beaumont CL 120 + Metrolink	Los Angeles	Beaumont	145
Greyhound	Los Angeles	Indio	240

Notes: The Sunset Limited stops in Palm Springs with no connecting services to Indio. The SunLine Commuter Link 220 eastern terminus is in Palm Desert. The Beaumont Commuter Link 120 eastern terminus is in Beaumont. The SunLine + Metrolink and Beaumont + Metrolink travel times include transfer and waiting time.

Source: Amtrak, June 2014; SunLine Transit Agency, June 2014; City of Beaumont, June 2014; SCRRA, June 2014; Greyhound, June 2014

2.4.3 Rail and Bus Ridership

Amtrak Sunset Limited

In 2013, approximately 2,000 riders embarked or disembarked at the Palm Springs station, which is an average of six passengers per long-distance passenger train (Amtrak, 2013).

SunLine and Beaumont

According to the SunLine FY2014 Short Range Transportation Plan, Route 220 carried 17,850 passengers in 2013 on two vehicles for a total of 116,918 passenger miles and 2,358 revenue hours or approximately 70 riders per day. Beaumont's Commuter Link Route 120 carried 8,350 annual passengers, or approximately 33 passengers per day (City of Beaumont Transit).

Amtrak Thruway

According to the Caltrans Division of Rail and Amtrak, ridership on Thruway routes in the Coachella Valley was 22,339 people during fiscal year 2013, or approximately 88 riders per day. Of those riders, 79% used the service to access the Pacific Surfliner in Fullerton, and 21% used it to access the San Joaquin in Bakersfield. (Caltrans and Amtrak, 2014)

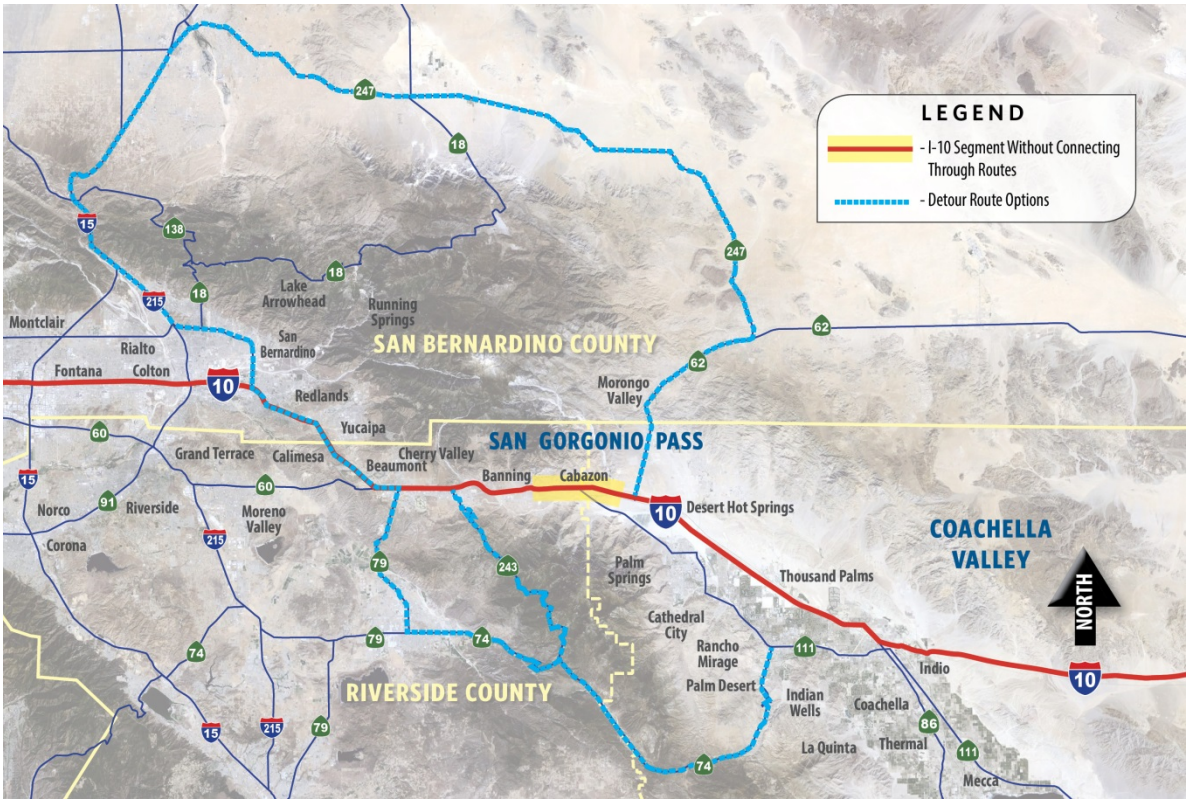
2.4.4 I-10 Emergency Closures

Since I-10 is the only road through the San Gorgonio Pass, Corridor travel is susceptible to significant disruption if an incident closes the roadway for any period of time. In the past ten years, four separate incidents in the San Gorgonio Pass have disrupted travel for several hours, as reported in the Los Angeles Times (Los Angeles Times, accessed June 2014):

- **June 2005:** A high-speed pursuit of a homicide suspect led to gunfire and a 12-hour shutdown of the freeway near Cabazon. Stranded drivers slept in their cars while others needed medical attention due to the heat.
- **December 2010:** A fatal collision involving a big rig and a spill of fertilizer and diesel oil near Whitewater closed I-10 for six hours.
- **February 2012:** A broken computer system led to a delay in concrete slabs needed for lanes that were ground up during repaving. Three of the four westbound lanes were closed for almost a full day, leading to a 25-mile backup in Banning and traffic spilling into Palm Springs.
- **September 2014:** A fiery big rig crash shut down westbound I-10 east of Cabazon. Three of the four westbound lanes were closed all morning.

Figure 36 illustrates the reliance of drivers on I-10 through the San Gorgonio Pass, as no parallel highways exist to I-10 through Beaumont, Banning and Cabazon, and the only alternative routes are difficult with lengthy detours. For example, facing an I-10 closure between Beaumont and Banning, a driver bound for Indio could detour south to SR 74, through the mountains and reach Indio in approximately 2 hours, travelling 80 miles. The direct route via I-10 is typically 46 minutes and 50 miles. The lack of redundancies in the roadway network through the San Gorgonio Pass offers limited driving alternatives.

Figure 36. I-10 Corridor San Gorgonio Pass Detour Alternatives



Local agencies, led by Riverside County, are exploring possibilities of developing an emergency bypass route by connecting and improving several existing local road segments that parallel I-10 through the Pass. Figure 37 illustrates the proposed improvements for the I-10 Emergency Action Plan. When completed, the bypass route would provide a two-lane route of connected roads linking eastern Banning to northern Palm Springs that could carry through traffic (in limited volumes) if I-10 was shut down. Portions of the bypass route are immediately adjacent to I-10 so it is possible that both I-10 and the emergency alternate route could be unavailable if an incident closed both the freeway and the adjacent road.

2.4.5 Key Points: Transportation System Performance

- For interregional travel between the Coachella Valley and the Los Angeles Basin, limited options to driving exist, so people without an available vehicle have limited ability to travel between the regions.
- The existing bus and rail alternatives have long travel times, require transferring between modes, and do not operate seven days a week. Typical driving times between Indio and Los Angeles range from 112 minutes during off-peak times to 200 minutes during afternoon peak hours. The same trip using existing rail or bus services takes about 240 minutes. (PeMS, Caltrans, Accessed December 2014; Google Maps, accessed August 2015; TomTom (http://routes.tomtom.com), accessed August 2015; Amtrak, June 2014; Greyhound, June 2014)
- Recurring highway congestion in the western half of the Corridor lengthens the travel time and reduces travel time reliability for driving trips between the Coachella Valley and the Los Angeles Basin.
- The highways in the eastern half of the Corridor experience little regular recurring congestion.
- Emergency closures of I-10 through San Gorgonio Pass can severely disrupt Corridor travel, as I-10 is essentially the only transportation facility available to move people through the San Gorgonio Pass.

2.5 Key Findings of Market Analysis

The detailed Market Analysis of the Corridor studied demographics, existing transportation facilities and services, existing and future travel volumes, trip purposes and trip patterns, and how the transportation system performs both now and in the future. The Market Analysis empirical results are used as the basis for defining the project's Purpose and Need in Chapter 4.

Market Analysis Findings Identify Need for Transportation Improvements

A strong economic, demographic, and cultural connection exists between the Coachella Valley and the Los Angeles Basin – every day 130,000 people travel between the two regions, and that number increases on weekends. The Los Angeles Basin population continues to grow while the Coachella Valley is expected to experience rapid population growth so the connection will become even stronger with a projected 47% increase in travel over the next 20 years (SCAG 2012 RTP/SCS).

Figure 37. I-10 Emergency Action Plan Projects Map

Virtually all of the travelers between the Coachella Valley and the Los Angeles Basin travel on I-10 through San Gorgonio Pass because few alternatives to driving and few road route options to the freeway exist. Corridor travelers experience significant recurring highway congestion through many parts of the Corridor, and have limited public transportation alternatives: one Amtrak long-distance train, two commuter bus routes, one Amtrak Thruway bus that connects with the Pacific Surfliner train in Fullerton, and private intercity bus service operated by Greyhound. The lack of available transportation options leaves the Corridor underserved, and travel demand is expected to increase in the future. Transportation alternatives are needed to accommodate the increased travel throughout the region. While I-10 is likely to carry most of the trips through the San Gorgonio Pass, a new transit service offering a new mode choice could provide a valuable alternative to driving for Corridor travelers. Providing additional lanes to I-10 would provide more capacity to the corridor, but would not provide an emergency route or additional transit service. A new roadway is not a viable option because although it would provide an alternate route during I-10 emergencies, a new roadway would not meet the need for improved enhance regional transit service through the Corridor.

Regular and reliable transportation service offering travelers a new mode choice along the Corridor could serve business trips and personal travel during weekdays, and could provide travel options for resort visitors and vacationers and the numerous events that occur in Coachella Valley throughout the year. This service could also provide a transportation option for disadvantaged populations and other travelers who do not own an automobile.

The Corridor operates as a multi-purpose route, and not solely a commuter route. Based on the origins and destinations information presented in Section 2.3.3, business and commuter trips comprise an important component of weekday travel, and a combination of social/recreational and visitor trips increases the travel volumes on Fridays and weekends. Analysis of weekday trip patterns shows that more than 60% of the travelers through the San Gorgonio Pass are moving between the Coachella Valley and the Inland Empire. On weekends that percentage is reduced and Los Angeles County travelers make up the difference (Caltrans PeMS data, December 2014).

In summary, the projected growth, existing travel patterns, freeway traffic congestion, and lack of travel mode options all suggest that a transit alternative to driving the I-10 corridor supports a need for a convenient, reliable, and affordable alternative to driving in the Coachella Valley-Los Angeles Corridor.

3 Outreach

This chapter describes the process for obtaining input from agencies, stakeholders, elected officials and the public. At the outset of the study process, the team developed a comprehensive outreach plan (Appendix B). The plan serves as the blueprint for community engagement in two distinct geographic areas. For areas in Riverside County the team worked closely with transportation agencies and other stakeholders including elected officials and the general public. For surrounding counties within the study area the team worked directly and exclusively with the transportation agencies and host railroads.

Public and agency involvement was an integral part of the Alternatives Analysis process. An outreach plan was developed at the outset of the study to provide multiple avenues of communication.

Key components of the outreach effort included:

- Engaging agency partners through Technical Advisory Committee (TAC) meetings
- Hosting stakeholder briefings for elected officials
- Hosting public outreach meetings using in-person and webcast formats
- Development and ongoing maintenance of a contact database
- Updating existing RCTC website pages and responding to inquires via the website
- Creation of fact sheets and frequently asked questions (FAQ) in English and Spanish
- An ongoing social media campaign on Facebook and Twitter

In particular, the outreach process obtained input from the TAC, the stakeholder meetings, and the public outreach meetings for identifying the Project's Purpose and Need and the range of alternatives to be studied. The Purpose and Need, Market Analysis findings, and screening methodology were reviewed by the TAC prior to moving forward into the screening process.

Another opportunity for resource agencies and the public to review route alternatives and the potential impacts associated with project implementation will be in the next phase during the public scoping periods and meetings conducted prior to preparation of the Tier 1 EIS/EIR process.

TAC Meetings

TAC meetings offer the opportunity for project partners and agency stakeholders to convene to discuss study direction, findings, and key milestones. Agencies invited to participate in the TAC are listed in Table 21.

Table 21. Invited TAC Members

Category	Partner Name
Agency Partners	Riverside County Transportation Commission (RCTC) (Lead)
	Coachella Valley Association of Governments (CVAG)
	San Bernardino Associated Governments (SANBAG)
	Los Angeles County Metropolitan Transportation Authority (Metro)
	Orange County Transportation Authority (OCTA)
	Southern California Regional Rail Authority (SCRRA) (Metrolink)
	Southern California Association of Governments (SCAG)
	California Department of Transportation (Caltrans), District 7
	Caltrans, District 8
	County of Riverside
	City of Riverside
	City of Palm Springs
	City of Rancho Mirage
	City of Indio
Federal / State Partners	Federal Railroad Administration (FRA)
	California State Transportation Agency (CalSTA)
	Caltrans Division of Rail
Rail / Transit Partners	LOSSAN (staffed by OCTA)
	Riverside Transit Agency (RTA)
	Pass Transit
	Omnitrans
	SunLine
Tribal Partners	Morongo Band of Mission Indians (BMI)
	Cabazon BMI
	Agua Caliente Band of Cahuilla Indians (BCI)
Participating Railroads	Union Pacific (UP)
	BNSF Railway (BNSF)
	Amtrak

Public Meetings

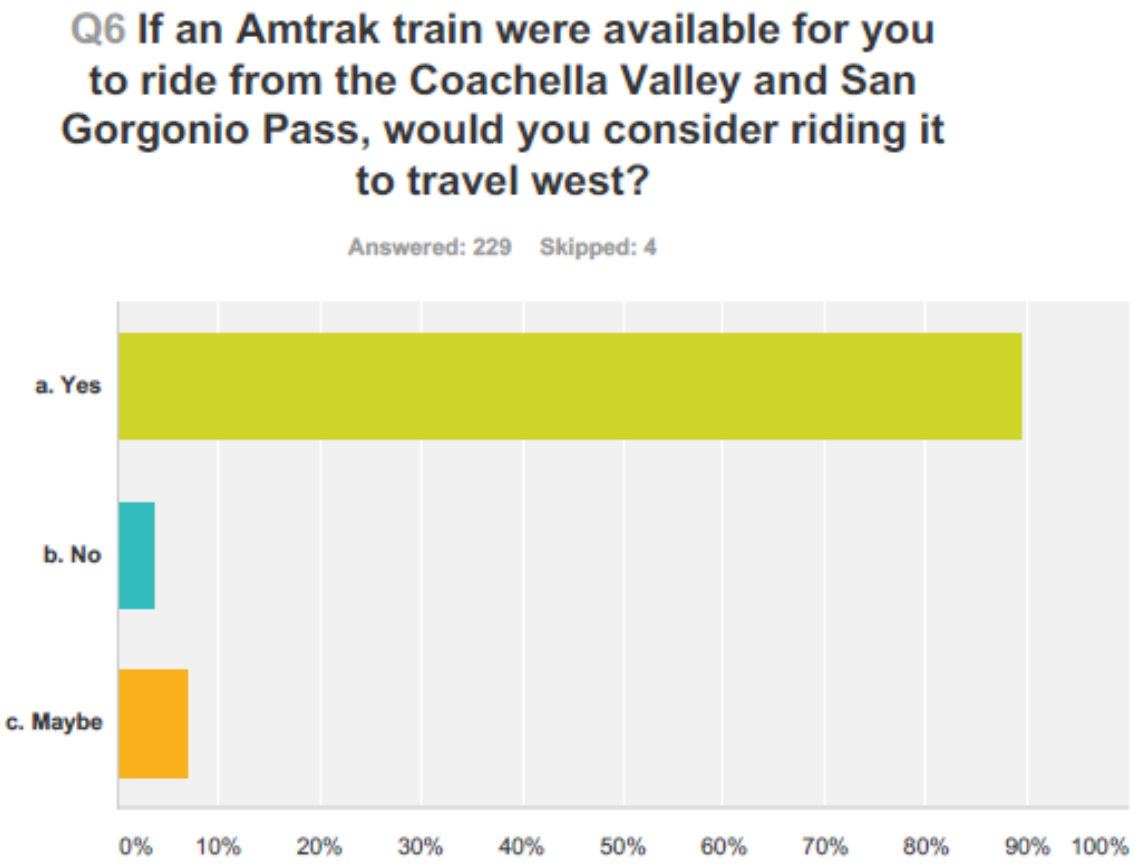
Two public meetings were held to solicit feedback about the Project's Purpose and Need. One meeting was held Monday, February 23, 2015, at Banning City Hall; the second meeting was held Thursday, February 26, 2015, at the Coachella Valley Association of Governments offices in Palm Desert. The February 26 meeting included a webcast option.

A variety of communication methods were used to invite visitors to the meetings, including mailings to the contact database and local cities / agencies, social media communications, advertisements in newspapers, a press release, updates to the RCTC and partner agency websites, and verbal announcements at RCTC meetings prior to the events.

While some attendees opted not to sign in at the registration table, the Banning meeting had 22 registrants, and the Palm Desert meeting had 75 registrants. The webcast had 56 participants. The webcast had an additional 98 views after the public meeting (as of April 3, 2015). After the meetings, the visitor contact information was added to the database; 88 were new additions to the database.

During both meetings, project team members worked to engage visitors in meaningful discussions about their existing travel patterns and future service needs. Exhibits were placed around the perimeter of the meeting rooms to prompt discussion between the team members and visitors. Written surveys were distributed to visitors during the meetings to request input about their travel patterns and potential future use of rail and transit service. The same survey was also available online during several months leading up to the meetings. Full survey results are shown in Appendix B. As an example, Figure 38 below illustrates that nearly 90% of respondents said they would utilize rail to travel west.

Figure 38. Public Meeting Survey Sample Question and Response



Stakeholder Briefings

During February and March 2015, briefings were conducted with 16 elected officials from the Coachella Valley and the San Gorgonio Pass Area, listed in Table 22. The goals of the briefings were to solicit stakeholder feedback about who they envision as the primary users of the service, major hurdles to be overcome, pros and cons of establishing the service and other key points or action items.

Table 22. Stakeholder Briefings

Elected Official	Briefing Date	Location
Brenda Knight, Mayor, City of Beaumont	February 11, 2015	Banning City Hall
Marion Ashley, Supervisor, Riverside County District 5	February 11, 2015	County Administrative Center
John Benoit, Supervisor, Riverside County District 4	February 17, 2015	Videoconference
Michael Wilson, Council Member, City of Indio	February 19, 2015	Teleconference
Ella Zanowic, Council Member, City of Calimesa	February 23, 2015	RCTC Offices
Debbie Franklin, Mayor, City of Banning	February 23, 2015	Banning City Hall
Jan Harnik, Council Member, City of Palm Desert	February 26, 2015	CVAG Offices
Iris Smotrich, Mayor, City of Rancho Mirage	February 26, 2015	CVAG Offices
Ted Weill, Council Member, City of Rancho Mirage	February 26, 2015	CVAG Offices
Doug Hanson, Council Member, City of Indian Wells	February 26, 2015	CVAG Offices
Glenn Miller, Council Member, City of Indio	February 26, 2015	CVAG Offices
Troy Strange, Council Member, City of Indio	February 26, 2015	CVAG Offices
Greg Pettis, Council Member, City of Cathedral City	March 5, 2015	Teleconference
Dana Reed, Council Member, City of Indian Wells	March 11, 2015	RCTC
Ginny Foat and Paul Lewin, Council Members, City of Palm Springs	March 12, 2015	Teleconference

The elected officials noted a number of likely system users: recreational travelers, commuters, youth and college students, medical patients, and seniors. The elected officials indicated a clear understanding of the challenges of sharing track and negotiating with Union Pacific and obtaining project funding. The elected officials also designated travel time, establishing service reliability, maintaining public interest, managing expectations and navigating the regulatory and approval process as other hurdles to overcome to implement service.

The officials also were asked to name pros and cons to creating the new rail service. Positive factors included promoting tourism in the Coachella Valley, creating an alternate travel option, increasing employment opportunities and socioeconomic justice, and willingness of cities to support station improvements. Officials mentioned difficulties related to farebox subsidies, the 3.5-hour project train travel time between Los Angeles and the Coachella Valley, and the length of the regulatory/approval process to establish service.

A number of additional key points were raised, namely station locations, tribal coordination, connecting transit, alternative technologies, rail-to-rail and bus-to-rail options, and others.

Outreach Summary

Outreach is a key component to identify and define an alternate transportation service within the Coachella Valley. Outreach informs every phase of the analysis and ensures that the ultimate project will meet the Purpose and Need. Stakeholders and the public provide input through social media, public meetings, stakeholder briefings and the TAC. As the study moves forward, additional outreach opportunities will be utilized in order to continue communicating the study progress and ensuring that stakeholder concerns and issues are incorporated.

4 Purpose and Need for the Study

The Study's Purpose and Need was developed using the information from the Market Analysis and stakeholder input from the outreach process. The market analysis established the data-driven basis for the project's Need and Purpose, supported by feedback from collaboration with multiple agencies, elected officials, and public meetings and surveys. In July 2015, the RCTC Board of Directors approved this Purpose and Need and objectives in order to conduct the Alternatives Analysis.

Section 2 defines the purpose of and need for the Study based on the findings of the Market Analysis and outreach to elected officials, stakeholders, and the general public.

4.1 Need for Transportation Improvements

1. For interregional travel between the Coachella Valley and the Los Angeles Basin, there are very limited options to driving a private vehicle, so people who cannot afford to own and operate a private vehicle, or choose not to, have very limited ability to travel between the regions, and people who might prefer not to drive do not have a viable alternative.
2. Congested highway conditions in the Los Angeles Basin cause delays and unreliability for longer-distance Corridor driving trips. Emergency closures of Interstate 10 through San Gorgonio Pass further undermine the reliability of the Corridor's transportation system. Future growth will result in more congestion and even longer travel times, and more unreliability. Thus driving is an increasingly unattractive and inconvenient mode of travel through the Corridor.

4.2 Purpose and Objectives for Transportation Improvements

The transportation service improvements should achieve the following objectives:

1. Provides travelers between the Coachella Valley and the Los Angeles Basin with a public transportation service that offers more convenient and competitive trip times, better station access, and more frequency, than currently-available public transportation services;
2. Provides travelers between the Coachella Valley and the Los Angeles Basin with an alternative to driving that offers reliable travel schedules;
3. Provides travelers between the Coachella Valley and the Los Angeles Basin with a transportation service that is affordable;
4. Serves a range of trip purposes traveling between the Coachella Valley and the Los Angeles Basin, particularly including business, social, medical, leisure, and recreational trips;

5. Improves regional travel opportunities between the Coachella Valley and the Los Angeles Basin for transit dependent people;
6. Is planned to serve the expected population growth in the Coachella Valley and the Los Angeles Basin; and
7. Does not preclude, by choice of alignment or technology, a possible future Corridor expansion between the Coachella Valley and Phoenix.

5 Range of Route Alternatives

This chapter identifies possible service options and considers them in relation to the service objectives to determine which merit inclusion in the Alternatives Analysis. Potential service options and route alternatives were identified through project team analysis, review of previous studies, and ideas or concepts that were suggested by resource agencies, elected officials, and the public during the outreach process.

The range of route alternatives identifies possible service options based on Corridor needs and public outreach.

The potential service options were assessed in terms of their ability to satisfy the project Purpose and Need. The options that could achieve the service objectives were moved forward into the coarse-level screening process, while those that could not achieve the objectives were dropped from further consideration.

5.1 No-Build Alternative

The No-Build Alternative is presented in this section because certain objectives in the Purpose and Need involve improved service relative to currently available services. The No-Build Alternative is not analyzed as part of the screening of alternatives later in this report because the purpose of the Alternatives Analysis is to compare improvement options and determine which should be carried forward into a NEPA Tier 1 EIS. In the Tier 1 EIS, the No-Build Alternative will be fully evaluated as the baseline alternative for identifying project impacts.

The No-Build Alternative consists of existing and programmed services that currently serve the Corridor (connecting the Coachella Valley with the Los Angeles Basin). As discussed in Section 2.2.2, five intercity rail and bus services currently provide such regional linkages:

- The Amtrak Sunset Limited provides long-distance passenger rail service with three trips in each direction per week between Palm Springs and LAUS as part of its route between Los Angeles and New Orleans;
- The Amtrak Thruway service provides two bus trips each way daily between the Coachella Valley (one round trip to/from Palm Springs, one round trip to/from Indio) and Fullerton for passengers riding on the Amtrak Pacific Surfliner;
- The SunLine Commuter Link 220 provides two bus trips each way between Palm Desert and the Riverside Metrolink station on weekdays during commute hours;
- The Beaumont Commuter Link 120 provides seven bus trips each way between Beaumont and the San Bernardino Metrolink station on weekdays; and
- Greyhound Lines provides intercity bus service that connects various locations throughout the Los Angeles Basin with Banning, Palm Springs, and Indio.

Figure 39 illustrates the rail and transit services connecting the Coachella Valley and Los Angeles Basin, and Figure 40 illustrates the cities connected by Greyhound service. No new Corridor services providing regional linkages are programmed and funded for implementation at this time. As indicated in Table 23, the No-Build Alternative would not meet most of the Purpose and Need objectives.

Table 23. Purpose & Need Objectives Consistency for No-Build Alternative

#	Purpose & Need Objective	Consistency for No-Build Alternative
1	Provides travelers between the Coachella Valley and the Los Angeles Basin with a public transportation service that offers more convenient and competitive trip times, better station access, and more frequency, than currently-available public transportation services	**Objective Not Achieved.** The No-Build Alternative does not include any programmed improvements to existing services, so this alternative does not improve upon the travel times of existing services.
2	Provides travelers between the Coachella Valley and the Los Angeles Basin with an alternative to driving that offers reliable travel schedules.	**Objective Not Achieved.** Existing services are limited and not convenient and reliable for most travelers because of service timing, frequency, or poor connections as noted below. • The Amtrak Sunset Limited operates only three times per week, stops in Palm Springs after midnight at a station location 2.5 miles from the edge of the developed part of the city, often runs well behind schedule because of delays during its long cross-country journey, and there is no connecting service to provide access to the station. • Of existing services only the Sunset Limited would be able to operate through San Gorgonio Pass in the event of Interstate 10 being shut down. • The Amtrak Thruway bus service carries only travelers with a ticket to ride on a connecting Amtrak train, provides only two round trips each day to the Amtrak station in Fullerton, and operates in a highly congested freeway corridor. • The SunLine Commuter Link 220 bus only serves the schedule of commuters, with two weekday trips into Riverside in the morning and two trips back to the Coachella Valley at the end of the normal work day. • The Beaumont Commuter Link 120 travels only as far east as Beaumont so it does not serve the eastern part of the pass area or the Coachella Valley and does not provide weekend service. • Greyhound does not conveniently serve most of the Corridor travelers from the Coachella Valley, the Indio station is located in the eastern end of the Corridor, and the Palm Springs stop is at the Amtrak station, which is in a remote location with no transit access.

Table 23. Purpose & Need Objectives Consistency for No-Build Alternative

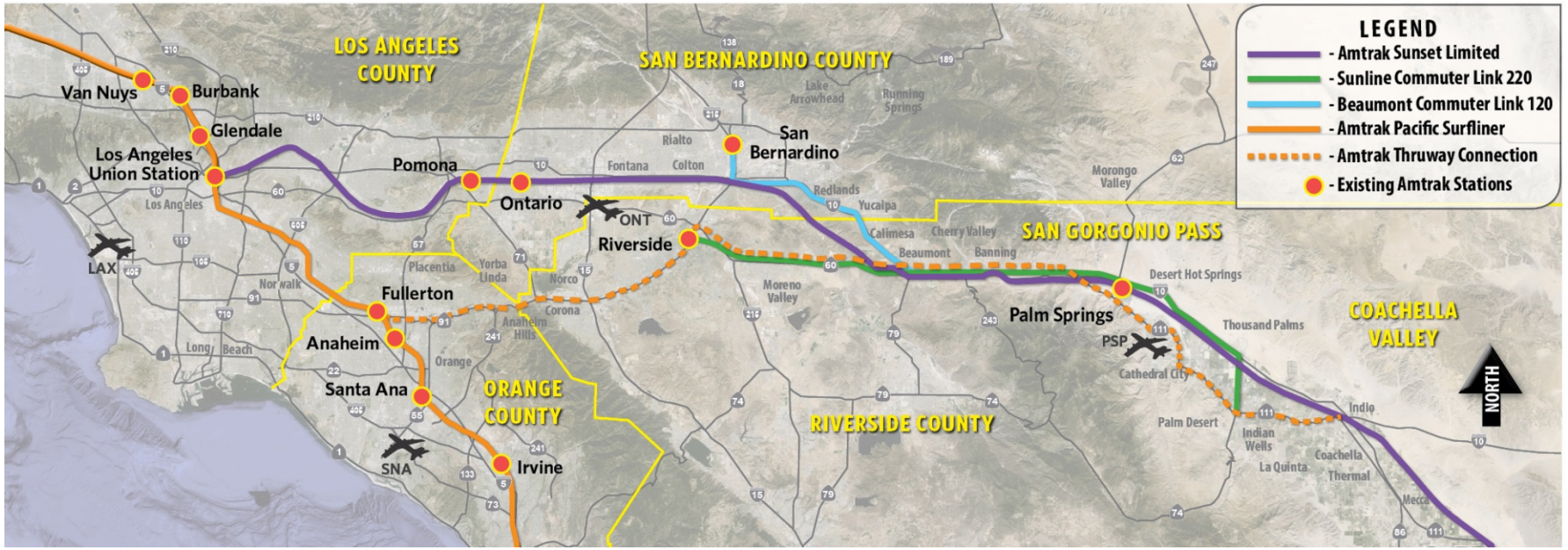
#	Purpose & Need Objective	Consistency for No-Build Alternative
3	Provides travelers between the Coachella Valley and the Los Angeles Basin with a transportation service that is affordable.	**Objective Achieved.** Existing services are affordable with prices ranging from $3 for a one way bus fare from Beaumont to San Bernardino (Beaumont Commuter Link 120) to $27 for a one way train fare from Palm Springs to Los Angeles (Sunset Limited).
4	Serves a range of trip purposes traveling between the Coachella Valley and the Los Angeles Basin, particularly including business, social, medical, leisure, and recreational trips.	**Objective Not Achieved.** Existing services are limited and not convenient for most travelers because of service timing, frequency, or poor connections (see Objective 2 explanation above.) In addition, the Commuter Link bus services do not provide the kinds of traveler amenities desired by leisure and recreational travelers. The intercity (Greyhound) buses do have traveler amenities.
5	Improves regional travel opportunities between the Coachella Valley and the Los Angeles Basin for transit-dependent people.	**Objective Not Achieved.** The No-Build Alternative does not include any programmed improvements to existing services, so this alternative does not enhance the regional travel connections.
6	Is planned to serve the expected population growth in the Coachella Valley and the Los Angeles Basin.	**Objective Not Achieved.** The No-Build Alternative does not include any programmed improvements to existing services, so this alternative does not do anything to enhance service for the growing regional population.
7	Does not preclude, by choice of alignment or technology, a possible future Corridor expansion between the Coachella Valley and Phoenix.	**Objective Achieved.** Existing Greyhound service provides connections from the Coachella Valley to Phoenix and could be expanded.

5.2 Consideration of Possible “Build” Alternatives

The improvement options identified for study (sometimes called “build” alternatives) must represent a range of potential improvements that meet the objectives identified Section 4.2 of the Purpose and Need.

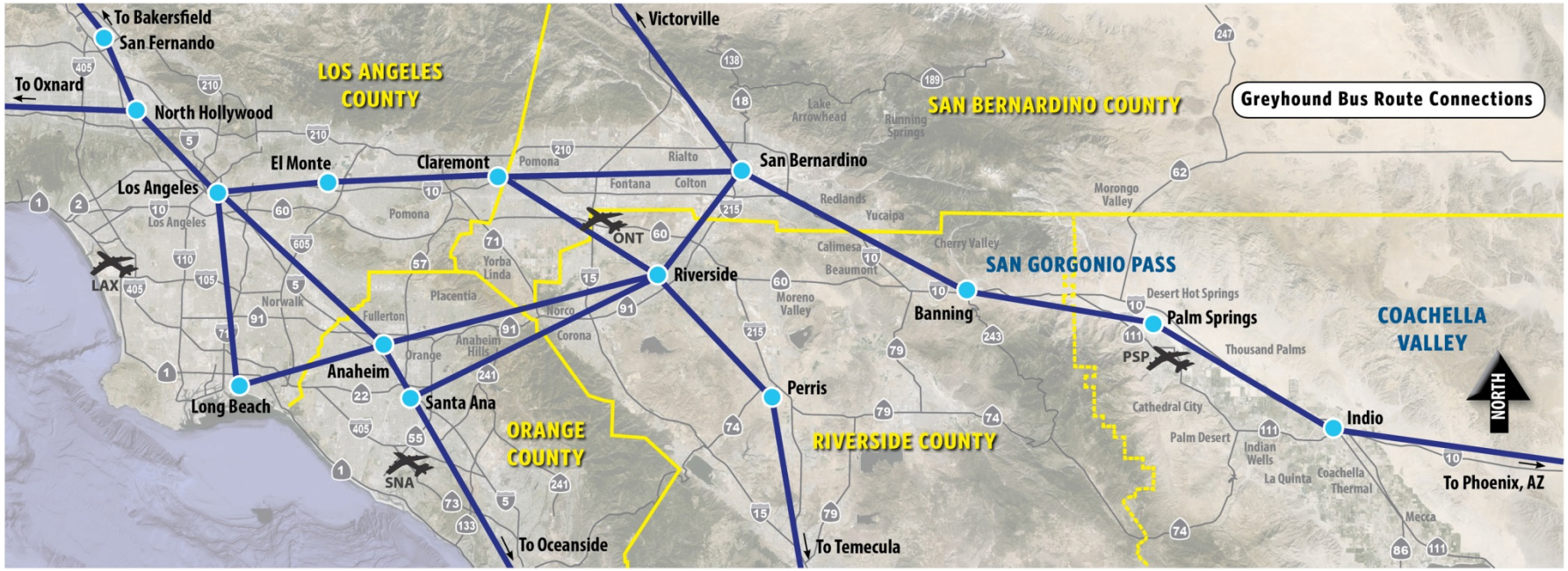
The only two travel modes that meet the objectives of the Purpose and Need are intercity rail and intercity bus. Air travel and high-cost individual and small-group travel modes such as taxis or shuttles are not affordable modes and were dismissed from further consideration.

Figure 39. No-Build Alternative - Transit and Intercity Rail Services



Source: Amtrak, 2014; SunLine, 2014; City of Beaumont, 2014

Figure 40. No-Build Alternative - Intercity Bus Service



Source: Greyhound, 2014

5.2.1 Potential Intercity Rail Options

New Alignments

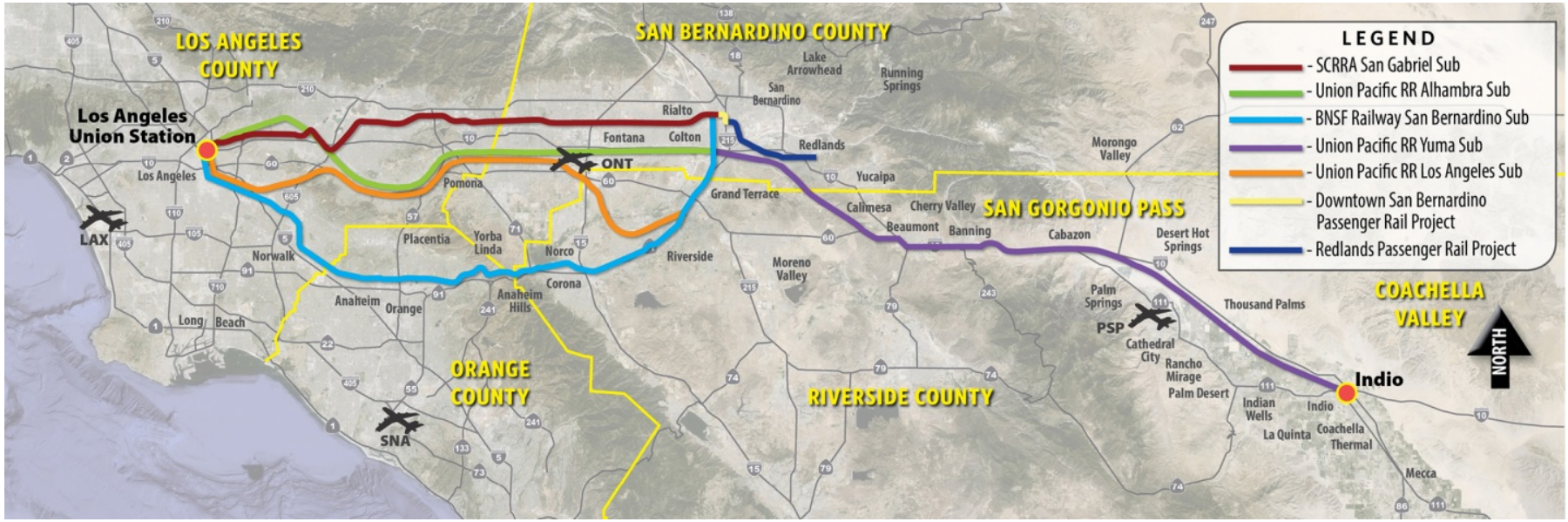
The rail route alternatives considered use existing freight-passenger routes, rather than constructing a new route on new ROW. Development of entirely new rail routes is more expensive and more disruptive to the environment and to communities than adding capacity or improvements to existing rail routes. Route alternatives with entirely new alignments were deemed unreasonable, owing to the cost of new ROW and the challenge of timely property acquisition. Additionally, grading entirely new ROW, rather than expanding as needed along existing ROW, would cause more impact on the natural environment and human environment than on-alignment route alternatives. For these reasons, rail alternatives that involve a new route were dropped from further consideration.

Existing Rail Routes

Existing rail lines that connect the Coachella Valley with the Los Angeles Basin could be used to accommodate a new intercity passenger rail service in the Corridor. The existing rail lines in the Corridor are shown in Figure 41. A single existing rail line – the UP Yuma Subdivision – runs through the San Gorgonio Pass to connect the Coachella Valley with the Los Angeles Basin. In the City of Colton, the Yuma Subdivision intersects other rail lines that provide four alternative routes linking Colton to Los Angeles:

1. The San Bernardino Subdivision (owned by BNSF Railway), which passes through Riverside and Fullerton;
2. The Los Angeles Subdivision (owned by UP), which passes through Riverside and Pomona;
3. The Alhambra Subdivision (owned by UP), which runs due west from Colton and passes through Pomona; and
4. The San Gabriel Subdivision (owned by the San Bernardino Associated Governments (SANBAG) and the Los Angeles County Metropolitan Transportation Authority (Metro)), which lies north of Colton and carries the Metrolink San Bernardino Line commuter rail service between San Bernardino and Los Angeles.

Figure 41. Corridor Rail Lines



Source: Amtrak, 2014; SCRRA, 2014

Table 24 shows the four established passenger rail routes identified by a designator number, subdivision name, current operator, and intermediate cities used to define the location of the route. All route alternatives in the Western Section will also use the River Subdivision trackage owned by SCRRA for the final approach into LAUS.

Table 24. Established Passenger Rail Routes in Western Section of the Corridor

Route Number	Subdivision Name	Current Operator and Route
1	BNSF San Bernardino Subdivision	BNSF Railway via Riverside and Fullerton, California
2	UP Los Angeles Subdivision	BNSF Railway from Colton to Riverside, then Union Pacific west of Riverside via Pomona, California
3	UP Alhambra Subdivision	Union Pacific via Ontario and Pomona, California
4	SCRRA San Gabriel Subdivision	BNSF Railway from Colton to San Bernardino, then SCRRA San Gabriel Sub (Metrolink's San Bernardino Line) via Rialto and Montclair, California

Source: Amtrak, 2014; SCRRA, 2014

Each of the four routes listed in Table 24 can be combined with the Yuma Subdivision to provide route alternatives from Indio in the east to LAUS in the west. Indio is a potential eastern terminus for the service because it is near the eastern end of the Coachella Valley and could capture travelers from throughout the eastern part of the Coachella Valley, it has an existing transportation center next to the rail line, and it is accessible to the highly transit-dependent communities further south and east such as Coachella (5 miles south), Thermal (7 miles south), and Mecca (14 miles south). LAUS is the logical western terminus for service because it is the primary hub of rail and transit connections for the rest of Southern California.

