Metro®

We have a plan for OUR NEXT LA*.

2020 Long Range Transportation Plan

TECHNICAL DOCUMENT

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**By LA, we mean all 88 cities, unincorporated areas and hundreds of neighborhoods, in LA County.*

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Introduction

The 2020 Long Range Transportation Plan Technical Document (Technical Document) is a companion document to the Los Angeles County Metropolitan Transportation Authority's 2020 Long Range Transportation Plan (LRTP). This technical document provides additional information regarding various technical components of the LRTP, including outreach efforts, priority areas, capital projects and programs, sustainability, equity, financial modeling and assumptions, travel demand modeling and assumptions, performance analysis, and sub-regional profiles. For more information on LRTP recommendations, please refer to the LRTP, available under separate cover.

LRTP Overview

As the state-designated transportation planning and programming agency for LA County, Metro is required to adopt and maintain an LRTP to satisfy federal and state funding requirements (per enabling legislation California Public Utilities Code §130050 et seq). Metro develops a LRTP for LA County. The LRTP is periodically updated to maintain at least a 20-year planning horizon, and to reflect changes since the last Plan was adopted. The 2020 LRTP extends the planning horizon from the 2009 LRTP by an additional seven years, from 2040 to 2047. It also updates the LRTP for a variety of factors, such as socio-economic data, financial conditions, changes in travel patterns, and the inclusion of additional projects and programs. The LRTP is a living document which can be amended through Board action as regional needs and priorities change.

LRTP Development

In developing the LRTP, Metro coordinated with a wide range of partners representing a variety of interests. Metro conducted community outreach meetings for the LRTP at locations throughout the County, and provided an opportunity for public review through a 45-day comment period (see Chapter 2 for more details). Metro also coordinated with its transportation partners, including the sub-regional agencies, the Southern California Association of Government (SCAG), Caltrans, Metrolink, and municipal and local transit operators. Finally, the LRTP benefited from regular consultation with the Metro Policy Advisory Council (PAC).

While the development of this LRTP occurred primarily over the past year, it is built on a multi-year process to engage community members and stakeholders. In 2013, the Metro Board directed that a holistic countywide "Mobility Matrices" approach be developed to assess the county's transportation needs. In February 2014, the Board approved the approach whereby subregional working groups would develop goals for analyzing unmet county transportation needs. The process ultimately resulted in a project list that met the expected revenue generated by the tax measure, and more importantly, it emerged as a plan from the people for the people. In November 2016, Measure M made history when 71.15 percent of LA County voters approved the ballot measure to fund an array of transportation projects and programs. The result was a half-cent sales tax with a no sunset provision and the indefinite extension of the existing half cent tax (Measure R) set to expire in 2039.

Together, Measures M and R provide LA County with a 40-year capital expansion program described in Section 4 of this document. However, the LRTP provides a 30-year vision for Metro to move beyond the capital program and develop bold policies and programs to transform mobility in LA County.

Document Contents

This technical document builds upon the LRTP by providing extended content in several topic areas with the following sections:

Outreach Summary
This chapter highlights the processes involved in public outreach and stakeholder engagement as a part of the LRTP.

Priority Areas
This chapter organizes Metro's projects and programs into the LRTP's four priority areas (Better Transit, Less Congestion, Complete Streets, Access to Opportunity) and takes a deep dive into Metro's sustainability and equity programs.

Financial Model and Assumptions
This chapter describes the financial model and analysis that supports the LRTP.

Travel Demand Model and Assumptions
This chapter describes the travel demand model and assumptions used to assess the performance of the LRTP.

Performance Measures
This chapter summarizes transportation system performance in LA County with the improvements recommended in this LRTP.

Subregional Profiles
This chapter describes each of Metro's nine subregions, their transportation facilities, land use, demographics, and major projects and programs.

Outreach Summary

Public engagement and stakeholder outreach are an integral part of the Long Range Transportation Plan (LRTP) update. It is done to guarantee that Metro is inclusive and responsive to its constituents, while ensuring responsible and transparent stewardship of public funds. The LRTP's Public Participation Plan Framework, which was presented to the Board in November 2017, outlined key principles, goals, and established a timeline for up to three rounds of engagement activities. Engagement activities took place across all of the nine LA County subregions.

This outreach effort was named "Our Next LA*" which is meant to illustrate that Metro values collaboration with our partners and constituents. The understanding of 'LA' in this case is that it is a diverse collection of distinct neighborhoods and cities throughout the County of Los Angeles that Metro serves. The outreach was guided by and centered in Metro's Equity Platform which calls on Metro to 'Listen and Learn' as one of its four pillars.

The engagement process can broadly be defined by three distinct steps. The first round, named Baseline Understanding, was an open listening session meant to learn how stakeholders move through the county, what hurdles they might encounter, and how they think Metro might best solve transportation challenges in the county. The second round, the Values Framework, asked participants to rank the five priorities Metro heard most often in the first round of outreach. The last round is the culmination of the previous rounds of outreach and resulted in the release of the Draft LRTP Update to the public. The LRTP reflects all of the voices we heard throughout the outreach process and how Metro is addressing the public's concerns.

Figure 1

Public Outreach Process

Phase 1	Baseline Understanding – Opening Listening	Summer 2018
Phase 2	Values Framework – Respond to What We Hear	Winter 2019
Phase 3	Draft LRTP – Public Review	Summer 2020

Phase 1 – Baseline Understanding

The first phase, named Baseline Understanding, was an open listening session meant to learn how people move through the county, what hurdles they encounter, and how they think Metro might best solve transportation challenges in the county. This initial round of outreach began in June 2018 where Metro used surveys, interviews, and pre-printed Post-It notes to ask the participants at public events what their visions or priorities were for the future of their community. Metro attended more than 52 community events, including health fairs, cultural events, open streets events, farmers markets, back to school giveaways, food fairs and more.

Phase 1 of outreach included the following strategies:

> **Surveys** – The surveys collected information related to participant's travel preferences, including usage of public transportation, and general interest in transportation options within LA County. The collection methods described were purposefully open-ended in order to collect the concerns of the public without having them feel limited by multiple choice options. Participants were also encouraged to complete post-it forms that asked the one thing they wanted realized for their future communities.

> **In-Depth Interviews** – Beyond collecting surveys from participants, Metro also conducted more in-depth interviews with select and willing participants to further probe their thoughts and travel behavior. These interviews supplemented the surveys Metro collected and increased opportunities for Metro listening to unfiltered ideas in detail.

> **Targeted Employer Outreach** – Metro also made in-roads with large employers throughout LA County. These employers ran the gamut of fields, including universities, healthcare, technology, and industrial companies. In total, Metro made contact with 31 employers, with a workforce of approximately 400,000 employees within LA County. Figure 2 is a sample of employers contacted, with estimated numbers for their workforce.

> **Advisory Groups** – Metro also made presentations to various councils and committees within the agency, including the Metro's Citizens Advisory Council(CAC), the Technical Advisory Committee (TAC), and the Policy Advisory Council (PAC), to ensure our diverse stakeholders had the opportunity to discuss their issues and ideas regarding this engagement process. The PAC was established in 2017 to help guide the development of the LRTP, as well as Measure M guidelines. In order to be balanced and broadly representative, the PAC consists of local jurisdictions with all nine Councils of Government (and/or subregions), local transportation providers and agency partners, as well as transportation consumer groups, including community-based organizations and advocates.

Through all channels of outreach, participants were invited to visit the *OurNext.LA* website to learn more about the process and to sign up to receive information regarding the upcoming outreach rounds and, ultimately, the release of the LRTP.

As a result of the outreach in Phase 1, Metro attended more than 50 events, gathered over 20,000 surveys, and spoke to over 40 partners. These events, surveys, and partners were spread throughout the county, to capture the needs from geographic and socioeconomically diverse regions within the county.

Figure 2

Large Employer Outreach

EMPLOYER	NUMBER OF EMPLOYEES
County of Los Angeles	107,400
University of California, Los Angeles	65,600
City of Los Angeles	61,900
Kaiser Permanente	37,400
University of Southern California	21,000
Northrop Grumman Corp.	16,600
Cedars-Sinai Medical Center	14,900
Los Angeles Community College District	13,200
Walt Disney Co.	13,000
NBCUniversal	12,000
California State University, Long Beach	8,800
California Institute of Technology	8,700
Children's Hospital Los Angeles	5,700
Compton Unified School District	3,600
Pasadena Area Community College District	3,500
City of Santa Monica	3,000
Montebello Unified School District	1,900


OUR NEXT LA


OUR NEXT LA


OUR NEXT SAN FERNANDO VALLEY


OUR NEXT LA


MY NEXT Whittier is Public TRANSIT FRIENDLY
MY NEXT Sierra Madre is more transit
MI PRÓXIMO Panorama City es más bicicletas
MY NEXT South Gate is bike friendly
MY NEXT Hacienda Heights is less traffic
MY NEXT Koreatown is more housing
MY NEXT Stevenson Ranch is more aid for homeless
MY NEXT Norwalk is Pro small business

Phase 2 – Values Framework

The second Phase, the Values Framework, began in January 2019 alongside the NextGen Bus Study workshops held throughout LA County. Metro asked participants to rank the five priorities Metro heard most often in the first phase of outreach—those being better transit, less congestion, more innovation, more affordable and inclusive, and safer more complete streets.

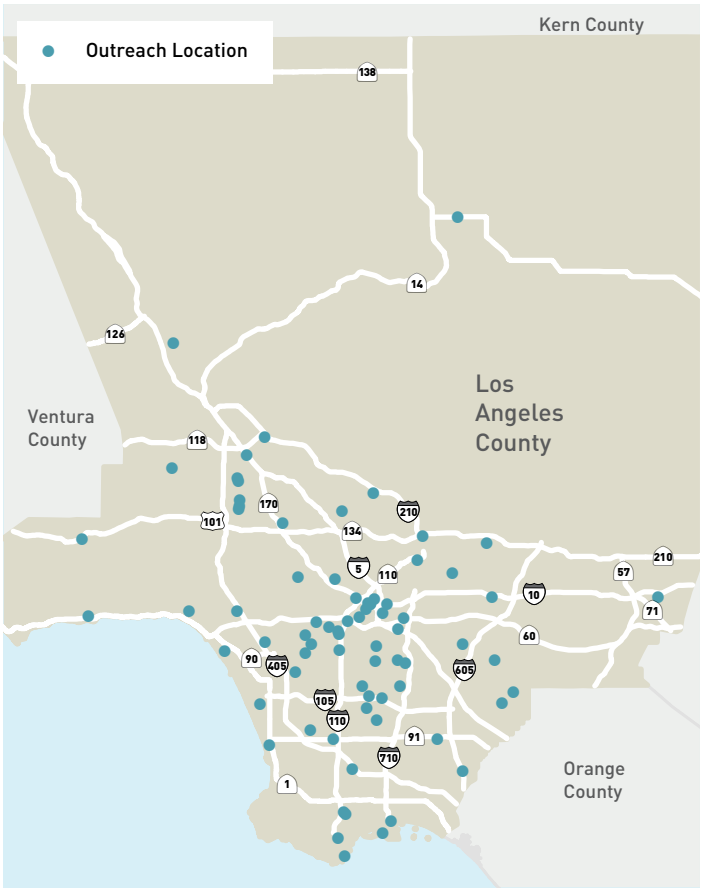
As in the prior phase of outreach, online presence continued to be a key component. In this round, Metro launched a Facebook and Instagram advertisement campaign, and utilized the preexisting Metro Twitter account to direct and encourage the public to rank their priorities through an online tool, available in English and Spanish. Other forms of advertisement for this round included small, neighborhood billboards and car cards, which are posters placed in Metro buses.

To elicit more input, Metro reached out to some of the first round's large employers, jurisdictions, municipal operators, and others to ask them to share the ranking exercise, as well as reached out to the faithbased community.

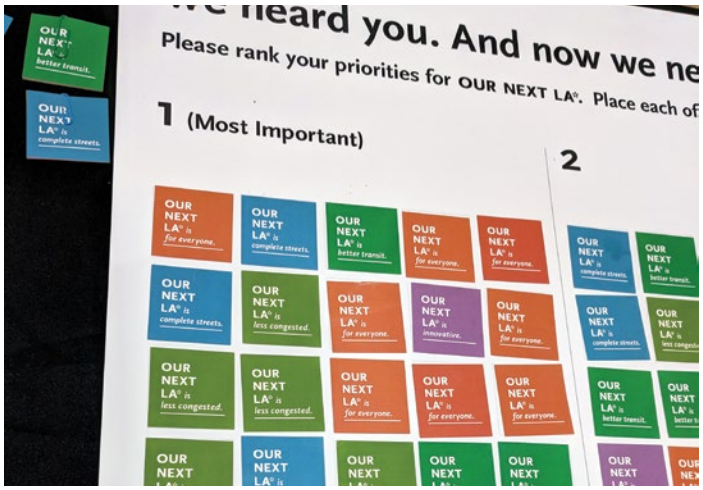
During this second phase, Metro attended approximately twenty-five events, attended twenty-eight public meetings, gathered over 48,000 priority rankings and spoke to 200 Community Based Organizations across all nine subregions.

Figure 3

LRTP COMMUNITY OUTREACH

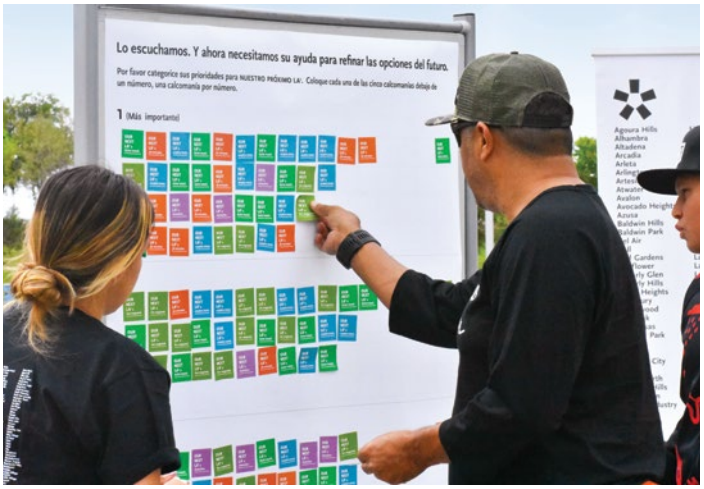


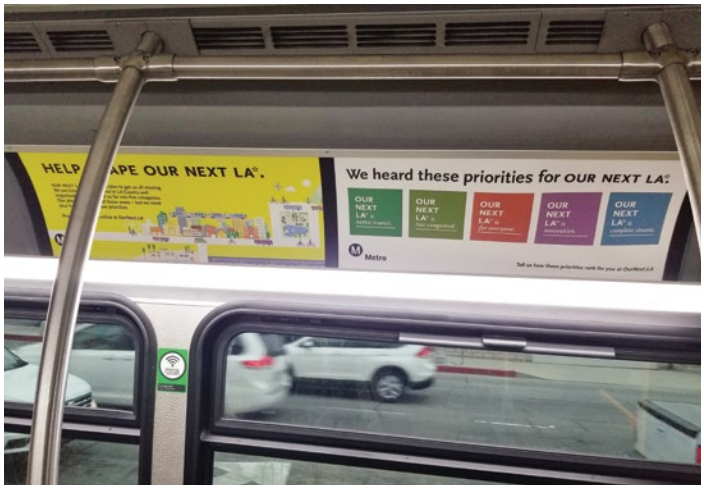
Outreach locations include Phase 1 and Phase 2.


heard you. And now we ne
Please rank your priorities for OUR NEXT LA. Place each of
1 (Most Important)
2


HELP SHAPE OUR NEXT LA.
Here's some detail about the top five priorities we heard:
OUR NEXT LA is better transit.
OUR NEXT LA is less congested.
OUR NEXT LA is innovative.


LRTP/BRT


Lo escuchamos. Y ahora necesitamos su ayuda para refinar las opciones del futuro.


We heard these priorities for OUR NEXT LA.
Metro


LAMAR
HELP SHAPE OUR NEXT LA.
Rank your priorities online at OurNext.LA
Metro
better transit
less congested
for everyone
complete streets
innovative

Phase 3 – Draft LRTP

In the third phase, we released the completed the Draft LRTP for public comment. The Draft LRTP was developed to reflect input gathered throughout the entire process. We asked for community input on the draft plan via several avenues:

> Telephone Town Hall

> Webinar

> Social Media Posts

> *OurNext.LA* Website

> *Metro.net* Website

> Emails

> Postcards

As a result, the LRTP received more than 130,000 visits to *OurNext.LA* during the draft public comment period from stakeholders reviewing plan details. Metro also received 188 comments on the draft LRTP. With this robust feedback, the final LRTP was able to better reflect the needs and priorities of Metro's communities.

Figure 4

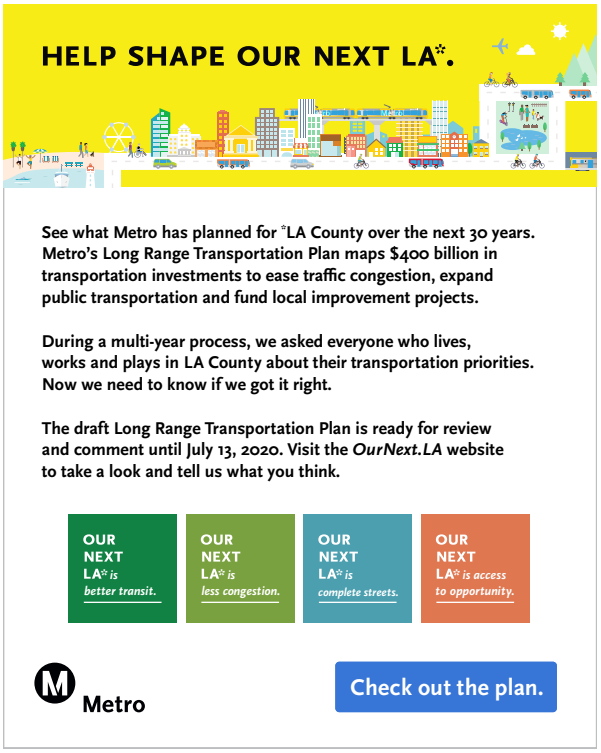
Outreach Tactics

	PHASE 1	PHASE 2	PHASE 3	TOTAL
Public events	52	25	2*	79
Public meetings	10	28	13*	51
Surveys	20,645			20,645
Priority Rankings		48,759		48,759
Partners (inc. large employers)	41	18		59
Emails		16,200	2,448,430	2,464,630
Postcards			23,521	23,521
Media impressions **		6,540,080	15,255,546	21,795,626
OurNext.LA website visits		41,935	134,197	176,132

* Virtual or online event

** Media includes advertising and social media

Rail Poster



E-Blast

Postcard Front

Postcard Back

Animated Digital Ad

Priority Areas

The LRTP public outreach process resulted in the region's desires being distilled into four priority areas:

> Better Transit
> Less Congestion
> Complete Streets
> Access to Opportunity

Metro's expansive programs, policies, and partnerships fit into these four areas, guiding Metro towards a vision of the future that reflects the communities we serve. Better Transit projects and programs aim to expand transportation options and improve service. Less Congestion encompasses programs and highway projects that reduce or are expected to reduce the time people spend in traffic. Programs and projects to maintain and improve upon street safety for all users and convenience fall under the Complete Streets Priority. Access to Opportunity includes Metro's efforts to invest in communities to create jobs and housing near transit.

The LRTP identifies key strategies and actions under each of these four priority areas. For each action, the LRTP indicates whether the action is occurring now (ongoing), soon (in the next 5-10 years), or in the future (more than 10 years) and the goal area (build, manage, maintain, partner). While the LRTP embeds Metro's projects and programs into key strategies and actions, the following section expands on Metro's strategies and actions through a robust overview of our key projects, programs, plans, and policies. Although sustainability and equity are woven throughout the four priority area sections, this chapter also takes a deeper dive into Metro's sustainability and equity programs.


Better Transit
Metro
Metro
Metro
Metro


Less Congestion


Complete Streets


Access to Opportunity

Better Transit

Better transit means faster, more frequent, secure and reliable public transportation, with more options and better customer experience. Since 1990, the Metro Rail system has become one of the largest urban rail systems in the United States. Metro operates a light and heavy rail system that provides more than 101.5 miles of revenue service track and 104 rail stations. Today, the Metro Rail system moves nearly 310,000 passengers each weekday. Figure 5 summarizes the existing rail lines and transitways and FY 2019 boardings.

Metro also operates a bus fleet of 2,308 vehicles that cover more than 1,479 square miles of service area. The estimated weekday ridership was nearly 870,000 in FY2019. Metro's existing bus network consists of the following route types:

> **Metro Local (100-299)** – buses stop on average every two blocks.

> **Metro Limited (300-399)** – modified local buses with wider stop spacing- that mostly operate during weekdays to supplement local service on major corridors that do not have Rapid service.

> **Metro Express (400-500)** – travel routes on freeways for longer distances with fewer stops and have a higher premium (e.g., express routes between regional destinations and Downtown Los Angeles, Dodger Stadium Express from Union Station runs during selected special events, etc.)

> **Metro Shuttles & Circulators (600-699)** – local shuttles and circulators connecting regional destinations (LAX, college and university campuses, medical facilities, etc.) to Metro rail stations or bus transfer hubs.

Figure 5

Existing Rail Network

LINE NAME	OPEN YEAR	MILES (MIN)	STATIONS	ESTIMATED WEEKDAY RIDERSHIP (FY19)
A (Blue) Line*	1990	21.3	22	47,517
B (Red) Line	1993	16.4	14	
D (Purple) Line	2006	6.4	8	137,201
C (Green) Line	1995	19.5	14	30,218
E (Expo) Line	2012	15.2	19	61,590
L (Gold) Line	2003	29.7	27	51,289
All Bus				867,326
TOTAL Weekday Ridership				**1,195,141**

*Note: Because the southern half of the Blue Line Stations were closed in part of 2019, Blue Line estimates only account for the northern half of the line and are solely based on APC counts from the trains. All other rail line estimates are based on manual rail ride checks.

> **Metro Rapid (700-799)** – faster buses featuring transit signal priority and with fewer stops, only at major intersections. LA Metro currently operates 20 Metro Rapid lines traversing all portions of LA County. This format for service is proposed to be merged with Metro Local service to provide a single very high frequency transit service on major corridors, to better balance speed and accessibility for more competitive overall travel times. The only exceptions are three corridors (Wilshire, Vermont, Van Nuys-Westside) with very high demand where Rapid service will be maintained pending the opening of planned or under construction rail or Bus Rapid Transit service.

> **Metro Busways** – bus rapid transit lines (BRT) that run on dedicated busways (e.g., Metro G [Orange] and J [Silver] lines).

In addition to Metro's local bus operations, transit services in LA County are provided by 26 municipal operators. These operators provide services countywide outside the urban core and are an integral part of LA County's transit network. The non-Metro operators collectively manage a fleet of more than 1,911 vehicles. Metro and the County's municipal operators carried 273 million boardings annually in FY19.

Metro is continuing construction of the largest public works program in America by focusing on rail projects which will expand and extend the existing rail network alongside new Bus Rapid Transit (BRT) projects that will focus on congested corridors. The 2020 LRTP will expand the Metro Rail network from 104 rail stations to over 200 stations covering nearly 240 miles. Investments in transit over the next 30 years include the construction or improvement of 22 transit corridors and the addition of 106 miles of fixed guideway transit.

Transit Investment

Funded by Measure M and Measure R, the transit investments at Metro are listed in Figure 6.

Figure 6
Transit Investment

TRANSIT PROJECT	$ IN MILLIONS	OPEN YEAR	DESCRIPTION
Crenshaw/LAX Transit Project (LRT)	2,058	2021	The Crenshaw/LAX Transit Project, currently in construction, will extend from the existing E Line (Expo) at Crenshaw 8.5 miles southwest to the C Line (Green). With opening expected in 2021, the Crenshaw Line will add eight new stations, including one at the Automated People Mover currently under construction at the Los Angeles International Airport (LAX).
Regional Connector Transit Project (LRT)	1,756	2022	This project will allow passengers to transfer between the A (Blue), E (Expo), B (Red) and D (Purple) Lines, bypassing the need to change trains at Union Station.
D Line (Purple) Extension (HRT)			The Purple Line Extension will provide a high-capacity, high-speed alternative for commuters to travel between downtown Los Angeles and the Westside beyond the existing terminus at Wilshire/Western. The project is divided into three sections.
Section 1 (Wilshire/Western to Wilshire/ La Cienega)	2,779	2023	Section 1 will add three new stations and 3.92 miles of new rail to Metro's Rail system. The three new stations will be located at Wilshire/La Brea, Wilshire/Fairfax, and Wilshire/La Cienega. The project will extend the current Purple Line from Koreatown through Miracle Mile.
Section 2 (Wilshire/La Cienega to Century City/Constellation)	2,441	2026	Section 2 includes 2.59 miles of additional tracks to Metro's Rail system and two new stations at Wilshire/Rodeo and Century City/Constellation. Construction for Section 2 began in 2018. The extension will continue the Purple Line from Miracle Mile through Beverly Hills and into Century City.
Section 3 (Century City/Constellation to Westwood/VA Hospital)	3,224	2027	Section 3 will add 2.56 miles of new rail to Metro's Rail system. The two new stations will be added at Wilshire/Westwood and on the U.S. Department of Veterans Affairs property. The project began construction in 2019 and is anticipated to open for operations in 2027.
Airport Metro Connector/96th Street Station/Green Line Ext LAX	626	2024	The Airport Metro Connector will provide a connection along the Crenshaw/LAX Line to a future Automated People Mover (APM) to be built and operated by Los Angeles World Airports (LAWA). This will serve as a transit "Gateway" to LAX. The AMC Transit Station is envisioned to include the following basic components: three at-grade LRT platforms to be served by the Crenshaw/LAX Line and an extension of the Metro Green Line, a bus plaza and terminal facility for Metro and municipal bus operators, a bicycle hub with secured parking, a pedestrian plaza, a passenger vehicle pick-up and drop-off area, and a Metro transit center/ terminal building ("Metro Hub") that connects passengers between the various modes of transportation.

LRTP project costs may not match Measure M expenditure plan due to year of expenditure escalation and prior spending. Final mode, alignments, and station locations to be confirmed during environmental processes. Estimated open year is a three-year range.

*Includes projects through 2057, the horizon year of Measure M

TRANSIT PROJECT	$ IN MILLIONS	OPEN YEAR	DESCRIPTION
Crenshaw/LAX Track Enhancement Project	56	2024	A portion of the Crenshaw/LAX project runs in a trench adjacent to the LAX runways and the LAX Runway Protection Zone. A cover will be installed over the portion of the below-grade trench that is currently open.
North San Fernando Valley Transit Corridor (BRT)	207	2025	The North San Fernando Valley (NSFV) project is a proposed new 18-mile BRT line that would enhance existing bus service and increase transit system connectivity. The project will travel primarily east-west across the northern San Fernando Valley, potentially connecting to the East San Fernando Valley Transit Corridor Project, the Chatsworth Metrolink Station, and the North Hollywood Metro G/B (Orange/Red) Line Station.
G Line (Orange) Improvements	314	2025	The nearly 18-mile long Metro Orange Line (MOL) Bus Rapid Transit (BRT) Improvements Project includes building up to 35 railroad-style gates at intersections along the Orange Line and constructing grade separated structures at Van Nuys and Sepulveda Blvds. The project seeks to improve bus speeds, safety, and provide a critical link in the transportation network Metro is building to transform the San Fernando Valley and improve regional mobility.
North Hollywood to Pasadena Transit Corridor (BRT)	315	2026	The North Hollywood (NoHo) to Pasadena BRT Corridor extends approximately 16 to 18 miles from the North Hollywood Metro Red/Orange Line Station to Pasadena City College. The project aims to build a high-quality bus rapid transit (BRT) line that will connect the San Fernando and San Gabriel Valleys. It will traverse the communities of North Hollywood and Eagle Rock in the City of Los Angeles, as well as the Cities of Burbank, Glendale, and Pasadena. Current plans estimate 21 to 23 potential stations along the corridor.
East San Fernando Valley Light Rail Project (LRT)	1,568	2027	A 9.2 mile high-capacity transit project with 14 stations connecting the Orange Line Van Nuys stations to the Sylmar/San Fernando Metrolink Station. This project is in the design phase.
Gold Line Foothill Extension to Claremont (LRT)	1,571	2028	This project will extend the existing Gold Line to Claremont, providing a 45 or 75 minute ride to Pasadena or Los Angeles, respectively. This project will serve many regional destinations as well as regional parks and two dozen colleges and universities. The project is in the design-build construction phase.
Vermont Transit Corridor	524	2028	Adds a 12.5-mile high capacity transit corridor from Hollywood Blvd to 120th St. Measure M includes a provision for a potential future conversion to rail based on ridership demand.
Antelope Valley Line Capacity and Infrastructure Improvement Program	221	2028	Builds four rail infrastructure improvement projects (Balboa Double track extension, Brighton to McGinley Double track, Canyon to Santa Clarita Double track and Lancaster terminal improvements) on the Antelope Valley Line that would enable hourly service to Palmdale and Lancaster and 30 minute bi-directional service to Santa Clarita.
West Santa Ana Branch Transit Corridor (LRT)			The Project will consist of 12 stations and is a 19-mile corridor that will connect southeast LA County to downtown Los Angeles, serving the cities and communities of Artesia, Cerritos, Bellflower, Paramount, Downey, South Gate, Cudahy, Bell, Huntington Park, Vernon, unincorporated Florence-Graham community of LA County and downtown Los Angeles.
	1,250	2028	
	5,061	2041	

TRANSIT PROJECT	$ IN MILLIONS	OPEN YEAR	DESCRIPTION
C Line (Green) Extension to Torrance	1,167	2030	Extension of the light rail line from its current terminus at the Redondo Beach Station to the Torrance Transit Center at Crenshaw Blvd. Consisting of up to 2 stations and 4.7 miles, the project is under reinitiated environmental phase.
Sepulveda Transit Corridor (Mode TBD)			The Sepulveda Transit Corridor is described in two phases, with high-capacity transit service between the San Fernando Valley and the Westside in FY2033 and an extension to LAX in FY2057. The Valley-Westside portion of the project is identified for potential acceleration in time for the 2028 Olympic and Paralympic Games in Los Angeles (LA 2028).
Phase 2 – Valley to Westside	7,685	2033	
Phase 3 – Westside to LAX	10,587	2057*	
Eastside Extension Phase 2 Transit Corridor (1st Alignment)[1]	4,409	2035	Extension of the Gold Line Eastside light rail corridor beginning at the existing L (Gold) Line Atlantic Station eastward.
Crenshaw Northern Extension (LRT)	4,744	2047	This project extends the future Crenshaw Line Rail north from the Expo/Crenshaw Station to Hollywood at the B (Red) Line Rail Hollywood/Highland Station.
Lincoln Bl (BRT)	220	2047	The Lincoln Boulevard BRT links the Airport Metro Connector to the E Line (Expo). The project could be converted to rail service at a later date if ridership demand outgrows the bus rapid service capacity.
SF Valley Transportation Improvements	257	2050	Improvements may include, but are not limited to, Transit Improvements, and I-210 soundwalls in Tujunga, Sunland, Shadow Hills and Lakeview Terrace.
C Line (Green) Eastern Extension (Norwalk) (LRT)	1,891	2052*	Extends the C Line (Green) 2.8 miles from Norwalk to the Norwalk/Santa Fe Springs Metrolink Station.
G Line (Orange) Conversion to Light Rail	4,069	2057*	The G Line conversion of the 18-mile bus rapid transit line to light-rail service.
Historic Downtown Streetcar	581	2057*	Builds a 3.8-mile streetcar along existing traffic lanes from 1st St to 11th St in downtown Los Angeles.
Eastside Extension Phase 2 Transit Corridor (2nd Alignment)[1]	8,707	2057*	Extension of the Gold Line Eastside light rail corridor beginning at the existing L (Gold) Line Atlantic Station eastward.

LRTP project costs may not match Measure M expenditure plan due to year of expenditure escalation and prior spending. Final mode, alignments, and station locations to be confirmed during environmental processes. Estimated open year is a three-year range.

[1]Metro Board approved a separate feasibility study to be completed along SR-60 to identify potential mobility solutions and options in the short and long-term for the San Gabriel Valley.

*Includes projects through 2057, the horizon year of Measure M

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Better Transit Programs, Plans, and Policies

Beyond the physical expansion and upgrades to transit corridors, Metro continues improving transit through programs, plans, and policies. Better Transit actions include plans for the future bus and BRT system, new mobility programs, and Metro's efforts to provide services that make transit more accessible to customers who face added barriers, such as people in need of paratransit services and women riders. Metro's transit programs, plans, and policies are shown in Figure 7.

Figure 7

Better Transit Programs, Plans, and Policies

TRANSIT PROJECT	DESCRIPTION
Bus Rapid Transit Vision & Principles Study	This study will define standards for future Metro (and Metro funded) BRT projects. Along with the design criteria/guidelines, the BRT standards will assist and guide Metro and other municipal transit operators with the planning, design, and monitoring of an efficient and effective BRT system that helps support the creation of a world class bus system in LA County.
NextGen Bus Plan	In 2018, Metro began the process of reimagining our bus system to better meet the needs of current and future riders. The proposed plan improvements would double the number of frequent Metro bus lines; provide more than 80% of current bus riders with 15-minute or better frequency; create an all-day, every day service; ensure a one quarter-mile walk to a bus stop for 99% of current riders; and create a more comfortable and safer waiting environment. The "Transit First" approach would include capital projects that speed up buses (bus lanes and traffic signal priority, etc.), make bus stops more comfortable, expand all-door boarding and add even more frequent services, among other improvements. NextGen will be rolled out in coordination with the upcoming Metro Micro service, which will pilot an on-demand format for service, utilizing on-demand vans equipped with bicycle racks, to maintain and expand service coverage for existing and potential new riders in areas where there is lower-usage or nonexistent fixed route bus service today.
City-Run Transit Circulators (Local Return Program)	Local Return is the city's share of the various transportation sales taxes. Proposition A, approved by voters in 1980, provides a 25% local return share of the fund to benefit public transit. Proposition C, approved in 1990, expanded the definition to provide for in-direct transit uses with a share of 20%. Measure R was approved in 2008 with a share of 15% and expands the definition even further to include public transportation uses. Measure M was approved in 2016 and provides a 17% share.
Complementary Paratransit (Access Services)	Access Services, a local public entity, is the Los Angeles County Consolidated Transportation Services Agency ("CTSA") and administers the Los Angeles County Coordinated Paratransit Plan on behalf of the County's 45 public fixed route operators (i.e., bus and rail). As required by applicable regulations, Access Paratransit service is available for any ADA paratransit eligible individual for any purpose to or from any location within ¾ of a mile of any fixed route bus operated by the LA County public fixed route bus operators and within ¾ of a mile around Metro Rail stations during the hours that the systems are operational.
Call for Projects	The Call for Project (CFP) process is a competitive grant program that co-funds new regionally significant capital projects. Various discretionary federal, state, and local transportation funds have been awarded by Metro to the most competitive projects through the CFP process. The process is typically held biennially in odd-numbered years, when funding is available. As funding needs are addressed throughout LA County, Metro will revisit the CFP process to determine financial feasibility and resources required to implement any future rounds.

TRANSIT PROJECT	DESCRIPTION
Regional Rail	Regional Rail plans, programs and implements certain commuter and intercity rail capital improvement projects along the Metro owned railroad right of way with partner agencies. Metro owns approximately 150 route miles of Class 1 commuter rail right-of-way with 152 at-grade crossings in LA County spanning up to Lancaster in the north, Chatsworth in the west and Claremont in the east. Regional Rail advances projects that improve regional mobility in LA County including modernizing Los Angeles Union Station to transform it into a World Class transit and mobility hub.
Transit Security and Law Enforcement	In March of 2017, Metro Transit Security entered into a five-year contract with three police agencies to further support security on bus and rail lines across Metro's transit system. That same year, Metro launched the use of a multi-agency approach to patrol LA County's 88 cities. This new policing structure includes the Los Angeles County Sheriff's Department, Los Angeles City Police Department, and Long Beach Police Department.
Security Certification	As part of a continuing effort to build system-wide resiliency, Metro will be adopting the FTA's Security Certification Management Guidance (FTA C 5800.1) to ensure preparedness for all hazards, meeting 21st century threats, unique to transit systems. An enhanced security design criteria program will also be advanced to provide agency-wide guidance on best practices related to security protective measures. Collectively, these efforts will buy down risk and increase the ability of Metro to provide uninterrupted service to the community.
Emergency Security Operations Center (ESOC)	As the heart of transit-centered emergency management and coordination for the Southern California Region, this collaborative and interactive facility, replete with centralized security technologies will support 24 hour situational awareness and total enterprise security to detect, deter, delay and deny serious risks to the agency while providing daily security operation management of all Metro security functions. Supported by the Metro Security & Emergency Preparedness Plan (SEPP), Threat Vulnerability Assessments, Continuity of Operations Plans, this facility is the culmination of federal, state and local guidance to best prepare the Agency for the decade of large-scale events (i.e. Super Bowls, 2028 Olympics, etc.)
Homeless Task Force	In spring 2016, at the direction of our CEO, Metro created a Homeless Task Force to address homelessness in and around the transit system and align action with County and City of Los Angeles priorities. In February 2017, the Homeless Action Plan was finalized. The Action Plan's goals are threefold: 1. to enhance the customer experience; 2. maintain a safe and secure system; and, 3. connect homeless persons in the transit system to services and resources under Measures H and HHH.
Transit Watch App	Metro utilizes a Transit Watch mobile application, which provides an easy way to report incidents on our trains or buses. The app allows the patron to report incidents and photos to the security dispatcher, allows for push notifications to all users, and in the future will provide a Spanish language option, GPS locating, and video uploads. If they choose, app users can remain anonymous when sending messages or filing a report. The new, Metro-developed app has the ability to push upgrades to our users seamlessly.
Metro Call Point	In response to the need for a consistent standard for communications equipment, Metro has developed a design solution 'Metro Call Point' units. The Call Point unit is intended to replace all existing, customer-facing P-TELs, E-TELs, and G-TELs. These units support station safety and security, as well as passenger experience. The units will provide both information and emergency communication capability within public areas of the station, parking structures and plaza area for all Metro rail and BRT stations. A Call Point unit shall be placed adjacent to the Ticket Vending Machines (TVMs).

TRANSIT PROJECT	DESCRIPTION
Sexual Harassment Prevention	In 2017, Metro partnered with Peace Over Violence to provide a 24/7 sexual harassment counseling hotline. The hotline, 1-844-Off-Limits (633-5464), is staffed by counselors with extensive experience counseling victims of sexual abuse in LA County. Metro has installed a video-based monitoring system in the operating cabs of each rail car. Metro uses this video-based system to supplement the random monitoring and enforcement of its operating rules, including rules and policies governing the use of electronic devices. Victims of sexual harassment will make contact with officers via LA Metro Dispatch or in person. Metro's Dispatch may be accessed through the Metro Transit Watch App.
SCORE Program	Metrolink's Southern California Optimized Rail Expansion (SCORE) program is an ambitious capital program that will upgrade Metrolink's system in time for the 2028 Olympic and Paralympic Games. LA Metro is a partner in this Southern California Regional Rail Authority Program. Metrolink is operated by the Southern California Regional Rail Authority (SCRRA) and serves Los Angeles, Orange, Riverside, San Bernardino, Ventura and North San Diego counties. SCRRA, a joint powers authority made up of an 11-member board representing the transportation commissions of Los Angeles, Orange, Riverside, San Bernardino and Ventura counties, governs the service.
TAP mobile app	Metro is currently upgrading its regional fare collection system that serves all 26 TAP agencies, including Metro. Upgrades include near real-time fare availability and the ability to pay fare with the tap of a smart phone using the Apple Wallet. Live system testing of the app is currently being performed on fareboxes, station validators, gates and TVMs in preparation for a 2020 launch of the Apple Pay functions. The Android platform will follow thereafter.
Supportive Transit Parking Program Master Plan	The Supportive Transit Parking Program Master Plan is an analysis of the supply and demand for parking at LA Metro facilities that is designed to assist LA Metro, its parking team, and Metro riders. The Program aims to ensure parking resources for transit patrons using a fee based model to control parking demand.
Mobility as a Service (MaaS) Platform	The Mobility-as-a-Service (MaaS) solution, called TAPforce uses the Salesforce platform and will provide a unified payment system across Metro and cloud-based partner programs. It includes the ability for cloud-based mobility services to connect to TAP payment. Fare can be paid for these services through various payment methods including credit/debit cards and cash.
Transfer Design Guide	Almost two-thirds (64%) of Metro riders transfer at least once as part of their journey. The Metro Transfers Design Guide serves as a useful resource to a variety of audiences including Metro, local and regional transit providers, local jurisdictions, developers, and community groups by providing guidance on what riders need to quickly and easily make decisions, safely move between transit vehicles, and comfortably wait for their next bus or train.
Metro Systemwide Station Design Standards Policy	In order to continue building and maintaining a state-of-the-art transit system, the Metro Board of Directors has determined that all future Metro Rail and Bus Rapid Transit (BRT) station designs shall follow a consistent, integrated systemwide design approach, with integrated public art and sustainable landscaping as variable elements. In 2012, following a thorough review and evaluation of other leading state-of-the-art transit systems and international best practices for transit station design, Metro developed the Systemwide Station Design Standards, using a modular system, or "kit-of-parts". These Standards are continually refined and updated to help ensure Metro stations provide an ever-improving customer experience.
Understanding How Women Travel Study	Metro was the first transit agency in the nation to study and report on women's unique mobility needs. This 2019 report found that women take more Metro trips, ride public transit more often and prioritize safety more often than men.

TRANSIT PROJECT	DESCRIPTION
Gender Action Plan	Following the How Women Travel Study, Metro plans to develop a Gender Action Plan, which will pivot from research findings to actionable changes, ensuring that the agency's policies, programs and activities include a gender perspective and promote the considerations of gender issues at all levels.
Accessible Wayfinding (NaviLens)	Metro is testing wayfinding strategies for the visually impaired so they can more easily navigate the transit system. This technology, NaviLens, allows users to access arrival and departure information and descriptions of how to get to different platforms at Union Station from a mobile application. The pilot deployment of NaviLens technology has allowed visually impaired riders to feel more comfortable traveling alone and improved the experience for passengers with disabilities.
Link Union Station (Link US)	Link US plans to transform Union Station into a modern, world-class transit and mobility hub, offering an improved passenger experience to meet the region's long-term transportation needs. As a part of the project, Metro is coordinating with the California High-Speed Rail Authority (CHSRA) to accommodate future high-speed rail (HSR) service at LAUS. Phase A of the Link Union Station project, expected to be complete in 2025, will transform Union Station from a "stub-end" station to a "run-through" station by constructing a new viaduct structure over the US-101 freeway that accommodates up to ten (10) run-through tracks. Phase A will enable the initial operation of two (2) run-through tracks that connects to the mainline tracks on the west bank of the LA River to the south, as well as the mainline tracks on the west bank to the north via a new northern loop track. Phase A will also include early track, rail signal and communication work to the throat north of the station, acquisition of properties along Commercial Street, and utility relocation and street improvement work south of US-101.
Mobility On Demand (MOD) Pilot	In October 2016, Metro was awarded $1.35 million from FTA to partner with a transportation network company (TNC) and explore the viability and benefit of using TNC services to provide first/last mile solutions. Metro is partnering with NoMad Transit LLC to provide first/last mile shared rides for trips originating and ending at North Hollywood, Artesia and El Monte Stations. Through this Mobility On Demand Pilot, Metro aims to open up the mobility benefits provided by TNCs to a larger group of users.
Metro Micro	Metro Micro is an innovative, new Metro transit service consisting of on-demand shared rides for short trips in vans that will be operated by professionally trained Metro employees. This service will start with an initial soft launch of 60 days in which it will be available 7 days per week and 12 hours per day. The service zones include Watts/ Willowbrook, LAWA/Inglewood, Northwest San Fernando Valley, Highland Park/ Eagle Rock/ Glendale, Altadena/ Pasadena/ Sierra Madre and UCLA/VA Medical Center/ Century City. Metro Micro is intended to supplement Metro's fixed route network in these areas by operating in zones with less bus and rail coverage. It can be taken to connect to another mode of transit or can be used to arrive at one's final destination. Additionally, vehicles will be equipped with bicycle racks. Riders will be able to order a Metro Micro vehicle through the upcoming app, a web browser, or by calling the customer service number.
Customer Experience (CX) Plan	Metro's CX vision is to always put you first – your safety, your time, your comfort, and your peace of mind – when we connect you to people and places that matter to you. The 2020 CX Plan will start by identifying the most pressing pain points from Metro customer research and focus on COVID recovery. In 2021, the Plan will dig into journey mapping and a review of best practices internationally.

Less Congestion

Less congestion means managing the number of vehicles using LA County streets and highways to reduce the amount of time buses, cars, and trucks spend stuck in traffic each day.

Metro, in partnership with the California Department of Transportation (Caltrans), advances the planning, environmental clearance, design and construction of major capital projects such as ExpressLanes, carpool lanes, freeway widening, interchange improvements, auxiliary lanes, freeway ramp improvements and other freeway capacity and operational improvement projects.

A key element of the Less Congestion Priority Area is the ExpressLanes Program, which in 2012, converted carpool lanes on I-110 and I-10 to ExpressLanes where single occupant vehicles (SOVs) are given the option to pay a variable fee to use the lanes and avoid delay, while carpoolers, vanpoolers and buses are permitted to use the lanes at no charge. Metro also works with local agencies to implement smaller scale improvements such as arterial widenings, intersection upgrades, ramp metering, traffic signal synchronization, corridor management and intelligent transportation systems (ITS) solutions.

Highway Investment

Funded by Measure M and Measure R, the highway investments at Metro are listed in Figure 8.

Figure 8

Highway Investment

HIGHWAY PROJECTS	$ IN MILLIONS	ESTIMATED OPEN YEAR	DESCRIPTION
I-5 Capacity Enhancement (I-605 to Orange County Line)	1,410	2023	Constructs one carpool lane and one mixed-flow lane in each direction extending 6.4 miles through Cerritos, La Mirada, Santa Fe Springs and Norwalk. Includes interchange reconstruction and arterial modifications.
I-5 North Carpool Lanes – SR-134 to SR-170	637	2023	Adds a 10-mile segment of carpool lanes in each direction along the I-5 freeway to improve connections between the Burbank Media Center, Burbank Airport, Downtown Santa Clarita and Downtown Los Angeles. It includes the modification of the Empire Avenue intersection to a full diamond interchange, the re-alignment and elevation of the Metrolink commuter railroad adjacent to the freeway and the construction of a railroad grade separation.
Alameda Corridor East Grade Separations Phase II	1,685	2024	Constructs bridges or underpasses and improves the operation of other railroad intersections along a 35-mile stretch of the San Gabriel Valley.
Rosecrans/Marquardt Grade Separation	155	2024	Builds a grade separation at the intersection of Rosecrans/ Marquardt in the City of Santa Fe Springs.
SR-71 Gap from I-10 to Rio Rancho Rd	379	2025	Adds three additional miles of SR-71 general purpose lanes in each direction, providing three continuous lanes in each direction to eliminate bottlenecks and improve traffic flow in sections where only two lanes exist today.
I-105 ExpressLanes from I-405 to I-605	530	2027	Caltrans in cooperation with Metro is evaluating alternatives to convert the existing high-occupancy vehicle (HOV) lanes to dynamically-priced, high-occupancy toll (HOT) lanes, also called ExpressLanes, in the eastbound and westbound directions of Interstate 105 (I-105) in LA County from the terminus of the existing HOV lanes west of Interstate 405 (I-405) in the City of Los Angeles to Studebaker Road in the City of Norwalk. The I-105 ExpressLanes Project limits include the installation of a new overhead tolling system and signage.
I-5 North Capacity Enhancements (SR-14 to Parker Rd)	679	2026	Constructs 14 miles of HOV lanes from SR-14 interchange to Parker Rd along the median. Other enhancements include extension of the northbound truck lane from Gavin Canyon undercrossing to Calgrove Bl off-ramp, addition of a southbound truck lane from Calgrove Bl on-ramp to SR-14, and addition of auxiliary lanes.

HIGHWAY PROJECTS	$ IN MILLIONS	ESTIMATED OPEN YEAR	DESCRIPTION
Sepulveda Pass Transit Corridor (Ph 1) – ExpressLanes	311	2026	Metro is making strides to improve travel between the San Fernando Valley, the Westside, and Los Angeles International Airport (LAX). Measure M provides funding for ExpressLanes on the I-405 between the US 101 and I-10.
Highway Operational Improvements in Las Virgenes/Malibu subregion	175	2026	The Las Virgenes/Malibu highway operational improvements include widening, off-ramp, and overpass projects.
SR-57/SR-60 Interchange Improvements	422	2027	The SR-57/SR-60 Interchange Improvements are the next and final step in completing improvements to the 57/60 Confluence. Project improvements will stretch from just south of the northbound SR-57/SR-60 merge to eastbound SR-60 and south of the Golden Springs Drive overpass and along a portion of Grand Avenue from the City of Industry to the City of Diamond Bar.
I-10 ExpressLanes from I-605 to LA/ San Bernardino Line	197	2028	The I-10 ExpressLanes Extension project is identified as a Tier I (near-term) priority in the 2017 Metro Countywide ExpressLane Strategic Plan. This project will convert existing and future HOV lanes to a single HOT lane in each direction across 34.2 lane miles.
SR-138 Capacity Enhancement	200	2028	Widens SR-138 by adding new lanes in each direction to the San Bernardino County line.
Highway Operational Improvements in Arroyo Verdugo subregion	170	2030	The Arroyo Verdugo highway operational improvements include projects such as Central Ave Improvements/ Broadway to SR-134EB Offramp, Grandview At-Grade Rail Crossing Improvements, and SR-134/Pacific Ave Westbound Offramp Widening.
I-605 Corridor "Hot Spots" Interchange Improvements	2,639	2030	Metro completed a Feasibility Study analyzing and identifying several "hot spots" along the SR-91, I-605, and I-405 corridors. These "hot spots" are chronic traffic congestion areas attributed to population/employment growth, increased trucking activity due to economic growth in the goods movement industry, and deficiencies in design, capacity, and operations of an older freeway system. The Early Action "hots spot" Projects (EAP) on I-605 are currently undergoing environmental assessment or final design approvals and will be constructed within the next 2-5 years.
High Desert Multi-Purpose Corridor (ROW)	393	2034	The High Desert Corridor (HDC) project is considering construction of a new multi-modal link between State Route (SR)-14 in LA County and SR-18 in San Bernardino County. This project would connect some of the fastest growing residential, commercial and industrial areas in Southern California, including the cities of Palmdale, Lancaster, Adelanto, Victorville and the Town of Apple Valley.
I-405, I-110, I-105 and SR-91 Ramp and Interchange Improvements (South Bay)	1,413	2039	Constructs improvements in the South Bay to reduce traffic congestion. Examples include auxiliary lanes and ramp reconfigurations.

HIGHWAY PROJECTS	$ IN MILLIONS	ESTIMATED OPEN YEAR	DESCRIPTION
Countywide Soundwall Construction	590	2040	SB-45 amended the California Street and Highway Code to transfer the programming and funding responsibilities of the Post 1989 Soundwall Retrofit Program to Regional Transportation Planning Agencies. In LA County, Metro assumed this responsibility. This program addresses the estimated 230 miles of freeways that are eligible for soundwalls within the County.
I-710 South Corridor Project (Ph 1 and Ph 2)	Ph 1 -5,697 Ph 2 – 1,512	Ph 1 – 2040 Ph2 - 2041	Evaluates modernization of the 710 freeway to improve truck/ traffic flows and safety on 18 miles of the freeway between the Ports of Los Angeles and Long Beach and the SR-60 freeway.
I-5 Corridor Improvements (I-605 to I-710)	2,036	2042	Adds one general purpose lane and one carpool lane in each direction, for a total of seven miles. When complete, there will be a total of five general purpose lanes and one carpool lane in each direction.
I-405/I-110 Int. HOV Connect Ramps & Interchange Improvements	504	2044	The new project provides direct connector ramps between ExpressLanes on the I-110 and I-405.
I-110 ExpressLanes Ext South to I-405/I-110 Interchange	599	2046	Extends the existing I-110 ExpressLanes southward one mile to the I-405 interchange while maintaining current general purpose lanes.
I-605/I-10 Interchange	1,287	2047	Interchange improvements in all directions (North, South, East and West).
SR 60/I-605 Interchange HOV Direct Connectors	1,055	2047	Improves interchanges from I-605 Rose Hills to I-10, and SR-60 from Santa Anita to Turnbull Canyon. Improvements include new auxiliary lanes, wider lanes and bridges, interchange connectors and ramp improvements.
I-405 South Bay Curve Improvements	883	2047	Adds segments of auxiliary lanes in each direction to improve traffic flow at on/off ramps for ten miles from Florence Av to I-110.
SR-710 North Corridor Mobility Improvement Projects	1,086	Varies	Since the inception of this project, Caltrans and Metro have been working in partnership to alleviate mobility constraints and traffic congestion in this study area that encompasses western San Gabriel Valley and the east/northeast area of Los Angeles. Metro is coordinating efforts with the various cities to begin implementation of the TSM/TDM projects identified in the Final EIR/EIS.

LRTP project costs may not match Measure M expenditure plan due to year of expenditure escalation and prior spending.
Final alignments and limits to be determined during environmental processes.

Less Congestion Programs, Plans, and Policies

The capital projects to lessen congestion are supplemented by several programs, policies, plans, and partnerships. In this area, most actions fall into the categories of Transportation System Management, Intelligent Transportation Systems, Transportation Demand Management, and goods movement programs. Metro's Less Congestion programs, plans, and policies are shown in Figure 9.

Figure 9

Less Congestion Programs, Plans, and Policies

HIGHWAY PROJECT	DESCRIPTION
Transportation System Management (TSM)/ Intelligent Transportation Systems (ITS) Strategies	Transportation System Management (TSM) strategies are tools that use traffic engineering and operational measures to maximize capacity and reduce traffic delays on streets and highways. Local TSM improvements, which include signal synchronization and Intelligent Transportation Systems (ITS) strategies, are known to improve traffic flow, movement of vehicles and goods, air quality, and safety.
Arterial ITS	Metro funds approximately $28 million per year in local arterial ITS projects which include improvements to traffic signals, signal synchronization, transit signal priority (TSP), and other ITS strategies. By using ITS on our local streets to address local traffic concerns and improve regional transportation corridor operational performance, overall mobility benefits are significantly enhanced. Arterial ITS projects are predominately funded by Prop C, Measure R, and Measure M through sub-regional programs.
Bus Signal Priority	Bus signal priority is a strategy that uses technology to communicate with the traffic signal at an intersection to request bus priority. Bus signal priority is currently being used on Metro's Rapid Service, Culver City Bus, Torrance Transit, Foothill Transit, and Gardena (G-Trans). Metro wishes to expand this system to all major corridors, not just those with Metro's Rapid service. Metro's Countywide Signal Priority (CSP) Program is the largest implementation of multi-jurisdictional signal priority in the nation.
Arterial Performance Measurement	The Arterial Performance Measurement Program, known as Measure UP!, was developed to help local agencies understand how the arterial system performs historically and in real-time conditions. Performance measures such as vehicle hours of delay, person-hours of delay, travel-time variability, travel-time reliability, vehicle miles traveled, average travel speed, and average travel time are used when analyzing streets and freeways. Metro plans to implement an analysis tool that provides all performance measures for LA County.
The LA County Information Exchange Network (IEN)	The Los Angeles County Information Exchange Network (IEN) is a system that shares traffic signal information between agencies and facilitates the coordination of signal timing across jurisdictional boundaries. The IEN primarily shares second-by-second intersection data, incident and planned event tracking, and scenario management capabilities. IEN closely coordinates with Regional Integration of ITS (RIITS) to ensure regional transportation information sharing to support regional project needs.

HIGHWAY PROJECT	DESCRIPTION
Regional Integration of Intelligent Transportation Systems (RIITS)	RIITS is a program that enables the efficient compilation, management, and exchange of transportation information and systems. RIITS integrates and presents transportation information via data feeds to allow government agencies to exchange data with each other, and provides private companies access to the data to share with the public. RIITS consists of a physical network, operational system, and administrative processes. Information is currently exchanged with Caltrans Districts 7, 8, and 12, Los Angeles Department of Transportation, California Highway Patrol (CHP), Metro, Foothill Transit, LA County Department of Public Works and others. RIITS also houses applications such as Measure UP! and supports operational programs such as Southern California 511 and integrated corridor management (ICM) projects. A strategic planning exercise is currently underway to provide a 5-year roadmap for RIITS. New and emerging technologies and initiatives are being examined to determine how RIITS should be utilized and position. Items/activities such as Connected and Automated vehicles, Internet of Things, Big Data and other related impacts will be evaluated to best determine how RIITS can support, lead and/or champion these items.
Integrated Corridor Management (ICM)	ICM is an Intelligent Transportation System (ITS) strategy to manage non-recurring congestion along a corridor by utilizing advanced technologies and systems. ICM components include active monitoring of all transportation modes and facilities within the corridor, on and off the freeway, including ramp metering, traffic signal coordination, incident traffic management, advanced traveler information system, and other advanced technologies and techniques. Caltrans, Metro, and local agencies are piloting the I-210 Connected Corridor project that includes Integrated Corridor Management (ICM) strategies along I-210 in the San Gabriel Valley.
Connect-IT: Los Angeles County Regional ITS Architecture	Connect-IT (Los Angeles County Regional ITS Architecture) is a framework to guide the planning and deployment of ITS strategies. The framework helps local agencies and stakeholders to collaboratively operate its systems and address transportation issues and challenges in LA County. Connect-IT is accessed through a website for local agencies and stakeholders to view and add ITS projects and find information on ITS innovations and advanced technology.
ITS Field Inventory Resource Sharing Tool (ITS FIRST)	The ITS Field Inventory Resource Sharing Tool (ITS FIRST) is a website that is used to collect and share ITS assets and inventory information between local agencies. ITS assets include but are not limited to traffic signals, traffic controllers, CCTV cameras, fiber-optic communications, changeable message signs, and vehicle detection. This tool gives local agencies a database to maintain an inventory of ITS field assets and a mechanism to perform asset management.
HOV (Carpool) Lanes	In LA County, the HOV system includes freeway HOV lanes, HOV access ramps, park-and-ride lots, and transit stations along HOV corridors. Metro, in cooperation with Caltrans, is in various stages of planning, design and construction for additional HOV facilities across LA County.
ExpressLanes	In 2012, the carpool lanes on I-110 and I-10 were converted to ExpressLanes, where single occupant vehicles (SOVs) are given the option to pay a variable fee to use the lanes and avoid delay, while carpoolers, vanpoolers and buses are permitted to use the lanes at no charge. By using variable pricing based on the current usage level, traffic flow in the ExpressLanes is continuously managed to maintain speed and flow, providing a more reliable option.
ExpressLanes Strategic Plan	The 2017 Countywide ExpressLanes Strategic Plan builds on the success of the I-110 and I-10 Congestion Reduction Demonstration pilot program (also known as ExpressLanes) by establishing a vision for Metro to deliver a system of ExpressLanes for LA County using a network approach to maximize regional benefits. The network would be implemented in tiers approximately ten-years apart: Tier 1 – near-term (within 5-10 years), Tier 2 – mid-term (within 15 years), and Tier 3 – longer-term (within 25 years).

HIGHWAY PROJECT	DESCRIPTION
Traffic Reduction Program/ Congestion Pricing	Metro is conducting a Traffic Reduction Study (formerly called the Congestion Pricing Feasibility Study) to: determine if a traffic reduction program would be feasible and successful in LA County; determine where and how a pilot program with congestion pricing and complementary transportation options could achieve the project goals of reducing traffic congestion; and identify willing local partners for collaboration on a potential pilot program. The goals of the traffic reduction pilot program are to reduce traffic congestion, which makes it easier for everyone to get around, regardless of how they choose to travel, and provide additional high-quality transportation options.
Freeway Service Patrol	The Metro Freeway Service Patrol (FSP) is a congestion mitigation program managed in partnership with Metro, CHP, and Caltrans on all major freeways in LA County. It is the largest of its kind in the nation performing approximately 25,000 assists each month. The program utilizes a fleet of roving tow and service trucks designed to reduce traffic congestion by efficiently getting disabled vehicles running again, or by quickly towing those vehicles off of the freeway to a designated safe location.
LA SAFE	LA County Service Authority for Freeway Emergencies (LA SAFE) is the driving force and sponsor behind the Southern California 511 program and the Kenneth Hahn Callbox system. The goal is to help improve mobility and traffic in the LA County region by giving drivers the tools they need to travel safely and efficiently.
Southern California 511	511 was deployed in June 2010 consisting of an automated Interactive Voice Response (IVR) phone service and a website (Go511.com). The service provides users with real-time traffic information as well as transit, rideshare, and other related information. Since the deployment in June 2010, the system has supported over 18,000,000 users and has undergone a number of changes, such as the addition of real-time transit and parking information, and the deployment of a mobile app (go511). In addition to the traveler information services, 511 also allows callers to request motorist assistance similar to using a roadside call box.
The Kenneth Hahn Callbox System	The Kenneth Hahn Callbox System is comprised of over 1,000 callboxes installed throughout LA County freeways. The call box system was established to provide motorist aid service to the public and now acts as a safety net for motorists. An average of over 250 calls per month are generated from the callbox system. The Los Angeles County SAFE is the largest and most active motorist aid callbox system in California.
Los Angeles County Goods Movement Strategic Plan (Draft 2020)	The Los Angeles County Goods Movement Strategic Plan (2020) strives to achieve a comprehensive and holistic approach to addressing a multitude of interconnected challenges so that LA County will grow and thrive while balancing goals, including the efficient and effective flow of goods to support economic sustainability and prosperity. To achieve the goals, goods movement stakeholders across the County collaborated to provide a framework to evaluate LA County's freight competitiveness.
Goods Movement Technology	Metro uses ITS and advanced technologies to improve the movement of goods in and out of the Ports of Long Beach and Los Angeles. Goods movement technology projects have included truck platooning, drayage and container efficiency, and freight traveler information.
Clean Truck Program	At its January 2020 meeting, Metro Board passed Motion 8.1 directing staff to develop 710 Clean Truck Program as an Early Action Item under both the Goods Movement Strategic Plan (Plan) and I-710 South Corridor Project. The Program includes $50 million in Metro-controlled funding sources as seed funding for the 710 Clean Truck Program.
Transportation Demand Management (TDM)	Transportation Demand Management (TDM) refers to strategies that increase transportation system efficiency and eliminate solo driver trips. Getting people out of their cars or encouraging forms of travel other than solo driving produces benefits ranging from increased travel efficiency, cost benefits, travel safety, and health benefits to helping reduce traffic congestion, reduce pollutants, and increase transit ridership. TDM often comprises a program of information, encouragement, and incentives to optimize the use of all modes in the transportation system.

HIGHWAY PROJECT	DESCRIPTION
Metro Regional TDM Program	Metro's Regional TDM Program is a countywide transportation demand management toolkit that encourages and supports local jurisdictions in initiating, developing, and implementing their own TDM goals and initiatives. The TDM Toolkit and corresponding website is in development and will be available to all eighty-nine cities in LA County in early 2020. The website will promote TDM strategies by coordinating local TDM objectives and creating a comprehensive marketing strategy.
Regional Rideshare/Shared Mobility & Implementation	Metro, through policy, programming, advocacy, and education, is helping to develop a shared mobility resource. Some of the program's core functions involve assisting Employee Transportation Coordinators (ETC) in meeting the Southern California Air Quality Management District's (SCAQMD) Rule 2202 Employee Commute Reduction Program (ECRP). The program promotes implementing congestion management strategies by encouraging employees to use alternatives to single occupancy vehicles such as: carpooling, vanpooling, transit ridership, biking, and walking.
Carpooling Program	Carpooling is an inexpensive and effective travel option and involves finding nearby commuters to share the ride. Metro offers ride-matching services to find local SoCal residents looking to share the ride. User services involve finding someone in your area to match your commute trip. Metro also partners with the Orange County Transportation Authority (OCTA) and Ventura County Transportation Commission (VCTC) in RideMatch, a ridesharing service that matches individuals with similar commutes interested in ridesharing.
Metro Vanpool Program	Metro operates one of the largest publicly funded vanpool programs in the country. Metro provides coordination, administration support, and a financial subsidy for commuters and a convenient mobility option to getting around LA County, especially in areas less served by transit options.
Car Share Program	Metro partners with qualified car share companies to provide an effective first and last mile option for communities that need affordable car sharing alternatives at Metro-owned park-and-ride lots. The program includes designated parking spaces at various transit stations' park and ride facilities, allowing patrons to easily locate and pick up vehicles to use for anything from local errands to weekend getaways. This program provides ways/means to improve customer service and transit connection experience with more mobility options for transit patrons.
Parking Management	Metro's Parking Management Program was developed to enhance the transit rider's experience by more closely managing anticipated parking demand. Parking spaces at stations with paid lots are prioritized for transit customers through the use of a TAP-based rider verification system, which works to retain parking resources for Metro patrons. To make parking availability more transparent, Metro has also implemented the Parking Guidance System at highly utilized facilities to provide real-time parking availability information to transit riders looking for a spot.
Connected and Autonomous Vehicles	Connected vehicle (CV) technology is the use of advanced technologies and communication for vehicles to connect with other vehicles, infrastructure, and people. Metro continues to pursue potential CV applications that would benefit local agencies in LA County. Autonomous vehicle (AV) technology has the potential to disrupt existing transportation systems and cities through the deployment of self-driving vehicles that are safer and faster than human-operated vehicles. Metro continues working with local jurisdictions, agencies, and vendors/ manufacturers to advance CV and AV technology in the region.

Complete Streets

Metro's Complete Streets Policy defines complete streets as a comprehensive, integrated transportation network with infrastructure and design that allows safe and convenient travel along and across streets for all users.

A complete streets network serves many users in a safe manner including: pedestrians, public transit users, bicyclists, people with disabilities, seniors, children, motorists, and movers of goods. Complete streets also have more greenery and sustainable elements to enhance the environmental sustainability of the transportation system. As a transportation funder, Metro can incentivize funding recipients to develop projects that meet complete street goals.

Active Transportation Corridor Projects

The 2020 LRTP includes close to $7 billion in funding for active transportation projects, including major facilities and bicycle and pedestrian programs at the local level. The major multi-use active transportation facilities funded in the LRTP are described in Figure 10.

Figure 10

Active Transportation Investment

MAJOR TRANSIT PROJECT	$ IN MILLIONS	ESTIMATED OPEN YEAR	LENGTH (MILES)	DESCRIPTION
Rail to Rail Active Transportation Corridor Segment A	40.2	2024	6	A 5.6 mile multi-use path connecting the Fairview Height Station of the soon-to-be-open Crenshaw Line in Inglewood to the Slauson A (Blue) Line station in South Los Angeles.
Rail to River Active Transportation Corridor Segment B				An approximate 4.5 mile active transportation corridor between the LA River to the Slauson A (Blue) Line station that connects to Segment A.
LA River Path – Central LA	429.5	2025 – 2027	8	An eight-mile bicycle and pedestrian path gap closure between Elysian Valley and Maywood, through downtown Los Angeles.
LA River Path – San Fernando Valley	69.6	2025	13	The San Fernando Valley LA River Path will connect the San Fernando Valley to the existing LA River Path near Griffith Park. This 13-mile path will help create a 51-mile continuous active transportation corridor from Long Beach to Warner Center.
City of San Fernando Master Bike Plan	13.7	2054	TBD	This project will create a bike path to run along the Pacoima Wash.

Complete Streets Programs, Plans, and Policies

In addition to the major capital commitments, Metro advances complete streets through three foundational documents including Metro's Complete Streets Policy (2014), First/Last Mile Strategic Plan (2014), and Active Transportation Strategic Plan (2016), which are the catalyst for several more plans and programs. Figure 11 shows the full range of complete streets programs, plans and policies.

Figure 11

Complete Streets Programs, Plans, and Policies

PROGRAM NAME	DESCRIPTION
Metro's Complete Streets Policy	Metro's Complete Streets Policy views transportation improvements as opportunities to create safe, accessible streets for all users, including but not limited to pedestrians, public transit users, bicyclists, people with disabilities, seniors, children, motorists and movers of commercial goods. Through incremental changes in capital projects and regular maintenance and operations improvements, the street network will gradually become safer and more accessible for travelers of all ages and abilities. In partnership with state, regional and local efforts, this policy will create a more complete and integrated transportation network for all modes of travel in LA County.
Active Transportation Program	Measure M establishes the Metro Active Transport, Transit and First/Last Mile (MAT) Program, which over the course of 40 years, is anticipated to fund more than $857 million (in 2015 dollars) in active transportation infrastructure projects throughout the region. This is a competitive discretionary program available to municipalities in LA County and will fund projects to improve and grow the active transportation network and expand the reach of transit.
Active Transportation Strategic Plan	Adopted in 2016, the Active Transportation Strategic Plan (ATSP) is Metro's ongoing commitment to enhance access to transit stations, create safer streets, and develop a regional network to improve mobility for people who walk, bike, and take transit. The ATSP is a roadmap for Metro and stakeholders, including local jurisdictions and regional governments to set regional active transportation policies and meet transportation goals and metrics established in local, regional, state, and federal plans.
First/Last Mile (FLM) Program	In 2016, the Metro Board of Directors adopted policies (Motion 14.1 and 14.2), which prompted the creation of Metro's FLM program. The three primary goals of Metro's FLM are: are: (1) To identify and remove barriers for people walking or bicycling to their transit station or destination and plan/implement improvements to an individual's trip. (2) Improve transit riders' safety by providing safe infrastructure to complete their trips safely, regardless of their travel mode. (3) Enhance the customer experience for transit riders by addressing visual aesthetics and livability through infrastructure improvements.
FLM Strategic Plan	Metro developed a First/Last Mile Strategic Plan in 2014 to address the challenge that riders face getting from their home to transit and from transit to their final destination. FLM strategies extend station areas, improve safety and enhance the visual aesthetic. The Plan identifies barriers and potential improvements for the FLM portions of a transit trip.
Blue Line FLM Plan	This First/Last Mile (FLM) Plan was adopted in April 2018 and represents a first-of-its-kind effort to plan comprehensive access improvements for an entire transit line. The Plan covered all 22 stations on the Metro A (Blue) Line and piloted an inclusive, equity focused community engagement process. The Plan included planning-level, community-identified pedestrian and bicycle improvements within walking (1/2-mile) and biking (3-mile) distance of each A Line station. The Plan executed the methodology from the FLM Strategic Plan, including walk audits of every station area, development of draft Pathway Networks and project ideas, community engagement events, and finalization of Pathway Networks and project ideas.

PROGRAM NAME	DESCRIPTION
Inglewood FLM Plan	This plan, adopted by the Metro Board of Directors in January 2019, identifies pedestrian and bicycle improvements for stations in the City of Inglewood, including three stations on the Crenshaw/LAX Line (Fairview Heights, Downtown Inglewood, Westchester/Veterans), and one station on the Green Line (Crenshaw). This is the first FLM plan with committed implementation funding from the City of Inglewood via the City's 3% local contribution.
Gold Line Foothill Extension 2B FLM Plan	Adopted by the Metro Board of Directors in June 2019, the Plan includes FLM station area plans for five stations on the Gold Line Foothill Extension Phase 2B (Glendora, San Dimas, La Verne, Pomona, Claremont). The development of the station plans included close coordination with the Foothill Gold Line Construction Authority and the five cities around the station areas.
Aviation/96th St Station (Airport Metro Connector) FLM Plan	A new major transit hub will connect the LAX/Crenshaw and Green Metro Rail lines and a number of bus routes with the LAX Automated People Mover. Adopted by the Metro Board of Directors in June 2019, the Plan addresses FLM connections in the area surrounding the future station, located near the border of Los Angeles and Inglewood.
Westside Purple Line Extension FLM Plan Sections 2 and 3	Adopted by the Metro Board of Directors in May 2020, the Plan includes FLM station area plans for four stations on the Westside Purple Line Extension Sections 2 and 3 (Wilshire/Rodeo, Century City/Constellation, Westwood UCLA, and Westwood/VA). The development of the station plans included close coordination with local jurisdictions, institutional stakeholders such as UCLA and the Veterans Administration, along with neighborhood and community groups.
Metro Micro Mobility Vehicles Program	The Metro Micro Mobility Program seeks to manage e-scooters and dockless bike share on Metro properties and right-of-way (ROW) focusing on maintaining a clear path of travel for transit patrons, developing an organized parking system, operating safety for users and pedestrians, and providing equitable availability and access. Through this program, Metro leases designated spaces for e-scooter and dockless bike share parking on Metro property, parking facilities, and Metro ROW.
New Mobility Regional Roadmap	Metro is building a coalition of civic partners to determine the best tools for managing new mobility in LA County and achieving Metro's Vision 2028 goal of doubling non-SOV driving trips by 2028. New Mobility includes, but is not limited to, ride-hailing, carsharing, e-scooter, bike share, and courier network services such as Postmates and Uber Eats.
Bicycle Education Safety Team (BEST) Program	Metro offers free classes for the community to learn how to bike safely, conveniently, and confidently. Metro also offers group rides that includes stopping at local destinations to help people feel more comfortable on a bike and realize where they can ride to in their neighborhood.
Connect Union Station Action Plan	The Connect US Action Plan was developed to improve historical and cultural connections in downtown Los Angeles by enhancing pedestrian and bicycle travel options through and between communities. At the center of the study is access to Los Angeles Union Station, a regional transportation hub for numerous rail, bus and shuttle services, as well as the future Regional Connector station at 1st/Central. The Connect US Action Plan is a joint effort between Metro and the Southern California Association of Governments (SCAG) and was developed in collaboration with various City of Los Angeles and County departments and agencies through the project's Technical Advisory Committee (TAC).
Metro Bike Share	Metro Bike Share is a docked bike share system which offers access to bikes at specific locations across the county. Smart Metro Bikes are available on the Westside and in North Hollywood. The Electric Metro Bike is a pedal-assisted bike that allows expanded opportunities for riders to complete their first/last mile connections from farther distances with less effort required to pedal.

