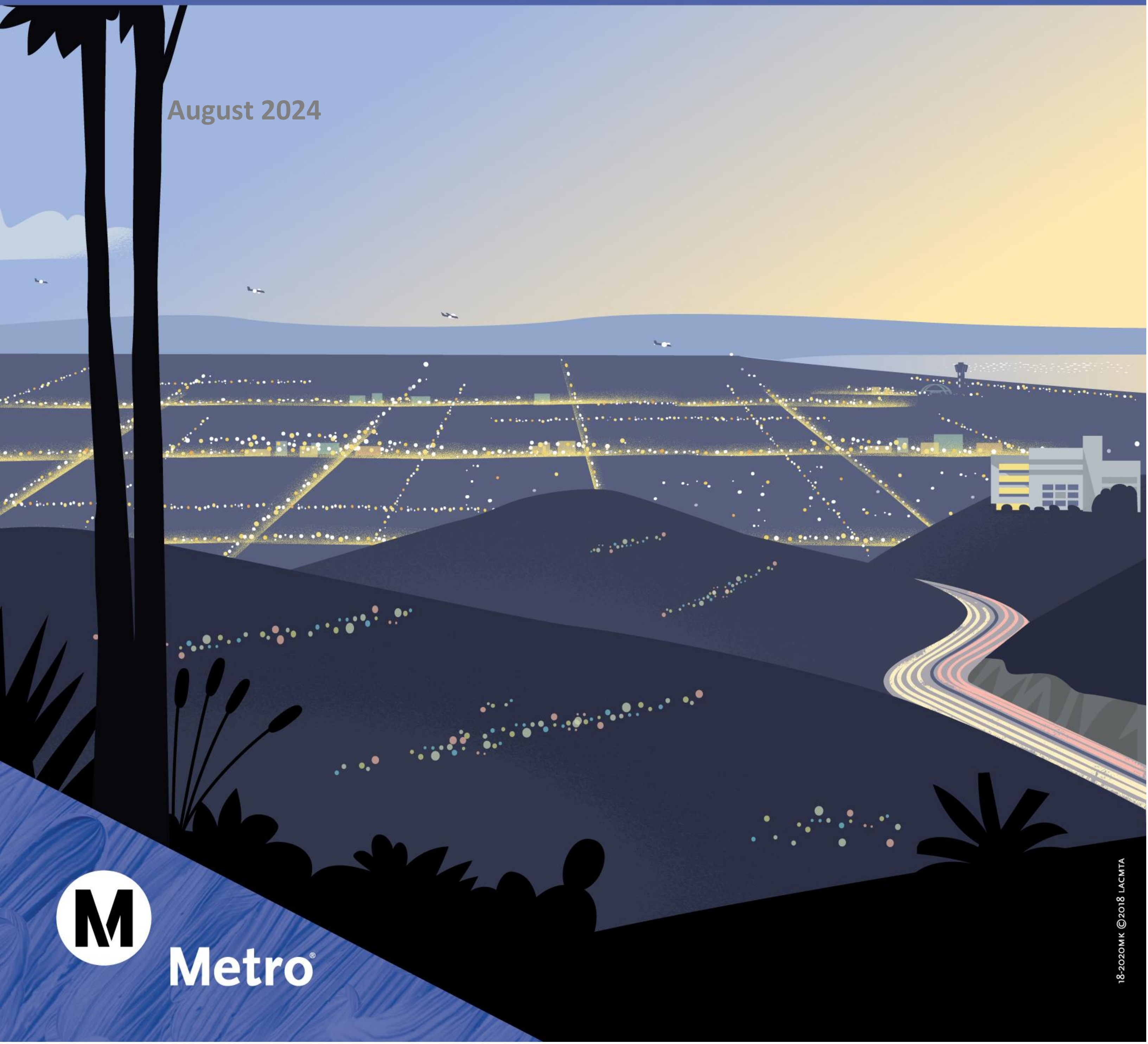
SEPULVEDA TRANSIT CORRIDOR PROJECT

Travel Demand Methodology and Forecasting Report

August 2024



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SEPULVEDA TRANSIT CORRIDOR PROJECT

Contract No. AE67085000

Travel Demand Model Methodology and Forecasts Report

Task 4.01.04.03

Prepared for:

Metro

Los Angeles County
Metropolitan Transportation Authority

Prepared by:

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Abbreviations and Acronyms

ACS	American Community Survey
AVTA	Antelope Valley Transit Authority
BRT	bus rapid transit
CBM18	Corridor Based Model 2018
CEQA	California Environmental Quality Act
CR	commuter rail
DEIR	Draft Environmental Impact Report
DEIS	Draft Environmental Impact Statement
EB	eastbound
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FEIR	Final Environmental Impact Report
FTA	Federal Transit Administration
HBOOP	Home-Based Other: Off-Peak
HBOPK	Home-Based Other: Peak
HBU	Home-Based University
HBUOP	Home Based University: Off-Peak
HBUPK	Home-Based University: Peak
HBW	Home-Based Work
HBWOP	Home-Based Work: Off-Peak
HBWPK	Home-Based Work: Peak
HOV	high-occupancy vehicle
HRT	heavy rail transit
HTA	HTA Partners
I-405	Interstate 405
KNR	kiss and ride
LADOT	Los Angeles Department of Transportation
LADWP	Los Angeles Department of Water and Power
LASRE	LA SkyRail Express
LAX	Los Angeles International Airport
LPA	Locally Preferred Alternative
MAX	Municipal Area Express
Metro	Los Angeles County Metropolitan Transportation Authority
MSF	maintenance and storage facility

NB	northbound
NEPA	National Environmental Protection Act
NHBOP	Non-Home Based: Off-Peak
NHBPK	Non-Home Based: Peak
OCTA	Orange County Transportation Authority
PMT	passenger miles traveled
Project	Sepulveda Transit Corridor Project
RMSE	root-mean-square error
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SB	southbound
SCAG	Southern California Association of Governments
skims	TAZ-to-TAZ travel times
SOV	single-occupancy vehicle
STCP	Sepulveda Transit Corridor Partners
TAZ	traffic analysis zone
U.S.	United States
UCLA	University of California, Los Angeles
UR	urban rail
US-101	U.S. Highway 101
Valley	San Fernando Valley
VMT	vehicle miles traveled
WB	westbound

1 INTRODUCTION

The Los Angeles County Metropolitan Transportation Authority (Metro) has initiated the preparation of an Environmental Impact Report (EIR) for the Sepulveda Transit Corridor Project (Project) and has contracted with HTA Partners (HTA) as the technical contractor to provide planning, engineering, and environmental services in support of the Sepulveda Transit Corridor Environmental Review and Conceptual Engineering effort. Metro has also entered into pre-development agreements with two firms, Sepulveda Transit Corridor Partners (STCP) and LA SkyRail Express (LASRE), to conduct pre-development services for the Project. This report has been prepared by HTA.

1.1 Purpose of the Study

The Project is intended to provide a high-capacity rail transit alternative to serve the large and growing travel market and transit needs currently channeled through the Sepulveda Pass and nearby canyon roads between the San Fernando Valley (Valley) and the Westside, including support of a future extension to the Los Angeles International Airport (LAX) area. For transit to be a competitive travel option that attracts new riders, there is a need to increase the speed, frequency, capacity, and reliability of transit service and provide convenient connections to existing and planned transit lines.

The Project is included in Metro's 2020 *Long-Range Transportation Plan* (Metro, 2020), in the *Measure R Expenditure Plan* (Metro, 2008) as the "San Fernando Valley I-405 Corridor Connection," and in the *Measure M Expenditure Plan* (Metro, 2016) as the "Sepulveda Pass Transit Corridor." The *Measure M Expenditure Plan* provides for operations of the Project between the Valley and the Westside to begin in 2033-2035 and for operations of the extension to LAX to begin in 2057-2059.

The study will include preparation of an EIR under the California Environmental Quality Act (CEQA) and an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). The Draft Environmental Impact Report (DEIR) will include project alternatives that represent a range of rail transit modes, alignments, and station locations for addressing the transportation needs of the Sepulveda Corridor. Following the public review period for the DEIR, a Locally Preferred Alternative (LPA) will be recommended to the Metro Board of Directors, after which the Final Environmental Impact Report (FEIR) and the EIS will be prepared to complete the environmental review process. The study approach will provide the public multiple opportunities to review and comment on the project alternatives and the environmental analysis.

1.2 Project Study Area

Figure 1-1 shows the Project Study Area. It generally includes Transportation Analysis Zones (TAZs) from Metro's travel demand model that are within 1 mile of the alignments of the four "Valley-Westside" alternatives from the *Sepulveda Transit Corridor Project Final Feasibility Report* (Metro, 2019a). The Study Area represents the area in which the transit concepts and ancillary facilities are expected to be located. The analysis of potential impacts and effects will encompass all areas that contribute substantial travel activity to the corridor, and the EIR and EIS will disclose all potential impacts and adverse effects related to the Project.

Figure 1-1. Sepulveda Transit Corridor Project Study Area

Source: HTA, 2024

1.3 Purpose of this Report

The purpose of this report is to present initial travel demand model run results for the Project using the latest Metro travel demand analysis model, Corridor Based Model 2018 (CBM18) (Metro, 2019b). Additionally, it provides a high-level overview of the proposed methodology to develop ridership forecasts for the Project, including the assumptions used for model validation and forecasts.

Section 2 presents an overview of the Metro Transportation Analysis Model. Section 3 shows the validated CBM18B for the Study Area, where the model was checked against observed travel patterns, transit service, and ridership for routes within the corridor and Study Area. Section 4 discusses the alternatives considered and modeled, along with parking assumptions. Section 5 includes the definitions for the key metrics included in the ridership forecasting results. Section 6 presents the ridership forecasting results for the two monorail transit) alternatives, Alternatives 1 and 3. Section 7 presents the ridership forecasting results for the two automated heavy rail transit (HRT) alternatives, Alternatives 4 and 5. Section 8 presents the ridership forecasting results for the driver-operated HRT alternative, Alternative 6. The alternatives have been analyzed by grouping them separately as they utilize different technologies. Section 9 presents the uncertainty in ridership estimates, with a stepwise buildup of the forecast for Alternatives 1 and 5, which are the lowest and highest performing options, respectively, based on project trips. Section 10 summarizes travel demand ridership modeling results and preliminary conclusions.

2 OVERVIEW OF THE METRO TRANSPORTATION ANALYSIS

Metro's Transportation Analysis Model, CBM18B, is similar to transit forecasting models used by other large United States (U.S.) transit agencies, uses assumptions regarding regional socioeconomic and transportation network characteristics to develop estimates of the amount of travel (i.e., trips) occurring between different locations in the area, the market share of each transportation mode, and the routing of these trips over the highway and transit networks, also known as the four-step model. To maintain a manageable modeling process, locations in the model are aggregated into TAZs, which are the fundamental geographic unit of analysis for the entire process. The model is a form of the conventional four-step model, a traditional framework in transportation forecasting that was developed in the 1950s and first proposed in the Chicago Area Transportation Study. The four-step model has been adopted for transportation analysis throughout the U.S. Key steps of the model include trip generation, trip distribution, mode choice, and assignment.

The trip generation step estimates the number of trips produced in and attracted to each TAZ, based on zonal socioeconomic variables such as population, households, and employment. The trip generation step estimates the amount of travel beginning and ending in each production (home) and attraction (non-home) TAZ, respectively, for work and non-work travel.

In the trip distribution step, a network representation of the highway system is used to estimate the time and cost associated with travel between each pair of TAZs, and these estimates are combined with trip generation results to develop a matrix (known as a "trip table") of travel between each production and each attraction TAZ in the region. Both the TAZ-to-TAZ travel times (known as "skims") and the trip tables are organized as very large matrices that have one row for each production TAZ and one column for each attraction TAZ. Each cell in these matrices contains an estimate of the time or number of trips beginning at a given production TAZ and ending at a given attraction TAZ.

Following trip distribution, in the mode choice step, the skim matrices for each mode of travel (drive alone, high-occupancy vehicle [HOV], and various transit options) are used to characterize the quality of each transportation option and estimate the market share that each mode will attract. In addition to generating trip tables for each mode of travel, this step generates estimates of the number of linked trips (from origin to destination, independent of transfers) attracted to each mode and an estimate of the aggregated time savings and other benefits associated with different transportation improvements.

Furthermore, network processing software is used to determine the best path or route that each highway and transit trip will use to travel between the trip origin and destination. This step is known as "assignment," and ridership results such as boardings by station or route are determined from the results of this model element. The results of this process include trips by mode and by facility, including use of individual transit routes or stations (ridership) for all the transit routes/services in the model.

For the current study, CBM18B version of the Metro Transportation Analysis Model (CBM18B) (also referred to as "Metro Model" in this document), which was validated for the region by Metro, is being used.

The following subsections present the various elements, relevant inputs, and assumptions of CBM18B.

2.1 Traffic Analysis Zone System

The TAZ system applied in the Metro Model is designed to support an understanding of all travel occurring to, from, and within Los Angeles County. Within the model, all travel is represented beginning at the trip origin (e.g., home) and ending at the trip destination (e.g., workplace or shopping location). This approach requires a broad regional geographic system that encompasses the key travel markets to, from, and within Los Angeles County, including Ventura, Orange, San Bernardino, Riverside, and Imperial Counties. The TAZ system includes approximately 3,000 TAZs.

2.2 Socioeconomic Data

Data on existing and projected socioeconomic characteristics are major inputs to the travel demand model. The socioeconomic data include population, employment, and household information, and they are aggregated by TAZ. Demographic projections for the Project were obtained from the Southern California Association of Governments (SCAG) from the latest available *Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS) series (SCAG, 2020).

2.3 Trip Generation and Distribution

During the trip generation and distribution steps, the Metro Model stratifies travel by the underlying purpose of the trip and time of travel. These stratifications include the following:

- Home-Based Work: Peak and Off-Peak (HBWPK, HBWOP)
- Home-Based Other: Peak and Off-Peak (HBOPK, HBOOP)
- Non-Home Based: Peak and Off-Peak (NHBPK, NHBOP)
- Home Based University: Peak and Off Peak (HBUPK, HBUOP)

A summary of the person trip tables for 2019 and 2045 is shown in Table 2-1. The trip tables show that regional travel between 2019 and 2045 is expected to grow by 18 percent, with growth occurring for Home-Based Work (HBW) trips and university travel.

Table 2-1. 2019 and 2045 Regional Person Trips by Purpose

Trip Purpose	Year 2019 Weekday Person Trips	Year 2045 Weekday Person Trips	Years 2019 to 2045 Growth (Percent)
Home-Based Work	11,980,265	14,190,257	18
Home-Based University	2,178,097	2,758,226	27
Home-Based Other	33,565,323	39,401,171	17
Non-Home Based	18,717,940	21,812,122	17
Total	66,441,625	78,161,776	18

Source: HTA, 2024

Note: The data used in this table were compiled from the Metro Model (CBM18B).

2.4 Highway Network

The highway networks for 2019 and 2045 are maintained and updated based on the SCAG highway networks developed for the 2020-2045 RTP/SCS. These networks are similar to the networks used by all agencies responsible for modeling in Southern California. One key difference is that Metro uses a utility program to generate connector links between the centroids for each of the TAZs in the Metro Model (roughly the area of the SCAG region) and the roadway network for measuring transit accessibility. The connectors are hypothetical links that connect the centroids to the highway network node and represent travel on streets below the level of detail in the model. Figure 2-1 shows the 2019 network in the Metro Model.

Figure 2-1. Year 2019 Highway Network

Source: HTA, 2024

2.5 Transit Networks

Transit networks in CBM18 currently represent the years 2019 and 2045 for all bus and rail public transit services operating and proposed as anticipated in Los Angeles County and neighboring jurisdictions. Coded services include the following:

- Metrolink Commuter Rail
- Metro Rail
- Metro Bus operations, including local, rapid/bus rapid transit (BRT), express, and transitway services
- Municipal Bus operations

Table 2-2 shows the list of transit companies operating in the Metro Model area by transit service type.

