SAN DIEGO FORWARD



THE REGIONAL PLAN

October 2015

San Diego FORWARD
The Regional Plan

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Chapter 1
Our Region, Our Future

San Diego FORWARD
The Regional Plan

1 Our Region, Our Future

A vision of healthy and thriving communities

The San Diego Region: A Special Place at a Crossroads

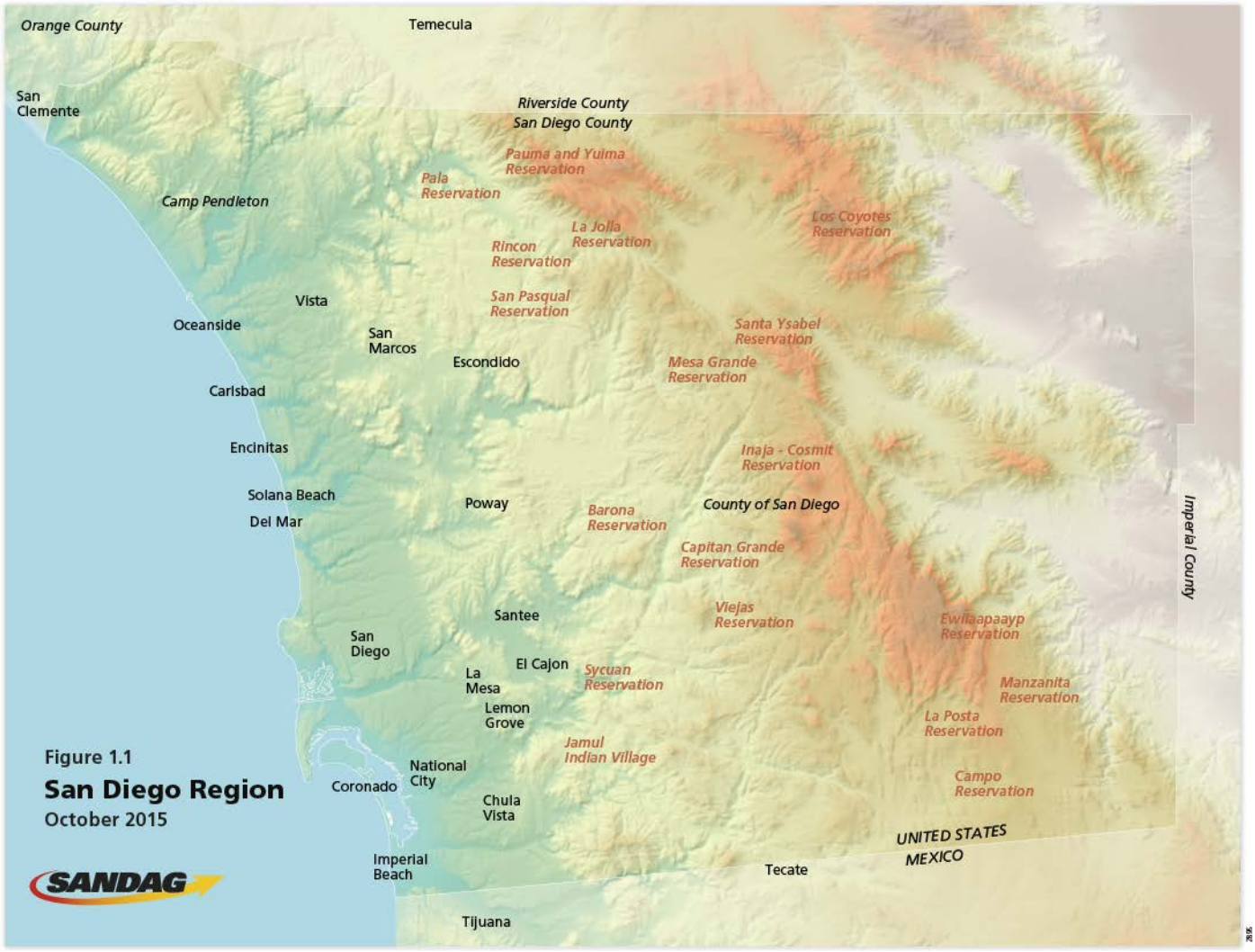
Here's a thought to get us started: we live in a place where people come to vacation, a place where they dream of living and find almost impossible to leave once they make it their home.

What draws people here? Certainly it's the gorgeous weather year round, a spectacular coastline, big open spaces, first-class family entertainment, a fantastic metropolitan area, a booming biotech industry, and an enticing international border. Those things make us proud to show off our region to out-of-town family and friends. But it's bedrock qualities like our strong economy, healthy neighborhoods, great schools, and top universities that make us grateful to live here.

Still, our region is at a crossroads. The same things that draw people here, to visit or stay, place pressures on our daily lives. Traffic can be challenging. Neighborhoods can be expensive and out of reach. Pick a summer day, any summer day, and it seems everyone is at the coast. The fact is, our region is growing. And while our

San Diego Forward: The Regional Plan serves as a blueprint for how our region will grow, and how SANDAG will invest in transportation infrastructure that will provide more choices.





population will continue to increase in the coming decades, we will have important choices to make – choices about how to grow, where to grow, and how to get around. We have big decisions to make to sustain the qualities we love most about the San Diego region.

This document, San Diego Forward: The Regional Plan (Regional Plan), serves as a blueprint for how our region will grow, and how SANDAG will invest in transportation infrastructure that will provide more choices, strengthen the economy, promote a healthy environment, and support thriving communities.

Defining Sustainability:
Sustainability means simultaneously meeting our current economic, environmental, and community needs, while also ensuring that we are not jeopardizing the ability of future generations to meet their needs. (Regional Comprehensive Plan, 2004)

An Opportunity to Shape Our Region

Sustainability. Our Regional Plan will talk a lot about what that word means, not just the dictionary version, but what it means *for us*.

This Regional Plan is built on input from people throughout our region, young and old and from neighborhoods big and small. The Regional Plan's success will depend on the degree to which our region feels invested in its success – a sense of buy-in and ownership. It's our region, after all. And our future. As we plan for the years ahead, it's important to recognize that we live in a unique place that is interconnected with our neighbors. We are surrounded by tangible boundaries: the Pacific Ocean to the west, the mountains, Anza-Borrego Desert, and

Imperial County's agricultural fields to the east, the international border with Mexico to the south, and Camp Pendleton as well as Orange and Riverside counties to the north. San Diego is also unique in that we have neighbors within our boundaries, as 18 tribal nations call the region home (see Figure 1.1). But we don't live in a vacuum, and we must coordinate with our regional and international neighbors.

Before us lie challenges and opportunities to help guide the future growth of our region and build a transportation system that works for everyone, all in ways that protect our environment, support our economy, and maintain our quality of life.

This Regional Plan presents an opportunity to shape our region for the 21st century. Over the next three and a half decades, more than $200 billion will be invested in our region to create, maintain, and improve a balanced transportation network. Our Regional Plan does two main things to ensure that these tax dollars will be spent for the greatest public good: It provides a roadmap to grow and evolve, and it prioritizes 35 years of regional transportation projects to create a framework for much of the region's transportation infrastructure. The transportation decisions detailed in the Regional Plan serve an overarching goal: create more transportation choices, which ultimately will lead to healthier communities, healthier people, and a healthier environment.

Our Regional Plan provides a roadmap to grow and evolve, and it prioritizes 35 years of regional transportation projects to create a framework for much of the region's transportation infrastructure.

In addition, the Regional Plan has been organized to include several important required elements,[1] starting out with the Policy Element included in this chapter. The required elements and locations where they can be found in the Regional Plan are described in Table 1.1 on page 4.



Table 1.1
Regional Plan Required Elements

Element Name	Description	Location
Policy Element	• Describes the transportation issues in the region; identifies and quantifies regional needs expressed within both short and long-range planning horizons; and maintains internal consistency with the Financial Element and fund estimates.	Chapter 1
Sustainable Communities Strategy	• Identifies the general location of uses, residential densities, and building intensities within the region. • Identifies areas sufficient to house all of the region's population and an eight-year projection of the regional housing need. • Identifies a transportation network to serve the transportation needs of the region. Gathers and considers the best practically available scientific information regarding resource areas and farmland in the region. Considers state housing goals. • Sets forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emissions reduction targets approved by the California Air Resources Board. • Allows the regional transportation plan to comply with Section 176 of the federal Clean Air Act.	Chapter 2 and Appendix C
Financial Element	• Summarizes costs to operate and maintain the current transportation system. Estimates costs and revenues to implement the projects identified in the Action Plan. • Provides an inventory of existing and potential transportation funding sources. Lists candidate projects if funding becomes available. Identifies potential funding shortfalls. • Identifies alternative policy directions that affect the funding of projects.	Chapter 3, Appendix A and Appendix E
Action Element	• Describes short- and long-term activities and strategies that address regional transportation issues and needs.	Chapter 5



The Importance of Planning

We all know that having a plan for the future is a good idea. Over the years, SANDAG has coordinated regional efforts to address a large number of important issues. These include using land more wisely; building an efficient and more accessible transportation system; protecting the environment; improving public health; promoting a strong regional economy; better managing our access to energy; ensuring adequate housing for everyone; incorporating equity into the planning process; addressing pressing needs on tribal lands; and supporting a vibrant international border.

More recently, planning has focused sharply on how the region can offer people *more transportation choices* – including more options for biking, walking, and public transit. We've also focused on what we can do collectively to better reduce greenhouse gas emissions and better adapt to the effects of climate change. We've drawn stronger links between how we use land and how we get around, and achieved a better understanding for how our choices for both can improve or harm our health. We're also working to make sure the region can benefit from emerging technologies that will make transportation more efficient. Finally, we're ensuring that all groups, including low-income, minority, and senior populations, have the opportunity to be meaningfully involved in developing plans for the future.

As San Diegans, we all share the responsibility for shaping our region's future. In a region as culturally and economically diverse as ours, crafting a plan for how best to grow and the smartest ways to get around isn't easy. But it's vital at a time when the challenges we face are being confronted by Americans across the nation. Among these are an increasing rate of obesity, which drives chronic illnesses such as heart disease, diabetes, cancer, and asthma. Other challenges in our region include a "silver tsunami" of aging citizens who will have significant needs, and a growing

and dynamic young population of "millennials" with their own priorities and desires. These two generations have many overlapping interests, including an increasing desire for urban lifestyles and more options for getting around. These are just a few reasons why it's important to plan for our future – locally, regionally, and across all of our borders.

Merging the Region's Plans



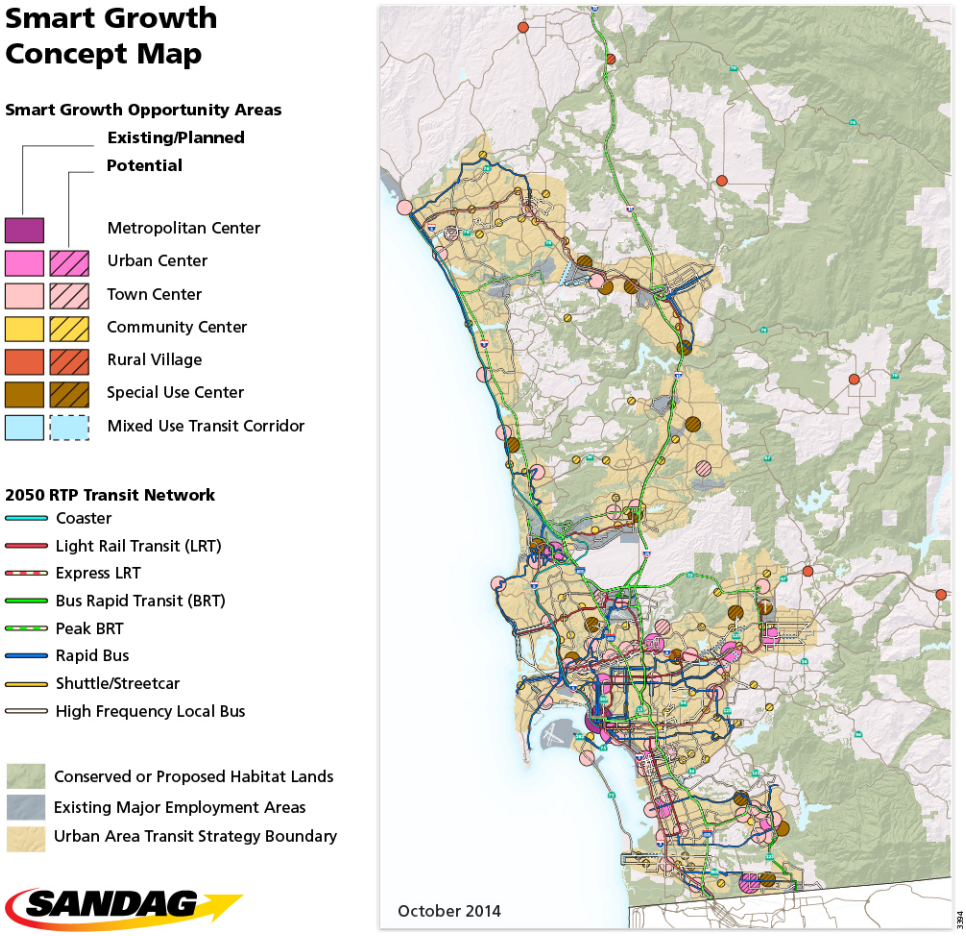
Why "San Diego Forward: The Regional Plan"?

The Regional Plan isn't starting from scratch. In fact, it combines the region's two most important existing planning documents: the Regional Comprehensive Plan (RCP), and the Regional Transportation Plan and its Sustainable Communities Strategy (RTP/SCS). The RCP, adopted in 2004, laid out key principles for managing the region's growth while preserving natural resources and limiting urban sprawl. The plan covered eight policy areas including urban form, transportation, housing, healthy environment, economic prosperity, public facilities, our borders, and social equity. These policy areas were addressed in the 2050 Regional Transportation Plan and its Sustainable Communities Strategy (2050 RTP/SCS) and are now fully integrated into the Regional Plan.

Defining Smart Growth: Smart growth is a compact, efficient, and environmentally-sensitive pattern of development that provides people with additional travel, housing, and employment choices by focusing future growth away from rural areas and closer to existing and planned job centers and public facilities, while preserving open space and natural resources and making more efficient use of existing urban infrastructure. (Regional Comprehensive Plan, 2004)

The RCP identified smart growth and sustainable development as important strategies to direct the region's future growth toward compact, mixed-use development in urbanized communities that already have existing and planned infrastructure, and then connecting those communities with a variety of transportation choices. One of the early actions that followed the adoption of the RCP in 2004 was to develop a *Smart Growth Concept Map*.[2] The *Concept Map* includes locations where local communities have identified existing, planned, and potential higher density mixed-use development – meaning more housing and more jobs – near existing and planned public transit. This was accompanied by a *Smart Growth Tool Box*, which provided regional planners with tools and funding

programs to help communities achieve these big picture goals at the local level. The Tool Box has been widely used since the adoption of the RCP, and it's still in place today. The *Smart Growth Concept Map* and *Smart Growth Tool Box* are carried over and incorporated into the Regional Plan (see Chapter 2).



The Smart Growth Concept Map includes locations where local communities have identified existing, planned, and potential higher density mixed-use development – meaning more housing and more jobs - near existing and planned public transit.

The 2050 RTP/SCS, adopted in 2011, took us beyond the vision of the RCP. It marked the first time that our regional transportation plan included a Sustainable Communities Strategy. The 2050 RTP/SCS provided a blueprint to improve mobility, preserve open space, and create vibrant and healthy communities – all of this with transportation choices designed to reduce greenhouse gas emissions and meet specific targets required by the state of California. These targets, described in more detail in Chapter 2: A Strategy for Sustainability, were set by the California Air Resources Board following the passage of Senate Bill 375 (Steinberg, 2008) (SB 375). The 2050 RTP/SCS outlined policies, strategies, and investments to maintain, manage, and improve the region's transportation system and meet the greenhouse gas reduction targets. An invigorated network of public transit options, based on a comprehensive transit planning effort known as the Urban Area Transit Strategy (UTAS), was a key part of the 2050 RTP/SCS. The 2050 RTP/SCS outlined strategies for success: focus on housing and job growth in the region's urbanized areas with existing and planned infrastructure; protect sensitive habitat and open space; invest in a transportation network that gives people transportation options and reduces greenhouse gas emissions; address the housing needs of all economic segments of the population; and implement the plan through incentives and

collaboration. As discussed in Chapter 2, these strategies are carried over and incorporated into the Regional Plan.

SANDAG is required by law to update its Regional Transportation Plan every four years, and this document is the latest update. Although many aspects of the 2050 RTP/SCS built upon the Regional Comprehensive Plan from 2004, a goal was to ensure that the broader, more comprehensive character of the RCP was included in this next update.

Individuals from communities across the San Diego region, community-based organizations, elected officials, environmental groups, developers, business and healthcare professionals, and other stakeholders spent thousands of hours helping to shape this Regional Plan.

As we've worked on this latest update, we've also continued to make progress on implementing actions included in the 2050 RTP/SCS. Planning for the region's future is an ongoing enterprise, with work progressing on several fronts continuously as plans are developed, implemented, evaluated, and updated to reflect new realities.

The Regional Plan reflects a broad range of public discourse and community engagement. Numerous people, organizations, and groups contributed to the development of this new Regional Plan. Individuals from communities across the San Diego region, community-based organizations, elected officials, environmental groups, developers, business and healthcare professionals, and other stakeholders spent thousands of hours helping to shape this Regional Plan.

The merging of the RCP and the RTP/SCS into the Regional Plan is truly a leap forward in charting our course far into the 21st century.



Our Roadmap for San Diego Forward: The Regional Plan

All good plans begin with an overall vision and specific goals. What do we want to accomplish? Where do we want to be when our Regional Plan is fully realized? The goals of the Regional Plan are simple but ambitious: to provide innovative mobility choices and planning to support a sustainable and healthy region, a vibrant economy, and an outstanding quality of life for all.



To provide innovative mobility choices and planning to support a sustainable and healthy region, a vibrant economy, and an outstanding quality of life for all.

Easily enough said. But how do we get there? For the Regional Plan, policy objectives point the way. With broad participation from many individuals and stakeholders, we developed policy objectives that together serve as a roadmap to guide our journey toward achieving our goals and vision.[3] We identified six general categories of policy objectives, and within each one there are two to three specific policy objectives. Collectively, these provide us with a framework for the strategy for sustainability described in Chapter 2: A Strategy for Sustainability, as well as concrete steps we need to take to implement our Regional Plan. These key actions are listed in Chapter 5: Ensuring Performance.

The goals of the Regional Plan are simple but ambitious: to provide innovative mobility choices and planning to support a sustainable and healthy region, a vibrant economy, and an outstanding quality of life for all.



Policy objective categories

Here are the six general categories of policy objectives, each with its own set of specific objectives:



Habitat and Open Space Preservation

- Focus growth in areas that are already urbanized, allowing the region to set aside and restore more open space in our less developed areas.
- Protect and restore our region's urban canyons, coastlines, beaches, and water resources.



Regional Economic Prosperity

- Invest in transportation projects that provide access for all communities to a variety of jobs with competitive wages.
- Build infrastructure that makes the movement of freight in our community more efficient and environmentally friendly.



Environmental Stewardship

- Make transportation investments that result in cleaner air, environmental protection, conservation, efficiency, and sustainable living.
- Support energy programs that promote sustainability.



Mobility Choices

- Provide safe, secure, healthy, affordable, and convenient travel choices between the places where people live, work, and play.
- Take advantage of new technologies to make the transportation system more efficient and accessible.



Partnerships/Collaboration

- Collaborate with Native American tribes, Mexico, military bases, neighboring counties, infrastructure providers, the private sector, and local communities to design a transportation system that connects to the megaregion and national network, works for everyone, and fosters a high quality of life for all.
- As we plan for our region, recognize the vital economic, environmental, cultural, and community linkages between the San Diego region and Baja California.



Healthy and Complete Communities

- Create great places for everyone to live, work, and play.
- Connect communities through a variety of transportation choices that promote healthy lifestyles, including walking and biking.
- Increase the supply and variety of housing types -- affordable for people of all ages and income levels in areas with frequent transit service and with access to a variety of services.





Recognizing the Connections in Our Regional Plan

So, those are the guiding principles that define our work and shape the character of this Regional Plan. As we developed these policy objectives, it became clear that the topics addressed in the Regional Plan – and in other big picture visions for our community's future – are interrelated. We must make a concerted effort to craft policies and actions that support livable communities and healthy places with a variety of transportation choices. And we must avoid decisions that lead us toward "silos" that fail to recognize the interconnectedness of the many issues that influence this region.

We're in this Together

As the region's planning agency, SANDAG is uniquely positioned to bring together decision-makers from all areas of the region. The agency serves as the Metropolitan Planning Organization for our region, joining elected officials from all 18 cities and the County of San Diego as a regional council of governments. One of our primary responsibilities is regional transportation planning. We invest in public transit, highways, bicycle and pedestrian infrastructure, freight corridors, and technologies to better manage our regional transportation system and the everyday demands on it. We also provide financial incentives and offer grant programs to various jurisdictions and organizations. Through these activities, SANDAG influences policies for how local governments use land, protect the environment, and grow their economies.

SANDAG collaborates with a variety of partners. They include regional economic development corporations, chambers of commerce, environmental groups, water and energy providers, health providers, community-based organizations, labor, law enforcement, partners in Baja California, tribal nations, the military, universities and

community colleges, neighboring counties, Caltrans, transit operators, Port of San Diego, San Diego County Airport Authority, the private sector, and other organizations and stakeholders.

Working together, we have developed a shared vision for mid-century. This vision brings together local plans for sustainable growth, and it provides a regional framework that promotes a strong economy, an efficient transportation system, a healthy environment, and thriving communities.

Partners at Our Borders

As we've mentioned, it's critical that we coordinate planning with our neighbors outside and within our geographic boundaries. We live in a binational region that includes San Diego and Imperial counties, and the northern cities of Baja California. About 6.4 million people live today in this binational region, and that number is projected to grow to 10.6 million by 2040. It's a place with diverse landscapes, politics, economies, languages, and cultures. Even so, we are linked socially and economically. People and goods flow across our borders in huge numbers every day.

We live in a binational region that includes San Diego and Imperial counties, and the northern cities of Baja California.

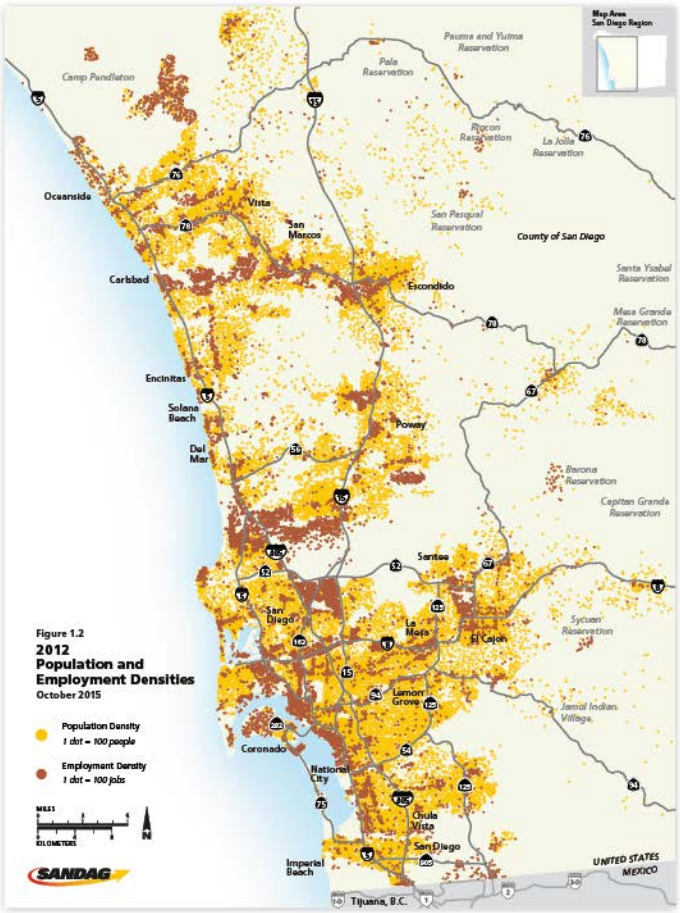
The San Ysidro Port of Entry is one of the busiest land ports of entry in the world. It's the region's primary gateway for people who drive and walk across the border. Otay Mesa, our region's main commercial port of entry, is one of the ten busiest land ports of entry in the country. It's the busiest commercial crossing on the California-Baja California border.

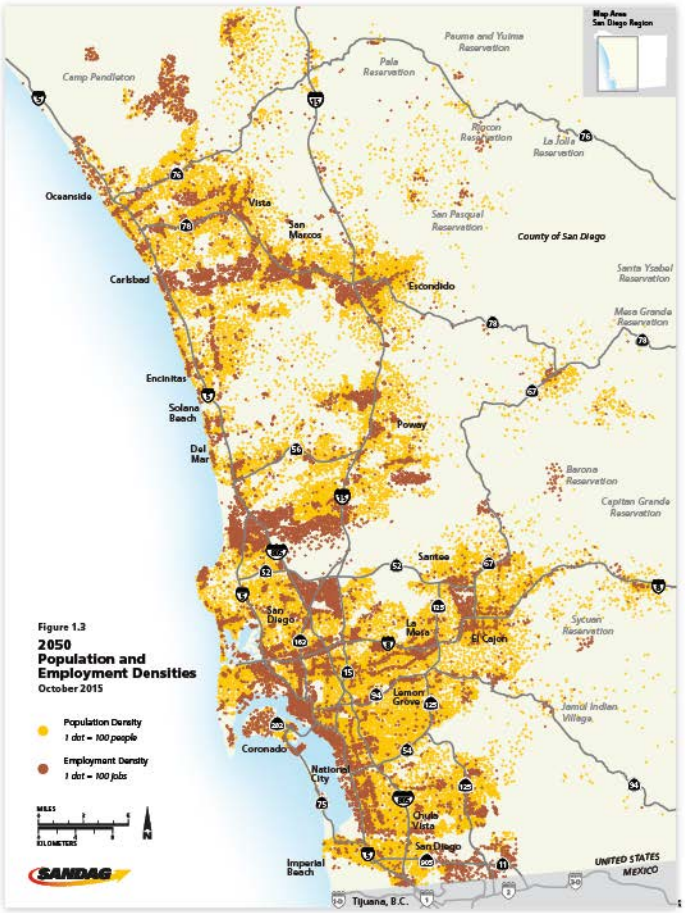
We also have neighbors within our region who have control over federal land: federally recognized tribes and the military. In the San Diego region, there are 18 independent sovereign tribal nations with jurisdiction over 19 reservations – the most in any county in the United States. Our region also has the largest military presence in the country, with Camp Pendleton, Miramar Marine Corps Air Station, North Island Naval Base, and Naval Base San Diego.

How we grow impacts our neighbors just as our neighbors' growth impacts us. Our collective growth – not only with Baja California but also within our tribal lands, military bases, and areas north and east of us – increases the demand for water, energy, housing, and roadways, and it places pressure on open space. Coordinated intergovernmental planning with our crossborder partners, neighboring counties, military partners, and tribal governments within the San Diego region helps promote collaborative solutions to protect our quality of life.

Where and How We'll Grow

Our region is large and diverse, with 18 individual cities, unincorporated land governed by the County of San Diego, the 18 sovereign tribal governments and 19 reservations we've mentioned, 3 major military bases, an international border with Mexico, and 3 major land ports of entry between San Diego and Baja California. Today, about 3.2 million people live here. Every year that number, as well as the number of jobs and homes, goes up. These increases reflect a growing economy and new opportunities.





Rather than expanding "out" as we have in the past, the SANDAG Regional Growth Forecast is projecting that we will grow "up," creating more compact communities.

Our region isn't just growing; it's growing in new ways. Figures 1.2 and 1.3 show that rather than expanding "out" as we have in the past, the SANDAG Regional Growth Forecast is projecting that we will grow "up," creating more compact communities.

The Regional Growth Forecast[4] uses the most recent land use planning assumptions from all 18 cities of the region and San Diego County. These planning assumptions are what SANDAG uses to develop the supporting transportation network, water agencies use for water planning purposes, and utility providers use for long range planning.

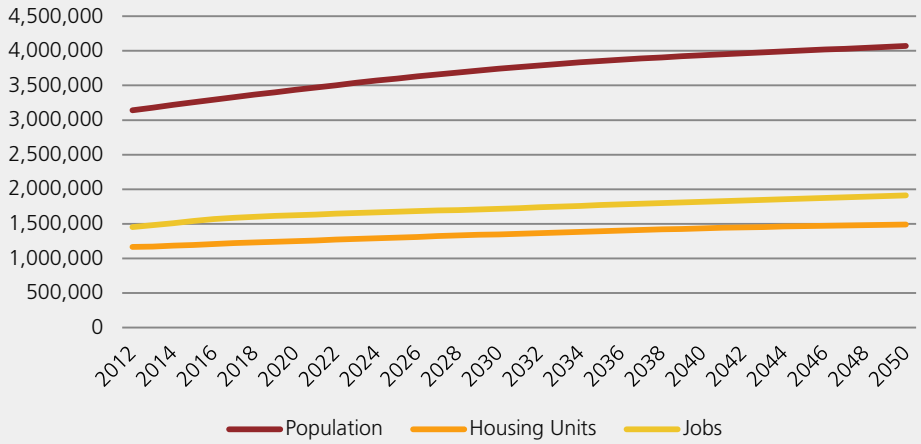
Denser neighborhoods, particularly in the western third of the San Diego region, will offer housing, jobs, and services closer to one another – and importantly, closer to the regional transportation network. While the western areas will grow over time through more compact communities, more land in the eastern two-thirds of the region will be preserved as open space.

Our Population

Now for some hard numbers: By 2050, our region's population is projected to grow by nearly a million people. This growth will lead to about 460,000 more jobs and over 325,000 more apartments, condos, houses, and other types of housing. Figure 1.4 provides a summary of population, housing units, and job statistics as well as future trends through 2050.

Figure 1.4

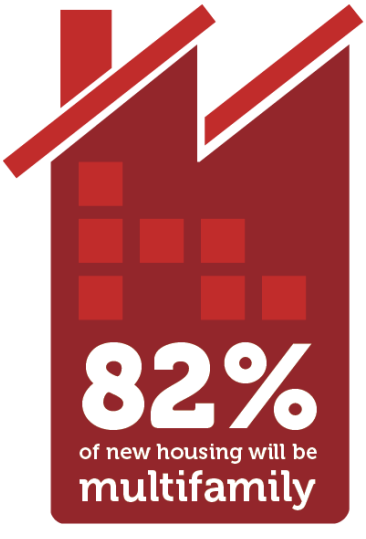
San Diego Region Population, Jobs, and Housing Forecast



While San Diego has long been thought of as a region of "transplants" where more than half of residents were born outside of California, future growth is expected to be largely homegrown. As people live longer and fertility rates rise, these two trends will fuel a natural increase in our region's population. In fact, they account for nearly two-thirds of our region's future population growth. Longer life expectancies also will contribute to the aging population seen in the outer years of the forecast. Currently, individuals aged 65 years and older make up 12 percent of the total population of our region. By 2050, this number is expected to swell dramatically. More than ever, our plans for the future need to consider all ages and life stages when planning for improved services, especially as individuals are living longer and pursuing more active lifestyles. The accessibility and efficiency of mobility options will continue to be important features of an effective transportation system.

Below are key projections for 2050, some of which we've discussed, that are influencing how we plan for the future:

- Most of the region's population growth will come from growing families that already live here today.
- Our population is aging. Nearly 20 percent of the population will be at least 65 by 2050. That's compared with 12 percent today.
- We'll grow more diverse. Nearly half of the region's population will be Hispanic, more than 15 percent will be Asian, and about 4 percent will be African American.



55%
of the region is slated to be preserved open space and parks, habitat, and farmland in
2050

- More than 82 percent of the growth in housing will be in apartment buildings, condo complexes, and other multifamily dwellings. That's a dramatic change from the way the future looked back in 2000, when 48 percent of the land planned for housing in our region was earmarked for single-family homes.
- By 2050, 55 percent of the region will be preserved as open space and parks, habitat, or farmland[5,6] – an accomplishment driven significantly by the projected shift to multifamily housing and compact development patterns across the region.

We've discussed already how development is projected to shift toward urban areas and along key transportation corridors. To help you visualize what we mean, here are a few concrete examples from around our region:

- National City's general plan provides opportunities for more than 10,000 additional multifamily homes near the Blue Line Trolley and the planned Trolley line connecting San Ysidro and Carmel Valley via the Interstate 805 corridor.
- San Marcos has drafted specific plans for the San Marcos Creek and University districts, adding mixed-use developments near California State University San Marcos and the SPRINTER rail corridor.
- More than half of the regional growth in new housing will occur within the City of San Diego. Downtown San Diego will continue to see growth over the next few decades, and it's also expected in the Barrio Logan, Golden Hill, and Uptown communities.





On the jobs front, the Regional Plan projects that today's centers of employment will continue to expand:

- The University Towne Centre/Sorrento Valley/Torrey Mesa employment cluster will remain the largest job center in the region.
- Downtown San Diego will add another 30,000 jobs by 2050.
- The Otay Mesa border area will become a much larger job center, growing from about 15,000 jobs today to more than 45,000 by 2050.
- Chula Vista will add nearly 50,000 new jobs as the Chula Vista Bayfront, downtown investments, and new planned communities in eastern Chula Vista come online.

The Regional Growth Forecast projects that the San Diego region will continue to grow more sustainably. More compact and efficient communities, paired with a greater variety of transportation options and less sprawl, will result in preserved open space and habitat, and a more efficient use of water and energy.

These expected changes raise two important issues. We need to successfully invest in transportation to connect our population with an adequate supply of well-paying jobs. Secondly, we must provide an adequate supply of housing that people can afford. We'll be discussing these and other issues in this Plan.



The Importance of Housing

Providing adequate housing for a growing number of people, from all income levels and at all stages of their lives, continues to be one of the major goals for our region. One way to do this is to provide more housing choices – more apartments, townhomes, condominiums, and single-family houses in all price ranges. These homes need to be affordable to people of all income levels, and accessible to people of all ages and abilities. They should be located in our urban communities close to jobs and transit. That will help preserve our open spaces and rural areas, bolster our existing neighborhoods, and keep commutes manageable.

How much housing is built, what type is built, and where it gets built will impact our future. The Regional Housing Needs Assessment (RHNA), updated every eight years and last updated in 2011 as part of the 2050 RTP/SCS, helps provide the framework for the planning and construction of housing, particularly affordable housing, in our region.[7] In Chapter 2, we'll go into more detail about housing.

The Importance of Water

Providing enough water for our growing population is essential to our economy and our quality of life. The severe drought that we've experienced in recent years has reminded us that water is a precious and sometimes scarce resource. We are often asked how the region can accommodate new growth when the existing population is facing statewide conservation mandates due to the drought. But the fact is that nearly two-thirds of our projected growth in coming decades will be driven by the natural increase of today's existing population – that is, our children's children. The San Diego County Water Authority has plans and strategies in place intended to

manage droughts and ensure the reliability of our region's water supplies for the long term – as we continue to grow.

SANDAG doesn't directly plan for water supplies in our region, but it coordinates closely with the Water Authority. The Water Authority prepares an Urban Water Management Plan every five years to help ensure that the San Diego region has reliable water supplies. Updates to the plan are provided to SANDAG and to local jurisdictions to consult as they develop their own land use plans and policies.

To show that the region will have reliable water supplies over the next 25 years, the Urban Water Management Plan quantifies the mix of existing and projected local and imported supplies needed to meet future demands. This plan focuses heavily on water conservation, and also on the diversification of water supplies. The Water Authority is working with its member agencies to implement this diverse mix of water supplies, while also identifying changing conditions that should be reflected in the next update of the Urban Water Management Plan (the Water Authority is working on an update to the Urban Water Management Plan, which is scheduled to be adopted in 2016). Demand management is a key component to future supply reliability and by focusing future development in the western third of our region, the overall demand for water will be lower than if we had expanded urban and suburban areas to the east – as we've done in the past. One key reason is because landscaping and other outdoor water use is lower when development is more concentrated in established urban areas. SANDAG and the Water Authority will continue to work together on addressing future water issues.[8]

By designing communities that better integrate the connections between land use and transportation, we can create more opportunities for developing a wider variety of travel choices.

It's All About Choices

When we think about the future, most of us would prefer to have *more* choices than fewer choices. And, we'd like our range of choices to vary according to the stages of our lives and our personal circumstances.



If we are young adults heading off to college, we may want a dorm room or an affordable apartment with lots of travel options to get to class – including safe routes for walking and biking. If we have young children, we may want a home that's close to our children's local school, and in a neighborhood that can support walking, riding a scooter, skateboarding, or biking. If we are empty nesters, we may prefer a condo in an urban area so we can get around easily and enjoy an art show, play, or other cultural event. If we're embarking on a blended family experience, we may need a larger home and more alternative ways of getting around. If we're older, we may need assisted living choices with options for traveling to our medical appointments. If we're facing health issues, we may need to build more physical activity into our daily schedules while also having ready access to medical care.

The ways in which our communities are built can make a difference in the kinds of choices available to us. By designing communities that better integrate the connections between how we use land and how we get around (i.e. transportation), we can create more opportunities for developing a wider variety of travel choices beyond the car, including options like the Trolley, SPRINTER,

COASTER, buses, biking, and walking. Emerging technologies can help us optimize these choices, by ultimately making it easier and more efficient to choose transportation options beyond driving alone.

The societal benefits of having access to a wider range of travel choices are numerous. We can spend less time in our cars and save gas money. We can reduce air pollution and maximize public health. And we can lower the amount of greenhouse gases that we emit into the atmosphere.

In coming chapters of this Regional Plan, we'll talk about our Sustainable Communities Strategy and regional housing needs. We'll review how our region grew in previous decades, and how new thinking about development, transportation, technology, and sustainability will improve the region's future. We'll outline how more compact development and a greater mix of land uses will create more vibrant communities, while also supporting existing and new transportation projects. We'll also review what it will take to pay for transportation improvements. Then we'll discuss the benefits of charting this course for the future. Finally, we'll review key actions that will propel us forward, and how we'll keep track of our progress to ensure the Regional Plan's success.

Together, we can strive to achieve what we want for our future: a vibrant economy, innovative mobility, a healthy environment, and great communities.

As Yogi Berra once said: *"If you don't know where you're going, you'll end up somewhere else."* As a region, thoughtful and effective planning for how we use land and invest in transportation will determine where we go in the future. Together, we can strive to achieve what we want for our future: a vibrant economy, innovative mobility, a healthy environment, and great communities. Do that, and we'll create a region we'd love to show off to out-of-town family and friends. Most of all, it'll be a great place to live.

Let's work together to move San Diego Forward!



Endnotes

[1] This Regional Plan includes the mandatory policy, action, and financial elements – in addition to the SCS as identified in California Government Code Section 65080 and detailed in Appendix C: Sustainable Communities Strategy Documentation and Related Information. The Regional Plan also includes the elements required by numerous other policy documents and regulations, such as the Regional Comprehensive Plan (Public Utilities Code 132360 *et. seq*) and the Regional Housing Needs Assessment (RHNA). Given the interrelated nature of these requirements, they are integrated into various chapters of the Regional Plan.

[2] http://www.sandag.org/index.asp?classid=12&projectid=296&fuseaction=projects.detail

[3] SANDAG prepared the Public Involvement Plan with input from the general public, community based organizations, SANDAG Working Groups, SANDAG Policy Advisory Committees, and the SANDAG Board of Directors. The Public Involvement Plan, which includes a detailed description of the consultation and participation of interested parties, is included as Appendix F: Public Involvement Program. Additionally, several key policy white papers were developed to inform the Regional Plan, and these are included as Appendix Q: White Papers.

[4] Appendix J: Regional Growth Forecast

[5] Based on the best practically available scientific information regarding resource areas and farmland in the region, as additionally shown in Appendix C.

[6] ¨Open Space and Parks" include beach-passive (other sandy areas along the coastline with limited parking and access), open space park or preserve, and undevelopable natural area. "Farmland" includes Williamson Act Lands. "Habitat" includes SANDAG conserved lands.

[7] The RHNA was developed as part of the 2050 Regional Transportation Plan and its Sustainable Communities Strategy, and can be found as Appendix L: Regional Housing Needs Assessment Plan.

[8] More information about the water forecasting process can be found in Appendix J.



Chapter 2
A Strategy for Sustainability

San Diego FORWARD
The Regional Plan

2 A Strategy for Sustainability

Smart growth and environmental protection through transportation choices

The Sustainable Communities Strategy

At the heart of San Diego Forward: The Regional Plan (Regional Plan) is a Sustainable Communities Strategy (SCS) that charts a course toward lower greenhouse gas emissions related to cars and light trucks, and proposes other measures to make the San Diego region more environmentally sustainable. Why the focus on transportation? Because about a third of greenhouse gas emissions generated in this nation come from that sector alone.[1]

At the heart of San Diego Forward: The Regional Plan is a Sustainable Communities Strategy that charts a course toward lower greenhouse gas emissions.

Reducing greenhouse gas emissions is a major goal for the state of California, and the nation. Rising emissions, chiefly carbon dioxide from the burning of fossil fuels, are increasing average temperatures around the globe. And those emissions are leading to numerous changes, including rising sea levels and shifting weather patterns. In the southwestern United States, climate scientists project that the effects of climate change include increasingly higher temperatures and more intense and frequent droughts, among other consequences.



The SANDAG SCS must integrate plans for how we use our land with our plans for transportation, and show how future investments will reduce greenhouse gas emissions to meet the targets.

Confronting this challenge, California has moved aggressively to reduce statewide greenhouse gas emissions. In 2006, it became a national leader in taking action when the state Legislature passed Assembly Bill 32 (Nunez, 2006) (AB 32). AB 32 requires the state to reduce its greenhouse gas emissions to 1990 levels by 2020. Passage of this landmark bill was a recognition that states, especially one as large and economically powerful as California, have significant roles to play in our collective effort to reduce greenhouse gas emissions.

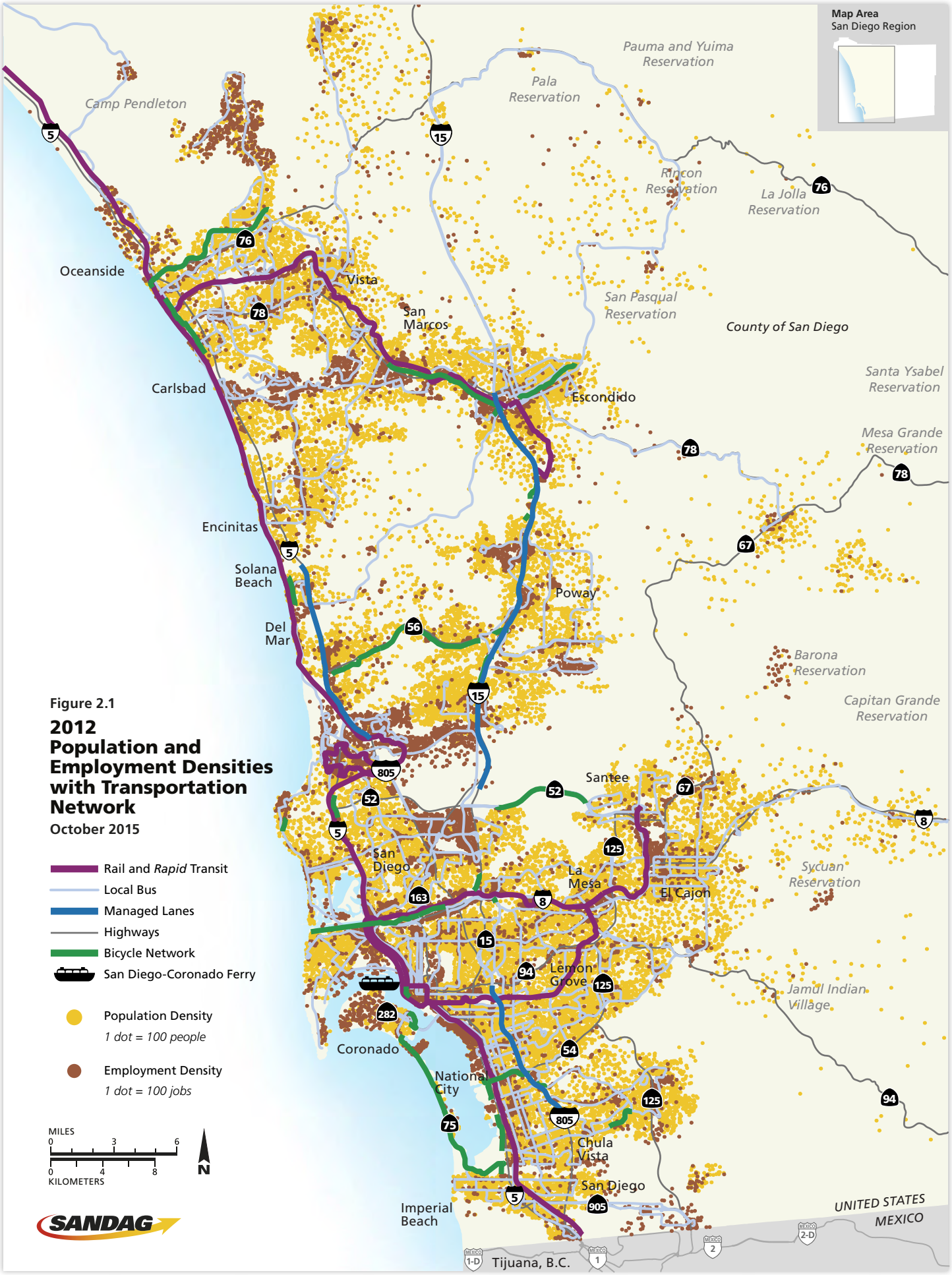
Following the passage of AB 32, California's Legislature passed the Sustainable Communities and Climate Protection Act of 2008 – one of several steps the state has taken to achieve the goals set by AB 32. Also known as Senate Bill 375 (Steinberg, 2008) (SB 375), the Sustainable Communities Act required the California Air Resources Board (ARB) to set regional targets for reducing greenhouse gas emissions from passenger vehicle use.[2] In 2010, ARB established targets for 2020 and 2035 for each region in California governed by a Metropolitan Planning Organization (MPO). SANDAG is the MPO for the San Diego region. The SANDAG target, as set by ARB, is to reduce the region's per capita emissions of greenhouse gases from cars and light trucks by 7 percent by 2020, compared with a 2005 baseline. By 2035, the target is a 13 percent per capita reduction. SB 375 does not require ARB to set targets beyond 2035. Nevertheless, the Regional Plan also includes a 2050 time horizon to integrate the *TransNet* Program, which has a 2048 time horizon (very close to 2050).

Government Code § 65080(b)(2)(B)

Each metropolitan planning organization shall prepare a sustainable communities strategy, subject to the requirements of Part 450 of Title 23 of, and Part 93 of Title 40 of, the Code of Federal Regulations, including the requirement to utilize the most recent planning assumptions considering local general plans, and other factors.

To achieve these targets, SANDAG and other MPOs are required to develop an SCS, as an element of its Regional Transportation Plan (RTP). The SANDAG SCS must integrate plans for how we use our land with our plans for transportation, and show how future investments will reduce greenhouse gas emissions to meet the targets. The law added specific sections to the California Government Code, and throughout this chapter we've included references to those sections to show how we're meeting the law. In addition, Appendix C: Sustainable Communities Strategy Documentation and Related Information includes a more detailed matrix that further documents how the Regional Plan meets the SB 375 requirements for an SCS.

Through implementation of the Regional Comprehensive Plan (RCP) and other planning efforts, our region has for years moved toward better integrating land use and transportation plans. This is illustrated in Figure 2.1, which shows the region's population and employment densities in 2012 overlaid with the existing transportation network, which serves our most populated areas. But SB 375 prompted us to focus more directly on reducing greenhouse gas emissions. In 2011, the SANDAG Board of Directors adopted the region's first SCS, included in the 2050 Regional Transportation Plan and its Sustainable Communities Strategy (2050 RTP/SCS) – which was also the first SCS produced in the state of California. This chapter lays out the updated SCS for the San Diego region.[3]


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Santa Ysabel Reservation
Carlsbad
Escondido
Mesa Grande Reservation
Encinitas
Solana Beach
Poway
Del Mar
Barona Reservation
Capitan Grande Reservation
Santee
Sycuan Reservation
San Diego
La Mesa
El Cajon
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure 2.1
2012 Population and Employment Densities with Transportation Network
October 2015
Rail and Rapid Transit
Local Bus
Managed Lanes
Highways
Bicycle Network
San Diego-Coronado Ferry
Population Density
1 dot = 100 people
Employment Density
1 dot = 100 jobs
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

The Five Building Blocks of Our SCS

Consistent with our previous SCS, this updated version includes five building blocks, in accordance with SB 375, which are accompanied by strategies. They include:

- A **land use pattern** that accommodates our region's future employment and housing needs, and protects sensitive habitats, cultural resources, and resource areas.
- A **transportation network** of public transit, Managed Lanes and highways, local streets, bikeways, and walkways built and maintained with reasonably expected funding.
- **Managing demands** on our transportation system (also known as Transportation Demand Management, or TDM) in ways that reduce or eliminate traffic congestion during peak periods of demand.
- **Managing our transportation system** (also known as Transportation System Management, or TSM) through measures that maximize the overall efficiency of the transportation network.
- **Innovative pricing policies** and other measures designed to reduce the number of miles people travel in their vehicles, as well as traffic congestion during peak periods of demand.

The five strategies to move us toward sustainability

Reducing greenhouse gas emissions, given the potential consequences of climate change, will help build a more sustainable future globally. In the San Diego region, the path toward sustainability requires lowering these emissions locally, and also other strategies. The following section describes our path toward sustainability in five concrete strategies we can understand and build upon. Our SCS is organized around these five strategies.


Focus housing and job growth in urbanized areas where there is existing and planned transportation infrastructure, including transit.


Protect the environment and help ensure the success of smart growth land use policies by preserving sensitive habitat, open space, cultural resources, and farmland.


Invest in a transportation network that gives people transportation choices and reduces greenhouse gas emissions.


Address the housing needs of all economic segments of the population.


Implement the Regional Plan through incentives and collaboration.



Heading Toward 2050 – A Quick Note About Transportation

In this chapter, we cover a wide range of topics. In the middle of the chapter, we lay out plans for the region's future transportation network in quite a bit of detail, followed by a discussion on coordinated regional efforts to address climate change. But first, as a prelude, here is a set of principles that has guided the development of our future transportation network:

- The transportation network included in the Regional Plan must be based on financial constraints. Every family knows that it should live within its means, and it's no different for the San Diego region. The SANDAG investment plan, which we also refer to as the "Revenue Constrained Transportation Network," will be built with financial resources we reasonably expect to be available between now and 2050.
- A more efficient transportation network will be achieved through two key strategies: effectively managing the overall system (TSM), and effectively managing demands on the system (TDM). Innovative technologies will be integrated into both TSM and TDM. The result will be maximized efficiency in the transportation network, which ultimately can lower greenhouse gas emissions.[4]

- Managing parts of the network, such as adding Managed Lanes and transit-only lanes on our freeways, can encourage people to carpool and use public transit to bypass bottlenecks.
- The road toward a more sustainable San Diego region should include vehicles that use cleaner, alternative sources of energy. SANDAG can play an important role in promoting this transition.

Where We've Been and How We Got Here

To understand where we are today and effectively plan for our future, we need to know where we've been. Our region has continually grown, and the reasons are easy to understand. Our beautiful coastline, unique neighborhoods, strong economy, and big open spaces make our region an attractive place to live. In past decades, these and other attributes drew people to our region, and neighborhoods steadily expanded – mostly toward the east. But more recently, we've placed a greater value on protecting open space. Collectively, the long-term plans for our local cities and the County of San Diego now call for focusing new growth in the urbanized areas of the western portion of our region where more people already live. This will allow us to preserve more open space and make more efficient use of resources such as water, energy, and transportation facilities.