PROGRAM NAME	DESCRIPTION
Metro Bike Hub	The Metro Bike Hub also offers onsite staff assistance, same-day repairs, accessory sales, bike classes and more at four locations across LA County. Hubs are located at Hollywood/ Vine, Union Station, El Monte, and Culver City. Secure bike parking is operated by BikeHub, Metro's Small Business Enterprise-certified contractor. Registered users may access the secure bike parking area 24 hours a day, seven days a week.
Green Construction Policy	Metro established a Green Construction Policy (GCP) in 2011 to reduce emissions during construction, as well as the Sustainability Plan Program to assist contractors with meeting CALGreen obligations. The GCP was updated in 2018, requiring contractors to use renewable diesel for all diesel engines and thus reducing the negative health impacts from diesel exhaust. This effort reaffirms Metro's commitment to protect the communities we serve, especially those disproportionately affected by air pollution.
Zero-Emission Fleet	Metro will transition to zero-emission buses systemwide. The G Line (Orange) will be the first to deploy electric-battery buses as part of its improvements project, scheduled for completion by 2025. With an original goal of 2040, Metro would like to fully electrify by 2030. Metro is also taking the lead in forming a Countywide Zero-Emission Trucks Collaborative to promote consistency among public agencies in working to catalyze the development and deployment of zero-emission trucks in LA County. This collaborative will include the Ports of Long Beach and Los Angeles, Caltrans, Southern California Association of Governments and the South Coast Air Quality Management District.
Metro Active Transport Program (MAT)	The MAT Program is a discretionary funding program in Measure M, and is the first dedicated funding for active transportation in a LA County sales tax measure. The program funds the development of new active transportation corridors and first/last mile projects, with a focus on equity. The MAT program will proceed in funding cycles of 2-5 years with the expectation of varying program emphasis areas over time.

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Access to Opportunity

Access to opportunity means investing in communities to connect people to what they need (jobs, education, healthcare, etc.) in a reasonable amount of time. Increasing access to opportunity involves bringing Metro's transportation options closer to jobs and homes, and supporting small businesses, local economies and families. Many of the actions in this area are closely tied to Metro's Equity Platform and related work, which is expanded on in the equity section.

Figure 12 describes the programs, plans and policies that comprise the Access to Opportunity Priority Area.

Access to Opportunity Programs, Plans, and Policies

Figure 12

Access to Opportunity Programs, Plans, and Policies

PROGRAM NAME	DESCRIPTION
Transit Oriented Communities	Metro is redefining the role of the transit agency by expanding mobility options, promoting sustainable urban design, and helping transform communities throughout LA County. At the forefront of this effort is Metro's vision to work with communities to create transit oriented communities (TOCs) across LA County. TOCs are places that, by their design, make it more convenient to take transit, walk, bike or roll than drive.
Metro's TOC Policy	In 2018, Metro adopted the Transit Oriented Communities (TOC) Policy. The TOC Policy defines: 1. TOCs for Metro and establishes Metro's goals and objectives to enable TOCs; 2. TOC activities that will be considered a transportation purpose and thus eligible for funding under the Measure M Guidelines by Metro and by its municipal partners through Local Return as well as for other eligible sources at the federal, state, and local level; and 3. Defines areas where Metro leads (implements directly) and where Metro supports partners to undertake TOC Activities.
Draft TOC Implementation Plan	Metro is currently in the process of developing the Draft TOC Implementation Plan that will outline a series of initiatives and strategies with corresponding measures and reporting that Metro can realize directly or in partnership with others. This draft TOC plan is expected to be presented to the Metro Board for adoption in 2020.
TOD Planning Grant Program	Since 2011, Metro has provided $24.6M grant funding to 32 jurisdictions across LA County to develop and adopt transit supportive plans around a half-mile radius around 95 Metro/Metrolink transit stations.
West Santa Ana Branch TOD Strategic Implementation Plan and Program (TOD SIP)	The TOD SIP provides an overarching vision and strategic guidance for local West Santa Ana Branch (WSAB) jurisdictions to use as a resource as they develop and implement their own plans, policies and economic development and mobility strategies in the 12 WSAB station areas along the alignment. Additionally, in 2019, the Metro Board approved a $1M implementation program to fund WSAB jurisdictions to implement TOD SIP recommendations.
Joint Development (JD) Program	Joint Development (JD) helps foster TOCs by leveraging properties Metro owns to advance community development goals while attracting new riders to the Metro system. These properties are often parcels of land acquired for transit projects for Metro stations, construction staging or other supportive uses and have been determined to have transit-oriented development potential. Following a multilayered community engagement and selection process, Metro collaborates with qualified developers to develop its sites through joint development agreements, typically culminating in a long-term ground lease.
Metro Affordable Housing Policy	In July 2015, the Metro Board of Directors adopted an updated JD Policy to encourage development of affordable housing in LA County. The JD Policy includes a goal that 35% of total housing units in the JD portfolio be affordable to households earning 60% of area median income (AMI) or below and allows Metro to discount JD ground lease rents below fair market rent to accommodate affordable housing. The JD Policy is in the process of being revised as Metro seeks to further strengthen its commitment to addressing the region's pressing affordable housing and homelessness crisis.

PROGRAM NAME	DESCRIPTION
Metro Adjacent Development Review	This program works with local municipalities and developers building near the Metro system to ensure safety during and after construction and identify synergies between new development and Metro stations and stops to increase ridership and reduce auto dependency.
Metro Adjacent Transit Connected Housing (MATCH) Loan Fund	In August 2016, the Metro Board approved investing $9,000,000 into the Metro Adjacent Transit Connected Housing (MATCH) Program which through a partnership with Community Development Financing Institutions (CDFIs) and philanthropic organizations, offers low interest loans to support the development and preservation of affordable housing units near transit.
TOC Small Business Loan Program	In August 2016, the Metro Board approved a $1,000,000 investment in the TOC Small Business Loan Program. Originally geared toward funding tenant improvements in TODs, in the spring of 2020, the Metro Board authorized changes to allow the funding to be used to provide emergency relief to small businesses near transit impacted by the COVID-19 health pandemic and economic crisis. Metro is currently exploring opportunities to improve upon the original TOC Small Business Loan Program.
Metro's Co-Powerment Programs	Co-powerment programs expand access to opportunities for small businesses and traditionally underrepresented residents in Metro's service area. The two areas of focus are economic development and workforce development.
Disadvantaged Business Enterprise Program (DBE)	The DBE program applies to Federal Transit Administration (FTA) funded contracts and exists to increase the number of historically underutilized (minority or women-owned) disadvantaged businesses and to equip them with tools and resources they need to do business with Metro. The groups that this program covers are: African Americans, Asian Pacific Americans, Native Americans, Hispanic Americans, Subcontinent Asian Americans, and women (including Caucasian women). In 2020, there are more than 1,400 DBE firms at Metro.
Small Business Enterprise Program (SBE)	Applicable to state and locally funded contracts (non-federal), SBE is similar to the DBE certification, except it is race and gender-neutral, and contracts businesses with a net worth of less than $1.32 million and average revenue over the previous three years of less than $23.98 million. In 2020, there are more than 2,100 SBE firms that are certified.
Small Business Prime Program	The Small Business Prime Program sets aside applicable contracts ($3,000 to $5 million) for which only Metro certified Small Business Enterprises (SBEs) can compete. SBE Primes are required to perform a minimum of 30% with their own workforce, and may subcontract 70% of the work to SBEs, medium or large firms. Metro actively encourage SBEs to use traditional primes as subcontractors to help mentor and fulfill increased contracting responsibility.
Disabled Veteran Business Enterprise Program (DVBE)	This program establishes a goal of contracting with DVBEs at 3% for all goods and services over $100,000 for non-federally funded competitive contracts.
Medium Size Business Enterprise Program (MSZ)	Metro has established a Medium-Size Business Enterprise (MSZ) program to provide contracting opportunities for medium-size businesses and allow for competition with similar size firms, The MSZ program may be applied to contracts ranging from $12M to $30M, bridging the gap between small businesses and large business concerns by creating contracting opportunities for which only MSZs may compete. MSZs are defined as firms with a three (3) year average of $25 million to $250 million in gross annual revenue and with more than 25 employees.
Contracting, Outreach, and Mentorship Program Protégé (COMP)	This is required on applicable contracts over $25 million. Proposers responding to Request for Proposals (RFPs) with this requirement must outline how they will provide technical assistance such as estimating, scheduling, management and other best practices to DBE, SBE, and DVBE subcontractors on their project. This mentoring plan will be documented in the COMP submittal and scored as part of the RFP evaluation. The COMP is designed to increase the practical and technical capabilities of the small business subcontractor (protégé).

PROGRAM NAME	DESCRIPTION
Contractor Development and Bonding Assistance Program (CDBAP)	The CDBAP assists Metro-certified SBE, DBE, and DVBE firms to secure necessary bonding required to bid on Metro construction projects. The program also assists with obtaining or increasing bonding capacity and collateral support for bids, performance and payment bonds, along with technical education, training, and contractor support. This program helps to increase the participation of small/disadvantaged businesses on Metro projects. Additionally, the CDBAP is comprised of a consortium of local agencies including Los Angeles World Airports, the Los Angeles County Department of Water and Power and the Port of Los Angeles to support the development and growth of small businesses.
Workforce Initiative Now-Los Angeles (WIN-LA)	WIN-LA is an initiative to build the workforce of the future through a career pathway that provides opportunities for people to work in the transportation sector and move up through the ranks. The initiative delivers workforce development and skills training for transportation jobs by partnering with private-sector employers, community colleges, labor organizations, and others. The focus is on construction, operations/maintenance, administration, and professional services. Participants include veterans, previously unemployed, emancipated foster youth, those involved with the justice system, those receiving public assistance, single custodial parents, and formerly homeless.
Project Labor Agreements (PLAs)	PLAs articulate goals for Metro construction contractors to train and employ economically disadvantaged residents, specifically targeting minorities and women. Each month the contractors must report how successful they have been in meeting their goals. As of May 2020, there have been 43 projects with PLAs to date since 2012, worth over $8B in construction, with over 2,000 apprentice workers on three mega projects alone. The PLAs encourage the hiring of female workers on construction jobs, with a goal of 6.9% participation. Metro's Women Build Metro LA (WBMLA) committee was established in support of Metro's PLAs and Construction Careers Policy to increase female participation in the transportation-related workforce.
Business Interruption Fund (BIF)	BIF provides some financial support ($10,000,000 annually) for "mom and pop" businesses immediately adjacent to the Crenshaw/LAX corridor, Purple Line Extension corridor, Little Tokyo area around the Regional Connector, or a designated construction staging/storage area. The maximum $50,000 grants are provided to cover verified business losses due to Metro construction.
Business Solutions Center (BSC)	Authorized by the Metro Board in 2014, this program helps "mom and pop" businesses with 25 or fewer full-time employees that are directly impacted by Metro rail projects. Through this program, professionals assist and teach business owners about long term business planning, website development, marketing on social media, assessment of their IT systems, accounting management, and access to financial capital.
Workforce Of Tomorrow – E3 Initiative	Metro is investing in the next generation of transportation workers through the E3 Initiative to expose, educate, and employ the next generation of LA County. The initiative's mission is to prepare LA County youth for career and college pathways in the global transportation infrastructure industry by teaching them transferrable Science, Technology, Engineering, Arts and Mathematics (STEAM) industry skills.
Metro's Transportation School	Metro, in partnership with the County of Los Angeles, is developing a Transportation School, which will prepare LA County youth for career and college pathways in the global transportation industry. The school's curriculum will be developed to teach students transferrable STEAM industry skills focused on science, technology, engineering, arts and math.
Teacher Externship Program	This is a six-week summer program for teachers from LA County middle and high schools to learn about the transportation industry and develop a project-based learning experience for their students. Teachers who participate are given stipends.

PROGRAM NAME	DESCRIPTION
Entry Level Trainee Program (ELTP)	This is an entry-level program for recent college graduates to get work experience and job skills as a Transportation Associate 1 at Metro.
Transportation Career Academy Program (TCAP)	This is a summer internship program at Metro for transit dependent juniors and seniors in high school who live or attend school near Metro rail. This offers the students real-world experience and a chance to learn about transportation careers.
Los Angeles Trade and Technical College (LATTC) Metro Joint Apprenticeship Committee (JAC)	JAC is a training program designed to provide rail maintenance personnel with introductory skills, abilities, techniques, tools, and practices to perform duties related to maintenance of rail vehicles.
Metro Bridge Academy	This is a free, paid four-week academy that trains unemployed individuals to become a Metro operator. This academy is built through a partnership between Metro, Los Angeles Valley College, and Community Career Development, Inc.
Regional EZ Transit Pass	The Regional EZ pass is a monthly pass good for local travel on 23 different public transit carriers throughout the Greater Los Angeles region. The EZ pass works with fare levels, referred to as zones, and eliminates the need for multiple passes when transferring between Metro transit and other participating municipalities. Seniors and persons with disabilities have the opportunity to receive additional discounts with appropriate verification.
LIFE Program	The Low-Income Fare is Easy (LIFE) program, considered a fare subsidy program, provides transportation assistance to low-income individuals in LA County. LIFE offers fare subsidies that may be applied toward the purchase of a Metro pass, a LIFE-participating operator pass, or free regional ride options. Qualifying riders can save more on Metro 7-Day, 30-Day or toward fare on participating transit operators with LIFE benefits. These benefits are loaded directly onto TAP cards. The system launch eliminated the use of paper coupons and tokens, enabling LIFE patrons to load their subsidies on their TAP cards.
Universal College Student Transit Pass (U-Pass Program)	In May 2016, the Metro Board approved the Universal College Student Transit Pass (U-PASS) Pilot Program. The U-PASS Program provides college students of participating schools with greater fare discounts and an expedited activation process administered on campus. The U-Pass is currently valid on Metro and nine municipal agencies.
Transitional Pass Program (GradPass Program)	The GradPass Program, also a transitional reduced fare program, is for graduating U-Pass holders allowing eligible participants to purchase Metro fare at the reduced college/vocational rate. It offers an additional 12 months after graduation to help students as they transition out of academia and into the workforce.
Employer Annual Pass Program (EAPP) – Annual Transit Access Pass (ATAP)	A regular ATAP is good on all Metro bus and rail services including Freeway Express services (Silver Line, Express). The program allows employers to purchase annual non-discounted passes for individual employees. Employers and employees may qualify for commuter benefits, which will significantly reduce the cost of the employee pass and act as a business tax benefit for the employer.
Employer Annual Pass Program (EAPP) - Business Transit Access Pass (BTAP)	Under the BTAP Program, employers are required to purchase reduced fare annual passes for all employees at a worksite. A small percentage of employees may be exempted for approved reasons, such as Metrolink and vanpool users or those with unconventional work assignment, such as having a night shift work schedule.
Employer Annual Pass Program (EAPP) - Staff and Faculty Pass Pilot Program (E-Pass)	In 2016, with the inception of the U-Pass Program, college staff and faculty requested a similar program for the administration. Commute Services is currently working with the Office of Management and Budget (OMB) on a Pilot Program based on a per-boarding cost and administered through partnership agreements, similar to the U-Pass Program. As of May 2018, OMB has approved 16 businesses for participation in this program.

PROGRAM NAME	DESCRIPTION
Employer Annual Pass Program (EAPP) - Promotional Employer Pass (PEPP) Program	As an introduction to EAPP Programs, the Promotional Employer Pass is open to new businesses who are not currently participating in the EAPP Program.
Residential Transit Access Pass (RTAP)	Based on past practice, the current Residential TAP (RTAP) program offers discounted passes to official Metro Joint Development projects under the Business Transit Access Pass (BTAP) program.
K-12 U-Pass Pilot Program	In the fall of 2019, Metro partnered with MoveLA, LA Promise Fund, The South Los Angeles Transit Empowerment Zone (SLATE-Z) and LAUSD to promote a U-Pass K-12 Pilot Program. The grant, funded from the 11th Hour Schmidt Family Foundation, provided 400 students with an unlimited U-Pass for the 2019-2020 academic year.
Youth on the Move Pilot Program	Metro is approving a one-year pilot program to explore multiple options, which include, but are not limited to, lowering, and extending the eligible age range of the Youth on the Move program to reach out to more youth participants. The program benefits include providing transportation assistance to foster youth transitioning out of foster care into self-support through the Independent Living Program managed by the Los Angeles County Department of Children and Family Services.
Unsolicited Proposals Policy	In May 2018, Metro established an Unsolicited Proposals Policy which established a process for Metro to engage the private sector by accepting written proposals for the purpose of developing partnerships that are not in response to an issued request from Metro. This policy provides a pathway for Metro to implement projects that otherwise might not have happened until well in to the future, if at all. Unsolicited Proposals can lead to a demonstration, pilot project, such as the Mobility on Demand first/ last mile pilot with Via, or even full deployment across Metro's system.
Comprehensive Pricing Strategy	The Metro Comprehensive Pricing Study (CPS) is a system-wide review of Metro's pricing policies for all of its transportation services, including fares, bike share, parking and tolls. Vision 2028 directs staff to conduct a comprehensive transportation system pricing study to determine options for meeting goals of revenue, equity, security, ridership, and user experience, and to implement pricing policies arising from the study.

Sustainability

Metro's mobility investments are largely oriented towards sustainable outcomes, and therefore sustainability is woven throughout actions that comprise the four priority areas. Investments in bus, rail, walking, bicycling and shared-mobility inherently produce less harmful emissions than a single-occupant motor-vehicle trip while consuming less natural resources. But Metro's work in sustainability does not stop there. Sustainability is a value at Metro that influences our work across the agency.

Sustainability is fundamentally about meeting the needs of the present without compromising the ability of future generations to meet their own needs. In this way, sustainability aspires to achieve intergenerational equity to ensure that future generations benefit from the opportunities and resources that prior generations enjoyed. This section explores the work Metro is undertaking to ensure that our sustainable mobility systems reduce harmful emissions, reduce water and energy use and are resilient in the face of a warming climate.

> Sustainability Vision: Create an organizational culture and workforce that continually integrates the principles of sustainability into all aspects of decision making and execution to enhance communities and lives through mobility and access to opportunity.

Metro's commitment to sustainability is guided by the following principles:

1. Implement sustainable practices and initiatives that advance and enhance the goals of Metro's Vision 2028 Strategic Plan.

2. Align sustainability projects and initiatives to support Metro's Long Range Transportation Plan.

3. Establish measurable key performance indicators to track the implementation and success of our sustainability strategies and actions.

4. Achieve our sustainability goals through transparent and authentic engagement with our stakeholders and community members.

5. Foster a culture of sustainability at Metro through staff education, workforce development and increased capacity.

6. Encourage innovation in strategic planning and sustainable practice through adaptability and resilience.

7. Strengthen regional sustainability efforts by providing leadership and collaborating with regional partners and agencies.

Further, the very nature of our sustainability work requires close collaboration and partnership with local, regional and state public agencies as well as private sector partners to achieve our shared climate and sustainability goals.

Key California Climate and Sustainability Practices

California continues to lead the nation as one of the most progressive states for sustainability and climate change policy. Below is a concise summary of some of the more prominent policies that guide Metro's work directly or through partnerships.

Greenhouse Gas Emmissions Reduction

Senate Bill 32 (Pavely, 2016) and Assembly Bill 32 (Nunez, 2006) – AB 32 requires California to reduce its overall greenhouse gas emissions to 1990 levels by 2020 and established the state's cap-and-trade program to help achieve this goal. SB 32 goes further to require California to reduce greenhouse gas emissions 40 percent below 1990 levels by 2030.

Cap-and-Trade Extension

Assembly Bill 398 (Garcia, 2017) – Law extending California's cap-and-trade program, established by AB 32, through 2030

Sustainable Transportation Planning

Senate Bill 375 (Steinberg, 2008) – Transportation planning legislation that requires Metropolitan Planning Organizations (MPOs) that prepare a Regional Transportation Plan (RTP) to adopt a Sustainable Communities Strategy (SCS) that sets goals for the reduction of greenhouse gas emissions from automobiles and light trucks in a region. The California Air Resources Board (CARB) sets the greenhouse gas reduction targets in consultation with the MPO for the LA County region, the Southern California Association of Governments (SCAG), and then works with Metro and the cities to help achieve those targeted greenhouse gas reduction targets through a combined RTP/SCS strategy.

California Air Resources Board Oversight and Reporting

Assembly Bill 197 (Garcia, 2016) – A companion bill to SB 32 requiring CARB to report regularly to the state legislature on its progress in implementing the state's climate policies, including progress on the aforementioned RTP/SCS.

Renewable Energy Procurement

Senate Bill 100 (de Leon, 2018) and Senate Bill 350 (de Leon, 2015) – Energy legislation that requires the state to procure 60 percent of all electricity from renewable sources by 2030 and 100 percent from carbon-free sources by 2045; double the energy efficiency of existing buildings; and allow greater electric utility investment in electric charging infrastructure.

Community Air Protection

Assembly Bill 617 (Garcia, 2017 – Companion bill to AB 398 that extends California's cap-and-trade program for greenhouse gas emissions. The legislation increases air monitoring requirements and penalties for polluters who exceed limitations in vulnerable communities.

California Climate Registry

Senate Bill 1771 (Sher, 2000) – Established the California Climate Registry, which cataloged early greenhouse gas emission reductions and set reduction goals and standards for measurement and verification, as a precursor to AB 32 as well as other state efforts.

Key Metro Climate and Sustainability Policies and Programs

Metro continues to evolve its policies and programs to adapt the latest innovative practices and be responsive to our evolving climate challenges. The following climate and sustainability policies and programs provide a sample of the breadth and depth of sustainability work that Metro is pursuing.

Southern California Association of Governments Regional Transportation Plan & Sustainable Communities Strategy (SCAG RTP/SCS)

SCAG prepares an RTP/SCS, a long-range regional planning document that coordinates land use and transportation strategies across the five county SCAG region to help the state of California achieve its climate goals. The Plan, required by the state of California and the federal government, is updated by SCAG every four years as demographic, economic and policy circumstances change. Metro is a key participant in this process, contributing many of the sustainable mobility projects that will help achieve the GHG emissions reductions identified in the Plan.

Zero Emission Buses (ZEB)

Metro's vehicle fleet accounts for 80 percent of its total energy consumption per year. Reducing criteria air pollutant emissions is critical to protecting public health and reducing air pollution. Metro has already replaced over 220 aging bus engines with near-zero emission engines and plans to continue, replacing at a rate of 180 engines per year. This initiative is not only increasing the operating life of existing buses, but more importantly, it is reducing NOx and PM emissions from our bus fleet. Additionally, we have adopted a comprehensive plan to transition to a 100 percent zero emission electric bus fleet by 2030. These initiatives will significantly reduce NOx, PM and GHG emissions. The following documents have more details on Metro's plans to transition vehicle fleets:

> Zero Emissions Bus Master Plan (2020)

> Electric Vehicle Implementation Plan (2020)

Climate Action and Adaptation Plan (CAAP)

Metro completed an update of the CAAP in 2019 which further commits our agency to reducing GHG emissions and building climate change resilience within our transportation system and across the region. Thus far, Metro has completed several energy assessments and implemented large-scale projects, including LED lighting retrofits, a transition to RNG for our bus fleet, a bus electrification schedule and various system upgrade installations at rail and bus maintenance divisions.

Climate Safe Infrastructure Adaptive Design (AB 2800)/ Climate Safe Infrastructure

Metro has participated in this statewide imitative to understand how the state of California can better prepare its existing and new infrastructure for climate conditions that will be increasingly different from the current ones. The overarching goal is to ensure a climate-safe future by incorporating climate change data into infrastructure design, construction, and operations and maintenance. Metro is taking steps to fully incorporate climate adaptation into its planning, procurement, asset management and operations.

Sustainable Design Training

All successful Metro Call for Projects grant recipients, beginning with the 2013 Call for Projects, are required to attend a Metro-sponsored Sustainable Design Training and submit a Sustainable Design Plan for their project. The training has four main objectives – 1) Train Call for Project applicants on how to develop a sustainable design plan, 2) Educate applicants on the components of a sustainable design plan, 3) Provide examples of sustainable outcomes and 4) Estimate performance results and quantify benefits.

Metro's Growing Greener Workforce

Implemented in 2017 to create a more resilient and sustainable Los Angeles by providing people with knowledge through Metro sponsored trainings and professional development. Trainings are available in-person or online and allow for local professionals to continue to advance their career and gain relevant industry certifications.

Metro Environmental Construction Awareness (MECA)

The Program is a set of video, text, and hotlink resources focused on specific environmental regulations and practices to be considered in proposal preparation and implementation. The resources provided should be used as a basis for understanding project expectations; to apply proven sustainability solutions throughout a project from its inception; and to learn the concepts, terminology, and procedures Metro's Environmental Compliance and Sustainability Department (ECSD) uses.

Sustainable Acquisition Program

Currently in development, the program identifies strategies to change existing behavioral and purchasing practices to minimize both the upstream and downstream impacts of procured materials.

Transportation Electrification Partnership

Metro is a key partner in the Transportation Electrification Partnership (Partnership), an unprecedented multi-year partnership among local, regional, and state stakeholders to accelerate transportation electrification and zero emissions goods movement in the Greater Los Angeles region. The Partnership was established by the Los Angeles Cleantech Incubator (LACI) in May 2018 to accelerate the adoption of transportation electrification across light and heavy-duty vehicles, to reduce greenhouse gas emissions and to improve air quality.

Water Action Plan (2010)

The Plan provides recommendations for water conservation and cost-benefit analysis of those recommended actions for Metro's consideration. It also recommends next steps for the refinement, implementation, and ongoing optimization of the Plan and its associated strategies. The intent of this Plan is to determine the potential for water conservation opportunities and cost-saving measures consistent with Metro's environmental policies and its implementation of an Environmental Management System (EMS). An update to the Water Action Plan is forthcoming.

Environmental Management System (EMS)

EMS creates a framework for implementing best practices that help ensure compliance with federal, state and local environmental regulations, pollution prevention and sustainability goals and maintains the International Organization for Standardization (ISO) 14001:2015 certification by conducting both internal and external third-party audits. Using the ISO 14001:2015 framework of Plan-Do-Check-Act, Metro EMS builds on Metro's Environmental Policy to synchronize operational best practices with the agency's larger environmental and sustainability goals and helps to increase employee awareness on how to reduce impacts on the environment.

Resiliency Indicator Framework (2015)

The Resiliency Indicator Framework established a mechanism to measure and evaluate climate adaptation implementation priorities to ensure infrastructure resilience and maintain a good state of repair. These indicators have a broad, multi-hazard application across Metro as they facilitate continual improvement, tracking the effectiveness of our planning, construction, and operational activities in increasing agency-wide resilience.

Moving Beyond Sustainability

In the fall of 2020, Metro released the Moving Beyond Sustainability Plan (MBS) – a comprehensive sustainability strategic plan framework to guide sustainability activities over the next ten years and beyond. The title is a reflection of the fact that while our day-to-day mobility operations inherently advance sustainability by reducing GHG emissions, we can and will do more. Our work intends to move beyond sustainable mobility as we increase access to opportunity, conserve resources, foster vibrant communities, improve public health, drive economic development and transform LA County.

Building on over a decade of sustainability policies, plans and programs, MBS will be Metro's most comprehensive sustainability planning document to date and sets goals, strategies and actions that align with and emanate from other key Metro guidance documents, including: Vision 2028, Long Range Transportation Plan, Equity Platform Framework and our Resiliency Indicator Framework. In addition, recognizing that Metro's success is dependent on collaboration with our public agency partners, MBS, aligns with and supports parallel efforts and plans underway at LA County and the City of Los Angeles, including LA's Green New Deal and Our County plans.

MBS will be a living document, adaptive to people's needs, a rapidly changing climate, new learning, continuous improvement and new opportunities for partnerships. Upon final adoption of the Plan by the Metro Board of Directors (adopted in September 2020), the plan will be available at Metro's sustainability website: *metro.net/projects/sustainability/*

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Equity

The LRTP update began with equity as a guiding theme. In February 2018, the Metro Board adopted the Equity Platform, confirming the agency's commitment to evaluate areas of the most need in the County and intentionally reevaluate agency priorities to advance opportunities for those who are faring the worst in the region. The following section describes Metro's Equity Program and the LRTP's relationship to advancing equity through the Equity Platform, a Definition of Equity, Equity Focus Communities, and Title VI analysis. Title VI of the Civil Rights Act of 1964 applies to programs and activities receiving federal assistance to protect people from discrimination based on race, color, and national origin. Transit operators are required to apply Title VI to operational decisions and contracting practices.

Equity Platform

In 2018, Metro adopted its Equity Platform to help ensure system changes prioritize those most in need of improved access to opportunity. Metro recognizes that there are deep-rooted and pervasive racial and socioeconomic inequities that create disparate results and impacts, even when the intention is to help all. Accordingly, we need an understanding of those disparities and an intentional focus on those faring the worst in order to truly improve access to opportunity for all. The Equity Platform is structured around four pillars:

I. Listen and Learn;

II. Define and Measure;

III. Focus and Deliver; and

IV. Train and Grow.

The LRTP was developed in accordance with these pillars, through robust public engagement, as well as clearly defining our goals and performance measures for tracking our effort to deliver better access and mobility in the future.

Defining Equity

As part of our commitment to the Equity Platform Framework, Metro has developed a definition of equity. This definition gives each facet of Metro and our community partners a starting place for understanding what equity means in our projects, plans and partnerships. The definition was developed with input from the Metro PAC in 2020.

> Equity is both an outcome and a process to address racial, socio-economic and gender disparities, to ensure fair and just access – with respect to where you begin and your capacity to improve from that starting point – to opportunities, including jobs, housing, education, mobility options and healthier communities. It is achieved when one's outcomes in life are not predetermined, in a statistical or experiential sense, on their racial, economic or social identities. It requires community informed and needs-based provision, implementation and impact of services, programs and policies that reduce and ultimately prevent disparities.

As it relates to the LRTP, the definition of equity is intended to apply broadly across Metro's range of activities and investments described in the Plan.

Equity Focus Communities

As part of the LRTP, Metro has defined "Equity Focus Communities" (EFCs). EFCs are a set of geographies that Metro staff developed with the Equity Working Group of the Policy Advisory Committee (PAC). The purpose of the Working Group was to determine the location of underserved communities and analyze data that identified disparate outcomes. The development of a definition of Equity Focus Communities was reviewed by experts at the University of Southern California (USC) Program for Environmental and Regional Equity (PERE) in consultation with the Metro PAC.

As part of defining EFCs, Metro looked at more than 30 indicators of opportunity across the following categories:

> Jobs

> Housing

> Education

> Public Health/ Environment

> Safety/ Security

Indicators such as households within a half mile of parks were calculated for the LA County population across a variety of socio-demographic risk factors including:

> Race

> Income

> Age

> Gender

> Birthplace

> Disability

> Family Structure

> Car Ownership

> Housing Tenure

> English Speaking

As part of the process of understanding EFCs in LA County, these socio-demographic risk factors were correlated with opportunity factors. Ultimately, in partnership with the PAC Equity Working Group and USC PERE, we determined EFCs based on two demographic factors that have historically been determinants of disinvestment and disenfranchisement, household income and race/ethnicity, and a third factor, households with low vehicle ownership. Incorporating the characteristic of households without a car presents an opportunity to target new mobility investments in neighborhoods with a higher propensity to take full advantage of them.

The identified communities represent geographic areas that have the following socioeconomic characteristics: more than 40 percent of households are low-income and either 80 percent of households are non-white or 10 percent have no access to a vehicle. Collectively, these areas represent about 30 percent of the county's population. EFCs are communities that have experienced historic disinvestments, reduced access to opportunity and housing, and policy decisions that have resulted in environmental justice disparities. As such, these communities have a higher degree of various negative outcomes and are those with the greatest need. EFCs are used to calculate several performance measures in the LRTP.

Title VI Analysis

A Title VI analysis is performed as part of the LRTP to assess the transportation impacts on distinct socioeconomic groups in LA County. Similar to analysis done with EFCs, Title VI analysis uses census data as the foundation for understanding socio-economic characteristics and evaluating differences in opportunities based on those population characteristics. The Title VI analysis uses the census tract geography to analyze the following transportation impacts:

> Job accessibility within 60 minutes via transit; and

> Mode choice by income quintile.

The results of the Title VI analysis using these designated geographies are described in Chapter 5.

Financial Model and Assumptions

The 2020 LRTP financial forecast is Metro's plan for funding the capital program. It helps determine funding strategies for capital projects and the allocation of state and federal grants. It demonstrates to our funding partners, at the state, federal, and local level, that we anticipate having the resources to meet our financial commitments. For federal New Starts funds, the financial forecast helps demonstrate to the Federal Transit Administration (FTA) that Metro has the financial capacity to build and operate the grant funded transit line.

The financial forecast covers the 30-year time horizon of the LRTP and is based on numerous cost and revenue assumptions. It funds an estimated $400 billion of transportation capital and operating costs countywide. This figure includes all forecasted investment in transportation projects and services in LA County from FY21-2050.

The LRTP financial forecast includes all projects and programs approved by the Metro Board, including the commitments in the Measure R and Measure M Expenditure Plans. The financial forecast shows that Metro can fund these commitments on their planned schedule, as well as future state of good repair. However, the financial forecast is subject to significant risks relating to ongoing sales tax growth, successful receipt of grant funds, additional capital and operating needs, and higher than anticipated capital and operating costs. Should these risks occur, Metro will need to reassess our capital program and prioritize the funding of the many projects and programs in the LRTP.

This section of the LRTP financial forecast covers, in detail, the following.

> Revenue assumptions

- Local sales tax
- Other local revenue
- State revenue
- Federal revenue

> Expenditure assumptions (with funding plans for major projects)

- Bus program
- Rail program
- Highway program
- Multimodal program

Major Revenue Assumptions

Metro receives revenue primarily from four separate voter-approved local sales tax measures that are dedicated for transportation purposes. Three of the sales taxes have no sunset date, and provide an unprecedented level of local financial commitment towards the construction and ongoing operations and maintenance of the capital plan. Metro also expects to benefit from a significant amount of State grant funding and other assistance created by Senate Bill 1 (SB 1), which increased the gasoline and diesel excise tax and vehicle licensing fees in California, as well as ongoing federal support through longstanding discretionary and formula transportation grant programs.

The key revenue assumptions for the LRTP include the forecasted amount of sales tax and availability of future state and federal grant funding.

This financial forecast was developed before the COVID-19 pandemic and the long-term revenue impact from the pandemic on local sales tax, state SB 1, and fare revenue, as well as the impact of federal stimulus funding is still to be determined.

Local Sales Tax Revenues

Sales Tax Revenue Growth

There are four separate 0.5 percent transportation sales taxes in LA County – Proposition A, Proposition C, Measure R, and Measure M. The revenue that Metro receives is determined by the amount of taxable sales in the county. Forecasted taxable sales are obtained from the University of California at Los Angeles (UCLA) Anderson Forecast. Based on a moving average of the forecast released in 2017 through 2019, the average sales tax growth rate is 3.66 percent from FY21 to FY50. The starting point for the sales tax forecast is the FY20 budgeted amounts of $873 million for each of the four countywide sales taxes.

Proposition A Eligible Uses

A half-cent sales tax, passed by LA County voters in 1980, is to be used to improve public transit throughout LA County. A portion of the revenues is returned to local jurisdictions, based on population, for use on public transit projects. Revenues, after 5 percent is allocated to Metro for administration, are divided as follows:

USES	PERCENTAGE
Local Return Program	25%
Rail development and operations	35%
Discretionary (bus operations per Metro Board policy)	40%
Total	**100%**

All Proposition A discretionary funds (40%) are used for bus operations in accordance with established formulas.

Proposition C Eligible Uses

A half-cent sales tax, passed by LA County voters in 1990, is to be used for public transit purposes in LA County. Revenues after 1.5 percent is allocated to Metro for administration, are divided as follows:

USES	PERCENTAGE
Rail and bus security	5%
Commuter rail/transit centers/park and ride	10%
Transit-related streets/state highways	25%
Local return (direct to cities and county)	20%
Discretionary	40%
Total	**100%**

The discretionary funds (40%) are assumed split among rail capital and operations and bus capital and operations. Allocations between bus and rail capital and operating requirements shift over time as capital projects are built and operations begin. These funds are also used for planned replacement and rehabilitation, of capital items including buses, facilities and rail cars.

Most of the transit-related highway funds (25%) are programmed for highway-related projects, such as carpool or high occupancy vehicle (HOV) lanes. These funds are also eligible for portions of transit projects that are on a state highway or freeway and for public mass transit improvements to railroad rights-of-way.

The Commuter Rail and transit funds (10%) are used for Metrolink commuter rail, debt service, and regional park-and-ride facilities and transit centers through the Call for Projects.

The Act of 1998

Both Proposition A and Proposition C sales tax are not eligible for expenditures on "new subway," pursuant to the Act of 1998 that was approved by county voters. This includes spending on the planning, design, construction, operation, and debt service for new subway.

Measure R Eligible Uses

A half-cent sales tax effective July 1, 2010, passed by LA County voters in 2008, is used for projects and programs as specified in the Measure R Expenditure Plan. This sales tax has a sunset date of June 30, 2039. Revenues, after 1.5 percent is allocated to Metro for administration, are divided as follows:

USES	PERCENTAGE
New Rail and/or Bus Rapid Transit Capital	35%
Metrolink Capital Improvements within LA County	3%
Metro Rail Capital System Improvements	2%
Highway Capital	20%
Local Return	15%
Rail Operations	5%
Bus Operations	20%
Total	**100%**

Measure M Eligible Uses

A half-cent sales tax effective July 1, 2017, which increases to a one-cent sales tax on July 1, 2039, was passed by LA County voters in 2016, and is used for the 91 projects and programs identified in the Measure M Expenditure Plan. Revenues, after 0.5 percent is allocated to Metro for administration, are divided as follows:

USES	PERCENTAGE
Rail Operations	5%
Bus Operations	20%
Paratransit Operations; Fare Discounts	2%
Transit Construction	35%
Metro State of Good Repair	2%
Highway Capital	17%
Active Transportation	2%
Local Return	16%
Regional Rail	1%
Total	**100%**

The capital percentage allocations or subfunds, can only be used for capital, and the operations subfunds only for transit operations.

Transportation Development Act (TDA Article 4)

Transportation Development Act (TDA) revenues are derived from one-quarter cent of the 7.25 percent statewide base retail sales tax. The funds are apportioned to each county by the State Board of Equalization according to the amount of tax collected in the county. Each year, the actual funds are allocated according to the Metro Transit Fund Allocations. Generally Metro receives approximately 74 percent and the Municipal Operators receive 26 percent of the county allocation. TDA Article 4 funds are available for bus and rail capital and operations.

Other Local Revenues

Fare Revenues

The financial forecast includes bus and rail fare revenues, initially equal to the budgeted amount in FY20. The projected fare revenues increase steadily over time to achieve a "fare recovery ratio" (fare revenue divided by transit operations and maintenance costs) of approximately 30 percent by FY50.

This key assumption may entail a combination of strategies such as reducing unproductive service, achieving operating efficiencies, reducing costs, and increasing fares and other operating revenues. The number of riders anticipated on the Metro system has declined over the last several years and has led to a historical low fare recovery ratio.

Local Agency Contributions

The Measure M Ordinance specifies that each city that has a Measure M transit station located in its boundaries shall pay 3 percent of the project costs, depending on the number of stations within the city (or unincorporated county). The financial forecast includes a 3 percent local agency contribution as a source of funding for all Measure M rail transit projects.

Lease and Advertising Revenues

Metro receives funding from land leases on Metro-owned property, advertising on Metro property, and advertising on Metro vehicles. Lease and advertising revenues total $40.5 million in FY20 and are projected to increase proportionally with inflation over the timeframe of the financial forecast.

Toll Revenues

Metro operates ExpressLanes on both I-10 and I-110, which generate net income that is included in the financial forecast. Toll revenue from future ExpressLanes on I-105 and I-405 Sepulveda Pass, are used to pay for the costs of the respective ExpressLane.

Bonds/Debt Financing

Sales Tax Bonds – Debt financing is needed for the timely completion of scheduled major capital construction projects when annual sales tax receipts and fund balance are not sufficient to support annual expenditures. The bonds proposed are for planning purposes to assist in making long-range financial decisions and will be issued when needed to fund transit and highway capital projects. The financial forecast assumes that 4.5 percent interest on 30-year bonds. At the time of actual need, bond issuances will be analyzed individually and approved by separate Metro Board action.

Grant Revenue Bonds – Metro has received federal New Starts grants for the Regional Connector and Westside Subway Extension projects, and anticipates future New Starts funding for additional rail projects. The grant funding is paid to Metro over time and a portion will be paid after completion of the projects. Borrowing is needed to provide funding during construction. The financial forecast assumes grant revenue bonds are used for some of the New Starts projects. The bonds are paid solely from the New Starts receipts.

Toll Revenue Bonds – The Measure M Expenditure Plan includes 2 new ExpressLanes on I-105 and I-405 through the Sepulveda Pass. Toll revenue bonds secured by the ExpressLanes revenue are included in the financial forecast for these projects. Future toll revenue bonds will explore use of system toll revenues, as opposed to corridor-specific revenues.

The total amount of debt to be issued in the financial forecast through FY49, by type of debt and by decade, is as follows (in millions$):

TYPE OF DEBT FINANCING	'20-'29	'30-'39	'40-'49	'50-'57
Proposition A	$810	$495	$910	-
Proposition C	$1,489	$1,821	$680	$6,609
Measure R	$2,828	$1,259	-	-
Measure M	$6,710	$4,697	$3,308	$12,681
Grant Revenue	$1,727	-	-	-
Total	**$268**	**-**	**-**	**-**

Debt Policy – Metro maintains a Debt Policy that identifies the types of debt that Metro will issue and places caps on the amount of sales tax that can be used to pay debt service. The financial forecast conforms to the Debt Policy, including the percentage maximums per sales tax category, as follows:

SALES TAX CATEGORY	DEBT POLICY PERCENTAGE MAX.	FINANCIAL FORECAST MAX.
Proposition A Rail 35%	87%	56%
Proposition C Transit-Related Streets 25%	60%	58%
Proposition C Discretionary 40%	40%	38%
Measure R Transit 35%	87%	85%
Measure R Highway 20%	60%	59%
Measure M Transit 35%	87%	84%
Measure M Highway 17%	87%	61%

State Revenues

The financial forecast includes all state revenues that Metro currently receives and expects to receive, with the assumption the funding program will continue to exist over the time horizon of the LRTP. A brief description of the major state revenues is provided.

Active Transportation Program (ATP)

This is a state grant program for projects, both infrastructure and non-infrastructure, that further ATP goals. Funding for the program was increased through SB 1 (as discussed see herein). Metro and all cities in the county are eligible to apply. Metro expects to receive a portion of the regional funding for highly competitive projects like the Los Angeles River Bikeway.

Low Carbon Transit Operations Program (LCTOP)

This program is funded from five percent of cap-and-trade auction proceeds and is intended for projects that increase transit mode share, replace conventional vehicles with electric zero emissions vehicle projects, support new or expanded bus or rail services, and expand intermodal transit facilities, equipment acquisition, fueling, and maintenance and other costs to operate the above services or facilities. Metro expects to receive about $30 million per year from this program primarily for funding rail operations.

Regional Improvement Program (RIP) Funds

The Regional Improvement Program (RIP) is part of the State Transportation Improvement Program (STIP). The STIP is divided 75 percent by county shares, the RIP, and 25 percent for interregional statewide shares. The 75 percent RIP share allows Metro to select projects for funding upon approval by the CTC. Metro uses its Long and Short Range Transportation Plans to select the projects to receive such funding and be programmed in the STIP. The Metro Board approves the programming of the RIP share for capital improvements to eligible highway, bus, rail, fixed guideway, and other capital projects.

The financial forecast incorporates the RIP awards from the 2018 and 2020 STIP. The biennial STIP adds two new years of programming. The financial forecast assumes $120 million per year will be available for Metro from the RIP, beyond the expected 2020 STIP awards. The RIP is allocated to projects including: East SF Valley Transit Corridor Project, Sepulveda Pass Transit Corridor (Ph 2), SR-710 North, I-5 and I-405 Carpool Lane Connector, and Retrofit Soundwalls Phase 1.

Senate Bill (SB 1)

SB 1 was signed into law on April 28, 2017 and contains new revenues to make road safety improvements, repair local streets, expand public transit, improve highways, and build bridges and overpasses. SB 1 provides $5.4 billion per year over the next decade to fund transportation improvements through increases in the state excise tax on gasoline and diesel fuel, sales tax on diesel fuel, and vehicle registration fees.

The major funding programs under SB 1 are:

> **Local Partnership Program (LPP)** – The LPP provides local and regional agencies that have passed sales tax measures, tolls, or fees or that have imposed fees which are dedicated solely to transportation improvements with a continuous appropriation of $200 million annually (statewide) to fund road maintenance and rehabilitation, sound walls, and other transportation improvement projects. There is a competitive and formulaic portion, and Metro expects to receive about $60 million per year from both. Projects to be funded in the financial forecast include bus replacements, Orange Line BRT Improvements, Division 20, I-5 and I-405 Carpool Lane Connector, and I-605 Corridor 'Hot Spot' Interchange Improvements.

> **Solutions for Congested Corridors Program (SCCP)** – The SCCP provides funding to achieve a balanced set of transportation, environmental, and community access improvements to reduce congestion throughout the state. Metro expects to receive, on average, $65 million per year in awards from this grant program for funding of projects including Airport Metro Connector, Sepulveda Pass Transit Corridor (Ph 2), and Gold Line Eastside Extension (one alignment).

> **State of Good Repair (SB-1 SGR)** – These funds are to be made available for eligible transit maintenance, rehabilitation, and capital projects. The state distributes these funds using the State Transit Assistance Fund (STA) distribution formula and LA County subrecipients receive these funds through the annual Transit Fund Allocation process, after submittal of the required project list.

> **Trade Corridor Enhancement Program (TCEP)** – TCEP provides funding for infrastructure improvements along corridors with high volumes of freight movement. Eligible projects will increase the use of on-dock rail, improve safety by eliminating at-grade crossings, reduce impacts to surrounding communities, reduce border wait times, and increase rail capacity with double tracking. Metro anticipates that as much as $200 million per year, on average, could be available from this grant program. Projects receiving funds in the financial forecast include SR-57/SR-60 Interchange Improvements and I-710 South Corridor Project (Ph 1).

State Transit Assistance (STA)

STA funds are derived from the State Public Transit Account, which is funded mostly from sales tax statewide on gasoline and diesel fuels. SB 1 provides an additional $250 million per year to STA. This additional funding will go to transit capital projects and operational costs via current funding formulas based on agency revenue and population. Metro expects to receive about $100 million per year from STA.

The regional STA allocation for LA County is based on the County's shares of population and transit operator revenue compared to the rest of the state. The population portion of STA is used for Metro rail operations and the operator revenue share is used mostly for Metro and municipal operator bus operations.

Transit and Intercity Rail Capital Program (TIRCP)

TIRCP was created to provide grants for capital improvements and operational investments that will modernize California's transit systems and intercity, commuter, and urban rail systems to reduce emissions of greenhouse gases by reducing vehicle miles traveled throughout California. The program is funded from both cap-and-trade auction proceeds and SB 1 tax revenue. Metro expects to rely heavily on TIRCP with funding of as much as $200 million per year, on average, for rail projects including West Santa Ana Transit Corridor, Green Line Extension to Crenshaw Blvd in Torrance, East SF Valley Transit Corridor Project, Sepulveda Pass Transit Corridor, Gold Line Eastside Extension, and Gold Line Foothill Extension to Claremont.

Federal Revenues

The financial forecast includes all federal transportation funding that Metro currently receives and assumes the major funding programs will continue to exist through ongoing multiyear reauthorization bills. Metro expects that major capital funding sources like the federal New Starts program will continue to be a large funding component for our planned future rail lines.

Congestion Mitigation and Air Quality (CMAQ)

The CMAQ program is designed to fund projects that contribute to attainment of national ambient air quality standards. CMAQ funds cannot be used to construct facilities providing additional capacity for single-occupancy vehicles. The financial forecast assumes that all new rail lines and various Metro bus rapid transit projects will receive CMAQ funding for operating costs during the first three years of operation. CMAQ will also be used for bus purchases, carpool lanes, and new rail projects. Metro estimates that, on average, $130 million per year will be available.

Surface Transportation Block Grant Program (STBGP)

STBGP funds are appropriated by Congress for highway improvements but are flexible and eligible for transit capital projects, Transportation Demand Management (TDM), and improvements to highways and arterial roads. Half of the STBGP allocation to the state is assumed to go to the California State Highway Account with the remainder allocated to the regions by formula in accordance with Section 182.6 of the California Streets and Highways Code. Most of Metro's regional share of STBGP funding is assumed for paratransit uses by Access Services. Some STBGP funds have been assumed for carpool lanes and freeway gap closures/arterial widening in LA County. On average, $140 million per year is estimated available from this program.

Section 5307 Urbanized Formula

Federal funding from FTA's Section 5307 Program is determined by federal and Southern California Association of Governments (SCAG) formulas. The funding assumed in Metro's financial forecast is equal to the actual allocation to Metro, with future estimates increased by 1.0 percent per year. Federal regulations allow Section 5307 funds to be used for preventive maintenance costs as well as capital costs. The financial forecast assumes the continued use of these funds for eligible bus preventive maintenance costs in the operating budget and for future bus replacements.

The forecast also assumes that these funds will be allocated to all eligible bus operators by formula for identified capital requirements, pursuant to the current Transit Fund Allocation (85 percent by formula and 15 percent discretionary).

Section 5309 New Starts and Small Starts

Metro has received a significant amount of funding from the federal New Starts program, with funding of almost $400 million per year (through FY22) for Westside Subway Extension Segment 1, Segment 2, and the Regional Connector. Metro will apply for future rail projects based on their estimated competitiveness. This could include West Santa Ana Branch and Sepulveda Transit Corridor.

No future funds have been assumed from the discretionary Small Starts, Expedited Project Delivery pilot, or Core Capacity program.

Section 5339 Bus and Bus Facilities

Federal funding from FTA's Section 5339 Program totals $65.5 million. Each state receives $1.25 million, each territory receives $500,000 and the remaining funding is allocated based on a formula that includes population, transit vehicles revenue miles, and transit passenger miles. The financial forecast includes $27 million of formula funds in FY20, growing at 1.0 percent per year. Metro was awarded funding from the discretionary component of this program but no future discretionary funding is assumed. Formula funds are applied to bus midlife costs and future bus facility state of good repair.

Section 5340 Section 5340 Growing States and High-Density Formula

Half of the funds are made available under the Growing States factors and are apportioned based on state population forecasts for 15 years beyond the most recent census. Metro expects to receive $9 million in FY20, increasing approximately 1.0 percent per year. The funding is allocated for Metro rail operations in the financial forecast.

Build America Bureau's Transportation Infrastructure Finance and Innovation Act (TIFIA)

Federal resources to stimulate capital market investment for developing transportation infrastructure by providing credit assistance in the form of direct loans or loan guarantees to projects of national or regional significance. Metro has participated in this program since FY12 on various rail corridors.

Revenue Assumptions

Bus Program

The major bus program assumptions include: level of bus and rail service, cost per service hour, fleet replacement schedule, and future cost per vehicle. The projected level of service is multiplied by cost per service hour, and projected fleet purchases are multiplied by the cost per vehicle. The financial forecast does not reflect any changes related to the NextGen Bus Plan and includes only the cost of replacing the Metro CNG bus fleet, as an implementation plan for a zero emission bus fleet has not yet been determined.

Bus Capital

Major Metro Rapid Bus Projects – Measure M includes several bus rapid transit (BRT) and potential BRT projects. Funding plans for five BRT projects in the financial forecast are provided, in year of expenditure dollars, in the table below.

AMOUNT OF FUNDING BY SOURCE (MILLIONS)				
PROJECT	LOCAL FUNDS	STATE FUNDS	FEDERAL FUNDS	TOTAL COST
BRT Connector Orange-Red Line to Gold Line	$265.1	$50.0	-	$315.1
Lincoln Blvd BRT	$220.3	-	-	$220.3
North San Fernando Valley Bus Rapid Transit Improvements	$206.5	-	-	$206.5
Orange Line BRT Improvements	$247.9	$75.0	$3,308	$322.9
Vermont Transit Corridor	$201.4	$267.6	$55.0	$524.0

Bus Operations

New Buses and Added Service – The financial forecast estimate is for planning purposes only and does not commit Metro to any specific expenditure level or continuation of the service if restructured. The financial forecast does not incorporate any potential modifications to bus service resulting from the NextGen Bus Plan initiative.

Metro Bus Operations – Operations and maintenance cost projections are based on the Metro FY20 budget cost per service hour and revenue service hours projected by Metro Operations. The cost per service hour increases approximately 2 percent per year. Revenue service hours remain relatively flat from a low of 7,030,361 to high of 7,308,639 by FY49. Total bus operating costs increase from $1,268.6 million in FY20 to $2,465.7 million in FY50.

Access Services, Incorporated (ASI) – The LRTP funds complementary parallel transit services required by the Americans with Disabilities Act (ADA) at the Metro subsidy consistent with the FY20 budget plus inflation. In order for Metro to meet its share of cost growth for mandated parallel ADA services that exceed inflation, a combination of revenue increases or transit operating cost reductions will be necessary. The forecast assumes that Surface Transportation Block Grant Program (STBGP) funds will continue to be programmed for ASI. Proposition C 40 percent is also programmed to match the FTA funds.

Rail Program Assumptions

Rail Capital

Near-Term Transit Corridor Projects – Over the first ten years of the LRTP, nine transit projects may be under construction. Descriptions for each of the projects are included below. The funding sources shown are those assumed in the LRTP but may change upon future Board programming actions. All funding and cost is shown in year of expenditure dollars. The estimated opening dates are based on awarded construction contracts or most recent Metro estimate, including the preliminary start dates in the Measure M Expenditure Plan.

1. **Crenshaw/LAX Transit Corridor (scheduled to open FY21)** – The capital costs and life of project budget as of spring 2020 for the light rail line is $2,058.0 million.

2. **Regional Connector (scheduled to open FY22)** – The estimated capital cost and current life of project budget is $1,755.8 million. This project is funded with a New Starts grant and TIFIA loan.

D Line (Westside/Purple) Extension

3. **Segment 1 (scheduled to open FY24)** – The estimated capital cost and life of project budget as of spring 2020 is $2,778.9 million. With grant revenue bond debt service, the cost is $3,363.9. This project is funded with a New Starts grant and TIFIA loan.

4. **Segment 2 (scheduled to open FY26)** – The estimated capital cost and life of project budget as of spring 2020 is $2,441.0 million. This project is funded with a New Starts grant and TIFIA loan.

5. **Segment 3 (scheduled to open FY27)** – The estimated capital cost and life of project budget as of spring 2020 is $3,223.6 million. With grant revenue bond debt service, the cost is $3,911.4. This project is funded with a New Starts grant.

6. **East SF Valley Transit Corridor Project (scheduled to open FY27)** – The estimated capital cost is $1,567.7 million.

7. **Gold Line Foothill Extension to Claremont (Phase 2B) (scheduled to open FY28)** – The estimated capital cost is $1,573.9 million. This project is being designed and constructed through the Gold Line Foothill Construction Authority. Metro will fund the design and construction and take over as operator. The current scope and budget extends the project from Azusa to Pomona.

8. **West Santa Ana Branch Transit Corridor LRT FY28 (scheduled to open FY28)** – The estimated capital cost is $1,250.2 million for the FY28 segment that was initially envisioned in the Measure M Expenditure Plan. However, Metro is currently planning to combine the FY28 project with portions of the FY41 projects.

9. **Green Line Extension to Crenshaw Blvd in Torrance (scheduled to open FY30)** – The estimated capital cost is $1,166.8 million.

	AMOUNT			
RAIL PROJECT	LOCAL FUNDS	STATE FUNDS	FEDERAL FUNDS	TOTAL COST
Crenshaw/LAX Transit Corridor	$1,656.5	$287.0	$114.5	$2,058.0
Regional Connector	$599.3	$267.0	$889.5	$1,755.8
D Line (Purple) Extension Segment 1	$1,574.9	$2.6	$1,786.4	$3,363.9
D Line (Purple) Extension Segment 2	$1,085.0	-	$1,356.0	$2,441.0
D Line (Purple) Extension Segment 3	$1,906.1	$31.8	$1,973.4	$3,911.4
East SF Valley Transit Corridor Project	$1,158.8	$407.9	$1.0	$1,567.7
Gold Line Foothill Extension to Claremont	$1,283.7	$290.2	-	$1,573.9
West Santa Ana Branch Transit Corridor	$922.5	$323.9	$3.8	$1,250.2
C Line (Green) Extension to Torrance	$935.4	$231.3	-	$1,166.8

Metrolink Commuter Rail – The Southern California Regional Rail Authority (SCRRA) Joint Powers Authority, or Metrolink, plans, constructs, and operates the five county commuter rail system. Metro funds the portion of the capital and operating costs for commuter rail lines and projects located within LA County. Metro also funds and manages additional commuter rail and related improvements. The financial forecast assumes continued funding for the current commuter rail system from Proposition C (10 percent) and Measure M (2 percent) commuter rail revenues.

Other Rail Costs and System Improvements – In addition to the costs associated with the construction of individual rail lines, costs to upgrade the overall rail system and for miscellaneous enhancements are included.

Rail Operations

Rail operations costs are based on the current cost per service hour (FY20), revenue service hour projections from Metro Operations, and estimated revenue service dates for future rail lines. The cost per service hour is escalated by the historical growth rate over the last five years. The future cost per service hour is reduced for estimated fixed administrative costs that are not expected to be incurred upon the opening of each new rail line.

Transit Asset Management

Metro maintains an inventory of its rail and bus vehicles, purchases replacements at the end of the useful life and performs midlife overhauls at periodic intervals. Metro has existing replacement and midlife contracts for much of its existing vehicle fleet, with allocated funding. The financial plan includes funding for all future vehicle replacements and midlife overhauls.

In FY 2020, approximately $530 million was allocated to maintain Metro's bus, rail and technology infrastructure in a state of good repair, including bus replacements, and related technology, on-going bus maintenance midlife and engine replacement, rail vehicle procurement, and rail overhaul. Vehicle procurement costs and other facility, infrastructure, and vehicle procurements/maintenance costs are estimated based on the existing composition and age of the vehicle fleet. From FY21 to FY50, the financial forecast funds $14.2 billion of total SGR expenditures for Metro rail and $10.3 billion for bus.

Vehicle Replacement Schedule – Bus vehicle replacement is based on a 12-year bus cycle and rail vehicle replacement is based on a 30-year schedule.

Vehicle Costs – Total bus and rail vehicle costs are presented below. These costs assume replacements with alternative-fueled vehicles and are escalated annually by CPI starting in FY20. The costs are based on Metro's most recent procurements.

TYPE	AMOUNT
40-Foot Bus	$693,338
60-Foot Bus	$1,070,308
Heavy Rail Vehicle	$4,978,716
Light Rail Vehicle	$4,681,971

Facilities and Support Equipment – Costs for bus capital projects are based on Metro's Transit Asset Management database.

Highway Program Assumptions

The highway component adds the estimated total escalated cost of all Measure R, Measure M, and other Board-approved highway projects and programs.

Active Transportation

The financial forecast includes $559.4 million for specific active transportation projects, in addition to those in the Measure M multi-year subregional programs. The projects are funded with a combination of Measure M funds and state active transportation grants.

Freeway Carpool Lanes [High Occupancy Vehicle Lanes (HOV)]

The financial forecast provides for the implementation of HOV projects identified in the Measure R and Measure M Expenditure Plans. Project cost estimates are provided by Caltrans District 7 or Metro. Carpool lanes, not including ExpressLanes, and related project expenditures are $1.5 billion (escalated) from FY20 to FY50.

Freeway Gap Closures, Interchanges, and Arterial Widenings

Project cost estimates were provided by Caltrans District 7 or Metro. These projects have total expenditures of $16.2 billion (escalated) in the financial forecast.

Freeway Service Patrol

Continued funding for this program is assumed primarily through Proposition C 25 percent, Freeway Service Patrol State Highway Account Funds, and HOV violation funds. The Proposition C 25 percent funding is assumed to grow annually by CPI.

Intelligent Transportation System (ITS)

This program aims to efficiently utilize advanced technologies in Southern California's transportation systems. For the Regional Integration of the ITS, the financial forecast assumes an average of $1.7 million of Proposition C 25 percent funds escalated by CPI.

Local Streets and Roads

Estimated local funding through the State Gas Tax subventions, earmark exchange, use of surplus Measure R, and allocation of STBGP local funds of $21.7 billion are assumed received by the County and the cities in LA County through FY50. The funding includes augmented gas tax funding from SB 1.

Multi-year Subregional Programs

Highway eligible funding for the Measure M Multi-Year Subregional Programs totals $6.9 billion escalated through FY57. The specific projects are and will be identified by the subregions, subject to Metro guidelines and Ordinance restrictions, which include active transportation, first-last mile, highway efficiency, and modal connectivity eligible projects.

Operations, Caltrans

Estimated State Highway Account funds of $8.0 billion are assumed for Caltrans District 7 operations.

Retrofit Soundwalls

The Retrofit Soundwalls program encompasses freeways previously constructed without necessary soundwalls. This program has been a Metro responsibility since Senate Bill 45 took effect in 1998. The program has two phases: three priorities in Phase I and unprioritized projects in Phase II. Completion of Phase I totals $459.2 million through FY40 funded with Proposition C 25 percent, Measure R, and RIP funds. Phase II, for soundwalls on freeways without carpool lanes and therefore not eligible for Proposition C 25 percent, are not funded in the financial forecast.

Rideshare/Vanpool Program

Since FY03, Metro has directly operated countywide rideshare services with over 100,000 registrants currently. In May 2007, the Vanpool Program was added, providing lease and fare incentives to new and existing vanpools. Total funding of $452.5 million (Proposition C 25 percent and RIP) is assumed through FY50.

Service Authority for Freeway Emergencies (SAFE)

A separate legal entity that is housed within Metro, SAFE operates call boxes along the freeways, the #399 Mobile Call Box program, and the 511 Traveler Information System. It is funded by a $1 surcharge on each of the seven million registered vehicles in the County. Cost estimates and assumptions are based on the SAFE Ten-Year Financial Plan and include capital requirements and operations and maintenance expenses.

State Highway Operation and Protection Program (SHOPP)

Every four years, Caltrans prepares a SHOPP plan that identifies needed projects for maintenance and safety repairs. Caltrans administers this program and allocates funding throughout California as-needed. Funding for this program is significantly increased from SB 1 fuel taxes. An estimated amount allocated to LA County is assumed for reference and comparison to other counties.

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Travel Demand Model, Assumptions, and Forecast

The development of the 2020 LRTP was preceded by a rigorous assessment of the analytical tools, assumptions, and performance criteria that would be employed in the evaluation of potential plan alternatives. The primary analysis tool is the Metro Travel Demand Simulation Model. This appendix provides a technical summary of the travel demand modeling process and performance measure analyses conducted as part of the 2020 LRTP development effort.

Metro Model Overview

Travel demand modeling evaluates existing and future socioeconomic conditions, transportation networks, land-uses, and pricing data to estimate future travel patterns.

Key inputs include:

> Demographic and socioeconomic data (population, households, income, auto ownership, and jobs)

> Transportation network data (existing and approved roadway and transit projects)

> Pricing data (transit fares and fuel costs, maintenance estimates, parking, tolls, etc.)

Key outputs include:

> Trip generation (number of trips made)

> Trip distribution (where those trips go)

> Mode choices (how the trips will be divided among the available modes of travel)

> Trip assignments of vehicle and transit trips (predicting the route trips will take)

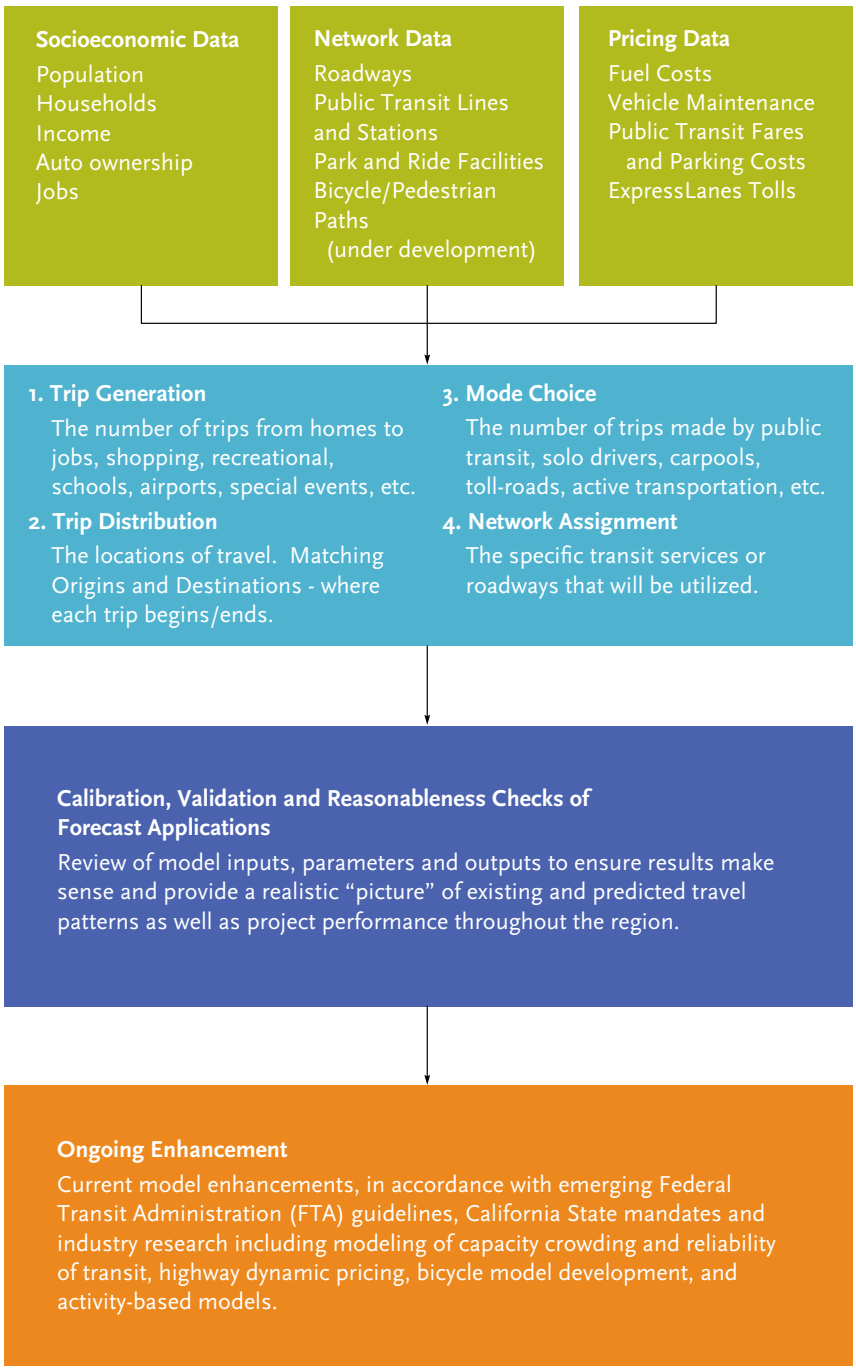
Travel demand models can test "what-if" scenarios, based on variations of inputs, providing decision makers with the best predictions of how well a project may be utilized, how a project may be implemented, and what benefits and impacts a project may have on the rest of the transportation network, community, and environment.

Metro's travel demand model includes the officially adopted Southern California Association of Governments (SCAG) forecasts of socioeconomic data. The Metro model also includes future transportation projects included and defined in Metro's Long Range Transportation Plan and SCAG's Regional Transportation Plan (RTP). Socioeconomic data forecasts are updated every four years by SCAG in cycle with the update of the RTP. These forecasts are developed by SCAG in coordination with local jurisdictions.

Travel Demand Model Components

The Metro travel demand modeling program components are illustrated in Figure 13.

Figure 13
Travel Demand Model Components



Model Structure and Key Details

The Metro Travel Demand Simulation Model uses the traditional four-step process generally employed by travel forecasting modelers throughout the United States. The four steps are trip generation, trip distribution, mode choice, and network assignment. Figure 14 is a conceptual representation of the four-step modeling process. The implementation of the travel demand modeling process is achieved through a series of 17 computer simulation modules. Figure 15 is a flowchart that illustrates the process.

