

Antelope Valley Line Study

An aerial photograph of a rugged, mountainous landscape. In the foreground, a train with several blue and white passenger cars is traveling along a track that curves through a valley. The surrounding terrain is covered in dense, green and brown vegetation, with numerous ridges and valleys visible in the background under a clear blue sky.

Appendix I Existing Conditions Report

APPENDIX 1
Existing Conditions Report

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ACRONYMS AND ABBREVIATIONS

| | |
|----------|--|
| AAR | The Association of American Railroads |
| AEI | Automatic Equipment Identification |
| AQMD | Air Quality Management District |
| AVL | Antelope Valley Line |
| AVTA | Antelope Valley Transportation Authority |
| BRT | Bus Rapid Transit |
| CalSTA | California State Transportation Agency |
| Caltrans | California Department of Transportation |
| CDFW | California Department of Fish and Wildlife |
| CEQA | California Environmental Quality Act |
| CHSRA | California High-Speed Rail Authority |
| CMF | Central Maintenance Facility |
| CNNDB | California Natural Diversity Database |
| CP | Control Point |
| DMU | Diesel Multiple Unit |
| EIR | Environmental Impact Report |
| EIS | Environmental Impact Statement |
| EMF | Eastern Maintenance Facility |
| EMS | Emergency Medical Services |
| ESFV | East San Fernando Valley |
| FEMA | Federal Emergency Management Agency |
| FRA | Federal Railroad Administration |
| FY | Fiscal Year |
| GHG | Greenhouse Gas |
| GIS | Geographic Information System |
| HSR | High-Speed Rail |
| I-5 | Interstate 5 |
| Jct | Junction |
| JPA | Joint Powers Authority |
| KPI | Key Performance Indicator |
| LASD | Los Angeles County Sheriff's Department |
| LAUS | Los Angeles Union Station |
| Link US | Link Union Station (Formerly known as Southern California Regional Interconnector Project (SCRIP)) |

Acronyms and Abbreviations

| | |
|-----------------|--|
| LOSSAN Corridor | Los Angeles – San Diego – San Luis Obispo Rail Corridor |
| LRT | Light Rail Transit |
| MAS | maximum authorized speed |
| Metro | Los Angeles County Metropolitan Transportation Authority |
| MIRP | Metrolink Infrastructure Rehabilitation Plan |
| MOW | Maintenance-of-Way |
| MP | Milepost |
| mph | Miles per Hour |
| MT | Main Track |
| NCTC | North County Transportation Coalition |
| NEPA | National Environmental Policy Act |
| NTSB | National Transportation Safety Board |
| OCTA | Orange County Transportation Authority |
| OD | Origin-Destination |
| OTP | On-Time Performance |
| PIO | Public Information Officer |
| PTC | Positive Train Control |
| RCTC | Riverside County Transportation Commission |
| SANBAG | San Bernardino Associated Governments |
| SBCTA | San Bernardino County Transportation Authority (formerly SANBAG) |
| SCORE | Southern California Optimized Rail Expansion |
| SCRRA | Southern California Regional Rail Authority |
| SEPP | Security and Emergency Preparedness Plan |
| SOC | Security Operations Center |
| SOGR | State-of-Good-Repair |
| SR 14 | State Route 14 |
| SWIC | Southwest Information Center of the California Historical Resources Information System |
| TIRCP | Transit and Intercity Rail Capital Program |
| TVM | ticket vending machine |
| UP | Union Pacific Railroad |
| CP | Control Point |
| USFWS | U.S. Fish and Wildlife Service |
| VCTC | Ventura County Transportation Commission |
| VTMI | Veolia Transportation Maintenance and Infrastructure, Inc. |

1 INTRODUCTION AND STUDY PURPOSE

1.1 OVERVIEW

The Antelope Valley Line (AVL) is the route used by the Southern California Regional Rail Authority (SCRRA) running Metrolink commuter rail service between Los Angeles Union Station (LAUS) and Lancaster. This 76.6-mile long commuter line is the only Metrolink route that operates entirely within Los Angeles County. The inner portion of the route, covering 11.4 miles between LAUS and Burbank Junction (Jct), is shared with Metrolink's Ventura County Line and Amtrak's Pacific Surfliner and Coast Starlight services. On the remaining 65.2-mile portion of the AVL beyond Burbank Jct, there are up to 42 train movements per day (30 Metrolink commuter trains and 12 Union Pacific Railroad (UP) freight trains), on a line that has only a single track along approximately two-thirds of its length. This AVL Study focuses on the portion of the AVL between Burbank Jct and the Lancaster Station. The Regional Rail department of The Los Angeles County Metropolitan Transportation Authority Regional Rail (Metro) has conducted a separate study called the *Glendale-Burbank-LAUS Study* that covers the portion of the line between LAUS and Burbank Jct.

The average speed on the entire AVL is approximately 40 miles per hour (mph). Passenger rail travel time between Lancaster and LAUS is approximately two hours. The AVL is currently Metrolink's third-busiest line and is facing a variety of service challenges due to its aging infrastructure, significant grades, curves and topography, and preponderance of single-tracking.

1.1.1 Antelope Valley Line Study Purpose

Metro is seeking solutions to realize the full potential of the AVL. The purpose of this study is to assess the existing conditions of the corridor between Burbank Jct and the Lancaster Station, identify infrastructure improvements to enhance travel speeds and reliability, and evaluate a series of potential service scenarios developed by Metrolink and define the most cost-effective infrastructure investments necessary to support them. Further, this study will also evaluate and prioritize multiple infrastructure improvement scenarios using a cost to benefit approach, and identify potential funding strategies.

A primary objective of this study is to identify existing constraints that reduce overall travel time and improve the ridership experience while improving regional rail services, safety, reliability, and community connectivity. A further objective of the study is to develop recommended incremental rail service and infrastructure improvements that are consistent with the vision for rail service in the greater Los Angeles region – specifically Metrolink's Southern California Optimized Rail Expansion (SCORE) program – as well the State's vision

for statewide intercity and regional rail service as presented in the 2018 California State Rail Plan. Key elements of the SCORE program that will be examined in the study include:

- Regular clock-face scheduling in both directions of travel (i.e., trains operating at regular intervals, at the same time each hour)
- Peak service frequencies on the inner portion of the line between Burbank and Santa Clarita at 30 minutes by 2023, and ultimately to 15 minutes
- Regular service frequencies to the North Los Angeles County cities along the AVL, including Palmdale and Lancaster, at one hour, leading ultimately to 30-minutes, plus hourly peak express service to LAUS in the peak direction of travel
- Rail infrastructure projects to deliver capacity necessary for the above service levels

The study will examine opportunities to enhance Metrolink service between the Burbank and Lancaster stations along the AVL. Operations on the AVL will be analyzed, with existing infrastructure and with potential enhancements, identifying infrastructure improvements that would mitigate existing operational constraints. The feasibility and relative merits of alternative service enhancements will be evaluated, specifying the additional capacity improvements necessary to support improved service. A phased strategy will be developed for prioritizing investments and building capacity to realize incremental service improvements, based on benefits and costs.

This Existing Conditions Report is part of the AVL Study, and its purpose is to establish the corridor context, physical and operational characteristics, safety and security, environmental constraints, station conditions, travel markets, and possible future opportunities.

1.1.2 Role of Metrolink Commuter Rail and the Antelope Valley Line in the Regional Transportation Network

SCRRA is a joint powers authority (JPA) formed in 1991, comprised of five Southern California county agencies: Metro, Orange County Transportation Authority (OCTA), Riverside County Transportation Commission (RCTC), San Bernardino County Transportation Authority (SBCTA) (formerly San Bernardino Associated Governments (SANBAG)), and Ventura County Transportation Commission (VCTC). SCRRA created Metrolink in October 1992 to fill a void in Southern California's transportation infrastructure. Currently, the Metrolink commuter rail system comprises seven routes, 61 stations, and 540 route-miles (SCRRA, 2018). Revenue service began May 14, 2018 at the AVL's Burbank Airport – North station, bringing the number of Metrolink stations on the line to 11 between LAUS and Lancaster (not including LAUS). Today, there are 30 weekday trains, 12 Saturday trains, and 12 Sunday trains serving the AVL. Figure 1-1 shows a map of the Metrolink network, including the AVL in the north of the system. The AVL runs between Los Angeles and Lancaster on the former Southern Pacific Valley Line, which parallels Interstate 5 (I-5), turns east, then north, to parallel State Route 14 (SR 14), connecting several cities in between.

1.1.3 Metrolink Catchment Areas and Project Area

The Metrolink system home-catchment areas, defined by SCRRA as areas capturing 95% of riders by each station, were utilized to define the Project Area for this AVL Study. Figure 1-2

shows the Metrolink system of home-catchment areas, and Figure 1-3 shows the catchment areas that make the AVL Study Project Area (Figure 1-4). The 8 catchment-areas that comprise the AVL Study Project Area are listed in Table 1-1. Currently the AVL serves 12 Metrolink stations, but this analysis does not include the LAUS, Glendale, and Burbank – Downtown stations. Additionally, Metrolink catchment-areas are updated roughly every five years when SCRRA conducts their extensive customer surveys, therefore, the recently opened Burbank Airport – North station is not included in the catchment-areas defined in this report for the market assessment.

Table 1-1: AVL Study Project Area Catchment Areas

| AVL Study Catchment Areas | |
|---------------------------|----------------------------|
| Sun Valley | Via Princessa/Vista Canyon |
| Sylmar/San Fernando | Vincent Grade/Acton |
| Newhall | Palmdale |
| Santa Clarita | Lancaster |

AVL Study Segments and Station Groups

To better study the AVL, and the internal markets along the alignment, the line has been broken down into four segments based on similar characteristics. Note that segment 1 is located outside the AVL Study Project Area, but it's but considered for informational purposes and for modeling assumptions. Table 1-2 presents the four AVL segments and their corresponding Metrolink stations. Figure 1-5 to Figure 1-9 illustrate the four segments. Additional information on the four segments and stations served by the AVL are discussed in Sections 2.1 and 5.0 of this report.

Table 1-2: AVL Segments

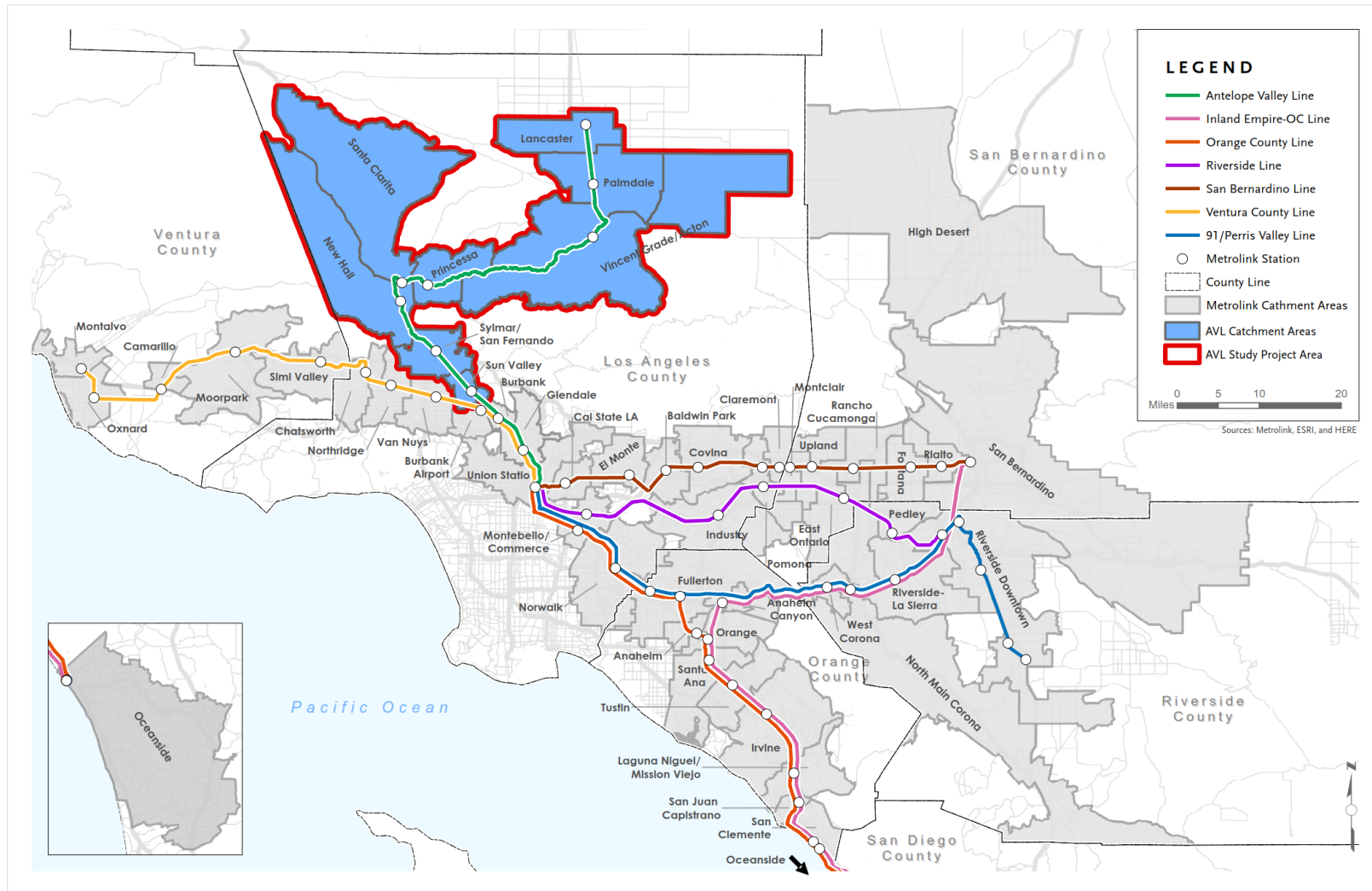
| Segment | Limits | Mileposts | Station Group | Stations |
|---------|--|--------------|------------------|--|
| 1 | LAUS to Control Point (CP) Burbank Jct | 0.0 – 11.4 | Glendale-Burbank | <ul style="list-style-type: none"> ▪ Glendale ▪ Burbank – Downtown |
| 2 | CP Burbank Jct to CP Lang | 11.4 – 41.6 | A | <ul style="list-style-type: none"> ▪ Burbank Airport – North ▪ Sun Valley ▪ Sylmar/San Fernando |
| | | | B | <ul style="list-style-type: none"> ▪ Newhall ▪ Santa Clarita ▪ Via Princessa/Vista Canyon |
| 3 | CP Lang to CP Harold | 41.6 – 67.55 | C | <ul style="list-style-type: none"> ▪ Vincent Grade/Acton ▪ Palmdale ▪ Lancaster |
| 4 | CP Harold to Lancaster Station | 67.55 – 76.6 | | |

Figure 1-1: Metrolink System Map



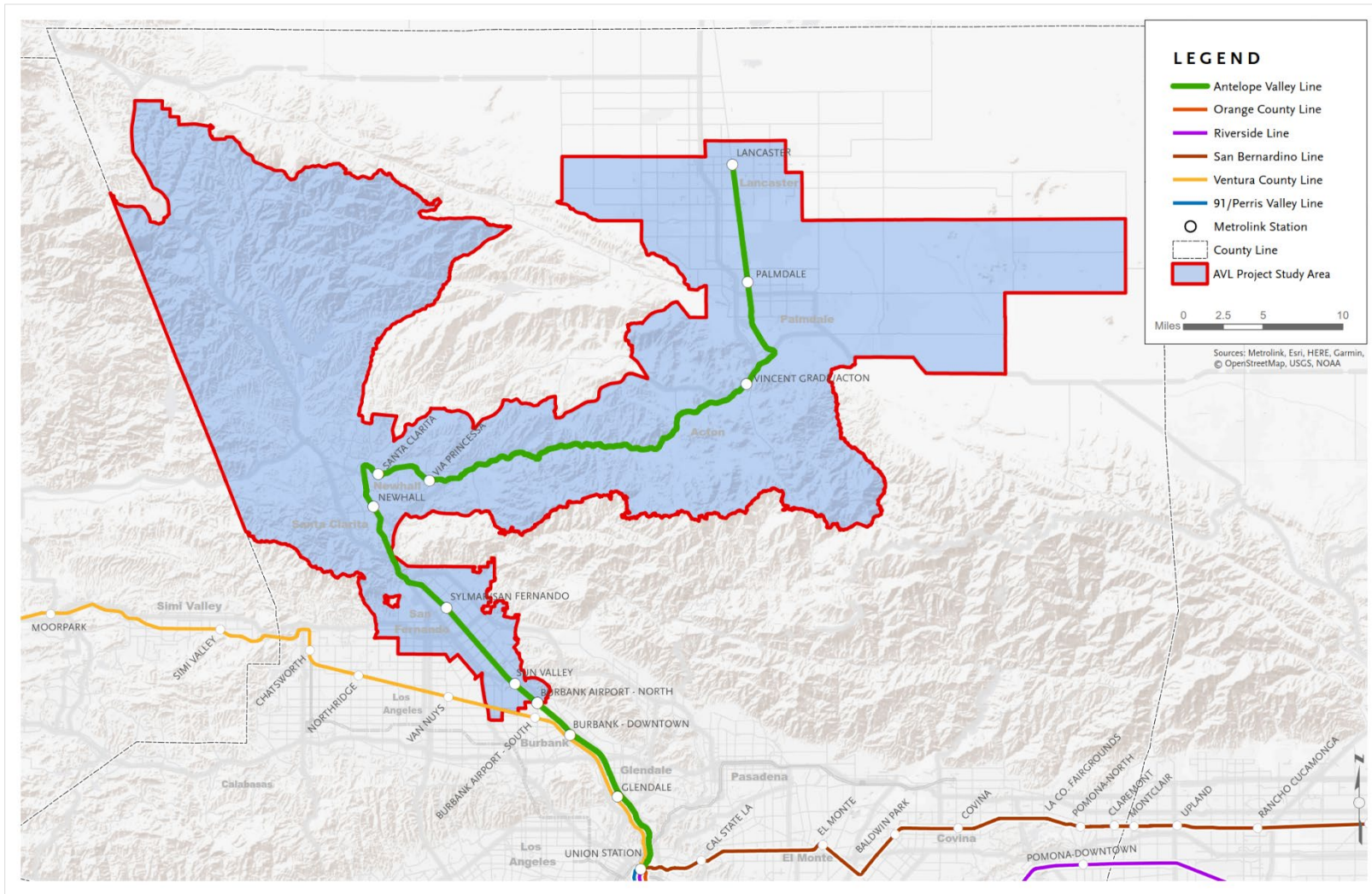
Source: SCRR Website. About Agency Webpage. Metrolink System Map effective May 14, 2018.

Figure 1-3. AVL Catchment Areas



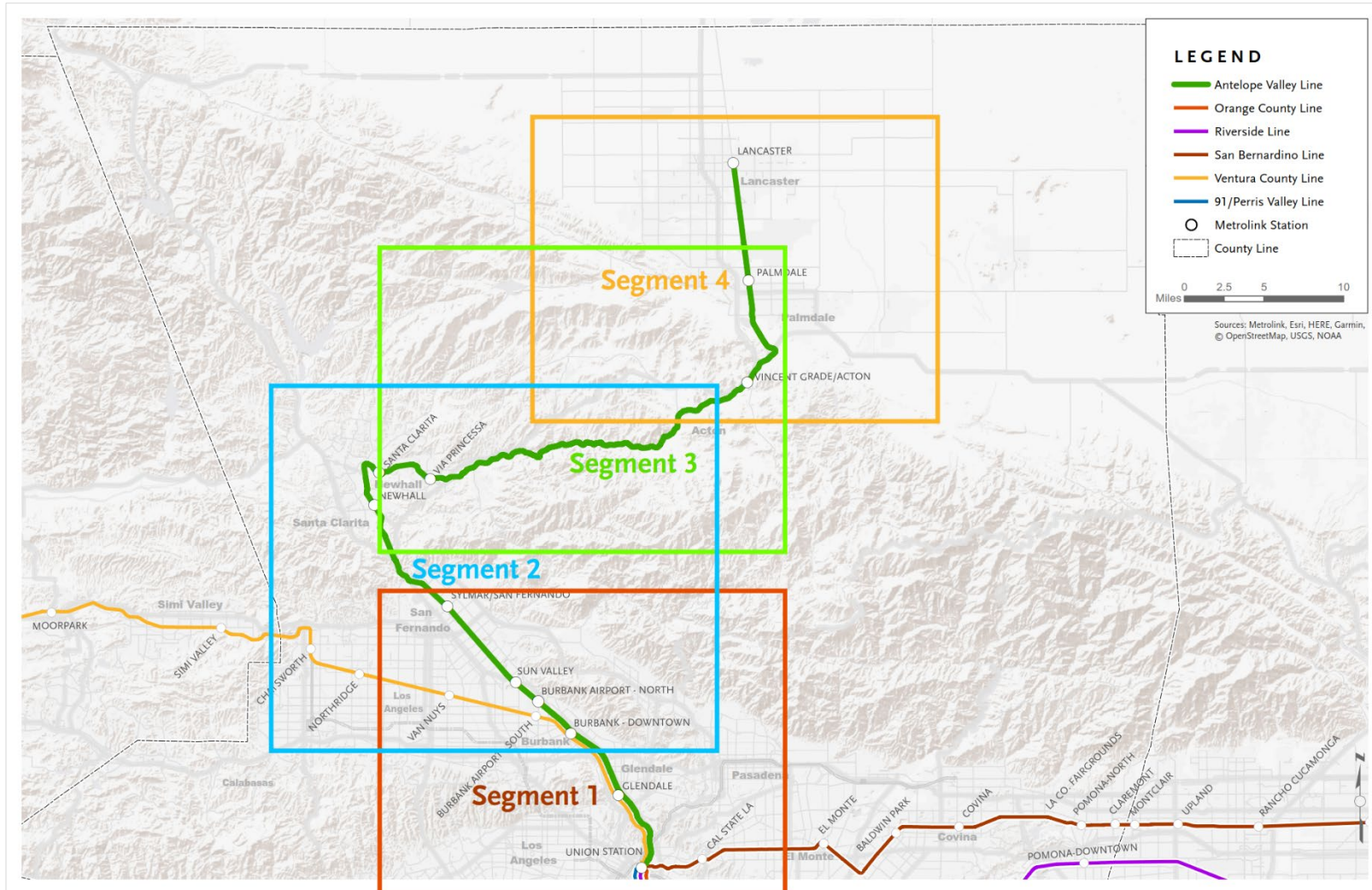
Source: SCRR, Home-Catchment Areas

Figure 1-4. Study Area Project Area



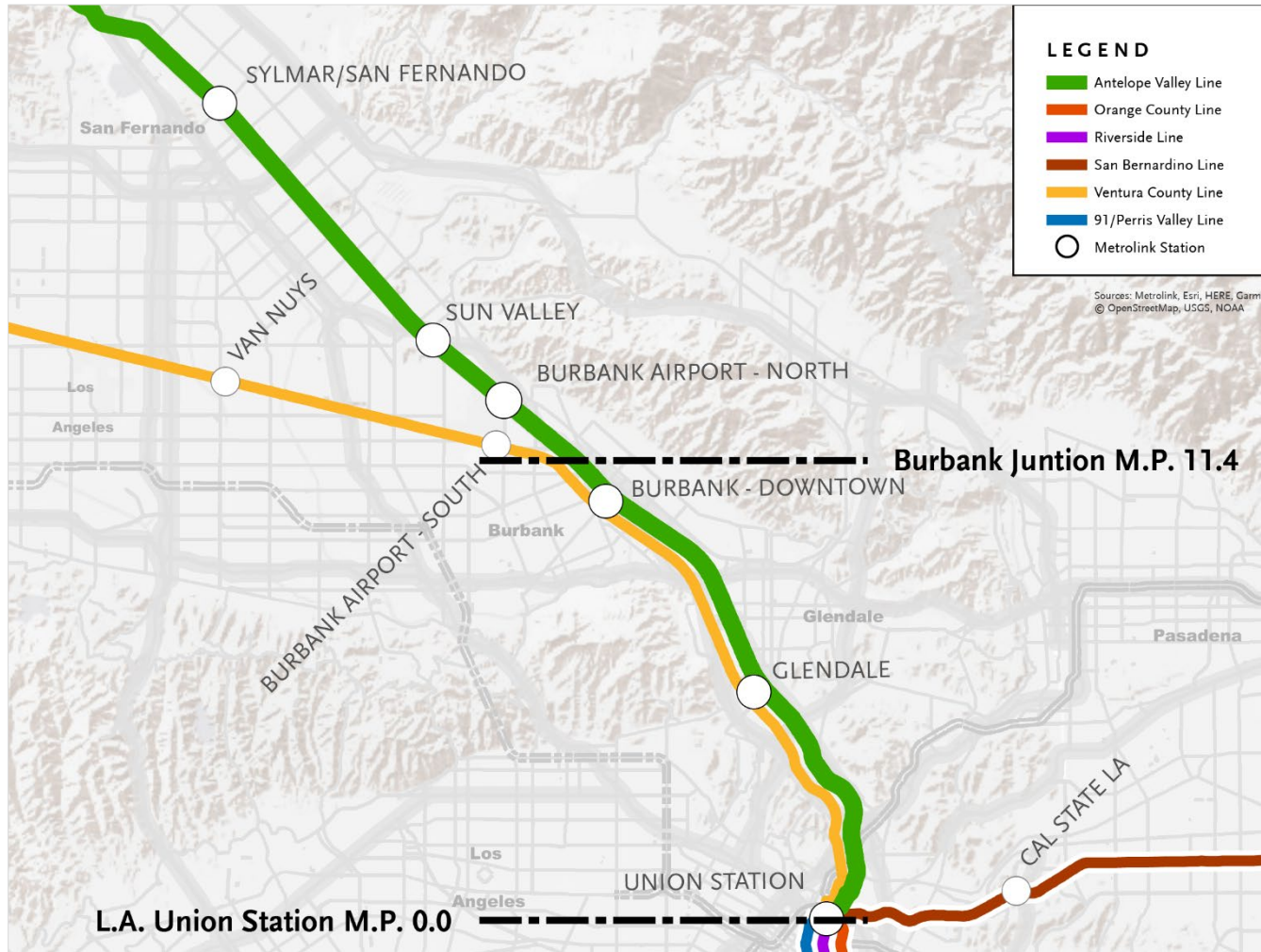
Source: Based on SCRRRA's Home-Catchment Areas

Figure 1-5: AVL Study's Four Segments



Source: SCRR, Right-of-way Map and Track Chart Valley Subdivision. January 2018; SCRR Home-Catchment Areas

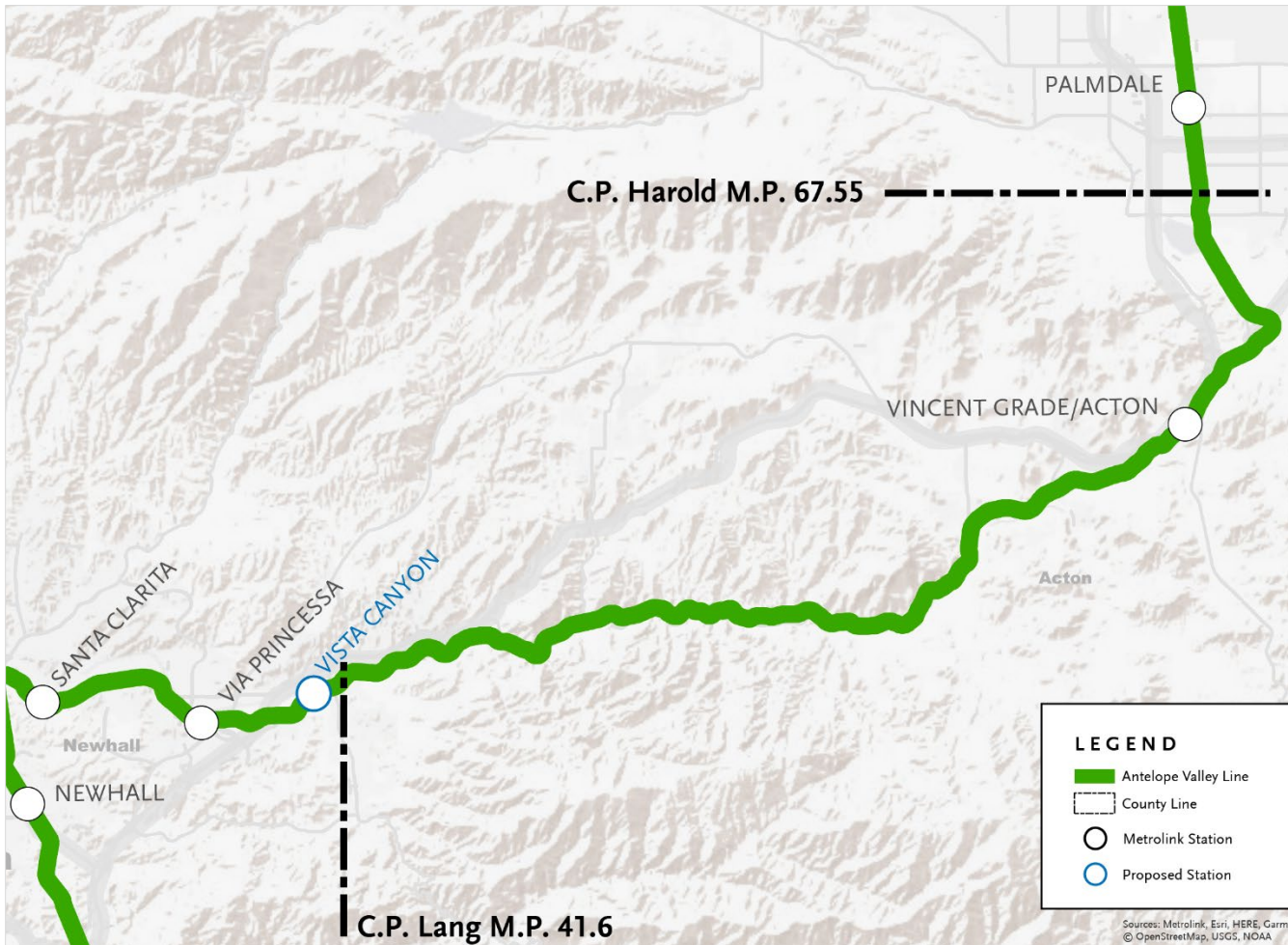
Figure 1-6: AVL Study Segment 1 – L.A. Union Station to Burbank Junction



