



DESIGNING TOMORROW

2018 LONG RANGE TRANSPORTATION PLAN

Draft

August 2018



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2018 Long Range Transportation Plan

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Attachment A - Trend 2040 Projects

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Executive Summary

2018 Long Range Transportation Plan

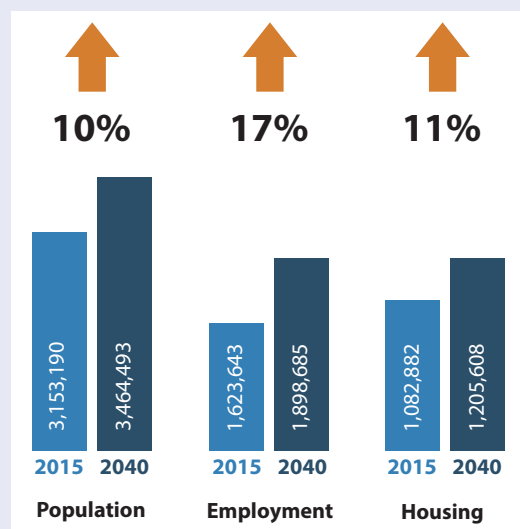
Executive Summary

The Orange County Transportation Authority (OCTA) was created in 1991 through the consolidation of seven separate transportation planning agencies. Since that time, Orange County has transformed from a Los Angeles bedroom community to a vibrant, independent economy of its own. OCTA played a major role in this growth by keeping residents and commuters moving throughout Orange County's 34 cities and the unincorporated County areas. This is exemplified through successful implementation and operation of transportation projects and services over the years, including well over 1 billion bus passenger trips, approximately 62 million Metrolink passenger trips, in excess of 200 miles of freeway lanes constructed, and 2,000 synchronized traffic signals.

In order to accommodate future growth in population, employment, and housing, OCTA must continue to improve upon the existing transportation system. Within this setting, transportation leaders have developed *Designing Tomorrow*, Orange County's long-range transportation plan to keep its transportation systems operating efficiently, effectively, and in keeping with the needs and desires of its residents.

2040 Baseline Conditions

Analysis by the Center for Demographic Research shows Orange County's population, employment, and housing are expected to continue growing for the foreseeable future. To understand how much of an impact the projected growth will have on the transportation system, OCTA analyzed a scenario referred to as 2040 Baseline. This scenario considers how the transportation system would operate in 2040 if no investments or changes were made after 2015. The result showed that without additional transportation improvements, the percent of time spent in traffic will increase 41 percent as average speeds decline on Orange County's highways and roadways by approximately six percent. The performance of this 2040 Baseline scenario is shown below in comparison to 2015 conditions.



TRANSPORTATION SYSTEM PERFORMANCE SUMMARY (2015 TO 2040)

Performance Metric	2015 Base Year	2040 Baseline
Delay as a percent of travel time	15.2%	21.4%
Freeways - AM peak average speed (mph)	38.3 miles per hour	36.2 miles per hour
Arterials - AM peak average speed (mph)	25.7 miles per hour	24.3 miles per hour

What is a Long-Range Transportation Plan (LRTP)?

Designing Tomorrow, OCTA's vision for mobility over the next 20+ years, is known as a long-range transportation plan. Orange County's long-range transportation plan is updated every four years to reflect changing demographics, economic trends, and mobility needs. It also serves as Orange County's input into regional planning efforts for southern California.

The Southern California Association of Governments (SCAG) is required by the state of California and the federal government to develop a Regional Transportation Plan/Sustainable Communities Strategy, also every four years. Orange County's transportation projects must be included in the Southern California Regional Transportation Plan/Sustainable Communities Strategy in order to be eligible for federal and state funding, and to progress through design and construction.

Establishing the Framework for the Long-Range Transportation Plan

Creating transportation solutions for the future requires developing and analyzing a range of scenarios, and ultimately defining a preferred transportation plan. The plan must take into account the many challenges facing a county that is continuing to grow. *Designing Tomorrow* does just that – it contains a set of goals that considers financial constraints, shifting interest in modes of transportation, and environmental regulations. It also supports exploring opportunities that come with the emergence of new technology and innovation that could substantially change the face of transportation in the next 20+ years.

Challenges

- High Cost of Housing
- Limited Land for System Expansion
- Transportation Funding Uncertainties
- Evolving Transit Market
- Disruptive Technologies
- Challenging Emission Standards

Goals

- Deliver on Commitments
- Improve System Performance
- Expand System Choices
- Support Sustainability

The 2040 Improvement Plan

The growing travel demand highlighted in the 2040 Baseline scenario is addressed through a financially-constrained multi-modal strategy in the Trend 2040 scenario. This scenario delivers on OCTA's commitments, improves system performance, expands transportation choices, supports sustainability, and aligns with stakeholder input. A listing of the Trend 2040 projects is shown in the tables on the following pages.

TREND 2040 PROJECT LIST - HIGHWAY PROJECTS

Corridor	Description	Regular Lanes	HOV Lanes	Express Lanes	Toll Roads	Inter-change
Measure M Projects						
I-5	Project A – Add one HOV in each direction from SR-55 to SR-57, plus auxiliary lanes as needed		X			
I-5	Project B – Add one regular lane NB from truck bypass on-ramp to SR-55; Add one regular lane SB from SR-55 to Alton Parkway; improve merging	X				
I-5	Project C – Add one regular lane in each direction from SR-73 to Alicia Parkway, and one HOV lane each in direction from Alicia Parkway to El Toro Road, and improve La Paz Road and Avery Parkway interchanges	X	X			X
I-5**	Project C – Add one HOV in each direction from Pacific Coast Highway to Avenida Pico, and reconfigure interchange at Avenida Pico		X			X
I-5	Project D – Improve access and merging in the vicinity of El Toro Road					X
SR-55	Project F – Add one regular lane and one HOV lane in each direction from I-405 to I-5, and fix chokepoints	X	X			
SR-55	Project F – Add one regular lane in each direction and fix chokepoints from I-5 to SR-22; make other operational improvements from I-5 to SR-91	X				
SR-57	Project G – Add one regular lane NB between Orangewood Avenue and Katella Avenue	X				
SR-57	Project G – Add one NB truck climbing lane from Lambert Road to Los Angeles County line	X				
SR-91**	Project H – Add one regular lane WB from I-5 to SR-57	X				
SR-91**	Project I – Add one regular lane WB from SR-55 to Tustin Avenue	X				

*Under construction
**Completed since 2015

NB - Northbound
SB - Southbound

EB - Eastbound
WB - Westbound

TREND 2040 PROJECT LIST - HIGHWAY PROJECTS CONTINUED

Corridor	Description	Regular Lanes	HOV Lanes	Express Lanes	Toll Roads	Inter-change
Measure M Projects						
SR-91	Project I – Add one regular lane EB from SR-57 to SR-55; add one regular lane WB from SR-57 NB connector to State College Boulevard; improve interchanges and merging from Lakeview Avenue to Raymond Avenue	X				
SR-91	Project J – Add one regular lane in each direction from SR-241 to county line	X				
I-405*	Project K – Add one regular and one express lane from I-605 to SR-73, convert existing HOV to express, and provide additional capital improvements	X		X		
I-405	Project L – Add one regular lane in each direction from I-5 to SR-55, and add SB auxiliary lane from SR-133 to Irvine Center Drive	X				
I-605	Project M – Improve interchange at Katella Avenue					X
	Project N – Freeway Service Patrol					
Additional Projects						
I-5	Add one HOV lane in each direction from SR-57 to SR- 91		X			
I-5	Add one HOV lane in each direction from Avenida Pico to San Diego County line		X			
I-5	Barranca Parkway HOV interchange improvement - Add SB HOV on-ramp and northbound HOV off-ramp					X
SR-55	Improve access and merging in the vicinity of Meats Avenue					X
SR-57	Interchange Improvement at Lambert Road					X
SR-73	Add one HOV lane in each direction from MacArthur Boulevard to I-405		X			
SR-91	Construct overcrossing and interchange at Fairmont Boulevard					X
SR-91	Express Lanes - Operations and maintenance					
I-405*	Add one express lane in each direction from I-605 to SR-73, convert existing HOV to HOT, and provide additional capital improvements			X		
I-405	Add auxiliary lanes from University Drive to Sand Canyon Ave, and from Sand Canyon Ave to SR-133	X				

*Under construction
**Completed since 2015

NB - Northbound
SB - Southbound

EB - Eastbound
WB - Westbound

TREND 2040 PROJECT LIST - HIGHWAY PROJECTS CONTINUED

Corridor	Description	Regular Lanes	HOV Lanes	Express Lanes	Toll Roads	Inter-change
Additional Projects						
I-405	Express Lanes – Operations and maintenance					
	Motorist services (511 service and call box network)					
Projects from External Agencies						
SR-241 SR-261 SR-133	Build out to three to four toll lanes in each direction from SR-91 to I-5 (via SR-261 and SR-133), plus climbing and auxiliary lanes				X	
SR-241	Build out to four to five toll lanes in each direction, plus climbing and auxiliary lanes, south of SR-133				X	
SR-73	Build out to four toll lanes in each direction, plus climbing and auxiliary lanes				X	
SR-133	Add new interchange at Trabuco Road/Great Park Boulevard (North Irvine Transportation Mitigation Program)				X	X
SR-241	Add Express Lane Connector to SR-91 Express Lanes				X	
SR-91	RCTC to add one regular lane from county line to SR-71	X				

TREND 2040 PROJECT LIST - STREETS AND ROADS

Corridor	Description
Measure M Projects	
Countywide	Project O – Master Plan of Arterial Highways build out
Grade Separations**	Project O – Grade separations along BNSF corridor at Raymond Ave and State College Boulevard
Countywide	Project P – Signal synchronization program
Additional Projects	
Countywide	Arterial Pavement Rehab
Grade Separations	Along LOSSAN corridor at 17th Street, State College, and Santa Ana Boulevard
Countywide	OC Bikeways

*Under construction

**Completed since 2015

TREND 2040 PROJECT LIST - TRANSIT

Description
Measure M Projects
Project R – Metrolink Capital – Supports service increase from 54 to 86 weekday trains
Project R – Metrolink Service Expansion Program station improvements
Project S – OC Streetcar
Project U – Senior Mobility Program
Project U – Senior Non-Emergency Medical Transportation Program
Project W – Safe Transit Stops
Additional Projects
OC Bus 360° – Bus Efficiency Strategy
North Harbor Corridor – High-quality transit between Cal State Fullerton and the Santa Ana Regional Transportation Center
17th/Westminster & Bristol Corridor – High-quality transit between the Goldenwest Transportation Center and the University of California, Irvine
South Harbor Corridor – High-quality transit between 17th/Westminster and Hoag Hospital Newport Beach
Bristol & State College Corridor – High-quality transit between Brea Mall and Downtown Santa Ana
Beach Corridor – High-quality transit between Fullerton Park-and-Ride and Downtown Huntington Beach
La Palma Corridor – High-quality transit between Hawaiian Gardens and Anaheim Canyon Station
McFadden & Bolsa Corridor – High-quality transit between Goldenwest Transportation Center and Larwin Square
Main Corridor – High-quality transit between Anaheim Regional Transportation Intermodal Center and the South Coast Plaza Park-and-Ride
Chapman Corridor – High-quality transit between Hewes and Beach
Interstate 5 Corridor – Freeway BRT between Fullerton Park-and-Ride and Mission Viejo/Laguna Niguel Metrolink Station
State Route 55 Corridor – Freeway BRT between Santa Ana Regional Transportation Center and Hoag Hospital Newport Beach
Metrolink Operations (increase from 54 to 86 weekday trains)
OC Flex – On-demand shared-ride microtransit service
LOSSAN – Laguna Niguel to San Juan Capistrano rail passing siding
Transit Security and Operations Center
Vanpool

TREND 2040 PROJECT LIST - OTHER

Description
Measure M Projects
Project X – Transportation-related water quality program
Additional Projects
Bond Interest

The Trend 2040 scenario can be delivered within OCTA's projected revenues of \$42.3 billion dollars over the life of the plan (2019-2040). The majority of these funds are locally controlled (68 percent), along with state funds comprising 22 percent and federal funds making up 10 percent. The allocation of these funds was prioritized first to deliver on OCTA's commitments, which are comprised of three main components: completion of OC Go (also known as Measure M - Orange County's one-half cent sales tax administered by OCTA), non-OC Go projects that have secured funding, as well as maintaining transit service levels and motorist services programs. Together these three components require about 84 percent of the available revenues.

Trend 2040 also outlines additional improvement projects beyond these commitments using the remaining 16 percent, or approximately \$7 billion, of projected funding. These discretionary funds were used to fund projects and services that further address the 2018 long-range transportation plan goals and challenges. These projects are typically selected from plans that have been publicly vetted, such as the OC Transit Vision, Regional Bikeways plans, Metrolink Strategic Plan, and locally preferred alternatives from OCTA's major investment studies.

PROPOSED TREND 2040 EXPENDITURE BY MODE

Mode	Expenditure
Highway Projects	\$8,546,999
Roadway Projects	\$14,361,388
Transit Projects	\$17,988,262
Other (OC Go Environmental Programs, Bond Interest, etc.)	\$1,352,960

Changing Carpool Lane Standards

The performance of the carpool lane system in Orange County is a challenge, in that it must comply with federal performance standards that are not being met today. To meet these standards, initiatives are being pursued by the California Department of Transportation (Caltrans) to increase the number of passengers required to three or more. Additionally, Caltrans and neighboring counties are planning to have many of these carpool lanes allow vehicles with fewer than three passengers to also use the carpool lanes for a fee. Since a significant amount of funding is at stake if the federal standards are not met, *Designing Tomorrow* evaluated the options, as shown in the chart below. It was determined that, based on what OCTA knows today, the most reasonable option is to assume that the carpool lane system will likely operate as carpool/tolled express lanes by 2040. Therefore, this was assumed in the analysis of the Trend 2040 scenario.

CARPOOL LANE PERFORMANCE SUMMARY

Metrics	Carpool 2+	Carpool 3+	Express Toll
Meets federal performance standards	No	Yes	Yes
Managed lane capacity used during morning drive time	70%	30%	60%
Findings summary	Does not meet federal standard due to overuse	Meets federal standard, but underused	Meets federal standard and doubles use compared to carpool 3+

Achieving the Goals and Performance

Trend 2040 keeps promises made to voters through OC Go and meets the long-range transportation plan goal of **delivering on commitments**. The performance metrics below indicate that the efficiency of the Orange County transportation system improves significantly under the Trend 2040 scenario, nearly matching the 2015 Base Year despite a 10 percent increase in population and a 17 percent increase in employment. Therefore, Trend 2040 is meeting the goal of **improved system performance**. Additionally, Trend 2040 supports the goal of **expanding system choices** by investing in development of transit, active transportation, and rideshare options. Finally, Trend 2040 can be accomplished within the funds projected to be available between now and 2040, making the plan **financially sustainable** for OC taxpayers. It also includes system maintenance programs and programs to improve the quality of life for Orange County residents, such as land acquisition and environmental mitigation projects that not only provide open space but also offset greenhouse gas emissions. Thus, Trend 2040 achieves both financial, infrastructural, and environmental sustainability.

Taking a closer look at the performance of the Trend 2040 scenario as compared with the 2040 Baseline, the percent of travel time in traffic is reduced 28 percent, while freeway and arterial speeds increase 9 percent and 6 percent, respectively. Additionally, transit trips are projected to increase approximately 6 percent.

TRANSPORTATION SYSTEM PERFORMANCE SUMMARY

Metrics (daily)	2015 Base Year	2040 Baseline	Trend 2040
Delay as a percent of travel time	15.2%	21.4%	15.5%
Transit trips	149,000	165,000	174,000
Freeways - AM peak average speed (mph)	38.3	36.2	39.5
Arterials - AM peak average speed (mph)	25.7	24.3	25.8

Note: Trend 2040 assumes managed lanes are operated as carpool/tolled Express Lanes by 2040

Designing in a Changing World

Advancing technologies and services, ranging from on-demand and remote transportation options to car-and bike-sharing to autonomous vehicles, are already operational or expected to be a part of the transportation landscape in the not-too-distant future. As groundbreaking technologies and services offer new transportation possibilities, they will significantly change travel behavior and patterns, and in turn, greatly impact the infrastructure and support systems needed to keep Orange County residents mobile.

Given this reality, a 20-year transportation plan must acknowledge that change related to new technologies is inevitable. Therefore, *Designing Tomorrow* includes two “discussion scenarios” to explore a sample of many possible futures that may take shape by 2040. The first is the Innovation scenario that considers potential impacts of certain technological innovations on travel behavior, in addition to the Trend 2040 investments and assumptions. The second is the Policy scenario, which builds on the Innovation scenario to also consider how policy changes being discussed at the state and regional levels could further influence travel behavior and leverage some of the technological innovations.

When comparing the performance of the Innovation discussion scenario to Trend 2040, it appears that autonomous vehicles, telecommuting technologies, and on-demand ridehailing services may not provide a focused benefit to the transportation system. Except for average freeway speeds, all other performance measures worsen under the Innovation scenario: arterial speeds decline, transit trips drop, and there is greater delay in travel times. This is primarily due to the assumption that autonomous vehicles will be accessible to many individuals who cannot operate vehicles today, as well as the introduction of zero-occupant trips, which together increase vehicle miles traveled and congestion. However, if policies are put in place to maximize the impact of technology on travel behavior, the performance measures show better outcomes.

Examples of policies that leverage innovations could include: allowing autonomous vehicles to access carpool lanes, like today’s clean air vehicle policy; providing telecommuting incentives to businesses; and policies that support ridesharing, including additional park-and-ride lots. Additionally, policies that are more independent from innovations can also substantially influence travel behavior. These could include mileage-based user fees, priced parking, and policies that enhance land use diversity and connectivity with active transportation facilities and transit services. The Policy scenario adds assumptions to the Innovation scenario that are intended to represent the types of policies described above. When comparing the Policy discussion scenario with Trend 2040, system performance improves significantly: there is a nearly 30 percent decrease in travel time delay, and freeway and arterial speeds increase by approximately 24 percent and 9 percent, respectively.

This highlights the important role policy will play to help guide how innovations should be implemented, as well as the level of direct impact policy can have on travel behavior. The development of these influential innovations and policies will continue to be monitored by OCTA for further discussion, as noted in the short-term Action Plan.

TRANSPORTATION SYSTEM PERFORMANCE SUMMARY

Metrics (daily)	Trend 2040	Innovation	Policy
Delay as a percent of travel time	15.5%	17%	11%
Transit trips	174,000	171,000	170,000
Freeways - AM peak average speed (mph)	34.4	34.4	42.7
Arterials - AM peak average speed (mph)	25.8	25.4	28

Future Efforts

In closing, *Designing Tomorrow* outlines several conceptual projects that go beyond the Trend 2040 financially constrained scenario that may further achieve the goals of the plan. As these conceptual projects become defined and refined through stakeholder input and environmental analyses, OCTA may consider including them in the financially constrained scenario of future LRTPs, subject to funding availability.

CONCEPTUAL PROJECT LIST

Description
Local Arterial Projects
Crown Valley Parkway – I-5 to Greenfield Drive lane additions beyond MPAH
Cabot Road – Paseo de Colinas to Camino Capistrano lane additions beyond MPAH
Harbor Boulevard/Ball Road gradeseparated intersection
Harbor Boulevard – Warner Avenue to 17th Street lane additions beyond MPAH
Laguna Canyon Road – El Toro Road to Canyon Acres Drive
OC Intersections Assessment recommendations
MPAH Complete Streets Assessment recommendations
OC Active recommendations
Countywide Communications Study (ITS) recommendations
Highway Projects
Ortega Highway – Operational Improvements
I-5 – Avenida Pico to Avenida Vaquero truck lane
Freeway Chokepoints (TBD)
Direct access ramps (TBD) – Managed lane and high-capacity transit support
Transit Projects
Metrolink expansion (increase from 86 to 98 weekday trains)
Other Projects
OC Goods Movement Study recommendations
Projects from External Agencies
SR-73/Glenwood intersection improvement (Phase III) - TCA
FTC South – SR-241/Oso Parkway to I-5 (San Diego) – TCA

Designing Tomorrow also identifies several short-term activities to keep OCTA moving forward by continuing to plan and evolve by working with partner agencies, engaging Orange County communities, and integrating emerging innovations and policies.

2018 LRTP ACTION PLAN

Activity	Description
Orange County Planning Activities	
Coordination with Local Partner Agencies	Continue dialogue with local jurisdictions, Caltrans District 12, TCA, local transit operators, and other local agencies as needed to further intra-county connectivity.
South Orange County Mobility	Identify multi-modal transportation needs and opportunities in South Orange County.
Corridor Studies & Improvements	Conduct studies evaluating the feasibility of multi-modal corridor enhancements.
OC Transit Vision Feasibility Studies	Study options to improve transit service and connectivity along corridors identified through the OC Transit Vision.
Transit Support Services	Establish a long-term plan for Orange County transit supportive services, such as OC Flex, Vanpools, and Park & Rides.
Managed Lane Studies	Identify operational enhancements to the HOV network and criteria for potential expansion of priced managed lanes.
Freeway Chokepoints	Develop long-term freeway chokepoint improvement strategies, assuming OC Go is fully implemented.
Signal Synchronization	Support local initiatives to maintain and modernize signal synchronization corridors countywide.
Transportation Demand Management (TDM)	Study opportunities for new or expanded TDM projects.
Active Transportation Investments	Continue evaluating Orange County's Active Transportation needs, develop long-term plans, and implement programs that address data collection, data management, and safety education.
Sustainable Transportation Strategies	Coordination with partner agencies on implementation of sustainability strategies.
Joint Development Studies	Evaluate opportunities for joint developments at OCTA transit terminals to improve transit facilities and connectivity with employment/housing.
Asset Management	Monitor maintenance needs for existing and new facilities and equipment.
Regional Planning Activities	
Coordination with Regional Partner Agencies	Continue dialogue with SCAG, SANDAG, County Transportation Commissions, SCAQMD, Caltrans, and other regional agencies as needed to further inter-county connectivity.
Trade Corridors/Goods Movement	Coordinate primarily through SCAG and Metro to plan for projected growth in regional goods movement.

2018 LRTP ACTION PLAN CONTINUED

Activity	Description
Regional Planning Activities	
2020 RTP/SCS	Participate in the development of the 2020 RTP/SCS and initiate dialogue with SCAG and local jurisdictions.
2028 Olympics	Coordinate with Metro on preparations for the 2028 Olympics
Metro Countywide ExpressLanes Strategic Plan	Continue dialogue with Metro and appropriate agencies to identify impacts to, and opportunities for, connectivity with Orange County's transportation network.
San Diego's I-5 HOT Lane Project	Continue dialogue with SANDAG and appropriate agencies to identify impacts to, and opportunities for, connectivity with Orange County's transportation network.
West Santa Ana Branch/ Pacific Electric Right-of-Way	Continue dialogue with Metro and appropriate agencies to identify impacts to, and opportunities for, connectivity with Orange County's transportation network.
Gold Line Eastern Extension – Phase 2	Continue dialogue with Metro and appropriate agencies to identify impacts to, and opportunities for, connectivity with Orange County's transportation network.
LOSSAN/Green Line Connection	Participate in SCAG's effort to identify impacts to, and opportunities for, connectivity. Metro is the lead agency for planning, constructing, and operating major transit capital investments in Los Angeles County such as this connection.
Emerging Issues	
Monitor New Technology	Monitor developing technologies and their potential impacts on transportation (e.g., autonomous vehicles, alternative fuels, and smart phone applications).
Connected Infrastructure Needs Assessment	Study infrastructure needs and identify opportunities to implement and/or complement emerging transportation technologies.
State and Federal Regulation	Monitor state and federal legislation/regulations.
State and Federal Funding	Identify strategies and opportunities to access and leverage State and federal funding.
Transportation Outreach and Education	
Active Transportation Safety	Seek opportunities to enhance public outreach and education related to active transportation safety.
Transit Use and Trip Planning	Explore new approaches to increase use of modes other than single occupant vehicles, including enhanced transit and active transportation facilities, public education, and incentives.

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Orange County Today

Chapter 1

Key Points:

- High housing costs and limited supply are impacting transportation
- Most Orange County highways, including carpool lanes, are congested during peak hours
- OCTA is working well with local jurisdictions to improve intersections
- Orange County's freeways and roadways are the best maintained in the state
- Orange County's transit market is evolving
- Metrolink ridership is growing, but operating costs are growing faster
- Biking and walking, while currently a small proportion of commuting, can grow with strategic investments
- OCTA's support services improve quality of life in Orange County

Today, Orange County is home to nearly 3.2 million residents. It is one of the densest, most populous counties in the state. In fact, eight percent of California's population lives in Orange County, on half of one percent of the state's land area. Climate, work opportunities, schools, and accessibility to services and entertainment are key reasons why people decide to locate here.

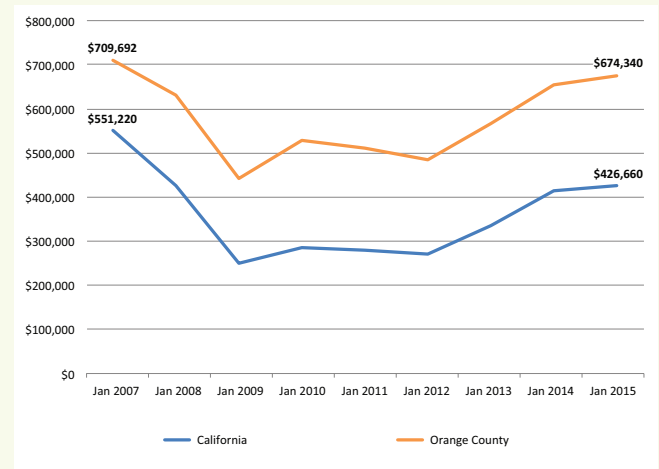
Orange County residents live throughout the 34 cities and unincorporated areas of the county, in a variety of housing types. Orange County's housing and population are relatively dense in the central and northern parts of the county, as shown in **Figure 1.1**. New housing is being built mostly as medium and high-density housing. Of this new housing, more than two-thirds is infill development in the urban cities of central and north Orange County.

Despite new developments, the production of housing is not keeping pace with the needs of our growing population and workforce. As a result, the cost of housing in Orange County is high and growing faster than elsewhere in the state. For example, the median sale price for an existing single-family home reached \$674,340 in January 2015, and only 43 percent of first-time home-buyers in Orange County could afford an entry-level home, which required an annual income of \$86,870 to qualify. Rent is also out of reach for many individuals and families. In 2015, the median market rent for a one-bedroom apartment was \$1,283 a month. That means an Orange County worker would need an hourly wage of \$24.67 per hour to afford the rent. A minimum wage-worker would have to work 110 hours a week to afford a one-bedroom apartment.¹

These characteristics of the housing market offer insight for why many young and middle-age professionals are leaving Orange County and why other individuals and families live doubled- and tripled-up in homes.

¹Orange County Community Indicators Report, 2016

MEDIAN EXISTING SINGLE-FAMILY HOME SALE PRICE IN ORANGE COUNTY AND CALIFORNIA (JANUARY 2007-JANUARY 2015)



Source: California Association of Realtors (www.car.org/marketdata/data/housingdata/)

Population and Housing

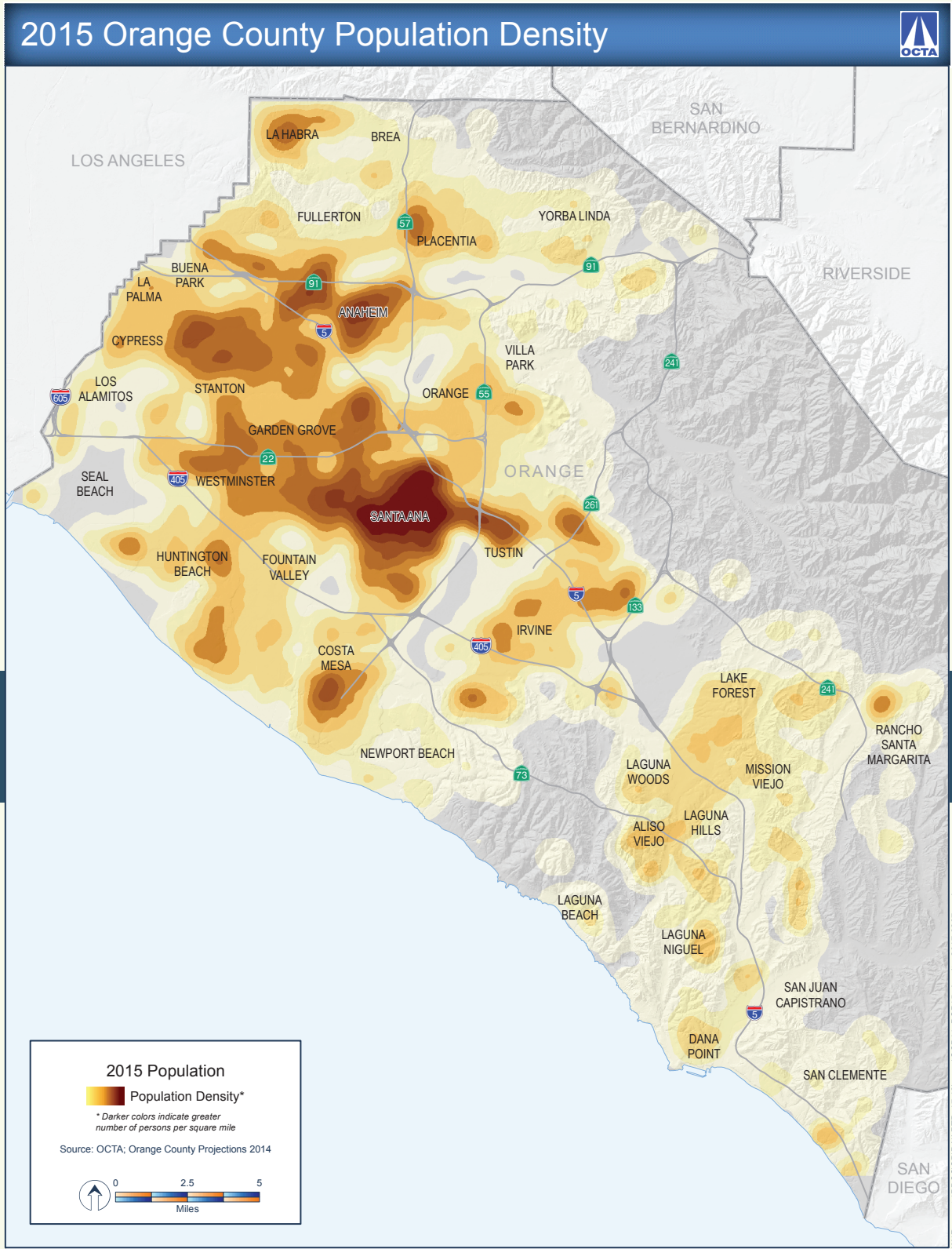
43%

first time home-buyers could afford an entry-level home in Orange County in 2015

\$24.67

hourly wage needed to afford a median-priced one-bedroom apartment in Orange County in 2015

FIGURE 1.1

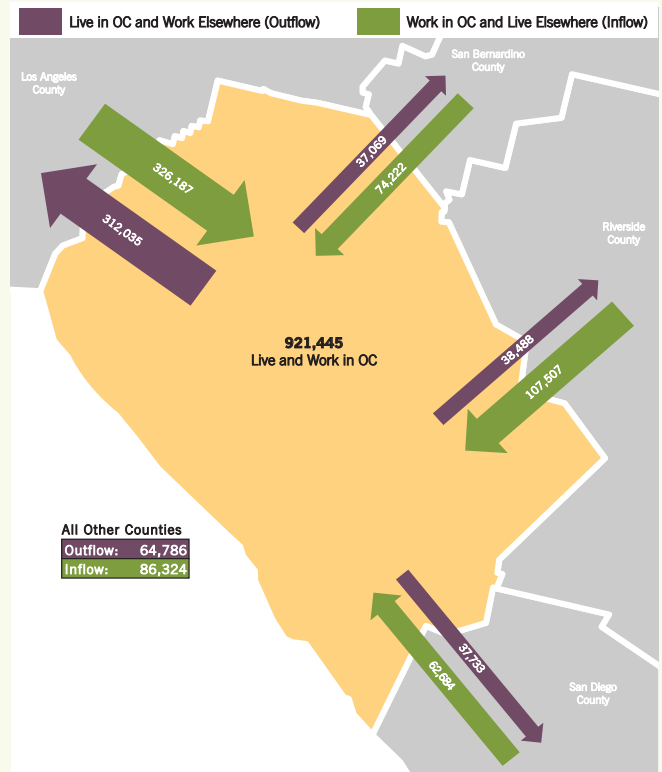


Once a suburb of the greater Los Angeles area, Orange County is now home to its own booming work force with a strong economic base that fuels Orange County's prosperity.

As Orange County's unemployment rate returns to pre-recession levels, the number of people employed increased from 1.39 million in 2010 to 1.52 million in 2015. Central and north Orange County have large employment centers, and there are also pockets of concentrated employment spread throughout the county, as shown in **Figure 1.2**.

Most Orange County residents both live and work within the county (58 percent). However, about 657,000 people live elsewhere and commute into Orange County to work, compared with about 490,000 residents who commute to work outside of Orange County. This means there is a greater inflow of people coming to Orange County to work – which impacts travel on our network of highways and roads. The greatest flow of traffic is between Los Angeles and Orange counties (flowing nearly evenly into and out of Orange County), while most of the work trips from the Inland Empire and San Diego are commuters traveling into Orange County.