Figure 14
Travel Demand Modeling Process

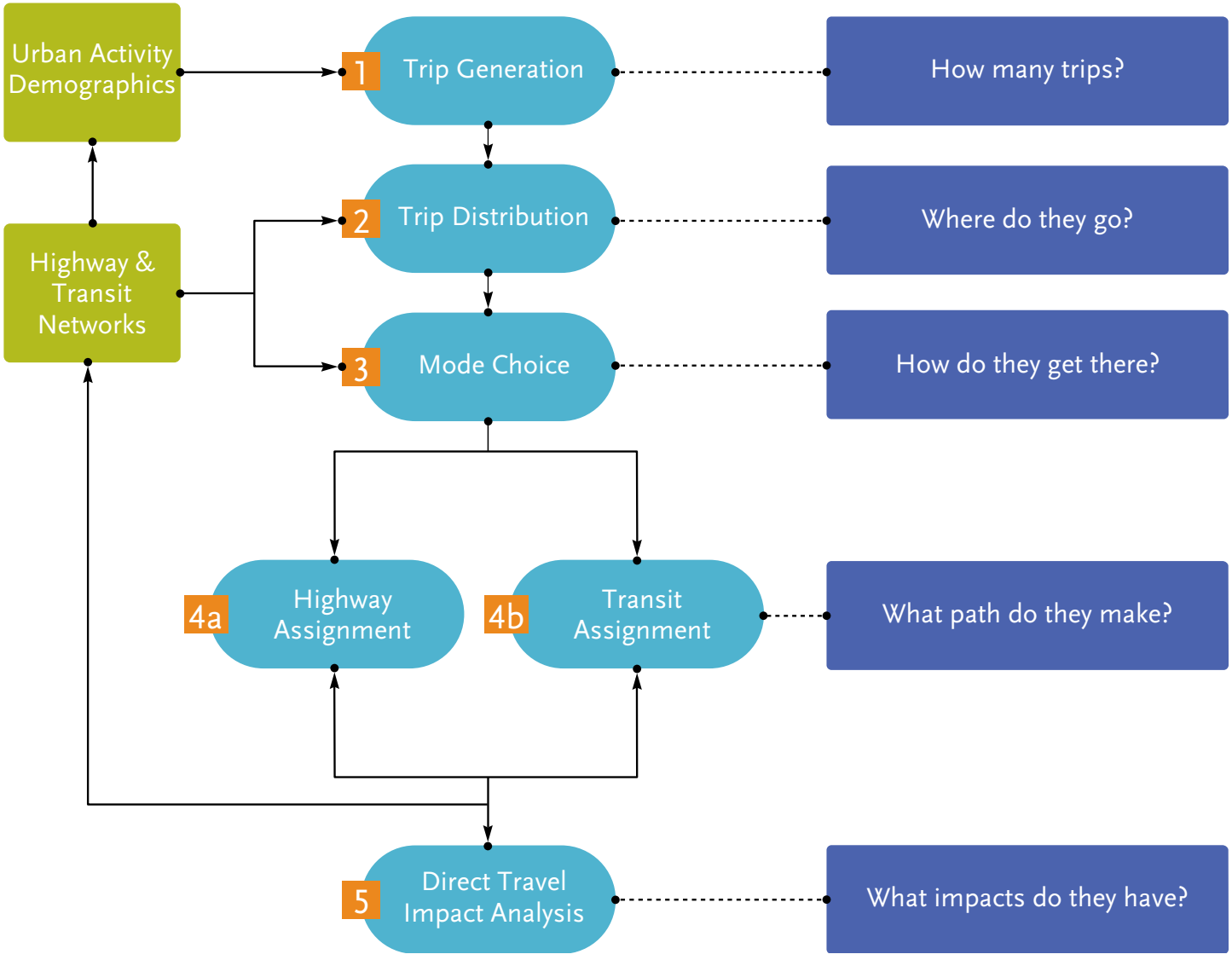
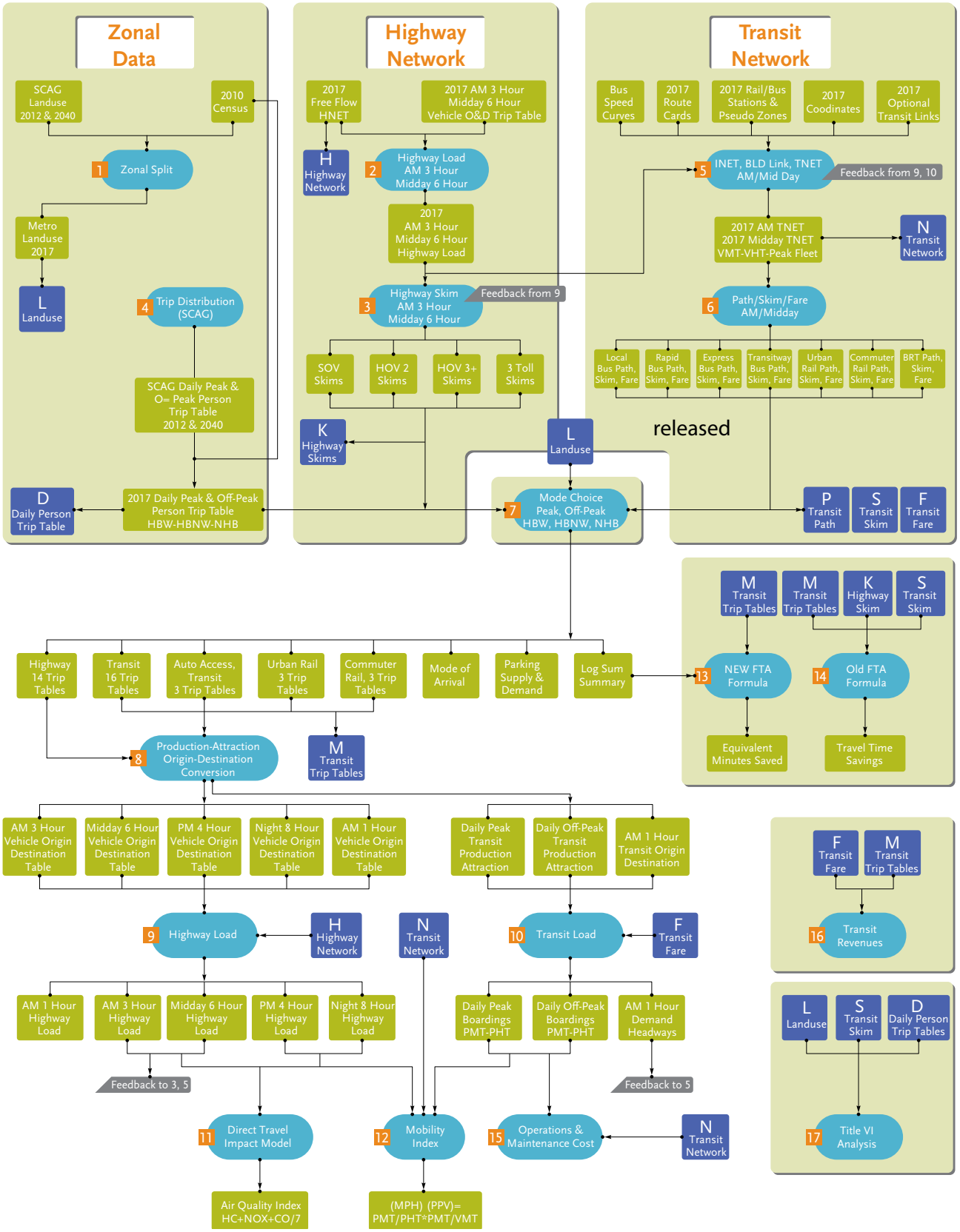


Figure 15

Metro Long Range Transportation Plan Base Year (2017) Model Flowchart



Each module has been calibrated from observed data, typically from a sample of household interviews from which detailed demographic and travel characteristics are collected through written questionnaires. The current Metro Travel Demand Simulation Model is the Year 2017 (Base Year) Model that was developed for the 2020 LRTP for LA County. The 2017 Model is the latest and most sophisticated evolution of the Metro Model originally developed in the early 1970s.

The trip generation component of the Metro Model is primarily based on the 1967, 1976, 1991, and 2011 home interview surveys for the Los Angeles metropolitan area that were conducted by the California Department of Transportation (Caltrans) and SCAG. The trip distribution and mode choice modules were updated using the 2010 Census, the Year 2010 Post-Census Regional Travel Survey, the 2011 On-Board Surveys on light-rail, heavy-rail and bus, and the 2010 On-Board Survey of commuter-rail patrons.

The 2017 Model was validated for its ability to replicate 2011 travel patterns and conditions using transit ridership statistics and the survey data from which it was calibrated. The model performed within standard limits for all components including average trip length, mode shares, and comparisons of transit boardings.

For the 2020 LRTP, the 2017 Model has been updated to reflect 2017 as the base year and 2047 as the forecast year. The process includes updating the input socioeconomic data and the modification of highway and transit networks for the years 2017 and 2047.

For mobility and ridership analysis, fundamental spatial units are based on tracts of Census 2000 and 2010. The Metro modeling area is identical to the SCAG modeling area which encompasses six counties, namely Los Angeles, Orange, Riverside, San Bernardino, Ventura, and Imperial counties. It is illustrated in Figure 16. The area is represented by a total of 3,800 transportation analysis zones (TAZs), of which 3,017 are in the internal modeling area, 40 represent cordons, and 742 are pseudo zones. The 2,286 TAZs in LA County are aggregated into Metro's nine subregions.

Figure 16

TRAVEL DEMAND MODEL AREA

Model Assumptions

Each input to the Metro Model is a representation of the characteristics of the trip, the trip maker, or the transportation system. This information is usually employed at the census tract level but may include some distributions of characteristics within the census tract. All inputs for the 2017 validation used empirical data compiled from a variety of sources as described in Figure 17.

Figure 17
Model Validation Data

MODEL COMPONENT	INPUT DATA	DATA SOURCE	OUTPUT DATA
Urban Activity	General Plans, Population, Employment, Licensed Drivers	Municipalities, Census Bureau, Bureau of Labor Statistics, Dept. of Economic Development	Population, Employment, household demographic data by Zone
Highway & Transit Networks	Highway facilities, Transit services	Caltrans, Municipalities, Transit Operators	Zone-to-zone travel time and cost by time period
Trip Generation	Population, employment, household demographics	Southern California Association of Governments	Trip productions and attractions by zone
Trip Distribution	Trip productions and attractions by Zone & Zone-to-zone travel time,	Southern California Association of Governments, Census Transportation Planning Products (CTPP) based on American Community Survey	Zone-to-zone trip volumes by purpose
Mode Choice	Zone-to-zone trip volumes, Zone-to-zone travel time, Zone demographic data, Parking costs, Fuel/auto operating costs, Transit fares	Trip Distribution Model, Transportation Networks, Urban Activity Model, Parking Posted Rate, Surveys Transit Operators	Zone-to-zone trips by purpose and mode of travel
Network Assignment	Transportation Networks, Zone-to-zone trips by purpose and mode	Transportation Networks, Mode Choice Model	Volumes on highway facilities and patronage on transit services

Projections for the planning horizon year 2047 were obtained from many of the same sources. The model then uses its econometric and behavioral formulations to project travel response and transportation system impacts under a variety of transportation system environments and conditions. However, there are several major assumptions that either reflect a continuation of existing trends or fall into the policy arena. If the future varies from these assumptions, the projected future year results will likely be different from those projected by the model. These assumptions are:

> The growth and distribution in population, employment, income, and vehicle ownership will occur in accordance with the projection adopted by SCAG in 2016;

> The per-mile vehicle operating cost will not change in constant dollars (i.e., changes in fuel prices and fuel economy offset one another but rise with inflation);

> The model was calibrated utilizing the 2011 transit fare structure and updated during a model validation in 2017 with the 2017 fare structure in place at that time. The 2011 calibration made use of the 2011 on-board survey, and the model was validated to 2017 data;

> Parking costs will rise with inflation and the location and application of parking costs will not change significantly from today (that is, the location of free versus pay parking, employer subsidies, etc.);

> The need or distribution of travel will not change dramatically due to a major movement to a round-the-clock business day or a major displacement of work trips by telecommuting; and,

> The current highway and transit levels-of-service will not change dramatically from today (except for planned system improvements and the projected congestion effects) due to potential large-scale Intelligent Transportation System implementation.

Alternatives Modeled

Four primary model runs were conducted for the LRTP. These include:

1. 2017 Base (and Validation Year) – the Existing Conditions Model Network;
2. No Build (2047) – the Trend Model Network which includes the 2047 demand on the base condition (2017), assuming implementation of no further projects;
3. Measure M (2047) – the 2047 demand on the Measure M Expenditure Plan transportation system;
4. 2020 Plan (2047) – the 2020 LRTP includes all major transit and highway projects with committed funding or partially committed funding, existing programs and policies, collaboration with our partners, and new policies and initiatives to achieve our regional goals.

The LRTP maximizes these benefits through the addition of expanded programs, such as ExpressLanes, off-peak transit services and active transportation network expansion; partnerships to enhance transit, active travel, goods movement, and community development; and bold policies, such as reduced transit fares, a reimagined bus system and congestion pricing.

The highway and transit projects that comprise the Measure M Expenditure plan (Measure M) model run are summarized in Figure 18 and Figure 20 and illustrated in Figure 19 and Figure 21.

Figure 18

Expenditure Plan Transit Projects

LABEL	DESCRIPTION/LIMITS
1	Airport Metro Connector 96th St. Station
2	Westside Purple Line Extension Section 3
5	Gold Line Foothill Extension to Claremont
6	Orange Line BRT Improvements
7	BRT Connector Orange/Red to Gold Line
9	East San Fernando Valley Transit Corridor Project
10	West Santa Ana Transit Corridor LRT
11	Crenshaw/LAX Track Enhancement Project
17	Vermont Transit Corridor
19	Green Line Extension to Crenshaw Blvd in Torrance
22	Sepulveda Pass Transit Corridor (Phase 2)
24	Gold Line Eastside Extension (One Alignment)
30	Crenshaw Northern Extension
35	Lincoln Blvd BRT
36	*Green Line Eastern Extension (Norwalk)
40	*Sepulveda Pass Westwood to LAX (Phase 3)
41	*Orange Line Conversion to Light Rail
44	*Gold Line Eastside Extension (Second Alignment)

Notes: *= Measure M project, to be completed after 2047

Figure 19

2020 PLAN TRANSIT PROJECTS MAP

Figure 20

Expenditure Plan Highway Projects

LABEL	DESCRIPTION/LIMITS
3	High Desert Multi-Purpose Corridor
4	I-5 North Capitol Enhancements (SR-14 to Lake Hughes Rd)
12	SR-71 Gap from I-10 to Rio Rancho Rd
15	Sepulveda Pass Transit Corridor
18	SR-57/SR-60 Interchange Improvements
20	I-710 South Corridor Project
21	I-105 Express Lane from I-405 to I-605
29	I-5 Corridor Improvements (I-605 to I-710)
32	I-405/I-110 Interchange HOV Connection Ramps and Interchange Improvements
33	I-605/I-10 Interchange
34	SR-60/I-605 Interchange HOV Direct Connectors
37	I-405 South Bay Curve Improvements
61	*I-605 Corridor "Hot Spot" Interchange Improvements
	Hot3+ Projects Not Funded by Measure M
1	I-110 from SR-91 to I-405
2	I-10 from I-605 to Los Angeles/San Bernardino County Line
3	I-405 from I-101 to Los Angeles/Orange County Line
4	I-605 from I-10 to Los Angeles/Orange County Line

Notes: *= Measure M project, to be completed after 2047

Figure 21

2020 PLAN HIGHWAY PROJECTS MAP

Model Inputs

The basic inputs to a travel demand simulation model include socioeconomic data and the transportation networks (both highway and transit). This section describes the socioeconomic data and the network information used in the Model for the 2020 LRTP development.

Transportation Networks

The transportation networks in the 2017 Model were updated from the 2011 conditions (calibration year) to 2017 conditions (validation year). Networks representing year 2047 with 2020 LRTP Improvements were also developed.

2017 Base Year Conditions

Figure 22 depicts the highway links included in the computer network file representing the year 2017 highway network. The network consists of 21,361 nodes and 66,739 links. They cover all freeways as well as major, primary and secondary arterials within the five-county modeling area.

Highway free-flow speed, lane capacities, and volume-delay functions vary by facility types and area types and are assumed as presented in Figure 23.

Figure 22

Highway Free Flow Speeds and Lane Capacities

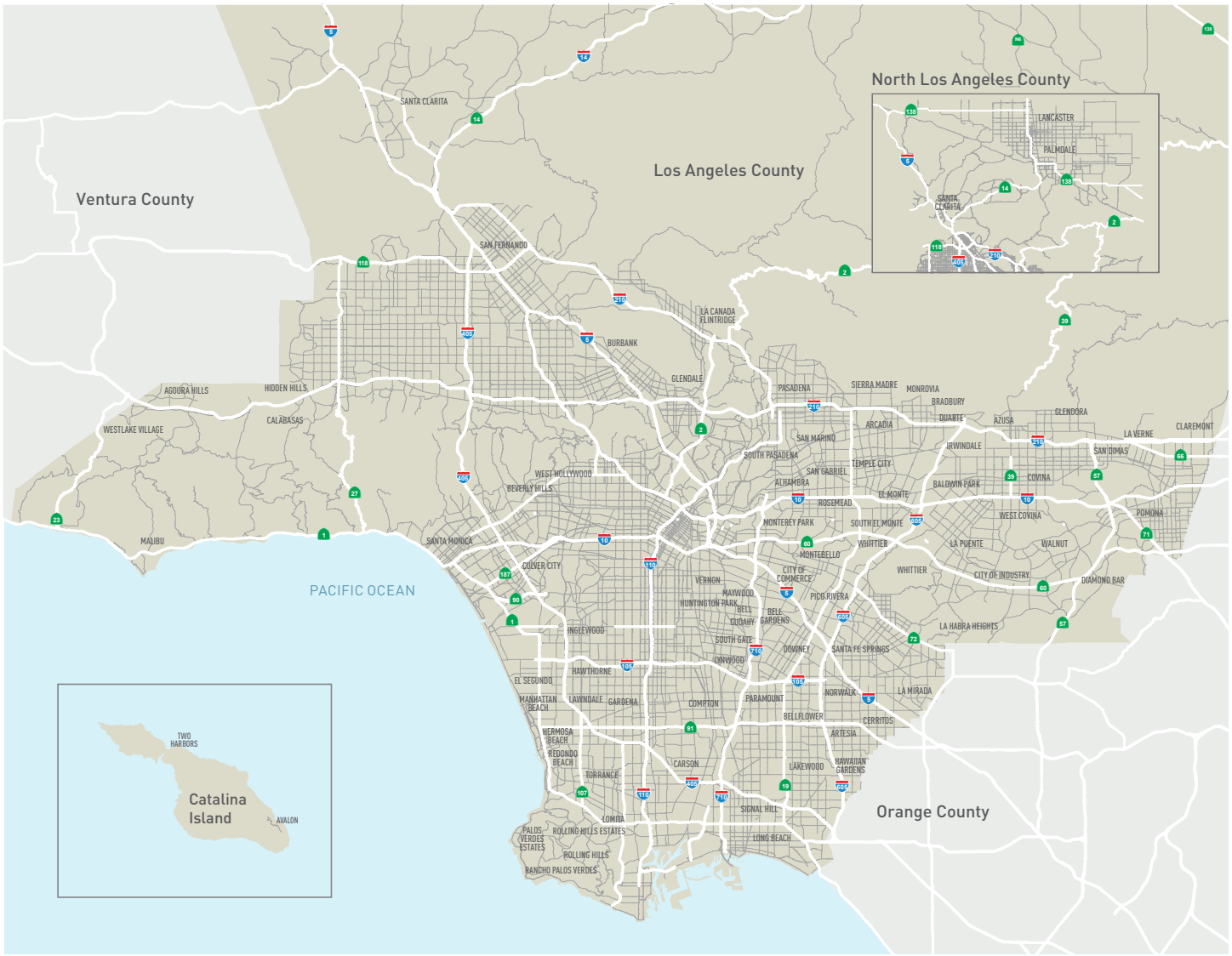
	FREE-FLOW SPEED				LANE CAPACITY			
	FREEWAYS	MAJOR ARTERIAL	PRIMARY	SECONDARY	FREEWAYS	MAJOR ARTERIAL	PRIMARY	SECONDARY
CBD	72	20	20	20	1950	625	575	500
Urban	72	30	30	25	1950	650	600	525
Suburban	72	35	35	30	1950	675	625	550
Mountain	72	40	40	35	1950	800	800	800
Rural	72	50	50	50	1950	900	900	900

Volume-Delay function

(Time in traffic) = (Free-flow Time) + (Delays)
= (Free-flow time) * {1 + α * [(Volume/Capacity) ^ β]},
(α, β) = (1.16, 4.33) for freeways and (0.15, 5) for arterials.

Figure 23

METRO 2017 HIGHWAY NETWORK



A summary of the 2017 highway network by facility type for each subregion is provided in Figure 24. Countywide, a total of 22,500 lane-miles of roadway are represented in the network. Among them, 5,100 lane-miles, or 23 percent are freeway. The San Gabriel Valley subregion has the highest amount of freeway lane-miles while the Gateway Cities subregion has the highest concentration of arterial facilities.

Figure 24

Summary of Highway Lane-Miles by Facility Type and Subregion in LA County (2017 – 2047)

	2017			2047		
SUBREGION	FREEWAY	ARTERIAL	TOTAL	FREEWAY	ARTERIAL	TOTAL
Arroyo Verdugo	301	751	1,052	312	751	1,063
Central Los Angeles	704	2,239	2,944	708	2,239	2,947
Gateway Cities	786	2,953	3,738	912	2,953	3,965
Las Virgines/Malibu	92	351	443	92	351	443
North LA County	731	2,828	3,558	842	2.863	3.706
San Fernando Valley	801	2,386	3,188	817	2,386	3,706
San Gabriel Valley	1,052	2,467	3,519	1,076	2,467	3,544
Southbay Cities	384	1,973	2,358	423	1,973	2,396
Westside	240	1,028	1,269	254	1,028	1,282
Total	**5,092**	**16,976**	**22,068**	**5,437**	**17,012**	**22,449**

	2017			2047		
SUBREGION	FREEWAY	ARTERIAL	TOTAL	FREEWAY	ARTERIAL	TOTAL
Los Angeles	5.092	16,976	22,068	5,437	17,012	22,449
Orange	1,789	4,712	6,501	1,798	4,712	6,510
Riverside	2,072	4,695	6,767	2,072	4,695	6,767
San Bernardino	2,589	6,590	9,179	2,589	6,590	9,179
Ventura	497	1,747	2,243	497	1,747	2,243
Imperial	420	944	1,363	420	944	1,363
Total	**12,458**	**35,664**	**48,122**	**12,813**	**35,699**	**48,512**

Transit networks are coded in accordance with highway networks. The modal designations include: Metrolink 10, Metro urban rail 13, Metro buses (bus rapid transit 26, rapid bus 24, transitway 25, express bus 12, local bus 11) and various municipal operators 14-23. The non-transit modal designations are sidewalk transfer walk 1, walk access 2, walk egress 3, driving/walk time inside Park-and-ride station 5, bicycle access 6 and bicycle egress 7.

In 2017, transit service was coded in the computer model's network to reflect the conditions existing at that time. In LA County this included approximately 554,000 route-miles of bus service (Metro and municipalities), 21,200 route-miles of Metro Rail service, and 8,500 route-miles of commuter rail (Metrolink) service in the region.

2020 Plan (2047 Future Year)

The 2020 Plan includes highway and transit improvement projects listed above in Figure 18 and Figure 20. These projects are assumed to be completed by 2047. The 2017 Base Year highway network and transit network were modified to reflect the completion of these projects.

The highway projects included in the 2020 Plan will add 345 lane-miles of freeways and 35 lane-miles of new/upgraded arterials. Combined, they represent a seven percent increase in freeway lane-miles and 0.2 percent increase in arterial lane-miles in LA County.

In addition, the 2020 Plan will add substantial transit infrastructure to the network. The 2047 transit service was coded in the model networks to reflect the future planned transit network. In LA County, this includes approximately 563,000 route-miles of bus service, 50,500 route-miles of Metro Rail service, and 8,500 route-miles of commuter rail service in the region. These increases over 2017 represent additional lines as well as increased service on existing lines.

Socioeconomic Forecast

The socioeconomic input data to the Metro model are consistent with the SCAG forecast. The latest official forecast released by SCAG is the "2016 RTP" version, used to develop the 2016 RTP adopted by the Regional Council. Population and employment are the main socioeconomic inputs to a travel demand model. For the LRTP, population and employment estimates by TAZ for 2011, 2017, and 2047 were derived from the population and employment data contained in SCAG's 2016 RTP.

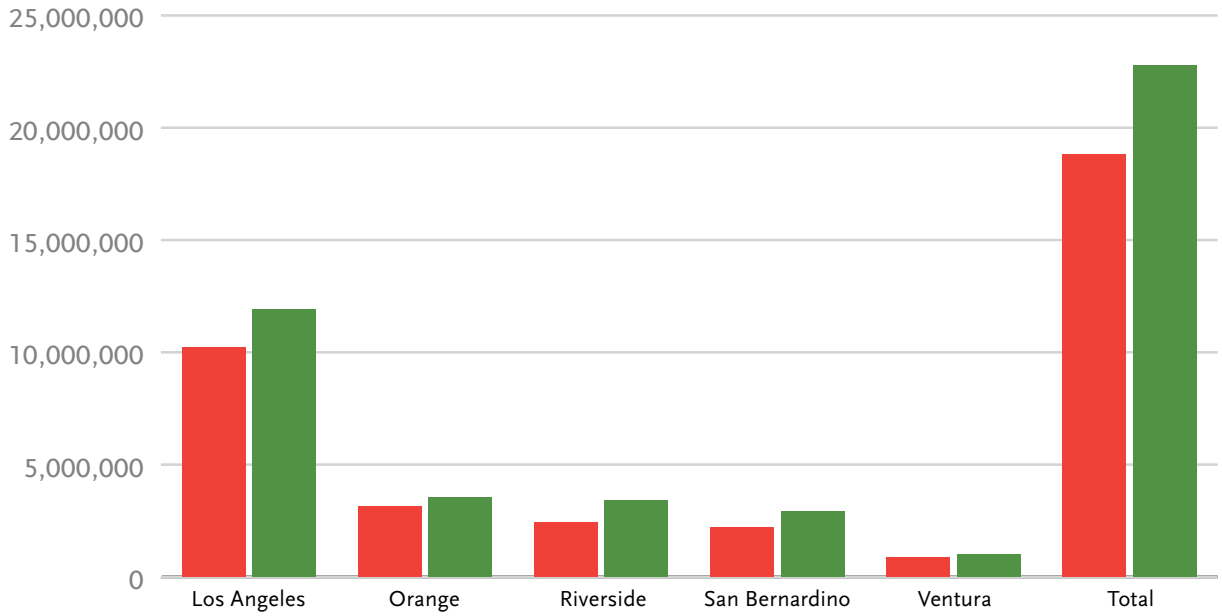
Population Forecasts

The analysis of population growth was conducted regionally by county and at a subregional level for LA County. Figure 25 shows that LA County's population is forecast to grow by 17 percent from approximately 10.2 million in 2017 to 11.9 million in 2047. The six-county region's population is forecasted to grow by 21 percent during the same period, from 18.8 million in 2017 to 22.8 million in 2047. LA County's share of the regional population is estimated to slightly decrease from 54 percent in 2017 to 52 percent in 2047.

Population growth trends by subregion within LA County are depicted in Figure 26. Gateway Cities was the most populous subregion in the county with 2 million in 2017. In 2047, Central Los Angeles is expected to become the most populous subregion with 2.5 million residents forecasted. North Los Angeles County is expected to experience the highest rate of population growth, growing from 0.7 million in 2017 to 1.1 million in 2047, a growth of 49 percent.

Figure 25

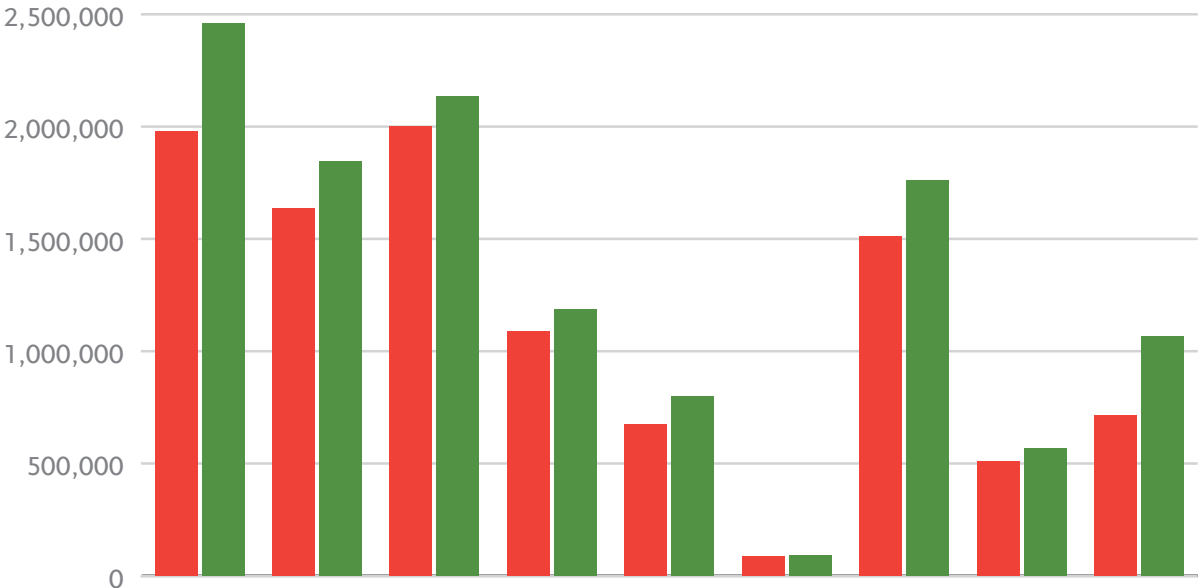
Population Growth by County (2017 – 2047)



	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Total
2017	10,204,395	3,141,186	2,412,518	2,186,427	858,693	18,803,220
2047	11,921,483	3,559,697	3,418,053	2,897,187	998,159	22,794,579
Growth	1,717,088	418,512	1,005,535	710,760	139,466	3,991,359
% Growth	17%	13%	42%	33%	16%	21%

Figure 26

Population Growth by Subregion (2017 – 2047)



	Central Los Angeles	San Gabriel Valley	Gateway Cities	South Bay	Westside Cities	Las Virgenes/ Malibu	San Fernando Valley	Arroyo Verdugo	North Los Angeles County
2017	1,977,436	1,638,570	2,001,313	1,087,000	675,207	86,218	1,510,761	511,088	716,802
2047	2,461,024	1,847,313	2,136,580	1,187,719	798,914	93,279	1,762,442	567,548	1,066,665
Growth	483,588	208,743	135,267	100,720	123,707	7,060	251,681	56,460	349,862
% Growth	24%	13%	7%	9%	18%	8%	17%	11%	49%

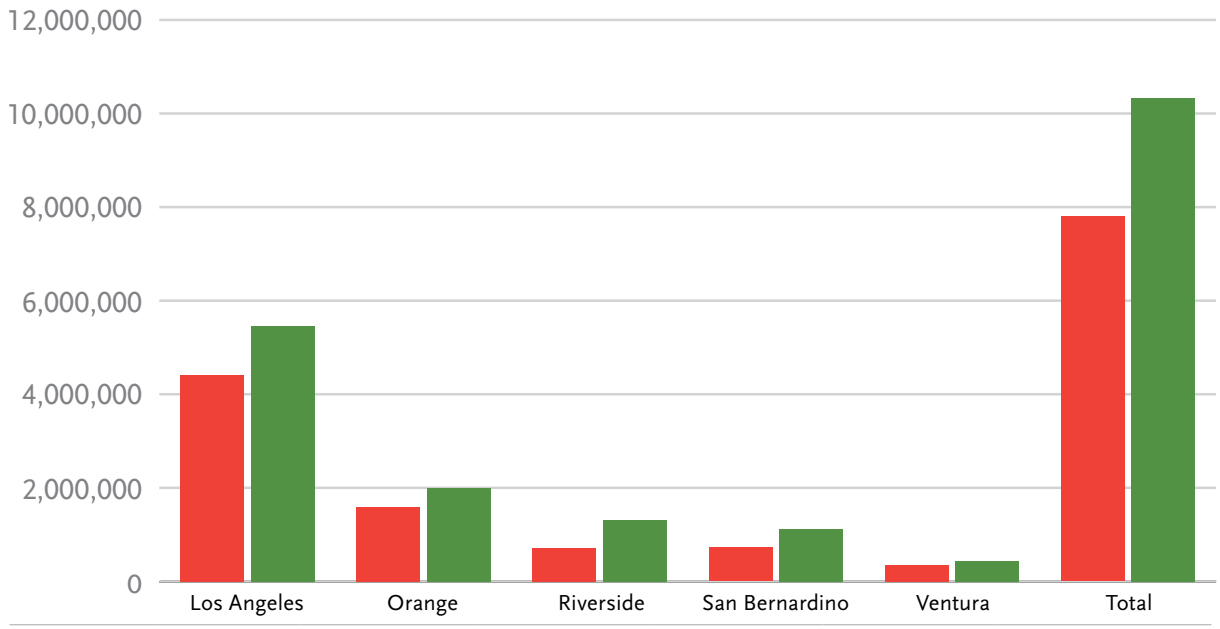
Employment Forecasts

Figure 27 shows that LA County employment is expected to grow by 24 percent from 4.4 million in 2017 to 5.5 million in 2047. The region's employment is expected to grow by 33 percent during that period, from 7.8 million in 2017 to 10.3 million in 2047. LA County's share of the regional employment is estimated to decrease from 57 percent in 2017 to 53 percent in 2047.

Figure 28 depicts employment growth in the subregions in LA County. In 2017, the Central Los Angeles subregion had the highest employment with 790,000 jobs. In 2047, Central Los Angeles is expected to continue to have the most employment with 1.05 million jobs. North Los Angeles County is expected to experience the highest rate of job growth, growing by 53 percent from 2017 to 2047.

Figure 27

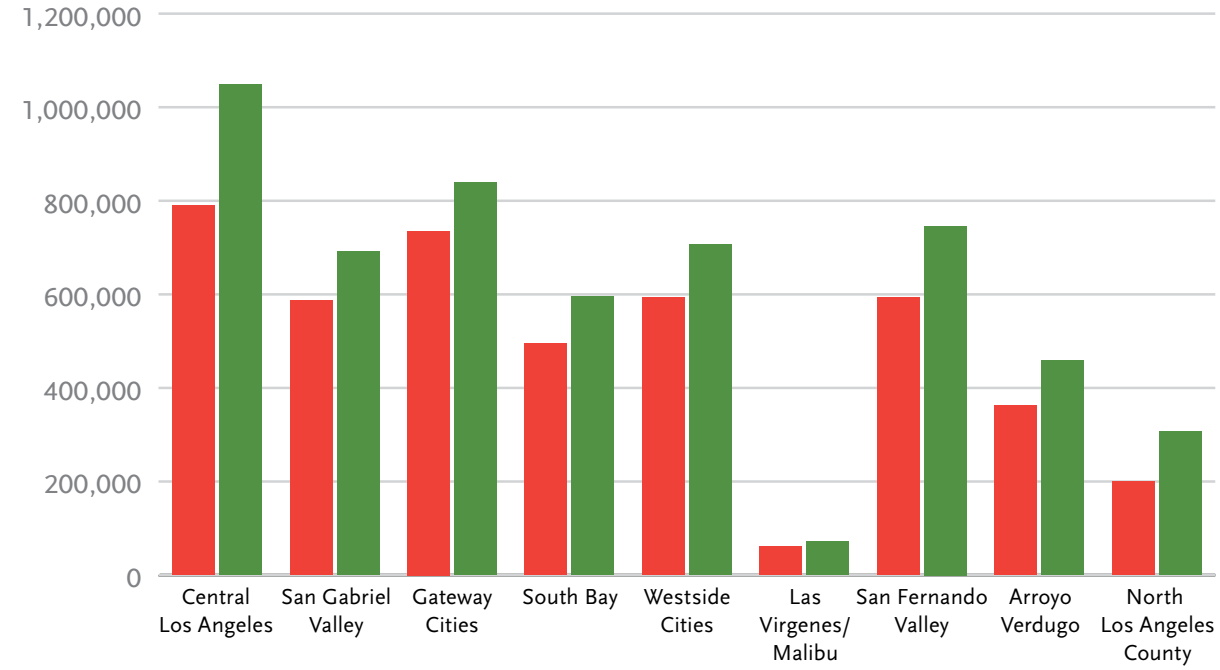
Employment Growth by County (2017 – 2047)



	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Total
2017	4,417,435	1,592,886	716,296	725,297	347,885	7,799,799
2047	5,466,580	1,992,840	1,313,953	1,120,299	441,698	10,335,369
Growth	1,049,145	399,954	597,657	395,003	93,812	2,535,570
% Growth	24%	25%	83%	54%	27%	33%

Figure 28

Employment Growth by Subregion (2017 – 2047)



	Central Los Angeles	San Gabriel Valley	Gateway Cities	South Bay	Westside Cities	Las Virgenes/ Malibu	San Fernando Valley	Arroyo Verdugo	North Los Angeles County
2017	790,035	587,593	735,258	494,115	593,146	61,684	593,243	362,963	199,397
2047	1,048,555	692,476	839,982	596,204	706,753	70,953	746,277	459,334	306,046
Growth	258,520	104,883	104,724	102,089	113,607	9,269	153,034	96,371	106,649
% Growth	33%	18%	14%	21%	19%	15%	26%	27%	53%

Model Outputs

The basic outputs from a travel demand simulation model include trip productions and attractions, trip tables between TAZs, trip tables by mode, and trip assignments. This section describes the outputs of the Model for the 2020 LRTP.

Trip Generation

Trip generation is the process of estimating how many daily person trips are generated by households within each TAZ. SCAG's trip generation model generates trips for the following thirteen (13) purposes:

1. Home-Based Work Direct – Low-Income
2. Home-Based Work Direct – Middle-Income
3. Home-Based Work Direct – High-Income
4. Home-Based Work Strategic – Low-Income
5. Home-Based Work Strategic – Middle-Income
6. Home-Based Work Strategic – High-Income
7. Home-Based School
8. Home-Based University
9. Home-Based Shop
10. Home-Based Social/Recreation
11. Home-Based Other
12. Work-Based Other
13. Other-Based Other

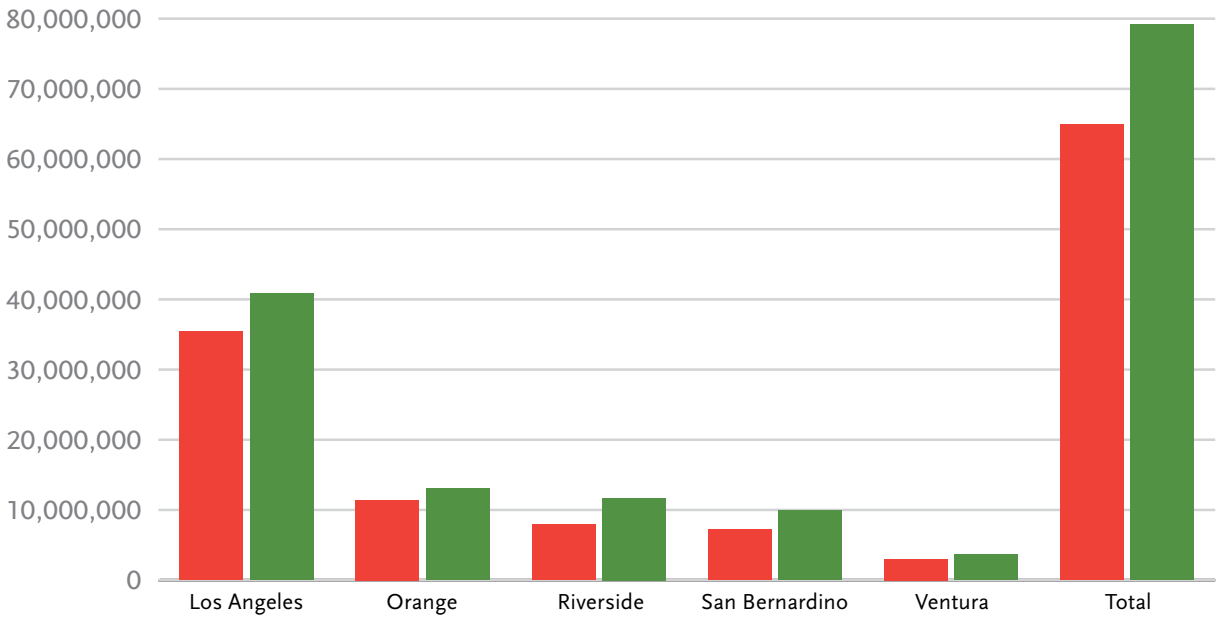
Using the population and employment estimates for 2017 and 2047 as input, SCAG's trip production model and trip attraction model are applied to estimate the trips produced from and trips attracted to each TAZ.

Trip Productions

The results of trip production are summarized in Figure 29. Figure 29 shows that productions in LA County are expected to grow from 35.4 million in 2017 to 40.8 million in 2047, a growth of 15 percent. Riverside County is expected to experience the highest growth rate, at 48 percent while Los Angles and Orange County have the lowest growth rates. Figure 30 illustrates the growth by subregions in LA County. North Los Angeles County is expected to experience the highest rate of growth in trip production at 45 percent while Central Los Angeles is expected to produce the largest number of trips, at 8.2 million.

Figure 29

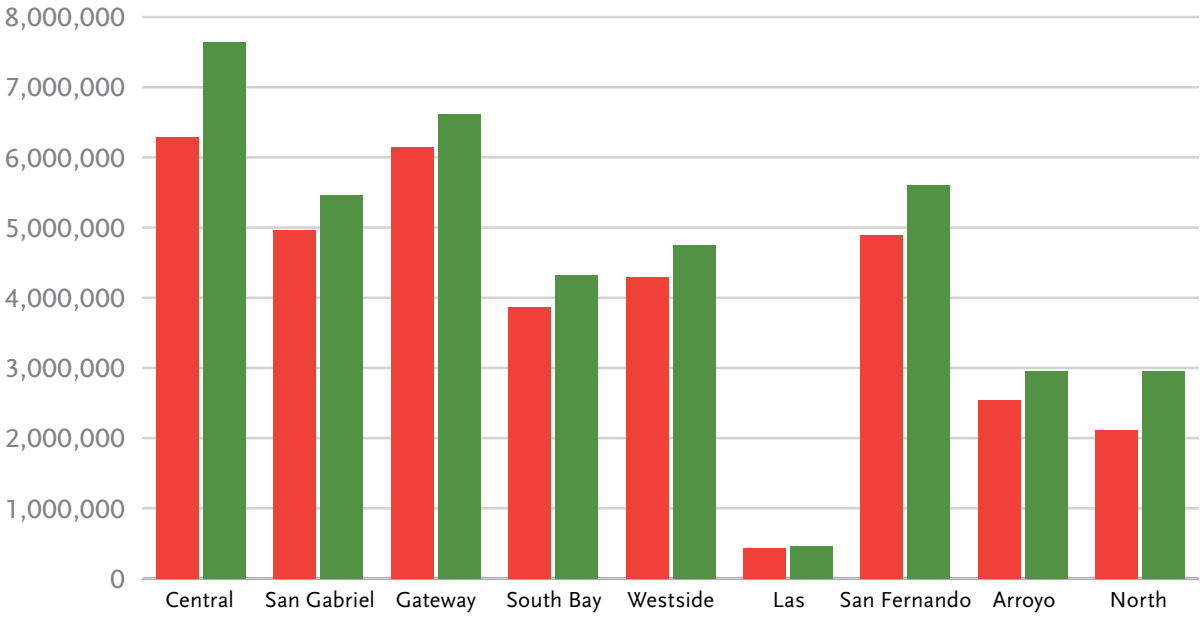
Total Daily Trip Production by County (2017 – 2047)



	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Total
2017	35,374,104	11,403,294	7,903,263	7,260,171	3,019,634	64,960,466
2047	40,804,724	13,089,492	11,686,214	9,960,561	3,600,458	79,141,449
Growth	5,430,621	1,686,198	3,782,951	2,700,390	580,824	14,180,983
% Growth	15%	15%	48%	37%	19%	22%

Figure 30

Total Daily Trip Production by Subregion (2017 – 2047)



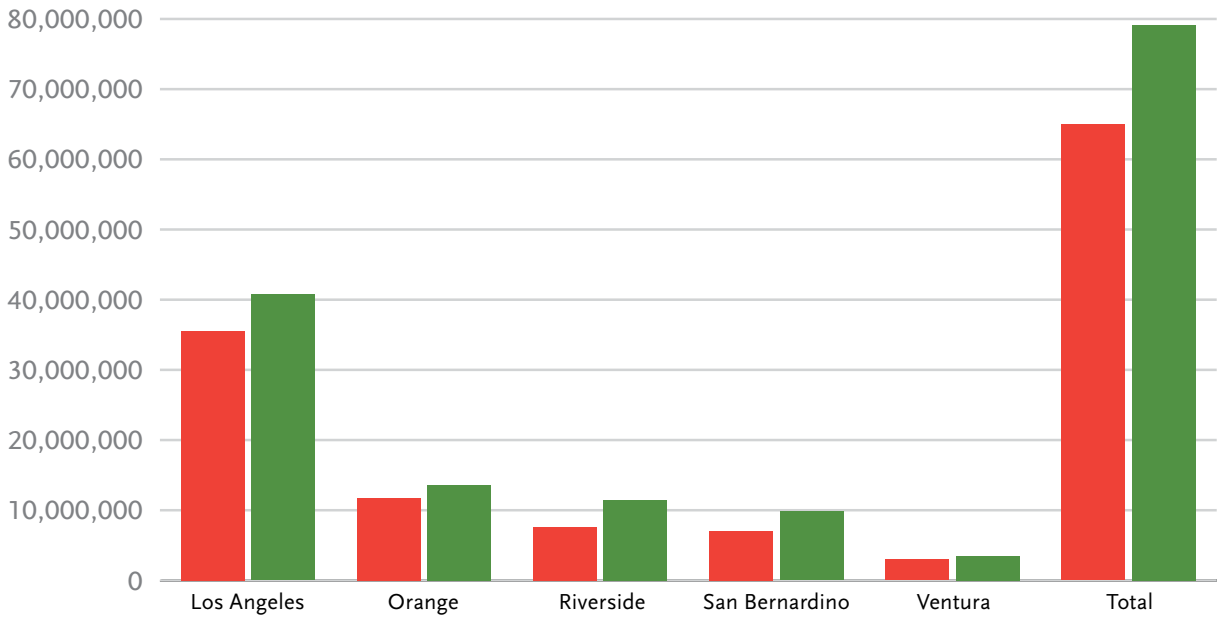
	Central Los Angeles	San Gabriel Valley	Gateway Cities	South Bay	Westside Cities	Las Virgenes/ Malibu	San Fernando Valley	Arroyo Verdugo	North Los Angeles County
2017	6,854,990	5,354,969	6,582,265	3,765,292	2,973,779	319,968	5,208,837	2,038,044	2,275,959
2047	8,186,138	6,113,613	7,074,516	4,137,951	3,320,088	345,921	6,062,842	2,252,712	3,310,941
Growth	1,331,148	758,644	492,251	372,659	346,309	25,953	854,005	214,669	1,034,982
% Growth	19%	14%	7%	10%	12%	8%	16%	11%	45%

Trip Attractions

The results of trip attraction are summarized in Figure 31. Figure 32 illustrates that LA County is expected to be the largest trip attractor in the region in 2047, with 40.8 million trips, a growth of 15 percent over 2017. Riverside County is expected to experience the highest growth rate, of 52 percent from 2017 to 2047. Figure 32 shows the attraction growth by subregions in LA County. North Los Angeles County is projected to experience the highest rate of growth at 39% while Central Los Angeles is expected to attract the largest number of trips, at 7.6 million.

Figure 31

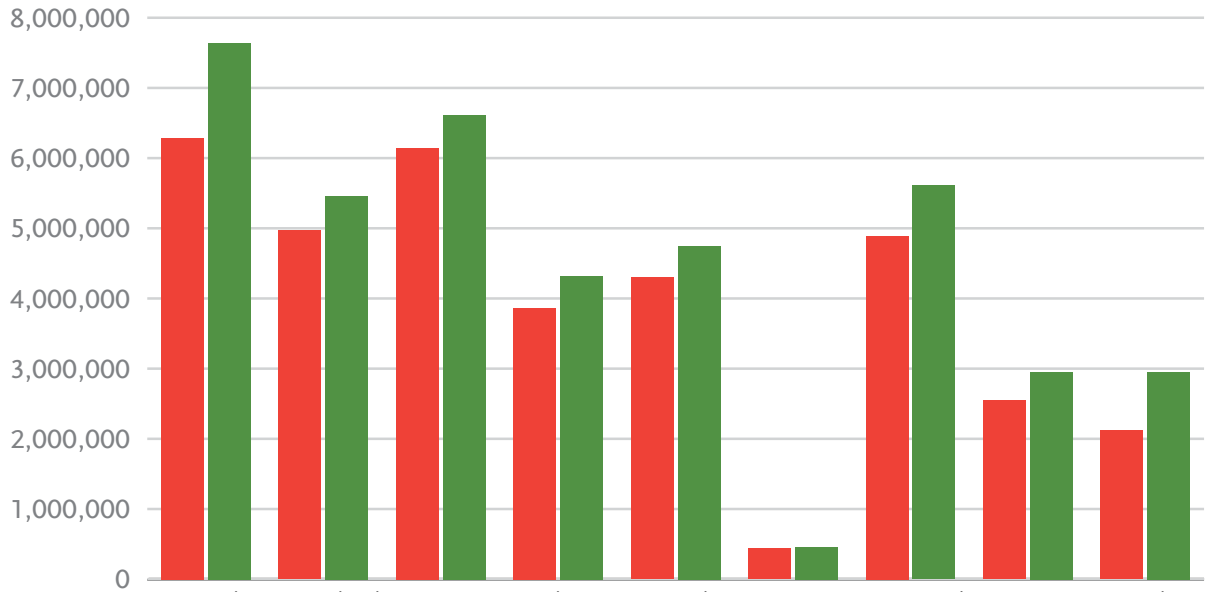
Total Daily Trip Attraction by County (2017 – 2047)



	Los Angeles	Orange	Riverside	San Bernardino	Ventura	Total
2017	35,555,073	11,760,889	7,587,824	7,095,203	2,967,539	64,966,527
2047	40,752,400	13,545,611	11,506,871	9,813,767	3,533,972	79,152,621
Growth	5,197,327	1,784,722	3,919,047	2,718,564	566,434	14,186,094
% Growth	15%	15%	52%	38%	19%	22%

Figure 32

Total Daily Trip Attraction by Subregion (2017 – 2047)



	Central Los Angeles	San Gabriel Valley	Gateway Cities	South Bay	Westside Cities	Las Virgenes/ Malibu	San Fernando Valley	Arroyo Verdugo	North Los Angeles County
2017	6,287,704	4,964,400	6,144,566	3,862,362	4,299,868	435,409	4,892,702	2,547,519	2,120,543
2047	7,642,147	5,457,455	6,614,339	4,319,508	4,749,300	459,170	5,606,144	2,950,869	2,953,468
Growth	1,354,442	493,055	469,773	457,147	449,431	23,761	713,441	403,350	832,926
% Growth	22%	10%	8%	12%	10%	5%	15%	16%	39%

Trip Distribution

Trip distribution is the process where person trip productions (for each TAZ) are linked to specific attraction TAZs, thereby creating a "trip table" of trip interchanges between TAZs. The SCAG trip distribution model created trip tables for 2012 and 2040. We interpolated those trip tables to create the 2017 trip tables and extrapolated to create the 2047 trip tables.

Years 2017 & 2047

Figure 33 summarizes the trip distribution patterns for 2017 daily peak period home-based work trips in each subregion of LA County. The large pie in the lower left corner of the exhibit shows the number of home-based work trips produced by each subregion. The Central Los Angeles subregion produces the largest number of home-based work trips—884,100. The Gateway Cities subregion produces the next highest number at 759,100.

Figure 33 also displays the home-based work trip production activity within each subregion, as represented by the smaller pies. The largest interaction within each subregion occurs intra-subregion; that is, the largest percentage of home-based work trips within each subregion stays internal to that subregion. For the San Gabriel Valley subregion, the second highest interaction occurs with trips headed outside LA County (at 15 percent), followed by trips to Central Los Angeles (at 12 percent).

Figure 34 displays the trip distribution patterns for 2047 daily peak period home-based work productions in the subregions of LA County. The Central Los Angeles subregion is expected to produce the largest number of home-based work trips, at 1.2 million, with the Gateway Cities subregion following at 836,300 trips. The largest interaction within each subregion occurs intra-subregion. For the San Gabriel Valley subregion, the second highest interaction occurs with trips destined outside of LA County, at 21 percent.

Figure 33

PEAK PERIOD HOME-TO-WORK TRIP PRODUCTIONS BY SUBREGION, 2017

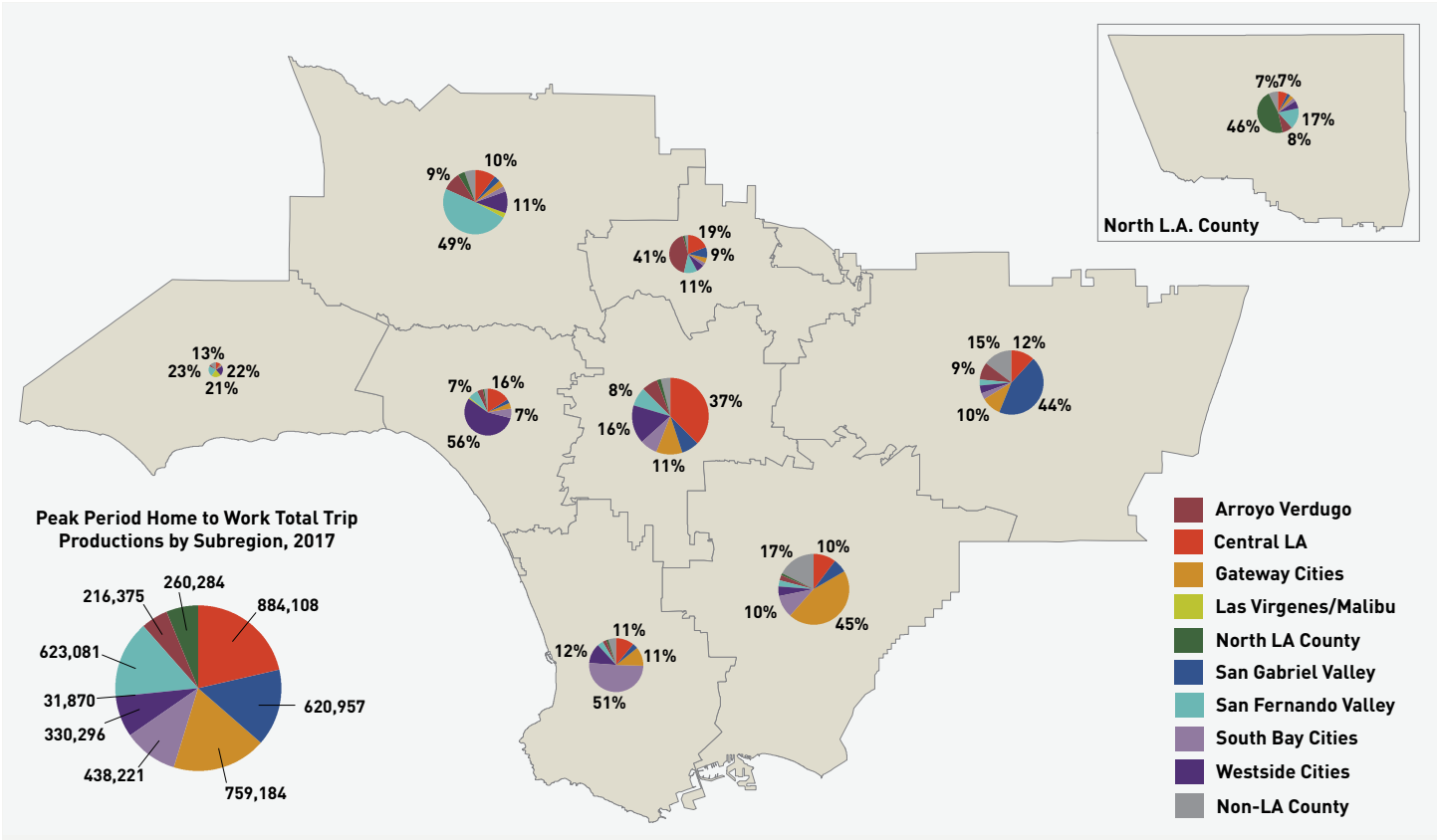


Figure 34

PEAK PERIOD HOME-TO-WORK TRIP PRODUCTIONS BY SUBREGION, 2047

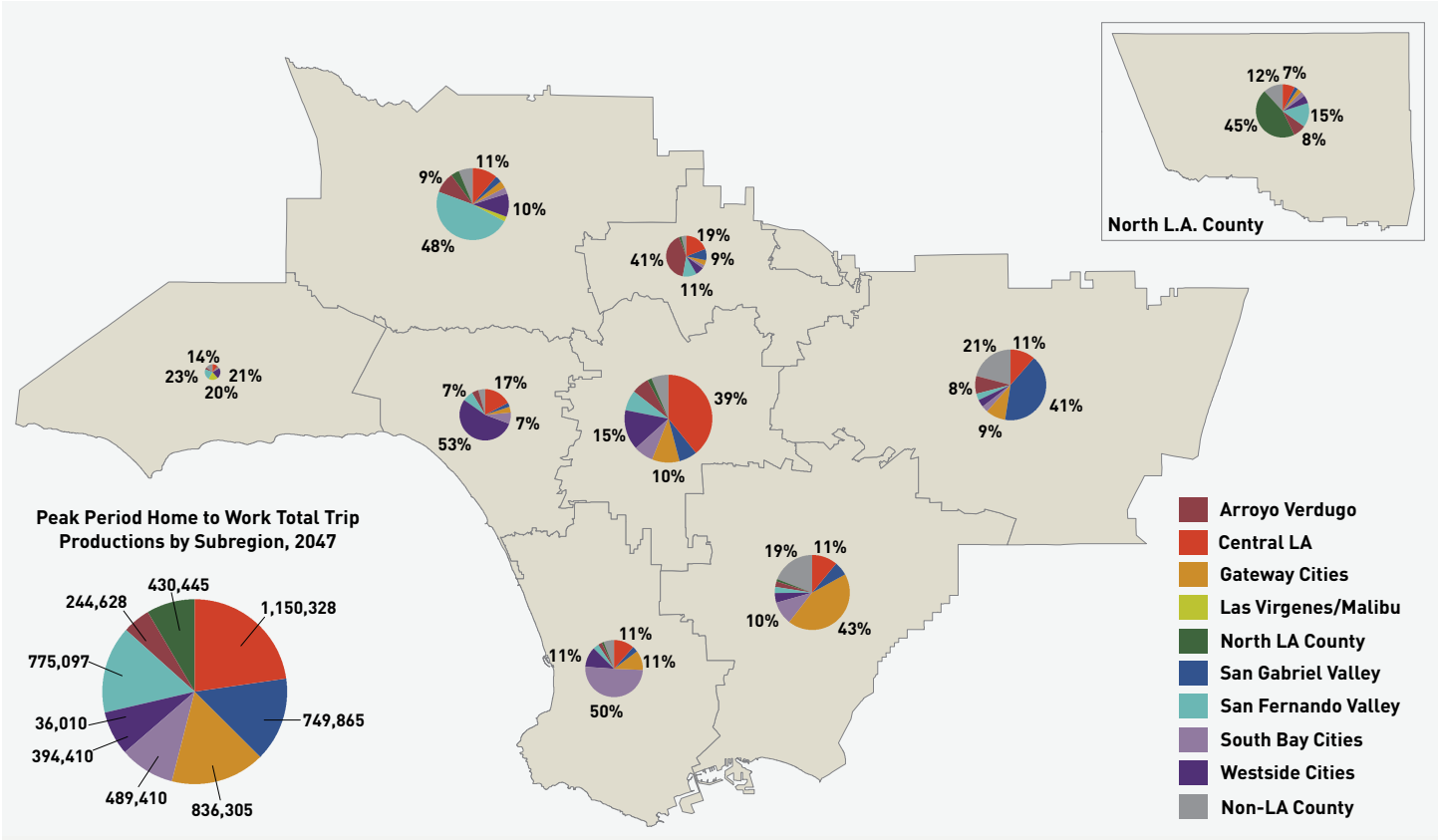


Figure 35 summarizes the daily peak period home-based work trip attractions within each subregion in year 2017. The Central Los Angeles subregion attracts the largest number of home-based work trips in the County (762,300), followed by the Gateway Cities subregion at 717,507 and San Gabriel Valley subregion at 567,600. Within Central Los Angeles, 10% of trips originate in the Gateway Cities subregion and 9% from the San Gabriel Valley subregion.

Figure 36 illustrates the daily peak period home-based work trip attractions within each subregion in year 2047. The Central Los Angeles subregion is expected to attract the largest number of daily peak period home-based work trips in the County at 977,400 trips, followed by the Gateway Cities subregion at 784,800 and the San Gabriel Valley subregion at 636,200. For the Central Los Angeles subregion, the second highest interaction occurs with trips expected to originate in the San Gabriel Valley and Gateway Cities subregions, both at 9%.

Figure 35

PEAK PERIOD HOME-TO-WORK TRIP ATTRACTIONS BY SUBREGION, 2017

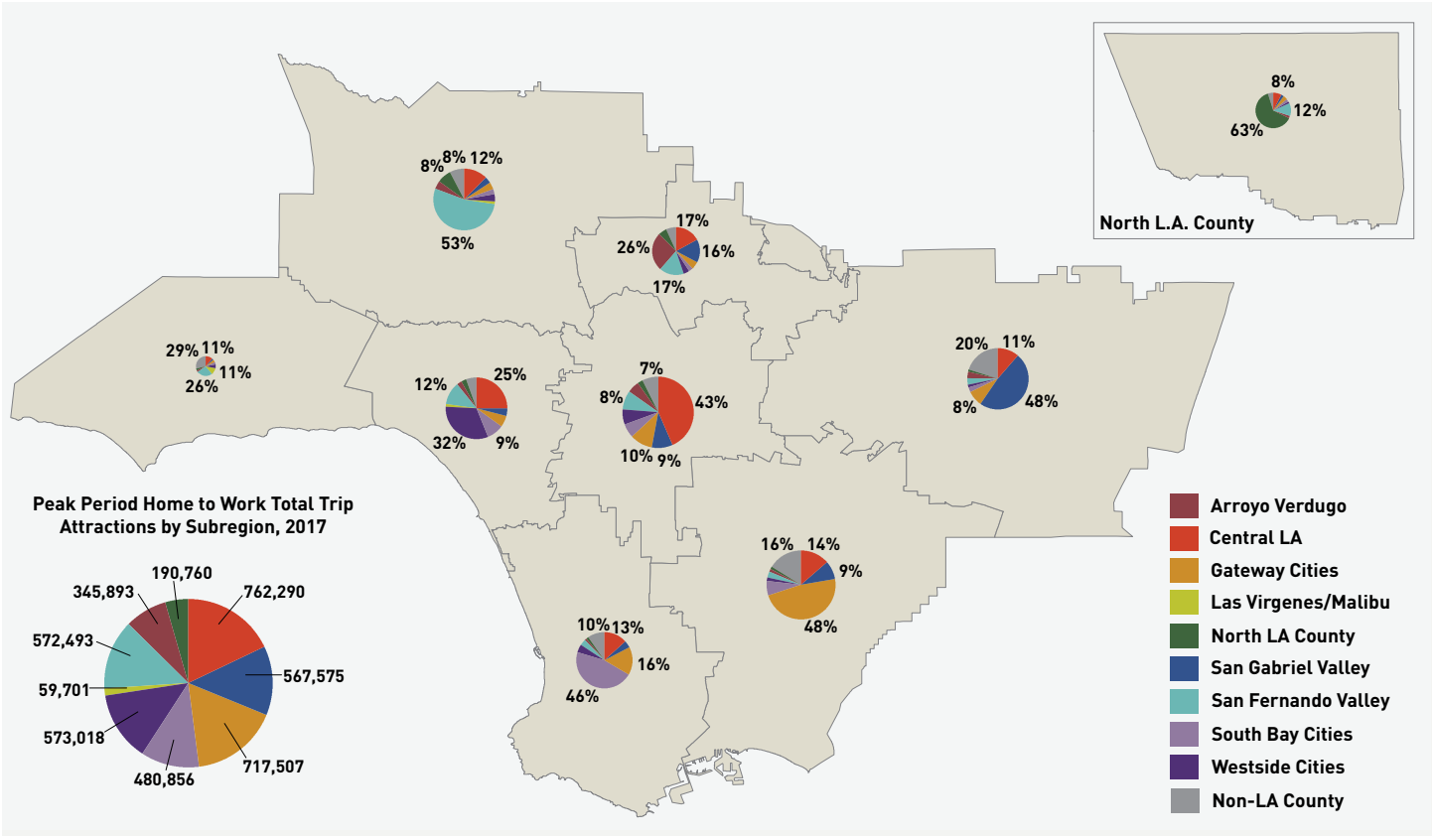
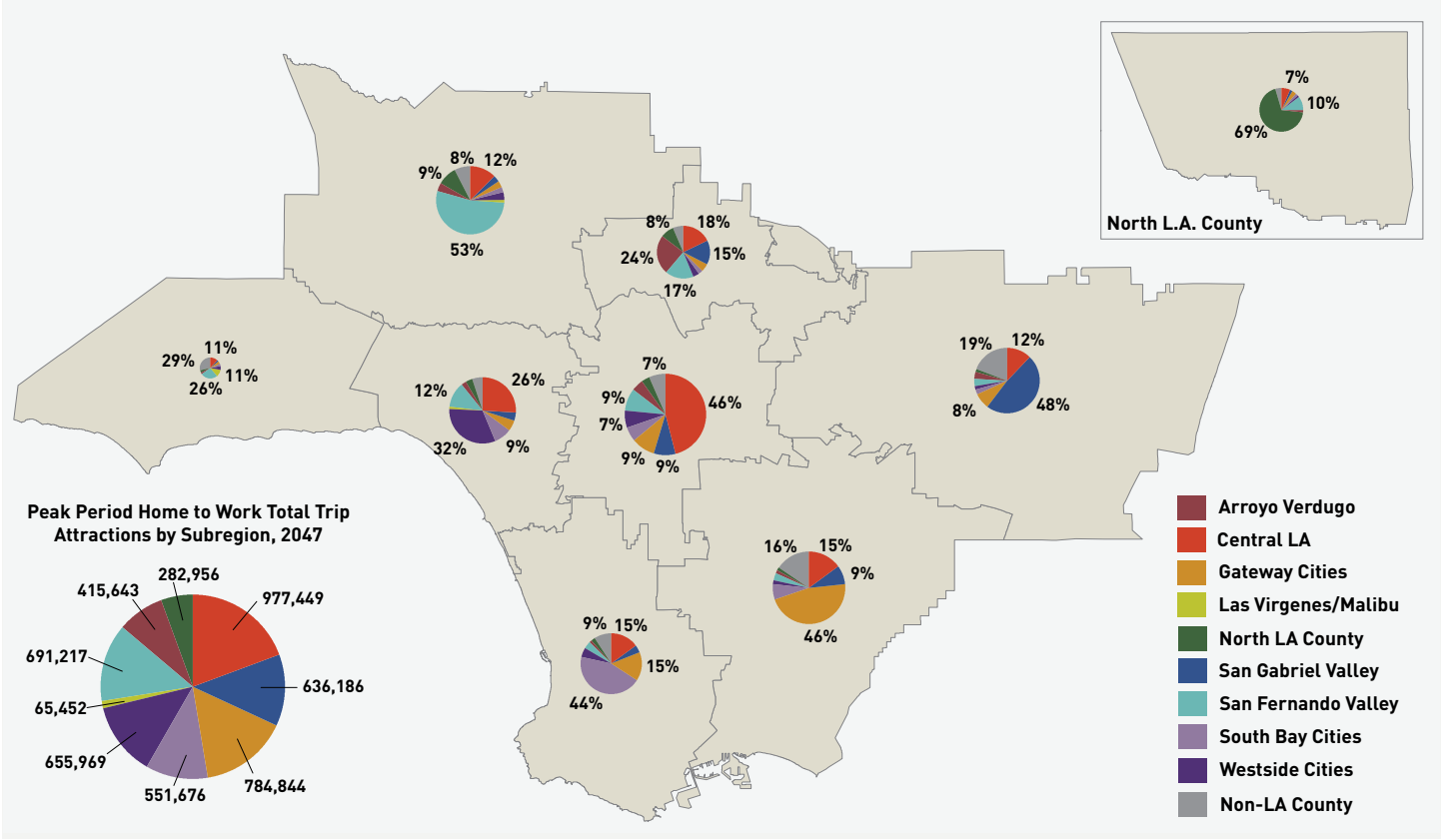


Figure 36

PEAK PERIOD HOME-TO-WORK TRIP ATTRACTIONS BY SUBREGION, 2047



All Purposes Travel Patterns in Years 2017 & 2047

Figure 37 illustrates the total daily trip productions within each subregion for year 2017. The Central Los Angeles subregion produces the highest number of total daily trips at 6.9 million, followed by the Gateway Cities subregion at 6.6 million. The largest interaction in each subregion occurs intra-subregion.

Within the Central Los Angeles subregion, 12% of the trips are destined to the Westside Cities subregion. Within the San Gabriel Valley subregion, 11 percent of the trips are destined outside LA County.

Figure 38 shows the total daily trip production patterns for 2047 in each subregion of LA County. The Central Los Angeles subregion is expected to produce the largest number of total daily trips, 8.2 million. The Gateway Cities subregion is expected to produce the second largest number of daily trips at 7.1 million. For the San Gabriel Valley, the second highest interaction occurs with trips destined outside LA County at 13%, followed by trips destined to the Central Los Angeles subregion at eight percent.

Figure 37

DAILY TRIP PRODUCTIONS BY SUBREGION, 2017

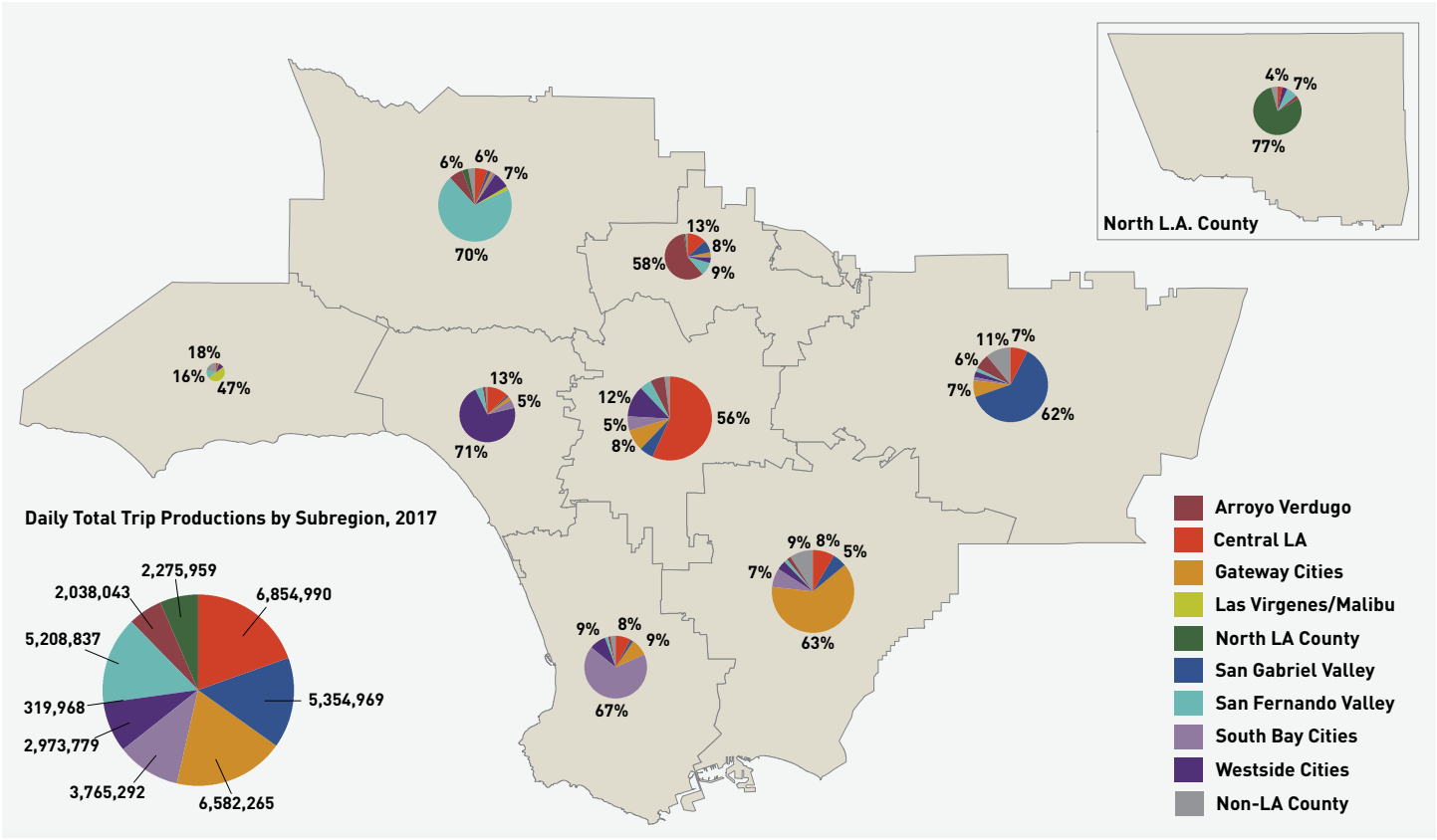


Figure 38

DAILY TRIP PRODUCTIONS BY SUBREGION, 2047

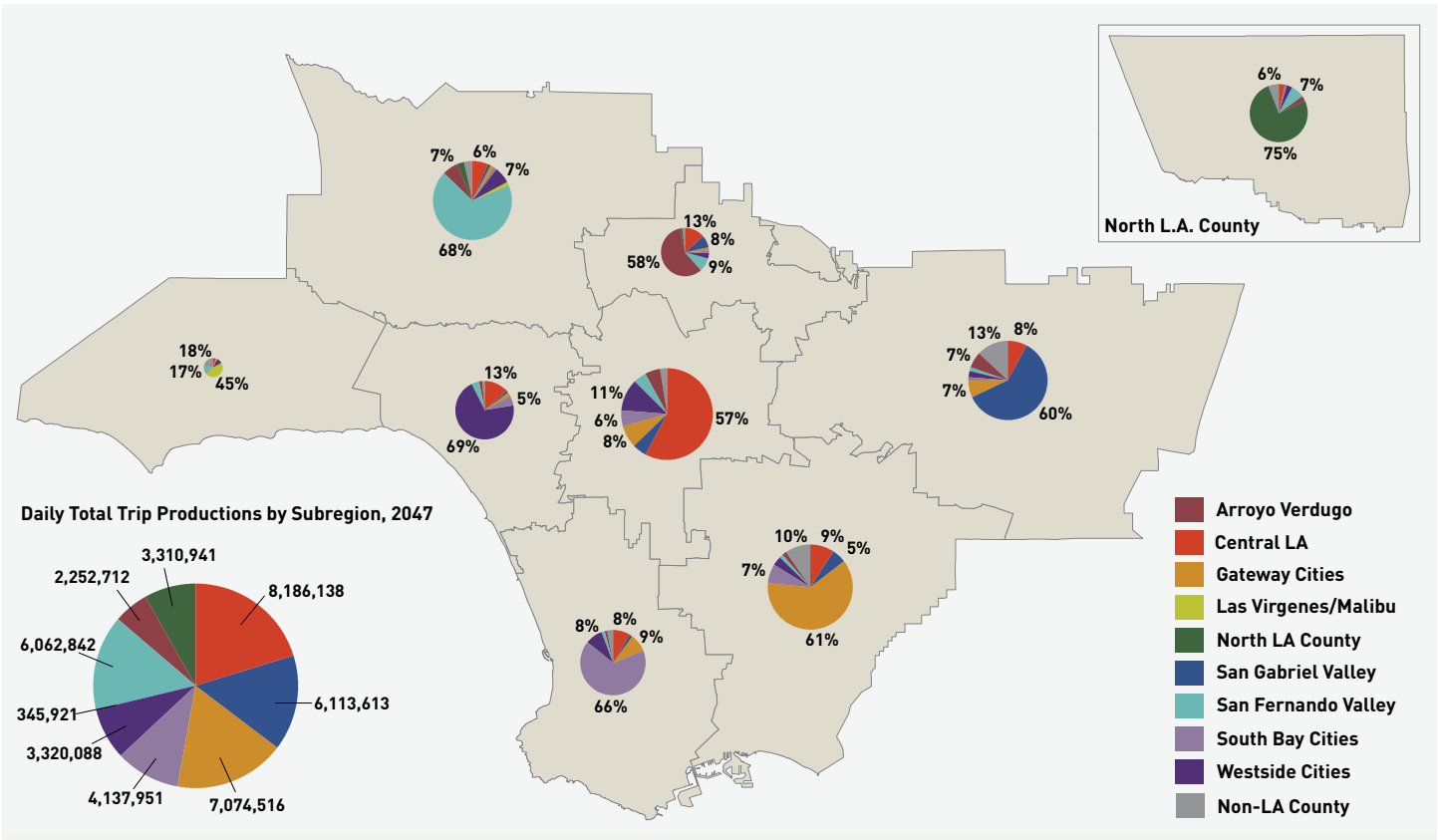


Figure 39 illustrates the total daily trip attractions within each subregion for year 2017. The Central Los Angeles subregion attracts the highest number of total daily trips, at 6.3 million, followed closely by the Gateway Cities subregion at 6.1 million. Within the Central Los Angeles subregion, the largest number of trips originates in the Gateway Cities subregion (nine percent), followed by the San Gabriel Valley subregion at six percent. Within the Gateway Cities subregion, the largest number of trips originates outside LA County (nine percent) and from Central Los Angeles (nine percent).