A history of sprawl

Efforts to create a more sustainable future began in the late 1960s and early 1970s, when Congress and the State of California passed sweeping federal and state environmental protection laws.

Efforts to create a more sustainable future began in the late 1960s and early 1970s, when Congress and the State of California passed sweeping federal and state environmental protection laws. Concerns here in San Diego had been rising over the environmental impacts of rapid growth and development. Our cities and suburbs had quickly expanded north and east as developers built tracts of single-family homes to meet the rising demand. Our city governments and the County, meanwhile, developed long-range plans that allowed the continued spread of suburban development into open land east of existing communities.

By the late 1980s, rapid suburban development was threatening remaining open space, with long commutes resulting in growing traffic congestion and air quality impacts. Voters responded by calling for the creation of a regional growth management review board, and approving the first local *TransNet* half-cent sales tax to fund regional transit, highway, and road improvements. These are responsibilities that SANDAG carries to this day.

An awakening to smart growth

During the 1990s, California expanded its commitment to environmental protection when the state Legislature enacted the Natural Community Conservation Planning (NCCP) Act. Local jurisdictions, collaborating with one another and with federal and state wildlife agencies, created plans to conserve natural habitats, better manage watersheds, and improve air quality. In the San Diego region, we adopted the Multiple Species Conservation Program (MSCP)[5] in 1998 and Multiple Habitat Conservation Program (MHCP) in 2002. These landmark programs identify an interconnected open space system from the U.S.-Mexico border to Riverside and



Orange counties. The land designated by these planning efforts, along with land in federal and state parks and forests, has preserved more than 1.2 million acres for open space and habitat preservation. That's about half our region's total land area.[6]

By the year 2000, new challenges emerged as familiar ones persisted. Affordable housing grew harder to come by. Traffic, a consequence of growth and a strong economy, continued to worsen. We needed a refined vision for planning that recognized these new realities.

To address the need to accommodate growth in ways that protect our quality of life, the RCP, as we discussed in Chapter 1: Our Region, Our Future, was adopted in 2004. The RCP called for new growth and development to occur in urbanized areas, near existing public facilities and transportation infrastructure, and for following principles of smart growth and sustainable development. Its goals were to provide people with more housing and transportation choices in existing communities, while reducing pressure to develop new suburbs in rural parts of the region that didn't have urban water and sewer service, or frequent transit service. The individual cities and the County – whose representatives make up the SANDAG Board of Directors that adopted the RCP – began to change their local long-range plans to reflect the land uses called for in the big picture outlined by the RCP.

During the last 15 years, our jurisdictions have changed their land use plans significantly, resulting in development patterns that concentrate future growth in urbanized areas, reduce sprawl, and preserve more land for open space and natural habitats.

This evolution, illustrated in Figure 2.2, compares the region's projected housing and job growth based upon local general plans in 1999 against plans in effect in 2012, as well as the growth forecasted in 2012 with an overlay of the transit projects planned in 2050. During the last 15 years, our jurisdictions have changed their land use plans significantly, resulting in development patterns that concentrate future growth in urbanized areas, reduce sprawl, preserve more land for open space and natural habitats, and use the region's water and energy supplies more efficiently.[7]

New thinking on transportation and sustainability

Defining Active Transportation: Active Transportation includes any method of travel that is human-powered, but most commonly refers to walking and bicycling.

These were seismic shifts in thinking about how to grow, and with them came new perspectives about how our region should invest in public transit, roads and highways, and other transportation infrastructure. It was becoming clear that people needed more options for getting around than just the car. This is now the basis of the transportation network described later in this chapter.

In 2004, our region's voters took another major step forward by approving an extension of the *TransNet* half-cent sales tax measure. This regional measure identified specific transportation projects that would give us more travel options. And as described in this chapter, the *TransNet* sales tax measure also provided various incentives. Significantly, it earmarked $850 million to preserve natural habitats, and it set aside nearly $600 million for smart growth and active transportation.

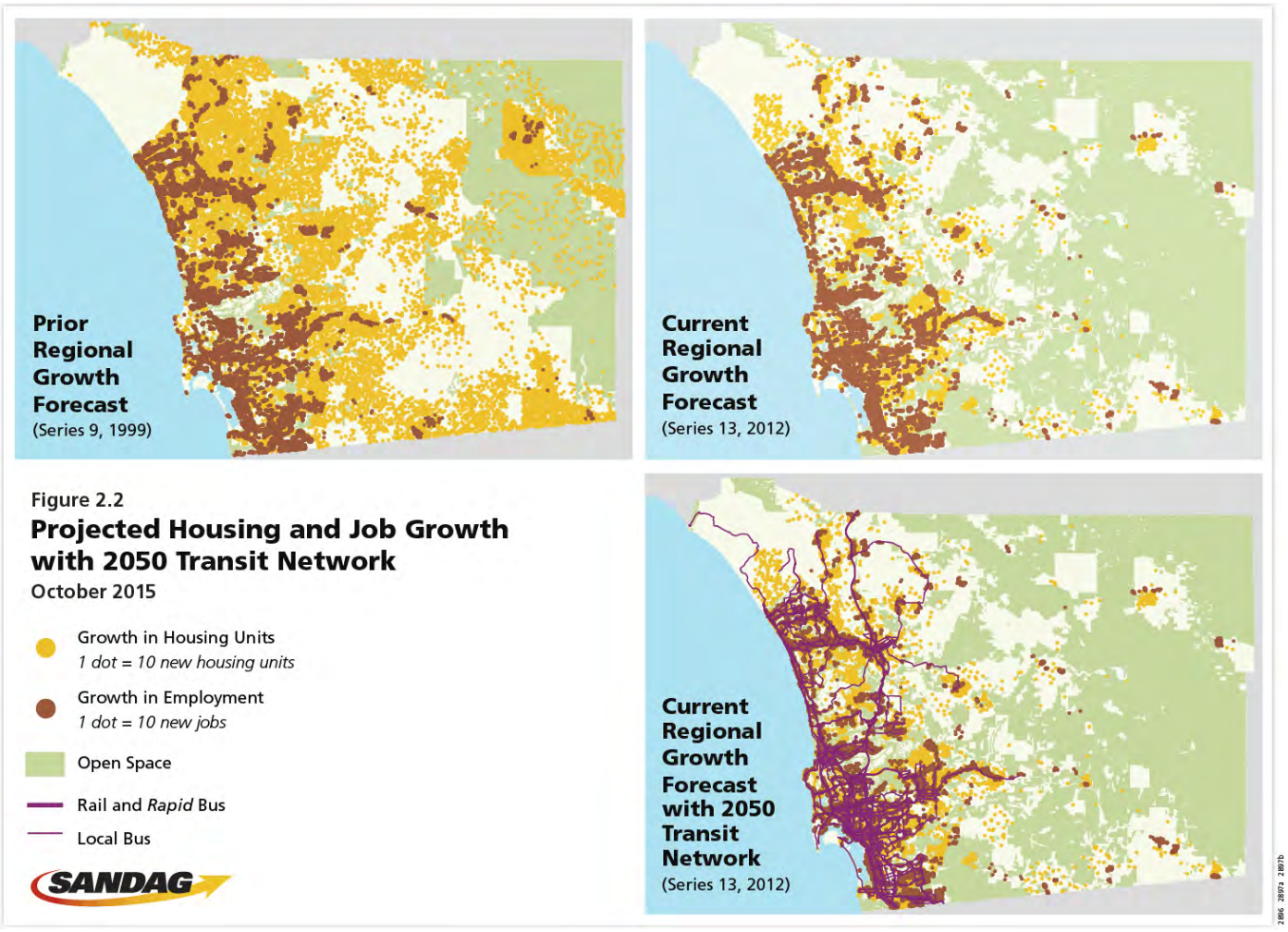


Figure 2.2
Projected Housing and Job Growth with 2050 Transit Network
October 2015



For example, it identified $280 million in grants to local jurisdictions to promote new mixed-use developments in smart growth areas that combine affordable housing with stores and other commercial buildings – all near existing and planned public transit. It also set aside an additional $280 million in grants for local jurisdictions to plan and build infrastructure for walking and biking in our urbanized communities.

As new kinds of development patterns have emerged, we've adjusted our region's long-range transportation plans. We've shifted our investment from single purpose highway lanes to Managed Lanes to support carpools, vanpools, and *Rapid* transit service – changes that serve all kinds of communities new and old, including long-established suburbs. We've added miles of new light rail lines to our transportation plans, including the Mid-Coast Trolley, which will connect the U.S.-Mexico border and Downtown San Diego with the University of California San Diego (UC San Diego) and University City, the region's largest job center. We've also made investments in regional bikeways and other infrastructure for biking to connect neighborhoods to job centers, schools, and public transit – including the new $200 million Regional Bike Plan Early Action Program to build out the backbone of the system in 10 years. These new investments, along with our existing transportation infrastructure, will use new and emerging technologies to become more accessible and more efficient.

Defining Mixed-Use: The combining of commercial, office, and residential land uses to provide easy pedestrian access and reduce the public's dependence on driving. It is often implemented in multi-story buildings containing businesses and retail stores on the lower floors, and homes on the upper floors.

A closer look at the five strategies toward sustainability in the SCS

Now let's take a look at each of the five strategies of the SCS that will move us toward sustainability:

Focus housing and job growth in urbanized areas where there is existing and planned transportation infrastructure, including transit.

Government Code § 65080(b)(2)(B)
Requires that the SCS be based on "the most recent planning assumptions considering local general plans and other factors."[7]

San Diego County and cities across the region have updated their land use plans, changing patterns of future development to provide more housing and jobs in cities, along existing transit corridors, and where projected job growth will be situated.[9] The highest density housing and employment density is planned within the most urbanized areas of the region.

As part of preparing this Regional Plan, we asked whether additional land use changes – beyond those already reflected in the general plans of our 18 cities and the County of San Diego – could further reduce greenhouse gas emissions.[10] Working with our stakeholders, the public, and our elected officials, we developed three hypothetical land use scenarios. With an eye toward reducing greenhouse gas emissions, each scenario had a different emphasis; the first, Scenario A, focused on second units and infill (such as "granny flats" on single-family parcels), the second, Scenario B, on transit-oriented development, and the third, Scenario C, on dense urban cores (See Figure 2.3). Then we paired up each hypothetical scenario with the transportation network from the 2050 RTP/SCS, and studied whether they could lower greenhouse gas emissions beyond those projected with the land uses in the Regional Growth Forecast.

The growth projected in the Growth Forecast will result in 30 percent less greenhouse gas emissions than the growth projected in the Growth Forecast prepared in 1999.

The results showed that changes already made to the general plans of the local jurisdictions throughout San Diego County – and already included in this Regional Plan – are projected to have a major impact on greenhouse gas emissions in the future. In other words, the growth projected in the Growth Forecast developed in 2013 will result in 30 percent less greenhouse gas emissions than the growth projected in the Growth Forecast prepared in 1999. The key difference between the two was the smart growth patterns that were adopted between these two growth forecasts.

So, given the fact that previous changes to land use plans lowered the projected greenhouse gas emissions so significantly, the study went on to look at whether the more drastic changes than those considered in the hypothetical scenarios would provide even more benefits. The answer was that the three scenarios had the potential to continue lowering emissions compared with the forecast, but at a much slower pace – only up to 3 percent more over the next 35 years. This slower pace is largely due to the fact that the significant land use changes have already been made to local plans.

Figure 2.3
Hypothetical Land Use Scenarios

Scenario A: Second Units and Infill



Scenario A constrains future residential and employment growth to the west of the incorporated cities boundaries, and tests the impact of second units.

Scenario B: Transit Oriented Development



Scenario B concentrates new housing and jobs around existing and future transit stations included in the 2050 RTP/SCS. New development consists primarily of urban/compact development.

Scenario C: Multiple Dense Cores



Scenario C focuses future growth into four dense cores. New housing and jobs consist of urban/compact development concentrated in North County; Mid-County; the greater Downtown area; and South County/International Border.

Source: SANDAG, December 2013

This exercise showed us that we are moving in the right direction. As our local jurisdictions continue to update their plans, they should be encouraged to continue to embrace smart growth and sustainable development, moving forward in the new direction that started with the RCP more than a decade ago.

Complementing this effort, our areas of higher density housing, job centers, and transportation access are shown on the Smart Growth Concept Map (see Chapter 1, page 7), which we developed as a tool to better coordinate our investments in transportation with the development of land. Transportation and planning professionals from all 18 cities and the County contributed to the development of this map, which identifies places with the potential to focus future high-density, mixed use, and compact development close to jobs, public services, and existing and planned transit. Because smart growth isn't a one-size fits all approach, the map includes seven distinct types of smart growth areas, from rural villages to town centers to Downtown San Diego. The map also shows major employment areas that support our economy.

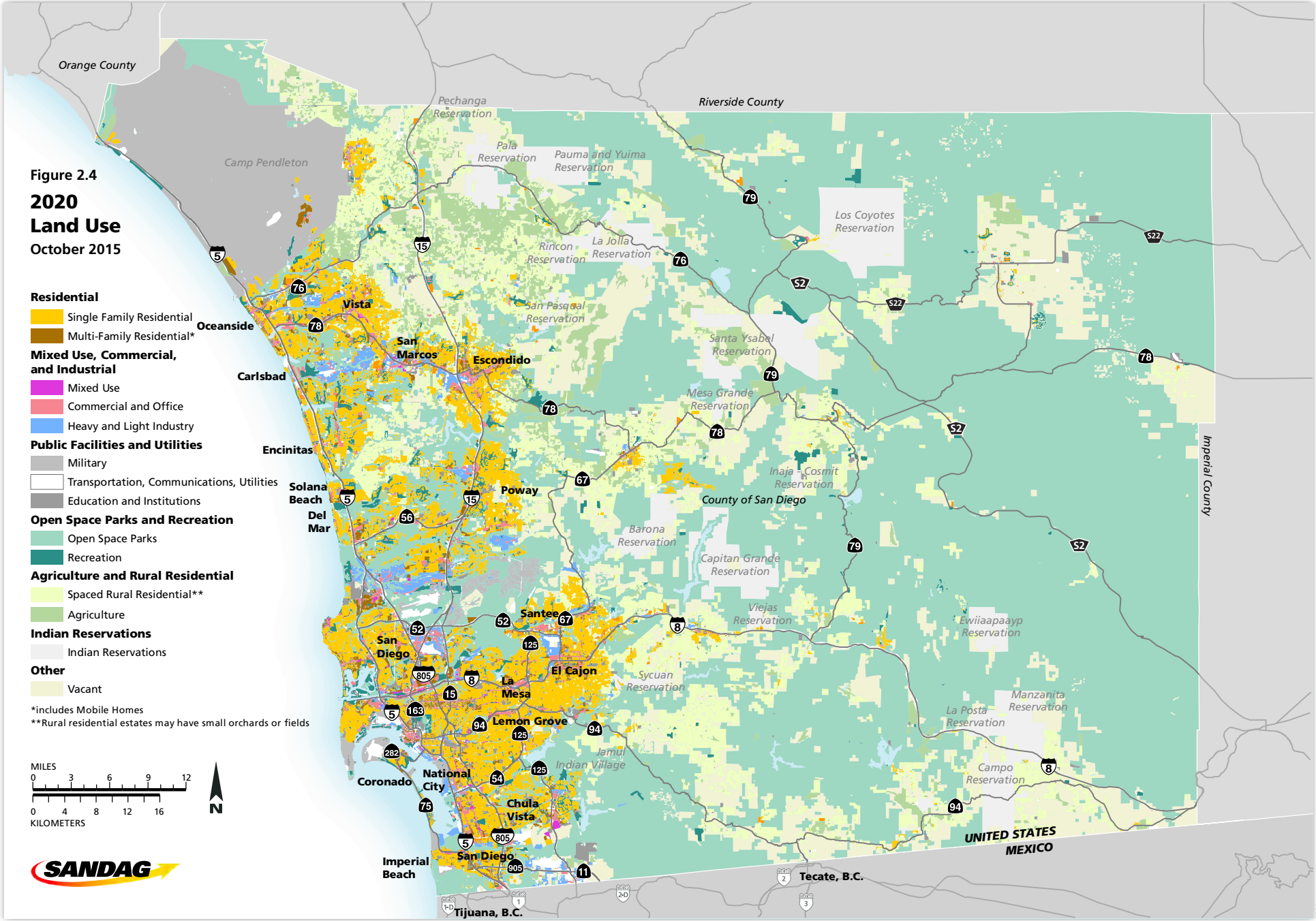
As our local jurisdictions continue to update their plans, they should be encouraged to continue to embrace smart growth and sustainable development.

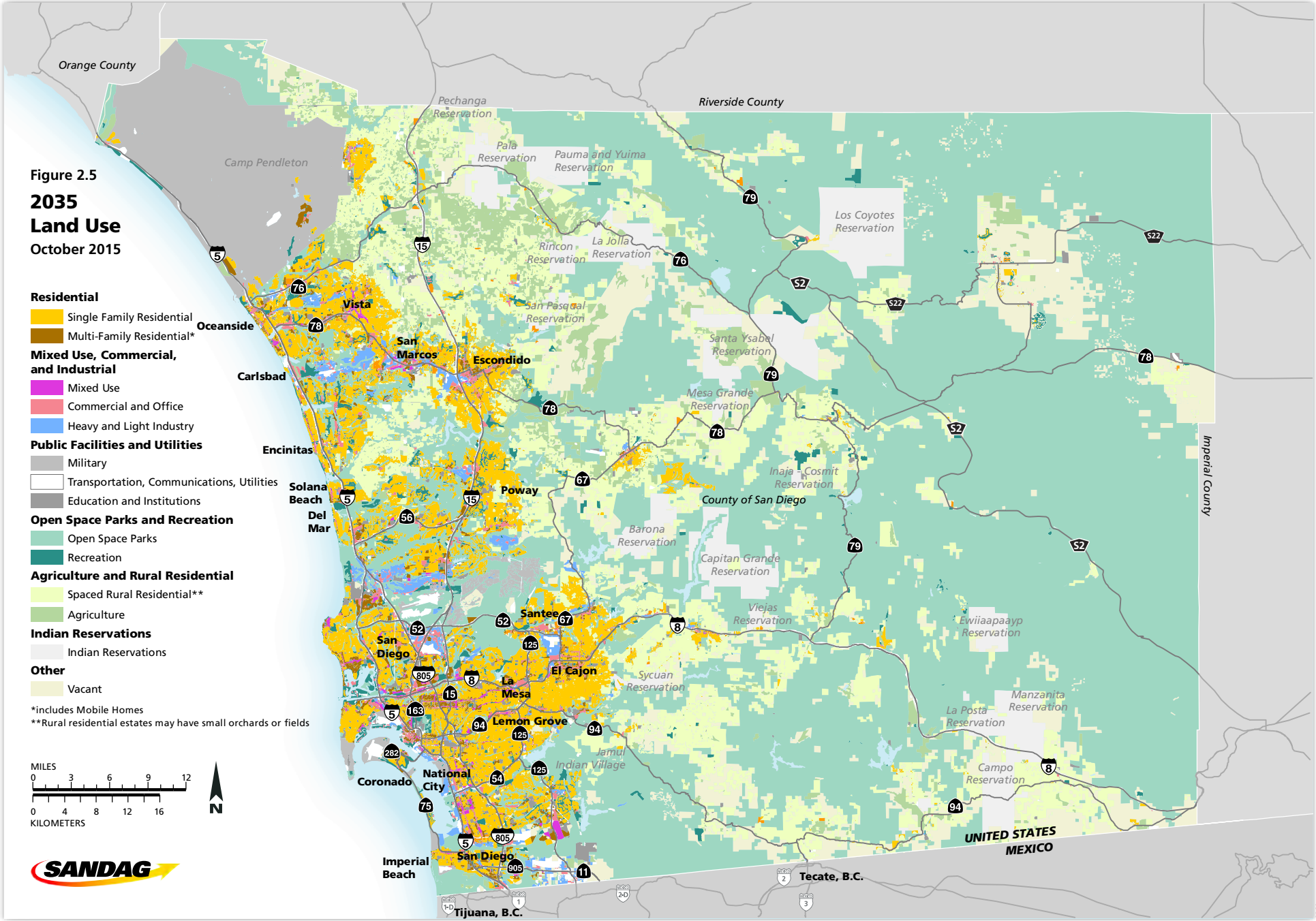
As we discussed in Chapter 1, focusing new growth and development in the most urbanized areas of the region is a key strategy toward sustainability. At the same time, we recognize that much of the region has already been developed, both in an urban and suburban pattern. Part of the smart growth strategy is to provide a more efficient transportation system in established areas. New investments in our regional transportation network, discussed later in this chapter, are designed to give people everywhere, including urban areas, established suburban areas, employment centers, and rural areas, more choices for getting around.

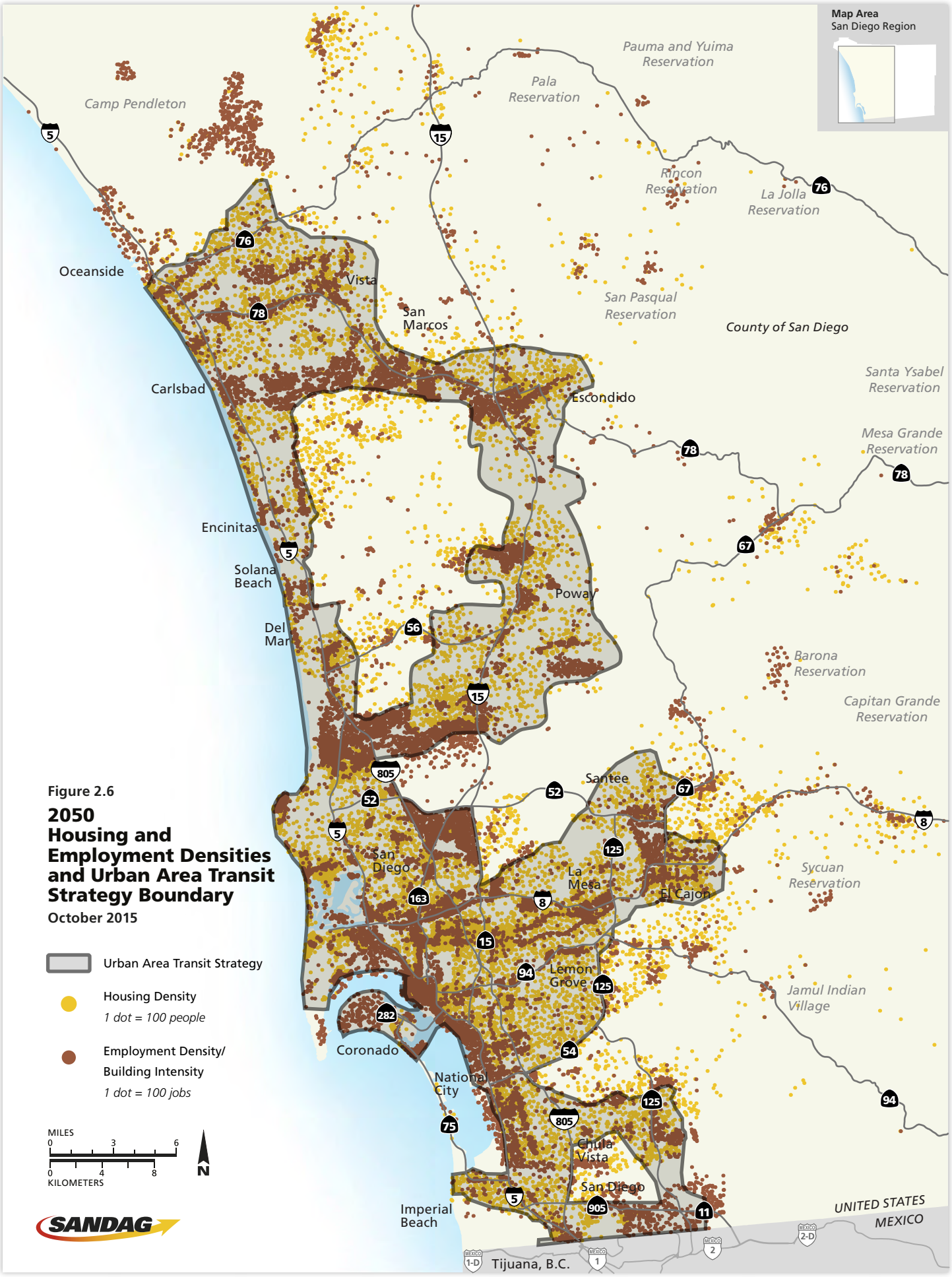
Now for some numbers. In 2012, the San Diego region included about 3.1 million people, 1.1 million homes, and over 1.3 million jobs. Most of the homes and jobs today are located within the western third of the region, and in areas served by public transit. The Regional Growth Forecast (which is also known as the Series 13 Forecast), projects that the region will grow by nearly 1 million people by 2050 (see Figures 2.6 and J.12 in Appendix J: Regional Growth Forecast). Over 325,000 new homes and 460,000 new jobs will be added during this time frame. (The base year for the Regional Plan is 2012, the year the data collection effort began to prepare the Regional Growth Forecast. It projects changes expected to occur from 2012 to 2050.)

As pointed out above, our region has made great strides in planning for more compact, higher density, greater employment intensity, and walkable developments situated near transit and in the incorporated areas of the region already served by water, sewer, and other public facilities. Evidence of the region's success can be found in the Regional Growth Forecast, which is the foundation of the SCS land use pattern, as shown in Figure 2.4 (2020 Land Use) and Figure 2.5 (2035 Land Use). The land use pattern accommodates 79 percent of all housing and 86 percent of all jobs within the portion of the region covered by the Urban Area Transit Strategy (UATS, described later in this Chapter), where the greatest investments in public transit are focused (see Figure 2.6). More than 80 percent of new housing in the region will be attached multifamily. The greatest employment density and building intensities will be with existing employment centers. The land use pattern also preserves about 1.3 million acres of land, more than half the region's land area. These open space lands include habitat conservation areas, parks, steep slopes, farmland, floodplains, and wetlands.[11]




Figure 2.4
2020
Land Use
October 2015
Residential
Single Family Residential
Multi-Family Residential*
Mixed Use, Commercial, and Industrial
Mixed Use
Commercial and Office
Heavy and Light Industry
Public Facilities and Utilities
Military
Transportation, Communications, Utilities
Education and Institutions
Open Space Parks and Recreation
Open Space Parks
Recreation
Agriculture and Rural Residential
Spaced Rural Residential**
Agriculture
Indian Reservations
Indian Reservations
Other
Vacant
*includes Mobile Homes
**Rural residential estates may have small orchards or fields
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG
Orange County
Riverside County
Imperial County
Camp Pendleton
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
La Jolla Reservation
Los Coyotes Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
County of San Diego
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
Manzanita Reservation
La Posta Reservation
Campo Reservation
Jamul Indian Village
Oceanside
Vista
San Marcos
Escondido
Carlsbad
Encinitas
Solana Beach
Del Mar
Poway
Santee
El Cajon
La Mesa
Lemon Grove
National City
Chula Vista
Coronado
Imperial Beach
San Diego
Tijuana, B.C.
Tecate, B.C.
UNITED STATES
MEXICO
2859


Figure 2.5
2035
Land Use
October 2015
Residential
Single Family Residential
Multi-Family Residential*
Mixed Use, Commercial, and Industrial
Mixed Use
Commercial and Office
Heavy and Light Industry
Public Facilities and Utilities
Military
Transportation, Communications, Utilities
Education and Institutions
Open Space Parks and Recreation
Open Space Parks
Recreation
Agriculture and Rural Residential
Spaced Rural Residential**
Agriculture
Indian Reservations
Indian Reservations
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*includes Mobile Homes
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MILES
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Santee
El Cajon
La Mesa
Lemon Grove
National City
Coronado
San Diego
Imperial Beach
Tijuana, B.C.
Tecate, B.C.
UNITED STATES
MEXICO


Map Area
San Diego Region
Pauma and Yuima Reservation
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Escondido
Mesa Grande Reservation
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Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure 2.6
2050 Housing and Employment Densities and Urban Area Transit Strategy Boundary
October 2015
Urban Area Transit Strategy
Housing Density
1 dot = 100 people
Employment Density/ Building Intensity
1 dot = 100 jobs
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

Protect the environment by preserving sensitive habitat, open space, and farmland

Government Code § 65080(b)(2)(B)(v)
Gather and consider the best practically available scientific information regarding resource areas and farmland in the region.

Complementing plans for how our urbanized areas will develop are plans for protecting parklands, open space, natural resource areas, and farmland. About half of our region's 2.7 million acres have been preserved,[12] and by 2050, 55 percent will be preserved, according to our forecast, which is based on local land use plans (see Appendix C Introduction, Appendix C Figure C.6, and Appendix J Figure J.6).[13]

Government Code § 65080(b)(4)(C)
The metropolitan planning organization shall consider financial incentives for cities and counties that have resource areas or farmland.

Our region is fortunate to have a local funding source for preserving natural habitats. When the region's voters approved the extension of the *TransNet* half-cent sales tax back in 2004, their vote included a provision to fund the $850 million Environmental Mitigation Program (EMP). The primary purpose of the EMP is to purchase habitat as mitigation for future transportation projects. The program buys land early and in large parcels, saving money, and in the process restores and maintains preserved land.

In addition, the EMP provides funding, through a competitive incentive program, to acquire, manage, and monitor sensitive lands in habitat preservation planning areas (such as the MSCP and the MHCP discussed earlier in this chapter). This is done to help mitigate the environmental impacts of transportation projects.



Over the years, we've established criteria for the incentive program to ensure that the region's conservation priorities are being met. The program also includes funding for working landscapes, such as agricultural lands, if they also support wildlife.

One of the unique aspects of the EMP is that it provides an "economic benefit" incentive, which enables *TransNet* funding to be used to buy land that contributes to wildlife and habitat conservation. This funding is earmarked as milestones are achieved during certain transportation projects. Recognized nationally as a major success, the *TransNet* EMP program is unique to our region, and it provides a critical source of funding to protect open space and preserve natural habitats.

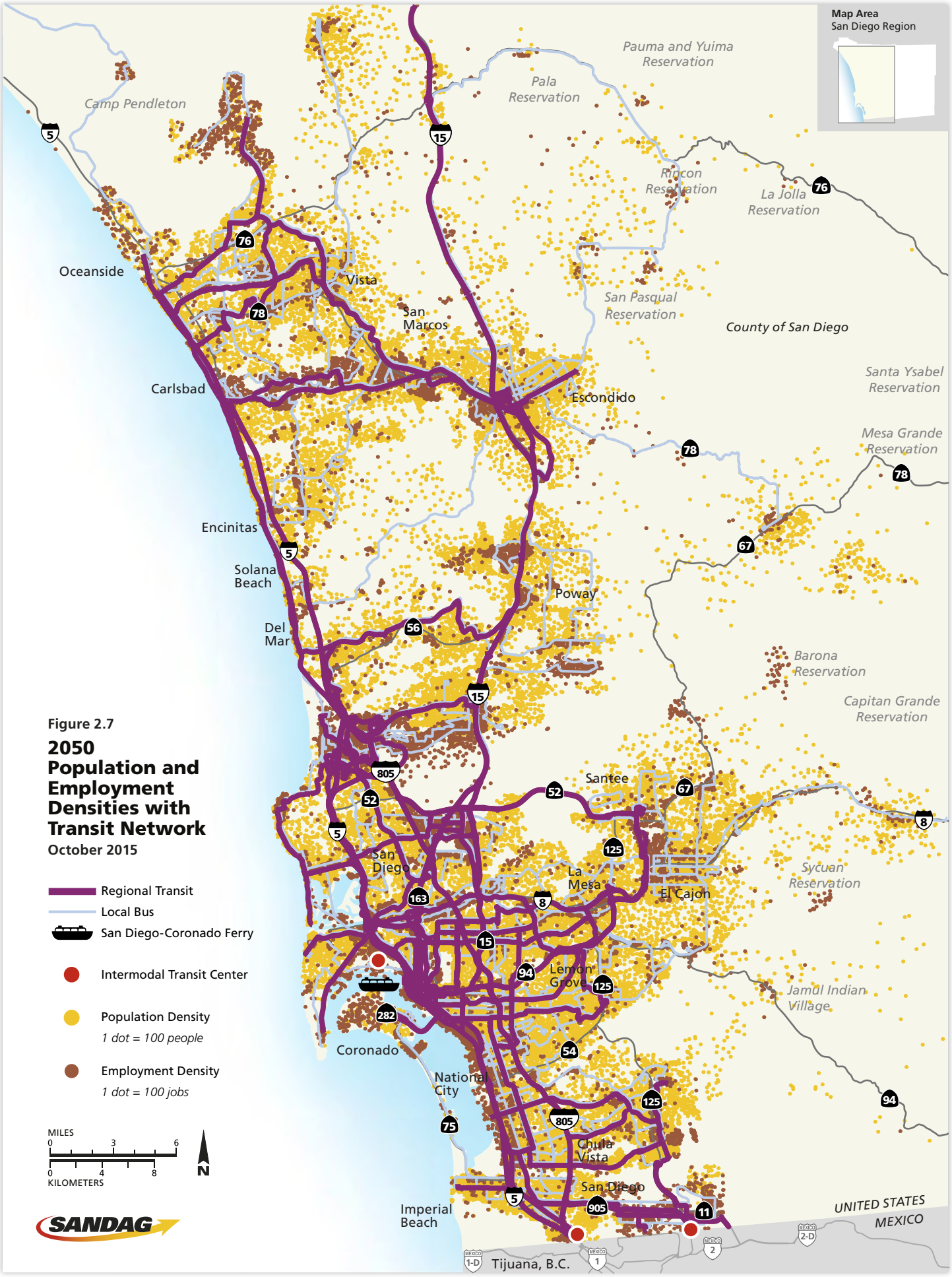
Invest in a transportation network that gives people transportation options and reduces greenhouse gas emissions

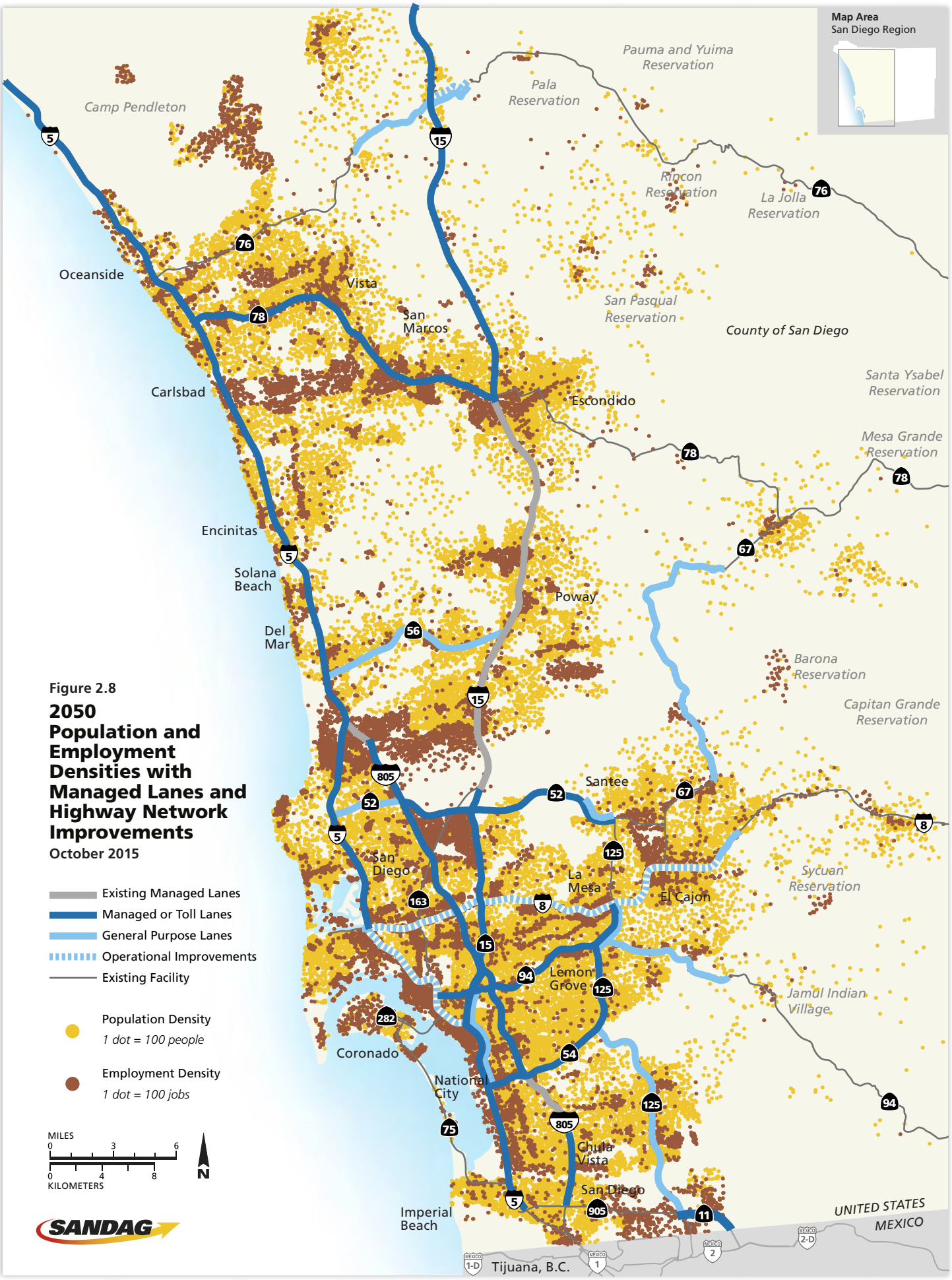
Government Code § 65080(b)(2)(B)(vii)
Set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board.

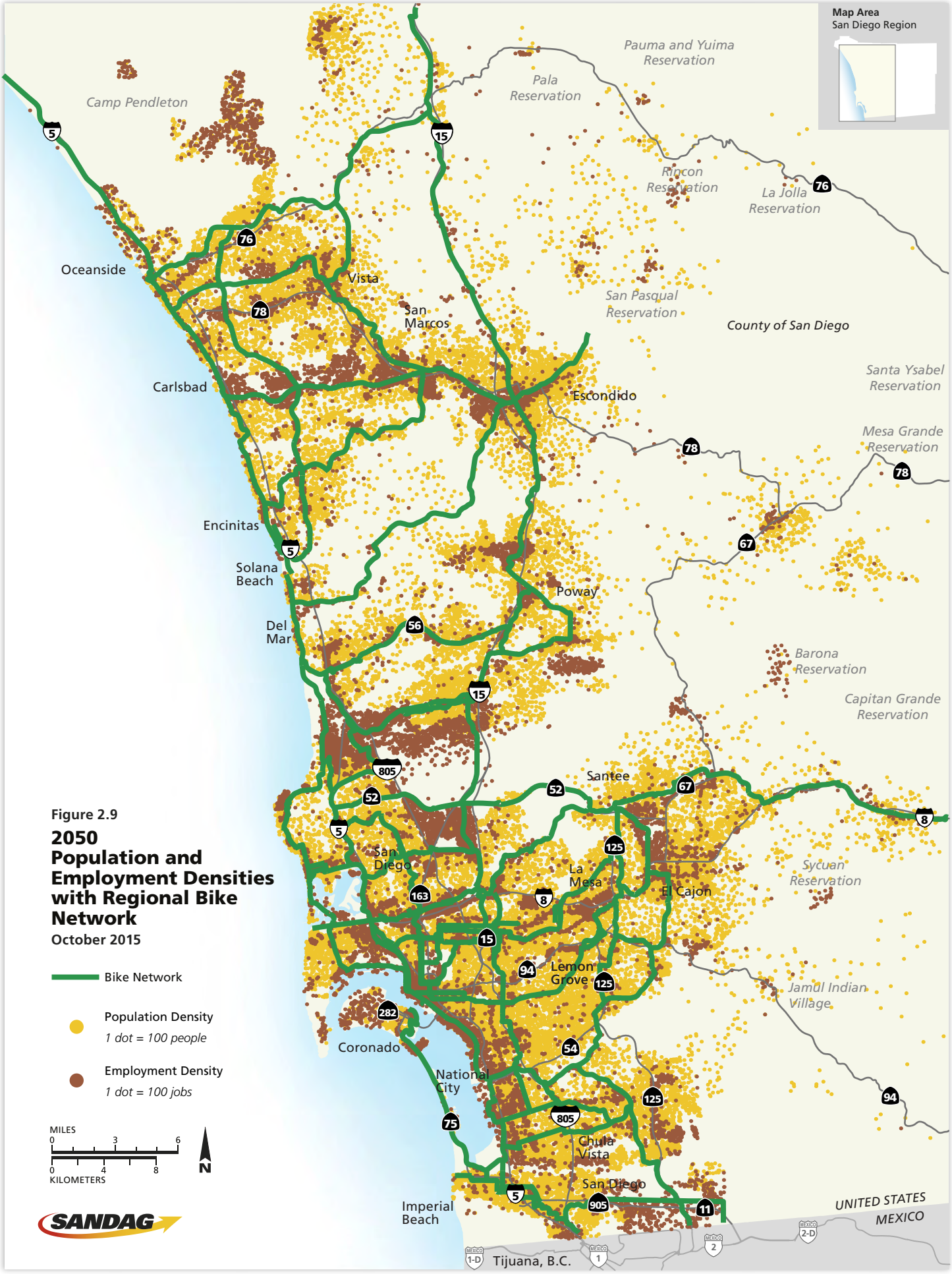
Our goal for a more sustainable future in San Diego is one in which fewer people have to drive alone, and more people have increased travel choices available to them. Those choices will include an ever-expanding, more accessible, and more convenient public transit system: carpooling; ridesharing; and more interconnected networks of biking and walking paths. These are just a few of many investments we'll discuss later in this chapter. To see a visual overview of these investments, check out the following series of maps (Figures 2.7, 2.8, and 2.9), which are overlaid with data on projected population and employment.

New transportation investments will help us improve existing infrastructure with technology designed to help cut congestion and travel times. Strengthening our public transit system and other transportation choices where most of us live and work, meanwhile, will give us more options for getting around. Today, about a third of our region lives within a half mile of high-frequency public transit. By 2050, that number will jump to more than 60 percent, which is attributable to our local jurisdictions planning for more housing near transit stations and to our investments in more high frequency transit routes closer to existing and future housing and jobs. These changes will help reduce per capita greenhouse gases emitted in the region.

To maximize our transportation investments, particularly those in transit, we recognize that we need to pay close attention to the mix of land uses and the urban design in the immediate vicinity of existing and planned transit stations. To focus more sharply on implementing land uses that support our transit investments – such as existing transit stops and future transit stations – SANDAG worked with a wide variety of stakeholders to develop a Regional Transit Oriented Development (TOD) Strategy, entitled Regional Transit Oriented Districts: A Strategy for the San Diego Region.[14] The strategy focuses on identifying tools, techniques, and actions for implementing and prioritizing transit oriented development in the areas identified on the Smart Growth Concept Map. Implementing the Regional TOD Strategy will be an important step toward carrying out our Regional Plan.


Map Area
San Diego Region
Camp Pendleton
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Poway
Del Mar
Barona Reservation
Capitan Grande Reservation
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure 2.7
2050 Population and Employment Densities with Transit Network
October 2015
Regional Transit
Local Bus
San Diego-Coronado Ferry
Intermodal Transit Center
Population Density
1 dot = 100 people
Employment Density
1 dot = 100 jobs
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Camp Pendleton
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Poway
Del Mar
Barona Reservation
Capitan Grande Reservation
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure 2.8
2050 Population and Employment Densities with Managed Lanes and Highway Network Improvements
October 2015
Existing Managed Lanes
Managed or Toll Lanes
General Purpose Lanes
Operational Improvements
Existing Facility
Population Density
1 dot = 100 people
Employment Density
1 dot = 100 jobs
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Camp Pendleton
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Poway
Del Mar
Barona Reservation
Capitan Grande Reservation
Santee
Sycuan Reservation
San Diego
La Mesa
El Cajon
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure 2.9
2050 Population and Employment Densities with Regional Bike Network
October 2015
Bike Network
Population Density
1 dot = 100 people
Employment Density
1 dot = 100 jobs
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG



Equally important is placing a greater emphasis on the quality of our streets. For a number of years, a growing movement has been underway to convert our streets, over time, to roads that serve the needs of a broader range of users than primarily those who drive cars. This effort to create "complete streets" involves rethinking roadway design to better accommodate people walking and riding bike. The good news is that many of our local jurisdictions have adopted or are in the process of developing local complete streets policies consistent with Assembly Bill 1358 (Leno, 2008) (AB 1358) – The Complete Streets Act. In 2014, SANDAG adopted a Regional Complete Streets Policy[15] for future improvements on SANDAG transportation infrastructure projects, a policy that is integrated into the Regional Plan.

In short, our transportation investments are not just about the transportation projects themselves. They're also about the surrounding land uses that make our communities livable and vibrant, and the improvements to our streets to make them friendlier and safer for all users, including people who walk and bike.

Our transportation investments are not just about the transportation projects themselves. They're also about the surrounding land uses that make our communities livable and vibrant.



Address the housing needs of all economic segments of the population

As we discussed in Chapter 1, providing adequate housing for a growing number of people, from all income levels and at all stages of their lives, continues to be one of the major goals for our region. The land use pattern of the Regional Plan is based on the Regional Growth Forecast, which in turn draws its information from the general plans of the region's local jurisdictions. The Regional Growth Forecast serves as the basis of our SCS.

There are two specific laws pertaining to housing with which the Regional Plan must comply. First, SB 375 requires that areas be identified within the region sufficient to house the entire population of the region, including all economic segments of the population, over the course of the planning period. Second, we must complete a Regional Housing Needs Assessment (RHNA), in accordance with California Housing Element law. The assessment determines the region's housing needs in four income categories – very low, low, moderate, and above moderate. The RHNA process occurs before each housing element cycle, which is required to occur every eight years by SB 375. In the past, the RHNA was completed every five years, and that process occurred separately from the RTP update. SB 375 now links the RHNA and RTP processes to better integrate housing, land use, and transportation planning, helping to ensure that the state's housing goals are met.

Accommodating the Eight-Year Regional Housing Needs Assessment

In terms of housing, the SCS land use pattern addresses the needs of all economic segments of the population. Our projected land use pattern identifies areas within the region sufficient to meet the needs detailed in the RHNA for the fifth housing element cycle (2010 – 2020), and it accommodates the projected growth between now and 2050 (see Figures J.3, J.4, and J.5 in Appendix J). The SANDAG Regional Growth Forecast projects the need for 325,000 additional homes to serve the expected population growth of nearly one million people. The capacity for future housing in the region, which is based entirely on the capacity in the general plans of the 18 cities and the County of San Diego, currently contains enough capacity for nearly 395,000 new homes. Of these, about 169,000 units are projected to have a housing density of 30 or greater dwelling units per acre, and almost 62,000 units are projected to fall into a density range of 20 to 29 dwelling units per acre.[16] This capacity for planned housing development, particularly for multifamily development, will help the region accommodate the projected housing needs for San Diegans of all income levels.[17]

Government Code § 65080(b)(2)(B)(iii)
Identify areas within the region sufficient to house an 8-year projection of the regional housing need for the region.

Government Code § 65080(b)(2)(B)(ii)
Identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth.

The SCS land use pattern and RHNA allocation meet the state's four housing goals – increasing the supply and mix of housing types, promoting infill development and efficient development patterns, promoting an improved relationship between jobs and housing, and creating economically balanced communities. In fact, about 82 percent of the projected new homes to be built by 2050 will be attached multifamily units – condominiums, townhomes, and apartments, and 80 percent of the new homes will be located within the UATS boundary where the greatest investments in public transit are being made (see Figure 2.6). This future, spelled out in local plans for growth, will increase the supply, mix, and affordability of housing regionwide.[18]

Government Code § 65080(b)(2)(B)(vi)
Consider the state housing goals.

The transition toward more multifamily homes throughout the region will benefit everyone. In particular, it will help young adults, single parents, and seniors whose incomes often aren't enough to afford a single-family home in our high-priced market. Metropolitan areas around the nation are moving toward this kind of development. Surveys show that an increasing number of people prefer to live in denser, more walkable neighborhoods with access to a wide variety of stores and services, and, importantly, public transit.[19] A larger number of multifamily homes situated near public transit options will offer people of all ages – and from all backgrounds, economic circumstances, and physical capabilities – lives enriched by more opportunities to work, shop, study, exercise, and play.

Surveys show that an increasing number of people prefer to live in denser, more walkable neighborhoods with access to a wide variety of stores and services, and, importantly, public transit.



Government Code § 65080(b)(2)(K)

Neither a sustainable communities strategy nor an alternative planning strategy regulates the use of land, nor, except as provided by subparagraph (J), shall either one be subject to any state approval. Nothing in a sustainable communities strategy shall be interpreted as superseding the exercise of land use authority of cities and counties within the region.

Implement the Regional Plan through Incentives and Collaboration

The course charted by the Regional Plan won't be implemented by SANDAG alone. Achieving the Regional Plan's vision and goals requires collaboration among local jurisdictions, Caltrans, transit operators, developers, water agencies, energy providers, other infrastructure providers, and a wide range of interest groups, stakeholders, and organizations.

While some of the projects in the Regional Plan will be implemented through funding that SANDAG will receive from the state and federal governments, we also need to rely on incentives and collaboration. The Smart Growth Toolbox contains a set of powerful tools to help us realize our regional vision for a sustainable future. They include the Smart Growth Concept Map; smart growth design guidelines; smart growth visual simulations; guidelines for integrating TDM into the planning process; parking management tools; guidelines for planning and designing for pedestrians; a smart growth photo library; and competitive grant programs that provide incentive funds for planning and capital projects in smart growth areas and for active transportation projects. These tools were developed with contributions from people throughout the region and are included in Chapter 5: Ensuring Performance.

The Transportation Network – A System that Offers More Ways to Get Around

Government Code § 65080(b)(2)(B)(iv)
Identify a transportation network to service the transportation needs of the region.

As we've discussed, a transportation system that offers more choices to get around empowers people to choose more sustainable ways to travel. And that improves air quality and the environment. And a transportation system that offers more choices improves the connections between businesses and their workers, customers, and partners – fueling the economy. This ultimately makes the system itself more functional, because more choices allow people and businesses to choose the best options for them – for the kinds of trips they're making and the time of day they're making them.

The SCS will help guide investments in our transportation system over the next 35 years. The Regional Plan outlines the investment of nearly $204 billion in year-of-expenditure dollars in local, state, and federal dollars to build a comprehensive, interconnected transportation system that provides choices.

All this investment will improve mobility for everyone, and give us more freedom by creating more travel choices. Doing so, while also taking steps to protect the environment – isn't just a goal for our everyday trips. It's vital for shipping the goods that help fuel our regional economy, and for keeping our region healthy. How we all get from point A to point B is important, and it impacts the quality of our lives. Commuting to work, getting to school, shopping, running errands, and saving time for some fun away from home – it all requires mobility. Whether it's driving a car on the highway, taking the local bus or one of the regional *Rapid* services, catching the COASTER, SPRINTER, or Trolley, jumping on a bike, or just taking a walk – we all want the freedom to choose how and when we get around.

The Regional Plan outlines the investment of nearly $204 billion (in year-of-expenditure dollars) from local, state, and federal sources to build a comprehensive, interconnected transportation system that provides choices.

In the upcoming review of our planned transportation network, you'll read about various "modes" of transportation – or ways that people travel to their destinations. Together, these modes offer a diverse mix of public transit service; a variety of Managed Lane projects on our highways (which include toll lanes, carpool, and transit-only lanes); pedestrian and bike investments (known as active transportation); and other programs. They're all designed to work together as a package, making the entire system more efficient while also giving travelers a variety of options.