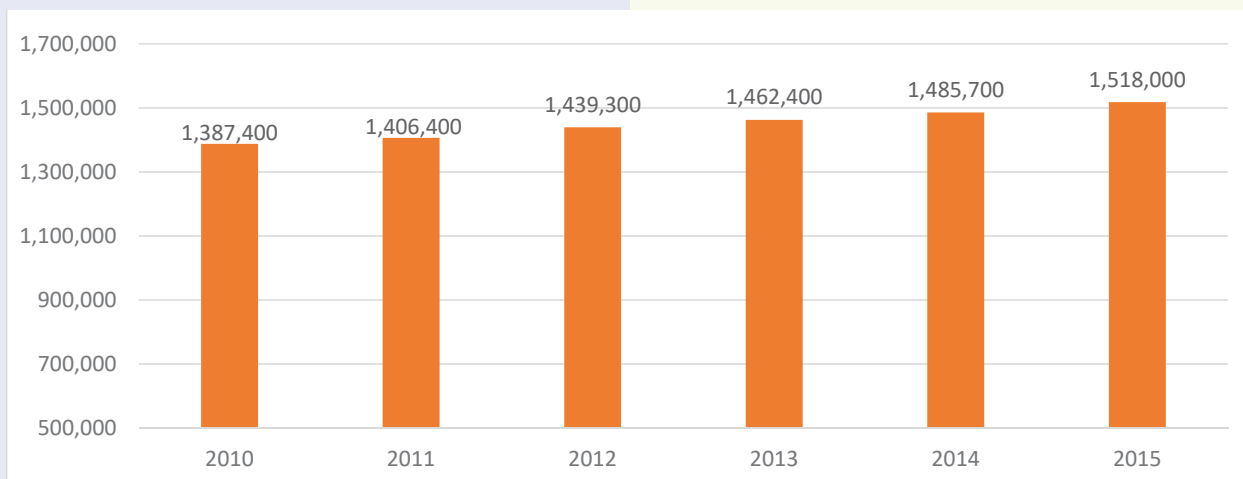
INTERCOUNTY COMMUTING PATTERNS



Source: California Department of Finance, Table E-2 (Population 2016), Table P-1 (Population 2040)

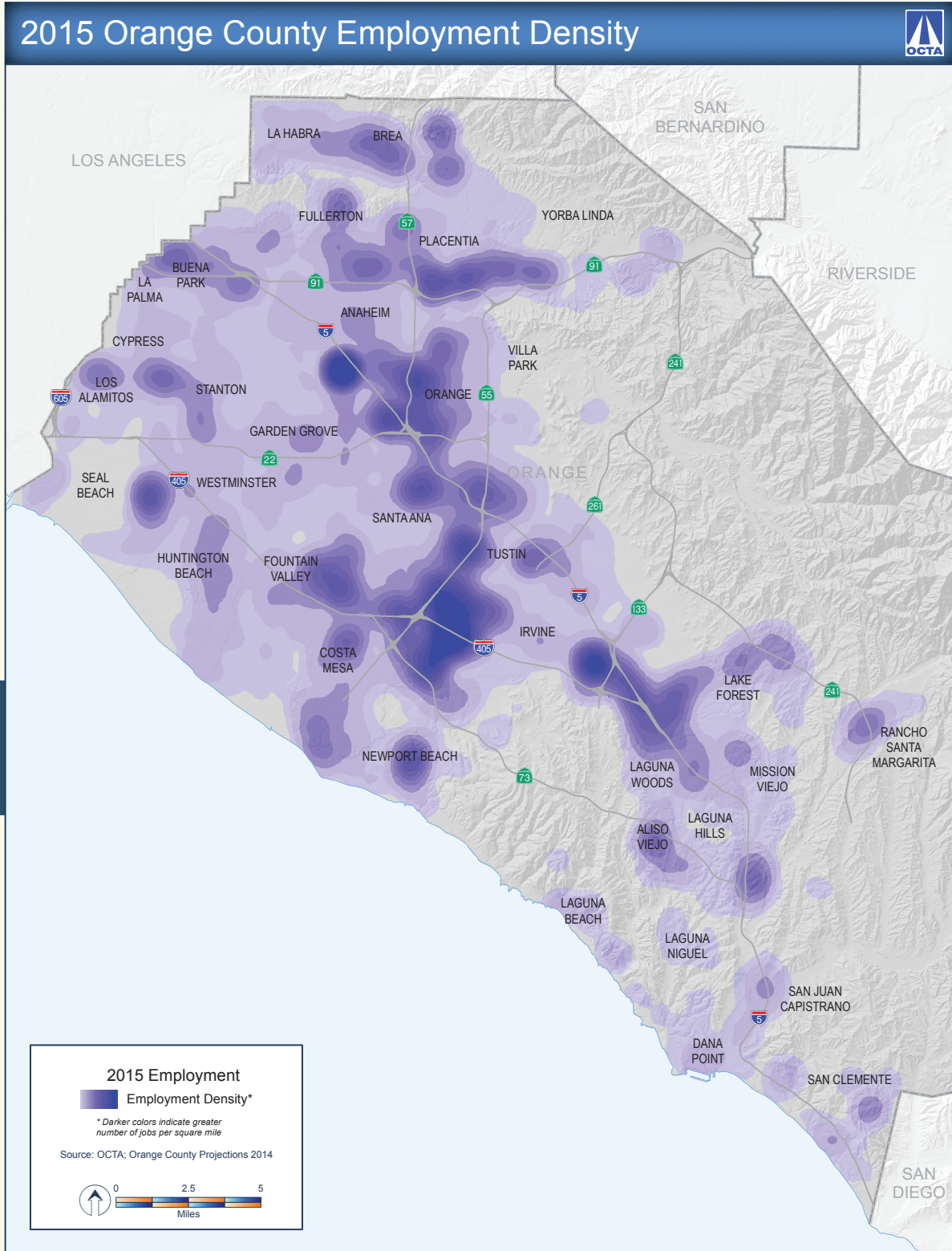
Employment

NUMBER OF PEOPLE EMPLOYED IN ORANGE COUNTY (2010-2015)

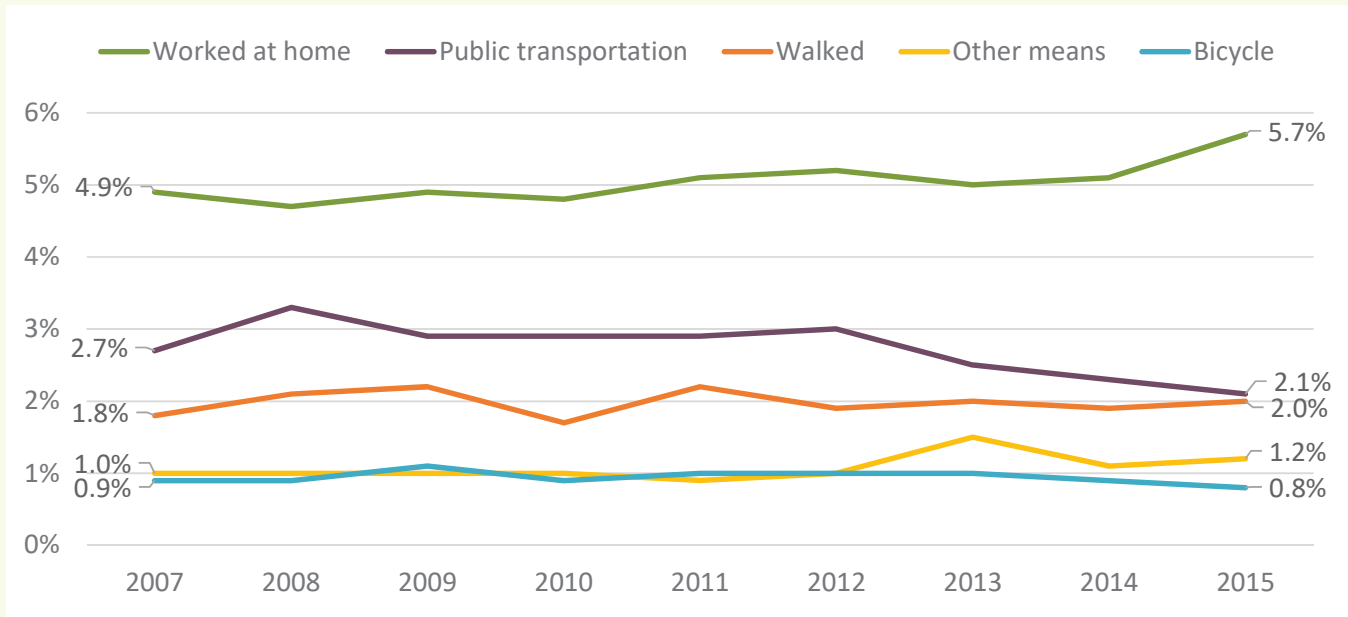


Source: California Employment Development Department

FIGURE 1.2



TREND IN SELECTED MODES OF TRAVEL TO WORK (2007-2015)



Note: Data is commute mode for workers age 16 and over. "Other means" includes taxi, motorcycle or other means.

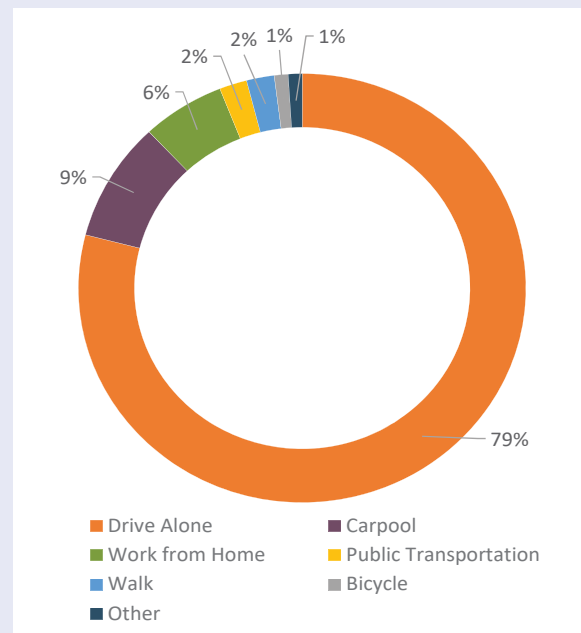
Source: U.S. Census Bureau, American Community Survey, 1-Year Estimates

How We Move

Most Orange County commuters drive alone to work (79 percent in 2015). The next most common way to travel – and it is a distant second – is carpooling. About nine percent of commuters carpool, while six percent work from home. This increase in working at home may indicate a new trend enabled by advancements in technology and evolving workplace cultures.

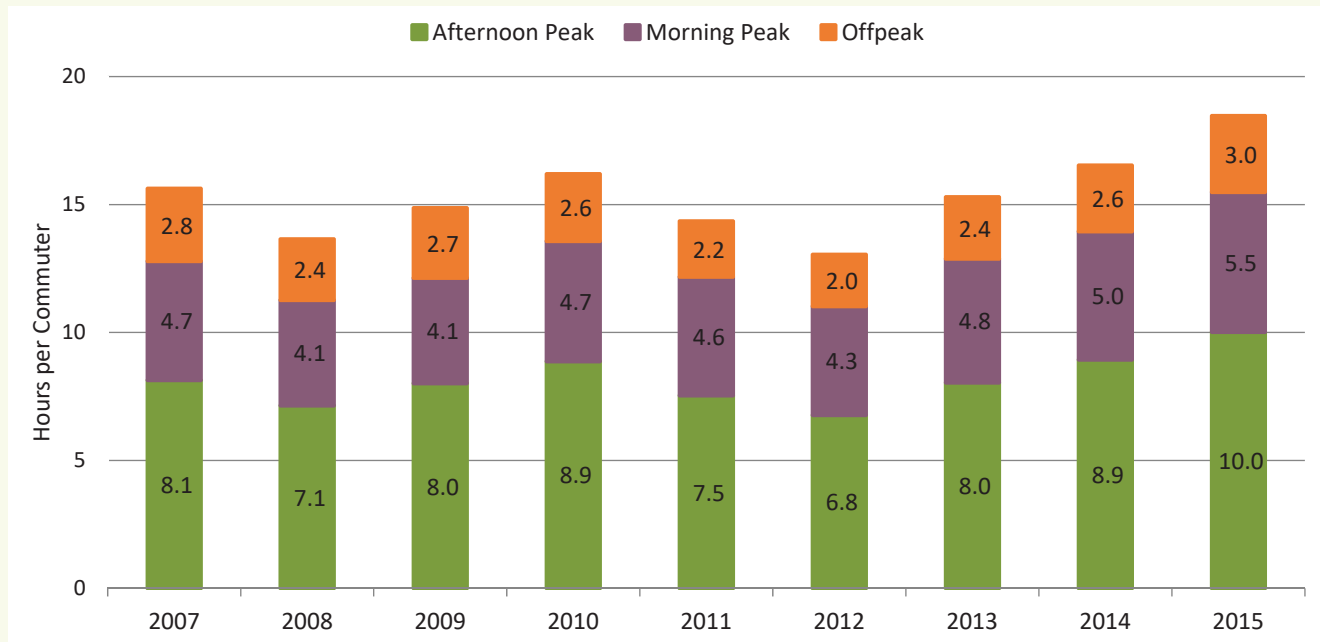
Only two percent take public transportation and two percent walk to work. Declining transit ridership presents a challenge that will be a key element of this plan. Less than one percent of commuters bike and another one percent take some other form of transportation like a taxi or shared ride option. Both driving alone and carpooling have remained relatively steady for more than 10 years. Working at home is trending upward, in contrast with public transportation, which has seen an incremental decline over the past decade.

HOW ORANGE COUNTY COMMUTES (2015)



Source: 2015 American Community Survey, 1-year estimates

ANNUAL HOURS OF DELAY PER COMMUTER AT SPEEDS LESS THAN 60 MILES PER HOUR ON FREEWAYS IN ORANGE COUNTY (2007-2015)



Note: Peak-hour delay is calculated by commuter; offpeak delay is calculated for the entire population. The total number of hours of delay is a combination of per capita and per commuter hours of delay. "Commuter" is defined as persons commuting to work in personal cars, trucks, or vans.

Source: Caltrans, Performance Measurement System; U.S. Census Bureau, American Community Survey, 1-Year Estimates

2015 Travel Conditions

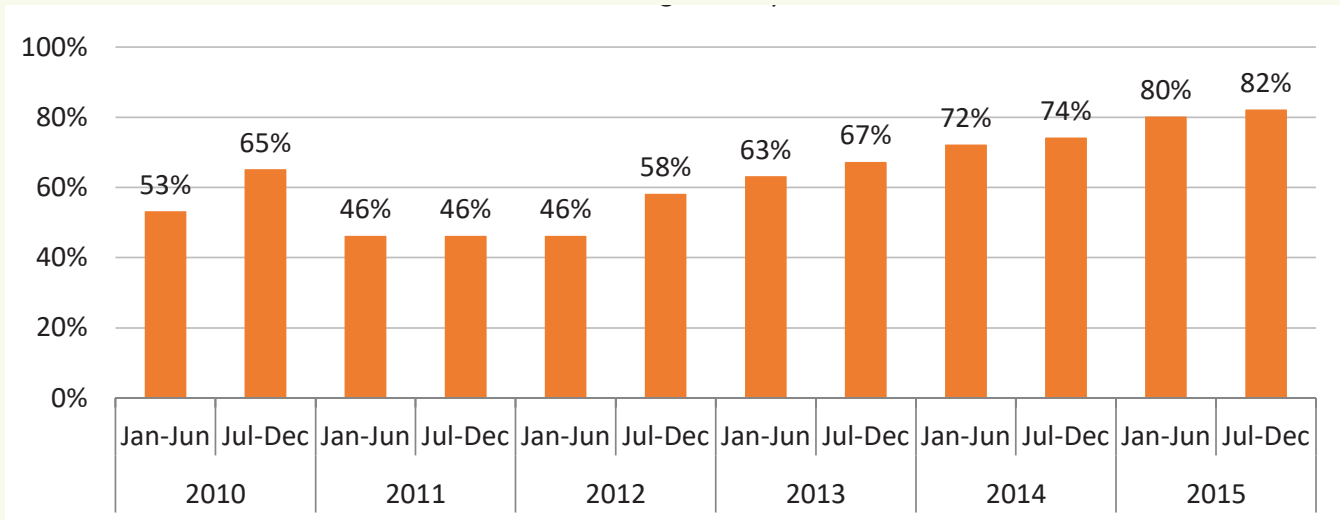
The year 2015 is the base year for this long-range transportation plan. In other words, it is the starting point at which we look at the condition of the various transportation systems in Orange County, from highways to local roads to bus, rail, and active transportation like biking and walking. From this starting point, OCTA can then develop strategies with a range of transportation projects and programs intended to keep residents and workers moving.

Regional Highways

Given that most Orange County residents and workers commute by driving, an effective network of highways is critical to mobility.

Unfortunately, as the number of people who live in and commute to Orange County continues to grow, average highway speeds are decreasing. This means commuters are spending more time in traffic, away from home and work. In 2015, travelers spent an average of 18.5 hours sitting in traffic on Orange County highways. **Figure 1.3** maps congestion on Orange County highways in 2015 during the morning peak travel period.

PERCENTAGE OF CARPOOL LANES THAT ARE CONGESTED: ORANGE COUNTY (2010-2015)



Note: The term “congestion” in this context refers to the federal definition of carpool “degradation.” A carpool lane is considered degraded if the average traffic speed during the morning or evening weekday peak commute hour is less than 45 miles per hour for more than 10 percent of the time over a consecutive 180-day period.

Source: Caltrans, 2010 through 2015 California High-Occupancy Vehicle Lane Degradation Determination Reports

2015 Travel Conditions

Carpool and Express Lanes

Orange County has the most robust system of carpool lanes (also sometimes referred to as high-occupancy vehicle [HOV] lanes or managed lanes) in the State, with carpool-to-carpool connectors in place on most highways. As of October 2014, carpool lanes provide a way to increase capacity on the highway network, and the good news is that nearly all highways in of Orange County have a carpool lane. The bad news is that congestion on Orange County’s carpool lanes has steadily increased since the first half of 2012. Fully 80 percent of Orange County carpool lane miles were reported as congested by Caltrans in the first half of 2015, compared to 53 percent in the first half of 2010. This is based on performance standards set by the Federal Highway Administration, which require detailed monitoring of the system that is more sensitive than the method used by OCTA in **Figure 1.4**.

OCTA is also the owner/operator of the highly successful 91 Express Lanes, the first facility of its kind in the state. The 91 Express Lanes, which extend from State Route 55 (SR-55) into Riverside County, experience free-flowing traffic and do not have the same congestion issue as the county’s carpool lanes.

As of October 2014, 96.3 percent of Orange County freeway miles had a carpool or express lane. When looking at lane miles, 19 percent of all highway lane miles were carpool or express lanes. **Figure 1.4** maps congestion on Orange County’s managed lane system (carpool and express lanes) in 2015 during morning peak travel times.

FIGURE 1.3

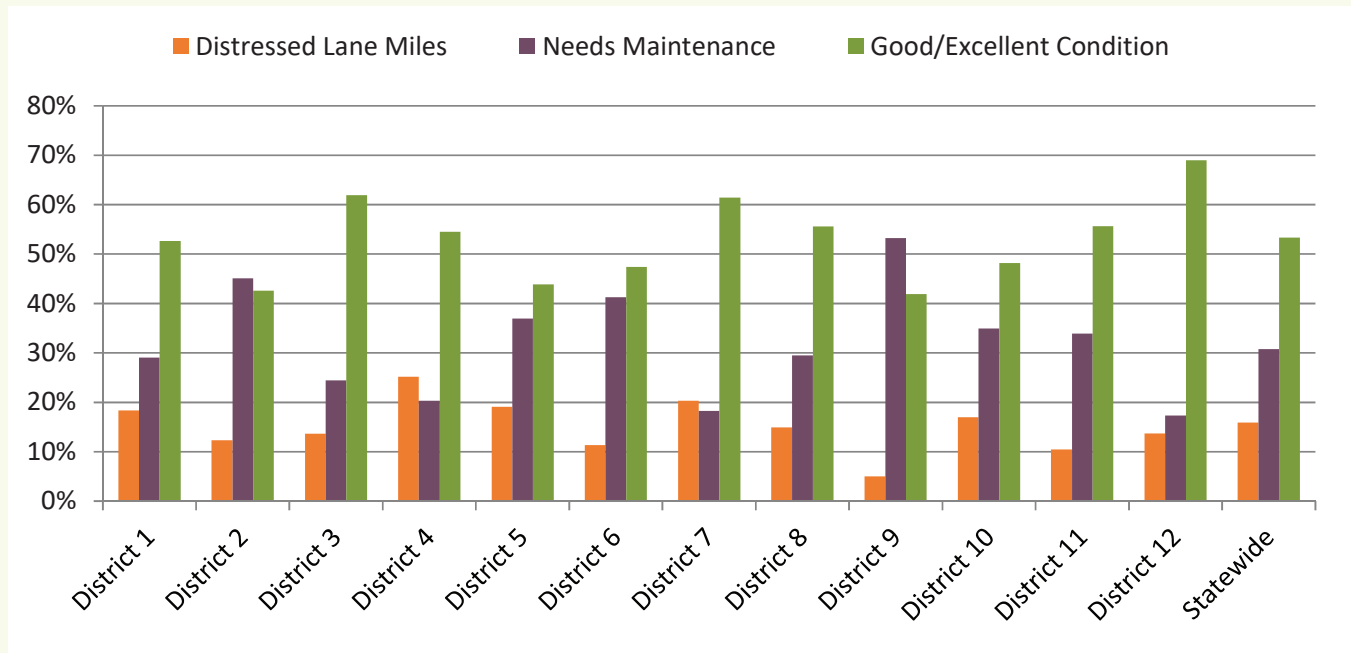


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FIGURE 1.4



CONDITION OF STATE-OPERATED HIGHWAYS (2015)



Note: Orange County is District 12.

Source: Caltrans State of the Pavement Report 2015, Appendix 4

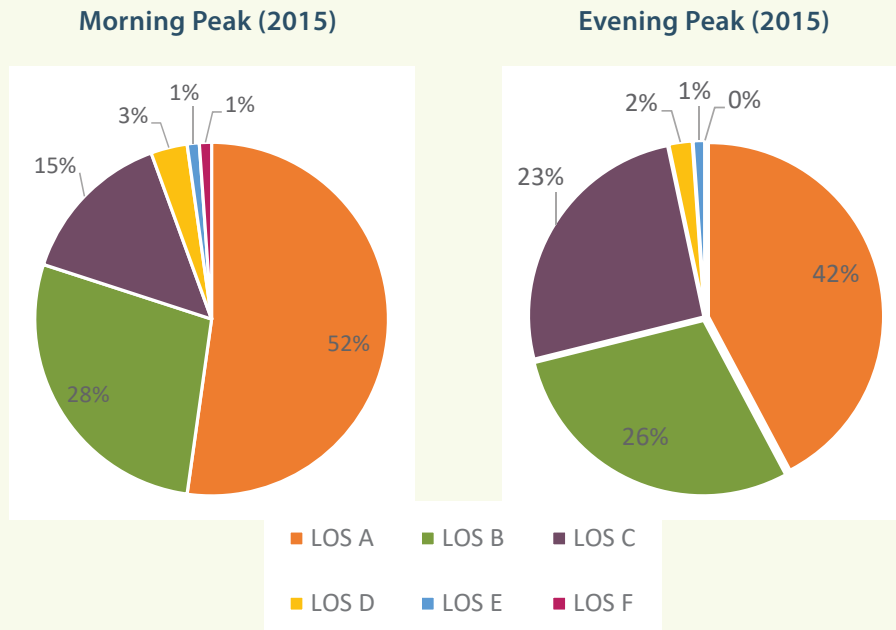
2015 Travel Conditions

Regional Highway Maintenance

All highways, carpool lanes, and express lanes must be maintained. When maintenance is deferred, the pavement becomes degraded and roadway safety can be impacted. Caltrans monitors the status of state highways and tracks their condition, rating highway pavement according to levels of “distress” which range from pavement in poor condition with extensive cracks to pavement providing poor ride quality (the lowest level of distress). In 2015, Caltrans reported that 14 percent of pavement on the state highway system in Orange County was distressed. This is lower than California overall (with 16 percent distressed pavement). Most of the distressed lane miles in Orange County (77 percent) were rated the lowest level of distress, “poor ride quality.” Most of the highway pavement in Orange County (69 percent) is in good or excellent condition. This is the highest percent in the state.

Prior to passage of Senate Bill 1 (SB 1), Caltrans projected an annual shortfall for statewide transportation maintenance in excess of \$250 million. About half of the new roadway maintenance revenue generated by SB 1 would fund improved maintenance of regional highway facilities and about half would be returned directly to local jurisdictions for maintenance of arterials. Additional maintenance revenue from SB 1 should help Orange County and our neighboring counties reduce the percentage of distressed pavement.

LEVEL OF SERVICE (LOS) FOR KEY INTERSECTIONS



Source: OCTA, Orange County Congestion Management Program

2015 Travel Conditions

Local Roads

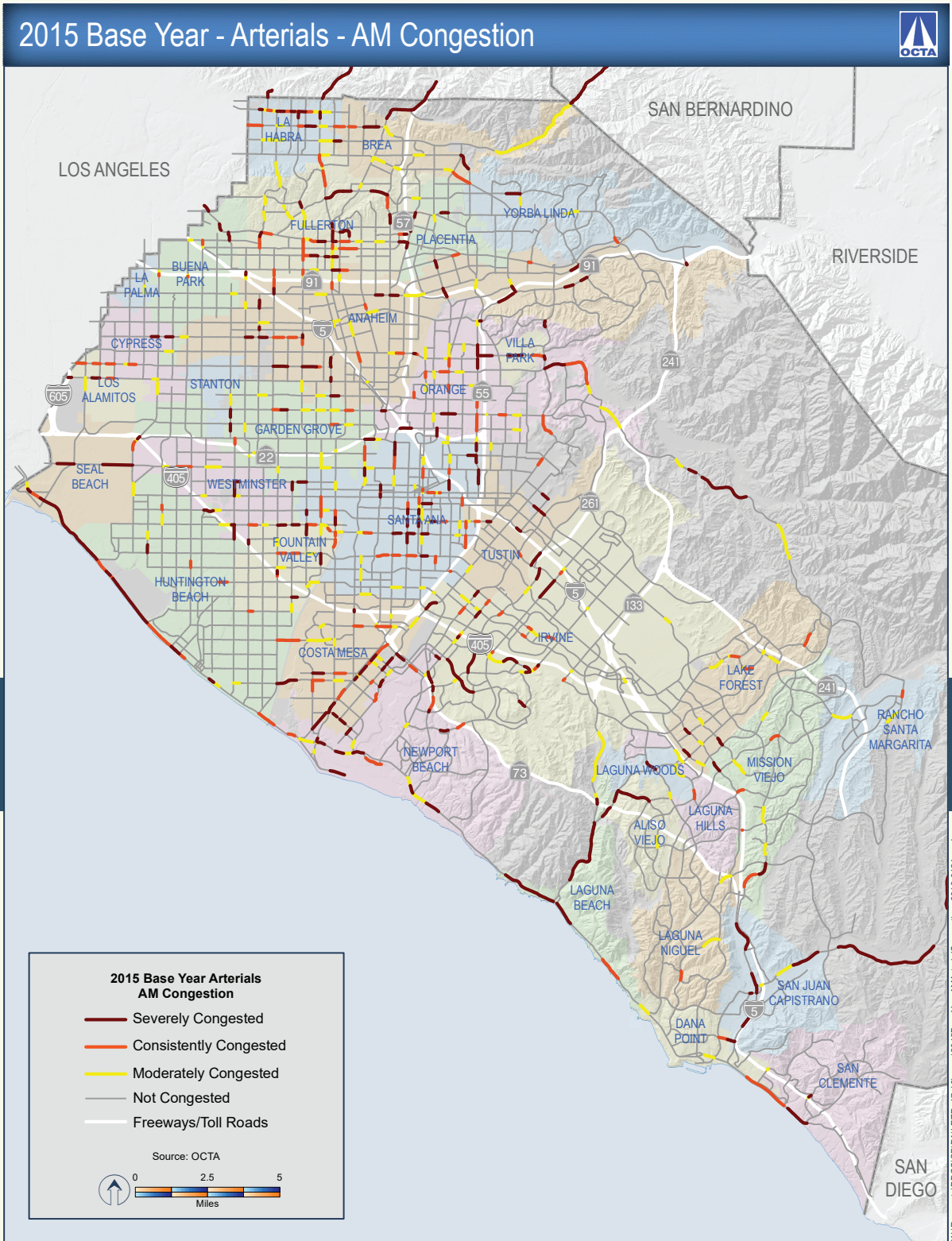
For the most part, Orange County's system of local roads, comprising more than 6,365 lane miles, is built out. This roadway network is coordinated across the county's 34 cities and unincorporated Orange County through the Master Plan of Arterial Highways (MPAH). **Figure 1.5** shows how the MPAH system performed in 2015, mapping congestion on the arterial system during morning peak travel times.

One way to gauge the performance of the roadway system is by tracking congestion at intersections along arterials. Through its Congestion Management Program (CMP), OCTA measures congestion at approximately 100 intersections on key roadways in Orange County. Most of these intersections meet or exceed the CMP performance standards during both morning and evening peak commute hours.

Overall, these 100 intersections have seen a 10 percent improvement in levels of service since the CMP began in 1992.

Also, through the OC Go half-cent sales tax initiative that is dedicated to transportation, OCTA and its partners from local jurisdictions have invested extensively in coordinating signals to increase traffic throughput (the Regional Traffic Signal Synchronization Program). By the end of 2015, more than 2,000 signalized intersections were synchronized along 540 miles in Orange County. Based on the improvements made, synchronizing signals provided greater traffic flow, with a countywide average of 13 percent time savings, 15 percent faster speeds, and 31 percent fewer stops.

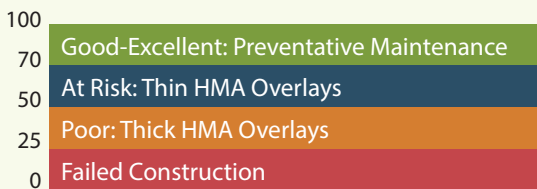
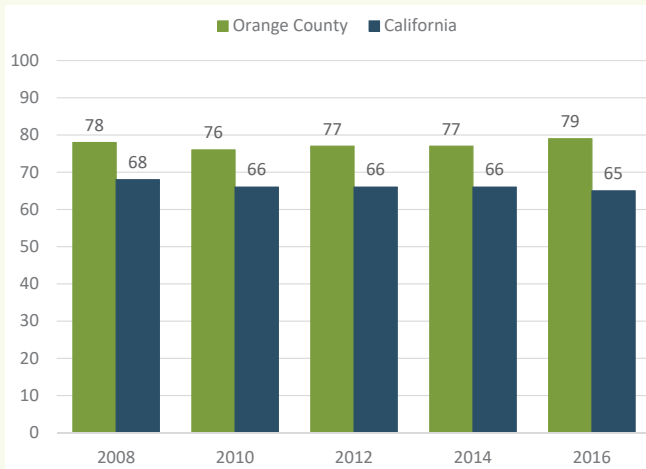
FIGURE 1.5



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PAVEMENT CONDITION INDEX: ORANGE COUNTY AND CALIFORNIA (2008-2016)



Pavement Condition Index Thresholds

A newly constructed road will have a Pavement Condition Index (PCI) of 100, while a failed road will have a PCI of 25 or less. The pavement condition is primarily affected by climate, traffic loads and volumes, construction materials, and age. Pavement with a PCI below 49 is considered poor; between 50 and 70 is considered at risk; between 71 and 85 is good; and 86 and above is considered excellent.

Good to excellent pavements (PCI > 70) are best suited for pavement preservation techniques. As pavements deteriorate, more intensive and expensive treatments that address structural adequacy are required. When the pavement has failed (PCI < 25), reconstruction is typically required.

Source: California Statewide Local Streets & Roads Needs Assessment 2016

2015 Travel Conditions

Local Road Maintenance

Today, nearly 17,000 lane miles of pavement in Orange County are maintained by local jurisdictions. In addition to local funding, OC Go also provides a source of funding to jurisdictions for maintenance of their roads. Like highways, the pavement condition on local roads is assessed regularly. According to the California Local Streets and Roads Needs Assessment, Orange County's average pavement condition index (PCI) was 79, which is in the "good to excellent" range. Orange County has maintained a good to excellent rating since tracking began and has the highest PCI of all 58 counties in California.



Bus Transit



Currently, OCTA operates a total of 59 bus routes, including six that serve Metrolink stations, three express buses and two Bravo! lines with fewer stops for faster route times, and three express buses that provide service to and from neighboring counties (**Figures 1.6 and 1.7**).

Over the past several years, OCTA has invested in high-quality transit corridors (HQTC), which are routes with more frequent bus service – at 15 minutes or less between buses on the route during peak hours of travel on weekdays. Approximately 12 percent of Orange County’s bus system miles were HQTC miles in 2015, and almost 31 percent of Orange County’s population lived within one-half mile of an HQTC.

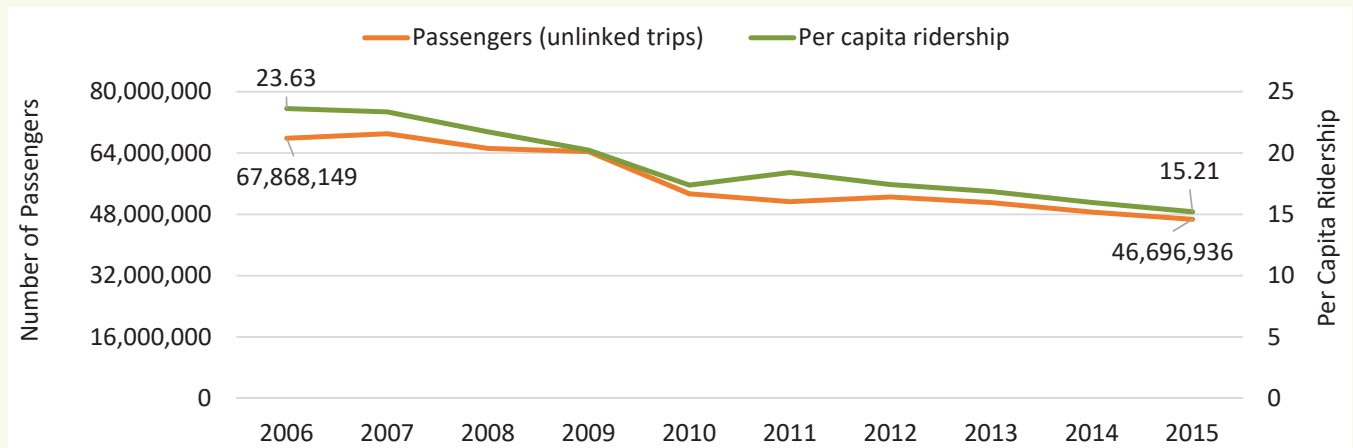
As the county has recovered from the Great Recession, fewer residents are using the bus. Bus ridership dropped 31 percent in 10 years, while the cost per passenger to operate the buses has steadily increased from \$3.38 per passenger in 2006 to \$4.10 per passenger in 2015. In 2015, there were 15.2 trips per capita on Orange County’s fixed route bus system. In comparison, the U.S. average in 2015 was approximately 13.6 trips per capita (for both urban and rural areas combined).

Additionally, passengers are riding buses for shorter trips, with a 15 percent decrease in 10 years in the average distance traveled by bus passengers. A recent study commissioned by the Southern California Association of Governments and conducted by the UCLA Institute of Transportation Studies looked at the trend of falling bus ridership in southern California.² They found that the most significant factor affecting transit use was increasing car ownership. In fact, their study found that car ownership has grown fastest among the most frequent transit riders.

To address concerns about declining ridership, in 2015, OCTA developed an initiative, called OC Bus 360°, to improve the bus system to better meet the county’s needs. OCTA improved the frequency of buses in areas with high demand and reduced costs in areas with low demand. OCTA also launched a real-time bus locator application that allows customers to receive real-time bus locations via smartphone apps such as Transit and Moovit, and implemented Text4Next 2.0, which gives riders real-time bus arrival information via text. Additionally, following a comprehensive public outreach campaign, the OCTA Board approved the new bus branding, “OC Bus.”

² Manville, Michael, et al. *Falling Transit Ridership: California and Southern California*, UCLA Institute of Transportation Studies, January 2018.

BUS TRANSIT RIDERSHIP: ORANGE COUNTY (2006-2015)



Source: National Transit Database (<https://www.transit.dot.gov/ntd/transit-profiles-summary-reports>)

Transit use across the nation, including bus and rail, has remained relatively steady over the past decade.

39 transit boardings per capita
California, 2006

However, similar to Orange County, California transit use declined.