Figure 40 illustrates the total daily trips attracted by subregion expected for year 2047. The Central Los Angeles, Gateway Cities, and San Gabriel Valley subregions each expected to attract 7.6, 6.6, and 5.5 million trips, respectively. Within the Central Los Angeles subregion, eight percent of trips are destined to go to the Gateway Cities subregion.

Mode Choice

The mode choice process determines the share of person trips taking various modes of transportation. The modes in the Metro Travel Demand Model are automobile and transit. The submodes under automobile include single-occupancy and high-occupancy vehicles (two-person carpools and three persons or more carpools) as well as toll vs. non-toll while the submodes under transit are bus (including local bus, rapid bus, express bus, and transitway bus) and rail (including urban rail and commuter rail).

The mode choice model, in nested logit functional form, is specified separately for peak and off-peak periods. For each period, we include four trip purposes: home-work, home-university, home-other, and non-home-based.

Traffic Assignment

Traffic assignment is the process of loading vehicle trips onto a highway network and transit trips onto a transit network. This process produces traffic volumes and the resulting congested speeds on each road segment represented in the highway network as well as passenger volumes on the transit network.

Metro uses a four time-period equilibrium highway assignment process. Separate vehicle trip tables are generated for the AM peak period, midday period, PM peak period, and night period. These trip tables are assigned to the appropriate highway network using equilibrium assignment procedures. The assignment results were reviewed for reasonableness and minor adjustments were made when required.

Figure 39

DAILY TRIP ATTRACTIONS BY SUBREGION, 2017

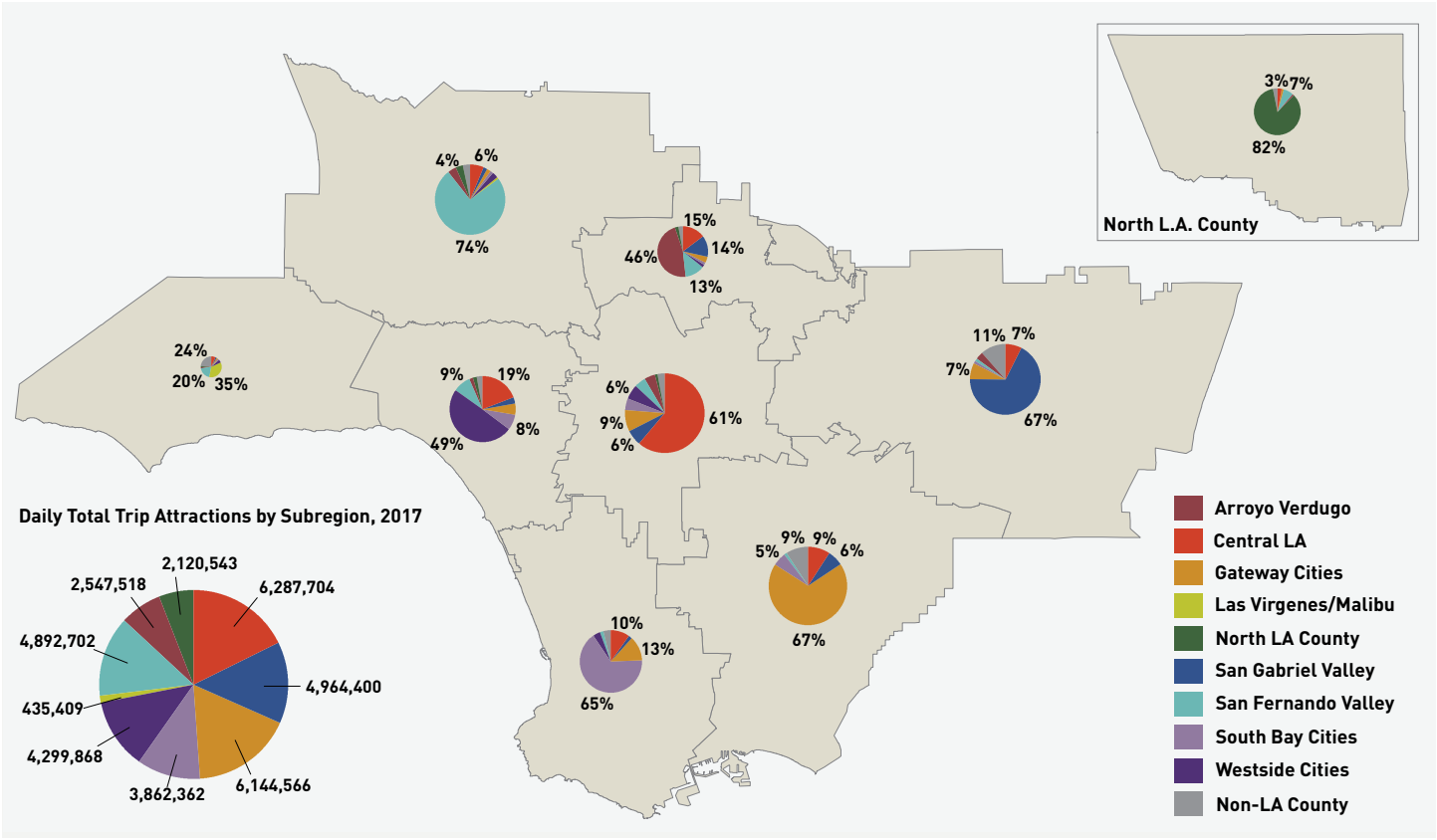
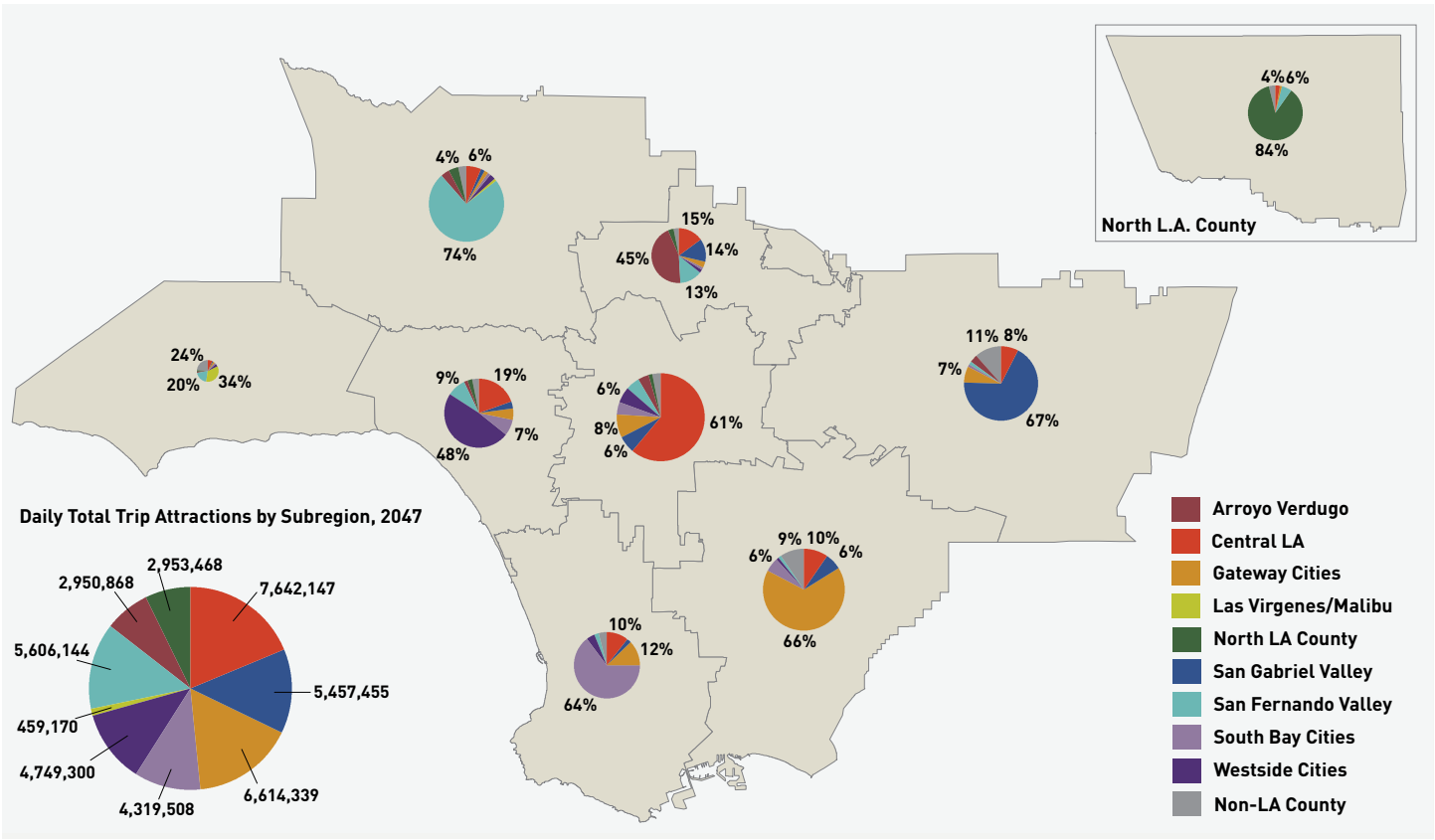


Figure 40

DAILY TRIP ATTRACTIONS BY SUBREGION, 2047



Scenario and Hybrid Testing

Several scenarios were designed for testing that aligned with Metro's Vision 2028 Strategic Plan goals. The insights learned from these model runs were instrumental for the development and composition of the recommended 2020 Plan. This section describes the definitions and results for the Scenario Testing that were modeled for Metro's 2020 LRTP. In addition, it describes the assumptions and procedures used to set up the scenarios. The section also presents the hybrid scenario, which is the recommended 2020 LRTP scenario, that combined various transportation improvements and policy components that had been previously tested.

The underlying transportation network used in the LRTP scenario modeling contains the same major transportation capital projects as the Southern California Association of Governments' 2020 RTP/SCS update. As part of the 2047 Baseline highway network, ExpressLanes are included on the following freeways – I-10 (Downtown Los Angeles to El Monte), I-110 (South Los Angeles to Carson), I-105 (Hawthorne to Norwalk), I-405 (Sherman Oaks to Westwood) and I-710 (Commerce to Long Beach). The first two ExpressLanes exist in the present-day transportation network, and the latter three are assumed to be completed and part of the network by 2047. This network was used as the foundation for development of these listed scenarios:

1. ExpressLanes Scenario
2. High Frequency Transit Scenario
3. Innovative Transportation Scenario
4. Urban Infill Scenario
5. Active Transportation Scenario
6. Cordon Pricing Scenario
7. VMT Pricing Scenario
8. 2020 LRTP (Hybrid-1) Scenario

There are approximately 40.8 million daily trips in LA County, which account for about half of the SCAG region's trips. The total number of daily trips for the region (and thus the county) are consistent throughout all scenarios.

ExpressLanes Scenario

The ExpressLanes Scenario was created to model Metro's Vision 2028 goal of increasing the options to avoid congestion on freeway corridors by paying tolls. To create the highway network for this scenario, all the high occupancy vehicle (HOV) lanes in LA County were converted into Express/high occupancy toll (HOT) lanes. This will serve two purposes:

1. The previous HOV users can still use the HOT lanes for free, and
2. This will allow additional users to use the lanes by paying toll.

In the ExpressLanes Scenario, these ExpressLanes were kept the same as the Baseline Scenario but the HOV lanes in LA County were converted into ExpressLanes. In addition, the number of lanes were increased to two in each direction and the capacity of the links were changed accordingly in both the peak and off-peak networks.

Under this scenario, countywide auto trips increase by approximately 54,000 trips (0.2% of the daily total). Most of these trips shift from transit while some shift from non-motorized trips. Among the auto trips, drive alone increases by about 1 percent while the shared ride 2 and shared ride 3 decrease by 1.7 percent and 0.6 percent respectively. The conversion of the HOV lanes to HOT lanes provides the drive alone mode an opportunity to use the HOT facility by paying toll, and thus increases the percentage of the drive alone trips in the county.

The effect of this scenario on the regional VMT and VHT is that with the increase in drive alone trips there is an increase of approximately 2.4 million vehicle miles and 144,000 vehicle hours in comparison to the Baseline.

High Frequency Transit Scenario

The high-frequency transit scenario was created to model Metro's Vision 2028 goal of providing high-quality mobility options that enable people to spend less time traveling. The adjustments that were made for this scenario are:

1. Headways for the top 40 bus routes by ridership (which serve approximately 66 percent of Metro's bus riders) were capped to 15 minutes for each line, in each direction;
2. Model parameters for roadway segments (links) in the model network that the top 40 bus routes travel was adjusted to increase bus speed on those links by 30 percent.

The proposed transit operational improvements for links on the road networks include, but are not limited to, transit-only lanes or transit signal priority. As these would improve the operational efficiency of all buses traversing the improved links, bus routes outside the top 40 were also assumed to have a 30 percent increase in speed when travelling on the improved links.

Innovative Transportation Scenario

The innovative scenario was created to model a future planning scenario where innovative and shared mobility options are included as travel modes. The innovations in transportation that are integrated into this scenario include autonomous vehicles, electric scooters, and transportation network companies (TNCs). In addition, an alternative parking option was enabled for autonomous vehicles. Under this scenario autonomous vehicles could be parked at their destination location, returned to their origin, or sent to an external lot. It is expected that under this scenario, automobile usage will increase, due to the inclusion of autonomous vehicles and TNCs. It is also expected that most of the e-scooter ridership will come from former walk or bike trips.

Urban Infill Scenario

The Urban Infill Scenario was created to model a future planning scenario where intensified land use around transit can provide increased opportunities for transit-oriented communities. The socioeconomic inputs for the horizon year 2047 were adjusted to reflect the intensified land use. The following assumptions were used for the land use changes:

> Total population and employment growth in LA County would be the same as the 2047 Baseline Scenario.

> Zones were designated as station zones if they were within a half mile of an urban rail station.

> All population growth from 2017 to 2047 was reallocated to station zones, and no population growth was allocated to non-station zones.

> 15 percent of LA County's employment growth was reallocated to station zones. For non-station zones within LA County, employment growth was factored to keep the total employment growth in LA County the same as the 2047 Baseline Scenario.

It is expected that under this scenario, transit ridership will increase, primarily due to the increase in the number of people who live within a half mile radius of an urban rail station.

Active Transportation Scenario

The Active Transportation Scenario was created to model a future planning scenario where the bicycle and transportation infrastructure within LA County was improved; providing a better environment for non-motorized travel and improve the modes' connectivity to transit. The transit skims and highway networks were modified using the following assumptions:

1. The model was modified to include an incentive for bicyclists, which was implemented as a modal constant.
2. In addition, as part of the Vision Zero goals, free-flow speed on arterials for autos on the transportation network was capped at 25 miles per hour.
3. Within LA County, to improve connectivity between modes, walk access and egress connections to transit were sped up by 20 percent.

It is expected that under this scenario that the bike share within LA County will be approximately 10 percent, and walk share will also increase.

Cordon Pricing Scenario

The Cordon Pricing Scenario was created to model Metro's Vision 2028 goal of reducing the congestion by pricing the Urban Core, Central Business District (CBD) and Urban Business District (UBD) areas in LA County. To create the highway network for this scenario, special fees (referred to as decongestion fees) were coded on the centroid connectors in Urban Core, CBD, and UBD areas of LA County, and on the highway links and ramps entering the Urban Core and CBD areas to simulate cordon pricing.

With this pricing policy, trips going from outside to a UBD, CBD and Urban Core zone will be charged $3/trip, $6/trip and $9/trip respectively. Further, the use of the freeway exit ramps to a CBD and Urban Core zone will increase the fees by an additional $3/trip and $6/trip respectively. Because the focus of the cordon pricing fees is on the Urban Core, CBD and UBD areas, it is important to summarize and analyze the model results by area type for this scenario to accurately gauge the impact of this policy.

VMT Pricing Scenario

The Vehicle Mile Traveled (VMT) Pricing scenario was created to model Metro's Vision 2028 goal of providing high-quality mobility options that enable people to spend less time traveling. The scenario is designed to model the following Metro Vision 2028 initiative: Test and implement pricing strategies to reduce traffic congestion. The model captures the cost of driving in the parameter OPCOST, which includes fuel and other operating costs such as maintenance. The mode choice model calculates the cost of driving by the equation: Drive Cost = OPCOST * Distance where distance is the drive distance between trip origin and destination. The VMT fee alternatives tested included:

1. Test 1: $0.10 fee per mile.
2. Test 2: $0.15 fee per mile.
3. Test 3: $0.20 fee per mile.

2020 LRTP (Hybrid-1) Scenario

The 2020 LRTP scenario combines various transportation improvements and policy components that had been previously tested, including high frequency transit, an increased network of high occupancy toll (HOT) lanes (which are also referred to as Express Lanes), first and last mile improvements, and a VMT fee of 20 cents per mile on top of the current operating costs. Some of the component scenarios were modified for their application in the Hybrid Scenario. In addition, for the Hybrid Scenario, a free fare and transfer policy on all LA County bus, urban rail and BRT lines was implemented. This policy excludes Metrolink riders, who still pay regular fare on commuter rail, but includes regional local bus operators (e.g. Santa Monica Big Blue Bus, Foothill Transit, etc.).

The scenario is designed to model the following Metro Vision 2028 desired outcomes:

1. To provide high frequency, fast transit service; where high quality options are at most a 10-minute walk or roll from home, the maximum wait for a trip is 15 minutes, and buses operate at 30 percent faster speeds;
2. To provide options to bypass congestion via freeway corridor pricing;
3. To improve first and last mile connectivity.

The following adjustments were made to the transit networks for this scenario:

1. Headways for the top 40 bus routes by ridership (which serve approximately 66 percent of Metro's bus riders) were capped to 10 minutes for each line, in each direction;
2. Model parameters for roadway segments (links) in the model network utilized by the top 40 bus routes were adjusted to increase bus speed on those links by 30 percent;
3. Fares and transfer fees for all LA County bus and urban rail lines were set to zero; and,
4. Travel times on walk access, egress, and transfer links (modes 1, 2, and 3 in the transit network) were reduced by 20 percent, in order to represent improvements in first and last mile travel time.

Mode Choice Results

Under this scenario, countywide auto trips decrease by approximately 807,000 trips (2.4% of the daily total). Among the auto trips, drive alone trips decrease by about 6.2 percent while the shared ride 2 trips decrease by 6.8 percent. The largest majority of these trips shift to transit while some shift to 3 and 4+ carpool and non-motorized trips. This is mainly due to the changes made in the transit and highway networks in the Hybrid Scenario. For example, the frequent and fast transit services in the Hybrid Scenario shifted some riders from auto to transit mode. In addition, the conversion of some of the HOV2+ lanes to HOT3+ lanes in the Hybrid Scenario also encouraged some of the shared ride 2 riders to shift from auto to other modes in the Hybrid Scenario. The increased operating cost in the Hybrid Scenario also shifted some of the trips to non-motorized mode.

MODE	BASELINE	HYBRID-1	DIFFERENCE	% DIFFERENCE
Bus subtotal	791,647	1,098,010	306,363	38.7%
Transit subtotal	1,600,068	2,332,514	732,446	45.8%
Auto subtotal	33,871,165	33,064,101	(807,064)	-2.4%
Non-Motorized Subtotal	5,330,526	5,405,193	74,667	1.4%
Total daily	40,801,759	40,801,807	48	0.0%

The boardings on all the urban rail lines increase in the Hybrid Scenario. Among these, the largest absolute increases are on the North-South Line, Purple Line and Green Line.

Transit Results

The increased transit service provided in the Hybrid Scenario would require a corresponding increase in the bus fleet. The Baseline Scenario network requires 1,909 Metro bus vehicles in operation during the peak period, and the Hybrid Scenario requires 2,264 buses. This is an increase of 355 buses (18.6%) over the original fleet size. Revenue vehicle miles increase in the Hybrid Scenario by 26,922 miles (11.0%). Revenue vehicle hours will be impacted by both the increase in service and change in speed, but the speed related change cannot be estimated with the modeling and analysis tools available. However, the increase in revenue vehicle hours due to the service increase by a maximum of 2,349 hours (11.6%) is due solely to the increase in service.

Figure 41

Systemwide Daily Boarding Comparison by Mode

TRANSIT SERVICES	BASELINE	HYBRID-1	DIFFERENCE	% DIFFERENCE
Local Bus Total Boardings	1,475,591	2,670,725	1,195,134	81%
Express Bus Total Boardings	44,503	67,0182	2,515	51%
Transitway	42,862	79,478	36,616	85%
Rapid Bus (Metro)	189,563	224,641	35,078	19%
BRT (Metro)	179,296	283,661	104,365	58%
Urban Rail (Metro)	1,170,978	1,744,883	573,905	49%
Commuter Rail	111,816	143,037	31,221	28%

The average trip length increases for all transit modes in the Hybrid Scenario. The provision of frequent and fast transit services with zero fare for all LA County transit modes (except Metrolink) give riders an opportunity to use these services for longer trips. Thus, the average transit trip length increases for all the modes (except BRT) in the Hybrid Scenario.

Highway Results

The effect of this scenario on the regional VMT and VHT is as expected. With the decrease in drive alone and shared ride trips, there is a decrease of approximately 21 million vehicle miles (7%) and 1.6 million vehicle hours (14%) in comparison to the Baseline.

Performance Measures

This chapter summarizes transportation system performance in LA County with the improvements recommended in this Long Range Transportation Plan (LRTP). The performance is measured across various performance measures associated with transportation system goals and objectives. Performance measures serve as a basis for comparing alternative improvement strategies and for tracking performance over time. System performance is evaluated for three scenarios that cover the 30-year horizon of the LRTP: Existing, Trend, Measure M, and 2020 LRTP scenarios. These scenarios have the following characteristics and are described in detail in the Travel Demand Model chapter.

LRTP Systemwide Performance

> **Existing (2017):** This scenario describes the transportation system performance in 2017. This is the current conditions scenario.

> **Trend (2047):** Referred to as the "Trend" scenario throughout the chapter, this scenario assesses the transportation system in 2047 with future population and employment growth conditions and no improvements to the transportation network. This scenario is the basis for assessing the impacts of Measure M and 2020 LRTP scenarios.

> **Measure M (2047):** Referred to as the "Measure M" scenario, this evaluates the transportation system in 2047 with future population and employment growth conditions as well as the major highway and transit capital improvements detailed in the LRTP. These improvements are described in the Travel Demand Model section above.

> **2020 LRTP (2047):** Referred to as the 2020 LRTP, this scenario includes the Measure M funded capital projects along with several bold policy initiatives, including a vehicle miles traveled (VMT) fee, free transit, and faster bus speeds. This is the recommended scenario for the 2020 LRTP.

The LRTP performance framework is organized around goals, objectives, and performance measures:

> **Goals** ("What do we want to achieve?") drawn from the service-oriented goals of Vision 2028.

> **Objectives** ("How should we address our goals?") drawn from public input gathered through the outreach phase of the LRTP, as well as objectives from countywide planning efforts, statutory requirements, and Vision 2028 initiatives.

> **Performance Measures** ("How do we track and measure success?") drawn from Vision 2028, the US Department of Transportation's Transportation Performance Management rulemaking, Metro's LRTP/Measure M Performance Framework, the SCAG 2016 Regional Transportation Plan/Sustainable Communities Strategy, and other Metro plans and programs.

> This performance framework was developed in partnership with Metro's internal departments, stakeholder input from the Policy Advisory Council (PAC), and input from the Metro Board.

The sections below highlight the systemwide performance measures and results for the four scenarios (Existing, Trend, Measure M, and 2020 LRTP). For some measures, the data and tools are insufficient to forecast future conditions. These are highlighted in the tables with "NA" for not-applicable. The sections are organized by the five goals from Vision 2028:

> **Goal 1:** Provide high-quality mobility options that enable people to spend less time traveling

> **Goal 2:** Deliver outstanding trip experiences for all users of the transportation system

> **Goal 3:** Enhance communities and lives through mobility and access to opportunity

> **Goal 4:** Transform LA County through regional collaboration and national leadership

> **Goal 5:** Provide responsive, accountable, and trustworthy governance within Metro

Goal 1

Provide high-quality mobility options that enable people to spend less time traveling

As laid out in Vision 2028, to achieve this goal, Metro will expand transportation options, improve the quality of its transit network and assets, and take steps to manage demand on the entire network. The LRTP will help advance this goal and measure progress towards two supporting objectives:

1. Optimize the speed, reliability and performance of the transportation system

2. Provide high-quality mobility options for all

These objectives and related performance measures, highlighted in Figure 42 on the right, quantify the system-level travel times, reliability, and access to various transportation modes.

> Countywide, average travel times for driving in the AM peak are longer than midday. In 2047, morning roadway travel times are expected to increase by roughly nine minutes, which is a 38% increase in travel time. Compared to the Trend, the Measure M scenario reduces the average AM trip by 2% and midday by 1%. Similarly, average transit travel times are expected to get longer between 2017 and 2047; however, the Measure M scenario is expected to improve transit travel times by 8% compared to the Trend. With the addition of the bold policies recommended in the 2020 LRTP, the average AM travel time for auto and transit are expected to improve by 19% and 16%, respectively, compared to the Trend.

> Roadway travel time reliability measures how much longer a trip in bad traffic (the 95th percentile of travel times) is relative to the average trip at that time. For highways, both in the morning and midday this value is 24%. On major arterials (Countywide Strategic Arterial Network and Truck Network), the buffer time is 14% in the morning and 12% during midday. Transit reliability is measured by on-time performance. Metro's In-Service On-Time Performance, for all Metro buses, was close to 74% in fiscal year 2018. For Metro rail it was over 98% in 2018.

> Currently, 8% of the households and 16% of jobs are within a 10 minute walk of high-quality transit (defined as fixed guideway stations). This number is expected to increase to 21% of households and 36% in the Measure M scenario. The Measure M scenario is expected to increase the percent of jobs within a 10 minute roll of high-quality transit from 48% to 62% compared to the Trend.

> Transit travel time competitiveness compares the transit time to what it would take to drive a car between key destinations. Of twenty key origin-destination pairs, the average travel time ratio is roughly 2.5, meaning it takes two and a half times longer to take transit versus drive between the origin and destination.

> Person hours of travel (PHT) in high occupant vehicle (HOV), where there is more than one person in the car, is expected to increase between the 2017 and the Trend scenario. Between the Trend and Measure M scenario, HOV PHT is expected to decrease, which is consistent with a reduction in vehicle hours of travel and vehicle hours of delay. Transit passenger hours traveled are expected to increase by 11% with the Measure M scenario and 68% for the 2020 LRTP scenario compared to the Trend.

> Another measure of transportation choice is the mode share of active transportation. While overall bicycle and walking trips will increase, with the Measure M scenario the mode share for active transportation is not expected to increase. The active transportation mode share is currently 13.1% for all trips in 2017 and is expected to remain relatively constant.

Figure 42

Goal 1 Systemwide Performance Results

SYSTEM PERFORMANCE OBJECTIVES	#	PERFORMANCE MEASURES	PERFORMANCE METRIC DESCRIPTION	EXISTING (2017)	TREND (2047)	MEASURE M (2047)	2020 LRTP (2047)
Optimize the speed, reliability and performance of the transportation system	1.a	Travel time by mode	AM travel time (in minutes) by auto	23.5	32.4	31.7	26.4
			Midday travel time (in minutes) by auto	17.0	20.1	19.9	NA
			AM travel time (in minutes) by transit	58.0	62.5	57.7	52.2
			Midday peak travel time (in minutes) by transit	64.3	64.6	61.3	NA
	1.b	Travel time reliability by mode	In-Service On-time Performance for Metro bus and rail (% of arrivals > 5 min later and departures > 1 before than scheduled)	Bus: 73.8% Rail: 98.5%	NA	NA	NA
			% variation in AM and Midday travel time on freeways	AM and Midday: 24%	NA	NA	NA
			% variation in AM and Midday travel time on CSAN	AM: 14% Midday: 12%	NA	NA	NA
			% variation in AM and Midday travel time on CSTAN	AM: 14% Midday: 12%	NA	NA	NA
Provide high-quality mobility options for all	2.a	Percent of households and jobs within 10-minute walk or roll of high-quality transit	Percent of households 10-minute walk or roll high-quality mobility options	Walk: 8% Roll: 38%	Walk: 9% Roll: 40%	Walk: 21% Roll: 55%	Walk: 21% Roll: 55%
			Percent of jobs within 10-minute walk or roll of high-quality mobility options	Walk: 16% Roll: 42%	Walk: 24% Roll: 48%	Walk: 36% Roll: 62%	Walk: 36% Roll: 62%
	2.b	Transit competitiveness (vs. driving) in key travel markets	Ratio of transit travel time to auto travel time between zonal pairs	Average Ratio: 2.49	NA	NA	NA
	2.c	Person travel hours in non-SOV modes	Daily person travel hours for HOV	9,382,646	14,018,530	12,933,380	NA
			Daily person travel hours for transit	522,661	815,531	908,143	1,367,320
	2.d	Active transportation mode share	% of trips made by bicycle or walking	13.1%	13.2%	13.1%	13.2%

Goal 2

Deliver outstanding trip experiences for all users of the transportation system

To achieve this goal, Metro seeks to improve the travel experiences of all users of the system. This means building and maintaining a world-class system that is attractive, affordable, efficient, safe, convenient, and user-friendly. The LRTP will help advance this goal and measure progress towards two supporting objectives:

1. Improve transportation system safety and security

2. Maintain a high level of customer satisfaction

These objectives and related measures, highlighted in Figure 43 below, quantify system-level safety and customer satisfaction. This includes tracking annual collisions, protecting vulnerable users through protected bikeways and sidewalks, and tracking customer satisfaction through regular surveying.

> Figure 43 details the annual number, averaged over the past three years, of severe and fatal collisions involving autos, trucks, bicycles, and pedestrians. Auto-only collisions represent over 80% of all injury collisions; however, collisions involving pedestrians made up only 9% of all injury collisions, but 37% of the collisions resulting in fatalities. There is an annual average of 268 fatal collisions involving pedestrians, 39 involving bicyclists, and 50 involving trucks.

> Protected bikeways include Class 1 paths and Class IV cycle tracks. Currently, there are only 60 miles of projected bikeways within ½ mile of fixed guideway transit stations. In the Trend scenario, with no new fixed guideway stations, the miles of bikeways would stay the same (assuming no increase in bike paths). In the Measure M scenario, the number would increase 73 miles. If local jurisdictions implement all bikeways planned in their bicycle plans, the Measure M scenario metric would increase significantly to 244 miles within ½ mile of fixed guideway transit stations. Currently, there is no countywide sidewalk inventory.

> There were 1,632 Part I and 1,434 Part II crimes on the Metro system in FY19, where Part I crimes refer to more serious violent and property crimes. Compared to FY18, total crimes were down by roughly 1%, with a slight increase in the less serious Part II crimes (+2%) and a larger decrease in Part I crimes (-3%).

> Generally speaking, Metro's customers have a high degree of satisfaction with Metro's bus, rail, and ExpressLane services. Close to 90% of customers are satisfied with Metro bus and rail service, and over 80% of ExpressLanes users are likely to support additional ExpressLanes projects countywide.

Figure 43
Goal 2 Systemwide Performance Results

SYSTEM PERFORMANCE OBJECTIVES	#	PERFORMANCE MEASURES	PERFORMANCE METRIC DESCRIPTION	EXISTING (2017)	TREND (2047)	MEASURE M (2047)	2020 LRTP (2047)
Improve transportation system safety and security	3.a	Collisions by mode by severity	Number of fatal and severe collisions involving autos	Severe: 1,974 Fatal: 362	NA	NA	NA
			Number of fatal and severe collisions involving trucks	Severe: 127 Fatal: 50	NA	NA	NA
			Number of fatal and severe collisions involving pedestrians	Severe: 761 Fatal: 268	NA	NA	NA
			Number of fatal and severe collisions involving bicycles	Severe: 249 Fatal: 39	NA	NA	NA
	3.b	Miles of protected bicycle pathways and sidewalks within ½ mile of high quality transit	Miles of protected bicycle pathways and sidewalks within ½ mile of high quality transit	Bikeways: 60 miles Sidewalks: Unknown	Bikeways: 60 miles Sidewalks: Unknown	Bikeways: 77 miles Sidewalks: Unknown	Bikeways: 77 miles Sidewalks: Unknown
	3.c	Part I & II crimes reported on Metro transit system	Part I & II crimes reported on Metro transit system (2019)	Part I: 1,632 Part II: 1,434	NA	NA	
Maintain a high level of customer satisfaction	4.a	Customer satisfaction with Metro bus, rail, and Express Lanes systems	Are customers satisfied with Metro bus service	Strongly Agree: 45% Agree: 46% Disagree: 6% Strongly Disagree: 3%	NA	NA	
			Are customers satisfied with Metro rail service	Strongly Agree: 33% Agree: 56% Disagree: 9% Strongly Disagree: 2%	NA	NA	
			Likelihood to support additional ExpressLane corridors	Very Likely: 54% Somewhat likely: 28% Somewhat unlikely: 8% Very Unlikely: 10%	NA	NA	

Goal 3

Enhance communities and lives through mobility and access to opportunity

Metro wants to improve individuals and families' access to jobs, essential services, education, and other social, cultural, and recreational opportunities. This means working to be responsive to the needs of diverse communities and seeking equitable outcomes from transportation investments. The LRTP will help advance this goal and measure progress towards five supporting objectives:

1. Promote access to opportunity in Equity Focus Communities
2. Reduce household costs spent on transportation and housing
3. Promote economic vitality
4. Improve environmental quality and resilience
5. Enhance public health and quality of life

These objectives and related measures, highlighted in Figure 44, quantify system-level performance in terms of equity, access to opportunity, economic benefits, affordability, environment, and public health. The first objective evaluates how systemwide performance in Equity Focus Communities (EFCs), defined geographic areas determined in need of access to opportunity, compares relative to the countywide averages. The EFCs comprise roughly 5% of the land area of LA County and contain roughly 30% of the population. These measures appear first in the table, but have been listed at the end of this introductory summary in order to highlight the comparisons to other countywide measures listed first.

> There are just over 35,000 Federal, State, and County-Administered affordable housing units within 1/2 mile of high quality transit, defined as fixed guideway transit stations, which is 32% of all the units in LA County.

> Residents of LA County spend roughly 33% of their income on combined housing and transportation costs.

> In 2017, an estimated 20% of the county's jobs are located within ½ mile of fixed guideway transit stations. In the Trend scenario, the percentage increases to 28% without any new transit stations, suggesting that job growth will be somewhat concentrated around station areas. In the Measure M scenario, 36% of the jobs are expected to be within ½ mile of fixed guideway transit.

> Regional growth can be measured as the increase in gross regional product attributable to transportation investments, increased economic activity, and benefits due to transportation system improvements. The increase in gross regional product is estimated to be $196 billion over the 30 year horizon. The benefits can also be measured in new jobs created. It is estimated that the Measure M scenario will create an additional 1.84 million job years (a year of full employment) compared to the Trend.

> Greenhouse gas emissions are expected to decrease between 2017 and 2047 due to increases in fuel efficiency and electrification. Between 2017 and 2047, the tons of CO_2 equivalent is projected to decrease 11%. The Measure M scenario is expected to further decrease these emissions, by 5%, relative to the Trend.

> Air quality pollutants, specifically particulate matter (PM2.5 and PM10), sulfur oxides (SOx), nitrogen oxides (NOx), and carbon monoxide, will also decrease significantly between 2017 and 2047 due to a cleaner fleet of vehicles on the roadways. Comparing the Trend with the Measure M scenario, the Plan scenario is expected to bring about modest decreases in CO, NOx and SOx, around 3-4% decreases, and no significant difference in particulate matter.

> There are 659 identified activity centers (this includes regional parks, colleges, regional shopping centers, cultural centers, among other destinations). In 2017, 15% are accessible within a 10 minute walk and 44% within a 10 minute roll of high quality transit. In 2047, these percentages are expected increase to 24% and 60%, respectively.

> As noted in Goal 1, the active transportation mode share, as modeled in Metro's travel demand model, is 12.4% for all trips. This is less than the 13.8% estimated from the recent National Household Travel Survey's estimate for LA County.

Equity Focus Community Measures

> Average travel times for auto trips originating in EFCs are slightly less than the county average in each scenario. The change in travel times between the Measure M scenario and Trend scenarios, at 2% in AM and 1% midday, is the same for both EFCs and the county as a whole. Average travel times for transit in EFCs improve slightly more than the county average; in the AM period they are 9% better in the Measure M scenario compared to the Trend, compared to 6% during midday.

> Currently, households in EFCs have better access to fixed guideway transit stations than the county average. Specifically, 20% of households in EFCs are within a 10 minute walk of high quality transit and 60% are within a 10 minute roll, compared to 8% and 38%, respectively, for LA County (measure 2.a). In the future Measure M scenario, the percent of households in EFCs within a 10 minute walk will be 41% and 80% within a 10 minute roll of fixed guideway transit stations.

> Roughly 28% of all fatal and severe collisions in LA County occur in EFCs. However, almost 40% of severe injury and fatal collisions involving pedestrians and bicycles in LA County occur in EFCs.

> In 2017 there were only 11 miles of protected bikeways in EFCs within ½ mile of fixed guideway transit. In the Measure M scenario, the protected bikeway mileage is expected to increase to 18 miles. This represents a 40% increase in mileage, compared to a 22% increase for the county as a whole (measure 3.b). If agencies countywide implemented all the bikeways in their respective bike plans, the mileage would increase to 98 miles.

> There are over 25,000 Federal, State, and County-Administered affordable housing units within 1/2 mile of high quality transit. This represents 23% of all the units in the county and 72% of the units within 1/2 mile of fixed guideway transit (measure 6a).

> Residents living in EFCs spend an estimated 55% of their income on housing and transportation compared to 33% countywide (measure 6.b)

> Roughly one third of all air quality pollutants, countywide, are emitted in EFCs. Compared to the Trend, the Measure M scenario is expected to decrease CO, NOx, and SOx by 9-10%, and particulate matter by 4%. These benefits are much higher in EFCs than the countywide average changes.

> Roughly one third of all identified activity centers are located in EFCs. Of these activity centers, 32% are with a 10 minute walk and 76% are within a 10 minute roll of fixed guideway transit stations. With the Measure M scenario, these percentages are expected to increase to 39% and 84% respectively.

> Of the principal arterials located in EFCs, 79% of the lane miles are in poor condition and only 2% are in good condition. This is in contrast to the county average for principal arterials, with 66% in poor condition and 6% in good condition (measure 13.a).

Figure 44

Goal 3 Systemwide Performance Results

SYSTEM PERFORMANCE OBJECTIVES	#	PERFORMANCE MEASURES	PERFORMANCE METRIC DESCRIPTION	EXISTING (2017)	TREND (2047)	MEASURE M (2047)	2020 LRTP (2047)
Promote access to opportunity in Equity Focus Communities	5.a	Travel time by mode in EFCs	AM travel time (in minutes) for trips originating in EFC by auto	22.6	30.3	29.6	NA
			Midday travel time (in minutes) for trips originating in EFC by auto	16.7	19.3	19.1	NA
			AM travel time (in minutes) for trips originating in EFC by transit	52.3	56.4	51.3	NA
			Midday peak travel time (in minutes) for trips originating in EFC by transit	58.4	58.1	54.8	NA
	5.b	Percent of EFC households within 10-minute walk or roll of high quality transit	Percent of EFC households within 10-minute walk or roll of high quality transit	Walk: 20% Roll: 66%	Walk: 22% Roll: 68%	Walk: 41% Roll: 80%	Walk: 41% Roll: 80%
	5.c	Collisions by mode and severity in EFCs	Number of fatal and severe collisions located in EFCs involving autos	Severe: 454 Fatal: 70	NA	NA	NA
			Number of fatal and severe collisions located in EFCs involving trucks	Severe: 28 Fatal: 10	NA	NA	NA
			Number of fatal and severe collisions located in EFCs involving pedestrians	Severe: 320 Fatal: 100	NA	NA	NA
			Number of fatal and severe collisions located in EFCs involving bicycles	Severe: 92 Fatal: 14	NA	NA	NA
	5.d	Miles of protected bicycle pathways and sidewalks within ½ mile of high quality transit in EFCs	Miles of protected bicycle pathways and sidewalks within ½ mile of high quality transit in EFCs	Bikeways: 11 miles Sidewalks: Unknown	Bikeways: 11 Sidewalks: Unknown	Bikeways: 18 miles Sidewalks: Unknown	

SYSTEM PERFORMANCE OBJECTIVES	#	PERFORMANCE MEASURES	PERFORMANCE METRIC DESCRIPTION	EXISTING (2017)	TREND (2047)	MEASURE M (2047)	2020 LRTP (2047)
	5.e	Affordable housing within ½ mile of high quality transit in EFCs	Federal, State, and County-Administered Affordable Housing Units in EFCS within 1/2 mile of high quality transit	25,215	NA	NA	NA
	5.f	Percent of household income spent on combined transportation and housing costs in EFCs	Percent of household income spent on combined transportation and housing costs in EFCs	55%	NA	NA	NA
	5.g	Air quality pollutants in EFCs	Annual short tons of quality criteria pollutants (Particulate Matter, NOx,, SOX, CO)	PM2.5: 132 PM10: 140 SOx: 95 NOx: 7,741 CO: 42,372	PM2.5: 33 PM10: 35 SOx: 77 NOx: 3,441 CO: 17,213	PM2.5: 32 PM10: 34 SOx: 71 NOx: 3,102 CO: 15,418	NA
	5.h	Percent of activity centers in EFCs within 10-minute walk or roll of high quality transit	Percent of activity centers in EFCs within 10-minute walk or roll of high quality transit	Walk: 32% Roll: 76%	Walk: 32%Roll: 76%	Walk: 39%Roll: 84%	Walk: 39%Roll: 84%
	5.i	Percent of roads and highway bridges in good and fair condition in EFCs	Percent of principal arterial roads in good and fair condition in EFCs	Good: 2% Fair: 19%P oor: 79%	NA	NA	NA
Reduce household costs spent on transportation and housing	6.a	Affordable housing within ½ mile of high quality transit	Federal, State, and County-Administered Affordable Housing Units within 1/2 mile of high quality transit	35,087	NA	NA	NA
	6.b	Percent of household income spent on combined transportation and housing costs	Percent of household income spent on combined transportation and housing costs	33%	NA	NA	NA

SYSTEM PERFORMANCE OBJECTIVES	#	PERFORMANCE MEASURES	PERFORMANCE METRIC DESCRIPTION	EXISTING (2017)	TREND (2047)	MEASURE M (2047)	2020 LRTP (2047)
Promote economic vitality	7.a	Jobs within 1/2 mile of high quality transit	Jobs within 1/2 mile of high quality transit	695,515	1,245,740	1,608,174	1,608,174
	7.b	Regional economic growth attributable to transportation investments	Regional economic growth attributable to transportation investments	NA	NA	$196 billion	NA
	7.c	Regional jobs attributable to transportation investments	Regional jobs years attributable to transportation investments	NA	NA	1.84 million	NA
Improve environmental quality and resilience	8.a	GHG emissions	Annual million metric tons of carbon dioxide equivalent (CO_2e)	35.05 million	31.03 million	29.42 million	25.27 million
	8.b	Air quality pollutants	Annual short tons of quality criteria pollutants (Particulate Matter, NOx, SOX, CO)	PM2.5: 466 PM10: 493 SOx: 298 NOx: 27,236 CO: 129,227	PM2.5: 127 PM10: 135 SOx: 252 NOx: 12,298 CO: 53,264	PM2.5: 127 PM10: 135 SOx: 245 NOx: 11,786 CO: 51,153	NA
Enhance public health and quality of life	9.a	Percent of activity centers within 10-minute walk or roll of high quality transit	Percent of activity centers within 10-minute walk or roll of high quality transit	Walk: 15% Roll: 44%	Walk: 15% Roll: 44%	Walk: 24% Roll: 60%	Walk: 24% Roll: 60%
	9.b	Active transportation mode share	% of trips made by bicycle or walking	13.1%	13.2%	13.1%	13.2%

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Goal 4

Transform LA County through regional collaboration and national leadership

In order to achieve the vision laid out in its strategic plan, Metro must further cooperation, coordination, and collaboration with Metro and its many partners and stakeholders. This means being a leader and partnering with local jurisdictions to manage the transportation system, relieve congestion, and increase resident and freight mobility.

The LRTP will help advance this goal and measure progress towards three supporting objectives:

1. Manage roadway congestion
2. Increase share of travel by non-SOV modes
3. Support efficient goods movement

These objectives and related performance measures, highlighted in Figure 45 below, quantify system-level performance in terms of roadway congestion, mode share, and goods movement.

> Vehicle hours of delay (VHD) per capita is expected to increase significantly between 2017 and 2047, from 82 hours per capita currently to over 135 hours per person per year in 2047. With the Measure M scenario, that number is expected to decrease by 12% to 119 annual hours per capita. In the 2020 LRTP scenario, VHD per capita is 22% less than the 2047 Trend.

> Per capita vehicle miles traveled (VMT) are expected to increase by over 6% between 2017 and 2047. The Measure M scenario is expected to decrease VMT by over 1% compared to the Trend. With the additional bold policies in the 2020 LRTP scenario, the LRTP could result in a 7% reduction.

> Person throughput is normally calculated at a corridor level. At the county level, the Mobility Index can be used as a proxy for throughput. This index quantifies how fast people are moving through the network. Between 2017 and 2047, the index drops from 41 to 34.6, indicating that conditions are expected to worsen. However, the throughput of the Measure M scenario is 7% higher than that of the Trend and the 2020 LRTP scenario is 12% higher than the Trend.

> Over the past five years, the California Highway Patrol (CHP) cleared incidents on freeways in 35 minutes on average. For collisions, the rate was 42 minutes. Over the five year period, the average clearance time increased by 8% for all incidents and 5% for collisions.

> Annual transit trips are expected to increase from 309 million in 2017 to 384 million in the Trend scenario. With the Measure M scenario, transit trips are expected to increase by 24% compared to the Trend, and with the addition of the bold policies included in the 2020 LRTP, the transit trips are expected to increase by 81% compared to the Trend.

> The majority of travel is made by private vehicle, and as currently forecasted, will continue to be the case in the future. Drive alone mode share is around 46% and is expected to see only a slight decrease in the Measure M scenario. There will be a slight increase in the transit mode share, from 2.9% in 2017 to 3.1% in the Trend scenario. The Measure M scenario is predicted to increase the mode share to 3.9%, a 24% increase, and a more significant jump to 5.7% in the 2020 LRTP scenario, an 81% increase.

> Between 2017 and 2047, truck vehicle hours of delay (VHD) is expected to increase significantly. However, between the Trend and Measure M scenarios, truck VHD is expected to decrease by 12%.

> Travel time reliability for trucks is measured as the buffer time index on the Countywide Strategic Truck Arterial Network. This index quantifies how much longer a trip in bad traffic (the 95th percentile of travel times) is relative to the average trip at that time. On the CSTAN, it is 14% worse in the AM peak and 12% worse in the midday periods.

Figure 45
Goal 4 Systemwide Performance Results

SYSTEM PERFORMANCE OBJECTIVES	#	PERFORMANCE MEASURES	PERFORMANCE METRIC DESCRIPTION	EXISTING (2017)	TREND (2047)	MEASURE M (2047)	2020 LRTP (2047)
Manage roadway congestion	10.a	Vehicle hours of delay per capita	Vehicle hours of delay per capita	82	136	119	93
	10.b	Vehicle miles traveled per capita	Vehicle miles traveled per capita	7,888	8,369	8,246	7,647
	10.c	Total person throughput	Mobility Index = (PMT/PHT) X (PMT/VMT)	41.0	34.6	37.0	41.5
	10.d	Average roadway incident clearance time	Average roadway incident clearance time for all incidents and collisions (minutes)	All: 34.6 Collisions: 42.1	NA	NA	NA
Increase share of travel by non-SOV modes	11.a	Annual transit trips	Annual transit trips	309 million	384 million	477 million	695 million
	11.b	Mode share	SOV mode share	46.2%	46.3%	45.8%	43.0%
			Carpool mode share	37.8%	37.3%	37.2%	38.1%
			Transit mode share	2.9%	3.1%	3.9%	5.7%
			Walk mode share	12.0%	12.1%	12.0%	12.1%
			Bike mode share	1.0%	1.1%	1.1%	1.1%
Support efficient goods movement	12.a	Truck vehicle hours of delay	Annual truck vehicle hours of delay	35.8 million	97.0 million	85.2 million	
	12.b	Truck travel time reliability	% variation in AM and Midday travel time (in minutes) on CSTAN	AM: 14% Midday: 12%	NA	NA	NA

Goal 5

Provide responsive, accountable, and trustworthy governance within Metro

As the county's Regional Transportation Planning Authority and the designer, builder, and operator of California's largest transit system, Metro has the responsibility to LA County residents and tax payers to be good stewards of public resources. Furthermore, to deliver the best mobility outcomes and build partnerships, Metro must improve business practices to be responsive, accountable, and trustworthy. The LRTP will help advance this goal and measure progress towards two supporting objectives:

1. Maintain a state of good repair of transportation assets
2. Ensure accountability through transparent reporting practices

These objectives and related measures, highlighted in Figure 46 below, quantify system-level performance in terms of system preservation and transparency.

> On the National Highway System (NHS), which includes all interstates and state routes in LA County, 50% of the lane miles are in good condition and only 3% are in poor condition. Alternatively, 66% of the lane miles of principal arterials in LA County are in poor condition and only 6% are in good condition. For bridges, 69% are in good condition and 4% are in poor condition.

> Metro's Transit Asset Management (TAM) group monitors the condition of Metro's transit assets, which include revenue vehicles, service vehicles, equipment, facilities, infrastructure, and other assets. This performance measure tracks the amount of funding projected to be available for TAM relative to the overall need. This unfunded need is 17% of the total TAM need over a 25 year period.

> Metro has released all of their legally mandated and financial disclosure reports. These include the triennial audits performed for the Federal Transit Administration and one prepared for Caltrans as a recipient of California's Transportation Development Act (TDA) funding. These include releasing the annual budget and Comprehensive Annual Financial Report (CAFR) each year. Finally, these include audits performed on behalf of the Independent Citizen's Advisory and Oversight Committee for Propositions A and C and Measures R and M.

Figure 46

Goal 5 Systemwide Performance Results

SYSTEM PERFORMANCE OBJECTIVES	#	PERFORMANCE MEASURES	PERFORMANCE METRIC DESCRIPTION	EXISTING (2017)	TREND (2047)	MEASURE M (2047)	2020 LRTP (2047)
Maintain a state of good repair of transportation assets	13.a	Percent of roads and highway bridges in good and fair condition	Percent of National Highway System in good and fair condition	Good: 50% Fair: 56% Poor: 3%	NA	NA	NA
			Percent of principal arterials in good and fair condition	Good: 6% Fair: 29% Poor: 66%	NA	NA	NA
			Percent of bridges in good and fair condition	Good: 69% Fair: 27% Poor: 4%	NA	NA	NA
	13.b	Percent of backlog to state-of-good-repair funding needs to address transit assets past useful life	Percent of backlog to state-of-good-repair funding needs to address transit assets past useful life	17%	NA	NA	NA
Ensure accountability through transparent reporting practices	14.a	Legal and policy reports issued on time	Percent of legally mandated and financial disclosure documents issued on time	100%	NA	NA	NA

Title VI Analysis

The Title VI analysis was performed to assess the transportation impacts on distinct socioeconomic groups in LA County. The transportation impacts analyzed include:

> Job accessibility within 60 minutes via transit; and

> Mode choice by income quintile.

The distinct socioeconomic groups include:

> Transit dependent;

> African American;

> Hispanic; and

> Asian/Pacific Islander.

Using information from the U.S. Census Bureau (2013–2017 American Community Survey [ACS] 5-Year Estimates), a Census Tract (CT) area was designated as transit-dependent if it met one or more of the following criteria:

> Zero-car ownership – 9.43% or more of the households do not own a car;

> Low-income – 21.92% or more of the households have income of $25,000 or less (in 2017 inflated-adjusted dollars); or

> Senior citizens with medium-low-income – 12.81% or more of the individuals aged 65 or older, and median household income is less than $59,410.

CTs were also designated with a specific socioeconomic group, if its population exceeded the socioeconomic group's average for LA County (e.g., a CT with ten percent of households comprised of African Americans would be deemed an African American CT since that exceeded the 8.2 percent average for LA County). Figure 47 summarizes the ethnic population of LA County based on the 2017 ACS. Hispanic or Latino residents, at 48.4 percent of the population, comprise the largest non-white group in the County. Figure 48 presents the race population of LA County based on the 2017 ACS.

Figure 47

Los Angeles County Ethnicity Based on 2017 ACS

	POPULATION	PERCENT
Hispanic or Latino	4,893,579	48.4%
Non-Hispanic Black or African American	799,579	7.9%
Non-Hispanic Asian/Pacific Islander	1,467,527	14.5%
Non-Hispanic White	2,676,962	26.5%
Non-Hispanic American Indian or Alaska Native	19,915	0.2%
(Non-Hispanic) Some other race	28,960	0.3%
(Non-Hispanic) Two or more races	219,180	2.2%
Total	**10,105,722**	**100.0%**

Figure 48

Los Angeles County Race Based on 2017 ACS

	POPULATION	PERCENT
Black or African American	828,981	8.2%
White	5,232,835	51.8%
Asian/Pacific Islander	1,488,199	14.7%
American Indian and Alaska Native	68,211	0.7%
Some other race	2,101,984	20.8%
Two or more races	386,412	3.8%
Total	**10,105,722**	**100.0%**

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In addition to transit-dependency and socioeconomic group, Census Tracts were also classified by household income quintiles. The quintiles represent:

> Low income – less than $39,481

> Moderate income – $39,482 to $52,188

> Medium income – $52,189 to $67,143

> Above average income – $67,144 to $88,875

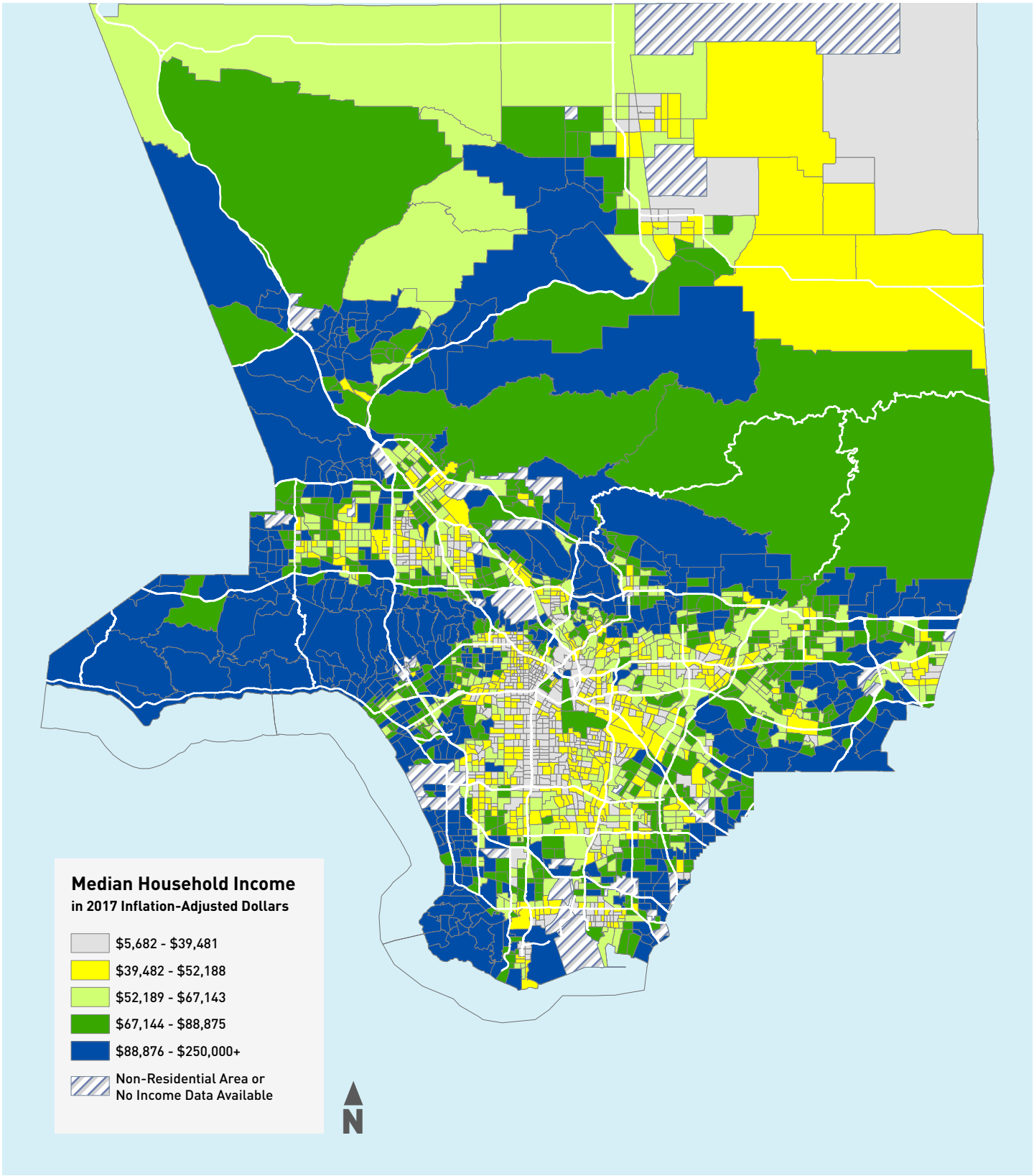
> High income – greater than $88,876

CTs by income quintiles are illustrated in Figure 49. Low-income CTs are concentrated in Central Los Angeles while the high-income CTs are concentrated in the western part of LA County.

Median household income, as defined in the 2017 ACS, is $54,501 (in 2017 inflated-adjusted dollars). A CT is designated with a specific income quintile, if its median household income falls into the range for that quintile (e.g., a CT with a median household income of $25,000 would be designated as a low-income CT).

Figure 49

2017 ACS MEDIAN ZONAL INCOME IN QUINTILES



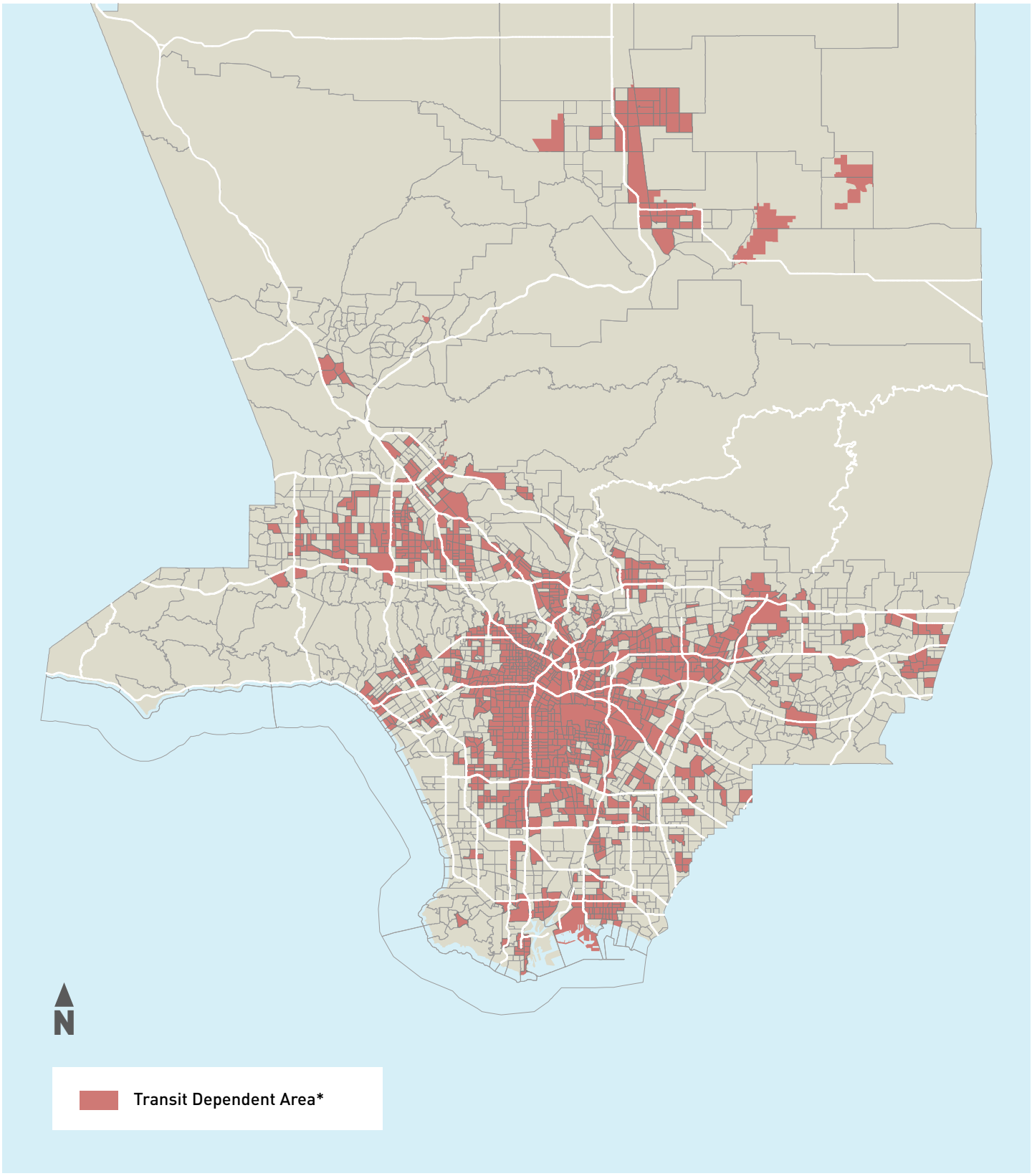
Source: U.S. Census Bureau 2013–2017 American Community Survey (ACS), 5-Year Estimates, Table B19013

Geographic Distribution of Socioeconomic Groups

Figure 50, Figure 51, Figure 52, and Figure 53 illustrate the distribution of transit dependent, African American, Hispanic, and Asian/Pacific Islander populations, respectively, throughout LA County. Figure 50 shows that CTs with a preponderance of transit-dependent households are concentrated in Central Los Angeles. Figure 51 illustrates the locations of CTs with a majority of African American households, which tend to be concentrated in Central Los Angeles, extending toward the southern part of the County. As shown in Figure 52, Hispanic majority CTs are dispersed throughout LA County, concentrated mainly in Central Los Angeles, and extending toward the eastern part of the County. Figure 53 displays the Asian/Pacific Islander households and shows they are concentrated mainly in the San Gabriel Valley, with pockets in the South Bay.

Figure 50

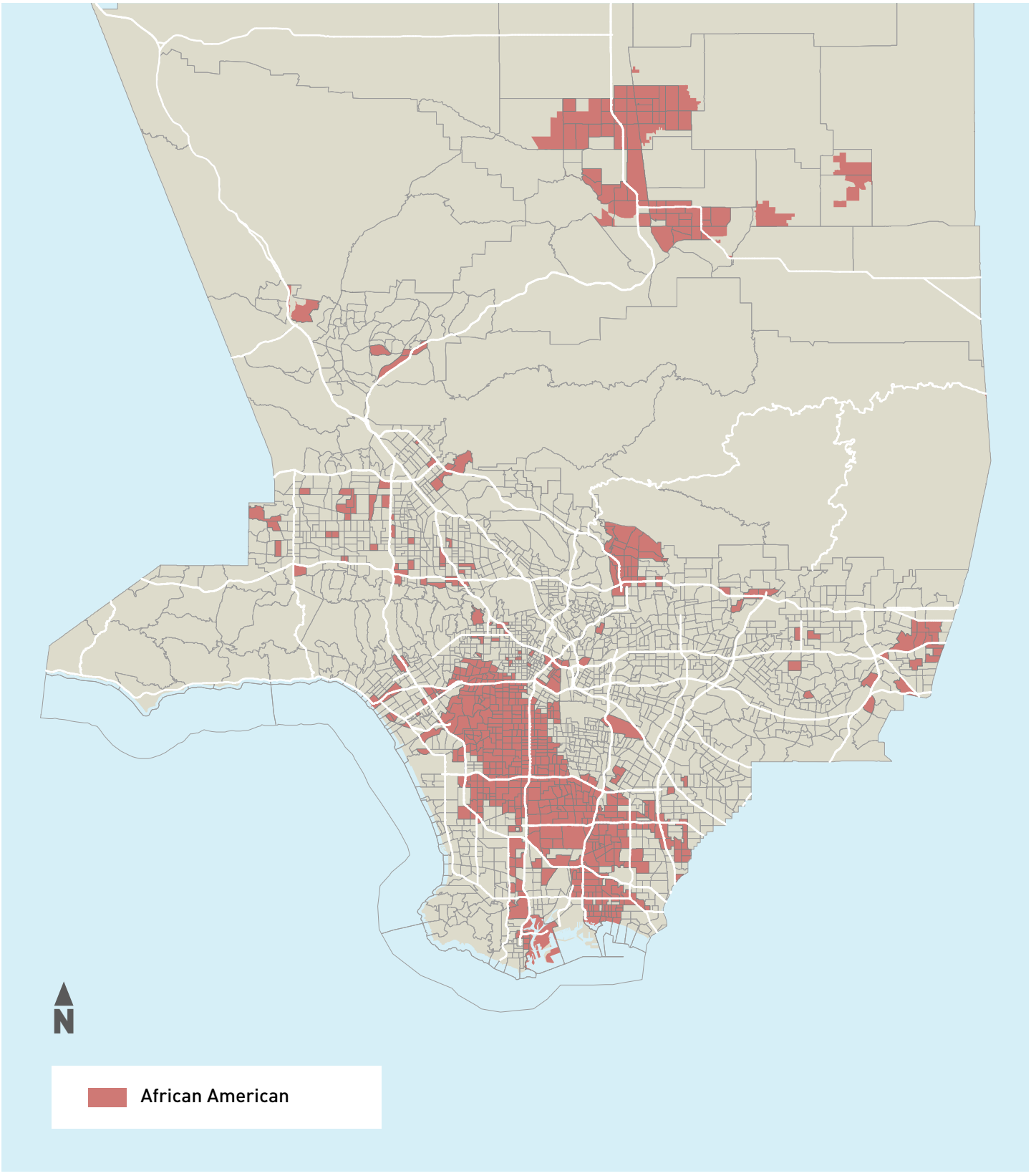
TRANSIT-DEPENDENT POPULATION



Source: U.S. Census Bureau 2013–2017 American Community Survey (ACS), 5-Year Estimates

Figure 51

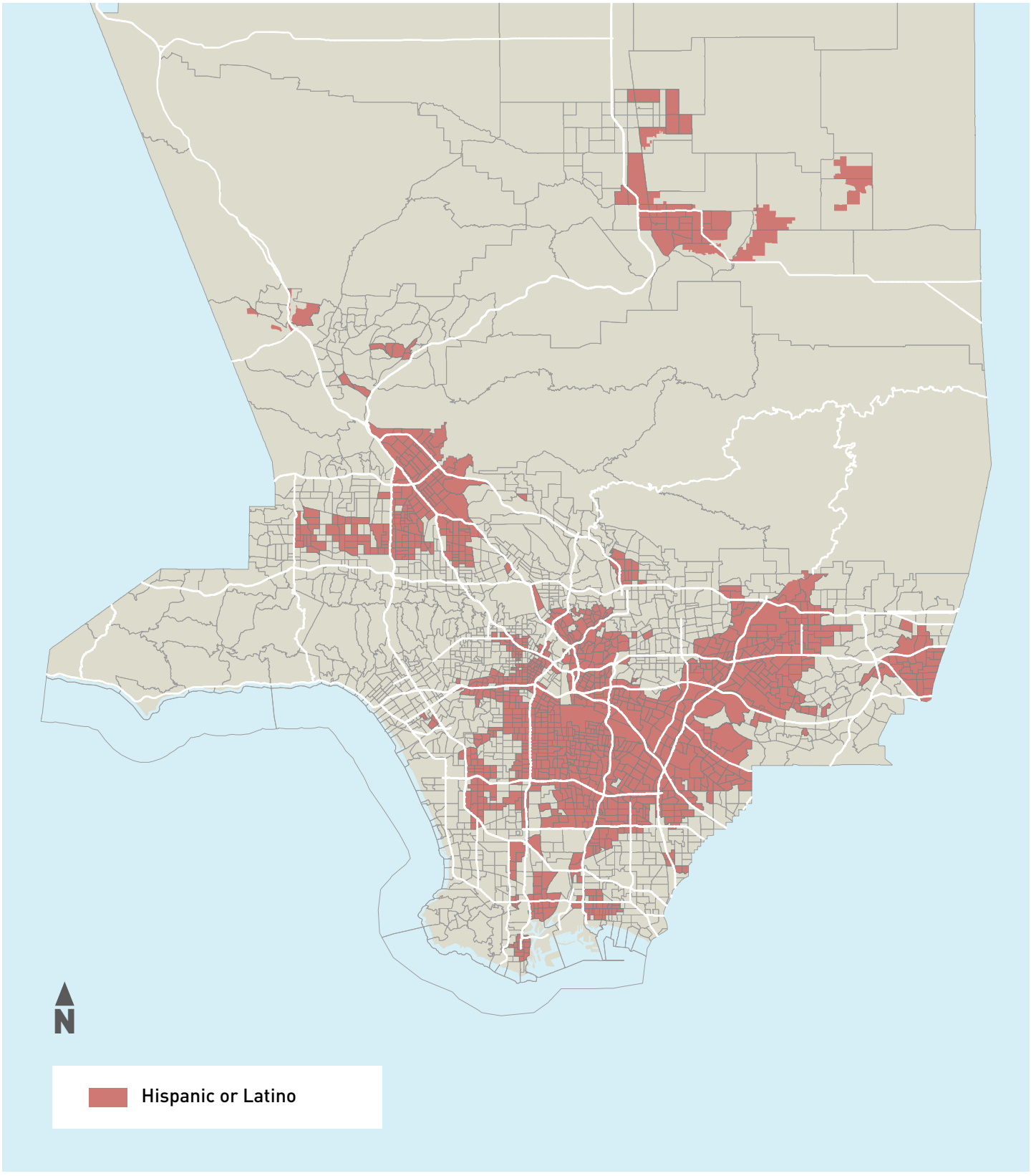
AFRICAN AMERICAN POPULATION



Source: U.S. Census Bureau 2013–2017 American Community Survey (ACS), 5-Year Estimates, Table B02001

Figure 52

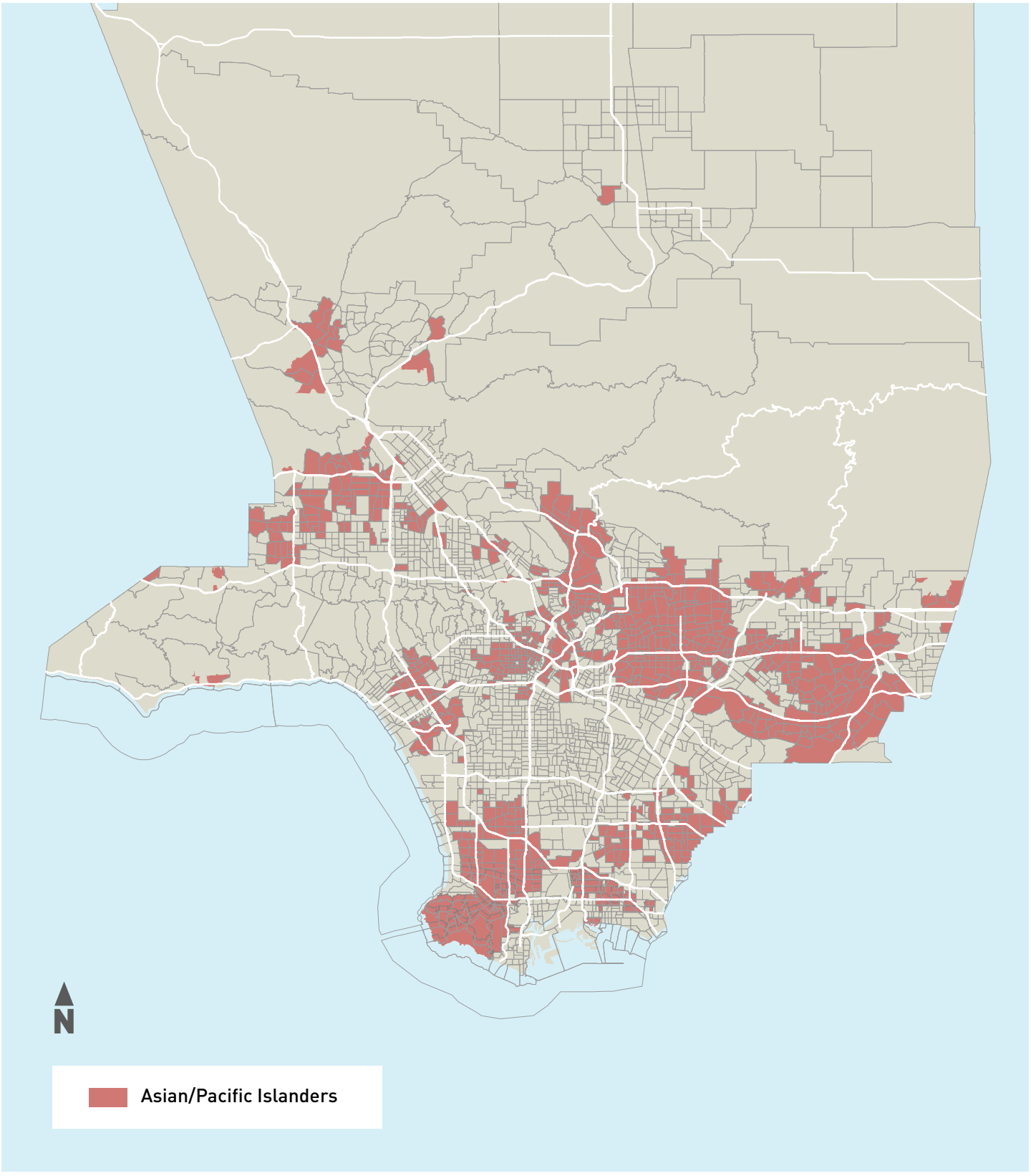
HISPANIC OR LATINO POPULATION



Source: U.S. Census Bureau 2013–2017 American Community Survey (ACS), 5-Year Estimates, Table B03002

Figure 53

ASIAN/PACIFIC ISLANDER POPULATION



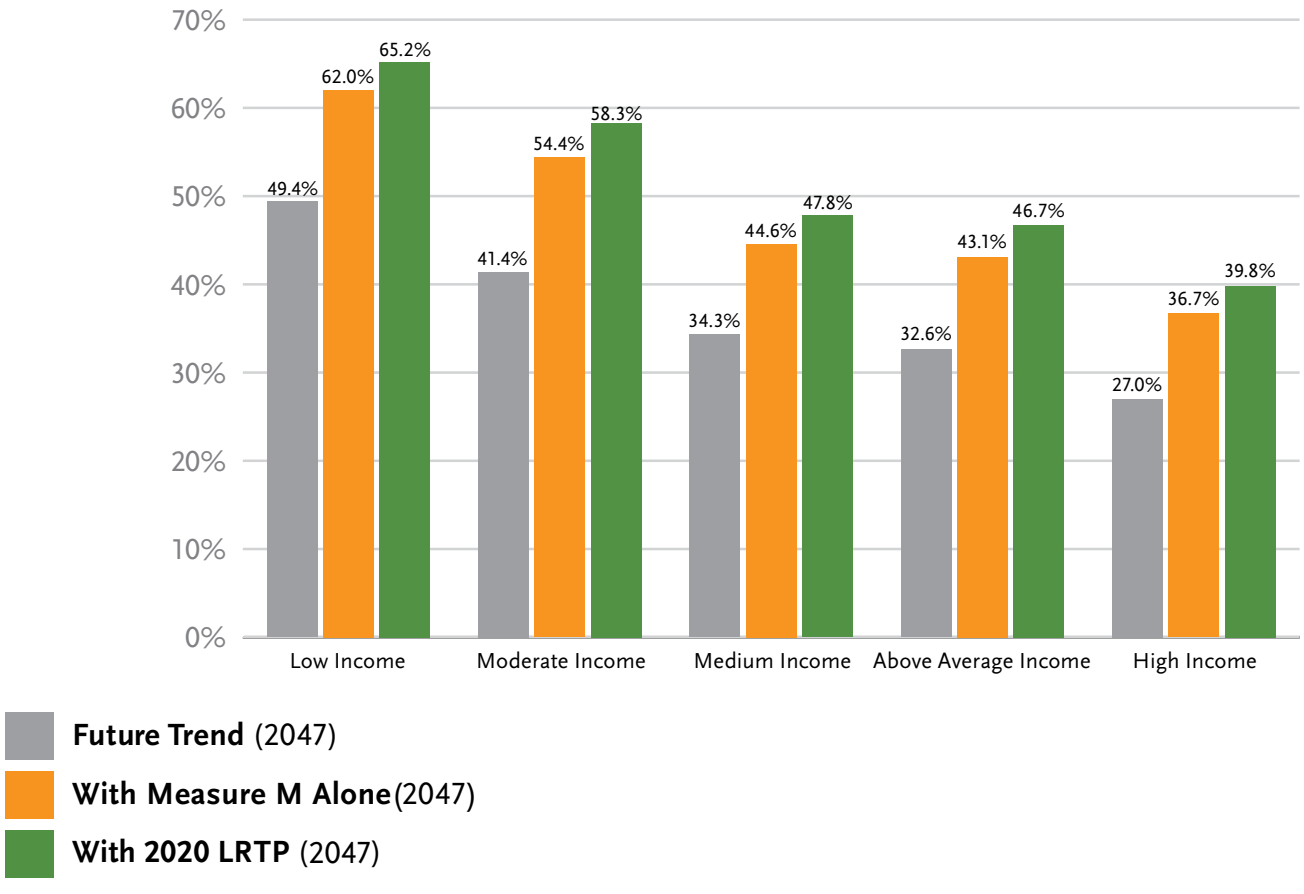
Source: U.S. Census Bureau 2013–2017 American Community Survey (ACS), 5-Year Estimates, Table B02001

Job Accessibility

Figure 54 illustrates, by income quintile, the percentage of jobs that can be made via transit in a sixty-minute period. Low-income TAZs are expected to benefit the most from transit accessibility as the 49.4 percent of jobs that can be reached via transit in the Future Trend scenario are expected to improve to 62.0 percent in the Measure M scenario, and to 65.2 percent with the 2020 Plan scenario. All income quintiles are expected to see an improvement in transit accessibility with implementation of the 2020 Plan.