As we look to the future, we can learn about new modes of transportation and mobility that are being studied and in some cases implemented around the world. Some of these ideas may work for our region. Skyways, often referred to as "aerial trams" or "aerial gondolas," offer one example. Our region is beginning to research the feasibility of adding Skyways for short-distance trips – those first-mile, last-mile connections that could improve access to our regional transit system. Existing Skyways work well in dense urban environments, and they're well-suited to traversing freeways, canyons, hills, and other obstacles. They also may be more cost-effective than other transit infrastructure investments. Future studies will assess the feasibility of Skyways as alternatives to ground-based transportation routes in several corridors.



Building a System That Meets the Needs of a Growing Region

Our region's transportation network, shown in Figure 2.1, includes 390 miles of regional public transit service and 1,236 miles of local public transit service. The existing network also includes more than 30 miles of Managed Lanes (high occupancy vehicle (HOV) and Express Lanes) on sections of Interstates I-5, I-15, and I-805. In addition, the network consists of 1,340 miles of bike routes and amenities, and about 9,400 miles of sidewalks.[20] Rounding out the network and supporting connectivity of all transportation types are thousands of miles of local streets and roads maintained and managed by the individual cities and the County of San Diego.

Between now and 2050, we will steadily add more high-quality public transit and expand our regional network of interconnected bike routes and walking paths. Also planned is a connected and free-flowing system of Managed Lanes on our highways.[21]

As our region grows, a quality transportation system will go a long way toward preserving our quality of life, even making it better than it is today. We may not think about it much – or maybe we do! – but the way we get around impacts our environment, our wallets, and our physical and mental health. It impacts how much we exercise, the quality of the air we breathe, and the amount of money we have available to spend on other things. Our investment plan reflects our Regional Plan's commitment to a healthier and higher-quality daily life for the people in our region.[22]

Selecting the Transportation Network

A specific process was followed to select the transportation network for the Regional Plan. The first step was to identify the Unconstrained Transportation Network, which contains a number of public transit, highway, goods movement, bikeway, pedestrian, and supportive program projects to serve the mobility needs of the region through 2050. These needs require funding above and beyond reasonable assumptions of the revenues that will be available during the period covered by the Regional Plan. The purpose was to create a project list to start with that was based on projected need versus projected revenues. The Unconstrained Transportation Network included not only the projects that have been committed to through the *TransNet* Ordinance (approved by voters in 2004), but also projects from corridor and mobility studies, and needs identified through travel demand modeling.

Project evaluation criteria were then developed to support the vision and three goals of the Regional Plan, and to rank the transportation projects. Meanwhile, revenue projections were developed for the likely amount of funding that would be available for transportation purposes, and in what time periods the funds would be available between now and 2050. The highest ranking projects were then brought together in a series of transportation network scenarios that could be implemented within projected funding availability. Not all of the projects in the Unconstrained Transportation Network could be included in the network scenarios with the highest ranked projects, but this does not mean SANDAG gives up on the projects that do not make the cut. SANDAG will continue to pursue additional funding while focusing available funding on priority corridors and projects. Funding availability, project readiness, and project rankings were all taken into consideration in crafting the transportation network scenarios selected for additional evaluation.

A second set of metrics, or performance measures, were then applied to the transportation scenarios to assess how these groups of projects work together to help people in the region access jobs, schools and services, ensure an equitable distribution of investments, and improve air quality, reduce greenhouse gas emissions, and improve safety. These performance measures were developed following a public process with public input, as described in Appendix N: Evaluating the Performance of the Transportation Network. Then, through another extensive public engagement process with the SANDAG working groups, policy committees, and Board of Directors, as well as the general public via workshops and online comments, a final or preferred network was assembled. This preferred network was accepted by the SANDAG Board to develop San Diego Forward: The Regional Plan. For more information on the evaluation criteria and performance measures, please see Appendix H: Social Equity: Engagement and Analysis, Appendix M: Transportation Project Evaluation Criteria and Rankings, and Appendix N: Evaluating the Performance of the Transportation Networks.



Elements of 21st Century Mobility

An expanded and more efficient public transit system

The transit plan envisioned 30 years ago has been largely realized. Now there's a new vision for the next generation of public transit.

Where We've Been – San Diego Trolley Launched a New Era in the '80s

Back in 1981, the new San Diego Trolley marked a big leap forward for public transit. But a lot has changed since then – for the better. What was a limited collection of local bus routes in the 1970s has evolved into a system of modern local bus services and regional high-speed bus service (*Rapid*), paired up with efficient rail services including the San Diego Trolley, SPRINTER, and COASTER lines. The result? Annual transit boarding on public transit has more than doubled, from 42 million riders in 1981 to just over 100 million riders in 2013.

Where We're Headed – A Transit Strategy Focused on the Most Urbanized Areas

Over time, plans change to reflect the progress we've made and to incorporate new and changing ideas. The transit plan envisioned 30 years ago has been largely realized. Now there's a new vision for the next generation of public transit. The UATS,[23] developed for the 2050 RTP/SCS in 2011 and used in this Regional Plan as a foundation of the SCS transit network, aims to create a world-class public transit system similar to what many people have experienced in other major cities worldwide. The UATS studied the transit strategies that work best in other cities,

and built upon local market research to help identify what San Diegans want from their transit system. These include:

- Making a strong link between how we design local development projects and how we design the regional transit systems that serve them.
- Focusing improvements to the transit system where the most people and jobs are concentrated, so riders can easily walk and bike to transit stations.
- Making transit more convenient. Market research shows that if trains and buses come by at least every 10 minutes, people don't have to plan their day around transit. Instead, transit is planned around them.
- Offering a range of transit services that fits the needs of riders. Some people use transit for short trips, where local transit services fit their needs. Others use transit for longer trips and where express services with fewer stops are a better option.
- Making the transit trip fast and reliable. Transit-only lanes, traffic lights that give priority to public transit vehicles, and freeway Managed Lanes all can help transit vehicles bypass congested areas.
- Offering lots of ways to get to and from transit stations, including carsharing, bikesharing, and employer shuttles. Infrastructure and safety improvements for people who bike or walk to transit also can help.
- Making transit easy to use. Maximizing investments in current technology can make paying fares easier, transit information more readily available, and enhance choices for getting to and from transit stations.

The UATS used market research, along with local land use plans, to identify the most effective places to concentrate transit improvements. The Smart Growth Concept Map included in Chapter 1 shows the UATS Boundary layer, geographically illustrating the areas where our Regional Plan focuses regional transit investments that serve major activity centers, residential areas, and places of employment. In addition, as discussed earlier in this chapter, transit oriented development (TOD) and complete streets policies help complement the performance of our transit network, the friendliness of our streets, and the overall livability of our communities.

Looking ahead: The transit investments planned for 2050

So, what new transit services and improvements are we planning? In our growing region, public transit will play an increasing role in lightening the load on our roads and highways, and getting people where they want to go quickly and safely. The following is a summary of the major transit projects included in the Regional Plan.



Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor: The COASTER, AMTRAK, and Metrolink rail corridor is the nation's second busiest. Premier passenger rail services connect the San Diego region to Los Angeles and other points north and east. The Regional Plan builds on this corridor by adding more track capacity and improved stations. These enhancements also will benefit shipping, because the LOSSAN corridor serves as the region's main freight rail line. Figure 2.10 illustrates the Southern California intercity and commuter rail services.

Trolley/SPRINTER/Rapid service: These routes serve as the trunk lines of the regional transit system. Together, they offer fast and reliable rail and bus travel with limited stops in key travel corridors. The Trolley and SPRINTER operate on their own dedicated rail lines, while *Rapid* service operates on freeway Managed Lanes and on local streets. Planned improvements include:

- The Mid-Coast Trolley extending service from Santa Fe Depot in Downtown San Diego to the University City community, serving Old Town, UC San Diego, and Westfield University Towne Centre.
- SPRINTER double-tracking, which will enable higher frequency service, and the extension of service from Escondido south to Westfield North County.
- A new Trolley line from San Ysidro to Carmel Valley along the I-805/ I-15 corridors via Chula Vista, National City, Southeastern San Diego, Mid-City, Mission Valley, Kearny Mesa, University City, and Sorrento Valley.
- A new Trolley line from Pacific Beach to the El Cajon Transit Center, via Clairemont, Kearny Mesa, Mission Valley, and San Diego State University (SDSU).

- A new Trolley line from Downtown San Diego to SDSU, along the Park Boulevard and El Cajon Boulevard corridors via Balboa Park, North Park, and City Heights.
- A new Trolley line from University City to Sorrento Valley, which will include a connection to the COASTER.
- New *Rapid* service from Otay Mesa to Downtown San Diego, along State Route 125 (SR 125)/ East Palomar/I-805 corridors via Otay Ranch, eastern Chula Vista, and National City.
- New *Rapid* service from San Ysidro to Downtown San Diego, along the I-5 corridor.
- New *Rapid* service for commuters. This will offer peak period service to key regional job centers along the Managed Lanes of key freeway corridors, including South Bay to Kearny Mesa/University City/Sorrento Mesa via the I-805 corridor; East County to Kearny Mesa/University City/Sorrento Mesa via the SR 52 and I-805 corridors; East County to Downtown San Diego via the SR 94 corridor; South County/Mid-City to Palomar Airport Road corridor via the I-805/I-5 corridors; and Downtown San Diego to Kearny Mesa along the SR 163 corridor.
- New *Rapid* service on arterials. This will operate on arterial roadways and provide limited-stop, high-speed service along several key corridors throughout the region, supplementing existing local bus services. This new arterial service would benefit from a variety of measures designed to give public transit priority along busy roadways (e.g., signal priority for buses and transit-only lanes). The frequency of service will be every 10 minutes (at least) on most routes throughout the day.





- New Airport Services. This will include premium bus transit from select stations along the I-5 and I-15 corridors directly to San Diego International Airport, as well as to the crossborder airport facility with access to Tijuana International Airport. All funding for these airport services is assumed to come from other sources, such as the San Diego Regional Airport Authority and other agencies.

Figure 2.11 shows the network of rail services by 2050, and Figure 2.12 shows the network of *Rapid* services.

Local Bus Services: Local bus services remain the backbone of the regional transit system. Most routes within the Urban Area Transit Strategy boundary will see service frequencies increased to every 10 minutes all day, creating a network of convenient local bus service for short-distance trips and access to rail and *Rapid* services.

Ferry: Another available transportation option is the San Diego-Coronado Ferry. This ferry service offers people more travel choices and vital connections to key job and activity centers. The San Diego-Coronado Ferry, owned and operated by Flagship Cruises & Events, offers two routes that serve Coronado from San Diego, with departures from Broadway Pier every hour and from the San Diego Convention Center every thirty minutes.[24] A 15-minute ride delivers passengers to Coronado Ferry Landing, a waterfront marketplace just north of the bridge. Passengers are allowed to bring their bicycles for no extra charge. Meanwhile, people who take the ferry during weekday morning commute hours ride free and are given a return ticket to use in the afternoon. The ferry has an average of 73,000 boardings per year during commute hours, based on data from 2004 to 2015, and it supplements an existing bus service (Route 901), which serves about half a million passengers annually during commute hours.

Streetcars/Shuttles: Streetcars and shuttles are great for short distance trips, and in many ways they can help strengthen community character and generate economic activity. Streetcars are rail vehicles that operate in auto travel lanes and offer short-distance rides within neighborhoods. They also offer connections to regional transit lines. The Regional Plan includes streetcars that would operate in several neighborhoods in and around Downtown San Diego, connect North Park with Downtown San Diego, and link La Jolla with Mission Beach via Pacific Beach. A shuttle in Downtown San Marcos also is included. Most funding for streetcars and shuttles is assumed to come from non-transit sources, such as local agencies and business improvement districts.

Seniors and People with Disabilities: The Regional Plan reserves 10 percent of transit operations funding for seniors and persons with disabilities. Five percent of the funds are reserved for Americans with Disabilities Act (ADA) services. Additionally, the Regional Plan includes 5 percent of transit operations funds to support a coordinated system of services provided by social services agencies for "door-through-door" assistance for seniors and persons with disabilities.

High-Speed Train Service: In coming years, our state will be home to a high-speed rail line connecting Northern and Southern California. The first legs of this exciting rail system are being built now in the Central Valley. When completed, high-speed trains will connect San Diego, Los Angeles, San Francisco, and Sacramento. In San Diego, high-speed trains will arrive at the future Intermodal Transportation Center to be located adjacent to the San Diego International Airport. This is a project funded by the State of California.[25]



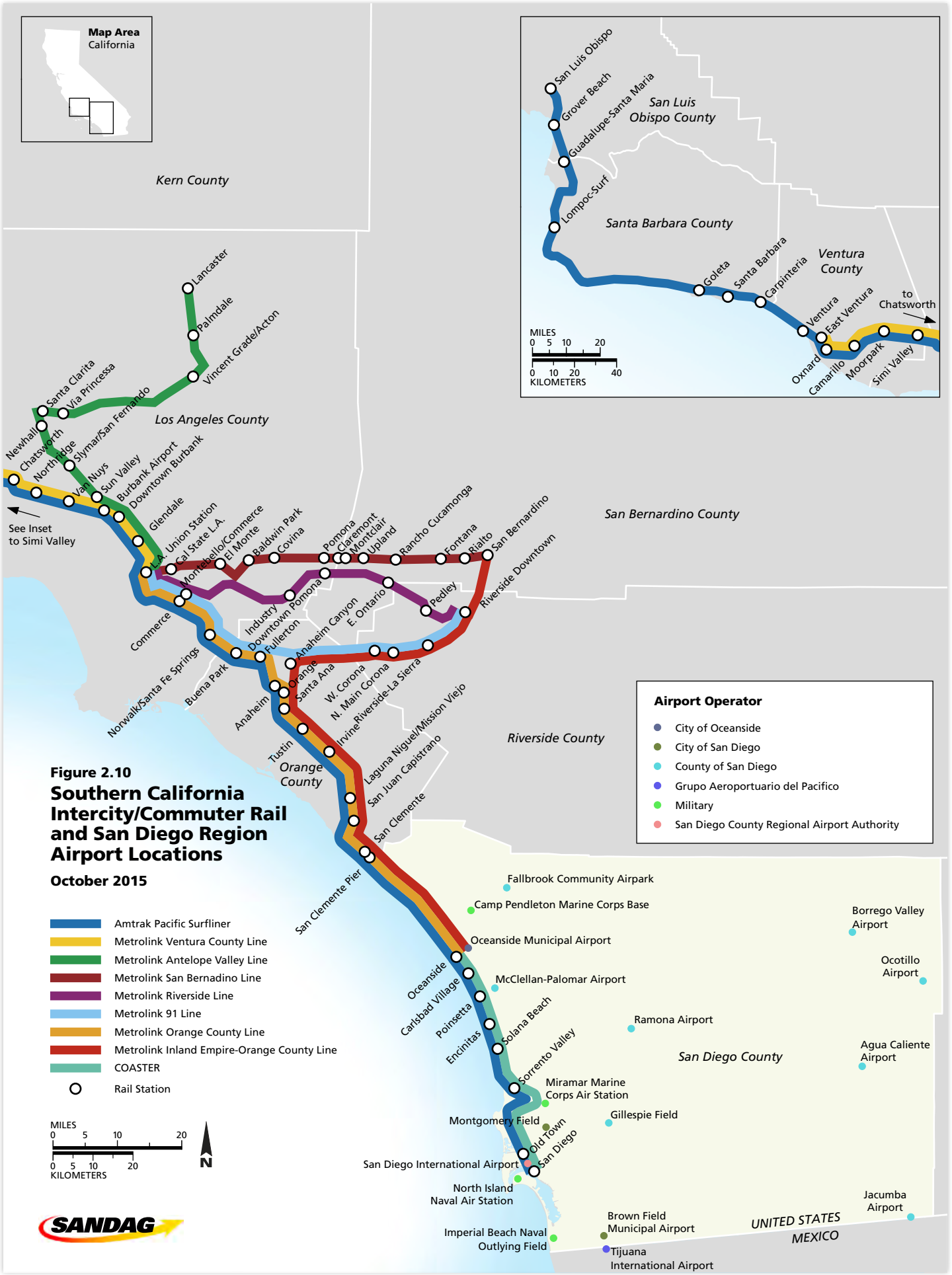


Figure 2.10
Southern California Intercity/Commuter Rail and San Diego Region Airport Locations
October 2015



Figure 2.11

2050 Revenue Constrained Rail Services

October 2015



Figure 2.12

2050 Revenue Constrained *Rapid* Services

October 2015

Figure 2.13 shows all of the transit investments included in our Regional Plan by 2050. The Regional Plan offers a robust and interconnected network of services that promote quick and convenient travel to the places we live, work, and play in our region's most urbanized areas. We've come a long way since the initial transit network from the 1970s. With nearly 50 percent of the Regional Plan's revenues going toward transit infrastructure and operations, we're moving ambitiously toward the world-class transit system envisioned in the UATS – a natural progression that builds on our success over the last 30 years. A new local funding source starting in 2020 will be needed to implement many of the new services.

With nearly 50 percent of the Regional Plan's revenues going toward transit infrastructure and operations, we're moving ambitiously toward the world-class transit system envisioned in the Urban Area Transit Strategy – a natural progression that builds on our success over the last 30 years.

The active transportation network: Healthy alternatives to driving

More of us than ever before are choosing to walk or ride our bikes to more places. Biking and walking, while not for everybody all the time, are important choices for many people. They're good for the environment and for our health.

Over time, choosing to walk and bike has become known as active transportation, because these two forms of getting around provide opportunities for exercise (i.e., being active), rather than letting a car do the work.

At some point in the day, walking is a part of most every person's life. That's particularly true in mixed-use, smart growth neighborhoods, where people often walk and sometimes bike between their homes, stores, parks, schools, and jobs.




Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
Tijuana, B.C.
UNITED STATES
MEXICO
Figure 2.13
2050
Revenue Constrained
Transit Network
October 2015
High Speed Rail
COASTER/AMTRAK/Metrolink
Trolley/SPRINTER
SPRINTER Express
Rapid Transit
Streetcar/Shuttle
Airport Express
Local Bus
San Diego-Coronado Ferry
Intermodal Transit Center
Safe Routes to Transit
MILES
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0 4 8
KILOMETERS
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SANDAG

Our active transportation projects are intended to make walking and biking safer, particularly for students, seniors, and people with disabilities. Walking and biking will only be viable choices for people if they're safe. The Regional Plan recognizes this, and so it incorporates safe bike and pedestrian access into investments in other modes of travel, including public transit and highway improvements.

Our Active Transportation projects are intended to make walking and biking safer, particularly for students, seniors, and people with disabilities.

The Regional Plan's Active Transportation Implementation Strategy[26] includes the projects and programs described below. It includes projects that comprise the Active Transportation Network, which are found in the Regional Bike Plan, as well as Safe Routes to Transit projects and bike and pedestrian improvements in and around highway and freeway interchanges. The Strategy also includes various educational programs and data collection efforts. The Strategy will provide safer access for pedestrians, particularly the most vulnerable roadway users such as school children, seniors, and people with disabilities.

Regional Bike Plan: The regional bike network is a valuable resource for people who choose to bike. This network was identified in Riding to 2050: The San Diego Regional Bicycle Plan, which SANDAG adopted in 2010.[27] It is incorporated into the Regional Plan. As shown in Figures 2.14 and 2.15, the bike plan details 40 interconnected bike corridors throughout the region, which total more than 500 miles of bike routes.[28] The goal of the Regional Bicycle Plan is to make it more practical and desirable for people to choose biking for everyday trips. By 2050, the Regional Plan includes full build-out of the entire regional bike network. Most bike projects will have safety improvements not only for people on bikes but also for pedestrians, including shortened crossing distances at intersections.

Safe Routes to School: The San Diego Regional Safe Routes to School Strategic Plan, which SANDAG adopted in 2010, was designed to help local communities establish Safe Routes to School programs.[29]

Safe Routes to Transit: Safe Routes to Transit projects will make walking or riding a bike between transit stops or stations and a variety of destinations – including residential areas, commercial centers, and places of employment – safer and more comfortable.[30] (See Figure 2.13 for Safe Routes to Transit Improvements.) Retrofit Safe Routes to Transit projects also would be considered as part of the Mobility Hub Implementation Strategy given the nexus between mobility hubs at transit centers and access to those centers by pedestrians and people on bikes.

Education and Data Collection Efforts: The Regional Plan includes investments in education on bike and pedestrian safety, outreach and encouragement programs such as GOBYBIKE, and data collection and modeling.

Active Transportation Improvements Related to Highway and Freeway Interchanges: When walking or riding a bike, crossing highway on-ramps and off-ramps is often the most dangerous and difficult part of a person's trip. Our Regional Plan includes the incorporation of safer crossings as part of future projects at freeway



Figure 2.14

2050 Revenue Constrained Regional Bike Network

October 2015


Figure 2.15
2050 Regional Bike Network Corridor Alignments
October 2015
1 Bayshore Bikeway
2 Bay to Ranch Bikeway
3 Border Access Corridor
4 Camp Pendleton Trail
5 Carlsbad - San Marcos Corridor
6 Central Coast Corridor
7 Centre City - La Mesa Corridor
8 Chula Vista Greenbelt
9 City Heights - Old Town Corridor
10 Clairemont - Centre City Corridor
11 Coastal Rail Trail
12 East County Northern Loop
13 East County Southern Loop
14 El Camino Real
15 Encinitas - San Marcos Corridor
16 Escondido Creek Bikeway
17 Gilman Connector
18 Hillcrest - El Cajon Corridor
19 Imperial Beach Connector
20 Inland Rail Trail
21 Kearny Mesa - Beaches Corridor
22 Kensington - Balboa Park Corridor
23 North Park - Centre City Corridor
24 Mid-County Bikeway
25 Mira Mesa Corridor
26 Mission Valley - Chula Vista Corridor
27 Park Boulevard Connector
28 Poway Loop
29 San Diego River Bikeway
30 San Luis Rey River Trail
31 Santee - El Cajon Corridor
32 Sweetwater River Bikeway
33 Vista Way Connector
34 I-8 Corridor
35 I-15 Bikeway
36 SR 52 Bikeway
37 SR 56 Bikeway
38 SR 125 Corridor
39 I-805 Connector
40 SR 905 Corridor
Freeways and Highways
Regional Arterials
MILES
KILOMETERS
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Map Area
San Diego Region
Camp Pendleton
Oceanside
Vista
San Marcos
Carlsbad
Encinitas
Solana Beach
Del Mar
Escondido
Poway
Santee
El Cajon
La Mesa
Lemon Grove
National City
Coronado
Imperial Beach
San Diego
Chula Vista
Tijuana, B.C.
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
County of San Diego
Santa Ysabel Reservation
Mesa Grande Reservation
Barona Reservation
Capitan Grande Reservation
Sycuan Reservation
Jamul Indian Village
UNITED STATES
MEXICO

and highway interchanges. (See Figure 2.16 for Active Transportation Improvements related to Highway and Freeway Interchanges.) Retrofit active transportation improvement projects surrounding existing highway on- or off-ramps will be considered for implementation as part of future operations and maintenance projects using State Highway Operations and Preservation Program (SHOPP) dollars.

California Coastal Trail: The California Coastal Trail (CCT) is made up of a series of trails stretching 1,300 miles up and down the California coastline.[31]

The CCT is intended as a continuous public right-of-way that extends from the northern border of California to the southern border, all within sight, sound, or at least smell of the ocean. It is the CCT's proximity to the ocean that makes it distinctive among other trails.

SANDAG has developed a technical memoranda entitled "Feasibility Study for the San Diego Portion of the California Coastal Trail" to inform the scoping of a comprehensive feasibility study for the region. The documents lay the groundwork and gather preliminary material to help identify existing and potential network segments, linkages, gaps, and coastal access routes. These technical memoranda are located in Technical Appendix U.5: California Coastal Trail Technical Memoranda. A map of the California Coastal Trail is included in Appendix A: Transportation Projects, Costs, and Phasing, as requested by Government Code Section 65080.1. Trails identified in the San Diego County Community Trails Master Plan (CTMP) are included on this map as well.

Offering people more route choices

Local Streets and Roads

Our investment plan dedicates a great deal of resources to help local jurisdictions improve, rehabilitate, and maintain the local roadways.

Local streets and roads can get busy, especially on weekdays when kids are getting dropped off at school and people are heading to work in the morning, and when people are heading home in the afternoon. On many weekends, it seems as though everyone is out – in cars, on bikes, riding scooters and skateboards, walking, and running. So it's vital to keep local streets and roads in good shape and safe. Our region has thousands of miles of local streets and roads, and they demand a lot of care to make sure they're serving people well. Our investment plan dedicates a great deal of resources to help local jurisdictions improve, rehabilitate, and maintain these local roadways.

An important function of local streets and roads is to accommodate the various buses, Trolleys, and streetcars that connect our local neighborhoods and surrounding communities. So, our investment plan includes funding to ensure that these vehicles can flow smoothly. Among the planned projects, improvements include: coordinating traffic signals, managing systems that detect traffic, implementing technology that gives public transit priority on roads and at intersections (such as queue jumpers), and deploying management systems that optimize the flow of arterials.



While local roads and streets are the responsibility of our cities and the County government, completing the Regional Arterial System (RAS) is nevertheless a continued priority in our Regional Plan.[32] For vanpools, carpools, and solo drivers, regional arterials offer critical links to highways. The RAS is the network of regional roadways and local streets that, along with the system of highways and transit services, allows for a significant amount of mobility throughout the region.

The region's 18 cities and the County have planned improvements to arterials within their jurisdictions, and these improvements are detailed in Appendix A.

The Regional Plan supports a flexible highway system that can be accessed by many types of users.

Managed Lanes: Adapting the Highway System for Optimal Mobility

The Regional Plan also supports a flexible highway system. By "flexible" we mean that some highway lanes can be dedicated to certain users to create a wide range of time-competitive travel choices on our highway system. Within this plan, these lanes are referred to as "Managed Lanes." They generally fall into three categories:

- *Express Lanes:* These are lanes in the middle of the highway that give priority access to transit, carpools, vanpools, motorcycles, and certain clean-air vehicles at no cost. Excess capacity on these Express Lanes is available for people driving alone to travel for a fee through the FasTrak® program. These "freeways within a freeway" also can be constructed with moveable barriers, allowing different



lane configurations such as three lanes in one direction and one lane in another, instead of two lanes in each direction. Express Lanes are managed to ensure that the people who use them can bypass congestion. Access to Express Lanes is typically provided along the route, and electronic signs post the cost for solo drivers. On-ramps to Express Lanes – such as direct access ramps – allow vehicles to safely drive onto them.

- *Carpool Lanes:* These lanes, also known as HOV or high occupancy vehicle lanes, have a limited number of access points along the highway. They are similar to Express Lanes, but solo drivers are precluded from using them. Each vehicle that travels onto an HOV lane must carry the minimum number of people posted at the entrance sign. Currently in San Diego County, that number is two, but some areas of the state require three. Some HOV lanes in California are active only during peak commute times, but the HOV lanes in San Diego County operate all day.
- *Transit-Only Lanes:* These lanes are open only to transit vehicles. They accommodate both regional and local bus services.

One of the important features of the Express Lane system is that the fee that solo drivers pay to use Express Lanes (through the FasTrak system) supports transit service along the same corridor. This is now the case along the I-15 corridor and is planned as a feature for other corridors in the future. As shown in Figure 2.16, the Regional Plan includes a robust system of Managed Lanes that can be designated as Express Lanes, carpool lanes, or transit-only lanes.


Map Area
San Diego Region
Camp Pendleton
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Mesa Grande Reservation
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Capitan Grande Reservation
Sycuan Reservation
Jamul Indian Village
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Vista
San Marcos
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Encinitas
Solana Beach
Del Mar
Poway
Santee
El Cajon
La Mesa
Lemon Grove
San Diego
Coronado
National City
Chula Vista
Imperial Beach
Tijuana, B.C.
UNITED STATES
MEXICO
4C/6C+OPS
8F+4T
8F+4ML
6F+2ML
10F+4ML
8F/14F +4ML
8F+2ML
6F+2ML(R)
8F/10F +OPS
8F/10F+2ML
8F/10F +2ML
8F+OPS
6F/8F +OPS
10F+2ML
8F+ 4ML
8F+ 2ML
6F+ 2ML
Figure 2.16
2050 Revenue Constrained Managed Lanes and Highway Network
October 2015
Existing Managed Lanes
Managed Lanes
General Purpose Lanes
Toll Lanes
Operational Improvements
Existing Facility
Freeway Connectors
ML Connectors
Freeway & ML Connectors
Bicycle/Pedestrian Improvements at Freeway Interchanges
C = Conventional Highway
F = Freeway
ML = Managed Lanes
T = Toll Road
R = Reversible Lanes
OPS = Operational Improvements
MILES
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KILOMETERS
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The San Diego region is building its Managed Lanes system incrementally. In 2012, the region had about 30 miles of HOV lanes and Express Lanes on sections of I-5, I-15, and I-805. An important strategy of the Regional Plan is to continue to guide the development of the freeway system into a fully interconnected network of Managed Lanes that supports not only carpools, vanpools, and fee-paying solo drivers, but also the extensive network of *Rapid* transit services that is planned for full build-out with the Regional Plan.[33] The Regional Plan includes funding for four new Managed Lanes on segments of I-5, I-15, and I-805, and funding for two new Managed Lanes on portions of SR 52, SR 54, SR 78, SR 94, and SR 125. By 2050, the region's Managed Lane system will include about 160 miles. In addition to Managed Lane improvements, the Regional Plan includes direct Managed-Lane-to-Managed-Lane connectors where major facilities intersect.

The I-15 corridor is one of the region's best examples for how to integrate transit and roadways into a flexible transportation system for an entire corridor. The 20-mile segment between SR 163 and SR 78 includes four Express lanes that feature a movable barrier (similar to the movable barriers on the San Diego-Coronado Bridge); dynamic pricing; multiple access points to regular highway lanes; and direct access ramps for buses, high occupancy vehicles, and toll-paying customers. Revenues from toll-paying customers are used to help fund public transit in the corridor. High-frequency *Rapid* transit vehicles operate in these lanes, enhancing connectivity to regional job centers for residents throughout the region.

In the future, *Rapid* transit service connecting Otay Mesa to Downtown San Diego will run on the I-805 and SR 94 Express Lanes. *Rapid* transit express service with limited stops, between San Ysidro and Downtown San Diego, will operate on the I-5 Managed Lanes.

During peak periods, *Rapid* transit vehicles using the I-805, I-5, SR 52, and SR 94 Express Lanes will carry commuters from their neighborhoods to where they work. Routes include South County to Kearny Mesa/University City/Sorrento Mesa on the I-805 corridor; East County to Kearny Mesa/University City/Sorrento Mesa on the SR 52 and I-805 corridors; East County to Downtown San Diego via the SR 94 corridor; and South County/Mid-City to Palomar Airport Road via the I-805 /I-5 corridors. South County *Rapid* routes also provide services to individuals who live in Baja California.

Highway Improvements

Highway improvements (including highway lanes, freeway connectors, and operational improvements) complement and complete the existing highway network. Planned improvements will increase the efficiency of the regional transportation system. The vast majority of the investments are focused on Managed Lanes that also support transit and carpooling instead of traditional general purpose lanes.

Toll Roads

State Route 11, a proposed two-mile toll highway, will connect the future Otay Mesa East Port of Entry (POE) with the rest of the region's freeway system via SR 905 and the South Bay Expressway. The new POE will offer an alternative to the highly congested ports of entry at Otay Mesa and San Ysidro, benefitting the regional economy and the environment by reducing border-crossing wait times. Separately, new toll lanes are envisioned on the I-5 corridor north of SR 76 and on I-15 north of SR 78, if demand builds over time and the improvements can be financed with toll revenues.





Applying the latest technologies to maximize mobility

To make our transportation system as efficient and user-friendly as possible, the Regional Plan envisions a network of high-tech tools to help transportation managers keep the system running smoothly, and to help travelers make their trips faster, more efficient, and trouble-free.

Intelligent Transportation Systems (ITS) is the term that describes a whole variety of technology applications to different modes of travel. We've all seen those electronic alerts on the freeway that give us a heads up on road construction, or warn us of an accident up ahead. And many of us have used FasTrak transponders to zip onto Express Lanes, toll roads, and bridges. Those are basic examples of how technology can be used to keep us moving efficiently and safely. Technology also can be leveraged inside cars, on local roads, at intersections, with public transit, and throughout bike and pedestrian networks. Technology, applied intelligently, is most powerful when it gives each of us the ability to choose the best mode of travel for a given circumstance.[34]

Technology embedded into the transportation system will grow even more useful when it's linked to our smart phones, tablets, and other hand-held computing devices. There's no reason why our regional transportation system can't leverage the power that mobile applications, or apps, and other smart phone features give us – and they will.

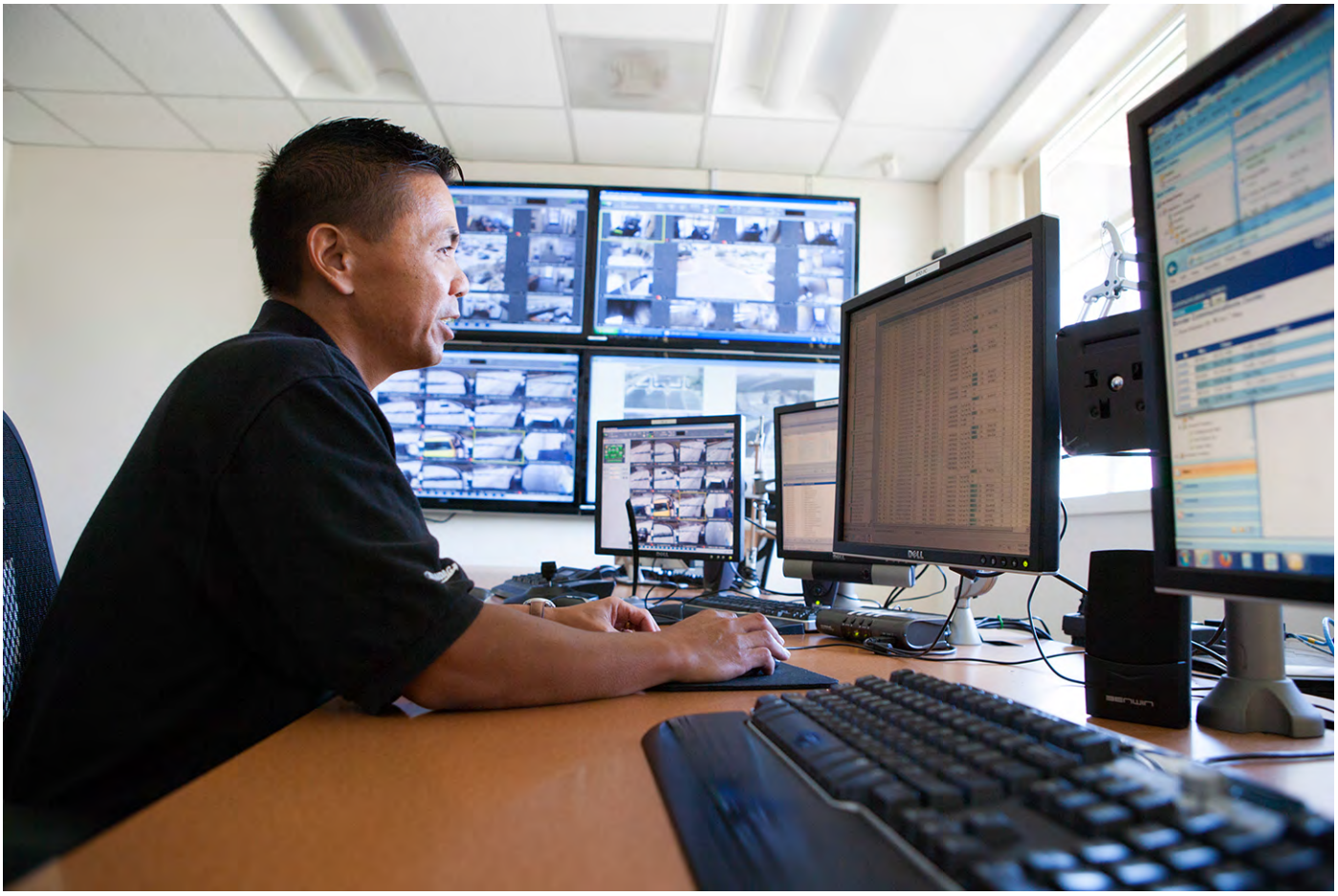


The benefits of these technologies go beyond speeding up the commute. Better informed travelers and more efficiently run roadways and transit systems can lead to lower demands on the overall transportation system. People have the information to make smarter choices about when and where to hit the road, and to drive alone less often. Better access to real-time information also can encourage people to use public transit more, or choose to bike or walk instead of driving.

Our region already uses, is developing, or plans to develop several emerging technologies to make the transportation system more efficient.[35] Here are several examples:

- **Vehicle Technologies:** It's the kind of stuff you see now in movies and sci-fi television shows – cars and other vehicles that drive themselves and are connected to one another and the larger environment through which they're traveling. But those kinds of technologies aren't fiction. They're coming. Autonomous or automated vehicles are evolving from today's driver-assist vehicles to vehicles that will be able to operate independently, and use sensors to survey their surroundings and respond to changing conditions. Vehicles that communicate wirelessly with one another will work cooperatively to increase the capacity of highway lanes, use fuel more efficiently, and increase safety. By 2025, driverless cars are expected to begin replacing conventional cars. Autonomous vehicle technologies will transform public transit as well, increasing efficiency and accessibility while reducing congestion.

By 2025, driverless cars are expected to begin replacing conventional cars. Autonomous vehicle technologies will transform public transit as well, increasing efficiency and accessibility while reducing congestion.



- **MultiModal Management:** Our region's network of freeways, arterials, roads, transit systems, bike paths, and sidewalks must be managed as a unified transportation system so that all modes of travel work together most efficiently. Doing this requires implementing Integrated Corridor Management (ICM). An important step toward making this happen is expanding the Regional Communications Network, a high-speed, inter-governmental data network that supports the San Diego region by defining, designing, and deploying specific projects that make the entire system work more effectively. The Regional Communications Network also improves mobility by allowing system managers to assess real-time travel conditions and then provide travelers with options. Expanding the Regional Communications Network would result in:
    - The deployment of a Dedicated Short-Range Communications (DSRC) system to support future Vehicle Infrastructure Integration (VII);
    - Enhanced data collection for regional arterials, bikeways, and pedestrian facilities in order to better monitor how the transportation system is performing; and
    - An enhanced California Freeway Performance Measurement System, which collects data that can be used to improve both transit and road performance.

An emerging technology within Multimodal System Management is real-time computer modeling and simulations of multiple modes of travel. These applications are designed to simulate and evaluate traffic patterns, and then develop strategies for making the transportation system more efficient across jurisdictional boundaries – all within minutes. Equipped with this technology, system managers can better forecast traffic patterns and pursue operational changes to minimize delays and congestion.

- **Smart Parking:** Smart parking combines management strategies and technology to deliver advanced parking solutions for communities. Smart parking systems can inform people where, when, and how much parking is available in the vicinity of their destination – even before they take their trip. Smart parking systems collect, analyze, and report data to help determine, for example, how public parking lots are being used, and to provide people the facts they need to use available parking more efficiently. Information like this can help people decide when to leave, whether to travel by car or by transit, what public transit service to take, or what route to choose.

  The practical application of management strategies and smart parking technology has many benefits. It can reduce unnecessary driving to find a parking space, saving time and gas while also reducing greenhouse gas emissions and traffic congestion; provide travelers with improved information, as real-time parking information will supplement transit alerts like departure and arrival times; and improve the management and financial health of parking lots and garages.

- **Universal Transportation Account:** A unified or universal transportation account combines all forms of public transportation payments, including transit fares, municipal parking, and toll collection into a single user-friendly system. By offering rewards based on frequent use, toll discounts and other incentives, the system can lead to a shift from driving alone to using public transit. A universal transportation account can be at the heart of a well-connected city, where people constantly receive information from the transportation network and are provided with the best options for their trips – based on their priorities, including cost, convenience, speed, and environmental impact.

A universal transportation account can be at the heart of a well-connected city.

Other emerging technology trends and programs

Other emerging technologies and programs that could have an impact on transportation demand, systems management, travel choices, and system accessibility include:

- Traveler Information Program
- Arterial Management
- Freeway Management
- Transit Management System
- Advanced Transportation Technology Program
- Transit Infrastructure Electrification/Regional Charger Program
- Active Traffic and Demand Management

These technologies and programs are described in Appendix E: Transportation System and Demand Management Programs, and Emerging Technologies.

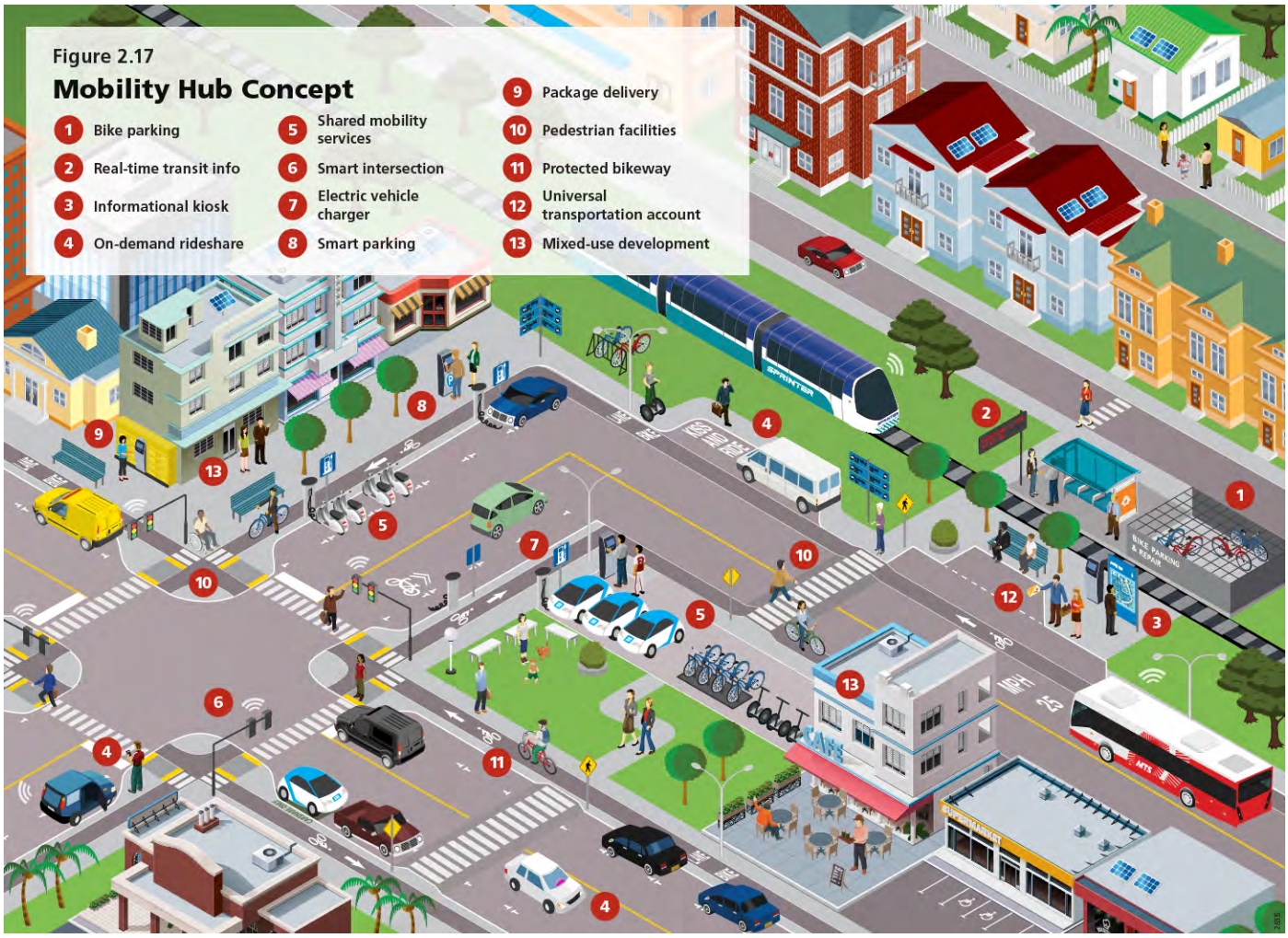
Transportation Demand Management

Managing demands on the existing transportation system is an important strategy for making the overall system more efficient.

The Regional Plan makes investments in emerging TDM innovations that are gaining traction across the globe. They are envisioned as key components of the Regional Plan. These TDM innovations have the potential to help transform the way that we travel within and between our communities. One of the new investment areas is "mobility hubs," or transportation centers focused around particular geographic locations and designed to give people more options for getting around. The other is "shared mobility services," which give people alternatives to owning a car, such as shared, temporary, and convenient transportation options when they need them. These two innovations, mobility hubs and shared mobility services, can transform our transportation behaviors and patterns. Let's take a closer look at them:

- **Mobility Hubs:** What exactly are mobility hubs? They're places of connectivity, where different modes of transportation — walking, biking, ridesharing, and transit — come together seamlessly to connect people to their jobs, school, shopping, errands, recreation, and back home. Smart growth areas are excellent places to build mobility hubs, because of their mixture of land uses and transit amenities.

  Access to transit is a key ingredient of a mobility hub. We all recognize that getting to and from transit stations can sometimes be challenging, and those first and last steps often end up being deterrents to using public transit. Mobility hubs can solve that problem. They promote options like carsharing, bikesharing, and neighborhood electric vehicles – for short trips within the neighborhood or to connect to the transit station for longer trips outside the area.



Meanwhile, mobility hubs include several features onsite that make using public transit easier. These include bike and pedestrian improvements, signs or apps that help people find their way (akin to "You Are Here" maps at shopping malls), urban design enhancements, real-time traveler information, parking spots for shared mobility services, and a universal payment system. Figure 2.17 provides an example of what elements could be included in a mobility hub.

A near-term action of the Regional Plan is to develop a "Regional Mobility Hub Implementation Strategy" to further define the mobility hub concept for the San Diego region and to identify opportunities for pilot projects (See Chapter 5).

Mobility hubs will play a big role in the lives of many people. By 2050, 87 percent of the region's new housing and 79 percent of new jobs will be situated within a half-mile of public transit – making mobility hubs increasingly useful and accessible to all travelers including persons with disabilities and seniors.

- **Shared Mobility Services:** The Regional Plan promotes shared mobility, which reduces the need to own and drive a private automobile by offering people on-demand access to convenient and affordable transportation options for any type of trip, whether or not these are in mobility hub areas. These options include carsharing, bikesharing, real-time ridesharing, Transportation Network

Companies (e.g., Uber, Lyft, Sidecar), neighborhood electric vehicles, scootershare, and shuttle or jitney services. Shared mobility services give people convenient alternatives to driving alone, in addition to the more traditional options such as public transit, carpooling, vanpooling, biking, or walking to work. Shared mobility can even provide people with options for running an errand or going to an off-site meeting in the middle of the workday.

The idea of shared mobility is becoming more popular in our region. Carsharing and bikesharing have experienced unprecedented growth. As of 2014, more than 33,000 people had access to more than 400 carshare vehicles regionwide. Early research shows that people who carshare drive less and use public transit more because shared mobility options complement public transit. As a result, opportunities to pair up shared mobility and mobility hubs provide great potential to influence our transportation choices and patterns.

While the section above focuses on innovative strategies to manage the demands on our transportation system, it's important to remember that many of our existing TDM programs have been very effective for years. They are expected to continue to make valuable contributions to the efficiency of the transportation system. These more traditional TDM strategies include the Regional Vanpool Program, employer services and outreach, and commuter services and bike programs.



Source: Mike Di Edoardo



Addressing Parking Needs

When it comes to planning for a more efficient transportation system, parking is a big focus. Many of us are often concerned about the location, price, supply, and convenience of parking, as well as the impact it has on travel choices and even the affordability of housing, among other issues. There are growing concerns about how parking impacts the transportation system, land use, and the design of our communities.

Over the years, SANDAG studies have shown that managing parking effectively can help communities achieve their goals for smart growth, mobility, and a healthier environment. We've also learned that proactive parking programs can support thriving commercial districts, affordable housing development, and increased choices for travelers. While many parking studies have been prepared, the need for a practical set of parking management strategies – a parking toolbox to help city governments cope with parking issues – was identified in the 2050 RTP/SCS.

SANDAG, in collaboration with local jurisdictions, businesses, and other community organizations, developed the Regional Parking Management Toolbox as part of the Regional Plan. The toolbox is one of many planning and financing tools that support smart growth and sustainable development. In short, it is an interactive, web-based resource[36] for local jurisdictions to identify parking-related challenges, such as long-term parkers using on-street spaces, spillover into neighborhoods, or parking issues faced by small businesses, and apply solutions that fit local communities, such as comprehensive curb lane management policies, valet zones, or the use of transitional parking spaces.[37] As we move toward smarter growth and implementing mobility hubs and shared mobility services, the parking toolbox can help communities apply approaches that meet their specific needs.

Defining Proactive Parking Programs: A proactive parking program relies on local data collection and analysis to identify current parking issues and evaluate parking management solutions. Proactive parking management seeks to continuously balance parking supply and demand to create a parking system that serves the needs of businesses, residents, and visitors alike.



Promoting Sustainable Mobility: Building Infrastructure for More Environmentally-Friendly Vehicles

Reducing the number of miles that people travel in their cars is an important goal for our Regional Plan. Transitioning to more fuel efficient vehicles and alternative, low-carbon fuels are key steps toward a more sustainable San Diego region. Fuel efficiency improvements and alternatives also comprise a major part of the state of California's plan for reducing greenhouse gas emissions from the transportation sector.

1.5 million zero-emission vehicles will be operating in California by 2025.

This transition will be implemented primarily through the state's Low Carbon Fuel Standard (LCFS) and Advanced Clean Cars Program. The LCFS calls for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. The Advanced Clean Cars Program is designed to boost vehicle efficiency by combining greenhouse gas emission standards and other air pollution requirements into a single package of standards. Under the program, 1.5 million zero-emission vehicles (ZEVs) will be operating in California by 2025, and 15 percent of new car sales will be ZEVs by then. For the state to meet its clean vehicle goals, new fueling infrastructure is needed statewide to power ZEVs and alternative fuel vehicles.

California also is working to reduce greenhouse gas emissions from transportation statewide by promoting the use of alternative fuels (including propane, natural gas, biodiesel, and ethanol). In our region, efforts are underway to promote the use of zero-emission vehicles and alternative fuels, and to ensure that we have the infrastructure to support them.

Since 2012, SANDAG has provided a forum for local governments and other regional stakeholders to discuss how to lower barriers to increasing the number of alternative fuel vehicles, and how to take steps toward building the needed fueling stations. In 2014, SANDAG completed a regional readiness plan for plug-in electric vehicles (PEVs)[38] and charging stations, as shown in Appendix U.12: San Diego Regional Plug-In-Electric Vehicle Readiness Plan. By 2016, an expanded plan that also addresses readiness for all alternative fuels will be completed.

As of 2015, our region is home to more than 16,000 plug-in electric vehicles and more than 500 public charging stations, including more than 20 DC Fast Chargers, a type of electric vehicle charging station, along key corridors. Moving forward, the readiness plan for plug-in electric vehicles identified barriers that the region still needs to address. These include the need for a better installation process for chargers at multi-unit dwellings, at the workplace, and at other commercial sites. Also needed is a more streamlined permitting process, as well as the integration of plug-in electric vehicle infrastructure into building codes. The Regional Plan provides us with an opportunity to continue to be leaders in this area, and to address these barriers to progress toward wider use of zero-emission vehicles.

Our region is home to more than 16,000 plug-in electric vehicles and more than 500 public charging stations.