36 transit boardings per capita
California, 2015

BUS OPERATING COST PER PASSENGER, INFLATION-ADJUSTED TO 2015 DOLLARS, ORANGE COUNTY (2006-2015)



Note: Dollars adjusted using Consumer Price Index Inflation Calculator: <https://data.bls.gov/cgi-bin/cpicalc.pl>

Source: National Transit Database (<https://www.transit.dot.gov/ntd/transit-profiles-summary-reports>)

FIGURE 1.6

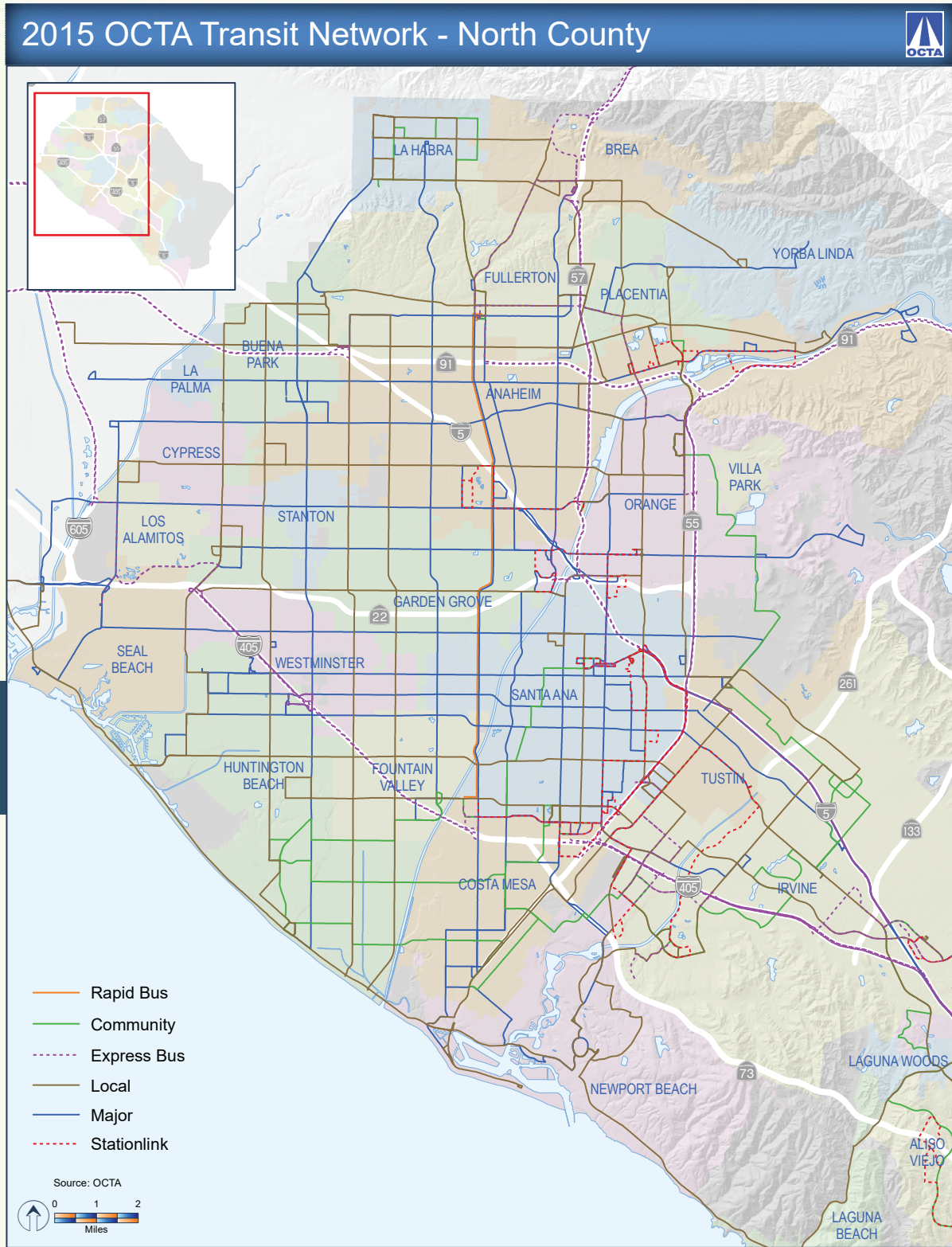
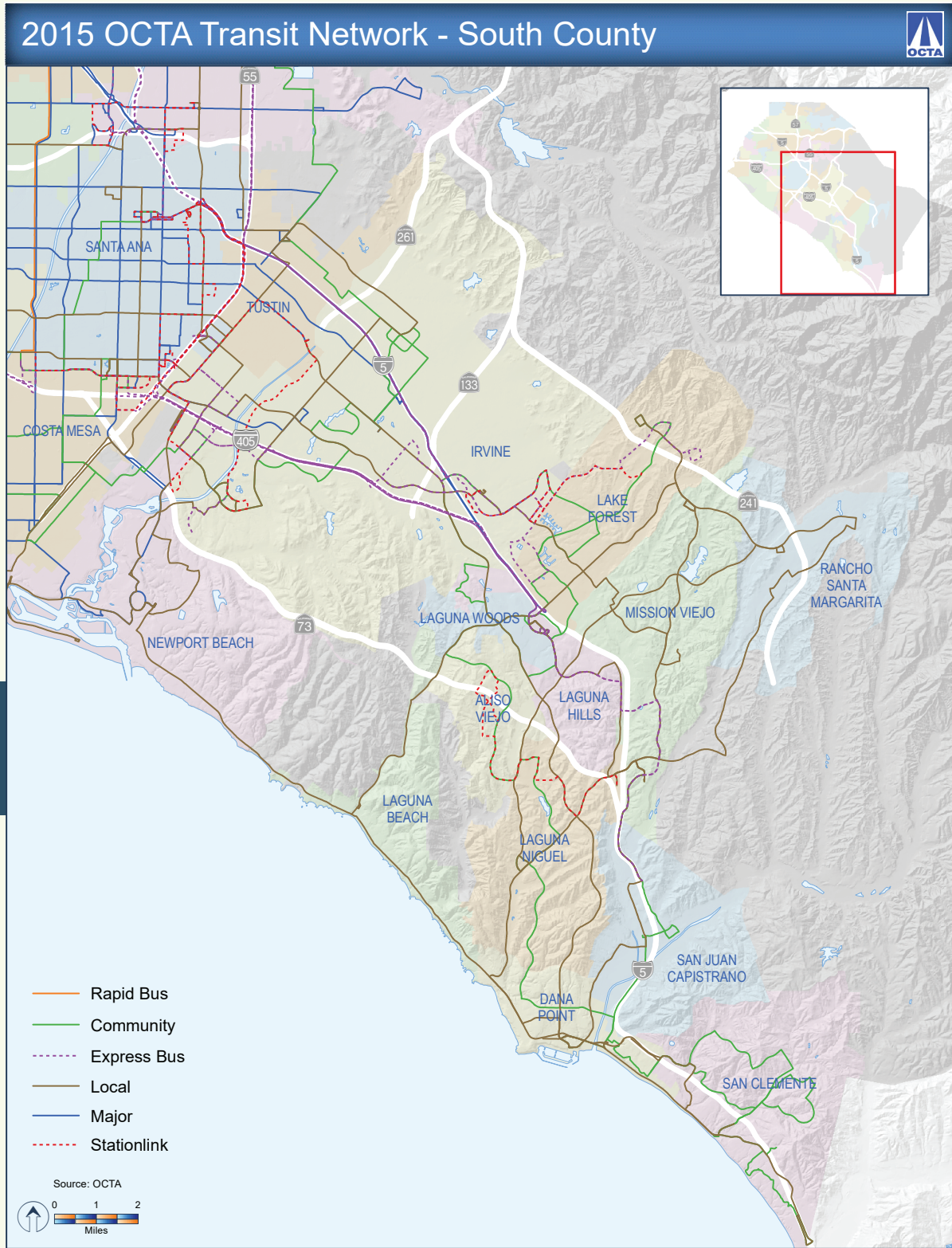
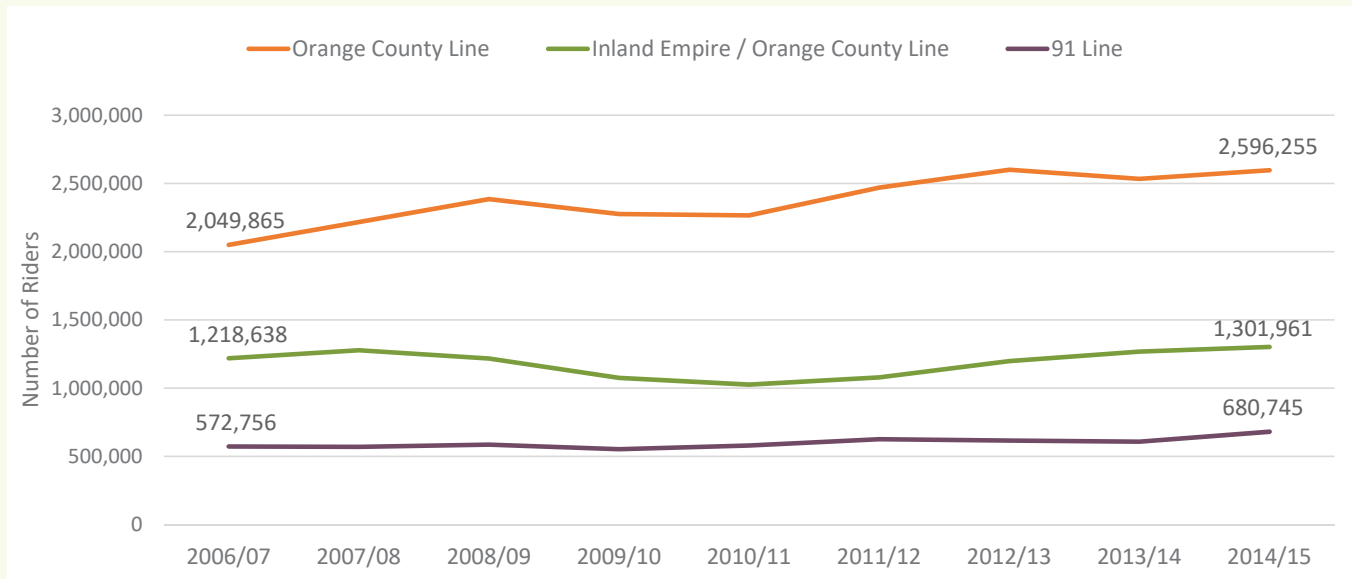


FIGURE 1.7



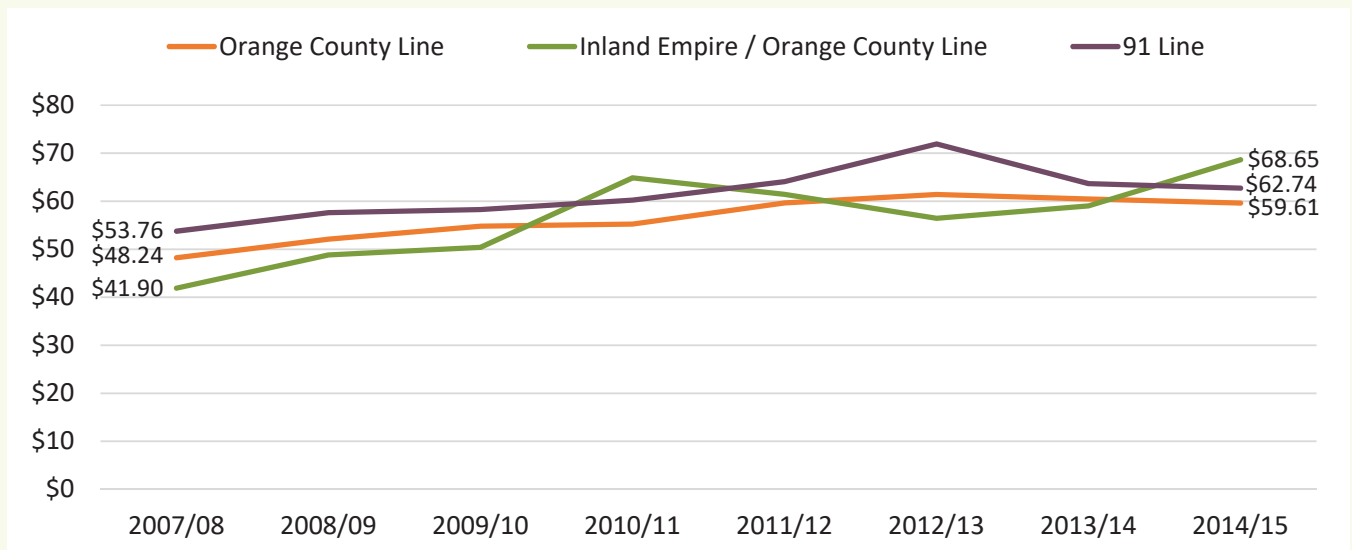
COMMUTER RAIL RIDERSHIP: ORANGE COUNTY LINE, INLAND EMPIRE-ORANGE COUNTY LINE, AND 91 LINE (2007-2015)



Sources: Southern California Regional Rail Authority, Orange County Transportation Authority

Rail Transit

OPERATING COST PER TRAIN MILE: ORANGE COUNTY LINE, INLAND EMPIRE-ORANGE COUNTY LINE, AND 91 LINE (2008-2015)



Source: Southern California Regional Rail Authority, Nominal Costs

FIGURE 1.8



Three Metrolink lines serve Orange County, including the Orange County line, the Inland Empire/Orange County line, and the 91 line. In 2015, Metrolink used these lines to serve Orange County travelers with, 54 trains on running on weekdays and 16 trains on weekends.

Ridership on all three rail lines has grown, rising to a total of nearly 4.6 million passengers in 2015. All three commuter rail lines also experienced an increase in the cost to operate. Between 2008 and 2015, the Orange County Line had a 24 percent increase in the operating costs per train mile, the Inland Empire/Orange County had a 64 percent increase, and the 91 line experienced a 17 percent increase in operating costs.

MILES OF BIKEWAYS BY BIKEWAY CLASS: ORANGE COUNTY (2001, 2009, AND 2013)



Note: Class I are off-street paved bike paths; Class II are on-road striped and signed bicycle lanes; and Class III are on-road, shared-lane signed bike routes.

Source: Orange County Transportation Authority (2001 & 2009 Commuter Bikeways Strategic Plans, 2014 Long-Range Transportation Plan, and OCTA GIS database, October 2017)

Active Transportation

Orange County continues to add miles to its bikeway, pedestrian, and trails systems, providing new facilities so that more residents have the option of using active transportation. About one percent of Orange County workers bike to work and two percent walk – percentages which haven't changed substantially in 10 years (American Community Survey, 2015).

The Southern California Association of Governments conducted an analysis in 2014 of a travel survey related to active transportation. The analysis found that 55 percent of bike trips were for home-based purposes (such as social and recreational non-commute trips). It also found that many pedestrian trips were for mode transfers which complemented transit service. The proportion of people walking and biking increased in higher-density neighborhoods.

In 2015, the county had approximately 1,060 miles of bikeways (the same as in 2013). Most (68 percent) were on-road striped and signed bicycle lanes. Another 24 percent of bikeways were off-street paved bike paths, and the remaining eight percent were on-road, shared-lane signed bike routes.

In 2015, OCTA conducted a sidewalk inventory within the roadway network to assess pedestrian access. The inventory was collected for over 1,700 miles of roadway and included an assessment of both sides of the roadway. It found that about 85 percent of roadways have sidewalks (approximately 2,852 miles of sidewalk) and that approximately 506 miles of roadway in Orange County do not have sidewalks (15 percent). **Figures 1.9 and 1.10** illustrate this network.

FIGURE 1.9

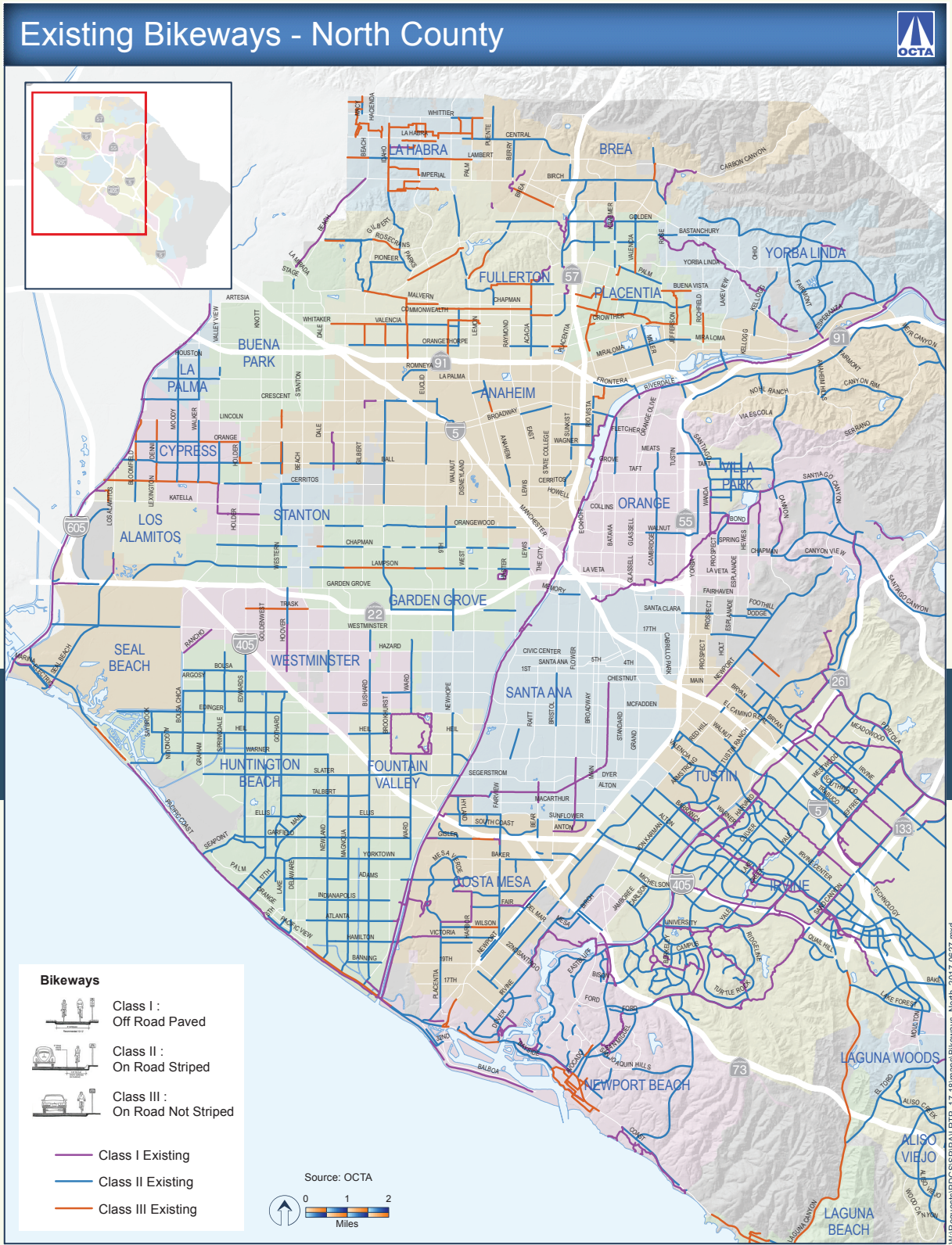
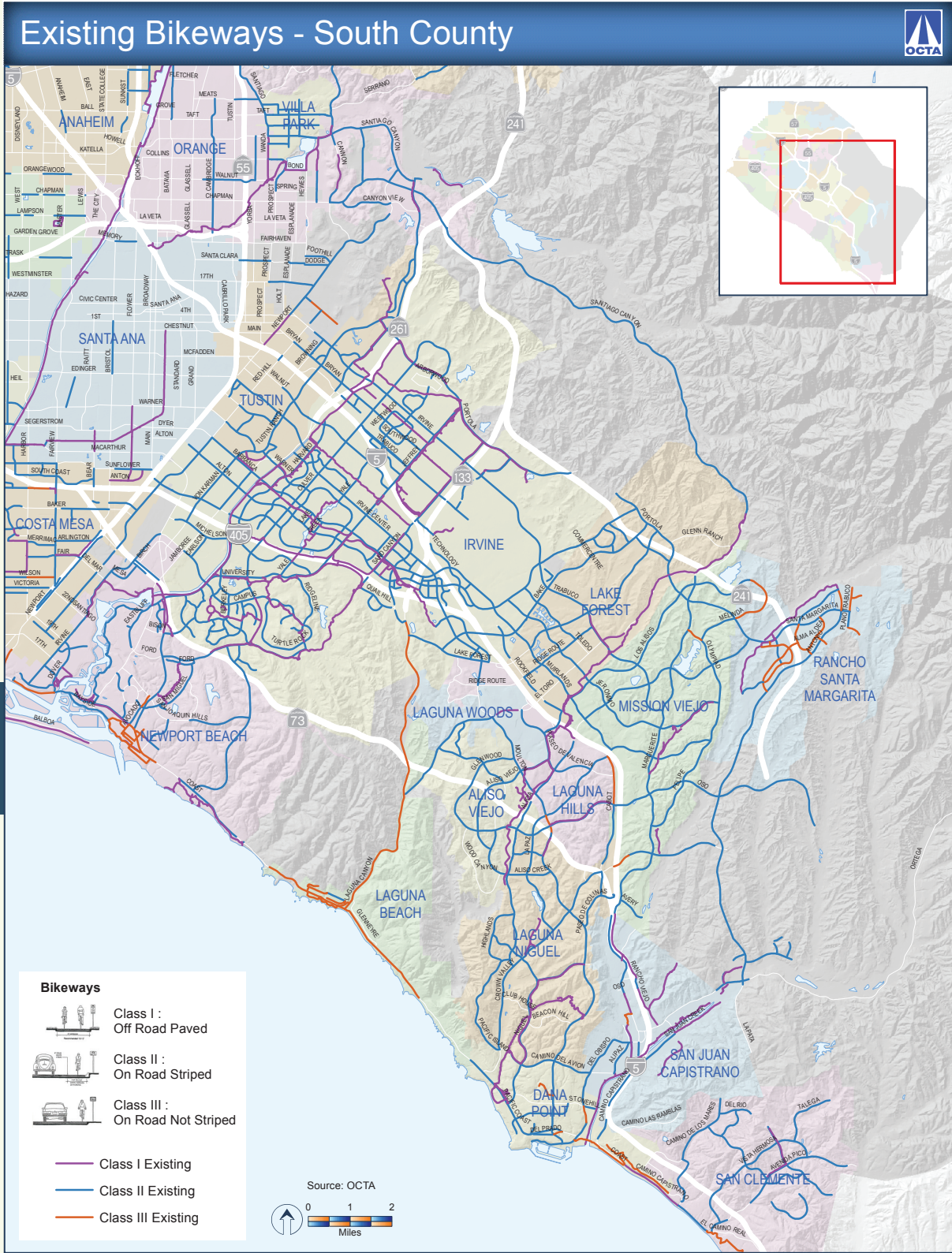


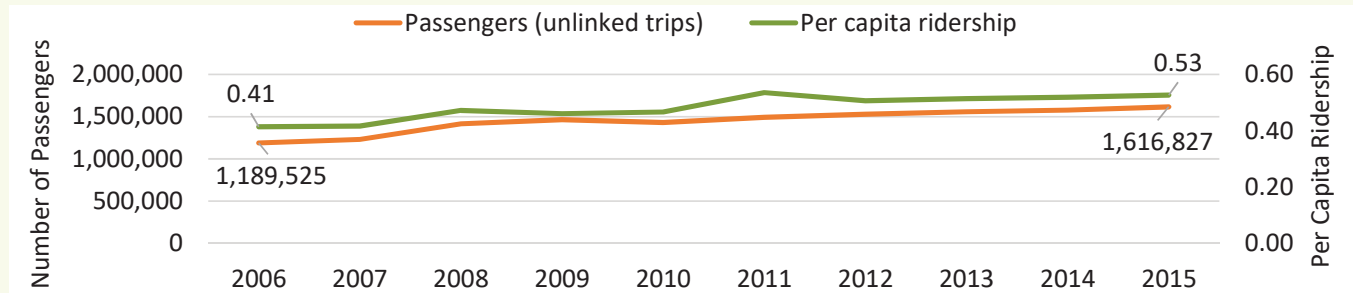
FIGURE 1.10



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OC ACCESS RIDERSHIP: ORANGE COUNTY (2006-2015)



Source: National Transit Database (<https://www.transit.dot.gov/ntd/transit-profiles-summary-reports>)

OC ACCESS OPERATING COST PER PASSENGER, INFLATION-ADJUSTED TO 2015 DOLLARS (2006-2015)



Note: Dollars adjusted using Consumer Price Index Inflation Calculator: <https://data.bls.gov/cgi-bin/cpicalc.pl>

Source: National Transit Database (<https://www.transit.dot.gov/ntd/transit-profiles-summary-reports>)

OC Support Services

OC ACCESS

OC ACCESS is a shared-ride transportation service for people who are unable to use the regular, fixed route OC Bus service because of functional limitations caused by a disability. OC ACCESS ridership is steadily increasing, along with the cost per passenger to operate the service and the average trip length. Ridership increased 36 percent between 2006 and 2015, while operating costs rose from \$32.10 to \$42.60 per passenger. Meanwhile, the length of the average trip rose from 10.1 to 11.3 miles.





OC Support Services

Motorist Services

Freeway Service Patrol



Orange County's Freeway Service Patrol is a special team of tow trucks that travel Orange County's freeways during peak commuting hours to help motorists with disabled vehicles (for example, providing a gallon of gas or changing a flat tire). Their job is to keep the freeways moving and reduce congestion by quickly removing disabled vehicles. Freeway Service Patrol services are free to motorists.

OCTAP



The Orange County Taxi Administration Program (OCTAP) is an association of Orange County cities and the County of Orange, created to coordinate taxicab service, permitting, and other administrative functions. OCTA administers the OCTAP program on behalf of the cities and the County of Orange, and works closely with city and county enforcement agencies to support the enforcement of OCTAP regulations and local municipal codes pertaining to the operation of taxicabs in Orange County. OCTAP will sunset in 2019 due to changes in state requirements. However, OCTA is coordinating with local jurisdictions to identify options moving forward.



Call Boxes

There is a network of over 400 call boxes on Orange County freeways to help motorists who break down during hours when Freeway Service Patrol isn't operating or where it is not available, and who don't have another way to call for help. Using the call boxes, motorists can reach an operator at a call center who sends the appropriate service to help.

511



Orange County's 511 service provides up-to-the-minute travel advisories and trip planning information. The 511 Motorist Aid and Travelers' Information System (MATIS) helps commuters outsmart traffic with:

- Real-time traffic speed, congestion and incident information
- Live freeway cameras and roadwork advisories
- Bus and rail trip planner
- Scheduled departures for 70+ transit agencies in southern California
- Carpool and ride-matching information
- Park & Ride lot locations (website/phone)
- Airport information (website only)
- Bike maps, tips and resources (website only)
- Local weather conditions (website only)

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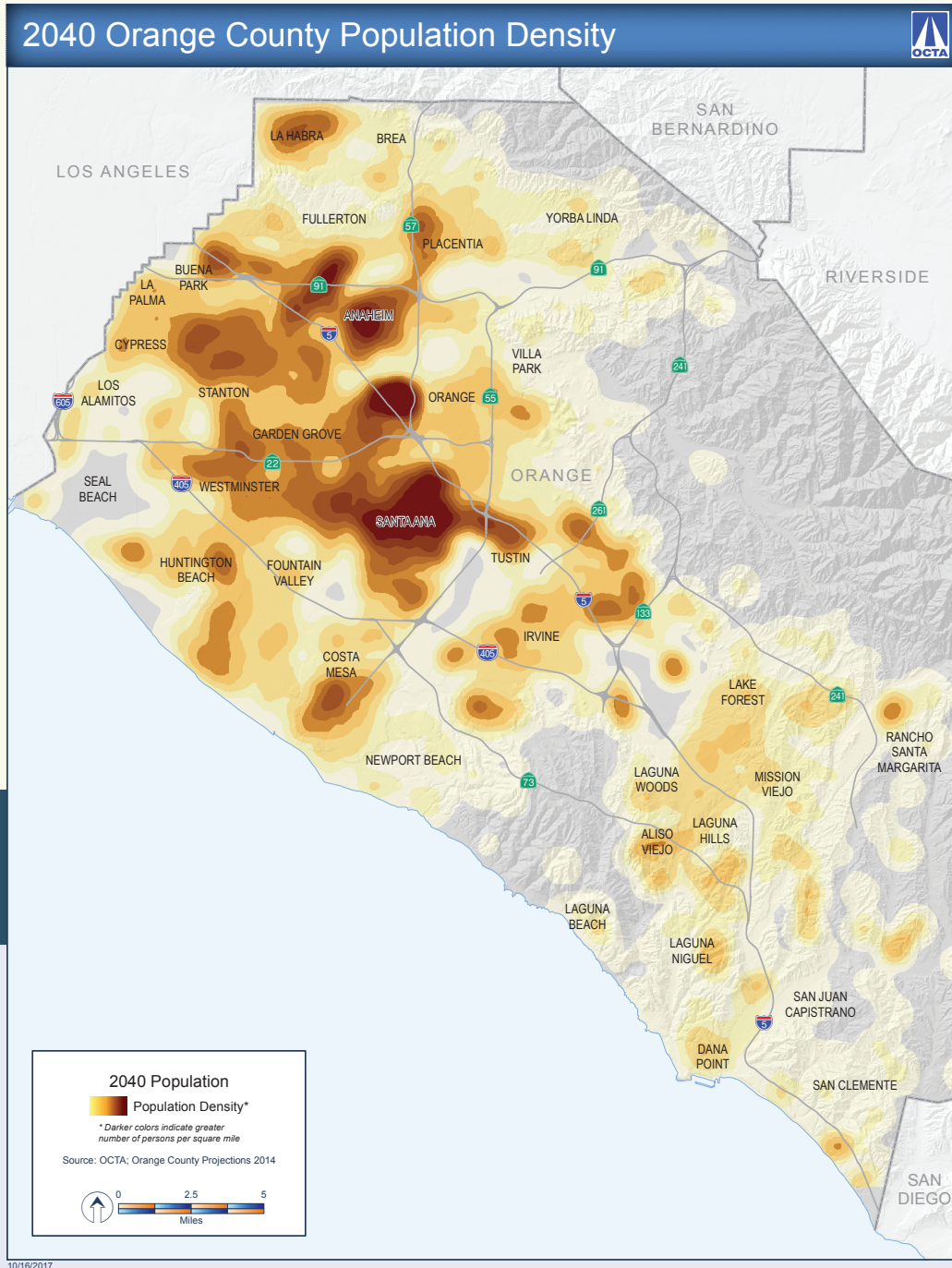
Chapter 2

Orange County in 2040

Key Points:

- By 2040, there will be:
 - ✓ 311,000 more residents
 - ✓ 275,000 more jobs
 - ✓ 122,000 more homes
- More trips will occur as population and employment grow
- Without improvements, more time will be lost to traffic

FIGURE 2.1



Population and Housing in 2040

Orange County’s steady population growth is expected to continue between 2015 and 2040, rising 10 percent to 3.46 million residents. To meet the demand of new residents for homes, it is projected that more than 122,700 housing units will be built, which equates to approximately 11 percent growth in the county’s supply of housing.³ This growth is expected to occur in concentrated pockets in northern, central, and southern parts of the county. **Figure 2.1** is a map of Orange County’s population density in 2040; **Figure 2.2** shows where the pockets of growth are expected to occur between 2015 and 2040.

³ Center for Demographic Research (CDR) at California State University, Fullerton.