Figure 54

Job Accessibility by Income Quintile

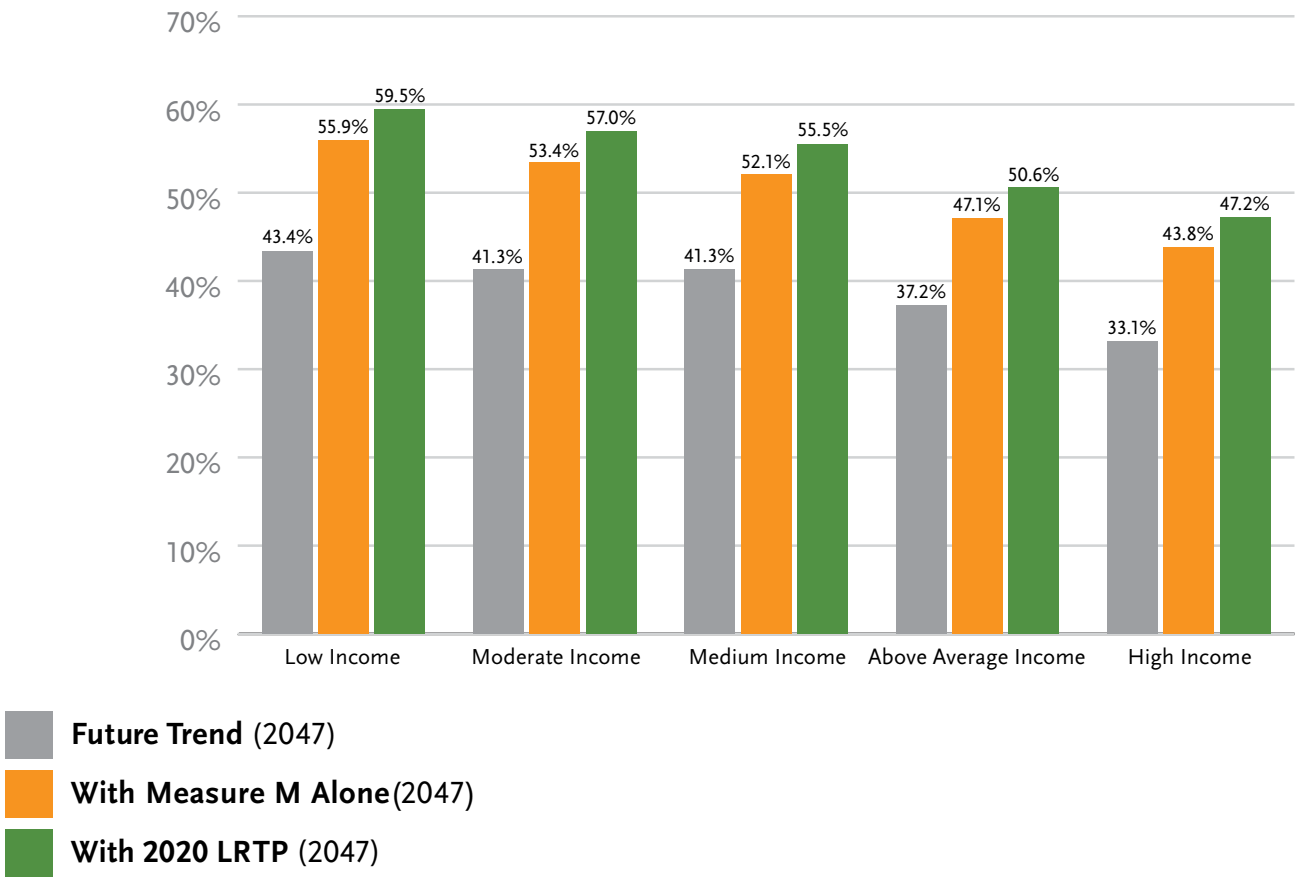


*Percent of jobs within 60 minutes transit travel time during peak periods

Figure 55 displays the job accessibility by population subgroup. The transit-dependent population is expected to benefit the most from the 2020 Plan with 43 percent of jobs accessible within 60 minutes of transit in the Trend, 56 percent in Measure M, and 60 percent with the Plan. All other population subgroups are expected to see an increase in transit accessibility as well.

Figure 55

Job Accessibility by Population Subgroup



*Percent of jobs within 60 minutes transit travel time during peak periods

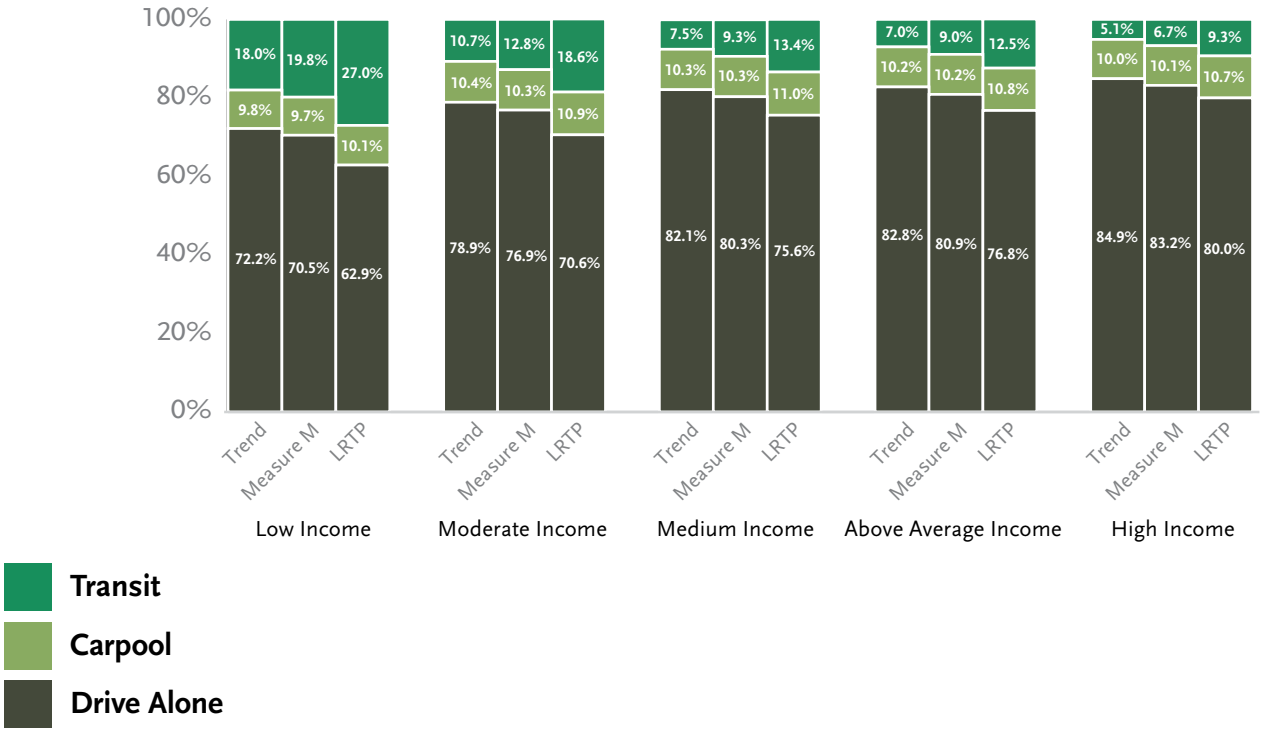
Mode Choice

Figure 56 illustrates, by income quintile, the mode split of home-to-work trips. Transit usage is expected to be higher for low-income households compared to other income groups in Trend scenario (18%), increasing to 20 percent for the Measure M scenario, and to 27 percent for the 2020 Plan scenario. All other income quintiles are also expected to experience an increase in transit usage as well.

Figure 57 displays the mode choice by population subgroup. The transit-dependent population is expected to increase transit usage from 13 percent in the Trend scenario to 15 percent in the Measure M scenario, and to 21 percent with the 2020 Plan. The non-minority populations also will see an increase from approximately 6 percent in the Trend scenario to about 8% in the Measure M scenario, and 11% in the 2020 Plan scenario. All other population subgroups are expected to increase transit usage as well.

Figure 56

Mode Choice by Income Quintile



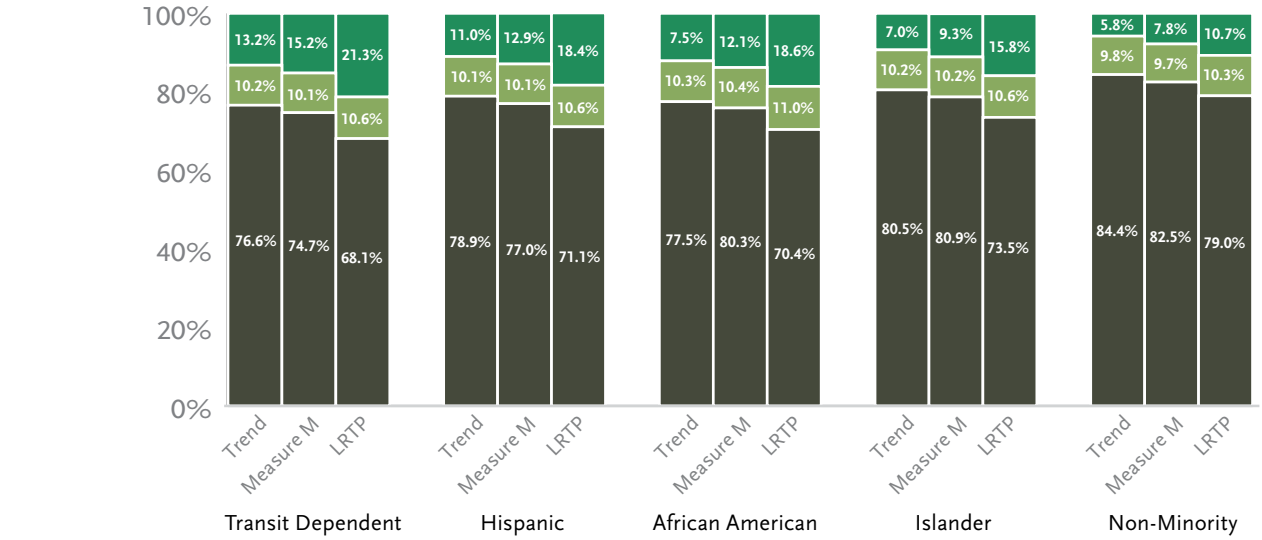
Transit

Carpool

Drive Alone

Figure 57

Mode Choice by Population Subgroup



Transit

Carpool

Drive Alone

Ongoing Monitoring

Ongoing monitoring of system performance is important to understanding how the region is changing over time and how effective Metro's programs and policies are at addressing our goals. The LRTP is a living document that can be amended as necessary; however, historically the LRTP has been updated approximately every six to eight years. As the region experiences changes every year, there are a subset of performance measures that are monitored more frequently to understand how the current conditions of our transportation system evolve.

The performance measures included in the 2020 LRTP are varied and can be categorized in different ways depending on the type (outcome vs process-oriented), the data utilized, and what Metro can and cannot influence. While some measures are more meaningful to track over time, others are better suited for forecasting and comparing alternative future scenarios. Some measures are clearly within Metro's control, while others are influenced by several competing regional factors.

Figure 58 displays each performance measure and the data source.

Measures that Metro should track on a regular basis should be updated frequently and should be capable of meaningfully changing each year. Metro is committed to establishing an ongoing monitoring framework to track performance measures prior to the next LRTP update.

Figure 58

Performance Measures and Data Source

PERFORMANCE MEASURES	DATA SOURCE
Travel time by mode	Metro Travel Demand Model (TDM) (2017)
Travel time reliability by mode	Freeways: Caltrans Performance Measurement System (PeMS)
	Arterials: Metro Arterial Performance Measurement Tool
Percent of households and jobs within 10-minute walk or roll of high-quality transit	Transit stops: Metro Service Planning GIS Data
	Households: US Census Bureau ACS (2017)
	Jobs: US Census Transportation Planning Products
Transit competitiveness (vs. driving) in key travel markets	Metro Travel Demand Model (2017)
	Data from NextGen Bus Study
Person travel hours in non-SOV modes	Metro Travel Demand Model (TDM) (2017)
Active transportation mode share	National Household Travel Survey (2017) – California Add-On
	US Census Bureau ACS (2017)
Collisions by mode by severity	Statewide Integrated Traffic Records System (SWITRS)
Miles of protected bicycle pathways and sidewalks within ½ mile of high quality transit	Existing & Planned Bicycle Facilities - Metro GIS (2018)
	Sidewalks – No Inventory Currently Available
	Metro rail stations and bus stops – Metro GIS
Part I & II crimes reported on Metro transit system	LA Police Department (LAPD) (2018)
	LA Sheriff's Department (LASD) (2018)
	Long Beach Police Department (LBPD) (2018)
Customer satisfaction with Metro bus, rail, and Express Lanes systems	Metro On-Board Customer Satisfaction Survey
Travel time by mode in EFCs	Metro Travel Demand Model (TDM) (2017)
	Metro Equity Focus Communities (2019)
Percent of EFC households within 10-minute walk or roll of high quality transit	Transit stops: Metro Service Planning GIS Data
	Households: US Census Bureau ACS (2017)
	Jobs: US Census Transportation Planning Products
	Metro Equity Focus Communities (2019)
Collisions by mode and severity in EFCs	Statewide Integrated Traffic Records System (SWITRS)
	Metro Equity Focus Communities (2019)
Miles of protected bicycle pathways and sidewalks within ½ mile of high quality transit in EFCs	Existing & Planned Bicycle Facilities – Metro GIS (2018)
	Sidewalks – No Inventory Currently Available
	Metro rail stations and bus stops – Metro GIS
	Metro Equity Focus Communities (2019)
Affordable housing within ½ mile of high quality transit in EFCs	California Housing Partnership - LA County Annual Housing Outcome Report (2018)
	Metro Equity Focus Communities (EFCs)
Percent of household income spent on combined transportation and housing costs in EFCs	US Census Bureau ACS (2017)
	Metro Travel Demand Model (2017)
	Equity Focus Communities (2019)

PERFORMANCE MEASURES	DATA SOURCE
Air quality pollutants in EFCs	California Air Resources Board EMFAC 2017 Web Database (v 1.0.2)
	Metro Travel Demand Model (TDM) (2017)
	Metro Equity Focus Communities (EFCs)
Percent of activity centers in EFCs within 10-minute walk or roll of high quality transit	LA County Location Management System (LMS) (2016)
	Metro rail stations and bus stops – Metro GIS
	Metro Equity Focus Communities (EFCs)
Percent of roads and highway bridges in good and fair condition in EFCs	Caltrans Automated Pavement Condition Survey Report (APCS), Caltrans Pavement Management System (PaveM),
	City and county pavement management systems
	Federal Highway Administration (FHWA) Highway Performance Monitoring System (HPMS)
	Metro Equity Focus Communities (EFCs)
Affordable housing within ½ mile of high quality transit	California Housing Partnership - LA County Annual Housing Outcome Report (2018)
Percent of household income spent on combined transportation and housing costs	US Census Bureau ACS (2017)
	Metro Travel Demand Model (2017)
Jobs within 1/2 mile of high quality transit	US Census Bureau's Census Transportation Planning Products
	Metro Service Planning data
Regional economic growth attributable to transportation investments	Metro Travel Demand Model (2017)
	Metro Financial Model
	Regional Economic Models Inc (REMI) TranSight
Regional jobs attributable to transportation investments	Metro Travel Demand Model (2017)
	Regional Economic Models Inc (REMI) TranSight
GHG emissions	California Air Resources Board EMFAC 2017 Web Database (v 1.0.2)
	Metro Travel Demand Model (TDM) (2017)
Air quality pollutants	California Air Resources Board EMFAC 2017 Web Database (v 1.0.2)
	Metro Travel Demand Model (TDM) (2017)
Percent of activity centers within 10-minute walk or roll of high quality transit	LA County Location Management System (LMS) (2016)
	Metro rail stations and bus stops – Metro GIS
Active transportation mode share	National Household Travel Survey (2017) – California Add-On
	US Census Bureau ACS (2017)
Vehicle hours of delay per capita	Metro Travel Demand Model (TDM) (2017)
Vehicle miles traveled per capita	Metro Travel Demand Model (TDM) (2017)
Total person throughput	Metro Travel Demand Model (TDM) (2017)
Average roadway incident clearance time	California Highway Patrol (CHP) Incident Logs from the Caltrans Performance Measurement System (PeMS)

PERFORMANCE MEASURES	DATA SOURCE
Annual transit trips	Metro Travel Demand Model (TDM) (2017)
Mode share	Metro Travel Demand Model (TDM) (2017)
	National Household Travel Survey – California Add-On (2017)
Truck vehicle hours of delay	Metro Travel Demand Model (TDM) (2017)
Truck travel time reliability	Freeways: Caltrans Performance Measurement System (PeMS)
	Arterials: Metro Arterial Performance Measurement Tool
Percent of roads and highway bridges in good and fair condition	Caltrans Automated Pavement Condition Survey Report (APCS), Caltrans Pavement Management System (PaveM)
	City and county pavement management systems (if available)
	Federal Highway Administration (FHWA) Highway Performance Monitoring System (HPMS)
Percent of backlog to state-of-good-repair funding needs to address transit assets past useful life	Metro Transit Asset Management Database
Legal and policy reports issued on time	Metro internal records from Metro Office of Management and Budget and Metro Management Audit Services Division (MASD)

Subregional Profiles

LA County's 10 million residents are dispersed across nine subregions, each containing many jurisdictions, communities, and neighborhoods. Although each subregion has distinct characteristics, taken together they share common needs and challenges, particularly when it comes to transportation and quality of life. The partnership between the subregions and Metro is interdependent and collaborative, resulting in the development and implementation of creative transportation solutions for LA County.

This chapter addresses the unique transportation challenges throughout the County by subregion and the transportation solutions that were developed through a collaborative approach as part of the process to get Measure M, a half-cent sales tax with no sunset, approved. Each subregion's unique transportation needs are informed by their existing population, employment, land use, and major transportation infrastructure. Future transportation investment by subregion is informed by the 2014 Measure M process in which subregional working groups developed goals for analyzing unmet transportation needs. The process ultimately resulted in a project list that met the expected revenue generated by the tax measure.

Metro is committed to working with all of the subregions and cities to address transportation priorities based upon the issues and objectives they have developed, as well as any other issues that may arise.

For planning purposes, LA County cities and communities are identified geographically by nine distinct, diverse, and vibrant subregions generally based on the existing Councils of Government (COGs) boundaries that range from 60 to 2,500 square miles in area. Some subregions are small, cooperative efforts staffed by city representatives; others are formalized COGs with paid staff; and some are geographic sub-sections of the City of Los Angeles.

In developing this chapter, subregional agencies were engaged early in the process to capture their insight on the unique transportation issues and challenges facing each subregion. The subregions are:

> Arroyo Verdugo Cities

> Central Los Angeles

> Gateway Cities

> Las Virgenes/Malibu

> North Los Angeles County

> San Fernando Valley

> San Gabriel Valley

> South Bay Cities

> Westside Cities

Figure 59 illustrates the subregions in the County.

In January 2015, the Board approved the separation of major airports and seaports (including LAX, Long Beach Airport, Burbank Bob Hope Airport, Palmdale Regional Airport, and the Ports of Los Angeles and Long Beach), as well as Los Angeles Union Station into a Regional Facilities Planning Area, because improvements to these regional facilities benefit the entire county. Regional facilities are separate for funding purposes, but will be displayed within the Metro Subregional Planning Area Boundaries for LRTP Update data purposes, including travel demand modeling and census-based population data.

Figure 59

LOS ANGELES COUNTY SUBREGIONS

Arroyo Verdugo Cities

The Arroyo Verdugo subregion includes Burbank, Glendale, Pasadena, South Pasadena, La Cañada Flintridge and La Crescenta-Montrose, a Census designated place. The region sits against a backdrop of the San Gabriel Mountains, on the northern edge of the Los Angeles Basin.

Major Transportation Facilities

Several major freeways traverse this subregion, including the Foothill (I-210), Glendale (SR-2), Golden State (I-5), and Ventura (SR-134) Freeways. Bus service in the subregion is provided by Metro and LADOT, as well as by local transit service providers in each of the member cities. Metro's L (Gold) Line provides rail service to communities in the eastern portion of the subregion. Metrolink's Ventura County and Antelope Valley Lines provide commuter rail services to Burbank and Glendale. Limited Amtrak service is also available. Burbank, Glendale, and La Cañada Flintridge provide paratransit services within their cities for the elderly and persons with disabilities. Service in La Cañada Flintridge is administered by the City of Glendale. Access Services, Inc. provides paratransit service in Arroyo Verdugo as part of its region-wide service.

Land Use and Demographics

Roughly 7 percent of the subregion is designated for commercial/industrial land use, and residential land use covers approximately 40 percent. The City of South Pasadena has the highest percentage of residential land use, while the largest total residential land use is located in the City of Pasadena. The largest industrial land use (by total area and percentage) can be found in the City of Burbank. Burbank also has a large percentage of commercial land use.

Bob Hope Airport is located in the City of Burbank. The airport can be reached by the I-5 Freeway or Metrolink rail. Hospitals in the subregion include Glendale Memorial Hospital, USC Verdugo Hills Hospital, Adventist Health Hospital, Huntington Hospital, Shriners for Children Medical Center, and Saint Joseph Medical Center. The subregion is also home to one of the world's most prestigious universities, California Institute of Technology, which manages the Jet Propulsion Laboratory in LaCanada Flintridge. The City of Burbank, billed as the "Media Capital of the World", has numerous media and entertainment companies' headquarters and production facilities.

Figure 6o

ARROYO VERDUGO SUBREGION

Population densities tend to cluster along SR-134, I-5, and the Metro Gold Line. High population density areas can be found south of the Verdugo Mountains and east of San Rafael Hills. The City of South Pasadena is the smallest city by total area but has the highest population density in the subregion. High employment densities can also be found along the freeways and fixed guideways. The City of Burbank has the highest employment density and one of the largest commercial land use areas in the subregion. The City of Glendale is the largest city in the subregion by area and total population. The city ranks 2nd in population density and 3rd in employment/trip densities within the subregion. Employment centers can be found near major thoroughfares in the Cities of Burbank, Glendale, and Pasadena.

Arroyo Verdugo is the smallest subregion in the County covering 87 square miles and is home to five cities and unincorporated LA County. The subregion ranks 8th (out of 9) in total population, 7th in total employment, and 7th in total daily trips. The subregion is predominately non-Hispanic Whites and ranks 4th in the County for average median household income.

Major Projects and Programs

When the Metro Board of Directors approved Measures M and R, they approved a set of projects, programs, and local return funding for each subregion. Widening on I-5 between SR-134 and SR-170 will provide carpool lanes, expected to open in the next several years. The North Hollywood to Pasadena Transit Corridor connecting the L line (Gold) in Pasadena to the B Line (Red) and G Line (Orange) in North Hollywood is the subregion's major project in the Los Angeles County Traffic Improvement Program and anticipated to open in 2026. The substantial Subregional Programs in the region include highway efficiency, noise mitigation and arterial projects valued at over $600 million (in 2015 $) and transit projects valued at over $250 million (in 2015 $).

Figure 61

Arroyo Verdugo Projects and Multi-year Subregional Programs

CATEGORIES	DESCRIPTION
Major Project (YOE $)	I-5 North Carpool Lanes (SR-134 to SR-170) $637 M (2023)
	LA River Path -- San Fernando Valley $69.6 M (2025)
	North Hollywood to Pasadena Transit Corridor $315 M (2026)
Multi-year Subregional Programs (in 2015 $)	Modal Connectivity and Complete Streets Projects $202 M (Start Date FY 2018)
	Transit Projects $257.1 M (Start Date FY 2018)
	Active Transportation Projects $136.5 M (Start Date FY 2033)
	Goods Movement Projects $81.7 M (Start Date FY 2048)
	Highway Efficiency, Noise Mitigation, and Arterial Projects $602.8 M (Start Date FY 2048)
	Arroyo Verdugo Projects to be Determined $110.6 M (Start Date FY 2048)

Source: *https://theplan.metro.net/wp-content/uploads/2016/09/FactSheet_Arroyo_Verdugo.pdf*

Figure 62

ARROYO VERDUGO DAILY TRIPS

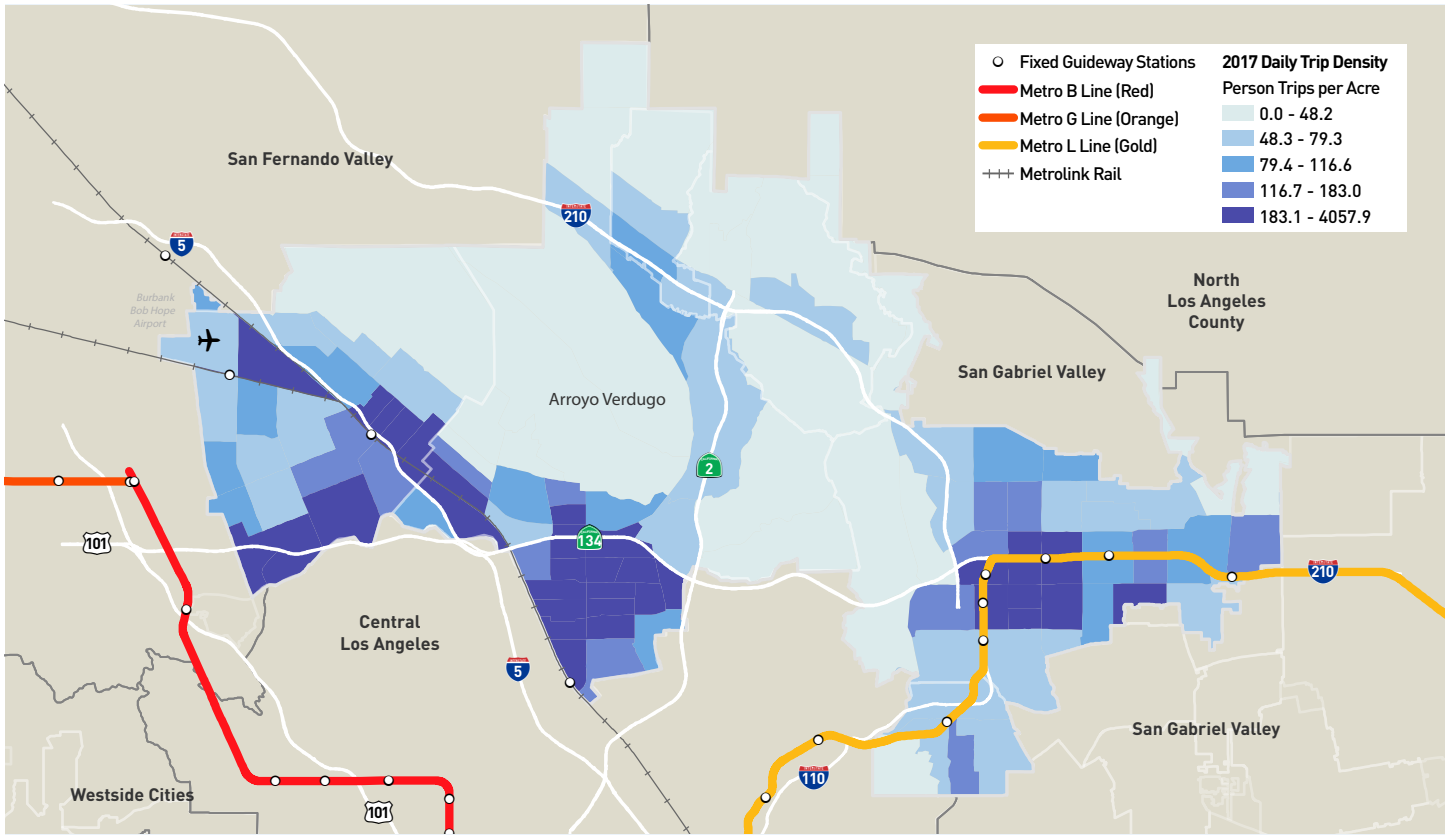


Figure 63

ARROYO VERDUGO EMPLOYMENT DENSITY

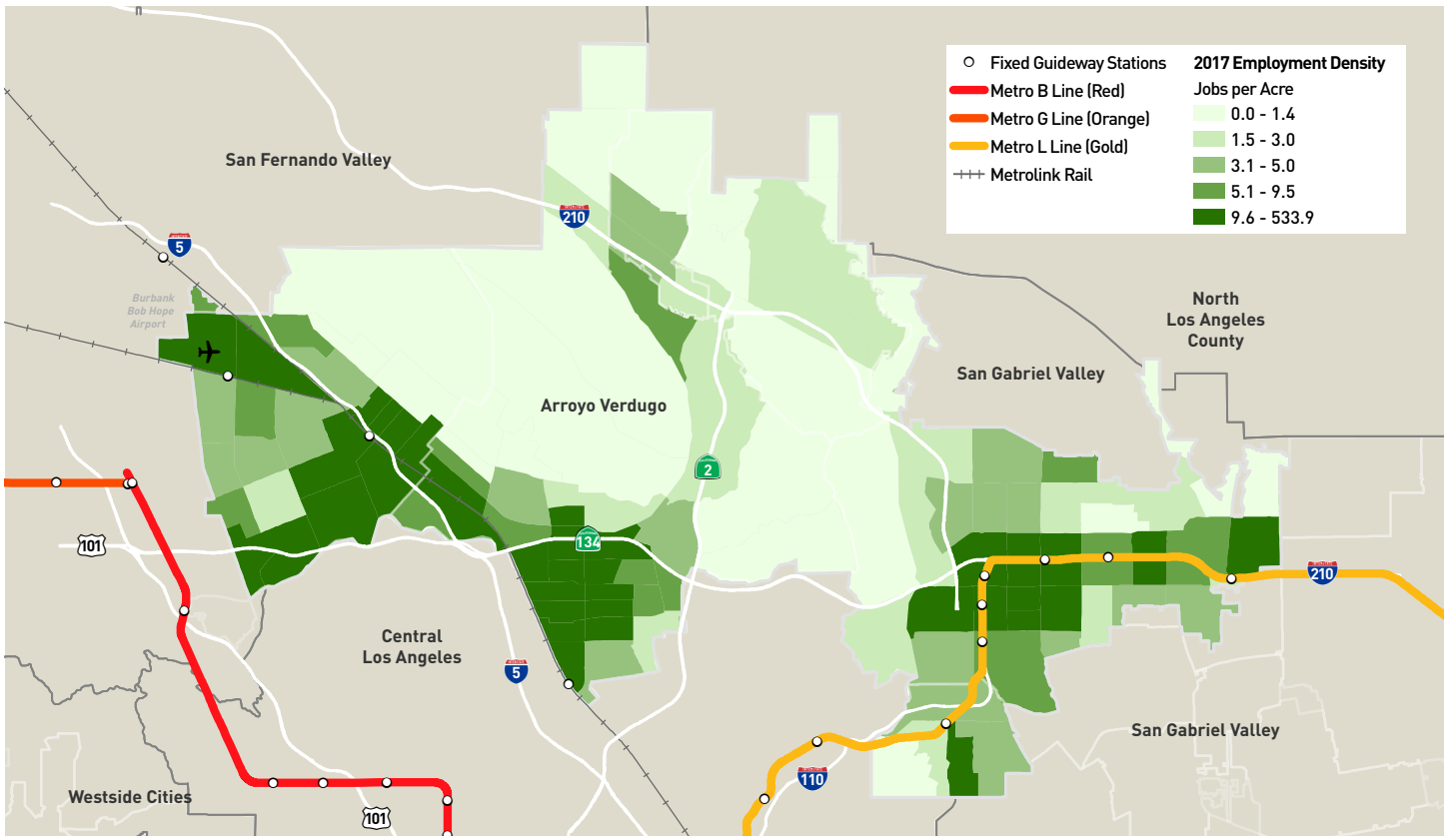


Figure 64

ARROYO VERDUGO POPULATION DENSITY

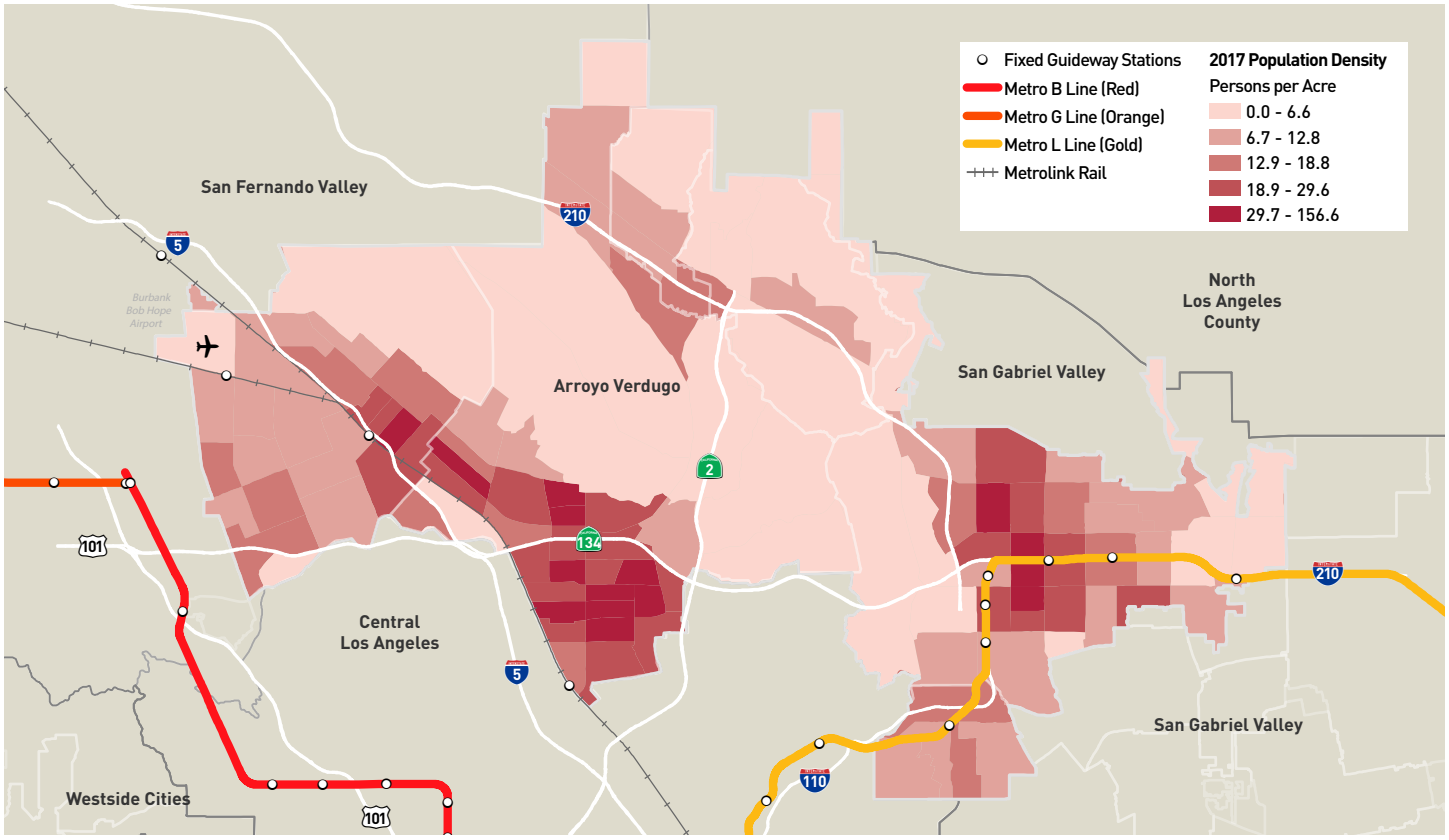


Figure 65

ARROYO VERDUGO LAND USE

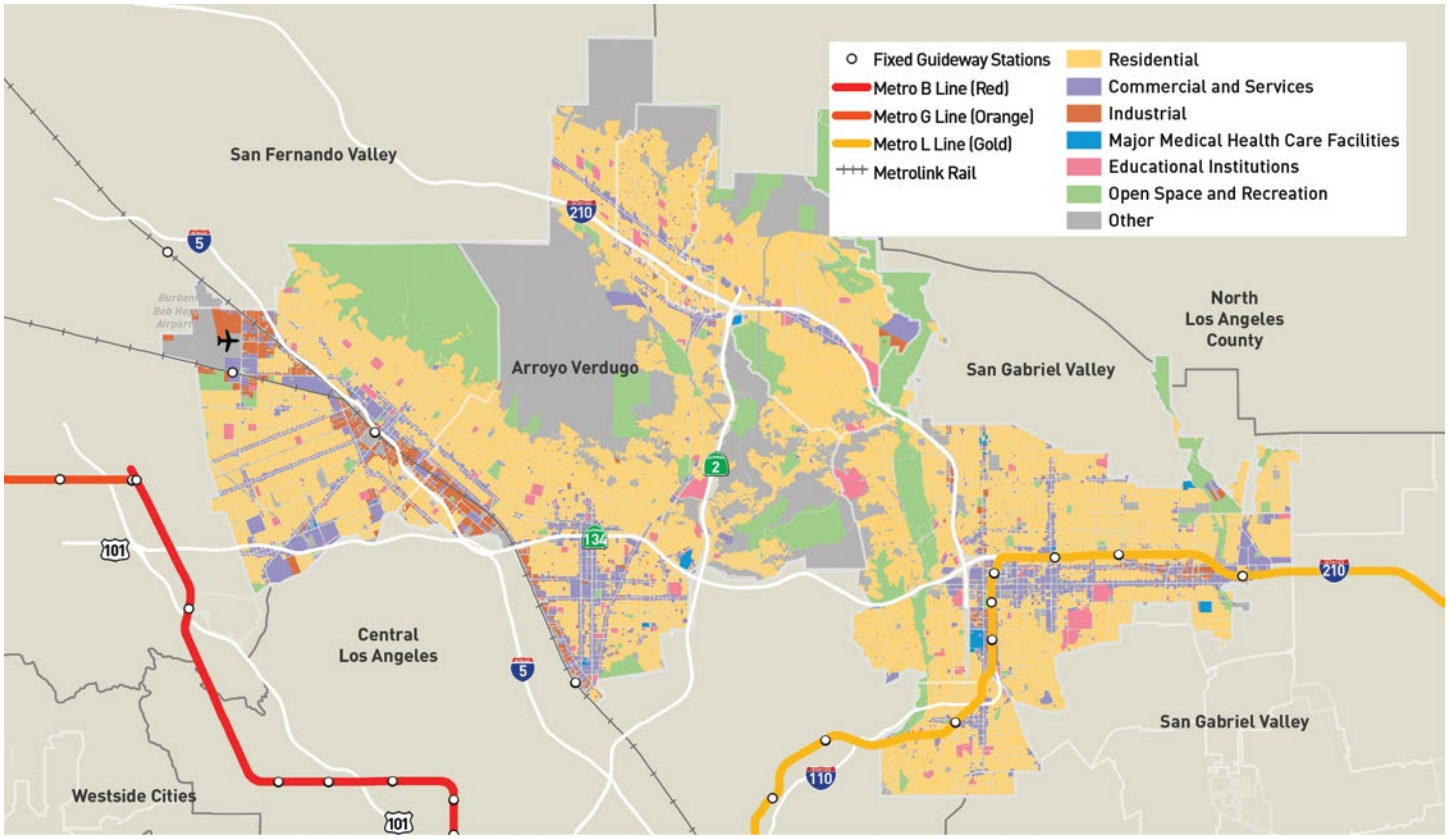
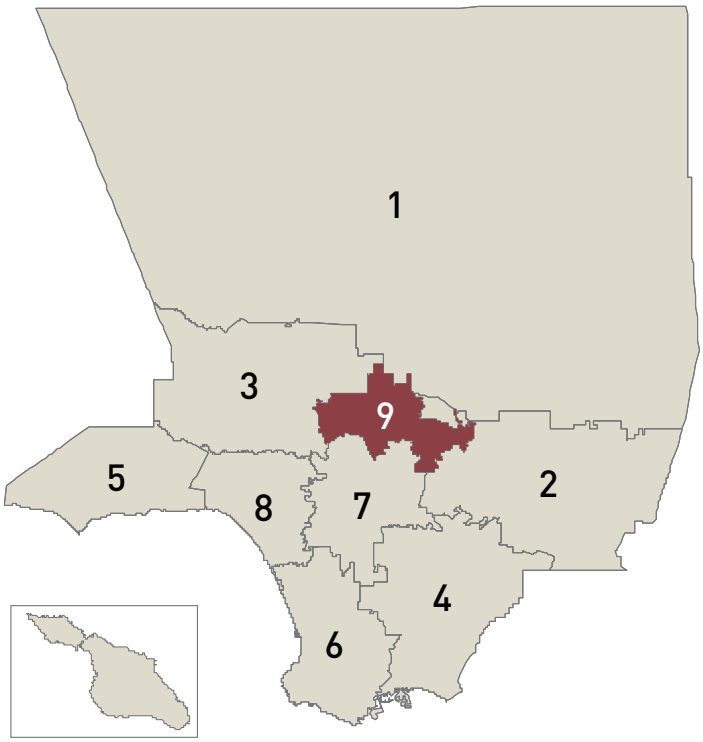


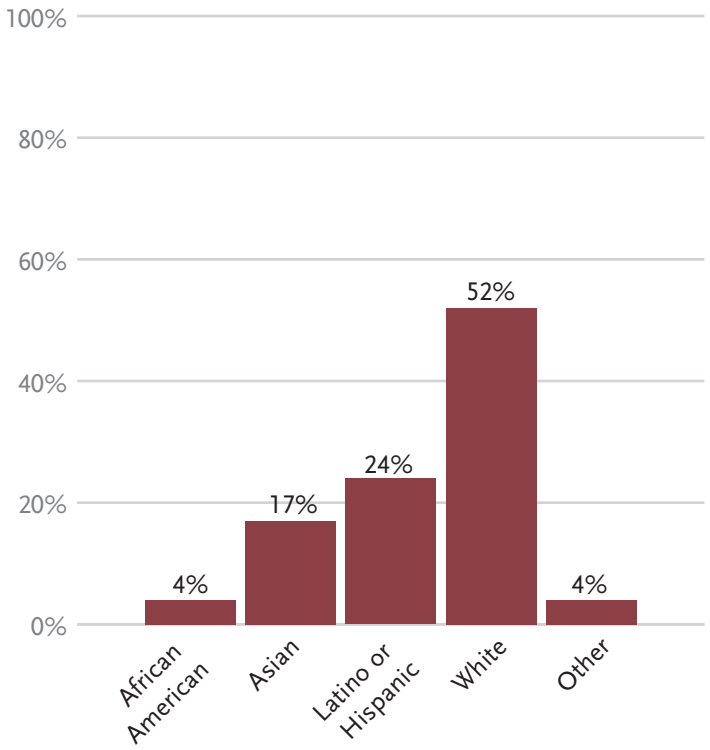
Figure 66

Arroyo Verdugo Summary Demographics

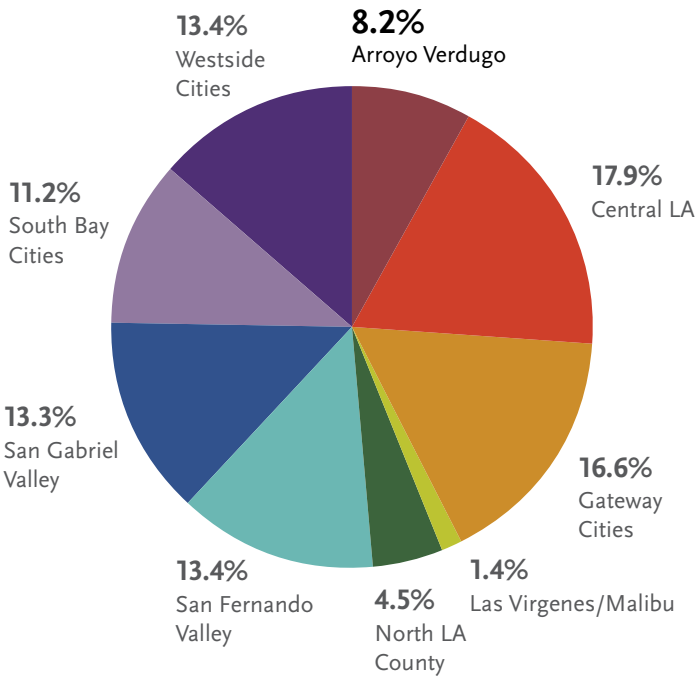
Total Area 87 Square Miles, Rank 9th (Out of 9 Subregions)



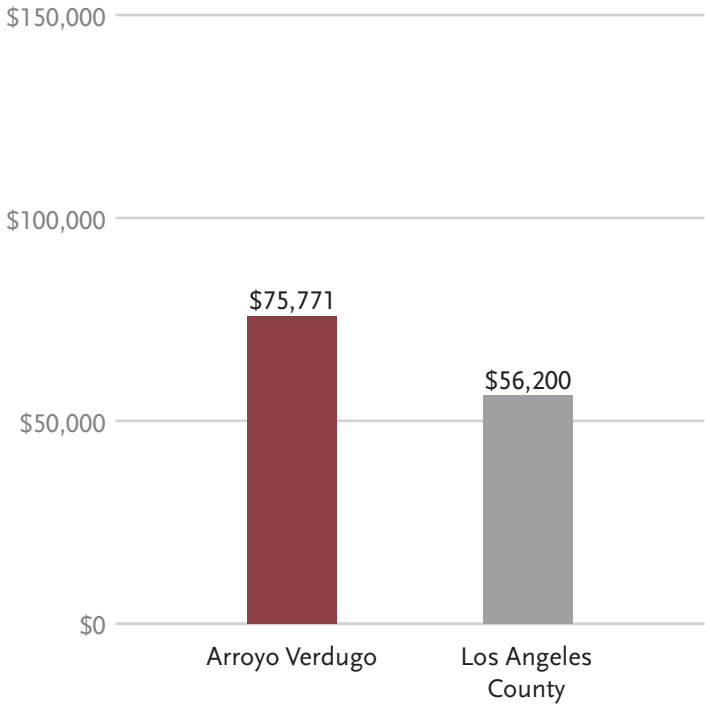
Total Population 509,273 People, Rank 8th



Total Employment 362,301 Jobs, Rank 7th



Median Household Income $75,771 Average MHI, Rank 4th



Central Los Angeles

The Central Los Angeles subregion encompasses many communities in the City of Los Angeles including Atwater Village, Baldwin Hills, Boyle Heights, Central City, Chinatown, Eagle Rock, Echo Park, El Sereno, Glassell Park, Hancock Park, Highland Park, Hollywood, Hollywood Hills, Koreatown, Leimert Park, Little Tokyo, Arts District, Miracle Mile, Mid-City, Mt. Washington, Silver Lake, South Park, University Park, West Adams, Wilshire Center and portions of South-Los Angeles. The subregion also includes unincorporated areas of East Los Angeles, Ladera Heights, and View Park-Windsor Hills.

Major Transportation Facilities

A total of eight freeways and two busways pass through the subregion. They include Harbor Freeway (I-110), Glendale Freeway (SR-2), Golden State/Santa Ana Freeway (I-5), Santa Monica/San Bernardino Freeway (I-10), Pomona Freeway (SR-60), Ventura Freeway (SR-134), Hollywood Freeway (US-101), and Long Beach Freeway (I-710). The El Monte Busway runs along the San Bernardino Freeway's median and terminates at Alameda St. The Harbor Transitway runs along the Harbor Freeway's median and terminates at Adams Bl.

Central Los Angeles is served by most Metro Rail lines, including the B (Red) Line, D (Purple) Line, and L (Gold) Line, all converging upon Union Station. In addition, A (Blue) Line and E (Expo) Line meet nearby at the 7th Street/Metro Center station. At the southern edge of Central Los Angeles, the C (Green) Line connects to the A (Blue) Line. Union Station also serves as the major hub for Metrolink commuter rail service including the 91/Perris Valley Line, Antelope Valley Line, Orange County Line, Riverside Line, San Bernardino Line, and Ventura County Line as well as the Amtrak Pacific Surfliner line.

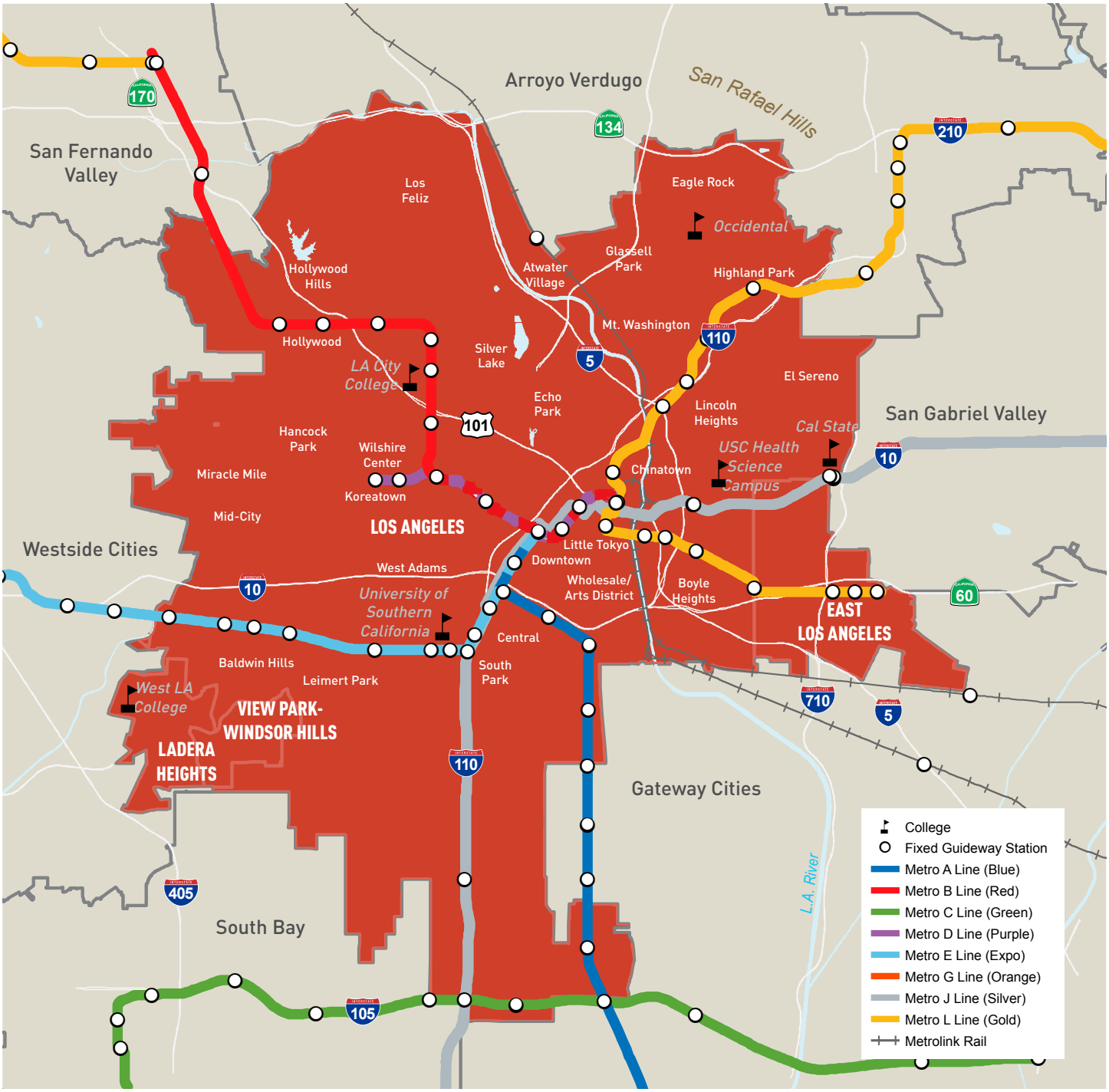
Ten municipal bus operators serve the Central Subregion, including Metro, Antelope Valley Transit, Foothill Transit, Gardena Municipal Bus Lines, LADOT (Dash and Commuter Express), Montebello Municipal Bus Lines, Orange County Transportation Authority (OCTA), Santa Clarita Transit, Santa Monica Municipal Bus Lines, and Torrance Transit. Currently, Metro operates four Metro Rapid lines within the Central Area (Wilshire Bl/Whittier Bl, South Broadway, Vermont Av and Florence Av). The road infrastructure is built-out and cannot accommodate more road capacity without adverse community impacts.

Land Use and Demographics

Central Los Angeles covers approximately 138 square miles. Roughly 15 percent is designated for commercial/industrial land use and residential land use covers approximately

Figure 67

CENTRAL LOS ANGELES



40 percent of the subregion. View Park-Windsor Hills has the highest percentage of residential land use, but 10 persons per acre population density. The highest population density is located in the East Los Angeles community. The City of Los Angeles has the largest area for industrial/commercial use and the highest employment density in the subregion.

Higher trip and population density is located in the areas of Hollywood, Echo Park, Koreatown, Silver Lake, Little Armenia, Downtown Los Angeles, and the Fashion District. Population densities tend to cluster around Metro's Red, Purple, Blue, Silver, and the southern portion of the Gold Line (near the industrial/residential interface of East LA and Boyle Heights). Employment density is clustered in areas between Hollywood and Downtown Los Angeles. Downtown Los Angeles has the highest trip density areas in the subregion.

There are many entertainment attractions located in the subregion including the Hollywood Walk of Fame, L.A. Live, Orpheum Theatre, and Griffith Park/Observatory. The region also has several major sports facilities including the Coliseum, L.A. where the L.A. Rams and USC Trojans play, the Chavez Ravine, home to the Dodgers, and the Staples Center, home to the L.A. Lakers. The symbolic landmark Hollywood sign can be found on Mount Lee and is often viewed by thousands of daily visitors from Griffith Park Observatory. Downtown Los Angeles is the County's largest employment district, and over the past decade, the site of a considerable expansion of residential, entertainment, and retail development.

Central Los Angeles is also home to several colleges and universities including the University of Southern California, Occidental College and Cal State Los Angeles. In addition, the medical complexes include Kaiser Permanente Los Angeles Medical Center, Childrens Hospital, Hollywood Presbyterian Medical Center, Los Angeles County + USC Medical Center, and USC Keck Hospital.

Central Los Angeles is the focal point of the region's transportation system. The subregion ranks 2nd in total population, 1st in total employment, and 1st in total daily trips. The population is predominately Hispanic or Latino and has the lowest average median household income in the County. The subregion contains a diverse land use pattern that includes the County's heaviest concentration of commercial and government offices, major industrial areas along the Los Angeles River, the most densely populated residential communities in the region, and many of the region's recreational and cultural facilities.

Major Projects and Programs

The major regional transit projects with initial phases to be completed by the 2028 Olympics include the West Santa Ana Branch Transit Corridor connecting Downtown Los Angeles to the City of Artesia, Vermont Transit Corridor, a proposed BRT along 12.5 miles of Vermont Avenue. The LA River Path – Central LA, an 8-mile path between the Elysian Valley and Maywood through Downtown Los Angeles is anticipated to open between 2026 – 2027. Both the LA Streetscape Enhancement and Great Streets Program and the Public Transit State of Good Repair Program are allocated more than $400 million in investment in the Central Subregion.

Figure 68

Central Los Angeles Projects and Multi-year Subregional Programs

CATEGORIES	DESCRIPTION
Major Projects (YOE $)	Rail to Rail Active Transportation Corridor Segment A $40.2 M (2024)
	LA River Path – Central LA $429.5 M (2026 – 2027)
	West Santa Ana Branch Transit Corridor Phase 1 $1.25 B (2028) and phase 2, $5.06 B (2041), ($6.31 B total cost)
	Vermont Transit Corridor $524 M (2028)
	Crenshaw Northern Extension $4.74 B (2047)
	Historic Downtown Streetcar $581 M (2057)
Multi-year Subregional Programs (in 2015 $)	Active Transportation, First/Last Mile and Mobility Hubs $215 M (Start Date FY 2018)
	Los Angeles Safe Routes to School Initiative $250 M (Start Date FY 2033)
	Bus Rapid Transit and First/Last Mile Solutions (e.g., DASH) $250 M (Start Date FY 2048)
	Freeway Interchange and Operational Improvements $195 M (Start Date FY 2048)
	LA Streetscape Enhancement and Great Streets Program $450 M (Start Date FY 2048)
	Public Transit State of Good Repair Program $402 M (Start Date FY 2048)
	Traffic Congestion Relief/Signal Synchronization $50 M (Start Date FY 2048)

Source: *https://theplan.metro.net/wp-content/uploads/2016/09/FactSheet_Central_LA.pdf*

Figure 69

CENTRAL LOS ANGELES DAILY TRIPS

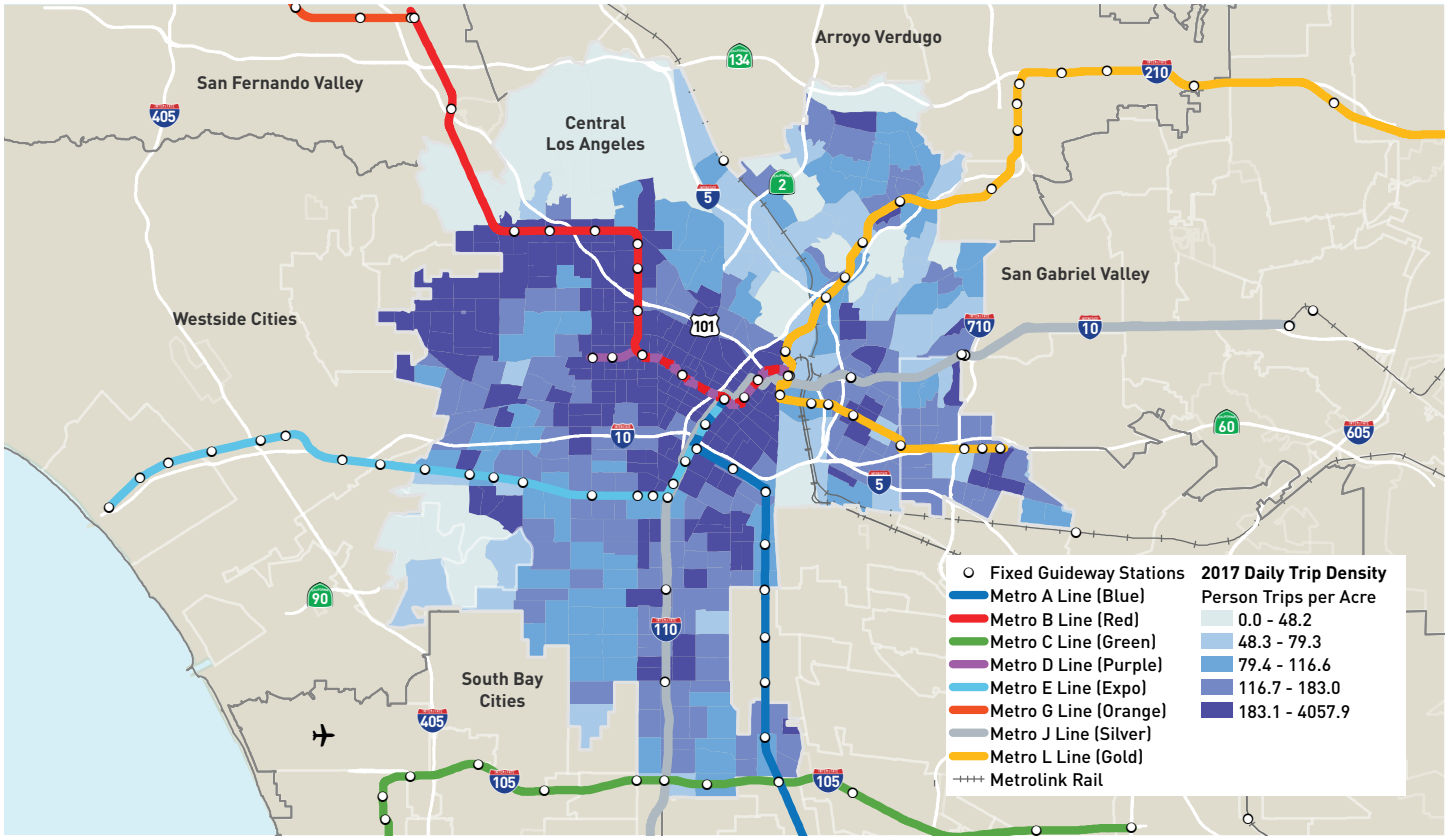


Figure 70

CENTRAL LOS ANGELES EMPLOYMENT DENSITY

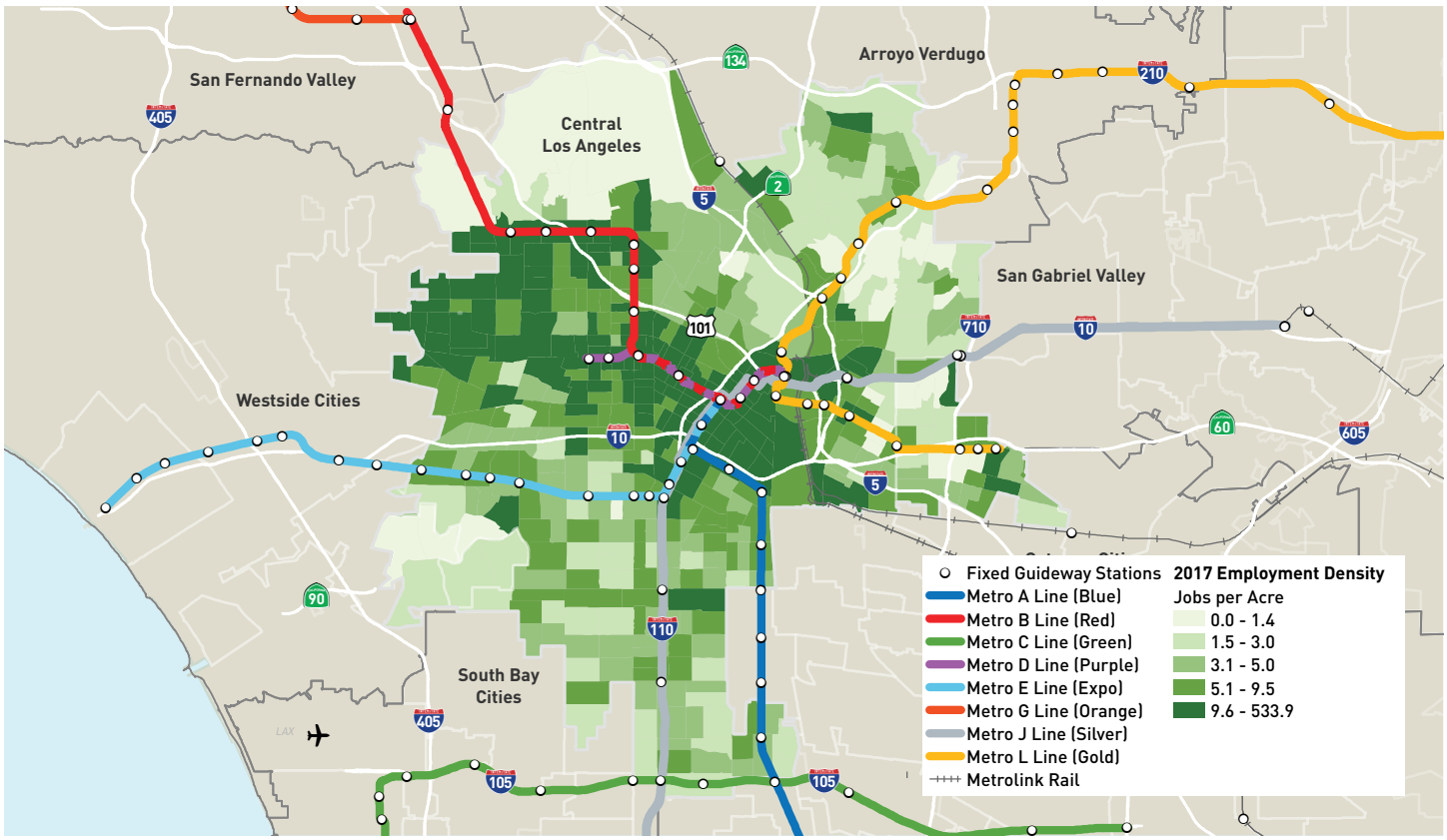


Figure 71

CENTRAL LOS ANGELES POPULATION DENSITY

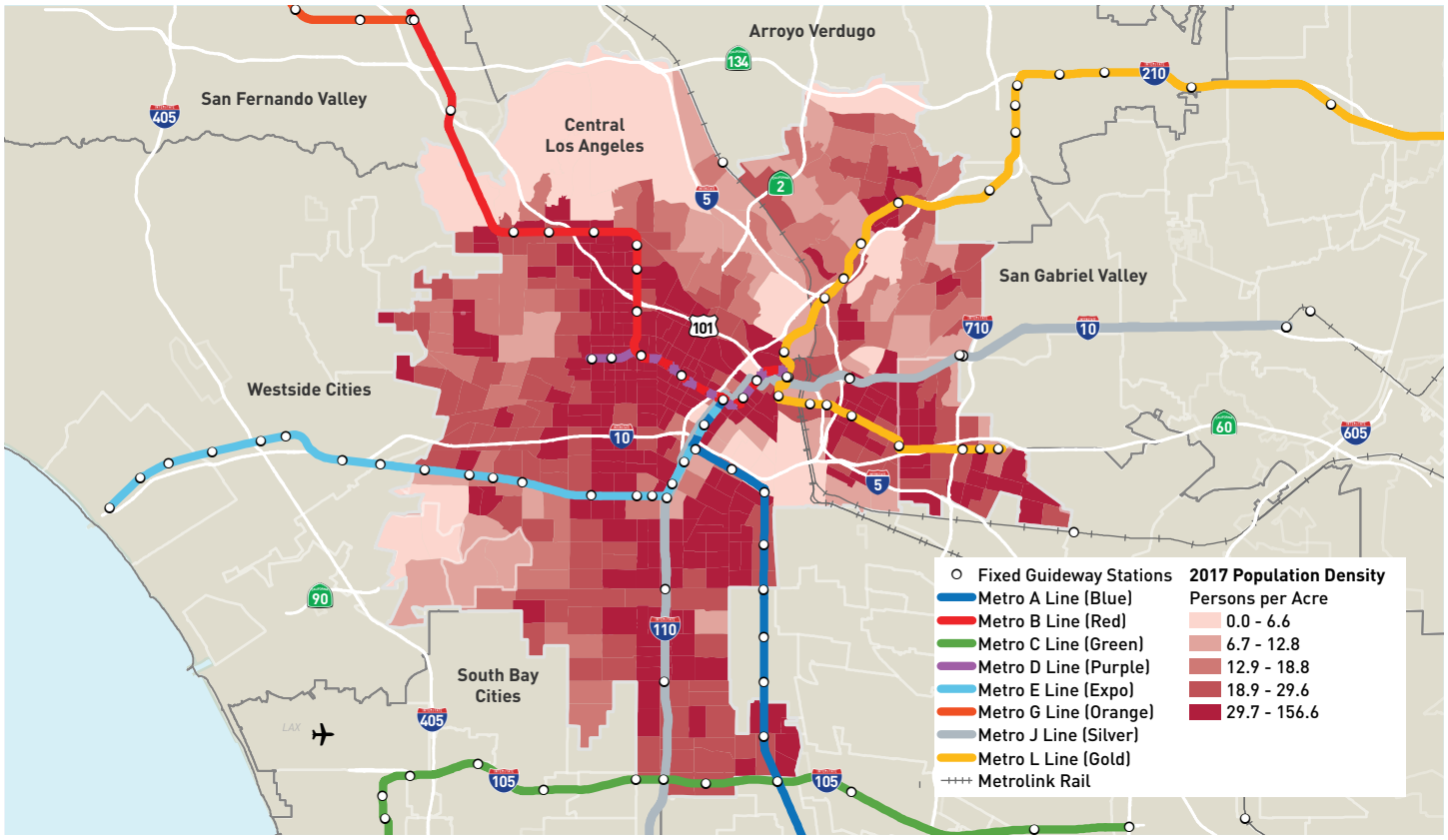


Figure 72

CENTRAL LOS ANGELES LAND USE

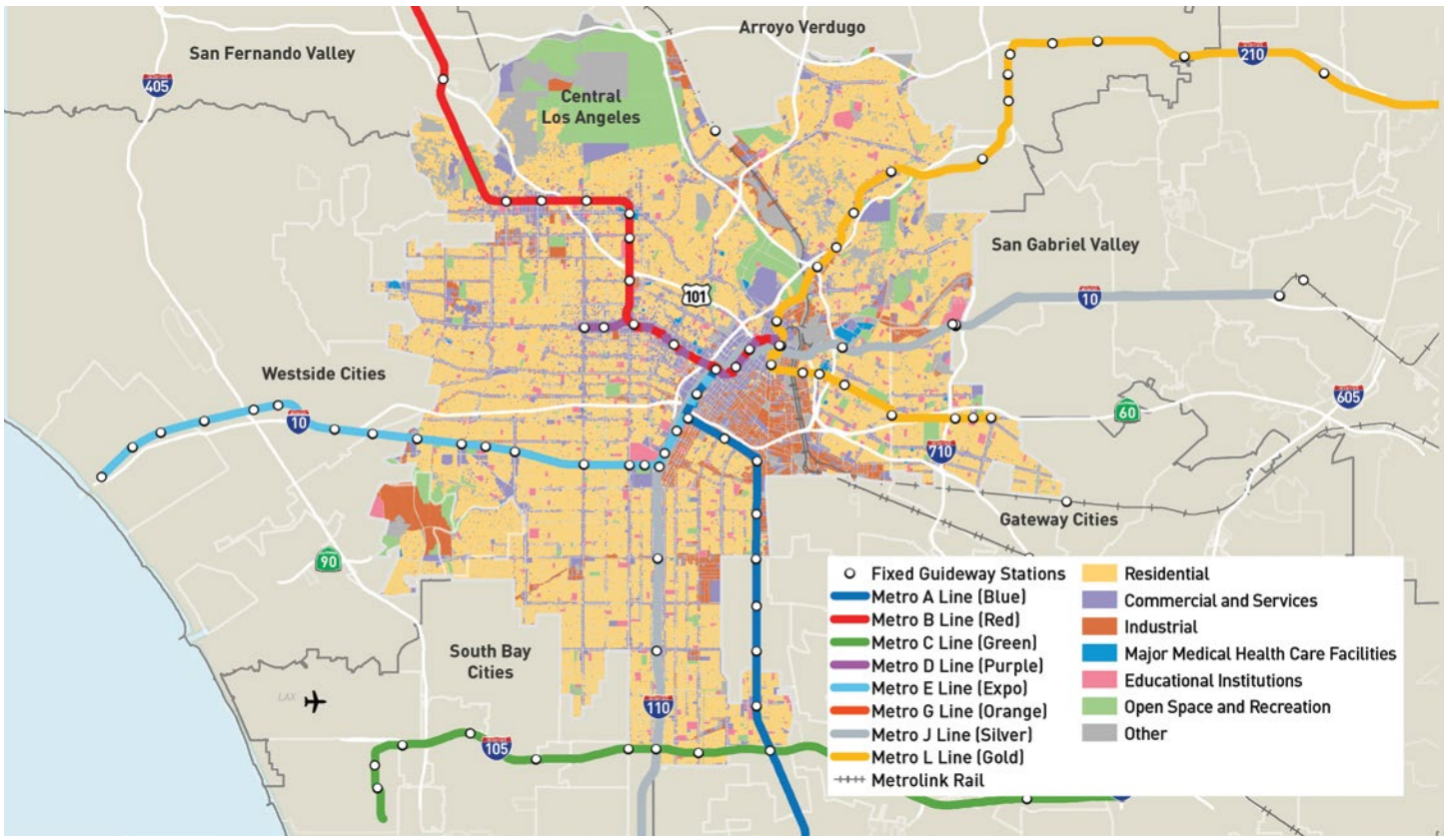
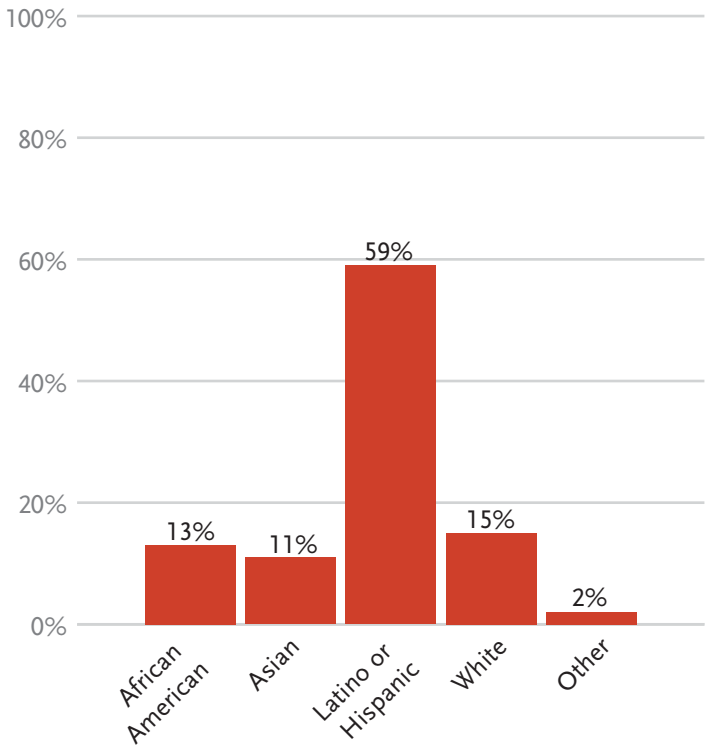


Figure 73

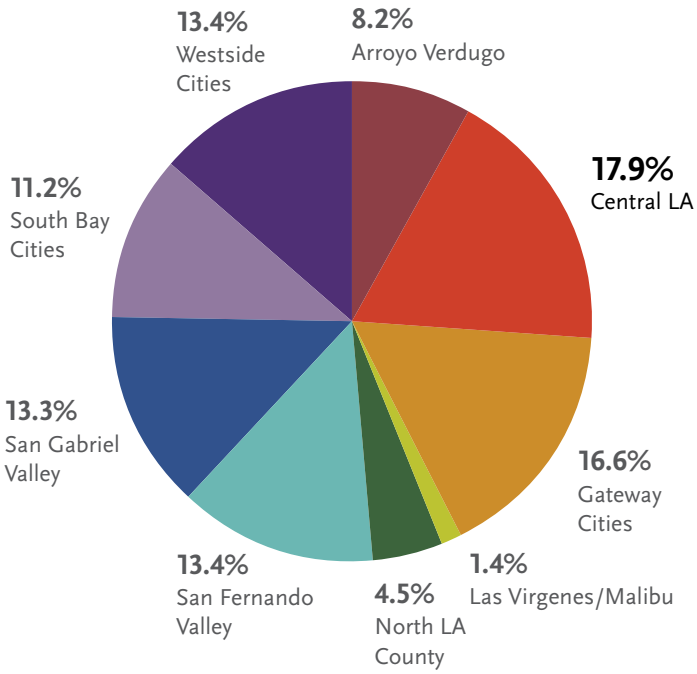
Central Los Angeles Summary Demographics

Total Area 138 Square Miles, Rank 7th (Out of 9 Subregions)

Total Population 1,910,621 People, Rank 2nd



Total Employment 789,312 Jobs, Rank 1st



Median Household Income $45,707 Average MHI, Rank 9th

Gateway Cities

The Gateway Cities Subregion include Artesia, Avalon, Bell, Bell Gardens, Bellflower, Cerritos, Commerce, Compton, Cudahy, Downey, Hawaiian Gardens, Huntington Park, La Habra Heights, La Mirada, Lakewood, Long Beach, Lynwood, Maywood, Montebello, Norwalk, Paramount, Pico Rivera, Santa Fe Springs, Signal Hill, South Gate, Vernon, and Whittier. Gateway Cities also contains the following unincorporated communities of LA County: East Rancho Dominguez, East Whittier, Florence-Graham, Rose Hills, South Whittier, Walnut Park, West Rancho Dominguez, West Whittier-Los Nietos, and Willowbrook (portion).