Source: SCRRRA, Right-of-way Map and Track Chart Valley Subdivision. January 2018; SCRRRA Home-Catchment Areas

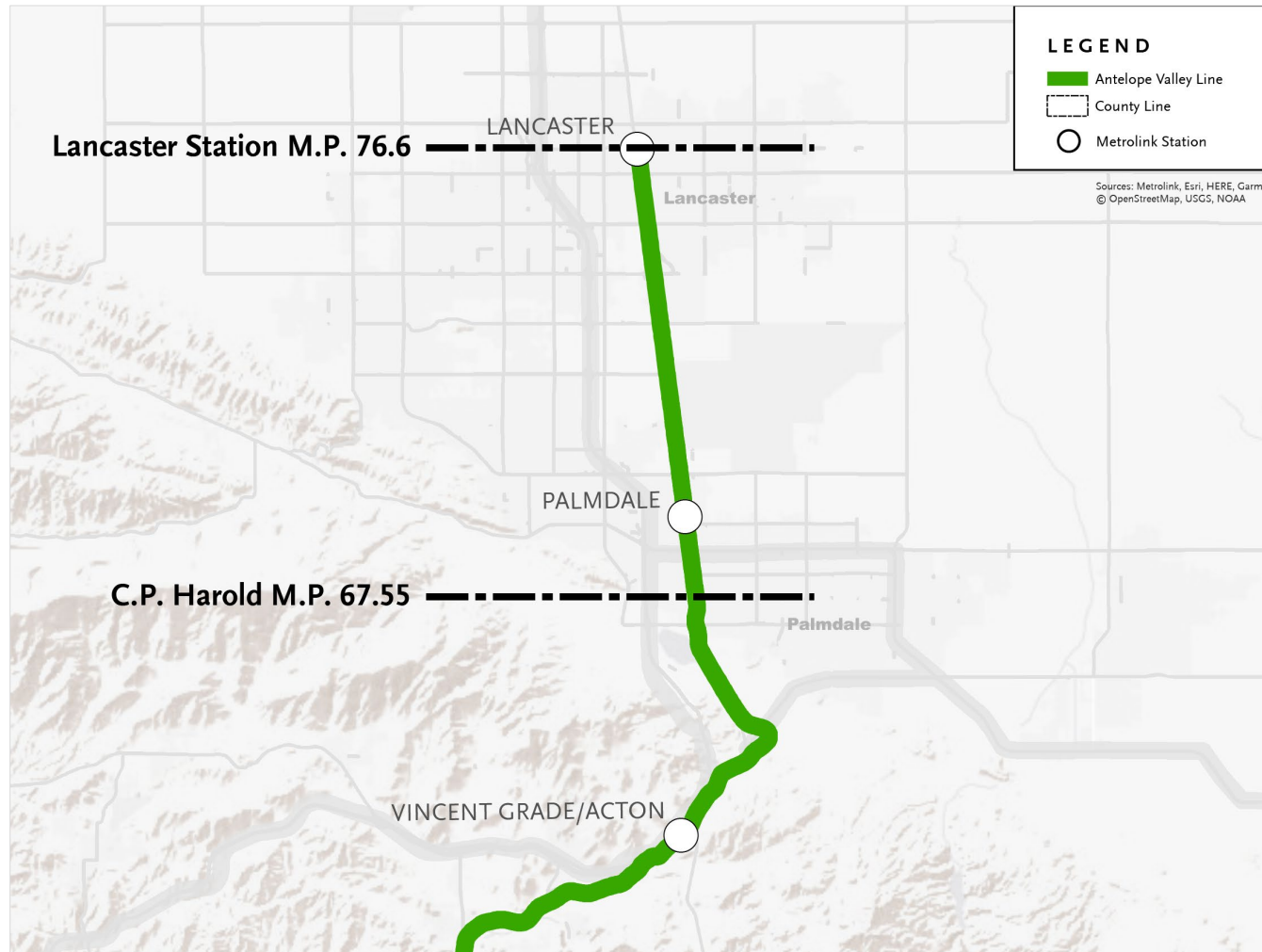
Source: SCRRRA, Right-of-way Map and Track Chart Valley Subdivision. January 2018; SCRRRA Home-Catchment Areas

Figure 1-8: AVL Study Segment 3 – C.P. Lang to C.P. Harold



Source: SCRRRA, Right-of-way Map and Track Chart Valley Subdivision. January 2018; SCRRRA Home-Catchment Areas

Figure 1-9: AVL Study Segment 4 – C.P. Harold to Lancaster Station



Source: SCRRRA, Right-of-way Map and Track Chart Valley Subdivision. January 2018; SCRRRA Home-Catchment Areas

1.2 CORRIDOR CONTEXT

The AVL does not exist in isolation. It is part of the larger Metrolink regional rail system. Metrolink operates seven routes through a six-county, 538-route-mile network. Metrolink's passengers travel approximately 441 million passenger miles each year, making Metrolink the second busiest public transportation provider in Southern California. Metrolink is the third largest commuter rail agency in the United States based on directional route miles and the eighth largest based on annual ridership. Metrolink is governed by the SCRRRA JPA made up of an 11-member board representing the transportation commissions of Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties.

Metrolink, in turn, is part of a multi-modal public transportation network that serves the greater Los Angeles region. Metrolink is the only service that spans the entire region and serves each of the five counties (and also provides connections at Oceanside to San Diego County). Though its role and the focus of its service has been on weekday peak period commuting, primarily to downtown Los Angeles, Metrolink has the potential to serve as the spine of a regional network that connects residents with workplaces and serves other travelers across the entire region.

Future plans by Metro, Metrolink, local transit systems and the California High-Speed Rail Authority (CHSRA) call for increasing integration and coordination of passenger transportation services, as those services expand to accommodate increasing ridership and meet new market demands.

1.2.1 Metrolink SCORE Program

The SCORE program is an initiative of Metrolink, to upgrade the regional rail system to meet the current and future needs of the traveling public. By adding tracks, grade separations, and upgrading signal systems across the entire Metrolink system, trains will operate more frequently and reliably, making regional travel by train easier and creating an even more appealing alternative to driving. The crossings will also be upgraded so the majority of the system will be Quiet Zone-ready, enabling cities to apply for a designation so trains horns aren't routinely blown. Communities throughout Southern California will also benefit from a reduction in vehicle miles traveled, which will reduce greenhouse gas (GHG) emissions by 51.6 million metric tons.

The multi-year SCORE program is pursuing funding from several grant programs. In April, 2018, the California State Transportation Agency (CalSTA) awarded state grants to Metrolink and Southern California regional rail totaling \$1.175 billion. Metrolink will receive \$876 million from the State's Transit and Intercity Rail Capital Program (TIRCP). Nearly half of that grant will be used to extend run-through tracks at Los Angeles Union Station. The balance of the TIRCP funds will be used for significant investments in infrastructure called for in the SCORE plan, such as adding track, signals, and additional station platforms so that Metrolink can provide more reliable, frequent service throughout Southern California. These funds will help provide at least 30-minute service in both directions on key Metrolink corridors that serve Los Angeles, including the AVL. Additionally, improvements at grade crossings will be funded to help ensure cities can implement Quiet Zones. To the extent additional funding is received,

the full set of projects could be complete as soon as 2028, just in time for the 2028 Summer Olympics.

Metrolink prepared future rail service plans and analyzed them using an operations planning model to determine where on the AVL new capacity is required. The initial modeling considered only Metrolink service and did not explicitly identify time slots for other operators on the corridor, including the freight railroad Union Pacific (UP). Two phases of capital projects are envisioned, to support expanded Metrolink service. The first phase, intended for completion by 2023, focuses on investments:

- Located primarily in the existing rail right-of-way
- Requiring minimal environmental clearance
- Enabling early service increases and transition to network with pulsed service at regular clock-face intervals

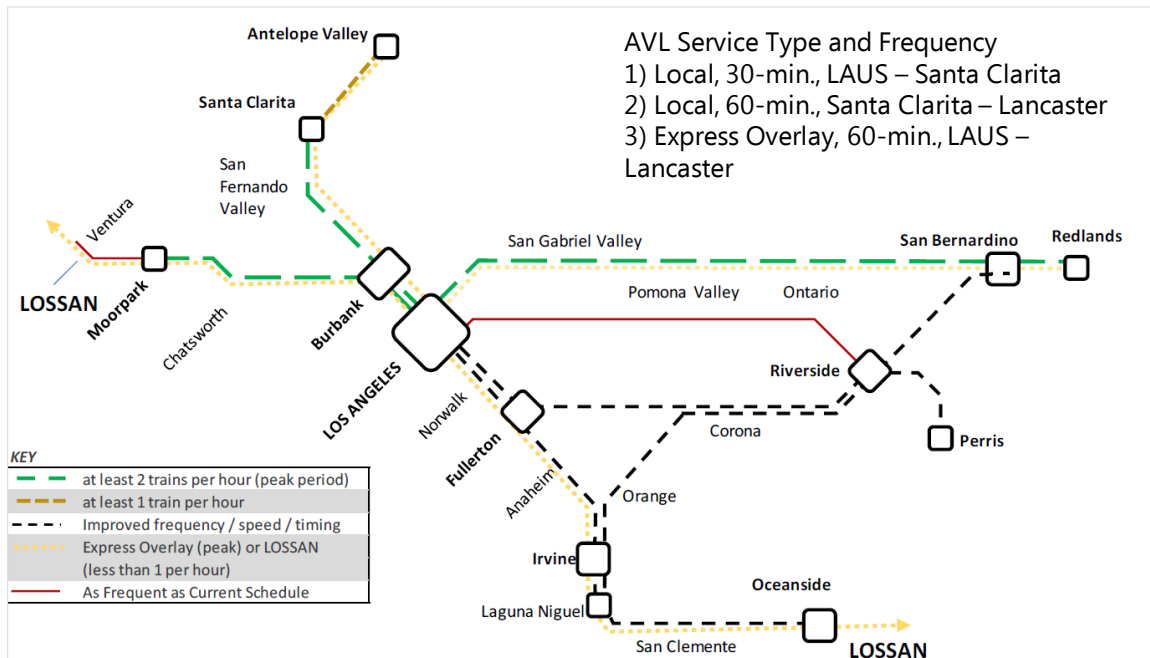
These early projects would promote operational efficiency, unlock capacity, and lay a critical foundation for later construction. They would enable the mix of Metrolink services indicated in Figure 1-10, including at least two trains per hour between LAUS and Santa Clarita and one train per hour between Santa Clarita and Lancaster, with one additional express train per hour between LAUS and Lancaster, operating in the peak periods in the peak direction of travel.

The second phase of construction, scheduled for completion by 2028, would:

- Include projects requiring right-of-way expansion/acquisition or environmental approval
- Enable robust, all-day and all-direction, region-wide service, including a true pulsed network
- Fulfill the 2040 State Rail Plan Vision in Southern California

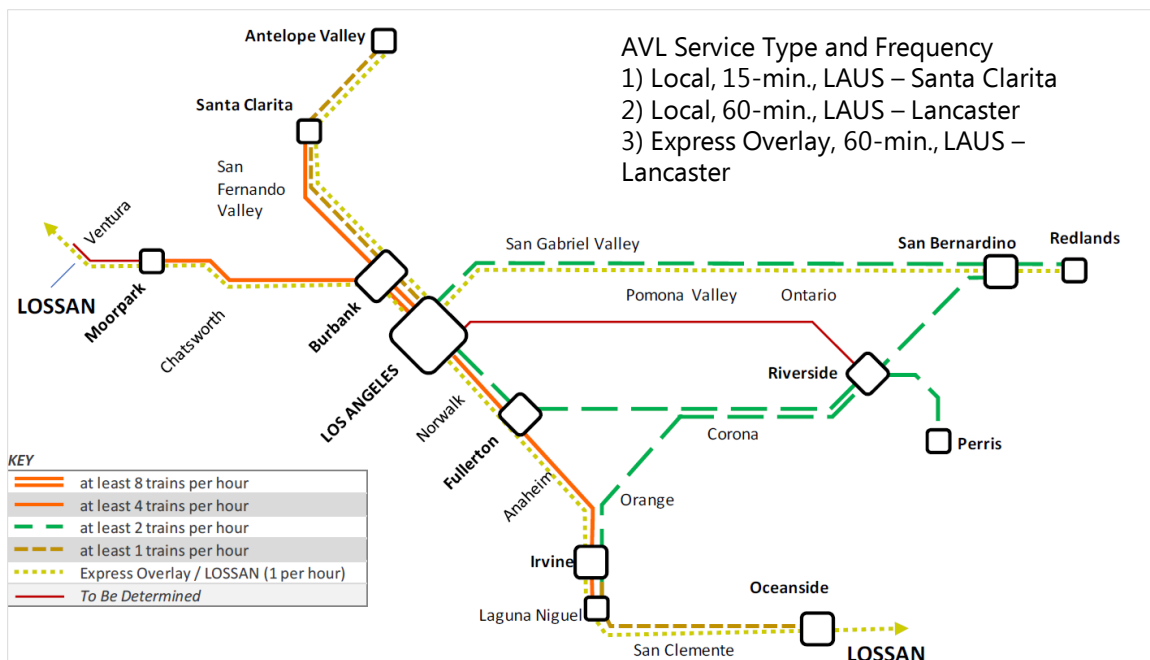
The System-wide service concept for 2028 is shown in Figure 1-11. On the AVL, the 2028 plan would increase base service frequencies to four trains per hour between LAUS and Santa Clarita, and two trains per hour between Santa Clarita and Lancaster, including a local train and the peak period express service.

Figure 1-10: SCORE Target Service Levels for 2023



Source: SCRRRA Website. SCORE: The Vision for the Future of Regional Rail Webpage. 2018.

Figure 1-11: SCORE Target Service Levels for 2028



Source: SCRRRA Website. SCORE: The Vision for the Future of Regional Rail Webpage. 2018.

1.2.2 Rail Freight

In addition to Metrolink commuter service, the UP runs freight trains on the AVL corridor between the Central Valley and the Ports of Los Angeles and Long Beach within the Los Angeles area. This 75-mile corridor runs at-grade through the San Fernando Valley, turning east to roughly follow the SR-14 corridor to Palmdale. The route has numerous at-grade crossings, tunnels, and slower speed curves through the mountains between Sylmar and Lancaster.

1.2.3 California High-Speed Rail Considerations

CHSRA intends to utilize the AVL Corridor, running parallel to the AVL between Lancaster and Palmdale, and then re-entering the corridor in the vicinity of the new Burbank Airport – North Metrolink Station. Although the horizontal and vertical alignments have not been fully defined, CHSRA's Alternative Analysis identifies the potential for significant track realignments within the 100-foot Metro-owned railroad right-of-way to allow for two dedicated high-speed rail (HSR) tracks within the Corridor. The track alignment and right-of-way configuration will need to be developed in collaboration with CHSRA, recognizing the planned shared or adjacent utilization of the Metro-owned right-of-way. Track and rail systems also will need to be designed according to SCRRRA engineering standards.

Once HSR is implemented, the potential will exist for service coordination between Metrolink and HSR. With the clock-face schedules that will be enabled by the SCORE investments, timed connections between AVL and high-speed trains will be possible at each of the stations that they are expected to jointly serve – LAUS, Burbank Airport – North, and Palmdale.

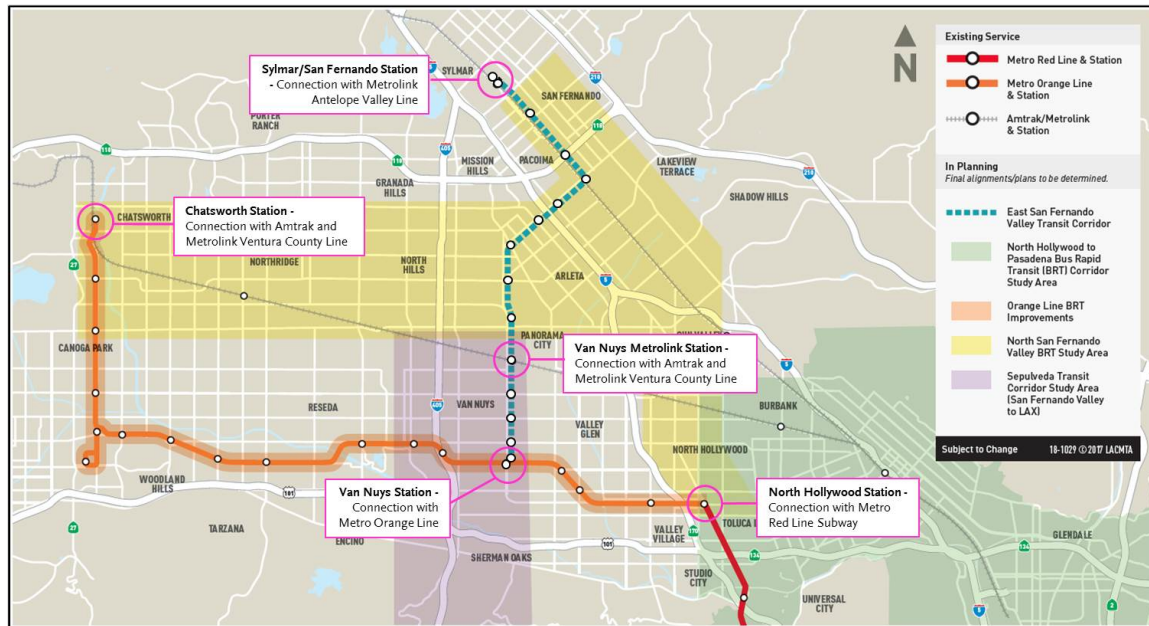
1.2.4 East San Fernando Valley Transit Corridor

The Metro Board of Directors has approved a light rail line along Van Nuys Boulevard as the preferred alternative for the East San Fernando Valley (ESFV) Transit Corridor project. The line will run for 9.2 miles between the Orange Line's Van Nuys Station and the Sylmar/San Fernando Metrolink Station. The new light rail line would run mostly in the median of Van Nuys Boulevard. At its northern end, it will run directly adjacent to San Fernando Road and the AVL between Van Nuys Boulevard and Sylmar. The line will have 14 stations, with an end-to-end travel time of 31 minutes.

The rail line will serve the more than 62,000 residents of Pacoima and other areas of the northeast Valley who are transit-dependent. Transit dependency, population density and poverty are all higher in the project's study area than in the urbanized part of L.A. County as a whole. The area's population and number of jobs are both expected to rise in the coming years. Van Nuys Boulevard is the second-busiest bus corridor in the San Fernando Valley and seventh-highest in the Metro system. The rail line would also offer transfers to/from Metrolink at both Sylmar and Van Nuys, the Orange Line, several busy Metro bus lines, and two future Metro projects — the Sepulveda Transit Corridor rail line and the North San Fernando Valley Bus Rapid Transit project. The line will carry an estimated 47,000 daily trips by 2040.

The project is slated to break ground in fiscal year 2021-22 and open in 2027. This project is also part of Metro's Twenty-Eight by '28 Plan, which seeks to ensure that 28 major projects are completed in time for the 2028 Summer Olympics and Paralympics in the Los Angeles area.

Figure 1-12: East San Fernando Valley Transit Corridor



Source: Metro. 2018. Metro staff recommendation for June 28 meeting of the agency's Board of Directors.

Connecting bus service is available at all of Metrolink's AVL stations, provided by eleven different bus operators. With the existing irregular schedule of Metrolink trains, tight schedule coordination is difficult. As train schedules are regularized and service frequencies increased, it will become easier to operate trains and buses on clock-face pulses that repeat regularly once, twice, or multiple times an hour.

The AVL route is paralleled by Metro bus services in the San Fernando Valley. Local route 94 and express route 794 run along San Fernando Road and serve LAUS. These buses run more frequently than Metrolink trains and fill the gaps in the current train schedule.

In the San Fernando Valley, plans are advancing to create a network of high-capacity, high-performance bus and light rail transit lines that interconnect and also serve Metrolink stations at several locations. In addition to the Van Nuys Boulevard line noted above, there is a potential east-west bus rapid transit (BRT) corridor and a transit corridor extending southward via Sepulveda Pass. Coupled with the Orange Line and the Metrolink AVL and Ventura County Line, these high-performance transit corridors potentially link together to form a network that can serve a much wider array of trip origins and destinations than the individual corridors that now exist.

1.3 Section 1 Rereferences

Southern California Regional Rail Authority (SCRR). 2018. *Facts and Numbers Webpage*. Accessed at (<https://www.metrolinktrains.com/about/agency/facts--numbers/>) July 2018.

2 ANTELOPE VALLEY PHYSICAL AND OPERATIONAL CHARACTERISTICS

The AVL was purchased by the SCRRRA from the Southern Pacific Railroad (predecessor to UP) in 1992, and began operations between LAUS and Santa Clarita in October of that year. Service was extended to Lancaster in 1994 following the Northridge Earthquake to help alleviate commuter traffic congestion resulting from a collapsed freeway connector of SR 14 to I-5 (SCRRRA, 2018).

2.1 EXISTING INFRASTRUCTURE CONFIGURATION AND ASSETS

The AVL runs between Los Angeles and Lancaster on the former Southern Pacific Valley Line, paralleling the I-5, turns east, then north, to parallel SR 14. The AVL operates on the Metrolink River Subdivision from LAUS to CP Taylor, in the City of Los Angeles, and on the Metrolink Valley Subdivision from CP Taylor to the City of Lancaster, for a total of 76.6 miles. Trains travel railroad west toward Lancaster and railroad east toward LAUS. An end-to-end trip takes approximately two hours. This AVL Study focuses on the 65.2-mile portion of the AVL between Burbank Jct and the Lancaster Station.

2.1.1 Right-of-Way and Track Configuration

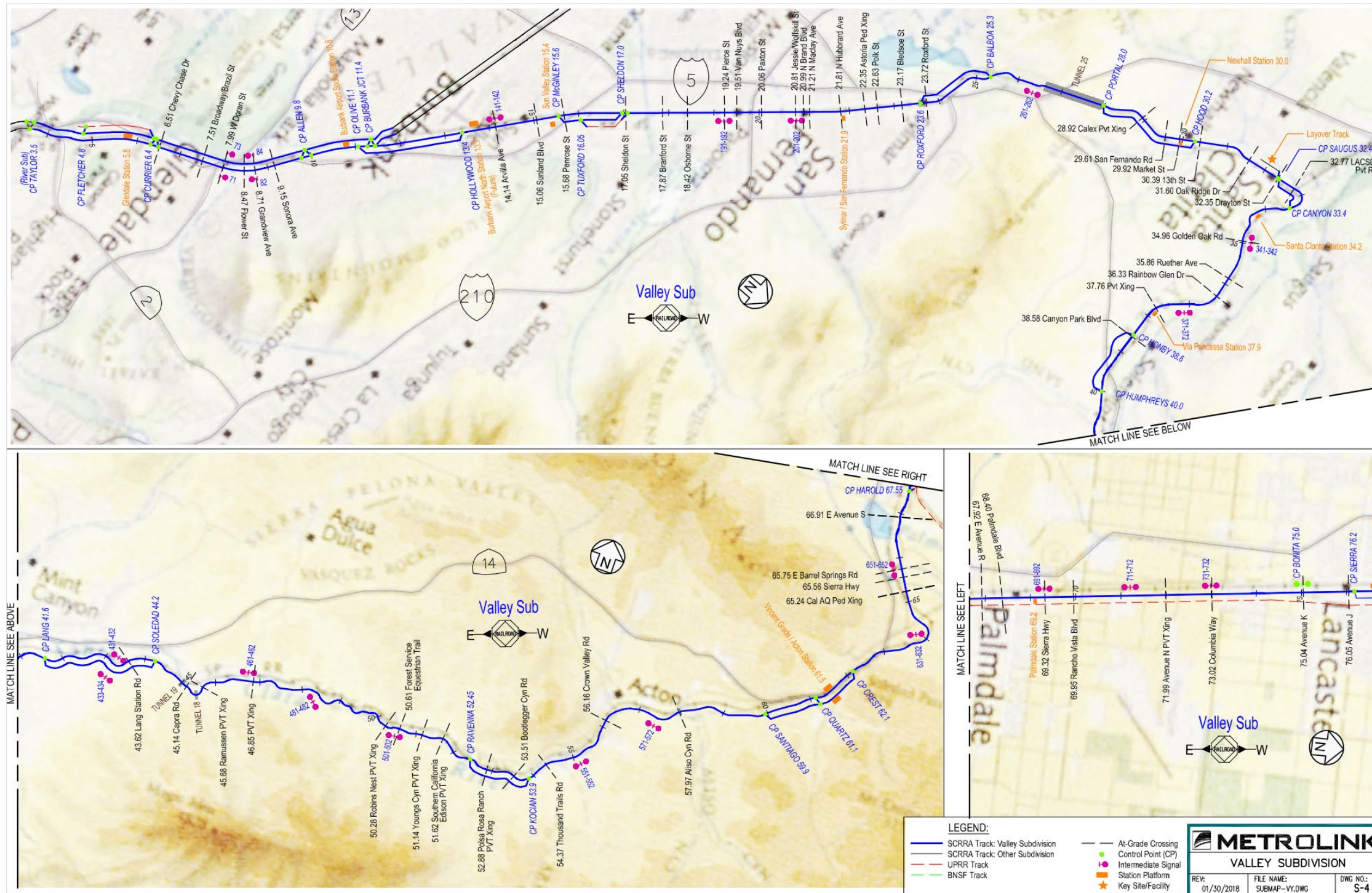
The AVL is located entirely within Los Angeles County. The railroad right-of-way and assets along the right-of-way (e.g. track and signals) are owned by Metro on both the River Subdivision and Valley Subdivision.

The track alignment is marked by significant grades, curves, and topography, with approximately two-thirds single-track condition that includes 57 structures, 72 highway-rail at-grade crossings, and three single track tunnels. Due to the varied conditions and constraints of the AVL, it has been broken down into four segments based on similar characteristics.

Table 2-1: AVL Segments

| Segment | Limits | Mileposts | Notable Characteristics |
|---------|--------------------------------|--------------|---|
| 1 | LAUS to CP Burbank Jct | 0.0 – 11.4 | <ul style="list-style-type: none"> ▪ Not part of the study area, but considered for informational purposes and for modeling assumptions |
| 2 | CP Burbank Jct to CP Lang | 11.4 – 41.6 | <ul style="list-style-type: none"> ▪ Speeds over 70 mph and grades less than 1% to CP Balboa ▪ 50 curves, 2/3 of which are railroad east of CP Balboa and cause reduced speeds ▪ Includes Tunnel 25: nearly 7,000 feet, or 1.3 miles |
| 3 | CP Lang to CP Harold | 41.6 – 67.55 | <ul style="list-style-type: none"> ▪ Significant grades ▪ Slower speeds ▪ Over 50% of curves along entire line are within this segment ▪ Reduced speeds with an average maximum authorized speed of 43 mph |
| 4 | CP Harold to Lancaster Station | 67.55 – 76.6 | <ul style="list-style-type: none"> ▪ CP Harold is junction to UP; limited right-of-way adjacent to UP ▪ Majority of grade less than 2% ▪ Very few curves ▪ Speeds over 70 mph |

Figure 2-1: AVL Corridor Alignment and Track Configuration



Source: SCRRRA, Right-of-way Map and Track Chart Valley Subdivision

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2.1.2 Stations

The AVL serves 12 Metrolink stations, including LAUS, nine of which are in the study area. The Lancaster, Palmdale, Vincent Grade/Acton, Via Princessa, and Sylmar/San Fernando stations were added after the Northridge Earthquake in January 1994 with funding from the Federal Emergency Management Agency (FEMA). These were built as emergency stations to alleviate commuter traffic congestion following the collapse of a freeway connector of SR 14 onto the I-5. The emergency stations have since been replaced with permanent stations, with the exception of the Via Princessa station. Via Princessa continues to use the same platform built for emergency purposes, with few added amenities.

The Burbank Airport – North station is the latest station to be added to the AVL. This station connects commuters on the AVL to the Hollywood Burbank Airport. Revenue service started at this station on May 14, 2018.

The AVL stations in the study area are listed in Table 2-2, starting with Burbank Airport – North and travelling railroad west to Lancaster. The table describes the milepost location, station owner, segment in which the stations are located, and the address. Operations and Maintenance Agreements between host cities, Metro, and SCRRRA dictate cost shares and responsibilities for each station.