Table 2-2. Transit Companies in the Metro Model

Mode	Companies	Service Type
10	Metrolink	Commuter Rail
11	Metro Local Bus	Local Bus
12	Metro Express Bus	Express Bus
13	Metro Rail	Urban Rail
14	Commerce Municipal, Inglewood, Santa Fe Springs	Local Bus
15	Whittier, Azusa, Bellflower, Cerritos, Duarte, El Monte, Glendale, Monterey Park, West Hollywood, LADOT, West Covina, Shuttle	Local Bus
16	Norwalk Transit, Long Beach Transit, Carson Circuit, Gardena Municipal, Santa Clarita	Local Bus
17	Torrance Transit, Santa Monica, Culver City Bus, Municipal Area Express (MAX)	Local Bus
18	Foothill Transit, Montebello Bus Lines, AVTA	Local Bus
19	South Coast Area Transit, Moorpark, Thousand Oaks, Simi Valley	Local Bus
20	OCTA, Omnitrans, Riverside Transit Agency	Local Bus
21	Santa Monica, Gardena Municipal, Santa Clarita, Torrance Transit, AVTA, LADOT	Express Bus
22	MAX, Foothill Transit	Express Bus
23	Vista, Inland Empire Connection, OCTA, OMNITRANS, Simi Valley	Express Bus
24	Metro	Rapid Bus
25	Metro	Transitway Bus
26	Metro G Line	BRT

Source: HTA, 2024

Notes:
The data used in this table was compiled from the Metro Model (CBM18B).
AVTA = Antelope Valley Transit Authority
BRT = bus rapid transit
LADOT = Los Angeles Department of Transportation
MAX = Municipal Area Express
OCTA = Orange County Transportation Authority

Transit access from zone of origin to stop or station in the model was estimated using Metro's INET-2-TNET application. This application is a set of "awk" programming language scripts and UNIX shell utilities. Transit access from a TAZ to a bus stop or a rail station initially is a function of the straight-line (Cartesian) distance between them. This distance is a parameter that can be controlled to get longer/shorter walk links. The resulting access links have been adjusted by a circuity factor to adjust the impedances to account for the difference between the actual network distance and the straight-line distance between a TAZ and a transit stop. Transit paths are built by considering many components, such as headway, fare (boarding fares and transfer fares), wait time, transfer time, and walk time.

2.6 Station Attributes

The bus network, in general, uses the highway nodes. The commuter rail (CR), urban rail (UR), BRT stations, and transitway, and express bus stops associated with park & ride lots are coded separately and are represented by a pseudo zone. The station attributes are provided to the Metro Model using separate text files. Table 2-3 provides a description of the stations and their respective attributes.

Table 2-3. List of Station Attributes

Attribute	Description	Units
PseudoZ	Pseudo zone number	N/A
Station Name	Transit station and line description	N/A
SGID	Station group identification number	N/A
UseFlag	Flag indicating whether station is active or inactive	N/A
Stype	Type of transit service provided by the station	N/A
Utype	Urban rail line indicator	N/A
Tnode	Rail, BRT, or Transit guideway station node	N/A
Hnode	Highway node	N/A
Stn2Plat	Walk access time from station entrance to station platform	Minutes
Bwalk	Walk access time from bus stop to station entrance	Minutes
ParkType	Type of parking facility (if any) at the station	N/A
ParkSize	Parking capacity	Vehicles
ParkCost	Parking cost	Dollars
Pwalk	Walk access time from parking lot to station entrance	Minutes
PIVT	In-vehicle time from nearest highway node to parking space in lot	Minutes
Kwalk	Walk access time from drop-off location to station entrance	Minutes
KIVT	In-vehicle time from nearest highway node to curb for passenger drop-off	Minutes
RZone1	First related station that shares parking facilities	N/A
RZone2	Second related station that shares parking facilities	N/A
RZone3	Third related station that shares parking facilities	N/A
RZone4	Fourth related station that shares parking facilities	N/A
RZone5	Fifth related station that shares parking facilities	N/A
hnet_x	Pseudo zone x-coordinate	Feet
hnet_y	Pseudo zone y-coordinate	Feet

Source: Metro Model, 2022

BRT = bus rapid transit
N/A = not applicable

2.7 Travel Times

This section describes the procedures used to generate travel time matrices containing the TAZ-to-TAZ travel times for each of the auto and transit modes of travel.

Peak travel times for single-occupancy vehicle (SOV) and HOV trips were determined by assigning an initial peak period vehicle trip table onto the highway network and using the resulting volumes to determine congested speeds on each link. A shortest path procedure is used to determine the fastest route between each origin and destination. The newly congested link travel times are updated, and a portion of the trips are reassigned to the new fastest route. This is repeated until no faster route remains. The resulting travel times are recorded in a skim matrix. This process is performed simultaneously for the following 11 sets of vehicle trips, each on "sub-networks" of highway links, based on occupancy and willingness to use HOV lanes and/or toll lanes:

1. Non-HOV Non-Toll
2. HOV2 and Non-Toll
3. HOV3+ and Non-Toll
4. SOV and Toll
5. 2Psn Non-HOV and Toll (Psn = Passenger)

6. 3Psn Non-HOV and Toll
7. 2Psn HOV and Toll
8. 3Psn HOV and Toll
9. Light Heavy-Duty Trucks
10. Medium Heavy-Duty Trucks
11. Heavy Heavy-Duty Truck

Each of the first eight populations potentially will have unique travel times and travel costs, which are inputs to mode choice. The heavy-duty truck trips are held constant.

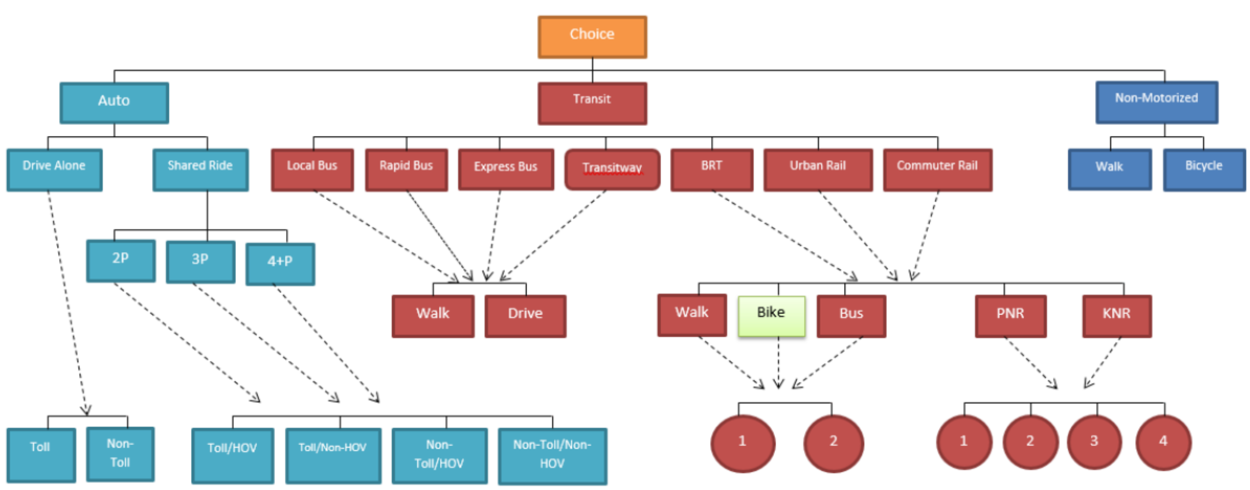
Off-peak highway travel times for each link were determined by assigning an initial off-peak period vehicle trip table onto the highway network and using the resulting volumes to determine speeds on each link. TAZ-to-TAZ travel times were estimated using path-finding and skimming procedures similar to those used for the peak networks.

Transit run times for fixed guideway modes (i.e., rail and high-level BRT modes) are directly specified based on scheduled or anticipated station-to-station travel times. Run times for bus services operating in mixed traffic are based on the highway travel time, including delays related to starting and stopping and passengers boarding and alighting on the corresponding link in the highway network.

2.8 Mode Choice Overview

The heart of the ridership forecasting process is the mode choice model. This process is designed to subdivide the person trip tables from the trip distribution model into separate trip tables for each travel mode. The share attracted to each mode is based on the travel characteristics of competing highway and transit services, socioeconomic characteristics of the production and attraction TAZs, and parameters that define the relative importance of each factor. Figure 2-2 shows the available mode choices. The model has separate Mode Choice procedures for the two time periods – Peak and Off-Peak, and for four purposes – HBW, HBU, HBO, and NHB

Figure 2-2. Modes Available in Mode Choice



Source: Metro, 2019b

KNR = Kiss & Ride
PNR = Park & Ride

The proportion of trips selecting each mode is estimated using a logit function that relates the probability of selecting a mode to the relative utility of that mode, compared to that of all other modes. The form of this function is as follows:

$$P_{g,i} = \frac{e^{[U_{g,i}(x_{g,i})]}}{\sum e^{[U_{g,m}(x_{g,m})]}}$$

where:

- $P_{g,i}$ is the probability of a traveler from group g choosing mode i
- $x_{g,i}$ are the attributes of mode i that describe its attractiveness to group g
- $U_{g,m}(x_{g,m})$ is the utility (or attractiveness) of mode m for travelers in group g

CBM18B is based on the nested logit form of this function, which allows sub-modal trade-offs to be more sensitive to service measures than higher-level choices of the “main” modes. The model includes Auto, Transit, and Non-motorized as the main modes. The Auto mode includes Drive Alone and Shared Ride (two-person, three-person, or more-person) submodes. All three submodes have a lower level that considers a toll and non-toll choice. The model considers the following seven primary transit submodes: Local Bus, Rapid Bus, Express Bus, BRT, Transitway, UR, and CR.

An access choice nest differentiates the walk and drive access to each primary transit submode. For UR and CR, the access choices include the following four options: walk, bus access, park & ride, and kiss & ride. Separate models have been developed for each time period (peak and off-peak) and each modeled purpose (described previously).

In addition, each rail station and park & ride bus station is coded as a pseudo zone. “Pseudo zones” are additional TAZs used to add up travel times and/or trips in the model. The auto access path and impedance are generated by skimming the path from the origin TAZ to all pseudo zones. The relative attractiveness (or “utility”) of each travel mode takes the following form:

$$U_{g,m}(x_{g,m}) = a_m + b_m\, LOS_m + c_{g,m} SE_g + d_m\, TRIP$$

where:

- a_m is a constant specific to mode m
- b_m is vector of coefficients describing the importance of each LOSm variable
- LOS_m is a variable set describing levels-of-service by mode m
- $c_{g,m}$ is vector of coefficients describing the importance of each SEg characteristic of group g with respect to mode m
- SE_g is a variable set describing the socioeconomic characteristics of group g
- d_m is vector of coefficients describing the importance of each TRIP characteristic of with respect to mode m
- TRIP is a variable set describing the characteristics of the trip

Table 2-4 shows the average weekday transit trips for all TAZs within the Metro Model by mode for Years 2019 and 2045 with Measure M projects in place by the respective years. The BRT, UR, and CR modes show growth in 2045 because of the demographic projections and the assumed implementation of Measure M projects. Figure 2-3 and Figure 2-4 show the percentage distribution of the transit trips by mode for Years 2019 and 2045, respectively. The transit trips are expected to increase by about 48 percent between 2019 and 2045. Note that the 2045 scenario uses Metro’s new NextGen Bus Plans.

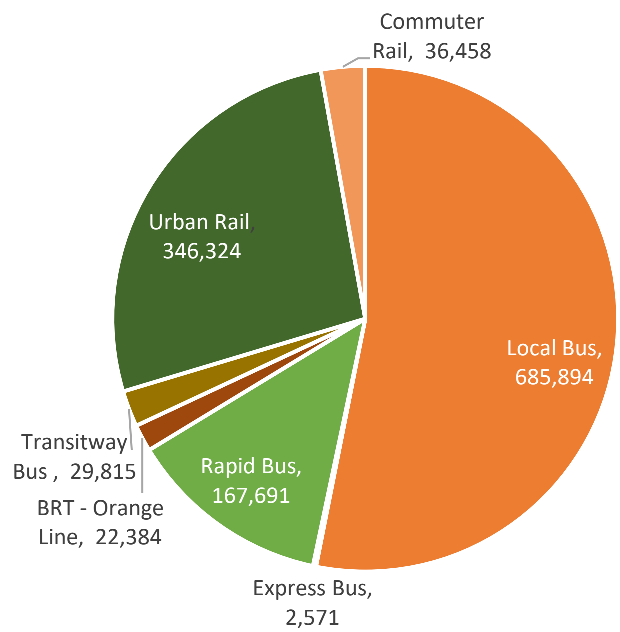
Table 2-4. Average Weekday Transit Trips by Mode

Mode	Year 2019 Average Weekly Trips			Year 2045 Average Weekly Trips			Percent Change
	Peak	Off-Peak	Total	Peak	Off-Peak	Total	
Local	377,694	368,160	745,854	455,817	446,922	902,739	21
Express	10,467	6,017	16,484	12,616	6,996	19,611	19
Rapid	72,151	58,180	130,331	18,549	7,798	26,347	-80
Bus Rapid Transit	7,207	6,846	14,053	47,545	43,120	90,664	545
Transitway	14,022	8,568	22,590	12,369	5,991	18,360	-19
Urban Rail	147,627	111,963	259,589	419,032	273,911	692,942	167
Commuter Rail	26,939	9,931	36,869	49,207	17,041	66,248	80
Total	656,107	569,664	1,225,771	1,015,134	801,778	1,816,912	48

Source: HTA, 2024

Note: The data used in this table were compiled from the Metro Model (CBM18B).

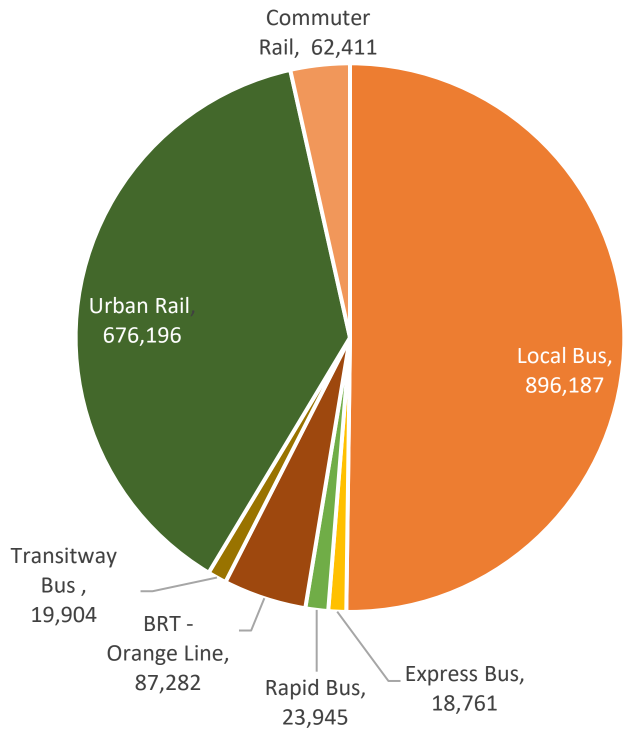
Figure 2-3. 2019 Average Weekday Transit Trips by Mode



Source: HTA, 2024

BRT = bus rapid transit
Note: The data used in this figure were compiled from the Metro Model (CBM18B).

Figure 2-4. 2045 Average Weekday Transit Trips by Mode



Source: HTA, 2024
BRT = bus rapid transit
Note: The data used in this figure were compiled from the Metro Model (CBM18B).

2.9 Highway Assignment

The output of the modal choice process includes work and non-work automobile vehicle trips that reflect the modal trade-offs among SOV, HOV, toll lanes, and various transit options. The vehicle trips are maintained separately in the mode choice model in eight of the 11 classes of automobile trips described in Section 2.7.

An equilibrium assignment process was applied that assigns the 11 vehicle trip tables to appropriate paths and links. During each iteration of the equilibrium assignment, the model loaded SOV, HOV2, HOV3+, and the various toll trips. The assignment produced a "loaded" highway network that included “constrained” times and speeds from the final assignment iteration and the initial input times and speeds. The assignment produced volumes for each of the 11 classes, where allowed, on each highway link. The highway assignments are performed for four time periods – AM, PM, MD and NT.

2.10 Transit Assignment

The resulting loads are reported by link and mode using the standard TRANPLAN “Load Transit Network” module. These assignments were produced in production, attraction format, as is typical for transit analyses, rather than the origin, destination format, more commonly used in highway assignments. The transit assignments are performed for two time periods – Peak and Off-Peak periods – represented by the AM and Midday networks, respectively.

3 MODEL VALIDATION

To validate CBM18B for the Study Area, the model was checked against observed travel patterns, transit service, and ridership for routes in the corridor and within the Study Area.