Major Transportation Facilities

Several major east-west freeway corridors traverse this subregion. These include the Pomona Freeway (SR-60), Artesia Freeway (SR-91), and the Glenn Anderson Freeway (I-105). Santa Ana Freeway (I-5), San Diego Freeway (I-405), Long Beach Freeway (I-710), and San Gabriel River Freeway (I-605) are the major north-south corridors. An airport located in the City of Long Beach serves as a hub of corporate activity. The Port of Long Beach combined with the adjacent Port of Los Angeles constitutes the fifth busiest port in the world and the largest container port in the U.S. The ports are served by the Alameda Corridor, a 20-mile railway designed to speed cargo and containers from the ports to the rest of the country. The ports are also served by the freeway network described above.

The subregion is served by the Metro Blue and Green Light Rail lines as well as the Harbor Transitway running along the I-110. These major transit infrastructure investments help move people to the ports and other employment centers within the subregion.

The subregional bus system consists of Metro Gateway Cities Service Sector, Long Beach Transit, Norwalk Transit, Commerce, and Montebello Municipal Bus lines. In addition, many cities operate transit and dial-a-ride services, such as Cerritos on Wheels (COW) and La Mirada Dial-a-Ride. Metrolink's Orange County Line and the 91-Line provide commuter rail services with stops in Norwalk/Santa Fe Springs and the City of Commerce. Metrolink's Riverside Line provides commuter service with a stop in Montebello/Commerce.

Figure 74

GATEWAY CITIES

Land Use and Demographics

Gateway Cities covers approximately 311 square miles. Roughly 18 percent is designated for commercial/industrial land use and residential land use covers approximately 37 percent. Figure 79 shows the land use of cities within the subregion. The city of Maywood has the highest percentage of residential land use area while Santa Fe Springs and the city of Vernon contain the highest percentage of commercial/industrial areas.

Trip density and population density cluster in the northwest and southwest areas of the subregion as well as areas between I-710 Freeway and Metro Blue Line. Population densities are dispersed sporadically throughout the region, oftentimes surrounded by high employment density. Bellflower, Downey, Norwalk, Lynwood, Maywood, and Long Beach all have high population density. The city of Vernon has the highest employment density in this subregion. City of Commerce and Santa Fe Springs also have high employment densities with a high percentage of commercial/industrial land use.

Gateway Cities form the southeastern boundary of LA County. This subregion has an approximate resident population of 2 million people within 26 cities and unincorporated areas. Long Beach covers the largest area, ranks 7th in population density, and 5th in employment density within the subregion. Hawaiian Gardens is the smallest city in the subregion, ranking 8th in population density, and 17th in employment density. The subregion also contains industrial-oriented cities, such as Vernon and Commerce; traditional residential suburbs, such as La Habra Heights; and a broad spectrum of balanced communities that fall between. Hospitals in the subregion include Kaiser Permanente Downey and Veteran Affairs Long Beach.

Gateway Cities is the third largest subregion in the County by area, ranks first in total population, second in total employment, and second in total daily trips. The subregion is predominately Hispanic or Latino and has the second lowest average median household income of all the subregions. The region also includes Catalina Island, a sparsely populated destination for tourists and visitors. Universities include Cal State Long Beach.

Major Projects and Programs

In the coming years the Gateway Cities will see initial investment in several major transit projects and new ExpressLanes on I-105. In addition to the West Santa Ana Transit Corridor, the L line (Gold) and the C line (Green) have planned extensions. Investment to address I-605 "Hot Spots" improvements is the major subregional program.

Figure 75

Gateway Cities Projects and Multi-year Subregional Programs

CATEGORIES	DESCRIPTION
Major Projects (YOE $)	West Santa Ana Branch Transit Corridor, $1.25 B (2028) and $5.06 B (2041), ($6.31 B total cost)
	Eastside Extension Phase 2 Transit Corridor (1st alignment) $4.41 B (2035)
	I-170 South Corridor Project phase 1, $5.7 B(2032) and phase 2, $1.51 B (2041)
	I-5 Corridor Improvements (I-605 to I-710) $ 2.04 B (2042)
	C Line (Green) Eastern Extension (Norwalk) $1.89 B (2052)
	I-105 ExpressLanes from I-405 to I-605 $530 M (2027)
Multi-year Subregional Programs (in 2015 $)	Active transportation Program (Start Date FY 2018)
	I-605 Corridor "Hot Spots" Interchange Improvements $1 B ($1.2 B total cost) (Start Date FY 2018)

Source: *https://theplan.metro.net/wp-content/uploads/2016/09/FactSheet_Gateway.pdf*

Figure 76

GATEWAY CITIES DAILY TRIPS

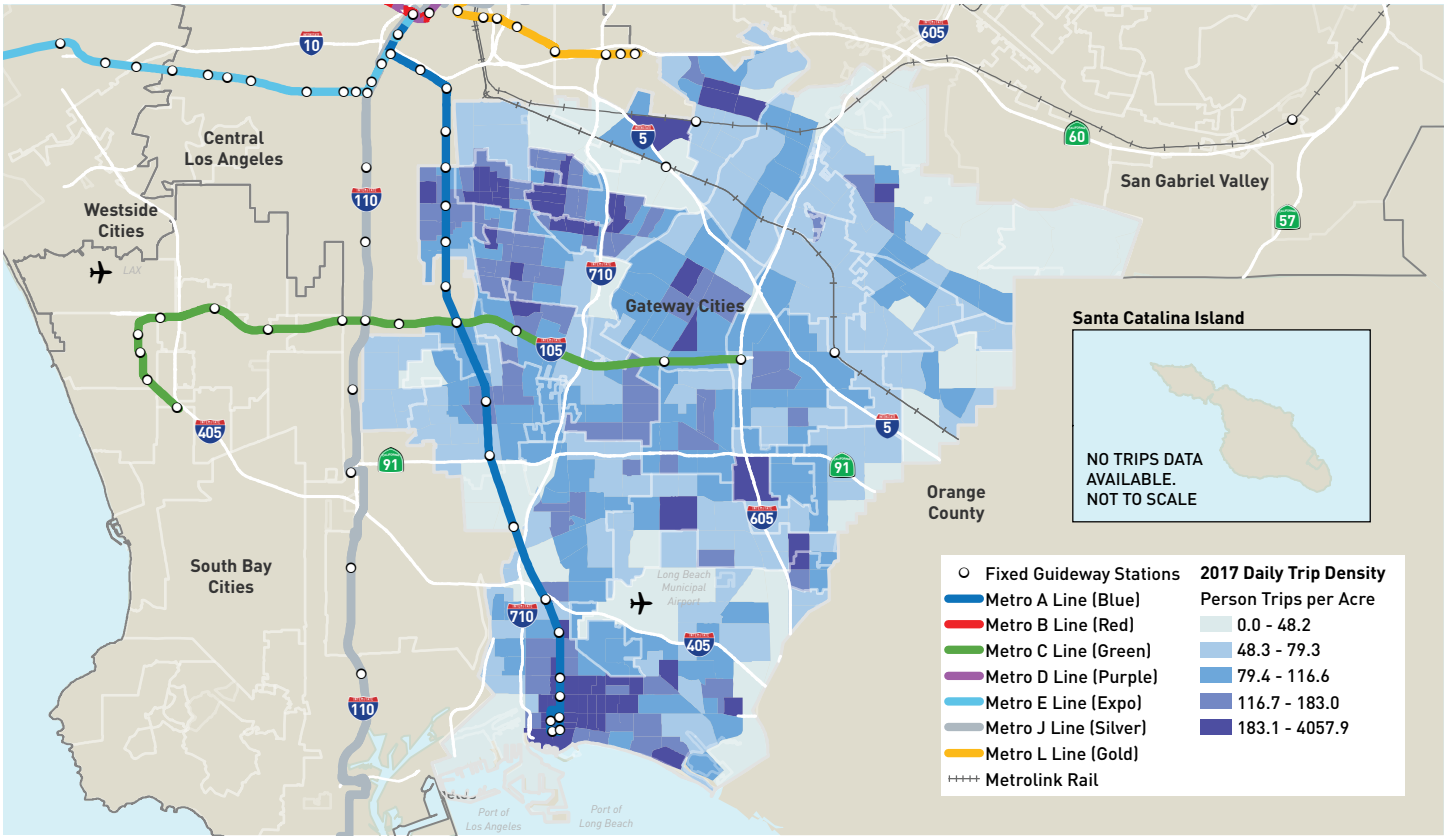


Figure 77

GATEWAY CITIES EMPLOYMENT DENSITY

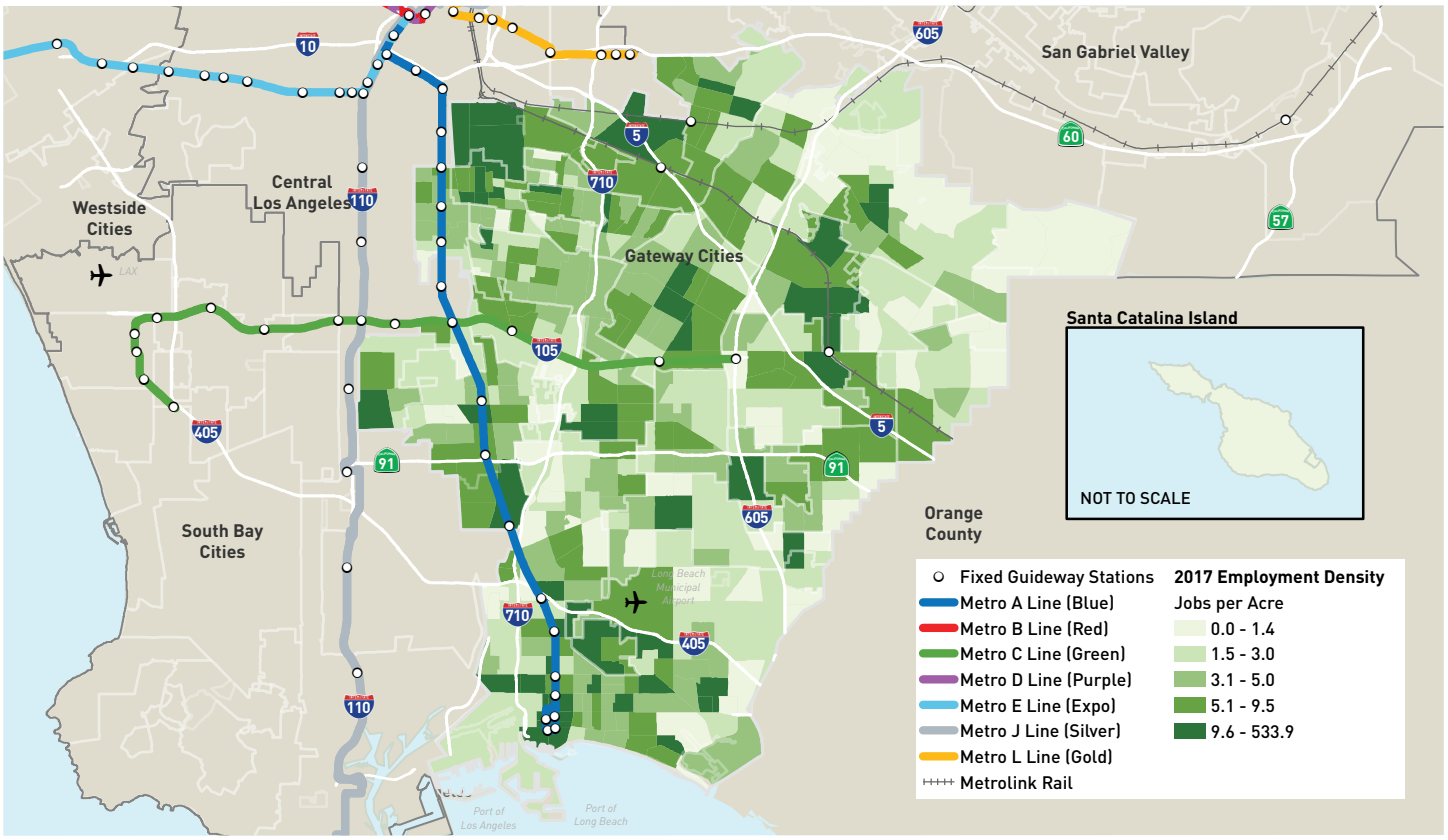


Figure 78

GATEWAY CITIES POPULATION DENSITY

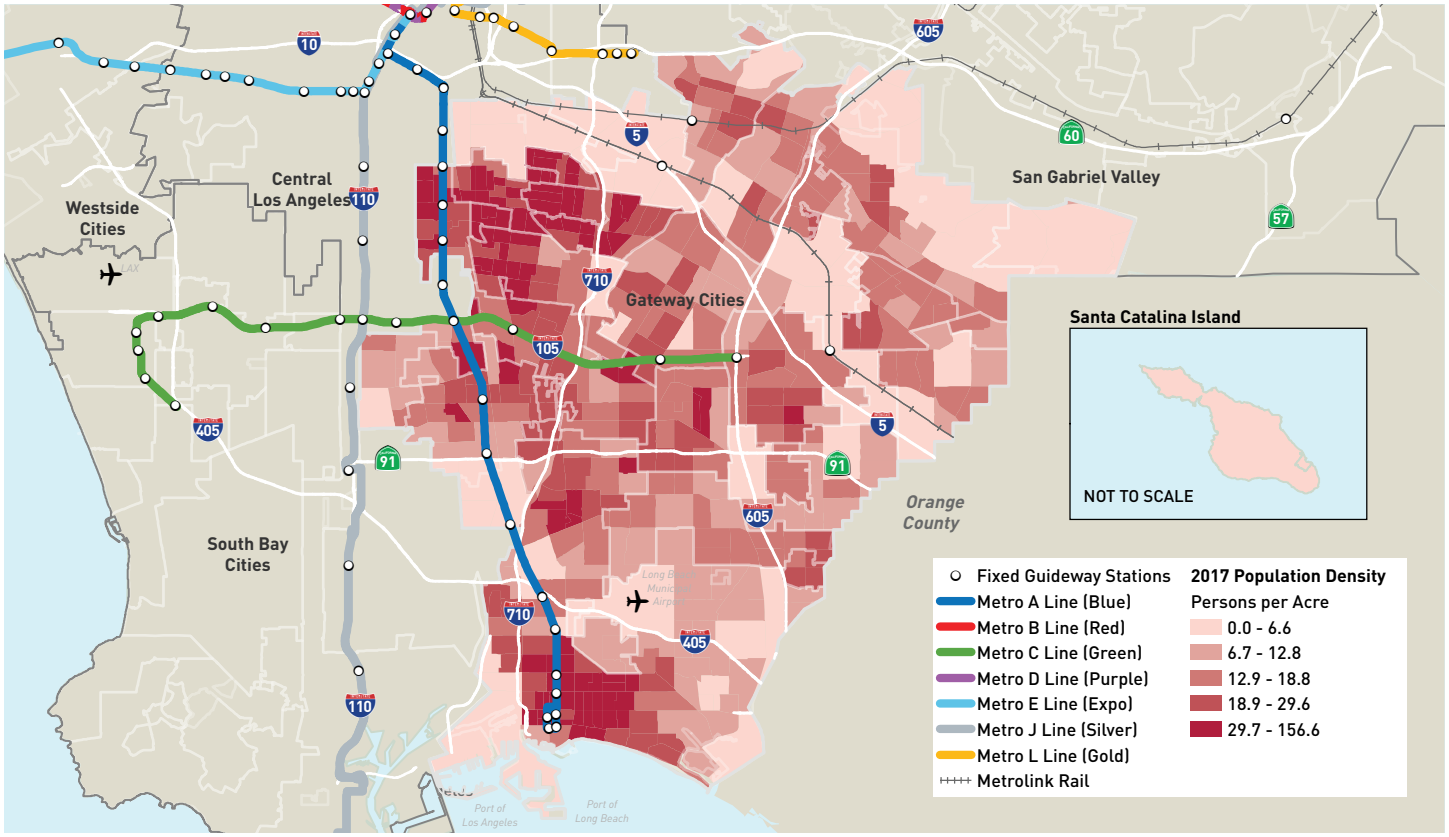


Figure 79

GATEWAY CITIES LAND USE

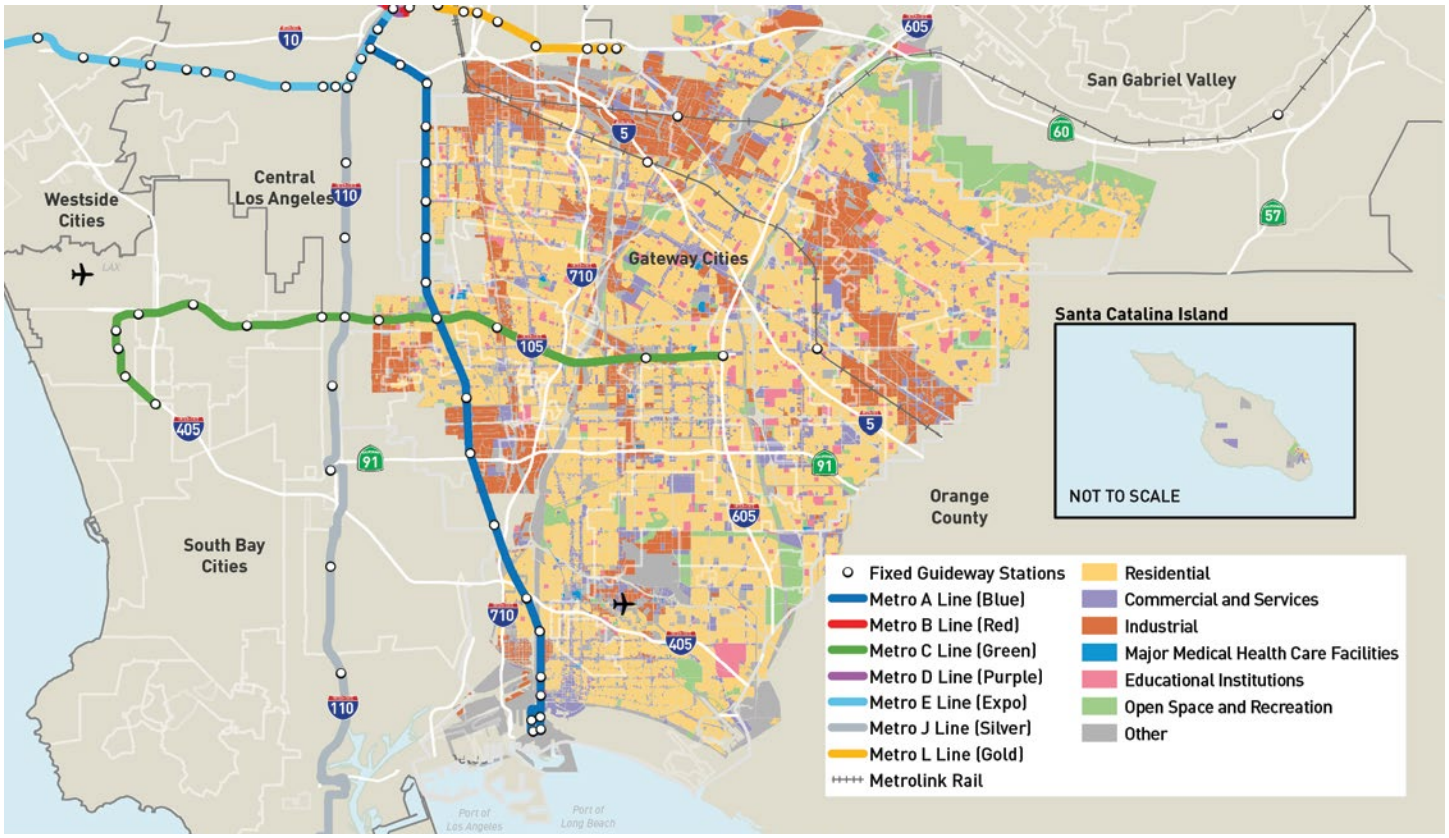
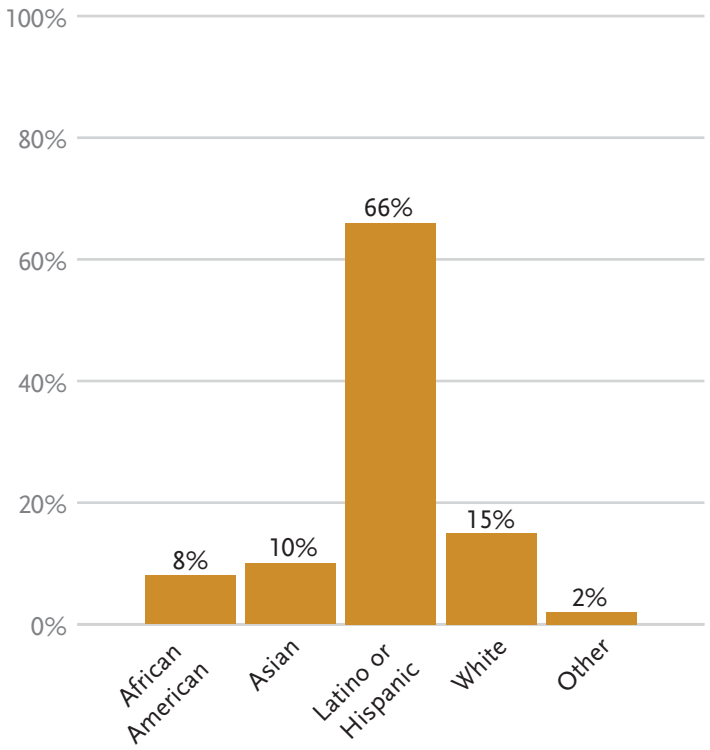


Figure 80

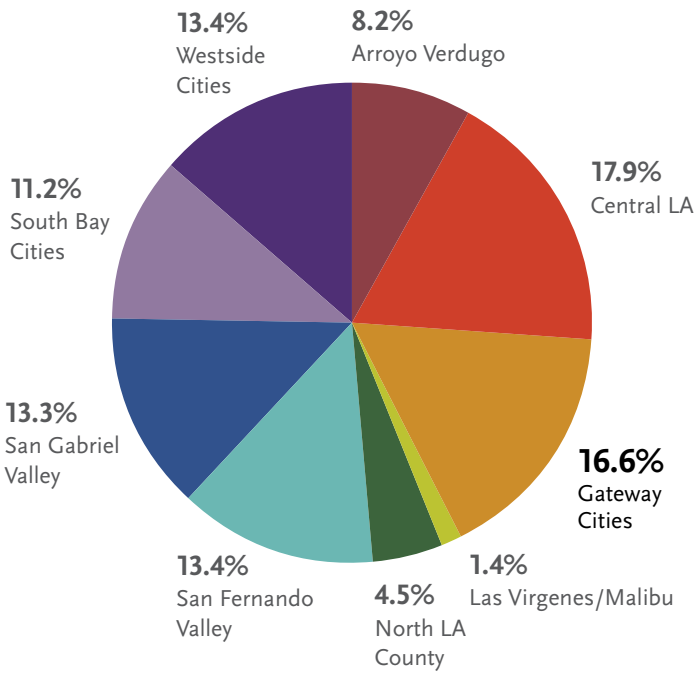
Gateway Cities Summary Demographics

Total Area 235 Square Miles, Rank 4th (Out of 9 Subregions)

Total Population 1,979,441 People, Rank 1st



Total Employment 735,342 Jobs, Rank 2nd



Median Household Income $55,533 Average MHI, Rank 8th

Las Virgenes/ Malibu

The Las Virgenes/Malibu subregion occupies the westernmost portion of LA County and includes Agoura Hills, Calabasas, Hidden Hills, Malibu and Westlake Village, and parts of unincorporated LA County.

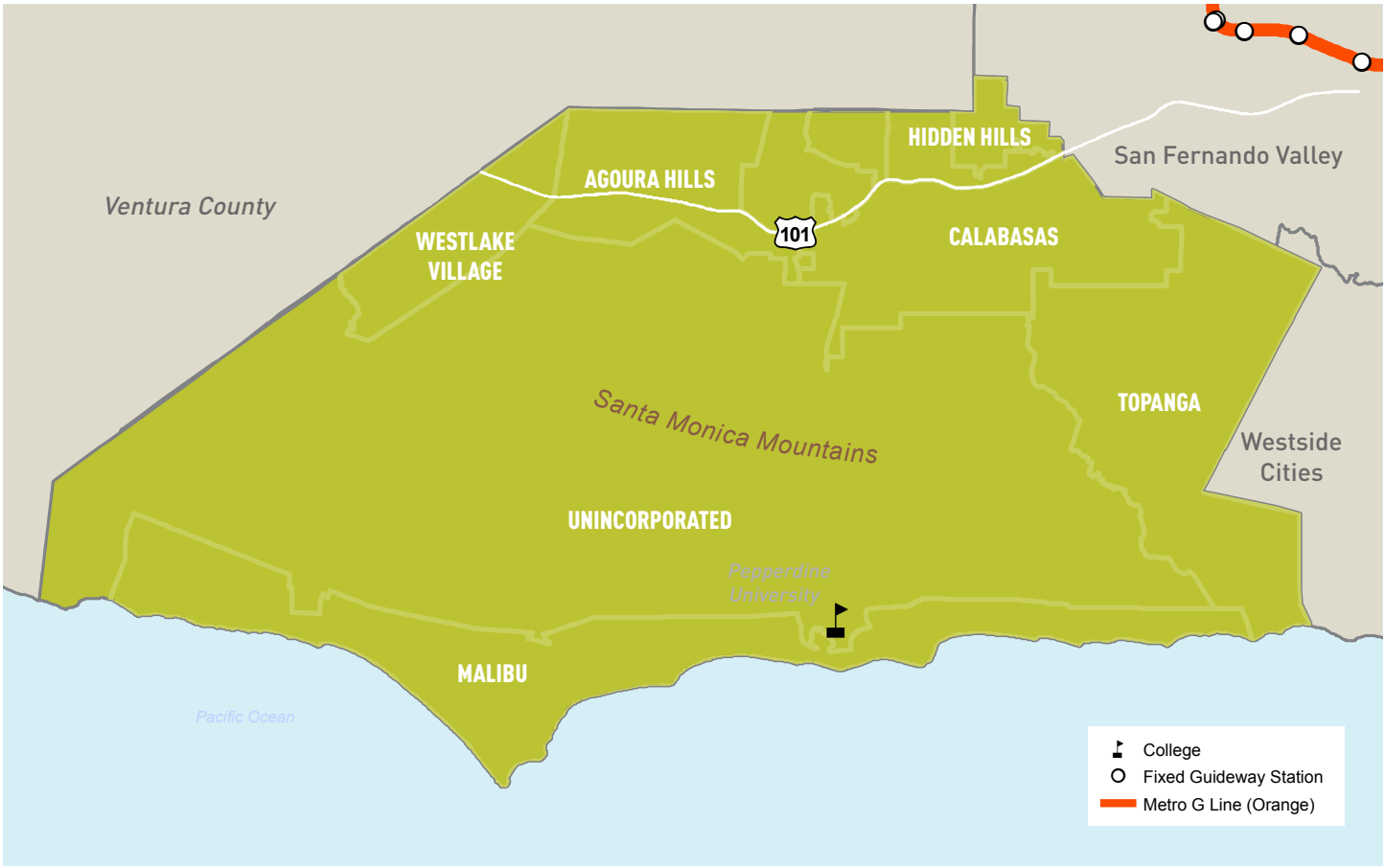
Major Transportation Facilities

The US-101 is the subregion's dominant transportation corridor, around which most commercial/research park development and employment opportunities have clustered. This generally low-density area has a limited network of arterial roadways, of which Pacific Coast Highway (SR-1) is the most heavily traveled. A series of north-south arterials connect the two highways, which include SR-23, Kanan Dume/Kanan, Las Virgenes/Malibu Canyon Rd, and Topanga Canyon Bl (SR-27). Regional bus service is provided by Metro and LADOT. Calabasas runs a community shuttle while the other cities in the subregion operate dial-a-ride services. There is currently no rail service in the subregion.

The transportation system in the Las Virgenes/Malibu subregion has substantial capacity problems. As home to some of the nation's most-visited beaches and recreational sites, severe weekend and summertime traffic are frequent occurrences. Weekday traffic volumes have also grown as development and employment opportunities have extended into Ventura County. The reliance on two primary routes presents substantial challenges to this area and yields traffic delays, disruptions and unreliable service levels. Due to the region's topography, size, modest roadway network, and limited transportation alternatives, congestion has become commonplace. Bus service does not traverse the mountains in a north-south direction. This significantly reduces access to employment opportunities by day workers and access to Pepperdine University by students traveling from other areas of the region.

Figure 81

LAS VIRGENES/MALIBU



Land Use and Demographics

The area's most prominent feature is the strikingly rugged Santa Monica Mountains, which divide this subregion. The Las Virgenes cities occupy the north-facing foothills and valleys adjacent to the Santa Monica Mountains State Park and National Recreation Area, and the city of Malibu sits in the south stretching 21 miles along the Pacific coast. The coastline is home to world-class beaches and surf breaks, which include Topanga Beach, Surfrider Beach, and Zuma Beach. Overlooking the Pacific Ocean is Pepperdine University, one of the nation's top business and law schools.

Roughly two percent of the subregion is designated for commercial/industrial land use and residential land use covers approximately 15 percent. The largest area in the subregion is unincorporated and used for recreation/state parks. The Santa Monica Mountain Range extends east-west for roughly 40 miles, paralleling the north shore of Santa Monica Bay. Figure 86 shows the variety of land use for communities within the subregion. The City of Hidden Hills has the highest percentage of residential land use at 85 percent, but is also the smallest city in the subregion. It is followed by Malibu with 37 percent residential land use, and the largest city in the subregion.

Population and employment density in the subregion is relatively low. The higher concentrations of employment density are in the immediate area surrounding the US-101 where there is commercial and industrial land use. This subregion covers 162 square miles and is home to five cities and unincorporated areas. The subregion has the lowest total population, lowest total employment, and lowest total daily trips. The area is predominately non-Hispanic Whites and has the highest average median household income of all the subregions.

Major Projects and Programs

The subregion does not have any major planned projects. Highway efficiency is the region's subregional program with the largest amount of funding.

Figure 82

Las Virgenes/Malibu Projects and Multi-year Subregional Programs

CATEGORIES	DESCRIPTION
Major Projects (YOE $)	N/A
Multi-year Subregional Programs (in 2015 $)	Active Transportation, Transit and Technology Program $32 M (Start Date FY 2018) Highway Efficiency Program $133 M (Start Date FY 2018) Modal Connectivity Program $68 M (Start Date FY 2048) Traffic Congestion Relief and Improvement Program $63 M (Start Date FY 2048)

Source: *https://theplan.metro.net/wp-content/uploads/2016/09/FactSheet_Malibu.pdf*

Figure 83

LAS VIRGENES/MALIBU DAILY TRIPS

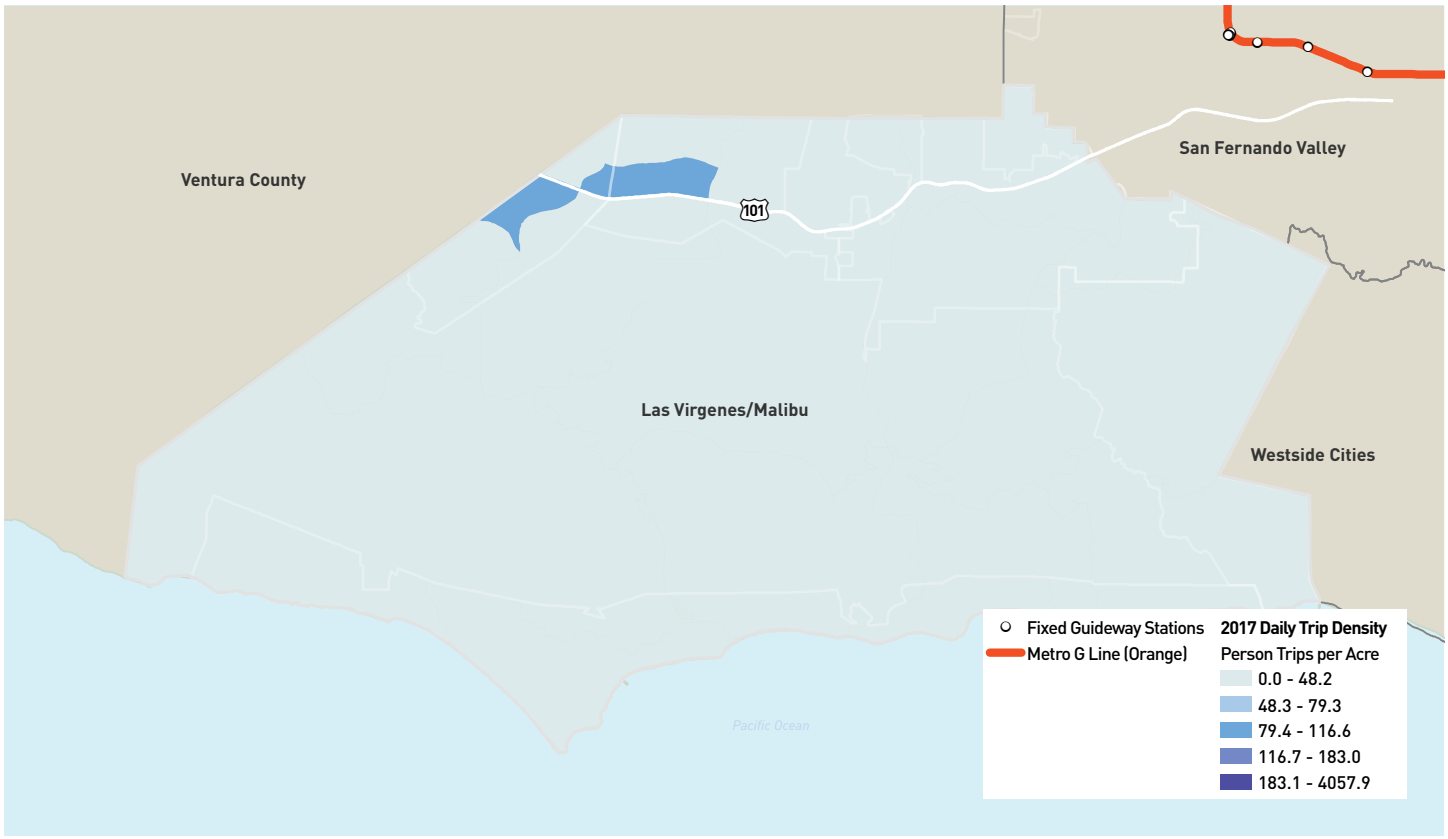


Figure 84

LAS VIRGENES/MALIBU EMPLOYMENT DENSITY

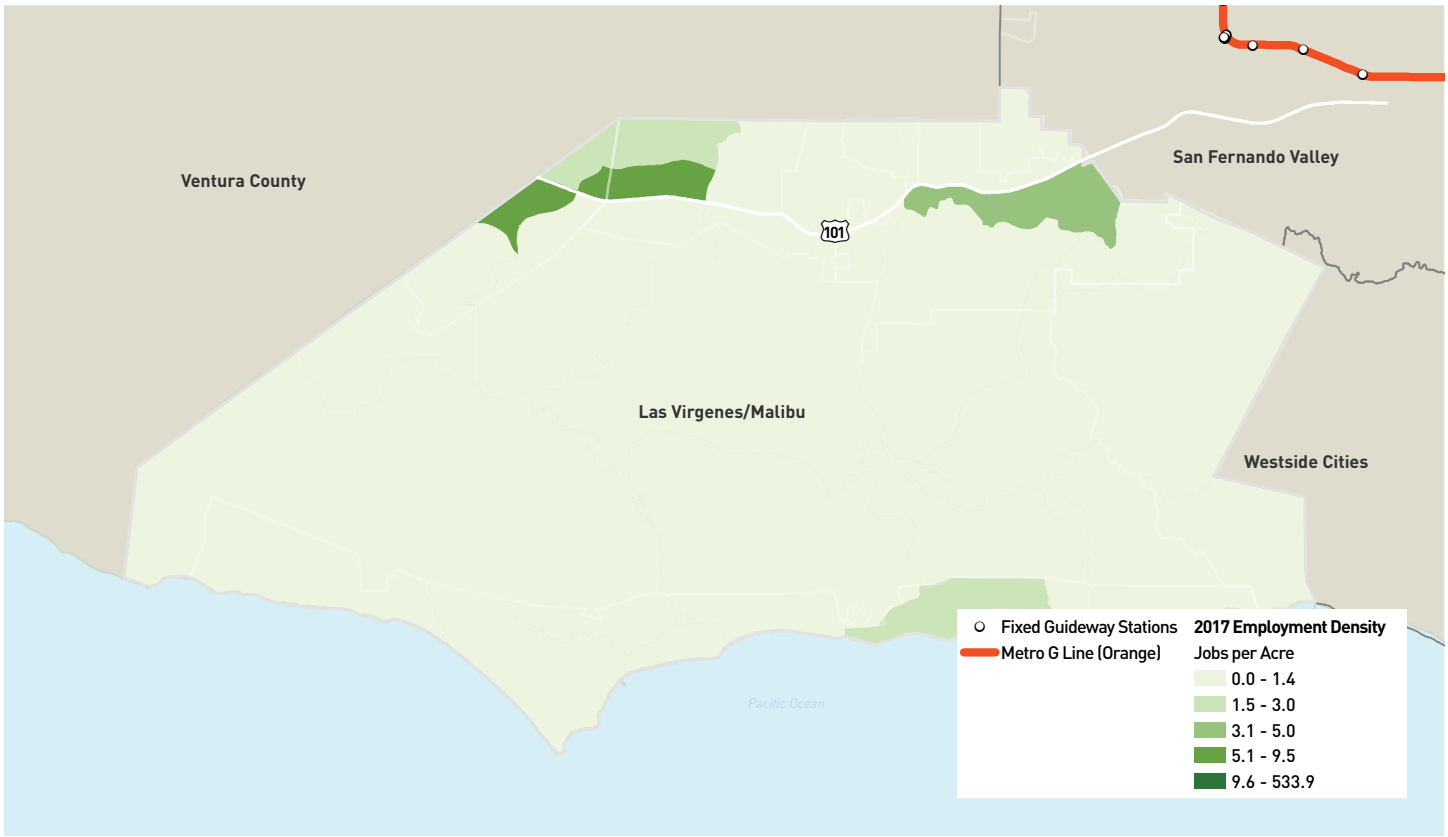


Figure 85

LAS VIRGENES/MALIBU POPULATION DENSITY

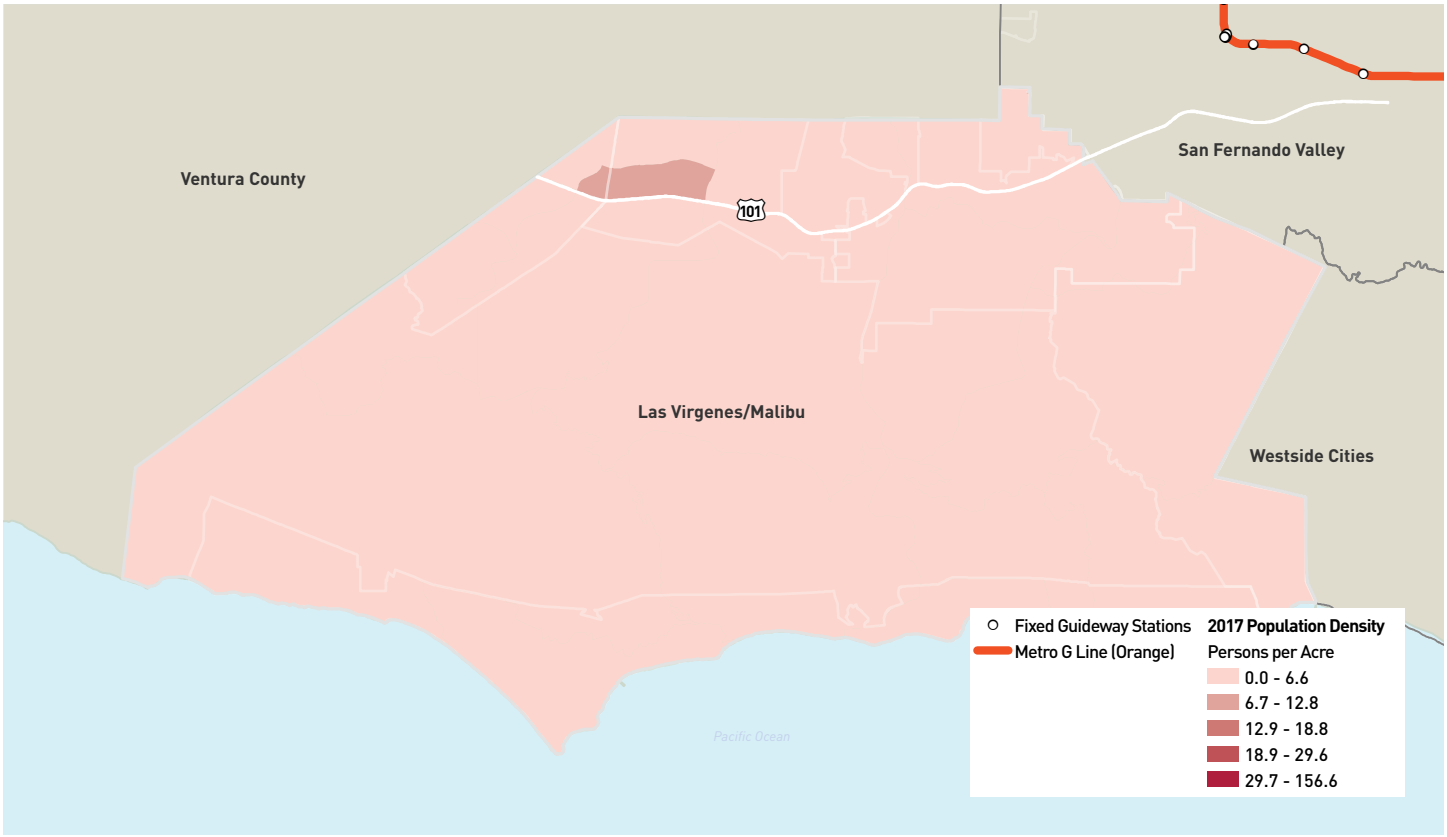


Figure 86

LAS VIRGENES/MALIBU LAND USE

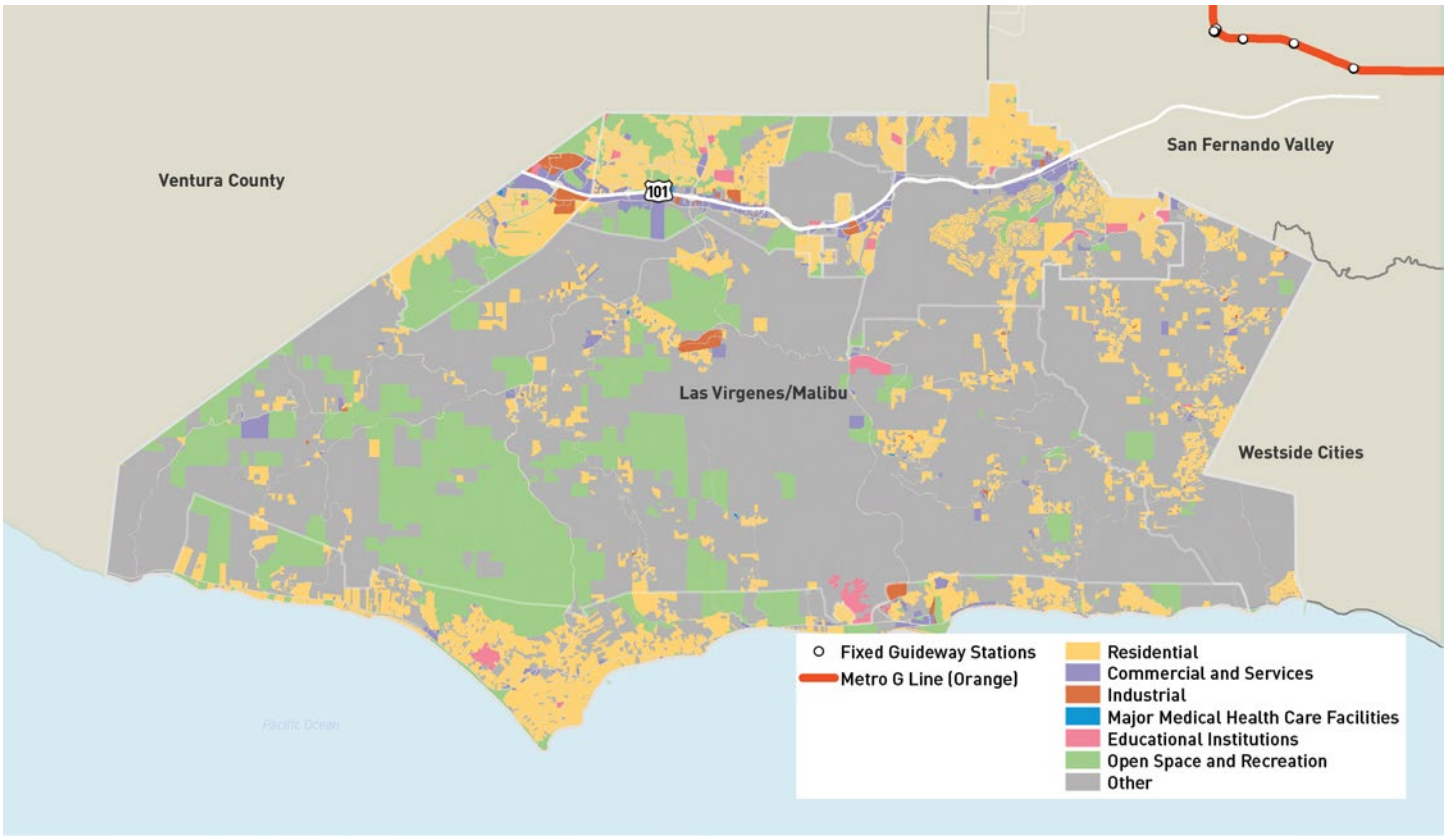
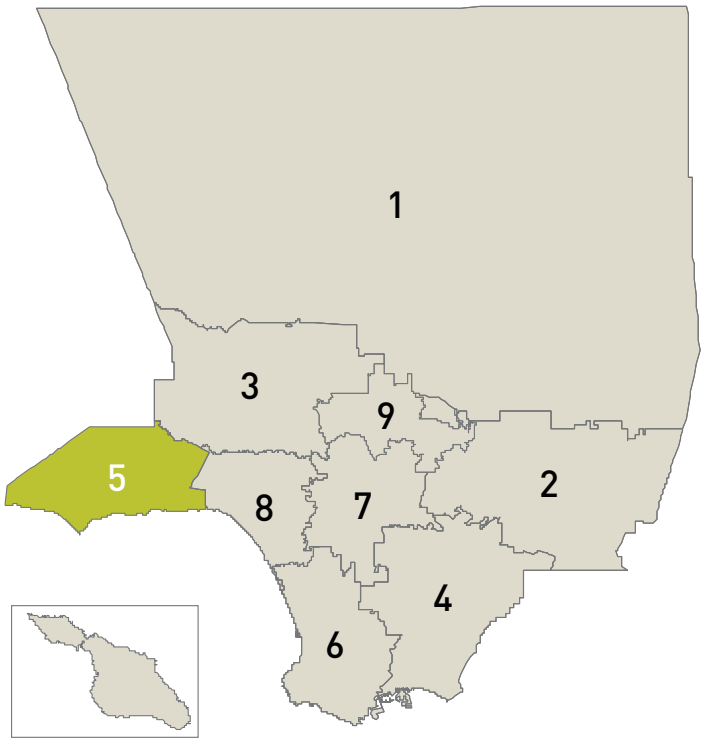


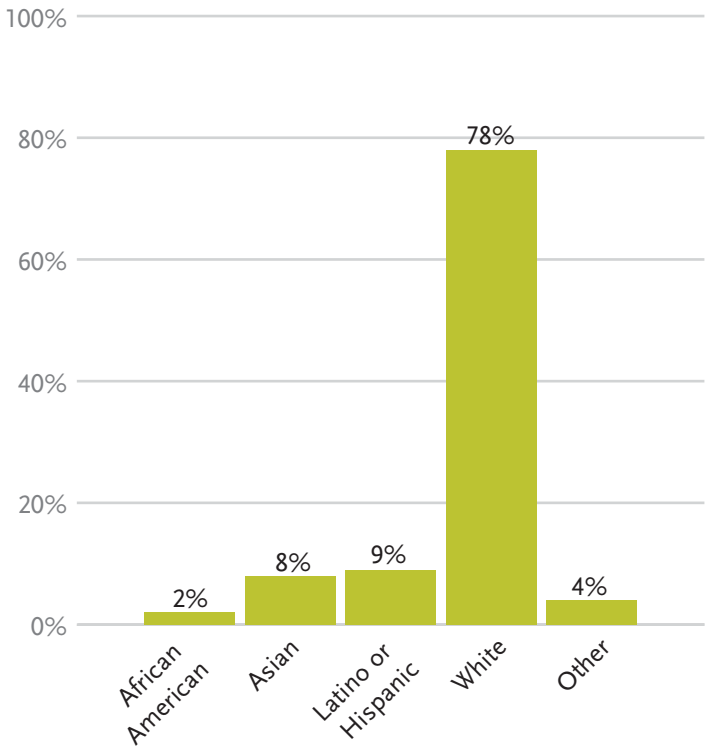
Figure 87

Las Virgenes/Malibu Summary Demographics

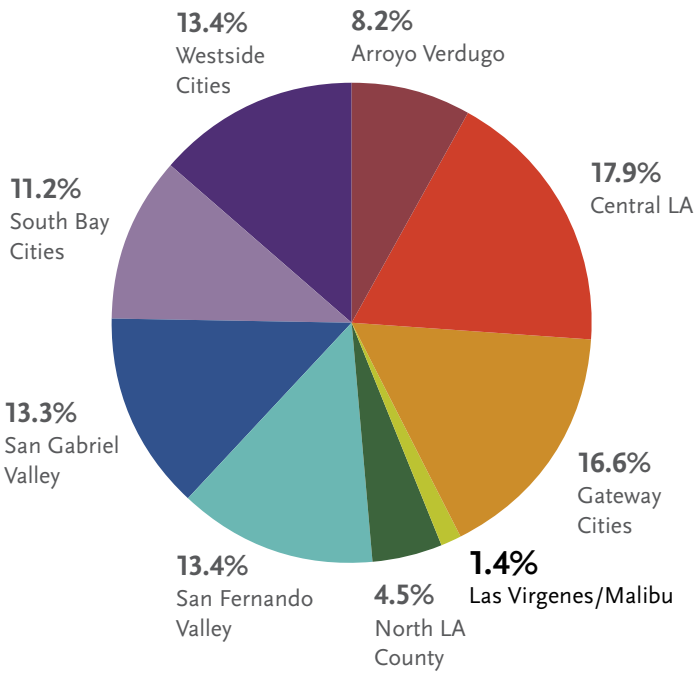
Total Area 162 Square Miles, Rank 5th (Out of 9 Subregions)



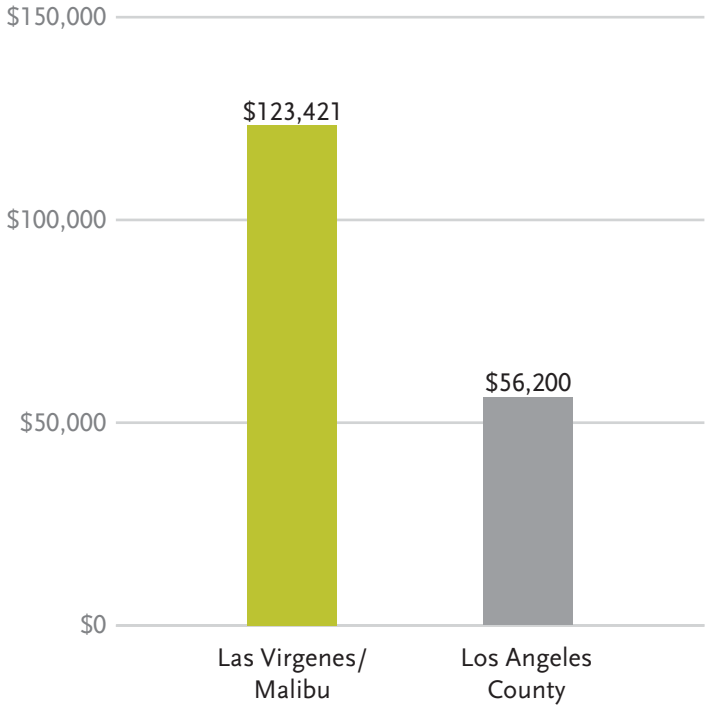
Total Population 84,282 People, Rank 9th



Total Employment 61,743 Jobs, Rank 9th



Median Household Income $123,421 Average MHI, Rank 1st



North Los Angeles County

North Los Angeles County includes Lancaster, Palmdale, and Santa Clarita. North Los Angeles County subregion also encompasses the following unincorporated communities: Acton, Agua Dulce, Castaic, Desert View Highlands, Elizabeth Lake, Green Valley, Hasley Canyon, Lake Hughes, Lake Los Angeles, Leona Valley, Littlerock, Quartz Hill, Stevenson Ranch, Sun Village, and Val Verde.

Major Transportation Facilities

Area freeways include the Golden State Freeway (I-5) and the Antelope Valley Freeway (SR-14). State Route SR-126 and SR-138 also impact the region. Metrolink operates commuter rail services with stations located in the cities of Lancaster, Palmdale, Santa Clarita, and in unincorporated areas of LA County.

Land Use and Demographics

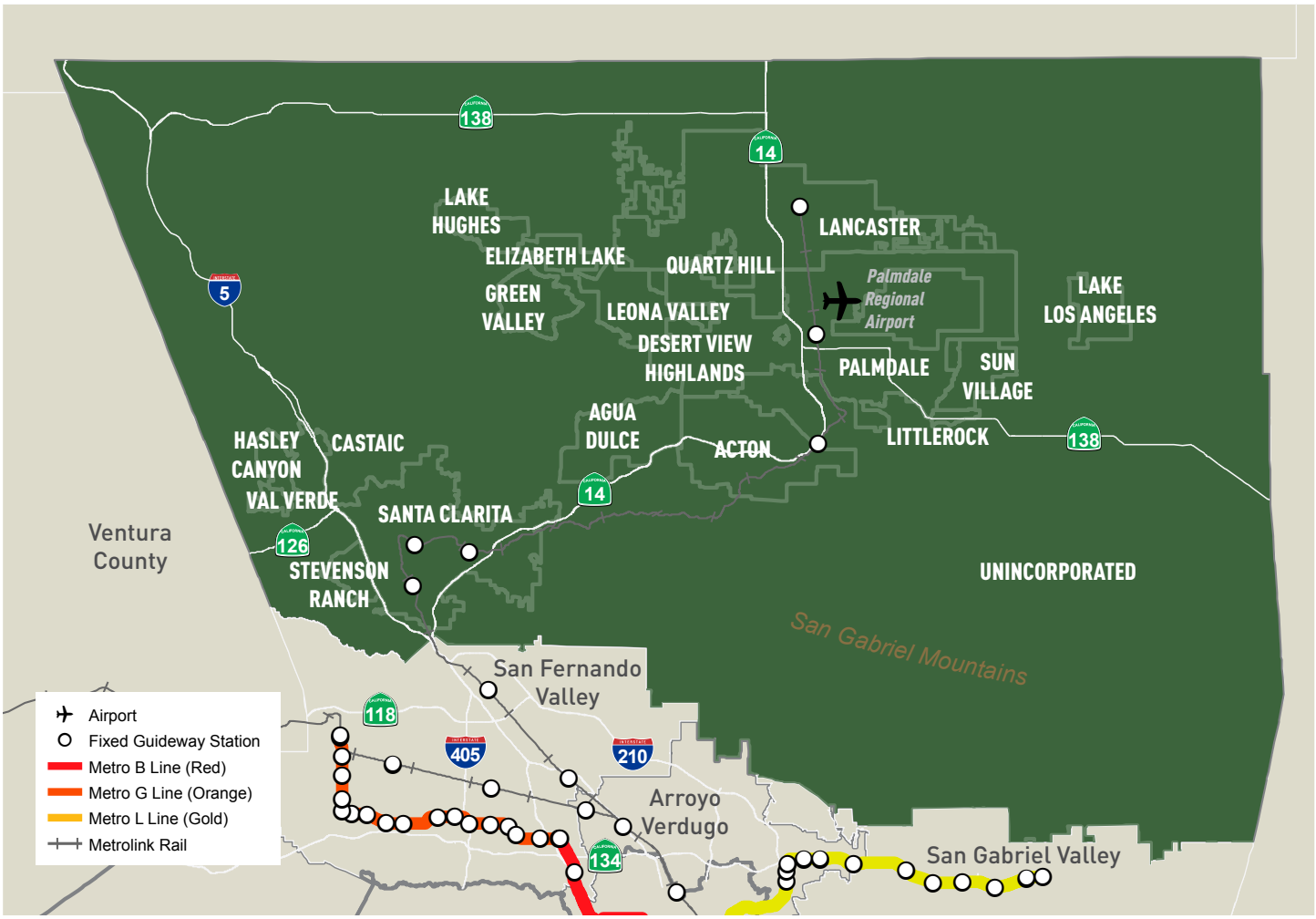
Roughly one percent of the subregion is designated for commercial/industrial land use and residential land use covers approximately four percent. Desert View Highlands is the smallest community in the subregion but has the highest population, employment, and daily trip densities. Palmdale is the largest city, followed by Lancaster, and Santa Clarita. The City of Santa Clarita has the 2nd highest densities in the subregion.

The North Los Angeles County subregion comprises the LA County area north of the San Fernando Valley. This subregion covers 2,479 square miles and includes three cities and unincorporated LA County. There are various unique characters in the landscape; as shown in Figure 93, the majority of the area is designated as desert/forest. The subregion is bounded to the south by the San Gabriel mountain range and Angeles National Forest, north-east by the Mojave Desert, and west by the Santa Susana mountain range. Snow is common in the mountain ranges over 4,000 feet. The subregion is home to the Henry Mayo Newhall Hospital as well as the California Institute of the Arts.

The subregion is the largest in the County by area, ranks 6th in total population, 8th in total employment, 8th in total daily trips, and 3rd in average median household income. The subregion has a high percentage of non-Hispanic Whites and Latino or Hispanic population.

Figure 88

NORTH LOS ANGELES COUNTY



Major Projects and Programs

North Los Angeles County will see two large projects including I-5 capacity enhancements and the High Desert Multi Purpose Corridor extending east-west across the region. The major subregional programs by dollar amount include the arterial and transit programs.