Previous studies of potential rail service in this Corridor – the 2010 Coachella Valley Rail Study Update (RCTC, 2010) and the Coachella Valley Intercity Rail Corridor Planning Study (Caltrans, 2013) both recommended the use of the UP Yuma Subdivision in the Eastern Section between Indio (as the eastern terminus) and Colton and the passenger-freight route owned by BNSF Railway in the Western Section between Colton and Los Angeles (identified in Table 24 as Route Number 1).

Option to Use the Redlands Rail Route

For Route 4, an option to connect the SCRRA San Gabriel Subdivision to the UP Yuma Subdivision through Colton might be possible by using a new passenger rail route being developed to connect the existing San Bernardino Metrolink station and the City of Redlands along the Redlands Branch line (see Figure 41). The Redlands Passenger Rail Project (RPRP) would require construction of new track approximately 1.5 miles in length in the Loma Linda/Redlands area. This would require the acquisition of new right-of-way and construction of new track, and would involve associated environmental impacts.

In addition to the challenges of developing a new 1.5-mile rail alignment to connect the two lines, the Coachella Valley-San Gorgonio Pass (CV-SGP) service may be incompatible with the planned operations along the Redlands Branch line. The RPRP proposes to use Diesel Multiple Unit (DMU) vehicles, which may not be compliant with FRA passenger equipment requirements. For intercity trains to operate in the same corridor as non-compliant DMU vehicles, either a second track would need to be constructed along the Redlands Branch line or all three services (the RPRP operation, freight service, and intercity service) would need to be time-separated through this area, which could jeopardize the reliability and utility of all three types of service.

The combination of these factors makes the RPRP route connection a very implausible option for carrying the CV-SGP service, therefore Route 4 is considered only using the BNSF San Bernardino Subdivision to connect the San Gabriel Subdivision to the Yuma Subdivision.

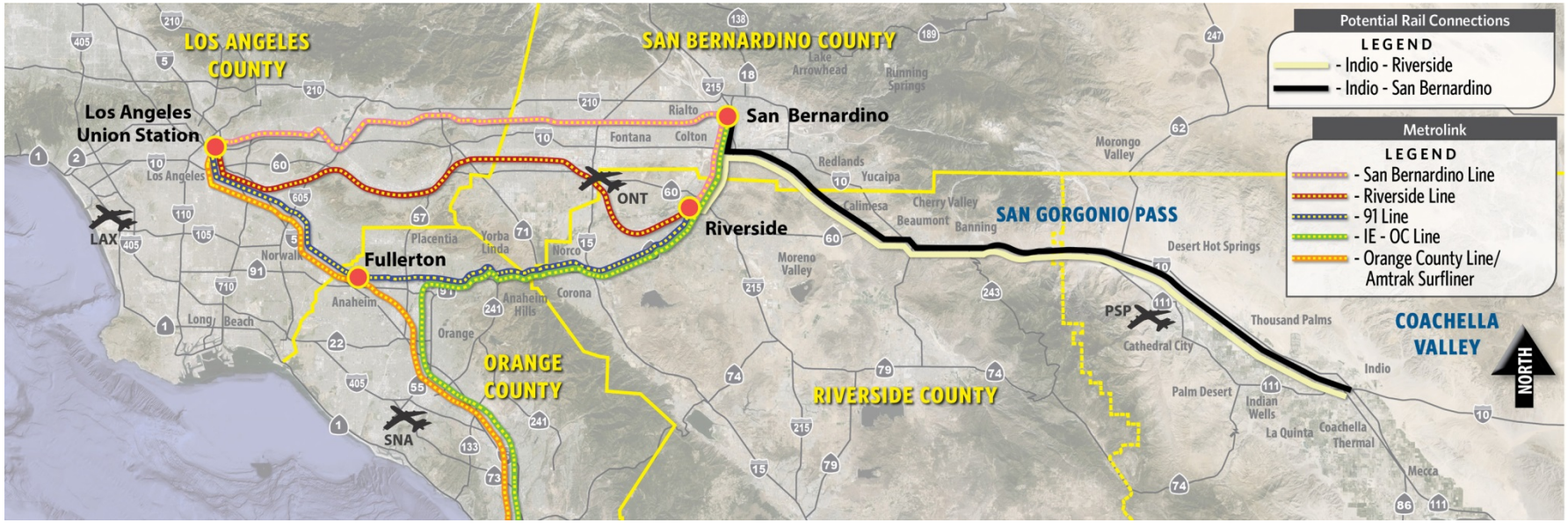
"Short Line" Rail Options

Another possible way to provide passenger rail service between Indio and Los Angeles would be to operate a new intercity rail service between Indio and the Inland Empire where passengers could transfer to existing Metrolink commuter rail lines to continue on to Los Angeles or other parts of the Los Angeles Basin (see Figure 42). One such "short rail" route option would follow the UP Yuma Subdivision from Indio to Colton, then turn south on the BNSF San Bernardino Subdivision to Riverside, where passengers could transfer to Metrolink's IE-OC Line, Riverside Line, or 91 Line. The other "short rail" route option would also follow the UP Yuma Subdivision from Indio to Colton, then turn north on the BNSF San Bernardino Subdivision to San Bernardino, where passengers could transfer to Metrolink's San Bernardino Line or IE-OC Line.

Comparison of Rail Options with Purpose and Need Objectives

The Indio-Los Angeles intercity service options (assumed to be a one-seat ride) and the Indio-Inland Empire "short line" intercity rail service options (assumed to be a connection to existing Metrolink service in Riverside or San Bernardino) were compared to the project's Purpose and Need objectives. The results of this comparison, shown in Table 25, indicate that the Indio-Los Angeles service options could achieve all of the objectives, whereas the Indio-Inland Empire options would not be able to achieve three of the objectives. Therefore, all four Indio-Los Angeles intercity rail routes were carried forward into the screening process, and the "short line" rail options were dropped from further consideration.

Figure 42. Potential "Short Rail" Service Options between Indio and the Inland Empire



Source: SCRRA, 2014

Table 25. Purpose and Need Objectives Consistency for Intercity Rail

#	Purpose & Need Objective	Consistency for Indio-Los Angeles Intercity Rail Service	Consistency for Indio-Inland Empire "Short Rail" Intercity Rail Service
1	Provides travelers between the Coachella Valley and the Los Angeles Basin with a public transportation service that offers more convenient and competitive trip times, better station access, and more frequency, than currently-available public transportation services.	**Objective Achieved.** An intercity passenger rail service between Indio and Los Angeles would have a substantial trip time reduction compared to the existing bus-rail trip using Amtrak Thruway and Pacific Surfliner. Daily intercity passenger rail service would also improve frequency and convenience.	**Objective Not Achieved.** Because of the need to transfer in Riverside or San Bernardino (the Inland Empire portion of the Los Angeles Basin), the possible reduction in rail/transit travel time is decidedly less than a service that provides passengers with a one-seat ride between Indio and Los Angeles.
2	Provides travelers between the Coachella Valley and the Los Angeles Basin with an alternative to driving that offers reliable travel schedules.	**Objective Achieved**. An intercity passenger rail service between Indio and Los Angeles would have reliable schedules because it would operate in an rail right-of-way and would not involve transfer to another, less reliable, service. An intercity train service between Indio and Los Angeles would be able to operate through San Gorgonio Pass in the event of Interstate 10 being shut down.	**Objective Not Achieved**. Scheduled Metrolink travel times between Riverside and Los Angeles vary depending on time of day, day of week, and service capacity on the shared tracks. Because of the variability in Metrolink's travel times due to scheduling issues, total trip schedules would also be variable. Additionally, timed transfers to connecting service have decreased schedule and on time performance reliability due to increased operational variables on each segment of service such as mechanical equipment failures, operational delays (meet/pass delays), engineering delays (such as PTC) and host railroad delays causing a cascading delay on one or both of the service segments. An intercity passenger train between Indio and the Inland Empire would be able to operate through San Gorgonio Pass in the event of I-10 being shut down.
3	Provides travelers between the Coachella Valley and the Los Angeles Basin with a transportation service that is affordable.	**Objective Achieved.** Intercity passenger rail service would be an affordable travel option.	**Objective Achieved.** Intercity passenger rail service would be an affordable travel option.
4	Serves a range of trip purposes traveling between the Coachella Valley and the Los Angeles Basin, particularly including business, social, medical, leisure, and recreational trips.	**Objective Achieved**. Intercity passenger trains provide travelers with comfortable and spacious seating, baggage service, wifi connection, café service, and other amenities suited to leisure/recreation and business travelers that are not available on Metrolink.	**Objective Not Achieved**. While a rail service between Indio and the Inland Empire could be customized to address a specific demographic, existing Metrolink schedules and traveler amenities are geared to commuters traveling to and from work, and do not accommodate as well the needs and desires of the leisure and recreational travelers that constitute a very significant component segment of this Corridor's travelers.
5	Improves regional travel opportunities between the Coachella Valley and the Los Angeles Basin for transit dependent people.	**Objective Achieved**. A new intercity passenger rail service between Indio and Los Angeles would provide direct service to Los Angeles and connections throughout the Los Angeles Basin.	**Objective Achieved**. A new intercity passenger rail service between Indio and the Inland Empire (Riverside or San Bernardino) would provide travelers with connections to much of the Los Angeles Basin by transfer to Metrolink commuter rail service.

Table 25. Purpose and Need Objectives Consistency for Intercity Rail

#	Purpose & Need Objective	Consistency for Indio-Los Angeles Intercity Rail Service	Consistency for Indio-Inland Empire "Short Rail" Intercity Rail Service
6	Is planned to serve the expected population growth in the Coachella Valley and the Los Angeles Basin.	**Objective Achieved**. Intercity passenger rail service could be expanded to accommodate ridership growth.	**Objective Achieved**. Intercity passenger rail service could be expanded to accommodate ridership growth.
7	Does not preclude, by choice of alignment or technology, a possible future Corridor expansion between the Coachella Valley and Phoenix.	**Objective Achieved.** The UP Yuma Subdivision offers a potential opportunity for service expansion from Indio to the Phoenix area.	**Objective Achieved.** The UP Yuma Subdivision offers a potential opportunity for service expansion from Indio to the Phoenix area.

5.2.2 Potential Intercity Bus Service Options

There are two ways that intercity bus service could be operated to connect Indio to Los Angeles, either (1) as a one-seat ride between Indio and LAUS, or (2) with service between Indio and a rail station in Riverside, San Bernardino, or Fullerton, where riders could connect with Amtrak or Metrolink train services. Either type of intercity bus service would operate almost entirely on the freeway system with a very limited number of intermediate stops with minimal diversion from the freeway route.

The two types of intercity bus service options were compared to the project's Purpose and Need objectives. The results of this comparison, shown in Table 26, indicate that both the Indio-Los Angeles bus service and Indio-Metrolink bus service options would not be able to achieve three of the objectives. Therefore, all of the intercity bus service options were dropped from further consideration.

Table 26. Purpose and Need Objectives Consistency for Intercity Bus

#	Purpose & Need Objective	Consistency for Indio-Los Angeles Bus Service	Consistency for Bus Service Connecting Indio to Metrolink (Riverside, San Bernardino, or Fullerton)
1	Provides travelers between the Coachella Valley and the Los Angeles Basin with a public transportation service that offers more convenient and competitive trip times, better station access, and more frequency, than currently-available public transportation services.	**Objective Not Achieved.** A new intercity bus service would operate over the same highway and street system as the existing intercity service, so a new bus service would not be able to provide any reduction in travel time. A new bus service would have essentially the same travel times as the existing Greyhound service between Indio and Los Angeles.	**Objective Not Achieved.** Because of the need to transfer between bus and rail, combined with the need to exit the freeway for intermediate stops, the potential for substantially reducing travel time with this type of service is small. A new bus/Metrolink service would have comparable travel times to the existing Greyhound and Amtrak services between the Coachella Valley and Los Angeles.
2	Provides travelers between the Coachella Valley and the Los Angeles Basin with an alternative to driving that offers reliable travel schedules.	**Objective Not Achieved.** A new intercity bus service would be subject to the same recurring congestion on the Los Angeles area freeway system that is encountered by the existing intercity bus service; therefore, a bus option would not offer any	**Objective Not Achieved.** This service option would be subject to the variability in Metrolink's travel times and to recurring freeway congestion in the part of the Corridor where buses would travel on freeways. Scheduled Metrolink travel times between Riverside and Los Angeles vary depending on time of day and service capacity on the

Table 26. Purpose and Need Objectives Consistency for Intercity Bus

#	Purpose & Need Objective	Consistency for Indio-Los Angeles Bus Service	Consistency for Bus Service Connecting Indio to Metrolink (Riverside, San Bernardino, or Fullerton)
		improvement in reliability. Because buses travel on the roadway system, a closure of I-10 through the San Gorgonio Pass would render bus service inoperable through the area, so this option would not be able to achieve this objective.	shared tracks. Also, both freeways leading east from Riverside and San Bernardino (SR-60 and I-10) experience regular recurring peak period congestion. So this option would not improve existing service reliability, and travelers would be subject to both Metrolink schedule variability and recurring freeway congestion. Because buses travel on the roadway system, a closure of I-10 through the San Gorgonio Pass would render bus service inoperable through the area, so this option would not be able to achieve this objective.
3	Provides travelers between the Coachella Valley and the Los Angeles Basin with a transportation service that is affordable.	**Objective Achieved.** Intercity bus service would be an affordable travel option.	**Objective Achieved.** Intercity bus service would be an affordable travel option.
4	Serves a range of trip purposes traveling between the Coachella Valley and the Los Angeles Basin, particularly including business, social, medical, leisure, and recreational trips.	**Objective Achieved.** Intercity bus service would include traveler amenities.	**Objective Not Achieved.** Metrolink schedules and traveler amenities are geared to commuters traveling to and from work, and do not accommodate as well the needs and desires of the leisure and recreational travelers that constitute a very significant component segment of this Corridor's travelers. Bus service connecting to Metrolink would be restricted to meeting Metrolink schedules.
5	Improves regional travel opportunities between the Coachella Valley and the Los Angeles Basin for transit dependent people.	**Objective Not Achieved**. This option would not improve regional connections – it would provide essentially similar regional connections to the existing intercity bus service operated by Greyhound. This service option could somewhat increase the service area compared to existing SunLine service (with an eastern terminus in Palm Desert rather than Indio) and provide service during more hours of the day. (The SunLine service operates only during weekday commute hours.)	**Objective Achieved**. This option would provide more regional bus opportunities between the Coachella Valley and the Los Angeles Basin for transit-dependent people through an intercity bus service with service between Indio and a rail station in Riverside, San Bernardino, or Fullerton, where riders could connect with Amtrak or Metrolink train services. This service option could somewhat increase the service area compared to existing SunLine service (with an eastern terminus in Palm Desert rather than Indio) and provide service during more hours of the day. (The SunLine service operates only during weekday commute hours.)
6	Is planned to serve the expected population growth in the Coachella Valley and the Los Angeles Basin.	**Objective Achieved**. This service could be expanded to accommodate ridership growth.	**Objective Achieved**. This service could be expanded to accommodate ridership growth.
7	Does not preclude, by choice of alignment or technology, a possible future Corridor expansion between the Coachella Valley and Phoenix.	**Objective Achieved.** An intercity bus service could be expanded to provide service to Phoenix, though it would essentially duplicate the existing Greyhound service to Phoenix.	**Objective Achieved.** An intercity bus service could be expanded to provide service to Phoenix, though it would essentially duplicate the existing Greyhound service to Phoenix.

5.3 Alternatives to be Studied

Based on the results of the Purpose and Need comparisons above, the alternatives to be studied will be comprised of intercity rail passenger service between Indio and Los Angeles, operating on the Yuma Subdivision between Indio and Colton and on the four existing rail lines between Colton and Los Angeles.

A total of six route combinations were identified for evaluation in the coarse-level screening.

Route Alternatives 1 through 3 use the UP Yuma Subdivision between Indio and Colton and then follow three of the four rail lines west of Colton, as described below.

- **Route Alternative 1** uses the BNSF San Bernardino Subdivision, travels from Colton through Riverside and Fullerton to reach LAUS;
- **Route Alternative 2** uses the UP Los Angeles Subdivision, travels from Colton through Riverside and Pomona to reach LAUS;
- **Route Alternative 3** uses the UP Alhambra Subdivision, travels from Colton through Ontario and Pomona to reach LAUS.

Route Alternative 4 uses the UP Yuma Subdivision between Indio and Colton and the San Gabriel Subdivision between San Bernardino and Los Angeles. It has two variations.

- **Route Alternative 4-A** travels from Colton through Rialto and Montclair to reach LAUS;
- **Route Alternative 4-B** travels from Colton to San Bernardino, then reverses its direction to travel through Montclair to LAUS.

Route Alternative 4-A bypasses downtown San Bernardino to provide a more direct route with a shorter travel time than Route Alternative 4-B. Route Alternative 4-B serves downtown San Bernardino and would involve a 20- to 30-minute station layover to reverse the train's operation (due in part to the operational needs of Positive Train Control). Initially, in coarse-level screening, Route Alternative 4-B served the San Bernardino Santa Fe station, however, the alternative was modified in fine-level screening to serve the downtown San Bernardino Transit Center location.

Route Alternative 5 was identified for study because the San Gabriel Subdivision (Route Alternative 4-A and 4-B) has a single-track capacity constraint where it operates at capacity during peak commute hours in the median of I-10 east of LAUS. Route Alternative 5 avoids the constrained segment of the San Gabriel Subdivision by using the UP Alhambra Subdivision while serving the same stations as Route Alternatives 4-A and 4-B.

- **Route Alternative 5** uses the UP Yuma Subdivision between Indio and Colton, the SCRRA Short Way Subdivision between Colton and San Bernardino, the SCRRA San Gabriel Subdivision between San Bernardino and El Monte, and the UP Alhambra Subdivision between El Monte and Los Angeles.

The alternatives are summarized in Table 27 and illustrated in Figures 43 through 49.

Table 27. Coachella Valley – San Gorgonio Pass Rail Corridor Route Alternatives

Alt.	Description	Termini		Mode	Rail Lines
		East	West		
1	LA-Indio Rail Service via Fullerton/Riverside	Indio	Los Angeles Union Station	Intercity Rail	BNSF San Bernardino Sub + UP Yuma Sub
2	LA-Indio Rail Service via Pomona/Riverside	Indio	Los Angeles Union Station	Intercity Rail	UP Los Angeles Sub + UP Yuma Sub
3	LA-Indio Rail Service via Pomona/Ontario Airport	Indio	Los Angeles Union Station	Intercity Rail	UP Alhambra Sub + UP Yuma Sub
4-A	LA-Indio Rail Service via Montclair/Rialto	Indio	Los Angeles Union Station	Intercity Rail	SCRRA San Gabriel Sub + UP Yuma Sub
4-B	LA-Indio Rail Service via Montclair/San Bernardino	Indio	Los Angeles Union Station	Intercity Rail	SCRRA San Gabriel Sub + UP Yuma Sub
5	LA-Indio Rail Service via Montclair/San Bernardino	Indio	Los Angeles Union Station	Intercity Rail	UP Alhambra + SCRRA San Gabriel Sub + UP Yuma Sub

Figure 43. Coachella Valley – San Gorgonio Pass Rail Corridor Route Alternatives

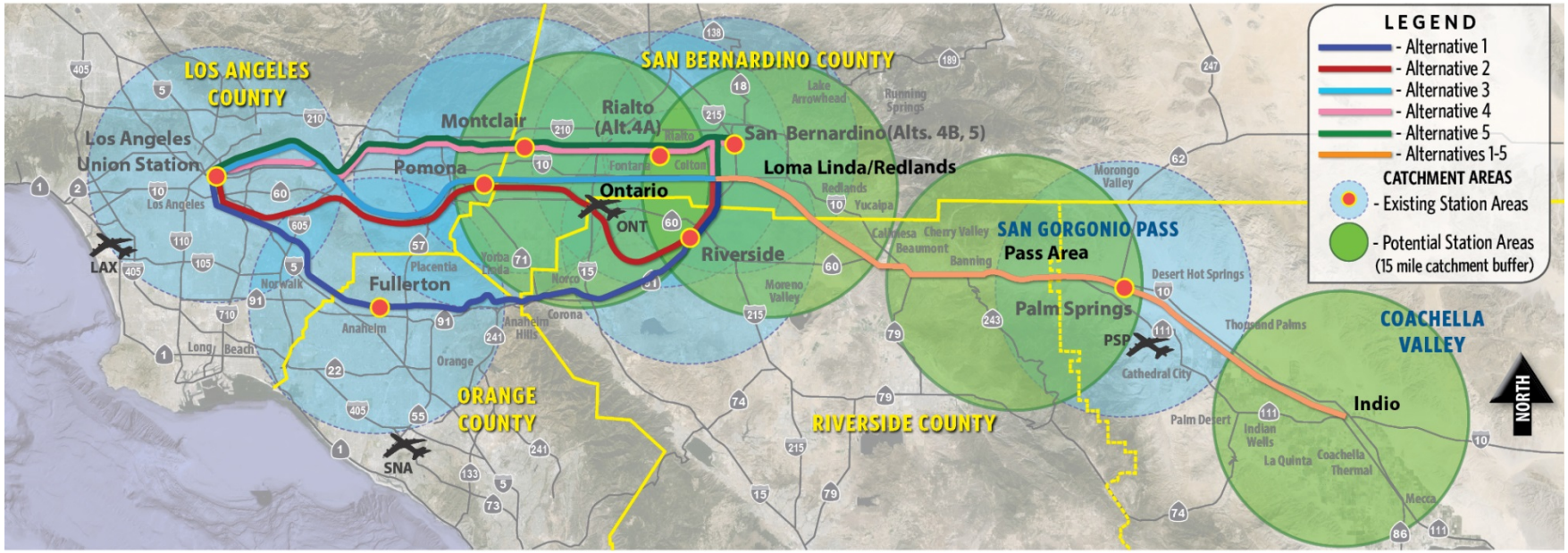


Figure 44. Route Alternative 1

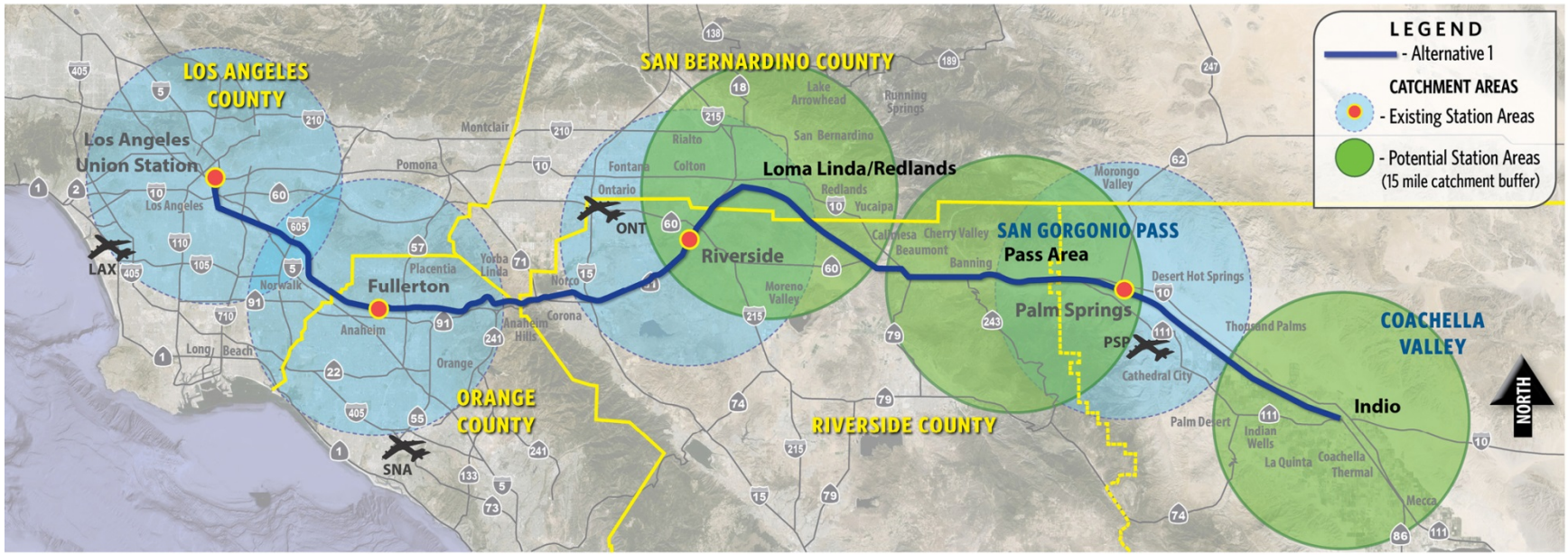


Figure 45. Route Alternative 2

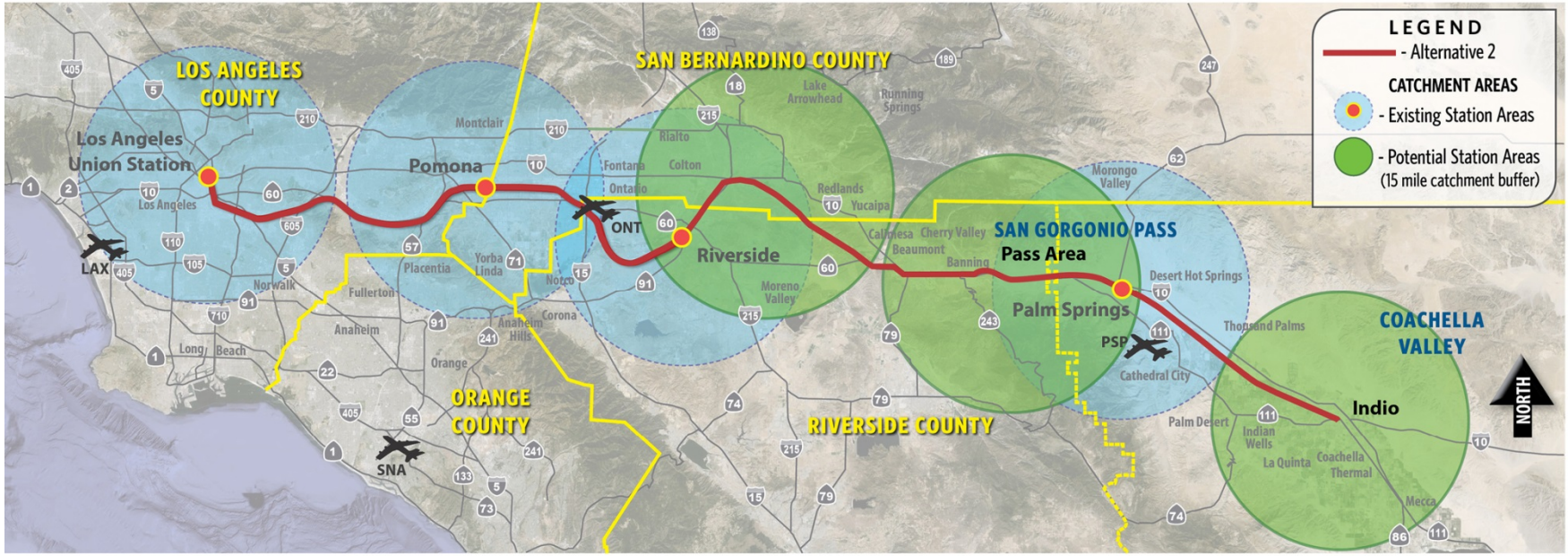


Figure 46. Route Alternative 3

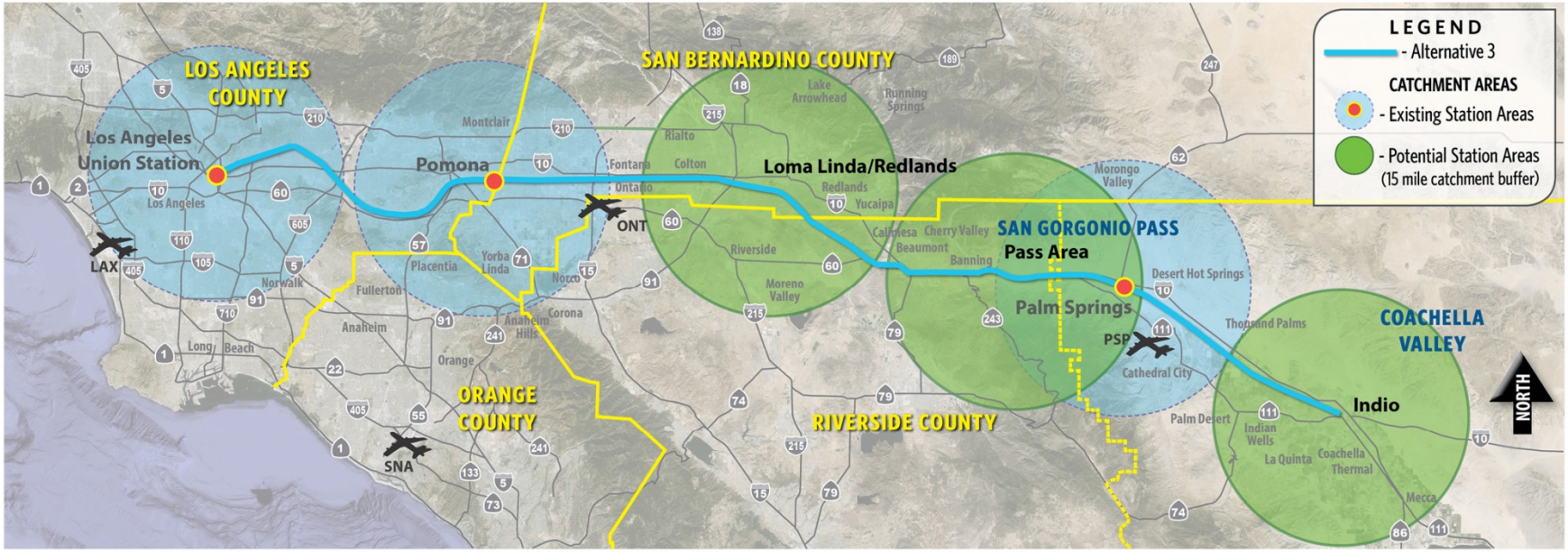


Figure 47. Route Alternative 4-A

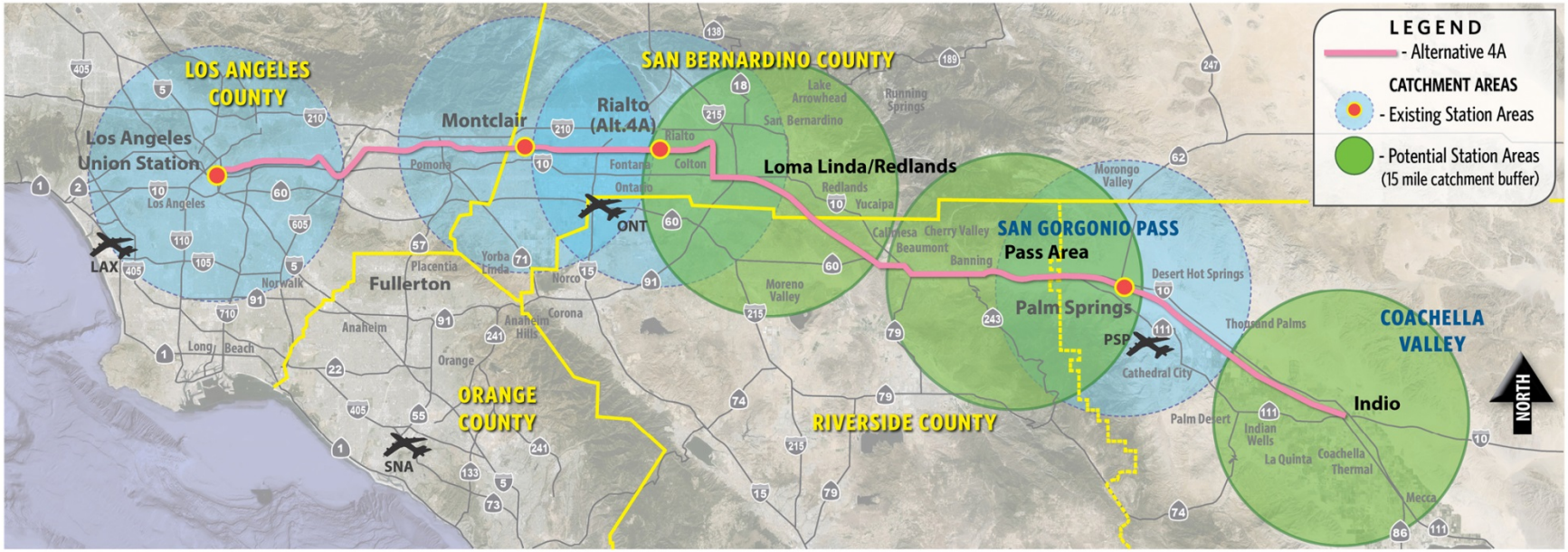


Figure 48. Route Alternative 4-B

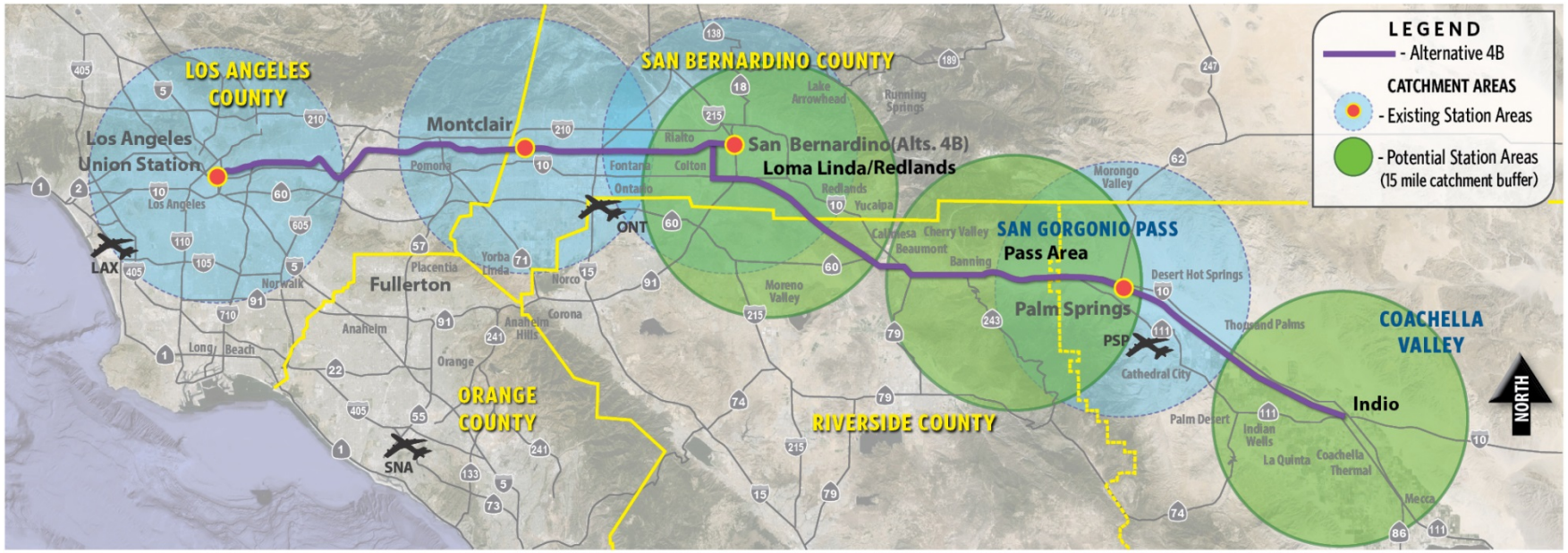
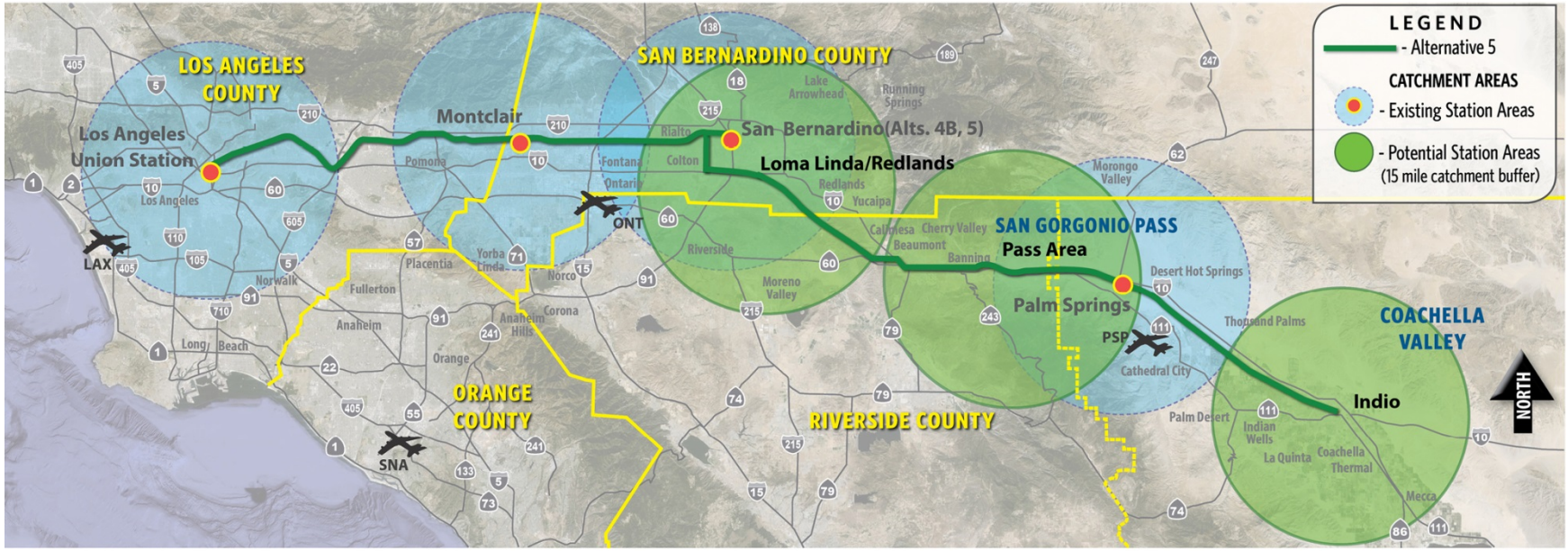


Figure 49. Route Alternative 5



6 Description of the Proposed Service

This chapter describes the assumed service to be evaluated in the screening of alternatives. Regardless of which route alternative is selected, the proposed passenger rail service between Indio and Los Angeles would have several similar characteristics—speed and travel time, stations, frequency, and infrastructure.

The general characteristics of the proposed passenger rail service include speed and travel time, stations, frequency, and infrastructure.

6.1 Speed and Travel Time

Providing convenient, reliable and competitive travel times are objectives of the proposed transportation improvement. The proposed maximum speed of the passenger rail service is 79 miles per hour (mph), which would result in scheduled one-way travel times between Indio and Los Angeles of approximately 186 to 218 minutes. As detailed in Section 2, an automobile requires between 112 to 200 minutes driving the approximately 127 miles between downtown Los Angeles and Indio. Existing transit requires about 240 minutes between Indio and Los Angeles. Air service between Los Angeles and Palm Springs is approximately 55 minutes flying time, and a total downtown-to-downtown travel time of approximately 2 hours, 30 minutes. Direct air service is available only between Los Angeles and Palm Springs, but not from Los Angeles to Indio or from intermediate city to intermediate city.