Separating Key Rail Crossings and Busy Streets from One Another

The transportation system is not just a collection of disconnected modes of travel. At its best, a transportation system integrates all modes of travel into a unified whole, so that people and goods can travel efficiently and safely. Rail-grade separations offer a good example of how our transportation system can work together. When tracks are separated from streets, cars, trucks, bicyclists, pedestrians, and the goods shipped by rail can get to where they're headed without coping with conflicts built in to the system. Rail-grade separations are expensive, and their construction must be prioritized. However, over the years we've added them in key locations throughout the region. The Regional Plan identifies several additional places where rail-grade separations will help the transportation system function more smoothly and safely. By 2050, nine rail-grade separations are proposed along the LOSSAN and SPRINTER corridors. On the Orange and Blue Line Trolley lines, 11 rail-grade improvements are planned by 2050.

Connecting the Region and Crossing Borders

The San Diego region, with the greater Los Angeles area to the north, the international border region of Baja California to the south, and agricultural industries to the east, sits between major centers of production, trade, and population. We depend on an integrated transportation network to effectively move people and goods within our region, in and out of our region, and through our region to the rest of the nation and around the world. In our region, I-5, I-15, and SR 125 are major north-south corridors, while I-8 is the key east-west corridor for domestic cargo and international trade.

The San Ysidro port of entry is one of the busiest border crossings in the world and the Otay Mesa port of entry is the busiest commercial crossing in California.

Our regional transportation system also is impacted by interregional commuting patterns between San Diego County and Imperial, Orange, and Riverside counties.

Three international land ports of entry operate between San Diego County and Baja California, while a fourth is planned at Otay Mesa East. Additionally, a crossborder airport terminal connecting San Diego to the Tijuana International Airport is under construction. Another three land ports of entry connect Imperial County to Baja California. All of these accommodate millions of crossings every year, including pedestrians, people on bikes, personal vehicles, and buses as well as trucks and trains carrying cargo.

The San Ysidro POE is one of the busiest border crossings in the world, with an estimated 59 million bidirectional crossings in 2014.[39] The port primarily processes pedestrians and passenger vehicles, but it also handles trade on a small-scale through its intermodal rail cargo facility.



The Otay Mesa POE is the busiest commercial crossing in California, and it processes the third highest dollar-amount value of U.S.-Mexico trade on the entire border. In 2014, an estimated 1.6 million trucks carrying nearly $38.8 billion in trade crossed through the port.[40] Congestion at this POE causes major delays in crossborder goods movement. The future port at Otay Mesa East is expected to ease congestion in Otay Mesa.

The smallest POE in San Diego County is Tecate. Tecate is a multimodal facility for freight rail, commercial vehicles, personal vehicles, buses, and pedestrians. Projects to modernize the crossborder rail line are being planned. These projects would increase the market potential of this route for the international and interstate shipment of goods.

The Managed Lanes along the I-5, I-805, and I-15 corridors increase the capacity of these highways so they can meet the demands of interregional travel. The improvements at the San Ysidro POE and the additional Cross Border Facility (Cross Border Xpress) connecting with the Tijuana International Airport aim to consistently reduce wait times in the near future. The future land port at Otay Mesa East is intended to cut delays for both individual international crossings and trade. Reductions in wait times reduce the amount of time vehicles spend idling and therefore greenhouse gas emissions.

Transporting goods more efficiently

The flow of goods by truck, rail, air, and sea – throughout our region and across borders – generates a constant stream of raw materials, parts, and finished goods.

The shipping of goods fuels the regional economy. It's made possible by an extremely complex network of public and private assets and operations, and as a result it's often the least understood part of the regional transportation system. The flow of goods by truck, rail, air, and sea – throughout our region and across borders – generates a constant stream of raw materials, parts, and finished goods. They all keep us supplied with food, clothing, shelter, vital consumer goods, and discretionary items.

The region's transportation network for shipping goods, also referred to as the "goods movement" network, encompasses the transport of air cargo at airports, the shipping of goods in trucks and rail cars at border crossings, maritime operations, and the flow of energy along pipelines and at terminals, as well as rail yards and mainlines. All of these elements of the goods movement network are served by trucks that use local and regional roadways.

Vital infrastructure serving the movement of goods includes: roadways (local, state, and Interstate routes); Class I and short line track and yards (nearly all rail tracks are shared with public passenger trains); the maritime Port of San Diego (two terminals at Tenth Avenue and in National City); San Diego International Airport's Cargo terminal, as well as smaller air cargo operations; several privately held pipeline networks and associated energy terminals; and finally border crossings by rail at San Ysidro, and by trucks at Otay Mesa and Tecate.



The SANDAG Draft 2015 Freight Gateway Study Update reviews our goods movement system in detail.[41] But the Regional Plan focuses on a few key points. Among them: goods movement contributes to the regional economy; the planning of goods movement is driven by sophisticated logistical practices that involve lean delivery approaches; there are both inherent conflicts and synergies between personal travel and the movement of goods (e.g., they often share the same assets at the same time, and operations have to be planned carefully); and finally, the movement of goods has to be planned and managed so operations are sustainable. Whenever and wherever possible, our Regional Plan strives to balance the need for mobility and speed, the capacity for growth, economic competitiveness goals, and the importance of clean air and healthy communities.

The majority of potential goods movement-related infrastructure projects outlined in our Regional Plan appears in the list of "unconstrained" goods movement projects.[42] There are far more projects in the unconstrained list than in the "preferred" or "revenue-constrained" list. This is because only *self-financed projects* and/or roadway and railway projects with dual passenger and freight benefits will be found in the preferred scenario. Investments in goods movement infrastructure are only beginning to be thought of as appropriate for public financing. As a result, there is no long-term funding category in our overall transportation investment plan that is solely focused on goods movement projects.

Even so, SANDAG works extensively with state and federal policy makers to help shape a publicly funded freight investment program. To date, SANDAG has financed all of the region's freight projects through grants, dedicated border funds, one-time bond bills, and other innovative financing strategies. A long list of unfunded projects to enhance the movement of goods regionally can be found in Appendix A. This list is a testament to a great unmet need. The Unconstrained Goods Movement Network Map is shown in Figure 2.18.

Quick and easy access to regional airports

Headache-free air travel is elusive for millions of Americans around the country. One of the goals of our Regional Plan is to make access to air travel as easy as possible. First, a few stats on how much we rely on air travel in our region:

- In 2014, more than 18 million air passengers used the San Diego International Airport (SDIA). McClellan-Palomar Airport also serves commercial travel. There are 12 public use airports in the San Diego region, as well as four military airports/airfields. Tijuana International Airport is located directly south of the U.S. border. The system accommodates commercial, general aviation, and corporate services (Figure 2.10). Airports that serve only general aviation and corporate operations are Brown Field Municipal, Gillespie Field, Montgomery Field, and Ramona. The remaining airports accommodate general aviation only. Many people choose to use other airports in the region, including in Mexico because of the varied air services they offer.

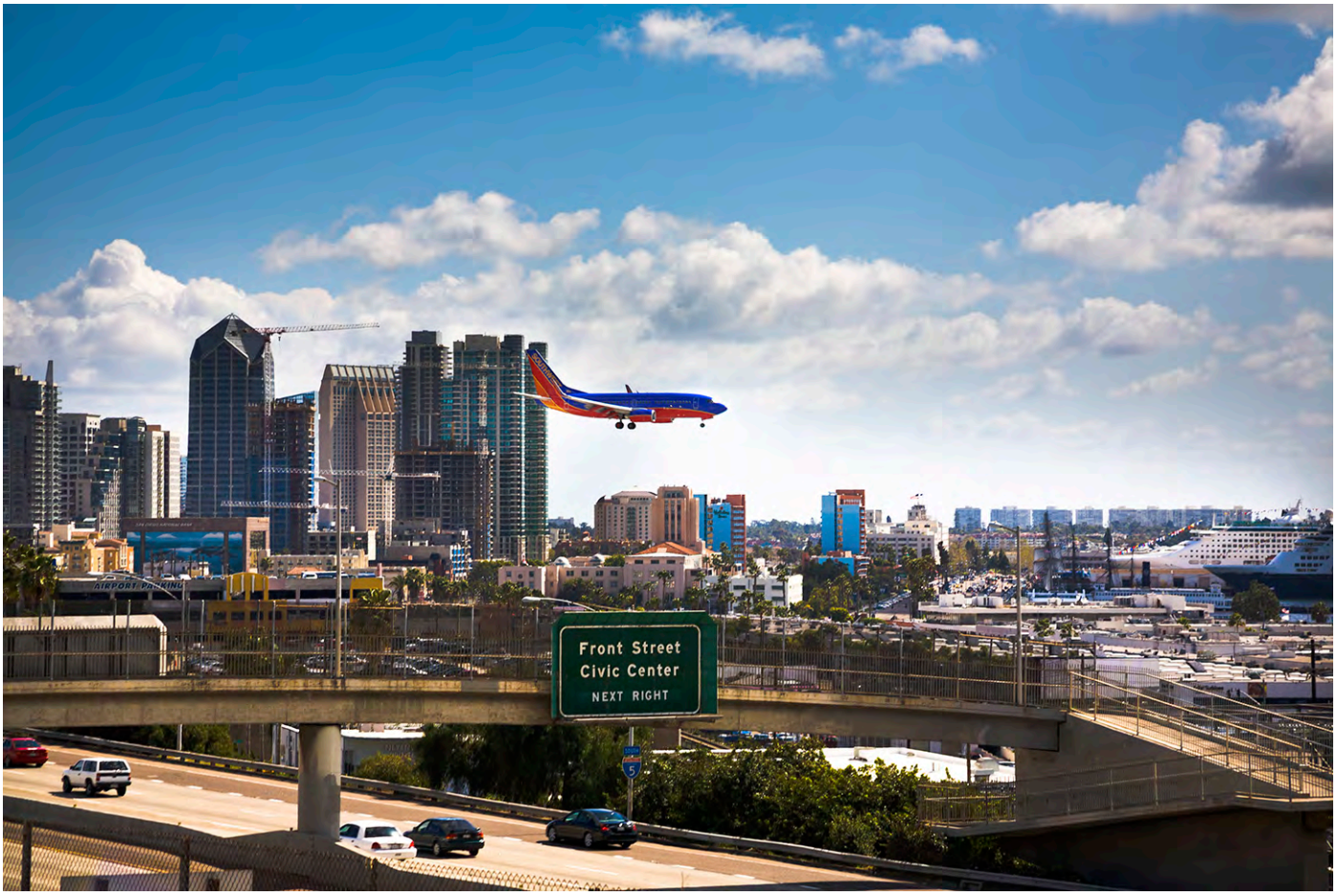



Figure 2.18
Unconstrained Goods Movement Strategy
October 2015
Commercial/Industrial Land Use
2012 San Diego Data and 2013 Baja California Data
Highway/Road/Managed Lanes
Freight Rail
Burlington Northern Santa Fe Railway (BNSF)
shared with COASTER/SPRINTER
San Diego and Imperial Valley Railroad (SDIY)
shared with MTS Trolley
Baja California Railroad, Inc. (BJRR) in Mexico/Desert Line in USA
Air Cargo
Port of San Diego
Land Port of Entry
San Ysidro Rail Port of Entry
Otay Mesa Truck Port of Entry
Tecate Truck Port of Entry
Otay Mesa East Future Truck Port of Entry
Logistics Center/Yard (Concept)
not location-specific
Potential Truck Rest Stops
MILES
KILOMETERS
N
SANDAG
Map Area
San Diego Region
Key Project Locations
Air Cargo
1 San Diego International Airport Access Improvements
Border
2 Southbound Truck Route Improvements
3 SR 11/Future Otay Mesa East Border Truck Crossing
4 SR 125
Maritime
5 Port Terminal and Access Improvements Harbor Drive
Rail
6 LOSSAN/SPRINTER Burlington Northern Santa Fe Railroad (BNSF)
7 Baja California Railroad, Inc. (BJRR) in Mexico/Desert Line in USA
Freeway/Highway
8 I-5
9 I-15
10 I-805
11 SR 94/125, I-8
12 SR 52/54/56/94
13 SR 78
Pechanga Reservation
Camp Pendleton
County of San Diego
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
San Pasqual Reservation
Viejas Reservation
Sycuan Reservation
Jamul Indian Village
Oceanside
Vista
San Marcos
Carlsbad
Escondido
Encinitas
Solana Beach
Del Mar
Poway
Santee
El Cajon
La Mesa
San Diego
Coronado
National City
Chula Vista
Imperial Beach
Tijuana, B.C.
Tecate
UNITED STATES
MEXICO

- Of all the San Diego County passengers who connect at Los Angeles International Airport (LAX) annually, 41 percent originate their travel at San Diego International Airport, and about 54 percent connect at LAX using ground transportation (e.g., train, car, and bus). About 5 percent of the passengers connecting at LAX begin their trips at McClellan-Palomar, which currently offers only commercial service to LAX.
- Previous studies have documented demand for air travel across our international border. A large share of San Diego County individuals who traveled to Mexico destinations flew from the Tijuana International Airport after crossing the international border.
- In 2014, nearly 178,000 tons of air cargo were shipped from or to the San Diego region. About 90 percent of the cargo handled at San Diego International Airport was accommodated on integrated/express carriers that originated from or were destined for Downtown San Diego.
- Senate Bill 10 (Kehoe, 2007), enacted in 2007, required SANDAG and the San Diego County Regional Airport Authority (Airport Authority) to coordinate planning for the multiple modes of transportation that serve the airport. The legislation required the development of two plans: a Regional Aviation Strategic Plan (RASP) and an Airport Multimodal Accessibility Plan (AMAP). The Airport Authority was the lead agency for the RASP, which analyzes scenarios to improve the performance of the regional airport system. SANDAG was the lead agency for the AMAP, which details a multimodal strategy to improve airport access for cars, transit, shuttles, trucks, and other surface transportation. The overarching goal of both these plans is to maximize the efficiency and effectiveness of existing and planned aviation facilities.[43]

San Diego International Airport

The Regional Plan includes the development of an Airport Intermodal Transit Center along the existing rail corridor to provide direct connections to Amtrak, COASTER, Trolley, bus services, and proposed high-speed train service.

In 2009, SANDAG, the Airport Authority, and the City of San Diego completed *Destination Lindbergh*, which detailed a planning strategy for the ultimate build-out of San Diego International Airport at its present location. The document evaluated improved intermodal access to the airport, and determined actions that could reduce traffic on surrounding arterial streets. Also envisioned was a consolidated rental car center on the north side of the airport (currently in construction), and the development of an Airport Intermodal Transit Center (ITC) along the existing rail corridor to provide direct connections to Amtrak, COASTER, Trolley, bus services, and the southern terminus for the proposed high-speed train service. Also planned were direct connector ramps from I-5 to Pacific Highway that would improve access to and from the airport.

The Airport Authority has completed its expansion of Terminal 2, known as The Green Build, which opened in August 2013. These improvements will accommodate growth to 21 million passengers annually. The Airport Authority has begun a planning update called the Airport Development Plan, which will identify the next phase of improvements so San Diego International can meet demand through 2035. The Airport Development Plan will look at the entire airport, and generate a

plan that considers the redevelopment of Terminal 1, as well as coordination with SANDAG on the Intermodal Transit Center and ground access plans.

Beyond 2035, San Diego International Airport likely will not have enough capacity to meet growing demand. This may result in the inability of the region as a whole to accommodate the demand for air travel, leading to potential service disruptions and higher air-fares. Several options, including high-speed trains, could help alleviate problems caused by exhausted capacity at San Diego International from 2035 through 2050.

Cross Border Airport Facility

A new, elevated pedestrian bridge for Tijuana International Airport passengers crossing the U.S.-Mexico border is scheduled to be completed in 2015. The "Cross Border Xpress" is the first such facility in the United States to directly connect to a foreign airport terminal. The Cross Border Xpress will be an option for about 2.4 million passengers who already cross the border as part of their travels, enabling them to avoid often unpredictable and long delays at the San Ysidro and Otay Mesa land ports of entry. Bridge users, who will pay a toll to cross, will be able to fly to China and more than 30 destinations within Mexico that Tijuana International Airport offers. Many of these Mexican destinations are not served by other Southern California airports. Direct express bus service that provides a one-seat ride from North County Inland to the cross border airport facility is proposed.



Our international border: Easier travel across and back

Since the U.S. Congress enacted the North American Free Trade Agreement (NAFTA), the international ports of entry in our region have experienced significant increases in the number of crossings, increased global trade, and security issues. All this has led to longer wait times for pedestrians and vehicles crossing the border into the United States, with substantial negative impacts on the economies and health of our border communities. In recent years, the federal governments of the United States and Mexico have taken steps to improve this situation. They include expanding the hours of operation, improving and modernizing border infrastructure, and using innovative technology to implement programs that reduce security threats and increase operational efficiencies at the region's ports of entry.

Currently, a variety of "trusted traveler" programs are used by people crossing at our region's ports of entry, including the Secure Electronic Network for Traveler's Rapid Inspection (SENTRI) and Global Entry, which provide expedited inspection processing for pre-approved, low-risk travelers. The Fast and Secure Trade (FAST) program facilitates trade and the movement of goods across the border via dedicated inspection lanes.

In 2014, agencies and stakeholders from both sides of the border prepared an update to the California – Baja California Border Master Plan. The intent of this plan is to coordinate the planning and delivery of projects at land ports of entry and the transportation infrastructure serving the border crossings. The Border Master Plan was prepared for the U.S.-Mexico Joint Working Committee and led by Caltrans and the Secretariat of Infrastructure and Urban Development of Baja California. The Master Plan created a list of prioritized projects to guide implementation.

As traditional resources for transportation and land ports of entry are diminishing, SANDAG and Caltrans, along with a number of local, state, and federal agencies in the United States and Mexico, are developing innovative tools to self-finance a proposed new border crossing at Otay Mesa East in the San Diego-Baja California region.[44]

Improving Air Quality & Doing Our Part to Combat Climate Change

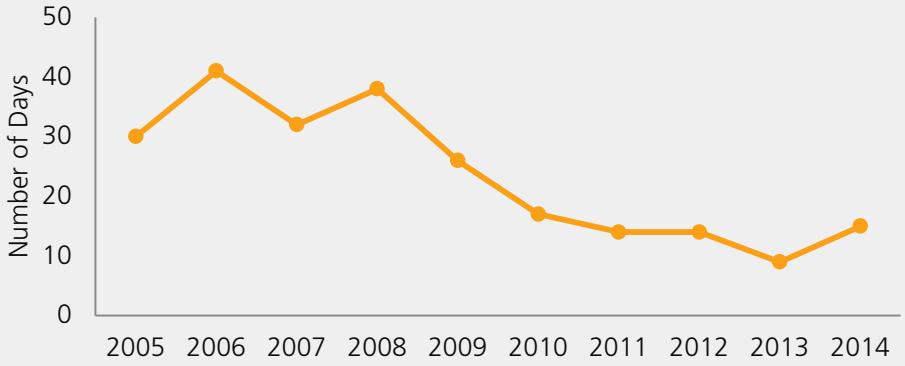
Air quality in the San Diego region has improved significantly over the past four decades.

Air quality in the San Diego region has improved significantly over the past four decades. One measure of air quality is the Air Quality Index (AQI), which reports daily air quality. It tells us how clean or polluted the air is and if there are associated health effects that might be of concern. For the San Diego region, the AQI is calculated for two major pollutants regulated by the Clean Air Act: ground-level ozone and particle pollution (also known as particulate matter). For both of these pollutants, the U.S. Environmental Protection Agency has established national air quality standards to protect public health.

An AQI value of 100 generally corresponds to the national air quality standard for the pollutant and is generally thought of as satisfactory. When AQI values are above 100, air quality is considered unhealthy – first for sensitive groups such as children, seniors, and those with heart or lung disease, and then for everyone as AQI values rise. As seen in Figure 2.19, the number of days with AQI values of more than 100 has dropped significantly, with the lowest levels seen in 2013.[45]

Figure 2.19

Air Quality Index Values Over 100





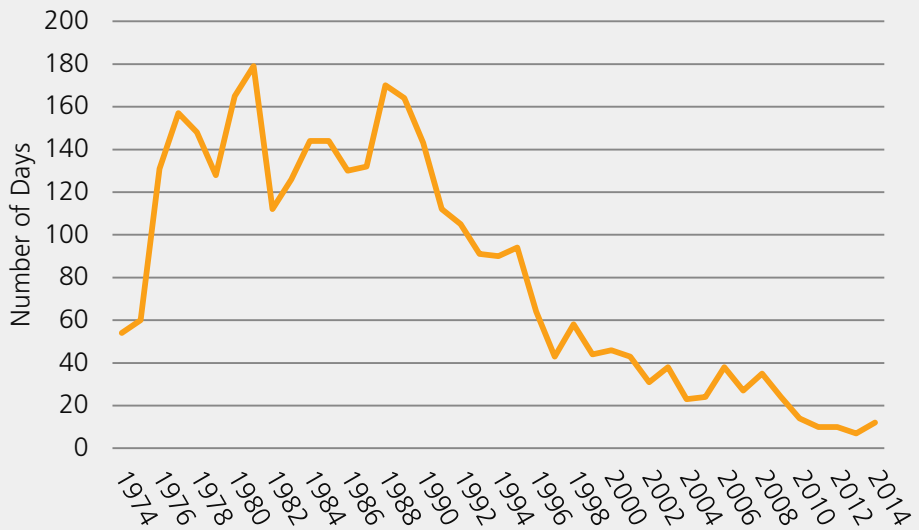
Ground-level ozone, which most people refer to as smog, also has decreased across our region. The number of days exceeding the federal 2008 standard for ozone levels over an eight-hour period has fallen dramatically, from a high of 179 days in 1981 to 12 days in 2014 as shown in Figure 2.20.[46] Transportation investments detailed in this Regional Plan, coupled with improvements in fuel and vehicle technologies, will continue to help reduce ozone levels throughout our region. Appendix B: Air Quality Planning and Transportation Conformity includes the air quality analysis for the Regional Plan, including how the Regional Plan conforms to applicable Clean Air Act requirements.

Government Code 65080(b)(2)(B)(viii)

Allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act.

Figure 2.20

Days Exceeding the 2008 Eight-Hour Ozone Standard



Using our land and building a transportation system in ways that lead to reduced greenhouse gas emissions

As we've discussed, the Legislature has mandated reductions across the state in greenhouse gas emissions. It's also calling upon regional planning agencies to coordinate efforts that make the state more adaptable and resilient to the effects of climate change. Here in the San Diego region, that means supporting a strong economy, improving public health, providing more sustainable transportation and energy choices, protecting infrastructure, conserving open space and natural habitats, and striving for equal opportunities for everyone.

Across the San Diego region, SANDAG is working collaboratively with regional public agencies and local governments to reduce the production of greenhouse gases

Across the San Diego region, SANDAG is working collaboratively with regional public agencies and local governments to reduce the production of greenhouse gases that contribute to climate change, as well as to prepare for the potential impacts of a changing climate in the region.

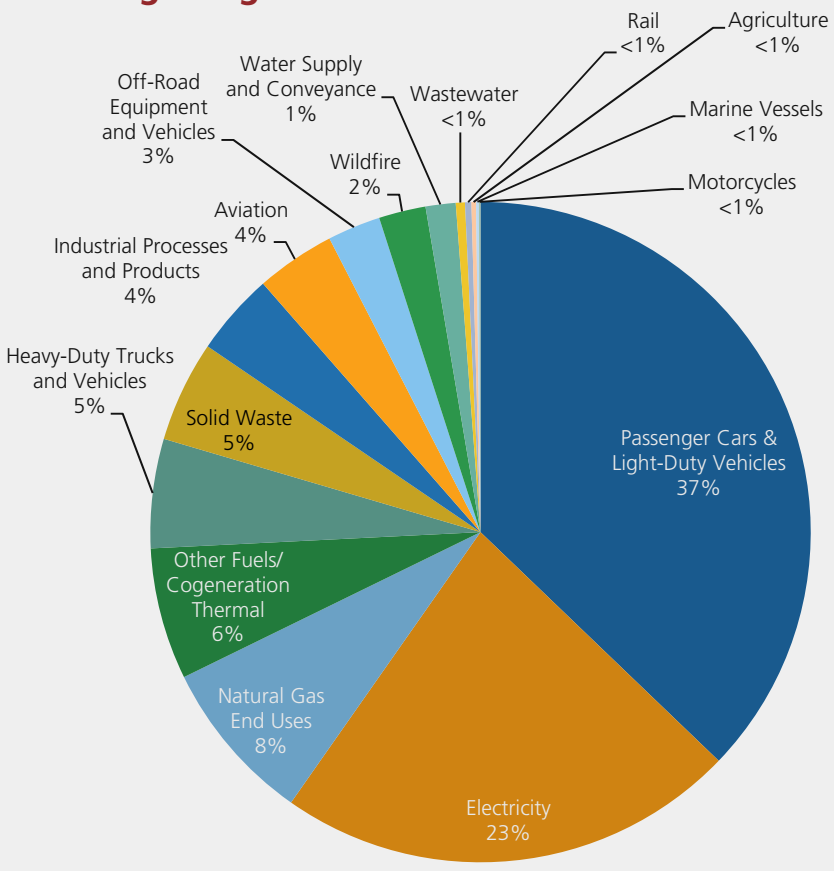
Land use decisions made at the local level can impact nearly all sources of emissions, – for better and for worse. Development guided by smart growth principles – remember: more compact communities, less suburban sprawl – brings people closer to more destinations. It also encourages alternative travel choices, such as public transit, carpooling, walking and biking, which cut greenhouse gas emissions and

other forms of pollution. Mixed use, compact developments also use less water, electricity, heating, and cooling per capita. Beyond this, smart growth promotes the preservation of agricultural land, open space, and natural habitats; improved water quality regionally because more compact developments cover less land than suburban housing tracts; less air pollution; and healthier lifestyles.

To better track the sources of greenhouse gas emissions in the region, SANDAG periodically completes an inventory of sources. This inventory identifies and then quantifies our region's sources of emissions, which allows planners to monitor those sources over time. In 2012, regionwide emissions totaled 35 million metric tons of carbon dioxide equivalents ($MMTCO_2e$), which is a measure of all greenhouse gases – including CO_2 and others such as methane and nitrous oxide.[47] The total amount in 2012 – 35 million metric tons – was an 18.7 percent increase over 1990 emissions levels, which measured 29 million metric tons (see Appendix D: 2012 Greenhouse Gas Inventory and Projections for the San Diego Region). As you can see from Figure 2.21, transportation is the largest source of greenhouse gas emissions in the region, followed by electricity and natural gas.

Figure 2.21

Greenhouse Gas Inventory for San Diego Region 2012



August, 2015.

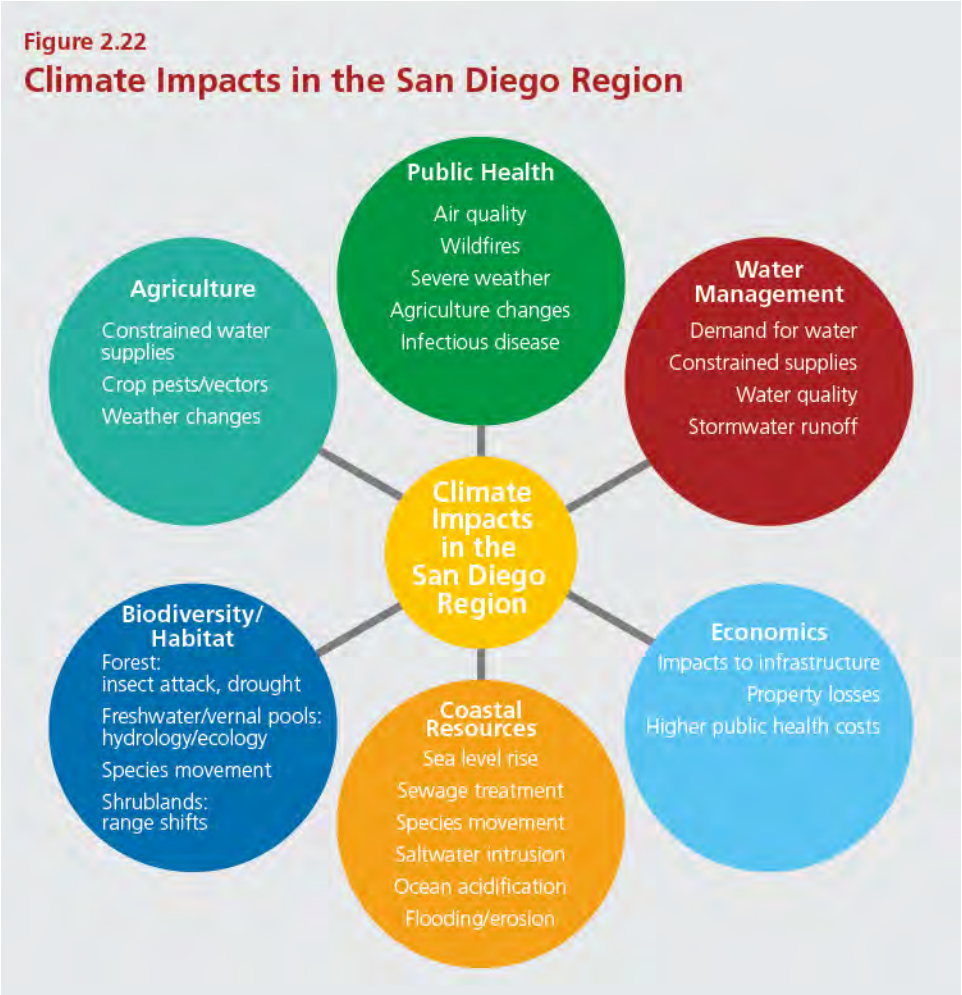
Our region's 18 cities and the County of San Diego all have inventoried greenhouse gas emissions from government operations and from their communities as a whole. More than half of these jurisdictions, representing more than 75 percent of the region's population, also have adopted or are in the process of developing a climate action plan (CAP). This type of plan includes an inventory and forecast of greenhouse gas emissions. It also identifies measures to lower emissions toward a specific target.

In addition to designing this Regional Plan to achieve SB 375's greenhouse gas reduction targets for light duty vehicles, SANDAG also supports local efforts to reduce the greenhouse gas emissions that contribute to climate change. In 2010, SANDAG prepared a Climate Action Strategy, which provides tools for local agencies as well as SANDAG itself to consider as plans and projects are prepared. SANDAG also offers local agencies resources and incentives for smart growth, and it supports efforts to save energy. Through our Energy Roadmap Program, SANDAG has developed energy management plans, or "Roadmaps," for local governments that identify opportunities to save energy in their own operations and in their larger communities. All 18 cities and the County have completed their own Roadmaps, and SANDAG is now focused on supporting them as they implement recommendations within their Roadmaps. The Energy Roadmap Program is made possible through a Local Government Partnership with San Diego Gas & Electric.[48]

Through the Energy Roadmap Program, we've also partnered with the San Diego Regional Clean Cities Coalition to assess the fleets of the region's local governments. We've reviewed options available to them for converting to alternative fuel vehicles, and detailed the costs, savings, and environmental impacts of making the switch. These fleet assessments complement our broader efforts to reduce emissions through the use of ZEV and alternative fuels.

Despite local efforts to reduce greenhouse gas emissions, the San Diego region will experience the consequences of ongoing global climate change.[49] As we've mentioned, sea levels along our coastline are already rising. The potential impacts for our region, identified in the SANDAG Climate Action Strategy (2010), are summarized in Figure 2.22. These impacts include higher surf and storm surges as a consequence of rising seas that will be seen statewide – and these will erode beaches, degrade bluffs, and damage coastal infrastructure. Other projected impacts, some of which we mentioned at the beginning of this chapter, include less fresh water, an increase in the frequency and intensity of wildfires, the loss of native plant and animal species, and severe weather events. All these are expected to threaten public health and the regional economy. Further, the region's cultural resources could also be threatened by climate impacts. Native Americans and others associate the natural habitat with the natural heritage of the region and that natural heritage is important to preserve.

Figure 2.22
Climate Impacts in the San Diego Region



Preparing the region for the inevitable consequences of our changing climate requires steps to adapt to these consequences and create more resilient communities. These words, "adaptation" and "resiliency" aren't chosen randomly. They represent important ways in which we can cope with coming changes – despite our best efforts regionally, nationally, and globally to reduce greenhouse gas emissions. *Adapting* to climate change means adjusting how we build, where we build, how we store and distribute water, and myriad other things in the face of ongoing change. Making our region more *resilient* to the consequences of climate change means increasing the capacity of our communities, economy, and environment to cope with hazardous events such as storms, heat waves, wildfires, and ongoing drought. State officials in Sacramento have developed policy guidance for local and regional decision makers, planning resources for local and regional governments, and technical tools to assist governments at every level to help their constituents adapt to climate change and become more resilient.

Preparing the region for the inevitable consequences of our changing climate requires steps to adapt to these consequences and create more resilient communities.

SANDAG considers the potential impacts of climate change on transportation projects by designing infrastructure to withstand impacts such as sea level rise, extreme heat, and intense rain events. Also, through our *TransNet* EMP, SANDAG studies how to help natural habitats become more resilient to climate changes. In addition, SANDAG also promotes collaboration to build and maintain beaches, which are threatened by rising sea levels.

Selecting the transportation network in our regional plan and measuring its effects

Constructing and managing a transportation network that will work best for our region into the future – and that we can afford – is no small challenge. But our Regional Plan has been guided by the three Board-adopted goals of Innovative Mobility and Planning, a Vibrant Economy, and a Healthy Environment and Communities. To predict the success of the network included in the Regional Plan, we subjected it to ten key questions that were designed to gauge the performance of the chosen network (Figure 2.23). Appendix N: Evaluating the Performance of the Transportation Network includes detailed performance results at the regional, subregional, and corridor level, and the methodology SANDAG used for estimating the performance measures.[50] The SANDAG travel demand model used for this analysis is documented in Appendix T: SANDAG Travel Demand Model and Forecasting Documentation.

Figure 2.23

Performance Measures

Goal		Key Question
Vibrant Economy	1	Do the transportation system investments help to improve the regional economy?
	2	Are the relative costs of transportation changing similarly for all communities?
	3	Are connections to neighboring counties, Mexico, tribal lands and military facilities improved?
Innovative Mobility and Planning	4	Are travel times reduced?
	5	Are more people walking, biking, using transit, and sharing rides?
	6	Is the transportation system safer?
Healthy Environment and Communities	7	Does the transportation network support smart growth?
	8	Is access to jobs and key destinations improving for all communities?
	9	Is the region's air quality improving?
	10	Are greenhouse gas emissions reduced?

The transportation investments in the Regional Plan provide benefits that outweigh their costs by a ratio of nearly two-to-one. With implementation of our Regional Plan, the percentage regionwide of people and jobs near high-frequency transit will increase substantially. In 2012, 35 percent of the region's population lived near high-frequency transit stops. With the significant transit investments and the implementation of the land uses outlined in the Regional Plan, that figure will increase to 61 percent by 2050. Similarly, the percentage of jobs located within half a mile of high-frequency transit will increase from 42 percent in 2012 to 71 percent in 2050.

Meanwhile, investments in infrastructure for biking and walking, combined with implementing smart growth principles, will result in an increase in the percentage of people and workplaces near bike routes. These transportation options will result in more people exercising and fewer people choosing to drive alone.

The Regional Plan's transportation investments, coupled with expected improvements in fuel and vehicle technologies, will help to reduce on-road, smog-forming pollutants and greenhouse gas emissions below 2012 levels. Over the life of the Regional Plan, more than 3.9 million fewer tons of greenhouse gases will be emitted, compared to a scenario in which no improvements are made (also known as the "no-build" scenario).

The transportation choices provided in the Regional Plan yield region-wide benefits, but these benefits are often more pronounced in the corridors where the transportation investments occur. Significant investments are being made in public transit, helping to improve transit access to a number of the region's major job centers. With an increase in efficient transit options, more people will be using transit to access jobs in Kearny Mesa, with nearly 9 percent of peak-period work trips being made via transit in 2050 – more than three times 2012 levels of 2.3 percent. Similar increases are expected to be seen in the University City and Sorrento Mesa job centers. More people will also be taking transit to jobs in Downtown San Diego – with nearly one in five people taking transit to work in 2050.



In terms of the use of the future transit system, daily regional transit boardings will double from 356,000 in 2012 to 775,000 in 2035, with a further increase to 947,000 in 2050. In terms of annual transit boardings, this translates to:

- 100.5 million annual boardings in 2012
- 247.9 million projected annual boardings in 2035
- 303.0 million projected annual boardings in 2050

The transportation investments made in our Regional Plan will provide residents, workers, and visitors with more transportation choices, while helping to preserve the environment and support regional economic growth.

Measuring greenhouse gas emissions reductions

So, how does the transportation network we've described in this chapter measure up? Will it help achieve the state-mandated targets for reducing greenhouse gas emissions in our region?[51]

A Climate Change Scoping Plan (Scoping Plan) was prepared pursuant to AB 32 (The Global Warming Solutions Act of 2006) by ARB in 2008 and updated in 2014.[52] The Scoping Plan identifies reduction targets for all sources of greenhouse gas emissions in the state. While the transportation sector is responsible for the greatest greenhouse gas reductions, nearly 30 percent of the total, most of those reductions will come from higher fuel efficiency vehicles (Pavley fuel efficiency

standards) (18 percent), and a more diverse fuel mix (low carbon fuel standards) (9 percent). Statewide, Regional Transportation Plans prepared by metropolitan planning organizations, such as SANDAG, are responsible for less than 3 percent of the greenhouse gas reductions. SB 375 is the mechanism that establishes greenhouse gas emission reduction targets for each regional agency.

SANDAG's SB 375 target is to reduce regional greenhouse gas emissions from cars and light trucks by 7 percent, per capita, by 2020, and by 13 percent by 2035, compared with a 2005 baseline.

SANDAG's SB 375 target is to reduce regional greenhouse gas emissions from cars and light trucks by 7 percent, per capita, by 2020, and by 13 percent by 2035, compared with a 2005 baseline.

The Regional Plan, encompassing both our RTP and our SCS, shows that our region will exceed these targets. How? By pursuing the strategies we've discussed here already: using land in ways that make developments more compact, conserving open space, and investing in a transportation system that provides people with alternatives to driving alone.

In short,as shown in Table 2.1, our SCS will result in a 15 percent reduction in emissions by 2020, and a 21 percent reduction by 2035 – far more than what the state mandates require.[53] Appendix C includes the technical methodology to estimate greenhouse gas emissions submitted to ARB and the detailed greenhouse gas emission reductions calculations.

Table 2.1
SB 375 Greenhouse Gas Reduction Targets and Regional Plan Greenhouse Gas Emissions Reductions Results

	2020	2035
ARB Targets	7 percent	13 percent
Greenhouse Gas Emissions Reductions	15 percent	21 percent

Note: Average weekday per capita carbon dioxide reductions for cars and light trucks from 2005.

Source: ARB and SANDAG

Government Code § 65080(b)(2)(H)
Prior to adopting a sustainable communities strategy, the metropolitan planning organization shall quantify the reduction in greenhouse gas emissions projected to be achieved by the sustainable communities strategy.

Potential State Funding to Meet our Greenhouse Gas Reduction Goals

Transportation projects that result in lower greenhouse gas emissions go hand-in-hand with the drive toward smarter growth and a healthier environment. Recognizing this, the California Legislature has set aside funding to support projects that reduce emissions. The Legislature's cap-and-trade initiative,[54] which created a market to encourage businesses to lower their emissions of greenhouse gases that contribute to climate change, provides financial incentives for lowering emissions. As a result, the state could provide financial help for many of the transportation projects planned in our region and well as local land use plans and projects.[55] These include, but are not limited to, increasing transit to low-income communities, expanding transit systems, purchasing low-emission vehicles, encouraging transit-oriented development and affordable housing, and building high-speed rail. Cap-and-trade revenues are included in the financial plan (See Appendix O: Transportation Financial Background).

California's Active Transportation Program, funded in part by federal tax dollars, supports projects that encourage walking and biking as an alternative to driving. In our region, the *TransNet* Ordinance and the state's Transportation Development Act also set aside funds for bike and pedestrian projects. *TransNet* provides further funding for building and operating new transit projects.

Looking Past 2035 – Possible Pathways for Additional Greenhouse Gas Emissions Reductions from Transportation

Continuing the effort to reduce greenhouse gas emissions beyond the SB 375 time horizon (year 2035) will require carefully crafted and aggressive policies and strategies. The effort, obviously, must be a global one – far beyond the scope and control of just regional government bodies such as SANDAG.

As our region looks ahead, it will be important to consider how we can reduce greenhouse gas emissions beyond the current SB 375 targets as they apply to cars and light-duty trucks. Progress could be made on several fronts, including:

- Expanding programs that enhance Transportation Demand Management (TDM) and Transportation System Management (TSM) – making the existing transportation system increasingly efficient.
- Implementing transportation projects that provide people with alternatives to driving alone and reduce vehicle miles traveled.
- Extending the Low Carbon Fuel Standard (LCFS) beyond the current reduction horizon year of 2020.[56]
- Getting more zero emission vehicles on the road, beyond near-term statewide goals.[57]
- Increasing the availability of vehicle charging stations, in order to extend the electric range of plug-in hybrid electric vehicles.
- Providing supportive infrastructure for the operations of automated vehicles and other emerging technologies.

As described in Appendix D, both ARB and Caltrans are evaluating potential strategies to meet statewide climate goals with a focus on the transportation sector. In 2012, ARB released a Draft Vision for Clean Air: A Framework for Air Quality and Climate Planning, which examines strategies to meet California's air quality and climate goals.[58] ARB currently is developing an update to the Vision Scenario Planning modeling tool. A public workshop on Vision 2.0 was held in March 2015.[59] As part of the development of the California Transportation Plan 2040 (CTP 2040), Caltrans also is using the ARB Vision framework to evaluate greenhouse gas emissions reductions from the transportation sector toward achieving California climate goals.[60]

The SANDAG Regional Plan focuses on reducing greenhouse gas emissions from cars and light-duty trucks, as required by SB 375. SANDAG reviewed the assumptions included in the ARB Vision scenarios and the draft CTP 2040 to help develop a post 2035 scenario illustrated in Figure 2.24, a scenario focused on carbon dioxide emissions reductions from cars and light-duty trucks for the San Diego region. This scenario uses state greenhouse gas 2050 emission reduction goals under Executive Orders S-03-05 and B-16-12 as long-term reference points for the San Diego region.[61] (SANDAG recognizes that the Governor in Executive Order B-30-15 has also set an interim 2030 state greenhouse gas reduction goal of 40 percent below 1990 levels prior to 2035, by the year 2030.)

Figure 2.24
Total Projected Carbon Dioxide Emissions from Cars and Light-Duty Trucks for the San Diego Region

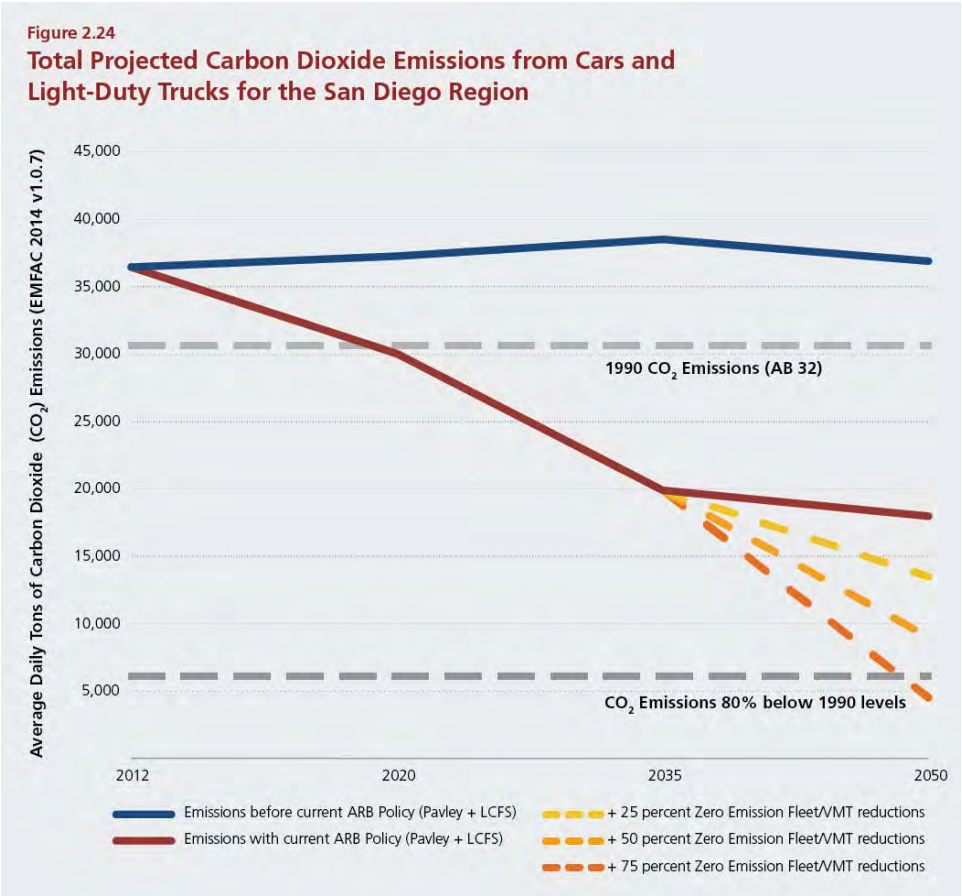


Figure 2.24 illustrates the projected regional carbon dioxide (CO_2) emissions from cars and light-duty trucks before current ARB policy and with current ARB policy. Current ARB Policy includes the Advanced Clean Car Program (Pavley) and low carbon fuel standard (LCFS). In addition, as shown in Figure 2.24 in dashed lines, a combination of varying levels of zero emission vehicle penetration and VMT

reductions could further decrease emissions by 2050. For example, the 25 percent emissions reduction shown in the dashed yellow line could be achieved solely with VMT reductions or zero emission vehicles or a combination of both strategies that yields the 25 percent reduction. Per capita, the examples of VMT reductions would mean driving nearly six fewer miles daily (25 percent reduction from 2050), or 12 fewer miles per day (50 percent reduction from 2050), or nearly 18 fewer miles on a daily basis (75 percent reduction from 2050). Achieving the additional emission reductions would require substantial changes in state and federal policies or regulations, which are beyond SANDAG's ability to implement.

It's worth noting that 2050 greenhouse gas emission projections are highly uncertain, and depend on assumptions regarding the growth of our regional population and economy, increasing the utilization of clean technologies, and major changes in markets for energy and transportation systems. To achieve the 2050 greenhouse gas emission reduction goals will require a concerted effort among federal, state, regional, and local agencies. California lawmakers, along with many local and regional governments within the state and beyond, are working to create innovative policies, plans, and programs to strive for a lower-carbon future. In the San Diego region, local governments, SANDAG, and other regional public agencies are working collaboratively with local non-profits, universities, and businesses to coordinate efforts with state, federal, and international initiatives.

SCS Public Involvement Activities

Government Code § 65080(b)(2)(F)

Each metropolitan planning organization shall adopt a public participation plan, for development of the sustainable communities strategy.

The public was deeply involved in the development of this Regional Plan's SCS. Through an extensive public outreach program, thousands of residents, community leaders, academics, business leaders, elected officials, and representatives from underrepresented groups have participated in the development of the Regional Plan and its SCS. The Regional Plan Public Involvement Plan (PIP) established a process and outlined specific activities for communicating with the public and obtaining input from the public – throughout the Regional Plan's development. The PIP, adopted on February 22, 2013, is based on the SANDAG Public Participation Plan, which was approved by the Board of Directors on December 21, 2012. In addition, SANDAG and the Southern California Tribal Chairmen's Association (SCTCA) developed and implemented the Tribal Consultation Plan for San Diego Forward (The consultation process is documented in Appendix G).



On March 27, 2015, SANDAG conducted an informational meeting on the SCS at its Board of Directors meeting. Pursuant to Government Code Section 65080(b)(2)(E), one informational meeting is required, if it is attended by the County Board of Supervisors and city councilmembers who represent a majority of the cities with a majority of the population in the incorporated areas of the County. SANDAG has exceeded the statutory requirement by holding discussions concerning the SCS at several other public meetings of the Board of Directors since October 2010. The documentation of these meetings also is included in Appendix F: Public Involvement Program.

Government Code § 65080(b)(2)(E)

The metropolitan planning organization shall conduct at least two informational meetings in each county within the region for members of the board of supervisors and city councils on the sustainable communities strategy.

The Draft Regional Plan was released on April 24, 2015 for public review and comment. During the public comment period, SANDAG hosted a series of seven public meetings throughout the San Diego region to obtain public input. Spanish translation was available at all of the workshops, and one workshop was conducted entirely in Spanish. Three workshops also were streamed live over the internet, allowing for remote access. Meanwhile, community based organizations contracted by SANDAG, conducted dozens of outreach meetings to seek input on the Draft Regional Plan from the region's disadvantaged communities.

In June 2015, SANDAG offered two additional chances for the public to provide oral and written comment on the Draft Regional Plan, in addition to its Sustainable Communities Strategy, the Draft Environmental Impact Report, and the Draft Air Quality Conformity Analysis. The first hearing occurred during a SANDAG Board meeting and the second hearing occurred in front of a SANDAG hearing officer at the North County Transit District's offices. These public hearings were conducted pursuant to Government Code Section 65080(b)(2)(F)(v), which calls for at least two public hearings to be held. SANDAG's efforts to involve the public in the development of the SCS have been tracked and recorded to chronicle the large number and wide range of activities organized and held by the agency. This record shows that SANDAG exceeded the public involvement requirements, including informational meetings mandated by SB 375 and federal regulations. The details of these activities, as well as the PIP and the Public Participation Plan, are included in Appendix F.

Government Code § 65080(b)(2)(G)

In preparing a sustainable communities strategy, the metropolitan planning organization shall consider spheres of influence that have been adopted by the local agency formation commissions within its region.

Consultation with the Local Agency Formation Commission

SANDAG considered spheres of influence that have been adopted by the Local Agency Formation Commission (LAFCO) within our region during the development of the SCS. A sphere of influence is defined as a plan for the probable physical boundaries and service area of a local government agency, as determined by LAFCO. All territory proposed for annexation to an incorporated city is required to be included in the city's sphere of influence and be located within the city's general plan.

LAFCO is responsible in our region for assisting the state legislature with promoting orderly development and growth, while also fulfilling many regional priorities. These include: accommodating growth within or through the expansion of local agency boundaries, extending necessary government services, preserving open space and prime agricultural lands, and promoting the provision of housing for residents of all incomes.

LAFCO also is a member of the Regional Planning Technical Working Group, which provides coordination on regional planning issues among member agencies. Members of the working group include the planning or community development director from each of the 18 cities and the County of San Diego, as well as representatives from other single-purpose regional agencies.

In the development of the Regional Growth Forecast, LAFCO and SANDAG consulted regarding sphere of influence determinations – as well as on factors that would be considered in the review of proposals. The 18 incorporated cities and the County of San Diego were asked about sphere of influence issues during the Regional Growth Forecast land use input process. No requests for adjustments to spheres of influence were made.[62]



Up Next: Paying for the Regional Plan

Next, in Chapter 3: Financing Our Future, we'll review how the transportation network described in this chapter will be paid for over the next 35 years. This is the "Financial Element" of the Regional Plan, as required by state law. Among the sections in Chapter 3 are:

- A discussion of where our transportation funds come from, and how we can invest them to build the network we can afford. We'll also offer a brief analysis of our investment plan – that is, a general review of how much money will be invested on different aspects of the transportation network.
- A reference to detailed information on the risks associated with relying on sources of funding for the new Regional Plan, and what SANDAG can do if anticipated revenues fall short.

Endnotes

[1] EPA: http://www.epa.gov/climatechange/ghgemissions/sources/transportation.html

ARB: First Update to Scoping Plan 2014, p 46.

[2] http://www.arb.ca.gov/cc/sb375/sb375.htm

[3] Additional detailed information on the SCS is included in Appendices C: Sustainable Communities Strategy Documentation and Related Information, I: Consultation with the Local Agency Formation Commission (LAFCO), J: Regional Growth Forecast, L: Regional Housing Needs Assessment Plan, and U.13: Housing – Providing Homes for all Residents. Appendix C, Table C.4 documents specific locations in San Diego Forward where each of SB 375's SCS requirements is met.