Figure 89

North Los Angeles County Projects and Multi-year Subregional Programs

CATEGORIES	DESCRIPTION
Major Projects (YOE $)	I-5 North Capacity Enhancements (SR-14 to Lake Hughes Rd) $679 M (2026)
	Antelope Valley Line Capacity and Infrastructure Improvement Program $221 M (2028)
	High Desert Multi-Purpose Corridor (HDMC) $393 M (2034)
Multi-year Subregional Programs (in 2015 $)	Active Transportation Program $264 M (Start Date FY 2018)
	Transit Program $88 million ($588 M total cost) (Start Date FY 2018)
	Multimodal Connectivity Program $239 M (Start Date FY 2033)
	Arterial Program $726.1 M (Start Date FY 2048)
	Goods Movement Program $104 M (Start Date FY 2048)
	Highway Efficiency Program $128.9 M (Start Date FY 2048)

Source: *https://theplan.metro.net/wp-content/uploads/2016/09/FactSheet_North_County.pdf*

Figure 90

NORTH LOS ANGELES COUNTY DAILY TRIPS

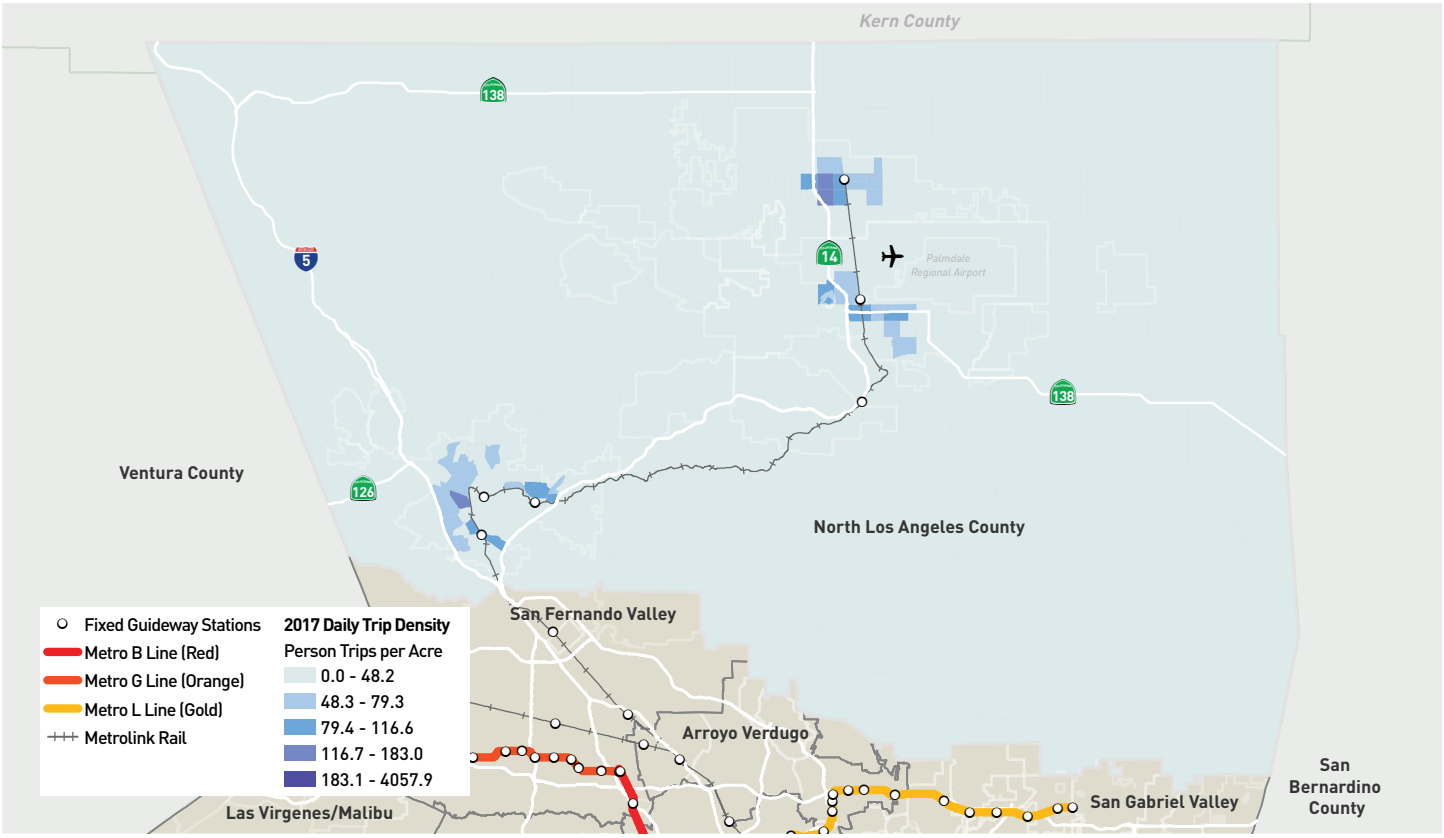


Figure 91

NORTH LOS ANGELES COUNTY EMPLOYMENT DENSITY

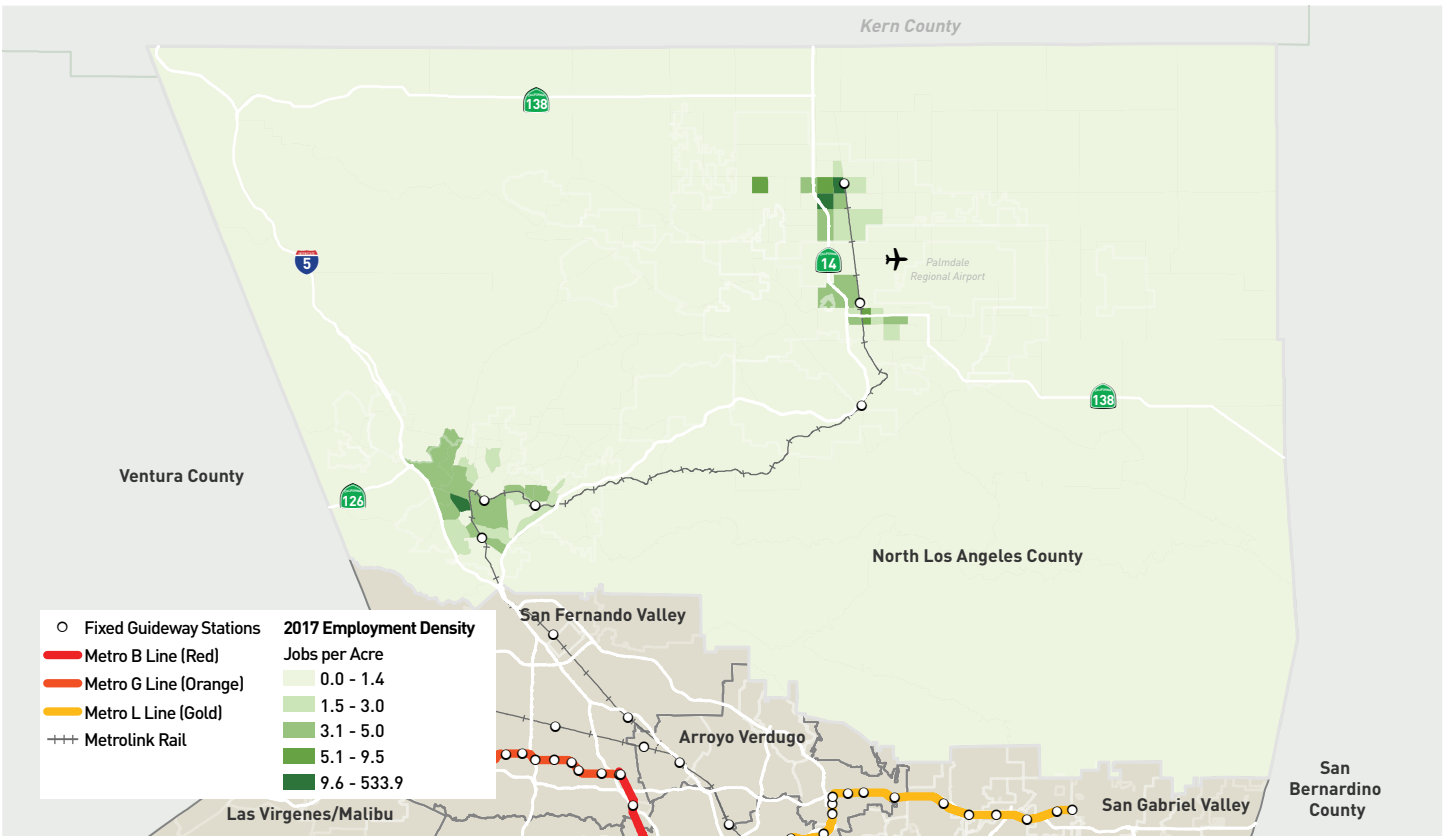


Figure 92

NORTH LOS ANGELES COUNTY POPULATION DENSITY

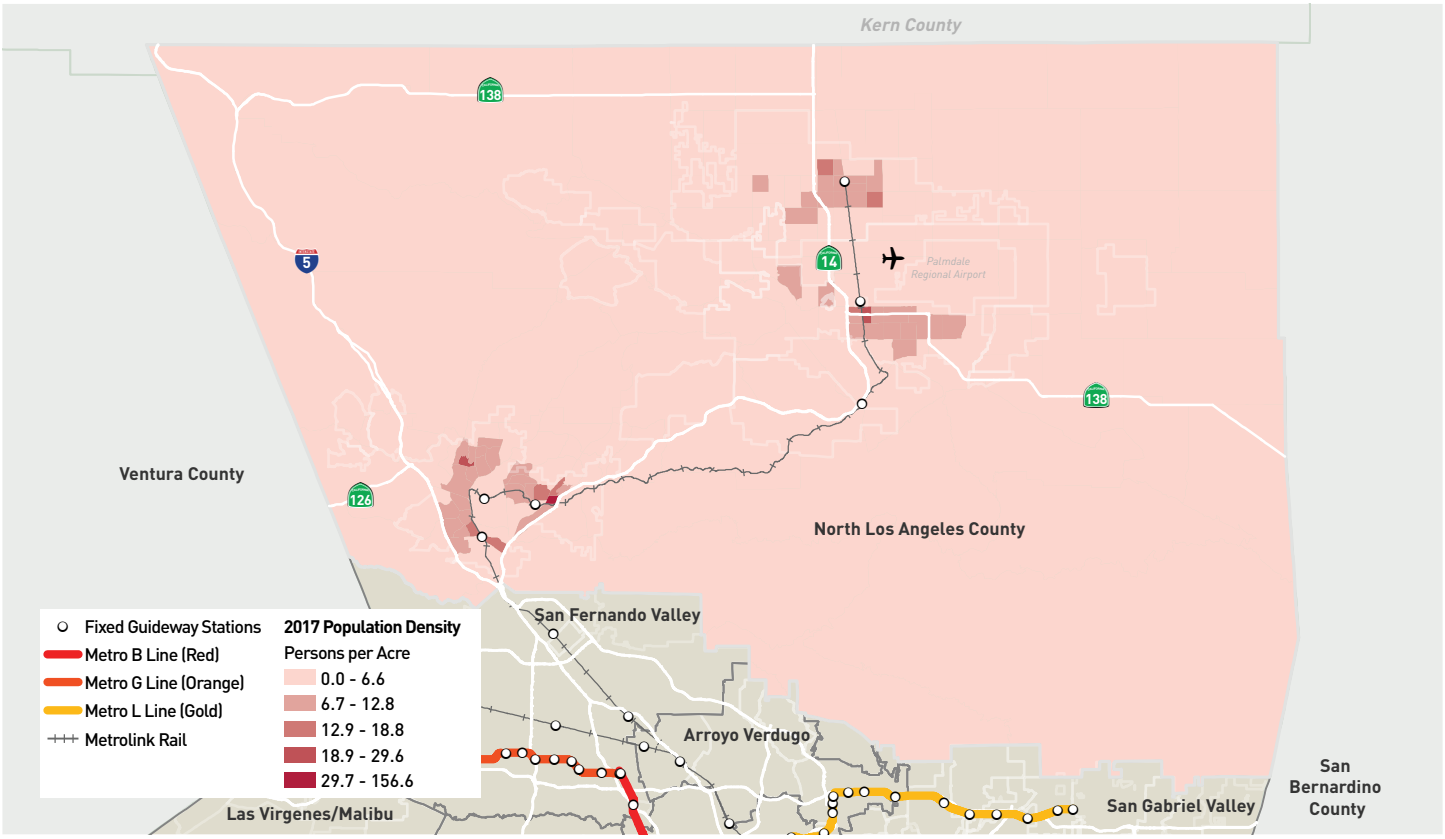


Figure 93

NORTH LOS ANGELES COUNTY LAND USE

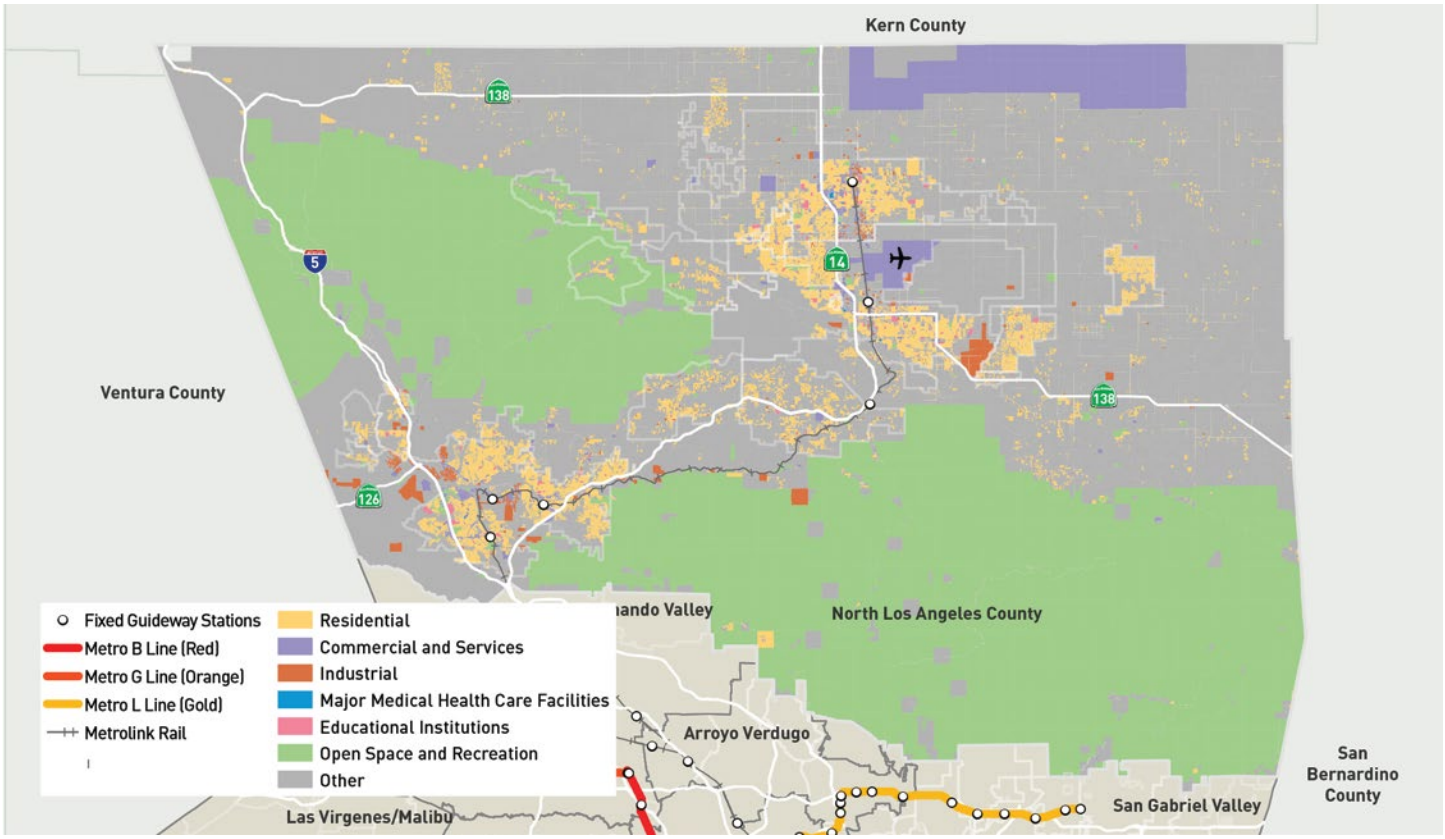
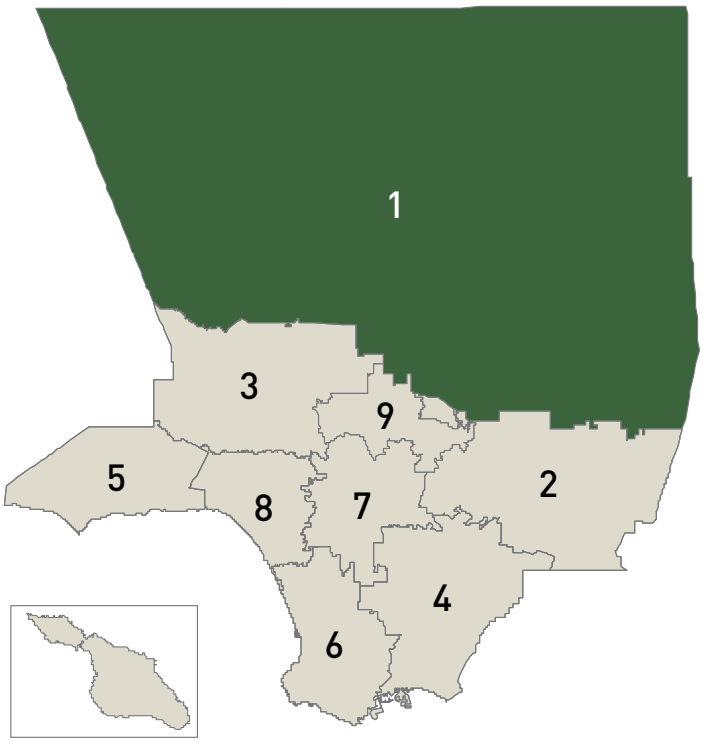


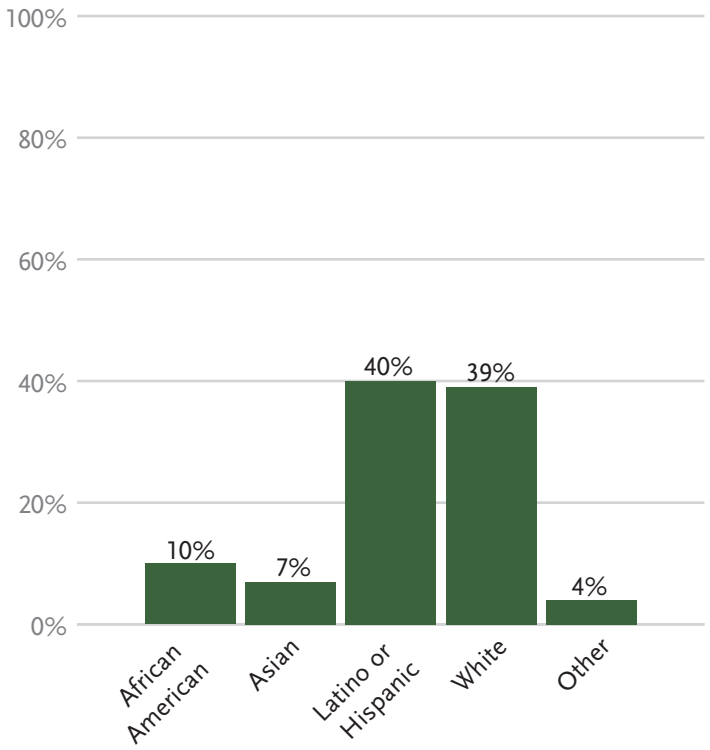
Figure 94

North Los Angeles County Summary Demographics

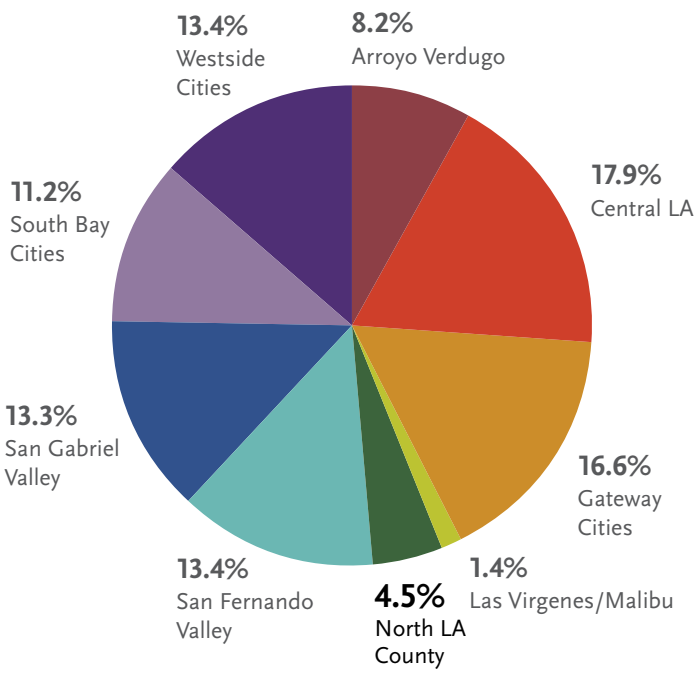
Total Area 2,479 Square Miles, Rank 1st (Out of 9 Subregions)



Total Population 671,680 People, Rank 6th



Total Employment 199,382 Jobs, Rank 8th



Median Household Income $76,340 Average MHI, Rank 3rd

San Fernando Valley

San Fernando Valley includes portions of the City of Los Angeles, City of San Fernando, and parts of unincorporated LA County. The San Fernando (SF) Valley subregion fans north of the Hollywood Hills west to the Las Virgenes/Malibu area and eastward towards the Arroyo Verdugo subregion. This subregion covers 269 square miles and is home to two cities and numerous Los Angeles City communities. The San Fernando Valley is home to several entertainment companies, the most well-known of which work in motion pictures, music recording, and television production.

Major Transportation Facilities

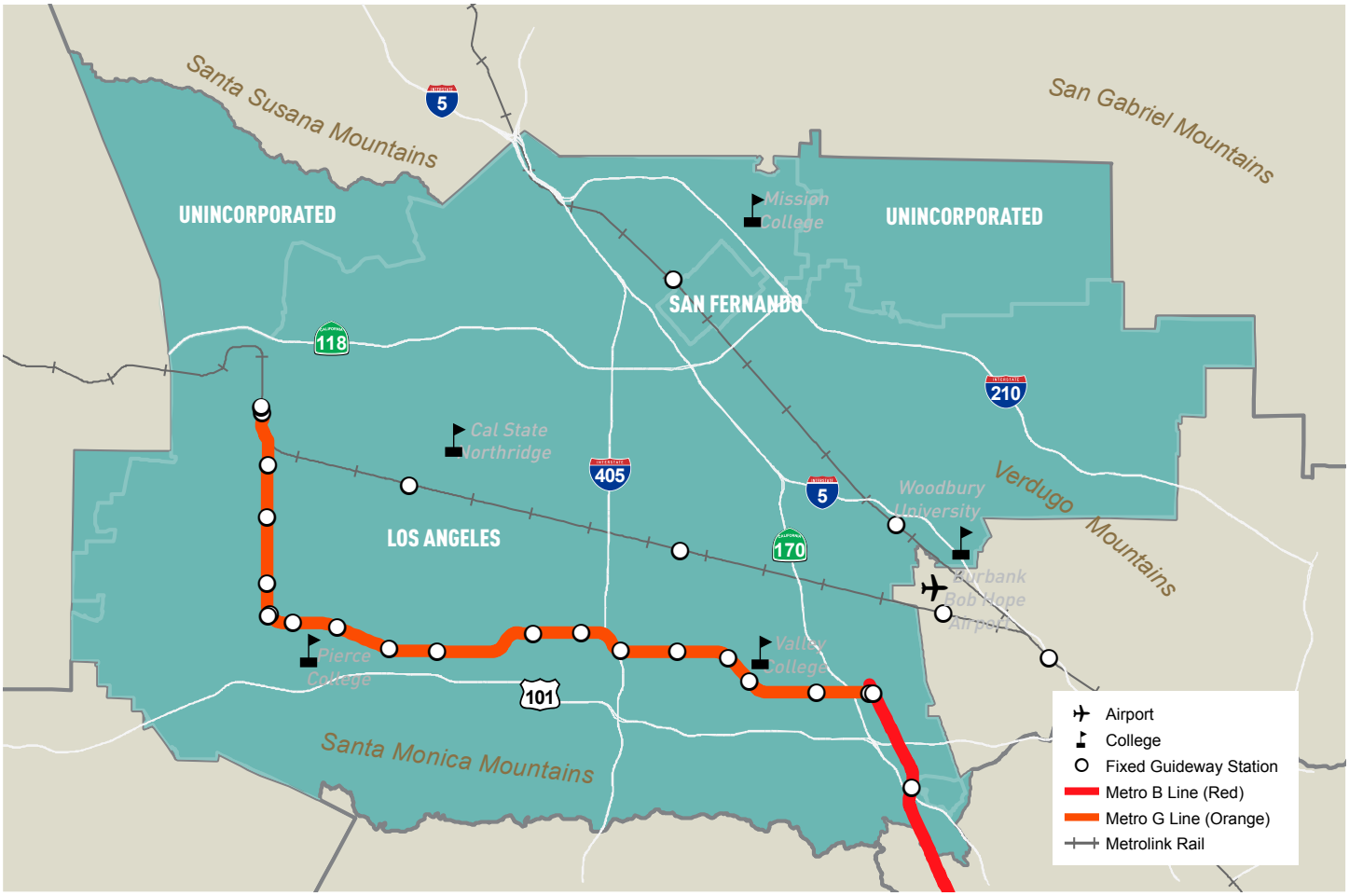
A number of freeways crisscross this subregion, including the Golden State Freeway (I-5), Ventura Freeway (US-101 and SR-134), Simi Valley Freeway (SR-118), Hollywood Freeway (SR-170), San Diego Freeway (I-405) and Foothill Freeway (I-210). There are carpool lanes on the SR-118, SR-134, and SR-170 and portions of the I-5 and I-405.

The I-405 is the major conduit between the San Fernando Valley and the Westside Cities, carrying several hundred thousand vehicles per day through the Sepulveda Pass. The I-405/US-101 and I-405/I-10 interchanges at either end of this section are two of the 10 busiest interchanges in the nation. Due to capacity limitations on the I-405 through the Pass, Sepulveda Bl, Laurel Canyon Bl, Coldwater Canyon Dr, and Beverly Glen Bl carry significant traffic between the San Fernando Valley and the Westside, impacting local residents. The I-405 is also the primary route to LAX from the San Fernando Valley and the North County sub-region.

Municipal operators as well as Metro provide bus and rail services to the subregion. The Metro Red Line serves this area via stations at Universal City and North Hollywood. Metrolink's Antelope Valley and Ventura County lines provide commuter rail service. The Metro Orange Line transitway, which includes a Class I bikeway along most of the alignment, runs between the North Hollywood Metro Rail station and the Metrolink Chatsworth Station in the area.

Figure 95

SAN FERNANDO VALLEY



Land Use and Demographics

Roughly 11 percent of the subregion is designated for commercial/industrial land use and residential land use covers approximately 35 percent. Figure 100 below shows the land use for communities within the subregion. City of Los Angeles is the largest city and has the biggest residential area in the subregion. The City of San Fernando is the smallest city in the subregion but has the highest area percentage of residential, commercial, and industrial land uses as well as the highest density in terms of population, employment, and daily trips. The subregion is home to Cal State Northridge as well as the Providence Holy Cross Medical Center and Kaiser Permanente Panorama City.

The area is the 4th largest subregion by area, ranks 4th in total population, 3rd in total employment, 4th in total daily trips, and 5th in average median household income. The subregion has a high percentage of non-Hispanic Whites and Latino or Hispanic population.

Major Projects and Programs

The San Fernando Valley subregion has several planned projects that will traverse the region, including the widening of I-5 between SR-134 and SR-170 to proide carpool lanes. In the coming years, the G Line (Orange) will undergo improvements and the North Hollywood to Pasadena Transit Corridor will be built to connect to the G Line. The LA River Path will also connect the San Fernando Valley with active transportation facilities.

Figure 96

San Fernando Valley Projects and Multi-year Subregional Programs

CATEGORIES	DESCRIPTION
Major Projects (YOE $)	I-5 North Carpool Lanes (SR-134 to SR-170) $637 M (2023)
	G Line (Orange) Improvement $314 M (2025)
	LA River Path – San Fernando Valley $69.6 M (2025)
	North San Fernando Valley Transit Corridor $207 M (2025)
	Sepulveda Pass Transit Corridor (Phase 1 – ExpressLanes) $311 M (2027)
	North Hollywood to Pasadena Transit Corridor $315 M (2026)
	East San Fernando Valley Light Rail Project $1.57 B (2027)
	Sepulveda Transit Corridor, Phase 2 – Valley to Westside $7.69 M (2033)
	G Line (Orange) Conversion to Light Rail $4.07 B (2057)
	City of San Fernando Bike Master Plan $13.7 million (2052)
Multi-year Subregional Programs (in 2015 $)	N/A

Source: *https://theplan.metro.net/wp-content/uploads/2016/09/FactSheet_SFV.pdf*

Figure 97

SAN FERNANDO VALLEY DAILY TRIPS

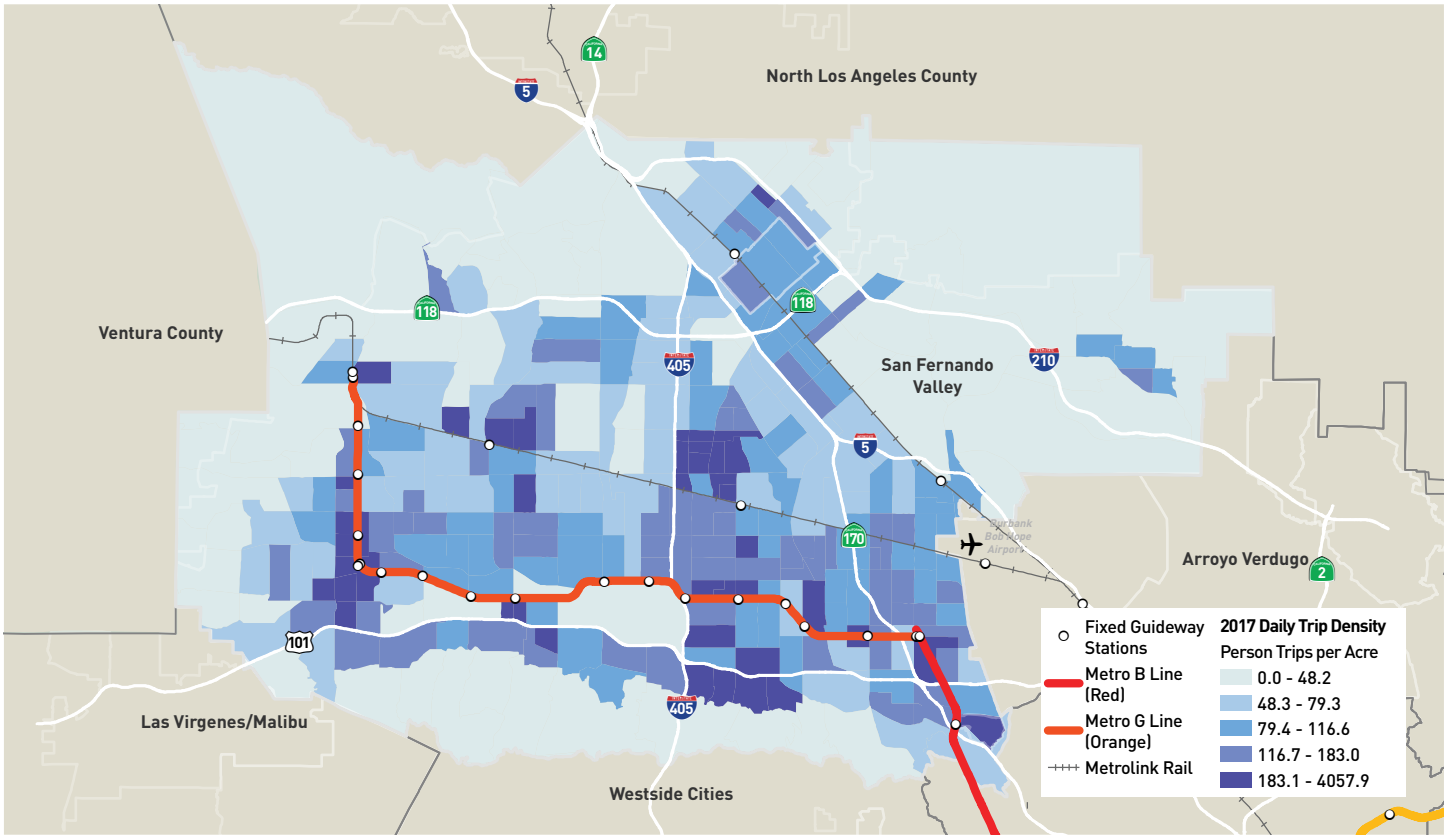


Figure 98

SAN FERNANDO VALLEY EMPLOYMENT DENSITY

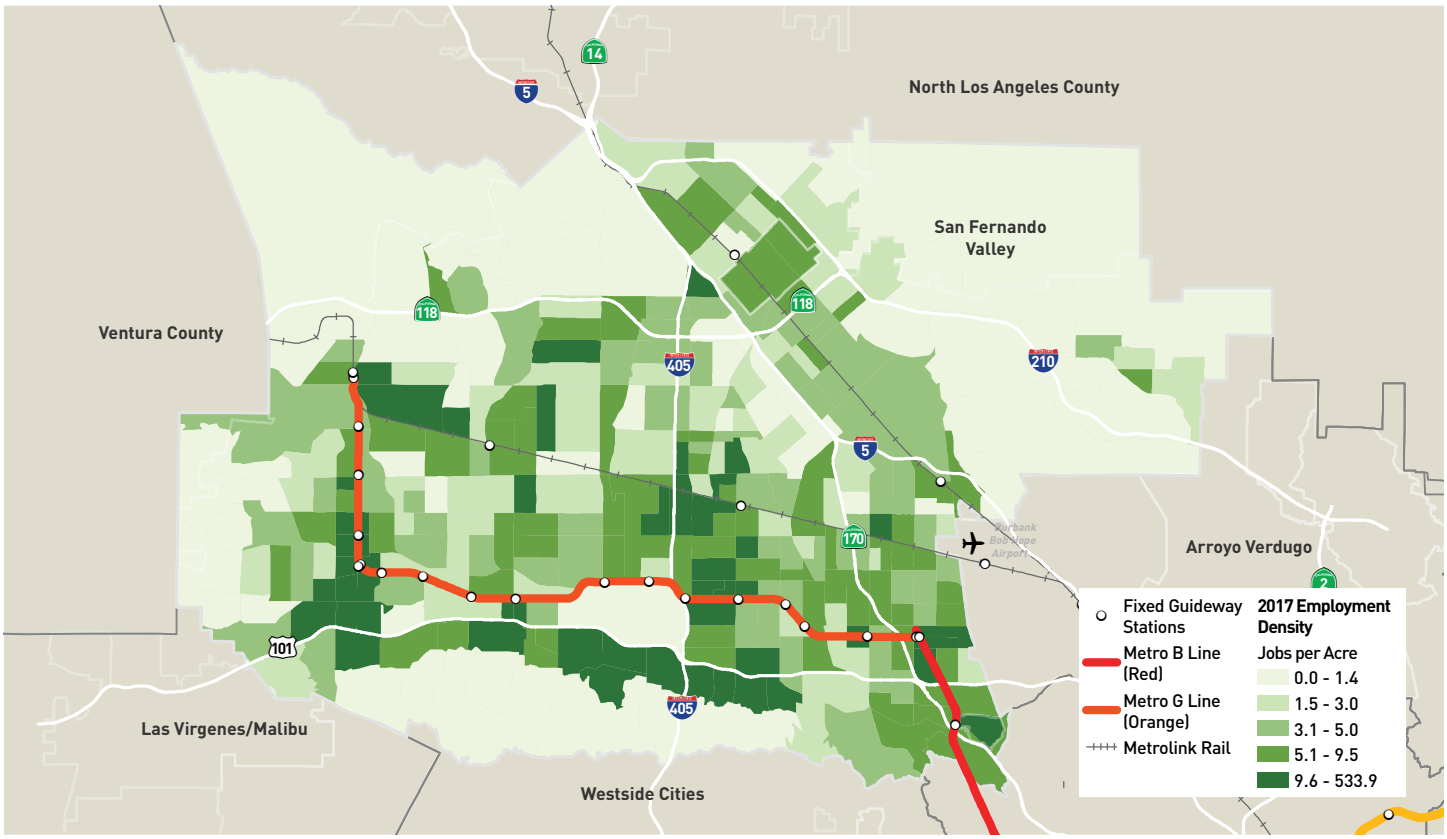


Figure 99

SAN FERNANDO VALLEY POPULATION DENSITY

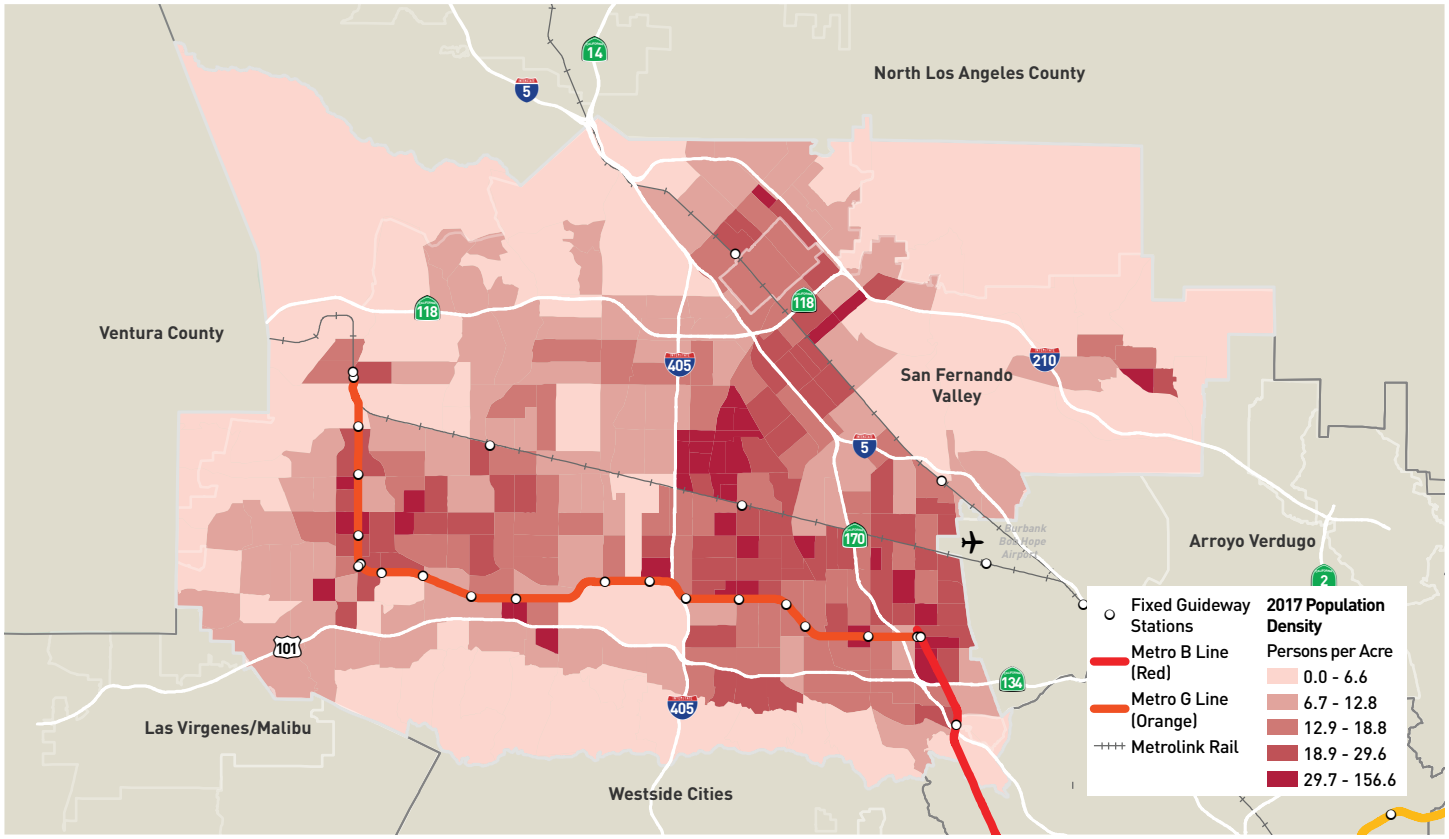


Figure 100

SAN FERNANDO VALLEY LAND USE

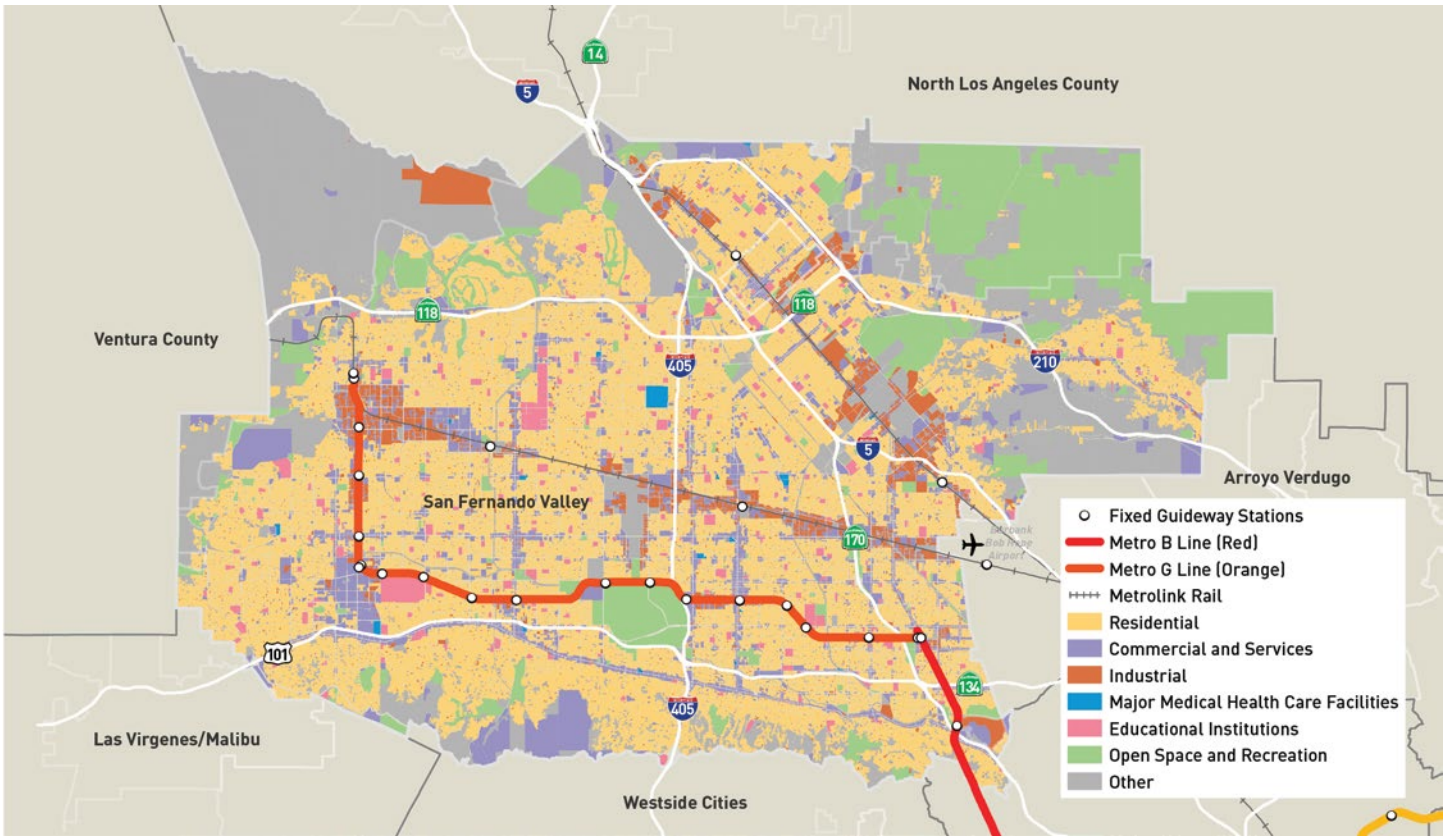
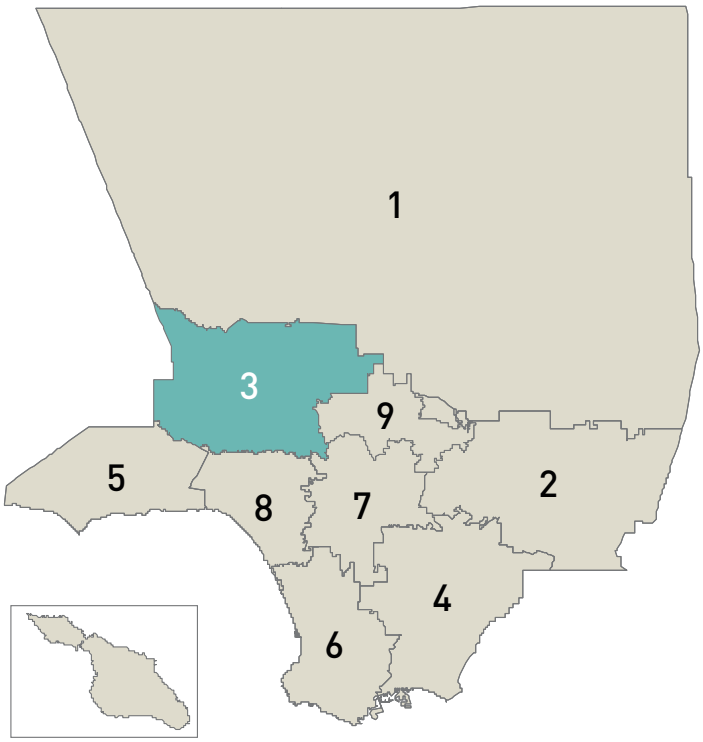


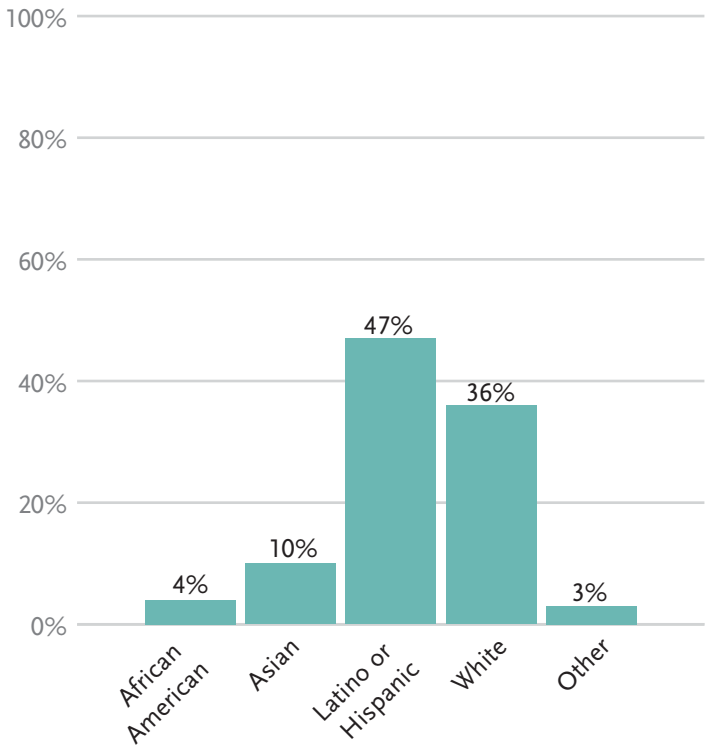
Figure 101

San Fernando Valley Summary Demographics

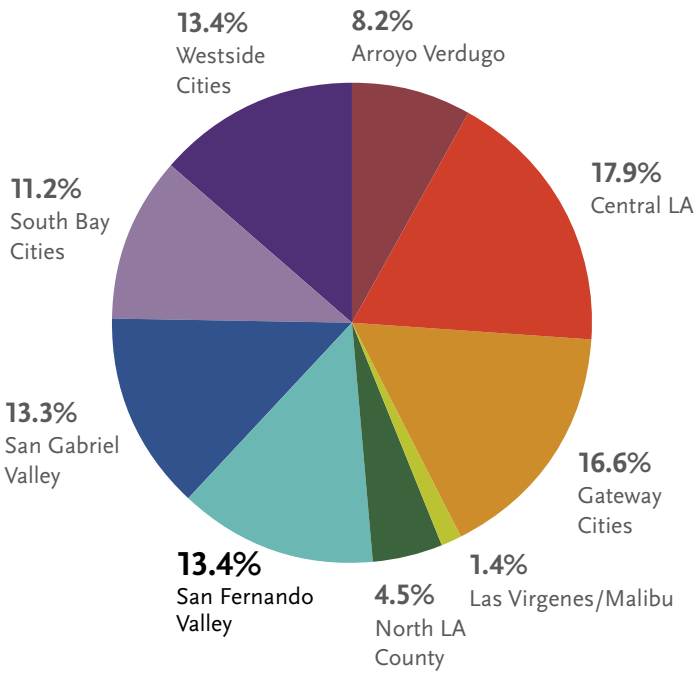
Total Area 269 Square Miles, Rank 3rd (Out of 9 Subregions)



Total Population 1,514,066 People, Rank 4th



Total Employment 593,890 Jobs, Rank 3rd



Median Household Income $69,228 Average MHI, Rank 5th

San Gabriel Valley

San Gabriel Valley includes Alhambra, Arcadia, Azusa, Baldwin Park, Bradbury, Claremont, Covina, Diamond Bar, Duarte, El Monte, Glendora, Industry, Irwindale, La Puente, La Verne, Monrovia, Monterey Park, Pomona, Rosemead, San Dimas, San Gabriel, San Marino, Sierra Madre, South El Monte, Temple City, Walnut, and West Covina. San Gabriel Valley also includes the following unincorporated communities of LA County: Altadena, Avocado Heights, Charter Oak, Citrus, East Pasadena, East San Gabriel, Hacienda Heights, Mayflower Village, North El Monte, Rowland Heights, San Pasqual, South Monrovia Island, South San Gabriel, South San Jose Hills, Valinda, Vincent, and West Puente Valley.

The subregion is home to several colleges, including Cal State Pomona, University of La Verne, the Claremont Colleges, Citrus College, East LA College, and Mt. San Antonio College. Major medical facilities include Alhambra Hospital Medical Center, Methodist Hospital, Harbor-UCLA Medical Center, and Kaiser Permanente South Bay Medical Center.

Major Transportation Facilities

One of the unique transportation features of this subregion is the significant number of freeways that traverse it; namely, San Bernardino Freeway (I-10), Foothill Freeway (I-210), Pasadena Freeway (SR-110), Orange Freeway (SR-57), Pomona Freeway (SR-60), Chino Valley Freeway (SR-71), San Gabriel River Freeway (I-605) and the Long Beach Freeway (I-710). The Foothill Freeway has a carpool lane in each direction through the entire San Gabriel Valley subregion. Carpool lanes also exist on portions of I-10, I-605, and SR-60.

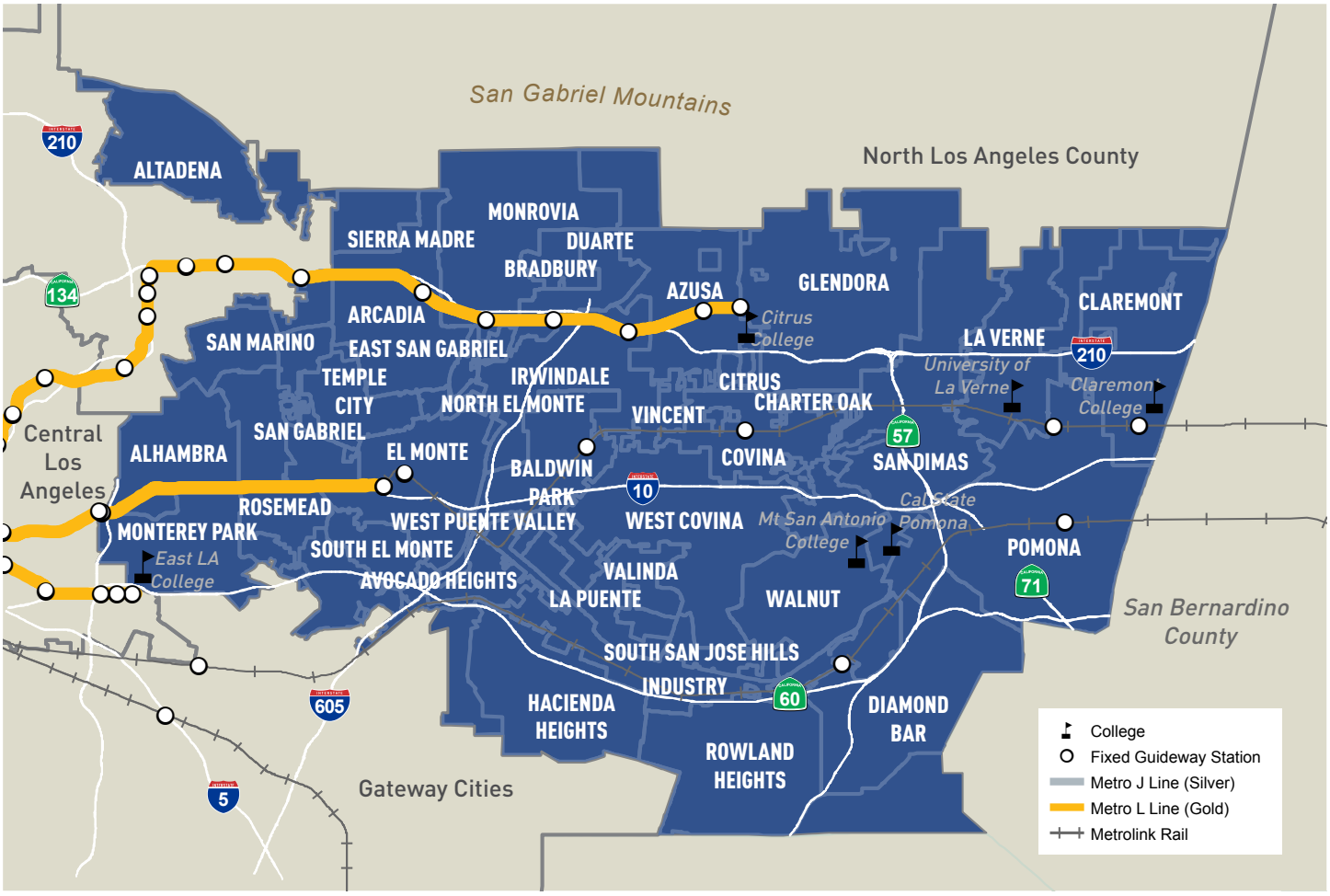
The El Monte Busway on the I-10 serves both buses and carpools and is the highest-volume carpool facility in LA County. Metro, Foothill, and Montebello Transit provide bus service to the subregion. Most cities in this subregion provide dial-a-ride services within their city limits to seniors and persons with disabilities.

Land Use and Demographics

Figure 107 below shows the breakdown of land use for communities within the subregion. The City of Industry has the largest percentage of commercial/industrial land use and the highest employment density in the area. The communities of South Monrovia Island and South San Gabriel have the highest percentage of residential land use area. The Cities of Industry and Irwindale contains the largest total area for commercial/industrial use.

Figure 102

SAN GABRIEL VALLEY



The City of Alhambra has the highest daily trip density in the subregion. The city is split by the I-10, which serves both buses and carpools and has the highest volume carpool facility in LA County. Population, employment, and trip densities can be seen clustering in or near the City of Alhambra, Rosemead, El Monte, South El Monte, Baldwin Park, Irwindale, Covina, La Puente, Azusa, Duarte, West Puente Valley, South San Jose Hills, and Pomona, and the southern portion of Claremont. The City of Industry has the highest employment density in the subregion. The highest population density area can be found in the community of San Jose Hills, but the highest total population is in the City of Pomona. Zero-vehicles households are dispersed throughout the region, with most of the tracts clustering around Alhambra, Monterey Park, El Monte, Duarte, La Verne, Claremont, and Pomona.

Major medical facilities include Arcadia Methodist Hospital, City of Hope, Kaiser Permanente Baldwin Park, and Pomona Valley Hospital. The San Gabriel Valley is also home to several universities including Cal State Poly Pomona, Azusa Pacific University, and University of La Verne.

The San Gabriel Valley subregion sits in the easternmost portion of LA County. It covers 322 square miles and is approximately 99 percent built-out, leaving very little undeveloped land for commercial or industrial uses. The subregion encompasses 31 jurisdictions and is home to 570,000 jobs. The area is also characterized by socioeconomic and ethnic diversity and is comprised of some of the most affluent as well as the lowest-income communities within LA County.

Major Projects and Programs

The subregion's major transportation investments include the Gold Line Foothill Extension to Claremont and multiple interchange projects. San Gabriel Valley has several subregional programs including significant funding for active transportation and highway programs.

Figure 103

San Gabriel Valley Projects and Multi-year Subregional Programs

CATEGORIES	DESCRIPTION
Major Projects (YOE $)	Gold Line Foothill Extension to Claremont $1.57 B (2028)
	SR-71 Gap from I-10 to Rio Rancho Rd $379 M (2026)
	SR-57/SR-60 Interchange Improvements $422 M (2027)
	I-605/I-10 Interchange $1.29 B (2047)
	SR-60/I-605 Interchange HOV Direct Connectors $1.06 B (2047)
	Eastside Extension Phase 2 Transit Corridor (2nd alignment) $8.71 B (2057)*
Multi-year Subregional Programs (in 2015 $)	Active Transportation Program (Including Greenway Proj.) $231 M (Start Date FY 2018)
	Bus System Improvement Program $55 M (Start Date FY 2018)
	First/Last Mile and Complete Streets $198 M (Start Date FY 2018)
	Highway Demand Based Program (HOV Ext. & Connect.) $231 M (Start Date FY 2018)
	Goods Movement (Improvements & RR Xing Elim.) $33 M (Start Date FY 2048)
	Highway Efficiency Program $534 M (Start Date FY 2048)
	ITS-Technology Program (Advanced Signal Tech.) $66 M (Start Date FY 2048)

Source: *https://theplan.metro.net/wp-content/uploads/2016/09/FactSheet_SGV.pdf*

** Metro Board identified a separate feasibility study to be completed along SR-60 to identify potential mobility solutions and options in the short and long-term for the San Gabriel Valley.*

Figure 104

SAN GABRIEL VALLEY DAILY TRIPS

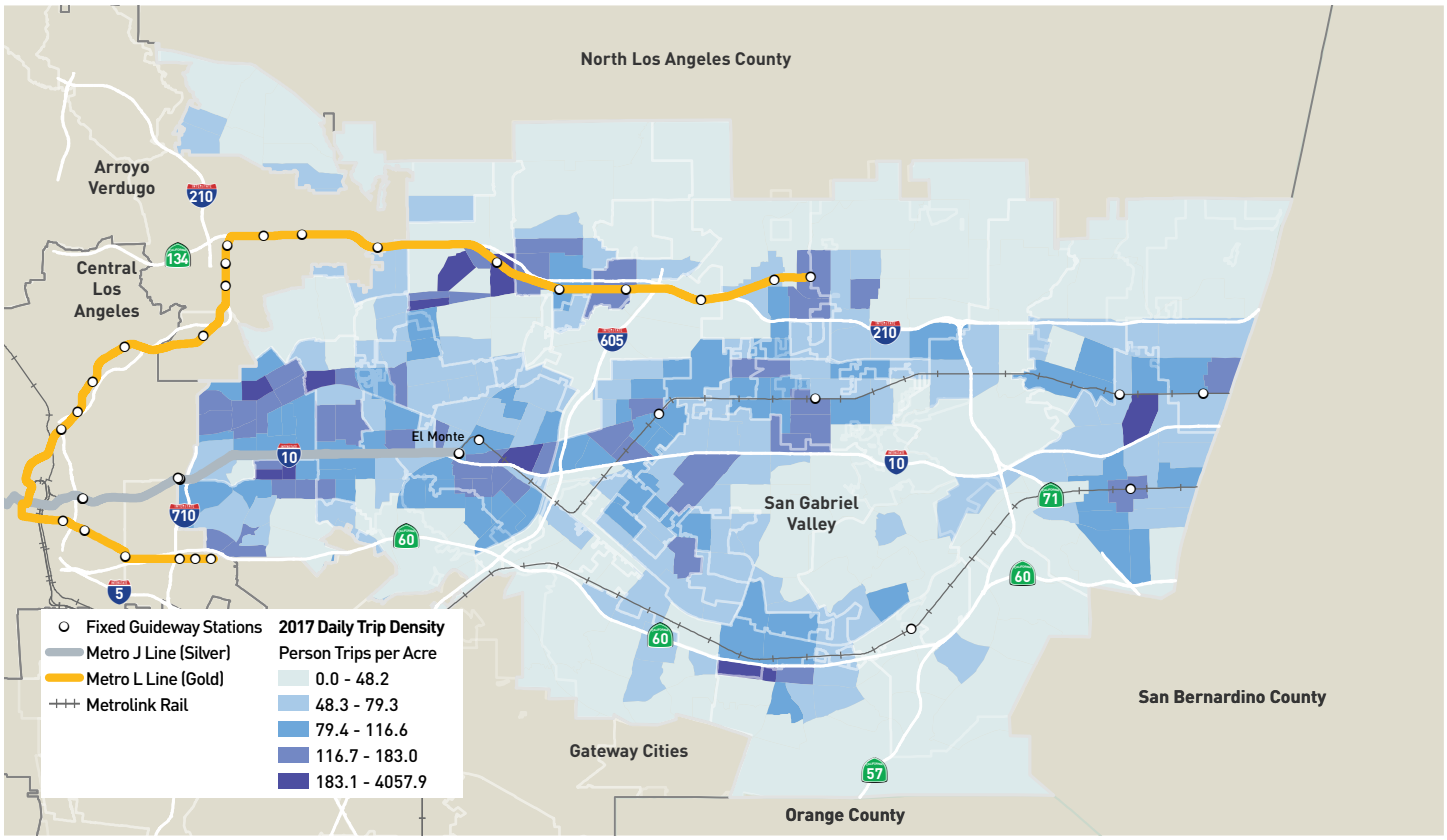


Figure 105

SAN GABRIEL VALLEY EMPLOYMENT DENSITY

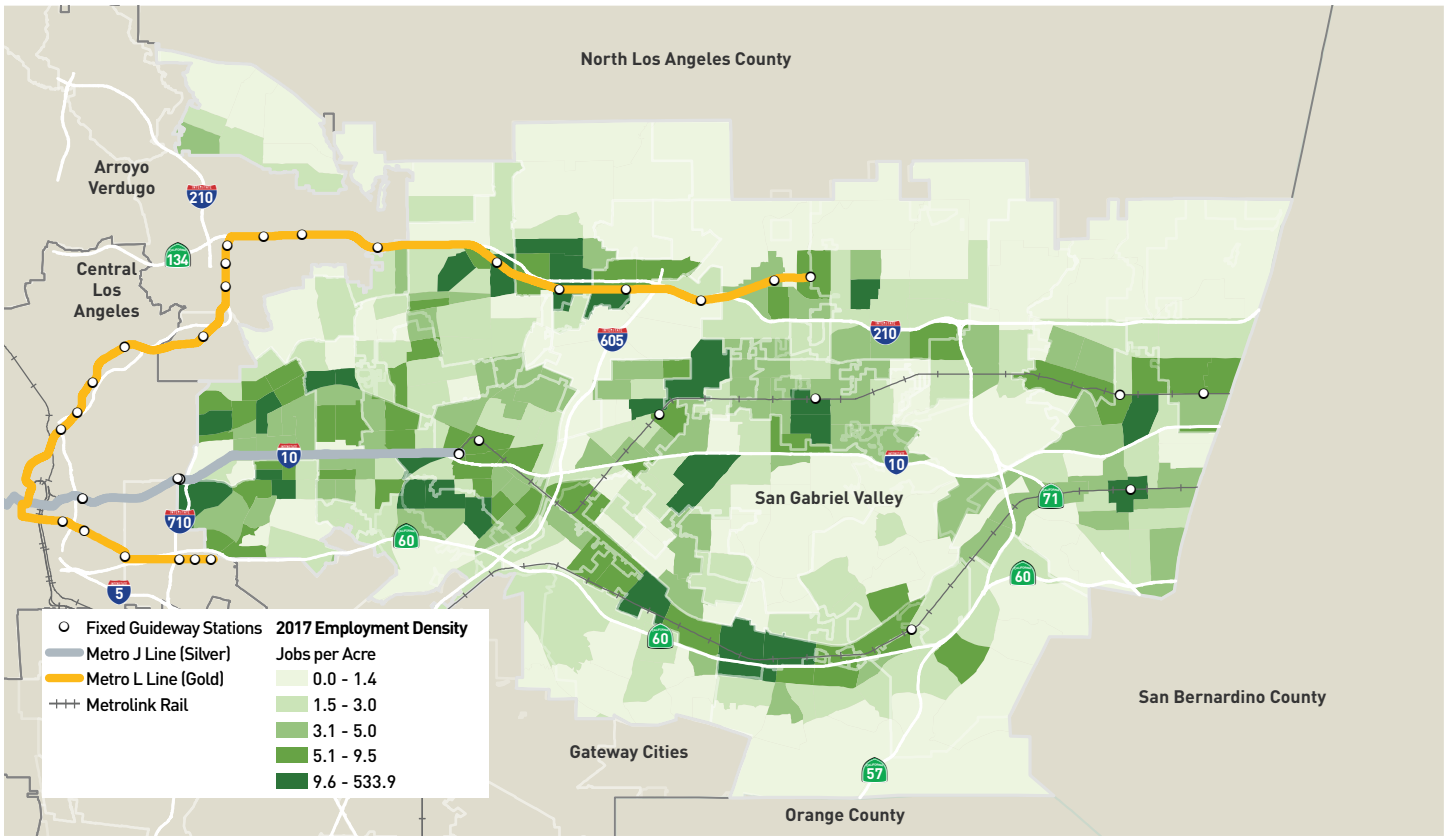


Figure 106

SAN GABRIEL VALLEY POPULATION DENSITY

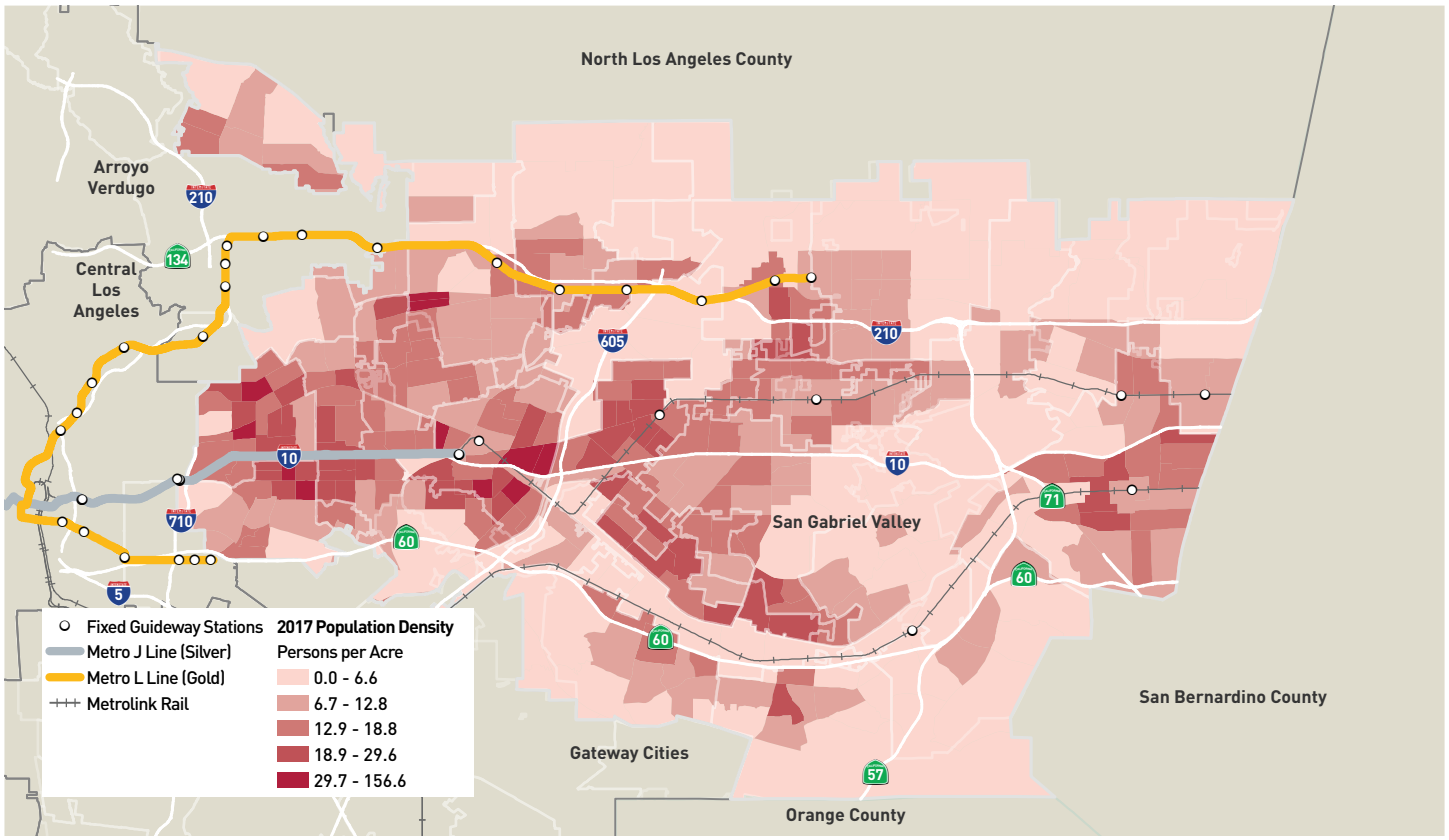


Figure 107

SAN GABRIEL VALLEY LAND USE

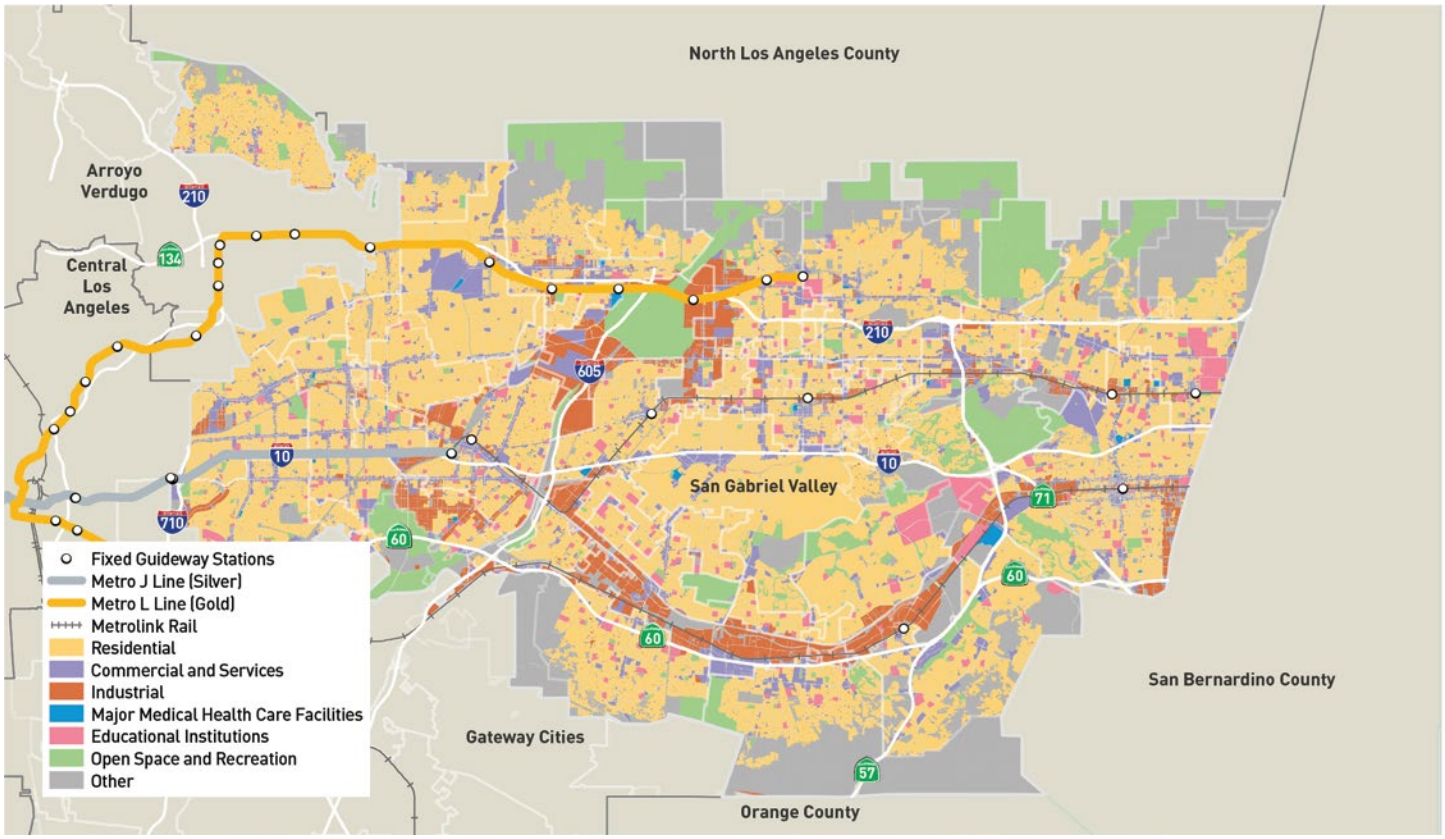
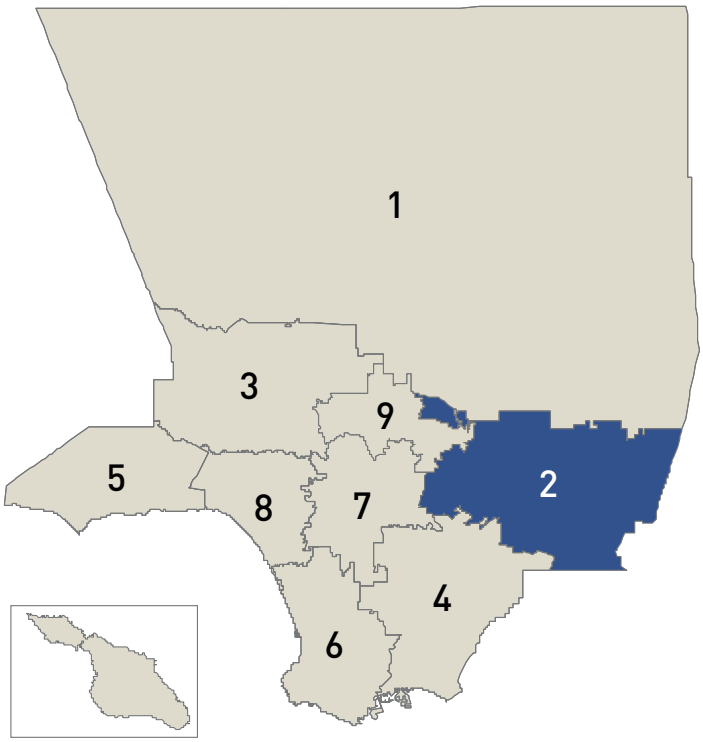


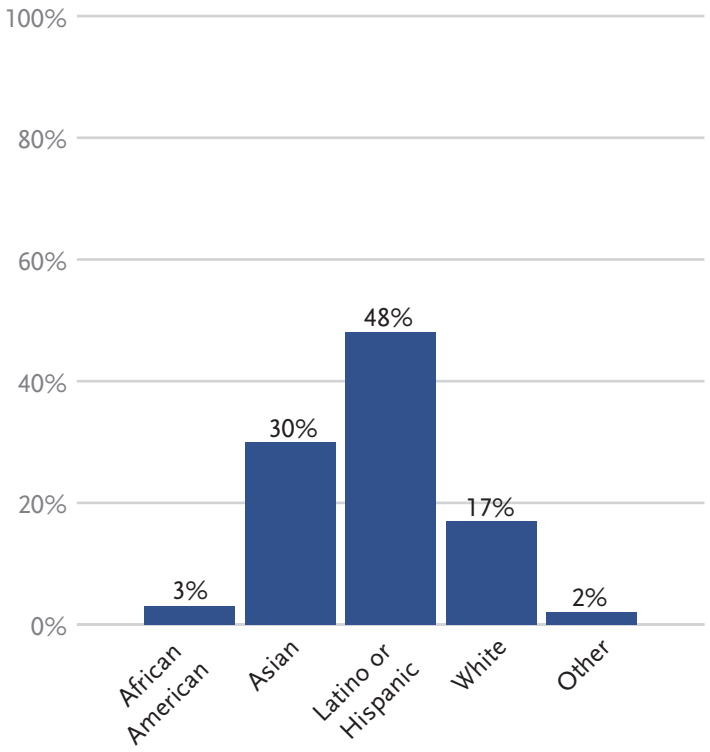
Figure 108

San Gabriel Valley Summary Demographics

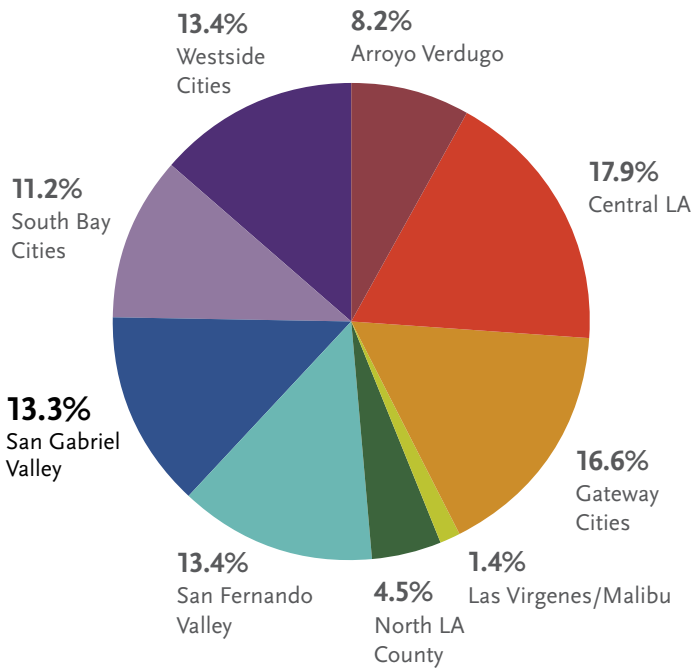
Total Area 324 Square Miles, Rank 2nd (Out of 9 Subregions)



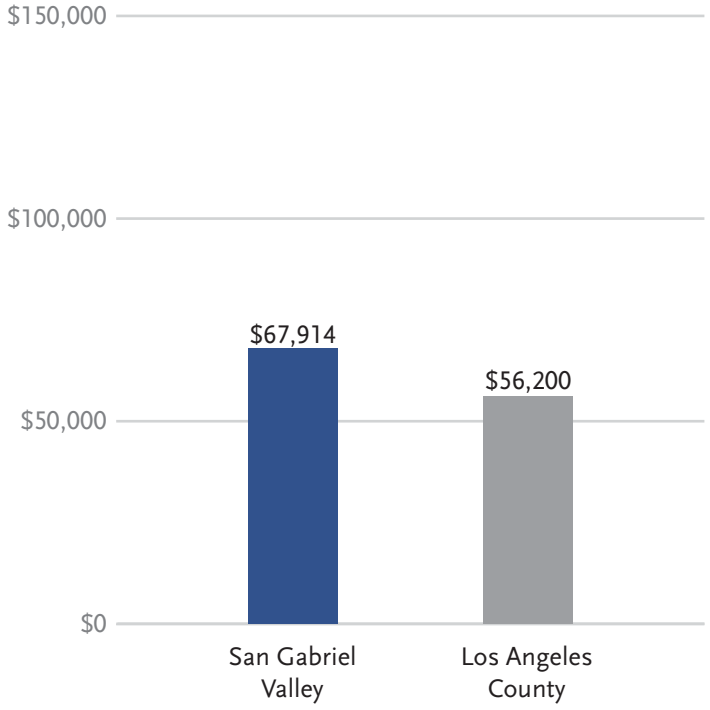
Total Population 1,618,858 People, Rank 3rd



Total Employment 587,628 Jobs, Rank 5th



Median Household Income $67,914 Average MHI, Rank 7th



South Bay Cities

South Bay Cities include portions of Los Angeles, Carson, El Segundo, Gardena, Hawthorne, Hermosa Beach, Inglewood, Lawndale, Lomita, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, and Torrance. South Bay Cities also include the following unincorporated communities of LA County: Alondra Park, Del Aire, Lennox, West Athens, West Carson, and Westmont.