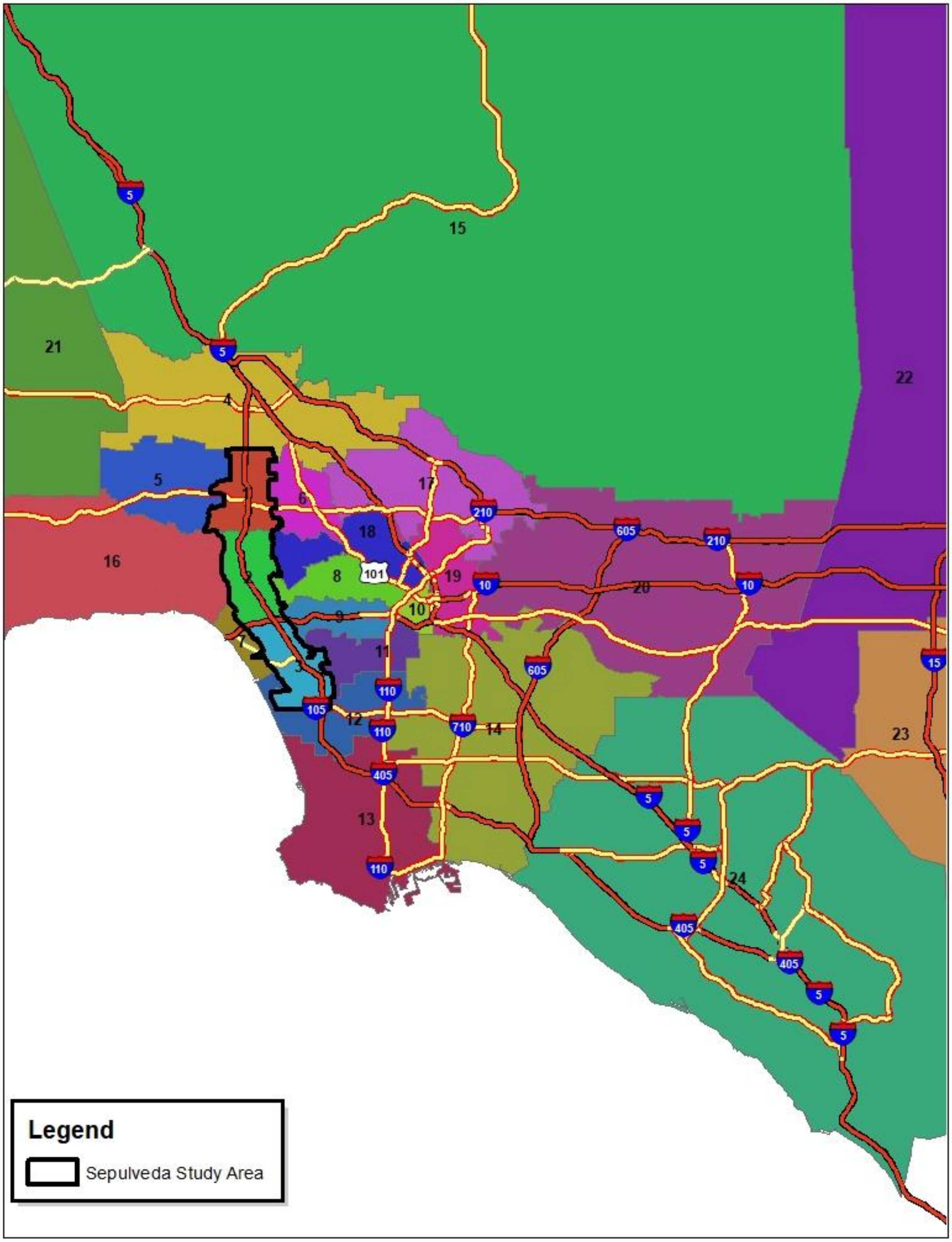
The validation comparisons in the sections presented next include the following elements:

- Work trip flow comparisons between model trips and the American Community Survey (ACS) data
- Special markets (the University of California, Los Angeles [UCLA] and the Getty Center) comparisons
- Study corridor route boardings and runtime comparisons
- Highway screenline comparisons
- System level comparisons

3.1 Work Trip Comparisons

To ensure work trips are adequately represented in the model, especially for the Study Area, the HBW trips were compared with the 2006–2010 ACS data. The ACS trips and the HBW trips in the model were summarized using the Project's district system, shown on Figure 3-1. The "Study Area" is made up of Districts 1 to 3. For comparison, the ACS trips were scaled to the model total trips. Table 3-1 shows the ACS trips, Table 3-2 shows the model trips, and Table 3-3 shows the percentage difference in trips between the model and ACS data. Table 3-3 shows that the model trips are reasonably close to the observed trips.

Figure 3-1. Sepulveda Transit Corridor Analysis Districts



Source: HTA, 2024

Table 3-1. Workflows between the Study Area and Other Districts Scaled from ACS

District	Study Area	Outside Study Area	Total
(1) Study Area	133,400	282,210	415,609
(2) Outside the Study Area	533,173	11,031,482	11,564,656
Total	**666,573**	**11,313,692**	**11,980,265**

Source: HTA, 2024

Table 3-2. Workflows between the Study Area and Other Districts in the 2019 Model

District	Study Area	Outside Study Area	Total
(1) Study Area	138,662	280,814	419,476
(2) Outside the Study Area	510,681	11,050,109	11,560,789
Total	**649,343**	**11,330,922**	**11,980,265**

Source: HTA, 2024

Table 3-3. Workflows between the Study Area and Other Districts Comparison in the 2019 Model and ACS

District	Study Area	Outside Study Area	Total
(1) Study Area	4%	0%	1%
(2) Outside the Study Area	-4%	0%	0%
Total	**-3%**	**0%**	**0%**

Source: HTA, 2024

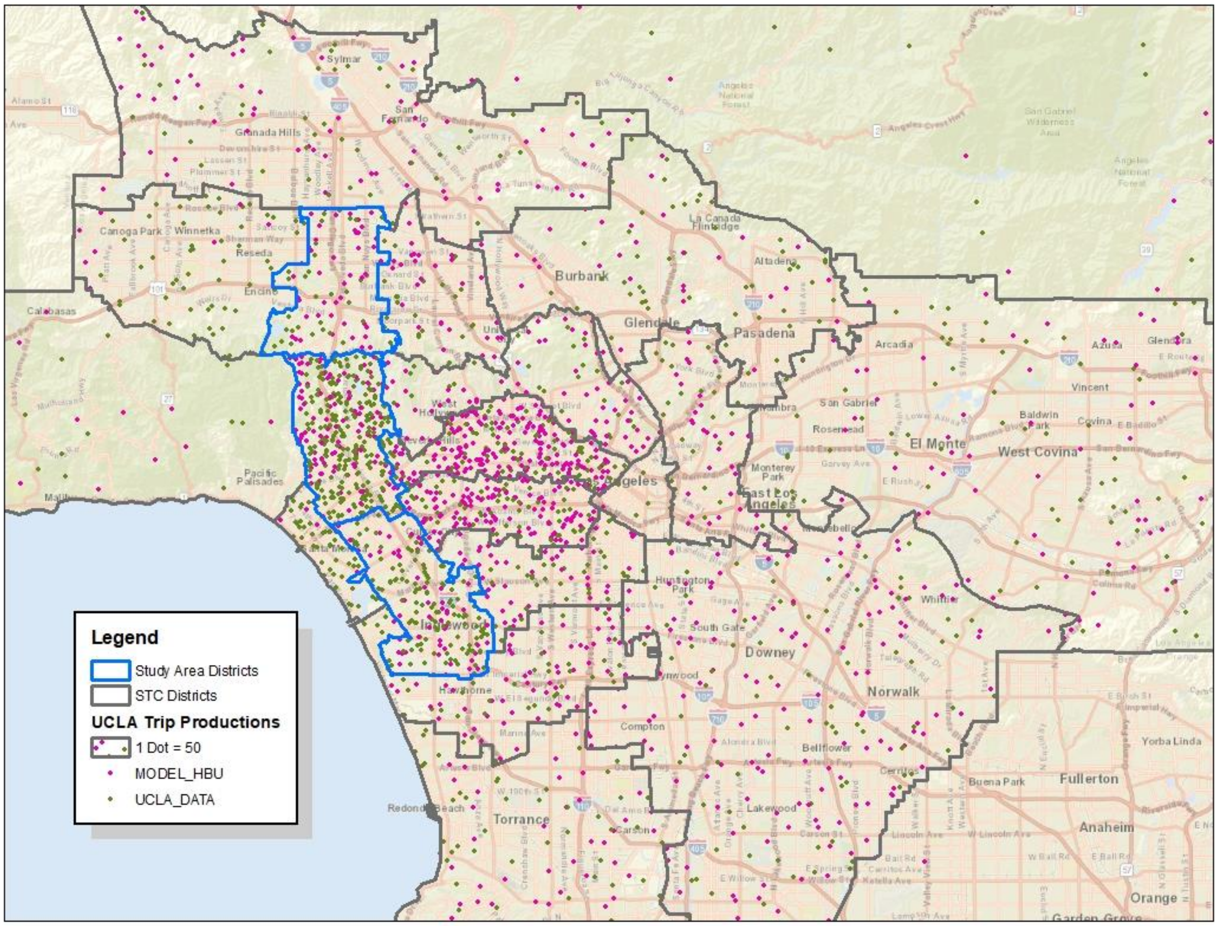
% = percent

3.2 Special Market Comparisons

As part of the validation effort, an analysis was conducted of large, special markets in the corridor. Two large generators included UCLA campus and the Getty Center, using data available from the *Sepulveda Transit Corridor Project Feasibility Study* Metro, 2019a). Metro may obtain more detailed data for subsequent analysis.

UCLA employee origin data for 2018 was converted to the Project's district system. Similarly, the Home-Based University (HBU) trips with attractions to the UCLA zone also were summarized to the Project's district system. The UCLA employee data showed that there are approximately 46,571 employee trips and model HBW trips were about 75,100. This shows that the model adequately represents employee trips. The UCLA student data shows that there are about 26,162 student trips, and the model HBU trips to UCLA were about 71,000, which indicates the model has adequate trips. Figure 3-2 shows the plot of origins from the model HBU trips and UCLA employee data. The plot shows that the trip patterns look similar to the observed data.

Figure 3-2. Plot of UCLA Employee Origins from Metro Model and UCLA Data



Source: HTA, 2024

HBU = Home-Based University
UCLA = University of California, Los Angeles
STC = Sepulveda Transit Corridor

The Getty Center is a major tourist attraction in the West Los Angeles area. From the information shared by the Getty Center, it attracts about 1.5 million visitors annually. The museum attracts more visitors on weekends than on weekdays. Assuming an annualization factor (to convert annual visitors to an approximate average weekday) of 300, approximately 5,000 people visit on an average weekday. As a comparison, the model estimates about 26,800 non-work trips to the museum zone (which includes other attractors) in the base year (2019). Because other productions and attractions are in this zone, this may show that the model adequately accounts for the visitor trips.

The Getty Center has approximately 2,400 workers (i.e., approximately 1,200 employees, 800 volunteers, and 400 contractors) who make about 4,800 trips (in and out). The model estimates about 4,825 work trips to the Getty Center Museum zone, which shows that the model trips are closer to the observed work trips to the area.

3.3 Corridor Comparisons

Transit services in the corridor were grouped by rail, buses over the Sepulveda Pass, north and south of the Sepulveda Pass. The transit services were reviewed and compared with the observed service to ensure that the coverage and level of service reflected the existing conditions. It was found that some of the service headways in the model were different from the scheduled headways and were corrected. The corrections include the following:

- The Metro C Line peak period service was corrected from 7.5 minutes to 6 minutes.
- The Metro G Line peak/off-peak period was corrected from 8/14 to 5/10 minutes, respectively.
- The peak headways for Routes 152, 162/163, 167, 169, and 237 were corrected from 22, 24, 45, 60, and 60 minutes to 8, 12, 30, 24, and 30 minutes, respectively.
- The off-peak headways for Routes 162/163, and 237 were corrected from 36 and 72 minutes to 24, and 45 minutes, respectively.

After the headways were corrected, the model was rerun along with the highway adjustments discussed in Section 3.4. The transit boardings were compared to boardings against the observed counts. A general "rule of thumb" indicated high-level totals should be within 10 percent of the observed.

Minor adjustments to headways were applied for Routes 233, 150, 154, and 158. The headways were improved by 10 minutes for Routes 233, 150, 154, and 158.

These adjustments helped improve the transit boardings comparison between the model and the observed results. Table 3-4 shows the comparison of average weekday observed and modeled boardings for the transit buses operated by Metro in the corridor after the model adjustments. Although at the individual route level the boardings differences are significant for some routes, the total boardings by group match well with the observed boardings. The comparison shows that the local bus boardings are within 5 percent, the rapid bus boardings are within 10 percent, and overall, the model boardings are within 1 percent of observed boardings for 2019. This information shows that the model well represents the travel patterns in the Study Area.

Table 3-4. Average Weekday Boardings Comparison for Corridor Buses

Route Type		Route	2019 Observed Boarding Counts	Original			After Highway and Headway Adjustments		
				Model	Difference	Percent	Model	Difference	Percent
Metro	Local	2	13,091	11,427	(1,664)	-13	13,321	230	2
Metro	Local	4	15,596	31,765	16,170	104	17,990	2,395	15
Metro	Local	20	13,511	16,820	3,309	24	16,819	3,308	24
Metro	Local	33	10,915	13,121	2,206	20	12,661	1,746	16
Metro	Local	102	2,734	468	(2,266)	-83	465	(2,269)	-83
Metro	Local	108	16,004	17,170	1,167	7	16,639	636	4
Metro	Local	110	8,333	5,048	(3,285)	-39	4,888	(3,445)	-41
Metro	Local	111	15,653	17,733	2,081	13	17,255	1,603	10
Metro	Local	115	14,808	18,135	3,327	22	17,571	2,763	19
Metro	Local	117	9,371	5,748	(3,623)	-39	5,670	(3,701)	-39
Metro	Local	150	8,844	4,402	(4,442)	-50	6,009	(2,835)	-32
Metro	Local	152	11,499	8,390	(3,109)	-27	9,274	(2,225)	-19
Metro	Local	154	868	251	(617)	-71	2,594	1,726	199

Route Type		Route	2019 Observed Boarding Counts	Original			After Highway and Headway Adjustments		
				Model	Difference	Percent	Model	Difference	Percent
Metro	Local	155	1,454	2,057	603	41	1,949	495	34
Metro	Local	158	2,209	880	(1,329)	-60	1,200	(1,009)	-46
Metro	Local	162/163	9,650	3,776	(5,874)	-61	5,907	(3,743)	-39
Metro	Local	164	6,518	9,330	2,813	43	7,359	842	13
Metro	Local	165	8,023	8,012	(11)	0	7,153	(870)	-11
Metro	Local	167	2,552	368	(2,184)	-86	623	(1,929)	-76
Metro	Local	169	2,404	141	(2,263)	-94	322	(2,082)	-87
Metro	Local	183	1,801	1,351	(450)	-25	1,123	(678)	-38
Metro	Local	217	6,947	2,561	(4,386)	-63	2,750	(4,197)	-60
Metro	Local	232	4,799	8,077	3,278	68	5,484	685	14
Metro	Local	233	11,827	6,815	(5,012)	-42	10,134	(1,693)	-14
Metro	Local	234	5,841	7,346	1,505	26	11,232	5,391	92
Metro	Local	237	2,132	666	(1,466)	-69	1,203	(929)	-44
Local Bus Total (Metro)			***207,381***	***201,858***	***(5,523)***	***-3***	***197,595***	***(9,786)***	***-5***
Metro	Rapid	704	11,029	2,069	(8,960)	-81	3,364	(7,665)	-69
Metro	Rapid	720	28,935	50,506	21,571	75	47,021	18,086	63
Metro	Rapid	733	8,154	8,468	314	4	7,917	(237)	-3
Metro	Rapid	734	6,209	6,389	181	3	4,099	(2,110)	-34
Metro	Rapid	744	9,229	7,108	(2,121)	-23	10,540	1,312	14
Metro	Rapid	750	2,490	3,299	809	32	1,162	(1,328)	-53
Metro	Rapid	788	2,106	958	(1,148)	-55	400	(1,706)	-81
Rapid Bus Total (All Lines)			**68,150**	**78,797**	**10,647**	**16**	**74,503**	**6,353**	**9**
Grand Total (Local + Rapid)			**275,531**	**280,655**	**5,125**	**2**	**272,098**	**(3,433)**	**-1**

Source: HTA, 2024

Horizon year transit routes are based on Metro's NextGen Plan (Metro, 2020), which includes modifying existing routes by enhancing frequencies and consolidating existing routes and eliminating a few rapid routes. Since the NextGen routes are considerably different than the existing bus routes, the changes to headways done as part of validation are not being carried over to the horizon year routes.

Comparisons also were made for routes in the Study Area by the portion of the region they traverse. Table 3-5 shows that the total for rail is within 1 percent of the 2019 observed boardings. The bus boardings over the Sepulveda Pass, north of the pass, and south of the pass groups and UCLA routes are within 2, 5, 13, and 14 percent of the observed boardings, respectively. Overall, the total boardings are within 1 percent of the observed boardings compared to 2019 observed ridership data. This shows that the model represents the transit service in the corridor reasonably well. As mentioned previously, because the 2019 observed boardings were lower than the 2019 observed boardings, the model boardings compared to 2019 boardings were slightly higher. Detailed comparisons by route are provided in Appendix A.