[4] See Appendix E: Transportation System and Demand Management Programs, and Emerging Technologies for a discussion of TDM and TSM strategies.

[5] In this region, the Multiple Species Conservation Program and Multiple Habitat Conservation Program implement the Natural Communities Conservation Plan from the state and federal government, which implements the California State Wildlife Action Plan.

[6] Appendix U.10: Management Strategic Plan for Conserved Lands in Western San Diego County.

[7] As of mid-2014, over half of the jurisdictions had adopted or were currently performing General Plan updates, and almost 85 percent of the jurisdictions had adopted or updated community plans, master plans, or specific plans. These include, but are not limited to, the Cities of San Diego, Chula Vista, Escondido, Vista, San Marcos, La Mesa, and National City, and the County of San Diego. See the following document for more information: http://www.sandag.org/uploads/projectid/projectid_360_17804.pdf

[8] This provision does not vest SANDAG with any authority to mandate changes to existing city and county general plans. But it does allow the SCS to take into account reasonably expected changes in existing general plans and other city and county land use regulations. In addition, because the SCS planning process is collaborative in nature, the process may be used to help local jurisdictions identify potential further changes that would promote the goals of sustainability and reducing greenhouse gas emissions.

[9] Appendix J: Regional Growth Forecast includes the Series 13 Regional Growth Forecast and Appendix L: Regional Housing Needs Assessment Plan includes the Regional Housing Needs Assessment (RHNA) for the San Diego Region.

[10] Appendix U.3: SANDAG Board of Directors Report San Diego Forward: The Regional Plan Alternative Land Use Scenarios

[11] Appendix J: Regional Growth Forecast

[12] Open Space and Parks include Beach-Passive (other sandy areas along the coastline with limited parking and access), Open Space Park or Preserve, and Undevelopable Natural Area. Farmland includes Williamson Act Lands. Habitat includes SANDAG Conserved Lands.

[13] Based on the best practically available scientific information regarding resource areas and farmland in the region as additionally shown in Appendix C and used to prepare the Regional Growth Forecast described in Appendix J.

[14] Appendix U.4: SANDAG Transit Oriented Development Strategy http://www.sandag.org/index.asp?classid=12&projectid=500&fuseaction=projects.detail

[15] Appendix U.2: Regional Complete Streets Policy

[16] The Regional Growth Forecast reflects land use changes made by local jurisdictions since the adoption of the 2050 RTP/SCS, RHNA, and Series 12 Regional Growth Forecast. These changes include updates made as a result of housing elements prepared by the local jurisdictions for the fifth housing element cycle.

[17] Further information about how SANDAG considered and meets the state housing goals and the Series 13 Regional Growth Forecast is included in Appendix L and Appendix U.13: Housing - Providing Homes for all Residents

[18] Updated housing information is included in Appendix U.13: Housing – Providing Homes for all Residents.

[19] Journal of the American Planning Association, Is Support for Traditionally Designed Communities Growing? Evidence From Two National Surveys Susan Handy, James F. Sallis, Deanne Weber, Ed Maibach & Marla Hollander April 2008, Vol. 74, Issue 2 pages 209-221

National Association of REALTORS® 2013 Community Preference Survey, Realtors® Report Americans Prefer to Live in Mixed-Use, Walkable Communities, October 2013

America in 2013: A ULI Survey of Views on Housing, Transportation, and Community

[20] With the exception of regional arterials, data represents lane miles (Lane miles are calculated by multiplying the centerline mileage of a road by the number of lanes). For regional arterials, centerline mileage is reported.

Generating a Sidewalk Network for San Diego County: Project Documentation. Prepared for Urban Design for Health, Inc., and the San Diego Association of Governments. June 17, 2011. Submitted by Resource Systems Group

[21] Appendix R: Transportation Security and Safety

[22] The Healthy Communities Atlas can be found in Appendix U.11: Healthy Communities Atlas, San Diego Region.

[23] Appendix U.17: Urban Area Transit Strategy

[24] For more information on the San Diego – Coronado ferry, visit FlagshipSD.com/cruises/Coronado-ferry.

[25] Although High-speed Rail (HSR) is not a proposed Regional Plan project, since its funding and implementation will be determined by the State of California rather than by entities within this region, its revenues and expenditures are included in the Regional Plan because the HSR segment between Los Angeles and San Diego, via the Inland Empire, is expected to provide connectivity for the San Diego region with the rest of the state and the project. Therefore, it is an integral part of the planned transportation infrastructure for the region.

[26] Appendix U:16: Active Transportation Implementation Strategy

[27] Included in Appendix U.16: Active Transportation Implementation Strategy

[28] See Appendix A: Transportation Projects, Costs, and Phasing for an updated California Coastal Trail map, and Appendix U.5: California Coastal Trail Technical Memoranda for maps and discussion of the California Coastal Trail, as required by Government Code Section 65080.1.

[29] Included in Appendix U.16: Active Transportation Implementation Strategy

[30] Safe Routes to Transit will be informed by recommendations from subregional studies such as the I-8 Corridor Study and the California-Baja California Port of Entry Bicycle and Pedestrian Study.

[31] The development of the California Coastal Trail a collaborative effort among the Coastal Conservancy, State Parks, the Coastal Commission, and the nonprofit agency Coastwalk. Designated in 1999 as California's Millennium Legacy Trail, it is defined as "a continuous public right-of-way along the California coastline; a trail designed to foster appreciation and stewardship of the scenic and natural resources of the coast through hiking and other complementary modes of non-motorized transportation."

[32] A description of the Regional Arterial System is included in Appendix M: Transportation Project Evaluation Criteria and Rankings and Appendix U.7: SANDAG Federal Congestion Management Process provides an overview of the SANDAG Federal Congestion Management Process.

[33] A definition of *Rapid* bus is included in Appendix K: Glossary of Transportation Terms, Abbreviations, and Acronyms.

[34] Additional information on emerging technologies, transportation demand management (TDM), transportation system management (TSM), and investment levels is included in Appendix E and the Emerging Technologies White Paper (Appendix Q).

[35] Appendix U.8: San Diego Region Intelligent Transportation Systems Strategic Plan

[36] www.sandag.org/TDM and http://www.sdforward.com/mobility-planning/regional-parking-management-toolbox

[37] Additional information and a link to the toolbox can be found in Appendix E.

[38] http://www.sandag.org/uploads/publicationid/publicationid_1817_17061.pdf Appendix U.12: San Diego Regional Plug-In Electric Vehicle Readiness Plan.

[39] U.S. Department of Transportation, Research and Innovative Technology Administration, Bureau of Transportation Statistics, Border Crossing/Entry Data, based on the U.S. Department of Homeland Security, Customs and Border Protection data

[40] Ibid.

[41] Appendix U.15: Draft 2015 Freight Gateway Study Update.

[42] This list can be found in Appendix A.

[43] The RASP Technical Report and AMAP are included in Appendix U.6: Regional Aviation Strategic Plan and Airport Multimodal Accessibility Plan.

[44] More information on crossborder transportation issues is included in Appendix U.14: Borders.

[45] San Diego County Air Pollution Control District and California Air Resources Board, Air Quality and Metrological Information System (AQMIS).

[46] California Air Resources Board, AQMIS

[47] Carbon dioxide equivalent ($MMTCO_2e$) is a measure of all greenhouse gases – including CO2, as well as others such as methane and nitrous oxide converted to what their quantity would be if converted to just CO2.

[48] Appendix U.9: Regional Energy Strategy for the San Diego Region.

[49] Appendix Q: White Papers

[50] Details on the project evaluation criteria which informed the transportation network development are included in Appendix M.

[51] SB 375 is the only mandated greenhouse gas reduction requirement for MPOs and focuses only on the reductions that could come from transportation planning for passenger vehicles, not those reductions that can come from vehicle technology improvements or from the carbon intensity of fuels.

[52] Initial AB 32 Climate Change Scoping Plan Document
http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm

First Update to the AB 32 Scoping Plan

http://www.arb.ca.gov/cc/scopingplan/document/updatedscopingplan2013.htm

[53] The greenhouse gas reductions for the final Regional Plan were calculated using the ARB model EMFAC 2014 v1.0.7 and adjustment factors provided by ARB to account for differences in emission rates between EMFAC 2007 (used to set the targets) and this latest version of the emissions model (EMFAC 2014 v1.0.7). The per capita greenhouse gas reductions for 2020 and 2035 have changed from the draft Regional Plan to the final Regional Plan by three percentage points. The ARB adjustment factor for SANDAG reduces the per capita results for both 2020 and 2035 by two percentage points. For example, before the ARB adjustment, per capita reductions for 2020 were 17 percent, and after applying the adjustment, the reductions become 15 percent. The additional one percentage point difference for 2020 and 2035 is due to final travel demand model runs, which also use EMFAC 2014 v1.0.7 to estimate greenhouse gas emissions.

[54] http://www.ebudget.ca.gov/2014-15/pdf/Enacted/BudgetSummary/CapandTradeExpenditurePlan.pdf

[55] Cap-and-Trade Expenditure Plan. http://www.ebudget.ca.gov/2014-15/pdf/Enacted/BudgetSummary/CapandTradeExpenditurePlan.pdf

[56] The LCFS directive calls for a reduction of at least 10 percent in the carbon intensity of California's transportation fuels by 2020. LCFS targets are back loaded in terms of mandated carbon reductions in the California fuel supply, starting slowly and ramping up quickly starting in 2015.

[57] The current Pavley Clean Car Standards (AB 1493) and Advanced Clean Cars Program are limited to a 2025 horizon year, yielding an opportunity to seek additional greenhouse gas reduction benefits if these or similar programs were supported by the state legislature in the future.

[58] ARB Vision for Clean Air: A framework for Air Quality and Climate Planning, June 27, 2012
http://www.arb.ca.gov/planning/vision/docs/vision_for_clean_air_public_review_draft.pdf;

Vision for Clean Air: A Framework for Air Quality and Climate Planning Sacramento Vision Workshop August 22, 2012
http://www.arb.ca.gov/planning/vision/docs/staff_presentation_on_August_22_2012.pdf;

Scenario Assumptions and Results, August 20, 2012
http://www.arb.ca.gov/planning/vision/docs/draft_scenario_assumptions_and_results_appendix.pdf

[59] ARB, Vision 2.0, http://www.arb.ca.gov/planning/vision/workshops.htm#mar2015

[60] Caltrans, Draft California Transportation Plan 2040, March 2015.

[61] Executive Order (EO) S-03-05 establishes the following greenhouse gas emission reduction targets for California: reduce greenhouse gas emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80 percent below 1990 levels by 2050. E.O. B-30-15 establishes an interim statewide greenhouse gas emission reduction target of 40 percent below 1990 levels by 2030. EO B-16-12 orders that California target for 2050 a reduction of greenhouse gas emissions from the transportation sector equaling 80 percent less than 1990 levels.

[62] Reference Appendix I for more information on Local Agency Formation Commission.



Chapter 3
Financing Our Future

San Diego FORWARD
The Regional Plan

3 Financing Our Future

How we'll pay for the Regional Plan

Paying for the Regional Plan

San Diego Forward: The Regional Plan (Regional Plan) is ambitious. Over the next 35 years, through 2050, the Regional Plan projects that about $204 billion in local, state, and federal tax dollars will be available to build a comprehensive, interconnected transportation system that provides more choices. As with the Regional Transportation Plan, adopted in 2011, the Regional Plan extends to 2050 to allow our region to incorporate all transportation projects and programs that voters approved in the *TransNet* Ordinance, which extends to 2048. SANDAG is working creatively to leverage available funds in order to maximize every dollar. Even so, there is a finite amount of anticipated funding available over the next three and a half decades. As we mentioned at the end of Chapter 2, this chapter (Financing our Future), and the appendices it references, comprise the financial element of the Regional Plan, as required by law.



Where Our Transportation Funds Come From, and How We Can Invest Them

Building a transportation system we can afford

Federal law requires SANDAG to develop a Regional Plan built on reasonable assumptions of the revenues that will be available during the time period covered by that plan.

Federal law requires SANDAG to develop a regional plan built on reasonable assumptions of the revenues that will be available during the time period covered by that plan. While we're anticipating around $204 billion over 35 years, we don't have all the money right now. Also, a majority of the funding sources are tied to certain types of projects (for example, transit infrastructure or highway operations and maintenance) and we don't have the authority to interchange them. These constraints come with specific provisions from Congress or the state Legislature. The "revenue constrained scenario" for transportation investments detailed in our Regional Plan plays by those rules. It's what we can do given the budget we project. From this point on, we'll refer to the "revenue constrained network" as our investment plan for transportation.

Our investment plan will be funded by a combination of local, state, and federal revenues. Local funds make up 48 percent of the total projected revenue, state funds make up 34 percent, and federal funds amount to 18 percent (Figure 3.1). Because funding will not be available all at once, projects will be constructed as the money becomes available. This is shown in Figure 3.2.

Figure 3.1
Major Revenue Sources
$204 billion in Year of Expenditure

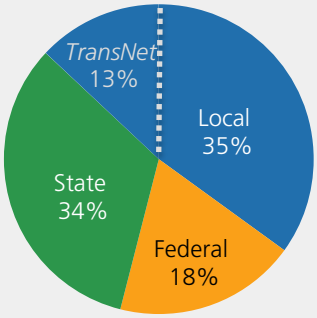


Figure 3.2
Phased Revenues
$204 billion in Year of Expenditure

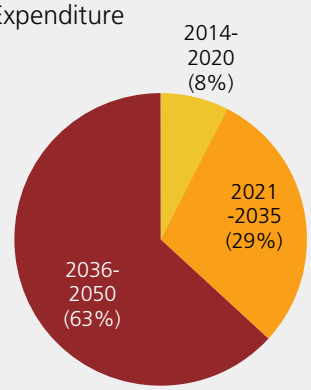


Table 3.1 outlines income sources within each revenue category. All revenues have been escalated to the year that the money will be spent, and they are based on the escalation factor appropriate for that specific revenue source.[1] It should be noted that the Regional Plan includes assumptions for new fund sources at the local, state, and federal levels. These include a potential new local funding source, fees charged for the number of miles driven by cars and trucks, and new gas taxes. While the actual timing and amount of these new fund sources may vary from what is assumed, given how new fund sources have been approved at various times over the past several decades, it is reasonable to assume that new fund sources will continue to be established in the future. None of the new fund sources are assumed to begin prior to 2020, but they would be required in order to complete all of the projects in the Regional Plan.

Table 3.1

Revenue Sources

	Estimated Revenues (in millions of YOE dollars)[a]			
	FY 2014-2020	FY 2021-2035	FY 2036-2050	Total
Local				
TransNet	$1,796	$7,454	$13,574	$22,824
TransNet (Bond Proceeds)	$1,257	$1,870	$405	$3,532
Transportation Development Act	$1,019	$3,695	$6,729	$11,443
Developer Impact Fees	$191	$438	$393	$1,022
City/County Local Gas Taxes	$871	$1,903	$2,438	$5,212
General Fund/Miscellaneous Local Road Funds	$1,990	$5,942	$9,257	$17,189
Future Local Revenues for Transportation	$169	$3,727	$6,787	$10,683
Toll Road Funding (I-5/I-15/SR 11/SR 241)	$494	$0	$7,454	$7,948
Public Private Partnerships/Transit Oriented Development	$5	$119	$192	$316
FasTrak® Revenues	$48	$337	$1,274	$1,659
Passenger Fares	$942	$4,771	$9,567	$15,280
Motorist Aid Services - Call Box Program	$56	$147	$198	$401
Prior Year Funds in Regional Transportation Improvement Program	$410	$111	$0	$521
Subtotal	**$9,248**	**$30,514**	**$58,268**	**$98,030**
State				
Active Transportation Program	$67	$248	$617	$932
State Transportation Improvement Program	$262	$947	$2,379	$3,588
State Transit Assistance Program	$175	$492	$906	$1,573
State Highway Operations and Preservation Program and Operations/Maintenance	$1,334	$4,587	$9,529	$15,450
Future State Revenues for Transportation	$128	$4,380	$6,219	$10,727
Cap and Trade	$97	$895	$1,343	$2,335
Transportation Bond/Infrastructure Programs	$263	$4,138	$8,348	$12,749
State Managed Federal Programs	$403	$1,397	$2,905	$4,705
High-Speed Rail	$0	$0	$17,182	$17,182
Prior Year Funds in Regional Transportation Improvement Program	$254	$0	$0	$254
Subtotal	**$2,983**	**$17,084**	**$49,428**	**$69,495**
Federal				
Federal Transit Administration Discretionary	$876	$4,314	$1,695	$6,885
Federal Transit Administration Formula Programs	$700	$1992	$5811	$8,503
Congestion Mitigation and Air Quality/ Regional Surface Transportation Program	$485	$1,496	$4,593	$6,574
Federal Highway Administration Discretionary	$4	$37	$86	$127
Other Financing (Grant Anticipation Notes)	$547	$0	$0	$547
Future Federal Revenues for Transportation	$184	$3,270	$5,377	$8,831
Federal Railroad Administration	$39	$487	$787	$1,313
Corridors and Borders Infrastructure/Other Freight Funds	$21	$842	$2,287	$3,150
Prior Year Funds in Regional Transportation Improvement Program	$305	$14	$0	$319
Subtotal	**$3,161**	**$12,452**	**$20,636**	**$36,249**
Grand Total Revenue Sources	**$15,392**	**$60,050**	**$128,332**	**$203,774**

[a] Year of Expenditure (YOE)

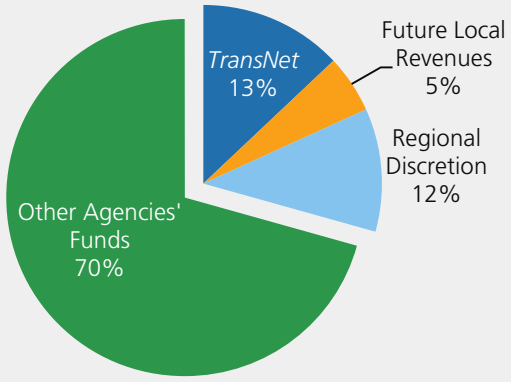


Also, certain funds can only be used for certain projects. For example, *TransNet* sales tax revenue can only be used for specific projects and programs.[2] Some funds will become available on a yearly, ongoing basis; others will be delivered in a single payment at one particular point in time. The timing also can depend on when the state Legislature and federal government pass their budgets. All this means that scheduling projects can be tricky. And certainly, not all of the projects in the Regional Plan can be built at once.

SANDAG, as an agency, has purview over a relatively small portion of the overall funds included in this Regional Plan, and therefore must continue to work creatively on how best to leverage the available dollars (Figure 3.3). We have further constraints on when money becomes available during the lifespan of the Regional Plan, and we also have constraints on which dollars stay with SANDAG and which dollars are distributed directly to other agencies to maintain, operate, and rehabilitate the transportation network. For example, the majority of the funds included in the Regional Plan are distributed directly to agencies such as Caltrans and the transit agencies for highway and transit operations and maintenance needs, as well as the cities and County for their local streets and roads.

Figure 3.3

San Diego Forward Funding Distribution



Our Investment Plan for Transportation: A Brief Analysis

Table 3.2 and Figure 3.4 summarize the nearly $204 billion in transportation expenditures included in the investment plan.[3] Regardless of which agencies expend the funds (as described above), here's an overall breakdown of how this money will be spent:

- Fifty percent is for public transit (29% for capital projects and 21% for operations).
- Fifteen percent is for Managed Lanes and connectors, including those that support public transit.
- Thirteen percent is for improvements to local streets and roads and rail grade.
- Eight percent is for rehabilitating highways and making them work more efficiently.
- Six percent is for other highway lanes and connector improvements.
- Four percent is for servicing debt.
- Three percent is for projects that promote walking and biking,[4] as well as smart growth.
- One percent is for managing the overall transportation network and the demands on it to make it more efficient.[5]

More than a third of total expenditures is designated for the operation, maintenance, and rehabilitation of transit, highways, and local streets and roads.

Figure 3.4

Major Project Expenditures

Nearly $204 billion in year of expenditures (YOE) dollars

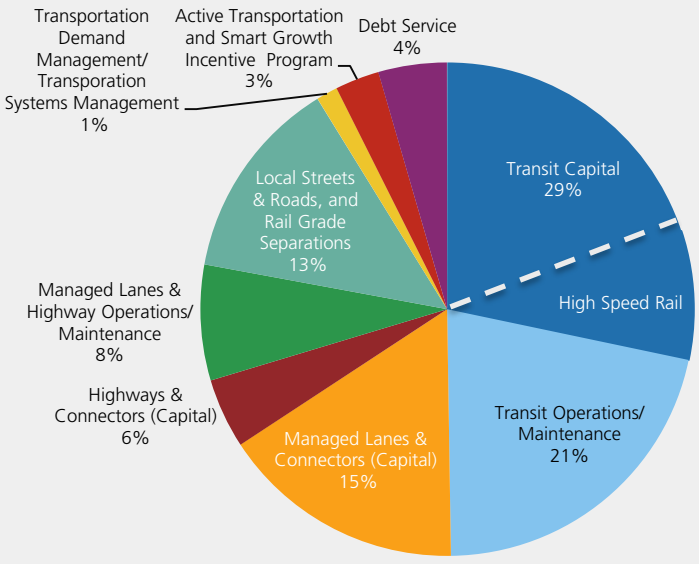


Table 3.2

Major Expenditures by Mode

Project Categories	Estimated Expenditures (in millions of YOE dollars)[a] FY 2014-2020	FY 2021-2035	FY 2036-2050	Total
Transit Facilities				
Major New Facilities	$2,560	$10,833	$15,470	$28,863
Miscellaneous Capital/Rehabilitation/Replacement	$680	$3,742	$7,341	$11,763
Transit Operations	$2,657	$12,062	$24,561	$39,280
ADA and Specialized Transportation Services[b]	$266	$1,206	$2,456	$3,928
High-Speed Rail	$0	$0	$17,182	$17,182
Subtotal	**$6,163**	**$27,843**	**$67,010**	**$101,016**
Managed Lanes and Highway Improvements				
Managed Lanes	$2,346	$9,541	$17,812	$29,699
Highways	$306	$224	$8,931	$9,461
Managed Lanes Connectors	$14	$888	$503	$1,405
Freeway Connectors	$72	$1,026	$265	$1,363
Operations / Maintenance / Rehabilitation	$1,357	$4,662	$9,638	$15,657
Subtotal	**$4,095**	**$16,341**	**$37,149**	**$57,585**
Local Streets and Roads (Capital, Rehabilitation, and Operations/Maintenance)				
Local Streets and Roads	$3,164	$8,573	$14,851	$26,588
Subtotal	**$3,164**	**$8,573**	**$14,851**	**$26,588**
Debt Service				
Debt Service	$863	$3,834	$4,477	$9,174
Subtotal	**$863**	**$3,834**	**$4,477**	**$9,174**
Active Transportation/Systems Management/Demand Management				
Smart Growth Incentive Program	$121	$352	$533	$1,006
Regional Rail Grade Separations	$0	$0	$720	$720
Active Transportation Program	$588	$1,716	$2,596	$4,900
Transportation Systems and Demand Management	$398	$1,391	$996	$2,785
Subtotal	**$1,107**	**$3,459**	**$4,845**	**$9,411**
Grand Total Cost	**$15,392**	**$60,050**	**$128,332**	**$203,774**

[a] Year of Expenditure (YOE)

[b] ADA and Specialized Transportation Services costs represents 5 percent each of the total transit operations cost (10 percent total)



The Regional Plan's major funding sources

Local Revenues

TransNet Half-Cent Local Sales Tax

The countywide transportation sales tax *TransNet,* which was first approved in 1987 implemented major transit and highway projects. It also funded improvements to local streets and roads, as well as bike and pedestrian facilities. In November 2004, San Diego County voters approved an extension of *TransNet* from 2008 to 2048. The *TransNet* extension became effective in April 2008. The revenues included in the Regional Plan are based on actual receipts to FY 2014, and they assume an annual increase based on the growth in taxable retail sales as projected by the SANDAG Demographic and Economic Forecasting Model (DEFM).[6] The amount estimated to be available through 2050 is two years beyond the current expiration of 2048; however, there is an assumption that the sales tax program will continue to be collected beyond 2048.

To make the program's benefits available more quickly, the SANDAG Board of Directors approved jump-starting several regional transportation projects by implementing the *TransNet* Early Action Program (EAP). The agency has issued bonds under the *TransNet* extension that so far amount to about $1.5 billion. These bonds support the accelerated delivery of major transit and highway projects across the region. The EAP strategy is to borrow against future *TransNet* revenues, in order to leverage additional federal and state funds. The goal is to complete these projects early and give people more travel choices as soon as possible.

The goal is to complete these projects early and give people more travel choices as soon as possible.

The *TransNet* extension includes some added features over the initial program. It supports an innovative $850 million environmental mitigation program to offset biological impacts of future transportation improvements, while at the same time reducing overall costs and accelerating the delivery of projects. The extension also

provides for a $280 million smart growth incentive fund. In addition, another $280 million is slated for bike paths and facilities, pedestrian improvements, neighborhood safety projects, and the Regional Bike Plan Early Action Program. These funds are leveraged to access other funding sources.

Developer Impact Fees

An element of the *TransNet* Ordinance requires the region's 18 cities and the County of San Diego to collect an exaction from the private sector for each new housing unit constructed in their jurisdiction. The Regional Transportation Congestion Improvement Program (RTCIP) has been in effect since July 1, 2008. SANDAG adjusts the minimum fee amount on July 1 of each year, based on analysis of construction cost indices. But it's no less than 2 percent. The purpose of the adjustment is to ensure that RTCIP retains its purchasing power to improve the regional arterial system. At its February 27, 2015, meeting, the SANDAG Board voted to increase the fee to $2,310 beginning July 1, 2015.

Transportation Development Act (TDA) Quarter-Cent Sales Tax

By state statute, TDA funds may be used for transit operating or capital purposes, but they are not eligible for use on non-transit-related improvements to highways or local streets and roads. Future year estimates are based on the same growth in taxable retail sales as projected by DEFM as is done for *TransNet*.

Local Gas Tax/General Fund

The local agencies receive direct subsidies from the state in the form of gas tax subventions. These subventions are based on a formula derived from the Assembly Bill x8-9 (Evans, 2010) (ABx8 9) fuel tax swap, which considers future fuel consumption, the federal tax rate, and the swap rate. Due to the continued improvement in fuel efficiency in vehicles, the average growth rate for this program is about 1 percent over the Regional Plan period. General funds are road expenditures the agencies spend from their general fund or other local revenues. The data is derived from the annual State Controller's report, and it's estimated to grow by about 3 percent per year.

Future Local Revenues

A provision in the *TransNet* Extension Ordinance specified that "SANDAG agrees to act on additional regional funding measures (a ballot measure and/or other secure funding commitments) to meet the long-term requirements for implementing habitat conservation plans in the San Diego region, within the timeframe necessary to allow a ballot measure to be considered by the voters no later than four years after passage of the *TransNet* Extension." A component of the future ballot measure is to fund transit operations. The SANDAG Board has periodically reassessed the timing of a new measure since the passage of *TransNet,* and has amended the particular section of the Ordinance to extend the deadline from 2008 to 2016. Using the existing *TransNet* program as the basis for estimating revenues, the assumption is that a quarter-cent of the sales tax would fund transit projects. These revenues are assumed to begin in 2020. The rate of growth assumed is the same as with *TransNet* and TDA.



Passenger Fares

These revenues are what passengers pay to ride on public transportation, and they help support transit operations. The revenues through FY 2019 are based on the short-term budgets as estimated by the two transit agencies – the North County Transit District (NCTD) and the Metropolitan Transit System (MTS). The farebox recovery ratio, assumed at 35 percent, is continued through the life of the Regional Plan.

Other Local Revenues

Other locally generated revenues include toll road funding, public/private partnerships, FasTrak revenues, and motorist aid services. Toll road revenues are based on the planned Managed Lanes and would help off-set operational costs and transit services.

Contributions from Tribal Governments

Tribal Governments make contributions toward improvements on regional arterials and county roads, and investments in shuttles connecting regional transit to Tribal Lands, and facilities to support carpools and vanpools.

State Funding

State Transportation Improvement Program

State funding for transportation improvements comes from taxes on gas and diesel fuels, truck weight fees, and other sources. These funds are distributed by the state to the region through the State Transportation Improvement Program (STIP), which is administered by the California Transportation Commission (CTC).

Beginning with the 1998 STIP, a greater share of the STIP was made available to regional agencies such as SANDAG. This gave them the flexibility to better determine how funds should be used. Overall, transportation funding has fluctuated

significantly as the economy has gone through ups and downs. For example, the 1998, 2000, and 2002 STIP cycles were built on optimistic funding scenarios, but these were followed by a severely constrained STIP cycle in 2004.

The landmark transportation infrastructure bond, Proposition 1B, injected much needed revenues in the middle of the 2006 STIP cycle. With these revenues came some relief to transportation funding at a time when improvements were badly needed. This infusion was short-lived, however, as the Great Recession beginning in 2007 led to flat and even declining gas tax revenues. Interestingly, gas tax revenues also have fallen with the increased number of vehicles on the road that are more fuel efficient or use alternative sources of energy such as electricity. All these changes have impacted STIP cycles from 2008 through 2014. In short, traditional sources of funding that pay for transportation improvements have not kept pace with the demands of a growing population and an aging transportation system.

California's economy has improved in recent years and the state budget has stabilized, but transportation funding continues to be strained. In its 2014 Annual Report, the CTC urged the Governor and the Legislature to address near-term funding needs to preserve the existing transportation system. The report notes: "For over a decade the Commission has implored the Legislature and the Administration to address this dire situation. No longer do we have the luxury of time; definitive and non-partisan action is required immediately to ensure the economic stability and public safety of the people we serve." There are a number of options being discussed to augment revenue sources for transportation. Each comes with both challenges and opportunities for transportation programs. Some of the options include: mileage-based user fees, toll pricing, an increase to the fuel tax, an increase to vehicle weight fees, an increase to other vehicle-related fees, and opportunities for more public-private partnerships.

State Highway Operations and Preservation Program (SHOPP)

The CTC also is responsible for allocating funds to this program, which the state administers. State law requires that these expenditures be given priority over new construction, and they are funded "off the top" of the State Highway Account. Caltrans develops a SHOPP ten-year plan from which projects are prioritized and selected during SHOPP updates.

Transportation Bond/Infrastructure Program

Although the Legislature has failed to pass a comprehensive and sustainable transportation funding program, it has recognized the need to provide funding. Historically, the Legislature and voters of the state have passed a number of bond measures to fund transportation such as the Traffic Congestion Relief Program, Propositions 108/116, Proposition 42, and Propositions 1A and 1B. Given this history, the Regional Plan includes a bond measure in the future similar to prior measures for transportation projects. The funding assumption is based on the historical share the region has received from these efforts. To be conservative, revenues begin in FY 2020.



Future State Revenues for Transportation

As noted earlier, some of the options for funding transportation include a user based mileage fee. Senate Bill 1077 (DeSaulnier), enacted in 2014, would authorize such a fee. The legislation calls for an advisory committee to study and develop options that can be implemented as a pilot project in 2017. The state of Oregon started its pilot program in July 2015, while the state of Washington is reviewing the potential for a similar program. Other states around the country are studying the potential of a user based mileage fee as a transportation funding source that may replace or supplement the current gas tax.

High-Speed Rail

The Governor and the state have committed to building a high-speed rail system. Senate Bill 1029 (Hancock, 2012) appropriated $8 billion in federal and state funds to construct the first segment of the high-speed rail in the Central Valley. Based on the current plan, the system will run from San Francisco to the Los Angeles basin by 2029, and trains will make this trip in less than three hours. The line will be extended north to Sacramento and south to San Diego. There is no specific timeline for the San Diego segment, so the Regional Plan assumes that the San Diego segment may be built toward end of the Regional Plan period.[7]

Other State Funds

Other funds administered by the state include the Active Transportation Program for non-motorized projects, the Cap-and-Trade Program as described in Chapter 2, the State Transit Assistance program dedicated toward public transit operations and capital support, and state managed federal programs such as the Highway Bridge Program.



Federal Funding

SANDAG is working toward the completion of federally-funded transportation projects, while also seeking additional discretionary funding for improved transportation infrastructure at the border, major transit projects, and other transportation improvements. The agency continues to work with regional, state, and national partners toward the reauthorization of MAP-21 – the Moving Ahead for Progress in the 21st Century Act. MAP-21, which President Obama signed into law in 2012, is the first long-term highway authorization bill signed into law since 2005.

SANDAG is collaborating with other regional agencies, transportation providers, organizations, and associations statewide to develop a set of principles for the next reauthorization of MAP-21.

SANDAG is collaborating with other regional agencies, transportation providers, organizations, and associations statewide to develop a set of principles for the next reauthorization of MAP-21. The effort to build support for these principles continues, so that California can present a clear and unified position as federal legislation is developed. It remains unclear when MAP-21 will be reauthorized.

The Highway Trust Fund, which is the source of most federal funding for the nation's roads and transit infrastructure, has seen revenues fall short of expenditures for more than a decade. Drawing down trust fund balances and transferring money from the general fund have served as temporary fixes, but these

measures have not addressed the underlying challenge of declining revenues from the federal fuel excise tax of 18.4 cents per gallon on gasoline and 24.4 cents per gallon on diesel fuel. The Congressional Budget Office projects that without reforms, shortfalls in the Highway Trust Fund will grow to $162 billion over the next ten years. As with the state funds, the Regional Plan assumes several potential options, such as an increase in the federal fuel tax on gasoline.

While these efforts are underway, the Regional Plan assumes continuation of the various funding programs as well as new federal revenue sources based on the discussions and actions by Congress.

Federal Transit Administration (FTA) Programs

The Regional Plan assumes that the formula programs – Sections 5307, 5337, 5339, 5310, and 5311 – will continue. The majority of these funds are passed through to the two transit agencies while others also are passed through to social services transportation providers. The Regional Plan also includes assumptions of discretionary funding for both large scale projects under the New Starts Program as well as smaller projects under the Small Starts program.

The Regional Plan also includes the use of Grant Anticipation Notes (GAN) backed by the FTA New Starts Program, specifically for the Mid-Coast Trolley project. This project is rated very high in the New Starts Program for FY 2015. Due to the anticipated long duration to fully appropriate all the New Starts funds, SANDAG plans to securitize the FTA funds in order to complete the project.

Federal Highway Administration (FHWA) Programs

As with the FTA formula programs, the Regional Plan assumes the continuation of the FHWA formula programs, which include the Congestion Mitigation and Air Quality Improvement program and the Regional Surface Transportation Program. Discretionary funds are not included in the early years; however, the Regional Plan assumes these funds would become available after 2020.

Future Federal Revenues for Transportation

Like California state legislators, federal lawmakers continue to discuss approaches for a long-term, sustainable transportation bill. The federal gas tax has not been increased since 1993 and has not been indexed for inflation. As a result, the Highway Trust Fund has been running on empty. Congress does recognize the crisis and various proposals have been introduced and discussed. In the meantime, the Regional Plan assumes that a potential increase to the federal gas tax, beginning in 2020, will be conservative.

Addressing Potential Funding Shortfalls

Planning for investments funded with anticipated income can be challenging. Table O.1 in Appendix O: Transportation Financial Background reviews each revenue source, the risks associated with relying on them for projects, and what can be done if anticipated revenues fall short. Although the revenue forecast is based on trends for existing revenue sources as well as reasonable assumptions about potential changes in the future, from time to time there are significant changes that cannot be easily predicted. These include economic downturns and the approval of new funding sources. Fortunately, the plan is reviewed and updated every four years to take into account these changes, and to make the necessary adjustments to the timing and availability of revenues to pay for all the projects in the Regional Plan.

State Route 125

SANDAG entered into a 40-year franchise agreement with Caltrans in December 2011 to manage and operate the State Route 125 (SR 125) South Bay Expressway Toll Facility. The SR 125 Toll Road is a 10-mile, traditional toll facility that lies on the southernmost portion of SR 125. The program is managed to be financially self-sufficient, with all management, operating, and debt service expenses being paid for from toll revenue generated on the facility. Revenues are generated from tolls, toll related activities, and interest. Table 3.3 displays the projected revenues and costs associated with this facility. Once the debts for the facility are paid off, toll revenues must be used for maintenance, operations, and transit within the corridor.[8]

Table 3.3

SR 125 South Bay Expressway Toll Facility: Projected Revenues and Costs

Financial Model (In Millions, 2014 Dollars)	2011-2020	2021-2035	2036-2043	Total
Total Revenues	$287.4	$966.1	$880.5	$2,134.0
Operating Expenses	$89.8	$231.6	$159.9	$481.3
Major Maintenance Reserves	$129.7	$403.5	$687.8	$1,221.0
Debt Service	$67.9	$331.0	$32.8	$431.7

Future Needs

What if our region had an unlimited budget? SANDAG considered this too, in order to get a clear-eyed view of what the region is actually expected to need in the years leading up to mid-century. This "Unconstrained Needs Analysis" provided a cost estimate for additional projects, programs, and services that would meet our transportation demands through 2050. This included the costs for operating, maintaining, and rehabilitating the transportation system regionwide. Obviously, this would cost more than our actual investment plan, but it's worth looking at because it shows the total actual needs for the region (See Table A.5 in Appendix A: Transportation Projects, Costs, and Phasing).[9]

Looking Ahead

In the next chapter, we'll review the tangible benefits of the Regional Plan, many of which come from the transportation, smart growth, and environmental mitigation investments discussed in Chapter 2. These are benefits for people throughout the region, regardless of where they're from, their economic circumstances, or their background. Our Regional Plan was created to achieve gains across our region, enhancing the quality of life for all of us.



Endnotes

[1] For more details about each source of funding, see Appendix O: Transportation Financial Background.

[2] *TransNet* Extension Ordinance and Expenditure Plan Commission Ordinance 04-01. Section 16 of the Ordinance "lock-boxes" some projects such as State Route 76 and the Mid-Coast light rail line by providing that these projects cannot be removed from the Expenditure Plan without a vote by the electorate.

[3] A list of projects in our investment plan can be found in Appendix A: Transportation Projects, Costs, and Phasing.

[4] The Active Transportation Program includes the Regional Program, Local Bike Projects, Local Pedestrian/Safety/Traffic Calming, and Safe Routes to School.

[5] Please see Appendix E for a more detailed breakdown of the Transportation Systems Management and Transportation Demand Management expenditures by phase.

[6] Appendix T: SANDAG Travel Demand Model and Forecasting Documentation

[7] High-speed Rail (HSR) is not a proposed Regional Plan project. Its funding and implementation will be determined by the State of California rather than by entities within this region. However, its revenues and expenditures are included in the Regional Plan because the HSR segment between Los Angeles and San Diego, via the Inland Empire, is expected to provide connectivity for the San Diego region with the rest of the state and the HSR project. Therefore, it is an integral part of the planned transportation infrastructure for our region.

[8] Streets and Highways Code section 143.1(b).

[9] A list of these unconstrained projects is shown in Appendix A.



Chapter 4
Benefits of the Plan

San Diego FORWARD
The Regional Plan

4 Benefits of the Plan

Fostering economic vitality

How We Can All Benefit

Making our transportation system more efficient will help generate tens of thousands of jobs, billions of dollars in economic output, and ultimately create economic opportunity for people across the financial spectrum. In other words, a healthy transportation system makes a robust regional economy possible.

A healthy transportation system makes a robust regional economy possible.

San Diego Forward: The Regional Plan (Regional Plan) does more than just outline a construction effort to build transportation choices. It makes connections that will fuel the continued success of the economy: it connects businesses with customers, future employees with education and training, suppliers and manufacturers with retailers and services industries. The more freely these connections flow, the more economic benefits will be realized.

When we think about our region's economic health, it's important to recognize that the transportation system:

- **Moves goods and services** through our binational megaregion.
- **Provides access and connects people and neighborhoods** of all income levels to jobs, education, recreational opportunities, and key destinations throughout the region.
- **Promotes health** through a variety of transportation choices that encourage active living.
- **Creates jobs** by efficiently connecting workers with jobs through construction and operation of the transportation network.

While our Regional Plan helps drive economic growth, it also will achieve environmental sustainability by guiding the region toward more choices for mobility, smarter growth, protected open spaces, healthier communities with more active people and less air pollution, more efficient water use, and reduced greenhouse gas emissions – benefits we've talked about in previous chapters. In addition, the economic analysis conducted for the Regional Plan shows that its benefits outweigh its costs by a factor of nearly two-to-one, meaning that for every dollar invested in transportation, the region gets back almost two dollars in benefit.[1]



The Regional Plan shows that its benefits outweigh its costs by a factor of nearly two-to-one, meaning that for every dollar invested in transportation, the region gets back almost two dollars in benefit.



Planning for Economic Prosperity

With long-range planning, our region can capitalize on, improve upon, and protect the qualities that make it a great place to live and drive a successful local economy: an educated workforce, energetic centers of employment, a spectacular natural environment, close proximity to the international border, and an abundance of recreational activities – to name just a few of our best attributes.

Smart growth, as we've discussed, can help us retain many of these attributes and make them better. Many American metropolitan areas are being reinvigorated with mixed-use, "walkable" developments that are served by a variety of transportation choices, including more frequent and farther reaching networks of public transit. These developments are especially attractive to younger people entering the workforce.[2] They also serve the needs of an increasing number of older individuals in our region who have varied transportation needs and may rely on transit and/or specialized transportation services.

Our circulatory system

The transportation system acts as an economic circulatory system, allowing businesses to access raw materials, ship finished goods, and reach customers. To function at its best, it must efficiently connect workers with jobs, future employees with education and training, and industries with one another, as well as with points outside San Diego County. The region's current transportation network relies on an efficient network of freeways and arterials, multiple airports, a seaport, expanding

bike routes and other options for active transportation, a growing transit system, and shared mobility services. With the population and job growth projected in our future, keeping this system running well and adding layers of transportation choices in an environmentally-conscious way will be critical to our region's economic future. Put simply, an efficient and healthy transportation system *reduces costs* for businesses and people, and it does this sustainably.

Keeping the transportation system running well and adding layers of transportation choices in an environmentally-conscious way will be critical to our region's economic future.

A high-quality transportation system that serves a growing region not only fuels its economy, but it also determines *how* that economy grows. The price of housing and where it's situated, how much tax revenue municipalities take in to serve the region, and where businesses decide to locate all are influenced by the quality of local and regional transportation. Meanwhile, development patterns impact the kinds of transportation options we have. And those transportation options, in turn, influence our access to jobs and residential areas, our traffic congestion and commute times, the state of our natural environment, how healthy we are, and how and where business develops.

Connecting with public investments

We know that the physical "clustering" of similar types of businesses can stimulate the growth of an industry, innovation, and entrepreneurship.[3, 4] The biotech and brewing industries in San Diego are great examples. Retail, manufacturing, shipping, and construction businesses need transportation infrastructure and particular patterns of land use to thrive. Businesses depend on roadways, rails, and ports, but they also depend on sidewalks and parks to attract customers and employees. Supporting emerging technologies, such as wireless communications that help maximize the efficiency of transit and highways, helps stimulate an area's business climate as well. The economics of public investments must be properly considered in order for policy-makers to make effective decisions that help promote the growth of industries and entrepreneurial areas vital to the region.

Promoting Both Economic Vitality and Equity: The Big Picture

Improving our economy is critical for everyone. Our goal is a balance between economic sectors - characterized by many different types of industries, a healthy middle class, a strong labor force, and high paying jobs. However, the San Diego region today has an "hourglass economy" – with many high-paying jobs and many low-paying jobs, and relatively few in between. This phenomenon of a shrinking middle class has been seen nationwide and it presents serious challenges.

One alarming trend is that the percentage of people in poverty in the San Diego region has grown steadily, from roughly 11 percent in 2007 to more than 14 percent in 2013. This percentage has continued to rise even as unemployment has begun to fall and incomes have rebounded since the Great Recession. It's clear that not everyone shares in the region's growing economic prosperity.



Poverty and persistent inequality undermine our regional economy. Jobs have rebounded, but wage growth has not kept pace. Higher home prices relative to lower wages results in less potential for taxable retail sales growth and sales tax revenues. For our region's economy to truly thrive, everyone must have the opportunity to prosper.

By making investments in lower-income and minority communities, the Plan gives everyone an opportunity to participate in the economy, which benefits all of our communities.

The need for widespread access to quality transportation

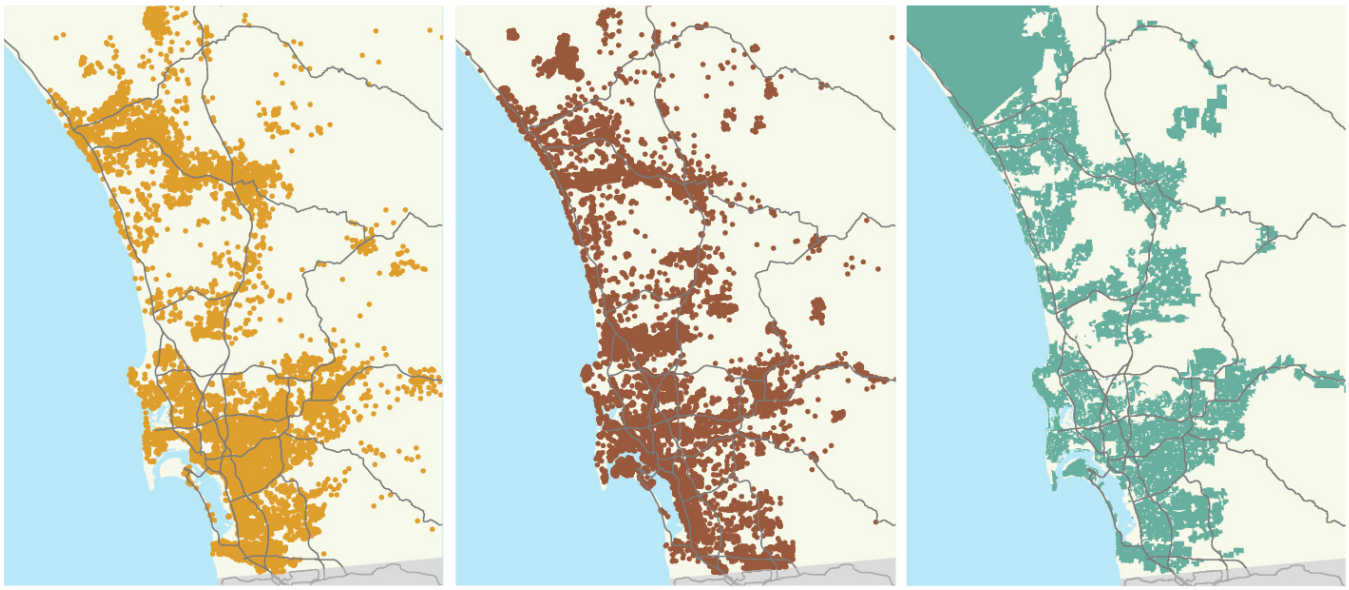
One of the biggest challenges for low-income communities, and one that can prolong poverty, is limited access to transportation. Low-income individuals in areas without adequate public transit often have to spend disproportionate amounts of time and money to access education, jobs, and recreation. These very practical, transportation-related barriers make it difficult for people in poverty to access education and training, cutting into our region's potential for producing skilled workers. Improving transportation options for low-income neighborhoods can help people lift themselves above the bottom of the region's "hourglass" economy. Widespread access to quality transportation is equally important to employers, who need to draw from a broad pool of potential employees of varying skill levels.

It's difficult to overstate the importance of transportation options for people who are economically disadvantaged. Without access to transportation, it's extremely difficult for poor people to improve their economic prospects. For many low-income individuals, the costs of owning and operating a car are prohibitive, and having one is simply not an option. As a result, investing in more transportation options regionally can increase economic opportunities for people who most need it.

Figure 4.1

2050 Low-Income Population Access to Jobs and Higher Education

October 2015



Our Regional Plan will make transportation investments in low-income communities, increasing access to high-frequency public transit by 24 percent,[5, 6] as shown in Figure 4.1. The Regional Plan's benefit-cost analysis concludes that low-income individuals will receive equitable benefits, when compared with others throughout the region.

One key to better connecting low-income communities with the rest of the economy will be the changing land use patterns reflected in the Regional Plan. Many low-income communities in the region are close to city centers. And like other metropolitan areas around the country, the San Diego region has seen a resurgence of development in city centers or downtowns, and in surrounding neighborhoods. It's a trend that our Regional Plan supports with investments in public transit projects and incentives for smart growth, biking and walking, and other projects that will encourage people to travel without a car.

Achieving Social Equity

Social equity and environmental justice aren't just obscure academic terms. They are embedded in the cherished right to equal opportunity that we value so much as Americans. By making investments in lower-income and minority communities, the Regional Plan gives everyone an opportunity to participate in the economy, which benefits all of our communities. In transportation planning, striving for social equity and environmental justice requires involving a wide variety of communities and stakeholders so they can help shape their futures. We should all have the opportunity to participate in planning the future of our region. For most of us, it's difficult to get involved in regional planning due to our busy lives. For some of us, it

Defining Social Equity:
SANDAG uses the term **social equity** as shorthand for an overarching goal that combines the concept of environmental justice, the federal laws in Title VI, the Americans With Disabilities Act (ADA), and National Environmental Policy Act (NEPA), and various other federal and state laws intended to promote an equitable distribution of benefits and burdens from SANDAG projects and programs.

Defining Minority: The term "minority" is described by the Federal Highway Administration as:

- Black (having origins in any of the black racial groups of Africa);
- Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish culture or origin, regardless of race)
- Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or
- American Indian and Alaskan Native (having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

is particularly hard because of additional barriers to involvement that include language, not understanding our rights, a lack of familiarity with the planning process, and in some cases a fear of getting involved. In the not so distant past, areas with high concentrations of low-income individuals and minorities, as well as members of federally recognized tribes, were underrepresented in the planning process. SANDAG carries out extensive outreach to ensure that these groups have a meaningful voice in the regional planning process.[7]

As SANDAG developed the Regional Plan, from the beginning, we partnered with a network of Community-Based Organizations (CBOs) from a wide range of disadvantaged communities in the region. These organizations helped to ensure that the needs and issues of their communities were heard and considered in a timely manner throughout each step of the planning process. They also helped to shape how we measured whether the Regional Plan improves people's access to transportation choices in an equitable manner.[8] Access to key amenities is critical for everyone. We need to be able to count on the transportation system to get us to our jobs or to school or to the doctor, as well as to the store, or the park, or the beach regardless of our income or background. In addition, through our government-to-government relationship, SANDAG and the tribal nations in the region worked together throughout the planning process to make sure that tribal needs and concerns were heard and considered.[9] The San Diego Regional Tribal Summit, held in April 2014, allowed tribal nations and the SANDAG Board to develop coordinated strategies to pursue. Twelve tribal nations provided us with their own tribal long range plans to include in the Regional Plan to facilitate better coordination.[10]



San Diego Forward: For an equitable future

Working with CBOs, SANDAG identified specific populations that would need special attention in the planning process. These included minorities, people with low income (200 percent of the Federal Poverty Rate), and seniors who are 75 years or older. We performed a social equity analysis using several performance measures to determine how the Regional Plan would benefit or burden disadvantaged populations in comparison to the rest of the region. The key is that no one group or population should get the short end of the stick; the benefits and the burdens of the Regional Plan should be equitably distributed.

In conducting its social equity analysis for minority, low-income, and senior populations,[11] SANDAG used a threshold of significance of 20 percentage points. The analysis indicates, however, that implementation of the Regional Plan will not cause any disproportionate effects or disparate impacts for the low-income, minority, or senior populations in our region.[12] Here are some key findings from our social equity analysis:

- In 2012, 46 percent of low-income people in our region had access to high- frequency transit; in 2050, with the Regional Plan's projects in place, 70 percent will have access. When compared to groups who are not low-income, the low-income populations will benefit equally in their access to high-frequency transit.
- Access to bike facilities improves for everyone substantially, and equitably. In 2012, 55 percent of minorities had access to those facilities, but with the Regional Plan, 64 percent will be within a quarter of a mile from a bike facility by 2050.
- Overall, disadvantaged populations will share proportionately in having better access to more transportation options.
- No particular population group will experience heavier burdens of toxic air emissions than any other group as a result of the Regional Plan.