The passenger rail service would be designed for an on-time performance of 90 percent to provide a competitive option with personal automobile and commercial bus and airline service, which may have a lower reliability due to inclement weather and highway traffic congestion. The proposed Los Angeles terminus is Los Angeles Union Station (LAUS), which is located in the downtown Los Angeles core and is the hub station for Amtrak's intercity and long-distance passenger rail services and much of Los Angeles' commuter-rail service. The station is also served by L.A. Metro's heavy-rail and light rail rapid-transit system, by L.A. Metro's bus system, by other municipal bus operators, and by a direct link to Los Angeles International Airport via the FlyAway Express Bus. LAUS is also a proposed station for the California High Speed Rail system.

6.2 Stations

For this Alternatives Analysis the assumed endpoints of the proposed passenger rail service are Indio and Los Angeles. The proposed station in Los Angeles is LAUS, which is the current hub for Amtrak intercity and long distance passenger trains serving Los Angeles, and is a proposed station for the California High Speed Rail system. Intermediate station stops are located on each route alternative at the largest intermediate cities, or as close as possible to the largest intermediate cities to attract and serve the largest possible ridership. For this analysis, a station has been assumed within each of the existing and potential station areas indicated on the alternatives maps. A site specific station location analysis and other potential station sites have

not been identified during the Alternatives Analysis, which will be studied during the subsequent Service Development Plan. Table 28 provides the existing and potential conceptual station areas considered for each alternative in the Alternatives Analysis.

Table 28. Existing and Potential Station Areas

Eastern Section Potential Station Areas		
Alternative Yuma Subdivision	**Existing Station Locations** Palm Springs	**Potential New Stations** Indio, Rancho Mirage, Cabazon, Loma Linda
Western Section Potential Station Areas		
Alternative	**Potential Existing Stations**	**Potential New Stations**
1	LAUS, Fullerton, Riverside	
2	LAUS, Pomona, Riverside	
3	LAUS, Pomona	Ontario Airport
4-A	LAUS, Montclair, Rialto	
4-B	LAUS, Montclair, San Bernardino	
5	LAUS, Montclair, San Bernardino	

The intermediate station stops are different for each route alternative, as the route alternatives share a common alignment only in the Eastern Section between Indio and Colton, and are geographically separated in the Western Section between Colton and Los Angeles until rejoining at LAUS. The number of station stops was identified with recognition that too many stops would make the overall travel time unacceptably long and less competitive with automobile travel times, thus reducing ridership. Likewise, station dwell times were kept to a minimum, to reduce overall travel times, which is common on corridor-type services where many travelers are making day-trips and most travelers tend to carry less baggage.

6.3 Frequency

A transportation improvement serving a range of trip purposes traveling between the Coachella Valley and the Los Angeles Basin, particularly including business, social, medical, leisure, and recreational trips is another objective of the Study. As a result, the frequency of the proposed passenger rail service has been initially defined as two daily round trips between Indio and Los Angeles, based on the ridership model's service optimization analysis (described in Section 7.3.2) which found that two round trips per day would attract the greatest number of riders per train while providing an opportunity for passengers to make a limited round trip in one day. Experience with other similar corridor services in Illinois, Wisconsin, Missouri, California, and Washington has shown that more round trips increase ridership because passengers have more options for departure and arrival times; the increased convenience corresponds to increased ridership (Iowa DOT, October 2012). The number of daily round trips also influences the technical complexity of the infrastructure required because more trains require more line capacity. Service schedules will be evaluated further during the Service Development Plan.

6.4 Infrastructure

Although the proposed passenger rail service would use existing infrastructure, additional track, signal, and structure infrastructure is likely to be necessary, to varying degrees, for each route alternative. New infrastructure is needed to provide adequate main track capacity and track quality for passenger trains to allow them to operate reliably and consistently at a speed as near to the proposed maximum speed as possible. New infrastructure also serves to mitigate any potential loss in existing freight capacity and freight capacity expansion potential. Segments of additional second main track or sidings for trains to meet and pass each other would be required where existing sidings or double-track is insufficient, or needed to mitigate the impacts of the proposed service on existing freight or commuter rail operations.

Additional tracks at some or all stations are also likely infrastructure requirements. A new maintenance facility for passenger rail equipment is not expected to be needed since the initial service level is only two round trips per day and there is an existing Amtrak maintenance facility near LAUS. Additional track, signal, and structure infrastructure may expand the footprint of the existing infrastructure. Areas where the infrastructure footprint would be expanded were identified and included in the identification of potential impacts on environmental, socioeconomic, and cultural resources.

A Shared Use Agreement between BNSF and RCTC which was signed in 1992 relates staged infrastructure improvement projects to available passenger train slots on the route (Atchison, Topeka, and Santa Fe Railway Company and RCTC, October 1992). Improvements completed since 1992 bring the subdivision to Stage 4 of the infrastructure staging plan, which provides 36 train slots for RCTC between Riverside and Fullerton. In addition, a memorandum of understanding between SANBAG, UP, and BNSF for the Colton Crossing rail grade separation project provides for the conversion of four non-revenue passenger train movements to revenue train movements in the segment of the San Bernardino Subdivision between San Bernardino and Riverside (San Bernardino Associated Governments, Union Pacific Railroad Company, and BNSF Railway, April 2010).

7 Screening Methodology

This section describes the screening methodology and criteria to be applied in the two-step process for screening Corridor alternatives. The two-step screening methodology describes how preliminary service planning elements were:

1. Analyzed for each route alternative identified for consideration in the Alternatives Analysis; and
2. Either eliminated from further consideration or carried forward for environmental evaluation in a Tier 1 NEPA document, consistent with the FRA's NEPA requirements, and a concurrent CEQA document.

The screening methodology used to evaluate and compare the route alternatives involves a two-step screening: coarse-level and fine-level.

Development of the Screening Methodology

A technical memorandum describing the draft screening methodology was provided to RCTC and FRA for review and comment. Obtaining consensus between RCTC and FRA was vital on the screening methodology prior to conducting detailed evaluation of proposed route alternatives. With FRA concurrence in March 2015, the final agreed upon methodology was implemented as a two-step screening process.

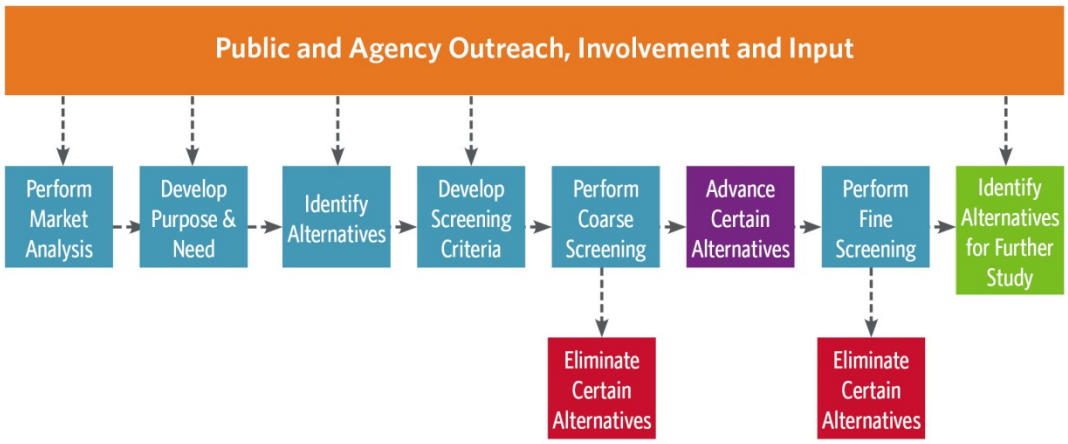
After completion of the alternatives analysis, an agency outreach (Technical Advisory Committee) meeting was conducted to obtain comments from interested federal, state, and local resource agencies on the analysis of route alternatives, and the analysis was reviewed and approved by RCTC.

Other opportunities for resource agencies and the public to review route alternatives and the potential impacts associated with project implementation will occur during the public scoping periods and meetings conducted prior to preparation of the Tier 1 EIS/EIR.

7.1 Overview

The screening process included two steps: an initial coarse-level screening to identify whether any route alternative is hindered by major challenges (and would thus be eliminated from subsequent fine-level screening) and a fine-level screening to evaluate each route alternative in greater quantitative and qualitative detail. This two-step screening process was used to eliminate those route alternatives from detailed analysis that could not achieve most of the Purpose and Need objectives for the Study, were not reasonable and/or feasible, and/or had environmental, physical, or right-of-way (ROW) constraints that made them less reasonable than one or more other route alternatives. This two-step screening process is intended to allow the Tier 1 NEPA document to focus on only those route alternatives that truly warrant consideration. Figure 50 illustrates the screening methodology.

Figure 50. Screening Methodology Flow Chart



Subsequent to the Alternatives Analysis, a Tier 1 NEPA document will be prepared to evaluate the environmental effects of the proposed rail corridor program, including the broader service-level issues associated with the No-Build Alternative and the reasonable and feasible route alternatives carried forward for detailed analysis and comparison. The Tier 1 NEPA review will be conducted jointly with a programmatic California Environmental Quality Act (CEQA) review, with RCTC serving as the CEQA lead agency. Ultimately, RCTC and the FRA will select an alternative based on the detailed evaluation in the Tier 1 EIS/EIR and input from resource agencies and the public.

7.2 Screening Criteria

The screening process for evaluating and selecting reasonable and feasible route alternatives to carry forward for detailed consideration in the Tier 1 Service NEPA document relies on the following four broad screening criteria:

- Meeting the Purpose and Need for passenger rail service between Indio and Los Angeles
- Environmental constraints
- Technical feasibility
- Economic feasibility

These screening criteria were used to compare each route alternative during both levels of the two-step screening process. These criteria were examined in the initial coarse-level screening and then in greater detail in the subsequent fine-level screening. The four criteria are described below.

7.2.1 Criteria 1: Purpose and Need

The Purpose and Need, developed based on input from the market analysis and public outreach, defines the need for transportation improvement and the objectives of the new service. The Study's Purpose and Need was used as the baseline for evaluating and comparing

the range of reasonable and feasible route alternatives in the Alternatives Analysis and will be used in the Tier 1 document. Therefore, each proposed route alternative was evaluated based on the following factors related to the Purpose and Need:

- Travel demand in the Corridor (both existing and potential for a 20-year horizon after implementation of the proposed service in the Study) resulting from population growth and changing demographics; and
- Competitive and attractive travel modes compared to other currently-available public transportation services, including competitive travel times, reliability and convenience (i.e., modal connectivity).

7.2.2 Criteria 2: Environmental Concerns

A high-level environmental evaluation was conducted for each proposed route alternative to determine whether there are substantial constraints with respect to impacts on the natural and human environment and the potential for mitigating these impacts.

7.2.3 Criteria 3: Technical Feasibility

Each proposed route alternative was evaluated to determine if it is feasible with respect to technical considerations. Screening included a high-level analysis of physical route characteristics; infrastructure requirements to achieve the desired passenger train travel times, frequency, and reliability; infrastructure required to obtain necessary capacity for existing and future freight trains and other passenger trains; and safety.

7.2.4 Criteria 4: Economic Feasibility

Each proposed route alternative was evaluated to determine its feasibility with respect to economic considerations, including assessment of market potential as measured by high-level ridership and revenue forecasts and capital and operating cost forecasts.

7.3 Screening Process

A two-step screening process—coarse-level screening and fine-level screening—was used to evaluate proposed route alternatives using the four criteria described above. The purpose of a two-step screening process as the agreed upon methodology for this project is to eliminate route alternatives burdened by major challenges during the coarse-level screening, thus reducing the number of route alternatives considered for detailed analysis during the fine-level screening and focusing the effort on those alternatives most likely to be built.

7.3.1 Coarse-Level Screening

Coarse-level screening was used to determine which route alternatives meet the Purpose and Need, were environmentally reasonable, and were technically and economically feasible. Route alternatives that met all of these criteria were carried forward to fine-level screening. Route alternatives that did not meet all of these criteria were eliminated from further consideration.

The first criterion to be evaluated was Purpose and Need. Any route alternative that did not meet the Purpose and Need was eliminated from further evaluation. The route alternatives that did meet Purpose and Need were evaluated concurrently based on the environmental, technical, and economic parameters, as presented in Table 29. The coarse-level screening results are presented in Section 8.

Table 29. Coarse-Level Screening Criteria

Criteria	Parameter
Purpose and Need: Travel Demand	What is the population served by the route alternative?
Purpose and Need: Competitive and Alternative Travel Modes	Would the route alternative provide a time-competitive and attractive travel mode compared to other route alternatives?
Environmental Constraints: Major Challenges	Based on qualitative analysis, does the route alternative have major environmental challenges, including key environmental constraints that make the route alternative unreasonable?
Environmental Constraints: Sensitive Areas	Based on qualitative analysis, would the route alternative traverse substantially more environmentally sensitive areas (such as wetlands, wildlife and waterfowl refuges, and park and recreation lands) than other route alternatives?
Environmental Constraints: Right-of-Way	Would the route alternative require substantially more ROW acquisition than other route alternatives?
Technical Feasibility	Would the route alternative involve substantially more technical hurdles than other route alternatives? Parameters considered will include: • Major construction efforts, such as major earthwork efforts and major new bridges • Potential for freight and commuter train traffic conflicts and scope of engineering solutions for such conflicts
Economic Feasibility	Would the route alternatives, upon first inspection, have costs far in excess of its reasonably anticipated benefits? Would the route alternative be substantially more expensive than other route alternatives?

The environmental review was conducted using mapping and open-source aerial photography to identify key constraints along the route alternatives. The economic review used uniform unit costs for new infrastructure to provide a consistent basis for screening.

Information collected during the scoping process was used to help compare and screen route alternatives.

The final product was a list of potentially feasible route alternatives that were carried forward for consideration during the fine-level screening.

7.3.2 Fine-Level Screening

Fine-level screening was conducted to further evaluate the reasonable and feasible route alternatives remaining after the coarse-level screening. During fine-level screening, route alternatives (or combinations of route alternatives) were identified that offered the highest potential ridership; the least potential construction, operating, and maintenance cost; and the

least potential impact on communities and the environment, as well as appropriate mitigation feasibility.

Fine-level screening was based on open-source aerial imagery and/or geographic information systems (GIS) data, which was used to characterize each route alternative. Because several route alternatives, each with lengths on the order of 60 miles, were carried forward from coarse-level screening, field visits were not conducted during fine-level screening.

Fine-level screening incorporated ridership forecasts provided by Caltrans. Caltrans, in collaboration with Amtrak, has developed a passenger rail forecasting model to assist in the development of the state rail plan by forecasting ridership on intercity train services in California. Caltrans developed the ridership forecasts for this study by first running the model with varying services levels (ranging from one round-trip per day up to four round-trips per day) to determine optimum service levels for the Corridor. The model determined that two round-trips per day obtained the best ridership per train while meeting the Purpose and Need of allowing people to go both directions on the same day (Caltrans Division of Rail, 2015 Appendices F and G). During the fine-level screening, model runs for the alternatives assumed two round-trips per day as the level of service for comparison and assumed stations as listed in the alternative descriptions.

The criteria and related parameters used during fine-level screening are identified in Table 30. Further detail on the methodology for evaluating each criterion follows the table. The fine-level screening analysis and results are documented in Section 9. The focus of the fine-level screening was to evaluate and compare route alternatives against each other.

Table 30. Fine-Level Screening Criteria

Criteria	Parameter
Purpose and Need: Travel Demand	Does an initial, "high-level" travel demand analysis indicate that the route alternative would attract a substantially greater or lesser number of riders compared to other route alternatives?
Purpose and Need: Competitive and Alternative Travel Modes	Based on information from coarse-level screening, determine if running times can be further refined for each route alternative. Would the route alternative provide a time-competitive and attractive travel mode compared to other route alternatives?
Environmental Constraints: Environmental Impacts	Upon initial evaluation of the route alternative and quantification of conceptual environmental effects, would the route alternative have the potential to impact substantially more environmentally sensitive areas in the following categories compared with other route alternatives? • Floodplains • Wetlands and non-wetland waters • Farmland • Threatened and endangered species • Cultural and historic resources • Section 4(f)/6(f) protected properties • Environmental justice/community impact assessment • Noise and vibration • Hazardous materials • Air quality and climate change • Visual resources • Land use and planning

Table 30. Fine-Level Screening Criteria

Criteria	Parameter
	• Energy • Transportation and traffic • Water quality • Safety and security
Environmental Constraints: Right-of-Way	Determine conceptual ROW acquisition for each route alternative for purposes of comparison (refined from coarse-level screening). Would the route alternative require acquisition and demolition/disruption of substantially more structures, developments, agricultural resources, or features of the built environment than other route alternatives?
Technical Feasibility: Passenger and Freight Capacity	Determine general infrastructure improvements that would be required to deliver desired passenger train travel times, frequency, and reliability. Determine general infrastructure improvements required to maintain existing and future freight and commuter rail services while enabling prioritized passenger-train operation.
Technical/ Economic Feasibility: Alignment	Would the route alternative involve a more challenging alignment or grading problems, including flyovers, in order to meet schedule and capacity requirements?
Technical/ Economic Feasibility: Structures	Establish conceptual costs for structures for each route alternative for purposes of comparison.
Technical/ Economic Feasibility: Grade Crossings	Determine the number of new and expanded grade crossings and grade separations for each route alternative for purposes of comparison.
Economic Feasibility	Determine O&M costs, revenue forecast estimates, and major infrastructure capital cost for each route alternative as a basis for comparison.

Purpose and Need

Fine-level screening of route alternatives based on the Purpose and Need built on the evaluations conducted during coarse-level screening and determined whether the conclusions regarding which route alternatives meet the Purpose and Need remain valid. Additionally, a more detailed look at travel demand and competitive and attractive travel modes was conducted.

Environmental Constraints

Fine-level screening for environmental constraints was based on a more detailed comparison of the route alternatives carried forward to determine whether a particular route alternative would result in substantially greater environmental impacts in comparison to other route alternatives. Resource analysis was completed using the most recent GIS data available from sources such as the U.S. Census, California Native Diversity Database (CNDDB), United States Fish and Wildlife Service (USFWS), U.S. Geological Survey, National Wetland Inventory, and data available from state agencies (e.g., State Historic Preservation Office). Route alternatives were evaluated by reviewing existing GIS data on environmental resources present along each route alternative deemed feasible during coarse-level screening, and by qualitatively assessing the potential environmental impacts associated with developing each route alternative for passenger rail service. Data on the environmental resources was compiled through publicly available datasets and information made available from resource agencies through the scoping process. A 300-foot-wide area on either side of each route alternative was reviewed via GIS to

determine whether sensitive resources are present. 300 feet on each side is a sufficiently wide swath to identify the presence of sensitive resources that could be affected even if an additional set of tracks was added through the length of the corridor. The existing resources along the route alternatives were compared to determine if one or more route alternatives have a larger proportion of sensitive resources as compared to other route alternatives, and thus have the potential for greater environmental impact.

Technical Feasibility

Railroad operating parameters that influence train speed have an effect on overall travel time and therefore on travel demand. Railroad operating parameters also influence line capacity and the severity of scheduling conflicts between freight and passenger trains, particularly with respect to overall line capacity. In turn, these operating considerations can possibly influence the necessary infrastructure associated with each route alternative.

Fine-level technical screening began with an evaluation of operating considerations and line capacity for each route alternative, as described below:

- Conceptual Train Performance Calculation (TPC) runs were developed for each route alternative as follows:
    - TPC runs were set for the highest possible speed commensurate with prior studies conducted by RCTC and Caltrans, and with the likely infrastructure costs and ridership demand.
    - TPC runs assumed unimpeded passenger train runs and station stops in urban areas.
    - Train consists used in TPC runs used locomotives and rolling stock commensurate with the speed regime used in RCTC/Caltrans studies and with the Passenger Rail Investment and Improvement Act (PRIIA) Section 305 committee specifications for Next Generation locomotives and rolling stock. TPC runs were calculated using an assumed trainset of one EMD F59PHI locomotive and six bi-level Pacific Surfliner coaches, which is the standard trainset currently in use on the intercity Amtrak Pacific Surfliner route between San Diego, Los Angeles, and San Luis Obispo.
    - Existing curve speeds, zone speeds, and 2015 railroad Employee Timetables and System Special Instructions were used to determine maximum initial train speeds.
- TPC runs were used to develop conceptual meet and pass locations and conceptual schedules. Schedules assumed that passenger trains are unimpeded by freight trains, other passenger trains, or themselves.
- The passenger train schedule and speed were used to identify high-level, conceptual infrastructure capacity for each route alternative. These infrastructure requirements include:

- Track capacity and features to enable unimpeded passenger train runs and reliable service, such as sidings for passenger/passenger meet-pass events, station tracks, and servicing facilities.
- Track capacity to avoid degradation of existing freight capacity, service, and reliability, and estimated growth in freight traffic for a 20-year horizon after implementation of the service proposed by the Study.
- Consideration of available passenger train slots under existing operating agreements with the host railroad.

After operating requirements were established, new and existing infrastructure was examined through high-level Conceptual Engineering work undertaken as part of the fine-level screening. Parameters included:

- Improved track structure necessary to deliver reliable passenger train service (for example, reductions in slow-order frequency and duration), to enable maintenance activities to be conducted without impedance to passenger, commuter, and freight trains, and to reduce ongoing maintenance costs.
- Additional infrastructure necessary to support passenger trains, such as station tracks, a layover facility, high-speed sidings and connections, signaling, and additional main track.
- Additional infrastructure necessary to mitigate effects on existing and forecasted commuter and freight rail service and industrial development.
- Additional infrastructure at road/rail at-grade crossings, such as improved warning devices and roadway improvements.
- Infrastructure necessary to deliver passengers to trains and receive passengers from trains, including stations, intermodal connections, and parking requirements.

Economic Feasibility

Generalized capital costs for construction or improvement of track, signaling and communications systems, bridges and drainage structures, and roadway crossings were assessed for each route alternative in order to provide a quick and consistent basis for evaluating the technical challenges and conceptual costs of each route alternative. Capital costs were totaled using a “base plus multiplier” method to enable cross-alternative comparisons. The lowest-cost alternative was established as the base cost, and higher cost alternatives were compared using a multiplier.

Several broad categories of terrain (for example, single-track shallow cuts and fills, double-track deep cuts and fills, single-track major structure, or double-track urban grade crossing) were defined, with accompanying generalizations about construction cost in each category. These definitions became the basis for conceptual cost estimates for each route alternative carried forward for fine level screening. The definition of terrain categories provided a valuable step because civil construction will likely represent both a major component of the cost and a major contributor to environmental impacts. Quantities were tabulated in spreadsheets; however, owing to the extensive length of the route alternatives to be evaluated, plan sheets were not

produced. Generalized annual operating costs were assessed for each route alternative. Capital and operating costs assumed maximum train speeds of 79 mph.

Infrastructure requirements in the LAUS terminal area were not specified, owing to the complexity of rail traffic in that area and the potential for the added effects of other major passenger rail initiatives in that area, and that each of the alternatives is likely to have identical requirements for trackage and platform capacity. L.A. Metro is currently engaged in planning for the future needs of LAUS in its Southern California Regional Interconnector Project (SCRIP).

Equipment costs were compared for the Corridor alternatives. If a particular route alternative required additional equipment, such as additional locomotives to overcome grades, additional trainsets to account for slower schedules and fewer equipment turns, or additional trainsets to account for greater capacity demand, these were used to for an equipment cost additive for that route alternative.

High-level operating costs were forecast based on equipment turns, schedules, and the characteristics of each route alternative. Any known host railroad or operator requirements that may affect operating costs for a particular route alternative were included, such as additional crew districts or additional personnel requirements. The high-level operating costs included high-level maintenance costs for infrastructure and equipment, which were forecast based on the requirements of each route alternative. Infrastructure that could not be shared with freight or commuter railroads were assessed as a stand-alone cost, whereas infrastructure that could be shared with freight or commuter railroads were assessed using existing Amtrak cost-reimbursement schedules. Equipment costs were forecast on a stand-alone basis to avoid assumptions of economies with other route alternatives that may not prove viable.

The application of those technical criteria related specifically to rail operations equipment, and maintenance will be addressed in greater detail in the SDP.

8 Coarse-Level Screening

This section describes the first level of evaluation in the Alternatives Analysis process. Coarse-level screening compares the route alternatives to identify excessive costs, impacts, or other factors that would warrant removing alternatives from further consideration. The Coachella Valley-San Gorgonio Pass Rail Corridor route alternatives were evaluated against the six coarse-level screening criteria defined in Section 7.3. These criteria include:

The coarse-level screening process evaluated the route alternatives and identified alternatives to move forward into the fine-screening process.

1. Purpose and Need: Travel Demand
2. Purpose and Need: Competitive and Alternative Travel Modes
3. Environmental Constraints: Major Challenges
4. Environmental Constraints: Sensitive Areas
5. Environmental Constraints: Right-of-Way
6. Technical Feasibility

The results of this evaluation are presented below. A summary of the screening results is provided at the end of this chapter. It is important to note that in the coarse and fine level screening, conceptual rail infrastructure capital projects identified are presented as potential improvements for the proposed Coachella Valley passenger rail service for alternatives comparison purposes, and should be considered as initial estimates that will be further refined through the next phases of the study.

As described in Section 1, the Study Area consists of two sections: the Eastern Section and the Western Section. The coarse-level screening addresses one rail route alternative in the Eastern Section between Indio and Colton and six rail route alternatives in the Western Section between Colton and Los Angeles, described in Section 5. All six rail route alternatives have a western terminus at LAUS, which requires the use of River Subdivision trackage owned by SCRRA.

The River Subdivision is a high-density, multiple-track railroad that provides the only rail access into LAUS for all Amtrak passenger and Metrolink commuter trains arriving from all directions. All route alternatives require use of the River Subdivision to access LAUS, at distances ranging from 0.9 to 5.3 miles. The River Subdivision was not included as a basis for comparison because it was not considered a differentiator for comparing route alternatives, except for the following criteria: mileage, travel time, ridership and revenue (as influenced by travel time), and operations and maintenance costs. Passenger train connections already exist between the River Subdivision and each route alternative being evaluated, and no additional connections are contemplated. No additional infrastructure or capacity improvements are anticipated on the River Subdivision as a result of the implementation of this service.

All route alternatives have similar station access plans and costs, as shown in Appendix D, and thus are not compared in this analysis.

8.1 Yuma Subdivision

All rail route alternatives considered using existing freight-passenger routes, rather than constructing a new route on new right-of-way. Development of entirely new rail routes would be more expensive and more disruptive to the environment and surrounding communities than adding capacity or improvements to existing rail routes. Alternatives with entirely new alignments were deemed unreasonable, owing to the potential significant impact on the natural and human environment; the cost of new right-of-way, and the challenge of timely property acquisition. Consequently, for the Eastern Section, the screening was limited to the Union Pacific's Yuma Subdivision. The Yuma Subdivision was evaluated against the coarse-level Screening criteria to identify any insurmountable technical or operational challenges to operating Coachella Valley passenger train service and consideration of the subdivision as a reasonable alignment alternative.

The Eastern Section is approximately 71 miles long and encompasses UP Yuma Subdivision between Indio and Colton. No existing alternative railroad lines exist in the Eastern Section of the Study Area, nor are there any historic rail corridors that are no longer in use. Accordingly, the Yuma Subdivision forms the Eastern Section of the Study Area. The Eastern Section of the Coachella Valley-San Gorgonio Pass Rail Corridor contains five potential station areas: Indio, Rancho Mirage, Palm Springs, San Gorgonio Pass, and Loma Linda/Redlands.

8.1.1 Purpose and Need: Travel Demand

In coarse-level screening, population serves as the parameter measure for the travel demand criterion. The combined total population within a 15- mile station catchment area of the Eastern Section was approximately 1.73 million in 2008, and is projected to grow to 2.03 million by 2020. The population in the Eastern Section of the rail Corridor represents about 20 to 25 percent of the total population within the Corridor in 2008 (depending on which Western Section route is selected to form the total rail Corridor). The population in the Eastern Section of the rail Corridor is projected to represent 22 to 27 percent of the total population in the Corridor by 2020.

8.1.2 Purpose and Need: Competitive and Attractive Travel Modes

Providing a time-competitive and attractive travel mode compared to other route alternatives is the parameter for this criterion. The Yuma Subdivision accounts for approximately 50 percent of the Coachella Valley Rail Corridor's route-mileage between Indio and Los Angeles Union Station, and also approximately 50 percent of the running time of the proposed passenger rail service.

The maximum authorized speed of a passenger train on the Yuma Subdivision in the Study Area ranges from 30 mph to 70 mph, with an average maximum authorized speed of 59 mph, owing to the numerous curves and steep ascending and descending grades between Indio and Colton. The projected travel time of the proposed Coachella Valley passenger trains in the Eastern Section between Indio and Loma Linda, a distance of nearly 68 miles, is projected to be 75 to 90 minutes, inclusive of station stops. The mileage and travel time on the Yuma Subdivision (the Eastern Section) remain the same regardless of which Western Section alternative is selected west of Colton

Comparisons can be made with competing travel modes to evaluate travel time competiveness by incorporating travel within the Eastern Section and combining it with the first station in the Western Section of the various route alternatives. For example, passenger trains operating via Route Alternatives 4b or 5 have a projected travel time between Indio and San Bernardino of 1 hour, 43 minutes westbound and 1 hour, 58 minutes eastbound. This is more competitive and attractive than the service currently provided by Amtrak Thruway Bus Route 19b, which has a scheduled travel time between Indio and San Bernardino of 2 hours, 25 minutes westbound and 2 hours, 20 minutes eastbound.

Similarly, passenger trains operating via Route Alternatives 1 or 2 have a projected travel time between Indio and Riverside of 1 hour, 48 minutes westbound and 2 hours eastbound. This is slightly more favorable than Amtrak Thruway Bus Route 39, which currently has a scheduled travel time between Indio and Riverside of 2 hours, 20 minutes westbound and 2 hours, 5 minutes eastbound.

Additionally, passenger trains operating between Cabazon in the San Gorgonio Pass Area and Riverside via Route Alternatives 1 or 2 have a projected travel time of between 1 hour, 5 minutes and 1 hour, 8 minutes. This compares quite favorably to the SunLine Transit Agency Route 220 commuter bus, which has a travel time between Cabazon and the Riverside Metrolink station of 1 hour, 19 minutes westbound and 1 hour, 33 minutes eastbound.

8.1.3 Environmental Concerns: Major Challenges

In coarse-level screening, the parameter measure for the major challenges criterion involved identifying any key environmental constraints that would render the route alternative unreasonable. Based on coarse-level analysis, a possibility exists that additional infrastructure for the Eastern section may require construction of sections of third main trackage and additional sidings or holding tracks along portions of the alignment between Indio and Colton. Depending on the final location of the potential sections of additional track capacity, the Eastern Route alignment may require a new bridge for a third main track across the Santa Ana River just east of the Colton Crossing. This section of the Santa Ana River is considered to contain critical habitat for the Southwestern Willow Flycatcher, an endangered species. Coordination with the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), and U.S Army Corps of Engineers (ACOE) would be required and is likely to be complex since critical habitat is identified for this waterway. Based on a preliminary review of State and Federal registers of historic places, the Eastern Route alignment is not in close proximity to a designated cultural resource. Should infrastructure improvements be required outside of the existing rail right-of-way between Indio and Colton, there is a possibility of previously undiscovered cultural or paleontological resources adjacent to the railroad right-of-way.

8.1.4 Environmental Concerns: Sensitive Areas

In coarse-level screening, the Sensitive Areas criterion parameter measured if the route alternative traverse substantially more environmentally sensitive areas, inferring that the more environmentally sensitive areas traveled through, the greater the potential environmental impact, primarily triggered by infrastructure improvements. A portion of the Eastern Route alignment passes through critical habitat for the Southwestern Willow Flycatcher as the

alignment crosses over the Santa Ana River near Grand Terrace and Colton. A portion of the Eastern Route alignment would also be adjacent to a critical habitat and a Bureau of Land Management (BLM) Area of Critical Environmental Concern (ACEC) for the Coachella Valley Fringe-Toed Lizard as the alignment crosses through Palm Springs and Thousand Palms. Based on an aerial review of the area, the Eastern Route alignment does not pass through any federal, state, or local parks.

8.1.5 Environmental Concerns: Right-of-Way

As previously stated, the Eastern Route alignment would use existing freight-passenger routes, rather than construct a new route on new right of way. Based on a review of aerial mapping along the route, land uses along this alternative are mostly rural/undeveloped land with pockets of urban uses consisting of commercial, industrial, and residential uses (Google Maps, 2015). Since the Eastern Route alignment would use the existing UP Yuma subdivision between Indio and Colton, right-of-way acquisition is not anticipated to be required along the entire Eastern Route alignment. Rather, there is a potential that additional infrastructure would require construction of sections of third main trackage and additional sidings or holding tracks in certain portions of the alignment between Indio and Colton, although specific locations have not been identified.

Portions of the Eastern Route alignment pass through the Morongo Indian Reservation and the Agua Caliente Indian Reservation. The end of the Eastern Route alignment in Indio is adjacent to the Cabazon Indian Reservation. In the event that right-of-way is needed for additional infrastructure (e.g. third main trackage, sidings, holding tracks), in areas designated as Native American Reservation lands, additional coordination with the applicable Native American Tribe and the Bureau of Indian Affairs (BIA) would be required. This would require potentially complex and lengthy government to government consultation, additional stakeholder coordination, and entering into an easement negotiation process with the Native American Tribe and BIA.

8.1.6 Technical Feasibility

In coarse-level screening, parameters considered for technical feasibility include: major construction, major earthwork, major new bridges; potential freight and commuter train traffic conflicts, and the scope of engineering solutions for the conflicts. Union Pacific's Yuma Subdivision is a high-density, double-track freight train route. The subdivision carries UP's long-haul intermodal, automotive, bulk, and manifest freight traffic destined to and from major terminals in Southern California, including the Ports of Los Angeles and Long Beach. The Yuma Subdivision is part of Union Pacific's Sunset Route, which links Southern California with major population centers in the Midwest, the Gulf Coast, and the Southeast. Current traffic averages approximately 40 freight trains per day, along with Amtrak Sunset Limited long-distance train that operates three days per week, according to Amtrak and SCAG's Comprehensive Regional Goods Movement Plan and Implementation Strategy. Freight train volumes have substantial variability associated with vessel calls at the Ports, customer requirements, day of week, and import-export fluctuations, and traffic on the Yuma Subdivision often can be as high as 80 trains per day.

Amtrak's Sunset Limited operates on the Yuma Subdivision three days per week in each direction. The train makes one station stop on the Yuma Subdivision, at Palm Springs. Westbound train No. 1 has a scheduled departure time at Palm Springs of 2:02 a.m. on Monday, Wednesday, and Friday; eastbound train No. 2 has a scheduled departure time at Palm Springs of 12:36 a.m. on Monday, Thursday, and Saturday.

Between Indio and Colton, passenger trains have maximum authorized speeds ranging between 30 and 70 mph. The average maximum authorized speed is 59 mph, but in many section the operating speed that a passenger train could actually attain is less, owing to the subdivision's adverse grades and curves, time required for acceleration and braking as speed limits change, and time allotted for station stops. The lower operating speeds primarily result from curves of 3 to 5 degrees and lengthy gradients of up to 2.0% in each direction of travel. Reduction of curvature or gradient on much of the subdivision would be costly, owing to the adjacent canyon terrain and surrounding urban development. The subdivision's maximum authorized freight train speed is also 70 mph, although most freight trains operate at much lower maximum speeds between Indio and Colton, and the line's steep grades and curves further limit freight train speeds. The route is equipped with wayside signaling with a Centralized Traffic Control overlay, and is in the process of being equipped with Positive Train Control (PTC). UP is assumed to have PTC operational by December 31, 2018, the extended deadline enacted by Congress in November 2015. UP submitted to FRA its revised PTC implementation plan on or before January 27, 2016, which contains this date.

Since 2000, Union Pacific has constructed portions of second main track on the Yuma Subdivision between Indio and Colton in all sections where only one main track had previously existed. This construction is part of a larger program to double-track all 760 miles of UP's Sunset Route between El Paso, TX and West Colton, CA. UP is pursuing this capacity improvement project to enable it to attract new business and improve service on the Corridor. In 2013, UP and BNSF completed the $93 million Colton Crossing project near the Yuma Subdivision's west end that eliminated an at-grade diamond crossing with BNSF's San Bernardino Subdivision at Colton and replaced it with a 1.4-mile overpass that carries UP's line over the BNSF line, reducing chronic delays that each railroad had been experiencing at the busy crossing.

Freight trains on the Yuma Subdivision experience operating challenges as a result of the steep grades on either side of San Gorgonio Pass, the geographic formation through which the Yuma Subdivision passes between the San Bernardino Mountains to the north and the San Jacinto Mountains to the south. From an elevation of sea level near Indio, westbound trains face a climb 50 miles long on a ruling grade that increases to 2.12%, before cresting the summit of the pass at an elevation of 2,591 feet just east of Beaumont. Eastbound trains from Colton have a 1.9% climb for more than 20 miles to reach the summit, passing through San Timoteo Canyon. The combination of steep grades on either side of the pass, and the sustained upgrade climb for westbound trains result in substantial loss of capacity compared to a double-track main line without heavy grades.

Freight trains can also experience delays or congestion at Colton, where some trains are held to wait for authority to enter BNSF's San Bernardino Subdivision. West Colton Yard, just west of Colton on the Alhambra Subdivision, is UP's principal classification yard for manifest trains in the Southern California region, as well as a crew change point for most freight trains that pass

by. On days of heavy freight train traffic, one of the two main tracks on the Yuma Subdivision is frequently occupied east of Colton by several parked freight trains waiting for an open track in West Colton Yard.

To accommodate additional passenger trains on the Yuma Subdivision without degrading freight train capacity, additional infrastructure would likely be required to enable overtakes of freight trains and enable meet/pass events for the proposed Coachella Valley passenger trains, and to provide adequate windows for track maintenance. The additional infrastructure could include construction of sections of third main track between Indio and Colton and construction of additional sidings or holding tracks, although specific locations have not been identified.

Construction of sections of third main track between Indio and Colton presents right-of-way, grading, and grade crossing challenges. The line crosses numerous washes, creeks and the Santa Ana River just east of the Colton Crossing. Should the potential new infrastructure include additional track over the Santa Ana River, a new bridge for a third main track would be needed. The Yuma Subdivision has 16 public grade crossings and 6 private grade crossings between Indio and Colton, any of which would require improvements in signaling and roadway surface, curb, and traffic management devices to accommodate sections of a third main track. There are 23 overpasses and 6 underpasses along the Yuma Subdivision. A few locations where the Yuma Subdivision goes underneath major highways would require evaluation to assess if an additional main track can be accommodated without modifications to the overhead structure including:

- Indio: Business Route 10 (Indio Boulevard)
- Whitewater: Highway 111
- Beaumont: Highway 60
- Colton: Interstate 215 (Riverside Freeway)

8.1.7 Economic Feasibility

At coarse-level screening, economic feasibility is measured by evaluating if the route alternative is substantially more expensive than other route alternatives, and if costs are far in excess of its reasonably anticipated benefits. In order to accommodate passenger trains on the Yuma Subdivision at a reasonable level of reliability, additional capacity construction may be required. Improvements could include the construction of sections of a third main track between Indio and Colton, and additional sidings or tracks, particularly near Colton, in which to store freight trains waiting for authority to proceed into UP's West Colton Yard or onto BNSF's San Bernardino Subdivision. Given the length of the subdivision, implementation of the capacity improvements could be accomplished with reasonable engineering solutions.

8.1.8 Summary

Based on the results of the coarse-level screening, no significant challenges or fatal flaws were identified and as a result, the Yuma Subdivision is carried forward in the analysis as the only Eastern Section alignment. Therefore, in the subsequent coarse- and fine-level screenings of various Western Section route alternatives, the Eastern Section using the Yuma Subdivision

alignment serves as a common component for all of the route alternatives under consideration when evaluating ridership, competitive and attractive travel modes, technical feasibility, and economic feasibility. Furthermore, because Yuma Subdivision is the only East Section route alignment, no subsequent fine-level screening of the alignment is provided.

8.2 Route Alternative 1

The BNSF San Bernardino Subdivision is the southernmost of the Western Section route alternatives (see Figures 41 and 42). This route alternative is 70 miles long between Colton and LAUS, and would form a total Indio-Los Angeles Corridor length of 141 miles. This route is used by Amtrak's Southwest Chief long-distance passenger train between Colton and Los Angeles, and Amtrak's Pacific Surfliner intercity passenger trains between Fullerton and Los Angeles. The route is also used by three Metrolink commuter services: Inland Empire-Orange County Line trains between Colton and Atwood; 91 Line trains between Riverside and Los Angeles; and Orange County Line trains between Fullerton and Los Angeles.