Table 2-2: Stations Serving AVL

| Item No. | Station | MP | Owner | Segment | Address |
|----------|-------------------------|-------|---|---------|--|
| 1 | Burbank Airport – North | 13.66 | City of Burbank | 2 | 3600 N. San Fernando Blvd., Burbank, CA |
| 2 | Sun Valley | 15.40 | City of Los Angeles, Department of Transportation | 2 | 8360 San Fernando Road, Sun Valley, CA 91352 |
| 3 | Sylmar/San Fernando | 21.94 | City of Los Angeles, Department of Transportation | 2 | 12219 Frank Modugno Dr., Los Angeles CA 91342 |
| 4 | Newhall | 29.99 | City of Santa Clarita | 2 | 24300 Railroad Avenue, Santa Clarita, CA 91321 |
| 5 | Santa Clarita | 34.22 | City of Santa Clarita | 2 | 22122 Soledad Canyon Road, Santa Clarita, CA 91350 |
| 6 | Via Princessa | 37.87 | City of Santa Clarita | 2 | 19201 Via Princessa, Santa Clarita, CA 91351 |
| 7 | Vincent Grade/Acton | 61.49 | City of Los Angeles, Department of Transportation | 4* | 730 W. Sierra Highway, Palmdale, CA 93550 |
| 8 | Palmdale | 69.19 | City of Palmdale | 4 | 39000 Clock Tower Plaza Drive, Palmdale, CA 93550 |
| 9 | Lancaster | 76.54 | City of Lancaster | 4 | 44812 N. Sierra Highway, Lancaster, CA 93534 |

Source: SCRRRA. 2018. Webpage. Rider-Info Stations webpage.

Note: MP = Actual milepost along centerline of track at the center of the station platform.

*Vincent Grade/Acton Station physically in within Segment 3, but grouped with Segment 4 for market analysis purposes.

2.1.3 Yards and Maintenance Facilities

The AVL has one stub-end layover facility located at the Lancaster station with a maximum capacity for six trains. This capacity allows for two trains to layover on the mainline track and four trains to layover on the siding track. Current operations utilize the full capacity to layover trains for weekday AM peak service originating from the Lancaster station, as shown in Table 2-6.

Metrolink has two maintenance facilities for its fleet, the Central Maintenance Facility (CMF) located near LAUS and the Eastern Maintenance Facility (EMF) located in Colton. Each facility allows for midday and overnight storage and cleaning and maintenance of any Metrolink train in the network.

One of the two Metrolink Maintenance-of-Way (MOW) yards is located in the AVL corridor. The Lang Yard in the city of Canyon Country stores MOW on-track equipment and materials.

2.2 OPERATIONS

SCRRA is the JPA that operates the Metrolink commuter rail system. Metrolink is the eighth largest commuter rail operation in the United States in terms of ridership (SCRRA, 2015). The Metrolink network includes seven routes, 540 route miles, and 61 stations (SCRRA, 2017b). Metrolink is the first passenger rail system in the nation to operate Positive Train Control (PTC).

Metrolink trains can reach a top speed of 90 mph in some subdivisions, but the maximum authorized speed (MAS) in the Valley Subdivision is 79 mph. Trains typically dwell 30 seconds at stations and have a 20-minute minimum scheduled turnaround time at terminal stations.

2.2.1 Existing Metrolink Train Operations

Metrolink dispatches all trains operating on the AVL corridor. Today, there are 30 weekday trains, 12 Saturday trains, and 12 Sunday trains serving the AVL. Peak direction is railroad east to LAUS in the AM and railroad west to Lancaster in the PM. Weekday service runs all day and is equally divided per direction, though peak period/peak direction service is more frequent than non-peak and midday period service.

As shown in Figure 2-2, the AVL runs four stopping patterns during the week. Eighteen trips make all stops between LAUS and Lancaster. Eight trips stop short at Via Princessa, but have timed connections to the North County TRANSPORTER bus at Newhall for travel to the Palmdale station. TRANSPORTER also stops at the Vincent Grade/Acton station by request. Two trains make all stops between LAUS and Santa Clarita in the PM, one in peak direction and one in reverse peak direction. One express service is provided once during each peak period, in the peak direction to provide a trip between Palmdale and LAUS in under two hours.

Figure 2-2: AVL Stopping Patterns



Source: WSP

As shown in Figure 2-3, peak service operates roughly every 30-60 minutes with most of the trains making all stops, and one train providing express service. Non-peak, non-peak direction service operates every 45 minutes to over two hours, and does not serve all the northern-most stations.

Figure 2-3: AVL Weekday Timetable

| MONDAY THROUGH FRIDAY | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|------|------|--|--|--|--|--|
| Metrolink Train No. | 200 | 202 | 204 | 206 | 208 | 210 | 212 | 214 | 216 | 218 | 220 | 222 | 224 | 226 | | | | | | | | | | |
| Lancaster | 3:44 | 4:46 | 5:16 | 5:58 | 6:48 | | 9:01 | | 11:35 | | 1:45 | | | 6:17 | | | | | | | | | | |
| Palmdale | 3:54 | 4:56 | 5:26 | 6:08 | 6:58 | 7:50 | 9:10 | 9:11 | 10:30 | 11:45 | 1:55 | 2:00 | 4:00 | 6:26 | | | | | | | | | | |
| Vincent Grade/Acton | 4:06 | 5:08 | 5:38 | 6:21 | 7:10 | | 9:23 | | 11:57 | | 2:07 | | | 6:39 | | | | | | | | | | |
| Via Princessa | 4:42 | 5:44 | 6:15 | 6:56 | 7:48 | 9:05 | 9:59 | | 11:26 | 12:34 | 1:51 | 2:43 | 3:25 | 7:25 | | | | | | | | | | |
| Santa Clarita | 4:48 | 5:50 | 6:21 | 7:02 | 7:55 | 9:11 | 10:05 | | 11:32 | 12:40 | 1:57 | 2:49 | 3:32 | 5:11 | 7:31 | | | | | | | | | |
| Newhall | 4:56 | 5:58 | 6:29 | 7:10 | 8:02 | 8:40 | 9:19 | 9:55 | 10:13 | 11:20 | 11:40 | 12:48 | 2:05 | 3:03 | 2:50 | 3:40 | 4:50 | 5:19 | 7:46 | | | | | |
| Sylmar/San Fernando | 5:11 | 6:13 | 6:45 | 7:11 | 7:28 | 8:20 | 9:35 | 10:32 | | 11:56 | 1:06 | 2:20 | 3:17 | 3:56 | 5:35 | 8:00 | | | | | | | | |
| Sun Valley | 5:18 | 6:20 | 6:56 | 7:36 | 8:27 | 9:43 | 10:40 | | 12:04 | 1:14 | 2:29 | 3:25 | 4:06 | 5:43 | 8:13 | | | | | | | | | |
| Burbank Airport - North (AV Line) | 5:22 | 6:24 | 7:00 | 7:40 | 8:31 | 9:47 | 10:44 | | 12:08 | 1:18 | 2:33 | 3:29 | 4:10 | 5:47 | 8:17 | | | | | | | | | |
| Burbank - Downtown | 5:28 | 6:30 | 7:05 | 7:22 | 7:45 | 8:37 | 9:52 | 10:49 | | 12:13 | 1:23 | 2:39 | 3:35 | 4:21 | 5:52 | 8:22 | | | | | | | | |
| Glendale | 5:34 | 6:36 | 7:12 | 7:51 | 8:43 | 9:59 | 10:56 | | 12:20 | 1:30 | 2:45 | 3:41 | 4:28 | 5:59 | 8:29 | | | | | | | | | |
| L.A. Union Station | 5:53 | 6:55 | 7:25 | 7:40 | 8:06 | 8:57 | 10:13 | 11:08 | | 12:34 | 1:43 | 3:01 | 3:55 | 4:41 | 6:14 | 8:42 | | | | | | | | |

Check Ventura County Line schedule for additional trains to Burbank Airport.

NOTES: See page 3

| MONDAY THROUGH FRIDAY | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|------|------|-------|-------|-------|-------|------|------|------|------|------|------|-------|-------|-------|-------|--|--|--|--|--|--|--|--|
| Metrolink Train No. | 201 | 203 | 205 | 207 | 209 | 211 | 213 | 215 | 217 | 219 | 205 | 221 | 223 | 225 | 227 | | | | | | | | | |
| L.A. Union Station | 6:19 | 7:29 | 8:29 | 9:42 | 11:06 | 11:58 | 1:55 | 3:28 | 3:50 | 4:44 | 5:34 | 5:58 | 6:38 | 7:36 | 9:25 | | | | | | | | | |
| Glendale | 6:31 | 7:41 | 8:41 | 9:54 | 11:18 | 12:10 | 2:07 | 3:40 | 4:02 | 4:56 | 6:10 | 6:50 | 7:48 | 9:37 | | | | | | | | | | |
| Burbank - Downtown | 6:38 | 7:49 | 8:48 | 10:01 | 11:25 | 12:18 | 2:14 | 3:48 | 4:09 | 5:04 | 5:51 | 6:18 | 6:57 | 7:55 | 9:44 | | | | | | | | | |
| Burbank Airport - North (AV Line) | 6:44 | 7:55 | 8:54 | 10:07 | 11:31 | 12:24 | 2:20 | 3:54 | 4:16 | 5:10 | 6:23 | 7:03 | 8:01 | 9:50 | | | | | | | | | | |
| Sun Valley | 6:49 | 7:59 | 8:59 | 10:12 | 11:36 | 12:29 | 2:25 | 3:58 | 4:21 | 5:14 | 6:28 | 7:08 | 8:06 | 9:54 | | | | | | | | | | |
| Sylmar/San Fernando | 7:01 | 8:08 | 9:08 | 10:21 | 11:45 | 12:38 | 2:36 | 4:10 | 4:30 | 5:24 | 6:05 | 6:37 | 7:17 | 8:15 | 10:03 | | | | | | | | | |
| Newhall | 7:19 | 8:26 | 9:24 | 10:40 | 12:03 | 12:54 | 2:51 | 3:00 | 4:25 | 4:45 | 5:00 | 5:42 | 6:52 | 7:32 | 8:30 | 10:18 | | | | | | | | |
| Santa Clarita | 7:26 | 8:33 | 9:32 | 10:48 | 12:11 | 1:02 | 3:00 | 4:32 | 4:52 | 5:49 | 6:25 | 7:00 | 7:43 | 8:38 | 10:26 | | | | | | | | | |
| Via Princessa | 7:33 | 8:42 | 9:40 | 10:55 | 12:18 | 1:12 | 3:06 | 4:39 | | 5:56 | 7:07 | 7:50 | 8:45 | 10:33 | | | | | | | | | | |
| Vincent Grade/Acton | 8:12 | | 10:24 | | 12:59 | | | 5:17 | | 6:35 | 7:49 | 8:28 | 9:23 | 11:11 | | | | | | | | | | |
| Palmdale | 8:22 | 9:36 | 10:35 | 11:40 | 1:10 | 3:50 | 5:28 | 5:50 | 6:50 | 7:21 | 8:00 | 8:39 | 9:34 | 11:22 | | | | | | | | | | |
| Lancaster | 8:35 | | 10:46 | | 1:20 | | 5:41 | | 6:58 | 8:12 | 8:54 | 9:49 | 11:37 | | | | | | | | | | | |

Northbound TRANSPORTER bus stops at the Vincent Grade/Acton Station by request only.

Check Ventura County Line schedule for additional trains to Burbank Airport.

NOTES: See page 3

Source: Metrolink Timetable, Effective May 14, 2018

Notes: Peak period trains in shown in red boxes

Weekend service operates six trains in each direction on Saturdays and Sundays, making all stops between LAUS and Lancaster. Frequency is uneven, varying from 90 minutes to three hours, 50 minutes between trains.

2.2.2 Operating Budget

The Metrolink FY2018-19 Proposed Operating Budget outlines \$100.8 million in revenues, up 0.2% from the FY18 Adopted Budget. These revenues come from four sources: fares, dispatching, MOW, and other. Operating expenditures are proposed to be \$251.4 million, up 3.4% from the FY18 Adopted Budget. Operating expenses include train operations, MOW, and Insurance The total net local subsidy from member agencies is \$150.6 million, up 5.7% from the FY18 Adopted Budget. Metro’s portion of this subsidy is proposed to be \$75.1 million, up 4.9% from the FY18 Adopted Budget.

Figure 2-4 summarizes the FY2018-19 Proposed Operating Budget by line and shows that the AVL is projecting \$16.6 million in operating revenue and \$46.8 million in expenses.

Figure 2-4: FY2018-19 SCRRRA Proposed Annual Operating Budget by Cost Component by Line

| (000's) | San Bernardino | Ventura County | Antelope Valley | Riverside | Orange County | OC MSEP | IEOC | 91/PVL | TOTAL |
|---|------------------|------------------|------------------|------------------|------------------|-----------------|------------------|------------------|-------------------|
| Operating Revenue | | | | | | | | | |
| Farebox Revenue | \$ 18,416 | \$ 6,613 | \$ 12,200 | \$ 8,386 | \$ 22,505 | \$ 885 | \$ 7,704 | \$ 6,196 | \$ 82,904 |
| Fare Reduction Subsidy | 2,732 | - | - | - | - | - | - | - | 2,732 |
| Subtotal-Pro Forma FareBox | 21,148 | 6,613 | 12,200 | 8,386 | 22,505 | 885 | 7,704 | 6,196 | 85,636 |
| Dispatching | 157 | 528 | 362 | 6 | 1,000 | 15 | 18 | 35 | 2,120 |
| Other Revenues | 108 | 63 | 86 | 48 | 75 | 10 | 61 | 36 | 490 |
| MOV Revenues | 3,303 | 1,492 | 3,928 | 269 | 1,467 | 248 | 1,136 | 718 | 12,561 |
| Total Operating Revenue | 24,715 | 8,696 | 16,576 | 8,709 | 25,047 | 1,159 | 8,919 | 6,986 | 100,806 |
| Operating Expenses | | | | | | | | | |
| Operations & Services | | | | | | | | | |
| Train Operations | 10,920 | 4,430 | 11,033 | 3,105 | 7,015 | 929 | 5,386 | 4,054 | 46,872 |
| Equipment Maintenance | 8,494 | 4,406 | 7,501 | 2,638 | 5,260 | 1,317 | 4,434 | 4,084 | 38,133 |
| Fuel | 4,035 | 1,565 | 4,228 | 1,283 | 3,131 | 612 | 2,383 | 1,507 | 18,744 |
| Non-Scheduled Rolling Stock Repairs | 61 | 27 | 54 | 17 | 39 | 8 | 31 | 23 | 260 |
| Operating Facilities Maintenance | 395 | 175 | 351 | 110 | 253 | 55 | 198 | 147 | 1,684 |
| Other Operating Train Services | 70 | 80 | 87 | 72 | 37 | 13 | 54 | 68 | 482 |
| Rolling Stock Lease | 74 | 51 | 53 | 46 | 57 | - | 45 | 10 | 336 |
| Security - Sheriff | 1,293 | 385 | 1,630 | 242 | 759 | 121 | 639 | 821 | 5,889 |
| Security - Guards | 355 | 406 | 444 | 368 | 190 | 67 | 275 | 344 | 2,450 |
| Supplemental Additional Security | 148 | 53 | 120 | 68 | 181 | 7 | 62 | 50 | 690 |
| Public Safety Program | 56 | 65 | 71 | 58 | 30 | 11 | 44 | 55 | 389 |
| Passenger Relations | 410 | 148 | 273 | 135 | 404 | 16 | 226 | 120 | 1,732 |
| TVM Maintenance/Revenue Collection | 1,734 | 1,261 | 1,464 | 867 | 935 | 384 | 1,272 | 1,137 | 9,055 |
| Marketing | 1,269 | 501 | 795 | 464 | 1,256 | 53 | 634 | 408 | 5,380 |
| Media & External Communications | 66 | 76 | 83 | 69 | 36 | 13 | 51 | 64 | 458 |
| Utilities/Leases | 503 | 576 | 630 | 522 | 269 | 95 | 390 | 487 | 3,473 |
| Transfers to Other Operators | 1,387 | 568 | 1,428 | 645 | 1,739 | - | 195 | 534 | 6,496 |
| Amtrak Transfers | - | 309 | - | - | 2,091 | - | - | - | 2,400 |
| Station Maintenance | 529 | 244 | 387 | 161 | 281 | 12 | 34 | 157 | 1,806 |
| Rail Agreements | - | 603 | - | 1,843 | 860 | 11 | 1,040 | 1,043 | 5,400 |
| Subtotal Operations & Services | 31,800 | 15,929 | 30,633 | 12,715 | 24,823 | 3,724 | 17,394 | 15,111 | 152,129 |
| Maintenance-of-Way | | | | | | | | | |
| MoW - Line Segments | 11,918 | 6,437 | 8,416 | 1,131 | 4,877 | 788 | 3,937 | 3,207 | 40,711 |
| MoW - Extraordinary Maintenance | 131 | 91 | 101 | 76 | 96 | - | 75 | 20 | 591 |
| Subtotal Maintenance-of-Way | 12,049 | 6,528 | 8,517 | 1,207 | 4,973 | 788 | 4,013 | 3,227 | 41,301 |
| Administration & Services | | | | | | | | | |
| Ops Salaries & Fringe Benefits | 2,005 | 2,278 | 2,505 | 2,063 | 1,081 | 378 | 1,546 | 1,926 | 13,782 |
| Ops Non-Labor Expenses | 1,642 | 824 | 1,580 | 677 | 1,039 | 242 | 904 | 728 | 7,635 |
| Indirect Administrative Expenses | 2,477 | 2,836 | 3,100 | 2,570 | 1,327 | 470 | 1,918 | 2,399 | 17,096 |
| Ops Professional Services | 374 | 428 | 468 | 388 | 200 | 71 | 289 | 362 | 2,579 |
| Subtotal Admin & Services | 6,498 | 6,365 | 7,652 | 5,698 | 3,647 | 1,160 | 4,658 | 5,414 | 41,093 |
| Contingency | 30 | 34 | 37 | 31 | 16 | 6 | 23 | 29 | 204 |
| Total Operating Expenses | 50,376 | 28,856 | 46,838 | 19,651 | 33,458 | 5,678 | 26,088 | 23,781 | 234,727 |
| Insurance Expense/(Revenue) | | | | | | | | | |
| Liability/Property/Auto | 2,680 | 1,184 | 2,381 | 746 | 1,716 | 371 | 1,346 | 996 | 11,418 |
| Claims / SI | 939 | 415 | 834 | 261 | 601 | 130 | 471 | 349 | 4,000 |
| Claims Administration | 284 | 126 | 253 | 79 | 182 | 39 | 143 | 106 | 1,211 |
| PLPD Revenue | - | - | - | - | - | - | - | - | - |
| Total Net Insurance Expense | 3,903 | 1,724 | 3,467 | 1,086 | 2,499 | 540 | 1,960 | 1,451 | 16,629 |
| Total Expense | 54,279 | 30,580 | 50,306 | 20,737 | 35,957 | 6,218 | 28,047 | 25,232 | 251,356 |
| Loss | (29,564) | (21,883) | (33,730) | (12,028) | (10,910) | (5,060) | (19,128) | (18,247) | (150,550) |
| Member Subsidies | | | | | | | | | |
| Operations | 25,661 | 20,160 | 30,262 | 10,942 | 8,411 | 4,519 | 17,168 | 16,796 | 133,920 |
| Insurance | 3,903 | 1,724 | 3,467 | 1,086 | 2,499 | 540 | 1,960 | 1,451 | 16,629 |
| Total Member Subsidies | \$ 29,564 | \$ 21,883 | \$ 33,730 | \$ 12,028 | \$ 10,910 | \$ 5,060 | \$ 19,128 | \$ 18,247 | \$ 150,550 |

Numbers may not foot due to rounding.

Source: Metrolink FY2018-19 Proposed Budget, Exhibit 3.8

2.2.3 Freight Operations

UP holds the freight operating rights on the AVL. UP has a reserved rail freight easement for use of shared-use facilities on the line pursuant to the Shared Use Agreement (Saugus Line) between Southern Pacific Transportation Company and Los Angeles County Transportation Commission, dated December 16, 1992 (SP/LACTC, 1992). Southern Pacific was the predecessor to UP.

2.2.3.1 Key Shared-Use Agreement Provisions

There are several provisions of the 1992 Agreement that directly impact commuter rail operations, including the potential to expand AVL service, operate 60-minute or 30-minute headways, and/or use alternative equipment such as diesel multiple units (DMUs). The key provisions with relevance to this study are summarized in Table 2-3. As described in Table 2-3, UP retains significant operating rights under their reserved rail freight easement, which will require discussions with SCRRA/Metro in order to make 60-minute or 30-minute headways feasible, as well as potentially the use of DMUs. Also of note is that as SCRRA/Metro increases the amount of double-tracking on the line, UP's usage rights during peak commuter periods are effectively increased, as detailed in Table 2-3.

2.2.3.2 Current Freight Train Movements on the AVL

UP currently operates the following freight train movements, based on information provided by Metro and contained in the *AVL Infrastructure Modeling and Validation Report* from 2012 (SCRRA, 2012). These freight train movements will be included in modeling efforts to analyze service scenarios.

UP 519 Rock Train (Monday – Friday)

A loaded unit train of aggregate rock, UP 519, operates from CP Harold (MP 67.55) to CP McGinley (MP 15.6), where it unloads and returns empty to CP Harold. The train enters the line traveling railroad east at CP Harold after AVL Train 221, headed railroad west, departs. Currently, Train 221 is scheduled to be at Palmdale Station at 8:00 PM. UP 519 goes into the siding at Acton to let AVL Train 223 pass. UP 519 then proceeds to CP McGinley and leaves the main line to deliver the aggregates. The empty train usually heads back to CP Harold in the early morning before Metrolink trains operate.

Figure 2-5: Siding near CP McGinley, MP 15.6, Where UP 519 delivers its load of aggregates



Source: Google earth. 2018. "Sun Valley. Los Angeles, CA" 34°13'49.10" N and 118°23'00.29" W

Z trains (Monday – Saturday)

UP operates Z trains regularly over the AVL. Z trains are time-sensitive intermodal trains carrying truck trailers and shipping containers between Los Angeles and points north and east. Although Z trains may operate over the AVL at different times of the day, the following schedules are listed in the source documents (SCRRA, 2012):

- 1 northbound (railroad westbound) Z train enters AVL at Pasadena Junction (River Subdivision) in Los Angeles at 12:00 PM, operating to CP Harold
- 1 southbound (railroad eastbound) Z train enters AVL at CP Harold at 11:00 AM, operating to Pasadena Junction

LOF42 (Monday – Friday)

LOF42 originates at UP's Gemco Yard, located 7.1 miles west of Burbank Jct on the Metrolink Ventura Subdivision at MP 455.5. The train services online industries at Sylmar, Newhall, and Via Princessa. The train enters the AVL around 8:00 AM at Burbank Jct, works up to Via Princessa, and is usually back at Gemco Yard by 12:00 PM

Sylmar: The train switches spur at MP 24.2. It holds the main line for 30 minutes, then continues railroad west.

Newhall: Train switches spur at MP 32.7 off Saugus siding. It holds the siding for 45 minutes to switch industry and run around train, then heads back to Burbank Jct. The Main track is open during this entire exercise.

Once back at Burbank Jct, the train waits five minutes for signal, then shoves west on Ventura County Line to Gemco Yard.

Figure 2-6: UP’s Gemco Yard, MP 455.5 on Ventura Subdivision



Source: Google earth. 2018. “Panorama City, CA”. 34°12'38.0"N 118°26'30.3"W

Table 2-3: Review of Southern Pacific “Saugus Line” Shared Use Agreement (Predecessor to UP)

| Section | Description | Significance for AVL Study |
|---|---|---|
| ARTICLE I -DEFINITIONS | | |
| Section 1.45 | Peak Commuter Periods are defined as 5:00 AM to 9:00 AM and from 4:00 PM to 9:00 PM Note that these are different that the peak commuter periods provided by Metro documentation. | Peak Commuter Periods are now defined as 4:00 AM to 7:00 AM and 4:00 PM to 7:00 PM, according to Metro staff and the AVL Operating Modeling Report from 2012 (SCRR, 2012) |
| ARTICLE II – SHARED USE FACILITIES | | |
| Section 2.2 (b) | During Peak Commuter Periods (defined above) the Railroad shall have no right to use any portion of the shared use facilities, which has a single main line track, with certain specified exceptions. | Note reference to those sections which have a single main line track. |
| Section 2.2 (c) | At times, other than the Peak Commuter Periods, the Railroad shall have the right to use any portion of the Shared Use Facilities, which has a single main line Track for Freight Trains scheduled in accordance with Section 4.1 (b), subject to the dispatching priorities contained in Article IV. | UP can use any portion of the line, single track or otherwise, at any time other than the Peak Commuter Periods, subject to the dispatching priorities. |

| Section | Description | Significance for AVL Study |
|--|--|--|
| Section 2.2 (d) | Any portion of the Shared Use Facilities, which now or in the future has two or more main line Tracks shall be operated as follows: (i) the Commission and the Railroad both shall have the shared use at all times of all main line Tracks constituting that portion of the Saugus Line having two or more main line tracks . . . subject to the dispatching priorities contained in Article IV and provided that, during Peak Commuter Periods, the Railroad may not conduct local freight service except for time sensitive trains to and from the GEMCO Yard and other local freight that does not, in reasonable judgment of the Commission, delay scheduled Commuter Rail Service. | <p>The Commission and UP have equal priority at all times for sections of the line where there are two or more main line tracks.</p> <p>As Metro/SCRRA increase the amount of double-tracking, UP's usage rights during Peak Commuter Periods under the Agreement are effectively increased.</p> |
| ARTICLE III - OPERATIONS | | |
| Section 3.4 (a) | . . . All such equipment shall at all times comply with applicable FRA, AAR, federal, state, and local requirements and with the Commission's reasonable standards for locomotives and cars permitted to operate over the Commission's tracks. | Could affect use of DMUs – would need to discuss with UP. Some of the DMUs currently on the market are compliant only under the FRA's Alternative Vehicle requirements. |
| ARTICLE IV – SCHEDULING AND DISPATCHING | | |
| Section 4.1 (a) - Scheduling | The Commission shall determine the schedule of Commission Trains and shall provide such schedules, and any changes thereto, in a timely manner to the Railroad provided however that the Commission shall not schedule Commission Trains that would unreasonably interfere with the Railroad's Rail Freight Service during times which are not Peak Commuter Periods. | SCRRA/Metro can determine Metrolink Train schedules, but they must not interfere unreasonably with UP's rail freight service during non-Peak Commuter Periods. This implies discussions with UP will be needed to establish AVL service on 60- or 30-minute headways. |
| Section 4.1 (b) | The Railroad shall determine the schedule of Freight Trains during Peak Commuter Periods, subject to the limitations of Section 2.2 (b) and 2.2 (d). The Railroad shall determine the schedule of Freight Trains at all times other than the Peak Commuter Periods, subject to the approval of the Commission, which approval shall not be unreasonably withheld or delayed. | UP determines its schedules during Peak Commuter Periods subject to Section 2.2; and determines its schedules at all other times subject to SCRRA/Metro approval. Again, indicates need for discussions on assigning slots to UP trains in order to achieve 60- or 30-minute AVL headways. |
| Section 4.2 (b) (ii) | Commission Trains scheduled in accordance with Section 4.1 and operating in revenue service, and Amtrak Trains operating in revenue service, shall be accorded absolute preference and priority over Freight Trains. | Provides priority to passenger trains over freight trains, subject to compliance with Section 4.1. |
| (iv) | Notwithstanding the priorities established by (ii) and (iii) above, Freight Trains shall at no time be required to wait for Commission Trains for more than 15 minutes (A) prior to crossing at Burbank Jct, at the Commuter Rail Interlocker or at other Crossovers within a portion of the Shared Use Facilities that has two or more main line Tracks, or (B) prior to entering Tunnels within or contiguous to a portion of the Shared Use Facilities that has two or more main line Tracks. | Provides a 15-minute cap on how long a UP freight train can be held on the line at certain locations. |

2.2.4 On-time Performance and Reliability

The On-Time Performance (OTP) Policy was adopted by the SCRRA Board of Directors on June 6, 2012 and states that:

“On-Time Performance, or schedule adherence, is a measure of trains that reach their final destination on time. Any train that is annulled, terminated, or more than five minutes, 59 seconds late into its final destination will be considered late.

The denominator for the OTP percentage calculation shall be the number of revenue trains scheduled during the reporting period for the appropriate line.

The numerator for the calculation shall be the number of scheduled trains LESS the sum of the number of trains (a) annulled, (b) terminated, and (c) more than five minutes 59 seconds late into their final destination.

Special trains, such as extra trains, charter trains, baseball trains, and other promotional trains are excluded from the OTP calculation.

Service Standard: 95% of trains arrive at their final destination within five minutes 59 seconds of their scheduled time.” (SCRRA, 2018b)

OTP is one of Metrolink’s Key Performance Indicators (KPIs). KPIs are tied to the seven strategic goals outlined in the *Metrolink 10-Year Strategic Plan 2015-2025*. The KPI Quarterly Performance Reports are included in SCRRA Board meeting agenda packets and detail OTP data by line. The KPI Quarterly Performance Reports for fiscal year 2018, third quarter (FY18 Q3) reported that overall Metrolink system OTP is at 94.7% for FY18 Q3, just shy of the 95% target. Per Metrolink statistics, the AVL had a line-specific OTP of 96.4%, up from the previous three quarters, as shown in Table 2-4.