Table 3-5. Average Weekday Boardings Comparison for Corridor Validation

Route/Route Group	2019 Boarding Counts	Original				After Highway and Headway Adjustments			
		Peak	Off-Peak	Total	Compared to 2019	Peak	Off-Peak	Total	Compared to 2019
Rail lines in the Interstate 405 Corridor									
Metrolink - Ventura	3,265	4,273	1,458	5,731	76%	2,978	1,547	4,525	39%
Metrolink - Antelope Valley	6,856	4,954	1,850	6,804	-1%	4,708	1,857	6,565	-4%
Metro D Line	37,476	27,257	15,521	42,778	14%	24,719	15,411	40,130	7%
Metro B Line	99,757	55,783	35,257	91,040	-9%	53,336	35,706	89,042	-11%
Metro C Line	30,246	18,105	12,227	30,332	0%	17,513	12,323	29,836	-1%
Total	**177,601**	**110,372**	**66,313**	**176,685**	**-1%**	103,254	66,844	170,098	-4%
Bus Routes in the Study Area									
Bus Routes over the Sepulveda Pass on Interstate 405 and Sepulveda Boulevard	14,089	8,311	5,756	14,087	0%	7,051	5,597	12,648	-10%
Bus Routes south of Sepulveda Pass	215,760	116,989	114,615	231,604	10%	106,506	106,267	212,773	-1%
Bus Routes north of Sepulveda Pass	106,118	49,103	35,789	84,892	-19%	51,200	41,895	93,095	-11%
UCLA Routes	14,292	8,154	9,889	18,043	26%	7,555	7,461	15,016	7,555

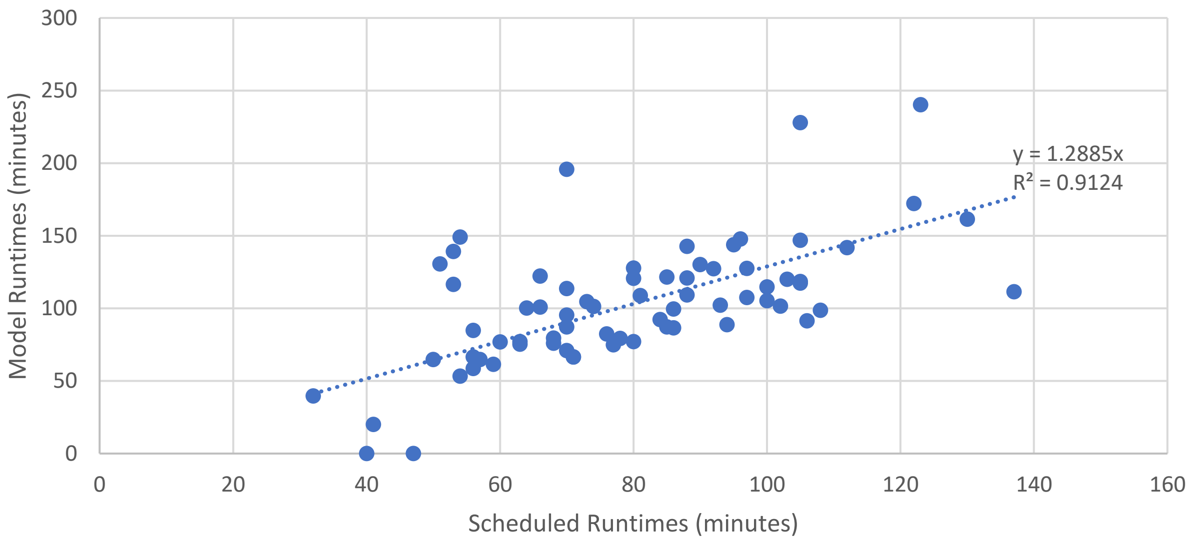
Source: HTA, 2024

“--" indicates no data

% = percent

In addition, the transit runtimes from the model were compared with the scheduled runtimes. For transit runtimes, the end-to-end runtimes for corridor routes were compared from the model for peak and off-peak periods against the average runtimes from existing schedules. **Figure 3-3** and **Figure 3-4** show the model versus observed runtimes for peak and off-peak periods. For reference, the X=Y line also is plotted, which represents the ideal conditions. Peak runtimes are slightly longer in the model than the scheduled runtimes, with a trendline slope of 1.28 and R^2 value of 0.91. R-squared (R^2) is a statistical measure that represents the proportion of the variance for a dependent variable that is explained by an independent variable or variables in a regression model. Off-Peak runtimes generally are consistent with scheduled times, with a trendline slope of 1.05 and an R^2 value of 0.96. The model-generated runtimes were determined to be suitable for the Project, and no adjustments were made to the model delay factors. Note that the horizon year of the CBM18B is based on NextGen, which is based on General Transit Feed Specification.

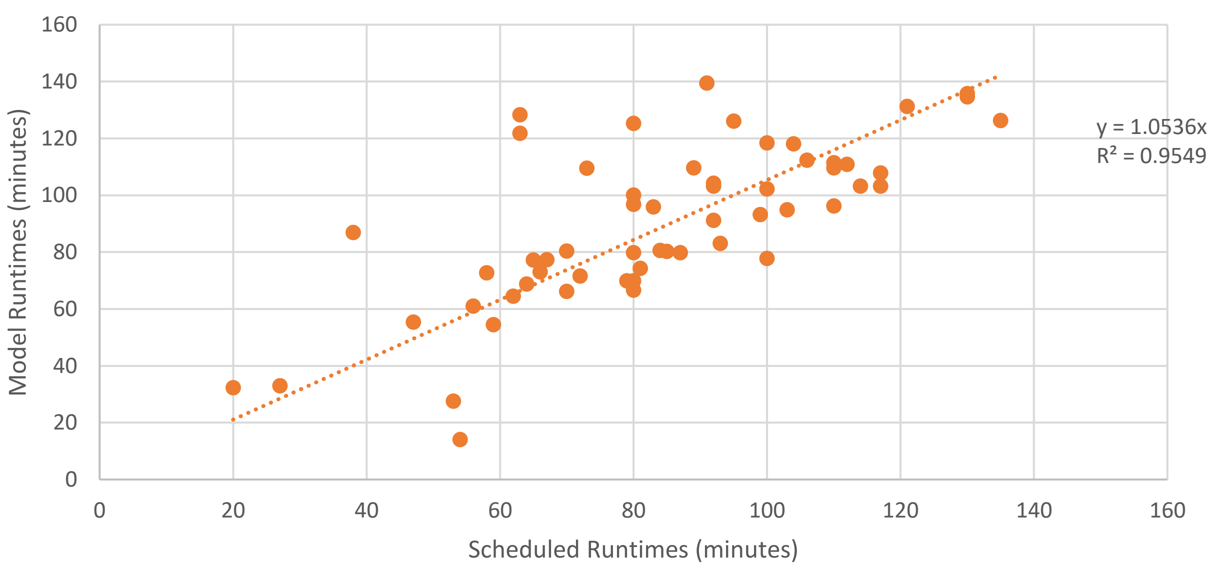
Figure 3-3. Peak Period Runtimes Comparison



Source: HTA, 2024

Note: The data used in this figure were compiled from the Metro Model (CBM18B).

Figure 3-4. Off-Peak Period Runtimes Comparison



Source: HTA, 2024

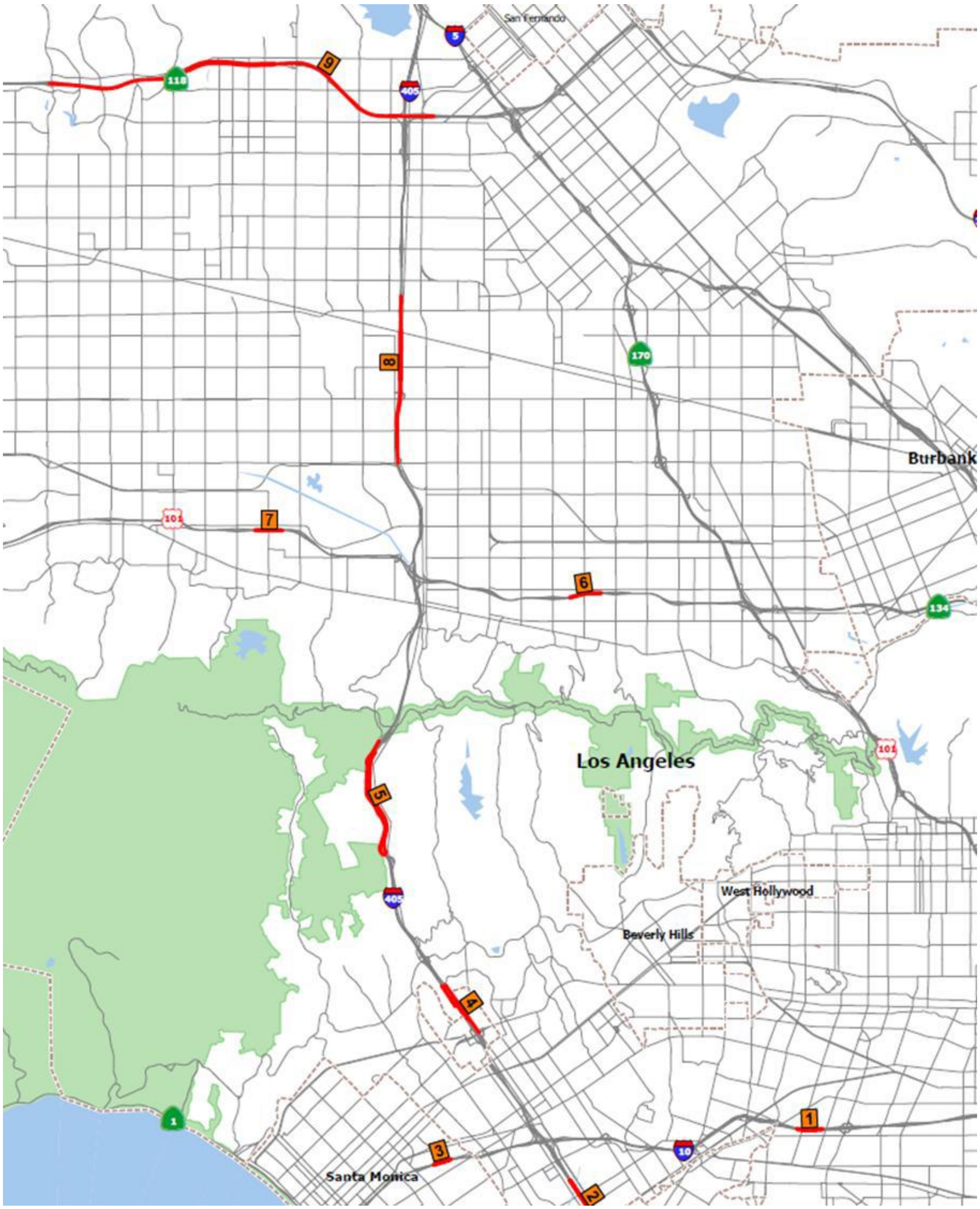
Note: The data used in this figure were compiled from the Metro Model (CBM18B).

3.4 Corridor Highway Screenline Comparisons

In addition to the transit model validation, highway volumes in the Study Area from the model highway assignment procedure also were compared to observed data. Comparisons were made for the Project's screenlines, shown on Figure 3-5. Observed volumes were extracted for the highway sections from

Caltrans's Performance Measurement System. The model has four time periods for highway assignment (AM Peak [before noon]): 6:00am to 9:00am, Midday: 9:00am to 3:00pm, PM Peak [after noon or midday]: 3:00pm to 7:00pm; and Night: 7:00pm to 6:00am).

Figure 3-5. Sepulveda Corridor Map and Project Screenlines



Source: HTA, 2024

Initial comparisons showed that the model was over-assigning Interstate 405 (I-405) and freeways in general in the AM and PM peak periods. The volume-delay function, which calculates congested times based on the number of vehicles using a highway link, was adjusted by adjusting the link capacity (multiplied by 0.5 for freeways and 0.7 for mountain pass highways) to generate more reasonable volumes. These adjustments were affecting only the freeways and over the Sepulveda Pass in the Study Area and not in the rest of the model. After the adjustments, the volumes were closer to the observed volumes.

Table 3-6 and Table 3-7 show the screenline-level volume comparison before and after the model adjustments. The comparison shows that the model volumes are reasonably close to the observed for the AM, PM, and total daily levels. The root-mean-square error (RMSE), which is a measure of how close the observed volumes are to the modeled at each of the locations, was calculated. The lower the RMSE, the better the volumes compare. After the adjustments, the RMSE was close to 0 percent for daily levels, about 12 percent for AM levels, and about 11 percent for PM levels. The model was rerun with the proposed highway adjustments to generate updated highway skims, which are used in the transit paths and affect transit assignment procedures.

Table 3-6. Project Screenline Comparison (before model adjustments)

Screenline	Location	Direction	Cross Street	2019 Traffic Count Data (Total)			CMB18B Model (Unadjusted) Metro 2019 Model Traffic Counts			CMB18B Model (Unadjusted) Compared to 2019 Counts		
				Daily	AM Pead Period	PM Peak Period	Daily	AM Peak Period	PM Peak Period	Daily	AM Peak Period	PM Peak Period
1	Santa Monica Fwy.	WB	West of La Brea	123,202	15,743	27,505	192,052	40,027	39,874	56%	154%	45%
1	Santa Monica Fwy.	EB		146,504	21,909	29,217	203,968	28,621	52,889	39%	31%	81%
2	San Diego Fwy.	SB	North of 187	145,655	23,932	25,043	188,271	26,877	47,470	29%	12%	90%
2	San Diego Fwy.	NB		145,081	25,625	23,323	183,685	39,147	38,165	27%	53%	64%
3	Santa Monica Fwy.	WB	East of Cloverfield Boulevard	52,524	10,272	11,465	98,139	20,717	20,634	87%	102%	80%
3	Santa Monica Fwy.	EB		90,134	15,612	16,321	106,223	15,378	27,625	18%	-1%	69%
4	San Diego Fwy.	NB	North of Wilshire Boulevard	126,229	19,756	25,013	209,853	35,853	54,355	66%	81%	117%
4	San Diego Fwy.	SB		128,041	22,315	24,970	180,475	33,972	40,318	41%	52%	61%
5	San Diego Fwy.	SB	North of Getty Center Drive	188,297	25,548	41,271	197,136	40,900	41,907	5%	60%	2%
5	San Diego Fwy.	NB		141,784	21,067	33,116	222,795	33,956	59,552	57%	61%	80%
6	Ventura Fwy.	WB	West of Coldwater Canyon Avenue	125,739	17,648	24,607	202,408	34,893	45,062	61%	98%	83%
6	Ventura Fwy.	EB		116,350	16,733	24,047	206,635	33,479	47,042	78%	100%	96%
7	Ventura Fwy.	NB	East of White Oak Avenue	153,286	22,398	34,626	211,465	35,119	49,598	38%	57%	43%
7	Ventura Fwy.	SB		143,172	20,200	34,732	210,631	37,072	47,281	47%	84%	36%
8	San Diego Fwy.	SB	North of Sherman Way	104,893	14,539	23,246	154,741	29,428	31,551	48%	102%	36%
8	San Diego Fwy.	NB		105,217	14,631	24,718	160,605	23,038	38,866	51%	57%	57%
8	I-405 HOV	SB		9,568	2,667	1,836	26,620	6,797	6,246	178%	155%	240%
8	I-405 HOV	NB		12,941	632	5,283	26,799	3,719	8,815	107%	489%	67%

Screenline	Location	Direction	Cross Street	2019 Traffic Count Data (Total)			CMB18B Model (Unadjusted)					
							Metro 2019 Model Traffic Counts			Compared to 2019 Counts		
				Daily	AM Pead Period	PM Peak Period	Daily	AM Peak Period	PM Peak Period	Daily	AM Peak Period	PM Peak Period
9	Ronald Reagan Fwy.	WB	East of Reseda Boulevard	118,412	24,541	30,864	113,189	21,323	25,787	-4%	-13%	-16%
9	Ronald Reagan Fwy.	EB		142,273	24,057	30,948	118,987	19,193	28,646	-16%	-20%	-7%
9	SR-118 HOV	WB		9,411	3,508	3,012	21,608	6,083	6,828	130%	73%	127%
9	SR-118 HOV	EB		11,031	2,596	5,489	18,799	3,845	7,496	70%	48%	37%
Total				**2,340,743**	**365,927**	**500,652**	**3,255,084**	**569,437**	**766,007**	**39%**	**56%**	**53%**

Source: HTA, 2024

% = percent
AM = before noon
PM = after noon or midday
EB = eastbound
Fwy. = Freeway
HOV = high-occupancy vehicle
NB = northbound
SB = southbound
SR = State Route
WB = westbound