The ridership model needs a precise schedule to develop its forecasts; however RTC modeling of the rail operations were not developed at this level of analysis. Several optimization runs were prepared with the Caltrans ridership model using various assumptions of service levels and schedules, and the schedule that yielded the highest ridership estimate was applied for the fine-level screening ridership forecasts for each alternative. The ridership model used is the same model used in the development of the State rail plan and on other corridors statewide.

The schedule developed from the optimization runs for this alternative is shown in Table 31 and Table 32.

Table 31. Route Alternative 1 Westbound Schedule

Westbound	AM Trip	PM Trip
Indio	9:50 AM	3:20 PM
Rancho Mirage	10:05 AM	3:35 PM
Palm Springs	10:15 AM	3:45 PM
Cabazon	10:30 AM	4:00 PM
Loma Linda	11:05 AM	4:35 PM
Riverside-Downtown	11:38 AM	5:08 PM
Fullerton	12:20 PM	5:50 PM
LAUS	1:00 PM	6:30 PM
Total Schedule Time	**3:10**	**3:10**

Source: Caltrans Travel Forecasting, 2015; Appendix D

Table 32. Route Alternative 1 Eastbound Schedule

Eastbound	AM Trip	PM Trip
LAUS	10:20 AM	3:25 PM
Fullerton	10:52 AM	3:57 PM
Riverside-Downtown	11:36 AM	4:41 PM
Loma Linda	12:06 PM	5:11 PM
Cabazon	12:41 PM	5:46 PM
Palm Springs	12:56 PM	6:01 PM
Rancho Mirage	1:11 PM	6:16 PM
Indio	1:36 PM	6:41 PM
Total Schedule Time	**3:16**	**3:16**

Source: Caltrans Travel Forecasting, 2015; Appendix D

8.2.1 Purpose and Need: Travel Demand

In coarse-level screening, population serves as the parameter measure for the travel demand criterion. This alternative would serve the intermediate major communities of Riverside and Fullerton, California. The total population within a 15-mile catchment area of these two intermediate stops is approximately 5.63 million, and is projected to grow to 6.08 million by 2020. The catchment area around Fullerton has the largest population of any potential intermediate stop among all six route alternatives, with a current population of approximately 4.19 million (and projected to reach 4.47 million by 2020).

The selection of this alternative would form an Indio-Los Angeles Corridor that would serve a total population within all the station catchment areas of approximately 10.73 million, with a projected increase in population along the Corridor to 11.63 million by 2020, which is the highest population reach based on proximity to the route among the six alternatives. (SCAG 2012 RTP/SCS)

8.2.2 Purpose and Need: Competitive and Attractive Travel Modes

Providing a time-competitive and attractive travel mode compared to other route alternatives is the parameter for this criterion. This alternative is the longest (i.e., miles from end to end) of the route alternatives being evaluated, but would have a travel time comparable to the other alternatives, given the route's 79-mph maximum allowable passenger train speed and multiple-track main line. Projected running times between Indio and Los Angeles are 3 hours, 10 minutes westbound and 3 hours, 16 minutes eastbound (Table 31 and 32).

8.2.3 Environmental Concerns: Major Challenges

In coarse-level screening, the parameter measure for the major challenges criterion involved identifying any key environmental constraints that make the route alternative unreasonable. As was previously discussed in the description of the proposed service, operating agreements between RCTC, BNSF and UP identified staged infrastructure improvement projects needed for

a prescribed level of passenger rail service along the BNSF San Bernardino Subdivision, the alignment for Alternative 1. Completed improvements provide sufficient passenger train slots for this route. Therefore, additional major infrastructure is not needed if RCTC dedicates the available slots to the Coachella Valley service, so this route would not involve any major direct environmental challenges.

8.2.4 Environmental Concerns: Sensitive Areas

In coarse-level screening, the Sensitive Areas criterion parameter measured if the route alternative traversed substantially more environmentally sensitive areas, inferring that the more environmentally sensitive areas traveled through, the greater potential for environmental impacts triggered by infrastructure improvements. This route is adjacent to least Bell's vireo (LBV), an endangered species, critical habitat that has been established by the USFWS as it passes through the community of Corona. This alternative also passes through critical habitat for the Southwestern Willow Flycatcher, an endangered species, between the communities of Grand Terrace and Colton. The route passes through or is adjacent to seven areas of regulated wetlands. In addition, the Western Section of this alternative crosses over the Santa Ana River (twice), the San Gabriel River, the Rio Hondo Channel, and Coyote Creek. This alternative also passes through and is adjacent to the southern-most boundary of Chino Hills State Park and is adjacent to seven city parks. While this route traverses these sensitive areas, no major infrastructure projects that could significantly impact sensitive areas have been identified for the Coachella Valley service based on current operating agreements.

8.2.5 Environmental Concerns: Right-of-Way

Measuring if the route alternative would require substantially more right-of-way acquisition compared to other route alternatives is the parameter for this criterion. Based on a review of aerial mapping along the route, land uses adjacent to this alternative are primarily commercial, industrial, and residential (Google Maps, 2015). Since sufficient passenger train slots are available under current operating agreements for this route, additional major infrastructure is not needed if RCTC dedicates the available slots to the Coachella Valley service, so this route would not involve any right-of-way issues.

8.2.6 Technical Feasibility

In coarse-level screening, parameters considered for technical feasibility include: major construction, major earthwork, major new bridges; potential freight and commuter train traffic conflicts, and the scope of engineering solutions for the conflicts.

This alternative is a high-density freight train route that also hosts Amtrak passenger and Metrolink commuter rail traffic. In addition, Union Pacific freight trains operating to and from the UP Los Angeles Subdivision at Riverside have trackage rights on BNSF's San Bernardino Subdivision between San Bernardino and Riverside. The route plays a critical role in the movement of domestic and imported consumer goods carried in BNSF intermodal trains between Southern California ports and terminals and the U.S. Interior. Intermodal trains to and from the Ports of Los Angeles and Long Beach operate the entire length of Route Alternative 1, and use a connection at the route's western end with the Alameda Corridor rail line serving the

Ports. BNSF operates additional intermodal trains to and from its own intermodal terminals located along Route Alternative 1 at Commerce and Hobart.

This alternative is the only alternative that has multiple main tracks for its entire length, consisting of alternating sections of double track and triple track. Current train traffic between Riverside and Los Angeles exceeds 40 freight trains per day, on average, and the section between San Bernardino and Riverside exceeds 60 freight trains per day, on average, according to SCAG's Comprehensive Regional Goods Movement Plan and Implementation Strategy. Two daily Amtrak long-distance trains operates the entire length of the route, and 22 daily Amtrak Pacific Surfliner trains use the portion of the route between Fullerton and Los Angeles. Weekday Metrolink commuter rail traffic varies by segment, with eight trains between Colton and Riverside; 25 trains between Riverside and Atwood; nine trains between Atwood and Fullerton; and 28 trains between Fullerton and Los Angeles. Weekend Metrolink commuter rail traffic also varies, with four trains between Colton and Riverside; eight trains between Riverside and Atwood; four trains between Atwood and Fullerton; and 12 trains between Fullerton and Los Angeles.

Maximum allowable passenger train speed is 60 mph east of Fullerton and 79 mph west of Fullerton. The maximum allowable freight train speed is 50 mph throughout. (Information about all BNSF track speeds, gradients, terminal locations, mileages, and signaling in this report have come from the BNSF San Bernardino Subdivision employee timetable dated June 25, 2014.) However, grades of 1% ascending eastward from Fullerton to Colton have the potential to slow or prevent freight trains from reaching track speed. The route is equipped with wayside signaling and Centralized Traffic Control, and Metrolink launched a revenue service demonstration project of Positive Train Control on the route in 2014. At Colton, a low-speed (20 mph) connecting track is in operation that enables trains from Indio operating westbound on UP's Yuma Subdivision to directly access and operate westbound on BNSF's San Bernardino Subdivision. There are 34 overpasses and 6 underpasses along Route Alternative 1.

To accommodate additional Coachella Valley passenger trains on the BNSF San Bernardino Subdivision will not require additional major infrastructure if RCTC dedicates some of the passenger train slots that are available under current operating agreements:

- Between Los Angeles and Fullerton, the near-term completion of the triple track project will allow for 50 train movements, up from the current 28. If needed, RCTC can commit four of those train slots to the Coachella Valley service.
- Between Fullerton and Riverside the agreement currently allows for 36 train movements, and there are 25 daily train movements at present. If needed, RCTC can commit four of those train slots to the Coachella Valley service.
- For the segment between Riverside and Colton, the 2013 completion of the Colton Crossing and some additional provisions allow for conversion of four non-revenue movements to revenue movements between Riverside and San Bernardino. If needed, RCTC can commit those four new revenue slots to the Coachella Valley service.

8.2.7 Economic Feasibility

At coarse-level screening, economic feasibility is measured by evaluating if the route alternative is substantially more expensive than other route alternative, and if it costs far in excess of its reasonably anticipated benefits. Because there are available passenger train slots for the entire route between Colton and Los Angeles, additional major infrastructure construction would not be required for this route alternative. The base train equipment sets would be adequate for this alternative. Route Alternative 1 has no specific characteristics that would change operating or maintenance costs substantially compared to the other alternatives, and because no major infrastructure improvements have been identified at this time, this alternative has the lowest capital costs compared to the other alternatives.

8.3 Route Alternative 2

Route Alternative 2, the UP Los Angeles Subdivision, is situated north of Route Alternative 1 (see Figures 41 and 43). This alternative is 67 miles long between Colton and LAUS and would form a total Indio-Los Angeles Corridor length of 138 miles. This alternative utilizes 6 miles of BNSF's San Bernardino Subdivision between West Colton and Riverside, then follows UP's Los Angeles Subdivision, which diverges from BNSF's main line at Riverside and extends west to Los Angeles. The BNSF portion of this alternative is used by Amtrak's Southwest Chief long-distance passenger train and Metrolink's Inland Empire-Orange County Line commuter trains. The UP portion of the route is used by Metrolink's Riverside Line commuter trains between Riverside and Los Angeles. The schedule for this alternative is shown in Tables 33 and 34, assuming two round trips per day.

Table 33. Route Alternative 2 Westbound Schedule

Westbound	AM Trip	PM Trip
Indio	9:50 AM	3:20 PM
Rancho Mirage	10:05 AM	3:35 PM
Palm Springs	10:15 AM	3:45 PM
Cabazon	10:30 AM	4:00 PM
Loma Linda	11:05 AM	4:35 PM
Riverside-Downtown	11:38 AM	5:08 PM
Pomona	12:08 PM	5:38 PM
LAUS	1:00 PM	6:30 PM
Total Schedule Time	**3:10**	**3:10**

Source: Caltrans Travel Forecasting, 2015; Appendix D

Table 34. Route Alternative 2 Eastbound Schedule

Eastbound	AM Trip	PM Trip
LAUS	10:20 AM	3:25 PM
Pomona	11:03 AM	4:08 PM
Riverside-Downtown	11:34 AM	4:39 PM
Loma Linda	12:04 PM	5:09 PM
Cabazon	12:39 PM	5:44 PM
Palm Springs	12:54 PM	5:59 PM
Rancho Mirage	1:09 PM	6:14 PM
Indio	1:34 PM	6:39 PM
Total Schedule Time	**3:14**	**3:14**

Source: Caltrans Travel Forecasting, 2015; Appendix D

8.3.1 Purpose and Need: Travel Demand

This alternative is located between Colton and Los Angeles serving the intermediate major communities of Riverside and Pomona, California. The total population within a 15-mile catchment area of these two intermediate stops is approximately 3.78 million, and is projected to grow to 4.14 million by 2020. This alternative would form an Indio-Los Angeles Corridor that would serve a total population within the station catchment areas of approximately 9.38 million, with a projected increase in total population by station catchment area along the Corridor to 10.20 million by 2020. (SCAG 2012 RTP/SCS)

8.3.2 Purpose and Need: Competitive and Attractive Travel Modes

This alternative is the second longest of the alternatives, but would have a travel time comparable to the other alternatives, given the route's 79-mph maximum allowable passenger train speed. As shown in Tables 32 and 33, projected running times between Indio and Los Angeles are 3 hours, 10 minutes westbound and 3 hours, 14 minutes eastbound.

8.3.3 Environmental Concerns: Major Challenges

Additional ROW and modifications to existing track infrastructure resulting in new or expanded bridges over waterways would require intensive coordination with the USFWS, CDFW, and other responsible resource agencies. In the event that a new or expanded bridge is needed at the Santa Ana River along the Los Angeles Subdivision between the cities of Riverside and Jurupa Valley, mitigation could be difficult to obtain since the route crosses critical habitat for LBV and Southwestern Willow Flycatcher (both are listed as a Federal and State endangered species). The route crosses through the Santa Ana River Wildlife Area. In addition, the project would have to comply with the Western Riverside Multiple Species Habitat Conservation Plan, which has strict requirements and mitigation measure strategies for impacted species.

For other areas where a new or expanded bridge crosses over a waterway (e.g. San Gabriel River, Rio Hondo Channel), coordination with the USFWS, CDFW, and ACOE is likely to be less complex since no critical habitat or wildlife management areas are identified for these waterways.

8.3.4 Environmental Concerns: Sensitive Areas

This alternative passes through least Bell's vireo critical habitat as it crosses the Santa Ana River between the communities of Pedley and Riverside. This alternative also passes through Southwestern Willow Flycatcher critical habitat between the communities of Grand Terrace and Colton. The Western Section of this alternative does not pass through and is not adjacent to any BLM ACECs or USFWS National Wildlife Refuges. However, this alternative does pass through a CDFW Wildlife Management Area (Santa Ana River Wildlife Area) and passes through or is adjacent to six areas of regulated wetlands. In addition, the Western Section of this alternative crosses over the Santa Ana River (twice), the San Gabriel River, and the Rio Hondo Channel. This alternative does not pass through any federal, state, or local parks but is adjacent to six local parks.

8.3.5 Environmental Concerns: Right-of-Way

Based on a review of aerial mapping along the route, land uses along this alternative are mostly urban uses consisting of commercial, industrial, and residential uses (Google Maps, 2015). Based on preliminary estimates (assuming a worst-case 20-foot right-of-way acquisition requirement along the entire rail route from Colton to Los Angeles), approximately 666 acres of land would need to be acquired. In addition to being very expensive, this would require displacement of many landowners, particularly where the route alternative passes through highly urbanized areas. Additional research will be conducted on the fine-level screening analysis.

8.3.6 Technical Feasibility

Route Alternative 2 is a high-density freight train route that also hosts Metrolink commuter rail service. The route carries UP intermodal, automotive, and manifest freight traffic operating between Southern California and main lines headed east from California to the Midwest and South Central regions of the U.S. Intermodal trains to and from the Ports of Los Angeles and Long Beach use a connection at Route Alternative 2's western end with the Alameda Corridor rail line serving the Ports. In addition to Port traffic, UP operates freight trains to and from major rail terminals of its own situated along Route Alternative 2. These terminals are located at East Los Angeles, a major domestic and international intermodal container facility; Montclair, a manifest support yard for local traffic; and Mira Loma, UP's primary automotive facility in the Los Angeles area. Current traffic averages approximately 20 to 40 freight trains per day, and 12 commuter trains per day on weekdays, according to Metrolink and SCAG's Comprehensive Regional Goods Movement Plan and Implementation Strategy. Route Alternative 2 has a maximum allowable speed of 79 mph for passenger trains and 65 mph for freight trains. However, grades approaching 1% in both directions between Riverside and Los Angeles may slow or prevent heavy from freight trains from achieving track speed. The route is equipped with

wayside signaling and Centralized Traffic Control. (Information about all UP track speeds, gradients, terminal locations, mileages, and signaling in this report have come from the UP Los Angeles Subdivision employee timetable dated October 28, 2013.)

The 55 miles of UP's Los Angeles Subdivision that would be used for Route Alternative 2 include almost 10 miles of single-track main line. This presents an impediment to freight operations during the morning and evening commuter train windows, as the single main track must be kept clear for the current Metrolink Riverside Line service, which uses all of the available passenger train slots. Further, UP's Los Angeles Subdivision terminates at Riverside, and all trains operating east of Riverside use trackage rights on BNSF's San Bernardino Subdivision for 7 miles east to UP's Yuma Subdivision at Colton, or for 102 miles east to UP's main line to Salt Lake City at Daggett, California. Eastbound UP trains on the Los Angeles Subdivision approaching Riverside must receive permission from the BNSF San Bernardino Subdivision dispatcher to proceed onto BNSF's trackage at Riverside. If contact with the dispatcher or permission to continue east is not quickly received, this process may require trains to stop and wait on UP's trackage west of Riverside. If there is a long wait for a train to receive permission to proceed onto the busy BNSF San Bernardino Subdivision, the effects can ripple west along the Los Angeles Subdivision and delay other trains.

The Los Angeles Subdivision is one of two east/west routes that UP owns between Colton and Los Angeles. The other is the Alhambra Subdivision that is primarily single track (Route Alternative 3). To mitigate the potential for delays caused by UP's heavy freight train volumes, Metrolink commuter trains, BNSF operating conditions, and limited mainline capacity, UP operates the Los Angeles and Alhambra subdivisions directionally for through trains operating between Colton and Los Angeles. The Los Angeles Subdivision handles a majority of UP's eastbound traffic leaving the region, including intermodal traffic originating at the Ports of Los Angeles and Long Beach. The Los Angeles Subdivision also handles westbound intermodal trains bound for the Ports that use a connection from the Alhambra Subdivision onto the Los Angeles Subdivision at Pomona. Local freight trains also operate in both directions on the line to serve a large number of industries between Riverside and Los Angeles. There are 25 overpasses and 39 underpasses along Route Alternative 2.

To accommodate additional passenger trains on Route Alternative 2 without degrading freight train capacity, additional infrastructure would likely be required to enable overtakes of freight trains, meet/pass events for the proposed Coachella Valley passenger trains and Metrolink commuter traffic, which include potential portions of third track, and adequate windows for track maintenance. Obstacles to constructing an additional main track between Riverside and Pomona include a lack of available ROW between Riverside and Arlington, where the alignment descends an escarpment and is constrained by a quarry. An additional bridge over the Santa Ana River would also be needed to supplement the existing single-track concrete arch structure.

8.3.7 Economic Feasibility

Because this alternative is near capacity, additional capacity construction would be required. Route Alternative 2 carries a heavy volume of intermodal trains as well as local trains on a mostly single-track route, and is considered to be operating near its effective capacity. The PRIIA requirement that a new intercity service not degrade existing host railroad freight

operations means that some infrastructure improvements, such as additional tracks or sidings, will likely be needed to avoid degradation. Route Alternative 2 would likely require extensive improvements, including constructing an additional main track at locations where only one track currently exists, and potentially constructing additional sidings to store freight trains during passenger train operating windows or while waiting for clearance to proceed onto BNSF's San Bernardino Subdivision. The base train equipment sets would be adequate for this alternative. Route Alternative 2 has no specific characteristics that would change operating or maintenance costs substantially compared to the other alternatives.

8.4 Route Alternative 3

Alternative 3, the UP Alhambra Subdivision, is a westward continuation of UP's Yuma Subdivision from Indio (see Figures 41 and 44). The two subdivisions join at the Rancho interlocking in Colton, at the east end of a major UP hump classification yard. This alternative is 58 miles long between Colton and Los Angeles Union Station, and would form a total Indio-Los Angeles Corridor length of 129 miles. This route is used by Amtrak's tri-weekly Sunset Limited long-distance passenger train between Colton and Los Angeles. The schedule for this alternative is shown in Tables 34 and 36, assuming two round trips per day.

Table 35. Route Alternative 3 Westbound Schedule

Westbound	AM Trip	PM Trip
Indio	9:50 AM	3:20 PM
Rancho Mirage	10:05 AM	3:35 PM
Palm Springs	10:15 AM	3:45 PM
Cabazon	10:30 AM	4:00 PM
Loma Linda	11:05 AM	4:35 PM
Ontario (Airport)	12:08 PM	5:38 PM
Pomona	12:24 PM	5:54 PM
LAUS	1:13 PM	6:43 PM
Total Schedule Time	**3:23**	**3:23**

Source: Caltrans Travel Forecasting, 2015; Appendix D
Note: Alternative 3 uses a proposed Ontario Airport stop instead of the existing Amtrak Ontario Station.

Table 36. Route Alternative 3 Eastbound Schedule

Eastbound	AM Trip	PM Trip
LAUS	10:20 AM	3:25 PM
Pomona	11:01 AM	4:06 PM
Ontario (Airport)	11:17 AM	4:22 PM
Loma Linda	12:18 PM	5:23 PM
Cabazon	12:53 PM	5:58 PM

Table 36. Route Alternative 3 Eastbound Schedule

Eastbound	AM Trip	PM Trip
Palm Springs	1:08 PM	6:13 PM
Rancho Mirage	1:23 PM	6:28 PM
Indio	1:48 PM	6:53 PM
Total Schedule Time	**3:28**	**3:28**

Source: Caltrans Travel Forecasting, 2015; Appendix D
Note: Alternative 3 uses a proposed Ontario Airport stop instead of the existing Amtrak Ontario Station.

8.4.1 Purpose and Need: Travel Demand

This alternative connects Colton and Los Angeles and would serve the intermediate major communities of Ontario and Pomona. The total population within a 15-mile catchment area of these intermediate stops is approximately 4.04 million, and is projected to grow to 4.41 million by 2020. The selection of Alternative 3 would form an Indio-Los Angeles Corridor that would serve a total population within the station catchment areas of approximately 9.28 million, with a projected increase in total population by station catchment area along the Corridor to 10.08 million by 2020. (SCAG 2012 RTP/SCS)

8.4.2 Purpose and Need: Competitive and Attractive Travel Modes

Route Alternative 3 has the shortest distance among the six route alternatives; however, it has one of the longest projected travel times. This can be attributed to the Alhambra Subdivision's slower maximum allowable speed for passenger trains of 65 mph, versus 79 mph for all other route alternatives; the lack of multiple main tracks (approximately 70 percent of Route Alternative 3 is single track between Colton and Los Angeles); and the high volume of freight train traffic in the vicinity of the West Colton freight yard and intermodal facilities in Industry and Los Angeles. Projected running times between Indio and Los Angeles are 3 hours, 23 minutes westbound and 3 hours, 28 minutes eastbound, one of the slowest of the route alternatives.

8.4.3 Environmental Concerns: Major Challenges

Aside from the potential acquisition of right-of-way along the Corridor, there appear to be no major environmental challenges for Route Alternative 3. For areas on this route where a new or expanded bridge crosses over a waterway (e.g. San Gabriel River, Rio Hondo Channel, Alhambra Wash, and Rubio Wash), coordination with the USFWS, CDFW, and ACOE is likely to be less complex since no critical habitat or wildlife management areas are identified for these waterways. Although the route is in close proximity to a designated cultural resource (San Gabriel Mission complex), it is anticipated that any additional right-of-way needed along this area would not encroach on the San Gabriel Mission complex.

8.4.4 Environmental Concerns: Sensitive Areas

Route Alternative 3 does not pass through any identified critical habitat. While the Western Section of Route Alternative 3 does not pass through and is not adjacent to any BLM ACECs or

USFWS National Wildlife Refuges, it does pass through or is adjacent to three areas of regulated wetlands. In addition, the Western Section of this alternative crosses over the San Gabriel River, Rio Hondo Channel, Alhambra Wash, and Rubio Wash. This alternative does not pass through any federal, state, or local parks but is adjacent to two local parks. In addition, the San Gabriel Mission complex (designated as a California Historical Landmark and identified on the National Register of Historic Places) is located approximately 200 feet from the existing track alignment.

8.4.5 Environmental Concerns: Right-of-Way

Based on a review of aerial mapping along the route, land uses along this alternative are mostly urban uses consisting of commercial, industrial, and residential uses (Google Maps, 2015). Based on preliminary estimates (assuming a worst-case 20-foot right-of-way acquisition requirement along the entire route from Colton to Los Angeles), approximately 625 acres of land would need to be acquired. In addition to being very expensive, acquisition would require displacement of many landowners, particularly where the route alternative passes through highly urbanized areas. Additional research will be conducted on the fine-level screening analysis.

8.4.6 Technical Feasibility

Route Alternative 3 is a high-density freight train route that also hosts Amtrak's Sunset Limited three days per week in each direction. The subdivision carries UP's long-haul intermodal, automotive, and manifest freight traffic destined to and from major terminals in Southern California, including the Ports of Los Angeles and Long Beach. In addition to handling intermodal traffic for the Ports, UP operates freight trains to and from major rail terminals of its own situated along this alternative. These terminals are located at West Colton, UP's primary Southern California manifest freight classification hump yard; City of Industry, site of a domestic intermodal terminal and local freight yard; and Los Angeles, the location of a domestic intermodal terminal serving premium, time-sensitive traffic (the Los Angeles Transfer Container facility, or LATC). Current traffic averages approximately 15 to 25 freight trains per day west of Pomona and approximately 40 freight trains per day east of Pomona, along with 1 Amtrak long-distance train that operates three days per week in each direction, according to Amtrak and SCAG's Comprehensive Regional Goods Movement Plan and Implementation Strategy. Route Alternative 3 has a maximum allowable speed of 65 mph for passenger trains, the slowest among the route alternatives, and 60 mph for freight trains. However, grades of 1% in both directions between Colton and Los Angeles may slow or prevent heavy freight trains from achieving track speed. The route is equipped with wayside signaling and Centralized Traffic Control. (Information about all UP track speeds, gradients, terminal locations, mileages, and signaling in this report have come from the UP Alhambra Subdivision employee timetable dated October 28, 2013.)

Of the 56 miles of UP's Alhambra Subdivision that would be used for Route Alternative 3, 70% are single main track, with limited passing sidings that have a combined total length of 11.5 miles, while the remaining 16 miles are double main track. This presents an impediment to current freight and passenger operations, and would be exacerbated with additional passenger trains, given the high volume of freight traffic and the number of freight terminals located along

the route. Trains destined for the Ports of Los Angeles and Long Beach sometimes have to wait for permission to travel south on the Alameda Corridor, and there are limited locations where trains can be staged without disrupting operations. The schedule of Amtrak's Sunset Limited reflects the slow travel times associated with Route Alternative 3. Running times between Ontario and Los Angeles, a distance of 38 miles, are 54 minutes eastbound and 1 hour, 41 minutes westbound, with time allotted for an intermediate stop at Pomona, and schedule recovery time added into the westbound trip. The average speed for the Sunset Limited between Ontario and Los Angeles is 42 mph eastbound and 29 mph westbound. There are 43 overpasses and 18 underpasses along Route Alternative 3.

The Alhambra Subdivision is one of two east/west routes that UP owns between Colton and Los Angeles. The other is the Los Angeles Subdivision (Route Alternative 2). To mitigate the potential for delays caused by UP's heavy freight train volumes and the unique operating constraints of each route, UP operates the Alhambra and Los Angeles subdivisions directionally for through trains operating between Colton and Los Angeles. The Alhambra Subdivision handles a majority of UP's westbound traffic entering the region, including intermodal traffic destined for the Ports. However, not all traffic can operate directionally, notably the manifest freight trains that enter and leave UP's hump classification yard at West Colton via the Alhambra Subdivision.

To accommodate additional passenger trains on Route Alternative 3 without degrading freight train capacity, additional infrastructure would likely be required to enable overtakes of freight trains and meet/pass events for the proposed Coachella Valley passenger trains, and to provide adequate windows for track maintenance. In addition, a new station is proposed at the Ontario Airport that Coachella Valley passenger trains would serve instead of the existing Ontario Amtrak station.

8.4.7 Economic Feasibility

Because Alternative 3 is near capacity, additional capacity construction would be required. This line carries a heavy volume of intermodal trains on a mostly single-track route, and is considered to be operating near its effective capacity. The PRIIA requirement that a new intercity service not degrade existing host railroad freight operations means that some infrastructure improvements, such as additional tracks or sidings, will likely be needed to avoid degradation. This would likely require extensive improvements, including constructing an additional main track at locations where only one track currently exists, and potentially constructing additional sidings in which to store freight trains destined for the Ports of Los Angeles and Long Beach that are waiting for permission to proceed onto the Alameda Corridor. Additional track would likely also be required near the West Colton classification yard to mitigate potential passenger train delays. The base train equipment sets would be adequate for this alternative. Route Alternative 3 has no specific characteristics that would change operating or maintenance costs substantially compared to the other alternatives.

8.5 Route Alternative 4-A

Route Alternative 4-A, the SCRRA San Gabriel Subdivision, is the northernmost of the alternative alignments (see Figures 41 and 52). This alternative uses a combination of BNSF's

San Bernardino Subdivision between Colton and San Bernardino and SCRRA's San Gabriel Subdivision between San Bernardino and Los Angeles. The BNSF-owned portion of this route is used by Amtrak's Southwest Chief long-distance passenger train and Metrolink's Inland Empire-Orange County Line commuter trains. The SCRRA-owned portion of this route is used by Metrolink's San Bernardino Line commuter trains.

Route Alternative 4-A uses BNSF's San Bernardino Subdivision from Colton north to BNSF's B Yard in San Bernardino, then SCRRA's San Gabriel Subdivision from Control Point (CP) Rancho to Los Angeles. A flyover would likely be required to cross passenger trains from one side of the BNSF main line to the other between Colton and B Yard, as the main tracks are frequently occupied by freight and commuter trains and there are no mainline holding locations on either side that could be used to create slots for the passenger trains to crossover at grade. This route alternative saves considerable travel time by eliminating the need for passenger trains to change their direction of operation at San Bernardino as would be required under Alternative 4-B, but also precludes service to the Metrolink/Amtrak San Bernardino station. To serve customers in the San Bernardino metropolitan area, trains using Route Alternative 4-A would stop at the Metrolink Rialto station, three miles west of the downtown San Bernardino station. This alternative is 58 miles long between Colton and Los Angeles Union Station, and would form a total Indio-Los Angeles Corridor length of 130 miles.

The schedule for this route alternative is shown in Tables 37 and 38, assuming two round trips per day.

Table 37. Route Alternative 4-A Westbound Schedule

Westbound	AM Trip	PM Trip
Indio	9:50 AM	3:20 PM
Rancho Mirage	10:05 AM	3:35 PM
Palm Springs	10:15 AM	3:45 PM
Cabazon	10:30 AM	4:00 PM
Loma Linda	11:05 AM	4:35 PM
Rialto	11:31 AM	5:01 PM
Montclair	12:01 PM	5:31 PM
LAUS	12:55 PM	6:25 PM
Total Schedule Time	**3:05**	**3:05**

Source: Caltrans Travel Forecasting, 2015; Appendix D

Note: Trains operate over new connection track to San Gabriel Flyover and bypass San Bernardino Amtrak Station

Table 38. Route Alternative 4-A Eastbound Schedule

Eastbound	AM Trip	PM Trip
LAUS	10:20 AM	3:25 PM
Montclair	11:07 AM	4:12 PM
Rialto	11:38 AM	4:43 PM
Loma Linda	12:03 PM	5:08 PM
Cabazon	12:38 PM	5:43 PM
Palm Springs	12:53 PM	5:58 PM
Rancho Mirage	1:08 PM	6:13 PM
Indio	1:33 PM	6:38 PM
Total Schedule Time	**3:13**	**3:13**

Source: Caltrans Travel Forecasting, 2015; Appendix D

Note: Trains operate over new connection track to San Gabriel Flyover and bypass San Bernardino Amtrak Station

8.5.1 Purpose and Need: Travel Demand

Route Alternative 4-A connects Colton and Los Angeles and would serve the intermediate major communities of San Bernardino and Montclair, California. The total population within a 15-mile catchment area of these intermediate stops is approximately 3.15 million, and is projected to grow to 3.46 million by 2020. The selection of Route Alternative 4-A would form an Indio-Los Angeles Corridor that would serve a total population within the station catchment areas of approximately 8.75 million, with a projected increase in total population by station catchment area along the Corridor to 9.52 million by 2020. (SCAG 2012 RTP/SCS)

8.5.2 Purpose and Need: Competitive and Attractive Travel Modes

This alternative is similar in length to Route Alternative 3. However, Route Alternative 4-A would have the fastest projected running time of all six route alternatives. This can be attributed to the use of the SCRRA San Gabriel Line, a commuter train line that has no through freight traffic and serves no major freight terminals. The San Gabriel Line hosts Metrolink commuter trains and local freight trains. Projected running times between Indio and Los Angeles via Route Alternative 4-A are 3 hours, 5 minutes westbound and 3 hours, 13 minutes eastbound.

8.5.3 Environmental Concerns: Major Challenges

Aside from the potential acquisition of right-of-way along the Corridor, no major environmental challenges for Route Alternative 4-A are anticipated. For areas on this route where a new or expanded bridge crosses over a waterway (e.g. San Gabriel River and Rio Hondo Channel), coordination with the USFWS, CDFW, and ACOE is likely to be less complex since no critical habitat or wildlife management areas are identified for these waterways.

8.5.4 Environmental Concerns: Sensitive Areas

This alternative does not pass through any identified critical habitat. While the Western Section of Route Alternative 4-A does not pass through and is not adjacent to any BLM ACECs or USFWS National Wildlife Refuges, it does pass through or is adjacent to four areas of regulated wetlands. The Western Section of this alternative crosses over the San Gabriel River and the Rio Hondo Channel. This alternative does not pass through any federal, state or local parks, but is adjacent to seven local parks.

8.5.5 Environmental Concerns: Right-of-Way

Based on a review of aerial mapping along the route, land uses along this alternative are mostly urban uses consisting of commercial, industrial, and residential uses (Google Maps, 2015). Based on preliminary estimates (assuming a worst-case 20-foot right-of-way acquisition requirement along the entire route from Colton to Los Angeles), approximately 634 acres of land would need to be acquired. In addition to being very expensive, this would require displacement of many landowners, particularly where the route alternative passes through highly urbanized areas. Additional research will be conducted on the fine-level screening analysis.

8.5.6 Technical Feasibility

Route Alternative 4-A has two distinct sections. The 2-mile portion of BNSF trackage used between Colton and San Bernardino is a high density freight route, and the 54-mile portion of SCRRA trackage used between San Bernardino and Los Angeles is a commuter route. Current train traffic on the BNSF portion of the route exceeds 60 freight trains per day on average, and has 8 Metrolink commuter trains and 2 Amtrak long-distance trains, according to current Amtrak and Metrolink schedules and SCAG's Comprehensive Regional Goods Movement Plan and Implementation Strategy. Current train traffic on the SCRRA portion of the route consists of 38 Metrolink commuter trains on weekdays (20 trains on Saturday and 14 trains on Sunday); up to 12 freight trains per day between San Bernardino and Fontana; and 2 to 4 local freight trains per day between Fontana and Los Angeles. Both the BNSF and SCRRA lines are equipped with wayside signaling and Centralized Traffic Control. Metrolink began a revenue service demonstration of Positive Train Control on the San Gabriel Subdivision in 2015. Passenger and freight trains are limited to 30 mph between Colton and San Bernardino because of the numerous yard operations on BNSF's San Bernardino Subdivision. On the SCRRA San Gabriel Subdivision, the maximum allowable speed is 79 mph for passenger trains and 55 mph for freight trains. There are 36 overpasses and 30 underpasses along Route Alternative 4-A.

Because no connection currently exists at Colton, a new connecting track would have to be built to enable westbound trains from Indio on UP's Yuma Subdivision to turn and head north (timetable east) at Colton onto BNSF's San Bernardino Subdivision, and eastbound trains to connect from BNSF's trackage onto UP's Yuma Subdivision. Given the limited space in the area and tight curvature required, this connecting track would be low speed, however, the track could be constructed on existing railroad property. Figure 51 provides a conceptual plan of the new Gonzales connection that would be required.

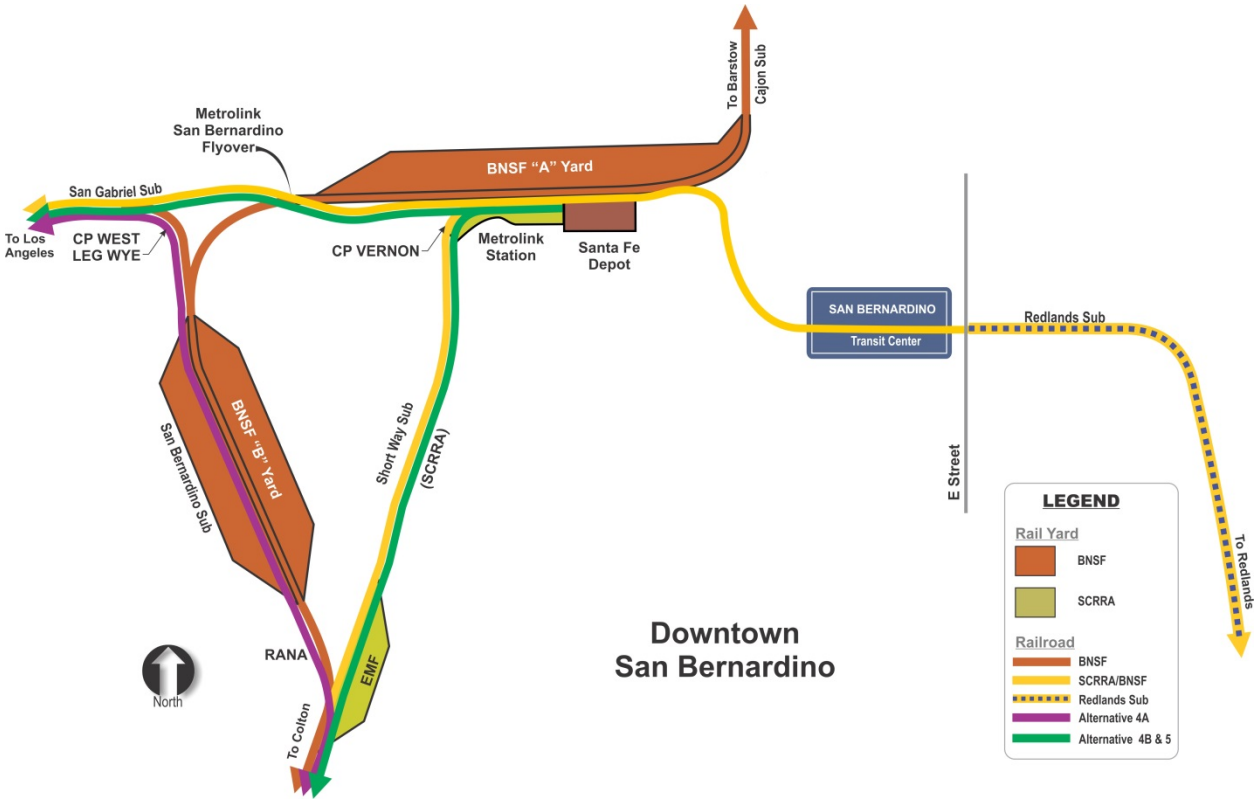
Figure 51. Gonzales Connector

Once on BNSF's trackage at Colton, passenger trains would have to cross all of BNSF's three main tracks within an approximately 2-mile stretch in order to access the West Leg Wye Track in BNSF's B Yard in San Bernardino. Given the high volume of BNSF freight traffic in this stretch, a flyover would have to be constructed to enable Coachella Valley passenger trains to move from one side of the BNSF right-of-way to the other without impacting mainline freight operations or existing passenger and commuter rail operations.

A dedicated passenger track would likely be required between the BNSF main line and B Yard. At B Yard, the West Leg Wye Track connects BNSF's San Bernardino Subdivision with the SCRRA San Gabriel Subdivision at the CP Rancho interlocking. Current track speed of the West Leg Wye Track is 10 mph, and would likely require upgrading to efficiently accommodate passenger trains. Figure 52 graphic depicts this complicated area in downtown San Bernardino with Route Alternative 4-A, 4-B and 5 alignments as analyzed in the coarse-level screening.