Table 2-4: Frequency of Train Delays on AVL

| | Delays (FY17 Q4) | Delays (FY18 Q1) | Delays (FY18 Q2) | Delays (FY18 Q3) |
|------------------------------------|------------------|------------------|------------------|------------------|
| No Delay | 1,681 | 1,564 | 1,556 | 1,594 |
| 1 min – 5 min | 173 | 265 | 257 | 271 |
| 6 min – 10 min | 35 | 34 | 28 | 28 |
| 11 min – 20 min | 18 | 31 | 43 | 18 |
| 21 min – 30 min | 9 | 17 | 14 | 11 |
| Greater than 30 min | 18 | 5 | 16 | 10 |
| Annulled | 0 | 2 | 1 | 3 |
| Total Delays | 1,934 | 1,918 | 1,915 | 1,935 |
| Total Delays Used to Calculate OTP | 80 | 89 | 102 | 70 |
| OTP % | 95.9% | 95.4% | 94.7% | 96.4% |

Source: KPI Quarterly Performance Reports for FY17 Q4 and FY18 Q1 – Q3

Notes: Includes weekday and weekend. Grey rows indicate figures not calculated as part of OTP.

The majority of delays on the AVL are under 5 minutes, as shown in Table 2-4, and, therefore, do not figure into the OTP calculation, per the OTP Policy. Most of the delays on the AVL that affect OTP are between six and 20 minutes.

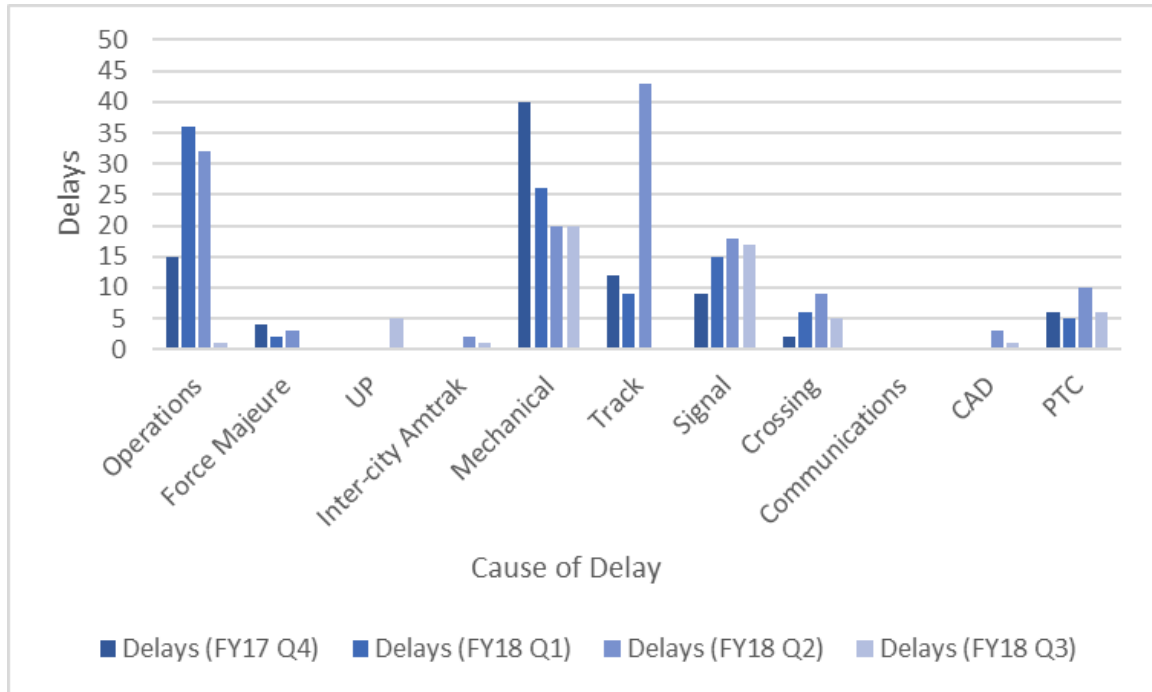
Causes of delays to OTP include numerous variables. The most common cause of delay on the AVL is mechanical issues to train equipment. The Metrolink Incident Log, provided by Metro for incidents between November 2017 and July 2018, shows that three of the six incidents noted for FY18 Q3 were due to mechanical issues, causing the cancellation or annulment of trains resulting in significant cascading delays. As shown in Figure 2-7 though, total mechanical issues to train equipment showed a trending improvement from FY17 Q4 to FY18 Q3. FY17 Q4 had 40 delays caused by mechanical issues, which dropped to 26 in FY18 Q1 and 20 in both FY18 Q2 and Q3.

Operations is the second most common cause of delay on the AVL. Operations is a broad category that includes things such as train congestion, crew-related issues, meet/pass issues, passengers needing assistance, etc. This cause of delay was significantly reduced in FY18 Q3 though, as shown in Figure 2-7, which would have to be studied further for the specific reason(s).

Track-related causes of delays (speed restrictions, Form B-restrictions, etc.) increased drastically in FY18 Q2, but dropped to zero in FY18 Q3. This is likely caused by construction for the CP Soledad Speed Increase capital improvement project, which was completed on November 30, 2017.

Other causes of delays remain fairly consistent, but interference with UP trains increased to five causes of delays in FY18 Q3, whereas it was zero in the previous three quarters.

Figure 2-7: AVL Delays by Cause/Type



Source: KPI Quarterly Performance Reports for FY17 Q4 and FY18 Q1 – Q3; Cause of Delay categories are described in Glossary
Notes: Includes weekday and weekend

The Metrolink Incident Log shows that significant delays recently, in FY18 Q4 and FY19 Q1, were caused by Force Majeure, which are delays due to acts of nature or events outside of Metrolink’s control. Force Majeure is not included in OTP calculations, but can result in significant delays. These two quarters showed one incident of a brush fire causing a 90-minute delay, three incidents of fatal trespasser strikes and two vehicle strikes causing cancellations and considerable delays, one incident of assault on a conductor, and four 30-minute delays caused by heat advisories. These delays are considerable and, while they are not figured in the Metrolink OTP calculations, need to be considered since they greatly affect Metrolink passengers.

2.2.5 Signal System

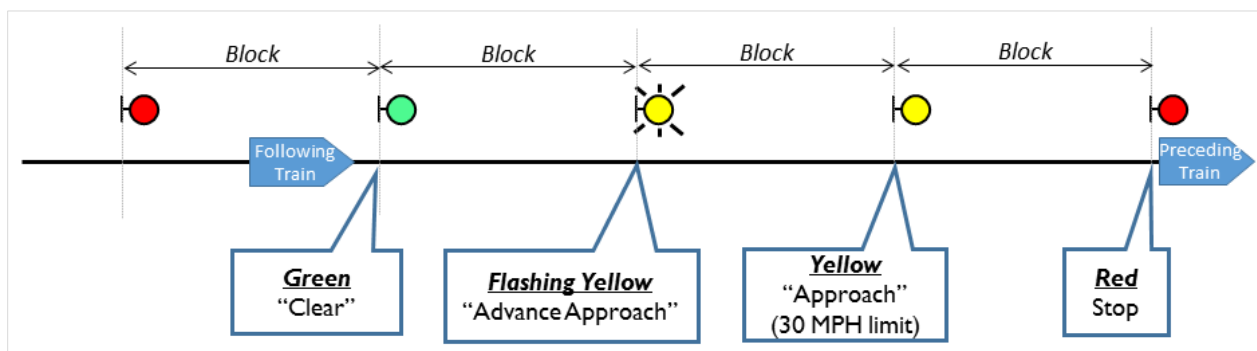
In North American railroads, including Metrolink, each wayside signal has three lamps in red, yellow, and green color, which can be displayed in various combinations or visual appearances. Each signal aspect (or visual appearance) is associated with a specific definition determined by each railroad. These definitions can be added to (but not changed) under a set of “Special Instructions” as defined by each railroad. The railroads operating within Southern California have adopted a typical 4-aspect system (though some older corridors still have segments with a 3-aspect system). The basic definition of each aspect in this system is listed in Table 2-5.

Table 2-5: North American Railroad Signal Aspect – 4-Aspect System

| Signal Aspect Indication | Name | Indication/Meaning | Status of the Preceding Train |
|--------------------------|------------------|--|---|
| Solid red | Stop | Stop before train passes the signal | Occupying the next block |
| Solid yellow | Approach | Proceed prepared to stop at next signal. Passenger trains exceeding 30 MPH immediately reduce to that speed. | Occupying the second block |
| Flashing Yellow | Advance Approach | Be prepared to stop at second signal. Proceed prepared to pass next signal not exceeding 30 MPH. | Occupying the third block |
| Solid green | Clear | Proceed (at the maximum speed allowed) | Not on the same track or occupying farther than the third block |

The segment between each signal is referred to as a “block”. The signals control the movement of trains into the next block. To ensure safe distance between trains, only one train on each track should be within each block at any one time. The implementation of Positive Train Control (or PTC) enforces this rule and removes the risk of a train entering to a block already occupied by another train. The basics of the 4-aspect system is summarized in Figure 2-8.

Figure 2-8: Basics of the 4-Aspect System



Source: WSP

The primary purpose of a railroad signaling system is to control movements of the trains by maintaining safe distances between trains. Signal systems govern the number of trains that can operate on the corridor to address passenger demand, and thus are a key element of overall line capacity. The time separation between trains is controlled by the signal system and is referred to as “headway”. Headway is the amount of time it takes for a signal to reset to “green” or “clear” after a train passes through.

As presented in the *Metrolink Antelope Valley Line Infrastructure Improvement Strategic Plan, March 2012*, the current signaling can support five- minute headways, which equates to twelve trains per hour. This will allow for the desired capacity when the necessary improvements are completed.

2.3 ROLLING STOCK

Metrolink has 56 locomotives (53 owned and three leased) and 258 passenger cars (73 cab cars and 185 coaches) operating in consists of four, five, or six cars. Forty Tier 4¹ F125 locomotives have been procured by SCRRA to phase out older locomotives. As of June 1, 2018, 15 F125 locomotives have been delivered, seven of which are in-service. Locomotives are 68 feet long and passenger cars 85 feet, making consist lengths between 408 and 578 feet. Forty sets of equipment are cycled throughout the system; equipment sets are not dedicated by line.

The AVL uses 11 sets of equipment to operate its weekday schedule, as shown in Table 2-6. Metrolink trains along the AVL are either four-car or five-car consists powered by one locomotive. Nine of the 11 equipment sets are four-car consists and two are five-car consists, which are part of equipment cycles that originate and terminate at the Eastern Maintenance Facility (EMF) and interline with San Bernardino Line service. Weekend service uses three sets of equipment that originate and terminate at the Lancaster Layover Facility.

Table 2-6: Weekday Equipment Cycles

| Cars | Originating Location | Train Numbers and Turns | Terminating Location |
|------|----------------------------|---|---------------------------------|
| 4 | Lancaster Layover Facility | 200 – CMF – 211 – 218 – 115 – 118 – 123 | Montalvo Layover Facility |
| 4 | Lancaster Layover Facility | 202 – 203 – 210 – CMF – 225 | Lancaster Layover Facility |
| 4 | Lancaster Layover Facility | 204 – 209 – 220 – 221 | Lancaster Layover Facility |
| 4 | Lancaster Layover Facility | 282 – CMF – 707 | Perris – South Layover Facility |
| 4 | Lancaster Layover Facility | 208 – 207 – 214 – 213 – 222 – 285 | Lancaster Layover Facility |
| 4 | Lancaster Layover Facility | 206 – CMF – 217 – 224 – 223 | Lancaster Layover Facility |
| 4 | CMF | 901 – 900 – 306 – 325 – 215 – 226 | CMF |
| 5 | EMF | 303 – 201 – 212 – 316 | EMF |
| 5 | EMF | 313 – 205 – 216 – 314 – 333 – 332 | EMF |
| 4 | Riverside Layover Facility | 409 – CMF – 219 | Lancaster Layover Facility |
| 4 | Riverside Layover Facility | DH801 – 681 – 700 – 811 – 802 – 323 – CMF – 911 – 910 – 227 | Lancaster Layover Facility |

Source: Equipment Cycles effective Monday, April 09, 2018, provided by SCRRA

Notes: Turns show train number and midday layover at CMF, if necessary

¹ Tier 4 refers to the current highest standard of emissions reduction available on commuter rail rolling stock.

2.3.1 Maximum Passenger Load Factors

The maximum loads and capacity utilization on a train trip are an important indicator of overall efficiency and equipment utilization. SCRRRA provided maximum load data for the first ten months of FY 2018, which have been analyzed for maximum capacity utilization and summarized in Table 2-7.

To examine the passenger load differences between peak and off-peak periods/directions, trips that operate during the AM peak period in the peak direction are highlighted in yellow. Trips that operate during the PM peak period in the peak direction are highlighted in blue. As can be seen from Table 2-7, there is a dramatic difference in loadings between peak and off-peak periods. Morning peak period trains in the peak direction have an average maximum load percentage of 50.9%. PM peak period trains in the peak direction have an average maximum load percentage of 52.6%. Trains operating at other times of the day have an average maximum load percentage of only 13.7%. These findings reflect a strong peak period orientation in ridership, and may indicate the potential viability of shorter train consists or use of DMUs, especially during off-peak period.

Table 2-7: Antelope Valley Line Maximum Load Analysis by Train Number, First Ten Months of FY 2018*

| Inbound/ Outbound | Train | Departure Time* | Origin | Destination | Peak | Median Capacity | Peak Passenger | Maximum Capacity Utilization 10 Month Average |
|----------------------|-------|--------------------|------------------|-------------|---------|--------------------|-------------------|---|
| Inbound | 200 | 3:47 AM | Lancaster | LAUS | AM PEAK | 532 | 167 | 30.9% |
| Inbound | 202 | 4:49 AM | Lancaster | LAUS | AM PEAK | 532 | 320 | 60.2% |
| Inbound | 204 | 5:19 AM | Lancaster | LAUS | AM PEAK | 532 | 256 | 50.7% |
| Inbound | 206 | 6:03 AM | Lancaster | LAUS | AM PEAK | 532 | 334 | 61.0% |
| Inbound | 208 | 6:51 AM | Lancaster | LAUS | AM PEAK | 532 | 261 | 49.7% |
| Inbound | 210 | 9:07 AM | Via Princessa | LAUS | MIDDAY | 532 | 72 | 13.8% |
| Inbound | 212 | 9:03 AM | Lancaster | LAUS | MIDDAY | 668 | 170 | 25.6% |
| Inbound | 214 | 11:29 AM | Via Princessa | LAUS | MIDDAY | 533 | 41 | 7.6% |
| Inbound | 216 | 11:35 AM | Lancaster | LAUS | MIDDAY | 663 | 137 | 20.2% |
| Inbound | 218 | 1:48 PM | Via Princessa | LAUS | MIDDAY | 533 | 30 | 5.6% |
| Inbound | 220 | 1:42 PM | Lancaster | LAUS | MIDDAY | 532 | 130 | 24.5% |
| Inbound | 222 | 3:23 PM | Via Princessa | LAUS | PM PEAK | 532 | 22 | 4.3% |

| Inbound/ Outbound | Train | Departure Time* | Origin | Destination | Peak | Median Capacity | Peak Passenger | Maximum Capacity Utilization 10 Month Average |
|----------------------|-------|--------------------|------------------|------------------|---------|--------------------|-------------------|---|
| Inbound | 224 | 5:14 PM | Santa Clarita | LAUS | PM PEAK | 532 | 83 | 14.9% |
| Inbound | 226 | 6:15 PM | Lancaster | LAUS | PM PEAK | 533 | 106 | 20.0% |
| Inbound | 282 | 6:01 AM | Palmdale | LAUS | AM PEAK | 532 | 282 | 52.6% |
| Outbound | 201 | 6:24 AM | LAUS | Lancaster | AM PEAK | 668 | 72 | 10.6% |
| Outbound | 203 | 7:29 AM | LAUS | Via Princessa | AM PEAK | 532 | 60 | 10.9% |
| Outbound | 205 | 8:29 AM | LAUS | Lancaster | AM PEAK | 663 | 78 | 12.0% |
| Outbound | 207 | 9:45 AM | LAUS | Via Princessa | MIDDAY | 532 | 39 | 7.3% |
| Outbound | 209 | 11:11 AM | LAUS | Lancaster | MIDDAY | 532 | 100 | 19.8% |
| Outbound | 211 | 12:05 PM | LAUS | Via Princessa | MIDDAY | 532 | 30 | 5.4% |
| Outbound | 213 | 1:55 PM | LAUS | Via Princessa | MIDDAY | 533 | 86 | 16.1% |
| Outbound | 215 | 3:28 PM | LAUS | Lancaster | PM PEAK | 533 | 220 | 42.0% |
| Outbound | 217 | 3:53 PM | LAUS | Santa Clarita | PM PEAK | 532 | 110 | 20.6% |
| Outbound | 219 | 4:50 PM | LAUS | Lancaster | PM PEAK | 532 | 480 | 92.5% |
| Outbound | 221 | 5:58 PM | LAUS | Lancaster | PM PEAK | 532 | 339 | 61.6% |
| Outbound | 223 | 6:38 PM | LAUS | Lancaster | PM PEAK | 532 | 192 | 35.0% |
| Outbound | 225 | 7:36 PM | LAUS | Lancaster | NIGHT | 532 | 123 | 22.8% |
| Outbound | 227 | 9:25 PM | LAUS | Lancaster | NIGHT | 532 | 84 | 15.9% |
| Outbound | 285 | 5:32 PM | LAUS | Palmdale | PM PEAK | 533 | 343 | 64.2% |

Source: Departure Times per Schedule Effective October 9, 2017. Data from SCRRA Median Load Capacity, FY-18.

2.4 CAPITAL IMPROVEMENTS

2.4.1 Current/Planned Capital Improvements

The CP Soledad Speed Increases project was the only major capital project identified for the Valley Subdivision in the *Capital Program Status Report – Third Quarter*, included in the June 22, 2018 SCRRA Board meeting agenda packet. This project replaced a turnout at CP Soledad (MP 44.2) to increase the speed of the existing siding from 20 mph to 40 mph and upgraded a spur track. This project started on December 22, 2016 and completed on November 30, 2017

and had an expended budget of \$5,060,000. System-wide major new capital projects for FY18, Q3 include:

- Maintenance Facilities Hardening – completion date: December 31, 2020
- Station Video Surveillance – completion date: December 31, 2020
- Security Data Network Buildout – completion date: June 30, 2020
- PTC Interoperability – completion date: September 30, 2018
- Tier 4 (F-125) Locomotive Procurement – completion date: February 28, 2020
- Ticket Vending Devices – completion date: June 30, 2020

SCRRA’s overall Proposed Capital Program Budget consists of three major components. The Rehabilitation component is comprised of \$93.8 million in carryforward from prior years and the amount adopted for the FY19 program. The Special Projects component has no carryforward, so will consist of the adopted FY19 amount. The New Capital component is comprised of \$233.8 million in carryforward from prior years, and the amount adopted for the FY19 program. The funding of the Capital Program Budget by Member Agencies has been reconciled with approved Member Agency funding by their Boards for a total of \$125.9 million, which \$62.8 million for rehabilitation, \$62.0 for special projects, and \$1.1 million for special projects. The budget for new projects includes \$1 million for the Palmdale Passing Siding (Design Phase).

2.4.2 Future Capital Improvements

Metro has identified capital projects necessary to enhance mobility and improve safety, OTP, and service along the AVL.

Table 2-8: Antelope Valley Line Capital Improvements

| No | Capital Project | Mileposts | Description | Status |
|----|---|--|--|--------------------|
| 1 | Link Union Station (Link US) Project | LAUS 0.0 to CP Chavez (1.0) in the north and LAUS (0.0) to CP Olympic (142.6) in the south | This project is essential to providing the increased rail and transit capacity that is needed to serve the growing Southern California region, and is required to successfully deliver California HSR service to the Los Angeles Basin. Link US is the centerpiece of the SCRRA SCORE Program, providing critical capacity increases that are required to realize over 26 percent of the significant reductions in Basin-wide vehicle miles traveled and greenhouse gas emissions that will result from the SCORE Program. | Environmental & PE |
| 2 | Doran Street and Broadway/Brazil Grade Separation Project | 7.51 and 7.99 | The two grade separated structures will result in the at-grade crossing closure at Doran Street and Broadway/Brazil to improve safety and mobility for the area while implementing the needed infrastructure capacity enhancements. | Environmental |

| No | Capital Project | Mileposts | Description | Status |
|----|---|-------------------------------|--|--|
| 3 | Burbank Jct Speed Improvements | 11.4 | These improvements will assist with commuter and freight rail movement between the Ventura and Valley subdivisions and accommodate a 30-minute headway for service. | Fully funded through SCRRRA TIRCP Grant (Metrolink is lead agency) |
| 4 | Burbank Airport – North Metrolink Station Project | 13.66 | Project provides the first train to plane connection for the Valley Line and will assist in reducing vehicle trips on the I-5 freeway and surrounding streets with new Metro and local bus connections at this station. | Completed (In Operation) |
| 5 | Brighton to Roxford Double Track Project | 12.8 to 23.6 | The Project includes 10.9 miles of new second mainline track. The project allows for express service capability and improved mobility, on-time performance and enhances safety at 16 at-grade crossings within the project limits. | Final Design Four construction phases will require Metro Board approval |
| 6 | Balboa Siding Project (pending Board approval) | 25.3 to 26.5 | This siding extension project would extend double track capability to control point Balboa to improve rail mobility and capacity leading up to Tunnel 25. | TBD (Subject to funding) |
| 7 | Saugas to Hood Double Track Project (pending Board approval) | 30.25 to 32.3 | The second mainline track completes capacity enhancements through most of the City to allow for improved frequency of service. | TBD (Subject to funding) |
| 8 | Canyon to Lang Railroad Improvements (pending Board approval) | 33.4 to 38.6 and 40.3 to 41.6 | These capacity improvements will double track two separate gaps between control point Canyon in Santa Clarita and Lang in the County of Los Angeles. | TBD (Subject to funding) |
| 9 | Ravenna to Russ Siding Extension (pending Board approval) | 47 to 52.5 | This siding extension project would improve rail mobility and capacity while addressing SCRRRA State of Good Repair needs parallel to the Santa Clara River. | TBD (Subject to funding) |
| 10 | Palmdale to Lancaster Double Track (pending Board approval) | 67.6 to 76.2 | The Project includes 8.6 miles of new second mainline track. The project allows for improved service capability and mobility, on-time performance and enhances safety at 7 at-grade crossings within the project limits. | TBD (Subject to funding) |

Source: Capital Project List provided by Metro, dated May 24, 2018

SCRRRA was awarded \$876 million by CalSTA to implement the first phase of the SCORE program. SCRRRA has identified system-wide and corridor-based projects that will allow for 30-minute service. These projects have been grouped into Service Wave 1, essential to enable 30-minute service, and Service Wave 2, projects to complement and improve upon those schedules (SCRRRA, 2018c). Two projects were identified in the AVL as part of Service Wave 1:

- Burbank Jct Speed Improvements

- Signals: Burbank to LAUS (Not part of the study area, but considered for informational purposes and for modeling assumptions)

System-wide projects identified as part of Service Wave 2 that will affect service on the AVL include:

- Link US Early Operational Phase
- Supplemental Fleet

2.5 REHABILITATION NEEDS

The railroad purchased from Southern Pacific in 1992 was over 100 years old at the time of purchase, and some of the infrastructure still in existence on the line today is up to 100 years old and in serious need of rehabilitation. Southern Pacific undoubtedly conducted track upgrades and replacements over the course of their ownership of the line, but many of the bridge, culvert, and tunnel structures currently in use are 75 to 100 years old or older. The need for significant rehabilitation on the line has become a major focus for both SCRRRA and Metro, the agency which owns the entire line. In 2016, SCRRRA began prioritizing railroad infrastructure on the line which, if not rehabilitated, was projected to potentially result in slow orders being instituted on AVL service. Metro initiated a Rehabilitation and Renovation Study to assist the agency with assessing and prioritizing the critical infrastructure needs on all four of the Metro-owned Metrolink corridors, including the AVL. WSP USA is the consultant supporting Metro on the Rehabilitation study.

SCRRRA undertook preparation of a programmatic rehabilitation plan, *the Metrolink Infrastructure Rehabilitation Plan* (MIRP), which was issued in draft form in December, 2017. That plan is very comprehensive in the coverage of railroad assets, and describes each element's function and major issues for State-of-Good-Repair (SOGR) considerations. Separate sub-plans are provided for Track Rehabilitation (including rail, ties, crossings, special trackwork), Structures Rehabilitation (including bridges, culverts, tunnels), Systems Rehabilitation (including signal systems, positive train control, communications, centralized train control), and Specialized MOW Equipment, and Vehicles Rehabilitation (including hi-rail vehicles, track maintenance equipment).

The MIRP divides rehab needs into “Backlog”, i.e., rehab needs which need to be addressed to bring the system up to a state-of-good-repair, and on-going “State-of-Good-Repair” needs, which would be annualized funding required to maintain the SOGR. Metro’s total “Backlog” for all four of its railroad corridors was estimated to be \$204 million, and its annual SOGR funding need was projected to be \$31.5 million (SCRRRA, 2017, Table 14). A breakdown by subdivision for Metro’s assets was not provided in the MIRP; however, Table 32 in the MIRP indicates that 96.71 track miles (accounting for double-tracking) out of the total 202.6 track miles for which Metro has financial responsibility are on the AVL, so a substantial portion of the projected total rehab backlog and on-going SOGR cost relates to the AVL (SCRRRA, 2017).

2.5.1 Specific AVL Infrastructure Rehabilitation Needs

SCRRRA has provided several rehabilitation project listings for the entire Metrolink system over the past two years. WSP, as part of its support to Metro on the Rehabilitation Study, has inspected many of the assets on these lists and has provided prioritization recommendations

for implementation. Inspections, which in some cases were conducted on a sampling basis, concluded that in nearly all instances, the rehabilitation projects requested by SCRRRA are necessary to ensure operational reliability and a state-of-good-repair. Metro has addressed SCRRRA's funding requests for rehabilitation of Metro-owned right-of-way assets through the following recent actions:

Table 2-9: Funding for Rehabilitation of Metro-Owned Right-of-Way Assets

| Item and Date | Action Taken |
|--|---|
| FY 2016-17 Metrolink Annual Work Program, June 2016 | Metro approved LACMTA's share of Metrolink's FY 2018-19 Annual Work Program including \$10,000,000 for rehabilitation projects |
| FY 2016-17 Annual Work Program Supplement, April 2017 | Metro approved \$18,381,025 for urgent Priority A structure and rail tie rehab work |
| FY 2016-17 Annual Work Program Supplement, January, 2018 | Metro approved an additional \$13,297,500 for urgent track and structure Priority A and B rehab work |
| FY 2018-19 Metrolink Annual Work Program, June 2018 | Metro approved LACMTA's share of Metrolink's FY 2018-19 Annual Work Program including \$41,731,193 for up to 72 rehab projects consisting of FY18 and FY19 All-Share, FY 18 and FY 19 Line Specific, and FY 19 Special Projects, including funding for Tunnel #25 |

Much of the funding provided by these Metro Board actions went to rehabilitation project needs on the AVL. As shown in Table 2-10, a total of \$45.1 million in rehabilitation project needs specifically for the AVL have been identified, reviewed, and confirmed on a complete or sampling basis by WSP. SCRRRA has made significant progress implementing the rehab projects from the "Slow Order" list with the funding provided by Metro, as shown. The rehab projects are critical to maintaining operational reliability and a state-of-good-repair, and will be essential to maintaining or increasing speeds on the line, a goal of the AVL study.

One project that has a direct bearing on the goals of the AVL Study is the Tunnel 25 Track Renovation. During inspections conducted by Metro and WSP in April – May, 2018, the trackbed and track structure in Tunnel 25, a 6,900-foot-long tunnel, exhibited the most serious rehabilitation needs of any track structure inspected by the team this year. That single-track tunnel with tangent track alignment is posted for maximum authorized speeds of 30 mph passenger/25 freight in the Metrolink Track Charts; however, Metrolink staff indicated it is currently operated at 30 mph passenger/ 12 freight, due to the current track conditions (Metro, 2018b). As a long, single track tunnel with reduced operating speeds, Tunnel 25 is a major bottleneck location on the AVL, impacting corridor capacity

Table 2-10: Specific Antelope Valley Line Rehabilitation Project Needs*

| Asset Category | Quantity | SCRRA Cost Estimate, Total | Current Status |
|---|---------------------------------|----------------------------|--|
| AVL Projects from SCRRA "Slow Order" Project List, November, 2016 | | | |
| Bridges | 15 | \$10,900,000 | Projects funded by Metro, first wave of Rail Top Bridge Replacements/rehabs in design and environmental. Invitation for Bid scheduled to be released by end of June, 2018. Planned to go to SCRRA Board in September. |
| Culverts | 15 | \$5,320,000 | Projects funded by Metro, reconstruction on weekend work windows has started. All culverts are complete, except for one culvert that needs a new headwall and some grading. |
| Track - Cross ties | 5 projects totaling 13,950 ties | \$4,112,500 | Projects funded by Metro, materials on order and work started. SCRRA has finished approx. 8,300 Ties in October 2017. The 2nd Phase of funds were received in March, 2018 and SCRRA ordered the ties for that phase. 6,000 Ties are scheduled to be received in July 2018. |
| Track - Turnouts | 1 | \$500,000 | Project funded by Metro. SCRRA currently has a Special Trackwork BPO out to vendors to provide the material for this project. SCRRA is also working on Specifications for a new Job Order Contract for this work. |
| Track - Crossings | 1 | \$400,000 | Project funded by Metro |
| Subtotal | 15 | \$21,232,500 | |
| AVL Projects from SCRRA FY2018-19 Rehab Project List, Tier A + Tunnel 25 | | | |
| Track Rehabilitation, MP 3 - 67.5 | 1 | \$4,065,250 | Inspected by WSP, Recommended for implementation in two phases |
| Tunnel 25 Track Renovation | 1 | \$10,792,750 | Inspected by WSP, recommended for implementation. Metro has proposed two-year funding plan: Planning and design in Year 1 and construction in Year 2 |
| Structures - Various Bridges and Culverts on AVL | 1 program with 7 projects | \$3,638,713 | Inspected by WSP, recommended for implementation for those projects not already rehabilitated |
| Signal Systems | 5 | \$2,167,330 | Inspected by WSP, recommended for implementation |
| Communications | 3 | \$275,000 | Not inspected by WSP |
| Grade Crossings | 2 | \$1,606,180 | Not inspected by WSP |
| Right-of-Way Grading/Ditching | 1 project, 4 separate locations | \$223,850 | Inspected by WSP, recommended for implementation |
| Facilities - Replace Lancaster Crew Base | 1 | \$950,000 | Not inspected by WSP |
| Station Pedestrian Crossings - Valley Sub Portion | 1 | \$166,000 | Inspected by WSP, recommended for implementation |
| Subtotal | | \$23,885,073 | |
| GRAND TOTAL, BOTH PROGRAMS | | \$45,117,573 | |

Sources: Metro Rehab Study Reports prepared by WSP. "Current Status" updates provided by Metrolink.