Major Transportation Facilities

The Glenn Anderson (Century, I-105), Harbor (I-110) and the San Diego (I-405) freeways serve the South Bay area. SR-91 terminates near the eastern portion of the subregion, near Harbor Gateway Transit Center. A transitway, which provides elevated carpool lanes and a busway, runs down the center of the Harbor Freeway from USC in Central Los Angeles southwards to SR-91. A unique feature of the carpool lanes on the I-110 and I-105 Freeways is that they flow directly into each other via an elevated direct connector interchange, bypassing the at-grade interchange used by other traffic. In addition, the South Bay is traversed with major arterials that carry capacity that is equivalent to the local freeway system. These major arterials include Hawthorne Bl, Pacific Coast Hwy, Sepulveda Bl, Crenshaw Bl, Artesia Bl, Lomita Bl, Manhattan Beach Bl, Douglas St, Rosecrans Av, and 190th St as well as others.

The South Bay has two major transportation hubs near its borders – LAX, and the Port of Los Angeles. LAX passenger trips substantially add to traffic volumes on the freeways and surface streets traversing the area. Cargo and truck traffic also impact the subregion's transportation system. During the economic downturn in the 1990s, the South Bay adapted existing business structures to warehousing, which has led to increased truck traffic, added congestion and associated pavement damage on arterials and freeways (I-405 and I-110). At the same time, transporting goods into and out of the subregion has added traffic volumes to the freeways, placing additional capacity pressure on the aging onramps.

The Metro Green Line runs in the median of the I-105 Freeway from Norwalk in the east to the southern edge of Los Angeles International Airport (LAX) and south to Redondo Beach. A long segment of the Alameda Corridor runs along the subregion's eastern border. The area has regional and local transit services provided by Metro, Torrance Transit, Municipal Area Express (MAX), Gardena Municipal Bus Lines, Long Beach Transit, Palos Verdes Transit, Beach Cities Transit, Carson Circuit, Lawndale Beat, and LADOT's Commuter Express. In addition, many local jurisdictions operate transit and dial-a-ride services within their boundaries.

Figure 109

SOUTH BAY CITIES

Land Use and Demographics

Roughly 19 percent of the subregion is designated for commercial/industrial land use and residential land use covers approximately 37 percent. Figure 114 below shows the breakdown of land use for communities within the subregion. City of Los Angeles is the largest city in the subregion. The city of Rolling Hills has the largest percentage of residential land use but the lowest population density in the subregion. City of Torrance has the largest total area for residential land use. City of El Segundo has the highest percentage of industrial land use but the City of Carson has the largest total area. City of Los Angeles has the largest total commercial area, followed by the City of Torrance.

In addition, major trip generators/attractors such as the StubHub Center, The Forum, and Hollywood Park, add to the considerable demand for commuter and entertainment travel and overall travel mobility needs of the subregion. Trip and population density clusters in the areas along I-405, I-110, and I-105 Freeways. High population and trip densities tends to occur in most areas north of Pacific Coast Highway and in the San Pedro community. City of El Segundo has the highest employment density, followed by Hermosa Beach and Torrance.

The South Bay Cities subregion is located at the southern end of the Santa Monica Bay. This subregion covers 154 square miles and is home to 16 cities and unincorporated County areas. The west and southern portion of the subregion is bounded by the Pacific Ocean. El Porto Beach, Abalone Cove, and Venice Beach are major attractions for surfers and other beach activities. Cal State Dominguez Hills is located in the City of Carson. Major medical facilities include Harbor-UCLA Medical Center, Kaiser Permanente South Bay Medical Center, and Children's Hospital Los Angeles.

Major Projects and Programs

Upcoming transportation projects in South Bay Cities include the Crenshaw/LAX Transit Project, Airport Metro Connector and the I-105 ExpressLanes, which will both provide added accessibility to LAX. Highway Operational Improvements and Transportation System and Mobility Improvements are the two South Bay Cities subregional programs.

Figure 110

South Bay Cities Projects and Multi-year Subregional Programs

CATEGORIES	DESCRIPTION
Major Projects (YOE $)	Crenshaw/LAX Transit Project $2.06 B (2021)
	Airport Metro Connector/96th Street Station/ Green Line Ext LAX $626 M (2024)
	Crenshaw/LAX Track Enhancement $56 M (2024)
	I-105 ExpressLanes from I-405 to I-605 $530 M (2025)
	C Line (Green) Extension to Torrance $1.17 B (2030)
	I-405, I-110, I-105 and SR-91 Ramp and Interchange Improvements $1.41 B (2039)
	I-405/I-110 Interchange HOV Connect Ramps and Interchange Improvements $504 M (2044)
	I-110 ExpressLanes Extension South to I-405/ I-110 Interchange $599 M (2046)
	I-405 South Bay Curve Improvements $883 M (2047)
	Sepulveda Transit Corridor, Phase 3 (Westside to LAX) $10.59 B (2057)
Multi-year Subregional Programs (in 2015 $)	South Bay Highway Operational Improvements $500 M ($1.1 B total cost) (Start Date FY 2018)
	Transportation System and Mobility Improvements Program $643.5 M (Start Date FY 2018)

Source: *https://theplan.metro.net/wp-content/uploads/2016/09/FactSheet_South_Bay.pdf*

Figure 111

SOUTH BAY CITIES DAILY TRIPS

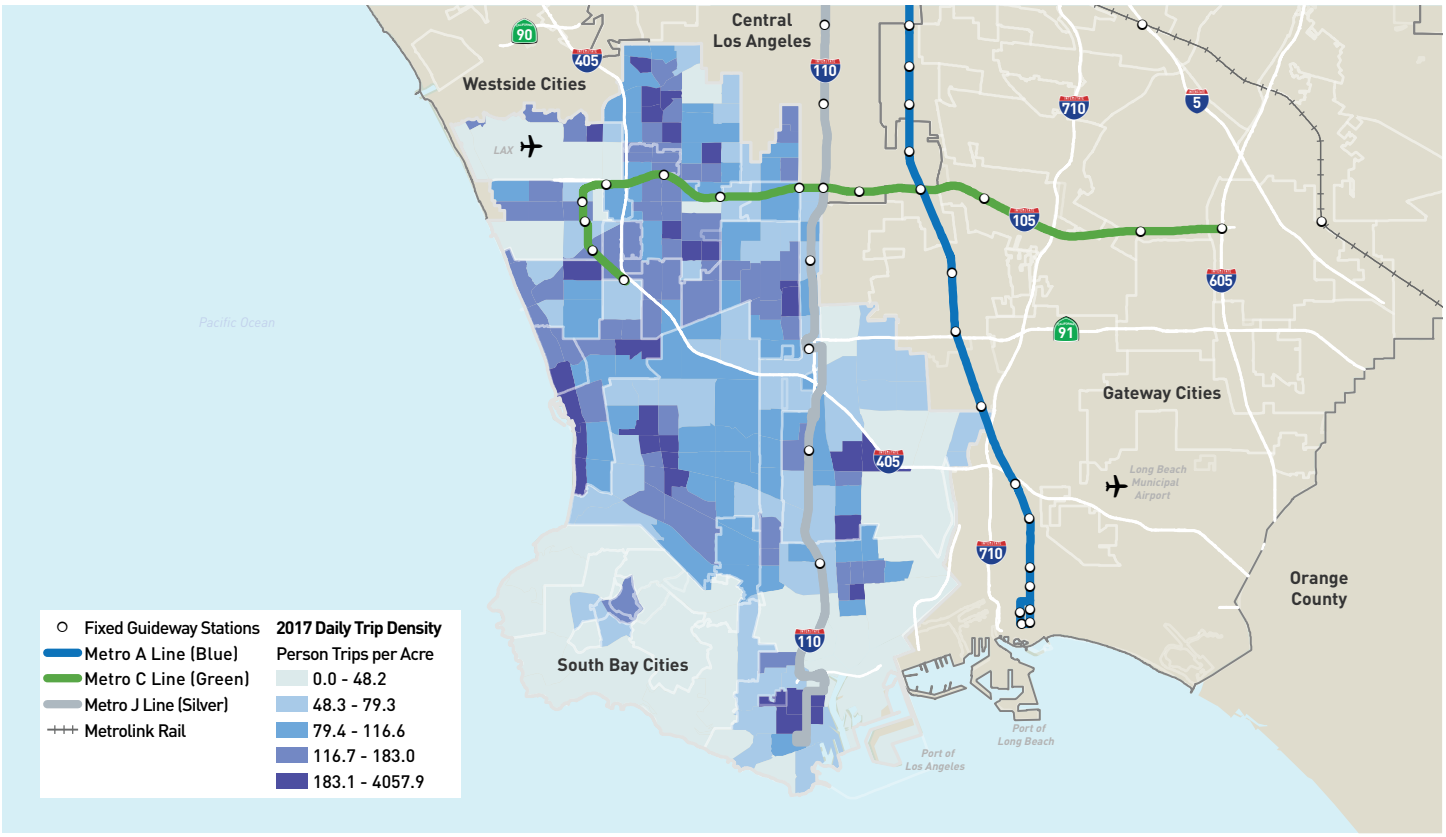


Figure 112

SOUTH BAY CITIES EMPLOYMENT DENSITY

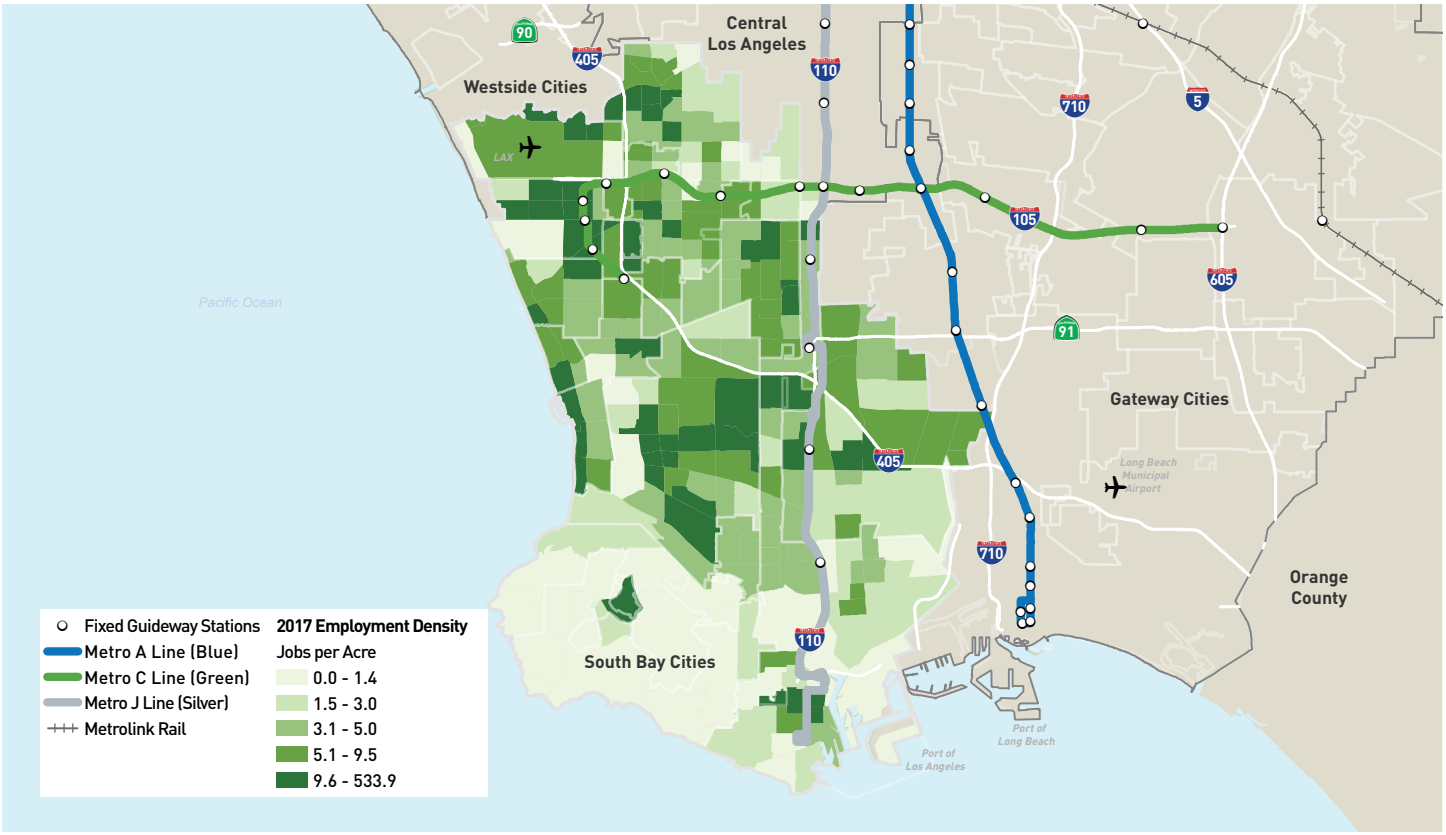


Figure 113

SOUTH BAY CITIES POPULATION DENSITY

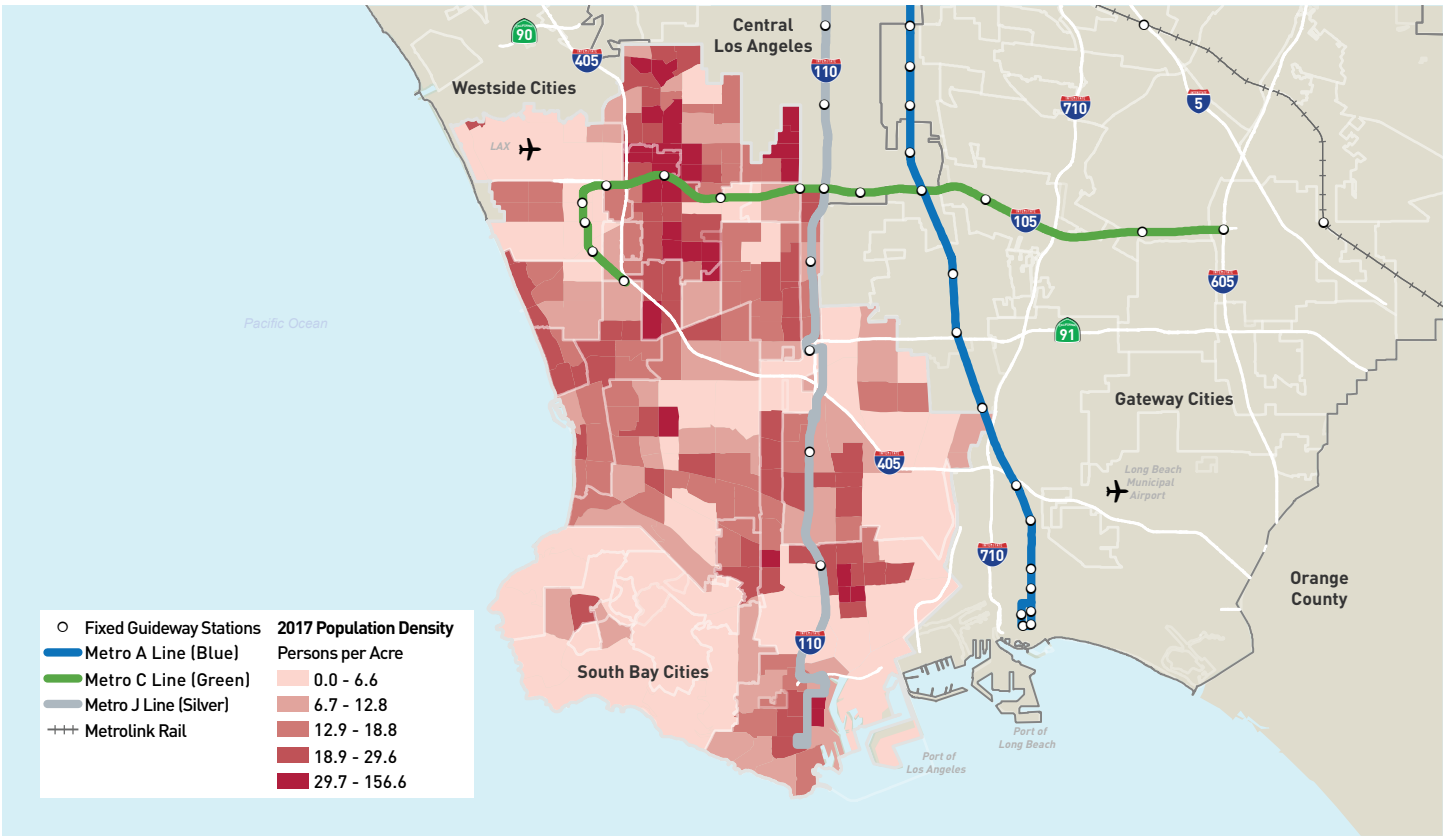


Figure 114

SOUTH BAY CITIES LAND USE

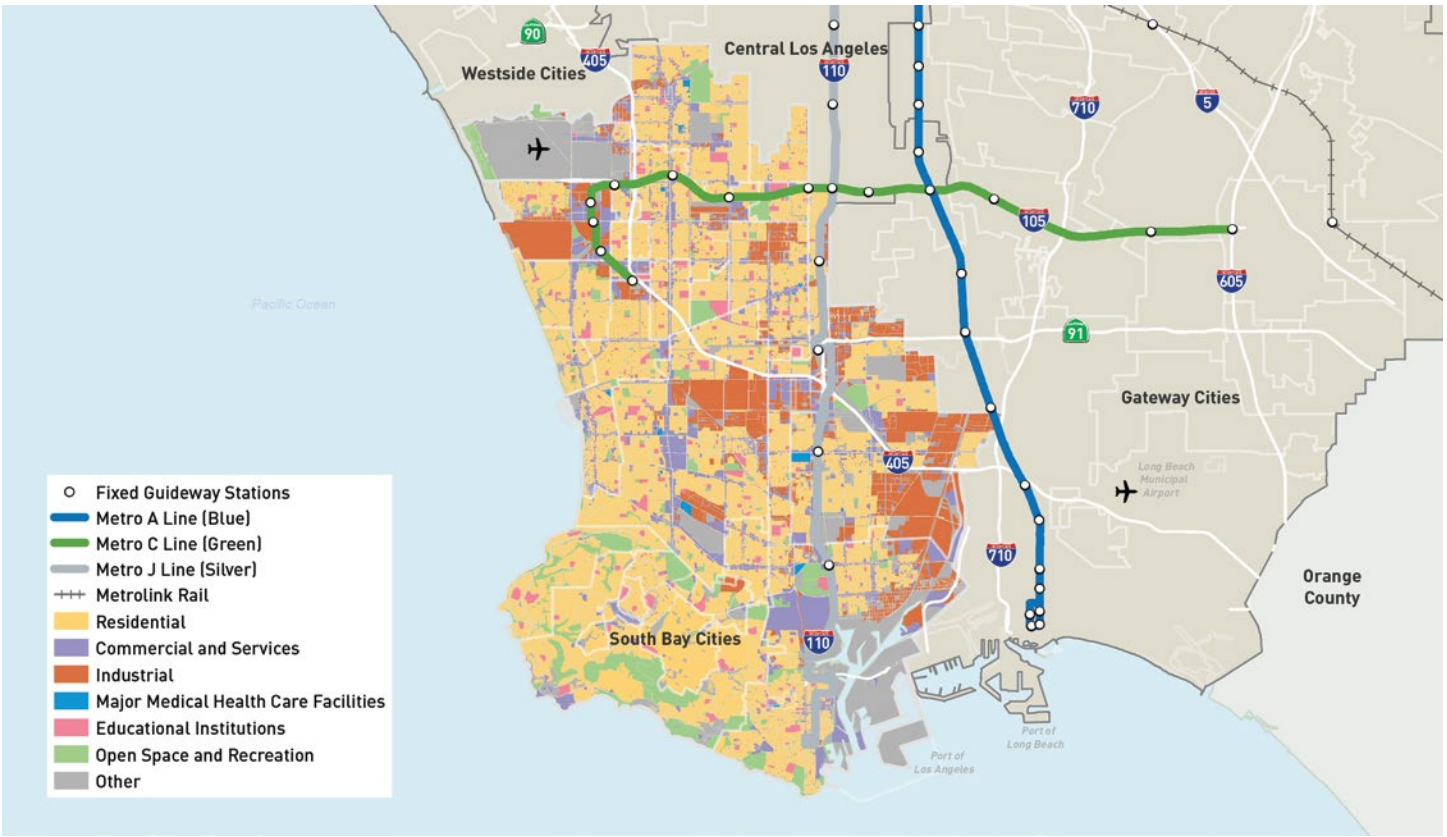
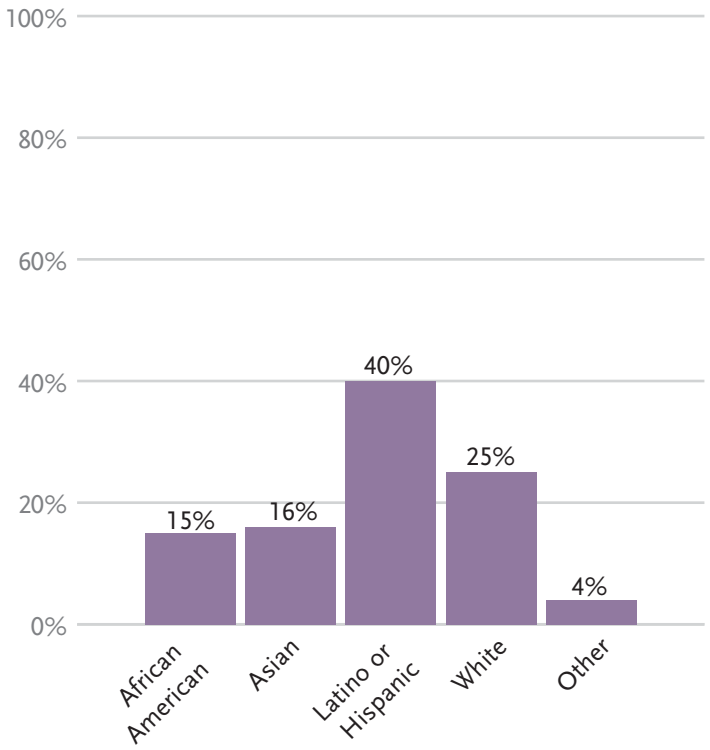


Figure 115

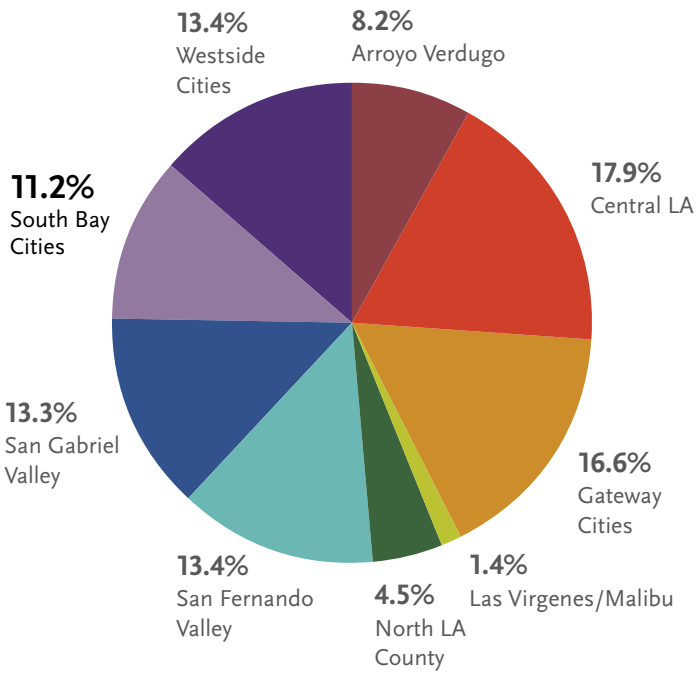
South Bay Cities Summary Demographics

Total Area 154 Square Miles, Rank 6th (Out of 9 Subregions)

Total Population 1,050,022 People, Rank 5th



Total Employment 494,121 Jobs, Rank 6th



Median Household Income $68,653 Average MHI, Rank 6th

Westside Cities

Westside Cities include portions of Los Angeles, Beverly Hills, Culver City, Santa Monica, and West Hollywood. Westside Cities also include the unincorporated community of Marina Del Rey.

This subregion covers 111 square miles and is home to five cities and numerous Los Angeles City communities. It includes several historical landmarks such as the Santa Monica Looff Hippodrome, Beverly Hills Hotel, and the Werle Building.

Major Transportation Facilities

The Santa Monica Freeway (I-10), the San Diego Freeway (I-405) and Marina Freeway (SR-90) all serve the Westside area. Several major east-west and north-south boulevards parallel I-10 and I-405, providing primary access to and within the Westside area.

The area also has an extensive network of regional and local transit services provided by Metro, LADOT's Commuter Express, Santa Monica Big Blue Bus and Culver City Bus. Currently, Metro Rapid bus service operates along Wilshire Bl, Santa Monica Bl, Olympic Bl, Venice Bl, La Cienega Bl, and parts of Sepulveda Bl and Fairfax Av. Big Blue Bus operates Rapid service along Lincoln Bl and Pico Bl, between UCLA and Expo, and express service to Downtown LA. Metro Rail service is provided by the E (Expo) Line. These lines provide connections to the Metro D (Purple) Line at the Wilshire/Western Station, the LAX City Bus Center, the Metro Green Line, and the downtown Santa Monica transit center. Metro also operates express service along Pacific Coast Highway.

Land Use and Demographics

Roughly 10 percent of the subregion is designated for commercial/industrial land use and residential land use covers approximately 34 percent. Figure 121 below shows the varying land use for communities within the subregion. City of Los Angeles is the largest city in the subregion. The City of Beverly Hills has the highest percentage of residential land use but the City of Los Angeles has the largest total residential and commercial area in the subregion.

West Hollywood and Santa Monica have the highest trip densities in the county. Some of the Westside's neighborhoods (such as parts of Santa Monica, West Hollywood, Westwood and Venice) have population densities almost 10 times the county average. West Hollywood has the highest population, employment, and trip densities. The City of Los Angeles

Figure 116

WESTSIDE CITIES

is the largest city in the subregion. It notably has the lowest employment density and has just 10 percent of land categorized for commercial/industrial use.

The subregion has some of the top educational institutions in the nation such as University of California Los Angeles. The West Los Angeles Veterans Affairs Medical Center, which is the largest facility in the Veterans Affairs health care system, is located west of UCLA. Westside Cities is the 2nd smallest subregion, ranks 7th in total population, 4th in total employment, 6th in total daily trips, and 2nd in average median household income. The subregion has non-Hispanic Whites predominantly.

Major Projects and Programs

The D Line (Purple) Extension and Airport Metro Connector are major transit projects to be built in the region in the next decade. The Westside Cities subregional program funding includes a total of more than $360 Million for active transportation and first last mile investment.

Figure 117

Westside Cities Projects and Multi-year Subregional Programs

CATEGORIES	DESCRIPTION
Major Projects (YOE $)	Airport Metro Connector/96th Street Station/ Green Line Ext LAX $626 M (2024)
	Sepulveda Pass Transit Corridor (Phase 1 – ExpressLanes) $311M (2026)
	D Line (Purple) Extension Section 3 $3.22 B ($8.44 B total cost) (2028)
	Sepulveda Transit Corridor, Phase 2 – Valley to Westside $7.69 B (2033) and Phase 3 – Westside to LAX 10.59 B (2057) ($18.58 B total cost)
	Crenshaw Northern Extension $4.7 B (2047)
	Lincoln Bl Bus Rapid Transit (BRT) $220 M (2047)
Multi-year Subregional Programs (in 2015 $)	Active Transportation First/Last Mile Connections Program $361 M (Start Date FY 2018)

Source: *https://theplan.metro.net/wp-content/uploads/2016/09/FactSheet_Westside.pdf*

Figure 118

WESTSIDE CITIES DAILY TRIPS

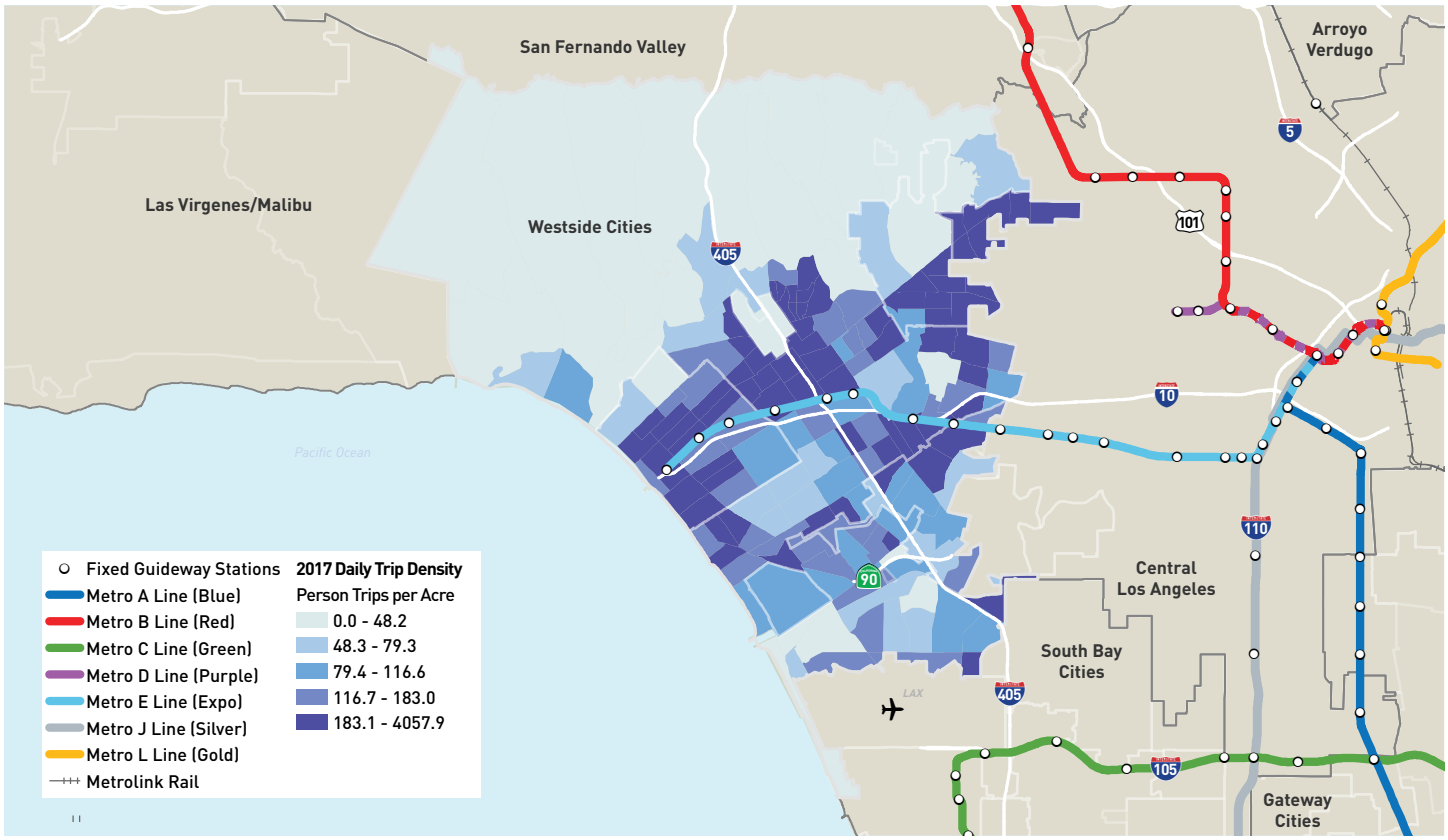


Figure 119

WESTSIDE CITIES EMPLOYMENT DENSITY

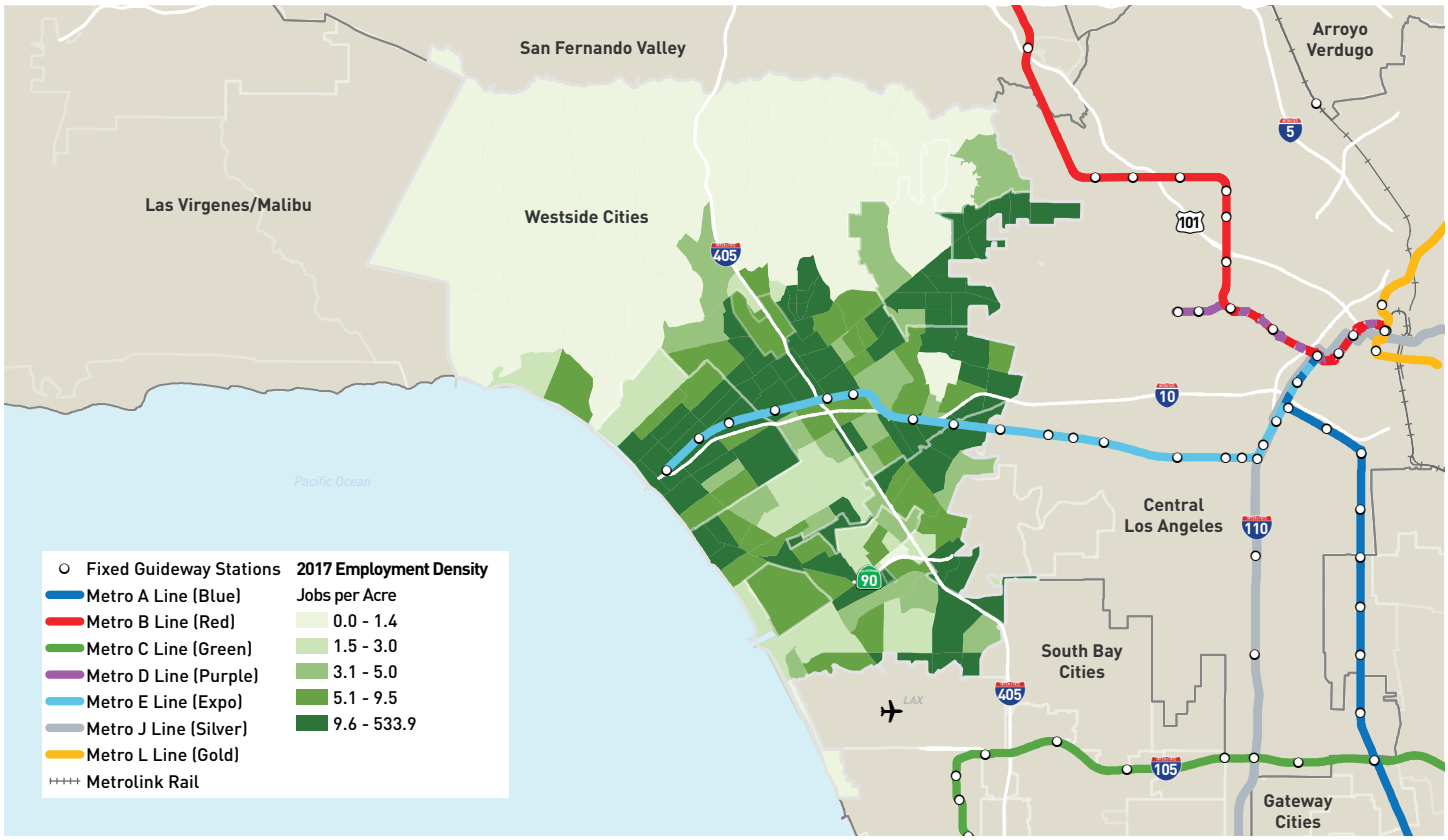


Figure 120

WESTSIDE CITIES POPULATION DENSITY

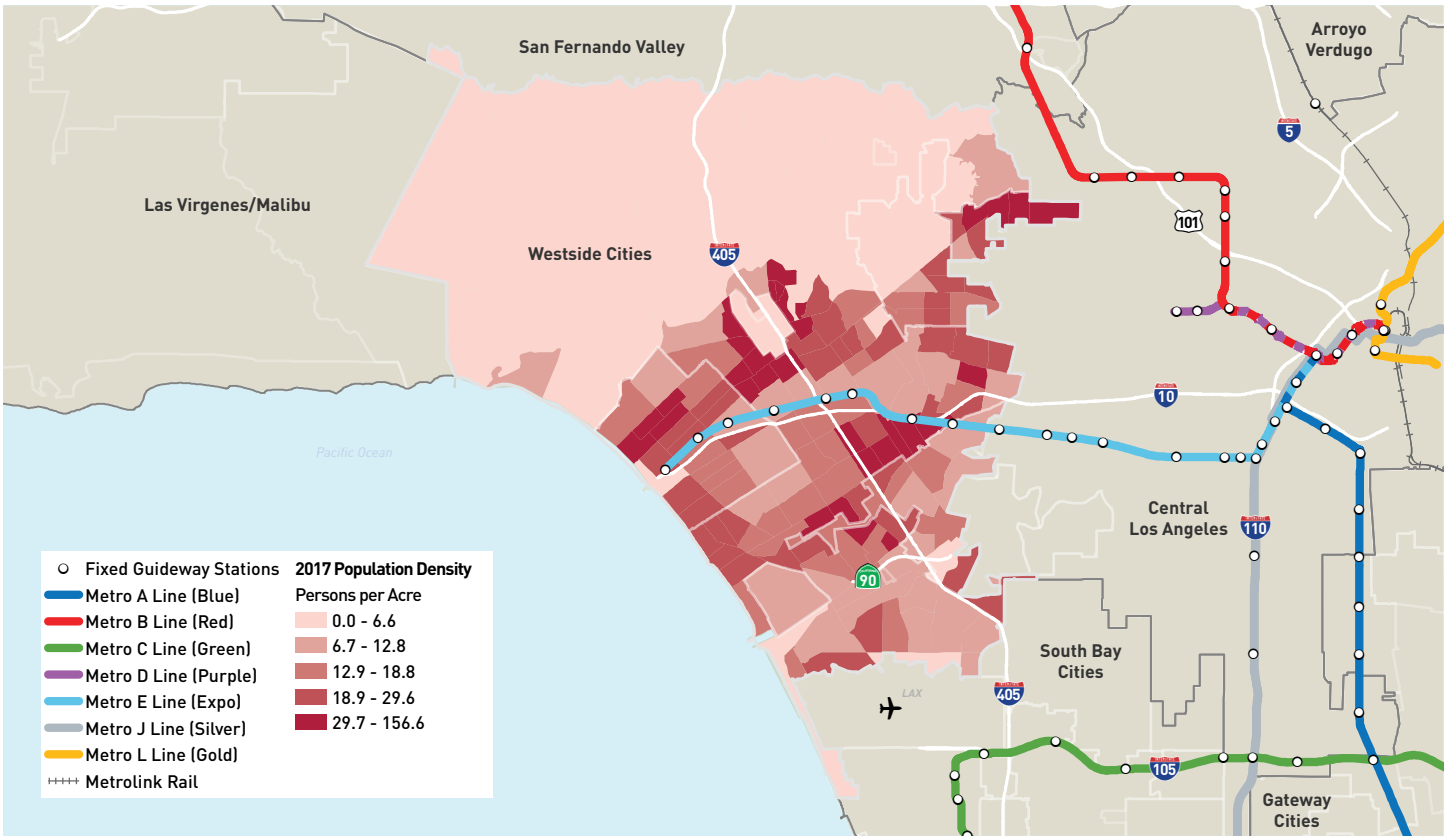


Figure 121

WESTSIDE CITIES LAND USE

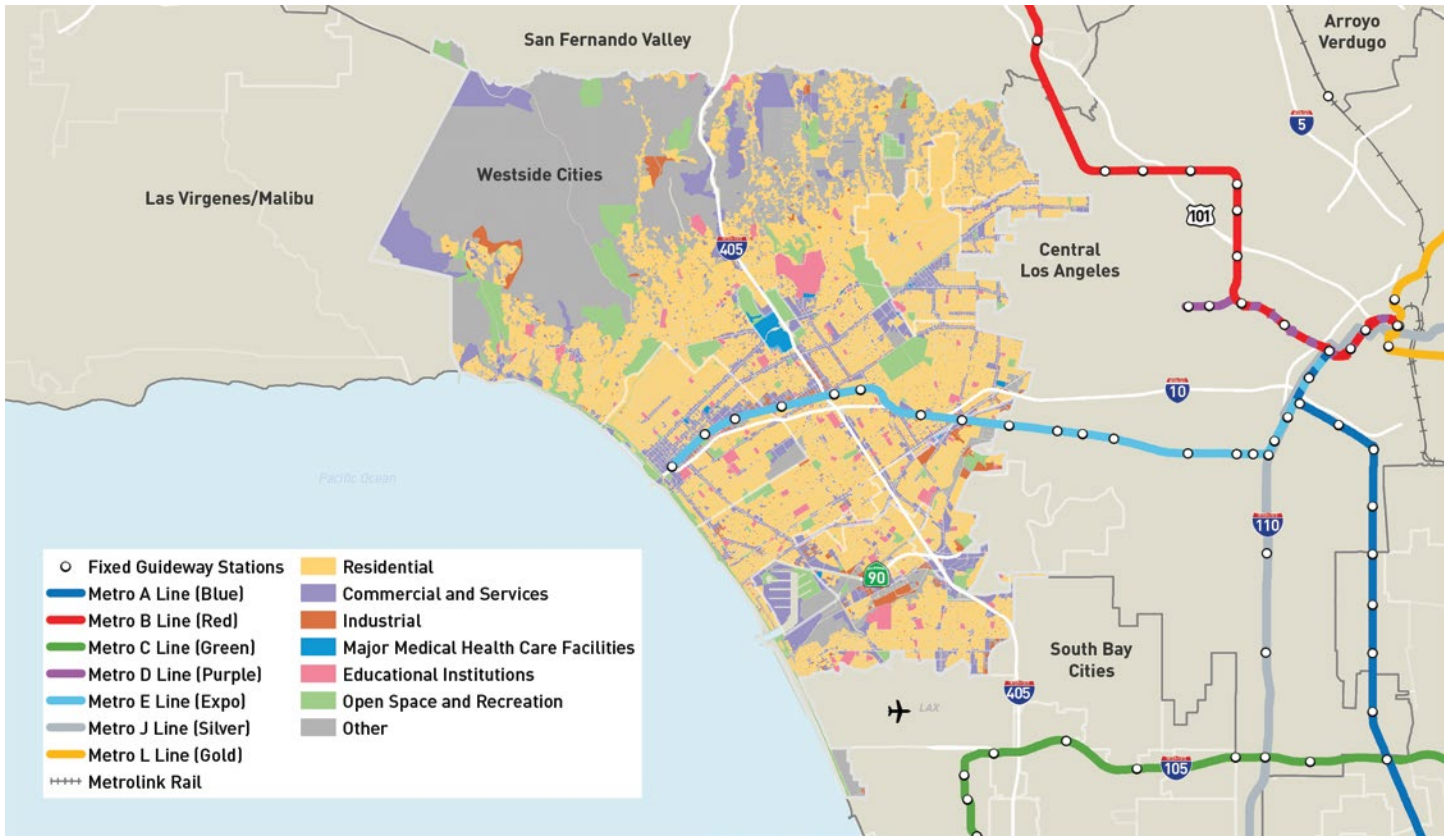
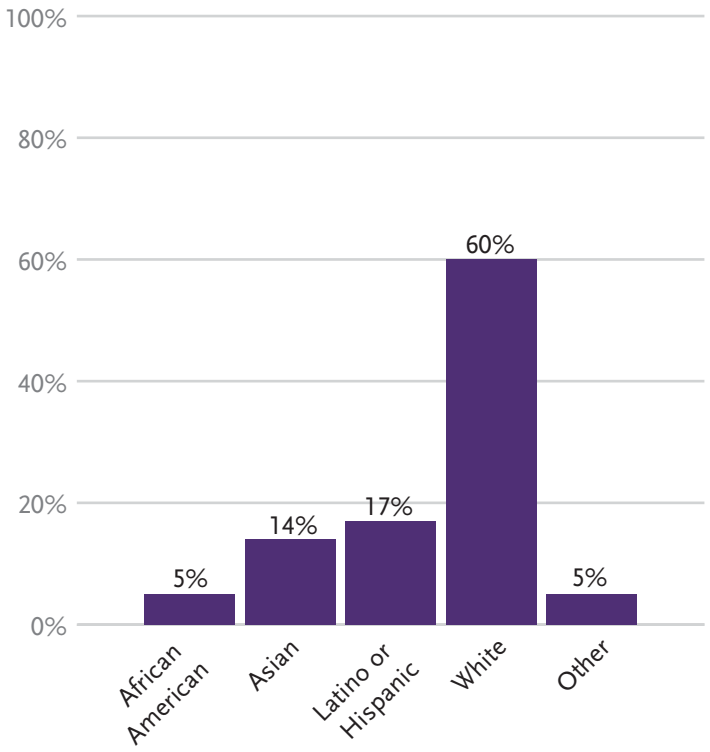


Figure 122

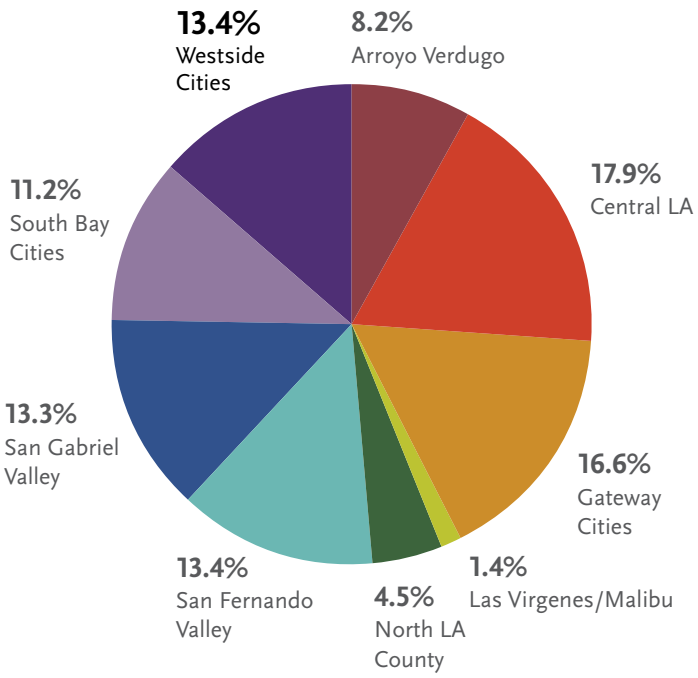
Westside Cities Summary Demographics

Total Area 111 Square Miles, Rank 8th (Out of 9 Subregions)

Total Population 653,289 People, Rank 7th



Total Employment 593,697 Jobs, Rank 4th



Median Household Income $93,182 Average MHI, Rank 4th

Glossary

511 – The National Traveler Information phone number that provides local freeway, transit, rideshare, airport, general emergency, and other traveler related services. 511 ensures that our region complies with this requirement of the federal SAFETEA-LU authorization program.

ACTIVE TRANSPORTATION – Refers to any non-motorized mode of travel such as walking, biking, and rolling. The objective is to improve mobility options, enhance quality of life, improve health and safety, and enable better access to goods and services.

ADA AMERICANS WITH DISABILITIES ACT – Federal civil rights legislation for disabled persons passed in 1990. It mandates that public transit systems make their services more fully accessible to the disabled. If persons with disabilities are not capable of accessing general public transit service, the law requires agencies to fund and provide for delivery of paratransit services which are capable of accommodating these individuals.

AQMD AIR QUALITY MANAGEMENT DISTRICT – Governmental agency established to monitor air quality within a region and to implement state and federal air quality standards through the development of regional air quality plans and regulations.

ARTERIAL STREET – A major thoroughfare, used primarily for through traffic rather than for access to abutting land, that is characterized by high-vehicular capacity and continuity of movement. The street is either divided or undivided and its main function is to carry non-local traffic at medium speeds.

AUTONOMOUS VEHICLE – A vehicle in which vehicle operation occurs without direct human driver input to control key functions such as steering, acceleration, and braking. There are various degrees of autonomy, but future systems will be principally designed so that the vehicle's passenger is not required to monitor the roadway or intervene in the operation of the vehicles in any way.

AUXILIARY LANE – The portion of the roadway adjoining the traveled way for speed change, turning, weaving, truck climbing, maneuvering of entering and leaving traffic, and other purposes supplementary to through-traffic movement.

AVO AVERAGE VEHICLE OCCUPANCY – The average number of persons occupying a passenger vehicle along a roadway segment, intersection, or area and monitored during a specified time period. For purposes of the California Clean Air Act, passenger vehicles include autos, light-duty trucks, passenger vans, buses, passenger rail vehicles and motorcycles.

BIF BUSINESS INTERRUPTION FUND – Metro's Business Interruption Fund (BIF) provides financial assistance to small "mom and pop" businesses directly impacted by transit rail construction through grants to cover certain fixed operating expenses.

BIKE SHARE PROGRAM – Metro's Bike Share system makes bikes available 24/7, 365 days a year in Downtown LA, Central LA, North Hollywood and the Westside. Metro Bike Share offers convenient round-the-clock access to a fleet of bicycles for short trips. Metro Bike Share is one of LA Metro's multiple public transportation options for Angelenos and visitors to get around.

BRT BUS RAPID TRANSIT – BRT combines the quality of rail transit with the flexibility of buses. It can operate on exclusive transitways, HOV lanes, expressways, or ordinary streets. A BRT system combines Intelligent Transportation Systems (ITS) technology, transit signal priority, rapid and convenient fare collection, enhanced transit stations, and integration with land use policy.

BSC BUSINESS SOLUTION CENTER – Metro's Business Solution Center (BSC) provides hands-on business assistance and support services to small businesses.

BTSP BICYCLE TRANSPORTATION STRATEGIC PLAN – Plan to enhance bicycling as a viable transportation mode for LA County.

BUS SPEED IMPROVEMENTS – Travel times for bus rider can be improved through the use of ITS, all-door boarding, and road design improvemets such as bus-only lanes or queue jumps that give buses priority movement.

BUSWAY – A street lane which is reserved for the exclusive use of buses, either in a separated right-of-way or on a city street.

CALTRANS CALIFORNIA DEPARTMENT OF TRANSPORTATION – Caltrans is the State's Transportation Department responsible for the design, construction, maintenance and operation of the California Highway System, including the Interstate Highway System within the state's boundaries.

CARPOOL – Arrangement in which two or more people share the use, cost or both of traveling in privately owned automobiles between fixed points on a regular basis.

CARPOOL LANE – A highway or street lane reserved for carpools and other high occupancy vehicles.

CHP CALIFORNIA HIGHWAY PATROL – The statewide law enforcement agency responsible for the management and regulation of traffic on Caltrans-designated freeways and highways to achieve safe, lawful and efficient use of the highway system.

CLIMATE CHANGE – A shift in global weather patterns resulting in an increase in the variability of temperature, precipitation, and wind in a region over a period of time. Recent studies suggest that emissions from gasoline powered internal combustion engines contribute to global climate warming, with 40% of GHG emissions attributable to transportation.

CMAQ CONGESTION MITIGATION AND AIR QUALITY IMPROVEMENT PROGRAM – Federal funds available for either transit or highway projects that contribute significantly to reducing automobile emissions which cause air pollution. Established by the Intermodal Surface Transportation Efficiency Act.

COMMUTER RAIL – Fixed-rail public transit system, generally utilizing heavy rail and track and providing service within a region. Metrolink is the commuter rail service in LA County.

COMPLETE STREETS – A comprehensive, integrated transportation network with infrastructure and design that allows safe and convenient travel along and across streets for all users, including pedestrians, users and operators of public transit, bicyclists, persons with disabilities, seniors, children, motorists, users of green modes, and movers of commercial goods.

COMPLETE STREETS POLICY – Adopted in 2014, Complete Streets is a high level policy direction that helps redefine how transportation agencies approach streets and highways so that the outcome is a transportation system that balances the needs of all users, regardless of age, ability, or mode of transportation.

CONGESTION PRICING – Congestion pricing is the concept of charging for the use of a transportation facility, such as a roadway, based on the level of congestion. The greater the level of congestion, usually occurring during morning and evening rush hours, the higher the cost to use the facility. The ultimate goal is to reduce traffic congestion and to dramatically improve equity, mobility, and environmental outcomes.

CONSTRAINED PLAN – Constrained Plan means our committed investments are programmed to match our anticipated funding.

CSP COUNTYWIDE SIGNAL PRIORITY PROGRAM – The Countywide Signal Priority (CSP) Program is the largest implementation of multi-jurisdictional signal priority in the nation. It established transit signal priority standards and is broadly adopted in LA County.

DBE DISADVANTAGED BUSINESS ENTERPRISE – A company is a DBE if it falls under the following general guidelines: the three-year average annual gross receipts are less than $23.98 million, the personal net worth of each owner is less than $1.32 million – excluding the equity in his or her primary residence, the company is an independent business, not a subsidiary and it is a for-profit business. Additionally, at least 51% of the company must be owned by one or more individuals that belong to one of the following socially and economically disadvantaged groups: African Americans, Hispanics, Native Americans, Asian Pacific Islanders, Subcontinent Asian Americans and non-minority women.

DRAYFLEX – DrayFLEX stands for Drayage, Freight, and Logistics Exchange and it is a technology application that provides freight-specific dynamic travel planning information to improve container movement in and around the Ports of Los Angeles and Long Beach.

DVBE DISABLED VETERANS BUSINESS ENTERPRISE – A company is a DVBE if the business is at least 51% owned by one or more disabled veterans, and if the daily business operations are managed and controlled by one or more disabled veterans

DYNAMIC PRICING – A toll collection strategy where tolls are continuously adjusted throughout the day according to traffic conditions to maintain a minimum designated speed.

ENVIRONMENTAL JUSTICE – The term stems from a 1994 presidential executive order to promote equity for disadvantaged communities and promote the inclusion of racial and ethnic populations and low-income communities in decision-making. Local and regional transportation agencies must ensure that services and benefits, as well as burdens, are fairly distributed to avoid discrimination.

EQUITY – Equity is both an outcome and a process to address racial, socio-economic, and gender disparities, to ensure fair and just access – with respect to where you begin and your capacity to improve from that starting point – to opportunities, including jobs, housing, education, mobility options, and healthier communities. It is achieved when one's outcomes in life are not predetermined, in a statistical or experiential sense, on their racial, economic, or social identities. It requires community informed and needs-based provision, implementation, and impact of services, programs, and policies that reduce and ultimately prevent disparities.

EQUITY FOCUS COMMUNITIES (EFCS) – Communities identified to measure and track future equity impacts from a transportation perspective.

EQUITY PLATFORM – Metro's multi-point platform provides a basis for Metro to actively lead and partner in addressing and overcoming disparities. It is based on an equity framework involving four key objectives: 1) Define & Measure, 2) Listen & Learn, 3) Focus & Deliver, and Train & Grow.

EXPRESSLANES – Metro ExpressLanes is a program designed to improve traffic flow and provide enhanced travel options in LA County. Tolls on the ExpressLanes are calculated using Congestion Pricing. Congestion pricing provides an opportunity to sell some of the additional capacity on the ExpressLanes to those willing to pay a toll and maximizes efficiency of the entire freeway.

FIXED GUIDEWAY – System of vehicles that can operate only on its own guideway constructed for that purpose (e.g. commuter rail, light rail).

FLM FIRST/LAST MILE – An individual trip is understood as the entire journey from origin to destination. Individuals may use a number of modes (types) of transport to complete a journey (walk, drive, ride, or roll).

FLM FIRST/LAST MILE STRATEGIC PLAN – The Plan is Metro's approach for identifying barriers and planning and implementing improvements for the first/last mile portion of an individual trip.

FSP FREEWAY SERVICE PATROL – Towing services funded by Metro to remove stalled vehicles from freeway lanes, especially during peak periods. The FSP also assists stranded motorists who may have run out of gas or need to change a tire.

GCP GREEN CONSTRUCTION POLICY – Metro's GCP aims to improve air quality through the implementation of best practices during planning, construction, operations, and procurement activities.

GHG GREENHOUSE GAS – Greenhouse gas is any gas including carbon dioxide, methane and ozone, whose absorption of solar radiation is responsible for the greenhouse effect, in which the atmosphere allows incoming sunlight to pass through but absorbs heat radiated back from the earth's surface. Greenhouse gases act like a heat-trapping blanket in the atmosphere, causing climate change.

GHGE GREENHOUSE GAS EMISSIONS – Greenhouse gas emissions are gases that trap heat in the atmosphere. Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities.

GOODS MOVEMENT STRATEGIC PLAN – The plan is a strategic framework to guide goods movement-related planning activities, investments, partnerships and decision-making.

GUIDEWAY – Facility housing a transit system, either a subway tunnel, at-grade trackway or busway, or aerial structure. Also see Fixed guideway.

HIGHWAY – A freeway or expressway which provides limited access for inter-regional or interstate travel or a major arterial which has been designated as part of the state highway system.

HOT LANE HIGH-OCCUPANCY/TOLL LANE – A designated carpool lane that motorists driving alone can use if they pay a toll, allowing them to avoid traffic delays in the adjacent regular lanes. Toll-paying drivers and toll-free carpools/vanpools share the lane, increasing the number of total vehicles using the HOV/HOT lane and generating revenues that can be used for transportation improvements.

HOV HIGH-OCCUPANCY VEHICLE – Any transportation vehicle carrying more than one person for travel purposes. This may include an automobile, bus, or train.

HOV LANE HIGH-OCCUPANCY VEHICLE LANE – A freeway lane reserved for use by vehicles carrying a specified minimum number of passengers, including buses, vanpools, and carpools. Motorcycles and certain alternatively-fueled vehicles are also permitted to use the lanes.

ICM INTEGRATED CORRIDOR MANAGEMENT – An ITS strategy to manage the capacity of a corridor utilizing existing and new technologies. ICM involves the close coordination and strategic planning of the multiple agencies and service providers in the area to manage traffic congestion on highways, arterials, and/or transit routes. ICM often enhances the communication between independent systems and provides alternate solutions to moving persons through an impacted area.

INTERMODAL – The term "mode" represents one method of transportation, such as automobile, transit, ship, bicycle or walking. Intermodal refers specifically to transportation trips using multiple modes.

ITS INTELLIGENT TRANSPORTATION SYSTEMS – Technical innovations that apply communications and information processing to improve the efficiency and safety of ground transportation systems.

JD JOINT DEVELOPMENT – As part of the real estate development program, Metro's JD collaborates with qualified developers to build transit-oriented developments on Metro-owned properties.

KISS AND RIDE – kiss and ride is the transfer point or area in which cars can stop briefly to discharge or, less commonly, pick up passengers.

LACDPW LOS ANGELES COUNTY DEPARTMENT OF PUBLIC WORKS – The transportation department for the County of Los Angeles.

LADOT LOS ANGELES DEPARTMENT OF TRANSPORTATION – The transportation department for the City of Los Angeles.

LIFE PROGRAM – The Low-Income Fare is Easy program provides transportation assistance to low-income individuals in LA County. The program offers fare subsidies that may be applied toward the purchase of fare on Metro or any participating agencies.

LRTP LONG RANGE TRANSPORTATION PLAN – Metro's plan to assess future population increases projected for the county and what such increases will mean for future mobility needs. The plan recommends what can be done within anticipated revenues, as well as what could be done if additional revenues became available. The 2009 LRTP is an update to the 2001 Long Range Transportation Plan for future transportation investments in LA County through 2040.

MAAS MOBILITY AS A SERVICE – Mobility as a Service (MaaS) is the integration of various forms of transport services into a single mobility service accessible on demand.

MEASURE M – A sales tax initiative approved by LA County voters in 2016 titled the Los Angeles County Traffic Improvement Plan. Measure M is a one-half cent sales tax to be used to ease traffic congestion, expand rail/subway/bus; improve jobs/school/airport connections; and create jobs among other goals.

MEASURE R – A sales tax initiative approved by LA County voters in 2008. Measure R established a one-half cent sales tax to be used for public transportation purposes, ending in 2039.

METRO RAIL – Metro's light rail and subway transit system.

METRO RAPID – Metro's Bus service on key transit corridors with several attributes to provide faster bus service including a distinctive look, traffic signal priority and fewer stops.

METROLINK – Southern California's regional commuter rail system connecting Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. Service began in October 1992.

MICRO MOBILITY – Micromobility refers to the use of electronic scooters and bikes to travel shorter distances around cities, often to or from another mode of transportation (bus, train, or car). Users typically rent such a scooter or bike for a short period of time using an app.

MICROTRANSIT – IT-enabled private multi-passenger transportation services that serve passengers using dynamically generated routes, and may expect passengers to make their way to and from common pick-up or drop-off points.

MOD MOBILITY ON DEMAND – Mobility on Demand is an innovative, user-focused approach which leverages emerging mobility services, integrated transit networks and operations, real-time data, connected.

MODE SHARE – Indicates the share of a transportation mode utilized by people for their transportation trips as compared to other modes and all of a region's transportation trips as a whole.

MPH MILES PER HOUR – Speed described as the distance traveled in one hour.

MSP MULTI-YEAR SUBREGIONAL PROGRAM – MSP is established under Measure M to provide Measure M programming funding for subregions in LA County based on the MSP guidelines.

MTP MICROTRANSIT PILOT PROJECT – Metro's MicroTransit Pilot is an innovative, three-year pilot project that will use professionally trained Metro employees to provide on-demand shared rides in smaller vehicles for short trips in six designated service areas in LA County.

MULTIMODAL – A transportation system which employs a combination of modes, such as highway, bus, rail, high occupancy vehicles, bikeway, and pedestrian and demand management systems.

NAVILENS – NaviLens is an audio wayfinding technology to assist and aid the autonomy of blind and visually impaired travelers in Union Station.

O&M OPERATIONS AND MAINTENANCE – These are the costs associated with the regular running of a transportation facility or service, including labor, vehicle maintenance, operations and overall facility maintenance.

PARATRANSIT – Flexible forms of transportation services that are not confined to a fixed route. Paratransit is generally used to provide service for people with disabilities in compliance with the Americans with Disabilities Act of 1990 (ADA).

PARKING MANAGEMENT – To support the implementation of a balanced TDM program, parking management is essential in working in tandem in significantly reducing automobile travel by removing free parking at high parking demand and congested destinations.

PEAK PERIOD – The period during which the maximum amount of travel occurs. It may be specified as the morning (AM) or afternoon or evening (PM) peak.

PM PARTICULATE MATTER – Mixture of extremely small particles and liquid droplets made up of a number of components, including acids, organic chemicals, metals, and soil or dust particles. The size of the particles is directly linked to their potential for causing health problems. Of particular concern are those particles that are ten micrometers in diameter or smaller that can be inhaled into the lungs and potentially cause serious health effects.

PROP A – Proposition A is a sales tax initiative approved by the LA County voters in 1980. The proposition established a one-half cent sales tax to be used for public transportation purposes.

PROP C – Proposition C is a sales tax initiative approved by the LA County voters in 1990 that established a one half-cent sales tax to be used for public transportation purposes.

RAMP METERING – A freeway to which access is controlled by entrance ramp signals that use fixed-time signal settings or is regulated by a computerized surveillance system. This procedure is used to prevent freeway congestion.

RIDESHARE – The term generally refers to carpooling and vanpooling.

RIDESHARING – Two or more persons traveling by any mode, including but not limited to, automobile, vanpool, bus, taxi, jitney, and public transit.

RIITS NETWORK REGIONAL INTEGRATION OF INTELLIGENT TRANSPORTATION SYSTEMS – Metro sponsors the network. Caltrans, LADOT, California Highway Patrol and Metro all contribute information collected through their own Intelligent Transportation Systems. The network supports information exchange in real-time between freeway, traffic, transit and emergency service agencies to improve management of the LA County transportation system and better serve the traveling public.

RTPA REGIONAL TRANSPORTATION PLANNING AGENCY – A state-designated agency responsible for preparing the Regional Transportation Plan (RTP) and the Regional Transportation Improvement Program (RTIP), administering state funds, and other regional transportation planning tasks.

SB 1 – Signed into law on April 28, 2017, new revenues focus on road safety improvements, repair local streets, expand public transit, improve highways, build bridges and overpasses. Also provides $5.4 billion per year over the next decade to fund transportation improvements.

SB 1 SGR STATE OF GOOD REPAIR – These funds are available for eligible transit maintenance, rehabilitation, and capital projects and are based on a distribution formula using State Transit Assistance Funds (STA).

SBE SMALL BUSINESS ENTERPRISE – A company is an SBE if it falls under the following general guidelines: the three-year average annual gross receipts are less than $23.98 million, the personal net worth of each owner is less than $1.32 million – excluding the equity in his or her primary residence, the company is an independent business, not a subsidiary and it is a for-profit business.

SCAG SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS – SCAG is the federally-designated Metropolitan Planning Organization (MPO) for six counties (Los Angeles, Orange, San Bernardino, Riverside, Ventura and Imperial). It is the regional agency responsible for developing a regional transportation plan for the six-county region.

SCAQMD SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT – A regional agency which adopts and enforces regulations to achieve and maintain state and federal air quality standards. It is responsible for preparing the Air Quality Management Plan (AQMP) for the South Coast Air Basin. Also known as the AQMD.

SCRRA SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY – The five county regional joint powers authority responsible for the operation of the Metrolink commuter train service.

SHOPP STATE HIGHWAY OPERATIONS AND PROTECTION PROGRAM – The state funding category used by Caltrans to maintain and operate state highways.

SRTP SHORT RANGE TRANSPORTATION PLAN – The 2014 Short Range Transportation Plan focuses on the phasing of transportation improvements through 2024 and relies on performance-based modeling to identify the best solution for each mobility challenge.

SIGNAL SYNCHRONIZATION – Traffic signal synchronization refers to the functioning relationship between active signals along a corridor. A common cycle length is established for all intersections in the coordinated system. By maintaining a constant relationship between the signals at all times, there is a greater likelihood that mobility will be improved. This does not mean that the signals will provide a green light at the same time for the entire length of a corridor; rather, that each signal will quite literally be synchronized with the entire system, allowing for more efficient mobility.

SMART GROWTH – A set of policies and programs designed to protect, preserve and economically stimulate established communities while protecting valuable natural and cultural resources and limiting sprawl.

SOUNDWALL – Noise control walls and barriers built between highways and nearby homes that can reduce noise levels by 10-15 decibels.

SOV SINGLE-OCCUPANT VEHICLE – A vehicle with only one occupant. Also known as a "drive alone."

SUBREGIONS – The nine geographic subregions of LA County include Arroyo Verdugo, Central Los Angeles, Gateway Cities, Las Virgenes/Malibu, North Los Angeles County, San Fernando Valley, San Gabriel Valley, South Bay Cities and Westside Cities.

SUSTAINABILITY – A manner to meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

TAM TRANSIT ASSET MANAGEMENT – A business model that uses the condition of assets to guide the optimal prioritization of funding at transit properties in order to keep transit networks in a State of Good Repair.

TAP TRANSIT ACCESS PASS – Transit pass, a plastic card with an embedded smart card chip, is designed to apply fare payments at fareboxes, ticket vending machines, and other participating agencies.

TDM TRANSPORTATION DEMAND MANAGEMENT – Involves various strategies aimed at increasing the efficient use of transportation systems. The benefits focus on reducing single occupancy vehicles, road and parking congestion, pollution reduction, and increasing transit ridership, and more efficient land use.

TNC TRANSPORTATION NETWORK COMPANY – Transportation Network Companies provide prearranged transportation services for compensation using an online-enabled application or platform (such as smart phone apps) to connect drivers using their personal vehicles with passengers.

TOC TRANSIT ORIENTED COMMUNITIES – TOCs include land use planning and community development policies that maximize access to transit as a key organizing principle and acknowledge mobility as an integral part of the urban fabric.

TOC POLICY – In June 2018, the Metro Board adopted the TOC Policy in an ambitious effort to formalize Metro's commitment to partner with the 88 cities and unincorporated areas in LA County to support "TOC activities."

TOD TRANSIT ORIENTED DEVELOPMENT – A type of development that links land use and transit facilities to support the transit system and help reduce sprawl, traffic congestion and air pollution. It calls for locating housing, along with complementary public uses (jobs, retail and services) at strategic points along a transit line.

TRANSITWAY – A transportation corridor dedicated for exclusive or preferential use by public transit vehicles, including rail vehicles, buses, carpools and vanpools.

TRANSPORTATION INFRASTRUCTURE – Transportation infrastructure generally refers to the built transportation system including highways, bridges, railways, ports, and transit facilities. Infrastructure for "transit" systems includes the fixed components of the transit system, such as rights-of-way, buses and rail vehicles, tracks, signal equipment, stations, park-and-ride lots, bus stops and maintenance facilities.

TSM TRANSPORTATION SYSTEM MANAGEMENT – That part of the urban transportation planning process undertaken to improve the efficiency of the existing transportation system by better managing the system. The intent is to make better use of the existing transportation system by using short-term, low-capital transportation improvements that generally cost less and can be implemented more quickly than major capital projects.

U-PASS THE UNIVERSAL COLLEGE STUDENT TRANSIT PASS – The U-Pass provides college students of participating schools with greater fare discounts and an expedited activation process that is administered directly on campus.

VANPOOL – A vanpool is a group of five to 15 commuters who regularly travel together to work in a comfortable van, minivan, or SUV, at least three days per week.

VEHICLE OCCUPANCY – The number of people aboard a vehicle at a given time; also known as auto or automobile occupancy when the reference is to automobile travel only.

VEHICLE TRIP – A one-way movement of a vehicle between two points.

VMT VEHICLE-MILES TRAVELED – The number of miles that vehicles are driven over a certain time period (usually a day or a year). VMT are key data for highway planning and management, and a common measure of roadway use. This data allows analysts to estimate on-road vehicle fuel consumption, congestion, air quality, and potential gas-tax revenues.

VSH VEHICLE SERVICE HOURS – The total hours of revenue service operated by transit service vehicles. This does not include deadhead hours.

WIN-LA WORKFORCE INITIATIVE NOW IN LOS ANGELES – WIN-LA is Metro's workforce development program created to focus on careers in the transportation industry.

ZERO EMISSIONS – Refers to a type of engine or energy source that emits no waste products that pollute the environment and does not contribute to climate change.

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