Defining Environmental Justice: Environmental justice is defined as the **fair treatment** and **meaningful involvement** of all people regardless of race, color, national origin, or income. **Fair treatment** means that no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental, and commercial operations or programs and policies. **Meaningful involvement** means that: a) potentially affected community members have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; b) the public's contribution can influence the regulatory agency's decision; c) the concerns of all participants involved will be considered in the decision-making process; and d) the decision makers seek out and facilitate the involvement of those potentially affected.

Recognizing the value of Tribal Nations in the region

Our region is enriched by the presence of 18 tribal nations. The tribal members of today's bands represent four Indian cultural/linguistic groups (the Luiseño, the Cahuilla, the Cupeño and the Kumeyaay), who have populated this entire region for more than 10,000 years, taking advantage of its abundant natural resources and diverse ecological system for their livelihoods. Today these nations support the regional economy through their economic activities such as gaming, energy production and hospitality.

Gaming is a traditional social activity among many tribal nations; San Diego County now has nine tribal gaming facilities, which is the greatest number of Indian gaming facilities in any county in the United States. Gaming-related and other types of development have led to rapid economic growth for a number of tribes, while also providing jobs and stimulating the regional economy. In the San Diego region,

statistics show that the Indian gaming industry as a whole has created more than 10,000 jobs in the region, resulting in a $1 billion industry with approximately $263 million in goods and services purchased annually and $500 million in payroll. It should be noted, however, that poverty levels among the Native American population remain below the national average, and some gaming tribes have been much more successful than others.

Over the past ten years SANDAG and the Southern California Tribal Chairmen's Association (SCTCA) have developed a government-to-government framework to engage in planning dialogue and action at the regional level. Collaboration with our tribal counterparts has focused on transportation, cultural resources, conservation, energy and economic development.

Realizing the benefits of living on an international border

The San Diego region and northern Baja California are linked socially and economically. Think about the amount of goods and number of people flowing everyday across our borders. The ports of entry along the border, as we discussed in Chapter 2, are among the busiest in the world. The San Diego region imports up to 90 percent of its energy and about 80 percent of its water each year, and it shares delivery systems for these resources with Mexico. Consequently, roadways, ports of entry, energy transmission lines, and water delivery systems are all issues of common concern for the San Diego region and our neighbors to the south. Collaboration with our Mexican counterparts has focused on transportation and housing, energy and water supply, the environment, and economic development. More recently collaborative efforts also have included active transportation, public health, and climate change (see Appendix U.14: Borders).

Our region's economy is binational in character, especially when considering the industry clusters that thrive here. Our geographic location means there is some reliance on Mexico's large labor force. The economy of Tijuana and the greater



Baja California region have benefited from employment opportunities across the border in the San Diego region, and our region has benefited from employment opportunities in Baja California. Mexico has taken several steps to bolster economic development along its northern border, such as the creation of the maquiladora program. The maquiladora industry is a big source of employment opportunities in Baja California and in the San Diego region; you only have to look at the large number of transnational corporations with sister facilities north of the border.

Employment in the maquiladora industry in Baja California doubled between 1991 and 2004. In Tijuana, employment in the sector reached its peak in 2008, with more than 200,000 people employed. There are now about 195,000 people employed by 580 maquiladora companies in Tijuana. That number represents 11.5 percent of Mexico's total number of manufacturing plants.[13]

By taking advantage of research and development hubs in San Diego, and advanced manufacturing capabilities in Baja California, goods are jointly produced in the United States and Mexico. They often cross the border many times before becoming finished products. This phenomenon of joint production is illustrated by the fact that Mexican exports to the United States contain 40 percent U.S. content, which greatly exceeds the U.S. value-added of any other foreign imports.[14] This manufacturing interdependence has huge implications for the local, regional, and national economy, given the enormous scale of U.S.-Mexico trade.

The economy of Tijuana and the greater Baja California region have benefited from employment opportunities across the border in the San Diego region, and our region has benefited from employment opportunities in Baja California.





Bilateral trade

The ports of entry between the United States and Mexico in our region are the main conduits for our economic relationship. The massive number of people and goods that cross the international border, and the intense economic activity at the border, are testaments to the close economic ties between the San Diego region and Baja California. In 2014, the dollar value of bilateral trade that passed through the ports of entry connecting San Diego County and Baja California was more than $40 billion.

In addition to trade, crossborder tourism, commerce, and commuting also are important players in the regional economy. For example, it's estimated that Mexican citizens spend $3 billion annually in San Diego County. That spending accounts for more than $1 out of every $15 in retail sales.[15] Similarly, tourism in Baja California is a key source of revenue for that region, and anecdotal evidence suggests that northern Baja California is making up for a shortfall in affordable housing in San Diego. These trends mean that people who live on one side of the border but work on the other are subject to significant commuting delays at the ports of entry every day – damaging both economies and highlighting an important transportation-related problem that is addressed in this Regional Plan through the development of the State Route 11 project and new Otay Mesa East Port of Entry (POE). State Route 11 will connect the future POE with the rest of the region's freeway system via State Route 905 and the South Bay Expressway and will offer an alternative to the highly congested border crossings at Otay Mesa and San Ysidro, benefitting the regional economy and the environment by reducing border-crossing wait times.



Megaregions

Residents of San Diego County live in two overlapping megaregions – interdependent groups of metropolitan areas in a single geographic area bound by interdependent relationships on several levels: environmental, economic, shared border infrastructure, a linked transportation system, related land use policies, history, and culture. Our binational community, like other megaregions around the world, has an opportunity to leverage its crossborder economic relationships to become more globally competitive.

The San Diego region actually is considered part of two megaregions – the greater California megaregion and the greater binational megaregion. The greater California megaregion includes five important metropolitan areas in terms of freight movement (Los Angeles/Long Beach, Sacramento, San Diego, San Francisco/ San Jose, and Las Vegas, Nevada). The four metropolitan centers in California are located on or nearby the Interstate 5 (I-5) corridor.[16]

The San Diego region is considered part of two megaregions – the greater California megaregion and the greater binational megaregion.

Our binational megaregion is part of the "Cali Baja Binational Megaregion Initiative," which promotes the entire border region between California and Baja California, Mexico as a globally unique, binational location for business investments.[17] The San Diego-Northern Baja California region is becoming an increasingly important, interdependent trade and commuting corridor with a distinct global competitive advantage. It's important for us to do all we can to understand the diverse landscapes, politics, economics, languages, and cultures of our geographic international neighbor as we plan for this unique and promising binational megaregion.

The Economic Analysis of our Regional Plan

The benefits of the Regional Plan outweigh the costs by a factor of almost two-to-one, meaning that for every dollar invested in the Plan, San Diegans receive almost two dollars of benefit.

To measure the potential impacts of our Regional Plan on the local economy, SANDAG developed a detailed economic analysis. This can be found in Appendix P: Economic Impact Analysis and Competitive Analysis. The results of the economic analysis help clarify that the Regional Plan is not simply a transportation plan, it's crucial to the economic health of the region. The analysis has three parts.

- **Benefit-Cost Analysis:** Uses transportation and economic modeling to compare the benefits of the transportation investments with the costs of the projects.
- **Economic Impact Analysis:** Explores how those benefits, such as reduced travel times and operating costs, translate into increased economic activity (more output, more jobs) for the San Diego region.
- **Economic Competitiveness Analysis:** Takes a broader view of the regional economy. It looks at how transportation and planning efforts can reduce costs and boost growth and opportunity. It also considers the views of business leaders to get real-world perspectives on the potential impacts of our Regional Plan on the overall business climate.

In essence, the first two parts of the analysis provide important quantitative measures of the economic impacts of our Regional Plan, and the third part provides broader perspectives about the interrelationships of our economy and the Regional Plan.

The **Benefit-Cost Analysis** (BCA) uses the outputs of the SANDAG activity-based travel model to determine if the benefits outweigh the costs. This analysis tells us things such as how much time and money drivers and transit riders will save, and how much safer, healthier, and cleaner our system becomes as the Regional Plan is implemented. We can then compare those monetized benefits to the cost of the Regional Plan to get a "benefit-cost ratio." The results indicate that the benefits of the Regional Plan *outweigh the costs by a factor of almost two-to-one (1.86)*, meaning that for every dollar invested in the Regional Plan, San Diegans receive almost two dollars of benefit. The primary driver of these benefits is time savings, which represent 80 percent of the benefits, followed by reduced operating costs, and the rest of the benefits categories. Detailed results and methodology are available in Appendix P, which spells out the methods and results of the BCA in detail.



The **Economic Impact Analysis** measures: 1) the economic effects of the stimulus obtained from construction and operation of the transportation system; and 2) the economic effects of a more efficient transportation system (compared with a "no-build" scenario). The combined impacts are listed in Table 4.1 and in Figures 4.2 and 4.3, and show an average increase in the San Diego economy of roughly 53,000 jobs and $13 billion in gross regional product (GRP) per year, versus the "no-build" scenario. About 11,500 of those jobs, and $1.2 billion of the GRP

increase, result directly from transportation investment. The rest, over 40,000 jobs and over $12 billion in GRP, result from private sector investments enabled by the improved efficiency in the transportation system. This equates to an increase of 2.5 percent in employment, and 4 percent in GRP between 2012 and 2050. This increased economic activity also will put an average of nearly $6 billion in additional income into the pockets of San Diego residents.[18] These benefits result from improvements in the ability of firms to access inputs, tap into a wider labor pool, and save on transportation-related production costs. Basically, it translates the monetary benefits calculated in the BCA into increased economic activity.

Table 4.1

Economic Impacts of San Diego Forward: The Regional Plan

(in 2014 dollars)

	Average Annual Jobs (2014-2050)	Average Annual GRP (2014-2050)	Average Annual Income (2014-2050)
Impacts from Construction and Operation	11,427	$1.2 billion	$0.9 billion
Impacts from Increased System Efficiency	41,097	$12.2 billion	$5.0 billion
Average Total Impacts	**52,524**	**$13.4 billion**	**$5.9 billion**

Figure 4.2

Increase in Gross Regional Product from Implementing San Diego Forward: The Regional Plan

(in billions 2014 dollars)

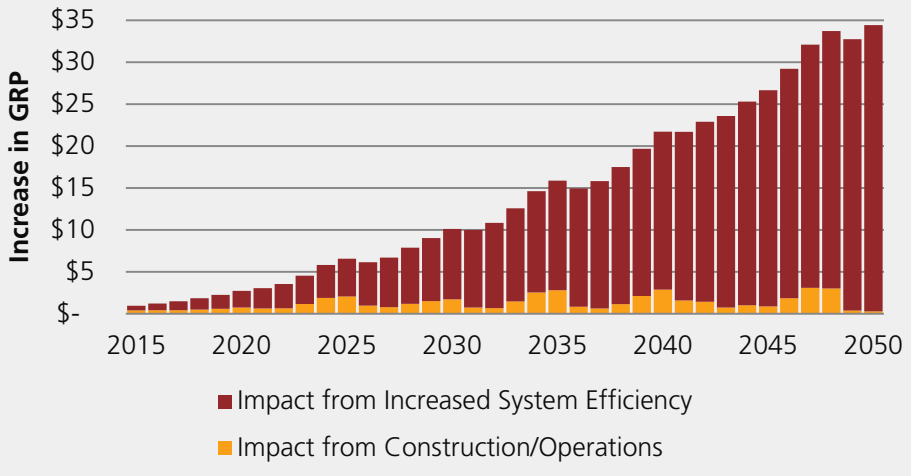
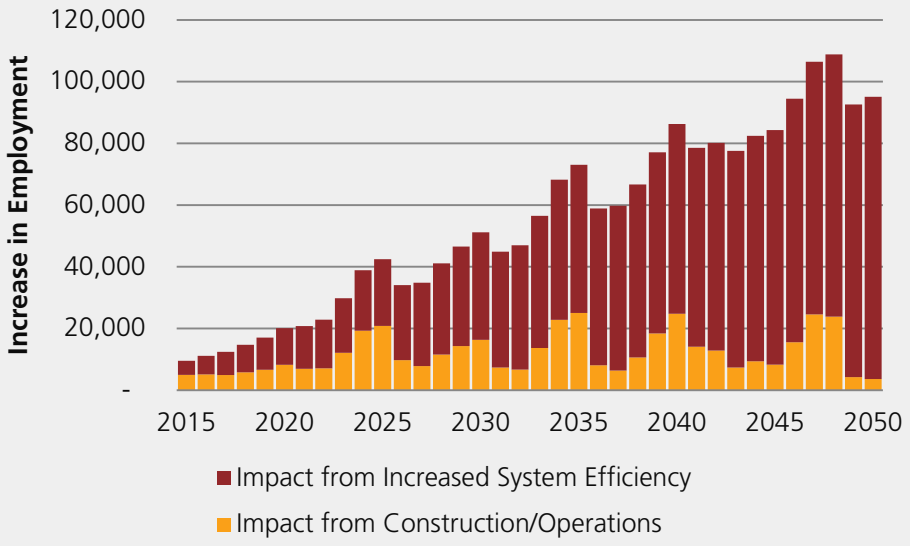


Figure 4.3

Job Growth from Implementing San Diego Forward: The Regional Plan



The **Economic Competitiveness Analysis** provides a more qualitative investigation into the economic effects of the Regional Plan. It examines the benefits of proposed transportation investments on industry clusters as a result of reducing travel times. These key industry clusters provide higher wage jobs in the region compared to non-cluster industries, and are fundamental to the region's economic development.

SANDAG compared travel times for auto and transit travel between the no-build scenario and the Regional Plan transportation network. With implementation of the Regional Plan, travel times would improve compared with the no-build scenario for both auto and transit in key travel corridors. With shorter travel times, important

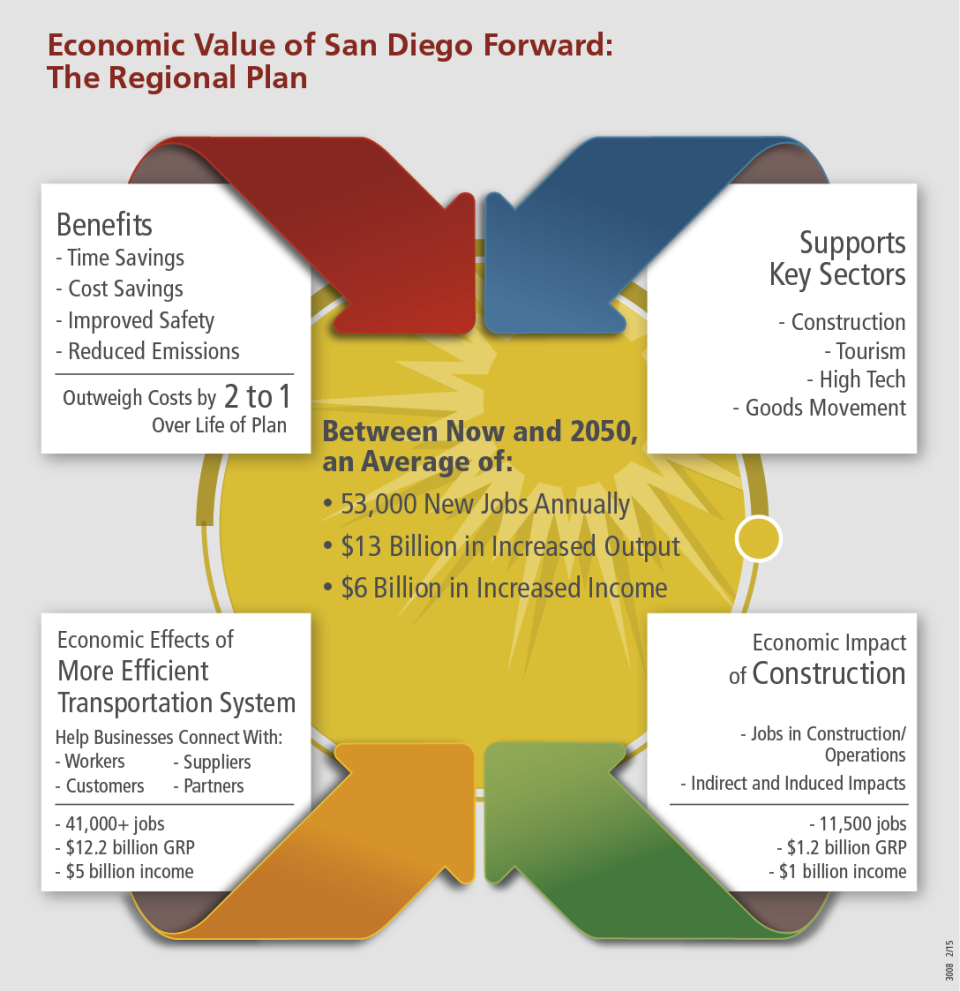
San Diego industries, such as the high-tech sectors (often called "industry clusters"), would have easier access to employees, suppliers, partners, and customers. And residents living near transportation corridors would have better access to jobs in these important sectors. Because transit is projected to experience greater time savings compared to automobiles, it is expected that transit will grow more attractive as a transportation option in the future. And transit stops can serve as focal points around which industry clusters can agglomerate for economic efficiencies.[19] Thus, investment in transit could support growth in high-wage industry clusters that might not otherwise be achievable solely through additional road capacity.



The availability of affordable housing also influences the success of important industry clusters – and on the overall economic health of the region. The economic competitiveness analysis looks at the San Diego region's capacity to provide affordable housing in key transportation corridors that serve industry clusters. The analysis helps assess whether investing money to improve our transportation system will result in affordable housing costs and improving the standard of living of workers in those corridors. Specifically, the analysis evaluates the average cost of buying or renting a home along various transportation corridors in the region (I-15, as an example), and comparing those costs to the average wages of employees of the industry clusters situated along that corridor. The results suggest that workers earning the average wage of those industry clusters along most transportation corridors in the region will have difficulty purchasing a house in that corridor. However, the analysis also indicates that a broad range of rental housing is within the reach of the average cluster worker in these travel corridors. Overall, the analysis concludes that investments in transportation reduce the costs of traveling and improve productivity in a corridor, potentially leading to a rise in wages. However, this analysis suggests that even after transportation investments are made it may still be difficult for San Diego residents to afford houses along the transportation corridors, and more high-wage jobs are needed.

The economic competitiveness analysis also includes detailed background literature, synthesized comments, and observations from economic outreach activities. It presents a few brief case studies from around the United States to illustrate how transportation investments can spur economic development. All of this information is in Appendix P.

SANDAG has attempted to capture the full range of economic effects that the San Diego region will realize from the Regional Plan with this analysis. The results are summarized in the following graphic, which shows the interrelationships of the several analyses. The average of roughly 53,000 jobs and $13.4 billion in GRP annually between now and 2050 indicate that the Regional Plan will be a boon to the regional economy in the long-term. And there are many unquantifiable economic benefits stemming from the Regional Plan that will help make the San Diego region more prosperous, sustainable, and equitable for businesses and residents in the future.



Taking Action

Developing our Regional Plan is one thing. Taking action is another. In the next and final chapter, we'll discuss key actions we'll take to implement the Regional Plan. We'll also review how we'll check our progress over time, to ensure that we realize our ambitious vision for the future.

Endnotes

[1] See Appendix P: Economic Impact Analysis.

[2] "Companies Say Goodbye to the 'Burbs"; Wall Street Journal, December 4, 2013; http://online.wsj.com/news/articles/SB10001424052702304281004579222442197428538

[3] "Why Today's Start-Ups Are Choosing Urban Lofts Over Suburban Office Parks", Atlantic Cities, September 4, 2013; http://www.theatlanticcities.com/jobs-and-economy/2013/09/why-todays-startups-are-choosing-urban-lofts-over-suburban-office-parks/6311/

[4] Harvard Business School Institute for Strategies and Competitiveness; http://www.isc.hbs.edu/econ-clusters.htm

[5] See Appendix H: Social Equity: Engagement and Analysis for more information on the Social Equity Analysis.

[6] See Appendix H, Figure H.3 on page 17.

[7] Tribal consultation and Tribal transportation plans are included in Appendix G: Tribal Consultation Process for San Diego Forward: Communication, Cooperation, and Coordination. An overview of the Tribal Consultation plan is discussed in Appendix F: Public Involvement Program.

[8] The SANDAG Public Involvement Program is included in Appendix F and specifics about the CBO Outreach Network are included in Appendix H.

[9] The Tribal Consultation process is included in Appendix G.

[10] See Appendix G, Attachment 8 – Tribal Transportation Plans

[11] Discussed further in Appendix H.

[12] The complete social equity analysis is included in Appendix H.

[13] INDEX Tijuana – Based on data collected from INEGI (May, 2015)

[14] Robert Koopman, William Powers, Zhi Wang and Shang-Jin Wei, "Give Credit Where Credit is Due: Tracing Value Added in Global Supply Chains," National Bureau of Economic Research Working Paper No. 16426, Cambridge, Massachusetts: September 2010

[15] Estimated from surveys conducted for Economic Impacts of Wait Times at the San Diego–Baja California Border, SANDAG and Caltrans, 2006.

[16] Federal Highway Administration, Literature Review of Organizational Structures and Finance of Multi-jurisdictional Initiatives and the Implications for Megaregion Transportation Planning in the U.S., submitted by Georgia Tech Research Corporation, October 2011.

[17] CaliBaja Mega-Region Initiative (http://www.calibaja.net/cbdb/p/), (accessed October 2014).

[18] The impacts of both types of effects were estimated using Regional Economic Models, Inc. (REMI) TranSight model, and the methodology is detailed in Appendix P.

[19] See the Economic Competitiveness Analysis in Appendix P for details; also American Public Transportation Association, "The Role of Transit in Support of High Growth Business Clusters in the U.S." http://www.apta.com/resources/reportsandpublications/Documents/TransitHighGrowthClustersUS-Final2013-1124.pdf



Chapter 5
Ensuring Performance

San Diego FORWARD
The Regional Plan

5 Ensuring Performance

Implementing the Plan and monitoring our progress

Putting San Diego Forward: The Regional Plan into Action

"The way to get started is to quit talking and begin doing."
– Walt Disney

San Diego Forward: The Regional Plan (Regional Plan) is a blueprint for how we'll grow and get around in the future. Putting this Regional Plan into action requires concrete steps – steps we need to take now to realize our vision, goals, and objectives for 2050 and beyond. This final chapter serves as the Action Element for our Regional Plan. It discusses key actions, and it shows how we'll measure our progress.

This final chapter serves as the Action Element for our Regional Plan. It discusses key actions, and it shows how we'll measure our progress.

This Regional Plan, like others before it, will take time to implement. But these plans do get implemented. Each regional plan builds upon the one before it, reflecting the new realities of changing demographics, economics, new laws, and other developments. They are continually reevaluated, revised, and refined – all in the service of ensuring a high quality of life in our region for years to come.





The Importance of Collaboration and Incentives

The Regional Plan has been built collaboratively with a wide variety of people and stakeholders, as we've discussed in previous chapters. This broad range of public involvement will help strengthen support for several key actions, including enhancing the connections between transportation and how we use land; reinforcing the links between our local and regional plans; and providing the framework to collaborate on implementing the Regional Plan.

The Regional Plan calls for using federal, state, regional, and local transportation funds, in conjunction with locally-generated incentives, as catalysts to promote smart growth, economic prosperity, and sustainable development. As people see changes develop around our region – whether they're biking or walking projects, new Trolley lines, enhancements to our freeway networks, local smart growth projects, binational infrastructure projects, or initiatives that preserve and enhance our environment – they'll want to see them in their own cities, neighborhoods, and the places where they work. That's why our implementation strategy also includes incentives to help communities across the region realize their own specific goals.

In past decades, our region has developed a variety of incentives funded through the local *TransNet* half-cent sales tax. *TransNet* grant programs will continue to play a big role in providing incentives for this Regional Plan. They include:

- The Active Transportation Grant Program, which funds bike and pedestrian plans, projects, and education and training programs.
- The Smart Growth Incentive Program, which funds planning and infrastructure projects that support mixed use and higher density development in the urbanized areas of the region near existing and planned public transportation. The program also supports long-term sustainability by encouraging development in areas that are not being used as habitat, farmland, rural land, or open space.

- The Environmental Mitigation Program, which funds the acquisition, management, and monitoring of habitat preservation lands and environmentally sensitive species.
- The Senior Mini-Grant Program, which funds specialized transportation services for seniors.
- The Bike Month Mini-Grant Program funds events that educate, promote, and encourage biking as a viable transportation choice.
- The Walk, Ride, and Roll to School Program, which awards mini-grants to public or private K-12 schools or school districts to educate and encourage active forms of transportation to and from school, and to promote pedestrian safety around schools.
- Other tools and incentives provided by SANDAG to help the region grow as envisioned in the Regional Plan. They include technical assistance, such as the Smart Growth Toolbox,[1] the Smart Growth Concept Map,[2] smart growth design guidelines,[3] smart growth visual simulations,[4] guidelines for integrating Transportation Demand Management into the development process,[5] the Regional Parking Management Toolbox,[6] guidelines for planning and designing for pedestrians,[7] a Smart Growth trip generation tool,[8] Regional Transit Development Strategy,[9] and customized land use and transportation modeling, forecasting work, and subregional planning.

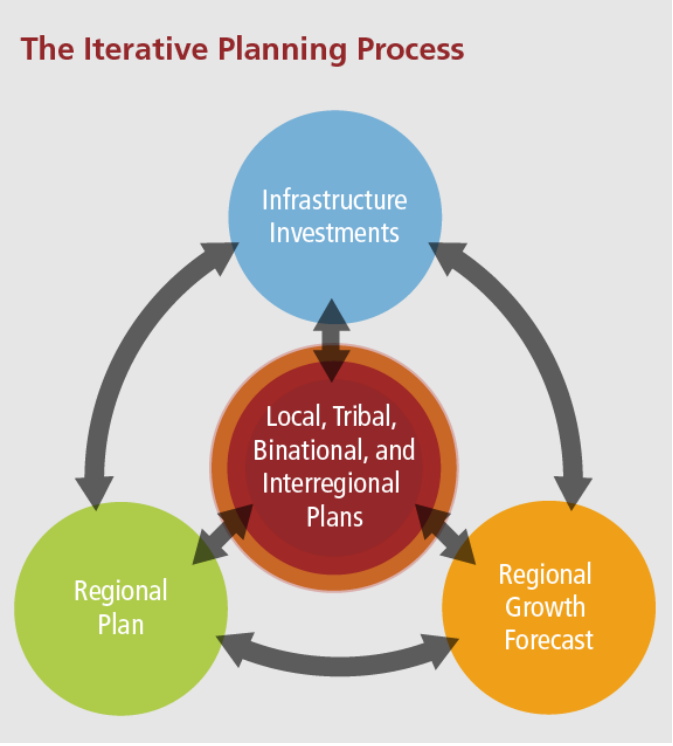


How the plan gets used: Evolving over time to reflect changing conditions

As a planning agency, SANDAG understands that change is inevitable. So implementing the Regional Plan will be part of an "iterative process." Here's what we mean – as illustrated in the following Iterative Planning Process graphic: Local general plans and policies, as well as binational, tribal, and interregional plans, feed information into the SANDAG regional forecast for growth. The forecast aggregates that information to create a picture of the region's overall land use pattern of the future, which is included in the Regional Plan. That big-picture land use pattern is then used to determine regional transportation needs. The Regional Plan, in turn, guides other agencies' plans and infrastructure investments, such as those of the San Diego County Water Authority, local government water and wastewater infrastructure, energy providers such as San Diego Gas & Electric, and others that rely on population, housing, and employment projections.

The policies and actions included in the Regional Plan can also influence future changes to local land use plans and crossborder plans. These local and crossborder planning efforts then get incorporated into the next regional forecast for growth.

By updating the Regional Plan every four years, as required by federal law, SANDAG captures changes, refines its analyses, and continues to incorporate policies and ideas that move us forward.



Actions to Implement the Plan

As noted in Chapter 1, the Regional Plan establishes the following vision, goals, and policy objectives.



To provide innovative mobility choices and planning to support a sustainable and healthy region, a vibrant economy, and an outstanding quality of life for all.

A key question is: What actions should we take to implement the Regional Plan and our Sustainable Communities Strategy and most effectively achieve our vision, goals, and policy objectives?

What actions should we take to implement the Regional Plan and our Sustainable Communities Strategy and most effectively achieve our vision, goals, and policy objectives?

The Regional Plan will be implemented with a combination of both near-term actions and continuing actions. As we discussed in Chapter 2, transportation projects and programs will be phased in over the life of the plan. So the actions we identify will be either "near-term" (intended to be completed before the adoption of the next regional plan), or "continuing" to support the longer-term implementation of projects and programs.

The most important near-term action related to transportation is to implement the Regional Transportation Improvement Program (RTIP), which includes the transportation projects and improvements scheduled to be built in this region over the next five years. Some examples include adding carpool lanes to Interstate 5; extending the Mid-Coast Trolley; continuing to double track the region's coastal rail corridor (our portion of the Los Angeles-San Diego-San Luis Obispo Corridor [LOSSAN]); completing the widening of State Route 76; and completing the South Bay *Rapid* Transit Project. RTIP projects, which include identified funding sources and detailed implementation schedules, are the concrete next steps of the region's transportation capital improvement plan. They also provide a foundation for the additional, longer-term transportation projects included in this Regional Plan.



The Regional Plan helps SANDAG set budget priorities, with the Regional Plan's near-term actions incorporated into the agency's annual budgets for the next few budgeting cycles. Below is a list of *near-term* actions – not necessarily in order of priority but numbered for easy reference – planned for completion prior to the adoption of the next regional plan in 2019. Following the near-term actions is a list of *continuing* SANDAG actions necessary to implement the Regional Plan, organized according to the Regional Plan's three goals.

Near-Term Actions

1. Implement the RTIP as detailed above.
2. Develop a long-term specialized transportation strategy through 2050, as part of the next biennial update of the SANDAG Coordinated Plan, to address the increasing specialized service needs of seniors and people with disabilities.[10]
3. Promote Vehicle Mile Travel (VMT) reduction by applying the Regional Complete Streets Policy to relevant SANDAG plans, programs, and projects.
4. Develop a Regional Mobility Hub Implementation Strategy.
5. Complete a follow-up study that details ways to reduce greenhouse gases by expanding the use of alternative fuels regionwide.
6. Incorporate regional transportation model enhancements to provide more robust data regarding bike and pedestrian travel, carpools, vanpools, carshare, and public health.

7. Expand the Integrated Corridor Management Concept and design for up to three corridors.

8. Complete the comprehensive 10-year review of the *TransNet* Program in accordance with the *TransNet* ordinance.

9. Develop innovative financing tools to self-finance near-term projects for the new border crossing at Otay Mesa East.

10. Participate in the target-setting process and monitoring for federal performance measures and report on progress toward the achievement of these federal performance measure targets in the new System Performance Report.

11. Develop an Intraregional Tribal Transportation Strategy with tribal nations in the region.

12. Explore the development of a regional military base access plan and implementation program.

Continuing Actions

Healthy Environment and Communities

1. Continue to provide and/or expand incentive programs that support the reduction of greenhouse gas emissions, protect open space and farmland, and create great places to live, work, and play.

2. Through incentives and collaboration, continue to work to increase the supply and variety of housing types affordable for people of all ages and income levels in areas with frequent transit service and with access to a variety of services.

3. Continue to refine planning and modeling tools to assess the public health implications of regional and local plans and projects.

4. Continue to support wildlife and habitat conservation through the acquisition, management, and monitoring of the region's habitat preserve areas through the *TransNet* Environmental Mitigation Program incentive program and implementation of the Multiple Species Conservation Program and Multiple Habitat Conservation Program.

5. Promote the use of both zero-emission vehicles and alternative fuels and ensure that we have the infrastructure to support these innovations.

6. Support the efforts of local jurisdictions to implement their Energy Roadmap Programs to save energy in their own operations and in their larger communities.

7. Develop strategies to enhance our region's ability to adapt to the consequences of climate change, including planning and design strategies to help communities to cope with hazardous events such as storms, heat waves, wildfires, or ongoing drought.

8. Continue to help improve our regional air quality through the implementation of transportation investments detailed in this Regional Plan, coupled with improvements in fuel and vehicle technologies.



Innovative Mobility and Planning

9. Work with partner agencies to implement the transportation projects contained in the Regional Plan. These include:

- Putting into operation the public transit projects included in the investment plan between now and 2050 (LOSSAN rail, COASTER, high-speed train, Trolley, SPRINTER, *Rapid* services, airport services, local bus services, streetcar/shuttles, and specialized services for seniors and people with disabilities).
- Fulfilling the Active Transportation Program, including building out the regional bike network, safety improvements for people biking and walking, Safe Routes to School, Safe Routes to Transit, education and data collection efforts, and active transportation improvements when highway and freeway interchanges are improved.
- Improving, rehabilitating, and maintaining local streets and roads
- Deploying advanced signal technologies to extend green lights for buses and other transit vehicles.
- Completing the Regional Arterial System and instituting technology and management systems that optimize the flow of arterials
- Supporting a flexible highway system with Managed Lanes, carpool lanes, or transit-only lanes, which will result in a fully interconnected network of Managed Lanes, including direct Managed Lane connectors.
- Constructing rail grade separation projects in key locations.
- Enhancing our border crossings to cut delays for individual international crossings and trade.

10. Conduct advanced planning on the highest priority segments of the proposed new transit services included in the Regional Plan.

11. Continue to seek funding for transportation investments that provide a variety of choices, and which reduce greenhouse gas emissions and promote healthy lifestyles through more active transportation.

12. Continue to provide capital and planning grants to local jurisdictions to support smart growth, biking and walking, and seek additional funds to leverage existing grant programs.

13. Help interested local jurisdictions implement the California Environmental Quality Act (CEQA) Streamlining provisions of Senate Bill 375 for Transit Priority Projects (see Appendix C, Figure C.11: 2035 Potential Transit Priority Project Areas).

14. Implement state-of-the-art technologies and Transportation Demand and Systems Management Programs to provide more mobility choices and allow the transportation system to function more efficiently.

15. Work with partner agencies to develop a regional Transportation Systems Management & Operational (TSM&O) Strategy. TSM&O focuses on establishing multi-agency partnerships to allow transportation systems and services to work together, regardless of institutional boundaries. For example, an objective under TSM&O can include using real-time congestion data to improve signal timing across agencies under a common and established shared objective, and providing coordination to better manage traffic entering and exiting the freeway during major incidents. A TSM&O strategy will set forth opportunities for efficiently managing the transportation system to its full performance potential under a common, multi-modal, and shared multi-agency perspective.

16. Continue to work with member agencies on parking management solutions.

17. Link technologies in vehicles and mobile devices to improve the way people travel and reduce VMT. These include emerging technologies such as autonomous vehicles, expansion of the regional communications network, smart parking systems, and universal transportation payment systems.

18. Continue to pursue opportunities to expand shared mobility services near Smart Growth Opportunity Areas in the region. Examples of shared mobility services include carsharing, bikesharing, real-time ridesharing, Transportation Network Companies (e.g., Uber, Lyft, Sidecar), neighborhood electric vehicles, scootershare, and on-demand shuttle and jitney services.

19. Support the development of policies, programs, and funding for moving goods in the state and nation, as well as for infrastructure in the region that supports moving goods.

20. Coordinate with the Airport Authority to implement the Regional Aviation Strategic Plan and the Airport Multimodal Accessibility Plan to maximize the efficiency and effectiveness of existing and planned aviation facilities. Move forward on the Intermodal Transit Center adjacent to San Diego International



Airport, ground access plans, and direct connector ramps to improve access to and from the San Diego International Airport.

21. Continue to seek innovative financing tools and new funding sources to implement the Regional Plan.

Vibrant Economy

22. Continue to apply social equity and environmental justice considerations in the implementation of SANDAG projects and programs.

23. Continue to collaborate with key partners and stakeholders, including representatives from low-income and minority communities, and actively involve the public in the planning process.

24. Leverage available funds in order to maximize every dollar, and advocate for legislation that supports implementation of the Regional Plan.

25. Continue to leverage our crossborder economic relationships with binational and global interests to become more globally competitive and strengthen our megaregion.[11]

26. Coordinate intergovernmental planning with our crossborder and interregional partners, and with tribal governments within the San Diego region to promote collaborative solutions.



27. Continue to coordinate with the San Diego County Water Authority on longer-term demand forecasting to ensure adequate and reliable water supplies for the future.

28. Continue to monitor implementation of the Regional Plan on a four-year reporting cycle, through the production of the Regional Plan Implementation Monitoring Report.

Monitoring important issues outside the scope of the Regional Plan

SANDAG doesn't have direct responsibility for issues such as water quality, water supply, solid waste, education, libraries, police/crime, hospitals, local parks, and other issues that have regional significance. Other agencies and city/county departments, with which we collaborate and coordinate, are actively working on these priorities. In many cases, these other entities have their own plans that address them.

For example, the San Diego County Water Authority has adopted plans identifying water sources, water projections, conservation targets, and infrastructure enhancements. The County of San Diego addresses solid waste and recycling issues. And the region's school districts, community college districts, and local universities address and plan for educational facilities and curriculum needs.

Because SANDAG is responsible for growth projections and transportation infrastructure, we are frequently in touch with these other agencies and departments to ensure maximum collaboration. And because these issues affect our quality of life, we measure and monitor some data related to them in order to consider the broader regional picture.

Monitoring the Plan's Success

How will we know if our Regional Plan is achieving the goals we've set? We'll have to track our progress as we implement our Regional Plan over time. A few years down the road, we should be able to answer the question, "How well are we doing?" If we're not achieving our goals, we should consider changes to the Regional Plan when it's updated.

To track the Regional Plan's performance, we've identified 23 "performance monitoring indicators."[12] These indicators will help us gauge the Regional Plan's progress toward an increase in the choices that people have to get around, expanded access to public transit, improved regional air quality, a more efficient and innovative use of energy, a stronger economy, and enhanced public health. These indicators will be revised periodically as new plans are adopted to reflect new and changing conditions.

In Figure 5.1, the performance indicators are grouped into categories that reflect the vision and goals of the Regional Plan:

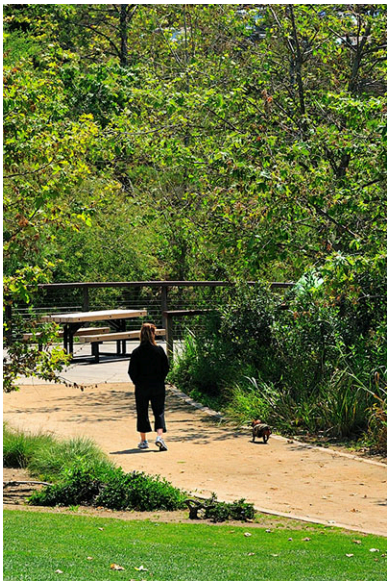
Figure 5.1

Performance Monitoring Indicators

HEALTHY ENVIRONMENT & COMMUNITIES	VIBRANT ECONOMY	INNOVATIVE MOBILITY & PLANNING
• Share of new housing units and jobs located in Smart Growth Opportunity Areas • Share of new housing units within County Water Authority water service boundary • Habitat conserved within designated preserve areas • Beach widths • Impaired waterbodies • Air quality • Fatalities/serious injuries per Vehicle Miles Traveled • Diversity of water supply • Diversity of energy supply and use • Electric and natural gas consumption by sector • Water consumption	• Travel times to jobs • Real per capita income, compared with California and the United States • Regional poverty rate, compared with California and the United States • Percent of households with housing costs greater than 35 percent of income • Annual income needed to afford fair market rent • Regional crime rate	• Commute mode share • Annual transit boardings • Border wait times • Border crossing volumes • Travel times and volumes for all modes • Alternative fuel vehicle ownership

Data for these indicators will be compiled and detailed in the Regional Plan Performance Monitoring Report,[13] which will be produced every four years in a timeframe that is staggered with the preparation of the next regional plan.[14] The next monitoring report is due out in 2018.

Conclusion: Forging a Shared Path toward a Sustainable and Prosperous Future



The Regional Plan will guide us toward a future that supports economic prosperity, offers people more options for getting around, encourages the creation of healthy and livable communities, improves air quality, cuts per capita greenhouse gas emissions, and preserves our natural environment.

SANDAG, the region's 18 cities and the County, member agencies, our binational, interregional and tribal partners, and regional stakeholders can work together to implement this Regional Plan. When implemented, the Regional Plan will:

- Exceed Senate Bill 375's greenhouse gas reduction targets for the San Diego region.
- Provide more mobility choices for individuals and businesses.
- Increase access to jobs, services, and recreation. Make $204 billion in transportation investments equitably throughout the region.

- Yield a return of nearly $2 for every $1 invested in transportation infrastructure.
- Provide more than 100 new miles of Trolley and SPRINTER service, and more than 160 miles of Managed Lanes to facilitate carpools, vanpools, and *Rapid* transit service.
- Spend $258 million to create mobility hubs that expand the reach of transit in the region.
- Provide $4.9 billion for regional and local bike and pedestrian projects and programs, and encourage exercise through active transportation.
- Accommodate housing needs to meet the projected population growth in the San Diego region, and improve housing choices for all income levels.
- Preserve more than half of our land as open space, parkland, and natural habitat.
- Result in a more efficient use of the region's water supply.
- Result in an average of 53,000 jobs annually in the San Diego region, $13.4 billion annually in projected increased regional economic output, and $5.9 billion annually in projected increased income.
- Strengthen collaboration with Mexico, tribal partners, and neighboring counties throughout the San Diego-Baja California megaregion.



This is a big list of expected accomplishments from the Regional Plan. But this Regional Plan is *designed* to accomplish grand things, for a future that will continue to make San Diego a fantastic place to live, a vibrant place to work and go to school, and a world-class destination for people everywhere.

Our Regional Plan is a "living" document; it will change over time as policies and programs evolve. We'll update it every four years to inform the region about our accomplishments, add new objectives, and adapt the Regional Plan to the region's changing needs.

Thank you for spending the time to learn about the Regional Plan. After all, it belongs to all of us. Together we can build a future that we all want. A future in which our region grows in new and exciting ways, yet preserves the qualities we love most about this very special place.

Let's work together to move San Diego Forward!



Endnotes

[1] http://www.sandag.org/index.asp?classid=12&projectid=334&fuseaction=projects.detail

[2] http://www.sandag.org/index.asp?projectid=296&fuseaction=projects.detail

[3] http://www.sandag.org/index.asp?projectid=344&fuseaction=projects.detail

[4] http://www.sandag.org/index.asp?projectid=334&fuseaction=projects.detail#visualization

[5] http://www.sandag.org/index.asp?projectid=19&fuseaction=projects.detail

[6] http://www.sdforward.com/mobility-planning/parking-toolbox

[7] http://www.sandag.org/index.asp?subclassid=98&fuseaction=home.subclasshome

[8] http://www.sandag.org/index.asp?classid=13&projectid=378&fuseaction=projects.detail

[9] http://www.sandag.org/index.asp?classid=12&projectid=500&fuseaction=projects.detail

[10] The Coordinated Plan is the region's short-range transit and specialized transportation document and can be found in Appendix U.1: The Coordinated Plan 2014-2018.

[11] A definition of Megaregion can be found in Appendix K: Glossary of Transportation Terms, Abbreviations, and Acronyms.

[12] The 20 performance indicators are detailed in Appendix S: Monitoring Performance.

[13] Detailed methodology is included in Appendix S.

[14] Appendix R: Transportation Security and Safety.

Appendix A

Transportation Projects, Costs, and Phasing

Appendix Contents

Revenue Constrained Projects
Phased Revenue Constrained Projects
Phased Revenue Constrained Arterial Projects
Revenue Constrained Freight and Goods Movement Projects
Revenue Constrained and Unconstrained Projects
No Build Projects
Revenue Constrained and Unconstrained Project Maps

Transportation Projects, Costs, and Phasing

This appendix includes information for both the Revenue Constrained Plan and Unconstrained (i.e., illustrative) list of projects. Detailed transit, managed lanes and highway, goods movement, and active transportation project listings, cost estimates, and phasing are included for the Revenue Constrained Plan. For the Unconstrained Transportation scenario, detailed descriptions and cost estimates are provided for the same types of projects.

Revenue Constrained Projects

Table A.1 lists the capital improvements in the 2050 Revenue Constrained Plan in 2014 and year of expenditure (YOE) dollars. Table A.2 lists these revenue constrained projects by phase and Table A.3 includes the phased Revenue Constrained arterial projects. Table A.4 shows Revenue Constrained Freight and Goods Movement projects. Figures A.1 through A.9 depict the Revenue Constrained 2020, 2035, and 2050 transit, highway, and active transportation improvements (Regional Bike Network), respectively. Figure A.10 shows the Planned California High-Speed Train Overview. Figure A.11 shows the high frequency local bus routes by 2020 and 2035. Figures A.12, A.13, and A.14 show the 2012 Transit System, Managed Lanes and Highway Network, and Bike Network, respectively. Figure A.15 shows the Regional Arterial System. The California Coastal Trail and County of San Diego Community Trails are shown in Figure A.16.

Unconstrained Projects

Table A.5 lists the major capital improvements included in the Revenue Constrained and the Unconstrained Network which also are shown in Figures A.17, A.18, and A.19. Additionally, Figure A.20 illustrates the Unconstrained Goods Movement Strategy.

No Build Projects

Table A.6 lists the projects included in the No Build Scenario.