Of the 54 miles of SCRRA's San Gabriel Subdivision that would be used for Alternative 4-A 80% are single main track, with passing sidings that have a combined total length of 6.7 miles, while the remaining 10 miles are double main track. Public timetables show that the San Gabriel Subdivision is Metrolink's busiest commuter line (SCRRA, 2015). (Information about all SCRRA track speeds, gradients, terminal locations, mileages, and signaling in this report have come from a SCRRA employee timetable dated June 2, 2013). During rush hours (5:00-7:00 a.m. and 3:00-6:00 p.m.), approximately 3 trains per hour operate west in the morning and east in the evening. Accommodating Coachella Valley passenger trains during peak periods is not possible with existing infrastructure.

Figure 52. Route Alternatives 4-A, 4-B and 5 in Downtown San Bernardino



Route Alternative 4-A and Route Alternative 4-B are also the only alternatives that do not have mainline freights, thus minimizing the potential for passenger trains to be delayed by freight train congestion.

To accommodate additional passenger trains on Route Alternative 4-A without delaying existing commuter trains, additional infrastructure would likely be required to enable overtakes of commuter trains and meet/pass events for the proposed Coachella Valley passenger trains, and to provide adequate windows for track maintenance. Obstacles to constructing an additional main track between San Bernardino and Los Angeles include a lack of available ROW through Pomona and Baldwin Park, and an approximately 11-mile segment between El Monte and Los Angeles, where the ROW is hemmed in by highways or operating within the median of I-10.

8.5.7 Economic Feasibility

Use of this alternative would require several track construction projects. A new track connection at Colton would have to be constructed to enable westbound trains leaving UP trackage to turn north (timetable east) onto BNSF's San Bernardino Subdivision and vice-versa. A flyover above the BNSF main line would have to be constructed to enable passenger trains to cross from one side of the BNSF right-of-way at Colton to the other side at San Bernardino. Improvements to BNSF's West Leg Wye Track and connections to accommodate passenger trains operating between BNSF's line and SCRRA's line are also likely to be required. Because of the preponderance of single track on SCRRA's busy commuter line, additional capacity construction

would likely be required between San Bernardino and Los Angeles. This would likely require constructing an additional main track at locations where only one track currently exists. However, if Coachella Valley passenger trains were scheduled outside of peak hours, the infrastructure requirements could potentially be reduced.

The base train equipment sets would be adequate for this alternative. Route Alternative 4-A has no specific characteristics that would change operating or maintenance costs substantially compared to the other alternatives.

8.6 Route Alternative 4-B

Route Alternative 4-B is the second of two route alternatives that would make use of SCRRA's San Gabriel Subdivision (see Figures 41 and 52). To serve customers in the San Bernardino metropolitan area, this alternative includes a stop at the San Bernardino station, whereas Route Alternative 4-A would stop in Rialto. This alternative uses a combination of BNSF's San Bernardino Subdivision in Colton, SCRRA's Short Way Subdivision between Colton and San Bernardino to access the Amtrak/Metrolink Santa Fe Depot in San Bernardino, and SCRRA's San Gabriel Subdivision between San Bernardino and Los Angeles. The BNSF-owned portion of this route alternative is used by Amtrak's Southwest Chief long-distance passenger train and Metrolink's Inland Empire-Orange County Line commuter trains. The SCRRA Short Way Subdivision is used by Metrolink's Inland Empire-Orange County Line commuter trains. The SCRRA San Gabriel Subdivision is used by Metrolink's San Bernardino Line commuter trains.

Route Alternative 4-B diverges from BNSF's San Bernardino Subdivision at CP Rana and continues north on SCRRA's Short Way Subdivision to reach the SCRRA San Gabriel Subdivision at CP Vernon in San Bernardino. At CP Vernon, trains would head east a short distance on the San Gabriel Subdivision to serve the current Amtrak/Metrolink San Bernardino Santa Fe Depot. During the station stop, trains would be required to change their end of operation in order to operate westbound to Los Angeles over the San Gabriel Subdivision. Indio-bound trains would also be required to change ends of operation at the San Bernardino station to negotiate the connection between the San Gabriel Subdivision and the Short Way Subdivision (see Figure 52). The San Gabriel Subdivision is on an elevated structure west of the CP Vernon junction, and no direct connection exists that would allow northbound trains on the Short Way Subdivision to turn westward onto San Gabriel Subdivision and continue to Los Angeles without making a reverse move. This alternative is 60 miles long between Colton and LAUS, and would form a total Indio-Los Angeles Corridor length of 132 miles.

The schedule for this route alternative is shown in Tables 39 and 40, assuming two round trips per day.

Table 39. Route Alternative 4-B Westbound Schedule

Westbound	AM Trip	PM Trip
Indio	9:50 AM	3:20 PM
Rancho Mirage	10:05 AM	3:35 PM
Palm Springs	10:15 AM	3:45 PM
Cabazon	10:30 AM	4:00 PM
Loma Linda	11:05 AM	4:35 PM
San Bernardino	11:50 AM	5:20 PM
Montclair	12:17 PM	5:47 PM
LAUS	1:11 PM	6:41 PM
Total Schedule Time	**3:21**	**3:21**

Source: Caltrans Travel Forecasting, 2015; Appendix D
Note: Trains stop at San Bernardino Amtrak station, requiring changing of train operating ends and 15 minute dwell

Table 40. Route Alternative 4-B Eastbound Schedule

Eastbound	AM Trip	PM Trip
LAUS	10:20 AM	3:25 PM
Montclair	11:09 AM	4:14 PM
San Bernardino	11:54 AM	4:59 PM
Loma Linda	12:19 PM	5:24 PM
Cabazon	12:54 PM	5:59 PM
Palm Springs	1:09 PM	6:14 PM
Rancho Mirage	1:24 PM	6:29 PM
Indio	1:49 PM	6:54 PM
Total Schedule Time	**3:29**	**3:29**

Source: Caltrans Travel Forecasting, 2015; Appendix D
Note: Trains stop at San Bernardino Amtrak station, requiring changing of train operating ends and 15 minute dwell

8.6.1 Purpose and Need: Travel Demand

This route alternative connects Colton and Los Angeles and would serve the intermediate major communities of San Bernardino and Montclair. The total population within a 15-mile catchment area of these intermediate stops is approximately 3.05 million, and is projected to grow to 3.36 million by 2020. The selection of Route Alternative 4-B would form an Indio-Los Angeles Corridor that would serve a total population within the station catchment area of approximately 8.72 million, with a projected increase in total population by station catchment area along the Corridor to 9.49 million by 2020. (SCAG 2012 RTP/SCS)

8.6.2 Purpose and Need: Competitive and Attractive Travel Modes

This alternative is longer than Route Alternative 4-A by 2 miles, but would have a considerably longer travel time because of the need to change ends of operation at the San Bernardino Station. This activity requires a projected 20-30 minute station dwell time at San Bernardino, versus a projected dwell at all other intermediate stations of 2 or 3 minutes. Projected running times between Indio and Los Angeles via Route Alternative 4-B are 3 hours, 21 minutes westbound and 3 hours, 29 minutes eastbound, one of the slowest of the route alternatives.

Use of the San Bernardino Santa Fe Depot introduces opportunities for connections with the planned Redlands passenger rail service. This project, currently scheduled for completion no earlier than 2018, will create a passenger rail service between the cities of San Bernardino and Redlands.

8.6.3 Environmental Concerns: Major Challenges

Aside from the potential acquisition of right-of-way along the Corridor, no major environmental challenges for Route Alternative 4-B are anticipated. For areas on this route where a new or expanded bridge crosses over a waterway (e.g. San Gabriel River and Rio Hondo Channel), coordination with the USFWS, CDFW, and ACOE is likely to be less complex since no critical habitat or wildlife management areas are identified for these waterways.

8.6.4 Environmental Concerns: Sensitive Areas

This alternative does not pass through any identified critical habitat. While the Western Section of Route Alternative 4-B does not pass through and is not adjacent to any BLM ACECs or USFWS National Wildlife Refuges, the alternative does pass through or is adjacent to four areas of regulated wetlands. The Western Section of this alternative crosses over the San Gabriel River and the Rio Hondo Channel. This alternative does not pass through any federal, state or local parks, but is adjacent to seven local parks.

8.6.5 Environmental Concerns: Right-of-Way

Based on a review of aerial mapping along the route, land uses along this alternative are mostly urban uses consisting of commercial, industrial, and residential uses (Google Maps, 2015). Based on preliminary estimates (assuming a worst-case 20-foot right-of-way acquisition requirement along the entire route from Colton to Los Angeles), approximately 634 acres of land would need to be acquired. In addition to being very expensive, this would require displacement of many landowners, particularly where the route alternative passes through highly urbanized areas. Additional research will be conducted on the fine-level screening analysis.

8.6.6 Technical Feasibility

Route Alternative 4-B has two distinct sections: a high-density freight route on the 1-mile portion of BNSF trackage used in Colton, and a commuter route on the two SCRRA subdivisions used between Colton, San Bernardino and Los Angeles. Current train traffic on the BNSF portion of the route exceeds 60 freight trains per day on average, and has eight weekday and four weekend Metrolink commuter trains and two Amtrak long-distance trains. Current train traffic on

the SCRRA Short Way Subdivision, which provides a direct route between BNSF's trackage and the Amtrak/Metrolink San Bernardino station, consists of eight Metrolink commuter trains on weekdays and four Metrolink commuter trains per day on weekends. Current train traffic on the SCRRA San Gabriel Subdivision consists of 38 Metrolink commuter trains on weekdays (20 trains on Saturday and 14 trains on Sunday); up to 12 freight trains per day between San Bernardino and Fontana; and two to four local freight trains per day between Fontana and Los Angeles. All of the BNSF and SCRRA lines are equipped with wayside signaling and Centralized Traffic Control. Metrolink began a revenue service demonstration of Positive Train Control on the San Gabriel Subdivision in 2015. Because of the numerous yard operations on BNSF's San Bernardino Subdivision, passenger and freight trains are limited to 30 mph between Colton and San Bernardino. The SCRRA Short Way Subdivision is also limited to a 30 mph maximum allowable speed for passenger and freight trains. On the SCRRA San Gabriel Subdivision, the maximum allowable speed is 79 mph for passenger trains and 55 mph for freights.

Because no connection currently exists at Colton, a new connecting track would have to be built to enable westbound trains from Indio on UP's Yuma Subdivision to turn and head north (timetable east) at Colton onto BNSF's San Bernardino Subdivision and eastbound trains to diverge from the BNSF line to head east on UP's Yuma Subdivision. Given the limited space in the area and tight curvature required, this connecting track would be low speed, however, the track could be constructed on existing railroad property (see Figure 51).

This connection would enter the BNSF main line on the east side of the right-of-way, which is the same side that the SCRRA Short Way Subdivision diverges from 1 mile east, so passenger trains would not have to cross all of the BNSF main tracks for the brief portion of the BNSF main line they use. At CP Vernon in San Bernardino, an existing turnout would enable trains to make a direct move from the Short Way Subdivision onto the SCRRA San Gabriel Subdivision to enter the Amtrak/Metrolink Santa Fe Depot in San Bernardino. Once at the station trains would have to reverse direction to operate westbound on the San Gabriel Subdivision to reach Los Angeles. No connection exists to permit a direct move from the Short Way Subdivision to operate westbound on the San Gabriel Subdivision or vice-versa, and one would be difficult to build since the San Gabriel Subdivision begins a westward climb on elevation to fly over the BNSF main line immediately after the turnout with the Short Way Subdivision.

Of the 55 miles of SCRRA's San Gabriel Subdivision that would be used for Route Alternative 4-B more than 80% are single track, with passing sidings that have a combined total length of 6.7 miles, while the remaining 10 miles are double main track. Public timetables show that the San Gabriel Subdivision is Metrolink's busiest commuter line (SCRRA, 2015). During rush hours, (5:00-7:00 a.m. and 3:00-6:00 p.m.) approximately three trains per hour operate west in the morning and east in the evening. Accommodating Coachella Valley passenger trains during peak periods is not likely possible with existing infrastructure. There are 38 overpasses and 30 underpasses along Route Alternative 4-B.

Route Alternative 4-A and 4-B are the only route alternatives that do not have overhead mainline freights, thus minimizing the potential for passenger trains to be delayed by freight train congestion. To accommodate additional passenger trains on Route Alternative 4-B without delaying existing commuter trains, additional infrastructure would likely be required to enable overtakes of commuter trains and meet/pass events for the proposed Coachella Valley

passenger trains, and to provide adequate windows for track maintenance. Obstacles to constructing an additional main track between San Bernardino and Los Angeles include a lack of available ROW through Pomona and Baldwin Park, and an approximately 11-mile segment between El Monte and Los Angeles, where the ROW is hemmed in by highways, or operating in the median of I-10.

8.6.7 Economic Feasibility

Because of the preponderance of single track on SCRRA's busy San Gabriel Subdivision, additional capacity construction would likely be required for Route Alternative 4-B. Route Alternative 4-B would likely require constructing an additional main track at locations where only one track currently exists. If Coachella Valley passenger trains were scheduled outside of peak hours, the infrastructure requirements could potentially be reduced.

The base train equipment sets would be adequate for this alternative. Route Alternative 4-B has no specific characteristics that would change operating or maintenance costs substantially compared to the other alternatives.

8.7 Route Alternative 5

Route Alternative 5 is a combination of Route Alternatives 3 and 4-B that would be used by Indio-Los Angeles trains operating during peak commuter travel periods (see Figures 41, 47, and 52). Route Alternative 5 uses BNSF's San Bernardino Subdivision in Colton; SCRRA's Short Way Subdivision between Colton and San Bernardino; SCRRA's San Gabriel Subdivision between San Bernardino and CP Bassett near El Monte; and UP's Alhambra Subdivision between CP Bassett and Los Angeles. Route Alternative 5 would provide a scheduling advantage over Alternative 4 in that it could be operated during either peak or off-peak periods. For the sake of comparability in the ridership forecasts, the same basic operating schedule was assumed for all alternatives.

Approximately 82 percent of SCRRA's San Gabriel Subdivision between San Bernardino and Los Angeles is single track, including a segment of approximately 11 miles between El Monte and Los Angeles that runs in the median of I-10 with no available ROW for construction of a second track. In addition, the San Gabriel Subdivision has an intense morning and evening peak travel commuter operation; the line has a 2-hour window in the morning and a 2-hour window in the evening that sees approximately three trains per hour operating in the direction of peak travel (to Los Angeles in the morning, from Los Angeles in the evening). Since the initial analysis, Metrolink schedules have changed to approximately two trains per hour due to PTC implementation which required more time between trains to maintain acceptable on-time performance.

Metrolink trains traveling in the opposite direction of peak travel flow are not granted priority on the single-track sections, and have 15 to 35 minutes of running time added to their scheduled trips to accommodate for peak travel trains.

Route Alternative 5 has been developed to enable Coachella Valley passenger trains scheduled to operate during peak commuter periods without a similar 15- to 35-minute addition to travel time. Route Alternative 5 also avoids potential congestion or delays along the San Gabriel

Subdivision's west end, by using UP's Alhambra Subdivision between Bassett and Los Angeles. There are no proposed station stops between Bassett and Los Angeles.

Trains using this alternative would operate to the Amtrak/Metrolink Santa Fe Depot in San Bernardino and change their direction of operation, just as they would in Route Alternative 4-B. Route Alternative 5 is 60 miles long between Colton and Los Angeles Union Station, and would form a total Indio-Los Angeles Corridor length of 132 miles. The schedule for this alternative is shown in Tables 41 and 42, assuming two round trips per day.

Table 41. Route Alternative 5 Westbound Schedule

Westbound	AM Trip	PM Trip
Indio	9:50 AM	3:20 PM
Rancho Mirage	10:05 AM	3:35 PM
Palm Springs	10:15 AM	3:45 PM
Cabazon	10:30 AM	4:00 PM
Loma Linda	11:05 AM	4:35 PM
San Bernardino	11:50 AM	5:20 PM
Montclair	12:17 PM	5:47 PM
LAUS	1:12 PM	6:42 PM
Total Schedule Time	**3:22**	**3:22**

Source: Caltrans Travel Forecasting, 2015; Appendix D

Table 42. Route Alternative 5 Eastbound Schedule

Eastbound	AM Trip	PM Trip
LAUS	10:20 AM	3:25 PM
Montclair	11:12 AM	4:17 PM
San Bernardino	11:57 AM	5:02 PM
Loma Linda	12:22 PM	5:27 PM
Cabazon	12:57 PM	6:02 PM
Palm Springs	1:12 PM	6:17 PM
Rancho Mirage	1:27 PM	6:32 PM
Indio	1:52 PM	6:57 PM
Total Schedule Time	**3:32**	**3:32**

Source: Caltrans Travel Forecasting, 2015; Appendix D

8.7.1 Purpose and Need: Travel Demand

This alternative between Colton and Los Angeles would serve the intermediate major communities of San Bernardino and Montclair. The total population within a 15-mile catchment area of these intermediate stops is approximately 3.05 million, and is projected to grow to 3.36 million by 2020. The selection of Route Alternative 5 would form an Indio-Los Angeles Corridor that would serve a total population within the station catchment areas of approximately

8.72 million, with a projected increase in total population by station catchment area along the Corridor to 9.49 million by 2020. (SCAG 2012 RTP/SCS)

8.7.2 Purpose and Need: Competitive and Attractive Travel Modes

Route Alternative 5 is similar in length to Route Alternative 4-B, and also has a lengthened travel time caused by the need to change ends of operation at the San Bernardino Station. This activity requires a projected 20-minute station dwell time at San Bernardino, versus a projected dwell at all other intermediate stations of 2 or 3 minutes. Projected running times between Indio and Los Angeles via Route Alternative 5 are 3 hours, 22 minutes westbound and 3 hours, 32 minutes eastbound, one of the slowest of the route alternatives. Running times on this alternative are slightly longer than Route Alternative 4-B, by 1 to 3 minutes, because of the high volume of freight traffic and slower maximum allowable speed for passenger trains on UP's Alhambra Subdivision.

8.7.3 Environmental Concerns: Major Challenges

Aside from the potential acquisition of right-of-way along the Corridor, no major environmental challenges for Route Alternative 5 are anticipated. For areas on this route where a new or expanded bridge crosses over a waterway (e.g. San Gabriel River, Rio Hondo Channel, Alhambra Wash, and Rubio Wash), coordination with the USFWS, CDFW, and ACOE is likely to be less complex since no critical habitat or wildlife management areas are identified for these waterways.

8.7.4 Environmental Concerns: Sensitive Areas

This alternative does not pass through any identified critical habitat. While the alternative does not pass through and is not adjacent to any BLM ACECs or USFWS National Wildlife Refuges, it does pass through or is adjacent to four areas of regulated wetlands. In addition, the Western Section of Route Alternative 5 crosses over the San Gabriel River, Rio Hondo Channel, Alhambra Wash, and Rubio Wash. Route Alternative 5 does not pass through any federal, state, or city parks but is adjacent to nine local parks.

8.7.5 Environmental Concerns: Right-of-Way

Based on a review of aerial mapping along the route, land uses along this alternative are mostly urban uses consisting of commercial, industrial, and residential uses (Google Maps, 2015). Based on preliminary estimates (assuming a worst-case 20-foot right-of-way acquisition requirement along the entire route from Colton to Los Angeles), approximately 636 acres of land would need to be acquired. In addition to being very expensive, this would require displacement of many landowners, particularly where the route alternative passes through highly urbanized areas. Additional research will be conducted on the fine-level screening analysis.

8.7.6 Technical Feasibility

Route Alternative 5 has three distinct sections: a high-density freight route on the 1-mile portion of BNSF trackage used in Colton; a commuter route on the two SCRRA subdivisions used

between Colton, San Bernardino and Bassett, totaling 44 miles; and a high-density freight route on the 14-mile portion of UP trackage used between Bassett and Los Angeles.

Current train traffic on the BNSF portion of the route exceeds 60 freight trains per day on average, and has eight weekday and four weekend Metrolink commuter trains and two Amtrak long-distance trains, according to Amtrak, Metrolink, and SCAG's Comprehensive Regional Goods Movement Plan and Implementation Strategy. Current train traffic on the SCRRA Short Way Subdivision, which provides a direct route between BNSF's trackage and the Amtrak/Metrolink San Bernardino station, consists of eight Metrolink commuter trains on weekdays and four Metrolink commuter trains on weekends. Current train traffic on the SCRRA San Gabriel Subdivision consists of 38 Metrolink commuter trains on weekdays (20 trains on Saturday and 14 trains on Sunday); up to 12 freight trains per day between San Bernardino and Fontana; and two to four local freight trains per day between Fontana and Los Angeles. Current train traffic on UP's Alhambra Subdivision averages approximately 15 to 25 freight trains per day, along with one Amtrak long-distance train that operates three days per week in each direction.

All of the BNSF, SCRRA, and UP lines are equipped with wayside signaling and Centralized Traffic Control. Metrolink began a revenue service demonstration of Positive Train Control on the San Gabriel Subdivision in 2015. Because of the numerous yard operations on BNSF's San Bernardino Subdivision, passenger and freight trains are limited to 30 mph between Colton and San Bernardino. The SCRRA Short Way Subdivision is also limited to a 30-mph maximum allowable speed for passenger and freight trains. On the SCRRA San Gabriel Subdivision, the maximum allowable speed is 79 mph for passenger trains and 55 mph for freight trains. UP's Alhambra Subdivision has a maximum allowable speed of 65 mph for passenger trains and 60 mph for freight trains. There are 29 overpasses and 26 underpasses along Route Alternative 5.

Because no connection currently exists at Colton, a new connecting track would have to be built to enable westbound trains from Indio on UP's Yuma Subdivision to turn and head north (timetable east) at Colton onto BNSF's San Bernardino Subdivision, and eastbound trains to diverge from the BNSF line to head east on UP's Yuma Subdivision. Given the limited space in the area and tight curvature required, this connecting track would be low speed, however, the track could be constructed on existing railroad property (see Figure 51).

This connection would enter the BNSF main line on the east side of the right-of-way, which is the same side that the SCRRA Short Way Subdivision diverges from 1 mile east, so passenger trains would not have to cross all of the BNSF main tracks for the brief portion of the BNSF main line they use. At CP Vernon in San Bernardino, an existing turnout would enable trains to make a direct move from the Short Way Subdivision onto the SCRRA San Gabriel Subdivision to enter the Amtrak/Metrolink Santa Fe Depot in San Bernardino. Once at the station, trains would have to reverse direction to operate westbound on the San Gabriel Subdivision to reach Los Angeles. No connection exists to permit a direct move from the Short Way Subdivision to operate westbound on the San Gabriel Subdivision, or vice-versa, and one would be difficult to build since the San Gabriel Subdivision begins a westward climb on elevation to fly over the BNSF main line immediately after the turnout with the Short Way Subdivision (see Figure 52).

As described in Route Alternatives 4-A/4-B and 3, respectively, both the SCRRA San Gabriel Subdivision and the UP Alhambra Subdivision are primarily single-track railroads, with minimal sections of second main track. The SCRRA San Gabriel Subdivision has frequent commuter rail traffic, but does not have overhead freight traffic. However, trains operating during peak periods against the prevailing flow of rush-hour commuter traffic could require up to 35 minutes or more of additional running time, due to the limited number of locations where meet/pass events can occur on the single-track line. During peak hours, approximately three Metrolink trains per hour operate west in the morning and east in the evening. Use of the UP Alhambra Subdivision west of Bassett would enable Coachella Valley passenger trains to operate during peak commuter periods by avoiding the capacity-constrained, single-track western segment of the San Gabriel Subdivision within the median of I-10. However, use of the Alhambra Subdivision would also require additional running time and could introduce the potential for delay from the UP subdivision's slower passenger train speeds, predominantly single-track infrastructure, and heavy freight volumes.

To accommodate additional passenger trains on Route Alternative 5 without delaying existing traffic, additional infrastructure would likely be required to enable overtakes of commuter and freight trains, meet/pass events for the proposed Coachella Valley passenger trains, and to provide adequate windows for track maintenance. Use of the UP Alhambra Subdivision allows for the possibility for the construction of additional infrastructure between Bassett and Los Angeles, where the SCRRA San Gabriel Subdivision is located adjacent to or in the median of I-10 and construction of a second track there highly unlikely. A connection between the SCRRA and UP lines at Bassett already exists and would not have to be constructed.

8.7.7 Economic Feasibility

An expensive new track connection at Colton would have to be constructed to enable westbound trains leaving UP trackage to turn north (timetable east) onto BNSF's San Bernardino Subdivision, and eastbound trains to diverge from the BNSF line to head east on UP's Yuma Subdivision.

Additional capacity construction would likely be required because of the preponderance of single track on SCRRA's busy commuter line. This would likely require constructing an additional main track at locations where only one track currently exists. Similarly, additional main track would track would likely be required on UP's single-track Alhambra Subdivision, which is operating near capacity.

The base train equipment sets would be adequate for this alternative. Route Alternative 5 has no specific characteristics that would change operating or maintenance costs substantially compared to the other alternatives.

8.8 Summary

The coarse-level screening results are summarized in Table 43.

Table 43. Route Alternatives Comparison – Coarse-Level Screening

Route Description: LA to Colton	Alternative 1 BNSF San Bernardino Subdivision	Alternative 2 UP Los Angeles Subdivision	Alternative 3 UP Alhambra Subdivision	Alternative 4-A SCRRA San Gabriel Subdivision	Alternative 4-B SCRRA San Gabriel Subdivision	Alternative 5 Alhambra + San Gabriel Subdivisions
Colton to Indio	**UP Yuma Subdivision**	**UP Yuma Subdivision**	**UP Yuma Subdivision**	**UP Yuma Subdivision**	**UP Yuma Subdivision**	**UP Yuma Subdivision**
Intermediate Stations (LA to Colton)	Fullerton Riverside	Pomona Riverside	Pomona Ontario	Montclair Rialto	Montclair San Bernardino	Montclair San Bernardino
Corridor Population in 2008 (Catchment Area)	10.73 million	9.38 million	9.28 million	8.75 million	8.72 million	8.72 million
Purpose and Need: Travel Demand	Highest population served	Second highest population served	High population served	High population served	High population served	High population served
Est. Running Time: Westbound Eastbound	 3:10 3:16	 3:10 3:14	 3:23 3:28	 3:05 3:13	 3:21 3:29	 3:22 3:32
Purpose and Need: Competitive and Attractive Travel Modes [a]	High competitiveness	High competitiveness	High competitiveness	High competitiveness	High competitiveness	High competitiveness
Environmental Concerns: Major Challenges	Low	High: permitting and bio resource complexities	Medium	Medium	Medium	Medium
Environmental Concerns: Sensitive Area	Low	High	Medium	Medium	Medium	Medium
Environmental Concerns: Right-of-Way	Low	High	High	High	High	High
Technical Feasibility	Low complexity	High complexity	High complexity	Medium complexity	Medium complexity	Medium complexity
Economic Feasibility	Low cost [b]	High cost	High cost	Medium cost	Low to medium cost	Medium cost
Disposition of Alternative	Retained for further analysis	Eliminated from further analysis	Eliminated from further analysis	Retained for further analysis	Retained for further analysis	Retained for further analysis

The six route alternatives between Colton and Los Angeles all share similar traits. With the exception of Route Alternatives 4-A and 4-B, the route alternatives involve the use of high-density freight lines. With the exception of Route Alternative 1, the alternatives are predominantly single-track routes.

Route Alternative 1 has the highest ridership potential Corridor population by 1 million to 2 million people by virtue of its alignment through Orange County, which increases the population reach of the Corridor's station catchment areas.

The difference in running times between the fastest alternative and the slowest alternative varies by 18 minutes in each direction. The fastest projected running time occurs on Route Alternative 4-A, whereas the slowest running times occur on Route Alternatives 3 and 5 (both of which involve the use of Union Pacific's congested, single-track Alhambra Subdivision) as well as Route Alternative 4-B (owing primarily to the long dwell time at the San Bernardino station for reversing direction, a condition that also affects Route Alternative 5).

Projected running times between Indio and Los Angeles range from 3 hours, 5 minutes (Route Alternative 4-A) to 3 hours, 32 minutes (Route Alternative 5). Using the driving times recorded in the Coachella Valley-San Gorgonio Pass Rail Corridor Service Market Analysis, these projected running times are 60 to 100 minutes slower than the driving time between Los Angeles and Indio during non-peak periods, and 20 to 50 minutes slower than the driving time during morning and evening peak periods. However, the projected travel times support the project's Purpose and Need by improving upon the travel times of currently-available public transportation alternatives between Indio and Los Angeles. Additionally, since the alternatives all use the UP Yuma Subdivision east of Colton, they provide the same level of regional accessibility improvements to the transit-dependent communities of the Coachella Valley and San Gorgonio Pass Area.

High existing freight and passenger volumes and the preponderance of single-track routes create technical complexities for several of the route alternatives that will require high-cost solutions.

Route Alternative 1 already has two main tracks throughout its entire length, and also has sections of third main track. Sufficient passenger train slots are available under current operating agreements for this route, so no additional major infrastructure improvements have been identified if RCTC dedicates the needed slots to the Coachella Valley service.

Of the six route alternatives, the greatest challenges are presented by Route Alternatives 2 and 3. Both are busy freight lines operating near capacity, with substantial sections of single track. Both would likely require costly capacity expansion projects. For Route Alternative 3, this could entail construction of up to 39 miles of second track. Route Alternative 2 could require up to 10 miles of second track, with potentially sections of third track to accommodate Metrolink commuter services, and construction of locations to hold freight trains waiting for space to enter BNSF's San Bernardino Subdivision or the Alameda Corridor. Both routes experience freight-train congestion and serve freight terminals where trains enter and exit at low speeds, all of which has the potential to affect passenger-train travel reliability. The Alhambra Subdivision, used by Route Alternatives 3 and 5, has a lower maximum passenger train speed than the other

route alternatives and have the slowest projected travel times. Given the extensive sections of single main track and the presence of heavy unscheduled freight train traffic, the potential for introducing travel unreliability, slow projected running time, and the high technical complexity and high cost for expanding capacity, Route Alternatives 2 and 3 are deemed infeasible and are eliminated from further study.

Route Alternatives 4-A, 4-B, and 5 would require a connection at Colton between UP's Yuma Subdivision from Indio and BNSF's San Bernardino Subdivision to San Bernardino, the Gonzales Connector. Among these three alternatives, the lowest cost and least complex option is Route Alternative 4-B, which uses the least amount of freight trackage between Colton and Los Angeles. Route Alternative 4-A would likely require a flyover above the BNSF San Bernardino Subdivision. Route Alternative 5 would likely require additional infrastructure capacity on UP's freight-heavy Alhambra Subdivision.

Route Alternatives 1, 4-A, 4-B, and 5 have been retained for further analysis in the fine screening analysis. The fine screening analysis will include more detailed operational analysis to refine travel times, conceptual definition of impacts of superimposing passenger trains upon existing and likely future freight train traffic, and conceptual cost estimates.

9 Fine-Level Screening

The fine-level screening process evaluated the remaining route alternatives and identified a preferred alternative to move forward into environmental analysis.

As the second level of evaluation, fine-level screening compares the remaining route alternatives to determine which demonstrate superior performance with lower cost and lower potential for adverse impacts. The screening criteria and methodology for the alternatives analysis are presented in Section 7. The screening criteria were refined following coarse-level screening. Table presents the refined fine-level screening criteria. The results of the fine-level screening for each Western Section route alternative carried forward from the coarse-level screening are presented in this section.

The fine-level screening effort addressed the remaining route alternatives in the Western Section from Colton to LAUS. The Eastern Section from Indio to Colton uses only one route alternative, the Yuma Subdivision, which was analyzed in the coarse-level screening. The Western Section was assessed in combination with each route alternative when evaluating travel demand, competitive and alternative travel modes, implementation costs, and operating and maintenance (O&M) costs. In addition, because all route alternatives require use of the SCRRA River Subdivision to access LAUS, at distances ranging from 0.9 to 5.3 miles, the River Subdivision was not included as a technical or economic criterion for comparison among the route alternatives, except for distance, travel time, and O&M cost comparisons between the route alternatives and alternate travel modes.

As discussed in Section 8.8, Route Alternatives 2 and 3 were deemed infeasible during coarse-level screening and were eliminated from further study. Therefore, Route Alternatives 2 and 3 are not discussed below.

For the fine-level analysis, buffers were applied to estimated current ROW based on the number of tracks currently present for a particular route alternative for potential impact assessment. The buffers in the fine-level analysis represent additional ROW that would have to be acquired for construction of additional track and improvements. Additional details on the buffers applied are included in Appendix E.

In fine-level screening, conceptual rail infrastructure capital projects identified for the proposed Coachella Valley passenger rail service are presented for comparison purposes and should be considered as initial estimates to be refined through the next phases of the study. Ridership and revenue forecasts were developed by Caltrans for an assumed initial operation year of 2022 and a future year of 2040.

As described below, all four route alternatives evaluated in the fine-level screening host commuter rail, two host intercity and/or long-distance passenger rail, and all host local freight trains and industrial switching. Route Alternatives 1 and 5 also host high-density through freight train traffic. Coachella Valley-San Gorgonio Pass Rail Corridor passenger trains would assume

to operate within the Corridor at the same speeds as present-day passenger and commuter trains, enabling the Coachella Valley trains to be slotted into existing commuter-train schedules and to avoid the necessity for construction of additional main tracks that would permit operation of the Coachella Valley passenger trains at higher speeds. Operation at higher speeds than existing passenger and commuter train services also has the potential to require extensive reconstruction of the wayside signal system, and may not be feasible within the technical limitations of grade-crossing signal systems. Consequently, this would require extensive separation of grade crossings, which could also create substantial impacts on the adjoining areas. Accordingly, the existing alignments of the route alternatives were assumed suitable for support of the Coachella Valley service's proposed frequency of two round-trips daily, by adjusting train schedules to slot passenger trains into existing commuter train schedules without the need for increasing passenger train speeds above the current allowable track speeds. This assumption would require confirmation in a Tier 2 study.

9.1 Route Alternative 1

Route Alternative 1 is located along BNSF's San Bernardino Subdivision, and is the southernmost of the route alternatives. This route alternative is 70 miles long between Colton and LAUS, and would form a total Indio-Los Angeles Corridor length of 141 miles. 100 percent of this route is double track, with portions of the route triple track. This route is used by Amtrak's Southwest Chief long-distance passenger train between Colton and Los Angeles, and Amtrak's Pacific Surfliner intercity passenger trains between Fullerton and Los Angeles. The route is also used by three Metrolink commuter services: Inland Empire-Orange County Line trains between Colton and Atwood; 91 Line trains between Riverside and Los Angeles; and Orange County Line trains between Fullerton and Los Angeles.

9.1.1 Purpose and Need: Travel Demand

Potential ridership is the parameter measure for the travel demand criterion. Route Alternative 1 would serve the intermediate major communities of Riverside and Fullerton. The selection of this alternative would form an Indio-Los Angeles Corridor that would serve a total population within the 15-mile station catchment areas of approximately 10.73 million, with a projected increase in total population by station catchment area along the corridor to 11.63 million by 2020, which is the highest population reach among the four route alternatives. (SCAG 2012 RTP/SCS)

Annual ridership and revenue from tickets sold for an assumed initial operation year of 2022 and a future year of 2040 were forecast as shown in Table 44. The revenue assumptions include ticket prices similar to those on the Pacific Surfliner for a comparable trip with an average price of approximately $17.15 per trip.

Ridership and revenue from tickets sold for Route Alternative 1 are the highest of the four route alternatives. Access to downtown Riverside and access to connections at Fullerton with Pacific Surfliner rail services helped Route Alternative 1 achieve its high ridership and revenue estimates. Route Alternative 1 meets the Purpose and Need for travel demand.

Table 44. Alternative 1 Annual Ridership and Revenue Forecasts

Alternative 1	Ridership	Revenue	Passenger-miles
Year 2022	189,100	$3,245,000	16,230,000
Year 2040	272,300	$4,656,000	23,280,000

Source: Caltrans Ridership Forecasts, 2015 (see Appendix F)

9.1.2 Purpose and Need: Competitive and Attractive Travel Modes

Providing a time-competitive and attractive travel mode compared to other route alternatives is the parameter for this criterion. Route Alternative 1 is the longest of the route alternatives, but would have a travel time comparable to the other alternatives with projected running times for Alternative 1 between Indio and Los Angeles are 3 hours, 10 minutes westbound and 3 hours, 16 minutes eastbound.

The projected travel time for Route Alternative 1 is comparable eastbound and faster westbound to the travel time of the existing Amtrak long-distance passenger rail service, which operates only three days per week in each direction in the middle of the night. The travel time is faster than existing scheduled bus services between Indio and Los Angeles by 20 to 50 minutes, and does not have the unreliability associated with highway travel on I-10. Travel times between Palm Springs and Los Angeles are approximately 1 hour faster than a SunLine-Metrolink bus/rail combination with a transfer at Riverside. Travel by air between Palm Springs and Los Angeles is only 56 minutes, compared with Route Alternative 1's travel time of 2 hours, 45 minutes between those two cities. However, when additional time factors associated with air travel are introduced, such as the time needed for airport check-in and security before a flight (approximately 1 hour) and travel between Los Angeles International Airport and the central business district (35-45 minutes by FlyAway bus between the airport and LAUS), then the travel times between air and rail via Route Alternative 1 are nearly identical.

Opportunities for connectivity with other transit modes are better with Route Alternative 1 than any other route alternative. Other route alternatives require most connections to be made at LAUS, whereas Route Alternative 1 not only offers transit connections at LAUS, but also provides opportunities for transit connections at Riverside and Fullerton. Passengers at Riverside would be able to connect to Metrolink Perris Valley Line trains, Metrolink trains on the Inland Empire-Orange County Line, the Riverside Line, and the 91 Line, and buses. Passengers at Fullerton would be able to connect with Amtrak's Pacific Surfliner service to San Diego, Metrolink Orange County Line trains to Oceanside, the Metrolink 91 Line, and buses.

Route Alternative 1 meets the Purpose and Need of providing a time-competitive and attractive travel mode compared to other currently-available public transportation services.

9.1.3 Environmental Concerns: Environmental Impacts

In fine-level screening, the Sensitive Areas criterion parameter measured if the route alternative has the potential to impact substantially more environmentally sensitive areas than the other alternatives. Since sufficient passenger train slots are available under current operating

agreements for this route between Colton and Los Angeles additional major infrastructure will not be needed if RCTC dedicates the needed slots to the Coachella Valley service, so this route would not involve any direct environmental impacts associated with railroad improvements.

9.1.4 Environmental Concerns: Right-of-Way

Evaluating the conceptual ROW acquisition scope, such as the demolition/disruption of substantially more structures, developments, agricultural resources, or features of the built environment in comparison to the other route alternatives is the parameter for this criterion. Since sufficient passenger train slots are available under current operating agreements for this route from Colton to Los Angeles, no additional major infrastructure improvements have been identified if RCTC dedicates the needed slots to the Coachella Valley service, so this route would not involve any right-of-way issues.

9.1.5 Technical Feasibility: Passenger and Freight Capacity

For fine-level screening, the technical feasibility criteria measures are more detailed than in coarse-level screening. The parameters include general infrastructure improvements needed: for desired passenger train travel times, frequency, and reliability; to maintain existing and future freight and commuter rail services, to enable prioritized passenger-train operations. Route Alternative 1 is a high-density double- and triple-track commuter, passenger, and freight rail line. Current train traffic exceeds 40 freight trains per day, on average, and the segment between Colton and Riverside, where Union Pacific has trackage rights, exceeds 60 freight trains per day, on average. Two daily Amtrak long-distance trains operate the entire length of the route, and 22 daily Amtrak Pacific Surfliner trains use the portion of the route between Fullerton and Los Angeles. Weekday Metrolink commuter rail traffic varies by segment, with 8 trains between Colton and Riverside; 25 trains between Riverside and Atwood; 9 trains between Atwood and Fullerton; and 28 trains between Fullerton and Los Angeles. Weekend Metrolink commuter rail traffic also varies, with 4 trains between Colton and Riverside; 8 trains between Riverside and Atwood; 4 trains between Atwood and Fullerton; and 12 trains between Fullerton and Los Angeles.