2.6 Section 2 References

- Los Angeles County Metropolitan Transportation Authority (Metro). 2012. *MetroLink Antelope Valley Line Infrastructure Improvement Strategic Plan – Final Report*. Prepared by HNTB Corporation for Metro, March, 2012.
- Los Angeles County Metropolitan Transportation Authority (Metro). 2017. *L.A. County MetroLink Rehabilitation & Renovation Study: Task 1 – Review of MetroLink’s \$47M Slow Order Project List*. Prepared by WSP USA for Metro, June 5, 2017.
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- Southern California Regional Rail Authority (SCRRA). 2012. *MetroLink Antelope Valley Line Infrastructure Improvement Strategic Plan: Infrastructure Modeling and Validation Report*. Prepared for SCRRA by HDR Engineering, March, 2012.
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- Southern California Regional Rail Authority (SCRRA). 2017. *2017 MetroLink Infrastructure Rehabilitation Plan*. Prepared for SCRRA, December, 2017.
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- Southern Pacific Transportation Company and Los Angeles County Transportation Commission (SP/LACTC). 1992. *Shared Use Agreement (Saugus Line) between Southern Pacific Transportation Company and Los Angeles County Transportation Commission*. December 16, 1992.

3 SAFETY, SECURITY, AND ACCIDENT HISTORY

3.1 SAFETY

The mission of Metrolink, adopted by the SCRRRA Board of Directors on March 11, 2016 is:

To provide safe, efficient, dependable, and on-time transportation service that offers outstanding customer experience, and enhances quality of life.

Safety is the foundation for Metrolink. It is the first KPI reported on quarterly. The Safety KPI is measured by the number of reported safety incidents per 100,000 train miles, excluding suicides, and the number of reportable employee injuries per 200,000 work hours. The KPI Quarterly Performance Reports for FY18 Q3 shows that within the last three years, the target of 1.0 incidents per 100,000 train miles was not met in two of the three years, as shown in Table 3-1. FY17 Q3 was the only third quarter trend to have been below the target at 0.6 incidents per 100,000 train miles, which was due to a decrease in vehicle strikes. The increase in the incident rate for FY18 Q3 is due to a large number of trespasser strikes; nine during the third quarter this year, compared to three a year earlier. There was also one pedestrian strike, compared to none a year earlier. The number of employee injuries per 200,000 work hours also increased, from 2.0 a year earlier to 4.6 now.

Table 3-1: Safety KPI Scores for Last Three Years

| KPI | FY16 | FY17 | FY18 |
|---|------|------|------|
| Number of reported safety incidents per 100,000 train miles | 1.8 | 0.6 | 1.6 |
| Number of reportable employee injuries per 200,000 work hours | 6.4 | 2.0 | 4.6 |

SCRRRA continues key initiatives to improve safety performance. These include safety training, community outreach efforts to increase safety messaging and awareness of potential dangers around trains and tracks, and improvement projects to enable a safer operating environment.

3.2 ACCIDENT HISTORY

According to the Federal Railroad Administration (FRA), there have been 177 reported cases of impacts between on-track equipment and any user of a public or private highway-rail intersection at AVL grade crossings for all years to 2018f (FRA, 2018). A quarter of these accidents, 43, have occurred in the last 10 years. Figure 3-1 shows the seven grade crossings in the study area that have reported cases of two or more impacts between 2008 and 2018. Three of these crossings are located in Segment 4 of the AVL. Palmdale Boulevard has the highest

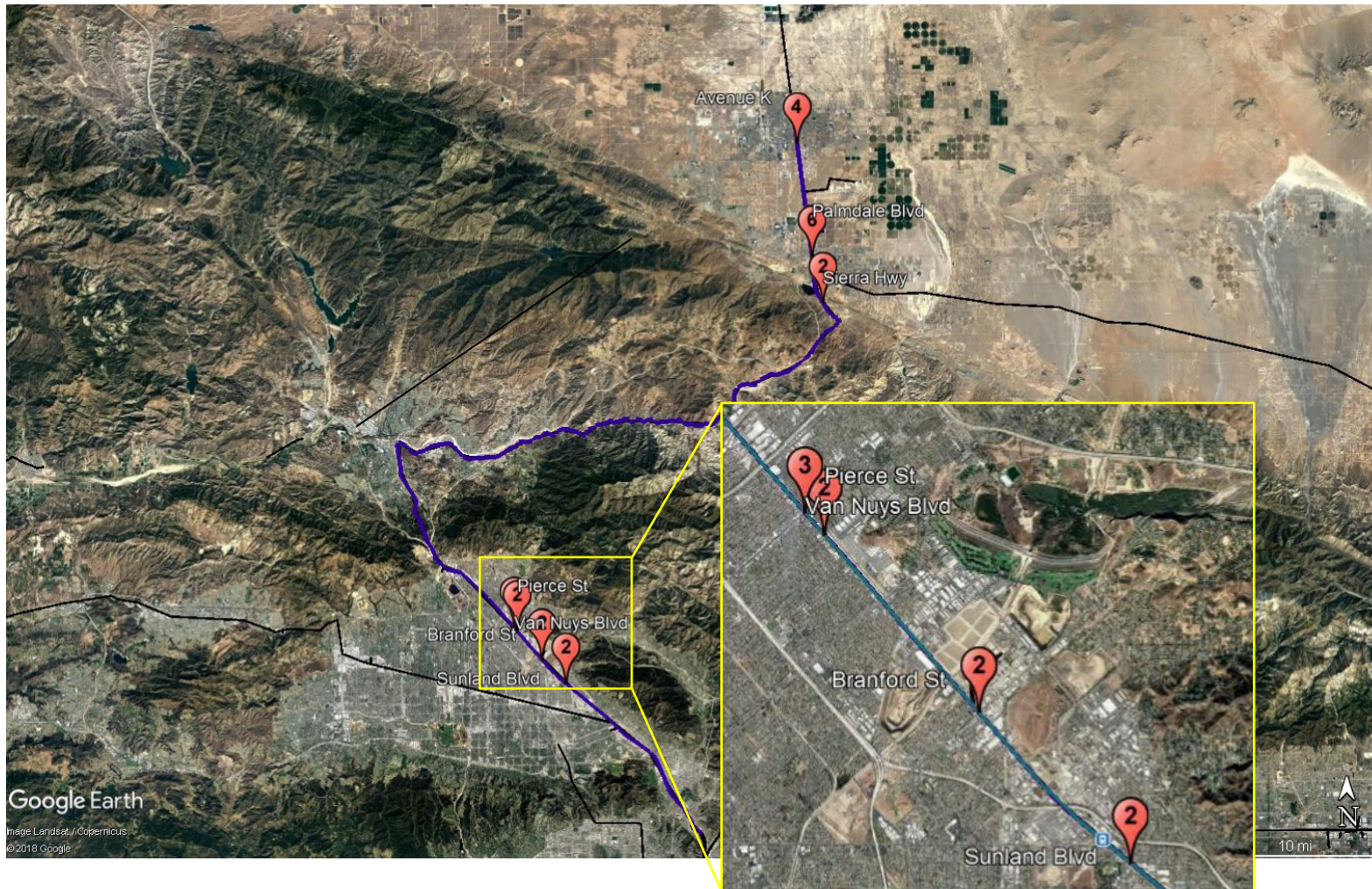
number of accidents with six, followed by Avenue K with four. Sierra Highway has had two accidents. The other four grade crossings with two or more reported accidents are located in Segment 2 in a 4.4-mile section of track between MP 15.1 and MP 19.5. These seven grade crossings have significant reports of accidents historically as well. Table 3-2 shows all crossings in the last 10 years that have had at least one accident and also shows the cumulative number of accidents for these same crossings for all years reported.

Table 3-2: Accidents at Grade Crossing (2008-2018)

| Grade Crossing | Milepost | No. of Accidents (2008-2018) | No. of Accidents (All Years) |
|---------------------|----------|------------------------------|------------------------------|
| Palmdale Blvd | 68.40 | 6 | 8 |
| Avenue K | 75.04 | 4 | 8 |
| Van Nuys Blvd | 19.51 | 3 | 13 |
| Sunland Blvd. | 15.06 | 2 | 17 |
| Branford St | 17.87 | 2 | 4 |
| Pierce St. | 19.24 | 2 | 6 |
| Sierra Hwy | 65.56 | 2 | 4 |
| Osborne St | 18.42 | 1 | 4 |
| Paxton St | 20.06 | 1 | 3 |
| Jessie/Wolfskill St | 20.81 | 1 | 4 |
| Brand Blvd. | 20.99 | 1 | 6 |
| Maclay St | 21.21 | 1 | 4 |
| Hubbard Ave | 21.81 | 1 | 1 |
| Bledsoe St | 23.17 | 1 | 1 |
| Calex Pvt Xing | 28.92 | 1 | 2 |
| San Fernando Rd | 29.61 | 1 | 1 |
| Ruether Rd | 35.86 | 1 | 2 |
| Rainbow Glen Dr | 36.33 | 1 | 2 |
| Weyerhauser | 38.1 | 1 | 1 |
| Crown Valley Rd | 56.16 | 1 | 1 |
| Columbia Way | 73.02 | 1 | 4 |
| Rancho Vista Blvd | 69.95 | 1 | 6 |

Source: FRA. 2018. *Office of Safety Accident/Prediction Website*

Figure 3-1: Grade Crossing Accidents of Two or More



Source: FRA. 2018. *Office of Safety Accident/Prediction Website*; Google earth. 2018. "Northern Greater Los Angeles Metropolitan Area"

3.3 SECURITY

Passenger rail is an inherently open system that makes it a viable target to threats to its security. Metrolink is committed to protecting the safety of its customers and employees and the security of its vehicles, equipment, facilities, and other properties. Metrolink considers the development, implementation, and consistent enforcement of a comprehensive Security and Emergency Preparedness Plan (SEPP) as the first step in developing an effective Security and Emergency Preparedness Program. The last published version of the SEPP is dated April 2014, but it is considered a living document. The SEPP is to be updated whenever a significant change occurs within the organization.

The SEPP notes that all employees and contractors are responsible and accountable for the general security and emergency preparedness of the system. The employees of SCRRA administer the Metrolink system and most of the operation is provided by contractors. SCRRA contractors also employ additional staff to operate and maintain the Metrolink system, including security, train crews, track, cab, and locomotive maintenance. The top contractors all have responsibilities involved in the security of the Metrolink system. Table 3-3 depicts the top contractors by company name, services provided, and security responsibilities.

Table 3-3: Metrolink Top Contractors and Security Responsibilities

| Contractor Name | Services Supplied | Security Responsibilities |
|--|--|---|
| Security: <ul style="list-style-type: none"> ▪ Los Angeles County Sheriff's Department (LASD) ▪ Allied Universal Security Services | <ul style="list-style-type: none"> ▪ Full Law Enforcement Services ▪ Provide Security Services for Metrolink Stations and Layover Facilities | <ul style="list-style-type: none"> ▪ Law Enforcement for Metrolink for on-board trains and throughout the system ▪ Observe and report security issues to the Security Operations Center (SOC) |
| Bombardier Transportation | Maintenance of passenger cars and locomotives. | Observe and report security issues to the SOC |
| Amtrak | Train crews consist of an engineer and conductor | Observe and report security issues to the SOC |
| Veolia Transportation Maintenance and Infrastructure, Inc. (VTMI) | Responsible for Track maintenance and laying new track | Observe and report security issues to the SOC |
| Mass Electric | Responsible for Signal maintenance and service to Positive Train Control system | Observe and report security issues to the SOC |

According to the SEPP, the general responsibilities applicable to Metrolink railroad emergency operations are:

- Ensure passengers and all employees receive appropriate care and are dealt with in a compassionate manner.

- Arrange for the initial transportation of passengers to their station destination.
- Protect passenger and freight railroad assets and interests at the incident site.
- Provide Emergency Response training/qualification of railroad personnel.
- Inform the relatives of passengers and employees as to their condition and location.
- Resume commuter service, or get passengers to their destinations by alternate means, with the shortest possible delay.
- Participate in the incident investigation.
- Interface with outside emergency response agencies including police, fire, emergency medical services (EMS), as well as other government agencies including the Federal Railroad Administration (FRA), National Transportation Safety Board (NTSB), and state and local agencies.
- Advise the National Response Center of status and progress with regard to the incident situation.
- For environmental occurrences, advise the federal and local environmental agencies and provide appropriate response actions as needed.
- When an emergency occurs on Metrolink's territory, Metrolink will coordinate proper notification and contacts as listed on Metrolink's Emergency Call-Out Sheets.
- Railroads Public Information Officer (PIO) keeps the public informed by providing the media with timely and accurate information.

3.4 Section 3 References

Federal Railroad Administration (FRA). 2018. *Office of Safety Accident/Prediction Website*. Accessed via <https://safetydata.fra.dot.gov/webaps/default.aspx> June 2018

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4 ENVIRONMENTAL CONSTRAINTS

When considering the construction of improvements in the corridor, environmental research and data collection is necessary to assist in the determination of preliminary environmental constraints within the project study area. It is anticipated that the main environmental constraints will be related to biological resources, jurisdictional waters/floodplains, cultural resources, and hazardous materials, although an overall assessment should be conducted on other pertinent resources such as pedestrian access, geotechnical, and other human environment and land use planning considerations.

- **Biological Data Collection:** The biological data collection will include searches of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNNDDB), the U.S. Fish and Wildlife Service's (USFWS) quadrangle species list, and the California Native Plant Society's Online Inventory as background information to determine whether any special status (federal or state) plant and animal species are documented to occur in the vicinity of the project corridor.
- **Jurisdictional Waters and Flood Plains:** Much of the corridor from MP 24 to 56 is within the FEMA designated floodplains of Placeritas Creek and the Santa Clara River. Proposed improvements in the floodplain must be designed to avoid alteration of floodplain flows. While there is no jurisdictional wetland delineation available for the corridor, the presence of Placeritas Creek and the Santa Clara River would indicate that a hydrologic nexus exists to any seasonal wetlands, and therefore Federal jurisdiction is likely (Metro, 2012).
- **Preliminary Cultural/Historical Resources Report:** To obtain information regarding the potential to impact prehistoric or historic cultural resources along the project alignment during construction, a record search will be conducted at the Southwest Information Center of the California Historical Resources Information System (SWIC). This record search will identify cultural resources and previous studies that might be applicable within one-half mile of the project alignment. This will include an archival research and review of their maps and literature on file. Structures along the corridor will be evaluated for historical significance.
- **Initial Site Assessment:** Conduct a record search for known hazardous materials along the corridor including any parcel that will be impacted in accordance with ASTM Standard Practice 1527-00 and the Caltrans Project Development Manual to determine if the proposed project area has been compromised by hazardous materials or wastes. Field samples and laboratory analysis are not proposed, although they will be recommended where appropriate.

- Permits: Once the corridor evaluation and conceptual design is complete, a list of required permits and potentially required is suggested.

Research and existing field studies information will be utilized to determine the general environmental setting of the project alignment, and for the analysis of potential impacts to determine needed studies and level of environmental document required pursuant to the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA), as well as any required permits.

5 ANTELOPE VALLEY LINE STATIONS

5.1 PLATFORMS AND STATION FACILITIES

According to the SCRRA Design Criteria Manual, November 2014:

“The design of a SCRRA commuter train station is typically site-specific and reflects the surrounding community. However, the functionality of SCRRA stations must be practical and consistent in order to effectively serve SCRRA trains and passengers.”

New stations are to be constructed with 680-foot-long platforms. Side platforms are the preferred design, with center platforms to be considered only if the station site is not suited for side platforms. Many of the AVL stations have platform lengths less than the required minimum, which must be considered when making upgrades.

Metrolink stations are typically equipped with a minimum of two self-service ticket vending machines (TVMs), two multi-trip ticket validators, platform and right-of-way signage, and a SCRRA passenger information system and phone. Additional amenities vary by station, as shown in Table 5-1.

Table 5-1: AVL Station Platforms and Amenities

| Station | MP | Number of Platforms | Platform Type(s) | Platform Length (feet) | Adjacent Track Services by Platform | Maximum Train Cars at Each Platform | Amenities |
|-------------------------|-------|---------------------|------------------|------------------------|-------------------------------------|-------------------------------------|--|
| Burbank Airport – North | 13.66 | 1 | ▪ Side | ▪ 680 | ▪ MT | 8 | ▪ Bike Rack/Lockers |
| Sun Valley | 15.40 | 1 | ▪ Side | ▪ 600 | ▪ MT | 7 | ▪ Bike Rack/Lockers ▪ Public Pay Phones |
| Sylmar/San Fernando | 21.94 | 1 | ▪ Side | ▪ 425 | ▪ MT | 5 | ▪ Bike Rack/Lockers ▪ Public Pay Phones |
| Newhall | 29.99 | 2 | ▪ Side | ▪ 510 ▪ 510 | ▪ MT ▪ Siding | 6 | ▪ Restrooms ▪ Public Pay Phones |

| Station | MP | Number of Platforms | Platform Type(s) | Platform Length (feet) | Adjacent Track Services by Platform | Maximum Train Cars at Each Platform | Amenities |
|---------------------|-------|---------------------|------------------|--|--|-------------------------------------|--|
| Santa Clarita | 34.22 | 1 | ▪ Side | ▪ 682 | ▪ MT | 6 | <ul style="list-style-type: none"> ▪ Bike Rack/Lockers ▪ Restrooms ▪ Public Pay Phones |
| Via Princessa | 37.87 | 1 | ▪ Side | ▪ 992 | ▪ MT | 11 | <ul style="list-style-type: none"> ▪ Restrooms ▪ Public Pay Phones |
| Vincent Grade/Acton | 61.49 | 2 | ▪ Side | <ul style="list-style-type: none"> ▪ 600 ▪ 600 | <ul style="list-style-type: none"> ▪ MT ▪ Siding | 7 | <ul style="list-style-type: none"> ▪ Public Pay Phones |
| Palmdale | 69.19 | 1 | ▪ Side | ▪ 510 | ▪ MT | 6 | <ul style="list-style-type: none"> ▪ Restrooms ▪ Waiting Room ▪ Dining ▪ Public Phones |
| Lancaster | 76.54 | 1 | ▪ Side | ▪ 680 | ▪ MT | 8 | <ul style="list-style-type: none"> ▪ Restrooms ▪ Waiting Room ▪ Public Phones |

Source: Metrolink Right-of-Way Map and Track Chart Valley Subdivision, January 2018 and www.metrolinktrains.com/stations

5.2 STATION ACCESS MODES

SCRRA encourages intermodal connections at stations, including parking, bicycle and pedestrian connectivity, transit, and other first/last mile connections, such as taxis and on-demand transportation. Stations along the AVL have a wide range of station access elements.

5.2.1 Parking Facilities, Capacity, and Utilization

Table 5-2 summarizes the parking facilities available at each AVL station. All AVL stations offer free parking, except for the Burbank Airport – North Station, which does not have parking currently, but future parking has been identified. New stations have a minimum parking requirement of 500 spaces. Only the Palmdale Station meets this new requirement.

Table 5-2: AVL Station Parking Facilities

| Station | Parking | Utilization |
|-------------------------|---|-------------|
| Burbank Airport – North | <ul style="list-style-type: none"> ▪ No parking | N/A |
| Sun Valley | <ul style="list-style-type: none"> ▪ 320 spaces / 8 handicapped spaces ▪ Free Parking ▪ Overnight allowed. | 24.4% |
| Sylmar/San Fernando | <ul style="list-style-type: none"> ▪ 375 spaces / 9 handicapped spaces ▪ Free Parking ▪ Overnight allowed ▪ Electric Vehicle Charging Stations available | 92.0% |
| Newhall | <ul style="list-style-type: none"> ▪ 324 spaces* / 17 handicapped spaces ▪ Free parking ▪ Overnight allowed ▪ *Total of 3 parking lots. Parking space amounts reflect totals from all three lots. | 97.5% |
| Santa Clarita | <ul style="list-style-type: none"> ▪ 473 spaces / 10 handicapped spaces ▪ Free parking ▪ Overnight allowed ▪ Disabled parking located at platform level. | 87.4% |
| Via Princessa | <ul style="list-style-type: none"> ▪ 395 spaces | 58.9% |
| Vincent Grade/Acton | <ul style="list-style-type: none"> ▪ 414 spaces / 16 handicapped spaces ▪ Free parking ▪ No overnight allowed | 54.1% |
| Palmdale | <ul style="list-style-type: none"> ▪ 750 spaces / 18 handicapped spaces ▪ Free parking ▪ Overnight allowed (48-hour maximum) | 54.1% |
| Lancaster | <ul style="list-style-type: none"> ▪ 420 spaces / 5 handicapped spaces ▪ Free parking ▪ Overnight allowed (72-hour maximum) | 71.9% |

Source: SCRRRA Website. Rider-info Parking spaces webpage

Notes: Utilization rate from March 2017

Much of the AVL station parking is at or near capacity. As of March 2017, parking utilization was above 80% at three of its stations:

- Sylmar/San Fernando
- Newhall
- Santa Clarita

The remaining stations have utilizations rates of over 50%, with one exception. Only the Sun Valley Station has utilization under 50%.

5.2.2 Connecting Transit

Los Angeles County has a high rate of transit transfers with 55 percent of Metrolink riders using connecting transit service to travel to or from the station (SCRRA, 2015). Metrolink has arrangements with transit systems throughout Southern California to provide transit connections, many of which are free with a valid Metrolink ticket. In Los Angeles County, the EZ Transit Pass program allows riders with a valid Metrolink ticket to unlimited rides on participating operators' local services on the date of the Metrolink ticket (SCRRA, 2018). The EZ Transit Pass travel does not require a direct transfer between Metrolink and the connecting service. Table 5-3 list the transit services offering connections to the AVL and the stations served.

Table 5-3: Connecting Transit and Stations Served

| Transit Service | Phone and/or website | AVL stations served |
|---|---|--|
| Metro* Metro Bus & Metro Rail | 213-626-4455 www.metro.net | Baldwin Park, Burbank Airport – North, Sun Valley, Sylmar/San Fernando, Van Nuys |
| Antelope Valley Transit Authority* | 661-945-9445 www.avta.com | Lancaster, Palmdale |
| Burbank Bus* | 808-246-4258 www.burbankbus.org | Burbank Airport – North |
| Hollywood Burbank Airport Shuttle | 818.558.3179 http://www.burbankbus.org/services/bo-b-hope-airport-shuttle | Burbank Airport – North |
| LADOT/DASH* | 310-808-2273 www.ladottransit.com | Sylmar/San Fernando |
| County of Los Angeles - Department of Public Works* Acton and Agua Dulce Shuttle | 626-458-3909 https://dpw.lacounty.gov/pdd/Transit/ActonAguaDulceShuttle.cfm | Newhall, Vincent Grade/Acton |
| North County TRANSporter bus (operated by AVTA) * | 661-945-9445 http://www.avta.com/index.aspx?page=406 | Palmdale, Newhall |
| Santa Clarita Transit* | 660-294-1287/661-294-IBUS www.santaclaritatransit.com | Newhall, Santa Clarita, Union Station, Via Princessa, Vincent Grade / Acton |

Notes: * Participating EZ Transit Pass operators

5.2.3 Bicycle and Pedestrian Access

All of the bus transit connecting services listed in Table 5-3 have bike amenities. As shown previously in Table 5-1, only four of the AVL stations in the project study area have bike racks and/or lockers.

- Burbank Airport – North
- Sun Valley
- Sylmar/San Fernando
- Santa Clarita

The San Fernando Road Bike Path is adjacent to the Sylmar/San Fernando Station, but is on the opposite side of the tracks as the platform.

The Santa Clarita Station is served by the Chuck Pontius Commuter Rail Trail. The Newhall Station is close to the South Fork Trail, and access between the trail and the station is possible

from Railroad Avenue and other low-traffic residential streets. The Via Princessa Station does not have direct bicycle access, though there are bike lanes on Sierra Highway approaching the station from the south and the Santa Clara River Trail is to the north of the station (City of Santa Clarita, 2014).

Metrolink stations along the AVL provide wayfinding signage and pedestrian crossings to facilitate safe and easy pedestrian access. Table 5-4 Shows the pedestrian access at each station.

Table 5-4: AVL Station Pedestrian Access

| Station | Pedestrian Circulation |
|-------------------------|---|
| Burbank Airport – North | <ul style="list-style-type: none"> ▪ At-grade track crossing to platform |
| Sun Valley | <ul style="list-style-type: none"> ▪ At-grade street crossings from parking lots on both sides of tracks ▪ At-grade track crossing to platform |
| Sylmar/San Fernando | <ul style="list-style-type: none"> ▪ Parking adjacent to platform |
| Newhall | <ul style="list-style-type: none"> ▪ Parking lots adjacent to both platforms ▪ At-grade track crossing to platform |
| Santa Clarita | <ul style="list-style-type: none"> ▪ At-grade street crossings from parking lot to platform ▪ Handicap parking adjacent to platform |
| Via Princessa | <ul style="list-style-type: none"> ▪ At-grade street crossings from parking lot ▪ Handicap parking adjacent to platform ▪ At-grade track crossing to platform |
| Vincent Grade/Acton | <ul style="list-style-type: none"> ▪ Few parking spots adjacent to platform ▪ Handicap parking adjacent to platform ▪ At-grade street crossings from parking lot to platform |
| Palmdale | <ul style="list-style-type: none"> ▪ At-grade street crossings from parking lot and bus bays to plaza/platform |
| Lancaster | <ul style="list-style-type: none"> ▪ Parking adjacent to platform ▪ Pedestrian access directly to platform |

Source: Google earth. 2018. "Northern Greater Los Angeles Metropolitan Area".

Many cities along the AVL encourage walking and bicycling as a means of transportation and to help mitigate traffic congestion. Metro has coordinated with stakeholders to produce the *Metro Active Transportation Strategic Plan*, which focuses on improving first and last mile bicycle and pedestrian station access.

The *2014 The Metro First Last Mile Strategic Plan & Planning Guidelines* outlines the average distance a person is willing to travel to a transit station or stop:

- Walk up to ½-mile
- Skateboard up to 1.3 miles
- Roller skate/Rollerblade up to 2.3 miles
- Bike up to 3 miles

Local jurisdictions have various plans and policies in place, as shown in Table 5-5, to assist in bicycle and pedestrian access and lay out plans for future improvements.

Table 5-5: City Active Transportation Plans

| City | Adoption Year | Plan | Comment |
|---------------|---------------|---|--|
| Burbank | 2009 | City of Burbank Bicycle Master Plan | |
| Burbank | 2013 | Burbank 2035 General Plan | Complete Streets policy within Mobility Element |
| Lancaster | 2008 | Downtown Lancaster Specific Plan | Promotes active transportation through street design |
| Lancaster | 2012 | City of Lancaster Master Plan of Trails and Bikeways | |
| Palmdale | In Progress | Active Transportation Program Plan | |
| San Fernando | 2013 | San Fernando Safe Routes to School Project | |
| Santa Clarita | 2011 | City of Santa Clarita General Plan | Complete Streets policy within Circulation Element |
| Santa Clarita | 2014 | City of Santa Clarita Non-Motorized Transportation Plan | |

Source: Metro Active Transportation Strategic Plan

5.2.4 Taxis, Transportation Network Companies, and other First/Last Mile Options

Local taxi services and transportation network companies, such as Uber and Lyft, provide additional first/last mile connections. These services do not currently have restrictions for accessing train stations like they do with airports.

Waze Carpool now offers a way for commuters to car share to stations. Waze Carpool is a new extension of the Waze live map app and offers a way for drivers and riders to choose the people they carpool with using profiles found from registered users of the app. OCTA, another member of the SCRRRA JPA, started a pilot program to subsidize Waze Carpool rides to/from Irvine for \$2 per rider, per ride. The success of this program could influence other agencies to offer similar subsidies for first/last mile connections.