Table A.1

Revenue Constrained Projects

Transit Facilities

TransNet	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
TransNet	COASTER	398	Double tracking (includes grade separations at Leucadia Blvd and two other locations, stations/ platforms at Convention Center/Gaslamp Quarter and Del Mar Fairgrounds, Del Mar Tunnel, and extensions to the Convention Center/Gaslamp Quarter and Camp Pendleton)	$2,710	$5,174
TransNet	SPRINTER	399	SPRINTER efficiency improvements and double tracking (Oceanside to Escondido and six rail grade separations at El Camino Real, Melrose Dr, Vista Village Dr/Main St, North Dr, Civic Center, Auto Parkway and Mission Ave)	$946	$1,339
	SPRINTER	399	Branch Extension to Westfield North County	$176	$437
	SPRINTER	588	SPRINTER Express	$244	$492
TransNet	Trolley	510	Mid-Coast Trolley Extension	$1,753	$1,753
	Trolley	510	Blue Line/Mid-Coast Frequency Enhancements and rail grade separations at 28th St, 32nd St, E St, H St, Palomar St, at Taylor St and Ash St, and Blue/Orange Track Connection at 12th/Imperial	$431	$741
	Trolley	520	Orange Line Frequency Enhancements and four rail grade separations at Euclid Ave, Broadway/ Lemon Grove Ave, Allison Ave/University Ave, Severin Dr	$267	$402
	Trolley	530	Green Line Frequency Enhancements	$0	$0
	Trolley	560	SDSU to Downtown San Diego via El Cajon Blvd/Mid-City (transition of Mid-City *Rapid* to Trolley)	$2,390	$5,005
	Trolley	561	UTC to COASTER Connection (extension of Route 510)	$343	$602
	Trolley	562	San Ysidro to Carmel Valley via National City/ Chula Vista via Highland Ave/ 4th Ave, Southeast San Diego, Mid-City, Mission Valley, and Kearny Mesa	$2,967	$5,471
	Trolley	563	Pacific Beach to El Cajon Transit Center via Balboa and Kearny Mesa	$1,299	$2,938
	Rapid	2	North Park to Downtown San Diego via 30th St, Golden Hill	$39	$52
	Rapid	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	$87	$117
	Rapid	11	Spring Valley to SDSU via Southeast San Diego, Downtown, Hillcrest, Mid-City	$113	$173
	Rapid	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	$49	$76
	Rapid	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	$105	$161

Table A.1 (continued)

Revenue Constrained Projects

Transit Facilities (continued)

TransNet	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
	Rapid	41	Fashion Valley to UTC/UC San Diego via Linda Vista and Clairemont	$55	$96
	Rapid	90	El Cajon Transit Center to San Diego International Airport ITC via SR 94, City College (peak only)	$20	$27
	Rapid	103	Solana Beach to Sabre Springs *Rapid* station via Carmel Valley	$67	$135
	Rapid	120	Kearny Mesa to Downtown San Diego via Mission Valley	$78	$104
TransNet	*Rapid*	225	South Bay *Rapid* (Otay Mesa to Downtown San Diego) and Otay Mesa ITC (formerly Route 628)	$206	$206
	Rapid	235	Temecula (peak only) Extension of Escondido to Downtown San Diego *Rapid* (formerly Route 610)	$98	$198
	Rapid	440	Carlsbad to Escondido Transit Center via Palomar Airport Rd	$51	$104
	Rapid	471	Downtown Escondido to East Escondido	$32	$80
	Rapid	473	UTC/UC San Diego to Oceanside via Hwy 101 Coastal Communities, Carmel Valley	$130	$242
	Rapid	474	Oceanside to Vista via Mission Ave/Santa Fe Rd Corridor	$50	$127
	Rapid	477	Camp Pendleton to Carlsbad Village via College Blvd, Plaza Camino Real	$80	$161
	Rapid	550	SDSU to Palomar Station via East San Diego, Southeast San Diego, National City	$59	$78
	Rapid	635	Eastlake to Palomar Trolley via Main St Corridor	$56	$98
	Rapid	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	$39	$79
	Rapid	637	North Park to 32nd St Trolley via Golden Hill	$33	$66
	Rapid	638	Iris Trolley to Otay Mesa via Otay, Airway Dr, SR 905 Corridor	$38	$67
	Rapid	640A/ 640B	Route 640A: I-5 - San Ysidro to Old Town Transit Center via City College Route 640B: I-5 Iris Trolley/Palomar to Kearny Mesa via Chula Vista, National City and City College	$153	$206
	Rapid	650	Chula Vista to Palomar Airport Rd Business Park via I-805/I-5 (peak only)	$82	$166
	Rapid	653	Mid-City to Palomar Airport Rd via Kearny Mesa/ I-805/I-5	$10	$21

Table A.1 (continued)

Revenue Constrained Projects

Transit Facilities (continued)

TransNet	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
TransNet	*Rapid*	688/ 689/ 690	Route 688: San Ysidro to Sorrento Mesa via I-805/ I-15/SR 52 Corridors (peak only); Route 689: Otay Mesa Port of Entry (POE) to UTC/Torrey Pines via Otay Ranch/ Millennia, I-805 Corridor (Peak Only); Route 690: Mid-City to Sorrento Mesa via I-805 Corridor (Peak Only)	$458	$653
	Rapid	709	H St Trolley to Millennia via H St Corridor, Southwestern College	$37	$49
	Rapid	870	El Cajon to UTC via Santee, SR 52, I-805	$7	$17
	Rapid	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	$12	$29
	Rapid	905	Extension of Iris Trolley Station to Otay Mesa Port of Entry (POE) route with new service to Otay Mesa East POE and Imperial Beach	$2	$2
	Rapid	910	Coronado to Downtown via Coronado Bridge	$26	$39
	Rapid	SR163 DARs	Kearny Mesa to Downtown San Diego via SR 163. Stations at Sharp/Children's Hospital, University Ave, and Fashion Valley Transit Center	$150	$196
	Shuttle	448/449	San Marcos Shuttle[1]	$0	$0
	Streetcar	553	Downtown San Diego: Little Italy to East Village[2]	$14	$21
	Streetcar	554	Hillcrest/Balboa Park/Downtown San Diego Loop[2]	$29	$38
	Streetcar	555	30th St to Downtown San Diego via North Park/ Golden Hill[2]	$26	$45
	Streetcar	565	Mission Beach to La Jolla via Pacific Beach[2]	$25	$50
	Airport Express	--	Airport Express Routes[3]	$52	$62
	Intermodal Transit Center (ITC)	--	San Diego International Airport ITC and I-5 Direct Connector Ramps	$170	$223
	ITC	--	San Ysidro ITC	$118	$189
	Transit Lanes	SR 15 from I-805 to I-8	Addition of two transit lanes for routes 235, 280/ 290, 653, and Airport Express Route to the cross-border facility in Otay Mesa	$56	$56
	Other	--	Vehicles	$3,646	$6,608
	Other	--	Transit System Rehabilitation	$1,250	$2,810
	Other	--	Maintenance Facilities, Park and Ride, Transit Center Expansions	$1,220	$1,842
	Other	--	ITS, Regulatory Compliance	$300	$502
			Subtotal	**$22,854**	**$40,625**

Table A.1 (continued)

Revenue Constrained Projects

Managed Lanes/Toll Lanes Projects

TransNet	Freeway	From	To	Existing	With Improvements	Transit Route	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
TransNet	I-5	SR 905	SR 54	8F	8F+2ML	640	$308	$416
TransNet	I-5	SR 54	SR 15	8F	10F+2ML	640	$343	$464
TransNet	I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML		$556	$1,378
TransNet	I-5	La Jolla Village Dr	I-5/805 Merge	8F/14F	8F/14F+2ML		$206	$249
TransNet	I-5	I-5/I-805 Merge	SR 56	8F/14F+ 2ML	8F/14F+4ML	650, 653	$91	$137
TransNet	I-5	SR 56	Manchester Ave	8F+2ML	8F+4ML	650, 653	$455	$686
TransNet	I-5	Manchester Ave	Vandegrift Blvd	8F	8F+4ML	650, 653	$2,458	$3,957
	I-5	Vandegrift Blvd	Orange County	8F	8F+4T		$1,813	$4,497
	SR 11/ Otay Mesa East POE	SR 125	Mexico	--	4T+POE	905	$832	$876
	SR 15	I-5	SR 94	6F	8F+2ML		$136	$338
TransNet	SR 15	SR 94	I-805	6F	6F+2ML	235, 610	$30	$52
TransNet	I-15	Viaduct	--	8F	8F+2ML	235, 610, 653, 690	$843	$2,092
TransNet	I-15	I-8	SR 163	8F	8F+2ML	235, 610, 653, 690	$56	$73
	I-15	SR 78	Riverside County	8F	8F+4T	610	$1,029	$2,555
TransNet	SR 52	I-805	I-15	6F	6F+2ML	653, 870, 890	$91	$181
TransNet	SR 52	I-15	SR 125	4F/6F	4F/6F+2ML(R)	870, 890	$298	$662
TransNet	SR 54	I-5	SR 125	6F	6F+2ML		$111	$276
TransNet	SR 78	I-5	I-15	6F	6F+2ML		$1,192	$1,720
TransNet	SR 94	I-5	SR 125	8F	8F+2ML	90, 225, 235, 610	$903	$1,478
TransNet	SR 125	SR 54	SR 94	6F	6F+2ML		$76	$188
TransNet	SR 125	SR 94	I-8	8F	10F+2ML	90	$293	$694
	SR 241	Orange County	I-5	--	6T		$479	$598
TransNet	I-805	SR 905	Palomar St	8F	8F+2ML	688	$343	$595

Table A.1 (continued)

Revenue Constrained Projects

Managed Lanes/Toll Lanes Projects (continued)

TransNet	Freeway	From	To	Existing	With Improvements	Transit Route	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
TransNet	I-805	SR 54	SR 94	8F+2ML	8F+4ML	225, 650, 688, 689	$704	$1,096
TransNet	I-805	SR 94	Carroll Canyon Rd	8F	8F+4ML	30, 225, 650, 653, 688, 689, 690, 870, 890	$2,585	$4,441
						Subtotal	**$16,231**	**$29,699**

Highway Projects

TransNet	Freeway	From	To	Existing	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
TransNet	I-8	2nd St	Los Coches	4F/6F	6F	$35	$88
	SR 52	I-5	I-805	4F	6F	$111	$276
	SR 52	Mast Blvd	SR 125	4F	6F	$76	$131
TransNet	SR 56	I-5	I-15	4F	6F	$141	$351
TransNet	SR 67	Mapleview St	Dye Rd	2C/4C	4C	$636	$1,418
TransNet	SR 76	Mission	I-15	2C	4C	$305	$305
TransNet	SR 94	SR 125	Avocado Blvd	4F	6F	$111	$221
TransNet	SR 94	Avocado Blvd	Jamacha	4C	6C	$91	$225
TransNet	SR 94	Jamacha	Steele Canyon Rd	2C/4C	4C	$40	$100
	SR 125	SR 905	San Miguel Rd	4T	8F	$323	$661
	SR 125	San Miguel Rd	SR 54	4F	8F	$177	$438
					Subtotal	**$2,046**	**$4,214**

Operational Improvements

TransNet	Freeway	From	To	Existing	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
TransNet	I-5	SR 15	I-8	8F	8F+Operational	$1,177	$2,919
	I-8	I-5	SR 125	8F/10F	8F/10F+Operational	$667	$1,654
	I-8	SR 125	2nd St	6F/8F	6F/8F+Operational	$167	$413

Table A.1 (continued)

Revenue Constrained Projects

Operational Improvements

TransNet	Freeway	From	To	Existing	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
	SR 76	I-15	Couser Canyon	2C/4C	4C/6C+Operational	$131	$261
					Subtotal	**$2,142**	**$5,247**

Managed Lanes Connectors

TransNet	Freeway	Intersecting Freeway	Movement	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
TransNet	I-5	I-805	North to North and South to South	$51	$66
	I-5	SR 78	South to East and West to North, North to East and West to South	$253	$332
TransNet	SR 15	SR 94	South to West and East to North	$71	$122
	SR 15	I-805	North to North and South to South	$81	$106
	I-15	SR 52	West to North and South to East	$130	$326
TransNet	I-15	SR 78	East to South and North to West	$106	$139
	I-805	SR 94	North to West and East to South	$101	$133
	I-805	SR 52	West to North and South to East	$91	$181
			Subtotal	**$884**	**$1,405**

Freeway Connectors

TransNet	Freeway	Intersecting Freeway	Movement	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
TransNet	I-5	SR 56	West to North and South to East	$273	$411
TransNet	I-5	SR 78	South to East and West to South	$273	$358
	SR 11/ SR 905	SR 125	EB SR 905 and WB SR 11 to NB SR 125 and NB SR 905 to NB SR 125	$26	$28
	SR 11/ SR 905	SR 125	SB 125 to WB SR 905, SB SR 125 to EB SR 11, SB SR 125 to SB SR 905	$74	$90
	I-15	SR 56	North to West	$101	$265
TransNet	SR 94	SR 125	South to East	$69	$88
TransNet	SR 94	SR 125	West to North	$81	$122
			Subtotal	**$897**	**$1,362**

Table A.1 (continued)

Revenue Constrained Projects

Active Transportation Projects[4]

Project	Jurisdiction(s)	Capital Cost ($2014) millions	Capital Cost ($YOE) millions
Uptown - Fashion Valley to Downtown San Diego	San Diego	$23.0	$27.2
Uptown - Old Town to Hillcrest	San Diego	$18.0	$21.3
Uptown - Hillcrest to Balboa Park	San Diego	$3.0	$3.5
North Park - Mid-City - Hillcrest to Kensington	San Diego	$6.0	$7.1
North Park - Mid-City - Hillcrest to City Heights (Hillcrest-El Cajon Corridor)	San Diego	$6.0	$7.1
North Park - Mid-City - City Heights	San Diego	$3.0	$3.5
North Park - Mid-City - Hillcrest to City Heights (City Heights - Old Town Corridor)	San Diego	$5.0	$5.9
North Park - Mid-City - City Heights to Rolando	San Diego	$4.0	$4.7
San Diego River Trail - Qualcomm Stadium	San Diego	$0.8	$0.9
Coastal Rail Trail San Diego - Rose Creek	San Diego	$21.0	$24.8
Bayshore Bikeway - Main St to Palomar	Chula Vista/Imperial Beach	$3.0	$3.5
Coastal Rail Trail Encinitas - Chesterfield to G St	Encinitas	$7.0	$8.3
Coastal Rail Trail Encinitas - Chesterfield to Solana Beach	Encinitas	$0.2	$0.3
Inland Rail Trail (combination of four projects)	San Marcos, Vista, Co. of San Diego	$33.0	$39.0
Coastal Rail Trail Oceanside - Wisconsin to Oceanside Blvd	Oceanside	$0.2	$0.2
Plaza Bonita Bike Path	National City	$0.4	$0.5
Plaza Bonita Bike Path	National City	$0.4	$0.5
Plaza Bonita Bike Path	National City	$0.4	$0.5
Bayshore Bikeway - National City Marina to 32nd St	San Diego/ National City	$2.0	$2.4
I-15 Mid-City - Adams Ave to Camino Del Rio S	San Diego	$9.0	$10.6
Pershing and El Prado - North Park to Downtown San Diego	San Diego	$7.0	$8.3
Pershing and El Prado - North Park to Downtown San Diego	San Diego	$7.0	$8.3
Pershing and El Prado - Cross-Park	San Diego	$0.6	$0.7
San Ysidro to Imperial Beach - Bayshore Bikeway Connection	Imperial Beach/San Diego	$8.9	$10.6
San Diego River Trail – I-805 to Fenton	San Diego	$2.0	$2.4
Terrace Dr/Central Ave - Adams to Wightman	San Diego	$1.0	$1.2
San Diego River Trail - Short gap connections	San Diego	$1.0	$1.2
Coastal Rail Trail Encinitas - Leucadia to G St	Encinitas	$5.0	$5.9
Bayshore Bikeway - Barrio Logan	San Diego	$19.0	$34.0

Table A.1 (continued)

Revenue Constrained Projects

Active Transportation Projects (continued)

Project	Jurisdiction(s)	Capital Cost ($2014) millions	Capital Cost ($YOE) millions
San Diego River Trail - Father Junipero Serra Trail to Santee	Santee	$10.0	$17.9
Downtown to Southeast connections	San Diego	$23.8	$42.6
Coastal Rail Trail San Diego - UTC	San Diego	$3.8	$6.8
Coastal Rail Trail San Diego - Rose Canyon	San Diego	$12.0	$21.5
Coastal Rail Trail San Diego - Pac Hwy (W Washington St to Laurel St)	San Diego	$4.0	$7.2
Coastal Rail Trail San Diego - Pac Hwy (Laurel St to Santa Fe Depot)	San Diego	$8.0	$14.3
Coastal Rail Trail San Diego – Pac Hwy (Taylor St to W Washington St)	San Diego	$4.0	$7.2
Coastal Rail Trail San Diego- Pac Hwy (Fiesta Island Rd to Taylor St)	San Diego	$7.0	$12.5
City Heights /Encanto/Lemon Grove	Lemon Grove/San Diego	$7.0	$12.5
City Heights/Fairmount Corridor	San Diego	$12.0	$21.5
Rolando to Grossmont/La Mesa	La Mesa/El Cajon/San Diego	$2.0	$3.6
La Mesa/Lemon Grove/El Cajon connections	Lemon Grove/La Mesa	$6.0	$10.7
San Diego River Trail - Qualcomm Stadium to Ward Rd	San Diego	$2.0	$3.6
San Diego River Trail - Rancho Mission Rd to Camino Del Rio North	San Diego	$0.3	$0.5
Coastal Rail Trail San Diego - Rose Creek Mission Bay Connection	San Diego	$4.0	$7.2
Coastal Rail Trail Carlsbad - Reach 4 Cannon to Palomar Airport Rd	Carlsbad	$5.0	$8.9
Coastal Rail Trail Carlsbad - Reach 5 Palomar Airport Rd to Poinsettia Station	Carlsbad	$3.0	$5.4
Coastal Rail Trail Encinitas - Carlsbad to Leucadia	Encinitas	$7.0	$12.5
Coastal Rail Trail Del Mar	Del Mar	$0.4	$0.7
Coastal Rail Trail Carlsbad - Reach 4 Cannon to Palomar Airport Rd	Carlsbad	$5.0	$8.9
Coastal Rail Trail San Diego - Del Mar to Sorrento via Carmel Valley	Del Mar/San Diego	$0.4	$0.7
Coastal Rail Trail San Diego - Carmel Valley to Roselle via Sorrento	San Diego	$0.9	$1.6
Coastal Rail Trail San Diego - Roselle Canyon	San Diego	$5.0	$8.9
Chula Vista/National City connections	Chula Vista/ National City	$11.0	$19.7
Pacific Beach to Mission Beach	San Diego	$10.0	$17.9

Table A.1 (continued)

Revenue Constrained Projects

Active Transportation Projects (continued)

Project	Jurisdiction(s)	Capital Cost ($2014) millions	Capital Cost ($YOE) millions
Ocean Beach to Mission Bay	San Diego	$24.0	$43.0
San Diego River Trail - Bridge connection (Sefton Field to Mission Valley YMCA)	San Diego	$7.0	$12.5
San Diego River Trail - Mast Park to Lakeside baseball park	Santee	$10.0	$17.9
I-8 Flyover - Camino del Rio S to Camino del Rio N	San Diego	$10.0	$17.9
Coastal Rail Trail Oceanside - Broadway to Eaton	Oceanside	$0.4	$0.7
El Cajon - Santee connections	El Cajon/La Mesa/Santee	$12.0	$21.5
San Diego River Trail - Father Junipero Serra Trail to West Hills Pkwy	San Diego	$3.0	$5.4
Inland Rail Trail Oceanside	Oceanside	$19.0	$34.0
Coastal Rail Trail Carlsbad - Reach 3 Tamarack to Cannon	Carlsbad	$5.0	$8.9
Clairemont Dr (Mission Bay to Burgener)	San Diego	$8.0	$14.3
Harbor Dr (Downtown to Ocean Beach)	San Diego	$7.0	$12.5
Mira Mesa Bike Blvd	San Diego	$4.0	$7.2
Sweetwater River Bikeway Ramps	National City	$9.0	$16.1
Coastal Rail Trail Oceanside - Alta Loma Marsh bridge	Oceanside	$5.0	$8.9
Coastal Rail Trail San Diego - Mission Bay (Clairemont to Tecolote)	San Diego	$3.0	$5.4
Bayshore Bikeway Coronado - Golf course adjacent	Coronado	$3.0	$5.4
San Luis Rey River Trail	Oceanside, Unincorporated	$37.0	$100.2
Encinitas-San Marcos Corridor – Double Peak Dr to San Marcos Blvd	San Marcos	$12.0	$32.5
Escondido Creek Bikeway – Quince St to Broadway	Escondido	$2.0	$5.4
Escondido Creek Bikeway – Escondido Creek to Washington Ave	Escondido	$1.0	$2.7
Escondido Creek Bikeway – 9th Ave to Escondido Creek	Escondido	$1.0	$2.7
Escondido Creek Bikeway – El Norte Pkwy to northern bikeway terminus	Escondido	$6.0	$16.2
Encinitas to San Marcos Corridor – Leucadia Blvd to El Camino Real	Carlsbad, Encinitas	$2.0	$5.4
I-15 Bikeway – Via Rancho Pkwy to Lost Oak Ln	Escondido	$4.0	$10.8
I-15 Bikeway – Rancho Bernardo Community Park to Lake Hodges Bridge	San Diego	$3.0	$8.1
I-15 Bikeway – Camino del Norte to Aguamiel Rd	San Diego	$13.0	$35.2

Table A.1 (continued)

Revenue Constrained Projects

Active Transportation Projects (continued)

Project	Jurisdiction(s)	Capital Cost ($2014) millions	Capital Cost ($YOE) millions
I-15 Bikeway – Poway Rd interchange to Carmel Mountain Rd	San Diego	$17.0	$46.0
SR 56 Bikeway – Azuaga St to Rancho Penasquitos Blvd	San Diego	$2.0	$5.4
I-15 Bikeway – Murphy Canyon Rd to Affinity Ct	San Diego	$40.0	$108.3
SR 56 Bikeway – El Camino Real to Caminito Pointe	San Diego	$2.0	$5.4
SR 52 Bikeway – I-5 to Santo Rd	San Diego	$30.0	$81.2
SR 52 Bikeway – SR 52/Mast Dr to San Diego River Trail	San Diego	$2.0	$5.4
I-8 Corridor – San Diego River Trail to Riverside Dr	Unincorporated	$2.0	$5.4
I-805 Connector – Bonita Rd to Floyd Ave	Chula Vista, Unincorporated	$6.0	$16.2
SR 125 Connector – Bonita Rd to U.S.-Mexico Border	Chula Vista, San Diego	$39.0	$105.6
SR 905 Connector – E Beyer Blvd to U.S.-Mexico Border	San Diego, Unincorporated	$34.0	$92.1
El Camino Real Bike Lanes – Douglas Dr to Mesa Dr	Oceanside	$1.0	$2.7
Vista Way Connector from Arcadia	Vista, Unincorporated	$2.1	$5.4
I-15 Bikeway – W Country Club Ln to Nutmeg St	Escondido	$0.6	$1.4
El Camino Real Bike Lanes – Marron Rd to SR 78 offramp	Carlsbad	$0.3	$0.5
Carlsbad to San Marcos Corridor – Paseo del Norte to Avenida Encinas	Carlsbad	$0.4	$0.8
Encinitas to San Marcos Corridor – Kristen Ct to Ecke Ranch Rd	Encinitas	$0.4	$0.8
Encinitas to San Marcos Corridor – Encinitas Blvd/I-5 Interchange	Encinitas	$0.2	$0.3
Mira Mesa Corridor – Reagan Rd to Parkdale Ave	San Diego	$0.4	$0.8
Mira Mesa Corridor – Scranton Rd to I-805	San Diego	$0.4	$0.8
Mira Mesa Corridor – Sorrento Valley Rd to Sorrento Valley Blvd	San Diego	$0.8	$1.9
Mid-County Bikeway – I-5/Via de la Valle Interchange	San Diego	$0.3	$0.5
Mid-County Bikeway – Rancho Santa Fe segment	San Diego, Unincorporated	$3.0	$8.1
El Camino Real Bike Lanes – Manchester Ave to Tennis Club Dr	Encinitas	$0.5	$1.1
Mid-County Bikeway – Manchester Ave/I-5 Interchange to San Elijo Ave	Encinitas	$0.8	$1.9
Central Coast Corridor – Van Nuys St to San Rafael Pl	San Diego	$1.0	$2.7
Clairemont – Centre-City Corridor – Coastal Rail Trail to Genesee Ave	San Diego	$2.0	$5.4
SR 125 Corridor – Mission Gorge Rd to Glen Vista Way	Santee	$0.3	$0.5
SR 125 Corridor – Prospect Ave to Weld Blvd	Santee, El Cajon	$0.8	$1.9
I-8 Corridor – Lakeside Ave to SR 67	Unincorporated	$0.5	$1.1
I-8 Corridor – Willows Rd to SR 79	Unincorporated	$5.0	$13.5
E County Northern Loop – N. Marshall Ave to El Cajon Blvd	El Cajon	$0.3	$0.8

Table A.1 (continued)

Revenue Constrained Projects

Active Transportation Projects (continued)

Project	Jurisdiction(s)	Capital Cost ($2014) millions	Capital Cost ($YOE) millions
E County Northern Loop – Washington Ave to Dewitt Ct	El Cajon	$1.0	$2.7
E County Northern Loop – SR 94 onramp to Del Rio Rd	Unincorporated	$0.2	$0.3
E County Southern Loop – Pointe Pkwy to Omega St	Unincorporated	$0.8	$2.2
SR 125 Corridor – SR 94 to S of Avocado St	Unincorporated	$1.1	$2.7
Centre City – La Mesa Corridor – Gateside Rd to Campo Rd	La Mesa, Unincorporated	$0.4	$0.8
Bay to Ranch Bikeway – River Ash Dr to Paseo Ranchero	Chula Vista	$0.5	$1.4
Mid-County Bikeway – San Elijo Ave to 101 Terminus	Encinitas	$1.0	$2.7
Central Coast Corridor – Van Nuys St	San Diego	$0.2	$0.3
E County Northern Loop – El Cajon Blvd to Washington Ave	El Cajon	$1.0	$2.7
E County Northern Loop – Calavo Dr to Sweetwater Springs Blvd	Unincorporated	$0.7	$1.9
Central Coast Corridor – Torrey Pines Rd to Nautilus St	San Diego	$6.0	$16.2
Central Coast Corridor – Via Del Norte to Van Nuys St	San Diego	$5.0	$13.5
Kearny Mesa to Beaches Corridor – Ingraham St from Garnet Ave to Pacific Beach Dr	San Diego	$2.0	$5.4
Kearny Mesa to Beaches Corridor – Clairemont Dr to Genesee Ave	San Diego	$10.0	$27.1
Kearny Mesa to Beaches Corridor – Genesee Ave to Linda Vista Dr	San Diego	$6.0	$16.2
Bay to Ranch Bikeway – E J St from 2nd Ave to Paseo Del Rey	Chula Vista	$12.0	$32.5
Chula Vista Greenbelt – Bay Blvd to Oleander Ave	Chula Vista	$17.0	$46.0
Safe Routes to Transit at new transit stations	Various	$1,025.0	$1,632.2
Local Bike Projects	Various	$728.4	$1,160.1
Local pedestrian/safety/traffic calming projects	Various	$180.4	$287
Regional Bicycle and Pedestrian Programs	Various	$30.4	$49
Regional Safe Routes to School Implementation	Various	$76.7	$122
	Subtotal	**$2,849**	**$4,901**
	TOTAL	**$47,903**	**$87,453**

[1] Capital cost to be funded by the City of San Marcos.

[2] Streetcar cost is representative of 10 percent of the total capital cost.

[3] Implementation of these services is dependent upon funding from aviation and other private sources.

[4] Figure A.9 includes Regional Bicycle Network segments built by others; such segments are not included in Table A.1.

Table A.2

Phased Revenue Constrained Projects

Transit Facilities

Year Built By	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2020	COASTER	398	Double tracking (20-minute peak frequencies and 120-minute off-peak frequencies)	$445	$445
2020	Trolley	510	Mid-Coast Trolley Extension	$1,753	$1,753
2020	*Rapid*	225	South Bay *Rapid* (Otay Mesa to Downtown) and Otay Mesa ITC (formerly Route 628)	$206	$206
2020	*Rapid*	905	Extension of Iris Trolley Station to Otay Mesa Port of Entry (POE) route with new service to Otay Mesa East POE and Imperial Beach	$2	$2
2020	Shuttle	448/449	San Marcos Shuttle[1]	$0	$0
2020	Airport Express	--	Airport Express Routes[2]	$52	$62
2020	Transit Lanes	SR 15 from I-805 to I-8	Addition of two Transit Lanes for routes 235, 280/290, 653, and Airport Express Route to the cross border facility in Otay Mesa	$56	$56
2020	Other	--	Other Improvements (Vehicles, transit system rehabilitation, maintenance facilities, ITS, regulatory compliance, Park and Ride, transit center expansions)	$632	$680
2020	--	--	Local Bus Routes - 15 minutes in key corridors	--	--
2035	COASTER	398	Double tracking (20-minute peak frequencies and 60-minute off-peak frequencies, grade separations at Leucadia Blvd, stations/platforms at Convention Center/Gaslamp Quarter and Del Mar Fairgrounds, and extension to Camp Pendleton)	$900	$1,357
2035	SPRINTER	399	SPRINTER efficiency improvements (20-minute frequencies by 2025); double tracking Oceanside to Escondido for 10-minute frequencies and six rail grade separations at El Camino Real, Melrose Dr, Vista Village Dr/Main St, North Dr, Civic Center, Auto Pkwy and Mission Ave	$946	$1,339
2035	Trolley	510	Phase I - Blue Line Frequency Enhancements and rail grade separations at 28th St, 32nd St, E St, H St, Palomar St, and Blue/Orange Track Connection at 12th/Imperial	$205	$292
2035	Trolley	520	Orange Line Frequency Enhancements and four rail grade separations at Euclid Ave, Broadway/Lemon Grove Ave, Allison Ave/University Ave, Severin Dr	$267	$402
2035	Trolley	561	UTC to COASTER Connection (extension of Route 510)	$343	$602
2035	Trolley	562	Phase I - San Ysidro to Kearny Mesa via Chula Vista via Highland Ave/4th Ave, National City, Southeast San Diego, Mid-City, and Mission Valley	$2,333	$4,028
2035	*Rapid*	2	North Park to Downtown San Diego via 30th St, Golden Hill	$39	$52
2035	*Rapid*	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	$87	$117
2035	*Rapid*	11	Spring Valley to SDSU via Southeast San Diego, Downtown, Hillcrest, Mid-City	$113	$173

Table A.2 (continued)

Phased Revenue Constrained Projects

Transit Facilities (continued)

Year Built By	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2035	*Rapid*	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	$49	$76
2035	*Rapid*	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	$105	$161
2035	*Rapid*	41	Fashion Valley to UTC/UC San Diego via Linda Vista and Clairemont	$55	$96
2035	*Rapid*	90	El Cajon Transit Center to San Diego International Airport ITC via SR 94, City College (peak only)	$20	$27
2035	*Rapid*	120	Kearny Mesa to Downtown via Mission Valley	$78	$104
2035	*Rapid*	473	Phase I - Solana Beach to UTC/UC San Diego via Hwy 101 Coastal Communities, Carmel Valley	$43	$66
2035	*Rapid*	550	SDSU to Palomar Station via East San Diego, Southeast San Diego, National City	$59	$78
2035	*Rapid*	635	Eastlake to Palomar Trolley via Main St Corridor	$56	$98
2035	*Rapid*	638	Iris Trolley Station to Otay Mesa via Otay, Airway Dr, SR 905 Corridor	$38	$67
2035	*Rapid*	640A/ 640B	Route 640A: I-5 - San Ysidro to Old Town Transit Center via City College; 640B: I-5 Iris Trolley/Palomar to Kearny Mesa via Chula Vista, National City and City College	$153	$206
2035	*Rapid*	688/ 689/ 690	Route 688: San Ysidro to Sorrento Mesa via I-805/I-15/SR 52 Corridors (Peak Only); Route 689:Otay Mesa Port of Entry (POE) to UTC/Torrey Pines via Otay Ranch/Millennia, I-805 Corridor (Peak Only); Route 690: Mid-City to Sorrento Mesa via I-805 Corridor (Peak Only)	$458	$653
2035	*Rapid*	709	H St Trolley Station to Millennia via H St Corridor, Southwestern College	$37	$49
2035	*Rapid*	910	Coronado to Downtown via Coronado Bridge	$26	$39
2035	*Rapid*	SR 163 DARs	Kearny Mesa to Downtown via SR 163. Stations at Sharp/Children's Hospital, University Ave, and Fashion Valley Transit Center	$150	$196
2035	Streetcar	553	Downtown San Diego: Little Italy to East Village[3]	$14	$21
2035	Streetcar	554	Hillcrest/Balboa Park/Downtown San Diego Loop[3]	$29	$38
2035	Streetcar	555	30th St to Downtown San Diego via North Park/ Golden Hill[3]	$26	$45
2035	ITC	--	San Diego International Airport ITC and I-5 Direct Connector Ramps	$170	$223
2035	ITC	--	Phase I - San Ysidro ITC	$95	$143
2035	Other	--	Other Improvements (Vehicles, transit system rehabilitation, maintenance facilities, ITS, regulatory compliance, Park and Ride, transit center expansions)	$2,519	$3,742

Table A.2 (continued)

Phased Revenue Constrained Projects

Transit Facilities (continued)

Year Built By	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2035	--	--	Local Bus Routes - 10 minutes in key corridors	--	--
2050	COASTER	398	Double tracking (completes double tracking; includes Del Mar Tunnel) plus 2 grade separations	$1,365	$3,372
2050	SPRINTER	399	Branch Extension to Westfield North County	$176	$437
2050	SPRINTER	588	SPRINTER Express	$244	$492
2050	Trolley	510	Phase II - Blue Line rail grade separations at Taylor St and Ash St	$226	$449
2050	Trolley	520	Orange Line Frequency Enhancements	$0	$0
2050	Trolley	530	Green Line Frequency Enhancements	$0	$0
2050	Trolley	560	SDSU to Downtown via El Cajon Blvd/Mid-City (transition of Mid-City *Rapid* to Trolley)	$2,390	$5,005
2050	Trolley	562	Phase II - Kearny Mesa to Carmel Valley	$633	$1,443
2050	Trolley	563	Pacific Beach to El Cajon Transit Center	$1,299	$2,937
2050	*Rapid*	103	Solana Beach to Sabre Springs *Rapid* station via Carmel Valley	$67	$135
2050	*Rapid*	440	Carlsbad to Escondido Transit Center via Palomar Airport Rd	$51	$104
2050	*Rapid*	471	Downtown Escondido to East Escondido	$32	$80
2050	*Rapid*	473	Phase II - Oceanside to Solana Beach via Hwy 101 Coastal Communities	$87	$176
2050	*Rapid*	474	Oceanside to Vista via Mission Ave/Santa Fe Rd Corridor	$50	$127
2050	*Rapid*	477	Camp Pendleton to Carlsbad Village via College Blvd, Plaza Camino Real	$80	$161
2050	*Rapid*	235	Temecula (peak only) Extension of Escondido to Downtown *Rapid* (formerly Route 610)	$98	$198
2050	*Rapid*	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	$39	$79
2050	*Rapid*	637	North Park to 32nd St Trolley Station via Golden Hill	$33	$66
2050	*Rapid*	650	Chula Vista to Palomar Airport Rd Business Park via I-805/I-5 (peak only)	$82	$166
2050	*Rapid*	653	Mid-City to Palomar Airport Rd via Kearny Mesa/I-805/I-5	$10	$21
2050	*Rapid*	870	El Cajon to UTC via Santee, SR 52, I-805	$7	$17
2050	*Rapid*	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	$12	$29
2050	Streetcar	565	Mission Beach to La Jolla via Pacific Beach[3]	$25	$50
2050	ITC	--	Phase II - San Ysidro ITC	$23	$46
2050	Other	--	Other Improvements (Vehicles, transit system rehabilitation, maintenance facilities, ITS, regulatory compliance, Park and Ride, transit center expansions)	$3,266	$7,341
			Subtotal	**$22,854**	**$40,625**

Table A.2 (continued)

Phased Revenue Constrained Projects

Managed Lanes/Toll Lanes

Year Built By	Freeway	From	To	Existing*	With Improvements	Transit Route	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2020	I-5	Manchester Ave	SR 78	8F	8F+2ML	650, 653	$701	$789
2020	SR 11/ Otay Mesa East Port of Entry (POE)	SR 125	Mexico	--	4T+POE	905	$832	$876
2020	I-805	SR 52	Carroll Canyon Rd	8F	8F+2ML	650, 653, 688, 689, 690, 870, 890	$255	$255
2035	I-5	SR 905	SR 54	8F	8F+2ML	640	$308	$416
2035	I-5	SR 54	SR 15	8F	10F+2ML	640	$343	$464
2035	I-5	La Jolla Village Dr	I-5/805 Merge	8F/14F	8F/14F+2ML		$206	$249
2035	I-5	I-5/I-805 Merge	SR 56	8F/14F+ 2ML	8F/14F+4ML	650, 653	$91	$137
2035	I-5	SR 56	Manchester Ave	8F+2ML	8F+4ML	650, 653	$455	$686
2035	I-5	Manchester Ave	SR 78	8F+2ML	8F+4ML	650, 653	$1,076	$1,863
2035	I-5	SR 78	Vandegrift Blvd	8F	8F+2ML		$76	$100
2035	SR 15	SR 94	I-805	6F	6F+2ML	235, 610	$30	$52
2035	I-15	I-8	SR 163	8F	8F+2ML	235, 610, 653, 690	$56	$73
2035	SR 78	I-5	I-15	6F	6F+2ML		$1,192	$1,720
2035	SR 94	I-5	I-805	8F	8F+2ML	90, 225, 235, 610,	$535	$703
2035	SR 241	Orange County	I-5	--	6T		$479	$598
2035	I-805	SR 905	Palomar St	8F	8F+2ML	688	$343	$595
2035	I-805	SR 54	SR 94	8F+2ML	8F+4ML	225, 650, 688, 689	$704	$1,096
2035	I-805	SR 94	SR 15	8F	8F+2ML	225, 650, 688, 689	$172	$226
2035	I-805	SR 163	SR 52	8F	8F+2ML	650, 688, 689, 690	$229	$346
2035	I-805	SR 52	Carroll Canyon Rd	8F+2ML	8F+4ML	30, 650, 653, 688, 689, 690, 870, 890	$394	$562
2050	I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML		$556	$1,378

Table A.2 (continued)

Phased Revenue Constrained Projects

Managed Lanes/Toll Lanes (continued)

Year Built By	Freeway	From	To	Existing*	With Improvements	Transit Route	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2050	I-5	SR 78	Vandegrift Blvd	8F+2ML	8F+4ML		$606	$1,205
2050	I-5	Vandegrift Blvd	Orange County	8F	8F+4T		$1,812	$4,496
2050	SR 15	I-5	SR 94	6F	8F+2ML		$136	$338
2050	I-15	Viaduct	--	8F	8F+2ML	235, 610, 653, 690	$842	$2,092
2050	I-15	SR 78	Riverside County	8F	8F+4T	610	$1,029	$2,554
2050	SR 52	I-805	I-15	6F	6F+2ML	653, 870, 890	$91	$181
2050	SR 52	I-15	SR 125	4F/6F	4F/6F+2ML(R)	870, 890	$298	$662
2050	SR 54	I-5	SR 125	6F	6F+2ML		$111	$276
2050	SR 94	I-805	SR 125	8F	8F+2ML	90	$369	$775
2050	SR 125	SR 54	SR 94	6F	6F+2ML		$76	$188
2050	SR 125	SR 94	I-8	8F	10F+2ML	90	$293	$695
2050	I-805	SR 94	SR 15	8F+2ML	8F+4ML	225, 650, 688, 690	$61	$121
2050	I-805	SR 15	SR 163	8F/10F	8F/10F+4ML	650, 688, 689, 690	$1,152	$2,292
2050	I-805	SR 163	SR 52	8F+2ML	8F+4ML	650, 688, 689, 690	$322	$640
						Subtotal	**$16,231**	**$29,699**

Highway Projects

Year Built By	Freeway	From	To	Existing*	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2020	SR 76	Mission	I-15	2C	4C	$305	$305
2035	SR 52	Mast Blvd	SR 125	4F	6F	$76	$131
2035	SR 67	Mapleview St	Gold Bar Ln	2C	4C	$60	$79
2050	I-8	2nd St	Los Coches	4F/6F	6F	$35	$88
2050	SR 52	I-5	I-805	4F	6F	$111	$276
2050	SR 56	I-5	I-15	4F	6F	$141	$351
2050	SR 67	Gold Bar Ln	Dye Rd	2C/4C	4C	$576	$1,339
2050	SR 94	SR 125	Avocado Blvd	4F	6F	$111	$221
2050	SR 94	Jamacha	Steele Canyon Rd	2C/4C	4C	$40	$100

Table A.2 (continued)

Phased Revenue Constrained Projects

Highway Projects (continued)

Year Built By	Freeway	From	To	Existing*	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2050	SR 94	Avocado Blvd	Jamacha	4C	6C	$91	$225
2050	SR 125	SR 905	San Miguel Rd	4T	8F	$323	$661
2050	SR 125	San Miguel Rd	SR 54	4F	8F	$177	$438
					Subtotal	**$2,046**	**$4,214**

Operational Improvements

Year Built By	Freeway	From	To	Existing*	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2050	I-5	I-15	I-8	8F	8F+Operational	$1,177	$2,919
2050	I-8	I-5	SR 125	8F/10F	8F/10F+Operational	$667	$1,654
2050	I-8	SR 125	2nd St	6F/8F	6F/8F+Operational	$167	$413
2050	SR 76	I-15	Couser Canyon	2C/4C	4C/6C+Operational	$131	$261
					Subtotal	**$2,142**	**$5,247**

Managed Lanes Connectors

Year Built By	Freeway	Intersecting Freeway	Movement	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2035	I-5	SR 78	South to East and West to North, North to East and West to South	$253	$332
2035	I-5	I-805	North to North and South to South	$51	$66
2035	I-15	SR 78	East to South and North to West	$106	$139
2035	SR 15	SR 94	South to West and East to North	$71	$122
2035	SR 15	I-805	North to North and South to South	$81	$106
2035	I-805	SR 94	North to West and East to South	$101	$133
2050	I-15	SR 52	West to North and South to East	$130	$326
2050	I-805	SR 52	West to North and South to East	$91	$181
			Subtotal	**$884**	**$1,405**

Table A.2 (continued)

Phased Revenue Constrained Projects

Freeway Connectors

Year Built By	Freeway	Intersecting Freeway	Movement	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2020	SR 11/ SR 905	SR 125	EB SR 905 and WB SR 11 to NB SR 125, NB SR 905 to NB SR 125	$26	$28
2035	I-5	SR 56	West to North and South to East	$273	$411
2035	I-5	SR 78	South to East and West to South	$273	$358
2035	SR 94	SR 125	South to East	$69	$88
2035	SR 94	SR 125	West to North	$81	$122
2035	SR 11/ SR 905	SR 125	SB 125 to WB SR 905, SB SR 125 to EB SR 11, SB SR 125 to SB SR 905	$74	$90
2050	I-15	SR 56	North to West	$101	$265
			Subtotal	**$897**	**$1,362**

Active Transportation Projects[4]

Year Built By	Project	Jurisdiction(s)	Project Phase	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2020	Uptown - Fashion Valley to Downtown San Diego	San Diego	Const.	$23.0	$27.2
2020	Uptown - Old Town to Hillcrest	San Diego	Const.	$18.0	$21.3
2020	Uptown - Hillcrest to Balboa Park	San Diego	Const.	$3.0	$3.5
2020	North Park - Mid-City - Hillcrest to Kensington	San Diego	Const.	$6.0	$7.1
2020	North Park - Mid-City - Hillcrest to City Heights (Hillcrest-El Cajon Corridor)	San Diego	Const.	$6.0	$7.1
2020	North Park - Mid-City - City Heights	San Diego	Const.	$3.0	$3.5
2020	North Park - Mid-City - Hillcrest to City Heights (City Heights - Old Town Corridor)	San Diego	Const.	$5.0	$5.9
2020	North Park - Mid-City - City Heights to Rolando	San Diego	Const.	$4.0	$4.7
2020	San Diego River Trail - Qualcomm Stadium	San Diego	Const.	$0.8	$0.9
2020	Coastal Rail Trail San Diego - Rose Creek	San Diego	Const.	$21.0	$24.8
2020	Bayshore Bikeway - Main St to Palomar	Chula Vista/ Imperial Beach	Const.	$3.0	$3.5
2020	Coastal Rail Trail Encinitas - Chesterfield to G St	Encinitas	Const.	$7.0	$8.3
2020	Coastal Rail Trail Encinitas - Chesterfield to Solana Beach	Encinitas	Eng.	$0.1	$0.1
2020	Inland Rail Trail (combination of four projects)	San Marcos, Vista, Co. of San Diego	Const.	$33.0	$39.0
2020	Coastal Rail Trail Oceanside - Wisconsin to Oceanside Blvd	Oceanside	Const.	$0.2	$0.2
2020	Plaza Bonita Bike Path	National City	Const.	$0.4	$0.5

Table A.2 (continued)

Phased Revenue Constrained Projects

Active Transportation Projects (continued)

Year Built By	Project	Jurisdiction(s)	Project Phase	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2020	Bayshore Bikeway - National City Marina to 32nd St	San Diego/ National City	Const.	$2.0	$2.4
2020	I-15 Mid-City - Adams Ave to Camino Del Rio S	San Diego	Const.	$9.0	$10.6
2020	Pershing and El Prado - North Park to Downtown San Diego	San Diego	Const.	$7.0	$8.3
2020	Pershing and El Prado - Cross-Park	San Diego	Const.	$0.6	$0.7
2020	San Ysidro to Imperial Beach - Bayshore Bikeway Connection (Border Access)	Imperial Beach/ San Diego	ROW	$2.0	$2.4
2020	San Ysidro to Imperial Beach - Bayshore Bikeway Connection (Imperial Beach Connector)	Imperial Beach/ San Diego	ROW	$0.9	$1.1
2020	Terrace Dr/Central Ave - Adams to Wightman	San Diego	Const.	$1.0	$1.2
2020	San Diego River Trail – I-805 to Fenton	San Diego	Const.	$2.0	$2.4
2020	San Diego River Trail - Short gap connections	San Diego	Const.	$1.0	$1.2
2020	Coastal Rail Trail Encinitas - Leucadia to G St	Encinitas	Const.	$5.0	$5.9
2020	San Ysidro to Imperial Beach - Bayshore Bikeway Connection	Imperial Beach/ San Diego	Const.	$6.0	$7.1
2020	Other Active Transportation Programs and Projects[5]	Various	Various	$368.3	$387.5
2035	Bayshore Bikeway - Barrio Logan	San Diego	ROW	$5.0	$8.9
2035	San Diego River Trail - Father Junipero Serra Trail to Santee	Santee	ROW	$3.0	$5.4
2035	Downtown to Southeast connections - East Village	San Diego	ROW	$0.8	$1.4
2035	Downtown to Southeast connections - Downtown San Diego to Encanto	San Diego	ROW	$3.0	$5.4
2035	Downtown to Southeast connections - Downtown San Diego to Golden Hill	San Diego	ROW	$3.0	$5.4
2035	Coastal Rail Trail San Diego - UTC	San Diego	ROW	$0.8	$1.4
2035	Coastal Rail Trail San Diego - Rose Canyon	San Diego	ROW	$3.0	$5.4
2035	Coastal Rail Trail San Diego - Pac Hwy (W Washington St to Laurel St)	San Diego	Const.	$4.0	$7.2
2035	Coastal Rail Trail San Diego - Pac Hwy (Laurel St to Santa Fe Depot)	San Diego	Const.	$8.0	$14.3
2035	Coastal Rail Trail San Diego - Encinitas Chesterfield to Solana Beach	Encinitas	Const.	$0.1	$0.2
2035	Coastal Rail Trail San Diego – Pac Hwy (Taylor St to W Washington St)	San Diego	Const.	$4.0	$7.2
2035	Coastal Rail Trail San Diego- Pac Hwy (Fiesta Island Rd to Taylor St)	San Diego	Const.	$7.0	$12.5
2035	San Diego River Trail - Father Junipero Serra Trail to Santee	Santee	Const.	$7.0	$12.5

Table A.2 (continued)

Phased Revenue Constrained Projects

Active Transportation Projects (continued)

Year Built By	Project	Jurisdiction(s)	Project Phase	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2035	Bayshore Bikeway - Barrio Logan	San Diego	Const.	$14.0	$25.1
2035	Downtown to Southeast connections	San Diego	Const.	$17.0	$30.4
2035	Coastal Rail Trail San Diego - UTC	San Diego	Const.	$3.0	$5.4
2035	City Heights /Encanto/Lemon Grove	Lemon Grove/ San Diego	Const.	$7.0	$12.5
2035	City Heights/Fairmount Corridor	San Diego	Const.	$12.0	$21.5
2035	Rolando to Grossmont/La Mesa	La Mesa/ El Cajon/ San Diego	Const.	$2.0	$3.6
2035	La Mesa/Lemon Grove/El Cajon connections	Lemon Grove/ La Mesa	Const.	$6.0	$10.7
2035	Coastal Rail Trail - Rose Canyon	San Diego	Const.	$9.0	$16.1
2035	San Diego River Trail - Qualcomm Stadium to Ward Rd	San Diego	Const.	$2.0	$3.6
2035	San Diego River Trail - Rancho Mission Rd to Camino Del Rio North	San Diego	Const.	$0.3	$0.5
2035	Coastal Rail Trail San Diego - Rose Creek Mission Bay Connection	San Diego	Const.	$4.0	$7.2
2035	Coastal Rail Trail Carlsbad - Reach 4 Cannon to Palomar Airport Rd	Carlsbad	Const.	$5.0	$8.9
2035	Coastal Rail Trail Carlsbad - Reach 5 Palomar Airport Rd to Poinsettia Station	Carlsbad	Const.	$3.0	$5.4
2035	Coastal Rail Trail Encinitas - Carlsbad to Leucadia	Encinitas	Const.	$7.0	$12.5
2035	Coastal Rail Trail Del Mar	Del Mar	Const.	$0.4	$0.7
2035	Coastal Rail Trail San Diego - Del Mar to Sorrento via Carmel Valley	Del Mar/ San Diego	Const.	$0.4	$0.7
2035	Coastal Rail Trail San Diego - Carmel Valley to Roselle via Sorrento	San Diego	Const.	$0.9	$1.6
2035	Coastal Rail Trail San Diego - Roselle Canyon	San Diego	Const.	$5.0	$8.9
2035	Chula Vista/National City connections	Chula Vista/ National City	Const.	$11.0	$19.7
2035	Pacific Beach to Mission Beach	San Diego	Const.	$10.0	$17.9
2035	Ocean Beach to Mission Bay	San Diego	Const.	$24.0	$43.0
2035	San Diego River Trail - Bridge connection (Sefton Field to Mission Valley YMCA)	San Diego	Const.	$7.0	$12.5
2035	San Diego River Trail - Mast Park to Lakeside baseball park	Santee	Const.	$10.0	$17.9
2035	I-8 Flyover - Camino del Rio S to Camino del Rio N	San Diego	Const.	$10.0	$17.9
2035	Coastal Rail Trail Oceanside - Broadway to Eaton	Oceanside	Const.	$0.4	$0.7
2035	El Cajon - Santee connections	El Cajon/ La Mesa/ Santee	Const.	$12.0	$21.5

Table A.2 (continued)

Phased Revenue Constrained Projects

Active Transportation Projects (continued)

Year Built By	Project	Jurisdiction(s)	Project Phase	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2035	San Diego River Trail - Father Junipero Serra Trail to West Hills Pkwy	San Diego	Const.	$3.0	$5.4
2035	Inland Rail Trail Oceanside	Oceanside	Const.	$19.0	$34.0
2035	Coastal Rail Trail Carlsbad - Reach 3 Tamarack to Cannon	Carlsbad	Const.	$5.0	$8.9
2035	Clairemont Dr (Mission Bay to Burgener)	San Diego	Const.	$8.0	$14.3
2035	Harbor Dr (Downtown to Ocean Beach)	San Diego	Const.	$7.0	$12.5
2035	Mira Mesa Bike Blvd	San Diego	Const.	$4.0	$7.2
2035	Sweetwater River Bikeway Ramps	National City	Const.	$9.0	$16.1
2035	Coastal Rail Trail Oceanside - Alta Loma Marsh bridge	Oceanside	Const.	$5.0	$8.9
2035	Coastal Rail Trail San Diego - Mission Bay (Clairemont to Tecolote)	San Diego	Const.	$3.0	$5.4
2035	Bayshore Bikeway Coronado - Golf course adjacent	Coronado	Const.	$3.0	$5.4
2035	Other Active Transportation Programs and Projects[5]	Various	Various	$857.3	$1,184.4
2050	San Luis Rey River Trail	Oceanside, Unincorporated	Const.	$37.0	$100.2
2050	Encinitas-San Marcos Corridor – Double Peak Dr to San Marcos Blvd	San Marcos	Const.	$12.0	$32.5
2050	Escondido Creek Bikeway – Quince St to Broadway	Escondido	Const.	$2.0	$5.4
2050	Escondido Creek Bikeway – Escondido Creek to Washington Ave	Escondido	Const.	$1.0	$2.7
2050	Escondido Creek Bikeway – 9th Ave to Escondido Creek	Escondido	Const.	$1.0	$2.7
2050	Escondido Creek Bikeway – El Norte Pkwy to northern bikeway terminus	Escondido	Const.	$6.0	$16.2
2050	Encinitas to San Marcos Corridor – Leucadia Blvd to El Camino Real	Carlsbad, Encinitas	Const.	$2.0	$5.4
2050	I-15 Bikeway – Via Rancho Pkwy to Lost Oak Ln	Escondido	Const.	$4.0	$10.8
2050	I-15 Bikeway – Rancho Bernardo Community Park to Lake Hodges Bridge	San Diego	Const.	$3.0	$8.1
2050	I-15 Bikeway – Camino del Norte to Aguamiel Rd	San Diego	Const.	$13.0	$35.2
2050	I-15 Bikeway – Poway Rd interchange to Carmel Mountain Rd	San Diego	Const.	$17.0	$46.0
2050	SR 56 Bikeway – Azuaga St to Rancho Penasquitos Blvd	San Diego	Const.	$2.0	$5.4
2050	I-15 Bikeway – Murphy Canyon Rd to Affinity Ct	San Diego	Const.	$40.0	$108.3
2050	SR 56 Bikeway – El Camino Real to Caminito Pointe	San Diego	Const.	$2.0	$5.4
2050	SR 52 Bikeway – I-5 to Santo Rd	San Diego	Const.	$30.0	$81.2
2050	SR 52 Bikeway – SR 52/Mast Dr to San Diego River Trail	San Diego	Const.	$2.0	$5.4
2050	I-8 Corridor – San Diego River Trail to Riverside Dr	Unincorporated	Const.	$2.0	$5.4

Table A.2 (continued)

Phased Revenue Constrained Projects

Active Transportation Projects (continued)

Year Built By	Project	Jurisdiction(s)	Project Phase	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2050	I-805 Connector – Bonita Rd to Floyd Ave	Chula Vista, Unincorporated	Const.	$6.0	$16.2
2050	SR 125 Connector – Bonita Rd to U.S.-Mexico Border	Chula Vista, San Diego	Const.	$39.0	$105.6
2050	SR 905 Connector – E Beyer Blvd to U.S.-Mexico Border	San Diego, Unincorporated	Const.	$34.0	$92.1
2050	El Camino Real Bike Lanes – Douglas Dr to Mesa Dr	Oceanside	Const.	$1.0	$2.7
2050	Vista Way Connector from Arcadia	Vista, Unincorporated	Const.	$2.1	$5.4
2050	I-15 Bikeway – W Country Club Ln to Nutmeg St	Escondido	Const.	$0.6	$1.4
2050	El Camino Real Bike Lanes – Marron Rd to SR 78 off ramp	Carlsbad	Const.	$0.3	$0.5
2050	Carlsbad to San Marcos Corridor – Paseo del Norte to Avenida Encinas	Carlsbad	Const.	$0.4	$0.8
2050	Encinitas to San Marcos Corridor – Kristen Ct to Ecke Ranch Rd	Encinitas	Const.	$0.4	$0.8
2050	Encinitas to San Marcos Corridor – Encinitas Blvd/ I-5 Interchange	Encinitas	Const.	$0.2	$0.3
2050	Mira Mesa Corridor – Reagan Rd to Parkdale Ave	San Diego	Const.	$0.4	$0.8
2050	Mira Mesa Corridor – Scranton Rd to I-805	San Diego	Const.	$0.4	$0.8
2050	Mira Mesa Corridor – Sorrento Valley Rd to Sorrento Valley Blvd	San Diego	Const.	$0.8	$1.9
2050	Mid-County Bikeway – I-5/Via de la Valle Interchange	San Diego	Const.	$0.3	$0.5
2050	Mid-County Bikeway – Rancho Santa Fe segment	San Diego, Unincorporated	Const.	$3.0	$8.1
2050	El Camino Real Bike Lanes – Manchester Ave to Tennis Club Dr	Encinitas	Const.	$0.5	$1.1
2050	Mid-County Bikeway – Manchester Ave/I-5 Interchange to San Elijo Ave	Encinitas	Const.	$0.8	$1.9
2050	Central Coast Corridor – Van Nuys St to San Rafael Pl	San Diego	Const.	$1.0	$2.7
2050	Clairemont – Centre-City Corridor – Coastal Rail Trail to Genesee Ave	San Diego	Const.	$2.0	$5.4
2050	SR 125 Corridor – Mission Gorge Rd to Glen Vista Way	Santee	Const.	$0.3	$0.5
2050	SR 125 Corridor – Prospect Ave to Weld Blvd	Santee, El Cajon	Const.	$0.8	$1.9
2050	I-8 Corridor – Lakeside Ave to SR 67	Unincorporated	Const.	$0.5	$1.1
2050	I-8 Corridor – Willows Rd to SR 79	Unincorporated	Const.	$5.0	$13.5
2050	E County Northern Loop – N Marshall Ave to El Cajon Blvd	El Cajon	Const.	$0.3	$0.8
2050	E County Northern Loop – Washington Ave to Dewitt Ct	El Cajon	Const.	$1.0	$2.7
2050	E County Northern Loop – SR 94 onramp to Del Rio Rd	Unincorporated	Const.	$0.2	$0.3

Table A.2 (continued)

Phased Revenue Constrained Projects

Active Transportation Projects (continued)

Year Built By	Project	Jurisdiction(s)	Project Phase	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2050	E County Southern Loop – Pointe Pkwy to Omega St	Unincorporated	Const.	$0.8	$2.2
2050	SR 125 Corridor – SR 94 to S of Avocado St	Unincorporated	Const.	$1.1	$2.7
2050	Centre City – La Mesa Corridor – Gateside Rd to Campo Rd	La Mesa, Unincorporated	Const.	$0.4	$0.8
2050	Bay to Ranch Bikeway – River Ash Dr to Paseo Ranchero	Chula Vista	Const.	$0.5	$1.4
2050	Mid-County Bikeway – San Elijo Ave to 101 Terminus	Encinitas	Const.	$1.0	$2.7
2050	Central Coast Corridor – Van Nuys St	San Diego	Const.	$0.2	$0.3
2050	E County Northern Loop – El Cajon Blvd to Washington Ave	El Cajon	Const.	$1.0	$2.7
2050	E County Northern Loop – Calavo Dr to Sweetwater Springs Blvd	Unincorporated	Const.	$0.7	$1.9
2050	Central Coast Corridor – Torrey Pines Rd to Nautilus St	San Diego	Const.	$6.0	$16.2
2050	Central Coast Corridor – Via Del Norte to Van Nuys St	San Diego	Const.	$5.0	$13.5
2050	Kearny Mesa to Beaches Corridor – Ingraham St from Garnet Ave to Pacific Beach Dr	San Diego	Const.	$2.0	$5.4
2050	Kearny Mesa to Beaches Corridor – Clairemont Dr to Genesee Ave	San Diego	Const.	$10.0	$27.1
2050	Kearny Mesa to Beaches Corridor – Genesee Ave to Linda Vista Dr	San Diego	Const.	$6.0	$16.2
2050	Bay to Ranch Bikeway – E J St from 2nd Ave to Paseo Del Rey	Chula Vista	Const.	$12.0	$32.5
2050	Chula Vista Greenbelt – Bay Blvd to Oleander Ave	Chula Vista	Const.	$17.0	$46.0
2050	Other Active Transportation Programs and Projects[5]	Various	Various	$815.3	$1,678.4
			Subtotal	**$2,849**	**$4,901**
			TOTAL	**$47,903**	**$87,453**

* Based on facility configuration at time of project construction.