Route Alternative 1's current track and train control infrastructure is matched to its freight speeds and traffic density. Maximum allowable passenger train speed is 60 mph east of Fullerton and 79 mph west of Fullerton; maximum allowable freight train speed is 50 mph throughout. However, grades of 1% ascending eastward from Fullerton to Colton have the potential to slow or prevent freight trains from reaching track speed. Topography and curvature have resulted in permanent passenger-train speed restrictions of 30 mph to 55 mph in segments totaling approximately 9.5 miles of the 42 miles of Route Alternative 1 between Colton and Fullerton. The route is equipped with wayside signaling and Centralized Traffic Control, and Metrolink launched a revenue service demonstration project of Positive Train Control on the route in 2014. At Colton, a 20 mph connecting track is in operation that enables trains from Indio operating westbound on UP's Yuma Subdivision to directly access and operate westbound on BNSF's San Bernardino Subdivision. (Information about all SCRRA track speeds, gradients, terminal locations, mileages, and signaling in this report have come from a SCRRA employee timetable dated June 2, 2013.)

Route Alternative 1 is the only alternative that has multiple main tracks for its entire length, consisting of alternating sections of double track and triple track. A Shared Use Agreement signed in 1992 between BNSF Railway's predecessor the Atchison, Topeka & Santa Fe Railway Company and RCTC provides for additional passenger-train slots between San Bernardino and LAUS. The agreement identifies specific capacity improvement projects to accommodate increases in RCTC-sponsored passenger rail traffic. Additionally, the Memorandum of Understanding for the Colton Crossing Rail Grade-Separation Project includes a provision for converting non-revenue train slots to revenue train slots between Riverside and San Bernardino. Under these agreements, the additional passenger trains on the BNSF San Bernardino Subdivision will not require additional infrastructure if RCTC dedicates to this service some of the available passenger train slots.

- Between Los Angeles and Fullerton, the near-term completion of the triple track project will allow for 50 train movements, up from the current 28. If needed, RCTC can commit four of those train slots to the Coachella Valley service.
- Between Fullerton and Riverside the agreement currently allows for 36 train movements, and there are 25 daily train movements at present. If needed, RCTC can commit four of those train slots to the Coachella Valley service.
- For the segment between Riverside and Colton, the 2013 completion of the Colton Crossing and some additional provisions allow for conversion of four non-revenue movements to revenue movements between Riverside and San Bernardino. If needed, RCTC can commit those four new revenue slots to the Coachella Valley service.

9.1.6 Technical/Economic Feasibility: Alignment

In fine-level screening, the parameter measure for the alignment criterion evaluates if the route alternative involves a more challenging alignment or grading problems, including flyovers, in order to meet schedule and capacity requirements than the other alternatives. Since sufficient passenger train slots are available under current operating agreements for this route, and the improvements completed since 1992 bring the San Bernardino Subdivision to Stage 4 of the infrastructure staging plan, no additional major infrastructure improvements have been identified if RCTC dedicates the needed slots to the Coachella Valley service, so this route would not involve any alignment-change right-of-way issues. While Route Alternative 1 has the highest density of freight traffic among the route alternatives, rail capital improvements have been completed or identified for the capacity required for the slots.

9.1.7 Technical/Economic Feasibility: Structures

Establishing conceptual costs for structures for each route alternative is the parameter for this criterion. Since sufficient passenger train slots are available under current operating agreements for this route no additional major structures were identified if RCTC dedicates the needed slots to the Coachella Valley service.

9.1.8 Technical/Economic Feasibility: Grade Crossings

In fine-level screening, the parameter measure for this criterion measures the comparative number of new and expanded grade crossings and grade separations for each route alternative. Route Alternative 1 has 45 grade crossings between Colton and Los Angeles, and this number will decrease to 38 by 2018 due to the Orange County Transportation Authority's (OCTA) $630 million O.C. Bridges program (OCTA OC Bridges Program website, accessed August 2015).. Since sufficient passenger train slots are available under current operating agreements for this route, no additional infrastructure requiring changes to grade crossings was identified if RCTC dedicates the needed slots to the Coachella Valley service, so this route would not involve any improvement costs for grade crossings.

9.1.9 Economic Feasibility

In fine-level screening, the parameter measure for economic feasibility is comparing major infrastructure capital cost and the operating and maintenance (O&M) costs for each route alternative. Route Alternative 1 is the only alternative with no infrastructure improvements needed between Colton and Los Angeles, so it is the least expensive route alternative in terms of capital infrastructure investment.

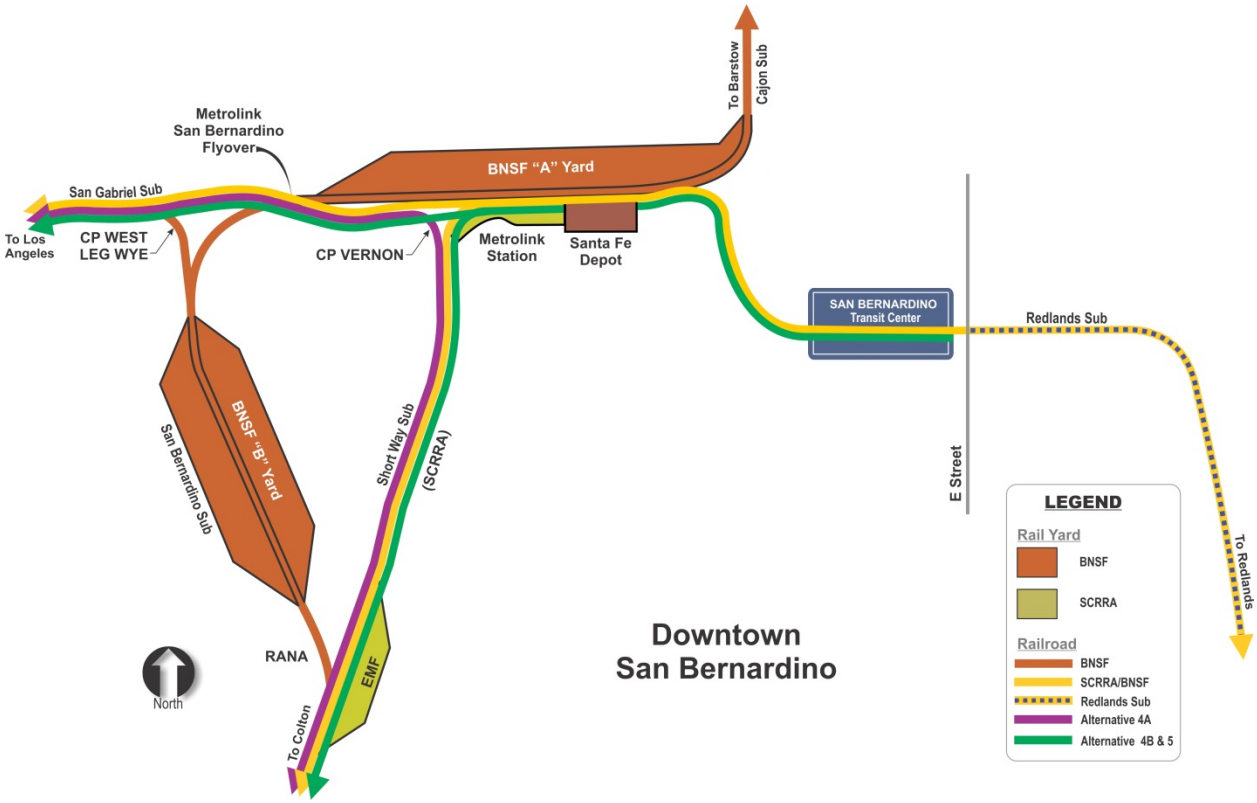
Route Alternative 1 has no unique characteristics that would render its unit costs for operations, maintenance, or equipment different than Route Alternatives 4-A, 4-B, or 5. Annual O&M costs for Route Alternative 1 are projected to be $15,080,000 in 2015 dollars, using the State Fiscal Year 2011-2012 O&M unit cost per train-mile of $70.47 for Pacific Surfliner service (Appendix C) and adjusting for inflation. This projected amount is higher by about $750,000 to $1 million than Route Alternatives 4-A, 4-B, and 5, due to Route Alternative 1's longer mileage.

Trainset equipment turn analysis indicates that two trainsets are required for the proposed service, with each trainset making one round trip per day. These trainset requirements are identical to Route Alternatives 4-A, 4-B, and 5.

9.2 Route Alternative 4-A

The alignment of Route Alternative 4-A through San Bernardino has changed from the description provided in the coarse-level Screening (Section 8) as a result of preliminary Conceptual Engineering analysis. The change reflects an adjustment in routing via SCRRA's Short Way Subdivision to access the SCRRA San Gabriel Subdivision, rather than the alignment presumed in coarse-level screening, which involved construction of a flyover over BNSF's San Bernardino Subdivision and use of BNSF's B Yard tracks in San Bernardino. Figure 53 depicts the revised alignments for Route Alternative 4-A, 4-B, and 5, and the analysis in this section is based on the revised alignment.

Figure 53. Revised Route Alternatives 4-A, 4-B and 5 in Downtown San Bernardino



Route Alternative 4-A, the SCRRA San Gabriel Subdivision, is the northernmost of the alternative alignments. This alternative uses a combination of BNSF's San Bernardino Subdivision in Colton, SCRRA's Short Way Subdivision between Colton and San Bernardino, and SCRRA's San Gabriel Subdivision between San Bernardino and Los Angeles. The BNSF-owned portion of this route is used by Amtrak's Southwest Chief long-distance passenger train and Metrolink's Inland Empire-Orange County Line commuter trains. The SCRRA Short Way Subdivision is used by Metrolink's Inland Empire-Orange County Line commuter trains. The SCRRA San Gabriel Subdivision is used by Metrolink's San Bernardino Line commuter trains. Of the 54 miles of SCRRA's San Gabriel Subdivision that would be used for Alternative 4-A, approximately 80% are single main track.

Route Alternative 4-A uses BNSF's San Bernardino Subdivision from Colton north to CP Rana, then SCRRA's Short Way Subdivision from CP Rana north to a new junction with SCRRA's San Gabriel Subdivision near CP Vernon in San Bernardino. From that point, Route Alternative 4-A uses SCRRA's San Gabriel Subdivision west to Los Angeles. The connection between SCRRA's Short Way Subdivision and San Gabriel Subdivision occurs west of CP Vernon in San Bernardino and east of a flyover that carries the SCRRA trackage over BNSF's San Bernardino Subdivision. This route alternative saves considerable travel time by eliminating the need for passenger trains to change their direction of operation at San Bernardino as would be required under Route Alternatives 4-B and 5, but precludes service to the Metrolink/Amtrak Santa Fe San Bernardino station or the Metrolink San Bernardino Transit Center.

To serve customers in the San Bernardino metropolitan area, trains using Route Alternative 4-A would stop at the Metrolink Rialto station, which is three miles west of the downtown San Bernardino station. Trains would also stop at the Montclair station in western San Bernardino County. This alternative is 60 miles long between Colton and Los Angeles Union Station, and would form a total Indio-Los Angeles Corridor length of 131 miles.

9.2.1 Purpose and Need: Travel Demand

Route Alternative 4-A connects Colton and Los Angeles and would serve the intermediate major communities of San Bernardino and Montclair. The total population within a 15-mile catchment area of these intermediate stops is approximately 3.15 million, and is projected to grow to 3.46 million by 2020. The selection of Route Alternative 4-A would form an Indio-Los Angeles Corridor that would serve a total population of approximately 8.75 million, with a projected increase in total population by station catchment area along the Corridor to 9.52 million by 2020. (SCAG 2012 RTP/SCS)

Annual ridership and revenue from tickets sold for an assumed initial operation year of 2022 and a future year of 2040 were forecast as shown in Table 45. The revenue assumptions include ticket prices similar to those on the Pacific Surfliner for a comparable trip with an average price of approximately $17.60 per trip.

Table 45. Alternative 4-A Annual Ridership and Revenue Forecasts

Alternative 4-A	Ridership	Revenue	Passenger-miles
Year 2022	161,600	$2,842,000	14,170,000
Year 2040	229,600	$4,035,000	20,120,000

Source: Caltrans, 2015 (see Appendix F)

Ridership and revenue from tickets sold for Route Alternative 4-A are the second highest of the four route alternatives. Estimated 2022 annual ridership is approximately 27,500 less than Route Alternative 1's forecast 2022 annual ridership. The lack of a downtown San Bernardino station stop did not negatively impact the ridership estimates. In fact, the forecasts estimate that about 300 to 400 more people per year would board and detrain at Rialto than in downtown San Bernardino, possibly as a result of the longer travel time associated with operating into downtown San Bernardino, as explained in Section 8.3. Route Alternative 4-A meets the Purpose and Need for travel demand.

9.2.2 Purpose and Need: Competitive and Attractive Travel Modes

Route Alternative 4-A has the shortest distance and fastest projected running time among all route alternatives. This can be attributed to the use of the SCRRA San Gabriel Line, a commuter rail line that has no through freight traffic and serves no major freight terminals. The line hosts Metrolink commuter trains and local freight trains. Based on conceptual TPC runs developed for each route alternative, projected running times for Route Alternative 4-A between Indio and Los Angeles are 3 hours, 06 minutes westbound and 3 hours, 14 minutes eastbound.

The projected travel time for Route Alternative 4-A is comparable eastbound and faster westbound to the travel time of the existing Amtrak long-distance passenger rail service, which operates only three days per week in each direction in the middle of the night. The travel time is faster than existing scheduled bus services between Indio and Los Angeles by 20 to 50 minutes, and does not have the unreliability associated with highway travel on I-10. Travel times between Palm Springs and Los Angeles are approximately 1 hour faster than a SunLine-Metrolink bus/rail combination with a transfer at Riverside. Travel by air between Palm Springs and Los Angeles is only 56 minutes, compared with Route Alternative 4-A's travel time of between 2 hours, 35 minutes and 2 hours, 41 minutes between the two cities. However, when additional time factors associated with air travel are introduced, such as the time needed for airport check-in and security before a flight (approximately 1 hour) and travel between Los Angeles International Airport and the central business district (35-45 minutes by FlyAway bus between the airport and LAUS), then the travel times between air and rail via Route Alternative 4-A are nearly identical.

Route Alternative 4-A meets the Purpose and Need of providing a time-competitive and attractive travel mode compared to other currently-available public transportation services.

9.2.3 Environmental Concerns: Environmental Impacts

The environmental resources present within the estimated existing ROW and buffer for Route Alternative 4-A are identified in Table 46. Supporting documentation for information contained in Table 46 is provided in Appendix E.

Table 46. Route Alternative 4-A Environmental Impacts within ROW and Buffer

Environmental Resource	Resources within ROW and Buffer
Named Rivers/Creeks	3 Rivers • Los Angeles River • Rio Hondo • San Gabriel River 6 Creeks • Walnut Creek • Charter Oak Creek • San Antonio Creek Channel • Deer Creek • East Etiwanda Creek • Lytle Creek 5 Washes • Alhambra Wash • Rubio Wash • Eaton Wash • Big Dalton Wash • Live Oak Wash
Floodplain	Approximately 36 acres within the 100 year storm event floodplain
Inventoried Wetlands	Approximately 3 acres • Freshwater Forested/Shrub Wetlands • Riverine Wetlands
Farmland	Approximately ½ acre • Grazing Land in Fontana (San Bernardino County)

Table 46. Route Alternative 4-A Environmental Impacts within ROW and Buffer

Environmental Resource	Resources within ROW and Buffer
Threatened and Endangered Species Critical Habitat	None
Threatened and Endangered Species With Potential to Occur	7 Federally Listed Species • Least Bells Vireo • Southwestern Willow Flycatcher • Slender-Horned Spineflower • Delhi Sands Flower-loving Fly • Salt Marsh Bird's Beak • San Bernardino Kangaroo Rat • Santa Ana River Woollystar 1 State Listed Species • Bank Swallow
NRHP listed Properties	3 properties or resource groupings • Euclid Avenue in Upland (San Bernardino County) • Atchison, Topeka and Santa Fe Railway Station in Claremont (Los Angeles County) • Ygnacio Palomares Adobe in Pomona (Los Angeles County)
Locally Designated Historic Districts, Historic Preservation Overlay Zones and Historic Specific Plan Areas; properties in the CHRIS listed in or eligible for listing in the CRHR or local register; properties in CHRIS eligible for listing in the NRHP	2 properties or resource groupings • Citrus Processing District in Colton (San Bernardino County) • Upland Historic Downtown Specific Plan Area in Upland (San Bernardino County)
Archaeological Sensitivity	Approximately 572 acres • 511 acres of high general archaeological sensitivity • 464 acres of high buried site sensitivity
Potential Section 4(f) (may also be Section 6(f)) Properties)	21 properties • Ramona Gardens Recreation Center in Los Angeles (Los Angeles County) • Pioneer Park in El Monte (Los Angeles County) • Rio Hondo Bike Path in El Monte (Los Angeles County) • Santa Fe Trail Historical Park in El Monte (Los Angeles County) • San Gabriel River Trail in El Monte and Baldwin Park (Los Angeles County) • Torch Middle School Play Areas in Industry (Los Angeles County) • Foster Elementary School in Baldwin Park (Los Angeles County) • Charles D. Jones Junior High School in Baldwin Park (Los Angeles County) • Vineland Elementary School in Baldwin Park (Los Angeles County) • Northview High School in Covina (Los Angeles County) • Edna Park in Covina (Los Angeles County) • Khaler Russell Park in Covina (Los Angeles County) • Charter Oak High School in Covina (Los Angeles County) • Lordburg Park in La Mirada (Los Angeles County) • Palomares Park in Pomona (Los Angeles County) • College Park in Claremont (Los Angeles County) • Fern Reservoir Park in Upland (San Bernardino County) • Wardens Field in Upland (San Bernardino County) • The aforementioned NRHP-listed sites

Table 46. Route Alternative 4-A Environmental Impacts within ROW and Buffer

Environmental Resource	Resources within ROW and Buffer
Environmental Justice/Title VI Populations	61 potential EJ populations[a] Potential environmental justice populations include • 18.66% average rate of poverty • 49% minority populations • 46% of block group census tracts with more than 50% minority population
Land Use and Planning	Land use percentage that could be acquired within the rail Corridor include • 15% single family residential • 3% multi-family residential • 2% other residential • 1% educational • 2% open space/recreation • 5% commercial • > 1% mixed commercial and industrial
Potential Sensitive Receptors for Noise and Air Quality	94 Existing Grade Crossings Sensitive land uses include • 5,226 Single Family Residences • 1,081 Multi Family Residences • 2 Hotels • 3 Hospitals • 61 Schools • 1 Library • 15 Places of Worship • 27 Parks
Visual Resources (scenic routes, trails, school recreation field, recreational areas)[b]	19 Potential Resources/Sites Visible from Alignment 0 Eligible State Scenic Routes 0 County Scenic Routes 1 National Trail • Old Spanish National Historic Trail in Alhambra, Baldwin Park, Covina, and La Verne (Los Angeles County)
Superfund NPL sites	4 Sites • San Gabriel Valley Superfund Site in Baldwin Park (Los Angeles County) • San Gabriel Valley Superfund Site in El Monte (Los Angeles County) • San Gabriel Groundwater Basin (1-4) in El Monte (Los Angeles County) • Area 3 – San Gabriel Valley Superfund Site in Alhambra (Los Angeles County)

Source: HDR 2015, ICF 2015 (Appendix E)

[a] Assumes that a block group within a census tract is a population.

[b] The criteria used in evaluating visual resources was to look at visual resources that could be seen from the ROW and Buffer.

The area along Route Alternative 4-A crosses through Los Angeles and San Bernardino Counties and is a mix of industrial, commercial, and moderately to densely developed residential area.

9.2.4 Environmental Concerns: Right-of-Way

As noted in Section 8.4, Route Alternative 4-A would require the construction of a new Gonzales Connecting Track approximately 1.3 miles long between UP and BNSF at Colton (see Figure 51). The construction of this connecting track would likely require commercial property acquisition in the vicinity of CP Gonzales. In addition, the connecting track may require routing through an existing water treatment area and would require a new rail overpass over South La Cadena Drive. This would result in more ROW acquisitions in the area. Route Alternative 4-A would also require the construction of a new mainline track approximately 0.8 mile long between the SCRRA Shortway Subdivision and the SCRAA San Gabriel Subdivision west of CP Vernon. The construction of this track segment would require the construction of a new bridge over Lytle Creek. The additional ROW that may be required for this new bridge may result in greater impacts on the natural environmental in terms of waters and sensitive species impacted. Construction of this track would also require the acquisition of commercial property – specifically a trucking company.

The construction of a new Shortway Flyover above BNSF's San Bernardino Subdivision as part of a new double-track section of the SCRRA San Gabriel Subdivision would also have potential ROW environmental concerns. This improvement may require relocating yard tracks within the existing BNSF intermodal terminal which would require property acquisition. Adjacent land uses include commercial and residential property, parkland, and Lytle Creek. The additional ROW that may be required could result in both human and natural environmental impacts in the area.

Route Alternative 4-A would also require the construction of approximately 3.85 miles of second track between CP White in Pomona and the South Lone Hill Avenue grade crossing in San Dimas. The ROW through this area is narrow and additional ROW requiring commercial and industrial property acquisition may be required.

9.2.5 Technical Feasibility: Passenger and Freight Capacity

Route Alternative 4-A has three distinct sections:

- A high-density double- and triple-track freight route on the 1-mile portion of BNSF trackage used between Colton and CP Rana.
- A moderate-density, single-track commuter route on the 2-mile portion of SCRRA's Short Way Subdivision between CP Rana in Colton and CP Vernon in San Bernardino.
- A high-density single- and double-track commuter route on the 55-mile portion of SCRRA's San Gabriel Subdivision used between San Bernardino and Los Angeles.

Current train traffic on the BNSF portion of the route exceeds 60 freight trains per day on average, and in addition has 8 weekday and 4 weekend Metrolink commuter trains and 2 Amtrak long-distance trains. Current train traffic on the SCRRA Short Way Subdivision includes 8 revenue commuter trains on weekdays and 4 revenue trains on weekends, plus numerous non-revenue moves to shuttle equipment to and from the Metrolink Eastern Maintenance Facility in Colton. Current train traffic on SCRRA's San Gabriel Subdivision consists of 38 Metrolink commuter trains carrying more than 10,000 passengers a day on

weekdays (20 trains on Saturday and 14 trains on Sunday); up to 12 freight trains per day between San Bernardino and Fontana; and between 2 and 4 local freight trains per day between Fontana and Los Angeles.

Route Alternative 4-A's present-day track and train control infrastructure is matched to its passenger and freight train speeds and traffic density. Both the BNSF and SCRRA lines are equipped with wayside signaling and Centralized Traffic Control. Metrolink began a revenue service demonstration of Positive Train Control on the San Gabriel Subdivision in 2015. Because of the numerous yard operations on BNSF's San Bernardino Subdivision, passenger and freight trains alike are limited to 30 mph through Colton. The SCRRA Short Way Subdivision has a maximum allowable speed of 30 mph for passenger and freight trains. On the SCRRA San Gabriel Subdivision, the maximum allowable speed is 79 mph for passenger trains and 55 mph for freights. Route Alternative 4-A and Alternative 4-B are the only alternatives that do not have mainline freight trains, thus minimizing the potential for passenger trains to be delayed by freight train congestion.

Of the 54 miles of SCRRA's San Gabriel Subdivision that would be used for Alternative 4-A 80% are single main track, with passing sidings that have a combined total length of 6.7 miles, while the remaining 10 miles are double main track. Public timetables show that the San Gabriel Subdivision is Metrolink's busiest commuter line (SCRRA, 2015). (Information about all SCRRA track speeds, gradients, terminal locations, mileages, and signaling in this report have come from a SCRRA employee timetable dated June 2, 2013.) The San Gabriel Subdivision is Metrolink's busiest commuter line, and the lack of second main track introduces the potential to create bottlenecks that can result in train delays. Rush hours are particularly high-volume, with approximately 3 trains per hour operating west in the morning and east in the evening. Since the initial analysis, Metrolink schedules have been reduced to approximately two trains per hour due to PTC implementation to maintain acceptable on-time performance. The current Metrolink service schedule maximizes the existing operating capacity of the San Gabriel Subdivision during peak-hour service periods (weekdays from 4:45 a.m. to 7:30 a.m. and 3:30 p.m. to 6:30 p.m.). (SCRRA, 2015) Accommodating Coachella Valley passenger trains during peak Metrolink periods is not feasible, and some segments of the San Gabriel Subdivision, notably the western segment where the ROW is in the median of I-10, cannot be expanded.

Outside of peak-hour service periods, capacity may be available to support Coachella Valley passenger trains operating in slots between scheduled Metrolink commuter trains, with minimal potential for delay, but would likely require some additional infrastructure. However, those available operating slots would need to be negotiated with SCRRA and its Member Agencies and may not be preferable for ridership purposes and schedules for the Coachella Valley passenger trains may have to be adjusted to better fit around the commuter schedules. Track time for maintenance in the commuter train territory may be constrained by the addition of Coachella Valley passenger trains, requiring nighttime track maintenance.

Route Alternative 4-A would require the construction of the Gonzales Connection Track at Colton to enable westbound trains from Indio on UP's Yuma Subdivision to curve and head north (timetable east) on BNSF's San Bernardino Subdivision (see Figure 51). Construction of this track would likely require some commercial property acquisition in the vicinity of CP Gonzales.

Given the high volume of traffic on the BNSF line, Route Alternative 4-A would likely require a continuation of the connecting track as a fourth mainline track from CP Gonzales east approximately 0.5 mile to CP Rana in Colton, where SCRRA's Short Way Subdivision diverges.

Route Alternative 4-A would also likely require construction of a second track on SCRRA's Short Way Subdivision between the north entrance lead track for Metrolink's Eastern Maintenance Facility at CP Mill north to a new CP Shortway interlocking, near CP Vernon in San Bernardino, to connect with SCRRA's San Gabriel Subdivision and allow northbound trains to operate directly west toward Los Angeles on the San Gabriel Subdivision. This second track would require a new bridge over Lytle Creek. This approximately 0.8 mile track would be built north and west from CP Mill on an incline to join the SCRRA San Gabriel Subdivision on an elevated fill just east of the BNSF flyover. Construction of this track would require commercial property acquisition in San Bernardino currently utilized by a trucking company.

This new second track would continue as a second main track on the SCRRA San Gabriel Subdivision, and would include construction of a new approximately 0.92 mile Shortway Flyover above the BNSF San Bernardino Subdivision main line parallel to the existing single-track SCRRA flyover above the BNSF main line. The west end of the Shortway Flyover would be at the CP Rancho interlocking on the San Gabriel Subdivision.

West of the BNSF flyover, the new second track would continue approximately 2.7 miles west from CP Rancho through Rialto to CP Lilac, which is the west end of an existing 8,100-foot siding. This is the first location west of San Bernardino where Metrolink San Bernardino line trains have an opportunity to pass each other. Construction of a second main track would also require construction of a second platform at the Rialto station, which is the proposed San Bernardino-area stop for Coachella Valley passenger trains under Route Alternative 4-A.

Route Alternative 4-A would likely require construction of a second track in the 7-mile single-track section between Pomona and Covina. The proposed second track would extend the existing second track that currently ends at CP White in Pomona west approximately 3.85 miles to the South Lone Hill Avenue grade crossing in San Dimas.

9.2.6 Technical/Economic Feasibility: Alignment

The addition of the Gonzales Connecting Track at Colton presents ROW, grading, and grade-crossing challenges. The connecting track would require a new bridge over South La Cadena Drive, would pass through a water treatment area north of UP's Yuma Subdivision, and would likely require commercial property acquisition where it connects to the BNSF main line at CP Gonzales.

The addition of a mainline northwest connecting track between the SCRRA Short Way Subdivision and SCRRA San Gabriel Subdivision at San Bernardino presents extensive ROW, grading, and grade-crossing challenges. The track will have to ascend on a curve from ground level north of the Rialto Avenue grade crossing to meet the SCRRA San Gabriel Subdivision, which is on an embankment, just prior to crossing over BNSF's San Bernardino Subdivision. Construction of this mainline track would require acquisition of commercial property used by a trucking warehouse south of the SCRRA San Gabriel Subdivision.

Construction of a SCRRA Shortway Flyover above BNSF's San Bernardino Subdivision and second SCRRA main track from CP Rancho west to CP Lilac would present extensive ROW and grading challenges, and would likely require property acquisition on the west side of the proposed flyover. This property is currently part of a large BNSF Railway intermodal terminal. Construction of a second flyover and main track in this area would cause significant disruption to operations at the intermodal terminal, would likely require relocating yard tracks within the terminal, and would likely require property acquisition to maintain the intermodal terminal's current acreage and mitigate the disruption caused during the construction phase. The terminal is bordered by commercial and residential property, and parkland, and Lytle Creek flows through the middle of the terminal.

West of the BNSF intermodal terminal, there appears to be sufficient width in the ROW to accommodate a second main track. The Rialto station would require a second platform to serve the second main track. At industrial spurs, where tracks leave the ROW to serve customers, new connections would need to be established to account for the second main track.

Construction of approximately 3.85 miles of second track between CP White in Pomona and the South Lone Hill Avenue grade crossing in San Dimas would likely require a realignment of curves and industry tracks in Pomona where the ROW passes between two industrial buildings. Between Pomona and San Dimas, the ROW is narrow in some locations, and property acquisition may be required to accommodate a second track. The alignment passes through suburban and light industrial locations. At industrial spurs, where tracks leave the ROW to serve customers, new connections would need to be established to account for the second main track.

9.2.7 Technical/Economic Feasibility: Structures

Several major structures would be required for Route Alternative 4-A. The major structure required would be a mainline connecting track at San Bernardino, rising in elevation from the SCRRA Short Way Subdivision to the SCRRA San Gabriel Subdivision west of CP Vernon, and a new Shortway Flyover across the BNSF Railway San Bernardino Subdivision parallel to the existing SCRRA San Gabriel Subdivision flyover. Work associated with this improvement would require significant property acquisition in San Bernardino, as described in Section 9.2.6.

In San Bernardino, a new bridge for a second main track would be required across Lytle Creek. The existing single-track SCRRA Short Way Subdivision bridge is approximately 150 feet long.

Locations where Route Alternative 4-A goes underneath other railroads or major highways would require inspection to confirm that an additional main track can be accommodated include:

- Rialto: UP's Mojave Subdivision
- San Dimas: Highway 57 (Orange Freeway)

9.2.8 Technical/Economic Feasibility: Grade Crossings

Route Alternative 4-A has 94 grade crossings between Colton and Los Angeles. Projected infrastructure improvements associated with the implementation of Coachella Valley-San Gorgonio Pass Rail Corridor passenger service would require improving or revising up to 24 grade crossings depending on the extend of improvements required to accommodate the

construction of additional main track between Colton and Los Angeles. Grade crossing work associated with Route Alternative 4-A would be about the same as Route Alternatives 4-B, and 5.

9.2.9 Economic Feasibility

Route Alternative 4-A presents many technical challenges and has an estimated cost that is approximately $100-$200 million more in 2015 dollars than Route Alternative 1, the least expensive route alternative. The major factors that contribute to this complexity and high cost are:

- Construction of a new Gonzales Connecting Track approximately 1.3 miles long between UP and BNSF at Colton
- Construction of a new mainline track approximately 0.8 miles long between the SCRRA Short Way Subdivision and the SCRRA San Gabriel Subdivision west of CP Vernon
- Construction of a new Shortway Flyover above BNSF's San Bernardino Subdivision in San Bernardino parallel to the existing single-track flyover, as part of a new double-track section of the SCRRA San Gabriel Subdivision
- Construction of approximately 8.8 miles of second or fourth main track on segments of BNSF and SCRRA trackage

Route Alternative 4-A has no outstanding operating, maintenance, or equipment cost differentiators compared to Route Alternatives 1, 4-B, or 5. Annual O&M costs for Route Alternative 4-A are projected to be $14,010,000 in 2015 dollars, using the State Fiscal Year 2011-2012 O&M unit cost per train-mile of $70.47for Pacific Surfliner service (Appendix C) and adjusting for inflation.

Trainset equipment turn analysis indicates that two trainsets are required for the proposed service, with each trainset making one round trip per day. These trainset requirements are identical to Route Alternatives 1, 4-B, and 5.

9.3 Route Alternative 4-B

The alignment of Route Alternative 4-B through San Bernardino has changed from the description provided in the coarse-level Screening (Section 8). The change reflects a planned adjustment in Metrolink service at San Bernardino that will replace the proposed station stop and change of direction at the San Bernardino Santa Fe Depot with a proposed station stop and change of direction at the San Bernardino Transit Center (currently under construction). The San Bernardino Transit Center is approximately 1.1 miles east of the Santa Fe Depot, and resulting changes in mileage and forecasted travel times have been updated to reflect this change (Figure 53).

Route Alternative 4-B is the second of two route alternatives that would make use of SCRRA's San Gabriel Subdivision. To serve customers in the San Bernardino metropolitan area, this alternative includes a stop at the downtown San Bernardino Transit Center (under construction as of September 2015), whereas Alternative 4-A would bypass downtown San Bernardino and

stop in Rialto. This alternative uses a combination of BNSF's San Bernardino Subdivision between Colton, SCRRA's Short Way Subdivision between Colton and San Bernardino, and SCRRA's San Gabriel Subdivision between San Bernardino and Los Angeles. The BNSF-owned portion of this route is used by Amtrak's Southwest Chief long-distance passenger train and Metrolink's Inland Empire-Orange County Line commuter trains. The SCRRA Short Way Subdivision is used by Metrolink's Inland Empire-Orange County Line commuter trains. The SCRRA San Gabriel Subdivision is used by Metrolink's San Bernardino Line commuter trains. Of the 55 miles of SCRRA's San Gabriel Subdivision that would be used for Route Alternative 4-B more than 80% are single track.

Route Alternative 4-B diverges from BNSF's San Bernardino Subdivision at CP Rana and continues north on SCRRA's Short Way Subdivision to reach the SCRRA San Gabriel Subdivision at CP Vernon in San Bernardino. At CP Vernon, trains would head east for approximately 1.3 miles on the San Gabriel Subdivision to serve the San Bernardino Transit Center. A lengthy station stop would be required to allow trains to change their end of operation in order to operate westbound to Los Angeles over the San Gabriel Subdivision. Indio-bound trains would also be required to change ends of operation at the San Bernardino Transit Center to negotiate the connection between the San Gabriel Subdivision and the Short Way Subdivision. This alternative is 63 miles long between Colton and Los Angeles Union Station, and would form a total Indio-Los Angeles Corridor length of 134 miles.

9.3.1 Purpose and Need: Travel Demand

This alternative connects Colton and Los Angeles and would serve the intermediate major communities of San Bernardino and Montclair, California. The total population within a 15-mile catchment area of these intermediate stops is approximately 3.05 million, and is projected to grow to 3.36 million by 2020. The selection of Alternative 4-B would form an Indio-Los Angeles Corridor that would serve a total population by station catchment area of approximately 8.72 million, with a projected increase in total population along the Corridor to 9.49 million by 2020. (SCAG 2012 RTP/SCS)

Annual ridership and revenue from tickets sold for an assumed initial operation year of 2022 and a future year of 2040 were forecast as shown in Table 47. The revenue assumptions include ticket prices similar to those on the Pacific Surfliner for a comparable trip with an average price of approximately $17.20 per trip.

Table 47. Alternative 4-B Annual Ridership and Revenue Forecasts

Alternative 4-B	Ridership	Revenue	Passenger-miles
Year 2022	148,200	$2,549,000	13,160,000
Year 2040	210,600	$3,618,000	18,670,000

Source: Caltrans, 2015 (See Appendix F)

Ridership and revenue from tickets sold for Route Alternative 4-B and similar to those for Route Alternative 5 and are the lowest of the route alternatives. Route Alternative 4-B estimated annual ridership in 2022 is 40,900 less than the ridership estimate for Route Alternative 1. The

additional travel time caused by the need to stop in San Bernardino and change the train's direction of travel decreases the train's attractiveness as a competitive travel mode, which is reflected in the ridership and revenue forecasts. Despite the availability of rail and bus connections at the San Bernardino Transit Center, overall San Bernardino ridership for Route Alternative 4-B is lower than Route Alternative 4-A, which bypasses downtown; ticket revenue for Route Alternative 4-B is approximately $300,000 to $400,000 less per year than Route Alternative 4-A. Nevertheless, Route Alternative 4-B can still meets the Purpose and Need for travel demand.

9.3.2 Purpose and Need: Competitive and Attractive Travel Modes

Route Alternative 4-B is longer than Route Alternative 4-A by 3 miles, but would have a considerably longer travel time, caused primarily by the need to change ends of operation at the San Bernardino Transit Center. This activity requires a projected 20-minute station dwell time at San Bernardino, versus a projected dwell at all other intermediate stations of 1 or 2 minutes. The projected 20-minute dwell time was based on similar Metrolink operations in effect during the development of the projected Corridor train schedules. However, revised Metrolink dwell times scheduled to go into effect in Fall 2015 will require a 30-minute stop when changing a trainset's direction of travel as a result of signaling and communications requirements associated with the implementation of Positive Train Control. Thus, Coachella Valley passenger trains would also likely require a 30-minute dwell time at San Bernardino.

Based on conceptual TPC runs developed for each route alternative, projected running times for Route Alternative 4-B between Indio and Los Angeles are 3 hours, 27 minutes westbound and 3 hours, 35 minutes eastbound.

Use of the San Bernardino Transit Center has the potential to introduce opportunities for connections with the planned Redlands passenger rail service. According to the San Bernardino Associated Governments, this $242 million project, currently scheduled for completion no earlier than 2018, will create a passenger rail service between the cities of San Bernardino and Redlands over a 9-mile route with up to 25 daily round trips (SANBAG website accessed August 2015). However, the benefit of this connection would not offset the erosion of ridership and competitive travel time that would result from a 20- or 30-minute station stop in the middle of the trip as discussed in Section 9.3.1.

The projected travel time for Route Alternative 4-B is approximately 30 minutes slower eastbound and slightly faster westbound (due only to 50 minutes of recovery time arriving at LAUS) than the travel time of the existing Amtrak long-distance passenger rail service, which operates three days per week in each direction in the middle of the night. The travel time is comparable to existing Greyhound service between Indio and Los Angeles and approximately 30 minutes faster than the existing Amtrak Thruway bus service. Travel times between Palm Springs and Los Angeles are approximately 50 minutes faster than a SunLine-Metrolink bus/rail combination with a transfer at Riverside. Travel by air between Palm Springs and Los Angeles is only 56 minutes, compared with Route Alternative 4-B's travel time of approximately 3 hours between the two cities. Even when additional time factors associated with air travel are introduced, such as the time needed for airport check-in and security before a flight (approximately 1 hour) and travel between Los Angeles International Airport and the central

business district (35-45 minutes by FlyAway bus between the airport and LAUS), air still has a travel time advantage over rail via Route Alternative 4-B by 15 to 30 minutes.

The addition of a 20- or 30-minute stop in San Bernardino negatively impacts the attractiveness of the passenger rail option when compared to other public transportation services. Therefore, Route Alternative 4-B does not meet the Purpose and Need of providing a time-competitive and attractive travel mode compared to other currently-available public transportation services.

9.3.3 Environmental Concerns: Environmental Impacts

The environmental resources present within the estimated existing ROW and buffer for Route Alternative 4-B are identified in Table 48. Supporting documentation for information contained in Table 48 is provided in Appendix E.