FIGURE 2.2

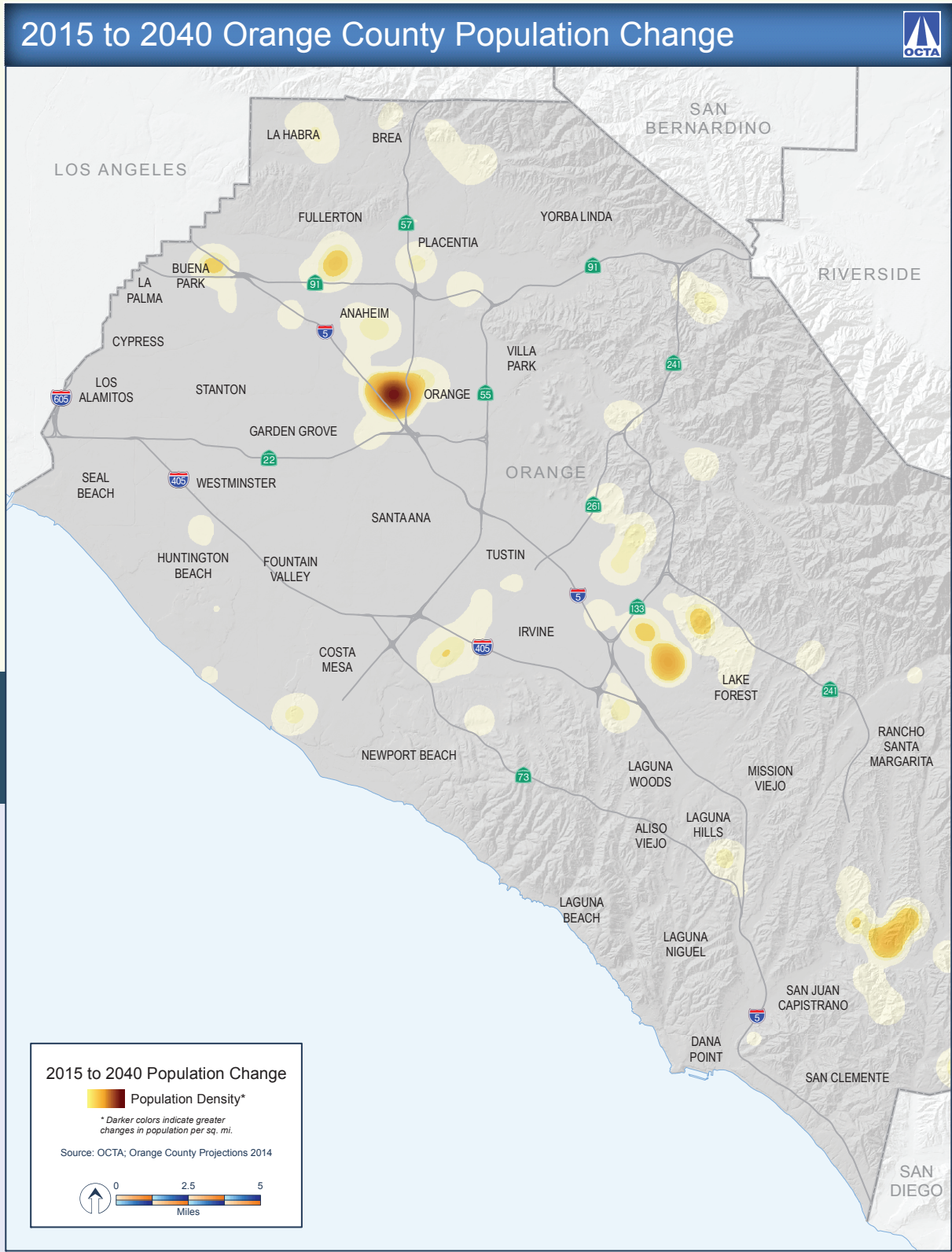
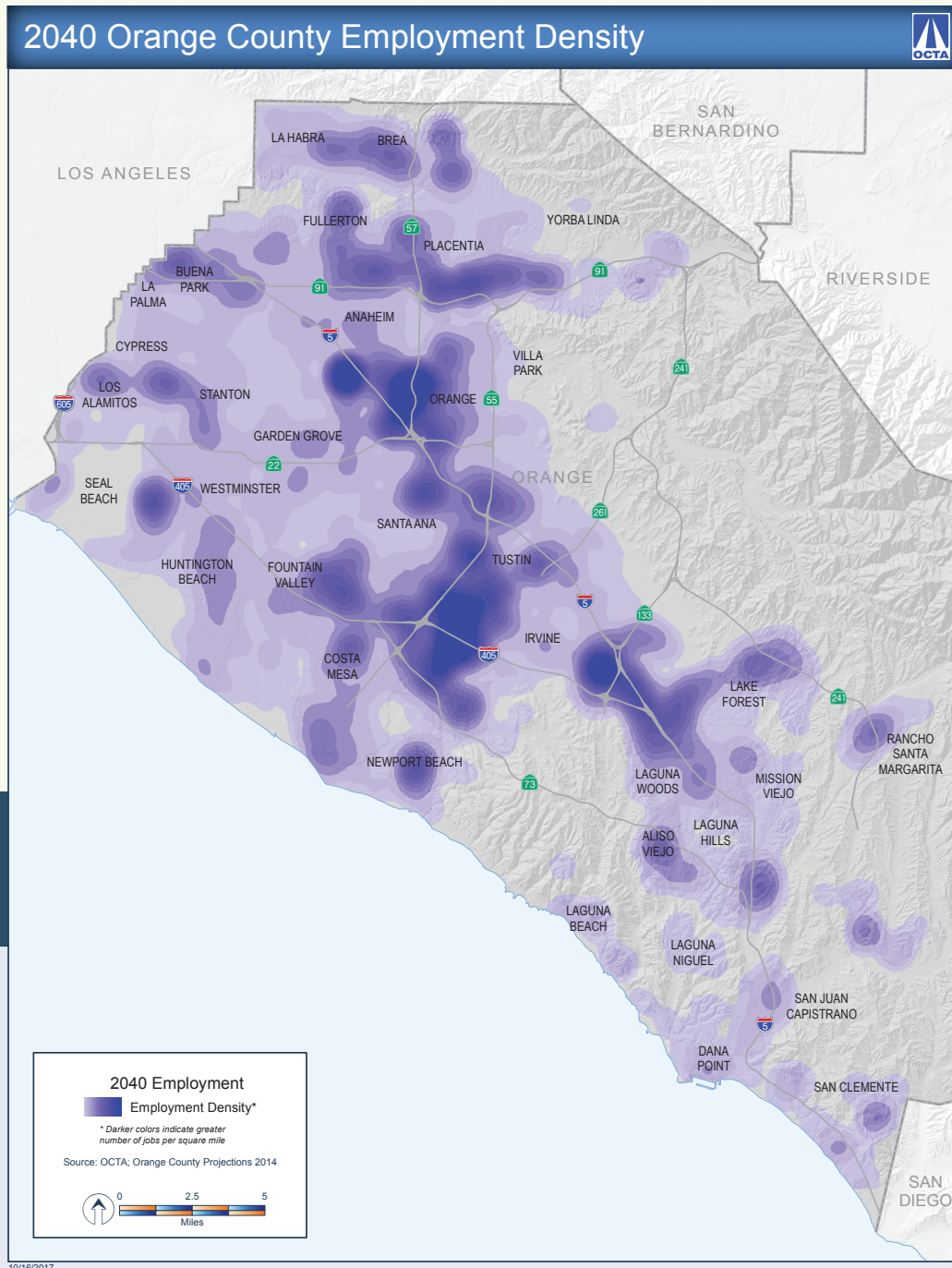


FIGURE 2.3

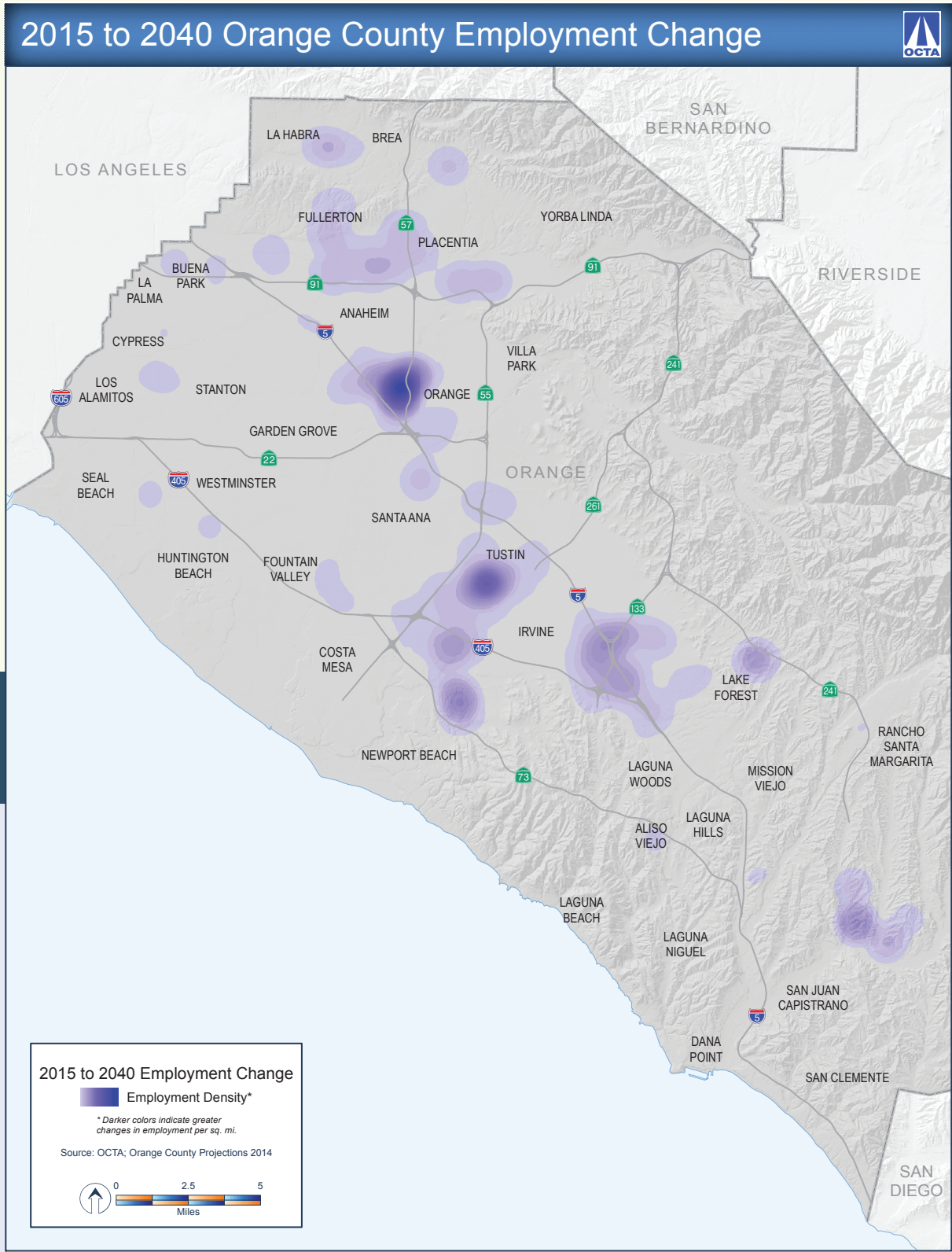


Employment in 2040

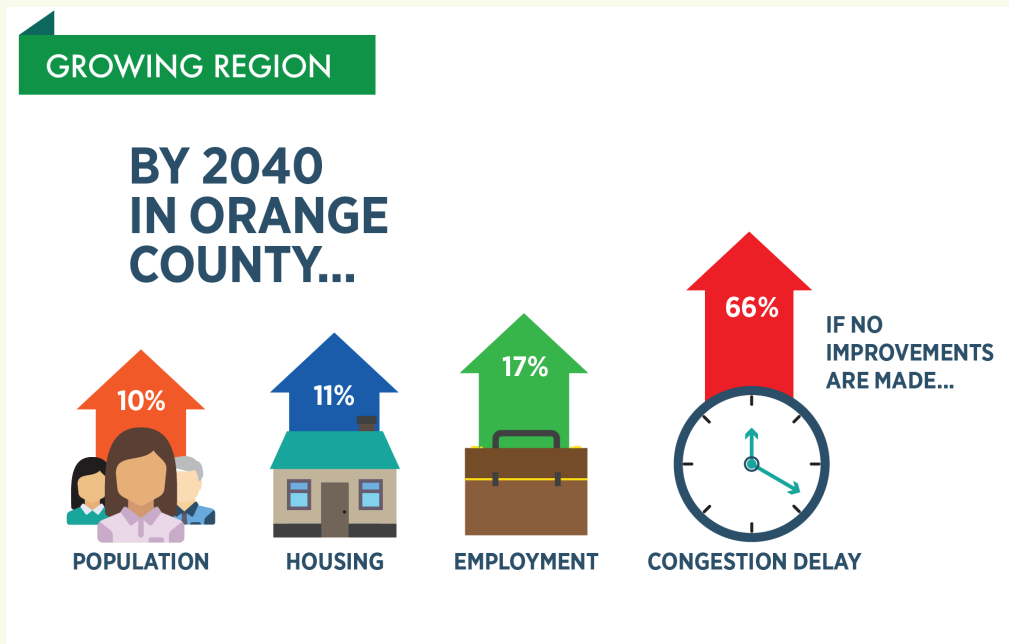
Orange County has become a major employment center, drawing workers from throughout southern California. While the double-digit growth in population and housing is significant, Orange County’s employment is projected to increase by an even greater margin of 17 percent.⁴ Employment growth generally mirrors the pockets of population and housing growth, with somewhat greater concentration of jobs in central Orange County. **Figure 2.3** illustrates projected employment density in 2040, while **Figure 2.4** shows where employment growth between 2015 and 2040 will be concentrated.

⁴ Center for Demographic Research (CDR) at California State University, Fullerton.

FIGURE 2.4



CHANGE IN POPULATION, EMPLOYMENT, HOUSING, AND CONGESTION (2015 TO 2040)



2040, If Work Stopped Today

What would it be like to live in Orange County if no additional improvements were made beyond those already planned and set in motion when the last long-range transportation plan was created? Certainly, there will be more people and more jobs in Orange County in 2040. The trend of insufficient local housing is also expected to continue, resulting in more people living in neighboring counties and commuting to work in Orange County.

Without additional improvements to our transportation system, traffic congestion will increase, travelers will experience deteriorating levels of service on highways and roadways, and costs to motorists will rise. Already, travel delay in southern California costs motorists an additional \$1,711 and an extra 25 gallons of fuel per year.⁵

⁵ National Congestion Data (<https://mobility.tamu.edu/ums/congestion-data/>)

TRANSPORTATION SYSTEM PERFORMANCE SUMMARY (2015 TO 2040)

Performance Metric	2015 Base Year	2040 Baseline
Vehicle passenger delay per capita (minutes)	8.3 minutes per day	12.5 minutes per day
Vehicle passenger travel time per capita (minutes)	54.5 minutes per day	58.5 minutes per day
Delay as a percent of travel time	15.2%	21.4%
Freeways - AM peak average speed (mph)	38.3 miles per hour	36.2 miles per hour
Arterials - AM peak average speed (mph)	25.7 miles per hour	24.3 miles per hour

To assess the extent of potential impacts, OCTA conducted traffic modeling comparing 2015 conditions with 2040 conditions if no further transportation system improvements are made (called “2040 Baseline”). With 2040 Baseline, drivers will experience increases in daily delay. On average, drivers’ daily travel time will increase four minutes per day to 58.5 minutes, as average speeds on highways and roadways drop by anywhere from two to seven miles per hour depending on whether travelers are using local streets, mainline freeways, or a carpool lane.

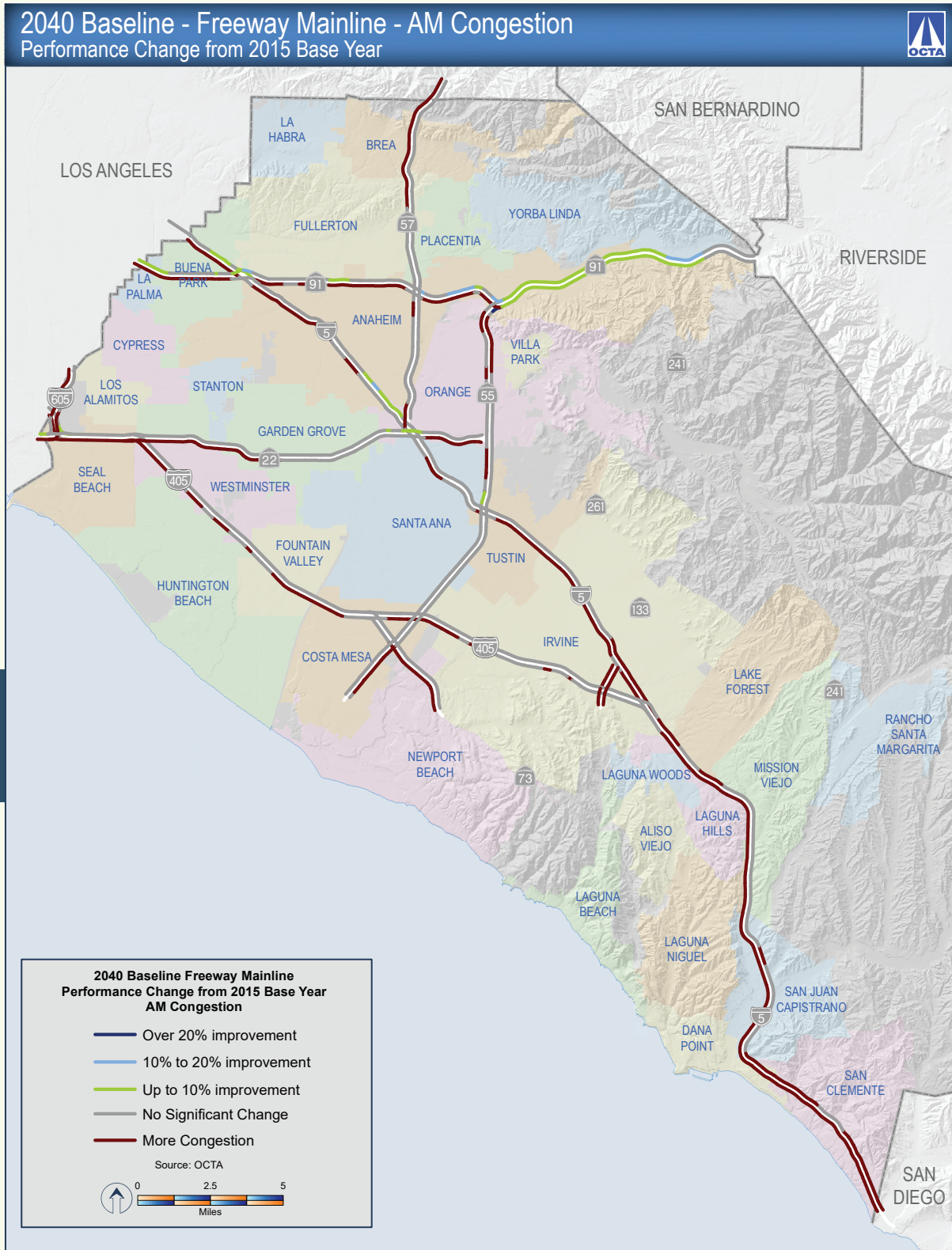
Figure 2.5 shows how the freeway system performs in morning peak travel times given the Baseline 2040 scenario. **Figure 2.6** shows the changes in freeway system performance between 2015 and 2040.

Similarly, **Figure 2.7** shows how the local road system performs during morning peak-hour travel for the 2040 Baseline scenario, while **Figure 2.8** shows the change in performance between 2015 and 2040.

FIGURE 2.5



FIGURE 2.6



4/18/2018

FIGURE 2.7

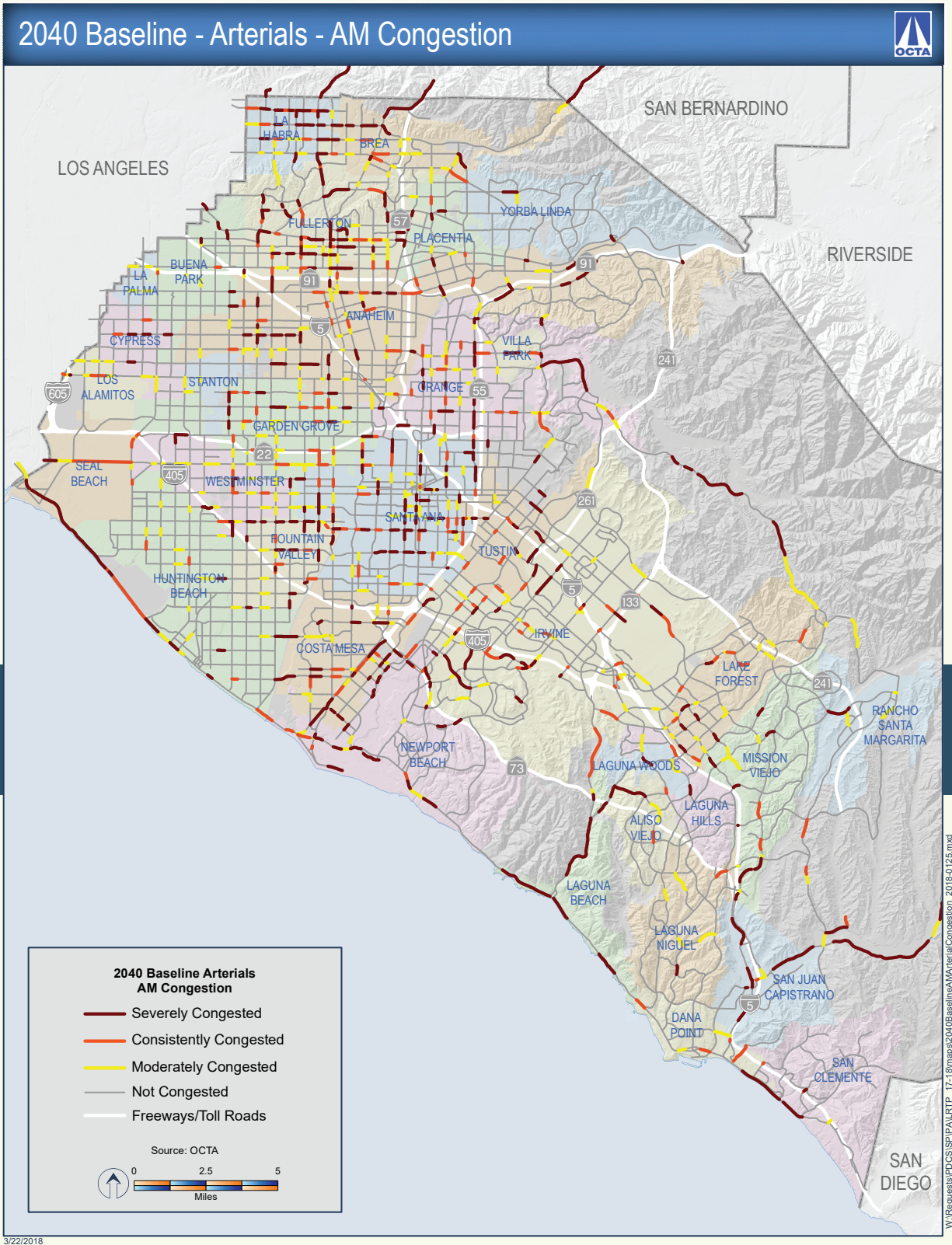
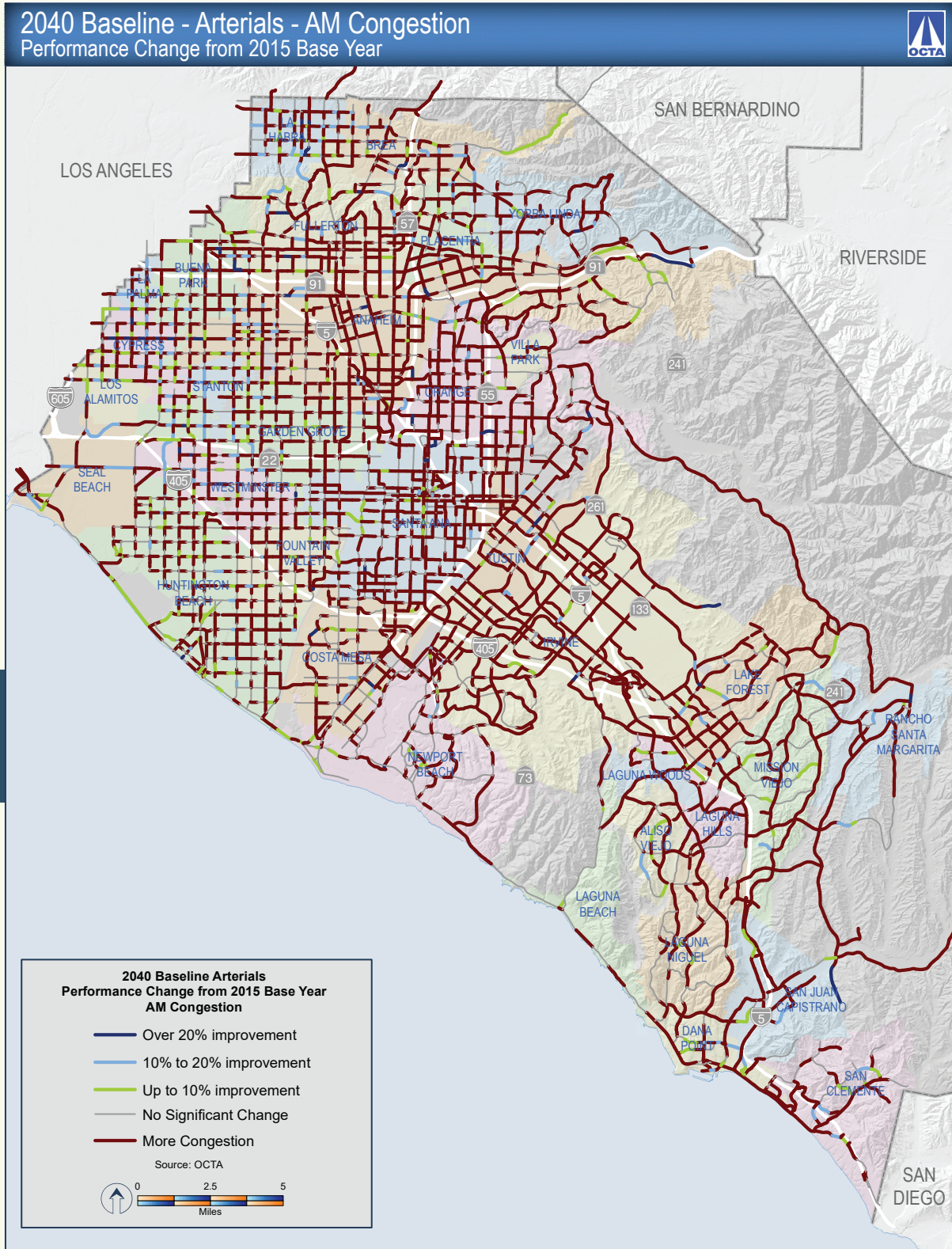


FIGURE 2.8



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Challenges and Goals

Chapter 3

Key Points:

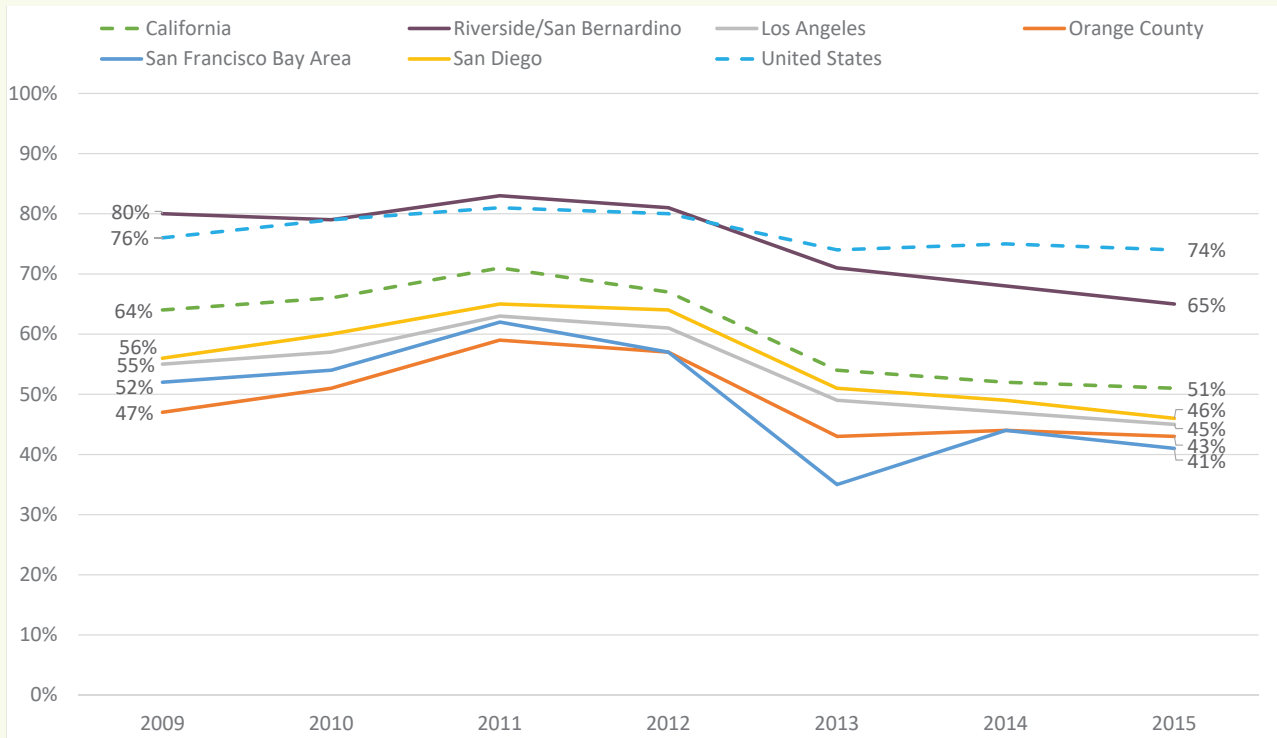
Challenges to addressing traffic growth:

- ✓ High Cost of Housing
- ✓ Limited Land for System Expansion
- ✓ Transportation Funding Uncertainties
- ✓ Evolving Transit Market
- ✓ Disruptive Technologies
- ✓ Challenging Emission Standards

Goals:

- ✓ Deliver on Commitments
- ✓ Improve System Performance
- ✓ Expand System Choices
- ✓ Support Sustainability

**PERCENTAGE OF FIRST-TIME HOMEBUYERS ABLE TO AFFORD AN ENTRY-LEVEL HOME
REGIONAL COMPARISON (2009-2015)**



Source: California Association of Realtors (www.car.org)

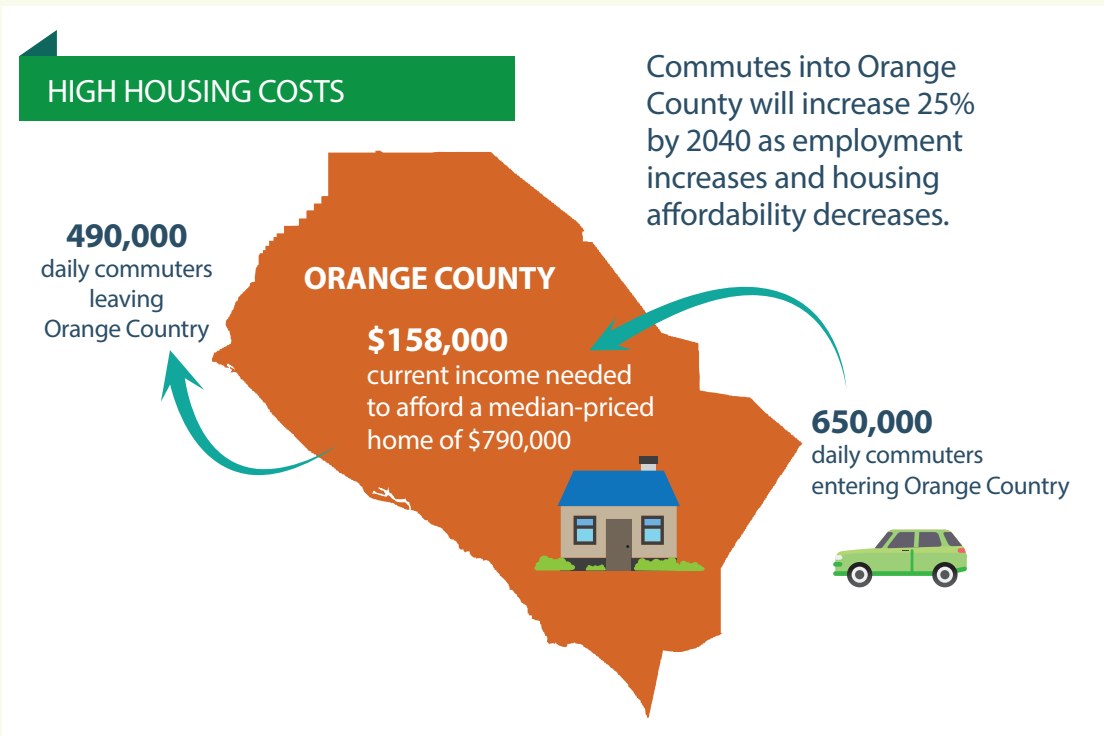
Challenges

The 2018 long-range transportation plan, *Designing Tomorrow*, allows Orange County to address the anticipated growth and improve the efficiency and safety of the transportation system through strategic investments into highways and roadways, bus and rail, active transportation, and other system elements. However, many factors influence Orange County’s ability to create change, and there are several challenges to be addressed, from physical and geographic limitations to economic and financial constraints, to regulatory and legislative requirements.

High Cost of Housing

As described earlier, by 2040, Orange County’s population will increase by 10 percent, employment by 17 percent, and the current housing shortage is projected to continue.

The cost to own a home or rent an apartment in Orange County is high compared to surrounding counties. In 2015, only 43 percent of first-time home buyers could afford an entry-level home in Orange County – lower than the California average of 50 percent and all neighboring counties, which range from 45 percent in Los Angeles and San Diego counties all the way to 65 percent in the Inland Empire. Renting in Orange County is equally challenging, with rents averaging about \$1,600 a month for a two-bedroom and \$2,250 a month for a three-bedroom apartment in 2015.



Note: The illustration above uses 2017 data.

Limited Land for System Expansion

These comparatively high housing costs, coupled with the fact that Orange County is a major employment center, force many would-be residents to live outside of Orange County and commute in for work.⁶ As a result, inbound commutes from other counties are projected to increase 25 percent by 2040.

This growth results in more travel demand, and congestion will worsen without improvements. However, there are limited opportunities to expand roadways and highways without acquiring new right-of-way. Other factors, such as the cost of owning, parking, and maintaining a vehicle, and the availability of transit options and the competitiveness of transit travel time compared to driving, also affect how people choose to travel.

⁶ Orange County Community Indicators Report, 2017



Challenges

Transportation Funding Uncertainties

OCTA uses a variety of funding sources to implement transportation-related projects and services, including local OC Go sales tax revenues, and state and federal funding. State and federal dollars may be provided to Orange County on a formula or project basis or may be competitively awarded.

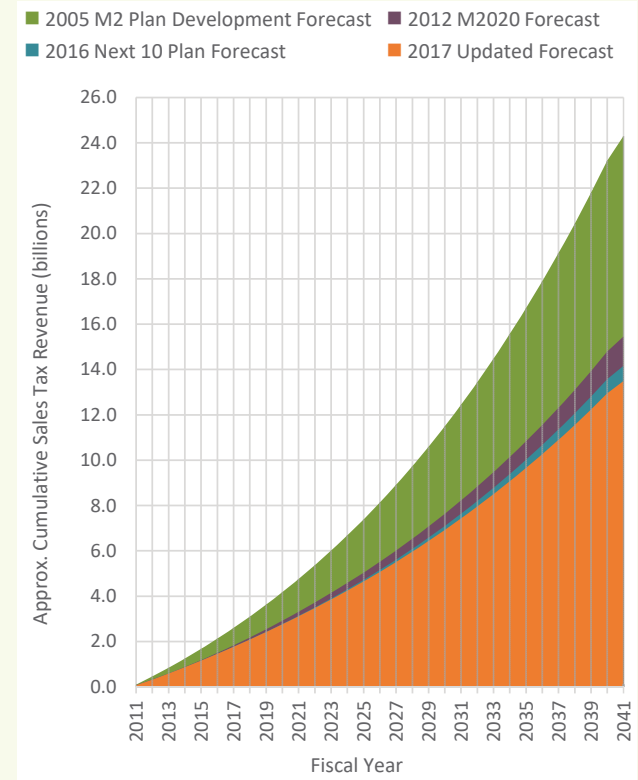
OC Go Sales Tax Revenues

Local OC Go sales tax revenues are expected to be substantially less than initially projected due to the impact of the Great Recession. In 2005, when OC Go was being developed, the revenue generated over the life of the 30-year program was expected to total \$24.3 billion. Since the Great Recession, sales tax revenue has dropped by 44 percent, or \$10.8 billion, and the latest revenue forecast for the life of OC Go is now projected to total \$13.5 billion.

This reduced revenue forecast is caused by the changes in consumer spending habits. Some of the key factors impacting OC Go revenues are lower growth in taxable retail sales as online sales grow; automobile sales are expected to taper off; new construction is expected to slow; and population growth and inflation are projected to slow over the long-term. Also, taxable sales as a percentage of overall household expenditures has eroded over time as people spend more money on housing, medical costs, and services that are not taxed. A U.S. Supreme Court decision in June 2018 may result in additional sales tax revenue collected by the state from online transactions. This could significantly change OCTA's revenue forecasts; however, the quantity of potential revenue returned to local jurisdictions is unknown at this time.



REVENUE FORECAST



Source: OC Go Next 10 Delivery Plan

Senate Bill 1 Uncertainties

SB 1 is a transportation funding bill that was passed by the California Legislature in April 2017. Recognizing a \$59 billion backlog of state highway repairs and a \$75 billion backlog for local streets and roads, SB 1 raises more than \$5 billion per year in perpetuity for transportation projects.

SB 1 provides an increase in transportation funding, but most of the new funds are set aside for maintenance of highways and roadways, and for transit service. Some funds will be available for capital improvements through competitive programs.

The funding sources for SB 1 include increases to the gas tax, diesel tax, and vehicle registration fees. Opposition to these measures resulted in an initiative to repeal SB 1. While that initiative did not gather enough signatures, another similar initiative may appear on the ballot in November 2018.