5.3 PLANNED AND POTENTIAL STATION IMPROVEMENTS

As part of some of the capital improvements listed in Section 2.4, improvements are planned for some of the AVL stations.

The Brighton to Roxford Double Track Project introduces improvements to the Burbank Airport – North and Sun Valley stations, providing platform boarding to both tracks.

As part of the Canyon to Lang Railroad Improvements, Via Princessa will move two miles northeast to a new "Vista Canyon" site. The new Vista Canyon Station will include double track and turnback track. This new station will be intermodal with a bus transfer station. Active

transportation access will be included through significant extensions of the Santa Clara River Trail (City of Santa Clarita, 2014).

As part of the Palmdale to Lancaster double track project, the Palmdale and Lancaster stations will have improvements that include double track and double platform edges. This will allow at-speed meets within two miles of the Palmdale Station and trains to originate/terminate at the Lancaster Station without affecting trains running in opposite direction. The Palmdale Station is also a planned to be a HSR station. The Palmdale California HSR Station is currently in the early planning stages and will promote economic development, encourage station area development, and enhance multimodal access connections between the station and the City.

The Sylmar/San Fernando Station will be improved to accommodate the future East San Fernando Valley (ESFV) Transit Corridor Project, which will bring many improvements to the station's access and connectivity. Parking improvements are also being studied as part of the ESFV Transit Corridor Project.

Each jurisdiction has planning documents that include improvements for better connectivity to the stations.

Additional local and commuter routes are planned for the City of Santa Clarita as noted in their Transportation Development Plan. The City of Santa Clarita outlines additional improvements to bicycle and pedestrian access to the Santa Clarita and Newhall stations in the Non-Motorized Transportation Plan. In December 2005, the City of Santa Clarita adopted the Downtown Newhall Specific Plan, with the purpose of developing a pedestrian-friendly commercial and cultural district, which will provide additional station access to the Newhall Station.

The Lancaster General Plan 2030 includes plans for a Transit Village District that includes new and revitalized public spaces within walking distance of the Metrolink station and other transit connections.

5.4 Section 5 References

City of Santa Clarita. 2015. *Non-Motorized Transportation Plan*. Prepared for the City of Santa Clarita by Alta Planning + Design on August 2014.

Southern California Regional Rail Authority (SCRRRA). 2015. *Metrolink 10-Year Strategic Plan 2015-2025 Technical Appendix*. Prepared by WSP Parsons Brinkerhoff for SCRRRA on 2015.

Southern California Regional Rail Authority (SCRRRA). 2018. *Transit Connections Webpage*. Metrolink's Website. Accessed at <https://www.metrolinktrains.com/rider-info/general-info/transit-connections/> on June 2018

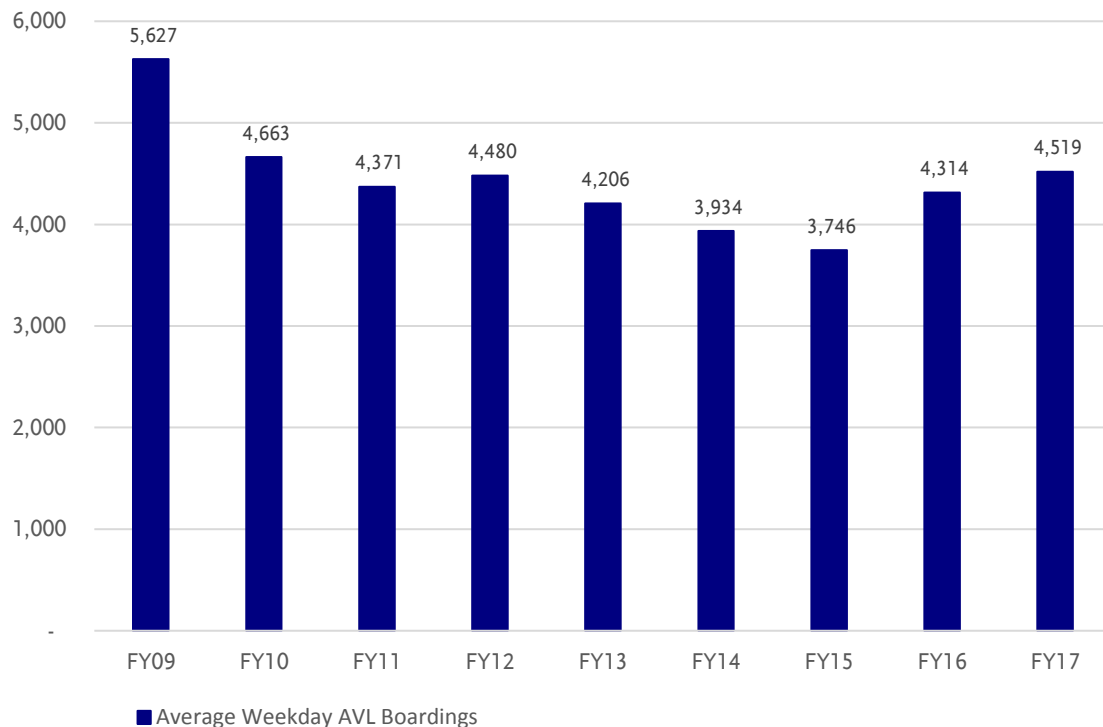
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6 MARKET ASSESSMENT

6.1 CURRENT RIDERSHIP AND HISTORICAL TRENDS

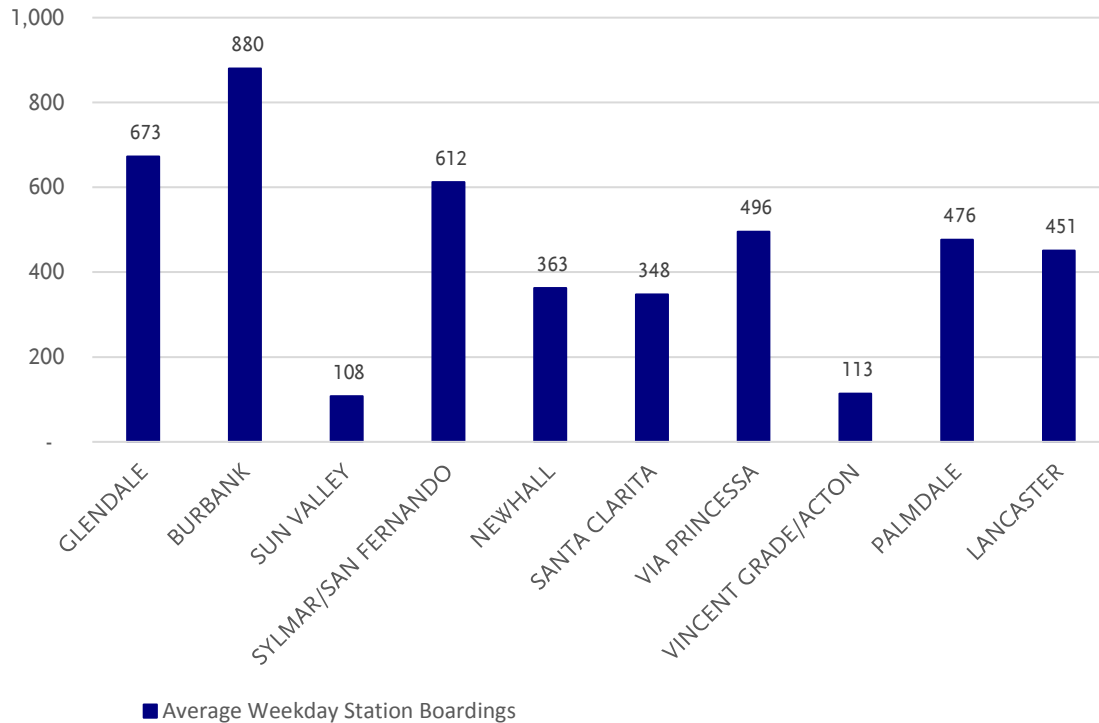
Currently, the AVL has an estimated average ridership of 5,800 daily passengers during weekdays, 2,600 passengers on Saturdays, and 2,300 passengers on Sundays, making the line the third busiest in the Metrolink system during weekdays, and the second busiest during the weekends (SCRRA, 2018). Average ridership on the AVL has been in an upward trend in recent years with a proposed annual ridership for FY19 of over 1,800,000. (SCRRA, 2018b) The recent ridership growth on the line was demarcated by the July 2015 fare reduction program, which has resulted in a 26.5% increase since FY 2015 (SCRRA, 2018c). Figure 6-1 illustrates the average weekday ridership on the AVL for fiscal years 2009 through 2017. Figure 6-2 presents AVL stations' boardings in FY 2017, with Burbank – Downtown, Glendale, and Sylmar/San Fernando having the highest average boardings. A detailed discussion of what stations AVL Study riders travel to within the Metrolink system is found in Section 6.3.2.

Figure 6-1: AVL Average Weekday Boardings (FY09 to FY17)



Note: Average weekday boardings were calculated from ticket sales data provided by SCRRA for AVL stations. These average weekday ridership estimates can vary when compared to estimates based on annual trip factors, which factor other tickets valid on working days, among other factors.

Figure 6-2: AVL Stations Average Weekday Boardings (FY17)



6.2 MARKET ASSESSMENT OBJECTIVES

This market assessment of the AVL helps to understand where residents within the Project Area (See Figures Figure 1-3 and Figure 1-4) commute and travel, to better define the ridership needs and trends that aid the most useful prioritization of projects to enhance operation along the AVL.

The following objectives for the market assessment have been identified:

- Define current AVL ridership levels and patterns
- Identify the relative size and characteristics of several discrete travel markets within the Project Area
- Identify unique or specific travel markets within and around the Project Area that potentially could be served by Metrolink
- Provide a basis for analyzing the effects on travel markets, Metrolink market shares and Metrolink ridership of potential commuter or transit service changes, upgrades, and enhancements
- Trip-making between markets beyond Union Station possibly served by interlining Metrolink lines

The market data obtained in this assessment will be used to assist in the development, refinement, and evaluation of various future service scenarios, and the infrastructure needed to achieve them.

6.3 TRAVEL MARKETS IN THE ANTELOPE VALLEY LINE CORRIDOR

The assessment of the travel markets provides information to form general travel pattern trends, the needs of potential riders in the short-and-long terms, reverse commute opportunities, and unique markets that can benefit from the service in the AVL Study Project Area.

6.3.1 Data Sources

Different data sets were obtained and analyzed to describe travel patterns within the region, and identify where residents within the AVL Study Project Area commute and travel. The data sets consist of the following:

1. **Station-to-Station:** This process analyzed trips of Metrolink riders between Metrolink stations by categorizing stations into geographic groups, and looking at the boardings between these groups. SCRRA provided the station-to-station data in the form of total linked weekday trips in FY17. This station-to-station analysis focuses on the interactions of AVL Study stations (split into three groups), with other groupings of stations organized by geographical location to identify ridership markets (SCRRA, 2017).
2. **Origin-Destination:** The origin-destination (OD) analysis utilizes data of personal trips taken for all purposes, and using different types of transportation modes, which include auto, commuter rail, urban rail, local bus, express bus, or BRT. The OD data was produced with the SCAG 2012 Model, and collected for the 52 Metrolink home-catchment-areas (see Figure 1-2). The catchment-areas were defined by SCRRA as areas capturing 95% of riders by each station. This section illustrates where trips starting in the AVL Study Project Area end in other Metrolink catchment-areas. It documents key travel patterns of trips taken for all purposes and by different transportation modes (SCAG, 2017).
3. **Work-trip Analysis:** Utilizing the Census Bureau's web-based mapping tool OnTheMap, the work-trips analysis shows where residents of the AVL Study Project Area are employed. This information indicates where residents commute too, but it does not tell us how residents travel to their places of employment. This analysis provides information to help identify regional commuting travel patterns of AVL Study Project Area residents, and to define ridership needs of the areas in and around the Project Area (U.S. Census Bureau, 2018).
4. **Top Employers Analysis:** With the use of a geographical information system (GIS), the major employers (more than 200 employees) within each AVL Study catchment-area were identified and ranked according to their number of employees. The list of employers used in this analysis was taken from Air Quality Management District (AQMD) databases

provided by the South Coast and Antelope Valley² districts. The analysis of top employers helped identify unique or special travel markets

6.3.2 Station-to-Station Ridership Analysis

The station-to-station ridership analysis between Metrolink stations was conducted to provide information on the travel patterns of current users within the commuter rail system. The information utilized in this analysis was data in the form of origin and destination total linked weekday trips between Metrolink stations providing service in fiscal year 2017. This analysis examines travel patterns by combining numerous stations into groups and by looking at boardings between these groups.

The focus of this analysis is in the interactions of the AVL Study stations, with other groups of stations organized by geographical locations consistent with other Metrolink lines. The AVL stations were split into three groups to differentiate the line's travel markets. Table 6-1 details the groupings used for this station-to-station analysis.

² At the time this draft report was written, a request to the Antelope Valley AQMD for employers' information was pending. To complete the Top Employment Analysis, employment information for the Palmdale and Lancaster areas was obtained from the Greater Antelope Valley Economic Alliance website. Once the Antelope Valley AQMD information is available, the Greater Antelope Valley Economic Alliance data will be validated.

Table 6-1: Station-to-Station Groups

| Station Group | Stations |
|----------------------------|--|
| AVL Study Group A* | Sun Valley, Sylmar/San Fernando |
| AVL Study Group B | Newhall, Santa Clarita, Via Princessa/Vista Canyon |
| AVL Study Group C | Vincent Grade/Acton, Palmdale, Lancaster |
| Glendale-Burbank | Glendale, Burbank – Downtown |
| Near Southeast | LAUS, Commerce, Norwalk/Santa Fe Springs, Buena Park, Fullerton |
| Ventura Line | Burbank Airport – South, Van Nuys, Northridge, Chatsworth, Simi Valley, Moorpark, Camarillo, Oxnard, Ventura – East |
| San Bernardino Line | Cal State LA, El Monte, Baldwin Park, Covina, Pomona – North, Claremont, Montclair, Upland, Rancho Cucamonga, Fontana, Rialto, San Bernardino Depot |
| Riverside Line | Montebello/Commerce, Industry, Pomona – Downtown, Ontario – East, Jurupa Valley/Pedley |
| 91/Perris Valley Line | Anaheim Canyon, Corona – West, Corona – North Main, Riverside – La Sierra, Riverside – Downtown, Riverside – Hunter Park/UCR, Moreno Valley/March Field, Perris – Downtown, Perris – South |
| Central Orange County Line | Anaheim, Orange, Santa Ana, Tustin, Irvine, Laguna Niguel/Mission Viejo |
| South Orange County Line | San Juan Capistrano, San Clemente, San Clemente Pier, Oceanside |

Note: * Revenue service began May 14, 2018 on the Burbank Airport North station, and the data provided for this analysis predates this date. For this reason, the Burbank Airport North station was not included in this station-to-station analysis.

The station groupings were developed to gain a sense of which direction AVL riders were traveling, and to understand the relationship to the overall Metrolink system by lines and stations. The following sections expand on trip patterns between the AVL stations groups and other Metrolink lines' regional geographic groups.

6.3.2.1 AVL Group A Linked Trips

An estimated 214,000 annual weekday trips originate from the AVL Group A stations (Sun Valley, and Sylmar/San Fernando), which represent approximately 16% of the total annual trip in the AVL. Approximately 27% of the riders from Group A travel to other stations in the AVL Study Project Area. Table 6-2 presents the number of trips by stations in Group A to the station groups in the Metrolink system.

The stations served by the AVL (not including LAUS) where the most trips from Group A stations end are: Palmdale, Newhall, Lancaster, Burbank – Downtown, and Glendale. Table 6-3 presents these top five AVL station destinations for Group A stations, and their corresponding estimated annual trips. The top five station destinations from Group A stations outside the AVL, are LAUS, Cal State LA, Fullerton, Norwalk/Santa Fe Springs, and Oceanside. These top five station destination account for 62% of all Group A stations trips, and their corresponding estimated trips are presented in Table 6-4.

Table 6-2: Group A Station's Linked Annual Weekday Trips to Other Metrolink Station Groups

| To Geographic Group | Number of Trips | Percent of Trips |
|----------------------------|-----------------|------------------|
| Stations in Groups B and C | 57,400 | 27% |
| Glendale-Burbank | 14,484 | 7% |
| Near Southeast | 129,077 | 60% |
| Ventura Line | 1,082 | 1% |
| San Bernardino Line | 6,018 | 3% |
| Riverside Line | 224 | 0% |
| 91/Perris Valley Line | 603 | 0% |
| Central Orange County Line | 3,840 | 2% |
| South Orange County Line | 1,318 | 1% |
| Total Annual Trips | 214,046 | 100% |

Table 6-3: Top Five AVL Destination Stations from Group A Stations

| Rank | AVL Station Destination | Number of Annual Trips |
|------|-------------------------|------------------------|
| 1 | Palmdale | 19,004 |
| 2 | Newhall | 14,976 |
| 3 | Lancaster | 12,603 |
| 4 | Burbank | 6,718 |
| 5 | Glendale | 7,766 |

Table 6-4: Top Five Metrolink Destination Stations from Group A Stations

| Rank | Metrolink Station Destination | Number of Trips |
|------|-------------------------------|-----------------|
| 1 | LAUS | 125,485 |
| 2 | Cal State LA | 3,512 |
| 3 | Fullerton | 2,022 |
| 4 | Norwalk/Santa Fe Springs | 1,172 |
| 5 | Oceanside | 1,172 |

The top destinations for trips starting at stations in Group A (Sun Valley, and Sylmar/San Fernando) are concentrated in the Near Southeast geographic area, and other AVL stations, with LAUS accounting for almost 60% of all trip destinations. Other than AVL stations, Orange County Line's stations serve a significant number of trips starting at AVL Group A stations. Interlining service between the AVL and the Orange County Line can serve these trips, and eliminate the need to switch lines at LAUS. An exception is the Cal State LA station (served by the San Bernardino Line), which is second to LAUS Station on the number of annual trips

received from the AVL Group A Stations. All other geographical areas account for zero to three percent of the total annual trips starting at the AVL Group A stations.

AVL Study Group A Reverse Commute

The station-to-station analysis for the Sun Valley and Sylmar/San Fernando Group A stations, indicates that Metrolink riders boarding at these stations have their destination at LAUS or another AVL station. Similarly, a reverse commute station-to-station analysis for these Group A stations, show that users that end their trips at a Group A station, usually start their trip at LAUS or a station served by the AVL. The stations where the most riders that end their trips at a Group A station are Union Station, Palmdale, Lancaster, Newhall, and Via Princessa. From the estimated 167,000 trips that end at a Group A station, these stations represent about 80 percent of these total trips. Table 6-5 presents the top 10 Metrolink station where the most trips end at the Group A stations.

Table 6-5: Top Ten Metrolink Origin Stations from Group A Stations

| Rank | Metrolink Station Origin | Number of Trips |
|------|--------------------------|-----------------|
| 1 | Union Station | 43,540 |
| 2 | Palmdale | 38,950 |
| 3 | Lancaster | 28,830 |
| 4 | Newhall | 12,550 |
| 5 | Via Princessa | 9,570 |
| 6 | Vincent Grade/Acton | 7,550 |
| 7 | Santa Clarita | 4,010 |
| 8 | Burbank Downtown | 2,100 |
| 9 | Glendale | 1,790 |
| 10 | Upland | 1,750 |

6.3.2.2 AVL Group B Linked Trips

An estimated 455,000 annual trips originate at Group B stations: Newhall, Santa Clarita, and Via Princessa. Approximately 12% of these riders travel to other stations inside the AVL Study Project Area stations. Table 6-6 presents the number of trips by Group B station to the rest of station groups in the Metrolink system.

The stations served by the AVL (excluding LAUS) where the most trips from Group B stations end are: Glendale, Sylmar/San Fernando, Palmdale, Sun Valley, and Lancaster. Table 6-7 presents these top five AVL station destinations from Group B stations. The top five destinations stations outside the AVL service area are LAUS, Tustin, Santa Ana, Burbank Airport – South, and Norwalk/Santa Fe Springs. These top five station destinations account for 61% of all Group B stations annual trips, and are summarized Table 6-8.

Table 6-6: Group B Station's Linked Annual Weekday Trips to Other Metrolink Station Groups

| To Geographic Group | Number of Trips | Percent of Trips |
|----------------------------|-----------------|------------------|
| Stations in Groups A and C | 52,606 | 12% |
| Glendale-Burbank | 113,279 | 25% |
| Near Southeast | 270,041 | 59% |
| Ventura Line | 3,456 | 1% |
| San Bernardino Line | 3,658 | 1% |
| Riverside Line | 136 | 0% |
| 91/ Perris Valley Line | 823 | 0% |
| Central Orange County Line | 9,198 | 2% |
| South Orange County Line | 1,400 | 0% |
| Total Annual Trips | 454,597 | 100% |

Table 6-7: Top Five Metrolink Destination Stations from Group B Stations

| Rank | AVL Station Destination | Number of Annual Trips |
|------|-------------------------|------------------------|
| 1 | Glendale | 40,511 |
| 2 | Sylmar/San Fernando | 21,573 |
| 3 | Palmdale | 9,721 |
| 4 | Sun Valley | 7,653 |
| 5 | Lancaster | 5,652 |

Table 6-8: Top Five Metrolink Destination Stations from Group B Stations

| Rank | Metrolink Station Destination | Number of Trips |
|------|-------------------------------|-----------------|
| 1 | LAUS | 266,061 |
| 2 | Tustin | 3,012 |
| 3 | Santa Ana | 2,388 |
| 4 | Burbank Airport – South | 2,184 |
| 5 | Norwalk/Santa Fe Springs | 1,580 |

Many of trips starting at Group B stations (Newhall, Santa Clarita, and Via Princessa/Vista Canyon) have destinations in a station in the Near Southeast geographic area, and other AVL stations, with LAUS accounting for 59% of all annual trip destinations. Stations served by the Orange County Line represent a significant number of destinations for trips initiated at Group B stations. Interlining service between the AVL and the Orange County Line can serve these trips, and eliminate the need to switch lines at LAUS. Stations that receive relatively significant amounts of trips from AVL Group B, not served by the Orange County Line, are the Burbank Airport – South, and the Cal State LA stations, served by the Ventura and San Bernardino lines

respectively. All other geographical areas account for zero to one percent of the total annual trips that start at a Group B stations.

AVL Study Group B Reverse Commute

The station-to-station reverse commute analysis of Metrolink riders traveling to a Group B station (Newhall, Santa Clarita, or Via Princessa), shows that the great majority of these riders start their trip at a station served by the AVL, including LAUS. The Metrolink stations where the most riders that end their trips at an AVL Study Group B station are LAUS, Palmdale, Burbank Downtown, Lancaster, and Glendale. From the estimated 135,000 trips that end at a Group C station, these five stations represent about 66 percent of these total trips. Table 6-9 presents the top 10 Metrolink station where the most trips end at the Group B stations.

Table 6-9: Top Ten Metrolink Origin Stations from Group B Stations

| Rank | Metrolink Station Origin | Number of Trips |
|------|--------------------------|-----------------|
| 1 | LAUS | 68,680 |
| 2 | Palmdale | 15,550 |
| 3 | Burbank Downtown | 13,130 |
| 4 | Lancaster | 12,720 |
| 5 | Glendale | 7,090 |
| 6 | Sun Valley | 3,360 |
| 7 | Vincent Grade/Acton | 3,120 |
| 8 | Irvine | 1,160 |
| 9 | Anaheim | 710 |
| 10 | Tustin | 590 |

6.3.2.3 AVL Group C Linked Trips

Group C stations had an estimated 370,000 annual trips originate from its stations: Vincent Grade/Acton, Palmdale, and Lancaster. Approximately 36% of these riders travel to other stations inside the AVL Study Project Area. Table 6-10 presents the number of trips by Group C station to the rest of station groups by Metrolink lines.

The stations served by the AVL (not including LAUS) where the most trips from Group C stations end are: Sylmar/San Fernando, Burbank – Downtown, Santa Clarita, Glendale, and Newhall. Table 6-12 presents these top five AVL station destinations. The top five station destinations outside the AVL service area are LAUS, Irvine, Tustin, Northridge, and Fullerton. These top five Metrolink station destinations account for 45% of all Group D trips. These top five Metrolink station destinations account for 61% of all Group B stations annual trips, and are summarized Table 6-12.

Table 6-10: Group C Station's Linked Annual Weekday Trips to Other Metrolink Station Groups

| To Geographic Group | Number of Trips | Percent of Trips |
|----------------------------|-----------------|------------------|
| Stations in Groups A and B | 132,953 | 36% |
| Glendale-Burbank | 54,153 | 15% |
| Near Southeast | 162,067 | 44% |
| Ventura Line | 4,676 | 1% |
| San Bernardino Line | 7,362 | 2% |
| Riverside Line | 372 | 0% |
| 91/ Perris Valley Line | 2,661 | 1% |
| Central Orange County Line | 3,278 | 1% |
| South Orange County Line | 1,130 | 0% |
| Total Annual Trips | 368,652 | 100% |

Table 6-11: Top Five Metrolink Destination Stations from Group C Stations

| Rank | AVL Station Destination | Number of Trips |
|------|-------------------------|-----------------|
| 1 | Sylmar/San Fernando | 60,195 |
| 2 | Burbank | 29,861 |
| 3 | Santa Clarita | 25,718 |
| 4 | Glendale | 24,292 |
| 5 | Newhall | 18,081 |

Table 6-12: Top Five Metrolink Destination Stations from Group C Stations

| Rank | Metrolink Station Destination | Number of Trips |
|------|-------------------------------|-----------------|
| 1 | LAUS | 159,175 |
| 2 | Cal State LA | 2,392 |
| 3 | Burbank Airport – South | 1,764 |
| 4 | San Bernardino Depot | 1,632 |
| 5 | Fullerton | 1,490 |

The top destinations for trips starting at stations in Group C (Vincent Grade/Acton, Palmdale, and Lancaster) are concentrated in the Near Southeast geographical area, and other AVL stations, with LAUS representing 43% of all trip destinations. Other significant destinations for Group C, include the Burbank Airport – South, Cal State LA, San Bernardino Depot, and Fullerton stations. The San Bernardino Depot is of interest, since it represents an important destination only for this group, and not for the other AVL Study station groups. Unlike the other groups, stations serve by the Orange County Line do not capture a significant amount of destinations for Group C, when compared to other lines. The geographic groups of Ventura

Line, San Bernardino Line, 91/Perris Valley Line, and Central Orange County Line capture a similar number of trips.

AVL Study Group C Reverse Commute

The station-to-station analysis for Group C stations shows that Metrolink riders boarding at these stations (Vincent Grade/Acton, Palmdale, and Lancaster), mainly end their trips at another AVL station or LAUS. Similarly, an additional station-to-station reverse commute analysis of Metrolink riders, shows that users that end their trips at a Group C station, usually start their trip at a station served by the AVL, including LAUS. The stations where the most riders that end their trips at an AVL Study Group C station are LAUS, Sylmar/San Fernando, Downtown Burbank, Newhall, and Santa Clarita. From the estimated 172,000 trips that end at a Group C station, these five stations represent about 81 percent of these total reverse trips. Table 6-13 presents the top 10 Metrolink station where the most trips end at the Group C stations.

Table 6-13: Top Ten Metrolink Origin Stations from Group C Stations

| Rank | Metrolink Station Origin | Number of Trips |
|------|--------------------------|-----------------|
| 1 | LAUS | 88,510 |
| 2 | Sylmar/San Fernando | 28,750 |
| 3 | Downtown Burbank | 9,110 |
| 4 | Newhall | 7,050 |
| 5 | Santa Clarita | 6,470 |
| 6 | Glendale | 6,460 |
| 7 | Sun Valley | 5,950 |
| 8 | Via Princessa | 5,040 |
| 9 | San Bernardino Deport | 1,610 |
| 10 | Downtown Riverside | 940 |

6.3.3 Origin-Destination Analysis

The Origin-Destination (OD) analysis involves the use of modeled data from the SCAG Travel Demand model, of daily trips made for all purposes by different types of transportation modes, which include auto, commuter rail, urban rail, local bus, express bus, or BRT. The OD data was curated for the 52 Metrolink system's home catchment-areas (see Section 1.1.3), defined by SCRRA as areas capturing 95% of riders by each station. This section illustrates travels patterns of trips starting at the AVL catchment-areas and ending within catchment-areas served by Metrolink service. The AVL eight catchment-areas combined create the Project Area, which is described in Section 1.1.3, and displayed in Figure 1-4.

The daily trips starting inside the eight AVL Study catchment-areas (the Project Area) are estimated by the SCAG model to be 2.5 million, and to account for 8% of the estimated 32 million daily all-purpose trips generated inside the 52 Metrolink catchment-areas. From these

2.5 million daily trips, 1.7 million are estimated to start and end within the Study Area. Table 6-14 presents the estimated daily trips to and from the eight AVL Study catchment-areas.