Table 48. Route Alternative 4-B Environmental Impacts within ROW and Buffer

Environmental Resource	Resources within ROW and Buffer
Named Rivers/Creeks	3 Rivers • Los Angeles River • Rio Hondo • San Gabriel River 6 Creeks • Walnut Creek • Charter Oak Creek • San Antonio Creek Channel • Deer Creek • East Etiwanda Creek • Lytle Creek 5 Washes • Alhambra Wash • Rubio Wash • Eaton Wash • Big Dalton Wash • Live Oak Wash
Floodplain	Approximately 36 acres within the 100 year storm event floodplain
Inventoried Wetlands	Approximately 3 acres • Freshwater Forested/Shrub Wetlands • Riverine Wetlands
Farmland	Approximately ½ acre • Grazing Land in Fontana (Riverside County)
Threatened and Endangered Species Critical Habitat	None
Threatened and Endangered Species With Potential to Occur	8 Federally Listed Species • Least Bells Vireo • Southwestern Willow Flycatcher • Slender-Horned Spineflower • Delhi Sands Flower-loving Fly • Salt Marsh Bird's Beak • San Bernardino Kangaroo Rat • Santa Ana River Woollystar • Gambel's water cress 2 State Listed Species

Table 48. Route Alternative 4-B Environmental Impacts within ROW and Buffer

Environmental Resource	Resources within ROW and Buffer
	• Bank Swallow • Swainson's Hawk
NRHP listed Properties	4 properties or resource groupings • Atchison, Topeka and Santa Fe Railway Passenger and Freight Depot in San Bernardino (San Bernardino County) • Euclid Avenue in Upland (San Bernardino County) • Atchison, Topeka and Santa Fe Railway Station in Claremont (Los Angeles County) • Ygnacio Palomares Adobe in Pomona (Los Angeles County)
Locally Designated Historic Districts, Historic Preservation Overlay Zones and Historic Specific Plan Areas; properties in the CHRIS listed in or eligible for listing in the CRHR or local register; properties in CHRIS eligible for listing in the NRHP	3 properties or resource groupings • Santa Fe Railroad Workers HPOZ in San Bernardino (San Bernardino County) • Citrus Processing District in Colton (San Bernardino County) • Upland Historic Downtown Specific Plan Area in Upland (San Bernardino County)
Archaeological Sensitivity	Approximately 588 acres • 527 acres of high general archaeological sensitivity • 480 acres of high buried site sensitivity
Potential Section 4(f) (may also be Section 6(f)) Properties)	22 properties • Ramona Gardens Recreation Center in Los Angeles (Los Angeles County) • Pioneer Park in El Monte (Los Angeles County) • Rio Hondo Bike Path in El Monte (Los Angeles County) • Santa Fe Trail Historical Park in El Monte (Los Angeles County) • San Gabriel River Trail in El Monte and Baldwin Park (Los Angeles County) • Torch Middle School Play Areas in Industry (Los Angeles County) • Foster Elementary School in Baldwin Park (Los Angeles County) • Charles D. Jones Junior High School in Baldwin Park (Los Angeles County) • Vineland Elementary School in Baldwin Park (Los Angeles County) • Northview High School in Covina (Los Angeles County) • Edna Park in Covina (Los Angeles County) • Khaler Russell Park in Covina (Los Angeles County) • Charter Oak High School in Covina (Los Angeles County) • Lordburg Park in La Mirada (Los Angeles County) • Palomares Park in Pomona (Los Angeles County) • College Park in Claremont (Los Angeles County) • Fern Reservoir Park in Upland (San Bernardino County) • Wardens Field in Upland (San Bernardino County) • The aforementioned NRHP-listed sites
Environmental Justice/Title VI Populations	62 potential EJ populations[a] Potential environmental justice populations include • 19.12% average rate of poverty • 49% minority populations • 46% of block group census tracts with more than 50% minority population

Table 48. Route Alternative 4-B Environmental Impacts within ROW and Buffer

Environmental Resource	Resources within ROW and Buffer
Land Use and Planning	Land use percentage that could be acquired within the rail Corridor include • 15% single family residential • 3% multi-family residential • 2% other residential • 1% educational • 2% open space/recreation • 5% commercial • > 1% mixed commercial and industrial
Potential Sensitive Receptors for Noise and Air Quality	99 Existing Grade Crossings Sensitive land uses include • 5,301 Single Family Residences • 1,081 Multi Family Residences • 2 Hotels • 3 Hospitals • 61 Schools • 1 Library • 15 Places of Worship • 27 Parks
Visual Resources (scenic routes, trails, school recreation field, recreational areas)[b]	20 Potential Resources/Sites Visible from Alignment 0 Eligible State Scenic Routes 0 County Scenic Routes 1 National Trail • Old Spanish National Historic Trail in Alhambra, Baldwin Park, Covina, and La Verne (Los Angeles County)
Superfund NPL sites	4 Sites • San Gabriel Valley Superfund Site in Baldwin Park (Los Angeles County) • San Gabriel Valley Superfund Site in El Monte (Los Angeles County) • San Gabriel Groundwater Basin (1-4) in El Monte (Los Angeles County) • Area 3 – San Gabriel Valley Superfund Site in Alhambra (Los Angeles County)

Source: HDR 2015, ICF 2015 (Appendix E)

[a] Assumes that a block group within a census tract is a population.

[b] The criteria used in evaluating visual resources was to look at visual resources that could be seen from the ROW and Buffer.

The area along Route Alternative 4-B crosses through Los Angeles and San Bernardino Counties and is a mix of industrial, commercial, and moderately to densely developed residential area.

9.3.4 Environmental Concerns: Right-of-Way

Route Alternative 4-B is anticipated to have similar ROW environmental concerns to Route Alternative 4-A. See Section 9.2.4 for the description of ROW environmental concerns.

9.3.5 Technical Feasibility: Passenger and Freight Capacity

Route Alternative 4-B has three distinct sections:

- A high-density double- and triple-track freight route on the 1-mile portion of BNSF trackage used between Colton and CP Rana.
- A moderate-density, single-track commuter route on the 2-mile portion of SCRRA's Short Way Subdivision between CP Rana in Colton and CP Vernon in San Bernardino.
- A high-density single- and double-track commuter route on the 58 miles of SCRRA's San Gabriel Subdivision used between San Bernardino and Los Angeles.

Current train traffic on the BNSF portion of the route exceeds 60 freight trains per day on average, and has eight Metrolink commuter trains on weekdays and four on weekend days and two Amtrak long-distance trains. Current train traffic on the SCRRA Short Way Subdivision includes eight revenue commuter trains on weekdays and four revenue trains on weekends, plus numerous non-revenue moves to shuttle equipment to and from the Metrolink Eastern Maintenance Facility in Colton. Current train traffic on SCRRA's San Gabriel Subdivision consists of 38 Metrolink commuter trains carrying more than 10,000 passengers a day on weekdays (20 trains on Saturday and 14 trains on Sunday); up to 12 freight trains per day between San Bernardino and Fontana; and between two and four local freight trains per day between Fontana and Los Angeles.

Route Alternative 4-B's current track and train control infrastructure is matched to its passenger and freight train speeds and traffic density. Both the BNSF and SCRRA lines are equipped with wayside signaling and Centralized Traffic Control. Metrolink began a revenue service demonstration of Positive Train Control on the San Gabriel Subdivision in 2015. Because of the numerous yard operations on BNSF's San Bernardino Subdivision, passenger and freight trains are limited to 30 mph through Colton. The SCRRA Short Way Subdivision has a maximum allowable speed of 30 mph for passenger and freight trains. On the SCRRA San Gabriel Subdivision, the maximum allowable speed is 79 mph for passenger trains and 55 mph for freights. Route Alternative 4-A and Route Alternative 4-B are the only alternatives that do not have mainline freight trains, thus minimizing the potential for passenger trains to be delayed by freight train congestion. (Information about all SCRRA track speeds, gradients, terminal locations, mileages, and signaling in this report have come from a SCRRA employee timetable dated June 2, 2013.)

Of the 55 miles of SCRRA's San Gabriel Subdivision that would be used for Route Alternative 4-B more than 80% are single track, with passing sidings that have a combined total length of 6.7 miles, while the remaining 10 miles are double main track. Public timetables show that the San Gabriel Subdivision is Metrolink's busiest commuter line (SCRRA, 2015), and the lack of second main track introduces the potential to create bottlenecks that can result in train delays. Peak hours are particularly high-volume, with approximately 3 trains per hour operating west in the morning and east in the evening. The current Metrolink service schedule maximizes the existing operating capacity of the San Gabriel Subdivision during peak-hour service periods (weekdays from 4:45 a.m. to 7:30 a.m. and 3:30 p.m. to 6:30 p.m.). Accommodating Coachella Valley passenger trains during peak Metrolink periods is not feasible, and some segments of the San Gabriel Subdivision, notably the western segment where the ROW is in the median of I-10, cannot be expanded.

Outside of peak-hour service periods, capacity may be available to support Coachella Valley passenger trains operating in slots between scheduled Metrolink commuter trains, with minimal potential for delay, but would likely require some additional infrastructure. However, those available operating slots would need to be negotiated with SCRRA and its Member Agencies and may not be preferable for ridership purposes and schedules for the Coachella Valley passenger trains may have to be adjusted to better fit around the commuter schedules. Track time for maintenance in the commuter train territory may be constrained by the addition of Coachella Valley passenger trains and may require nighttime track maintenance.

Route Alternative 4-B would require the construction of the Gonzales Connection Track at Colton to enable westbound trains from Indio on UP's Yuma Subdivision to curve and head north (timetable east) on BNSF's San Bernardino Subdivision, and eastbound trains to diverge from the BNSF line to head east on UP's Yuma Subdivision (Figure 51). Construction of this track would likely require some commercial property acquisition in the vicinity of CP Gonzales.

Given the high volume of traffic on the BNSF line, Route Alternative 4-B would likely require an approximately 0.5 mile continuation of the connecting track as a fourth mainline track from CP Gonzales east to CP Rana in Colton, where SCRRA's Short Way Subdivision diverges.

Route Alternative 4-B would also likely require construction of an approximately 0.8 mile second track on SCRRA's Short Way Subdivision between the north entrance lead track for Metrolink's Eastern Maintenance Facility at CP Mill north to the junction with the SCRRA San Gabriel Subdivision at CP Vernon. This second track would require a new bridge over Lytle Creek.

To accommodate the projected 20- to 30-minute dwell time of Coachella Valley passenger trains at the San Bernardino Transit Center, an additional station track may be needed. Currently, four station tracks are planned for the transit center, two through tracks and two stub tracks, which will accommodate service on the existing Metrolink San Bernardino and Inland Empire lines, as well as future service on the proposed Redlands passenger rail line. Since all Metrolink commuter trains would be changing their direction of operation at the transit center, they would be operating under the 30-minute station dwell time that the commuter agency is placing into effect Fall 2015. The additional dwell time could consume the transit center's available platform capacity allocated for San Bernardino Line, Inland Empire Line, and Redlands operations. Construction of a fifth station track at the San Bernardino Transit Center could require significant reconstruction of the facility and adjacent property acquisition.

Route Alternative 4-B would likely require construction of a second main track between the CP Vernon interlocking in San Bernardino, west of the Santa Fe Depot, and CP Lilac in Rialto. The approximately 3.9 miles of single-track at the western end of the San Gabriel Subdivision has the potential to affect passenger-train reliability if service increases are implemented. Addition of a second track in this section would include construction of a new flyover above the BNSF main line parallel to the existing single-track SCRRA flyover above the BNSF San Bernardino Subdivision main line. The flyover would extend approximately 1.2 miles from CP Vernon to the CP Rancho interlocking on the San Gabriel Subdivision. West of the BNSF flyover, the new second track would continue west from CP Rancho through Rialto to CP Lilac, which is the west end of an existing 8,100-foot siding, and the first location west of San Bernardino where Metrolink San Bernardino line trains have an opportunity to pass each other. Construction of a second main track would also require construction of a second platform at the Rialto station.

The length of second main track required to connect CP Rancho and CP Lilac is approximately 2.7 miles. Although this second track is being proposed in fine-level screening as part of conceptual engineering, further analysis incorporating operations modeling and different scheduling scenarios may determine that an additional track and flyover are not required. Even without the 2.7 miles of additional track and flyover other infrastructure requirements associated with Route Alternative 4-B make it more expensive than the lowest cost option, Route Alternative 1.

Route Alternative 4-B would likely require construction of a second track in the 7-mile single-track section between Pomona and Covina. The proposed second track would extend the existing second track that currently ends at CP White in Pomona westward to the South Lone Hill Avenue grade crossing in San Dimas, a distance of approximately 3.85 miles.

9.3.6 Technical/Economic Feasibility: Alignment

The addition of the Gonzales Connecting Track at Colton presents ROW, grading, and grade-crossing challenges. The connecting track would require a new bridge over South La Cadena Drive, would pass through a water treatment area north of UP's Yuma Subdivision, and would likely require commercial property acquisition where it connects to the BNSF main line at CP Gonzales.

Construction of a fifth station track at the San Bernardino Transit Center could require significant reconstruction of the facility and adjacent property acquisition.

Construction of a second main track for approximately 3.9 miles from CP Vernon in San Bernardino to CP Lilac in Rialto, including construction of a second rail flyover above BNSF Railway's San Bernardino Subdivision, presents extensive ROW and grading challenges in San Bernardino, and would likely require property acquisition on the west side of the proposed flyover. This property is currently part of a large BNSF Railway intermodal terminal. Construction of a second flyover and main track in this area would cause significant disruption to operations at the intermodal terminal, would likely require relocating yard tracks within the terminal, and would likely require property acquisition to maintain the intermodal terminal's current acreage and mitigate the disruption caused during the construction phase. The terminal is bordered by commercial and residential property, and parkland, and Lytle Creek flows through the middle of the terminal.

West of the BNSF intermodal terminal, there appears to be sufficient width in the ROW to accommodate a second main track. The Rialto station would require a second platform serving the second main track. At industrial spurs, where tracks leave the ROW to serve customers, new connections would need to be established to account for the second main track.

Construction of approximately 3.85 miles of second track between CP White in Pomona and the South Lone Hill Avenue grade crossing in San Dimas would likely require a realignment of curves and industry tracks in Pomona where the ROW passes between two industrial buildings. Between Pomona and San Dimas, the ROW is narrow in some locations, and property acquisition may be required to accommodate a second track. The alignment passes through suburban and light industrial locations. At industrial spurs, where tracks leave the ROW to serve customers, new connections would need to be established to account for the second main track.

9.3.7 Technical/Economic Feasibility: Structures

Several major structures would be required for Route Alternative 4-B. One major structure required would be a new flyover across the BNSF Railway San Bernardino Subdivision parallel to the existing SCRRA San Gabriel Subdivision flyover to allow for a second main track between CP Vernon in San Bernardino and CP Lilac in Rialto. Work associated with this improvement would require significant property acquisition in San Bernardino, as described in Section 9.3.6.

Route Alternative 4-B would also require construction of a new bridge for a second track across Lytle Creek in San Bernardino. The existing single-track SCRRA Short Way Subdivision bridge is approximately 150 feet long.

Locations where Route Alternative 4-B goes underneath other railroads or major highways would require inspection to confirm that an additional main track can be accommodated include:

- Rialto: UP's Mojave Subdivision
- San Dimas: Highway 57 (Orange Freeway)

9.3.8 Technical/Economic Feasibility: Grade Crossings

Route Alternative 4-B has 99 grade crossings between Colton and Los Angeles, five of which would be crossed twice in San Bernardino. Projected infrastructure improvements associated with the implementation of Corridor passenger service would require improving or revising up to 24 grade crossings depending on the extent of improvements required to accommodate the construction of additional main track between Colton and Los Angeles. Grade crossing work associated with Route Alternative 4-B would be about the same as Route Alternatives 4-A, and 5.

9.3.9 Economic Feasibility

Route Alternative 4-B presents many technical challenges and has an estimated cost that is approximately $100-$200 million more in 2015 dollars than Route Alternative 1, the least expensive route alternative. The major factors that contribute to this complexity are:

- Construction of a new Gonzales Connecting Track approximately 1.3 miles long between UP and BNSF at Colton
- Potential construction of an additional station track at the San Bernardino Transit Center
- Construction of a new San Bernardino Flyover above BNSF's San Bernardino Subdivision in San Bernardino parallel to the existing single-track flyover, as part of a new double-track section of the SCRRA San Gabriel Subdivision
- Construction of approximately 9.0 miles of second or fourth main track on segments of BNSF and SCRRA trackage

Route Alternative 4-B has no outstanding operating, maintenance, or equipment cost differentiators compared to Route Alternatives 1, 4-A, or 5. Annual O&M costs for Route Alternative 4-B are projected to be $14,331,000 in 2015 dollars, using the State Fiscal Year

2011-2012 O&M unit cost per train-mile of $70.47 for Pacific Surfliner service (Appendix C) and adjusting for inflation.

Trainset equipment turn analysis indicates that two trainsets are required for the proposed service, with each trainset making one round trip per day. These trainset requirements are identical to Route Alternatives 1, 4-A, and 5.

9.4 Route Alternative 5

The alignment of Route Alternative 5 through San Bernardino has changed from the description provided in the coarse-level Screening (Section 8). One change reflects a planned adjustment in Metrolink service at San Bernardino that replaces the proposed station stop and change of direction at the San Bernardino Santa Fe Depot with a proposed station stop and change of direction at the new San Bernardino Transit Center (under construction in September 2015). The San Bernardino Transit Center is approximately 1.1 miles east of the Santa Fe Depot, and mileage and forecasted travel times have been updated to reflect this change (Figure 53). The second change reflects an adjustment as a result of preliminary Conceptual Engineering analysis in the location where Coachella Valley trains would switch from use of the SCRRA San Gabriel Subdivision to the UP Alhambra Subdivision. In coarse-level screening the switch of subdivisions was proposed to occur at the CP Bassett crossover in Industry. However, in fine-level Screening a new high-speed crossover is being proposed approximately 1.6 miles west of CP Bassett in El Monte, west of the Cogswell Road grade crossing, which would serve as the location where trains would switch subdivisions. This adjustment would allow for a longer use of the SCRRA San Gabriel Subdivision and eliminate the potential need for an additional rail bridge over the San Gabriel River, which might have been required for use of the UP Alhambra Subdivision between CP Bassett and El Monte.

Route Alternative 5 is a combination of Route Alternatives 3 (eliminated in coarse-level screening) and 4-B that would be used by Indio-Los Angeles trains operating during peak commuter travel periods. Route Alternative 5 uses BNSF's San Bernardino Subdivision in Colton; SCRRA's Short Way Subdivision between Colton and San Bernardino; SCRRA's San Gabriel Subdivision between San Bernardino and El Monte; and UP's Alhambra Subdivision between El Monte and Los Angeles.

Approximately 82 percent of SCRRA's San Gabriel Subdivision between San Bernardino and Los Angeles is single track, including a segment of approximately 11 miles between El Monte and Los Angeles that runs in the median of I-10 with no room for construction of a second track. In addition, the San Gabriel Subdivision has a heavy morning and evening peak travel commuter operation. The line has a 2-hour window in the morning and a 2-hour window in the evening that sees approximately three trains per hour operating in the direction of peak travel (to Los Angeles in the morning, from Los Angeles in the evening). Metrolink trains traveling in the opposite direction of peak travel flow are not granted priority on the single-track sections, and therefore have 15 to 35 minutes of running time added to their scheduled trips to accommodate waits in sidings or at the ends of double-track sections.

Route Alternative 5 has been devised as a way of enabling Coachella Valley passenger trains to use a significant portion of Metrolink's San Gabriel Subdivision, yet still operate trains on the San Gabriel Subdivision during peak service periods (an option not available under Alternatives

4-A or 4-B) by using UP's Alhambra Subdivision between El Monte and Los Angeles. There are no proposed station stops on either Route Alternative 4-B or 5 between El Monte and LAUS.

Trains using Route Alternative 5 would operate to the Metrolink San Bernardino Transit Center and change their direction of operation, just as they would in Route Alternative 4-B. A lengthy station stop would be required to allow trains to change their end of operation in order to operate westbound to Los Angeles over the San Gabriel Subdivision. Indio-bound trains would also be required to change ends of operation at the San Bernardino Transit Center to negotiate the connection between the San Gabriel Subdivision and the Short Way Subdivision. Alternative 5 is 63 miles long between Colton and Los Angeles Union Station, and would form a total Indio-Los Angeles Corridor length of 134 miles.

9.4.1 Purpose and Need: Travel Demand

Between Colton and Los Angeles, Route Alternative 5 would serve the intermediate major communities of San Bernardino and Montclair. The total population within a 15-mile catchment area of these intermediate stops is approximately 3.05 million, and is projected to grow to 3.36 million by 2020. The selection of Route Alternative 5 would form an Indio-Los Angeles Corridor that would serve a total population by station catchment area of approximately 8.72 million, with a projected increase in total population along the Corridor to 9.49 million by 2020. (SCAG 2012 RTP/SCS)

The station stops for Route Alternative 5 are identical to Route Alternative 4-B and the travel time is similar, thus presuming the ridership and revenue forecasts to be identical. While the route is slightly different (the western 13 miles of the alignment between El Monte and LAUS vary), the mileage is quite similar between the two route alternatives. The annual ridership and revenue from tickets sold for an assumed initial operation year of 2022 and a future year of 2040 were forecast as shown in Table 49. The revenue assumptions include ticket prices similar to those on the Pacific Surfliner for a comparable trip with an average price of approximately $17.20 per trip. Route Alternative 5 2022 estimated annual ridership is 40,900 less than the ridership estimates for Route Alternative 1.

Table 49. Alternative 5 Annual Ridership and Revenue Forecasts

Alternative 5	Ridership	Revenue	Passenger-miles
Year 2022	148,200	$2,549,000	13,160,000
Year 2040	210,600	$3,618,000	18,670,000

Source: Caltrans, 2015 (see Appendix F)

Ridership and revenue from tickets sold for Route Alternative 5, as with Route Alternative 4-B, are the lowest of the route alternatives. Route Alternative 5 estimated annual ridership in 2022 is 40,900 less than the ridership estimate for Route Alternative 1. The additional travel time caused by the need to stop in San Bernardino and change the train's direction of travel decreases the train's attractiveness as a competitive travel mode, which is reflected in the ridership and revenue forecasts. Despite the availability of rail and bus connections at the San Bernardino Transit Center, overall San Bernardino ridership for Route Alternative 5 is lower than Route Alternative 4-A, which bypasses downtown. Ticket revenue for Route Alternative 5 is

approximately $300,000 to $400,000 less per year than Route Alternative 4-A. Nevertheless, Route Alternative 5 meets the Purpose and Need for travel demand.

9.4.2 Purpose and Need: Competitive and Attractive Travel Modes

Route Alternative 5 would have the longest travel time of all alternatives, caused by the need to change ends of operation at the San Bernardino Transit Center and the use of the UP Alhambra Subdivision west of El Monte, which has a lower track speed.

Changing the trainset's direction requires a projected 20-minute station dwell time at San Bernardino, versus a projected dwell at all other intermediate stations of 1 or 2 minutes. The projected 20-minute dwell time was based on similar Metrolink operations in effect during the development of the projected Corridor train schedules. However, revised Metrolink dwell times scheduled to go into effect in Fall 2015 will require a 30-minute dwell time when changing a trainset's direction of travel, as a result of signaling and communications requirements associated with the implementation of Positive Train Control. Coachella Valley passenger trains would also likely require a 30-minute dwell time at San Bernardino.

Based on conceptual TPC runs developed for each route alternative, projected running times for Route Alternative 5 between Indio and Los Angeles are 3 hours, 28 minutes westbound and 3 hours, 38 minutes eastbound. Running times on Route Alternative 5 are longer than Route Alternative 4-B by 1 to 3 minutes to account for the high volume of freight traffic and slower maximum allowable speed for passenger trains on UP's Alhambra Subdivision.

Use of the San Bernardino Transit Center has the potential to introduce opportunities for connections with the planned Redlands passenger rail service. According to the San Bernardino Associated Governments, this $242 million project, currently scheduled for completion no earlier than 2018, will create a passenger rail service between the cities of San Bernardino and Redlands over a 9-mile route with up to 25 daily round trips. (SANBAG website, August 2015) However, the benefit of this connection would not offset the erosion of ridership and competitive travel time that would result from a 20- or 30-minute station stop in the middle of the trip.

The projected travel time for Route Alternative 5 is approximately 30 minutes slower eastbound and slightly faster westbound (due only to 50 minutes of recovery time arriving at LAUS) than the travel time of the existing Amtrak long-distance passenger rail service, which operates three days per week in each direction in the middle of the night. The travel time is comparable to existing Greyhound service between Indio and Los Angeles and approximately 30 minutes faster than the existing Amtrak Thruway bus service. Travel times between Palm Springs and Los Angeles are approximately 50 minutes faster than a SunLine-Metrolink bus/rail combination with a transfer at Riverside. Travel by air between Palm Springs and Los Angeles is only 56 minutes, compared with Route Alternative 5's travel time of approximately 3 hours between the two cities. Even when additional time factors associated with air travel are introduced, such as the time needed for airport check-in and security before a flight (approximately 1 hour) and travel between Los Angeles International Airport and the central business district (35-45 minutes by FlyAway bus between the airport and LAUS), air still has a travel time advantage over rail via Route Alternative 5 by 15 to 30 minutes.

The addition of a 20- or 30-minute stop in San Bernardino negatively impacts the attractiveness of the passenger rail option when compared to other public transportation services. Therefore, Route Alternative 5 does not meet the purpose and need of providing a time-competitive and attractive travel mode compared to other currently-available public transportation services.

9.4.3 Environmental Concerns: Environmental Impacts

The environmental resources present within the estimated existing ROW and buffer for Route Alternative 5 are identified in Table 50. Supporting documentation for information contained in Table 50 is provided in Appendix E.

Table 50. Route Alternative 5 Environmental Impacts within ROW and Buffer

Environmental Resource	Resources within ROW and Buffer
Named Rivers/Creeks	3 Rivers • Los Angeles River • Rio Hondo • San Gabriel River 6 Creeks • Walnut Creek • Charter Oak Creek • San Antonio Creek Channel • Deer Creek • East Etiwanda Creek • Lytle Creek 5 Washes • Alhambra Wash • Rubio Wash • Eaton Wash • Big Dalton Wash • Live Oak Wash
Floodplain	Approximately 37 acres within the 100 year storm event floodplain
Inventoried Wetlands	Approximately 3 acres • Freshwater Forested/Shrub Wetlands • Riverine Wetlands
Farmland	Approximately ½ acre • Grazing Land in Fontana (Riverside County)
Threatened and Endangered Species Critical Habitat	None
Threatened and Endangered Species With Potential to Occur	8 Federally Listed Species • Least Bells Vireo • Southwestern Willow Flycatcher • Slender-Horned Spineflower • Delhi Sands Flower-loving Fly • Salt Marsh Bird's Beak • San Bernardino Kangaroo Rat • Santa Ana River Woollystar • Gambel's water cress 2 State Listed Species • Bank Swallow • Swainson's Hawk

Table 50. Route Alternative 5 Environmental Impacts within ROW and Buffer

Environmental Resource	Resources within ROW and Buffer
NRHP listed Properties	4 properties or resource groupings • Atchison, Topeka and Santa Fe Railway Passenger and Freight Depot in San Bernardino (San Bernardino County) • Euclid Avenue in Upland (San Bernardino County) • Atchison, Topeka and Santa Fe Railway Station in Claremont (Los Angeles County) • Ygnacio Palomares Adobe in Pomona (Los Angeles County)
Locally Designated Historic Districts, Historic Preservation Overlay Zones and Historic Specific Plan Areas; properties in the CHRIS listed in or eligible for listing in the CRHR or local register; properties in CHRIS eligible for listing in the NRHP	4 properties or resource groupings • Santa Fe Railroad Workers HPOZ in San Bernardino (San Bernardino County) • Citrus Processing District in Colton (San Bernardino County) • Upland Historic Downtown Specific Plan Area in Upland (San Bernardino County) • Historic Mission District Specific Plan Area in San Gabriel (Los Angeles County)
Archaeological Sensitivity	Approximately 590 acres • 515 acres of high general archaeological sensitivity • 462 acres of high buried site sensitivity
Potential Section 4(f) (may also be Section 6(f)) Properties)	19 properties • Lincoln Park in Los Angeles (Los Angeles County) • Alhambra Golf Course in Alhambra (Los Angeles County) • Torch Middle School Play Areas in Industry (Los Angeles County) • Foster Elementary School in Baldwin Park (Los Angeles County) • Charles D. Jones Junior High School in Baldwin Park (Los Angeles County) • Vineland Elementary School in Baldwin Park (Los Angeles County) • Northview High School in Covina (Los Angeles County) • Edna Park in Covina (Los Angeles County) • Khaler Russell Park in Covina (Los Angeles County) • Charter Oak High School in Covina (Los Angeles County) • Lordburg Park in La Mirada (Los Angeles County) • Palomares Park in Pomona (Los Angeles County) • College Park in Claremont (Los Angeles County) • Fern Reservoir Park in Upland (San Bernardino County) • Wardens Field in Upland (San Bernardino County) • The aforementioned NRHP-listed sites
Environmental Justice/Title VI Populations	70 potential EJ populations[a] Potential environmental justice populations include • 18.74% average rate of poverty • 51% minority populations • 50% of block group census tracts with more than 50% minority population
Land Use and Planning	Land use percentage that could be acquired within the rail Corridor include • 15% single family residential • 3% multi-family residential • 1% other residential • 2% educational • 1% open space/recreation • 6% commercial • > 1% mixed commercial and industrial

Table 50. Route Alternative 5 Environmental Impacts within ROW and Buffer

Environmental Resource	Resources within ROW and Buffer
Potential Sensitive Receptors for Noise and Air Quality	111 Existing Grade Crossings Sensitive land uses include • 5,252 Single Family Residences • 1,111 Multi Family Residences • 1 Hotel • 5 Hospitals • 54 Schools • 1 Library • 13 Places of Worship • 28 Parks
Visual Resources (scenic routes, trails, school recreation field, recreational areas)[a]	23 Potential Resources/Sites Visible from Alignment 0 Eligible State Scenic Routes 0 County Scenic Routes 1 National Trail • Old Spanish National Historic Trail in El Monte, Baldwin Park, Covina, and La Verne (Los Angeles County)
Superfund NPL sites	4 Sites • San Gabriel Valley Superfund Site in Baldwin Park (Los Angeles County) • San Gabriel Valley Superfund Site in El Monte (Los Angeles County) • San Gabriel Groundwater Basin (1-4) in El Monte (Los Angeles County) • Area 3 – San Gabriel Valley Superfund Site in Alhambra (Los Angeles County)

Source: HDR 2015, ICF 2015 (Appendix E)

[a] Assumes that a block group within a census tract is a population.

[b] The criteria used in evaluating visual resources was to look at visual resources that could be seen from the ROW and Buffer.

The area along Route Alternative 5 crosses through Los Angeles and San Bernardino Counties and is a mix of industrial, commercial, and moderately to densely developed residential area.

9.4.4 Environmental Concerns: Right-of-Way

Route Alternative 5 would require the construction of a new Gonzales Connecting Track approximately 1.3 miles long between UP and BNSF at Colton. The construction of this connecting track would likely require commercial property acquisition in the vicinity of CP Gonzales. In addition, the connecting track may require the routing through an existing water treatment area and would require a new rail overpass over South La Cadena Drive. This would result in more ROW acquisitions in the area.

Route Alternative 5 would also require the construction of a new mainline track approximately 0.8 mile long between the SCRRA Shortway Subdivision and the SCRAA San Gabriel Subdivision west of CP Vernon. The construction of this track segment would require the construction of a new bridge over Lytle Creek. The additional ROW that may be required for this new bridge may result in greater impacts on the natural environmental in terms of waters and sensitive species impacted. Construction of this track would also require the acquisition of commercial property – specifically a trucking company. The construction of a new Shortway

Flyover above BNSF's San Bernardino Subdivision as part of a new double-track section of the SCRRA San Gabriel Subdivision would also have potential ROW environmental concerns. This improvement may require relocating yard tracks within the existing BNSF intermodal terminal which would require property acquisition. Adjacent land uses include commercial and residential property, parkland, and Lytle Creek. The additional ROW that may be required could result in both human and natural environmental impacts in the area. Route Alternative 5 would also require the construction of approximately 3.85 miles of second track between CP White in Pomona and the South Lone Hill Avenue grade crossing in San Dimas. The ROW through this area is narrow and additional ROW requiring commercial and industrial property acquisition may be required.

9.4.5 Technical Feasibility: Passenger and Freight Capacity

Route Alternative 5 has four distinct sections:

- A high-density double- and triple-track freight route on the 1-mile portion of BNSF trackage used between Colton and CP Rana.
- A moderate-density, single-track commuter route on the 2-mile portion of SCRRA's Short Way Subdivision between CP Rana in Colton and CP Vernon in San Bernardino.
- A high-density commuter route on the 45 miles of SCRRA's San Gabriel Subdivision used between San Bernardino and Los Angeles.
- A high-density single-track freight route on the 13-mile portion of UP's Alhambra Subdivision.

Current train traffic on the BNSF portion of the route exceeds 60 freight trains per day on average, and has eight Metrolink commuter trains on weekdays and four on weekend days, and two Amtrak long-distance trains. Current train traffic on the SCRRA Short Way Subdivision includes eight revenue commuter trains on weekdays and four revenue trains on weekends, plus numerous non-revenue moves to shuttle equipment to and from the Metrolink Eastern Maintenance Facility in Colton. Current train traffic on SCRRA's San Gabriel Subdivision consists of 38 Metrolink commuter trains carrying more than 10,000 passengers a day on weekdays (20 trains on Saturday and 14 trains on Sunday); up to 12 freight trains per day between San Bernardino and Fontana; and between two and four local freight trains per day between Fontana and Los Angeles. Current train traffic on the UP portion of the route averages approximately 15 to 25 freight trains per day, along with one Amtrak long-distance train that operates three days per week in each direction. According to the Alameda Corridor-East Construction Authority, which is managing the construction of road-rail grade separation projects on UP's freight rail lines serving the Ports of Los Angeles and Long Beach, freight traffic on UP's Alhambra Subdivision is projected to double to 40-42 trains per day by 2025, and could rise as high as 59 trains per day. (Alameda Corridor East Construction Authority, 2015)

Route Alternative 5's current track and train control infrastructure is matched to its passenger and freight train speeds and traffic density. Both the BNSF, SCRRA, and UP lines are equipped with wayside signaling and Centralized Traffic Control. Metrolink began a revenue service demonstration of Positive Train Control on the San Gabriel Subdivision in 2015. Because of the

numerous yard operations on BNSF's San Bernardino Subdivision, passenger and freight trains are limited to 30 mph through Colton. The SCRRA Short Way Subdivision has a maximum allowable speed of 30 mph for passenger and freight trains. On the SCRRA San Gabriel Subdivision, the maximum allowable speed is 79 mph for passenger trains and 55 mph for freights. UP's Alhambra Subdivision has a maximum authorized speed of 65 mph for passenger trains and 60 mph for freight trains, but the portion of the Alhambra Subdivision that would be used for Route Alternative 5 has permanent speed restrictions for passenger trains of 20 mph to 50 mph over 8.5 miles of the 13-mile segment. (Information about all SCRRA track speeds, gradients, terminal locations, mileages, and signaling in this report have come from a SCRRA employee timetable dated June 2, 2013.)

Both the SCRRA San Gabriel Subdivision and the UP Alhambra Subdivision are primarily single-track railroads, with minimal sections of second main track. UP's Alhambra Subdivision is a high-density, single-track freight main line. The SCRRA San Gabriel Subdivision does not have mainline freight traffic, but is Metrolink's busiest commuter rail line (SCRRA, 2014). The lack of second main track on the San Gabriel Subdivision introduces the potential to create bottlenecks that can result in train delays. Peak hours on the San Gabriel Subdivision are particularly high-volume, with approximately three trains per hour operating west in the morning and east in the evening. The current Metrolink service schedule maximizes the existing operating capacity of the San Gabriel Subdivision during peak-hour service periods (weekdays from 4:45 a.m. to 7:30 a.m. and 3:30 p.m. to 6:30 p.m.).Trains operating during peak periods against the prevailing flow of rush-hour commuter traffic require between 15 and 35 minutes of additional running time, because of the limited number of locations where meet/pass events can occur on the single-track line. Accommodating Coachella Valley passenger trains on the San Gabriel Subdivision during peak Metrolink periods is not feasible, and some segments of the San Gabriel Subdivision, notably the western segment where the ROW is in the median of I-10, cannot be expanded.

Use of the UP Alhambra Subdivision west of El Monte would enable Coachella Valley passenger trains to operate during peak commuter service periods by avoiding one of the most capacity-constrained single-track segments of the San Gabriel Subdivision where it operates within the median of I-10. However, use of the Alhambra Subdivision will also require additional running time and could introduce the potential for delay from the UP subdivision's slower passenger train speeds, predominantly single-track infrastructure, and heavy freight train volumes. The Alhambra Subdivision carries UP's long-haul intermodal, automotive, and manifest freight traffic destined to and from major terminals in Southern California, including the LATC facility located at the west end of the Alhambra Subdivision in Los Angeles. This domestic intermodal terminal handles UP's premium, time-sensitive intermodal traffic. The Alhambra Subdivision is currently operating at or near capacity.

The schedule of Amtrak's Sunset Limited reflects the slow travel times associated with the use of UP's Alhambra Subdivision. Running times between Ontario and Los Angeles, a distance of 38 miles, are 54 minutes eastbound and 1 hour, 41 minutes westbound, with time allotted for an intermediate stop at Pomona, and schedule recovery time added into the westbound trip. The average speed for the Sunset Limited between Ontario and Los Angeles is 42 mph eastbound and 29 mph westbound.

Route Alternative 5 would require the construction of the Gonzales Connection Track at Colton to enable westbound trains from Indio on UP's Yuma Subdivision to curve and head north (timetable east) on BNSF's San Bernardino Subdivision, and eastbound trains to diverge from the BNSF line to head east on UP's Yuma Subdivision (Figure 51). Construction of this track would likely require some commercial property acquisition in the vicinity of CP Gonzales.

Given the high volume of traffic on the BNSF line, Route Alternative 5 would likely require an approximately 0.5 mile continuation of the connecting track as a fourth mainline track from CP Gonzales east to CP Rana in Colton, where SCRRA's Short Way Subdivision diverges.

Route Alternative 5 would also likely require construction of an approximately 0.8 mile second track on SCRRA's Short Way Subdivision between the north entrance lead track for Metrolink's Eastern Maintenance Facility at CP Mill north to the junction with the SCRRA San Gabriel Subdivision at CP Vernon. This second track would require a new bridge over Lytle Creek.

To accommodate the projected 20- to 30-minute dwell time of Coachella Valley passenger trains at the San Bernardino Transit Center, an additional station track might be needed. Currently, four station tracks are planned for the transit center, two through tracks and two stub tracks, which will accommodate service on the existing Metrolink San Bernardino and Inland Empire lines, as well as future service on the proposed Redlands passenger rail line. Since all Metrolink commuter trains would be changing their direction of operation at the transit center, they would be operating under the 30-minute station dwell time that the commuter agency is placing into effect Fall 2015. The additional dwell time could consume the transit center's available platform capacity allocated for San Bernardino Line, Inland Empire Line, and Redlands operations. Construction of a fifth station track at the San Bernardino Transit Center could require significant reconstruction of the facility and adjacent property acquisition.

Route Alternative 5 would likely require construction of a second main track between the CP Vernon in interlocking in San Bernardino, west of the Santa Fe Depot, and CP Lilac in Rialto. The approximately 3.9 mile single-track gap at the western end of the San Gabriel Subdivision has the potential to affect passenger-train reliability if service increases are implemented. Addition of a second track in this section would include construction of a new flyover above the BNSF main line parallel to the existing single-track SCRRA flyover above the BNSF San Bernardino Subdivision main line. The flyover would extend approximately 1.2 miles from CP Vernon to the CP Rancho interlocking on the San Gabriel Subdivision. West of the BNSF flyover, the new second track would continue west from CP Rancho through Rialto to CP Lilac, which is the west end of an existing 8,100-foot siding, and the first location west of San Bernardino where Metrolink San Bernardino line trains have an opportunity to pass each other. Construction of a second main track would also require construction of a second platform at the Rialto station. The length of second main track required to connect CP Rancho and CP Lilac is approximately 2.7 miles. Although this second track is being proposed in fine-level screening as part of conceptual engineering, further analysis incorporating operations modeling and different scheduling scenarios may determine that an additional track and flyover are not required. Even so, without the 2.7 miles of additional track and flyover other infrastructure requirements associated with Route Alternative 5 make it more expensive than the lowest cost option, Route Alternative 1.

Route Alternative 5 would likely require construction of a second track in the 7-mile single-track section between Pomona and Covina. The proposed second track would extend the existing second track that currently ends at CP White in Pomona westward to the South Lone Hill Avenue grade crossing in San Dimas, a distance of approximately 3.85 miles.

Route Alternative 5 would likely require construction of a high speed passenger crossover just west of the Cogswell Road grade crossing in El Monte to allow westbound trains to exit the SCRRA San Gabriel Subdivision and enter the UP Alhambra Subdivision.