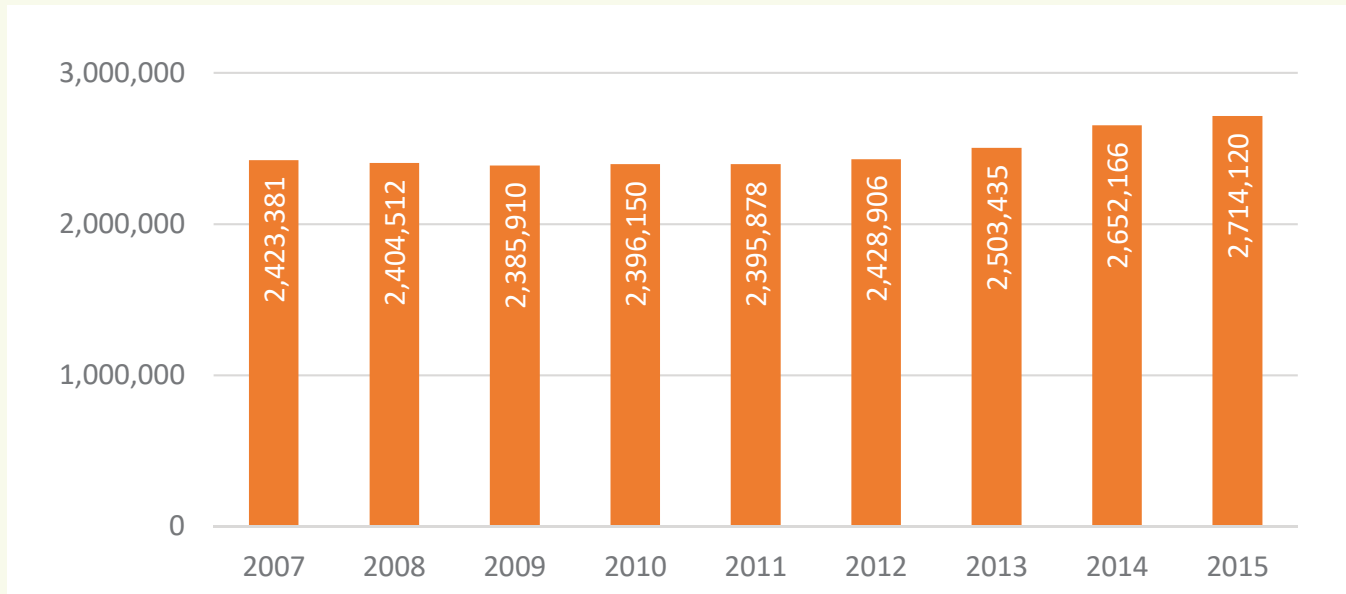
Competitive Funding Programs

Several state and federal funding sources (such as some SB 1 funds, Proposition 1b programs, and the Active Transportation Program) are allocated through competitive award, based on project merit and readiness. OCTA actively pursues funding through competitive programs; however, competitive-based programs are not conducive to long-range planning, as the funds can fluctuate greatly year-to-year.

Diminished Transit Revenue

Revenues generated by transit passenger fares comprise a relatively small but important portion of OCTA's funding (approximately \$50 million in 2016). As bus ridership continues to decline in Orange County, so do revenues generated through passenger fares.

ANNUAL VEHICLE REGISTRATIONS: ORANGE COUNTY (2007-2015)



Source: California Department of Motor Vehicles, Forecasting Unit (https://www.dmv.ca.gov/portal/dmv/detail/pubs/media_center/statistics)

Challenges

Evolving Transit Market

Transit ridership is declining nationwide for many reasons. A recent study of transit in southern California found that a dramatic increase in car ownership is a main cause of this current trend. In Orange County, bus ridership declined 31 percent over 10 years, while car ownership has increased. The number of vehicles (autos, trucks, and motorcycles) registered annually in Orange County dipped slightly during the recession but has increased consistently each year since 2011, growing a total of 13 percent between 2011 and 2015 – outpacing the statewide average increase in registered vehicles of nine percent. This presents a challenge as OCTA tries to balance residents’ desires for cars with the goals of reduced travel times and increased travel options.

OCTA is taking steps to address the challenge of falling transit ridership as targets for greenhouse gas emissions reductions are increasing.

The OCTA Bus 360° Plan began the process of modernizing the approach to transit by increasing bus service in areas with high demand and reducing service (and costs) in areas with low demand.

In 2017, OCTA prepared The State of OC Transit as a first step in developing the OC Transit Vision. That assessment found that OC Bus service is focused on a select number of hubs, including destinations and connection points; that most of existing OC Bus ridership is concentrated in a few key corridors; and that OC Bus service is concentrated during peak periods. While OCTA is taking steps to address recent ridership declines, limited funding has constrained ridership growth. In addition, Orange County’s land uses and demographics present challenges for effective transit services. At the same time, there are opportunities: increased transit use can support greenhouse gas reduction targets, and the future OC Streetcar and Bravo! lines provide a template for ridership growth.



After extensive community engagement, OCTA developed a new OC Transit Vision which outlines operating, capital, and programmatic priorities, and includes funding and implementation strategies along with land use and other policies needed to support the growth of transit services in Orange County. This new vision for transit is embedded in the *Designing Tomorrow* long-range transportation plan update, either in the financially constrained preferred plan or the discussion of unconstrained future projects.

The OC Transit Vision continues the process of modernizing transit by moving away from a “one-size-fits-all” approach. As described in the OC Transit Vision, some corridors with high demand may benefit from a high-capacity transit service such as streetcar or rapid bus. For example, serving the high concentration of employment in the Irvine Business Complex might be better accomplished using Freeway Bus Rapid Transit rather than standard buses on arterial roadways. Areas with a low density of transit demand might be addressed through flexible “microtransit” such as the pilot OC Flex service. These modernized transit services benefit from technological advances as they strive to serve existing and potential Orange County transit customers while controlling costs.

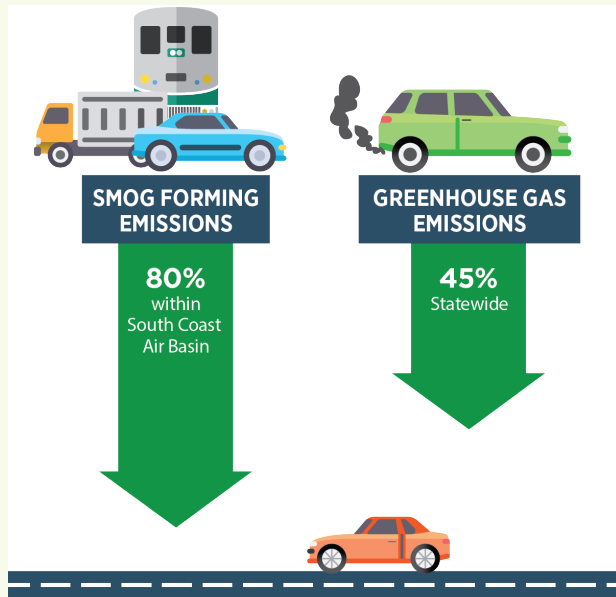


Challenges

Disruptive Services and Technologies

New transportation services like Transportation Network Companies and Automated Carpool Matching, along with new technologies like connected vehicles and cloud-based networking, are increasingly changing how, when, and why people choose to travel. *Designing Tomorrow* must consider mobility innovations and leave room for new technologies and services to change the way people and goods move, enhance efficiencies of our existing systems, and reduce environmental impacts of present-day modes of transportation.

STATE GOALS TO COMPLY WITH EMISSION REDUCTION STANDARDS BY 2030 MAY REQUIRE DECREASING:



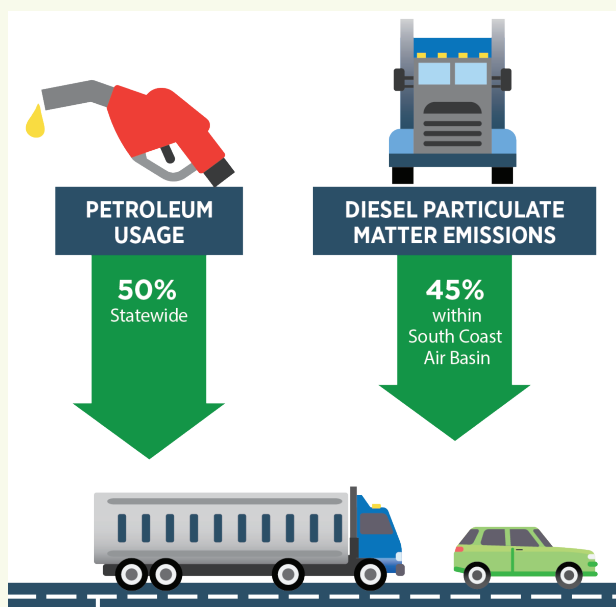
Challenging Emission Standards

The South Coast Air Basin, in which Orange County is located, has some of the worst air pollution in the United States, and vehicles are a major contributor. There are multiple pieces of existing legislation and regulations aimed at improving air quality which influence transportation and land use planning.

California's landmark Assembly Bill 32 (AB 32, the Global Warming Solutions Act of 2006) required the California Air Resources Board to reduce statewide emissions of greenhouse gases to 1990 levels by 2020. This was followed by approval of Senate Bill 375 (SB 375), the Sustainable Communities and Climate Protection Act of 2008, which increased regulation of greenhouse gas emissions and required improved coordination of land use and transportation projects and established reduction targets for 2020 and 2035 that must be addressed in Regional Transportation Plans. In 2016, Senate Bill 32 (SB 32) expanded on the earlier mandate of AB 32, requiring California to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030.

To comply with federal air quality standards and meet state greenhouse gas reduction goals by 2030, the California Air Resources Board is implementing several strategies to reduce vehicle emissions. They have developed the 2017 Climate Change Scoping Plan and the related 2016 Mobile Source Strategy to shift the California economy away from dependence on fossil fuels, meet air quality standards, achieve greenhouse gas emission reduction targets, and decrease health risk from transportation emissions. They hope to achieve these goals through actions such as slowing the growth in the overall number of miles traveled by passenger vehicles, transitioning transit fleets to cleaner technologies, and promoting zero-emission technologies.

Senate Bill 743 (SB 743), for which rulemaking is still in development, changes how transportation impacts are measured, removing focus on individual vehicle delay. The new rules are expedited to have a significant impact on land use and transportation planning. Thanks to early action and acceleration of the OC Go Freeway Program, there are only a few remaining freeway projects that could be hindered, but future long-range plan scenarios beyond OC Go projects will most likely be impacted.





ENVIRONMENTAL

- A total of 5% of OC Go Freeway Program funds is allocated to the Freeway Environmental Mitigation Program
- A total of 2% of the overall OC Go Program funds is allocated to the Environmental Cleanup Program

Goals and Objectives



Setting Goals, Creating Objectives

To address the increasing travel demand and the range of challenges facing the county, additional investments into Orange County’s transportation system are necessary. OCTA uses the long-range transportation plan as a roadmap to make such investments strategically to monitor the effectiveness of current investment strategies and policies. To do so, OCTA outlined a set of goals and objectives that define the expectations for the plan.

The first goal for *Designing Tomorrow* is to **Deliver on Commitments**. Voters in Orange County have twice endorsed a list of projects and programs to improve mobility through a half-cent sales tax (Measure M, now named OC Go). OC Go was originally approved in 1990 and renewed in 2006 to fund transportation, investments covering all modes of transportation including system sustainability and environmental enhancements.

Given changing economic conditions that impacted sales tax revenues, the OCTA Board adopted the Next 10 Plan to ensure delivery of OC Go projects and programs, and to maximize external funds such as state and federal grants. In addition to delivering the set of OC Go projects, this goal includes completing projects in the Federal Transportation Improvement Program (FTIP) and maintaining transit and motorist services such as freeway service patrol, 511, and the Orange County Taxi Administration Program.

OCTA GOALS AND OBJECTIVES

Goals	Objectives
Deliver on Commitments	<ul style="list-style-type: none"> • Prioritize OC Go (Measure M) Investments • Maintain consistency with the Next 10 Plan • Maximize external funds to support OC Go (Measure M) and complementary investments
Improve System Performance	<ul style="list-style-type: none"> • Deploy transit resources in a cost-effective manner • Improve efficiency of highways (freeways and toll facilities) and roadways • Leverage emerging technologies and services
Expand System Choices	<ul style="list-style-type: none"> • Deploy on-demand transit service and rideshare options • Support improved connectivity for active transportation • Explore public/private partnerships for new transportation capacity
Support Sustainability	<ul style="list-style-type: none"> • Deliver a financially constrained long-range transportation plan and identify opportunities to reduce funding uncertainty • Explore environmental and emission reduction strategies • System maintenance



Goals and Objectives

The second goal of *Designing Tomorrow* is to **Improve System Performance** – In other words, ensuring we are getting the most out of Orange County’s existing transportation system. For example, synchronizing signals along a corridor to reduce congestion and increase the flow of traffic through intersections is one way to maximize an existing roadway’s performance. Another example is the addition of express lanes to expand capacity on a highway that experiences heavy congestion.

For transit, improving system performance may be adding passing areas for passenger trains to pass freight trains (improving on-time performance) or improving the frequency of service on heavily used routes so that riders spend less time waiting for a bus.

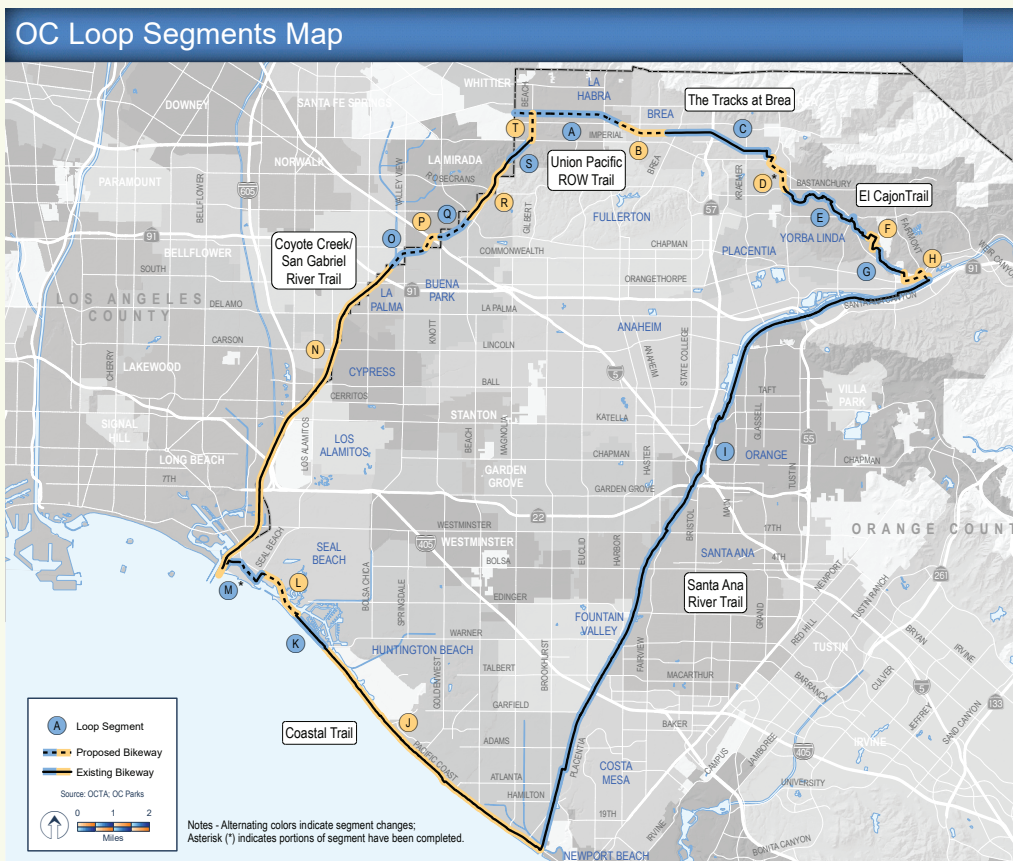
For active transportation, it could be closing gaps along a bikeway to allow a continuous ride from a common starting point to a popular destination, improving both travel time and safety.



Expand System Choices is the third goal, which seeks to offer the traveling public choices beyond the automobile, and to make those choices more convenient and accessible than ever before. An example of expanding system choice by improving convenience and accessibility is a shuttle that takes passengers from a rail station to within walking distance of their work, or the use of on-demand ride-hailing services like Uber or Lyft to provide flexible transport to and from transit stations.

Adding miles of strategically located bicycle and pedestrian facilities to the network is also a way to expand system choices. Providing travel choices beyond the single occupant vehicle also gives Orange County residents opportunities to improve their health, age in place, and benefits the environment.

All plans and programs that are part of *Designing Tomorrow* must **Support Sustainability**, which is the fourth goal. While a fiscally sustainable plan is paramount, sustainability also applies to the quality and longevity of our infrastructure, and the importance of maintaining and enhancing the environment.



OC Loop 70/30 Plan (2015)

Coordination and Collaboration

OCTA works extensively with transportation and planning organizations, within Orange County and with our neighboring counties, to create a seamless transportation network. For example, by working with the Riverside County Transportation Commission, a successful revenue-sharing approach to extend the 91 Express Lanes to the I-15 was developed. This success could lead to partnering with our neighbors, including the Los Angeles County Metropolitan Transportation Authority (Metro) and the San Diego Association of Governments (SANDAG), to discuss developing other inter-county managed lane strategies.

The Los Angeles-San Diego-San Luis Obispo Rail (LOSSAN) Rail Corridor Agency is a joint powers authority coordinating rail travel through a six-county region encompassing 41 stations. The governing board has representatives from rail owners, operators, planning agencies, and elected officials along the rail corridor. OCTA has taken a leadership role by

providing staff to administer the agency and oversee the necessary interagency collaboration.

Another example of coordination and collaboration is the OC Loop, a 66-mile loop through Orange County that will provide a mostly off-street bicycle and pedestrian paths in northern Orange County. This project is being developed with 17 cities and the County of Orange. OCTA regularly works with all 34 cities and the County of Orange to plan and deliver a comprehensive Bicycle Corridor Improvement Program for funding bikeway projects countywide.

OCTA has launched a Planning Directors collaborative to engage the county's land use experts and policy makers in the important work of coordination between land use and transportation planning and project implementation. OCTA also hosts many roundtables, technical advisory and policy advisory committees, and stakeholder events addressing a myriad of mobility issues to seek public feedback.

The 2040 Solution

Chapter 4

Key Points:

The proposed plan:

- Continues to **deliver on commitments** such as OC Go
- **Improves system performance** with efficiency strategies such as signal synchronization
- Increases transit service and adds bikeways to **expand system choices**
- Delivers projects within available revenues and preserves Orange County's quality of life, **supporting sustainability**



Making Progress

Since 2015, OCTA has completed several projects as part of its commitment to maintaining and enhancing Orange County's transportation network. These OC Go projects include freeway and carpool lane improvements, grade separations for key Orange County rail crossings, and transit projects like Metrolink station and transportation center improvements. A list of these projects illustrating progress since 2015 is shown on the following page. Additionally, OCTA conducted an extensive analysis of countywide bus service known as OC Bus 360° which provides a framework for modernizing transit services in the county. OCTA has also facilitated inter-agency planning efforts such as the OC Loop to advance the Bicycle Corridor Improvement Plan.

Freeway Improvement Projects

Since 2015, OCTA has addressed congestion hot spots along SR-91 westbound, SR-57 northbound, and at the interchange of Ortega Highway with I-5.

The I-5 Avenida Pico to San Juan Creek Road Improvement Project adds a carpool lane in both directions on I-5 between Avenida Pico and San Juan Creek Road. The project includes reconstruction of the Avenida Pico interchange, including widening the northbound Avenida Pico on-ramp to three lanes, the addition of a dedicated bicycle lane at the Avenida Pico interchange, on-ramp improvements, and soundwalls where needed. Construction began at the end of 2014 and was completed in 2018.

We're Committed



OC Bridges

In 2017, the last two underpasses in the OC Bridge program were completed – the final projects among a total of seven bridges and underpasses built over five years. These under- or overpasses separate car and pedestrian traffic from the BNSF Rail freight rail line running through Fullerton, Anaheim, and Placentia to improve travel times, cut air pollution by eliminating the need for cars to idle at railroad gates, and enhance safety in the community. The projects include underpasses at State College Boulevard and Raymond Avenue, Placentia Avenue and Kraemer Boulevard, and bridges over the rail line at Lakeview Avenue, Orangethorpe Avenue, and Tustin Avenue/Rose Drive.

OC GO PROJECTS COMPLETED SINCE 2015

OC Go Projects C and D	I-5 HOV lanes from San Juan Creek Road to Avenida Pico
OC Go Project D	Ortega Highway interchange with I-5
OC Go Project H	SR-91 westbound from I-5 to SR-57
OC Go Project I	SR-91 westbound from SR-55 to Tustin Avenue
OC Go Project O	Grade separations at Lakeview Avenue, Orangethorpe Avenue, Tustin Avenue, Raymond Avenue, State College Boulevard, Kraemer Boulevard, and Placentia Avenue
OC Go Project R	Laguna Niguel/Mission Viejo Metrolink Station ADA Ramps
OC Go Project R	San Clemente Beach Trail Safety Enhancements
OC Go Project R	San Clemente Pier Station Lighting



OC Bus 360°

The OC Bus 360° work includes:

- Implementation of new, faster bus routes;
- Redeployment of services to improve efficiencies and build ridership; and
- Rollout of new technologies, including mobile ticketing and real-time bus arrival information.

The strategy of focusing service in areas of high demand includes preserving StationLink service as a connection to regional rail and expanding Bravo! express bus service. While OCTA ridership declined by three percent comparing the second quarter of 2017 to 2016, ridership on routes that were improved in October 2016 increased by 19.6 percent (comparing average weekday ridership September 2017 to September 2016). Additionally, Orange County's one-year bus ridership decline of 3.0% is not as steep as the national average decline of 4.2% over the same time (2016 to 2017, Q2).

New or modified routes are attracting new transit riders. For example, the pilot College Pass Program for Santa Ana College had nearly 3,000 students sign up in the first week, which translates to an additional 171,555 bus boardings. Also, after improving efficiencies for Bravo! 560 service, more than half (57 percent) of riders said their travel time improved by 15 minutes or more.

The real-time bus apps that OCTA launched are getting traction, with more than 1 million sessions per month and 300 new mobile ticketing app users per week on average. About seven percent of OCTA's total fare revenue from bus service is from the new mobile ticketing app, which is double the industry average.

OC Bus 360° also includes competitively awarded grants to local agencies for transit services tailored to community needs (referred to as Project V under OC Go). Numerous projects and services are being planned and implemented by local agencies, such as vanpool services from local employment centers to transportation hubs, special event and seasonal services that operate during heavy traffic periods, and local community circulators that carry passengers between various shopping, medical, and transportation-related centers. **Figures 4.1 and 4.2** show OC Bus 360° local and express routes.



We're Committed



FIGURE 4.1

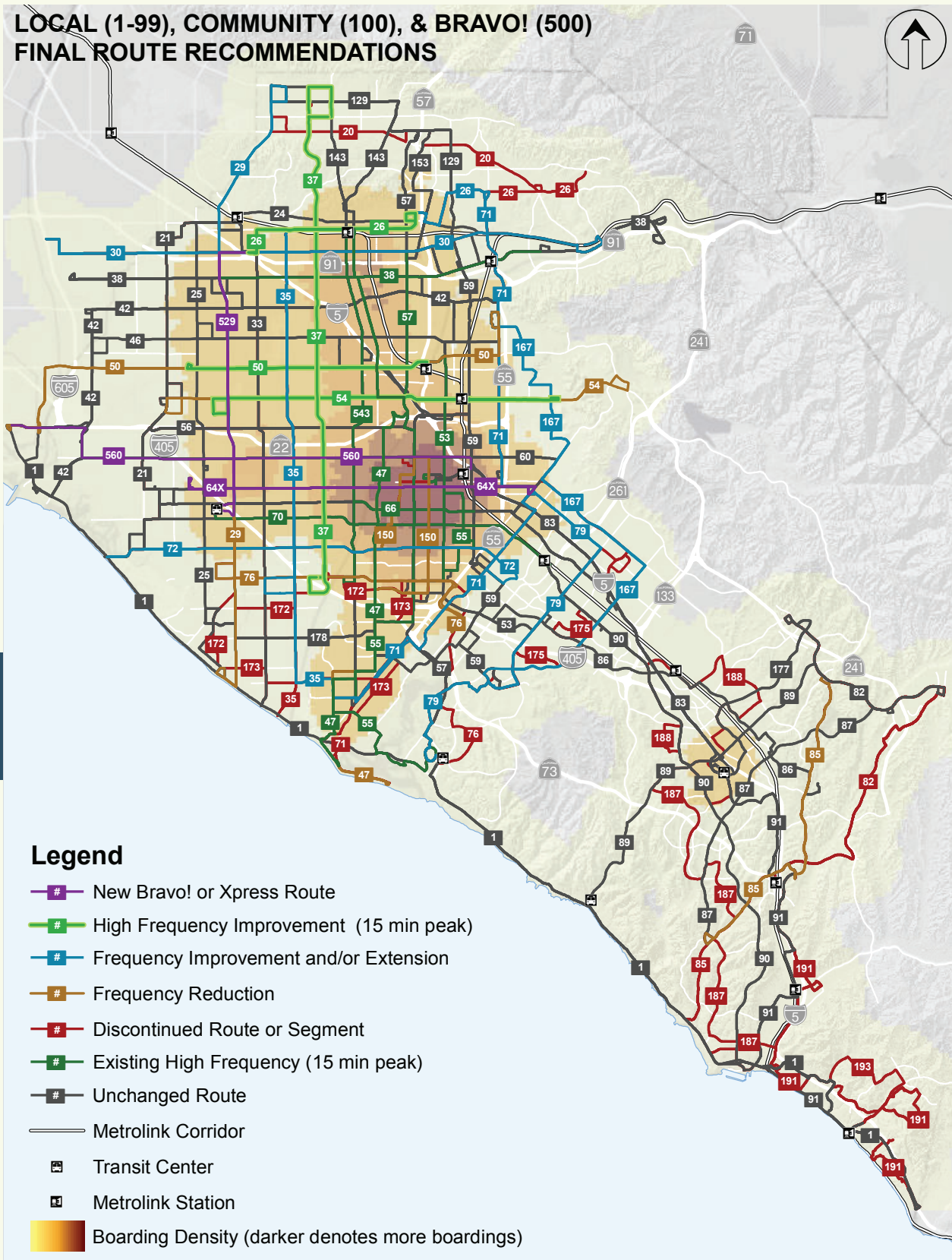


FIGURE 4.2



OC GO COMMITTED PROJECTS

OC Go Project A	Add second HOV lane on I-5 from SR-55 to SR-57
OC Go Project B	Add capacity on I-5 from I-405 to SR-55
OC Go Projects C and D	Add capacity on I-5 from SR-73 to El Toro Road and improve interchanges at La Paz Road and Avery Parkway
OC Go Project D	Improve El Toro Road Interchange with I-5
OC Go Project F	Add capacity and improve operations on SR-55 from I-405 to SR-91
OC Go Project G	Add capacity on SR-57 northbound from Lambert Road to Tonner Canyon Road
OC Go Project G	Add capacity on SR-57 northbound from Orangewood Avenue to Katella Avenue
OC Go Project I	Add capacity on SR-91 from SR-55 to SR-57
OC Go Project J	Add capacity on SR-91 from SR-241 to Riverside County
OC Go Project K	I-405 Improvement Project from SR-73 to I-605
OC Go Project L	Add capacity on I-405 from I-5 to SR-55
OC Go Project M	Katella Avenue Interchange with I-605
OC Go Project N	Freeway Service Patrol
OC Go Project O	Implement Master Plan of Arterial Highways
OC Go Project P	Signal Synchronization Program
OC Go Project R	Metrolink capital support
OC Go Project R	Metrolink station improvements
OC Go Project S	OC Streetcar
OC Go Project U	Senior Mobility Program and Senior Non-Emergency Medical Transportation Program
OC Go Project W	Safe Transit Stops
OC Go Project X	Transportation-related water quality program

PROJECTS FROM EXTERNAL AGENCIES

Highway	SR-241/261/133 - Build out 3 to 4 toll lanes in each direction from SR-91 to I-5 (via SR-261 and SR-133), plus climbing and auxiliary lanes
Highway	SR-241 - Build out 4 to 5 toll lanes in each direction, plus climbing and auxiliary lanes
Highway	SR-73 - Build out 4 to 5 toll lanes in each direction, plus climbing and auxiliary lanes
Transit	SR-133 - Add new interchange at Trabuco Road/Great Park Boulevard (North Irvine Transportation Mitigation Program)
Highway	SR-241 - Add express lane connector to SR-91 Express Lanes
Highway	SR-91 - Riverside County Transportation Commission to add one general purpose lane from county line to SR-71

We're Committed

Continuing Efforts

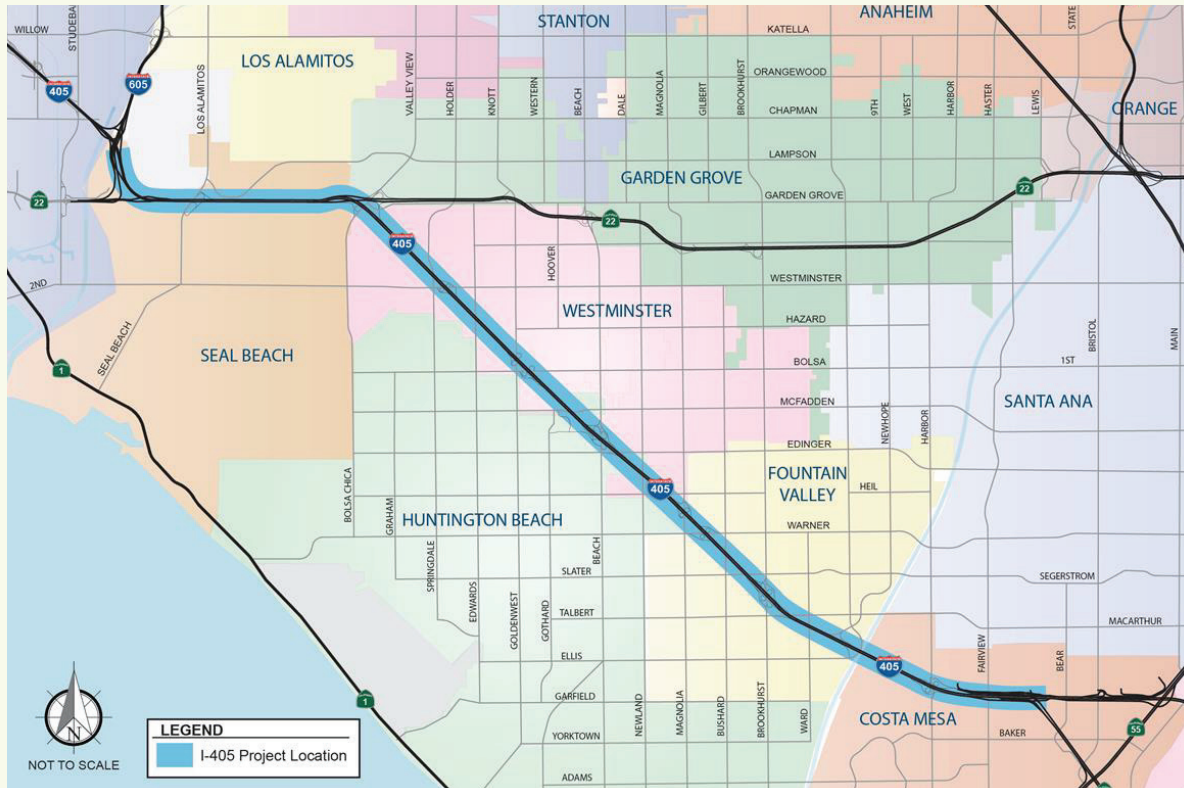
Between now and 2040, OCTA is proceeding with several additional projects that deliver on commitments, improve system performance, expand system choices, and support sustainability. A list of OC Go projects in development is shown above.

Freeway improvements under development include general and express lanes on a segment of the I-405 and a carpool lane on a segment of the I-5. Additionally, Metrolink service will be maintained at existing levels and improvements at five Metrolink stations (including a new station in Placentia) are anticipated to be completed by 2021.

On an annual basis, OCTA partners with local jurisdictions to synchronize traffic signals, address arterial hot spots, and maintain pavement quality through the Regional Traffic Signal Synchronization Program, Regional Capacity Program, and Local Fair Share Program. On the transit side, OC Streetcar is under construction and OCTA is continuing to apply the learnings from the OC Bus 360° effort, which addresses falling transit ridership while increasing travel options for Orange County residents and reducing greenhouse gas emissions.

Motorist assistance programs, such as Freeway Service Patrol and 511, and other projects like the Freeway Environmental Mitigation and Environmental Cleanup programs will remain regularly funded.

I-405 IMPROVEMENT PROJECT LOCATION



I-405 Improvement Project

In cooperation with Caltrans, OCTA is widening the San Diego Freeway between State Route 73 (SR-73) and Interstate 605 (I-605), the Interstate 405 (I-405) Improvement Project, shown above. The project will improve 16 miles of I-405, and add one regular lane in each direction from Euclid Street to I-605, and make improvements to freeway entrances, exits, and bridges.

It also will construct the I-405 Express Lanes from SR-73 to I-605. The new express lanes – incorporating the existing carpool lanes and connectors that opened in 2014 – will be two lanes in each direction. Construction of this project was initiated in 2018 and will be completed by 2023.



I-5 HOV Lane

One of the most degraded segments of Orange County’s HOV network is the approximately four-mile section on I-5 between the HOV-to-HOV interchanges with SR-55 and SR-57. During busy travel periods the volume of vehicles using this facility can exceed the capacity of the single HOV lane. As a result, motorists in the HOV lane can experience slow travel speeds and delay. OCTA is addressing this problem by implementing OC Go Project A, which will add a second HOV lane to I-5 between SR-55 and SR-57. Design of this project is complete and construction is anticipated to begin in 2018.