Table 3-7. Project Screenline Comparison (after model adjustments)

Screenline	Location	Direction	Cross Street	2019 Traffic Count Data (Total)			CMB18B Model (Unadjusted)					
							Metro 2019 Model Traffic Counts			Compared to 2019 Counts		
				Daily	AM Pead Period	PM Peak Period	Daily	AM Peak Period	PM Peak Period	Daily	AM Peak Period	PM Peak Period
1	Santa Monica Fwy.	WB	West of La Brea	123,202	15,743	27,505	127,186	27,665	24,510	3%	76%	-11%
1	Santa Monica Fwy.	EB		146,504	21,909	29,217	137,370	18,307	36,835	-6%	-16%	26%
2	San Diego Fwy.	SB	North of 187	145,655	23,932	25,043	128,945	16,648	39,691	-11%	-30%	58%
2	San Diego Fwy.	NB		145,081	25,625	23,323	125,843	32,306	24,374	-13%	26%	5%
3	Santa Monica Fwy.	WB	East of Cloverfield Boulevard	52,524	10,272	11,465	93,334	21,014	19,193	78%	105%	67%
3	Santa Monica Fwy.	EB		90,134	15,612	16,321	98,595	14,010	27,475	9%	-10%	68%
4	San Diego Fwy.	NB	North of Wilshire Boulevard	126,229	19,756	25,013	146,524	22,932	39,020	16%	16%	56%
4	San Diego Fwy.	SB		128,041	22,315	24,970	118,716	23,923	25,794	-7%	7%	3%
5	San Diego Fwy.	SB	North of Getty Center Drive	188,297	25,548	41,271	149,193	32,819	30,324	-21%	28%	-27%
5	San Diego Fwy.	NB		141,784	21,067	33,116	170,545	23,872	46,698	20%	13%	41%
6	Ventura Fwy.	WB	West of Coldwater Canyon Avenue	125,739	17,648	24,607	127,043	21,049	26,780	1%	19%	9%
6	Ventura Fwy.	EB		116,350	16,733	24,047	129,434	19,376	29,109	11%	16%	21%
7	Ventura Fwy.	NB	East of White Oak Avenue	153,286	22,398	34,626	136,289	21,294	33,428	-11%	-5%	-3%
7	Ventura Fwy.	SB		143,172	20,200	34,732	133,763	24,073	29,427	-7%	19%	-15%
8	San Diego Fwy.	SB	North of Sherman Way	104,893	14,539	23,246	97,042	17,302	18,339	-7%	19%	-21%
8	San Diego Fwy.	NB		105,217	14,631	24,718	101,249	13,311	23,159	-5%	-9%	-6%
8	I-405 HOV	SB		9,568	2,667	1,836	18,008	4153	4,280	88%	56%	133%
8	I-405 HOV	NB		12,941	632	5,283	17,703	2,687	5,620	37%	325%	6%

Screenline	Location	Direction	Cross Street	2019 Traffic Count Data (Total)			CMB18B Model (Unadjusted)					
							Metro 2019 Model Traffic Counts			Compared to 2019 Counts		
				Daily	AM Pead Period	PM Peak Period	Daily	AM Peak Period	PM Peak Period	Daily	AM Peak Period	PM Peak Period
9	Ronald Reagan Fwy	WB	East of Reseda Boulevard	118,412	24,541	30,864	123,090	22,560	27,333	4%	-8%	-11%
9	Ronald Reagan Fwy	EB		142,273	24,057	30,948	129,001	19,857	30,772	-9%	-17%	-1%
9	SR-118 HOV	WB		9,411	3,508	3,012	21,513	6,074	6,632	129%	73%	120%
9	SR-118 HOV	EB		11,031	2,596	5,489	19,559	3,733	7,707	77%	44%	40%
Total				**2,340,743**	**365,927**	**500,652**	**2,349,945**	**408,965**	**556,500**	**0%**	**12%**	**11%**

Source: HTA, 2024

% = percent
AM = before noon
PM = after noon or midday
EB = eastbound
Fwy. = Freeway
HOV = high-occupancy vehicle
NB = northbound
SB = southbound
SR = State Route
WB = westbound

As part of validation, highway travel times over the Sepulveda Pass and other passes were checked for reasonableness. The model highway travel time for the base year resulting from the highway assignments were compared to observed travel times (according to Google Maps) between the San Fernando Valley and Westside/Central Los Angeles. Google Maps times were extracted for 8:00am departure on a weekday (Tuesday through Thursday) using the “Depart At” option for peak times and for 1:00pm for off-peak times. Google times from 2019 were used for comparison. Google Maps generates a range for travel times based on historical travel time data, and, as such, is a good proxy for observed travel times. Travel times comparison in Table 3-8 show that the model travel times were comparable to the observed travel times. Comparisons were also made against the 2045 scenario highway times. In general, the 2045 times are slightly higher compared to the 2019 travel times.

Table 3-8. Highway Travel Time Comparisons

Facility	Distance (miles)	Northbound Travel Time (minutes)			Southbound Travel Time (minutes)		
		Observed (Google)	Model (2019)	Model (2045)	Observed (Google)	Model (2019)	Model (2045)
Peak							
CA-27	3.8	9	8	9	10	13	12
I-405 (Sepulveda Pass)	4.8	6	6	6	13	13	12
Roscomare Road	4.4	10	8	8	20	22	17
Beverly Glen Boulevard	3.6	10	9	9	22	25	31
Laurel Canyon Boulevard	4	14	17	19	20	22	28
US-101	2.7	6	9	10	7	10	13
Off-Peak							
CA-27	3.8	7	7	6	9	6	5
I-405 (Sepulveda Pass)	4.8	6	5	5	8	5	4
Roscomare Road	4.4	14	8	8	13	8	8
Beverly Glen Boulevard	3.6	10	8	9	10	9	10
Laurel Canyon Boulevard	4	15	11	13	14	12	13
US-101	2.7	4	5	6	4	4	5

Sources: Google and HTA, 2022

CA-27 = Topanga Canyon Blvd
I-405 = Interstate 405
US-101 = U.S. Highway 101

3.5 System Level Comparisons

Systemwide boardings were compared against observed data to ensure that the corridor-level adjustments previously described did not significantly impact overall ridership. Table 3-9 shows the comparison between observed and average weekday transit boardings by mode. The table shows that the model represents the observed ridership reasonably well. UR boardings are within 3 percent, and overall boardings are within 3 percent of observed boardings for 2019.

Table 3-9. Average Weekday Metro Transit Boardings by Mode

Mode	2019 Counts	CBM18B (as is)				CBM18B (after model adjustments)			
		Peak	Off-Peak	Total	Difference	Peak	Off-Peak	Total	Difference
Local Bus	698,635	361,945	323,949	685,894	-2%	355,861	320,680	676,541	-3%
Express Bus	4,433	2,263	1,308	3,571	-19%	2,719	1,250	3,969	-10%
Urban Rail	342,650	208,919	137,405	346,324	1%	195,720	137,122	332,842	-3%
Rapid Bus	159,371	94,684	73,007	167,691	5%	87,905	73,705	161,610	1%
Transitway Bus	31,426	18,648	11,167	29,815	-5%	18,618	11,238	29,856	-5%
BRT – Metro G Line	23,356	12,637	9,747	22,384	-4%	11,944	10,222	22,166	-5%
Commuter Rail	41,750	31,111	10,955	42,066	1%	29,392	11,391	40,783	-2%
Total	**1,301,621**	**730,207**	**567,538**	**1,297,745**	**0%**	**702,159**	**565,608**	**1,267,767**	**-3%**

Source: HTA, 2024

% = percent
BRT = bus rapid transit

Table 3-10 shows the model versus observed rail boardings by line. The Metro C Line model boardings are within 3 percent of observed boardings, and the Metro L Line and Metro E Line are close to 10 percent of the observed boardings. The Metro A Line, Metro B Line, and Metro D Line are within 6 percent of the observed boardings. Overall, the model UR boardings are within 3 percent of the observed 2019 rail boardings, showing that the model represents the UR service reasonably well.

Table 3-10. Average Weekday Metro Rail Boardings by Route

Service	2019 Counts	CBM18B (as is)				CBM18B (after model adjustments)			
		Peak	Off-Peak	Total	Difference	Peak	Off-Peak	Total	Difference
Metro B Line	99,757	55,783	35,257	91,040	-2%	53,336	35,706	89,042	-6%
Metro D Line	37,476	27,257	15,521	42,778		24,719	15,411	40,130	
Metro A Line	62,593	39,280	27,072	66,352	6%	37,011	27,069	64,080	2%
Metro C Line	30,246	18,105	12,227	30,332	0%	17,513	12,323	29,836	-1%
Metro L Line	50,773	33,792	23,900	57,692	14%	32,242	23,863	56,105	11%
Metro E Line	61,804	34,702	23,428	58,130	-6%	30,899	22,750	53,649	-13%
Total Metro Rail	342,650	208,919	137,405	346,324	1%	195,720	137,122	332,842	-3%

Source: HTA, 2024

% = percent

4 ALTERNATIVES CONSIDERED

Model runs were conducted for the No Build Alternative and Build alternatives.

4.1 No Build Alternative

The No Build Alternative would maintain the existing infrastructure and would not include the construction of a fixed-guideway public transportation line. The No Build Alternative is used for comparison purposes to assess the relative benefits and impacts of constructing a new transit project in the Project Area versus implementing only currently planned and funded projects.

4.2 Build Alternatives

Descriptions of Alternatives 1 through 6 are provided below. Maps of the alignments are included in Figure 4-1.

4.2.1 Alternative 1: Monorail with Aerial Alignment in the Interstate 405 Corridor and an Electric Bus Connection to UCLA Gateway Plaza

Alternative 1 would utilize monorail technology, with automated train operations and planned peak-period headways of 166 seconds and off-peak period headways of 5 minutes. Trains would consist of two to eight cars and are expected to consist of six cars during peak periods, with each car having a capacity of 90 to 97 passengers. The southern terminus station would be adjacent to the Metro E Line Expo/Sepulveda Station, and the northern terminus station would be adjacent to the Van Nuys Metrolink/Amtrak Station. The length of the alignment between the terminus stations would be 15.1 miles. The monorail guideway would be entirely aerial and generally located within the I-405 right-of-way and then adjacent to the LOSSAN Corridor tracks between I-405 and the Van Nuys Metrolink Station. In some areas, including all stations, the guideway and passenger platforms would be located on one side of the freeway. Alternative 1 would have eight aerial monorail stations: Sepulveda Boulevard (Metro E Line), Santa Monica Boulevard, Wilshire Boulevard (Metro D Line), the Getty Center, Ventura Boulevard, Sepulveda Boulevard (Metro G Line), Sherman Way, and the Van Nuys Metrolink Station.

At Wilshire Boulevard, an aerial station would be located on the west side of I-405, and an electric bus shuttle would provide service along a 1.5-mile route between the Metro D Line Westwood/VA Station and UCLA Gateway Plaza, with an intermediate stop at Westwood Boulevard/Le Conte Avenue. The electric bus shuttle would operate at the same frequency as the monorail. A maintenance and storage facility (MSF) for monorail vehicles would be located either east of Sepulveda Boulevard south of the LOSSAN Corridor tracks or on property owned by the City of Los Angeles Department of Water and Power (LADWP) east of the Van Nuys Metrolink Station. An Electric Bus MSF would be located at the northwest corner of Pico Boulevard and Cotner Avenue.

Table 4-6 presents the station-to-station travel times for Alternative 1. The travel times include both run time and dwell time. Dwell time is 30 seconds per station. Northbound and southbound travel times vary slightly because of grade differentials and operational considerations at end-of-line stations. To accommodate the monorail guideway within the I-405 corridor, widening of the freeway will be required at some locations, and some freeway ramps and local roads will be realigned or relocated.

Table 4-1. Station-to-Station Travel Time and Station Dwell Time for Alternative 1

From Station	To Station	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Van Nuys Metrolink Station				30
Van Nuys Metrolink	Sherman Way	284	284	-
Sherman Way Station				30
Sherman Way	Metro G Line	135	134	-
Metro G Line Station				30
Metro G Line	Ventura Boulevard	177	184	-
Ventura Boulevard Station				30
Ventura Boulevard	Getty Center	419	418	-
Getty Center Station				30
Getty Center	Wilshire/Metro D Line	263	266	-
Wilshire/Metro D Line Station				30
Wilshire/Metro D Line	Santa Monica Boulevard	99	104	-
Santa Monica Boulevard Station				30
Santa Monica Boulevard	Metro E Line	122	98	-
Metro E Line Station				30

Source: LASRE, 2024

4.2.2 Alternative 3: Monorail with Aerial Alignment in the Interstate 405 Corridor and Underground Alignment between the Getty Center and Wilshire Boulevard

Alternative 3 would utilize monorail technology, with automated train operations and planned peak-period headways of 166 seconds and off-peak period headways of 5 minutes. Trains would consist of two to eight cars and are expected to consist of six cars during peak periods, with each car having a capacity of 90 to 97 passengers. The southern terminus station would be adjacent to the Metro E Line Expo/Sepulveda Station, and the northern terminus station would be adjacent to the Van Nuys Metrolink/Amtrak Station. The length of the alignment between the terminus stations would be 16.1 miles. The monorail guideway would be aerial for most of the alignment, with a 3.6-mile tunnel segment between the Getty Center and Wilshire Boulevard. The aerial alignment would generally be located within the I-405 right-of-way and then adjacent to the LOSSAN Corridor tracks between I-405 and the Van Nuys Metrolink Station.

South of Santa Monica Boulevard and north of the Getty Center, the alignment of Alternative 3 would be the same as that of Alternatives 1. South of Wilshire Boulevard, the alignment would diverge from the I-405 median and transition to below grade along the south edge of the Federal Building property. It would turn north under Veteran Avenue and then travel underneath Westwood Village to an underground station at UCLA Gateway Plaza before returning to the I-405 corridor just south of the proposed Getty Center Station. In some areas, including all aerial stations, the guideway and passenger platforms would be located on one side of the freeway. Alternative 3 would have two underground monorail stations at Wilshire Boulevard (Metro D Line) and UCLA Gateway Plaza along with seven aerial monorail stations: Sepulveda Boulevard (Metro E Line), Santa Monica Boulevard, the Getty Center, Ventura Boulevard, Sepulveda Boulevard (Metro G Line), Sherman Way, and the Van Nuys Metrolink Station. An MSF for monorail vehicles would be located either east of Sepulveda Boulevard south of the LOSSAN Corridor tracks or on property owned by LADWP east of the Van Nuys Metrolink/Amtrak Station. To accommodate the monorail guideway within the I-405 corridor, widening of the freeway will be required at some locations, and some freeway ramps and local roads will be realigned or relocated.

Table 4-2 describes the station-to-station travel distance and time for Alternative 3. The travel times includes both running time and dwelling time. The travel times differ between northbound and southbound trips because of grade differentials and operational considerations at end-of-line stations.

Table 4-2. Station-to-Station Travel Time and Station Dwell Time for Alternative 3

From Station	To Station	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Van Nuys Metrolink Station				30
Van Nuys Metrolink	Sherman Way	284	279	-
Sherman Way Station				30
Sherman Way	Metro G Line	134	133	-
Metro G Line Station				30
Metro G Line	Ventura Boulevard	179	187	-
Ventura Boulevard Station				30
Ventura Boulevard	Getty Center	414	424	-
Getty Center Station				30
Getty Center	UCLA	295	284	-
UCLA Station				30
UCLA	Wilshire/Metro D Line	138	133	-
Wilshire/Metro D Line Station				30
Wilshire/Metro D Line	Santa Monica Boulevard	192	194	-
Santa Monica Boulevard Station				30
Santa Monica Boulevard	Metro E Line	123	97	-
Metro E Line Station				30

Source: LASRE, 2024

4.2.3 Alternative 4: Heavy Rail with Underground Alignment South of Ventura Boulevard and Aerial Alignment Generally along Sepulveda Boulevard in the San Fernando Valley

Alternative 4 would utilize steel-wheel HRT trains, with automated train operations and planned peak-period headways of 2.5 minutes and off-peak-period headways ranging from 4 to 6 minutes. For the current forecasts, an off peak headway of 4 minutes was used. Trains would typically consist of three cars, with each car having a capacity of 170 passengers, but could be increased to four cars. The southern terminus station would be adjacent to the Metro E Line Expo/Sepulveda Station, and the northern terminus station would be adjacent to the Van Nuys Metrolink/Amtrak Station. The length of the alignment between the terminus stations would be 14 miles. The alignment would be underground between the southern terminus and a portal south of Ventura Boulevard in the San Fernando Valley. Between this portal and Ventura Boulevard, the guideway would be aerial on the east side of I-405. North of Ventura Boulevard, the guideway would generally be located above Sepulveda Boulevard until curving southeast to parallel the LOSSAN Corridor tracks. A raised median would be constructed in Sepulveda Boulevard, and the curb would be realigned in some areas to accommodate columns supporting the aerial guideway.