Table 6-14: Estimates O-D Daily Trips within AVL Study Catchment-areas – All Purpose Trips, All Modes

| Project Area Catchment-Area | Lancaster | Palmdale | Sylmar/ San Fernando | New Hall | Via Princessa | Sun Valley | Santa Clarita | Vincent Grade/Acton |
|-----------------------------|-----------|----------|----------------------|----------|---------------|------------|---------------|---------------------|
| Lancaster | 323,590 | 48,310 | 1,610 | 3,260 | 1,240 | 470 | 2,230 | 2,360 |
| Palmdale | 73,590 | 284,220 | 2,910 | 5,460 | 2,640 | 830 | 3,260 | 11,620 |
| Sylmar/San Fernando | 770 | 830 | 234,400 | 24,250 | 7,630 | 24,240 | 9,410 | 320 |
| New Hall | 880 | 860 | 15,130 | 136,560 | 13,000 | 3,020 | 37,220 | 330 |
| Via Princessa | 1,560 | 1,880 | 12,000 | 41,660 | 71,550 | 2,630 | 17,850 | 890 |
| Sun Valley | 200 | 210 | 20,930 | 6,020 | 1,970 | 45,880 | 2,590 | 80 |
| Santa Clarita | 800 | 750 | 6,470 | 45,310 | 8,810 | 1,480 | 70,010 | 240 |
| Vincent Grade/ Acton | 9,710 | 22,410 | 1,090 | 1,900 | 1,180 | 310 | 1,090 | 24,440 |

Source: SCAG Travel Demand Model Analysis

From all the daily trips originated in the three most northern catchment-areas of the AVL (Lancaster, Palmdale, and Vincent Grande/Acton), 75 to 95 percent of trips start and end in the same catchment-area. This indicates that a majority of all-purpose trips taken in the Lancaster-Palmdale area don't leave this geography. From those daily trips that leave the area, they tend to travel to other Metrolink catchment-areas like Union Station, Van Nuys, Northridge, Santa Clarita and New Hall. In comparison, 31 and 47 percent of trips start and end in the same catchment-area for the Sun Valley and Sylmar catchment-area, the two most southern AVL Study catchment-areas. Trips from these two catchment-areas tend to be taken to catchment-areas to the south or east. The New Hall, Via Princessa, and Santa Clarita catchment-area capture between 68 and 76 percent of the trips that generate within their catchment-area borders. Trips from these three catchment-areas tend to be taken to Metrolink catchment-areas to the south, along the AVL, and east to catchment-areas like Northridge and Chatsworth.

From all trips generated in the AVL Study Project Area, the most common destinations are the Lancaster and Palmdale catchment-areas accounting for 17% and 14% respectively, followed by the Sylmar/San Fernando catchment-area that accounts for 11%. The Newhall and Van Nuys catchment-areas complete the top five destination catchment-areas served by Metrolink, with 11% and 7% respectively, of the trips originated inside the Project Area.

These top five catchment-areas combined serve as destinations for 61% of all trips generated in the Project Area, regardless of transportation mode. Given that more than half of all-purpose trips in the Project Area have their destination in these top five catchment-areas, improvements to the service at these stations offer an opportunity to provide enhanced service to a greater number of trip destinations. Table 6-15 presents the Project Area catchment-areas and the top-five Metrolink destinations catchments-areas.

Table 6-15: Top 5 Catchment-areas Destinations – All Purpose Trips, All Modes

| Project Area Catchment-Areas | Top 5 Catchment-areas Destinations | | | | |
|------------------------------|------------------------------------|----------|---------------------|----------|----------|
| | Lancaster | Palmdale | Sylmar/San Fernando | New Hall | Van Nuys |
| Lancaster | 323,600 | 48,310 | 1,610 | 3,260 | 2,440 |
| Newhall | 880 | 860 | 15,130 | 136,560 | 16,260 |
| Palmdale | 73,590 | 284,220 | 2,910 | 5,460 | 4,400 |
| Via Princessa/Vista Canyon | 1,560 | 1,880 | 12,000 | 41,660 | 13,950 |
| Santa Clarita | 800 | 750 | 6,470 | 45,310 | 7,780 |
| Sun Valley | 200 | 210 | 20,930 | 6,020 | 42,490 |
| Sylmar/San Fernando | 770 | 830 | 234,400 | 24,250 | 94,150 |
| Vincent Grade/Acton | 9,710 | 22,410 | 1,090 | 1,900 | 1,710 |

Source: SCAG Travel Demand Model Analysis

6.3.4 Work-Trip Analysis

For the work-trip analysis, the Census Bureau’s web-based mapping tool, *OnTheMap*, was utilized to determine where employees of the eight AVL Study catchment-areas work. The census data represents all jobs estimates of where residents of the AVL Study catchment areas were employed in 2015 (the latest available complete dataset). The work-trip patterns are examined to identify the major destinations of employment of people who can use the AVL service through its stations. This work-trip information also helps in the understanding of regional commuting patterns, which are essential for the development of service options to better provide for current and anticipated ridership needs. This information represents the number of employees and the location of their jobs, not the transportation mode used to commute. The boundaries of the eight AVL Study catchment-areas were utilized as inputs for the tool, *OnTheMap*. The eight AVL catchment-areas were defined in Section 1.1.3, and are displayed in Figure 1-3.

6.3.4.1 Lancaster

In 2015, the Lancaster catchment-area had an estimated 50,000 employees, of which 58% work in the following five cities: Lancaster, Los Angeles, Palmdale, Santa Clarita, and Quartz Hill. The remaining 42% of employees travel to a different city or place in Southern California, or elsewhere. Table 6-16 summarizes the job counts estimates and percent share of the cities capturing the most work from the Lancaster catchment-area.

Table 6-16: Lancaster Catchment-Area Top Five Employment Destinations

| City | Job Count | Percent Share |
|-----------------|-----------|---------------|
| Lancaster, CA | 13,372 | 26.8% |
| Los Angeles, CA | 8,606 | 17.3% |
| Palmdale, CA | 4,998 | 10.0% |

| | | |
|------------------------|---------------|---------------|
| Santa Clarita, CA | 1471 | 3.0% |
| Quartz Hill CDP, CA | 623 | 1.2% |
| All Other Locations | 20,781 | 41.7% |
| Total Employees | 49,851 | 100.0% |

Source: US Census Bureau. 2018. Census Longitudinal Employer-Household Dynamics. OnTheMap Application. 2015 dataset.

6.3.4.2 Palmdale

The Palmdale catchment-area had an estimated 53,000 employees, of which 56% work in the cities of Los Angeles, Palmdale, Lancaster, Santa Clarita, and Burbank. The remaining 44% of employees travel to a different city or place in Southern California, or elsewhere, for work. Table 6-17 summarizes the job counts estimates and percent share of the cities capturing the most work from the Palmdale catchment-area.

Table 6-17: Palmdale Catchment-Area Top Five Employment Destinations

| City | Job Count | Percent Share |
|------------------------|---------------|---------------|
| Los Angeles, CA | 12,216 | 23.2% |
| Palmdale, CA | 7,180 | 13.6% |
| Lancaster, CA | 6,409 | 12.2% |
| Santa Clarita, CA | 2533 | 4.8% |
| Burbank, CA | 953 | 1.8% |
| All Other Locations | 23,391 | 44.4% |
| Total Employees | 52,682 | 100.0% |

Source: US Census Bureau. 2018. Census Longitudinal Employer-Household Dynamics. OnTheMap Application. 2015 dataset.

6.3.4.3 Vincent Grade/Acton

In 2015, the Vincent Grade/Acton catchment-area had an estimated 15,000 employees, of which 46% work in the following five cities: Los Angeles, Lancaster, Palmdale, Santa Clarita, and Burbank. The remaining 54% of employees travel to a different city or place in Southern California, or elsewhere for work. Table 6-18 summarizes the job counts estimates and percent share of the cities capturing the most work from the Vincent Grade/Acton catchment-area.

Table 6-18: Vincent Grade/Acton Catchment-Area Top Five Employment Destinations

| City | Job Count | Percent Share |
|---------------------|-----------|---------------|
| Los Angeles, CA | 3,735 | 25.1% |
| Lancaster, CA | 1,075 | 7.2% |
| Palmdale, CA | 919 | 6.2% |
| Santa Clarita, CA | 710 | 4.8% |
| Burbank, CA | 473 | 3.2% |
| All Other Locations | 7,946 | 53.5% |
| Total Employees | 14,858 | 100.0% |

Source: US Census Bureau. 2018. Census Longitudinal Employer-Household Dynamics. OnTheMap Application. 2015 dataset.

6.3.4.4 Via Princessa/Vista Canyon

The Via Princessa/Vista Canyon catchment-area had an estimated 38,000 employees, of which 62% work in the following five cities: Los Angeles, Santa Clarita, Burbank, Glendale, and Pasadena. The remaining 38% of employees travel to a different city or place in Southern California, or elsewhere for work. Table 6-19 summarizes the job counts estimates and percent share of the cities capturing the most work from the Via Princessa/Vista Canyon catchment-area.

Table 6-19: Via Princessa/Vista Canyon Catchment-Area Top Five Employment Destinations

| City | Job Count | Percent Share |
|---------------------|-----------|---------------|
| Los Angeles, CA | 12,825 | 33.4% |
| Santa Clarita, CA | 7,870 | 20.5% |
| Burbank, CA | 1,870 | 4.9% |
| Glendale, CA | 602 | 1.6% |
| Pasadena, CA | 538 | 1.4% |
| All Other Locations | 14,658 | 38.2% |
| Total Employees | 38,363 | 100.0% |

Source: US Census Bureau. 2018. Census Longitudinal Employer-Household Dynamics. OnTheMap Application. 2015 dataset.

6.3.4.5 Santa Clarita

The Santa Clarita catchment-area had an estimated 29,000 employees, of which 60% work in the cities of Los Angeles, Santa Clarita, Burbank, Glendale, and Pasadena. The remaining 40% of employees travel to a different city or for work. Table 6-20 summarizes the job counts estimates and percent share of the cities capturing the most work from the Santa Clarita catchment-area.

Table 6-20: Santa Clarita Catchment-Area Top Five Employment Destinations

| City | Job Count | Percent Share |
|---------------------|-----------|---------------|
| Los Angeles, CA | 8,820 | 30.2% |
| Santa Clarita, CA | 6,603 | 22.6% |
| Burbank, CA | 1,437 | 4.9% |
| Glendale, CA | 470 | 1.6% |
| Pasadena, CA | 444 | 1.5% |
| All Other Locations | 11,466 | 39.2% |
| Total Employees | 29,240 | 100.0% |

Source: US Census Bureau. 2018. Census Longitudinal Employer-Household Dynamics. OnTheMap Application. 2015 dataset.

6.3.4.6 Newhall

The Newhall catchment-area had an estimated 44,000 employees, of which 60% work in the following five cities: Los Angeles, Santa Clarita, Burbank, Glendale, and Pasadena. The remaining 40% of employees travel to a different city or place in Southern California, or elsewhere for work. Table 6-21 summarizes the job counts estimates and percent share of the cities capturing the most work from the Newhall catchment-area.

Table 6-21: Newhall Catchment-Area Top Five Employment Destinations

| City | Job Count | Percent Share |
|---------------------|-----------|---------------|
| Los Angeles, CA | 14,055 | 32.2% |
| Santa Clarita, CA | 8,611 | 19.7% |
| Burbank, CA | 2,340 | 5.4% |
| Glendale, CA | 696 | 1.6% |
| Pasadena, CA | 687 | 1.6% |
| All Other Locations | 17,323 | 39.6% |
| Total Employees | 43,712 | 100.0% |

Source: US Census Bureau. 2018. Census Longitudinal Employer-Household Dynamics. OnTheMap Application. 2015 dataset.

6.3.4.7 Sylmar/San Fernando

In 2015, the Sylmar/San Fernando catchment-area had an estimated 105,000 employees, of which 69% work in the cities of Los Angeles, Burbank, Santa Clarita, Glendale, and San Fernando. The remaining 31% of employees travel to a different city or place for work. Table

6-22 summarizes the job counts estimates and percent share of the cities capturing the most work from the Sylmar/San Fernando catchment-area.

Table 6-22: Sylmar/San Fernando Catchment-Area Top Five Employment Destinations

| City | Job Count | Percent Share |
|---------------------|-----------|---------------|
| Los Angeles, CA | 59,182 | 56.4% |
| Burbank, CA | 5,492 | 5.2% |
| Santa Clarita, CA | 3,904 | 3.7% |
| Glendale, CA | 2,198 | 2.1% |
| San Fernando, CA | 2,123 | 2.0% |
| All Other Locations | 31,947 | 30.5% |
| Total Employees | 104,846 | 100.0% |

Source: US Census Bureau. 2018. Census Longitudinal Employer-Household Dynamics. OnTheMap Application. 2015 dataset.

6.3.4.8 Sun Valley

The Sun Valley catchment-area had an estimated 44,000 employees, of which 72% work in the following five cities: Los Angeles, Burbank, Glendale, Pasadena, and Santa Clarita. The remaining 28% of employees travel to a different city or place in Southern California, or elsewhere for work. Table 6-23 summarizes the job counts estimates and percent share of the cities capturing the most work from the Sun Valley catchment-area.

Table 6-23: Sun Valley Catchment-Area Top Five Employment Destinations

| City | Job Count | Percent Share |
|---------------------|-----------|---------------|
| Los Angeles, CA | 24,579 | 55.6% |
| Burbank, CA | 3,621 | 8.2% |
| Glendale, CA | 2,118 | 4.8% |
| Pasadena, CA | 788 | 1.8% |
| Santa Clarita, CA | 768 | 1.7% |
| All Other Locations | 12,338 | 27.9% |
| Total Employees | 44,212 | 100.0% |

Source: US Census Bureau. 2018. Census Longitudinal Employer-Household Dynamics. OnTheMap Application. 2015 dataset.

6.3.5 Top Employers Analysis

To determine the employers with the most significant number of employees in each AVL Study catchment-area, a GIS was utilized to analyze employee data collected by the South Coast and Antelope Valley AQMDs.³ This analysis helps to identify potential concentrations of employees which can benefit from an optimized commuting service along the AVL. To focus the analysis, major employers with more than 200 employees were included for this analysis. Note that this analysis does not present total number of jobs per catchment-area, but rather it identifies the number of jobs from employers with more than 200 employees. Also, the catchment-area boundaries vary greatly to the actual boundaries of the cities where the station is location, therefore the identifies number of employees does not represent the number of employees within a particular city.

Per the statistics provided by the AQMDs, 77 major employers were identified in the AVL Study Project Area. In the Project Area, these major employers provided approximately 68,000 jobs, which tend to be medical providers, educational institutions, and government agencies. For the Santa Clarita and Palmdale catchment-areas, top employers also include aerospace and aviation related businesses. Table 6-24 presents the number of major employers in each of the eight AVL Study catchment-areas, and Table 6-25 lists the largest employers in each catchment-area, and their estimated number employees.

Table 6-24: Employers Distribution Among AVL Study Catchment-Areas

| AVL Study Catchment Area | Approximate Number of Employer | Approximate Number of Employees |
|----------------------------|--------------------------------|---------------------------------|
| Sun Valley | 8 | 3,670 |
| Sylmar/San Fernando | 13 | 10,860 |
| Newhall | 13 | 12,360 |
| Santa Clarita | 7 | 3,570 |
| Via Princessa/Vista Canyon | 1 | 270 |
| Vincent Grade/Acton | 0 | 0 |
| Palmdale | 12 | 15,570 |
| Lancaster | 23 | 22,100 |

Source: South Coast Air Quality Management District. 2017; The Greater Antelope Valley Economic Alliance. 2018

³ At the time this draft report was written, a request to the Antelope Valley AQMD for employers' information was pending. To complete the Top Employment Analysis, employment information for the Palmdale and Lancaster areas was obtained from the Greater Antelope Valley Economic Alliance website. Once the Antelope Valley AQMD information is available, the Greater Antelope Valley Economic Alliance data will be validated.

Table 6-25: AVL Study Catchment-Areas Largest Employer

| AVL Study Catchment Area | Largest Employer | Approximate Number of Employees |
|----------------------------|--|---------------------------------|
| Sun Valley | LA Metro | 670 |
| Sylmar/San Fernando | Providence Holy Cross Medical Center | 2,390 |
| Newhall | Princess Cruises Six Flags Themes Parks Inc. | 2,270 |
| Santa Clarita | Wesco Aircraft | 260 |
| Via Princessa/Vista Canyon | Costco Wholesale Corporation #447 | 270 |
| Vincent Grade/Acton | - No Large Employer Identified | 0 |
| Palmdale | Northrop Grumman | 4,200 |
| Lancaster | County of Los Angeles | 4,140 |

Source: South Coast Air Quality Management District. 2017; The Greater Antelope Valley Economic Alliance. 2018

The following sections present an overview of the major employers within each AVL Study catchment-area.

6.3.5.1 Sun Valley

The Sun Valley catchment-area has 8 major employers, which provide approximately 3,670 jobs. The top large employers for this catchment-area are LA Metro, Pacific Hospital of the Valley, Woodbury University, Kaiser Foundation Health Plan Inc., and All Saints Health Care. The two closest identified major employers to the Sun Valley station are All Saints Health Care and Avibank Manufacturing Inc. at a distance of about 1.5 miles from the station. Table 6-26 presents all the major employers identified for the Sun Valley catchment-area.

Table 6-26: Sun Valley Catchment-Areas Top Major Employers

| Employer | Approximate Number of Employees |
|-------------------------------------|---------------------------------|
| La Metro | 670 |
| Pacifica Hospital of The Valley | 650 |
| Woodbury University | 540 |
| Kaiser Foundation Health Plan Inc. | 500 |
| All Saints Health Care | 460 |
| Avibank Manufacturing Inc. | 330 |
| The Home Depot Store #6613 | 280 |
| La City, Department of Gen Services | 240 |

Source: South Coast Air Quality Management District. 2017

6.3.5.2 Sylmar/San Fernando

The Sylmar/San Fernando catchment-area has 13 major employers, which provide approximately 10,860 jobs. The top large employers for this catchment-area are Providence Holy Cross Medical Center, L.A. County's Olive View/ UCLA Medical Center, St. Jude Medical, Los Angeles Mission College, and UPS. The two closest identified major employers to the Sylmar/San Fernando station are Providence Holy Cross Medical Center and Sierracin/Sylmar Corporation at a distance of about a mile from the station. Table 6-27 presents all the major employers identified for the Sylmar/San Fernando catchment-area.

Table 6-27: Sylmar/San Fernando Catchment-Ares Top Major Employers

| Employer | Approximate Number of Employees |
|--|---------------------------------|
| Providence Holy Cross Medical Center | 2,390 |
| L.A. County's Olive View/ UCLA Medical Center | 2,250 |
| St. Jude Medical | 1,250 |
| Los Angeles Mission College | 780 |
| UPS | 710 |
| Spears Manufacturing Co. | 630 |
| Anthony, Inc. | 540 |
| Sierracin/Sylmar Corporation | 500 |
| L.A. County, Barry J. Nidorf Probation | 430 |
| Esterline - Mason | 410 |
| Pharmavite Corporation | 390 |
| City of L.A.- Dept. Of General Services. L.A.P.D | 300 |
| Costco Wholesale Corp | 280 |

Source: South Coast Air Quality Management District. 2017

6.3.5.3 Newhall

The Newhall catchment-area has 13 major employers, which provide approximately 12,360 jobs. The top five large employers for this catchment-area are Six Flags Themes Parks Inc., Santa Clarita Community, College District, Princess Cruises, L.A. County, Sheriff's Department, and Us Postal Service, Santa Clarita Center. The two closest major employers to the Newhall station are The Master's College, Plant Operations Department and Henry Mayo Newhall Hospital at a distance of about 0.5 and 2 miles from the station respectively. Table 6-28 presents all the major employers identified for the Newhall catchment-area.

Table 6-28: Newhall Catchment-Area Top Major Employers

| Employer | Approximate Number of Employees |
|--|---------------------------------|
| Six Flags Themes Parks Inc. | 2,270 |
| Santa Clarita Community College District | 1,840 |
| Princess Cruises | 1,800 |
| L.A. County, Sheriff's Department | 1,350 |
| Us Postal Service, Santa Clarita Center | 1,040 |
| Henry Mayo Newhall Hospital | 970 |
| California Institute of The Arts | 710 |
| Quest Diagnostics Nichols Inst. | 600 |
| Wal-Mart #3523 | 510 |
| ITT Aerospace Controls | 370 |
| The Master's College | 310 |
| Wal-Mart #2297 | 300 |
| Pharmavite L.L.C | 290 |

Source: South Coast Air Quality Management District. 2017

6.3.5.4 Santa Clarita

The Santa Clarita catchment-area has 7 major employers, which provide approximately 3,570 jobs. The top five large employers for this catchment-area are Wesco Aircraft, D.C.F.S. Santa Clarita, Wal-Mart #5162, Aerospace Dynamics Int'l, and Advanced Bionics, L.L.C. The two closest major employers to the Santa Clarita station are Wesco Aircraft and Woodward HRT-Valencia at a distance of just over three miles from the station. Table 6-29 presents all the major employers identified for the Santa Clarita catchment-area.

Table 6-29: Santa Clarita Catchment-Area Top Major Employers

| Employer | Approximate Number of Employees |
|-----------------------------------|---------------------------------|
| Wesco Aircraft | 260 |
| D.C.F.S. Santa Clarita | 260 |
| Wal-Mart, #5162 | 420 |
| Aerospace Dynamics Int'l | 570 |
| Advanced Bionics, L.L.C. | 570 |
| Woodward HRT- Valencia | 680 |
| Boston Scientific Neuromodulation | 810 |

Source: South Coast Air Quality Management District. 2017

6.3.5.5 Via Princessa

The Via Princessa catchment-area has one major employers, which provide approximately 270 jobs. This large employer is the Costco Wholesale Store #447, and is located half a mile from the station (See Table 6-30).

Table 6-30: Via Princessa Catchment-Area Top Major Employers

| Employer | Approximate Number of Employees |
|-----------------------------------|---------------------------------|
| Costco Wholesale Corporation #447 | 270 |

Source: South Coast Air Quality Management District. 2017

6.3.5.6 Vincent Grande/Acton

Per the information by the South Coast AQMD (2017), and The Greater Antelope Valley Economic Alliance (2018), the Vincent Grande/Acton catchment-area has no employers with more than 200 employees (See Table 6-31).

Table 6-31: Vincent Grande/Acton Catchment-Area Top Major Employers

| Employer | Approximate Number of Employees |
|--------------------------------|---------------------------------|
| - No Large Employer Identified | 0 |

Source: South Coast Air Quality Management District. 2017; The Greater Antelope Valley Economic Alliance. 2018.

6.3.5.7 Palmdale

Twelve major employers were identified for the Palmdale catchment-area has, which provide approximately 15,670 jobs. The top five large employers for this catchment-area are Northrop Grumman, Lockheed Martin, Antelope Valley Mall, Palmdale School District, and Wal-Mart (3 Stores combined). The two closest major employers to the Palmdale station are the Palmdale School District, and Lockheed Martin at a distance of about 0.5 and 1.5 miles from the station respectively. Table 6-32 presents all the major employers identified for the Palmdale catchment-area.

Table 6-32: Palmdale Catchment-Ares Top Major Employers

| Employer | Approximate Number of Employees |
|----------------------------------|---------------------------------|
| Northrop Grumman | 4,200 |
| Lockheed Martin | 3,700 |
| Antelope Valley Mall | 1,800 |
| Palmdale School District | 1,790 |
| Wal-Mart (3 Stores) | 1,150 |
| Palmdale Regional Medical Center | 1,100 |
| Westside School District | 590 |
| Home Depot (2 Stores) | 280 |
| Kinkisharyo International, L.L.C | 260 |
| Target (2 Stores) | 230 |
| Vallarta (3 Stores) | 360 |
| Waste Management | 210 |

Source: The Greater Antelope Valley Economic Alliance. 2018.

6.3.5.8 Lancaster

The Lancaster catchment-area has 23 major employers, which provide approximately 22,120 jobs. The top five large employers for this catchment-area are County of Los Angeles, Antelope Valley Hospital Medical Center, Antelope Valley Union High School District, Lancaster School District, and the California State Prison in L.A. County. The two closest major employers to the Lancaster station are the Lancaster School District and the Antelope Valley Union High School District with a distance of about less than half a mile from the station. Table 6-33 presents all the major employers identified for the Lancaster catchment-area.

Table 6-33: Lancaster Catchment-Ares Top Major Employers

| Employer | Approximate Number of Employees |
|--|---------------------------------|
| County of Los Angeles | 4,140 |
| Antelope Valley Hospital Medical Center | 2,600 |
| Antelope Valley Union High School District | 2,500 |
| Lancaster School District | 2,200 |
| CA State Prison, L.A. County | 1,480 |
| Antelope Valley College | 1,120 |
| Kaiser Permanente | 1,000 |
| BYD | 800 |

| Employer | Approximate Number of Employees |
|------------------------------|---------------------------------|
| Wal-Mart (2 Stores) | 770 |
| Lancaster Auto Mall | 590 |
| High Desert Health Systems | 590 |
| Lance Campers | 580 |
| Rite Aid Distribution Center | 570 |
| Michaels Distribution Center | 550 |
| Granite Construction | 400 |
| High Desert Medical Group | 360 |
| City of Lancaster | 350 |
| Costco | 340 |
| Syigma | 270 |
| Southern CA, lifornia Edison | 240 |
| Deluxe Checks | 240 |
| AVTA | 220 |
| Morton Manufacturing | 210 |

Source: The Greater Antelope Valley Economic Alliance. 2018.

6.3.6 Market Analysis Takeaways

Ridership in the AVL has been increasing since the implementation of the 2015 fare reduction program. Metrolink anticipates this upward trend on ridership to continue on the line. Currently, the busiest stations along the AVL during weekdays are the Downtown Burbank, Glendale and Sylmar/San Fernando stations, whereas the Sun Valley and Vincent Grade/Acton stations have the lowest average boardings.

The station-to-station analysis of current Metrolink riders showed that 34 percent of weekday riders boarding at a Group A stations (Sun Valley, and Sylmar/San Fernando) travel to other station served by the AVL, and that 59 percent of Group A riders end their trips at LAUS. All other regional station groupings receive less than three percent of trips from these two stations. One station of interest for Group A is Cal State LA. This station alone receives two percent of the trips originate at a Group A stations, and it serves more than half of the trips that transfer to the San Bernardino Line from Group A. The station-to-station analysis also shows that Union Station is the most important destination for riders boarding in a station in Group B (Newhall, Santa Clarita, Via Princessa/Vista Canyon), and that one third of the estimated 455,000 annual trips ends at a station served by the AVL. In comparison to other geographical areas, the Orange County Line area received the most riders from Group B stations, with the Santa Ana, and Tustin station receiving the most weekday annual trips. The analysis also shows that Group C had an estimated 370,000 annual weekday trips originate from its stations: Vincent Grade/Acton, Palmdale, and Lancaster. Approximately 51 percent of these riders travel to other stations served by the AVL. Union Station captures 43 percent of riders starting their trips at a Group C station. Other significant destinations for Group C include the Burbank Airport South, Cal State LA, San Bernardino Depot, and Fullerton stations.

The San Bernardino Depot is of interest for Group C, since it represents an important destination only for this group of stations, and not for the other AVL Study station groups. Overall, the station-to-stations analysis shows that LAUS is the largest destinations for riders boarding at a station served by the AVL, and that there is a significant amount of intra-AVL line travel. It also showed that a significant number of AVL riders transfer to other Metrolink lines to reach their destination, in particular the stations of Northridge, Cal State LA, and Fullerton, among others served by the Orange County Line (Santa Ana, Tustin, and Irvine).

The origin-destination analysis of daily trips taken for all kinds of purposes, via different transportation modes, showed that trips starting in the eight AVL Study catchment-areas account for eight percent of all trips generated in the 52 Metrolink catchment-areas. These all-purpose trips tend to end within catchment-areas served by the AVL. The analysis also illustrated that from the approximately 2.5 million total daily all-purpose trips originated in the Project Area, the most common destinations are in the Lancaster and Lancaster catchment-areas, which account for 17 and 14 percent respectively. The Sylmar/San Fernando catchment-area accounts for 12 percent, and the Newhall and Van Nuys catchment-areas complete the top five destination catchment-areas served by Metrolink service, with 11 and seven percent of the trips originated inside the Project Area respectively. These top five destination catchment-area (from the 52 Metrolink station catchment-areas) account for 61% for all total daily trips generated in the AVL Study Project Area. As is to be expected, the origin-destination data showed a trend where many of the trips from a catchment-area started and ended in the catchment-area itself, or in adjacent catchment-areas. Consistent with the observations from the station-to-station analysis, the origin-destination analysis showed that there is a significant amount of intra-Project Area travel, and that the Union Station catchment-area serves as major destination for trips initiated in the eight AVL Study catchment-areas.

The work-trip analysis data extracted for the Project Area's catchment-areas, suggests there is a substantial amount of commute travel among cities along the AVL, and that the great majority of the top five cities where employees who live in the eight AVL Study catchment-areas work, are served by an existing AVL Station (The cities of Los Angeles, Burbank, Glendale, Pasadena, Santa Clarita, Palmdale, Lancaster and San Fernando). Other cities identified as major commuting destinations not served by an AVL station are Culver City and Pasadena, which can be reached via LA Metro's light rail EXPO and Gold lines. The only top five city of employment not served by fixed-guideway transit service is Quartz Hill, located about six miles east from the Palmdale and Lancaster AVL stations. The work-trip analysis also showed that there seemed to be higher employment travel among the cities in the northern-portion of the AVL; as you get closer to the Union Station catchment-area, the percentage heading into the center of the City of Los Angeles rises.