OC Streetcar

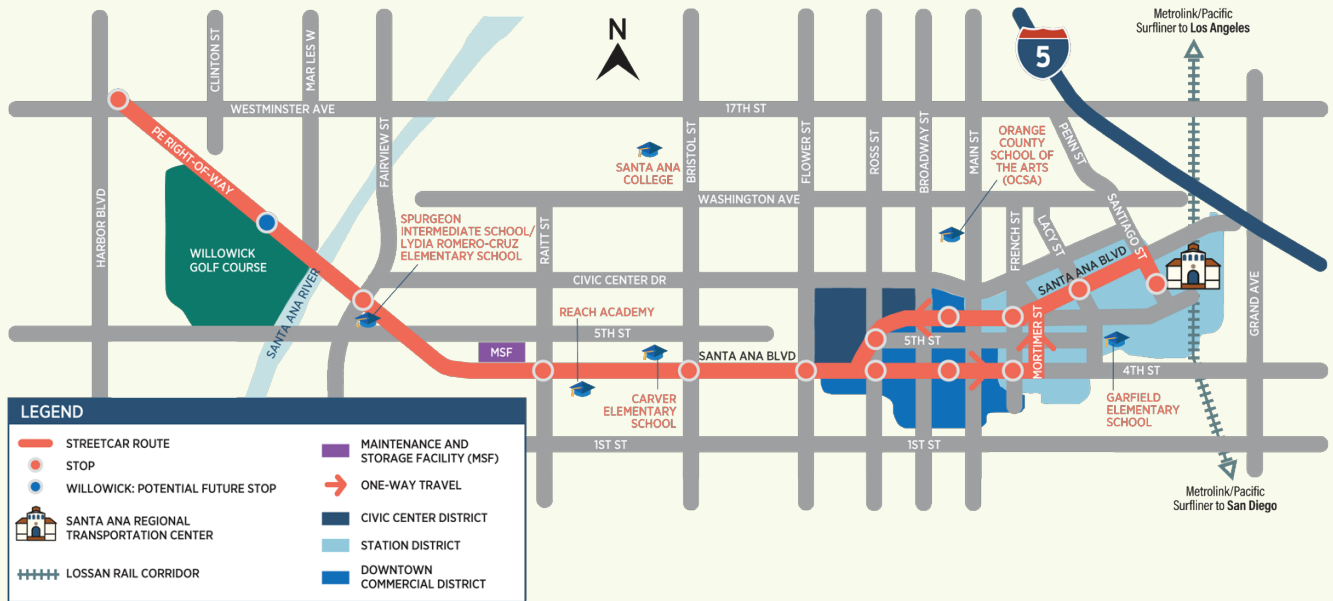
OC Streetcar will be the first modern streetcar project to be built in Orange County. Expected to begin carrying passengers in 2021, the OC Streetcar is planned to travel along a 4.1-mile route (see map on the following page) from the Santa Ana Regional Transportation Center, through Downtown Santa Ana and the Civic Center, along the Pacific-Electric right-of-way, and connect to a new multimodal transit hub at Harbor Boulevard and Westminster Avenue in Garden Grove. It is intended to enhance resident connectivity between neighborhoods, businesses, and major destinations, as well as to make it possible for Metrolink passengers to rely on public transportation for their entire journey throughout Orange County and beyond.

OCTA became the lead agency in 2014 for project development, engineering, construction, operations, and maintenance, working together with the cities of Santa Ana and Garden Grove. Design and engineering for the project occurred in 2016. Construction is planned to begin in 2018, with project testing and operations starting in 2021.

We’re Committed



OC STREETCAR ROUTES



OC STREETCAR BY THE NUMBERS

PROJECT FEATURES

OCTA BUS CONNECTIONS: 14

FLEET SIZE: 8

FREQUENCY: 10-15 MINUTES

STOPS: 10 (IN EACH DIRECTION)



STREETCAR CAPACITY: UP TO 175+ PEOPLE

DAILY TRAIN CONNECTIONS AT SARTC: 65+

ROUTE: 4.15 MILES (in each direction)

Freeway Environmental Mitigation Program

OCTA's Freeway Environmental Mitigation Program provides environmental mitigation for the impacts from freeway improvements. Approximately \$274 million is available from OC Go over 30 years.

The Mitigation Program allocates funds to acquire land and restore habitat. Properties are acquired and permanently protected as conservation lands. To date, OCTA has acquired more than 1,300 acres of Preserves in Brea, Laguna Beach, Silverado Canyon, and Trabuco Canyon, as shown in **Figure 4.3**. A total of 12 restoration projects have also been funded throughout Orange County. Approximately \$30 million has been spent on acquisitions and \$10 million on over 350 acres of habitat restoration activities.

OCTA completed the Final Natural Community Conservation Plan/Habitat Conservation Plan after 2015, which is a state and federal process to protect threatened and endangered species. The Conservation Plan ensures OCTA's wilderness preserves will remain forever protected from development. It also requires OCTA to provide funding for the long-term management of the properties.

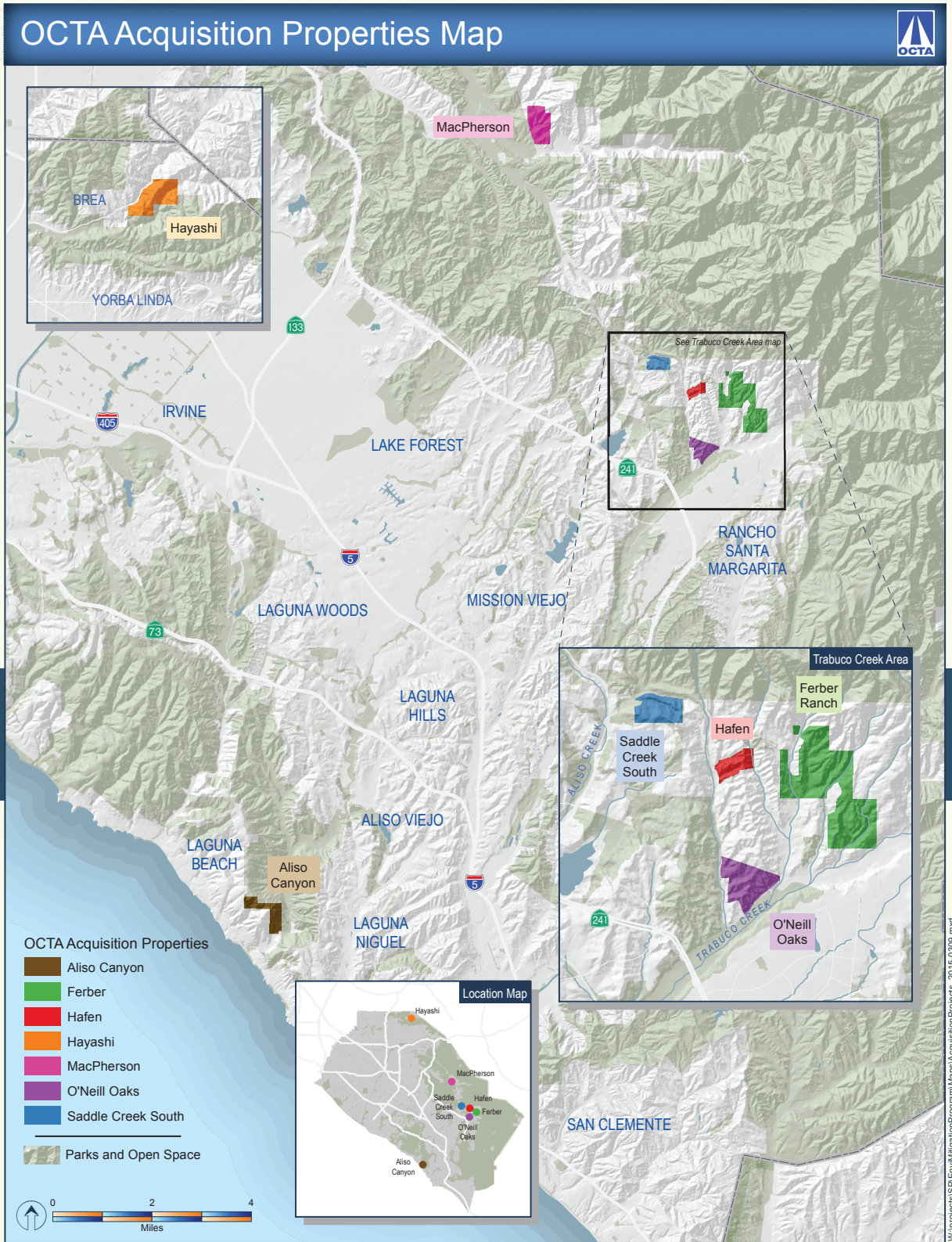
In conjunction with the Conservation Plan, Resource Management Plans (RMP) are being developed for each acquired Preserve. These plans will outline how the Preserves are protected, how they will be managed, and will address public access. The Trabuco Canyon and Silverado Canyon RMPs were finalized in late 2017, and the RMPs for the Eagle Ridge and Pacific Horizon Preserves are expected to be completed in 2018.



We're Committed



FIGURE 4.3





We're Committed

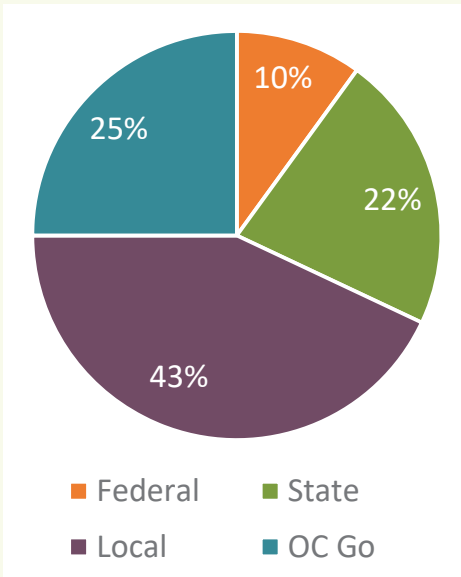
Environmental Cleanup Allocation Program

OCTA has established an Environmental Cleanup Program to improve overall water quality in Orange County from transportation-generated pollution. About \$300 million is available from OC Go over 30 years for this program. Program funds are allocated on a countywide competitive basis to assist jurisdictions in meeting the Clean Water Act requirements for controlling transportation-generated pollution.

The Tier 1 Grant Program is designed to mitigate the more visible form of pollutants, such as litter and debris that collect on roadways and in storm drains prior to being deposited in waterways and the ocean. To date, approximately \$20.1 million of Tier 1 funding has been awarded to over 150 projects from 33 cities and the County of Orange.

The Tier 2 Grant Program consists of funding regional, potentially multi-jurisdictional, capital-intensive projects. Examples include constructed wetlands, detention/infiltration basins, and bioswales, which mitigate pollutants including litter and debris, but also heavy metals, organic chemicals, sediment, and nutrients. To date, approximately \$28 million has been awarded to 22 projects from 12 cities and the County of Orange.

**2018 LONG-RANGE TRANSPORTATION PLAN
REVENUES BY FUNDING SOURCE (2019-2040)**



Source: Orange County Transportation Authority

Currently committed improvements and programs will be funded through a variety of sources, including federal, state, and local dollars. OCTA has identified the revenues it expects to receive between 2019 and 2040, which total approximately \$42.3 billion. Federal funds make up about 10 percent of overall revenues and state funds comprise another 22 percent. The state funds include about \$4 billion projected to be available for Orange County’s transportation system from SB. While there is a possibility that SB 1 may be repealed, the long-range transportation plan forecast assumes a moderate level of SB 1 funding to benefit the transportation system through highway maintenance and repair, expanded public transit, local street and road repair work, and bicycle and pedestrian projects.

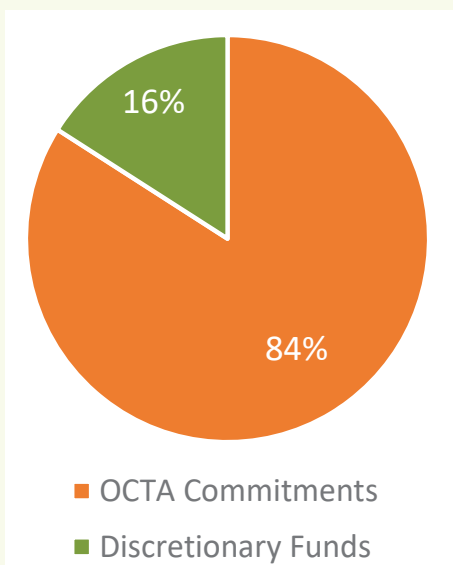
Local agencies contribute the largest proportion of funds, at 43 percent. These local funds include Transportation Development Act funds, local general fund expenditures for maintenance, developer fees, express lane revenues, and local transit fare revenues. Rounding out available revenues is OC Go, Orange County’s half-cent sales tax for transportation, which accounts for 25 percent of revenues anticipated to be available for maintaining and improving mobility in Orange County over the next 20 years.

Of the total \$42.3 billion projected to be available within the long-range transportation plan time frame, the committed improvements and programs are estimated to take about 84 percent (including OC Go projects, Federal Transportation Improvement Program projects, and maintaining current transit levels). This leaves 16 percent, or approximately \$7 billion, for projects beyond OCTA’s existing commitments that can further address the challenges and goals of the long-range transportation plan.

The remaining revenues are proposed for implementing additional projects that are beyond commitments and that further address the challenges and goals of the long-range transportation plan. These investments are discussed in more detail in the next section: Beyond Commitments.

Penciling it Out

**2018 LONG-RANGE TRANSPORTATION PLAN
EXPENDITURES PROPOSED (2019-2040)**



Source: Orange County Transportation Authority



Beyond Commitments

The projects proposed for the \$7 billion available after existing commitments were selected because of their ability to address key challenges and goals. Proposed freeway projects include adding carpool lanes as well as interchange improvements and overcrossings, which will help to improve system performance. Additional lanes proposed on OCTA's toll roads will build system capacity. Freeway capacity expansion projects proposed as discretionary improvements only occur in areas where right-of-way is available, and these include:

- Interstate 5 – Add managed-lane capacity from Avenida Pico to the San Diego County line;
- Interstate 5 – Add managed-lane capacity from State Route 57 (SR-57) to State Route 91 (SR-91); and
- SR-73 – Add managed-lane capacity from I-405 to MacArthur Boulevard

Several transit projects were also identified through the OC Transit Vision and include capital projects as well as operations and maintenance, which together will expand mobility choices for Orange County travelers. Metrolink's Strategic Plan provided the framework for rail projects which, along with active transportation projects, also enhance system choices. A complete list of projects proposed for the \$7 billion beyond current commitments is shown on the following page.

TREND 2040 BEYOND COMMITTED PROJECT LIST

Highway	I-405 - Add auxiliary lanes from University Drive to Sand Canyon Avenue, and from Sand Canyon Avenue to SR-133
Highway	I-5 - Add one HOV lane in each direction from Avenida Pico to San Diego County line
Highway	I-5 - Add one HOV lane in each direction from SR-57 to SR-91
Highway	I-5 - Barranca Parkway HOV interchange improvement - Add SB HOV on-ramp and northbound HOV off-ramp
Highway	SR-55 - Improve access and merging in the vicinity of Meats Avenue
Highway	SR-57 Interchange improvements at Lambert Road
Highway	SR-73 - Add one HOV lane in each direction from MacArthur Boulevard to I-405
Highway	SR-91 - Construct overcrossing and interchange at Fairmont Boulevard
Local Arterial	Build out planned OC Bikeways
Local Arterial	Grade Separations along LOSSAN corridor at 17th Street, State College, Boulevard and Santa Ana Boulevard
Transit	Implement OC Transit Vision
Transit	Support Metrolink Strategic Plan implementation
Transit	Laguna Niguel to San Juan Capistrano Metrolink Passing Siding Project
Transit	Transit Security and Operations Center
Transit	Vanpool



Beyond Commitments



OC Transit Vision

After extensive community input, OCTA developed the OC Transit Vision, which includes operating, capital, and programmatic priorities along with land use and other policies needed to support the growth of transit services in Orange County. The OC Transit Vision identifies corridors with high demand that may benefit from high-capacity transit services such as the OC Streetcar or rapid bus. At the same time, the Transit Vision addresses areas with low density of transit demand through strategies like flexible “microtransit.” The pilot OC Flex service is an example of microtransit (**Figure 4.4**).

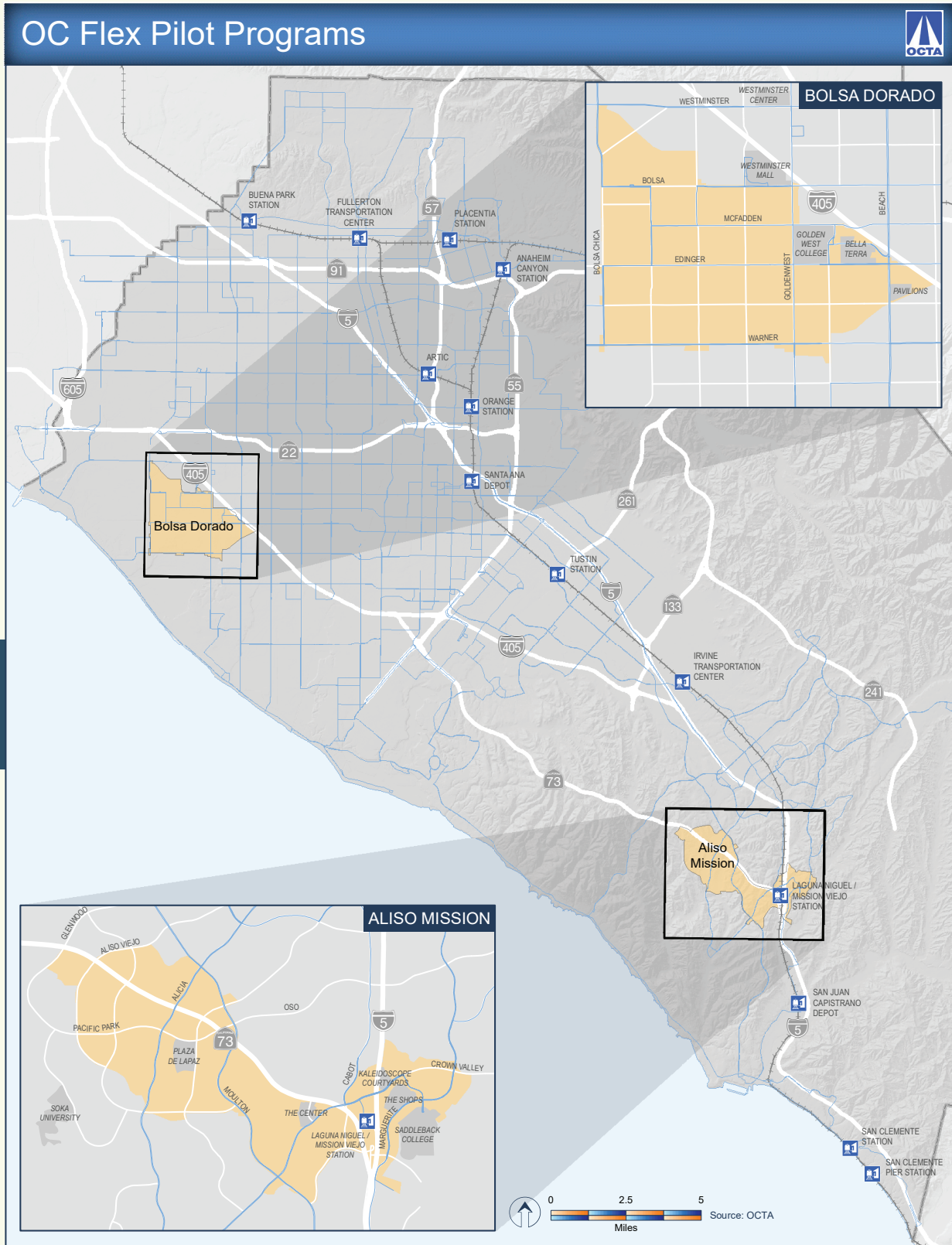
Metrolink Strategic Plan

After 23 years of operation, Metrolink assessed their infrastructure and services and developed a plan to take commuter rail into the future. Their priority is bringing the stations, tracks, and rail cars up to the latest standards of safety and comfort to ensure a state of good repair and support future growth in the system. They also propose to evaluate the potential for additional reverse commute trips to address shifting travel patterns in the region. Modernizing the system is in the mix of the Strategic Plan, with technology ranging from mobile ticketing to positive train control to new clean, high-horsepower locomotives. Finally, Metrolink will focus on strategic regional partnerships, including with OCTA as the manager of the LOSSAN Rail Corridor Agency, which operates on the same system as Metrolink.

OC Active

OC Active is a comprehensive countywide effort, spearheaded by OCTA, to map out a better plan for walking, rolling, and bicycling in Orange County. “Rolling” includes skating, skateboarding, wheelchairs, and similar rolling modes of transportation. OC Active will evaluate needs, as well as recommend active transportation improvements for all 35 local jurisdictions in Orange County. It will include analyses to identify pedestrian improvement areas and will incorporate all regional and local bikeway planning work completed to date by both OCTA and local jurisdictions. OC Active will help support the development of more sustainable, livable, and efficient mobility, and in doing so will further expand Orange County’s travel options while improving systemwide performance.

FIGURE 4.4



5/1/2018

PROPOSED TREND 2040 EXPENDITURE BY MODE

Mode	Expenditure
Highway Projects	\$8,546,999
Roadway Projects	\$14,361,388
Transit Projects	\$17,988,262
Other (OC Go Environmental Programs, Bond Interest, etc.)	\$1,352,960

Trend 2040

Together, the committed projects and additional discretionary projects constitute the long-range transportation plan, referred to as Trend 2040. It is a holistic approach to addressing mobility across modes.

The complete list of Trend 2040 projects includes regional highway, roadway, bus, rail, and bikeway improvements. For carpool lanes, the Trend 2040 scenario assumes a transition to a priced-managed lane approach with a carpool lane requirement of three or more passengers, and single-occupant vehicles allowed with a fee in response to new regulations as detailed later in this chapter.

There are also senior mobility projects, roadway pavement rehabilitation, a transportation-related water quality program, vanpools, and Orange County’s taxi administration program. All projects in Trend 2040 are within OCTA’s financial capability to deliver, which meets the goal of financial sustainability. The list of Trend 2040 projects is provided as **Attachment A**.

New infrastructure proposed as part of Trend 2040 is illustrated on the following maps, shown by location within the county and by type of facility or mode of travel (**Figures 4.5 - 4.13**).