Alternative 4 would have four underground stations at Sepulveda Boulevard (Metro E Line), Santa Monica Boulevard, Wilshire Boulevard (Metro D Line), and UCLA Gateway Plaza, and four aerial stations at Ventura Boulevard, Sepulveda Boulevard (Metro G Line), Sherman Way, and the Van Nuys Metrolink

Station. An MSF for HRT vehicles would be located west of Woodman Avenue south of the LOSSAN Corridor tracks.

Table 4-3 presents the station-to-station travel times for Alternative 4. The travel times include both run time and dwell time. Dwell time is 30 seconds for transfer stations and 20 seconds for other stations. Northbound and southbound travel times vary slightly because of grade differentials and operational considerations at end-of-line stations.

Table 4-3. Station-to-Station Travel Time and Station Dwell Time for Alternative 4

From Station	To Station	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Van Nuys Metrolink Station				30
Van Nuys Metrolink	Sherman Way	182	180	-
Sherman Way Station				20
Sherman Way	Metro G Line	110	109	-
Metro G Line Station				30
Metro G Line	Ventura Boulevard	149	149	-
Ventura Boulevard Station				20
Ventura Boulevard	UCLA	376	366	-
UCLA Station				20
UCLA	Wilshire/Metro D Line	75	68	-
Wilshire/Metro D Line Station				30
Wilshire/Metro D Line	Santa Monica Boulevard	91	92	-
Santa Monica Boulevard Station				20
Santa Monica Boulevard	Metro E Line	89	86	-
Metro E Line Station				30

Source: STCP, 2024

4.2.4 Alternative 5: Heavy Rail with Underground Alignment Including along Sepulveda Boulevard in the San Fernando Valley

Alternative 5 would utilize steel-wheel HRT trains, with automated train operations and with planned peak-period headways of 2.5 minutes and off-peak-period headways of 4 minutes. Trains would typically consist of three cars, with each car having a capacity of 170 passengers, but could be increased to four cars. The southern terminus station would be adjacent to the Metro E Line Expo/Sepulveda Station, and the northern terminus station would be adjacent to the Van Nuys Metrolink Station. The length of the alignment between the terminus stations would be 13.9 miles. The alignment would be the same as that of Alternative 4, but it would be underground between the southern terminus and a portal south of the LOSSAN Corridor tracks. Near the northern terminus, the alignment would be aerial parallel to the LOSSAN Corridor tracks.

Alternative 5 would have seven underground stations at Sepulveda Boulevard (Metro E Line), Santa Monica Boulevard, Wilshire Boulevard (Metro D Line), UCLA Gateway Plaza, Ventura Boulevard, Sepulveda Boulevard (Metro G Line), and Sherman Way, and one aerial station at the Van Nuys Metrolink Station. An MSF for HRT vehicles would be located west of Woodman Avenue south of the LOSSAN Corridor tracks.

Table 4-4 presents the station-to-station travel times for Alternative 5. The travel times include both run time and dwell time. Dwell time is 30 seconds for transfer stations and 20 seconds for other stations. Northbound and southbound travel times vary slightly because of grade differentials and operational considerations at end-of-line stations.

Table 4-4. Station-to-Station Travel Time and Station Dwell Time for Alternative 5

From Station	To Station	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Van Nuys Metrolink Station				30
Van Nuys Metrolink	Sherman Way	166	162	-
Sherman Way Station				20
Sherman Way	Metro G Line	113	109	-
Metro G Line Station				30
Metro G Line	Ventura Boulevard	137	138	-
Ventura Boulevard Station				20
Ventura Boulevard	UCLA	368	359	-
UCLA Station				20
UCLA	Wilshire/Metro D Line	75	69	-
Wilshire/Metro D Line Station				30
Wilshire/Metro D Line	Santa Monica Boulevard	91	92	-
Santa Monica Boulevard Station				20
Santa Monica Boulevard	Metro E Line	89	86	-
Metro E Line Station				30

Source: STCP, 2024

4.2.5 Alternative 6: Heavy Rail with Entirely Underground Alignment Including along Van Nuys Boulevard in the San Fernando Valley and Southern Terminus Station on Bundy Drive

Alternative 6 would utilize the same driver-operated steel-wheel HRT trains as used on the Metro B and D Lines, with planned peak headways of 4 minutes and off-peak-period headways ranging from 8 to 15 minutes. For the current forecasts, an off peak headway of 8 minutes was used. Trains would consist of two, four or six cars and are expected to consist of six cars during peak periods, with each car having a capacity of 133 passengers. The southern terminus station would be adjacent to the Metro E Line Expo/Bundy Station, and the northern terminus station would be adjacent to the Van Nuys Metrolink/Amtrak Station. The length of the alignment between the terminus stations would be 12.9 miles.

The alignment would be entirely underground, with the segment on the Westside running generally northeast between the Metro E Line Expo/Bundy Station and the UCLA campus, and the segment in the San Fernando Valley located along Van Nuys Boulevard. Alternative 6 would have seven underground stations at Bundy Drive (Metro E Line), Santa Monica Boulevard, Wilshire Boulevard (Metro D Line), UCLA Gateway Plaza, Ventura Boulevard, Van Nuys Boulevard (Metro G Line), and the Van Nuys Metrolink Station. A ventilation shaft for the tunnel and an associated access road would be located on LADWP property east of Stone Canyon Reservoir. An MSF for HRT vehicles would be located west of Woodman Avenue south of the LOSSAN Corridor tracks.

Table 4-5 presents the station-to-station travel times for Alternative 6. The travel times include both run time and dwell time. Dwell time is 30 seconds for stations anticipated to have higher passenger volumes and 20 seconds for other stations. Northbound and southbound travel times vary slightly because of grade differentials and operational considerations at end-of-line stations.

Table 4-5. Station-to-Station Travel Time and Station Dwell Time for Alternative 6

From Station	To Station	Northbound Station to Station Travel Time (seconds)	Southbound Station to Station Travel Time (seconds)	Dwell Time (seconds)
Van Nuys Metrolink Station				30
Van Nuys Metrolink	Metro G Line	211	164	-
Metro G Line Station				30
Metro G Line	Ventura Boulevard	135	131	-
Ventura Boulevard Station				20
Ventura Boulevard	UCLA	358	358	-
UCLA Station				30
UCLA	Wilshire/Metro D Line	69	71	-
Wilshire/Metro D Line Station				30
Wilshire/Metro D Line	Santa Monica Boulevard	103	108	-
Santa Monica Boulevard Station				20
Santa Monica Boulevard	Metro E Line	111	121	-
Metro E Line Station				20

Source: HTA, 2024

4.3 Parking Assumptions

The ridership results presented in this document have been constrained on parking availability at transit stations. Table 4-6 presents the number of parking spaces available at each station for use by transit patrons, including existing and new parking, for Alternatives 1 through 6. Existing parking represents existing Metro parking facilities adjacent to the new station site that is available for use by riders of the Build alternatives. New parking represents new parking facilities that would be built as part of the Build alternatives for use by riders.

Table 4-6. Existing and New Parking Spaces by Station for Alternatives 1-6

Station	Alt 1	Alt 3	Alt 4	Alt 5	Alt 6
Van Nuys Metrolink Station	0	0	0	0	0
Sherman Way	0	0	New: 122	New: 122	0
Metro G Linea	Existing: 1205	Existing: 1205	Existing: 1205	Existing: 1205	Existing: 307
Ventura Boulevard[a]	0	0	New: 92	New: 92	New: 185
Getty Center	0	0	--	--	--
UCLA Gateway Plaza	--	0	0	0	0
Metro E Line Expo/Sepulveda[b]	Existing: 260	Existing: 260	New: 126 Existing: 260	New: 126 Existing: 260	--
Metro E Line Expo/Bundy[b]	--	--	--	--	New: 80 Existing: 217

Source: HTA, 2024

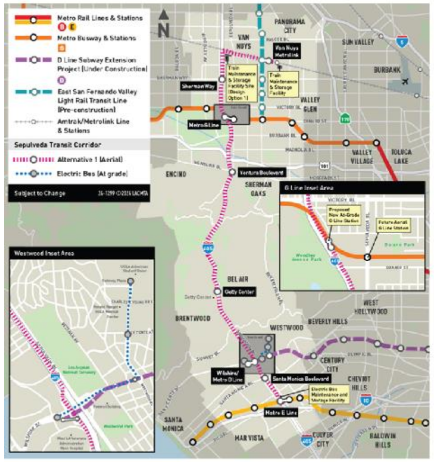
[a] Metro G Line and Ventura Boulevard Stations are at Sepulveda Boulevard for Alternatives 1-5 and at Van Nuys Boulevard for Alternative 6.

[b] Metro E Line Stations are at Sepulveda Boulevard for Alternatives 1-5 and at Bundy Drive for Alternative 6.

Alt = Alternative
-- indicates no data

Figure 4-1. Project Build Alternatives

Alternative 1 (Monorail)

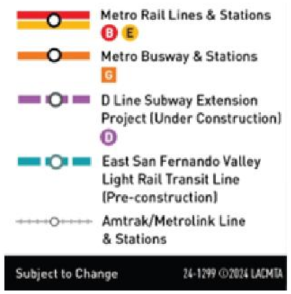


Alternative 3 (Monorail)

Alternative 4 (Heavy Rail)

Alternative 5 (Heavy Rail)

Alternative 6 (Heavy Rail)



Source: HTA, 2024

5 RIDERSHIP FORECAST DEFINITIONS

The model results presented in this report are based on operating and design plans provided by the Project's three design teams. The model runs have been constrained for parking availability, based on the existing Metro parking facilities adjacent to the Build alternative stations and new parking facilities that would be provided as part of the Build alternatives. The model runs presented in this report reflect the re-routing of Antelope Valley Transit Authority line 786 and Santa Clarita Transit line 782/797 to terminate at the proposed Van Nuys Metrolink Station.

The model runs have not been equilibrated to match operating plans to demand. In addition, the ridership results do not reflect potential bus stop relocations or other station area design changes that may be proposed as project design progresses.

Transit ridership measures cover a broad range of statistics that depict the ability of a project to attract riders and the ability of the bus and rail system to serve the traveling public. Important metrics in characterizing the efficiency and utility of a transit alternative are presented herein. The following information defines the typical ridership metrics for each alternative presented in this report:

- **Linked Transit Trips.** A linked transit trip represents a traveler using one or more transit vehicles during the journey from trip origin to trip destination. A commuter driving to a train station and taking the train downtown counts as one linked transit trip. A traveler walking from home to a feeder bus who then transfers to another bus or train also counts as a single linked transit trip. This statistic is directly related to the system's ability to attract customers. A desirable aspect of this statistic is that it is unaffected by system changes that induce extra transfers that would increase other ridership measures. The biggest disadvantage of linked transit trips is that it is intrinsically a system-wide statistic and cannot be related to the performance of a particular route or service. Estimates of linked transit trips are directly estimated by the mode choice model and therefore are directly related to market share.
- **New Riders.** The difference in regional linked trips between the Build and No Build Alternatives is defined by the Federal Transit Administration (FTA) as new riders. A transit alternative that attracts more new riders will do more to reduce highway and local street congestion and will improve the mobility of both the new and existing transit riders as well as the remaining highway users.
- **Unlinked Transit Trips (Boardings).** Unlinked transit trips (also known as boardings) represent the number of times a traveler boards a new transit vehicle. With this statistic, a commuter driving to a train station and taking the train downtown counts as one unlinked transit trip. A traveler walking from home to a feeder bus who then transfers to another bus or train counts as two unlinked transit trips. Alternatives that introduce the need for extra transfers could result in an increase in unlinked trips. The advantage of this statistic is that it can be measured at the route or station level and provides the most intuitive understanding of whether a project is able to attract ridership.
- **Station Boardings.** Station boardings are the number of boardings occurring at each station and can also show the modes of access and egress (e.g., walk, bus, park & ride, or kiss & ride). This statistic provides information on the locations where a project is projected to attract demand. It is also useful in understanding the impacts that each station may have on the surrounding community.
- **Project Boardings (Trips on Project).** Trips on project represent those linked trips making use of a new project. For a stand- alone fixed-guideway system, project boardings are equal to the number of boardings forecast for that service. For projects that are extensions of a pre-existing service,

boardings are equal to the number of boardings at each new station plus the number of travelers who are on-board the trains as they leave the last existing station and travel toward the first new station.

- **Transportation System User Benefits.** Transportation system user benefits (User Benefits) is a system-wide measure of the benefits that are derived by travelers due to the implementation of a project. Travel time savings is a measure of User Benefits, which is expressed as person-hours of equivalent travel time savings when the project is compared to the No Build Alternative. Although the key benefit of a new fixed-guideway project is expected to be shorter running times (i.e., in-vehicle time), fixed-guideway projects may also include improved access, egress, frequencies, and fares and all of these elements are embedded in the User Benefit measure.
- **Congestion Relief.** Congestion relief is the reduction in highway travel demand in a project study area expressed in the reduction of vehicle miles traveled (VMT). It includes both auto and truck travel. As more people switch to transit, fewer vehicles are observed on the highway, thus reducing the overall regional VMT. This measure is calculated from passenger miles traveled (PMT) with an occupancy factor.

6 RIDERSHIP FORECAST RESULTS – ALTERNATIVES 1 AND 3

This section summarizes the ridership forecasting results for the monorail alternatives, Alternatives 1 and 3 (as described in Table 6-1 and sections 4.2.1 and 4.2.2).

Table 6-1. Alternatives 1 and 3 Summary

Alternative	Description
No Build	No project
Alternative 1	Monorail alternative on an aerial alignment in Interstate 405 corridor with eight aerial stations and an electric bus connection to UCLA Gateway Plaza bus stop
Alternative 3	Monorail alternative with aerial alignment in Interstate 405 corridor with nine stations (seven aerial, two underground) and an underground alignment between the Getty Center and Wilshire Boulevard

Source: HTA, 2024

UCLA = University of California, Los Angeles

6.1 Linked and Unlinked Transit Trips

Linked daily transit trips, daily fixed-guideway boardings, daily bus boardings, and daily linked trips are all system-wide statistics for the entire modeling area. These metrics include Metro bus and rail activity, municipal transit activity, and other trip activity across all travel modes. Alternatives 1 and 3 generate similar region-wide statistics, with Alternative 3 generating the largest increase in linked fixed-guideway trips. Compared to the No Build Alternative, Alternatives 1 and 3 would increase the systemwide unlinked transit trips by 88,403 (Alternative 1) and 101,073 (Alternative 3). The fixed guideway service is expected to attract riders from other modes, including single-occupancy-vehicles and other transit modes. Table 6-2 provides a summary of systemwide transit performance measures for Alternatives 1 and 3.

Table 6-2. 2045 Transit Performance Measures for Alternatives 1 and 3

Alternative	Daily Linked Fixed-Guideway Trips[a]	Daily Linked Bus Trips[b]	Daily Linked Transit Trips	Unlinked Transit Trips
No Build	713,616	1,002,677	1,716,293	2,268,389
Alternative 1	747,865	988,479	1,736,344	2,356,792
Alternative 3	755,055	987,309	1,742,364	2,369,462

Source: HTA, 2024 (CBM18, 2018)

[a] Exclusive of bus rapid transit trips
[b] Inclusive of bus rapid transit trips

6.2 Station Level Summaries

For monorail on Alternative 1, the Wilshire/Metro D Line Station has the highest forecasted ridership with 18,200 daily trips, while Sherman Way and Getty Center have the lowest projected ridership with 1,553 and 1,366 daily trips, respectively, in 2045. The total daily ridership for Alternative 1 is projected to be 61,590 in 2045. For the e-bus on Alternative 1, the UCLA Gateway Plaza Station has the lowest projected ridership with 224 daily trips, compared to the Wilshire and Le Conte Stations, which have similar projected ridership numbers at 1,439 and 1,501 daily trips, respectively, in 2045. The total daily ridership for the Alternative 1 e-bus is projected to be 3,164 in 2045. For Alternative 3, the

Wilshire/Metro D Line Station has the highest projected ridership with 19,812 daily trips, while Sherman Way and Getty Center have the lowest projected ridership with 1,523 and 1,301 daily trips, respectively, in 2045. The total daily ridership for Alternative 3 is projected to be 81,842 in 2045, which is 20,252 daily trips higher than that of Alternative 1. Average weekday station boardings for Alternatives 1 and 3 are shown in Table 6-3, Table 6-4 and Table 6-5.