Section 6 References

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7 SUMMARY OF EXISTING CONDITIONS AND FUTURE OPORTUNITIES

7.1 SUMMARY OF EXISTING CONDITIONS

The AVL provides a regional rail service that is primarily focused on weekday peak period journey-to-work from the San Fernando, Santa Clarita, and Antelope Valleys to downtown Los Angeles. Weekday peak direction service runs at roughly 30-45 minute intervals. Reverse-peak service is approximately hourly. Off-peak service is irregular, with service intervals varying from 1½ hours to over 3½ hours. Late evening service from LAUS is limited, with only one outbound train, departing at 9:25 PM. Weekend service is limited to six round trips. The line provides basic connectivity for the corridor, but the irregular service patterns limit the choices available to riders and make the service unavailable or inconvenient for certain origins and destinations or times of day.

The service is also relatively slow for a commuter railroad, averaging approximately 40 mph. While line speeds are reasonable at either end of the line, the central portion of the route through the Santa Clarita Valley and Soledad Canyon has numerous sharp curves and relatively steep grades, which limit train speeds and result in an end-to-end trip of over two hours.

Despite these limitations, Metrolink ridership on the AVL has grown steadily over the past several years. The AVL service area has a low rate of automobile ownership and a high degree of transit-dependency, compared with other corridors in the region, so there is a basic need for public transportation service in the corridor. A reduction in fares on the AVL served to boost ridership. The line has seen a 25% gain in total ridership between FY15 and FY18. The strongest growth has been on the portion of the route where the AVL operates exclusively, between Burbank and Lancaster. Demand also is spread relatively evenly along the corridor, with the strongest demand from the San Fernando and Santa Clarita valleys (2,000 average daily trips), coupled with strong demand from Acton, Palmdale, and Lancaster (1,100 average daily trips), and high ridership from the inner zone of Glendale and Burbank (1,600 daily trips, shared between the AVL and Ventura County Line). These figures support the case for improving service along the entire corridor.

Extensive single tracking limits scheduling flexibility, constrains Metrolink's ability to increase service levels and precludes regularized schedule patterns. Trains running in opposite directions on a single-track railroad need to pass each other where there are existing passing sidings. These locations effectively dictate the frequency of service that is possible, and the times when the trains can run, particularly in the reverse-peak direction. Also, extra time needs to be built into train schedules at these siding locations, to maintain reliable schedules, further

contributing to the long run times. Any program to improve service significantly on the AVL will need to add more train capacity, either by extending existing passing sidings, building new sidings or creating extended sections of double-track railroad by adding a mainline track.

The existing infrastructure assets, in some locations, are in substandard condition or beyond their useful life expectancy, requiring investment in their replacement or renewal. A survey of existing assets has identified the need for \$45 million in basic infrastructure capital investment to restore the railroad to a state of good repair. This investment in track, ties, signal, and communications systems, bridges, culverts, grade crossings, and facilities is necessary, to lay the groundwork for future improvement of service, and therefore is a high priority.

The Metro-owned right-of-way is used by Metrolink passenger trains (up to 30 per day) and UP freight trains (up to 12 per day). UP needs to be able to get its trains over the rail line without undue delay and also needs to be able to serve freight customers and shippers along the line. UP's rights are governed by an access agreement that dates back to 1992, an agreement that is ill-suited to a future rail line that envisions passenger trains operating in frequent, repeating slots over the course of a full day. This agreement will need to be updated, and operating practices for both freight and passenger trains will need to be modified to make the clock-face regular patterns work successfully. There is precedent for this type of operation, notably in the California San Joaquin Valley, where Amtrak and BNSF have agreed to operate with a schedule of regular, fixed train slots.

Metrolink currently runs traditional commuter rail trainsets, comprising of a diesel locomotive and a set of attached coaches. The trainset can operate bi-directionally, either with the locomotive in front or with the engineer occupying a cab control car at the opposite end of the train. While this configuration is able to carry relatively high volumes of passengers on a single train and is flexible in terms of how it can operate at terminal stations, the equipment configuration has a relatively high rate of fuel consumption, and train crew costs are relatively high on trains or portions of the line with light passenger loads. There is room for increasing passenger loads by lengthening trains where warranted by demand. There also may be opportunities for serving lighter-density territory with equipment that is less expensive to operate and with lower fuel consumption, such as DMU trainsets.

7.2 OPPORTUNITIES FOR IMPROVEMENT

With strategic investments in line capacity, stations, rolling stock, and train storage and maintenance facilities, Metrolink has the opportunity to significantly improve service and grow ridership on the AVL. Ridership growth opportunities exist in both the peak and off-peak markets. With regularized service, potential through-service markets to south of downtown Los Angeles potentially can be served – such as to Orange County or Riverside County. Better and more convenient local transit connections can be made with timed transfers organized around hourly or half-hourly service “pulses.” With more frequent and regular peak and off-peak service, and with extended service hours and more frequent weekend service, the AVL has the potential to serve as a transit spine for an integrated transit network for northern Los Angeles County – where reasonable travel by transit to and from a much wider set of origins and destinations becomes possible. The AVL can better serve the San Fernando Valley with rail stations at Sylmar and downtown Burbank serving as transit hubs for connections to light rail,

BRT, local bus, and other rail services that broadly serve the entire valley. Local transit systems can provide comparable connectivity within the Santa Clarita and Antelope valleys.

Capital improvements on the AVL, along with changes in service, can also serve to reduce trip times. The proposed SCORE projects would help, but the level of trip time reduction would be relatively modest. The topography and physical environment in the Soledad Canyon portion of the line limits the extent to which average speeds can be increased without major construction such as entirely new rights-of-way and new tunnels. Such projects are not in the scope of the potential 2023 service targets, due to their high cost, need for right-of-way acquisition, and extensive environmental review requirements. The requirements of bi-directional clock-face scheduling on a largely single-track railroad also constrains the ability to incrementally achieve trip time improvements by straightening curves and improving the right-of-way, since the locations of passing sidings are rigorously optimized with respect to the expected timing of train movements in both directions. Once the clock-face pattern is set up, changing trip time, either through infrastructure improvements, or improved rolling stock performance, or changes to stopping patterns, tends to change the location of meet points. This could lead to the future requirement to effectively double track the line. As a result, potential incremental trip time improvements will need to be considered in the overall phasing plan for corridor improvements.

It is worth noting, however, that over the long term, the most dramatic change in travel time between the Antelope Valley and Los Angeles will come with the introduction of HSR. With coordinated scheduling and integrated ticketing and trip planning, the AVL markets can take advantage of opportunities for travel on HSR to cut trip times and provide access to the intercity markets that will be served by HSR, including the Bay Area, Central Valley, Las Vegas, and eventually Sacramento and San Diego.

Investment in Metrolink has the potential to spur development at rail stations and in the vicinity of stations. Concentration of transit-accessible development will reinforce strong transit ridership, support growth in service, and enable a reasonable share of operating costs to be covered by fare revenue.

Metrolink can serve as a mode of access to both airports in the AVL corridor – Burbank and Palmdale – with more frequent and regular service and with coordinated transit connections at the nearest rail stations. These links would be used by both air passengers and airport employees.

7.3 CURRENTLY-IDENTIFIED INFRASTRUCTURE PROJECTS TO SUPPORT SCORE SERVICE TARGETS

The AVL is the third most heavily patronized Metrolink line and the only long-distance, high-speed transit service connecting the Antelope Valley to the rest of Southern California. The Metrolink SCORE program includes significant capacity-enhancement projects along the entire length of the AVL. Most of these improvements entail lengthening passing sidings or double-tracking portions of the railroad that currently have only a single track. These potential projects are shown on the corridor map in Figure 7-1 and listed in Table 7-1. They would be

implemented in two phases, aimed at achieving service improvement targets by 2023 in the first phase and 2028 in the second phase.

The proposed SCORE projects are an input to the AVL Study and provide the starting point for the analysis of incremental service improvements and required capital investment. Additional rail operations analysis will be undertaken in the AVL Study to validate these concepts, consider other potential concepts, and identify requirements to support rail freight service and other potential service operators in the corridor between the Antelope Valley and LAUS.

Figure 7-1: SCORE Capital Projects on the AVL

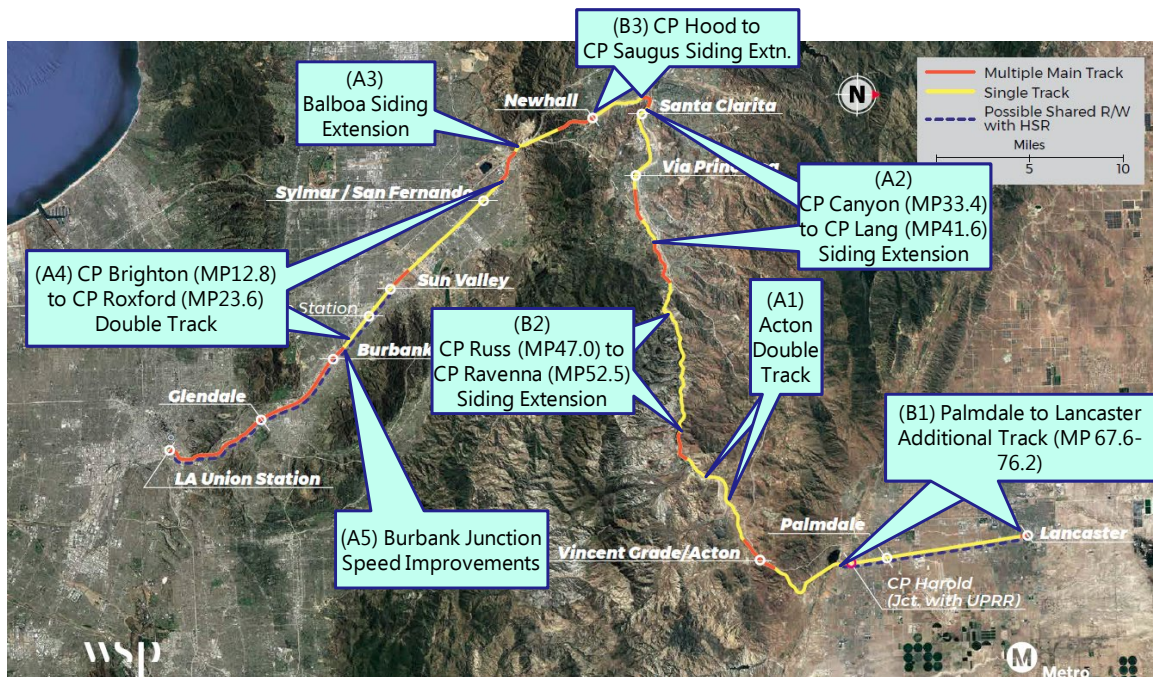


Table 7-1: SCORE Capital Projects

| Project | Potential SCORE Capacity and Service Project | AVL Milepost |
|---------|--|--------------|
| 1 | Burbank Junction Speed Improvements | 11.1 to 11.2 |
| 2 | Brigton to Roxford Double Track Project | 12.8 to 23.6 |
| 3 | Balboa Siding Project | 25.3 to 26.5 |
| 4 | Saugas to Hood Double Track Project | 30.2 to 32.2 |
| 5 | Canyon to Land Rail Improvements | 33.4 to 41.6 |
| 6 | Ravenna to Russ Siding Improvements | 47.0 to 52.5 |
| 7 | Downtown Acton Siding | 55.7 to 57.2 |
| 8 | Palmdale to Lancaster Double Track | 67.6 to 76.2 |

The Brighton to Roxford project (#2 in the above list) is funded and is proceeding to implementation. It will provide over ten miles of double tracking at the most heavily utilized

portion of the line, closest to downtown Los Angeles, and is, therefore, a high priority for increased capacity and the improved operational flexibility that comes with double tracking. This project is taken as a given in the current AVL Study. The Burbank Junction Speed Improvements project is also fully funded through the SCRRA TIRCP grant for the SCORE Program. This project includes adding a new crossover and switch to allow meets at Burbank Jct. This speed improvement at Burbank Jct, which serves both the Antelope Valley and Ventura County Lines, will help keep scheduled five-minute headways for Metrolink and Pacific Surfliner trains on time and is needed to support the “pulsed” schedule concept. The other prospective projects will be evaluated as part of the AVL Study.

The SCORE 2023 program includes proposed capital projects on the AVL that enable all-day hourly frequencies, 30-minute frequencies between Santa Clarita and Los Angeles, and a peak-direction peak-period hourly express, which lays the foundation for 30-minute, all day frequencies. This includes partial double-tracking, siding extensions, junction improvements, and a new station at Vista Canyon in Santa Clarita. It also facilitates integrated express bus service.

The AVL Improvements include double tracking at three locations, a 2.0-mile segment in downtown Acton, an 8.2-mile stretch from CP Lang to CP Canyon, and a 10.8-mile segment from CP Brighton to CP Roxford. It also includes two siding extensions, a 0.3-mile segment that is part of constructing the Vista Canyon Station and 1.2-mile stretch from CP Balboa to MP 26.5.

The new Vista Canyon Station, a relocation of the existing Via Princessa Station, enables a higher frequency of service and is sited within a dense transit-oriented development that will generate additional rail ridership.

Outside of the AVL study area, the 2023 program features the transformational Link US project, which removes existing stub end tracks and replaces them with run through tracks, delivering two operational run through tracks in 2023. This world class multi-modal hub will also feature a new passenger concourse, active transportation improvements, and other transportation enhancements.

The 2023 SCORE program also includes essential system investments beyond the limits of the AVL. This includes construction at the CMF to add capacity to manage existing and future rolling stock more efficiently, and completion of the build out of the EMF, to provide a secondary location for heavy duty maintenance needed to accommodate future rolling stock. It also includes reliability projects that add operational resiliency that support capacity expansion.

The medium-term 2028 SCORE program includes projects on the AVL that enable 30-minute, all day frequencies and 15-minute frequencies to Santa Clarita. It completes the Link US project, creating up to 10 run-through tracks at LAUS. It also completes the procurement of additional fleet to support increased service, as well as construction of up to five rolling stock maintenance facilities.

Completion of the projects in this set of investments allows for the second step of regional rail transformation, including interlining from Antelope Valley to the south of LAUS, as well as the

introduction of 15-minute service on core segments, including Los Angeles to Santa Clarita. Delivering the service by 2028 depends on the completion of the several large projects in addition to Link US, including a fourth main track from Los Angeles to Fullerton and a third main track from Fullerton to San Bernardino. Further, completing all projects in this mid-term program by 2028 ensures the regional rail network can seamlessly connect with new HSR service, planned to come on line in the Los Angeles area starting in 2029. Taken together, these capacity enhancements will enable capacity for a near quadrupling of Metrolink service, with a second-level of improved interconnections to Los Angeles – San Diego – San Luis Obispo Rail Corridor (LOSSAN Corridor) and a ready state to operate seamlessly with HSR.

The AVL Improvements in the 2028 SCORE program include three double track segments, a 7.4 mile stretch from the Lancaster Station through Palmdale, a 5.4-mile segment from CP Ravenna to CP Russ, between the Vista Canyon and Santa Clarita Stations, and a 2.2 mile stretch between CP Saugus and CP Hood, between the Santa Clarita and Newhall Stations. It also includes additional platforms at the Lancaster and Palmdale stations. This set of investments is needed to support capacity for even greater service and frequency levels beyond 30-minute intervals that will connect the Antelope Valley, future HSR, and potentially Las Vegas.

7.4 INITIAL PROPOSED CAPITAL IMPROVEMENTS

The Metrolink SCORE program is the most recent comprehensive source of information on potential capital improvements on the AVL. However, it is not the only source. Based on a review of prior studies, plans, and proposals for the study area, a more complete listing of potential capital projects was assembled. This list is presented in matrix form in an appendix to this report. The projects are summarized in Table 7-2 through Table 7-4, identifying the location and scope of each project. Table 7-2 lists potential projects at the southern end of the line, between Glendale and Sylmar, including Tunnel 25. Table 7-3 includes potential projects in the Santa Clarita Valley, and Table 7-4 includes potential projects in Soledad Canyon and the Antelope Valley, between Vista Canyon and Lancaster. The matrix in the appendix includes additional information, to the extent available, including estimated capital cost, source of funding, project status, right-of-way assumptions and requirements, affected stakeholders, target completion date, the type of service the project would support, and the source of project data.

This list of potential projects will be the starting point for identifying packages of capital projects that support potential service increments.

Table 7-2: Potential AVL Capital Projects – Glendale to Sylmar

| Project Number | Capital Projects | Mileposts | Jurisdiction | Description | Track | Signal | Station | Ped Bridge | Grade Separation | Grade Xing Improv | Maintenance |
|----------------|--|---------------|-----------------------------|--|-------|--------|---------|------------|------------------|-------------------|-------------|
| 1 | Salem/Sperry Overpass (Doran Street and Broadway/Brazil Grade Separations) | 7.51 and 7.99 | Glendale | The two grade separated structures will result in the grade crossing closure at Doran Street and Broadway/Brazil to improve safety and mobility for the area while implementing the needed infrastructure capacity enhancements. | | | | ✓ | ✓ | | |
| 2 | Burbank Junction Speed Improvements | 11.4 | Burbank | Upgrade one turnout and add a crossover at CP Olive to allow at-speed diverging moves from both tracks to Brighton siding (convert Brighton siding to MT) | ✓ | ✓ | | | | ✓ | |
| 3 | Brighton to Roxford Double Track Project | 12.8 to 23.6 | Sun Valley and San Fernando | The Project includes 10.9 miles of new second mainline track. The project allows for express service capability and improved mobility, on-time performance and enhances safety at 16 at-grade crossings within the project limits. (The Sylmar Station needs to accommodate the future East San Fernando Valley (ESFV) Transit Corridor Project) | ✓ | ✓ | ✓ | | | ✓ | |
| 3.1 | Brighton to McGinley Double Track | 12.8 to 15.6 | | Merge Brighton and Sun Valley sidings into a contiguous double track segment, and provide platform boarding to both tracks at Sun Valley and Burbank-Airport stations | ✓ | ✓ | ✓ | | | ✓ | |
| 3.2 | Brighton to Sheldon | 12.8 to 17.0 | | Double track in this guideway will allow for the dispatch of 30-minute regional service between Santa Clarita and LAUS | ✓ | ✓ | | | | ✓ | |
| 3.3 | Sheldon to Roxford Double Track | 17.0 to 23.6 | | Merge Balboa and Sun Valley sidings into a contiguous double track segment, and provide platform boarding to both tracks at San Fernando / Sylmar Station | ✓ | ✓ | ✓ | | | ✓ | |

| Project Number | Capital Projects | Mileposts | Jurisdiction | Description | Track | Signal | Station | Ped Bridge | Grade Separation | Grade Xing Improv | Maintenance |
|----------------|---------------------------------|-------------------|---------------|---|-------|--------|---------|------------|------------------|-------------------|-------------|
| 3.4 | Sylmar to Roxford Double Track | 21.9 to 23.6 | | | ✓ | ✓ | ✓ | | | ✓ | |
| 4 | Balboa Siding Project | 25.3 to 26.5 | Santa Clarita | This siding extension project would extend double track capability to control point Balboa to improve rail mobility and capacity leading up to Tunnel 25. | ✓ | ✓ | | | | | |
| 4.1 | Balboa to Tunnel 25 Realignment | 25.3 to Tunnel 25 | Santa Clarita | Realign the track from approximately CP Balboa to east of Tunnel 25 to straighten out curves and increase speed | ✓ | ✓ | | | | | |
| 5 | Newhall Tunnel | Tunnel 25 | | TBD improvements to address "bottleneck" at the tunnel | ✓ | ✓ | | | | | |

Table 7-3: Potential AVL Capital Projects – Newhall to Santa Clarita

| Project Number | Capital Projects | Mileposts | Jurisdiction | Description | Track | Signal | Station | Ped Bridge | Grade Separation | Grade Xing Improv | Maintenance |
|----------------|-------------------------------------|---------------|---------------|--|-------|--------|---------|------------|------------------|-------------------|-------------|
| 6 | West of Tunnel 25 Track Realignment | 28.0 to 28.92 | Santa Clarita | Realign the two curves west of Tunnel 25 to straighten out curves and increase speed | ✓ | ✓ | | | | | |
| 7 | Saugus to Hood Double Track | 30.25 to 32.3 | Santa Clarita | The second mainline track completes capacity enhancements through most of the City to allow for improved frequency of service. | ✓ | ✓ | | | | ✓ | |

| Project Number | Capital Projects | Mileposts | Jurisdiction | Description | Track | Signal | Station | Ped Bridge | Grade Separation | Grade Xing Improv | Maintenance |
|----------------|---|-------------------------------|-----------------------------|---|-------|--------|---------|------------|------------------|-------------------|-------------|
| 8 | Canyon to Lang Railroad Improvements (Canyon to Hornby and Humphreys to Lang) | 33.4 to 38.6 and 40.3 to 41.6 | Santa Clarita; County of LA | These capacity improvements will double track two separate gaps between control point Canyon in Santa Clarita and Lang in the County of Los Angeles. | ✓ | ✓ | | | | ✓ | |
| 8.1 | Canyon to Santa Clarita Double Track | 33.4 to 34.2 | | | ✓ | | | | | | |
| 8.2 | Humphreys to Via Princessa Double Track | 37.8 to 40 | | | ✓ | | | | | | |
| 8.3 | Vista Canyon Station & Siding | | | Move "Via Princessa" 2 miles NE to new "Vista Canyon" site. Required to double-track area (current Via Princessa station was an "earthquake station" and as sited today precludes double tracking). Realign and extend Honby siding to make Vista Canyon a double track station. Add turnback track. | ✓ | | ✓ | | | | |
| 8.4 | Signal Respacing from Lancaster to McGinley | 34.6 to 44.5 | | Respace existing intermediate signals in the defined parameters to allow for express trains and an increased speed from 78mph to 90mph | | ✓ | | | | | |
| 9 | Lang Station Road Track Realignment | 43.62 | | Realign the track to straighten out curves and increase speed | ✓ | ✓ | | | | | |
| 10 | Santa Clarita Area Maintenance Facility | 41.6 to 44.25 | Santa Clarita | A new maintenance facility, likely in the vicinity of today's Lang siding, will be needed to support 15-min high frequency line service between LA and Santa Clarita. It would also allow additional service to be added in the near term. Would need capacity for at least 15 full consists: 13 daily cycles plus 2 spares | | | | | | | ✓ |

Table 7-4: Potential AVL Capital Projects – Soledad Canyon to Lancaster

| Project Number | Capital Projects | Mileposts | Jurisdiction | Description | Track | Signal | Station | Ped Bridge | Grade Separation | Grade Xing Improv | Maintenance |
|----------------|-------------------------------------|----------------|---------------------|--|-------|--------|---------|------------|------------------|-------------------|-------------|
| 11 | Soledad to Harold Track Realignment | 44.2 to 67.5 | | Realign the track from approximately CP Soledad to CP Harold to straighten out curves and increase speed. Includes new bridge and tunnel at approximately MP 45-46. | ✓ | ✓ | | | | ✓ | |
| 12 | Ravenna to Russ Siding Extension | 47 to 52.5 | Agua Dulce | This siding extension project would improve rail mobility and capacity while addressing SCRRA State of Good Repair needs parallel to the Santa Clara River. | ✓ | ✓ | | | | ✓ | |
| 13 | Acton Double Track | 55.25 to 57.25 | Acton | Double track for approx. two miles to allow at- speed train meet. The existing track will need to be shifted, new track turnouts, drainage, culverts. The Crown Valley crossing will need to be upgraded to contain new warning devices and grade crossing panels. A new retaining wall of approximately 370 LF will need to be constructed. | ✓ | | | | | ✓ | |
| 13.1 | Connect Action Sidings | | | Possibly needed for future semi-express services from Antelope Valley to LAUS | | | | | | | |
| 14 | Palmdale to Lancaster Double Track | 67.6 to 76.2 | Palmdale/ Lancaster | The Project includes 8.6 miles of new second mainline track. The project allows for improved service capability and mobility, on-time performance and enhances safety at 7 at-grade crossings within the project limits. | ✓ | ✓ | ✓ | | | ✓ | |
| 14.1 | Palmdale Station | 69.2 | | Double Track / Double platform edge the station allowing at-speed meets within two miles of station | ✓ | | ✓ | | | | |

| Project Number | Capital Projects | Mileposts | Jurisdiction | Description | Track | Signal | Station | Ped Bridge | Grade Separation | Grade Xing Improv | Maintenance |
|----------------|----------------------------|-----------|--------------|---|-------|--------|---------|------------|------------------|-------------------|-------------|
| 14.2 | Lancaster Station | 76.6 | | Double Track / Double platform edge the station allowing trains to originate/terminate at station without affecting trains running in opposite direction | ✓ | | ✓ | | | | |
| 15 | Lancaster Layover Facility | TBD | Lancaster | Construct 4 storage yard tracks, each 1000 ft. One additional storage tack to be built for expansion purposes. Toilet dump features. | | | | | | | ✓ |
| 16 | Van Nuys Blvd Rail Project | | | Potential exists to interline services if the Van Nuys Blvd Projects is built to FRA Alternative Compliance standards for freight / light-rail shared tracks and if dimensions of platforms/equipment are compatible. | | | | | | | |

7.5 INITIAL SERVICE IMPROVEMENT CONCEPTS

As part of the SCORE initiative, Metrolink has identified a number of passenger train service patterns on the AVL that would be consistent with the future vision for regularized bi-directional train service. These patterns, listed in Table 7-5, include assumptions about the frequency of service, the stopping pattern (i.e., which stations are served), and the trip times between stations, based on the physical characteristics of the rail line and the performance characteristics of the assumed rolling stock. All of the patterns in the table have in common mirror-image bi-directionality (i.e., the identical train slots exist in both directions of travel). They also all represent clock-face schedules, where train slots recur at the same time(s) every hour – with station stops in each direction at every station also occurring at the same time each hour.

These patterns could represent an actual train schedule, with perfectly uniform train service in each direction (i.e., all local trains, operating at regular one-hour or 30-minute intervals). More likely, these patterns will be components of a service plan that incorporates more than one pattern (i.e., an hourly pattern combined with a half-hourly overlay on one portion of the line) or a mix of different patterns (i.e., a base local pattern with an express overlay pattern during weekday peak periods).

Table 7-5: AVL Service Patterns

| Pattern | Description | SCORE Target |
|----------|--|--------------------|
| AVR-60 | 60-minute headway (bi-directional) local service on AVL between LAUS and Lancaster | SCORE 2023 |
| AVE-Pk | Hourly peak-direction-only AVL Express train between LAUS and Lancaster | SCORE 2023 |
| SCR-30 | 30-minute headway (bi-directional) local service on AVL between LAUS and Santa Clarita (Vista Canyon) | SCORE 2023 |
| AVR-30 | 30-minute headway (bi-directional) local service on AVL between LAUS and Lancaster | SCORE 2028 |
| SCL-15 | 15-minute headway (bi-directional) local service on AVL between LAUS and Santa Clarita (Vista Canyon) | SCORE 2028 |
| SCL-Elec | Electrified 15-minute headway (bi-directional) local service on AVL between LAUS and Sant Clarita (Vista Canyon) | Long-Term Post-HSR |

Source: Metrolink

Various scenarios are possible for combining these patterns. Metrolink has developed four examples, which will be examined in the study. These scenarios are in Table 7-6.

Table 7-6: AVL Service Patterns

| Scen. | Title | Service Between LAUS and Santa Clarita | Service Between Santa Clarita and Lancaster | Siding Extensions or Double Track Segments Needed |
|-------|--|--|---|---|
| [1] | Hourly Base | 60-minute headway local slots all day | 60-minute headway local slots all day (to from LAUS) | 1 |
| [2] | Hourly Base with 30-min. Inner Zone | 30-minute headway local slots all day | 60-minute headway local slots all day (to from LAUS) | 3 |
| [3] | Hourly Base with 30-Min. Inner Zone & Hourly Express | 30-minute headway local slots all day; 60-min. express service (skipping most stations) peak period/peak direction only | 60-minute headway local slots all day (to/fm LAUS); 60-min. headway express service peak period/peak direction only (to/fm LAUS) | 6 |
| [4] | 30-Minute Base | 30-minute headway local slots all day | 30-minute headway local slots all day (to from LAUS) | 5 |

Source: Metrolink

The first scenario simply provides a repeating hourly local service in each direction. Scenario [2] builds on this pattern and doubles up the number of trains serving the inner zone. One train per hour would operate as a local between LAUS and Santa Clarita (or Vista Canyon), turning and returning to LAUS. This would result in a regular 30-minute local pattern within the inner zone.

Scenario [3], in turn, builds on Scenario [2] by adding an hourly express train between Lancaster and LAUS. This train would only operate during weekday peak periods and only in the peak direction of travel (inbound to LAUS in the morning, outbound from LAUS in the evening). It would have a different stopping pattern than the local train and a different (faster) running time. As a result, it would require meets with reverse-peak trains at different locations on the railroad, most likely requiring additional passing sidings or more double tracking. Scenario [3] approximates the level of service that meets the SCORE 2023 service target.

Scenario [4] represents a different way to operate two trains per hour on the outer portion of the AVL serving the Antelope Valley, with operating patterns different from Scenario [3]. This scenario would provide slots for local trains in both directions at 30-minute intervals for the entire line from LAUS to Lancaster. Because this pattern would be less complex than the one in Scenario [2], it would likely require fewer passing sidings, although the trip time benefit of the peak period express train would not be realized.

The study will use these service patterns and scenarios as a starting point but will not be limited to these concepts exclusively. The study will evaluate possible alternative service patterns and scenarios with multiple patterns that build towards the SCORE 2023 target level of service.