FIGURE 4.5



FIGURE 4.6

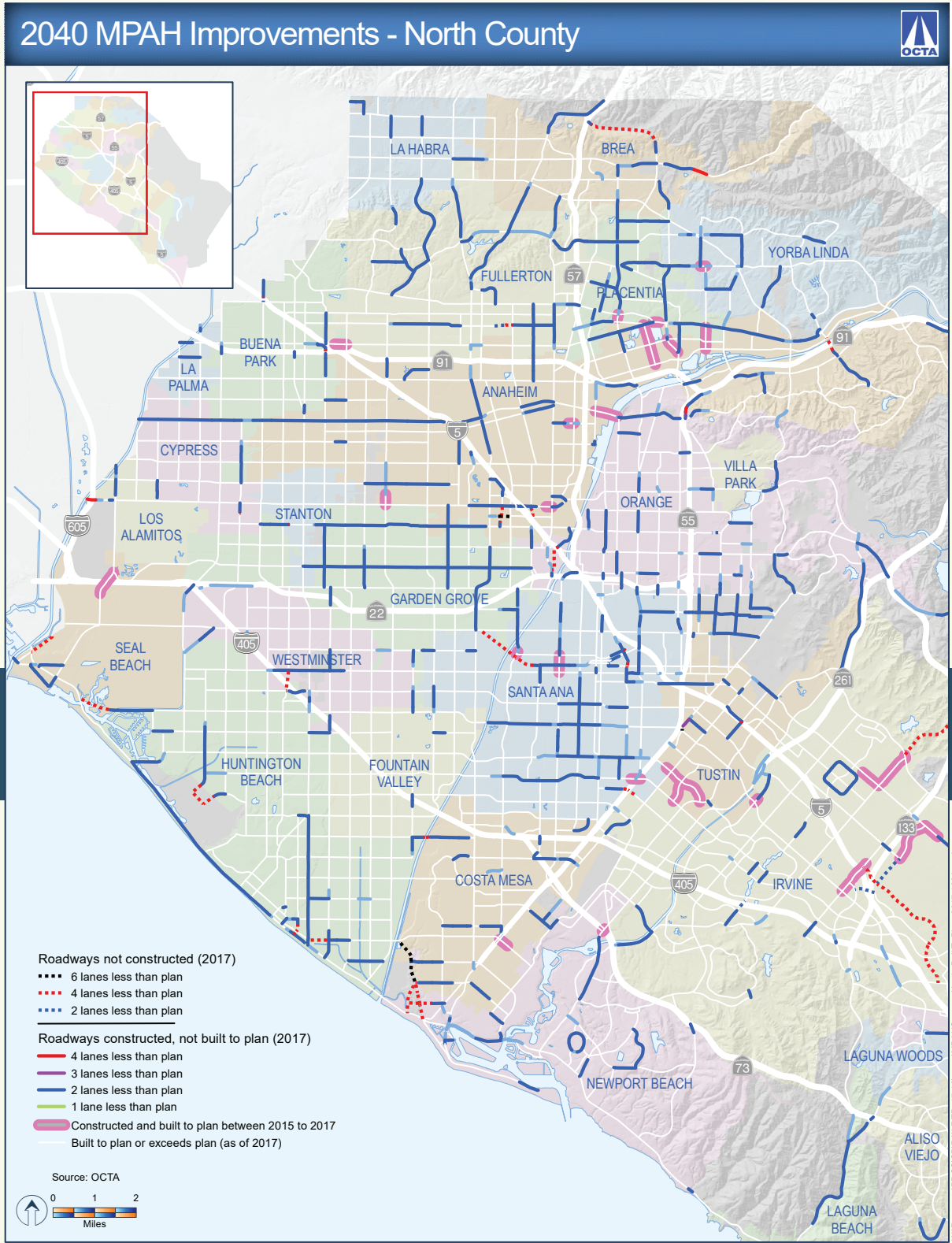


FIGURE 4.7

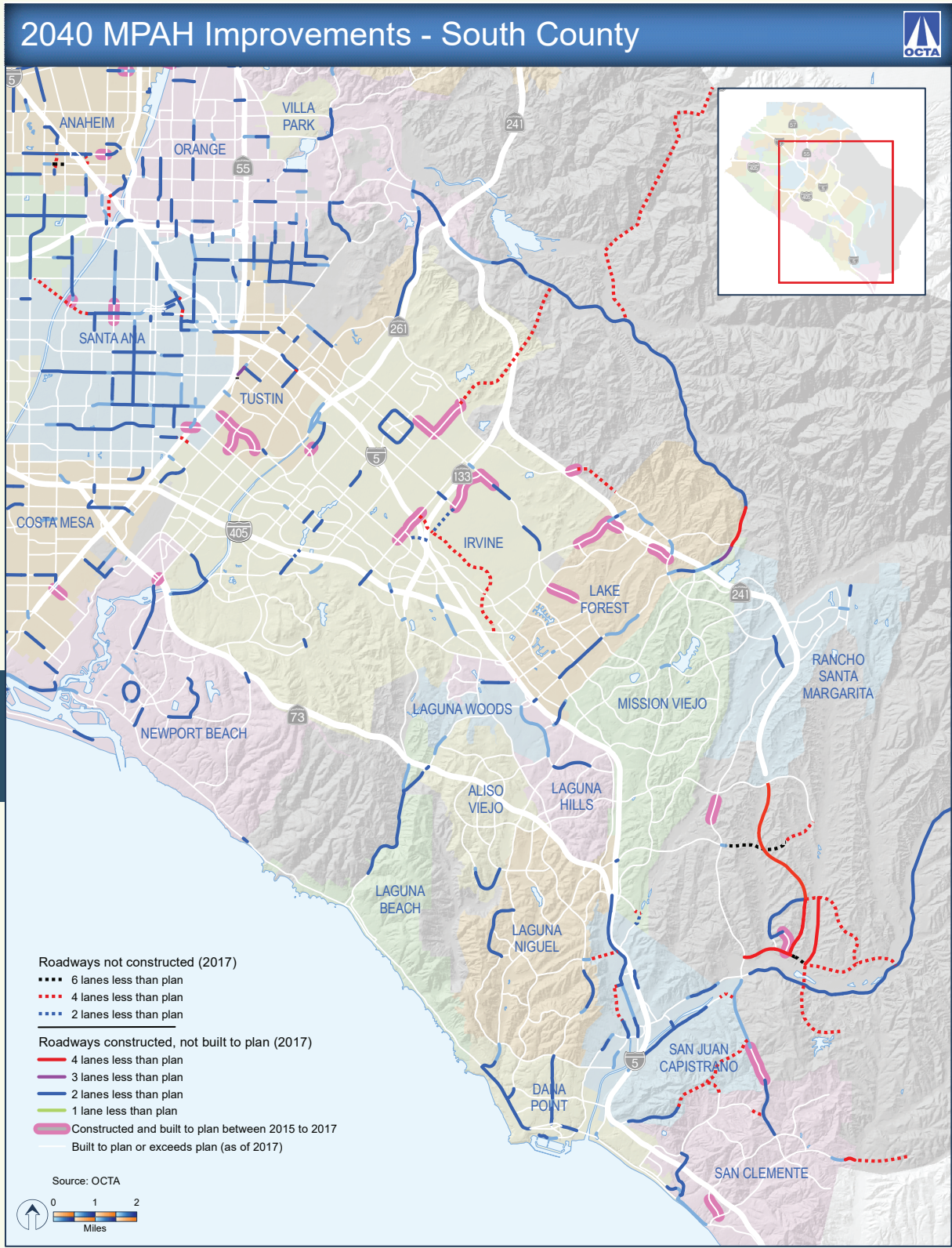


FIGURE 4.8

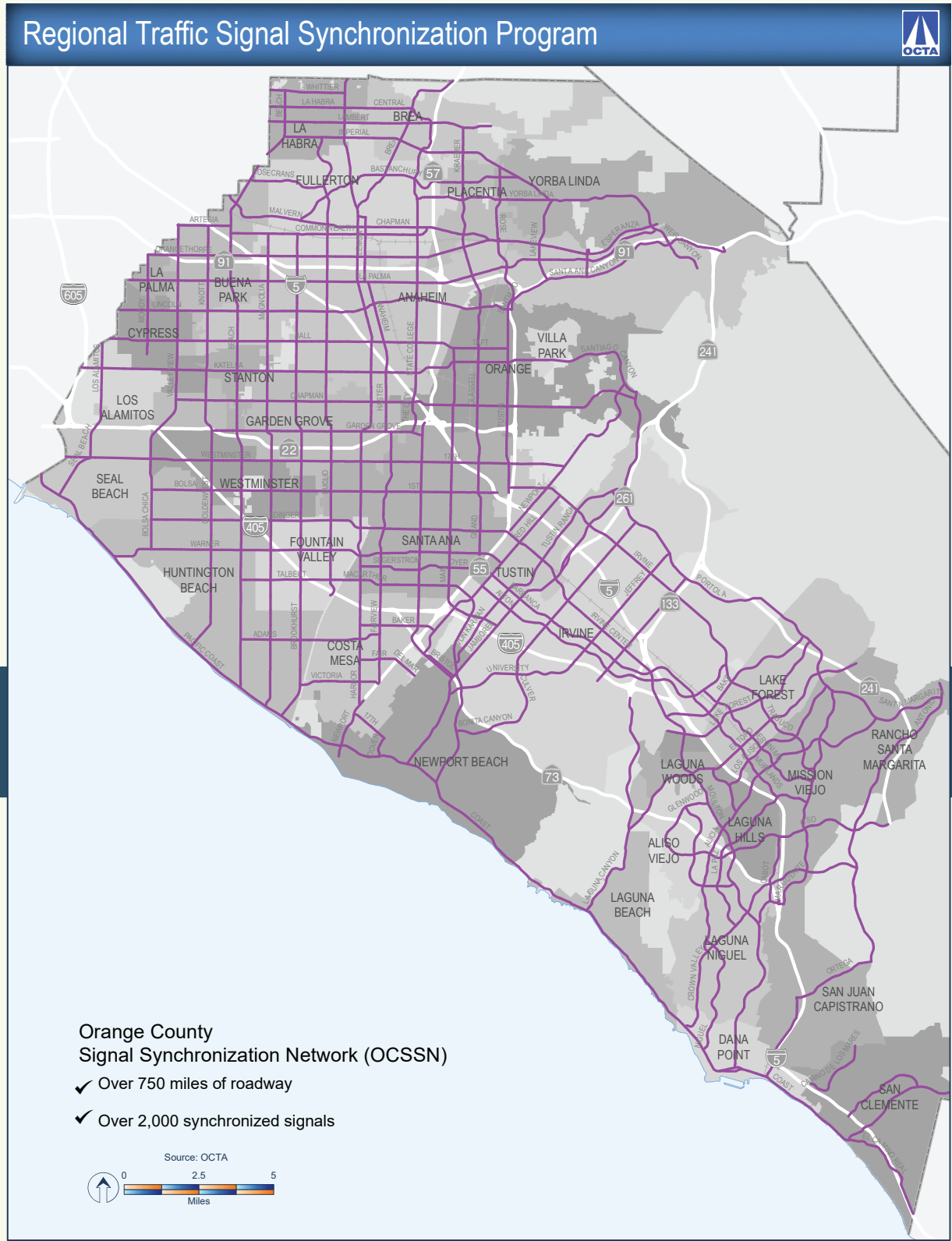


FIGURE 4.9



FIGURE 4.10

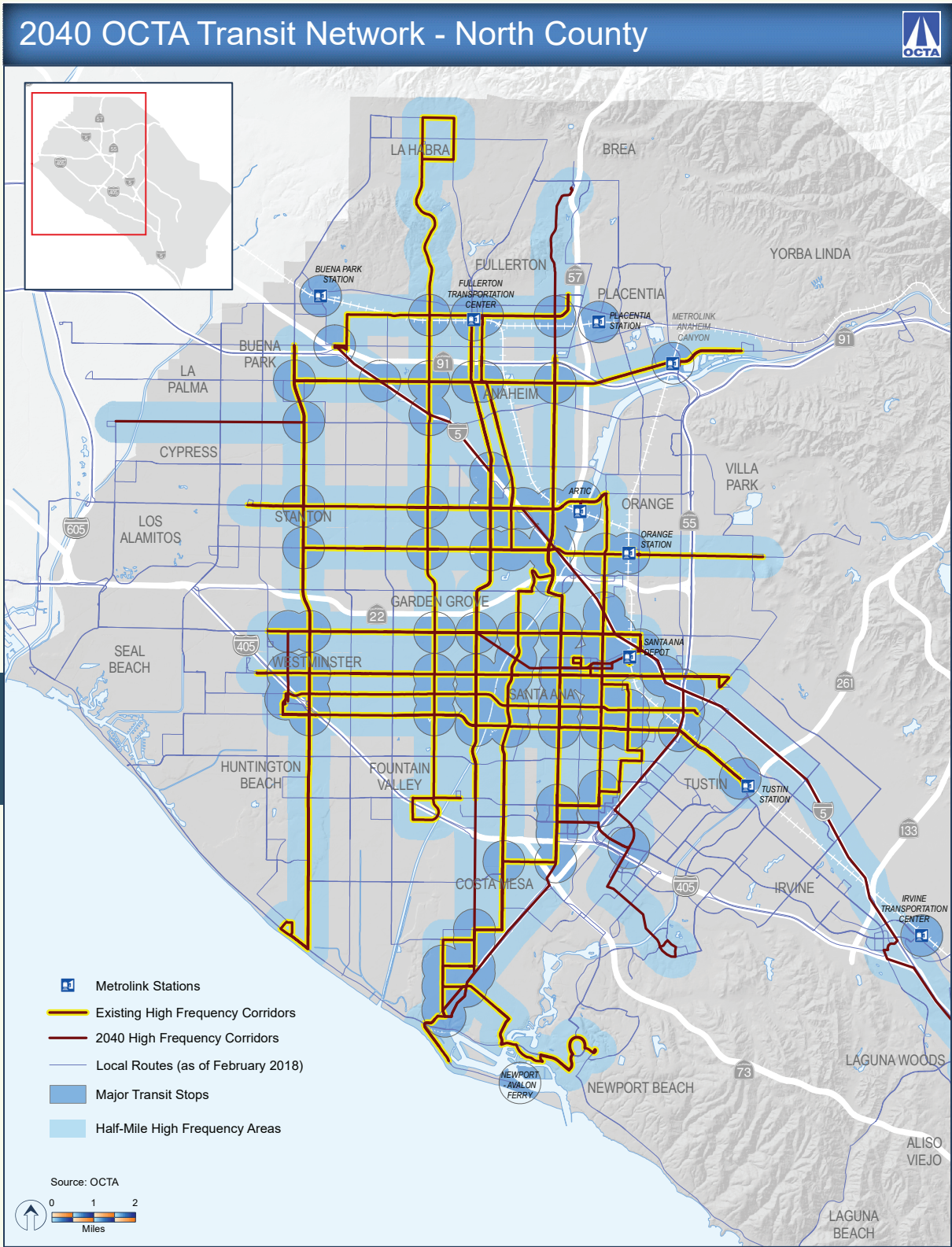


FIGURE 4.11

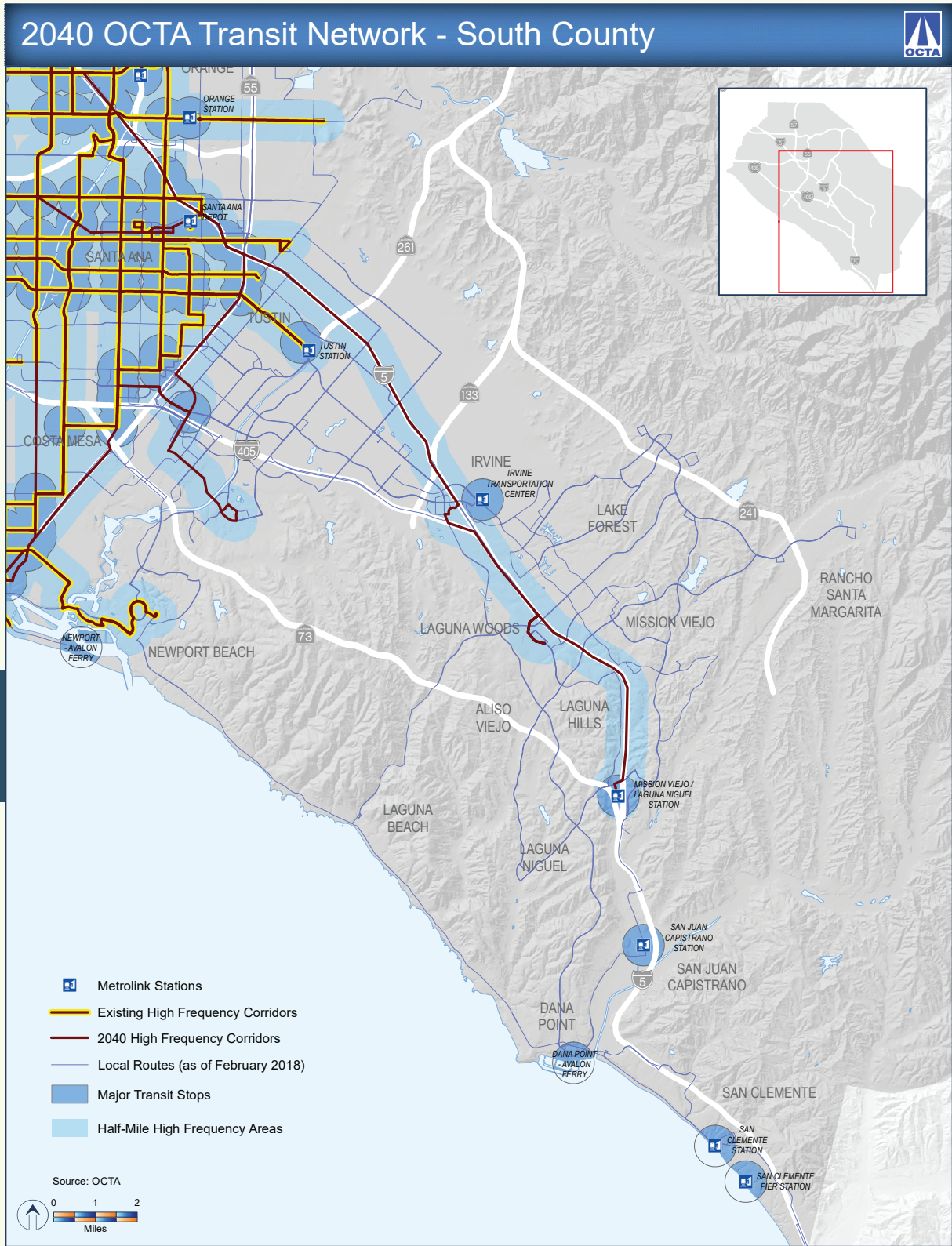


FIGURE 4.12

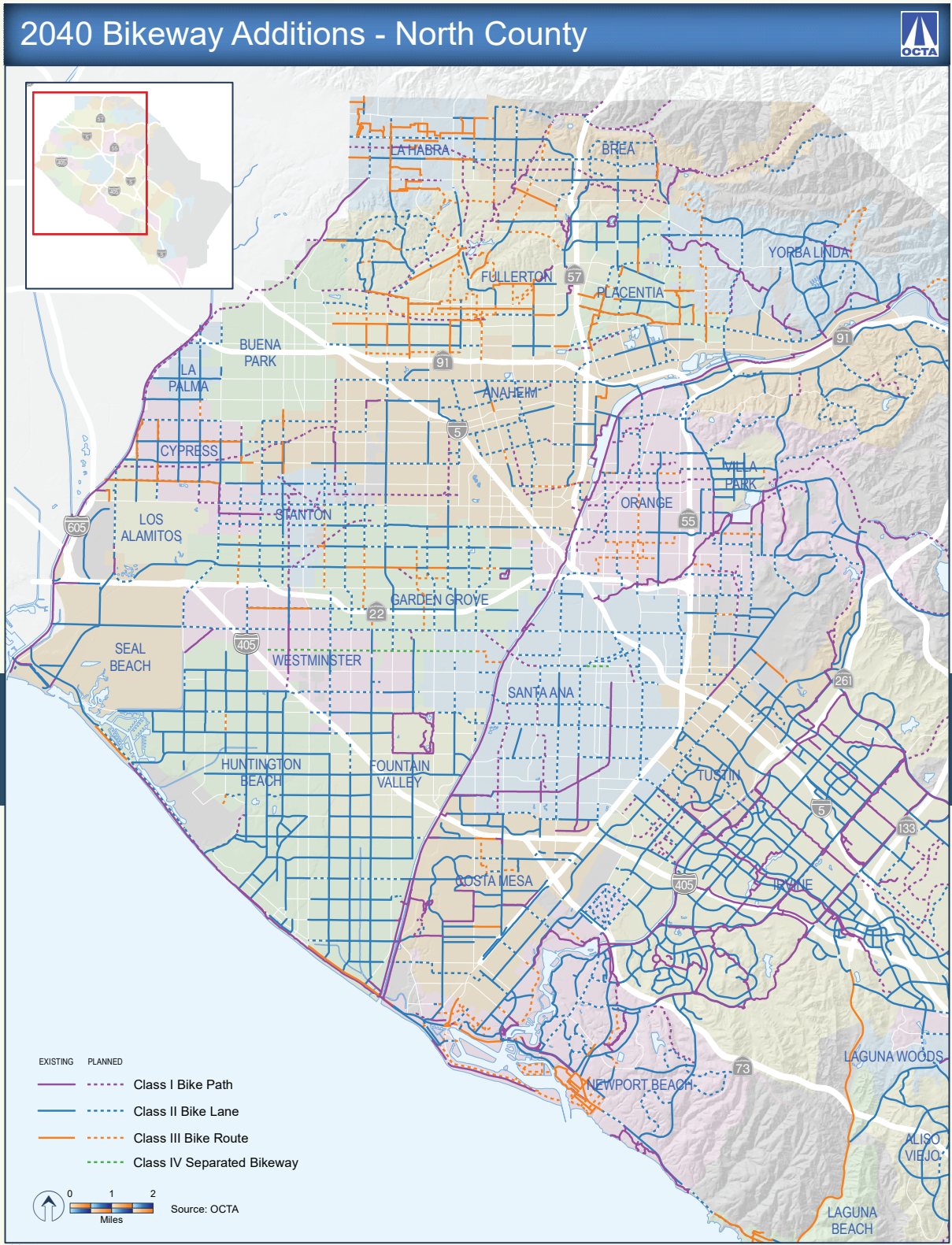
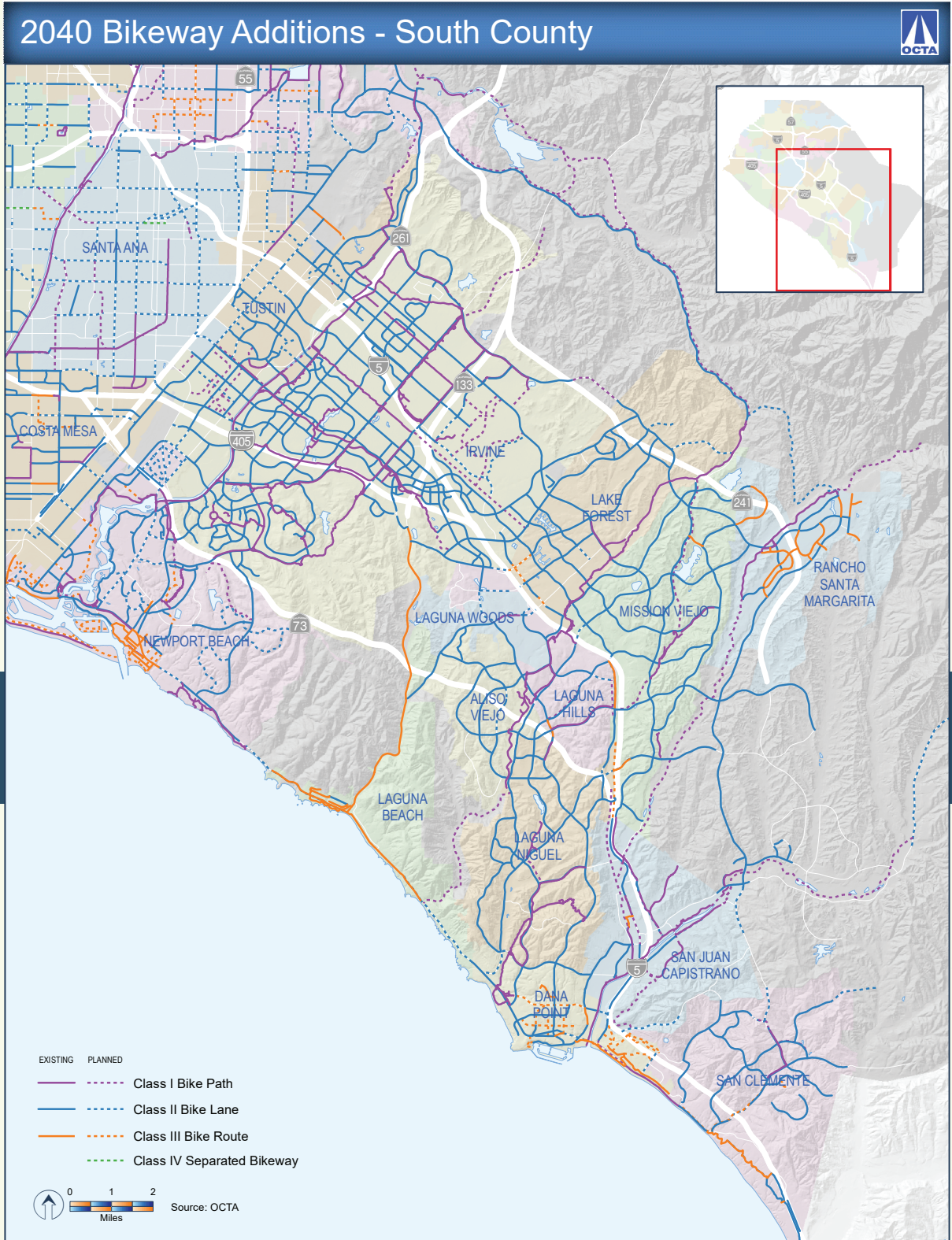


FIGURE 4.13



5/3/2018



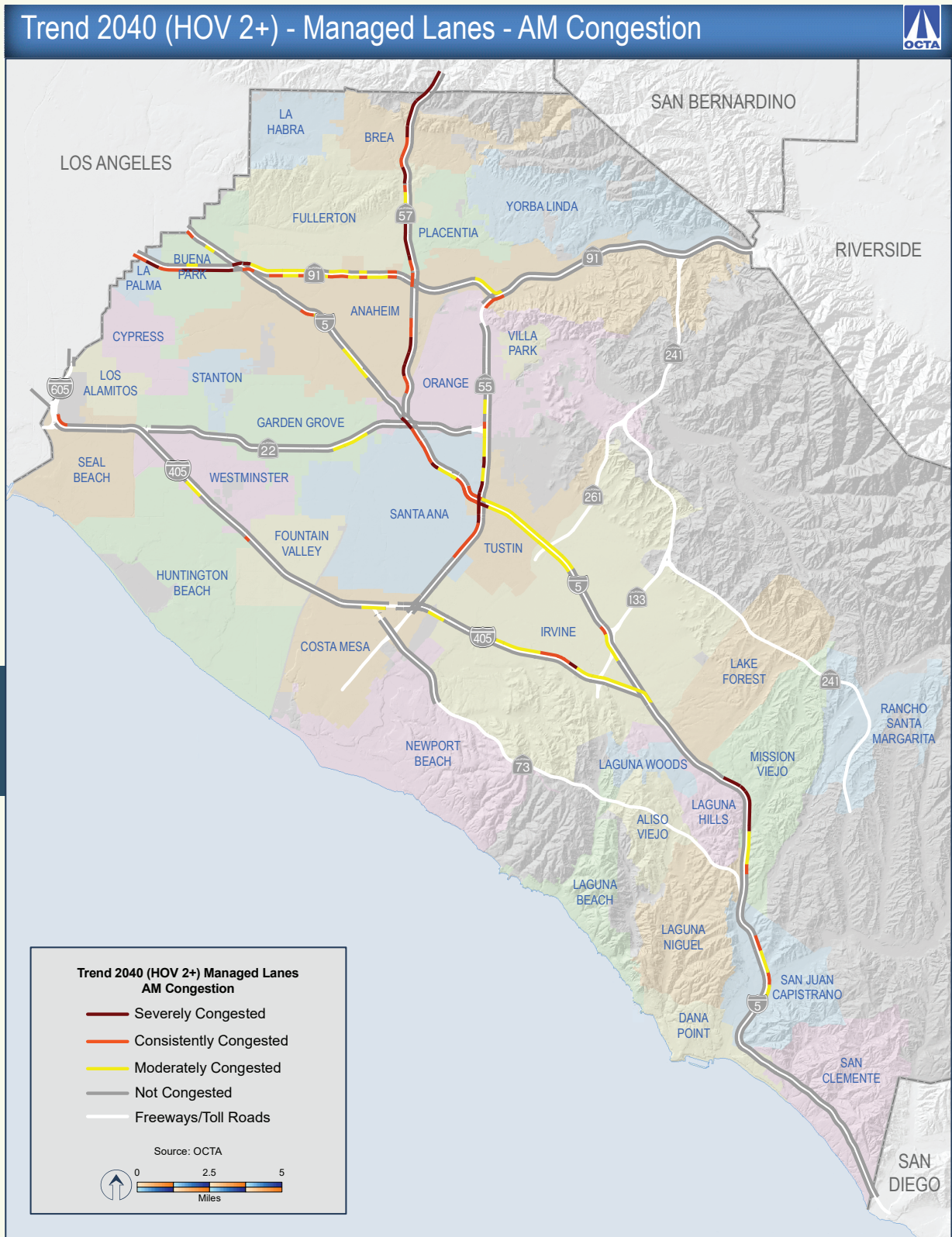
The Managed Lane Conundrum

Trend 2040 assumes that Orange County's carpool lanes require more passengers per car and allow use by single-occupant vehicles for a fee. This is a change from current carpool lane requirements of two or more passengers and no managed-lane fees.

Unfortunately, when the carpool lanes require two passengers per car, Orange County's carpool lane system does not meet federal performance standards of 45 miles per hour for most, but not all of, the system. It is expected that by 2040, Caltrans will need to increase the requirement for carpool lanes to three passengers per vehicle for the entire system to comply with federal standards. In fact, Caltrans already has efforts underway to move in this direction.

Given this likely move, OCTA analyzed the Trend 2040 scenario under a three-passenger carpool requirement. The result is that managed lane speeds increase significantly, from an average of 49 to 63 miles per hour. Yet this option, while addressing federal performance standards, has a downside. In this scenario, the carpool lanes operate at only 30 percent of their capacity – an inefficient use of existing highway infrastructure and counter to the goal of improving system performance.

FIGURE 4.14



5/3/2018

CARPPOOL LANE PERFORMANCE SUMMARY

Metrics	Carpool 2+	Carpool 3+	Express Toll
Meets federal performance standards	No	Yes	Yes
Managed lane capacity used during morning drive time	70%	30%	60%
Findings summary	Does not meet federal standards due to overuse	Meets federal standard, but underused	Meets federal standard and doubles use compared to carpool 3+

Arriving at Trend 2040

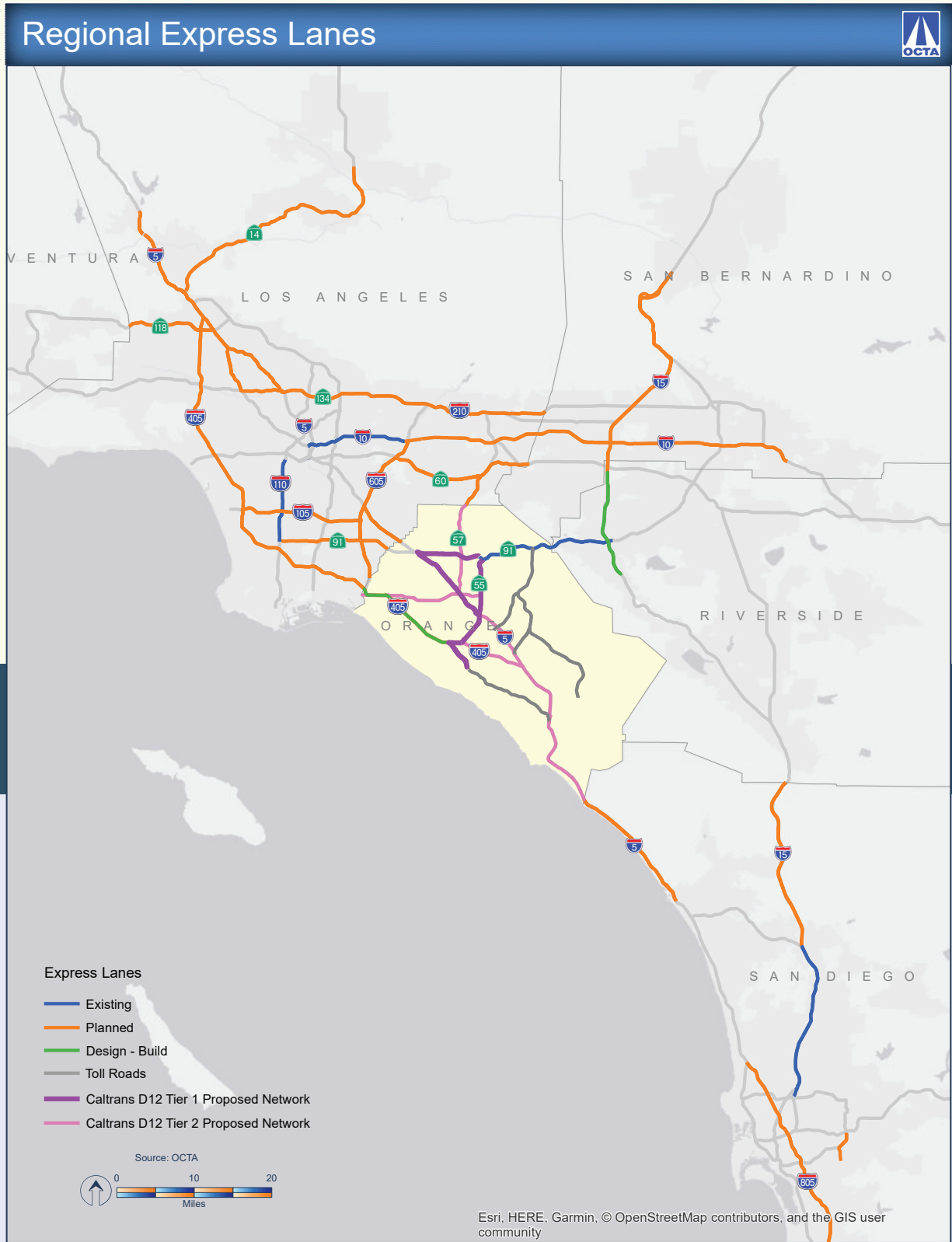
One way to address the inefficient use of the carpool lanes given 3+ passenger requirements is to allow use of these lanes by single-driver vehicles for a fee. Caltrans has conducted a series of studies regarding conversion of carpool lanes to this type of priced-managed lanes. These studies show that priced-managed lanes operating as 3+ carpool lanes, along with tolled access for other vehicles, would likely meet federal performance standards while balancing mobility and capacity for all users. Since a significant amount of funding is at stake if the federal standards are not met, Caltrans is pressing forward to develop a priced-managed lane network in Orange County, and OCTA is planning for this outcome by assuming a priced-managed lane network in the Trend 2040 scenario.

Several of Orange County's neighboring counties also face similar challenges on their highway networks and are proposing priced-managed lanes.

For example, Metro has prepared an express lane implementation plan, and San Bernardino and Riverside counties are expanding their express lane networks. SANDAG is planning for toll lanes on both Interstate 5 to Orange County and Interstate 15 to Riverside County. On a regional level, the 2016 Regional Transportation Plan/Sustainable Communities Strategy prepared by the Southern California Association of Governments included a regional express lane network.

OCTA assessed how a priced-managed lane network would perform in Orange County. This assumption would convert the carpool lanes to 3+ passengers and allow for tolled access by other vehicles, resulting in increased use of the carpool/priced-managed lane and an increase in carpool/managed lane speeds to meet federal performance standards.

FIGURE 4.14



5/2/2018

The exercise of long-range planning requires looking forward with intention – projecting future needs and anticipating environmental, regulatory, and technology changes and innovations. It also requires a look back after grappling with various plan scenarios to ensure that the selected plan – both the approach and activities – achieves the plan goals, addresses the issues, and responds to community desires.

Achieving the Goals

By including the remaining OC Go projects, Trend 2040 keeps promises made to voters and meets the long-range transportation plan goal of **delivering on commitments**. Further, through the performance metrics, Trend 2040 demonstrates improved mobility for all users of Orange County’s transportation systems. These metrics show that with Trend 2040, travel times and delays decrease as highway and roadway speeds improve. Additionally, more transit patrons are accommodated and new facilities are built for active transportation commuters and recreationalists. Taken together, the Trend 2040 set of projects and programs meet the goal of **improved system performance**.

The Trend 2040 plan also makes using alternative modes of transportation more viable, thereby **expanding transportation choices**. This is accomplished by completing and connecting alternative transportation networks (such as the OC Streetcar, first/last-mile linkages to transit facilities, and bikeways/access to bikeway facilities) and by providing continued support of motorists through services such as OC Flex, Freeway Service Patrol, and 511.

The Trend 2040 plan can be accomplished within the funds projected to be available between now and 2040, making the plan financially sustainable for OC taxpayers. It also includes programs to improve the quality of life for Orange County residents, such as land acquisition and environmental mitigation projects that not only provide open space but also offset greenhouse gas emissions. Thus, the Trend 2040 plan achieves both **financial and environmental sustainability**.



Reality Check



TRANSPORTATION SYSTEM PERFORMANCE SUMMARY

Metrics (daily)	2015 Base Year	2040 Baseline	Trend 2040
Vehicle passenger delay per capita (minutes)	8.3	12.5	8.7
Vehicle passenger travel time per capita (minutes)	54.5	58.5	55.9
Delay as a percent of travel time	15.2%	21.4%	15.5%
Transit trips	149,000	165,000	174,000
Freeways - AM peak average speed (mph)	38.3	36.2	39.5
Managed lanes - AM peak capacity utilization	77%	83.6%	60%
Arterials - AM peak average speed (mph)	25.7	24.3	25.8

Note: Trend 2040 assumes managed lanes are operated as tolled express lanes by 2040

Performance

When assessed using the performance measures as before, the Trend 2040 scenario improves on the 2040 Baseline outcomes and brings Orange County's transportation system close to the performance of the 2015 Base Year. Roadways maintain the same average speeds as in 2015, while freeway speeds improve by only 1.2 miles per hour during the morning peak travel time.

The daily delay for commuters stays essentially the same, with an increase of only 0.4 minute per vehicle passenger per day in 2040 compared to 2015.



High Cost of Housing

A lack of accessible and affordable housing forces many individuals who are employed in Orange County to live in surrounding counties. While Trend 2040 proposes a multi-modal investment strategy that maintains 2015 conditions despite growing travel demand – thereby improving job accessibility compared to the 2040 No Build scenario – more can be done. One strategy included in Trend 2040 is the use of priced-managed lanes to improve travel conditions for intercounty trips, especially if coordinated with neighboring counties and ridesharing programs. Realistically, however, local land use decisions likely create the best opportunities to reduce projected inter-county travel growth, and OCTA has limited influence over these decisions. It is possible that locating employment and housing closer to Metrolink stations and transit hubs, and developing higher-density and more affordable housing within the county, will help moderate if not eliminate this long-standing Orange County issue.

Growing Traffic and Limited Land

How does Trend 2040 address the problem of growing traffic when there is little right-of-way available for additional freeway or roadway capacity projects? First, its primary focus is the delivery of already-committed OC Go projects. Second, it only includes discretionary capacity projects that can be implemented, mostly within existing right-of-way – Specifically, adding carpool lanes on I-5 from SR-57 to SR-91, and from Avenida Pico to the San Diego County line; and on SR-73 from I-405 to MacArthur Boulevard.

Trend 2040 also expands system choices by implementing new transit services and supporting buildout of planned bikeways. Finally, Trend 2040 assumes express lanes that could improve corridor throughput and travel time reliability without additional right-of-way.

Disruptive Services and Technologies

The Innovation and Policy discussion scenarios within the 2018 long-range transportation plan explore how emerging technologies and services may influence how people choose to travel. OCTA proposes continuing to monitor the development of these technologies and services and to look for opportunities to integrate promising technologies and to partner with service providers that may benefit Orange County residents.

Addressing the Issues



Transportation Funding Uncertainties

Transportation funding is complex and the current funding environment – such as opposition to SB 1, federal reliance on general fund sources rather than user fees, and competitive-based funding programs – creates uncertainty for long-range planning. Trend 2040's approach to the uncertainty of funding over its 20-year scope is to use a somewhat conservative revenue forecast that is coordinated with the development of the OCTA Comprehensive Business Plan. The forecast assumes that SB 1 is in place but counts on limited revenues from competitive programs. It assumes that Trend 2040 discretionary projects will likely compete well for competitive funds, given that most of them are transit and bikeway improvements, and that freeway capacity projects are managed lane projects. If SB 1 is recalled, discretionary projects and potentially some committed projects would likely be eliminated from the long-range transportation plan.

New Vision for Transit

Transit ridership is declining throughout the nation due to increasing rates of auto ownership and high housing costs, among other factors. Trend 2040 attends to the evolving transit market by incorporating both the OC Bus 360° Program that reallocates resources to better serve transit riders and to be more cost-effective, as well as the OC Transit Vision that brings higher-quality transit services to high-demand corridors and introduces new types of services like the on-demand OC Flex pilot projects.

Challenging Emission Standards

Federal emission standards and state goals for reducing greenhouse gas emissions create significant challenges that could impede funding for transportation projects if they are not met. To address this concern, Trend 2040 proposes discretionary investments that improve access to transit and active transportation choices. Further, even the highway-related capacity projects support carpooling and use of zero-emission vehicles. Additional policy decisions could support further integration of zero-emission technology, such as additional purchases of zero-emission buses and/or investments in publicly accessible charging infrastructure at Metrolink stations and OCTA facilities.





Public Input

OCTA conducted a comprehensive public outreach program to elicit input about the long-range transportation plan from a variety of sources, including the general public, elected officials, local jurisdictions, business leaders, transportation professionals, and diversity leaders. The outreach effort used a variety of methods to gather input such as focus groups, an online survey, a social media campaign, stakeholder meetings and workshops, and leadership meetings.

Generally, there was acknowledgment that there is a need to address the current issues that will likely affect travel demand, services, and infrastructure needs moving forward. In addition, it is vital for OCTA to stay on top of new and emerging trends.

Both in-person and online feedback from Orange County residents revealed that the clear majority of OC travelers travel by car and believe freeways and roadways should be priorities for improvements. Specifically, motorists want freeway bottlenecks fixed and signal synchronization put in place along major corridors. Some individuals questioned if changing carpool lanes to 3+ due to state mandates would be impactful enough, while others saw the value in having 3+ carpool lanes due to Orange County's changing population and the use of shared-ride providers.

KEY THEMES OF PUBLIC OUTREACH EFFORTS

Key Theme	Public Sentiment
Keep OC Moving	The general public and stakeholders are looking for congestion relief on local streets and freeways.
Expand Transit Options	Although public input indicates cars continue to be the number one choice of travel, there is growing interest in offering expanded transit options in Orange County.
Be Innovative	It is important that OCTA effectively monitors and engages in the implementation of emerging technologies.

Looking to the future, residents indicated that OCTA should focus on transit opportunities to relieve congestion on both freeways and streets – provided that transit is efficient, accessible, convenient, reliable, and affordable. Suggestions for transit options included more light rail and localized transit such as streetcars or trolleys in local communities.

In terms of innovation, self-driving vehicles were identified as one of the top emerging technologies expected to have the biggest impact on transportation, along with services provided by transportation network companies such as Lyft and Uber.

Above is a summary of the key themes that came out of the stakeholder meetings, focus groups, leadership meetings, and online survey. The complete Public Outreach report is provided as **Attachment B**.

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Designing in a Changing World

Chapter 5

Key Points:

- Technology is rapidly evolving
- On-demand transportation options are changing the way people travel
- State goals influence transportation and development
- Collaboration with private and public sectors is essential

Technology is rapidly advancing, creating new opportunities for private sector industries and individuals to influence transportation. Therefore, it is important to understand how private sector innovations are becoming embedded in the transportation system and creating new mobility options. On their own, these innovations can enhance or diminish mobility for the traveling public. However, if policies are put in place alongside these innovations, the benefits could be secured or even magnified. Such policies are currently being crafted and debated to positively impact travel behavior.

The intent of this discussion about new technology is not to advocate for specific technologies or services to pursue. Rather, it is to acknowledge that such technologies and services already exist – with more certain to emerge in the future – and to open dialogue about how OCTA can prepare for these types of changes.

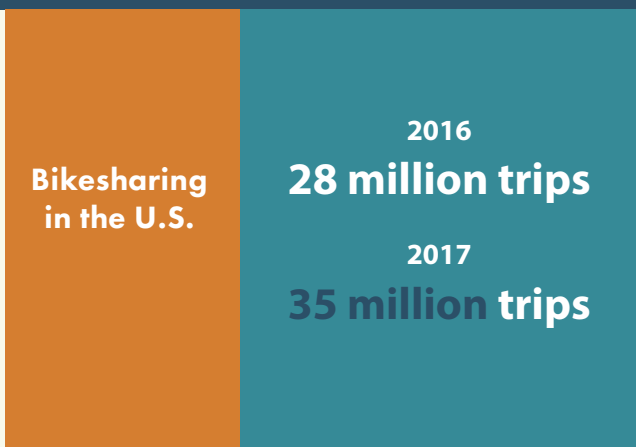
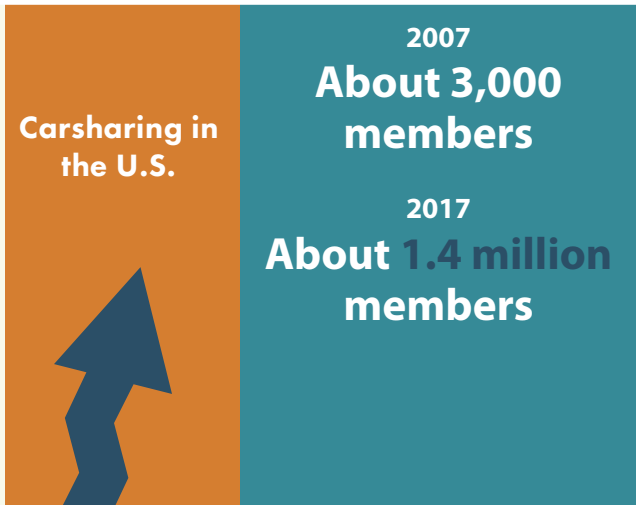
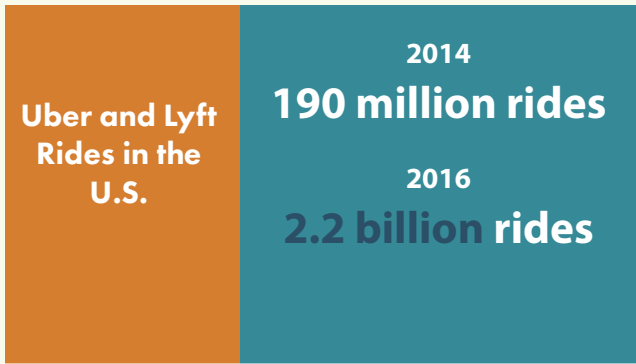
To support this discussion, two scenarios have been developed to explore a sample of many possible futures that may take shape by 2040. The first is the Innovation scenario that considers potential impacts of certain technological innovations on travel behavior, in addition to the Trend 2040 investments and assumptions. The second is the Policy scenario, which builds on the Innovation scenario to consider how policy changes being discussed at the state and regional levels could further influence travel behavior and leverage some of the technological innovations.



New Technologies and Services



RAPIDLY ADOPTED TRANSPORTATION INNOVATIONS



Uber & Lyft: Dogtiev, Artyom. *Uber Revenue and Usage Statistics (2017)*. Business of Apps, www.businessofapps.com/data/uber-statistics/#1.

Carsharing: Bert, Julien. *What's Ahead for Car Sharing? The New Mobility and Its Impact on Vehicle Sales*. Boston Consulting Group, www.bcg.com/publications/2016/automotive-whats-ahead-car-sharing-new-mobility-its-impact-vehicle-sales.aspx.

Bikesharing: *Bike Share in the US: 2017*. National Association of City Transportation Officials, nacto.org/bike-share-statistics-2017/.