Table 6-3. Year 2045 Alternative 1 Average Weekday Boardings

Station Names	Southbound			Northbound			Total		
	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily
Van Nuys Metrolink	7,603	3,504	11,107	722	434	1,156	8,325	3,938	12,262
Sherman Way	678	422	1,100	277	177	453	955	599	1,553
Metro G Line	3,150	2,104	5,254	2,380	1,285	3,665	5,530	3,389	8,919
Ventura Boulevard	1,806	1,400	3,206	1,614	908	2,522	3,420	2,307	5,727
Getty Center	380	357	737	375	255	630	755	612	1,366
Wilshire/Metro D Line	7,960	3,884	11,844	4,482	1,875	6,357	12,441	5,759	18,200
Santa Monica Boulevard	822	871	1,693	656	842	1,498	1,477	1,713	3,190
Metro E Line	2,529	1,323	3,852	4,382	2,142	6,523	6,910	3,464	10,374
Total	**24,925**	**13,863**	**38,788**	**14,886**	**7,916**	**22,802**	**39,811**	**21,779**	**61,590**

Source: HTA, 2024 (CBM18, 2018)

Table 6-4. Year 2045 Alternative 1 E-Bus Average Weekday Boardings

Station Names	Inbound			Outbound			Daily		
	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily
Wilshire	192	351	543	436	461	897	628	811	1,439
Le Conte	236	407	643	421	438	858	657	845	1,501
UCLA Gateway Plaza	76	86	162	30	33	63	106	119	224
Total	**504**	**843**	**1,347**	**886**	**931**	**1,817**	**1,390**	**1,774**	**3,164**

Source: HTA, 2024 (CBM18, 2018)

Table 6-5. Year 2045 Alternative 3 Average Weekday Boardings

Station Names	Southbound			Northbound			Total		
	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily
Van Nuys Metrolink	7,719	3,976	11,694	656	413	1,068	8,374	4,388	12,762
Sherman Way	674	441	1,115	240	169	409	914	609	1,523
Metro G Line	3,113	2,240	5,352	2,120	1,211	3,331	5,233	3,451	8,683
Ventura Boulevard	1,901	1,550	3,451	1,564	923	2,486	3,464	2,473	5,937
Getty Center	378	368	746	332	223	555	710	591	1,301
UCLA Gateway Plaza	3,386	2,396	5,782	7,435	4,243	11,678	10,821	6,639	17,459
Wilshire/Metro D Line	4,867	2,744	7,610	8,006	4,197	12,202	12,872	6,940	19,812
Santa Monica Boulevard	638	598	1,235	1,228	942	2,170	1,865	1,540	3,405
Metro E Line	2,161	1,136	3,297	4,808	2,858	7,665	6,968	3,994	10,962
Total	**24,834**	**15,446**	**40,280**	**26,386**	**15,176**	**41,562**	**51,220**	**30,622**	**81,842**

Source: HTA, 2024 (CBM18, 2018)

6.3 Project Boardings and Other Metrics

Alternative 3 is projected to generate 19,332 more trips on the Project than Alternative 1. Similarly, there is an increase in new riders, user benefits, congestion relief, and trips made by transit-dependent populations. Table 6-6 presents the Year 2045 average weekday project boardings, user benefits.

Table 6-6. Year 2045 Average Weekday Project Boardings, User Benefits and Congestion Relief Summaries for Alternatives 1 and 3

Description	Alternative 1	Alternative 3
Trips on Project[a]	62,510	81,842
New Riders	20,051	26,071
User Benefits (travel time savings in hours)	13,672	20,023
User benefits per Project Trip (travel time savings in minutes)	13.1	14.7
PMT Savings	358,890	473,655
VMT Savings[b]	341,800	451,100

Source: HTA, 2024 (CBM18, 2018)

a. Trips on Project include the trips that use the proposed alternative including the proposed E-bus Alternative 1
b. An occupancy factor of 1.05 was used for converting the PMT to VMT

PMT = passenger miles traveled
VMT = vehicle miles traveled

7 RIDERSHIP FORECAST RESULTS – ALTERNATIVES 4 AND 5

This section summarizes the ridership forecasting results for the heavy rail alternatives, Alternatives 4 and 5 (as described in Table 7-1 and sections 4.2.3 and 4.2.4).

Table 7-1. Alternatives 4 and 5 Summary

Alternative	Description
No Build	No project
Alternative 4	Heavy rail alternative with underground alignment south of Ventura Boulevard and aerial alignment generally along Sepulveda Boulevard in the San Fernando Valley with eight stations (four aerial, four underground)
Alternative 5	Heavy rail alternative with underground alignment along Sepulveda Boulevard in the San Fernando Valley with eight stations (one aerial, seven underground)

Source: HTA, 2024

7.1 Linked and Unlinked Transit Trips

Linked daily transit trips, daily fixed-guideway boardings, daily bus boardings, and daily linked trips are all system-wide statistics for the entire modeling area. These metrics include Metro bus and rail activity, municipal transit activity, and other trip activity across all travel modes. Alternatives 4 and 5 generate similar region-wide statistics, with Alternative 5 generating a larger increase in linked fixed-guideway trips. Compared to the No Build Alternative, Alternatives 4 and 5 would increase the systemwide unlinked transit trips by 154,603 and 155,430, respectively. The fixed guideway service is expected to attract riders from other modes, including single-occupancy-vehicles and other transit modes. Table 7-2 provides a summary of systemwide transit performance measures for Alternatives 4 and 5.

Table 7-2. 2045 Transit Performance Measures for Alternatives 4 and 5

Alternative	Daily Linked Fixed-Guideway Trips[a]	Daily Linked Bus Trips[b]	Daily Linked Transit Trips	Unlinked Transit Trips
No Build	713,616	1,002,677	1,716,293	2,268,389
Alternative 4	771,932	986,020	1,757,952	2,422,992
Alternative 5	772,294	986,042	1,758,336	2,423,819

Source: HTA, 2024 (CBM18, 2018)

[a.] Exclusive of bus rapid transit trips
[b.] Inclusive of bus rapid transit trips

7.2 Station Level Summaries

For Alternative 4, the Wilshire/Metro D Line Station has the highest projected ridership with 33,384 daily trips, while Santa Monica Boulevard Station has the lowest projected ridership with 5,077 daily trips in 2045. The total daily ridership for Alternative 4 is projected to be 122,775 in 2045. For Alternative 5, the Wilshire/Metro D Line Station has the highest projected ridership with 33,448 daily trips, while Santa Monica Boulevard Station has the lowest projected ridership with 5,107 daily trips in 2045. The total daily ridership for Alternative 5 is projected to be 123,551 in 2045, which is 776 daily trips higher than that of Alternative 4. Average weekday station boardings for Alternatives 4 and 5 are shown in Table 7-3 and Table 7-4.

Table 7-3. Year 2045 Alternative 4 Average Weekday Boardings

Station Names	Southbound			Northbound			Total		
	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily
Van Nuys Metrolink	11,625	5,084	16,709	1,093	684	1,776	12,718	5,767	18,485
Sherman Way	3,084	1,982	5,066	977	636	1,613	4,061	2,617	6,678
Metro G Line	5,227	3,204	8,431	4,449	2,269	6,717	9,676	5,473	15,148
Ventura Boulevard	2,264	1,824	4,087	1,966	1,157	3,123	4,230	2,980	7,210
UCLA Gateway Plaza	3,372	2,735	6,107	7,575	4,729	12,304	10,947	7,464	18,411
Wilshire/Metro D Line	9,581	5,128	14,709	11,921	6,754	18,675	21,502	11,882	33,384
Santa Monica Boulevard	1,298	1,402	2,700	1,152	1,226	2,377	2,449	2,628	5,077
Metro E Line	4,262	1,560	5,821	8,312	4,252	12,563	12,573	5,811	18,384
TOTAL	**40,711**	**22,917**	**63,628**	**37,443**	**21,704**	**59,147**	**78,154**	**44,621**	**122,775**

Source: HTA, 2024 (CBM18, 2018)

Table 7-4. Year 2045 Alternative 5 Average Weekday Boardings

Station Names	Southbound			Northbound			Total		
	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily
Van Nuys Metrolink	12,294	5,478	17,772	1,087	691	1,778	13,381	6,169	19,549
Sherman Way	3,037	1,962	4,999	972	628	1,599	4,009	2,589	6,598
Metro G Line	5,233	3,282	8,515	4,382	2,095	6,476	9,615	5,376	14,991
Ventura Boulevard	2,293	1,842	4,134	1,954	1,145	3,098	4,246	2,986	7,232
UCLA Gateway Plaza	3,443	2,772	6,215	7,514	4,688	12,201	10,956	7,460	18,416
Wilshire/Metro D Line	9,810	5,219	15,029	11,844	6,576	18,420	21,654	11,795	33,448
Santa Monica Boulevard	1,339	1,465	2,804	1,080	1,224	2,303	2,419	2,689	5,107
Metro E Line	4,337	1,532	5,869	8,150	4,194	12,343	12,487	5,725	18,212
TOTAL	**41,785**	**23,549**	**65,334**	**36,979**	**21,238**	**58,217**	**78,764**	**44,787**	**123,551**

Source: HTA, 2024 (CBM18, 2018)

7.3 Project Boardings and Other Metrics

Alternative 5 is projected to generate 776 more trips on the Project than Alternative 4. Similarly, there is an increase in new riders, user benefits, congestion relief, and trips made by transit-dependent populations. Table 7-5 presents the Year 2045 average weekday project boardings, user benefits, and congestion relief summaries for Alternatives 4 and 5.

Table 7-5. Year 2045 Average Weekday Project Boardings, User Benefits and Congestion Relief Summaries for Alternatives 4 and 5

Description	Alternative 4	Alternative 5
Trips on Project	122,775	123,551
New Riders	41,659	42,043
User Benefits (travel time savings in hours)	32,223	32,297
User Benefits per Project Trip (travel time savings in minutes)	15.7	15.7
PMT Savings	806,190	813,855
VMT Savings[a]	767,800	775,100

Source: HTA, 2024 (CBM18, 2018)

[a]An occupancy factor of 1.05 was used for converting the PMT to VMT

PMT = passenger miles traveled
VMT = vehicle miles traveled

8 RIDERSHIP FORECAST RESULTS – ALTERNATIVE 6

This section summarizes the ridership forecasting results for the heavy rail Alternative 6 (as described in Table 8-1 and section 4.2.5).

Table 8-1. Alternative 6 Summary

Alternative	Description
No Build	No project
Alternative 6	Heavy rail alternative with entirely underground alignment including along Van Nuys Boulevard in the San Fernando Valley and southern terminus station on Bundy Drive with seven underground stations

Source: HTA, 2024

8.1 Linked and Unlinked Transit Trips

Linked daily transit trips, daily fixed-guideway boardings, daily bus boardings, and daily linked trips are all system-wide statistics for the entire modeling area. These metrics include Metro bus and rail activity, municipal transit activity, and other trip activity across all travel modes. Compared to the No Build Alternative, Alternative 6 would increase the systemwide unlinked transit trips by 139,587. The fixed guideway service is expected to attract riders from other modes, including single-occupancy-vehicles and other transit modes. Table 8-2 provides a summary of systemwide transit performance measures for all scenarios.

Table 8-2. 2045 Transit Performance Measures for Alternative 6

Alternative	Daily Linked Fixed-Guideway Trips[a]	Daily Linked Bus Trips[b]	Daily Linked Transit Trips	Unlinked Transit Trips
No Build	713,616	1,002,677	1,716,293	2,268,389
Alternative 6	765,244	988,127	1,753,371	2,407,976

Source: HTA, 2024 (CBM18, 2018)

a. Exclusive of Orange Line bus rapid transit trips
b. Inclusive of Orange Line trips

8.2 Station Level Summaries

For Alternative 6, the Wilshire/Metro D Line Station has the highest projected ridership with 30,918 daily trips, while Santa Monica Boulevard Station has the lowest projected ridership with 5,625 daily trips in 2045. The total daily ridership for Alternative 6 is projected to be 107,092 in 2045. Table 8-3 shows average weekday station boardings for Alternative 6.

Table 8-3. Year 2045 Alternative 6 Average Weekday Boardings

Station Names	Southbound			Northbound			Total		
	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily	Peak	Off-Peak	Daily
Van Nuys Metrolink	12,143	4,771	16,914	715	352	1,067	12,858	5,123	17,981
Metro G Line	5,950	2,914	8,864	3,264	1,441	4,705	9,214	4,355	13,569
Ventura Boulevard	2,594	1,721	4,315	1,823	1,025	2,848	4,417	2,746	7,163
UCLA Gateway Plaza	3,467	2,526	5,993	6,986	3,341	10,327	10,453	5,867	16,320
Wilshire/Metro D Line	11,485	5,085	16,570	9,755	4,594	14,349	21,240	9,679	30,918
Santa Monica Boulevard	2,155	1,162	3,317	1,278	1,030	2,308	3,433	2,192	5,625
Metro E Line	4,330	1,651	5,981	6,158	3,380	9,538	10,488	5,031	15,518
TOTAL	**42,123**	**19,829**	**61,952**	**29,978**	**15,162**	**45,140**	**72,101**	**34,991**	**107,092**

Source: HTA, 2024 (CBM18, 2018)

8.3 Project Boardings and Other Metrics

Of the projected 107,092 trips on the Project for Alternative 6, 18,500 trips are projected to be made by transit-dependent populations, accounting for approximately 17.29 percent of the total trips. Table 8-4 presents the Year 2045 average weekday project boardings, user benefits, and congestion relief summaries for Alternative 6.

Table 8-4. Year 2045 Average Weekday Project Boardings, User Benefits, and Congestion Relief Summary for Alternative 6

Description	Alternative 6
Trips on Project	107,092
New Riders	37,078
User Benefits (travel time savings in hours)	27,883
User benefits per Project Trip (travel time savings in minutes)	15.6
PMT Savings	730,170
VMT Savings[a]	695,400

Source: HTA, 2024 (CBM18, 2018)

[a.] An occupancy factor of 1.05 was used for converting the PMT to VMT

PMT = passenger miles traveled
VMT = vehicle miles traveled

9 MODEL UNCERTAINTIES

As part of the uncertainty in the ridership estimates, stepwise buildup of forecast was performed. This section discusses the tests performed and the results. The uncertainty analysis was performed on Alternatives 1 and 5, which are the lowest and highest performing alternatives as defined by trips on the Project.

The following series of runs were performed as a stepwise buildup on top of the existing (2019) scenario:

- Existing + Project
- Existing + Project + Future Year Trip Tables
- Existing + Project + Future Year Trip Tables + Future Year Skims

Trips on the Project for each scenario were estimated and compared to the future year (2045) Build scenarios for Alternative 1 and Alternative 5 as shown in Table 9-1. Compared to 2045 Build scenarios, the Existing + Project scenario generates about 65 percent trips on the Project. Using future year trip tables generates about 72 percent of the full Build 2045 scenario with the increase due to the future land use. When replacing the highway skims with future congested skims generates about 90 percent of the 2045 Build scenario estimates. It is to be noted that the existing year networks include non-NextGen bus network and do not include some of the future rail projects such as the Metro D Line Extension and the East San Fernando Valley Light Rail Transit projects that are included in the 2045 Build scenarios.

Table 9-1. Model Uncertainties Analysis

Scenario	Network	Trip Table	Highway Skim	Trips on the Project	
				Alternative 1	Alternative 5
Existing + Project	2019	2019	2019	40,598	79,708
Existing + Project + Future Year Trip Tables	2019	2045	2019	44,763	88,328
Existing + Project + Future Year Trip Tables + Future Year Skims	2019	2045	2045	56,418	108,532
Future Year + Project + Future Year Trip Tables + Future Year Skims	2045	2045	2045	62,510	122,715

Source: HTA, 2024

Table 9-2 shows comparison of Trips on the Project by scenario as a share of the Future year Trips on the Project. If the Project was built today, the Project would generate about 65 percent of Trips on the Project generated in the future year scenario. The effect of growth in the demographics adds about 6.7 percent in the Alternative 1 and about 7 percent for Alternative 5 scenarios. Including future year congestion results in the Trips on the Project increase by about 18.6 percent for Alternative 1 and about 16.5 percent for Alternative 5, respectively. Including the future year network changes results in an increase in the Trips on the Project by about 9.7 percent for Alternative 1 and about 11.6 percent for Alternative 5, respectively. This indicates that the Project has a strong beneficial impact. The comparison also shows that the impacts are similar between Alternative 1 and Alternative 5.