Route Alternative 5 would also likely require construction of an approximately 0.8 miles second main track beginning at the high speed crossover in El Monte proposed above west to El Monte to the beginning of the existing El Monte siding, and conversion of the existing El Monte siding to second main track. This would create a total of 2.3 miles of second track and would mitigate conflicts between passenger and freight trains. Route Alternative 5 would also likely require construction of a second track through the San Gabriel Trench currently being constructed in San Gabriel to mitigate conflicts between passenger and freight trains. The second track for Route Alternative 5 would be extended approximately 2.1 miles from the Walnut Grove Avenue crossing in San Gabriel to a point just west of the bridge over the Alhambra Wash.

9.4.6 Technical/Economic Feasibility: Alignment

The addition of the Gonzales Connecting Track at Colton presents ROW, grading, and grade-crossing challenges. The connecting track would require a new bridge over South La Cadena Drive, would pass through a water treatment area north of UP's Yuma Subdivision, and would likely require commercial property acquisition where it connects to the BNSF main line at CP Gonzales.

Construction of a fifth station track at the San Bernardino Transit Center could require significant reconstruction of the facility and adjacent property acquisition.

Construction of approximately 3.9 miles of second main track from CP Vernon in San Bernardino to CP Lilac in Rialto, including construction of a second rail flyover above BNSF Railway's San Bernardino Subdivision, presents extensive ROW and grading challenges in San Bernardino. Construction of the second track including the flyover would likely require property acquisition on the west side of the proposed flyover. This property is currently part of a large BNSF Railway intermodal terminal. Construction of a second flyover and main track in this area would cause disruption of operations at the intermodal terminal, would likely require relocating yard tracks within the terminal, and would likely require property acquisition to maintain the intermodal terminal's current acreage and mitigate the disruption caused during the construction phase. The terminal is bordered by commercial and residential property, and parkland, and Lytle Creek flows through the middle of the terminal.

West of the BNSF intermodal terminal, there appears to be sufficient width in the ROW to accommodate a second main track. The Rialto station would require a second platform serving the second main track. At industrial spurs, where tracks leave the ROW to serve customers, new connections would need to be established to account for the second main track.

Construction of approximately 3.85 miles of second track between CP White in Pomona and the South Lone Hill Avenue grade crossing in San Dimas would likely require a realignment of

curves and industry tracks in Pomona where the ROW passes between two industrial buildings. Between Pomona and San Dimas, the ROW is narrow in some locations, and property acquisition may be required to accommodate a second track. The alignment passes through suburban and light industrial locations. At industrial spurs, where tracks leave the ROW to serve customers, new connections would need to be established to account for the second main track.

On UP's Alhambra Subdivision, the extension of the El Monte siding and conversion of siding track to double track would require the construction of a new bridge over Ramona Boulevard (a divided highway) and perhaps track shifts with the parallel SCRRA San Gabriel Subdivision. The proposed 2.1 miles of second main track in San Gabriel would be located primarily within the San Gabriel Trench, currently under construction. According to the Alameda Corridor-East Construction Authority, the 2.2-mile San Gabriel Trench project will lower a 1.4-mile section of UP's Alhambra Subdivision inside a 30-foot-deep, 65-foot-wide, concrete-walled open trench that will eliminate four surface grade crossings in the City of San Gabriel. The project also includes construction of two new railroad bridges over the Alhambra Wash and the Rubio Wash. The $337 million project, which is part of the Alameda Corridor-East grade-separation program, is expected to be completed in winter 2017. Although only one main track currently exists through this area, the trench's 65-foot width would be able to accommodate a second main track and service road. No industrial spurs exist in either proposed section of second track. (Alameda Corridor-East Construction Authority, 2015)

9.4.7 Technical/Economic Feasibility: Structures

Several major structures would be required for Route Alternative 5. One major structure required would be a new flyover across the BNSF Railway San Bernardino Subdivision parallel to the existing SCRRA San Gabriel Subdivision flyover to allow for a second main track between CP Vernon in San Bernardino and CP Lilac in Rialto. Work associated with this improvement would require significant property acquisition in San Bernardino, as described in Section 9.4.6.

Route Alternative 5 would also require construction of a new bridge for a second track across Lytle Creek in San Bernardino. The existing single-track SCRRA Short Way Subdivision bridge is approximately 150 feet long.

Locations where Route Alternative 5 goes underneath other railroads or major highways would require inspection to confirm that an additional main track can be accommodated include:

- Rialto: UP's Mojave Subdivision
- San Dimas: Highway 57 (Orange Freeway)
- El Monte: I-10

9.4.8 Technical/Economic Feasibility: Grade Crossings

Route Alternative 5 has 111 grade crossings between Colton and Los Angeles, five of which would be crossed twice in San Bernardino. Four grade crossings will be eliminated with the completion of the San Gabriel Trench on UP's Alhambra Subdivision, bringing the number of grade crossings to 107. Projected infrastructure improvements associated with the implementation of Corridor passenger service would require improving or revising up to

28 grade crossings depending on the extent of improvements required to accommodate the construction of additional main track between Colton and Los Angeles. Grade crossing work associated with Route Alternative 5 would be about the same as Route Alternatives 4-A and 4-B.

9.4.9 Economic Feasibility

Route Alternative 5 presents many technical challenges and has an estimated cost that is approximately $150-$250 million more than Route Alternative 1, the least expensive route alternative. The major factors that contribute to this complexity are:

- Construction of a new Gonzales Connecting Track approximately 1.3 miles long between UP and BNSF at Colton
- Potential construction of an additional station track at the San Bernardino Transit Center
- Construction of a new San Bernardino Flyover above BNSF's San Bernardino Subdivision in San Bernardino parallel to the existing single-track flyover, as part of a new double-track section of the SCRRA San Gabriel Subdivision
- Construction of a new high-speed connection at El Monte between the SCRRA San Gabriel Subdivision and UP Alhambra Subdivision
- Construction of approximately 13.4 miles of second or fourth main track on segments of BNSF, SCRRA, and UP trackage

Route Alternative 5 has no outstanding operating, maintenance, or equipment cost differentiators compared to Route Alternatives 1, 4-A, or 4-B. Annual O&M costs for Route Alternative 5 are projected to be $14,331,000 in 2015 dollars, using the State Fiscal Year 2011-2012 O&M unit cost per train-mile of $70.47 for Pacific Surfliner service (Appendix C) and adjusting for inflation.

Trainset equipment turn analysis indicates that two trainsets are required for the proposed service, with each trainset making 1 round trip per day. These trainset requirements are identical to Route Alternatives 1, 4-A, and 4-B.

The 13.4 miles of additional main track likely required under this alternative includes two sections of second track on UP's Alhambra Subdivision totaling 4.4 miles that would not be needed under Route Alternative 4-B. Under the current projected timetable, only one of the four proposed daily Coachella Valley passenger trains would be operating during a peak commuter period and thus require use of UP's Alhambra Subdivision. The other three Coachella Valley trains would be arriving and departing LAUS midday and would permit full use of Route Alternative 4-B, the SCRRA San Gabriel Subdivision. Use of UP's Alhambra Subdivision is also predicated on the availability of freight capacity. These additional expenses make Route Alternative 5 less economically feasible than Route Alternative 4-B.

9.5 Fine-Level Screening Summary

The fine-level Screening of the four route alternatives based on ability to meet Purpose and Need, environmental concerns, and technical and economic feasibility is summarized below, followed by a comparison of route alternatives.

9.5.1 Purpose and Need

Although all four alternatives meet the Purpose and Need for attracting an adequate number of riders to make the service viable, Route Alternative 1 attracts the most riders (189,100 in 2022, 27,500 to 40,900 more than the other alternatives) and is forecast to accrue revenue of $700,000 to $1,000,000 more than Route Alternatives 4-B and 5. Tables 51 and 52 show the ridership and revenue from tickets forecast for the four route alternatives carried forward into fine-level screening at the initial operation year of 2022 and a future year of 2040.

Table 51. Initial Operation Year 2022 Forecast Results, All Alternatives

Initial Operation Year 2022	Alternative 1	Alternative 4-A	Alternative 4-B	Alternative 5
Ridership (thousands)	189.1	161.6	148.2	148.2
Revenue (millions, $2015)	$3.25	$2.84	$2.55	$2.55

Note: Revenue forecast is for revenue from ticket sales only. Appendix F

Table 52. Future Year 2040 Forecast Results, All Alternatives

Future Year 2040	Alternative 1	Alternative 4-A	Alternative 4-B	Alternative 5
Ridership (thousands)	272.3	229.6	210.6	210.6
Revenue (millions, $2015)	$4.66	$4.04	$3.62	$3.62

Note: Revenue forecast is for revenue from ticket sales only. Appendix F

The ridership and revenue forecasts are influenced by populations served at intermediate cities that create ridership and revenue between pairs of intermediate cities, as well as between endpoint and intermediate cities. Running times of trains on each route alternative also influence ridership and revenue forecasts. Conceptual TPC runs were developed for each route alternative. The TPC runs were calculated using an assumed trainset of one EMD F59PHI locomotive and six bi-level Pacific Surfliner coaches, which is the standard trainset currently in use on Amtrak's state-supported Pacific Surfliner trains operating between San Diego, Los Angeles, and San Luis Obispo. Preliminary running times are summarized in Table 53. Route Alternatives 4-B and 5 do not meet the Purpose and Need for providing a competitive and attractive travel mode because the running times are longer than other currently-available public transportation services.

Table 53. Comparative Running Times, All Alternatives

Route Alternatives	Alternative 1	Alternative 4-A	Alternative 4-B	Alternative 5
Miles	141	131	134	134
Westbound (hours:minutes)	03:10	03:06	03:27	03:28
Eastbound (hours:minutes)	03:16	03:14	03:35	03:38

Note: Running times include station dwell times but do not include recovery time. Running times are based on common conceptual parameters for infrastructure among all route alternatives. Running times will require validation upon development of preliminary infrastructure, and will be subject to the terms and conditions of Service Outcome Agreements that would be agreed upon among host railroads and service operator(s).

9.5.2 Environmental Concerns

The environmental resources discussed below represent the resources within the estimated existing ROW and an estimated buffer of additional ROW that may need to be acquired and provide a conservative estimate of what the potential impacts would be. As the design process proceeds for the one or more route alternatives carried forward for detailed evaluation in the Tier 1 Service Level EIS and SDP, a refined assessment of ROW needs would be established and potential impacts refined. Consequently, only environmental resources present in the estimated ROW and buffer are identified during the fine-level screening process. Opportunities for impact avoidance and minimization will be possible through an interactive design and impact consideration process.

In addition to the general environmental conditions discussed in this analysis, each route alternative would present various technical challenges, requiring construction that would result in adverse environmental impacts along each route alternative. Given all of considerations discussed in Section 9, Route Alternative 5 would require the most complex construction and would likely have the most environmental impacts related to construction. Route Alternatives 4-A and 4-B would be somewhat less complex than Route Alternative 5, while Route Alternative 1 does not have construction requirements since no infrastructure improvements would be needed.

The fine-level screening indicates that since Route Alternative 1 would not involve infrastructure improvements it would clearly have the least amount of environmental impact of all the alternatives. Listed from least impacts to most impacts, Route Alternative 1 is followed by Route Alternatives 4-A, 4-B, and 5. Table 54 illustrates a comparison of the route alternatives.

Table 54. Environmental Resources within ROW and Buffer for Route Alternatives

Criteria	Resources within ROW and Buffer		
	Alternative 4-A	Alternative 4-B	Alternative 5
Named Rivers/Streams Count	14	14	14
Floodplain Acres (approximate)	36	36	37
Wetland Acres (approximate)	3	3	3
Farmland Acres (approximate)	½	½	½
Threatened and Endangered Species Critical Habitats	None	None	None
Threatened and Endangered Species with Potential to Occur	8	10	10
Cultural Resources (Historic Sites/ Districts)	5	7	8
Archaeological Sensitivity Acres (approximate)	572	588	590
Potential Section 4(f) Resources	21	22	19
Potential Environmental Justice/Title VI Populations - Average Poverty Rate - Minority Populations - Block Group Census Tracts with more than 50% minority population	61 18.66% 49% 46%	62 19.12% 49% 46%	70 18.74% 51% 50%
Land Uses that could be acquired within the rail Corridor - Residential - Educational - Open Space/Recreation - Commercial - Mixed Commercial/Industrial	 20% 1% 2% 5% > 1%	 20% 1% 2% 5% >1%	 19% 2% 1% 6% >1%
Hazardous Materials	4 Superfund sites	4 Superfund sites	4 Superfund sites

Note: Alternative 1 not shown because it involves no infrastructure improvements that would result in direct environmental impacts.

9.5.3 Technical Feasibility

The four route alternatives evaluated in the fine-level screening are similar in some respects. All share a common alignment between Indio and Colton that is a high-density double-track freight railroad and all require new or upgraded connecting tracks at Colton between the UP Yuma Subdivision and the BNSF San Bernardino Subdivision. However, the route alternatives have widely divergent technical feasibility. This divergence is driven primarily by three factors:

- Length of route – greater length requires more infrastructure improvements for passenger trains

- Density of freight and commuter rail traffic – greater density requires more challenging improvements to accommodate passenger trains, including impacts on bridges, grade crossings, and conflicts with industrial spurs
- Rail flyovers – at locations where two high-density lines cross, rail flyovers are proposed to provide reliability of the proposed passenger service and mitigate conflicts between passenger, freight, and commuter trains

A brief summary of each route alternative's technical feasibility is provided below.

Route Alternative 1 would not require additional major infrastructure because sufficient passenger train slots are available under current operating agreements for this route if RCTC dedicates the needed slots to the Coachella Valley service.

Route Alternative 4-A would likely require:

- Construction of approximately 8.8 miles of additional main track on segments of BNSF and SCRRA trackage;
- A new Gonzales Connecting Track approximately 1.3 miles long between UP's Yuma Subdivision at Colton and BNSF's San Bernardino Subdivision at CP Gonzales in Colton;
- Construction of a new mainline track approximately 0.8 miles long between the SCRRA Short Way Subdivision and the SCRRA San Gabriel Subdivision west of CP Vernon;
- Construction of a new Shortway Flyover above BNSF's San Bernardino Subdivision in San Bernardino parallel to the existing single-track flyover, as part of a new double-track section of the SCRRA San Gabriel Subdivision.

Route Alternative 4-B would likely require:

- Construction of approximately 9.0 miles of additional main track on segments of BNSF and SCRRA trackage;
- A new Gonzales Connecting Track approximately 1.3 miles long between UP's Yuma Subdivision at Colton and BNSF's San Bernardino Subdivision at CP Gonzales in Colton;
- Potential construction of an additional station track at the San Bernardino Transit Center;
- Construction of a new San Bernardino Flyover above BNSF's San Bernardino Subdivision in San Bernardino parallel to the existing single-track flyover, as part of a new double-track section of the SCRRA San Gabriel Subdivision.

Route Alternative 5 would likely require:

- Construction of approximately 13.4 miles of additional main track on segments of BNSF, SCRRA, and UP trackage;

- A new Gonzales Connecting Track approximately 1.3 miles long between UP's Yuma Subdivision at Colton and BNSF's San Bernardino Subdivision at CP Gonzales in Colton;
- Potential construction of an additional station track at the San Bernardino Transit Center;
- Construction of a new San Bernardino Flyover above BNSF's San Bernardino Subdivision in San Bernardino parallel to the existing single-track flyover, as part of a new double-track section of the SCRRA San Gabriel Subdivision;
- Construction of a new high-speed connection at El Monte between the SCRRA San Gabriel Subdivision and UP Alhambra Subdivision.

Route Alternative 1 is the most technically feasible route because it has:

- No requirement for construction of rail flyovers;
- No additional main track required.

9.5.4 Economic Feasibility

The four route alternatives evaluated in the fine-level screening have widely divergent economic feasibility, driven by their technical feasibility and the resulting associated costs. Table 55 provides a relative comparison of the alternatives' technical feasibility by summarizing the major capital improvement projects identified through the fine-screening process. The table is not a comprehensive list of all infrastructure improvements that may be required for each alternative, but provides an order-of-magnitude comparison. Table 56 summarizes the economic feasibility of the route alternatives by comparing their additive cost differences for implementation to Route Alternative 1 (which has the lowest cost because available train slots preclude the need for major infrastructure improvements), along with their forecast revenue differences and annual O&M costs.

Table 55. Estimated Major Capital Improvements Comparison

Major Infrastructure Project	Alternative 1	Alternative 4-A	Alternative 4-B	Alternative 5
Gonzales Connector	No	Yes	Yes	Yes
Lytle Creek Bridge	No	Yes	Yes	Yes
Shortway Flyover	No	Yes	No	No
San Bernardino Flyover	No	No	Yes	Yes
San Bernardino Transit Center Track	No	No	Yes	Yes
Grade Crossing Improvements (#)	No	Yes (24)	Yes (24)	Yes (28)
New Mainline Track (miles)	No	Yes (8.8)	Yes (9)	Yes (13.4)
Range of Estimated Improvement Cost (Millions)	$0	$100-$200M	$100-$200M	$150-$250M

Table 56. Economic Feasibility Comparison, All Build Alternatives

Route Alternative	Alternative 1	Alternative 4-A	Alternative 4-B	Alternative 5
Implementation Cost ($ millions 2015 dollars)	Base	Base plus $100-$200 million	Base plus $100-$200 million	Base plus $$150-$250 million
Forecasted Year 2022 Revenue ($ millions 2015 dollars)	$3.3	$2.8	$2.6	$2.6
Forecasted O&M Costs ($ millions 2015 dollars)	$15.1	$14.0	$14.3	$14.3

Source: Appendix C
Note: Revenue forecast is for revenue from ticket sales only

Route Alternative 5 has the highest implementation cost among all of the alternatives, because of the use of UP's Alhambra Subdivision to avoid use of the SCRRA San Gabriel Subdivision during peak commuter periods. However, only one of the four proposed Coachella Valley passenger trips would operate during a peak commuter period; a change in schedule to allow for the use of Route Alternative 4-B may be more economically feasible than expending the additional construction costs associated with Route Alternative 5. Route Alternatives 4-A, 4-B, and 5 each require the construction of a complex rail flyover in San Bernardino that significantly increases the implementation cost.

As shown in Table 56, Route Alternative 1 has the lowest relative implementation cost, and also generates the highest revenue. Therefore, Route Alternative 1 is the most economically feasible.

9.5.5 Fine-Level Screening Conclusion

Of the remaining four alternatives carried forward to fine-level screening, Route Alternative 1 is clearly superior in terms of Purpose and Need factors, minimizing potential for environmental impacts, Technical Feasibility, and Economic Feasibility, and will be the alternative carried into the Tier 1 EIS and SDP. The information and reasoning supporting this conclusion is presented in Section 10, which describes the evaluation process and results that led to this determination.

10 Reasonable and Feasible Alternatives Carried Forward

This report documents which alternatives have sufficiently demonstrated superior performance, lower cost, and lower potential for adverse impacts to justify advancement into the Tier 1 EIS and Service Development Plan phase. The analysis evaluated and screened the range of route alternatives that could potentially meet the proposed development of an intercity passenger rail service in the Coachella Valley-San Gorgonio Pass Rail Corridor.

Section 10 summarizes the results of the analysis and the reasonable and feasible alternatives carried forward.

The proposed service is intended to meet the following objectives:

1. Provides travelers between the Coachella Valley and the Los Angeles Basin with a public transportation service that offers more convenient and competitive trip times, better station access, and more frequency, than currently-available public transportation services;
2. Provides travelers between the Coachella Valley and the Los Angeles Basin with an alternative to driving that offers reliable travel schedules;
3. Provides travelers between the Coachella Valley and the Los Angeles Basin with a transportation service that is affordable;
4. Serves a range of trip purposes traveling between the Coachella Valley and the Los Angeles Basin, particularly including business, social, medical, leisure, and recreational trips;
5. Improves regional travel opportunities between the Coachella Valley and the Los Angeles Basin for transit dependent people;
6. Is planned to serve the expected population growth in the Coachella Valley and the Los Angeles Basin;
7. Does not preclude, by choice of alignment or technology, a possible future Corridor expansion between the Coachella Valley and Phoenix.

A total of six route alternatives made up the universe of potential Western Section route alternatives that were evaluated and screened in this Alternatives Analysis. The six route alternatives share a common Eastern Section alignment between Indio and Colton, then divide among four existing rail corridors (Route Alternatives 1 through 4-B) and one combination (Route Alternative 5). The screening process for evaluating, and ultimately selecting, one or more route alternatives to carry forward for detailed consideration relied on the following four broad screening criteria:

- Meeting the Purpose and Need for passenger rail service in the Coachella Valley-San Gorgonio Pass Rail Corridor between Indio and Los Angeles
- Environmental concerns
- Technical feasibility
- Economic feasibility

The screening was conducted in two steps. The first step, described in Section 8, was a coarse-level screening to identify if any of the route alternatives had major flaws or challenges that would render the particular route alternative infeasible. During the first screening step, one alternative, the Yuma Subdivision in the Eastern Section of the study Corridor was analyzed, and six Western Section alternatives were evaluated.

The second step, described in Section 9, was a fine-level screening, during which more detailed engineering, cost information, ridership and revenue information, and environmental information were developed and evaluated for each of the Western Section route alternatives carried forward from the coarse-level screening.

10.1 Results from the Coarse-Level Screening

The coarse-level screening concluded that one Eastern Section alternative was feasible, and two of the six Western Section route alternatives, Route Alternatives 2 and 3, were not reasonable or feasible. Both are high-density freight lines, with substantial sections of single track that would require costly expansion projects to create the additional capacity needed to reliably operate the proposed Coachella Valley passenger rail service. Both routes also experience freight-train congestion and serve freight terminals where trains enter and exit at low speeds. The remaining four Western Section route alternatives were carried forward for more detailed consideration in the fine-level screening.

10.2 Results from the Fine-Level Screening

The fine-level screening concluded that of the remaining four Western Section route alternatives carried forward from the coarse-level screening, three are not reasonable or feasible. Each of the route alternatives is discussed below. Table 57 provides a side-by-side comparison of each alternative.

Table 57. Route Alternative Comparison

Route Description	Route Alternative				
	1	4-A	4-B	5	No-Build
LA to Colton Colton to Indio	BNSF San Bernardino Subdivision UP Yuma Subdivision	Metrolink San Gabriel Subdivision UP Yuma Sub	Metrolink San Gabriel Subdivision UP Yuma Sub	Alhambra Subdivision + San Gabriel Subdivision UP Yuma Sub	None None
Intermediate Stations (LA to Colton)	Fullerton, Riverside	Montclair, Rialto	Montclair, San Bernardino	Montclair, San Bernardino	None
Purpose and Need: Travel Demand	10.73 million total Corridor population in 2008	8.75 million total Corridor population in 2008	8.72 million total Corridor population in 2008	8.72 million total Corridor population in 2008	No additional service
Purpose and Need: Ridership Forecast (2022 to 2040)	189,100 to 272,300	161,600 to 229,600	148,200 to 210,600	148,200 to 210,600	None
Revenue Forecast (2022 to 2040)	$3.25 million to $4.66 million	$2.84 million to $4.04 million	$2.55 million to $3.62 million	$2.55 million to $3.62 million	None
Est. Running Time Westbound Eastbound	 3:10 3:16	 3:06 3:14	 3:27 3:35	 3:28 3:38	Not Applicable
Purpose and Need: Competitive and Attractive Travel Modes*	• 141 miles • Competitive travel time	• 131 miles • Competitive travel time	• 134 miles • Excessive travel time	• 134 miles • Excessive travel time	No new travel mode
Environmental Concerns: Environmental Impacts	• No unreasonable environmental resource issues identified	• Potentially impacted by 4 Superfund sites • 21 Section 4(f) resources • 5 identified Historic Sites/ Districts	• Potentially impacted by 4 Superfund sites • 21 Section 4(f) resources • 7 identified Historic Sites/ Districts	• Potentially impacted by 4 Superfund sites • 21 Section 4(f) resources • 8 identified Historic sites/ Districts	No unreasonable environmental resource issues identified
Environmental Concerns: Right-of-Way	None	High percentage of residential and commercial uses that would need to be acquired and relocated	High percentage of residential and commercial uses that would need to be acquired and relocated	High percentage of residential and commercial uses that would need to be acquired and relocated	None

Table 57. Route Alternative Comparison

Route Description	Route Alternative				
	1	4-A	4-B	5	No-Build
LA to Colton Colton to Indio	BNSF San Bernardino Subdivision UP Yuma Subdivision	Metrolink San Gabriel Subdivision UP Yuma Sub	Metrolink San Gabriel Subdivision UP Yuma Sub	Alhambra Subdivision + San Gabriel Subdivision UP Yuma Sub	None None
Technical Feasibility: Passenger and Freight Capacity	• No major changes to existing infrastructure	• Partial second main track • New Gonzales Connection at Colton • New CP-Vernon connection • New Shortway Flyover at San Bernardino	• Partial second main track • New Gonzales Connection at Colton • Potential new San Bernardino station track • Potential new San Bernardino Flyover	• Partial second main track • New Gonzales Connection at Colton • Potential new San Bernardino station track • Potential new San Bernardino Flyover • Freight congestion	No change to existing capacity
Technical/Economic Feasibility: Alignment	No change to existing alignments	Heavy earthwork requirements and property acquisition to build Shortway Flyover	Heavy earthwork requirements and property acquisition to build San Bernardino Flyover	Heavy earthwork requirements and property acquisition to build San Bernardino Flyover	No change to existing alignments
Technical/Economic Feasibility: Structures	No changes to structures	New San Bernardino flyover	New San Bernardino flyover	New San Bernardino flyover	No changes to structures
Technical/Economic Feasibility: Grade Crossings	No changes to grade crossings	Moderate number of grade crossings to modify, but not technically complicated	Moderate number of grade crossings to modify, but not technically complicated	Moderate number of grade crossings to modify, but not technically complicated	No changes to grade crossings
Economic Feasibility	Base	Base plus $100-$200 million	Base plus $100-$200 million	Base plus $150-$250 million	Not applicable
Meets Purpose and Need	**Very Good**	**Fair to Good**	**Fair**	**Fair**	**Poor**
Carried Forward	**Yes**	**No**	**No**	**No**	**Yes****

Source: HDR, 2015 (Appendix E)

*In comparison to currently-available transportation services.

**While the No-Build Alternative does not meet purpose and need, it is carried forward to provide a basis of comparison to any route alternative (40 CFR 1502.14; 64 FR 28545).

10.2.1 Route Alternative 1

Route Alternative 1 fully meets the Purpose and Need for the Project. In consideration of meeting the Purpose and Need and other criteria, Route Alternative 1 was determined to be reasonable and feasible. Route Alternative 1 has the highest projected ridership, and a significantly lower implementation cost than all other alternatives. Route Alternative 1 has somewhat higher operations and maintenance costs, because of its longer mileage. Nevertheless, Route Alternative 1 was determined to meet the technical and economic criteria, and was determined to be reasonable and feasible. Route Alternative 1 will be carried forward for evaluation in the Tier 1 EIS and SDP.

10.2.2 Route Alternative 2

Alternative 2 was eliminated during the coarse-level screening because it had high environmental concerns, technical complexities, and economic infeasibility.

10.2.3 Route Alternative 3

Alternative 3 was eliminated during the coarse-level screening because it had high technical complexity and economic infeasibility.

10.2.4 Route Alternative 4-A

Route Alternative 4-A has the shortest projected travel time, but has ridership projections lower than Route Alternative 1. Route Alternative 4-A would partly meet the Purpose and Need of providing a competitive and attractive travel mode. Route Alternative 4-A did not meet the technical/economic criteria by requiring complex connecting tracks at Colton and San Bernardino, additional main track, and a major new flyover across the BNSF San Bernardino Subdivision in San Bernardino. This flyover would be costly, have impacts on adjacent urban areas, and is not practical. Route Alternative 4-A did not meet the economic criterion because of the excessive capital cost requirements. Route Alternative 4-A was determined to be neither reasonable nor feasible.

10.2.5 Route Alternative 4-B

Route Alternative 4-B did not meet the Purpose and Need for the Project well because it (along with Route Alternative 5) would attract the lowest ridership. The route alternative would also not offer a competitive travel time because of the need for a mid-route station stop at San Bernardino with a dwell time of 20 to 30 minutes. Route Alternative 4-B also did not meet the technical/economic criteria by requiring a complex connecting track at Colton, additional main track, and a potential new flyover across the BNSF San Bernardino Subdivision in San Bernardino. This flyover would be costly, have impacts on adjacent urban areas, and is not practical. Route Alternative 4-B did not meet the economic criterion because of the excessive capital cost requirements. Route Alternative 4-B was determined to be neither reasonable nor feasible.

10.2.6 Route Alternative 5

Route Alternative 5 did not meet the Purpose and Need for the Project well because it (along with Route Alternative 4-B) would attract the lowest ridership. This alternative is the slowest of the route alternatives and does not offer a competitive travel time because of the need for a mid-route station stop at San Bernardino with a dwell time of 20 to 30 minutes and the slower track speed on UP's Alhambra Subdivision. Route Alternative 5 also did not meet the technical/economic criteria by requiring a complex connecting track at Colton, additional main track, use of a UP freight line that is at or near capacity for which creating new capacity would be costly, and a potential new flyover across the BNSF San Bernardino Subdivision in San Bernardino. This flyover would be costly, have impacts on adjacent urban areas, and is not practical. Route Alternative 5 did not meet the economic criterion because of the excessive capital cost requirements. Route Alternative 5 would cost more than Alternative 4-B without providing any additional ridership benefits. Route Alternative 5 was determined to be neither reasonable nor feasible.

10.2.7 No-Build Alternative

The No-Build Alternative did not meet Purpose and Need for the Project because it would not provide any additional service or a new travel mode. The No-Build Alternative would result in no change to existing capacity, alignment, structures, or grade crossings. However, to meet NEPA requirements for evaluating No Action and to serve as a baseline for comparing impacts of a route alternative, this alternative will be carried forward for evaluation in the Tier 1 EIS.

10.3 Reasonable and Feasible Alternatives

The fine-level screening concluded that Route Alternative 1 is clearly superior to the other three in terms of all four screening criteria categories (Purpose and Need, Environmental Constraints, Technical Feasibility, and Economic Feasibility). Route Alternative 1 demonstrated superior performance in the following ways:

1. Meeting Purpose and Need
    - Serving the largest population catchment area (two million people more than each of the other alternatives)
    - Having the highest ridership and revenue forecast (17-19% higher ridership forecast than the next-best alternative)
    - Offering a competitive travel time (comparable travel time to the next-best alternative, and 17-22 minutes less than the other two alternatives).
2. Reducing Environmental Constraints
    - No impact to environmental resources (all of the other alternatives have potential impacts to parkland, schools, Superfund sites, and historic properties).
    - No right-of-way concerns (all other alternatives require property acquisition causing potential displacement of commercial and residential uses).

3. Offering Technical Feasibility
    - Available and adequate passenger and freight capacity (8.8-13.4 miles of new track for the other alternatives)
    - No major alignment changes needed (two new track connections for the other alternatives).
    - No major new structures or grade crossings required (new San Bernardino flyover and 24-28 grade crossing improvements for the other alternatives).
4. Affording Economic Feasibility
    - Lowest capital cost of all alternatives (approximately $100-$250 million less than the other alternatives)
    - Uses available operating rights

10.4 Conclusions and Next Steps

The purpose of this Alternatives Analysis was to consider reasonable buildable alternatives for daily intercity rail service between the Coachella Valley and Los Angeles, and to identify the most promising alternatives for more detailed evaluation based on superior performance in the screening analysis. Based on the Alternatives Analysis results, Route Alternative 1 will be carried forward for analysis in the Service Development Plan because, when compared to other route alternatives considered, it:

- Best meets the project Purpose and Need
- Has relatively low construction complexity and low construction costs by exercising operating rights and leveraging public agency railroad capital investments
- May not require a flyover above an active rail line
- Has a competitive passenger-train travel time
- Serves the largest population
- Has the highest ridership and revenue forecast
- Has no unreasonable environmental resource issues

The next steps of the Study process include the preparation of a Tier 1 Environmental Impact Statement (EIS)/Programmatic Environmental Impact Report (EIR) and a Service Development Plan (SDP), consistent with federal and state requirements, and following FRA guidance. As part of the EIR/EIS, all interested agencies and the public at large will be invited to participate in the scoping process to ensure the EIS/EIR addresses the full range of issues related to the purpose and need, the proposed action, reasonable alternatives are addressed, and all significant issues are identified. Additionally, the scoping process and public comments are used to identify reasonable alternatives and potential environmental effects in the preparation of the EIS/EIR. This may involve the development of alternatives not considered in the Alternatives Analysis or an iterative process of existing alternatives, where

Route Alternative 1 maybe refined as more information comes available based on the environmental analysis and coordination with stakeholders and the public. A No-Build Alternative will also be carried forward for analysis in the Tier 1 EIS because evaluation of No Action is required by the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA), and the No-Build alternative serves as a basis of comparison for likely impacts of constructing and operating the Coachella Valley-San Gorgonio Pass Rail Corridor service. The Tier 1 EIS analysis will provide a basis for selecting the service level (station stops and frequency) that will best meet the Purpose and Need for the new passenger rail service.

11 References

The alternatives analysis process utilized information from diverse sources.

AirSage. Cell Phone Data, April 29, 2014 through May 14, 2014.

Alameda Corridor-East Construction Authority, Accessed August 2015. http://www.theaceproject.org/san_gabriel_trench.php

Amtrak California. Summer 2013 Pacific Surfliner Ridership Profile Survey Results Board Presentation, January 2014. (Confidential)

Amtrak. FY13 Bus and Rail Ridership Data, September 2014. (Confidential)

Amtrak. Bus and Rail Schedules, Accessed online June 2014. www.amtrak.com

Atchison, Topeka, and Santa Fe Railway Company and RCTC, Shared Use Agreement (San Bernardino Subdivision), October 1992.

BNSF Railway. California Division Timetable No. 2. June 25, 2014

California Travel and Tourism Commission. California Travel Impacts by County, 1992-2011, and 2012 Preliminary State and Regional Estimates, May 2013. Prepared by Dean Runyan Associates.

California Department of Transportation (Caltrans). 2010-2012 California Household Travel Survey Final Report, June 2013. Prepared by NuStats, LLC with Geo Stats, Franklin Hill Group, and Mark Bradley Research and Consultancy.

Caltrans. California State Rail Plan, February 2013. Prepared by AECOM.

Caltrans. Coachella Valley Intercity Rail Corridor Planning Study, May 2013. Prepared by AECOM with Cambridge Systematics and Arellano Associates.

Caltrans. I-5 Freeway Commute Study Volumes 1 and 2, November 2012. Prepared by Redhill Group Inc.

Caltrans. Corridor System Management Plan (CSMP) San Bernardino County I-10 Final Report, June 2011. Prepared by System Metrics Group, Inc.

Caltrans. CSMP San Bernardino County I-15 Final Report, October 2011.

Caltrans. CSMP San Bernardino County I-215 Final Report, June 2011. Prepared by DKS Associates in association with Kimley-Horn Associates.

Caltrans. CSMP Riverside County SR-91 Final Report, June 2011. Prepared by System Metrics Group, Inc.

Caltrans. Performance Measurement System (PeMS) Data, Accessed December 2014.

Caltrans. Press Release, August 31, 2011, Accessed June 2015. http://www.dot.ca.gov/hq/paffairs/news/pressrel/11pr77.htm.

Caltrans, Division of Rail. Travel Forecasting, 2015.

Caltrans. Route Concept Fact Sheet, District 8, Interstate Route 15, March 1999.

Caltrans. Route Concept Fact Sheet, District 8, Interstate Route 10, March 2000.

Caltrans. Route Concept Fact Sheet, District 8, Interstate Route 215, August 1999.

Caltrans. Route Concept Fact Sheet, District 8, State Route 60, August 1999.

Caltrans. Route Concept Fact Sheet, District 8, State Route 91, October 1989.

California Environmental Protection Agency (CalEPA). Disadvantaged communities data – CalEnviroScreen 2.0. Accessed June 2015.

Coachella Valley Association of Governments (CVAG). Coachella Valley Passenger Rail Feasibility Study, February 1999. Prepared by Schiermeyer Consulting Services.

CVAG. 2004 Origin and Destination Survey, September 2004. Prepared by ETC Institute in association with Kimley-Horn Associates.

Google Maps. Routes and Travel Times, accessed online August 2015.

Greater Palm Springs Convention and Visitors Bureau. 2013 Annual Report, December 2013.

Greater Palm Springs Convention and Visitors Bureau. 2013 Economic Impact Report, December 2013.

Greater Palm Springs Convention and Visitors Bureau. The Economic Impact of Tourism in Greater Palm Springs, November 2012. Prepared by Tourism Economics – an Oxford Economics Company.

Greyhound. Route Map, accessed online June 2014. www.greyhound.com

Iowa DOT. Chicago to Council Bluffs-Omaha Regional Passenger Rail System Planning Study, October 2012.

National Park Service. Visitor information accessed online August 2015. http://www.nps.gov/jotr/planyourvisit/things2know.htm

Orange County Transportation Authority (OCTA). Multi-County Goods Movement Action Plan: Orange County Action Plan, April 30, 2008. Prepared by Wilbur Smith Associates.

OCTA. OC Bridges Program, Accessed August 2015. https://www.octa.net/Freeways-and-Streets/Streets/OC-Bridges/Project-Overview/

Riverside County Transportation Commission (RCTC). 2010 Coachella Valley Rail Study Update, April 2010. Prepared by SCS Consulting Services.

RCTC. Los Angeles-Coachella Valley-Imperial County Intercity Rail Feasibility Study, Executive Summary, 1991. Prepared by Schiermeyer Consulting Services and Wilbur Smith Associates.

RCTC. RCTC Commuter Rail Feasibility Study, November 2005. Prepared by R.L. Banks & Associates Inc., in association with Wilbur Smith Associates.

RCTC. Resolution of Support to Establish Daily Intercity Rail Service from Los Angeles to the Coachella Valley via the Pass Area, October 2013.

Riverside Transit Agency. System Map, January 2014.

San Bernardino Associated Governments (SANBAG). Redlands Passenger Rail Project website, accessed August 2015. http://www.sanbag.ca.gov/projects/redlands-transit.html

San Bernardino Associated Governments, Union Pacific Railroad Company, and BNSF Railway, Memorandum of Understanding Colton Crossing Rail Grade-Separation Project, April 2010.

Southern California Association of Governments (SCAG). Regional Transportation Plan / Sustainable Communities Strategy: 2012-2035, April 2012.

SCAG. Comprehensive Regional Goods Movement Plan and Implementation Strategy, February 2011

SCAG. Regional Travel Model Production-Attraction Data for 2008, accessed December 2014.

Southern California Public Radio. News article accessed August 2015. http://www.scpr.org/programs/take-two/2013/04/11/31290/coachella-2013-cash-strapped-indio-wants-to-share/.

Southern California Regional Rail Authority (SCRRA). Capital Planning Budget FY 14-15, 2014.

SCRRA. Metrolink Timetable No. 9., June 2, 2013.

SCRRA. Perris Valley Line, accessed June 2015. http://www.perrisvalleyline.info/

SCRRA and Orange County Transportation Authority. Multi-County Goods Movement Action Plan, April 2008.

SunLine Transit Agency. Draft Short Range Transit Plan, FY 2013/14 – FY 2015/16, May 2013.

SunLine Transit Agency. SunBus System Map, May 2014.

TNS Travels America. 2012 Domestic Travel to California: Trip and Travel Behavior and Statistics, May 2015.

TomTom Data, Accessed June 2015.

Tourism Economics – An Oxford Economics Company. California Travel and Tourism Outlook, October 2013.

Union Pacific Railroad. Los Angeles Area Timetable No. 5. October 28, 2013

United Airlines. Schedules, Fares, and Route Maps, accessed online August 2015.

US Department of Commerce, Economics and Statistics Administration, US Census Bureau. 2010 Journey to Work database.

US Department of Commerce, Economics and Statistics Administration, US Census Bureau. American Community Survey: County-to-County Commuting Flows: 2006-2010, January 2013. Prepared by Brian McKenzie.

US Department of Commerce, Economics and Statistics Administration, US Census Bureau. American Community Survey: Modes Less Traveled – Bicycling and Walking to Work in the United States: 2008-2012, May 2014. Prepared by Brian McKenzie.

US Department of Commerce, Economics and Statistics Administration, US Census Bureau. American Community Survey: Commuting in the United States: 2009, September 2011. Prepared by Brian McKenzie.