Before diving into how these scenarios might impact the performance of Orange County's future transportation systems, a review of some emerging technologies will be helpful. The private sector is rapidly innovating transportation-related technology. For example, zero-emission and alternative-fueled vehicles are fast becoming part of the transportation landscape, along with real-time ridesharing, telecommuting, and car- and bike-sharing services that operate in many cities across the nation.

Public transit systems are incorporating new technology to improve overall operations and user experience. For example, Global Positioning System technology allows tracking of buses and train locations, which can be used to provide real-time information to customers, improving the transit experience and ease-of-use. Looking to the not-too-distant future, fully automated and connected vehicles are on the horizon, along with delivery robots and drones. These innovations may become part of our daily routines before we are able to understand exactly how they impact travel behavior. Even harder to imagine, but potentially just as real, are technologies such as Hyperloop (a tube through which a pod carrying people and goods could travel at very high speeds using electromagnets and vacuum technology) and flying cars.

An example of how significant changes can occur in a very short time frame is seen in the exponential growth of transportation network companies (TNCs) like Uber and Lyft. Four years ago, TNCs were not given significant consideration in the development of the 2014 long-range transportation plan. Yet today, they are a common travel option for Orange County residents and they are even being used to supplement fixed route bus service. Other innovations that are becoming commonplace are car- and bike-sharing services and mobile ticketing for transit, to name a few.



The Innovation Scenario



To examine the potential impact on Orange County's future mobility, OCTA considered various assumptions that can be modeled to reflect private sector innovations. These assumptions are discussed in more detail under Influencing Travel Behavior. To identify and incorporate these assumptions, OCTA coordinated with partner planning agencies and reviewed recently published research. The assumptions for this scenario reflect innovations related to ridesharing, autonomous vehicles, and telecommuting. Each of these is further discussed below.

Ridesharing

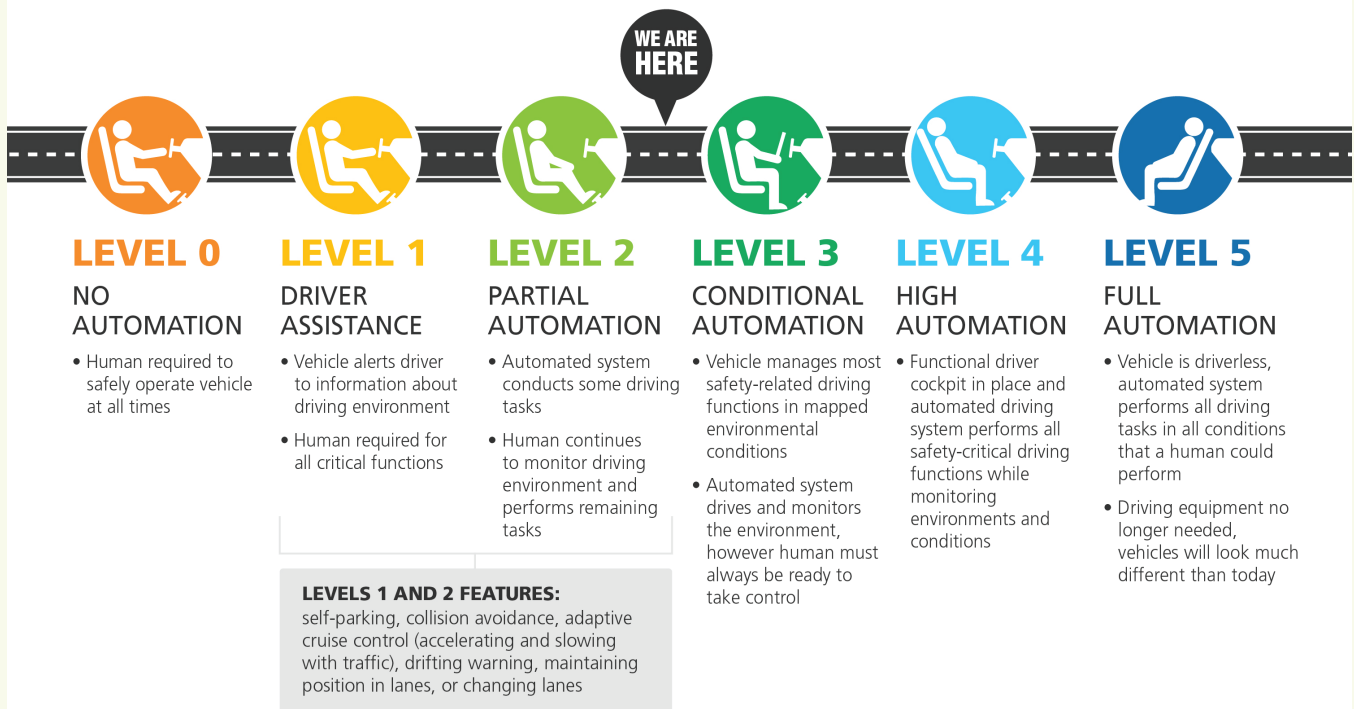
On-demand ridesharing allows users to request a ride in real time using a mobile application. This ride could be via dynamic carpooling such as Scoop and Waze Carpool, which fill empty seats in a vehicle by matching drivers and passengers in real time. It could also be through ride-hailing services like uberPOOL and Lyft Line, which provide a discounted rate to passengers willing to share a ride to a similar destination. Ride-hailing services, also called transportation network companies (TNCs) in California, are distinguished from taxicab services because they are e-hailed. TNC services have been established in more than 700 U.S. Cities, with Uber providing over 5.5 million riders per day and Lyft providing about 1 million rides per day.

The benefits of dynamic carpooling services include cost-sharing by passengers as well as a reduction in congestion and greenhouse gas emissions from fewer vehicles on the roadways. There is also the potential for decreased vehicle ownership, which may result in a savings for some. However, TNC drivers are likely adding single-occupant trips between drop-offs and pick-ups, and they are also competing for curb space with delivery vehicles, bicyclists, and others. As these services continue to grow, more focus will need to be put on curbside pick-up/drop-off zones rather than traditional long-term parking spaces.

Bike-sharing and scooter-sharing are two other examples of how the private sector is providing alternatives to drive-alone trips. These services allow people to share in a fleet of bikes and/or scooters through short-term rentals, usually within urban areas or beach cities. Technology makes these sharing services more convenient, with the ability for electronic payment, location identification, and automatic locking/unlocking. Electric bikes and scooters offer these same conveniences but open access to people who need to go farther distances or who are not interested in breaking a sweat for that trip.



Levels of Vehicle Automation



Source: Levels of automation defined by Society of Automotive Engineers (SAE) International and used by U.S. Department of Transportation

The Innovation Scenario

Autonomous Vehicles

There are five levels of autonomous vehicles, ranging from partially automated to fully automated. Many vehicles sold today include features such as self-parking, collision avoidance, adaptive cruise control, drifting warning, and maintaining the vehicle's position in lanes. These are typically Level 1 or 2 autonomous vehicles that require a driver. Level 3 vehicles still require a driver in some situations but can function autonomously much of the time. Full automation (Level 5) uses technology such as Global Positioning Systems, sensors and cameras to perform all the functions needed to drive without any human assistance. The difference between Levels 4 and 5 is that Level 4 vehicles can only operate in areas where the vehicle has access to mapping and other spatial data, whereas Level 5 vehicles could operate using onboard sensors alone. Manufacturers such as Tesla and Waymo are testing conditional

and high-automation vehicles (Levels 3 and 4), and fully automated vehicles are not far behind. Car manufacturers estimate fully autonomous vehicles could be available commercially as early as 2020.

While the technology is continuing to develop and still requires rigorous testing, it holds a lot of potential. By communicating with other vehicles and infrastructure, plus using advanced onboard sensors, these vehicles could safely operate much closer together than human-operated vehicles. This could result in more efficient use of freeway capacity and smooth the flow of traffic, reducing congestion on highways. Further, more than 90% of accidents can be tied to human choice or error, according to the National Highway Traffic Safety Administration. Autonomous vehicles could significantly reduce the number of accidents and fatalities while also improving safety for pedestrians and bicyclists.



Also, if autonomous vehicles are incorporated into TNC and goods movement fleets, the removal of labor expenses would reduce the cost of providing services. Similarly, reduced labor costs with autonomous buses and heavy trucks could allow for increases in service levels.

However, autonomous vehicles could also have negative impacts on the transportation systems. Without policies related to practices such as universal safety standards, vehicle design, and the use of autonomous vehicles on public roadways, there could be an increase in overall vehicle miles traveled, increased congestion on roadways, and an increase in energy consumption and air pollution.

Introduction of autonomous vehicles will result in “zero-passenger” trips if vehicles are traveling to pick up a passenger, park, or make a delivery. The technology inherent in autonomous vehicles raises questions about security and hacking, and ultimately driver safety. Also, while autonomous vehicles may open new mobility options for populations that could not previously use automobiles, such as seniors or the disabled, the resulting impact could be more vehicles on the road and therefore increased congestion.



The Innovation Scenario

Telecommuting

Telecommuting (in other words, working remotely) is gaining popularity nationally, and the same is true in Orange County. In fact, six percent of Orange County workers over age 16 report that they telecommuted in 2016 – more than those who walk, bike, or take public transportation to work combined. However, the benefits of telecommuting are not clear-cut. On one hand, telecommuting has the potential to remove cars from Orange County roadways during peak travel times, thereby decreasing congestion.

On the other hand, people who do not drive to an office during rush hour may still run errands or make other additional trips. Also, the ability to telecommute may allow people to live farther from their work, resulting in longer commutes if they do commute to the office. Regardless, as technology continues to improve communication and information-sharing capabilities, it is likely the use of telecommuting will continue to grow in Orange County and elsewhere.



The Policy Scenario

The Policy scenario explores how some of the concepts outlined in the Innovation scenario could be managed and further leveraged through public policy. It also includes other policies that are being considered and implemented primarily at the state and regional levels, such as pricing strategies and strategies that encourage infill development and alternatives to driving.

These are being analyzed in this long-range transportation plan to consider what kind of impact they could have on travel behavior and system performance.



Leveraging Private Sector Innovations through Policy-setting

Ridesharing technology can be supported through policies that incentivize the use of on-demand rideshare services for short trips. Traditionally, publicly supported ridesharing services have been offered for longer commutes, such as vanpools for longer trips to work. To also encourage ridesharing for shorter trips, policies can be developed that focus on first- and last-mile connections and other local trips. An example of this type of service is the OC Flex, which is an on-demand, micro-transit service (approximately 5-12 passengers) that operates like some of the TNC rideshare services, picking up multiple passengers and taking them to destinations in a similar area. The primary differences are that OC Flex is designed to carry more passengers, operates in a specified area, and would have a lower cost for users.

For automated vehicles, public policy could be established to allow and encourage autonomous vehicles to use carpool or express lanes. Experts have estimated that if vehicles operating on a facility reach at least 50 percent autonomous, the benefits from the vehicle-to-vehicle communication technologies and onboard systems that allow autonomous vehicles to safely operate closely together can significantly increase the capacity of the facility. Therefore, policies could be designed to concentrate autonomous vehicles in managed lanes to expedite reaching the 50 percent threshold.

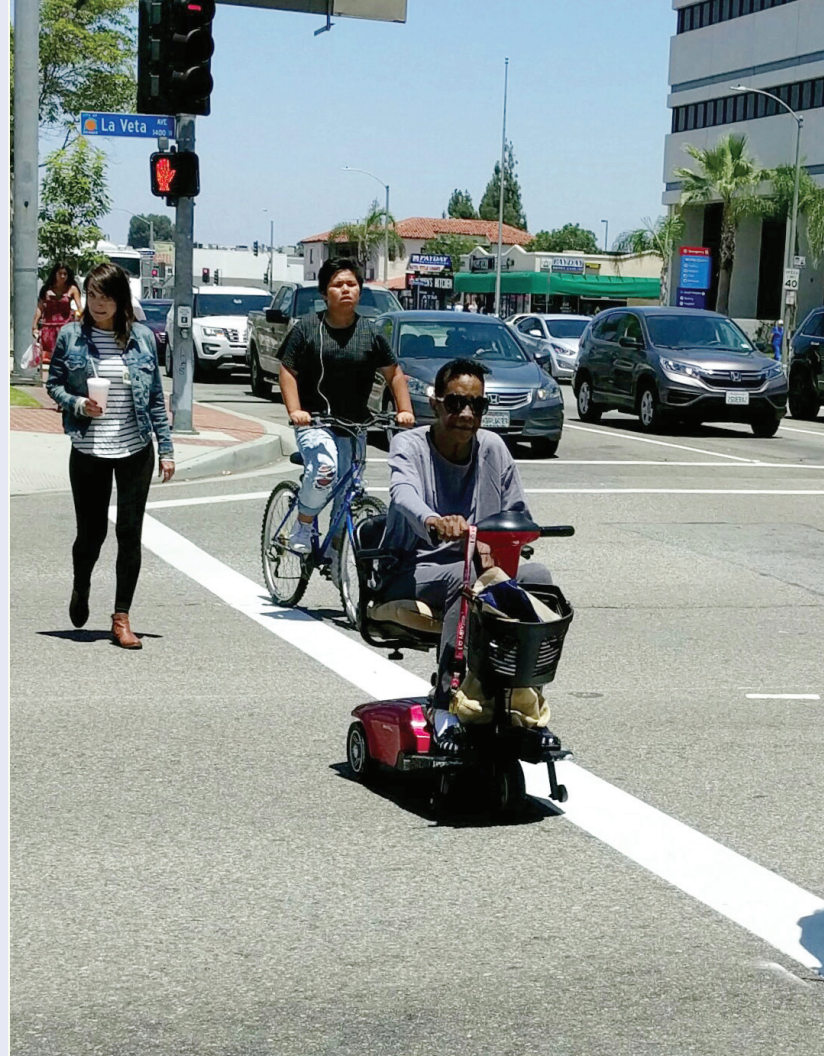
The use of telecommuting could be enhanced with public policies that provide incentives, such as tax breaks for companies that allow employees to telecommute. This could reduce the number of peak-period commute trips by either removing the commute altogether, or by allowing employees to work remotely during peak periods and commute during off-peak times. The latter could be a more feasible option for companies that need employees on-site but want to provide their employees with the benefit of an easier commute and a more flexible schedule. However, an increase in telecommuting in any form will help to reduce travel demand and congestion.

The Policy Scenario



Promoting Active Transportation

Active transportation, sometimes called non-motorized transportation, is a way of getting around that is powered by human energy, like bicycling or walking. Policies are being put in place through legislation that attempts to change land use patterns to be more conducive to active transportation. For example, SB 375 (the Sustainable Communities and Climate Protection Act of 2008) promotes development patterns that will reduce sprawl and give people transportation options, so they can drive less. SB 743 provides alternative criteria for assessing transportation impacts under the California Environmental Quality Act. The alternative criteria must “promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.” (Public Resources Code Section 21099(b)(1).) The state’s goal is to at least double active transportation mode shares for bicycling and walking. This would be accomplished primarily through shifts in land use and investing in bike lanes, sidewalks, and other supporting infrastructure.





The Policy Scenario

Shifting or Changing the Costs of Driving

The Southern California Association of Governments recently completed a comprehensive study of value pricing strategies (the Express Travel Choices Study), which looked at how allowing commuters to know the true cost of their travel could result in a more efficient use of the transportation system and help the region meet mobility needs. A variety of policies could be implemented that change or shift an individual's cost of driving. For example, the state could shift from the current gas tax, which is dependent on combustion vehicles, to a mileage-based user fee that more equitably collects fees from all vehicles.

Another example is the use of cordon pricing strategies where the state or a region charge drivers to access cordoned areas through tolls at defined boundaries or through the sale of passes to drive in the cordoned area. Parking fees are another driving-related cost-based approach that could be used to influence travel behavior. It is anticipated that increasing the cost of driving would likely have the most significant impact on travel behavior of all the innovations and policies discussed in this long-range transportation plan but would also likely carry the most controversy since so many individuals would be impacted.



A Seamless Highway Network

Trend 2040 assumes that managed lanes on freeways will be operated as tolled express lanes by 2040. Orange County also has a network of toll roads currently operated by the Transportation Corridor Agencies (TCA), which include State Routes 73, 133, 241, and 261. When the toll roads were established, there was an agreement that TCA would turn the toll roads over to the state to become freeways once all bonds used to build the facilities are paid off. Although this will likely occur after 2040, the Policy scenario explores how Orange County commuter travel patterns could change once this transaction takes place.

To examine the potential level of change, the toll lane network is assumed to operate as freeways with tolled express lanes, consistent with the Trend 2040 freeway system. This would create a seamless travel experience on Orange County's freeways, with consistent lane configurations and operations throughout the network. This results in an expanded freeway network while retaining a reliable travel option with tolled express lanes.

INNOVATION SCENARIO ASSUMPTIONS

Technology	Impact	Justification
Ridesharing	The analysis assumes 5 percent of single-occupant vehicles shift to multiple-occupant vehicles, resulting in 5 percent of daily average trips moving from general purpose lanes to carpool lanes.	According to the California Transportation Plan, the state assumes a 5 percent increase in carpool vehicles.
Autonomous Vehicles	The analysis assumes that autonomous vehicles induce a 10 percent increase in total vehicle trips. This results in 8 percent growth in total vehicle miles traveled. However, there is also an increase of general purpose lane capacity of 8 percent.	<p>With fully automated vehicles, there will be zero-occupant trips, more access to vehicles (e.g., by seniors, disabled, others), and lower operating costs for businesses, resulting in higher overall vehicle miles traveled.</p> <p>An increase in the proportion of automated vehicles on Orange County's roadways will increase overall capacity because of their ability to operate safely more closely to other vehicles.</p>
Telecommuting	The analysis assumes that rates of people working remotely will increase by 2.1 percent which results in a corresponding decrease in vehicle trips of 2.1 percent.	According to the California Transportation Plan, the state assumes a 2.1 percent increase in telecommuting.

Influencing Travel Behavior

The Innovation and Policy scenarios were tested to predict their potential impact on travel behavior and generate thought about their applicability to future planning work, as shown in the table above and on the following page. This analysis is not a forecast but rather an opportunity to explore a range of innovations and engage the public and policy-makers in discussion about potential policy direction.

POLICY SCENARIO ASSUMPTIONS

Policy	Impact	Justification
Autonomous Vehicles	As with the Innovation scenario, the analysis assumes that autonomous vehicles induce a 10 percent increase in total vehicle trips. However, with policies in place to guide the use of autonomous vehicles, in addition to an 8 percent increase in general lane capacity, there is a 40 percent increase in express lane capacity.	When policies are in place to concentrate automated vehicles into express lanes, the advantages of safe, close operations are magnified.
Active Transportation	The analysis assumes that the number of people who bike or walk to work (at distances of three miles or less) doubles, resulting in a reduction of vehicle trips with distances of less than three miles by 21 percent. This translates to an overall reduction in vehicle trips on the system of 9.3 percent.	According to the California Transportation Plan, the state aims to double pedestrian and bicycle commuting.
Cost of Driving	The analysis assumes that implementation of pricing strategies will result in a 20 percent decrease in overall vehicle trips, which is roughly equivalent to a 17 percent decrease in vehicle miles traveled.	According to the California Transportation Plan, the state assumes the use of expanded pricing policies.
Toll Road Bonds	The analysis assumes that the four TCA toll roads become public facilities. This expands Orange County's highway network and assumes the TCA corridors include both general purpose and express lanes, consistent with the Trend 2040 network.	<p>Bonds used to build the toll roads were originally to be paid off, and the toll roads tuned over to the state, by 2036. The TCA refinanced the bonds in 2011 and 2014, and these are expected to be paid by 2050.</p> <p>Once the bonds are paid down, the corridors will be turned over to the state to operate as freeways. Because of available right-of-way on the corridors, express lanes can also be implemented within the corridors, which will maintain consistency with Orange County's highway network.</p>

TRANSPORTATION SYSTEM PERFORMANCE SUMMARY

Metrics (daily)	Trend 2040	Innovation	Policy
Delay as a percent of travel time	15.5%	17%	11%
Transit trips	174,000	171,000	170,000
Freeways - AM peak average speed (mph)	34.4	34.4	42.7
Arterials - AM peak average speed (mph)	25.8	25.4	28

Innovation and Policy Scenario Performance

The Innovation and Policy scenario assumptions could significantly impact the performance of Orange County's transportation system, increasing overall system capacity, expanding the use of alternative modes of transportation, reducing congestion, and impacting traffic flow. While the measures are rough, the high-level impact of these concepts was estimated using the long-range transportation plan performance measures.

When comparing the performance of the Innovation scenario to Trend 2040, it appears that technology alone does not provide significant benefits to the transportation system.

Except for average freeway speeds, which are the same for both scenarios, all other performance measures worsen under the Innovation scenario: arterial speeds decline, transit trips drop, and there is greater delay in travel times. If policies are put in place to maximize the impact of technology on travel behavior, the performance measures show better outcomes. When comparing the Policy scenario with Trend 2040, system performance improves: there is a decrease in travel time delay as freeway and arterial speeds increase. Transit trips, however, decline. A summary of the performance measure outcomes for the Trend 2040, Innovation, and Policy scenarios is shown in the table above.



Looking ahead, it is evident that as new technology and innovations become embedded within the various transportation modes and systems in Orange County, there will be corresponding changes in travel behavior and impacts on the transportation system usage and efficiencies. OCTA will monitor technology as it evolves as well as state policies that influence how that technology is used. OCTA will also continue to define its role in advancing innovative technology for the benefit of Orange County travelers.

Because technology could radically change the mobility of the future, it is in the public's interest that good policy responds to and keeps pace with innovations as they occur.

The following chapter describes some immediate actions that begin to flesh out this juxtaposition of technology, policy, and OCTA's role in maximizing their benefit for Orange County.

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A Living Document

Chapter 6

Key Points:

- The plan is updated regularly to respond to changing conditions
- Conceptual projects require more research, development, funding, and/or public input
- A short-term Action Plan identifies OCTA planning efforts that influence the next LRTP



Orange County's long-range transportation plan is ever-evolving. By law, it must be updated every four years. Realistically, however, the specific needs of Orange County travelers are continuously changing, and new technology and innovative solutions regularly surface. Orange County's transportation leaders must develop systems to respond to changing travel demands and keep up with innovations in the fields of transportation and planning.

Potential Transportation Projects

Several transportation concepts and projects have been identified that go beyond the proposed financially constrained scenario, Trend 2040 Express, but which support the long-range transportation plan goals and objectives. They have typically been vetted through high-level planning efforts, such as major investment studies, but require more research, development, funding, and/or public input. As these concepts become defined and refined through stakeholder input and environmental analyses, OCTA may consider including them in the financially constrained scenario, subject to funding availability.

Please refer to the table on the next page for Conceptual Transportation Projects.



CONCEPTUAL PROJECT LIST

Description
Local Arterial Projects
Crown Valley Parkway – I-5 to Greenfield Drive lane additions beyond MPAH
Cabot Road – Paseo de Colinas to Camino Capistrano lane additions beyond MPAH
Harbor Boulevard/Ball Road grade separated intersection
Harbor Boulevard – Warner Avenue to 17th Street lane additions beyond MPAH
Laguna Canyon Road – El Toro Road to Canyon Acres Drive
OC Intersections Assessment recommendations
MPAH Complete Streets Assessment recommendations
OC Active recommendations
Countywide Communications Study (ITS) recommendations
Highway Projects
Ortega Highway – Operational Improvements
I-5 – Avenida Pico to Avenida Vaquero truck lane
Freeway Chokepoints (TBD)
Direct access ramps (TBD) – Managed lane and high-capacity transit support
Transit Projects
Metrolink expansion (increase from 86 to 98 weekday trains)
Other Projects
OC Goods Movement Study recommendations
Projects from External Agencies
SR-73/Glenwood intersection improvement (Phase III) - TCA
FTC South – SR-241/Oso Parkway to I-5 (San Diego) – TCA



Short-Term Action Plan

OCTA has identified several short-term activities which build on the foundation of the long-range transportation plan. These activities are grouped into the categories of local and regional planning, emerging issues, and transportation outreach and education, and include all modes of transportation. They further the goals outlined in the long-range transportation plan, keeping OCTA moving forward by continuing to plan and dream, work with partners, consider all segments of Orange County's community, and make room for new technologies, regulations, and partnerships.

SHORT-TERM ACTION PLAN ACTIVITIES

Orange County Planning Activities	
Coordination with Local Partner Agencies	Continue dialogue with local jurisdictions, Caltrans District 12, TCA, local transit operators, and other local agencies as needed to further intra-county connectivity.
South Orange County Mobility	Identify multi-modal transportation needs and opportunities in South Orange County.
Corridor Studies & Improvements	Conduct studies evaluating the feasibility of multi-modal corridor enhancements.
OC Transit Vision Feasibility Studies	Study options to improve transit service and connectivity along corridors identified through the OC Transit Vision.
Transit Support Services	Establish a long-term plan for Orange County transit supportive services, such as OC Flex, Vanpools, and Park & Rides.
Managed Lane Studies	Identify operational enhancements to the HOV network and criteria for potential expansion of priced managed lanes.
Freeway Chokepoints	Develop long-term freeway chokepoint improvement strategies, assuming OC Go is fully implemented.
Signal Synchronization	Support local initiatives to maintain and modernize signal synchronization corridors countywide.
Transportation Demand Management (TDM)	Study opportunities for new or expanded TDM projects.
Active Transportation Investments	Continue evaluating Orange County's Active Transportation needs, develop long-term plans, and implement programs that address data collection, data management, and safety education.
Sustainable Transportation Strategies	Coordination with partner agencies on implementation of sustainability strategies.
Joint Development Studies	Evaluate opportunities for joint developments at OCTA transit terminals to improve transit facilities and connectivity with employment/housing.
Asset Management	Monitor maintenance needs for existing and new facilities and equipment.
Regional Planning Activities	
Coordination with Regional Partner Agencies	Continue dialogue with SCAG, SANDAG, County Transportation Commissions, SCAQMD, Caltrans, and other regional agencies as needed to further inter-county connectivity.
Trade Corridors/Goods Movement	Coordinate primarily through SCAG and Metro to plan for projected growth in regional goods movement.

SHORT-TERM ACTION PLAN ACTIVITIES

Regional Planning Activities	
2020 RTP/SCS	Participate in the development of the 2020 RTP/SCS and initiate dialogue with SCAG and local jurisdictions.
2028 Olympics	Coordinate with Metro on preparations for the 2028 Olympics
Metro Countywide ExpressLanes Strategic Plan	Continue dialogue with Metro and appropriate agencies to identify impacts to, and opportunities for, connectivity with Orange County's transportation network.
San Diego's I-5 HOT Lane Project	Continue dialogue with SANDAG and appropriate agencies to identify impacts to, and opportunities for, connectivity with Orange County's transportation network.
West Santa Ana Branch/Pacific Electric Right-of-Way	Continue dialogue with Metro and appropriate agencies to identify impacts to, and opportunities for, connectivity with Orange County's transportation network.
Gold Line Eastern Extension – Phase 2	Continue dialogue with Metro and appropriate agencies to identify impacts to, and opportunities for, connectivity with Orange County's transportation network.
LOSSAN/Green Line Connection	Participate in SCAG's effort to identify impacts to, and opportunities for, connectivity. Metro is the lead agency for planning, constructing, and operating major transit capital investments in Los Angeles County such as this connection.
Emerging Issues	
Monitor New Technology	Monitor developing technologies and their potential impacts on transportation (e.g., autonomous vehicles, alternative fuels, and smartphone applications).
Connected Infrastructure Needs Assessment	Study infrastructure needs and identify opportunities to implement and/or complement emerging transportation technologies.
State and Federal Regulation	Monitor state and federal legislation/regulations.
State and Federal Funding	Identify strategies and opportunities to access and leverage state and federal funding.
Transportation Outreach and Education	
Active Transportation Safety	Seek opportunities to enhance public outreach and education related to active transportation safety.
Transit Use and Trip Planning	Explore new approaches to increase use of modes other than single-occupant vehicles, including enhanced transit and active transportation facilities, public education, and incentives.

Attachment A

Trend 2040 Projects

TREND 2040 PROJECT LIST - HIGHWAY PROJECTS

Corridor	Description	Regular Lanes	HOV Lanes	Express Lanes	Toll Roads	Inter-change
Measure M Projects						
I-5	Project A – Add one HOV in each direction from SR-55 to SR-57, plus auxiliary lanes as needed		X			
I-5	Project B – Add one regular lane NB from truck bypass on-ramp to SR-55; add one regular lane SB from SR-55 to Alton Parkway; improve merging	X				
I-5	Project C – Add one regular lane in each direction from SR-73 to Alicia Parkway, and one HOV lane in each direction from Alicia Parkway to El Toro Road, and improve La Paz Road and Avery Parkway interchanges	X	X			X
I-5**	Project C – Add one HOV lane in each direction from Pacific Coast Highway to Avenida Pico, and reconfigure interchange at Avenida Pico		X			X
I-5	Project D – Improve access and merging in the vicinity of El Toro Road					X
SR-55	Project F – Add one regular lane and one HOV lane in each direction from I-405 to I-5, and fix chokepoints	X	X			
SR-55	Project F – Add one regular lane in each direction and fix chokepoints from I-5 to SR-22; make other operational improvements from I-5 to SR-91	X				
SR-57	Project G – Add one regular lane NB between Orangewood Avenue and Katella Avenue	X				
SR-57	Project G – Add one NB truck climbing lane from Lambert Road to Los Angeles County line	X				
SR-91**	Project H – Add one regular lane WB from I-5 to SR-57	X				
SR-91**	Project I – Add one regular lane WB from SR-55 to Tustin Avenue	X				
SR-91	Project I – Add one regular lane EB from SR-57 to SR-55; add one regular lane WB from SR-57 NB connector to State College Boulevard; improve interchanges and merging from Lakeview Avenue to Raymond Avenue	X				
SR-91	Project J – Add one regular lane in each direction from SR-241 to county line	X				
I-405*	Project K – Add one regular and one express lane from I-605 to SR-73, convert existing HOV to express, and provide additional capital improvements	X		X		

*Under construction
 **Completed since 2015

NB - Northbound
 SB - Southbound

EB - Eastbound
 WB - Westbound

TREND 2040 PROJECT LIST - HIGHWAY PROJECTS CONTINUED

Corridor	Description	Regular Lanes	HOV Lanes	Express Lanes	Toll Roads	Inter-change
Measure M Projects						
I-405	Project L – Add one regular lane in each direction from I-5 to SR-55, and add SB auxiliary lane from SR-133 to Irvine Center Drive	X				
I-605	Project M – Improve interchange at Katella Avenue					X
	Project N – Freeway Service Patrol					
Additional Projects						
I-5	Add one HOV lane in each direction from SR-57 to SR- 91		X			
I-5	Add one HOV lane in each direction from Avenida Pico to San Diego County line		X			
I-5	Barranca Parkway HOV interchange improvement - Add SB HOV on-ramp and NB HOV off-ramp					X
SR-55	Improve access and merging in the vicinity of Meats Avenue					X
SR-57	Interchange Improvement at Lambert Road					X
SR-73	Add one HOV lane in each direction from MacArthur Boulevard to I-405		X			
SR-91	Construct overcrossing and interchange at Fairmont Boulevard					X
SR-91	Express Lanes - Operations and maintenance					
I-405*	Add one express lane in each direction from I-605 to SR-73, convert existing HOV to HOT, and provide additional capital improvements			X		
I-405	Add auxiliary lanes from University Drive to Sand Canyon Avenue, and from Sand Canyon Avenue to SR-133	X				
I-405	Express Lanes – Operations and maintenance					
	Motorist services (511 service and call box network)					

*Under construction
 **Completed since 2015

NB - Northbound
 SB - Southbound

EB - Eastbound
 WB - Westbound

TREND 2040 PROJECT LIST - HIGHWAY PROJECTS CONTINUED

Corridor	Description	Regular Lanes	HOV Lanes	Express Lanes	Toll Roads	Inter-change
Projects from External Agencies						
SR-241 SR-261 SR-133	Build out to 3 to 4 toll lanes in each direction from SR-91 to I-5 (via SR-261 and SR-133), plus climbing and auxiliary lanes				X	
SR-241	Build out to 4 to 5 toll lanes in each direction, plus climbing and auxiliary lanes, south of SR-133				X	
SR-73	Build out to 4 toll lanes in each direction, plus climbing and auxiliary lanes				X	
SR-133	Add new interchange at Trabuco Road/Great Park Boulevard (North Irvine Transportation Mitigation Program)				X	X
SR-241	Add Express Lane Connector to SR-91 Express Lanes				X	
SR-91	RCTC to add one regular lane from county line to SR-71	X				

TREND 2040 PROJECT LIST - STREETS AND ROADS

Corridor	Description
Measure M Projects	
Countywide	Project O – Master Plan of Arterial Highways build out
Grade Separations**	Project O – Grade separations along BNSF corridor at Raymond Avenue and State College Boulevard
Countywide	Project P – Signal synchronization program
Additional Projects	
Countywide	Arterial Pavement Rehab
Grade Separations	Along LOSSAN corridor at 17th Street, State College Boulevard, and Santa Ana Boulevard
Countywide	OC Bikeways

*Under construction

**Completed since 2015

TREND 2040 PROJECT LIST - TRANSIT

Description
Measure M Projects
Project R – Metrolink Capital – Supports service increase from 54 to 86 weekday trains
Project R – Metrolink Service Expansion Program station improvements
Project S – OC Streetcar
Project U – Senior Mobility Program
Project U – Senior Non-Emergency Medical Transportation Program
Project W – Safe Transit Stops
Additional Projects
OC Bus 360° – Bus Efficiency Strategy
North Harbor Corridor – High-quality transit between Cal State Fullerton and the Santa Ana Regional Transportation Center
17th/Westminster & Bristol Corridor – High-quality transit between the Goldenwest Transportation Center and the University of California, Irvine
South Harbor Corridor – High-quality transit between 17th/Westminster and Hoag Hospital Newport Beach
Bristol & State College Corridor – High-quality transit between Brea Mall and Downtown Santa Ana
Beach Corridor – High-quality transit between Fullerton Park-and-Ride and Downtown Huntington Beach
La Palma Corridor – High-quality transit between Hawaiian Gardens and Anaheim Canyon Station
McFadden & Bolsa Corridor – High-quality transit between Goldenwest Transportation Center and Larwin Square
Main Corridor – High-quality transit between Anaheim Regional Transportation Intermodal Center and the South Coast Plaza Park-and-Ride
Chapman Corridor – High-quality transit between Hewes and Beach
Interstate 5 Corridor – Freeway BRT between Fullerton Park-and-Ride and Mission Viejo/Laguna Niguel Metrolink Station
State Route 55 Corridor – Freeway BRT between Santa Ana Regional Transportation Center and Hoag Hospital Newport Beach
Metrolink Operations (increase from 54 to 86 weekday trains)
OC Flex – On-demand shared-ride microtransit service
LOSSAN – Laguna Niguel to San Juan Capistrano rail passing siding
Transit Security and Operations Center
Vanpool

TREND 2040 PROJECT LIST - OTHER

Description
Measure M Projects
Project X – Transportation-related water quality program
Additional Projects
Bond Interest

Public Outreach Report

The Public Outreach Report is available under a separate cover.

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DESIGNING
TOMORROW

2018 LONG RANGE TRANSPORTATION PLAN



ORANGE COUNTY TRANSPORTATION AUTHORITY