Table 9-2. Trips on the Project by Scenario Compared to Future Build Scenario

Scenario	Alternative 1 (%)	Alternative 5 (%)	Alternative 5 compared to Alternative 1 (%)
"If today"	64.90	65.00	0.00
SED Growth	6.70	7.00	0.40
Future Congestion	18.60	16.50	-2.20
Future Network Synergy	9.70	11.60	1.80

Source: HTA, 2024

% = percent

10 CONCLUSIONS

This report presents the travel demand ridership modeling results for all five build alternatives for the Project. Key metrics from the forecasts are summarized in Table 10-1, including boardings at new stations, trips on the Project, new riders, travel time savings (i.e., transportation system user benefits), and PMT and VMT reductions.

Table 10-1. Summary of Key Metrics, Average Weekday Ridership Results, Model Uncertainty Analysis, and Transit-Dependent Trips for Alternatives 1-6

Ridership Metric	Alt 1	Alt 3	Alt 4	Alt 5	Alt 6
Alignment Statistics					
Number of Stations	8 (3 bus stops)	9	8	8	7
Distance (miles)	15.1 (1.5-mile bus route)	16.1	14.0	13.9	12.9
Base Alternatives and Options					
Total Trips on the Project	62,510	81,842	122,775	123,551	107,092
New Rider Trips	20,051	26,071	41,659	42,043	37,078
User Benefits (travel time savings in hours)	13,672	20,023	32,223	32,297	27,883
User Benefits per Project Trip (travel time savings in minutes)	13.1	14.7	15.7	15.7	15.6
PMT Savings	358,890	473,655	806,190	813,855	730,170
VMT Savings	341,800	451,100	767,800	775,100	695,400

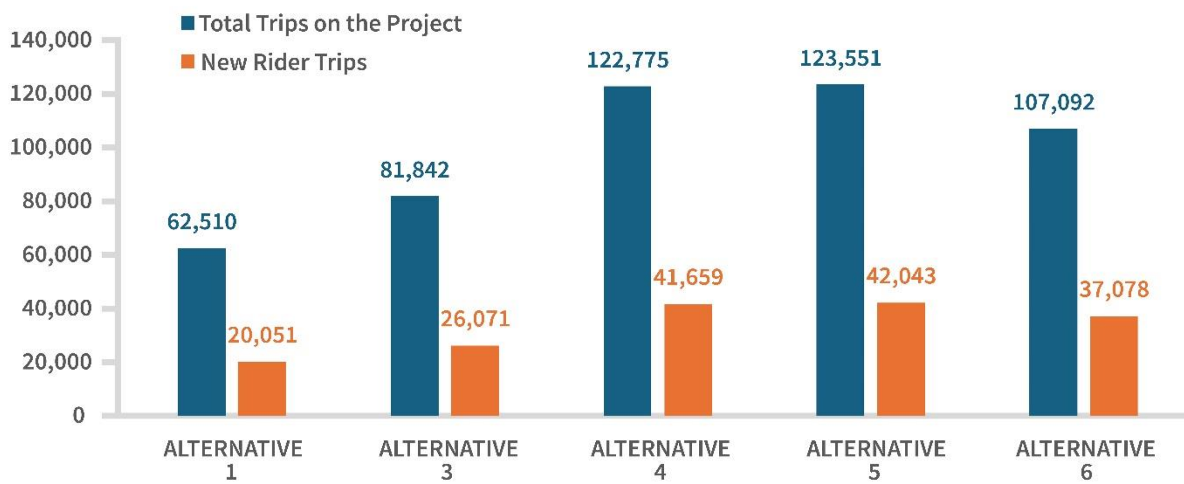
Model Uncertainty Analysis					
Scenario	*Trips on the Project*				
Existing + Project	40,598	--	--	79,708	--
Existing + Project + Future Year Trip Tables	44,763	--	--	88,328	--
Existing + Project + Future Year Trip Tables + Future Year Skims	56,418	--	--	108,532	--
Future Year + Project + Future Year Trip Tables + Future Year Skims	62,510	--	--	122,715	--

Source: HTA, 2024 (CBM18, 2018)

-- indicates model run not performed
Alt = Alternative
PMT = passenger miles traveled
VMT = vehicle miles traveled

Regarding the total trips on project and new rider trips for the various project alternatives, Alternative 5 leads with 123,551 total trips, followed closely by Alternative 4 with 122,775 trips. For new rider trips, Alternative 5 has the highest number at 42,043, followed by Alternative 4 with 41,659. Alternative 1 has the lowest figures across all categories, highlighting its lesser impact compared to the other alternatives. Figure 10-1 illustrates the total trips on project and the new rider trips for all build alternatives.

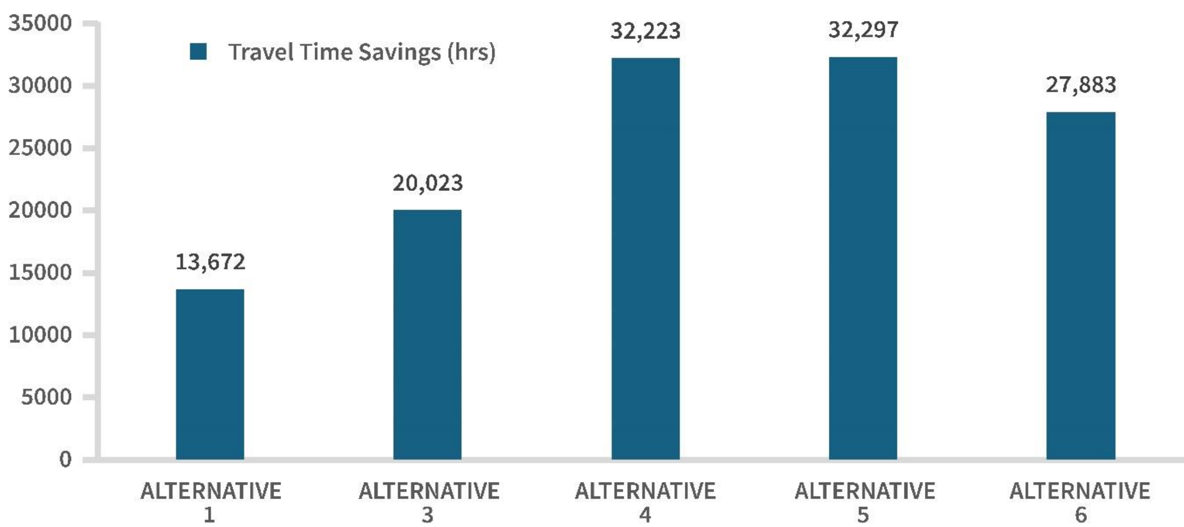
Figure 10-1. Trips on the Project for Build Alternatives



Source: HTA, 2024 (CBM18, 2018)

Transportation System User Benefits (User Benefits) for Alternative 1 results in the lowest travel time savings with 13,672 hours, while Alternative 5 provides the highest savings with 32,297 hours. Alternatives 4 and 5 have nearly identical savings, indicating a significant improvement over the other options. Alternative 6 also shows considerable savings at 27,883 hours, highlighting its effectiveness compared to the lower-ranked alternatives. Figure 10-2 illustrates the User Benefits in terms of travel time savings in hours for Alternatives 1 through 6.

Figure 10-2. User Benefits (in Hours) for Build Alternatives

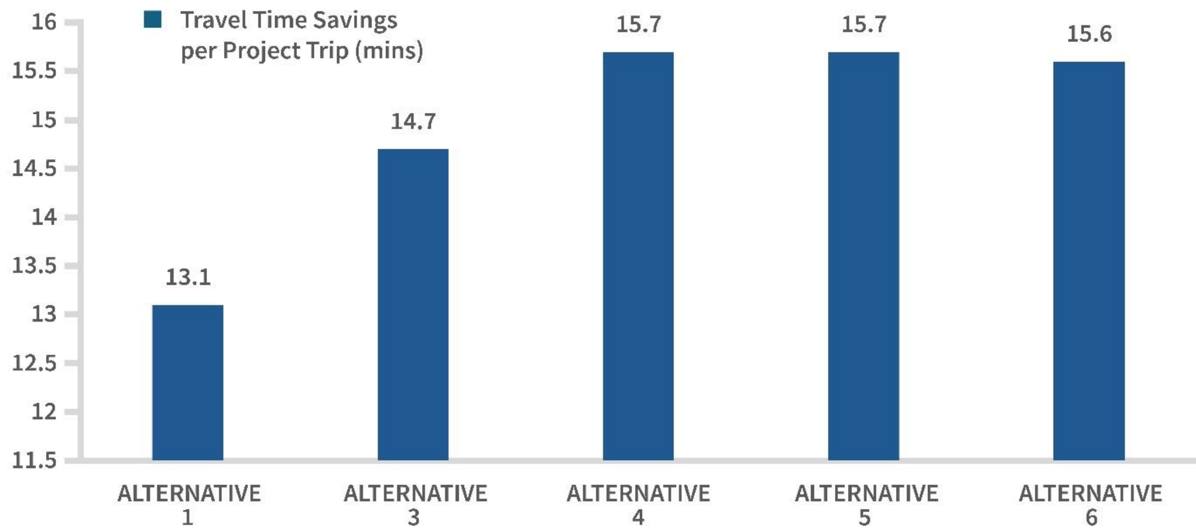


Source: HTA, 2024 (CBM18, 2018)

User Benefits per trips on the project for Alternative 1 offers the least savings at 13.1 minutes per trip, whereas Alternatives 4 and 5 tie for the highest savings, both at 15.7 minutes per trip. Alternative 6 also performs well with a savings of 15.6 minutes per trip, while Alternative 3 provides moderate savings at

14.7 minutes per trip. Figure 10-3 illustrates the User Benefits per project trip in minutes for Alternatives 1-6.

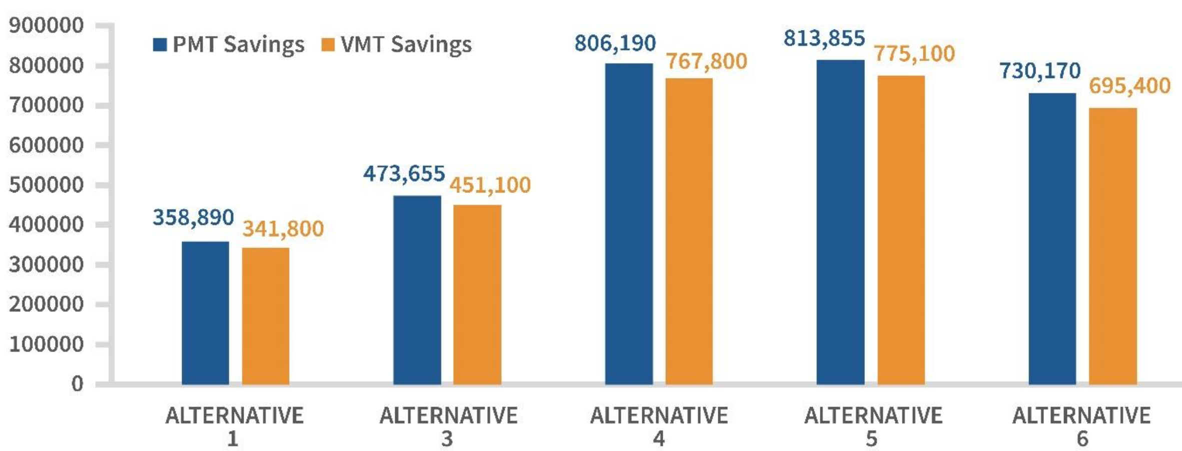
Figure 10-3. User Benefits per Project Trip (in Minutes) for Build Alternatives



Source: HTA, 2024 (CBM18, 2018)

Regarding PMT and VMT savings, Alternative 1 has the lowest savings in both PMT (358,890) and VMT (341,800). Alternative 5 achieves the highest PMT savings at 813,855, closely followed by Alternative 4 with 806,190. Alternative 5 also leads in VMT savings with 775,100, while Alternative 4 saves 767,800 VMT. Alternatives 3 and 6 show moderate savings in both metrics, highlighting that Alternatives 4 and 5 are the most effective in reducing both PMT and VMT. Figure 10-4 illustrates PMT and VMT savings for Alternatives 1-6.

Figure 10-4. PMT and VMT Savings for Build Alternatives



Source: HTA, 2024 (CBM18, 2018)

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Appendix A. Average Weekday Boardings Comparison by Routes for Corridor Validation

Table A-1. Average Weekday Boardings Comparison by Routes for Corridor Validation

Route/Routes Group	2019 Counts	Model As Is	Comparison to Counts	Model After Adjustments	Comparison to Counts
Rail Lines in the I-405 Corridor					
Metrolink - Ventura	3,265	5,731	76%	4,525	39%
Metrolink - Antelope Valley	6,856	6,804	-1%	6,565	-4%
Metro D Line	137,234	133,818	-2%	129,172	-4%
Metro B Line					
Metro C Line	30,246	30,332	0%	29,836	-1%
Subtotal	**177,601**	**176,685**	**-1%**	**170,098**	**-4%**
Bus Routes over the Sepulveda Pass on I-405 and Sepulveda Boulevard					
Metro Route 573	910	395	-	256	-72%
Metro Route 574	297	343	-	197	-34%
Santa Clarita Commuter 797	786	790	-	790	1%
Santa Clarita Commuter 792	46	15	-	14	-70%
AVTA Commuter 786	0	2,482	-	1,676	-
Metro Route 234	5,841	3,673	-37%	5,616	-4%
Metro Route 734	6,209	6,389	3%	4,099	-34%
Subtotal	**14,089**	14,087	17%	**12,648**	**-10%**
Bus Routes South of Sepulveda Pass					
Metro Route 720	28,935	50,506	75%	47,021	63%
Metro Route 20	13,511	16,820	24%	16,819	24%
LADOT 534	172	499	-69%	566	229%
LADOT 431	157	23	-	24	-85%
Metro Route 2_302	13,091	11,427	-13%	13,321	2%
Metro Route 4_304	15,596	31,765	104%	17,990	15%
Metro Route 16	22,082	14,305	-35%	14,235	-36%
Santa Monica BBB1	8,563	6,334	27%	7,330	-14%
Santa Monica BBB10	2,803	369	-45%	403	-86%
Metro Route 704	11,029	2,069	-81%	3,364	-69%
Metro Route 33	10,915	13,121	20%	12,661	16%
Metro Route 733	8,154	8,468	4%	7,917	-3%
Metro Route 110	8,333	5,048	-39%	4,888	-41%
Metro Route 788	2,106	958	-55%	400	-81%
Metro Route 102	2,734	468	-83%	465	-83%
Metro Route 108	16,004	17,170	7%	16,639	4%
Metro Route 217	6,947	2,561	-63%	2,750	-60%
Metro Route 117	9,371	5,748	-39%	5,670	-39%
Metro Route 111	15,653	17,733	13%	17,255	10%
Metro Route 115	14,808	18,135	22%	17,571	19%
Metro Route 232	4,799	8,077	68%	5,484	14%
Subtotal	**215,760**	231,604	10%	**212,773**	**-1%**
Bus Routes North of Sepulveda Pass					
Metro Route 901	23,357	22,384	-	22,166	-5%
Metro Route 240	-	2,897	-	2,298	-
Metro Route 150	8,844	4,402	-50%	6,009	-32%
LADOT 423	493	2,314	-	1,570	218%
LADOT 422	771	451	-	509	-34%

Route/Routes Group	2019 Counts	Model As Is	Comparison to Counts	Model After Adjustments	Comparison to Counts
Metro Route 750	2,490	3,299	32%	1,162	-53%
Metro Route 154	868	251	-71%	2,594	199%
Metro Route 183	1,801	1,351	-25%	1,123	-38%
Metro Route 744	9,229	7,108	-23%	10,540	14%
Metro Route 164	6,518	9,330	43%	7,359	13%
Metro Route 165	8,023	8,012	0%	7,153	-11%
Metro Route 162/163	9,650	3,776	-61%	5,907	-39%
Metro Route 158	2,209	880	-60%	1,200	-46%
Metro Route 167	2,552	368	-86%	623	-76%
Metro Route 152	11,499	8,390	-27%	9,274	-19%
Metro Route 155	1,454	2,057	41%	1,949	34%
Metro Route 169	2,404	141	-94%	322	-87%
Metro Route 237	2,132	666	-69%	1,203	-44%
Metro Route 233	11,827	6,815	-42%	10,134	-14%
Subtotal	**106,118**	**84,892**	**-19%**	**93,095**	**-12%**
UCLA Routes					
Santa Monica BBB2	2,712	3,214	19%	3,414	26%
Santa Monica BBB3	2,478	2,440	-2%	2,440	-2%
Santa Monica BBB8	4,382	3,524	-20%	4,179	-5%
Santa Monica BBB12	4,720	8,865	88%	4,983	6%
Subtotal	**14,292**	**18,043**	**26%**	**15,016**	**5%**

Source: HTA, 2022

% = percent
AVTA = Antelope Valley Transit Authority
BBB = Big Blue Bus
LADOT = Los Angeles Department of Transportation