[1] Capital cost to be funded by the City of San Marcos.

[2] Implementation of these services is dependent upon funding from aviation and other private sources.

[3] Streetcar cost is representative of 10 percent of the total capital cost.

[4] Figure A.9 includes Regional Bicycle Network segments built by others; such segments are not included in Table A.2.

[5] Includes Safe Routes to Transit projects at new transit station areas, local bike projects, local pedestrian/safety/traffic calming projects, regional bicycle and pedestrian programs and Regional Safe Routes to School implementation.

Table A.3

Phased Revenue Constrained Arterial Projects[1]

Year Built By	SANDAG ID	Lead Agency	Project Title	Project Description
2020	CB04A	Carlsbad	El Camino Real Widening - Tamarack Ave to Chestnut Ave	Widen El Camino Real to prime arterial standards with three travel lanes, bike lanes, and sidewalks in each direction including intersection improvements at Tamarack Ave and Chestnut Ave
2020	CB04B	Carlsbad	El Camino Real and Cannon Rd	Along the eastside of El Camino Real just south of Cannon Rd, widen to prime arterial standards with three through lanes, a right turn lane, and a sidewalk approaching the intersection
2020	CB04C	Carlsbad	El Camino Real - Lisa St to Crestview Dr	Along the west side of El Camino Real, roadway widening to provide three southbound through lanes, curb, gutter, and sidewalk per prime arterial standards
2020	CB12	Carlsbad	College Blvd Reach A - Badger Ln to Cannon Rd	From Badger Ln to Cannon Rd, construct a new segment of College Blvd to provide 4-lane roadway with raised median, bike lanes, and sidewalks/trails in accordance with major arterial standards
2020	CB13	Carlsbad	Poinsettia Ln Reach E - Cassia Dr to Skimmer Ct	From Cassia Dr to Skimmer Ct, construct a new 4-lane roadway with median, bike lanes, and sidewalks/trails to major arterial standards
2020	CB22	Carlsbad	Avenida Encinas, widen from Palomar Airport Rd to Encinas Water Pollution Control Facility	Avenida Encinas from Palomar Airport Rd southerly to existing improvements adjacent to the Embarcadero Lane, roadway widening to secondary arterial standards
2020	CB30	Carlsbad	El Camino Real – El Camino Real to Tamarack Ave	At the intersection of El Camino Real and Tamarack Ave, construct a second left turn lane from El Camino Real to westbound Tamarack
2020	CB31	Carlsbad	El Camino Real – La Costa Ave to Arenal Rd	Along El Camino Real from 700 feet north of La Costa Ave to Arenal Rd, widening along the southbound side of the roadway to provide three travel lanes and a bike lane in accordance with prime arterial standards
2020	CB32	Carlsbad	El Camino Real Widening - Cassia to Camino Vida Roble	Widen El Camino Real from 900 feet north of Cassia Rd to Camino Vida Roble, along the northbound side of the roadway to provide three travel lanes and a bike lane in accordance with prime arterial standards
2020	CB35	Carlsbad	Palomar Airport Rd - Palomar Airport Rd to Paseo Del Norte	Lengthen the left turn pocket along eastbound Palomar Airport Rd to northbound Paseo Del Norte
2020	CB38	Carlsbad	El Camino Real – Cannon Rd to Tamarack Ave	El Camino Real from Cannon Rd to Tamarack, widen along both sides of El Camino Real from Cannon Rd to Tamarack Ave excluding the limits of project CB04C, to provide a raised median, three travel lanes, bike lane, curb, gutter, and walkway along both sides per prime arterial standards, and a new traffic signal at Lisa St
2020	CHV08	Chula Vista	Willow St Bridge Project - Bonita Rd to Sweetwater Rd	Replace 2-lane bridge with 4-lane bridge (Phase I and II)

Table A.3 (continued)

Phased Revenue Constrained Arterial Projects

Year Built By	SANDAG ID	Lead Agency	Project Title	Project Description
2020	CHV69	Chula Vista	Heritage Rd Bridge	Heritage Rd from Main St/Nirvana Ave to Entertainment Circle, widen and lengthen bridge over Otay River from 4-lane to 6-lane bridge that accommodates shoulders, sidewalk, and medial; project is on Heritage Rd from the intersection of Main St and Nirvana Ave to Entertainment Circle
2020	CNTY14	San Diego County	South Santa Fe Ave North - Montgomery Dr to South of Woodland Dr	Vista City limits to 700 feet south of Woodland, reconstruct and widen from 2 to 4 lanes including bicycle lane; more detail in 2014 RTIP Project List
2020	CNTY14A	San Diego County	South Santa Fe Ave South	South Santa Fe from 700 feet south of Woodland Dr to Smilax Rd, widening of South Santa Fe Ave to a 5-lane major road with a center left turn lane, curb, gutter, sidewalk, bike lanes, and drainage improvements.
2020	CNTY21	San Diego County	Bradley Ave Overpass at SR 67	Widen Bradley Ave from Magnolia Ave to Mollison Ave; widen from 2 lanes to 4 lanes plus sidewalks. Replace 2-lane bridge over SR 67 with a 6-lane bridge, which accommodates turn pockets.
2020	CNTY24	San Diego County	Cole Grade Rd	Cole Grade Rd from north of Horse Creek Trail to south of Pauma Heights Rd, widen to accommodate 14-foot traffic lane in both directions, 12-foot center 2-way left turn, 6-foot bike lane and 10-foot pathway
2020	CNTY36	San Diego County	San Vicente Rd Improvements	From Warnock Dr to Wildcat Canyon Rd - in Ramona, design and reconstruct road improvements, including 2-lane community collector road with intermittent turn lanes, bike lanes, asphalt concrete dike, and pathway/walkway
2020	CNTY39	San Diego County	Bear Valley Pkwy North	From San Pasqual Valley Rd to Boyle Ave - widen from 2 to 4 lanes, with a center median, a bike lane and shoulder in each direction of travel
2020	CNTY82	San Diego County	Alpine Blvd Streetscape Improvements	From Tavern Rd to South Grade Rd – in unincorporated community of Alpine, widen from 2-lane to 3-lane roadway including a median turn-lane with bicycle, parking, and pedestrian improvements
2020	CNTY83	San Diego County	SR 67/ Highland/Dye Intersection	From SR 67 to 1,000 feet SE of SR 67 – in Ramona, intersection widening (double left turn lanes on Dye/Highland and double through lanes with dedicated right turn lanes on SR 67), signal modification with bicycle and pedestrian improvements, and associated improvements
2020	ESC02A	Escondido	East Valley/Valley Center	Widen roadway from 4 to 6 lanes with raised medians and left turn pockets; modify signal at Lake Wohlford and Valley Center Rd; widen bridge over Escondido Creek
2020	ESC04	Escondido	Citracado Parkway II	West Valley to Harmony Grove, widen from 2 to 4 lanes with raised medians; construct bridge over Escondido Creek

Table A.3 (continued)

Phased Revenue Constrained Arterial Projects

Year Built By	SANDAG ID	Lead Agency	Project Title	Project Description
2020	ESC06	Escondido	El Norte Pkwy Bridge at Escondido Creek - Kaile Ln to Key Lime Way	Construct missing 2-lane bridge at Escondido Creek
2020	ESC08	Escondido	Felicita Ave/Juniper St - from Escondido Blvd to Juniper St and from Juniper St to Chestnut St	Widen from 2 to 4 lanes with left turn pockets, raised medians on Felicita; new traffic signals at Juniper and Chestnut, Juniper and 13th Ave, Juniper and 15th Ave; modify traffic signal at Juniper and Felicita
2020	ESC09	Escondido	Ninth Ave – La Terraza Blvd to Spruce St	Widen from 2 to 4 lanes with raised median and modify traffic signals at Ninth Ave and Tulip St - design phase
2020	ESC24	Escondido	Centre City Pkwy	Mission Rd to SR 78, widen 4 lanes to 6 lanes with intersection improvements
2020	LG13	Lemon Grove	Lemon Grove Ave Realignment Project	Lemon Grove Ave at SR 94 - a key project in the redevelopment of the city's downtown Village Specific Plan, this project will realign Lemon Grove Ave at SR 94 adding traffic lanes and improving access to and from SR 94, reducing motorist delays and emissions
2020	NC01	National City	Plaza Blvd Widening	Plaza Blvd from Highland Ave to Euclid Ave, widen from 2 to 3 lanes including a new traffic lane in each direction, new sidewalks, sidewalk widening, traffic signal upgrades, and interconnection at Plaza Blvd
2020	O06	Oceanside	Melrose Dr Extension	Melrose Dr from North Santa Fe Ave to Spur Ave - in Oceanside, future construction of Melrose Dr; 4-lane arterial highway with medians, sidewalks, and bike lanes between North Santa Fe Ave and Spur Ave
2020	O22	Oceanside	College Blvd - Vista Way to Old Grove Rd	Widen from the existing 4 lanes to 6 lanes with bike lanes and raised median
2020	SD32	San Diego	Carroll Canyon Rd	Carroll Canyon Rd from Scranton Rd to I-805: extend Carroll Canyon under I-805 including improvements to on/off ramps
2020	SD34	San Diego	El Camino Real	In San Diego on El Camino Real from San Dieguito Rd to Via de la Valle, reconstruct and widen from 2 to 4 lanes and extend transition lane and additional grading to avoid biological impacts (CIP 52-479.0)
2020	SD70	San Diego	West Mission Bay Dr Bridge	In San Diego, replace bridge and increase from 4- to 6-lane bridge including Class II bike lane (CIP 52-643.0/S00871)

Table A.3 (continued)

Phased Revenue Constrained Arterial Projects

Year Built By	SANDAG ID	Lead Agency	Project Title	Project Description
2020	SD83	San Diego	SR 163/Friars Rd Interchange Modification	Friars Rd from Avenida de las Tiendas to Mission Center Rd, widen and improve Friars Rd and overcrossing; reconstruct interchange including improvements to ramp intersections (Phase I). Construct new connector roadways and structures (Phase II). Construct auxiliary lanes along northbound and southbound SR 163 (Phase III).
2020	SD90	San Diego	SR 163/Clairemont Mesa Blvd Interchange	From Kearny Villa Rd to Kearny Mesa - in San Diego, widen from 4- to 6-lane prime arterial; Phase II of the project - west ramps
2020	SD102A	San Diego	Otay Truck Route Widening	On Otay Truck Route in San Diego from Drucker Ln to La Media, add one lane (total 3 lanes) for trucks; from Britannia to La Media, add one lane for trucks and one lane for emergency vehicles (border patrol/fire department access); along Britannia from Britannia Court to the Otay Truck Route - add one lane for trucks
2020	SD103	San Diego	I-5/Genesee Ave Interchange	Replace Genesee Ave over-crossing from 4-lane bridge with 6-lane bridge; construct auxiliary lanes and replace Voigt Dr bridge; add additional lane at on/off ramp to Sorrento Valley Rd; add one carpool lane and one general purpose lane to on-ramp from Sorrento Valley Rd to southbound I-5; install ramp meters at on-ramp and construct a southbound auxiliary lane between Sorrento Valley Rd and Genesee Ave
2020	SD189	San Diego	Sea World Dr Widening and I-5 Interchange Improvements	Replace existing 4-lane bridge with an 8-lane bridge with new on/off ramps; widen approach-ways to add right turn lanes to improve access to I-5 (CIP 52-706.0)
2020	SD190	San Diego	Palm Ave/I-805 Interchange	Improvements to the Palm Avenue Bridge over I-805; repairs to the bridge approaches; a new Project Study Report (PSR) and Preliminary Environmental Assessment Report (PEAR). Phase II will include widening of the bridge, realignment of existing ramps, possible addition of northbound looping entrance ramp, restriping of traffic lanes, and signal modifications.
2020	SM19	San Marcos	Grand Ave Bridge and Street Improvements	From Discovery St to San Marcos Blvd, construct 4-lane arterial bridge and a 6-lane arterial street from Craven to Grand Ave
2020	SM22	San Marcos	South Santa Fe - Bosstick to Smilax	From Bosstick to Smilax, realign and signalize the South Santa Fe/Smilax intersection (Phase I)
2020	SM24	San Marcos	Woodland Pkwy Interchange Improvements	From La Moree Rd to Rancheros Dr, modify existing ramps at Woodland Pkwy and Barham Dr; widen and realign SR 78 undercrossing and associated work

Table A.3 (continued)

Phased Revenue Constrained Arterial Projects

Year Built By	SANDAG ID	Lead Agency	Project Title	Project Description
2020	SM31	San Marcos	Discovery St Improvements	From Via Vera Cruz to Bent Ave/Craven Rd, widen roadway to 4-lane secondary arterial
2020	SM32	San Marcos	Via Vera Cruz Bridge and Street Improvements	From San Marcos Blvd to Discovery St, widen to 4-lane secondary arterial and construct a bridge at San Marcos Creek
2020	SM42	San Marcos	Street Improvements: Discovery St - Craven Rd to West of Twin Oaks Valley Rd	In the City of San Marcos, on Discovery St from Craven Rd to west of Twin Oaks Valley Rd, construct approximately 5,100 lineal feet of a new 6-lane roadway
2020	SM43	San Marcos	Street Improvements and Widening on Barham Dr	Twin Oaks Valley Rd to La Moree Rd in the City of San Marcos, on Barham Dr between Twin Oaks Valley Rd and La Moree Rd, widen and reconstruct the north side of Barham Dr to a 6-lane prime arterial and associated work
2020	SM48	San Marcos	Creekside Dr	Construct approximately 3,000 feet of a 2-lane collector road from Via Vera Cruz to Grand Ave in the City of San Marcos. The road will include two 12-foot lanes, diagonal parking on the north side, and parallel parking on the south side. In addition, the project also will include a 10-foot bike trail meandering along the south side.
2020	SM55	San Marcos	Borden Rd Widening and Improvements	Borden Rd from Vineyard to Richland, widening of Borden Rd will add an additional roadway capacity to accommodate increase in traffic volumes
2035	CB34	Carlsbad	Palomar Airport Rd - Palomar Airport Rd to Paseo Del Norte	Widening along eastbound Palomar Airport Rd to provide a dedicated right turn lane to southbound Paseo Del Norte
2035	CNTY34	San Diego County	Dye Rd Extension	Dye Rd to San Vicente Rd - in Ramona, study, design, and construct a 2-lane community collector road with intermittent turn lanes, bike lanes, curb, gutter, and pathway/walkway
2035	CNTY35	San Diego County	Ramona St Extension	From Boundary Ave to Warnock Dr - in the community of Ramona, construct new road extension, 2 lanes with intermittent turn lanes, bike lanes, and walkway/pathway
2035	CNTY88		Ashwood Street Corridor Improvements – Mapleview to Willow	Ashwood Street/Wildcat Canyon Road from Mapleview Street to 1100 feet north of Willow Road in Lakeside- traffic signal improvements at Mapleview and Ashwood; traffic signal installation at Willow and Ashwood/Wildcat Canyon; and the addition of turn lanes, addition of a passing lane in a non-urbanized area, bike lanes, and pedestrian facilities.

Table A.3 (continued)

Phased Revenue Constrained Arterial Projects

Year Built By	SANDAG ID	Lead Agency	Project Title	Project Description
2035	SD81	San Diego	Genesee Ave - Nobel Dr to SR 52	In San Diego, future widening to 6-lane major street north of Decoro St and to a 6-lane primary arterial south of Decoro St and included Class II bicycle lanes (CIP 52-458.0)
2035	SD190	San Diego	Palm Avenue/I-805 Interchange	Phase III will provide the ultimate build-out of the project which will incorporate improvements of Phase II plus the northbound and southbound entrance ramps (CIP 52-640.0)
2035	SM10	San Marcos	SR 78/Smilax	Construct new interchange at Smilax Rd interchange and SR 78 improvements

[1] The arterials listed in this table reflect locally initiated projects that were submitted by local jurisdictions in the 2014 Regional Transportation Improvement Program.

Table A.4

Revenue Constrained Freight and Goods Movement Projects

Rail Facilities (Shared Use Freight and Passengers)

Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
COASTER/ BNSF	398	Double tracking (includes grade separations at Leucadia Blvd and two other locations, stations/platforms at Convention Center/Gaslamp Quarter and Del Mar Fairgrounds, Del Mar Tunnel, and extensions to the Convention Center and Camp Pendleton)	$2,710	$5,174
SPRINTER/ BNSF	399	SPRINTER efficiency improvements and double tracking (Oceanside to Escondido and six rail grade separations at El Camino Real, Melrose Dr, Vista Village Dr/Main St, North Dr, Civic Center, Auto Parkway and Mission Ave)	$946	$1,339
SPRINTER/ BNSF	588	SPRINTER Express	$244	$492
Trolley/ BNSF	510	Blue Line/Mid-Coast Frequency Enhancements and rail grade separations at 28th St, 32nd St, E St, H St, Palomar St, at Taylor St and Ash St, and Blue/Orange Track Connection at 12th/Imperial	$431	$741
Trolley/ BNSF	520	Orange Line Frequency Enhancements and four rail grade separations at Euclid Ave, Broadway/Lemon Grove Ave, Allison Ave/University Ave, Severin Dr	$267	$402
		Subtotal	**$4,598**	**$8,148**

Managed Lanes / Toll Lanes

Freeway	From	To	Existing	With Improvements	Transit Route	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
I-5	SR 905	SR 54	8F	8F+2ML	640	$308	$416
I-5	SR 54	SR 15	8F	10F+2ML	640	$343	$464
I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML		$556	$1,378
I-5	La Jolla Village Dr	I-5/I-805 Merge	8F/14F	8F/14F+2ML		$206	$249
I-5	I-5/I-805 Merge	SR 56	8F/14F+2ML	8F/14F+4ML	650, 653	$91	$137
I-5	SR 56	Manchester Ave	8F+2ML	8F+4ML	650, 653	$455	$686
I-5	Manchester Ave	Vandegrift Blvd	8F	8F+4ML	650, 653	$2,458	$3,957
I-5	Vandegrift Blvd	Orange County	8F	8F+4T		$1,813	$4,497
SR 11/ Otay Mesa East POE	SR 125	Mexico	--	4T+POE	905	$832	$876
SR 15	I-5	SR 94	6F	8F+2ML		$136	$338
SR 15	SR 94	I-805	6F	6F+2ML	235, 610	$30	$52
I-15	Viaduct		8F	8F+2ML	235, 610, 653, 690	$843	$2,092
I-15	I-8	SR 163	8F	8F+2ML	235, 610, 653, 690	$56	$73

Table A.4 (continued)

Revenue Constrained Freight and Goods Movement Projects

Managed Lanes / Toll Lanes (continued)

Freeway	From	To	Existing	With Improvements	Transit Route	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
I-15	SR 78	Riverside County	8F	8F+4T	610	$1,029	$2,555
SR 52	I-805	I-15	6F	6F+2ML	653, 870, 890	$91	$181
SR 52	I-15	SR 125	4F/6F	4F/6F+2ML(R)	870, 890	$298	$662
SR 54	I-5	SR 125	6F	6F+2ML		$111	$276
SR 78	I-5	I-15	6F	6F+2ML		$1,192	$1,720
SR 94	I-5	SR 125	8F	8F+2ML	90, 225, 235, 610,	$903	$1,478
SR 125	SR 54	SR 94	6F	6F+2ML		$76	$188
SR 125	SR 94	I-8	8F	10F+2ML	90	$293	$694
I-805	SR 905	Palomar St	8F	8F+2ML	688	$343	$595
I-805	SR 54	SR 94	8F+2ML	8F+4ML	225, 650, 688, 689	$704	$1,096
I-805	SR 94	Carroll Canyon Rd	8F	8F+4ML	30, 225, 650, 653, 688, 689, 690, 870, 890	$2,585	$4,441
					Subtotal	**$15,752**	**$29,101**

Highway Projects

Freeway	From	To	Existing	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
I-8	2nd St	Los Coches	4F/6F	6F	$35	$88
SR 52	Mast Blvd	SR 125	4F	6F	$76	$131
SR 56	I-5	I-15	4F	6F	$141	$351
SR 94	SR 125	Avocado Blvd	4F	6F	$111	$221
SR 94	Avocado Blvd	Jamacha	4C	6C	$91	$225
SR 94	Jamacha	Steele Canyon Rd	2C/4C	4C	$40	$100
SR 125	SR 905	San Miguel Rd	4T	8F	$323	$661
SR 125	San Miguel Rd	SR 54	4F	8F	$177	$438
				Subtotal	**$994**	**$2,215**

Table A.4 (continued)

Revenue Constrained Freight and Goods Movement Projects

Operational Improvements

Freeway	From	To	Existing	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
I-5	SR 15	I-8	8F	8F+Operational	$1,177	$2,919
I-8	I-5	SR 125	8F/10F	8F/10F+Operational	$667	$1,654
I-8	SR 125	2nd St	6F/8F	6F/8F+Operational	$167	$413
				Subtotal	**$2,011**	**$4,986**

Freeway Connectors

Freeway	Intersecting Freeway	Movement	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
I-5	SR 56	West to North and South to East	$273	$411
I-5	SR 78	South to East and West to South	$273	$358
SR 11/ SR 905	SR 125	EB SR 905 and WB SR 11 to NB SR 125 and NB SR 905 to NB SR 125	$26	$28
SR 11/ SR 905	SR 125	SB 125 to WB SR 905, SB SR 125 to EB SR 11, SB SR 125 to SB SR 905	$74	$90
I-15	SR 56	North to West	$101	$265
SR 94	SR 125	South to East	$69	$88
SR 94	SR 125	West to North	$81	$122
		Subtotal	**$897**	**$1,362**

Goods Movement

Year Built By	Air Cargo System Improvement	Capital Cost ($2014) millions	Capital Cost ($YOE) millions
2020	SDIA Interior Northside Roadway	$4	$4
2020	SDIA Air Cargo Facility Improvements for cargo storage and handling	$20	$20
	Subtotal	**$24**	**$24**
	TOTAL	**$24,276**	**$45,836**

Table A.5

Revenue Constrained and Unconstrained Projects

Transit Facilities

Service	Route	Description	Revenue Constrained Peak/Off-Peak (minutes)	Unconstrained Peak/Off-Peak (minutes)	Unconstrained Capital Cost ($2014); millions
HSR	598	Commuter Rail Overlay (Temecula to Airport ITC)	NA	15/15	$340
HSR	--	Extension from Airport ITC to San Ysidro/ Otay Mesa	NA	15/60	$2,734
COASTER	398	Double tracking, grade separation at Leucadia Blvd and two other locations, stations/ platforms at Convention Center/Gaslamp Quarter and Del Mar Fairgrounds, extension to Convention Center/Gaslamp Quarter and Camp Pendleton, and Del Mar and UTC Tunnels[1]	20/60	15/15	$5,786
COASTER	398	COASTER extension to National City	NA	15/15	$900
SPRINTER	399	SPRINTER efficiency improvements; double tracking Oceanside to Escondido; includes six rail grade separations at El Camino Real, Melrose Dr, Vista Village Dr/Main St, North Dr, Civic Center, Auto Pkwy and Mission Ave and a Branch Extension to Westfield North County[1]	10/10	7.5/7.5	$1,122
SPRINTER	588	SPRINTER Express	10/15	10/15	$244
Trolley	510	Mid-Coast Trolley Extension	7.5/7.5	7.5/7.5	$1,753
Trolley	510	Blue Line/Mid-Coast Frequency Enhancements and rail grade separations at 28th St, 32nd St, E St, H St, Palomar St, Taylor and Ash St, and Blue/Orange Track Connection at 12th/Imperial	7.5/7.5	7.5/7.5	$431
Trolley	520	Orange Line Frequency Enhancements and four rail grade separations at Euclid Ave, Broadway/ Lemon Grove Ave, Allison Ave/University Ave, Severin Dr	7.5/7.5	7.5/7.5	$267
Trolley	530	Green Line Frequency Enhancements	7.5/7.5	7.5/7.5	$0
Trolley	522	Orange Line Express - El Cajon to San Diego International Airport ITC (ITC)	NA	10/10	$198
Trolley	540	Blue Line Express - Santa Fe Depot to San Ysidro via Downtown	NA	10/10	$391
Trolley	550	SDSU to Palomar Station via East San Diego, Southeast San Diego, National City	NA	7.5/7.5	$1,582
Trolley	560	SDSU to Downtown San Diego via El Cajon Blvd/Mid-City (transition of Mid-City *Rapid* to Trolley)	7.5/7.5	7.5/7.5	$2,390
Trolley	561	UTC COASTER Connection	7.5/7.5	7.5/7.5	$343
Trolley	561	COASTER Connection to Mira Mesa/Carroll Canyon (extension of Route 510)	NA	7.5/7.5	$824
Trolley	562	San Ysidro to Carmel Valley via Chula Vista, National City, Southeast San Diego, Mid-City, Mission Valley, and Kearny Mesa	7.5/10	7.5/7.5	$2,967

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Transit Facilities (continued)

Service	Route	Description	Revenue Constrained Peak/Off-Peak (minutes)	Unconstrained Peak/Off-Peak (minutes)	Unconstrained Capital Cost ($2014); millions
Trolley	563	Pacific Beach to El Cajon Transit Center via Balboa and Kearny Mesa	7.5/10	7.5/7.5	$1,299
Trolley	564	Otay Mesa East Border Crossing to Western Chula Vista via Otay Ranch/Millennia	NA	7.5/7.5	$1,001
Trolley	566	Palomar St Trolley Station to Carmel Valley via Mid-City, Kearny Mesa (Route 562 Express)	NA	10/10	$335
Trolley	510, 520, 540, 522 and 560	Downtown Trolley Tunnel	NA	7.5/7.5	$2,666
Rapid	2	North Park to Downtown San Diego via 30th St, Golden Hill	10/10	10/10	$39
Rapid	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	10/10	10/10	$87
Rapid	11	Spring Valley to SDSU via Southeast San Diego, Downtown, Hillcrest, Mid-City	10/10	10/10	$113
Rapid	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	10/10	10/10	$49
Rapid	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	10/10	10/10	$105
Rapid	41	Fashion Valley to UTC/UC San Diego via Linda Vista and Clairemont	10/10	10/10	$55
Rapid	90	El Cajon Transit Center to San Diego International Airport ITC via SR 94, City College (peak only)	10/10	10/10	$20
Rapid	103	Solana Beach to Sabre Springs *Rapid* station via Carmel Valley	15/15	15/15	$67
Rapid	120	Kearny Mesa to Downtown via Mission Valley	10/10	10/10	$78
Rapid	225	South Bay *Rapid* (Otay Mesa to Downtown) and Otay Mesa ITC	15/30	10/10	$206
Rapid	235	Temecula (peak only) Extension of Escondido to Downtown *Rapid* (formerly Route 610)	10/NA	10/NA	$98
Rapid	430	Oceanside to Escondido (peak only)	NA	10/10	$240
Rapid	440	Carlsbad to Escondido Transit Center via Palomar Airport Rd	10/10	10/10	$51
Rapid	471	Downtown Escondido to East Escondido	10/10	10/10	$32
Rapid	473	UTC/UC San Diego to Oceanside via Hwy 101 Coastal Communities, Carmel Valley	10/10	10/10	$130
Rapid	474	Oceanside to Vista via Mission Ave/Santa Fe Road Corridor	10/10	10/10	$50
Rapid	477	Camp Pendleton to Carlsbad Village via College Blvd, Plaza Camino Real	10/10	10/10	$80
Rapid	550	SDSU to Palomar Station via East San Diego, Southeast San Diego, National City[2]	10/10	NA	$59

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Transit Facilities (continued)

Service	Route	Description	Revenue Constrained Peak/Off-Peak (minutes)	Unconstrained Peak/Off-Peak (minutes)	Unconstrained Capital Cost ($2014); millions
Rapid	635	Eastlake to Palomar Trolley via Main St Corridor	10/10	10/10	$56
Rapid	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	10/10	10/10	$39
Rapid	637	North Park to 32nd St Trolley via Golden Hill	10/10	10/10	$33
Rapid	638	Iris Trolley to Otay Mesa via Otay, Airway Dr, SR 905 Corridor	10/10	10/10	$38
Rapid	639	Iris Trolley Station to North Island via Imperial Beach and Silver Strand, Coronado	NA	10/10	$54
Rapid	640A/ 640B	Route 640A: I-5 - San Ysidro to Old Town Transit Center via City College Route 640B: I-5 Iris Trolley/Palomar to Kearny Mesa via Chula Vista, National City and City College	640A = 10/15 640B=15/NA	NA	$153
Rapid	650	Chula Vista to Palomar Airport Rd Business Park via I-805/I-5 (peak only)	15/NA	15/NA	$82
Rapid	652	Downtown to UTC via Kearny Mesa Guideway/ I-805	NA	10/10	$3
Rapid	653	Mid-City to Palomar Airport Rd via Kearny Mesa/ I-805/I-5	15/NA	15/NA	$10
Rapid	688/ 689/ 690	San Ysidro to Sorrento Mesa via I-805/I-15/SR 52 Corridors; Otay Mesa Port of Entry (POE) to UTC/Torrey Pines via Otay Ranch/Millennia, I-805 Corridor; Mid City to Sorrento Mesa via I-805 Corridor. All Peak Only	15/NA	15/NA (no Rt 690)	$458
Rapid	692	Grossmont Center to Otay Town Center/Millennia via Southwest College, SR125, Spring Valley	NA	15/15	$5
Rapid	709	H St Trolley to Millennia via H St Corridor, Southwestern College	10/10	10/10	$37
Rapid	870	El Cajon to UTC via Santee, SR 52, I-805	10/NA	10/15	$7
Rapid	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	10/NA	10/NA	$12
Rapid	905	Extension of Iris Trolley Station to Otay Mesa Port of Entry (POE) with new service to Otay Mesa East POE and Imperial Beach	10/10	10/10	$2
Rapid	910	Coronado to Downtown via Coronado Bridge	10/10	10/10	$26
Rapid	940	Oceanside to Sorrento Mesa via I-5, Carlsbad, Encinitas (peak only)	NA	10/0	$39
Rapid	SR 163 DARs	Kearny Mesa to Downtown via SR 163. Stations at Sharp/Children's Hospital, University Ave, and Fashion Valley Transit Center	✓	✓	$150

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Transit Facilities (continued)

Service	Route	Description	Revenue Constrained Peak/Off-Peak (minutes)	Unconstrained Peak/Off-Peak (minutes)	Unconstrained Capital Cost ($2014); millions
Shuttle	448/449	San Marcos Shuttle[3]	10/10	10/10	$0
Streetcar	551	Chula Vista Downtown[4]	NA	10/10	$14
Streetcar	552	National City Downtown[4]	NA	10/10	$41
Streetcar	553	Downtown San Diego: Little Italy to East Village[4]	10/10	10/10	$14
Streetcar	554	Hillcrest/Balboa Park/Downtown San Diego Loop[4]	10/10	10/10	$29
Streetcar	555	30th St to Downtown San Diego via North Park/Golden Hill[4]	10/10	10/10	$26
Streetcar	557	El Cajon Downtown[4]	NA	10/10	$16
Streetcar	558	Escondido Downtown[4]	NA	10/10	$51
Streetcar	559	Oceanside Downtown[4]	NA	10/10	$46
Streetcar	565	Mission Beach to La Jolla via Pacific Beach[4]	10/10	10/10	$25
Airport Express	-	Airport Express Routes[5]	30/30	30/30	$52
Local	-	Local Bus Routes - 15 minutes in key corridors	15/15	15/15	NA
Local	-	Local Bus Routes - 10 minutes in key corridors	10/10	10/10	NA
ITC	-	San Diego International Airport ITC and I-5 Direct Connector Ramps	✓	✓	$170
ITC	-	San Ysidro ITC	✓	✓	$118
ITC	-	Otay Mesa East ITC	NA	✓	$0
Transit Lanes	SR 15 from I-805 to I-8	Addition of two transit lanes for routes 235, 280/290, 653, and Airport Express Route to the cross-border facility in Otay Mesa	✓	✓	$56
Other	-	Other Improvements (Vehicles, transit system rehabilitation, maintenance facilities, ITS, regulatory compliance, park and ride, and transit center expansions)	✓	✓	$7,696
				Subtotal	**$38,690**

Managed Lanes / Toll Lanes / Highway Projects / Operational Improvements

Freeway	From	To	Existing or Planned Phase	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
I-5	SR 905	SR 54	8F	8F+2ML	8F+2ML	$308
I-5	SR 54	SR 15	8F	10F+2ML	10F+2ML	$343

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Managed Lanes / Toll Lanes / Highway Projects / Operational Improvements (continued)

Freeway	From	To	Existing or Planned Phase	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
I-5	I-15	I-8	8F	8F+Operational	8F+Operational	$1,177
I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	8F/10F+2ML	$556
I-5	La Jolla Village Dr	I-5/805 Merge	8F/14F	8F/14F+2ML	8F/14F+2ML	$206
I-5	I-5/I-805 Merge	SR 56	8F/14F +2ML	8F/14F+4ML	8F/14F+4ML	$91
I-5	SR 56	Manchester Ave	8F+2ML	8F+4ML	8F+4ML	$455
I-5	Manchester Ave	Vandegrift Blvd	8F	8F+4ML	8F+4ML	$2,458
I-5	Vandegrift Blvd	Orange County	8F	8F+4T	8F+4T	$1,813
I-8	I-5	SR 125	8F/10F	8F/10F+ Operational	8F/10F+ Operational	$667
I-8	SR 125	2nd St	6F/8F	6F/8F+ Operational	6F/8F+ Operational	$167
I-8	2nd St	Los Coches	4F/6F	6F	6F	$35
I-8	Los Coches	Dunbar Rd[6]	4F/6F	4F/6F	6F	$131
SR 11/ Otay Mesa East POE	SR 125	Mexico	--	4T + POE	4T + POE	$832
SR 15	I-5	SR 94	6F	8F+2ML	8F+2ML	$136
SR 15	SR 94	I-805	6F	6F+2ML	6F+2ML	$30
I-15	Viaduct		8F	8F+2ML	8F+2ML	$843
I-15	I-8	SR 163	8F	8F+2ML	8F+2ML	$56
I-15	Centre City Pkwy	SR 78	8F/10F+4ML	8F/10F+4ML	10F+4ML	$232
I-15	SR 78	Riverside County	8F	8F+4T	8F+4T	$1,030
SR 52	I-5	I-805	4F	6F	6F	$111
SR 52	I-805	I-15	6F	6F+2ML	6F+2ML	$91
SR 52	I-15	SR 125[6]	6F	6F+2ML(R)	6F+3ML(R)	$379
SR 52	Mast Blvd	SR 125	4F	6F	6F	$76
SR 52	SR 125	SR 67[6]	4F	4F	6F	$253
SR 54	I-5	SR 125[6]	6F	6F+2ML	6F/8F+2ML	$230
SR 56	I-5	I-15	4F	6F	6F +2ML	$797
SR 67	I-8	Mapleview St[6]	4F/6F	4F/6F	6F/8F	$141
SR 67	Mapleview St	Dye Rd	2C/4C	4C	4C	$636
SR 76	I-5	Melrose	4E	4E	6E	$232
SR 76	Mission	I-15	2C	4C	4C	$305
SR 76	I-15	Couser Canyon	2C/4C	4C/6C+ Operational	4C/6C+ Operational	$131

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Managed Lanes / Toll Lanes / Highway Projects / Operational Improvements (continued)

Freeway	From	To	Existing or Planned Phase	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
SR 76	Couser Canyon	SR 79	2C	2C	2C+Operational	$633
SR 78	I-5	I-15	6F	6F+2ML+ Operational	6F+2ML+ Operational	$1,192
SR 94	I-5	I-805	8F	8F+2ML	8F+2ML	$535
SR 94	I-805	College Ave[6]	8F	8F+2ML	8F/10F+2ML	$495
SR 94	College Ave	SR 125	8F	8F+2ML	8F+2ML	$172
SR 94	SR 125	Avocado Blvd	4F	6F	6F	$111
SR 94	Avocado Blvd	Jamacha	4C	6C	6C	$91
SR 94	Jamacha	Steele Canyon Rd	2C/4C	4C	6C	$40
SR 125	SR 905	San Miguel Rd	4T	8F	8F	$323
SR 125	San Miguel Rd	SR 54	4F	8F	8F	$177
SR 125	SR 54	SR 94[6]	6F	6F+2ML	8F+2ML	$146
SR 125	SR 94	I-8	8F	10F+2ML	10F+2ML	$293
SR 125	I-8	SR 52[6]	6F	6F	6F+2ML	$263
SR 163	I-805	I-151	8F	8F	8F+2ML	$333
SR 241	Orange County	I-5	--	6T	6T	$479
I-805	SR 905	Palomar St	8F	8F+2ML	8F+2ML	$343
I-805	SR 54	SR 94	8F +2ML	8F+4ML	8F+4ML	$704
I-805	SR 94	Carroll Canyon Rd	8F	8F+4ML	8F+4ML	$2,585
SR 905	I-5	I-805[6]	4F	4F	8F	$157
SR 905	I-805	Mexico[6]	6F	6F	8F	$202
					Subtotal	**$24,222**

Managed Lanes Connectors

Freeway	Intersecting Freeway	Movement	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
I-5	SR 15	North to North and South to South		✓	$197
I-5	SR 54	West to South and North to East		✓	$121
I-5	SR 54	South to East and West to North		✓	$121
I-5	SR 56	South to East and West to North		✓	$177
I-5	SR 56	North to East and West to South		✓	$152
I-5	SR 78	South to East and West to North, North to East and West to South	✓	✓	$253
I-5	I-805	North to North and South to South	✓	✓	$51
I-15	SR 52	West to North and South to East	✓	✓	$130

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Managed Lanes Connectors (continued)

Freeway	Intersecting Freeway	Movement	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
I-15	SR 52	West to South and North to East		✓	$141
I-15	SR 56	East to North and South to West		✓	$172
I-15	SR 78	East to South and North to West	✓	✓	$106
I-15	SR 163	North to North and South to South		✓	$162
SR 15	SR 94	South to West and East to North	✓	✓	$71
SR 15	I-805	North to North and South to South	✓	✓	$81
SR 52	SR 125	North to West and East to South		✓	$111
SR 94	SR 125	East to North and South to West		✓	$146
I-805	SR 52	West to North and South to East	✓	✓	$91
I-805	SR 54	North to West and East to South		✓	$157
I-805	SR 94	North to West and East to South	✓	✓	$101
I-805	SR 94	West to South and North to East		✓	$217
I-805	SR 94	East to North and South to East		✓	$212
I-805	SR 163	North to North and South to South		✓	$192
				Subtotal	**$3,162**

Freeway Connectors

Freeway	Intersecting Freeway	Movement	Revenue Constrained	Unconstrained	Unconstrained Capital Costs ($2014) millions
I-5	I-8	East to North and South to West[7]		✓	$323
I-5	SR 56	West to North and South to East	✓	✓	$273
I-5	SR 78	South to East and West to South	✓	✓	$273
I-5	SR 94	North to East[7]		✓	$131
I-15	SR 56	North to West	✓	✓	$101
SR 94	SR 125	South to East and West to North	✓	✓	$150
SR 11/ SR 905	SR 125	EB SR 11 and WB SR 11 to NB SR 125, NB SR 905 to NB SR 125	✓	✓	$26
SR 11/ SR 905	SR 125	SB 125 to WB SR 905, SB SR 125 to EB SR 11, SB SR 125 to SB SR 905	✓	✓	$74
				Subtotal	**$1,351**

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Goods Movement

Maritime System Improvements	Revenue Constrained	Unconstrained	Unconstrained Capital Costs ($2014) millions
Tenth Ave Marine Terminal (TAMT) Marine Cargo Staging and Handling Projects, including but not limited to: enhanced open storage, shed demolition, cargo handling infrastructure improvements, wharf reinforcements, additional crane, on-dock shorepower, improvements to facilitate "marine highway" cargo, and front gate technology enhancements.[8]		✓	$88
TAMT Freight Rail Improvements, including but not limited to: track upgrades and increased staging area for rail cargo and loading[8]		✓	$28
National City Marine Terminal (NCMT) Marine Cargo Staging and Handling Projects, including but not limited to: construct garages for additional roll-on/roll-off cargo storage, wharf extension to create two new berths, and improvements to facilitate "marine highway" cargo.[8]		✓	$95
NCMT Freight Rail Improvements, including but not limited to: additional rail storage facilities in the vicinity of the balloon track.[8]		✓	$3
Harbor Dr Multimodal Corridor Improvements, including but not limited to: improvements at 32nd St and Vesta St; pedestrian crossings and bridges; various truck improvements; bikeway accommodations; streetscape, safety, and parking improvements.[8]		✓	$273
Rail Mainline Capacity			
Desert Line Basic Service, Rehabilitation[9]		✓	$182
Rail Intermodal System Improvements			
Logistics Center Mid County[8]		✓	$2,130
Logistics Center North County[8]		✓	$166
Rail Safety, Tunnels			
LOSSAN Grade Separations (locations TBD)		✓	$260
Pipeline			
I-15 Access to Kinder Morgan (KM) MV Terminal[8]		✓	NA
KM, New Miramar Junction/Terminal/Tanks[9]		✓	NA
KM Expand to 16 Pipe/Extend to Mexico[9]		✓	NA
Border System Improvements			
Otay Mesa Southbound Truck Route Improvements[9]		✓	$35
Jacumba Port of Entry (POE)[9]		✓	NA
Otay Mesa Port of Entry Modernization Project[9]		✓	$63

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Truck Rest Stop

Maritime System Improvements	Revenue Constrained	Unconstrained	Unconstrained Capital Costs ($2014) millions
Truck parking at SR 76/I-15[8]		✓	$14
Truck staging at border[8]		✓	$30
Truck rest stop with restrooms, location TBD[8]		✓	NA

Mexican Freight Projects

Mesa de Otay II Port of Entry and Related Roads[8]		✓	NA
Tijuana Intermodal Terminal/Distribution Center[9]		✓	NA
Ensenada Port Expansion[9]		✓	NA
Mexican Rail Yard Bicentennial Multi-modal Center in Tijuana[9]		✓	NA
Jacumé Port of Entry (POE)[9]		✓	NA
Expansion of Tecate Port of Entry Cargo Inspection Facility[9]		✓	NA
Tijuana-Tecate Rail Line Improvements[9]		✓	$20
		Subtotal	**$3,387**

Active Transportation Projects[10]

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
Uptown - Fashion Valley to Downtown San Diego	San Diego	✓	✓	$23.0
Uptown - Old Town to Hillcrest	San Diego	✓	✓	$18.0
Uptown - Hillcrest to Balboa Park	San Diego	✓	✓	$3.0
North Park - Mid-City - Hillcrest to Kensington	San Diego	✓	✓	$6.0
North Park - Mid-City - Hillcrest to City Heights (Hillcrest-El Cajon Corridor)	San Diego	✓	✓	$6.0
North Park - Mid-City - City Heights	San Diego	✓	✓	$3.0
North Park - Mid-City - Hillcrest to City Heights (City Heights - Old Town Corridor)	San Diego	✓	✓	$5.0
North Park - Mid-City - City Heights to Rolando	San Diego	✓	✓	$4.0
San Diego River Trail - Qualcomm Stadium	San Diego	✓	✓	$0.8
Coastal Rail Trail San Diego - Rose Creek	San Diego	✓	✓	$21.0
Bayshore Bikeway - Main St to Palomar	Chula Vista/ Imperial Beach	✓	✓	$3.0
Coastal Rail Trail Encinitas - Chesterfield to G St	Encinitas	✓	✓	$7.0
Coastal Rail Trail Encinitas - Chesterfield to Solana Beach	Encinitas	✓	✓	$0.2

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Active Transportation Projects (continued)

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
Inland Rail Trail (combination of four projects)	San Marcos, Vista, Co. of San Diego	✓	✓	$33.0
Coastal Rail Trail Oceanside - Wisconsin to Oceanside Blvd	Oceanside	✓	✓	$0.2
Plaza Bonita Bike Path	National City	✓	✓	$0.4
Bayshore Bikeway - National City Marina to 32nd St	San Diego/ National City	✓	✓	$2.0
I-15 Mid-City - Adams Ave to Camino Del Rio S	San Diego	✓	✓	$9.0
Pershing and El Prado - North Park to Downtown San Diego	San Diego	✓	✓	$7.0
Pershing and El Prado - Cross-Park	San Diego	✓	✓	$0.6
San Ysidro to Imperial Beach - Bayshore Bikeway Connection	Imperial Beach/ San Diego	✓	✓	$8.9
Terrace Dr/Central Ave - Adams to Wightman	San Diego	✓	✓	$1.0
San Diego River Trail – I-805 to Fenton	San Diego	✓	✓	$2.0
San Diego River Trail - Short gap connections	San Diego	✓	✓	$1.0
Coastal Rail Trail Encinitas - Leucadia to G St	Encinitas	✓	✓	$5.0
Bayshore Bikeway - Barrio Logan	San Diego	✓	✓	$19.0
San Diego River Trail - Father Junipero Serra Trail to Santee	Santee	✓	✓	$10.0
Downtown to Southeast connections	San Diego	✓	✓	$23.8
Coastal Rail Trail San Diego - UTC	San Diego	✓	✓	$3.8
Coastal Rail Trail San Diego - Rose Canyon	San Diego	✓	✓	$12.0
Coastal Rail Trail San Diego - Pac Hwy (W Washington St to Laurel St)	San Diego	✓	✓	$4.0
Coastal Rail Trail San Diego - Pac Hwy (Laurel St to Santa Fe Depot)	San Diego	✓	✓	$8.0
Coastal Rail Trail San Diego – Pac Hwy (Taylor St to W Washington St)	San Diego	✓	✓	$4.0
Coastal Rail Trail San Diego- Pac Hwy (Fiesta Island Rd to Taylor St)	San Diego	✓	✓	$7.0
City Heights /Encanto/Lemon Grove	Lemon Grove/ San Diego	✓	✓	$7.0
City Heights/Fairmount Corridor	San Diego	✓	✓	$12.0
Rolando to Grossmont/La Mesa	La Mesa/ El Cajon/ San Diego	✓	✓	$2.0
La Mesa/Lemon Grove/El Cajon connections	Lemon Grove/ La Mesa	✓	✓	$6.0

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Active Transportation Projects (continued)

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
San Diego River Trail - Qualcomm Stadium to Ward Rd	San Diego	✓	✓	$2.0
San Diego River Trail - Rancho Mission Rd to Camino Del Rio North	San Diego	✓	✓	$0.3
Coastal Rail Trail San Diego - Rose Creek Mission Bay Connection	San Diego	✓	✓	$4.0
Coastal Rail Trail Carlsbad - Reach 4 Cannon to Palomar Airport Rd	Carlsbad	✓	✓	$5.0
Coastal Rail Trail Carlsbad - Reach 5 Palomar Airport Rd to Poinsettia Station	Carlsbad	✓	✓	$3.0
Coastal Rail Trail Encinitas - Carlsbad to Leucadia	Encinitas	✓	✓	$7.0
Coastal Rail Trail Del Mar	Del Mar	✓	✓	$0.4
Coastal Rail Trail San Diego - Del Mar to Sorrento via Carmel Valley	Del Mar/ San Diego	✓	✓	$0.4
Coastal Rail Trail San Diego - Carmel Valley to Roselle via Sorrento	San Diego	✓	✓	$0.9
Coastal Rail Trail San Diego - Roselle Canyon	San Diego	✓	✓	$5.0
Chula Vista National City connections	Chula Vista/ National City	✓	✓	$11.0
Pacific Beach to Mission Beach	San Diego	✓	✓	$10.0
Ocean Beach to Mission Bay	San Diego	✓	✓	$24.0
San Diego River Trail - Bridge connection (Sefton Field to Mission Valley YMCA)	San Diego	✓	✓	$7.0
San Diego River Trail - Mast Park to Lakeside baseball park	Santee	✓	✓	$10.0
I-8 Flyover - Camino del Rio S to Camino del Rio N	San Diego	✓	✓	$10.0
Coastal Rail Trail Oceanside - Broadway to Eaton	Oceanside	✓	✓	$0.4
El Cajon - Santee connections	El Cajon/La Mesa/ Santee	✓	✓	$12.0
San Diego River Trail - Father Junipero Serra Trail to West Hills Parkway	San Diego	✓	✓	$3.0
Inland Rail Trail Oceanside	Oceanside	✓	✓	$19.0
Coastal Rail Trail Carlsbad - Reach 3 Tamarack to Cannon	Carlsbad	✓	✓	$5.0
Clairemont Dr (Mission Bay to Burgener)	San Diego	✓	✓	$8.0
Harbor Dr (Downtown to Ocean Beach)	San Diego	✓	✓	$7.0
Mira Mesa Bike Blvd	San Diego	✓	✓	$4.0

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Active Transportation Projects (continued)

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
Sweetwater River Bikeway Ramps	National City	✓	✓	$9.0
Coastal Rail Trail Oceanside - Alta Loma Marsh bridge	Oceanside	✓	✓	$5.0
Coastal Rail Trail San Diego - Mission Bay (Clairemont to Tecolote)	San Diego	✓	✓	$3.0
Bayshore Bikeway Coronado - Golf course adjacent	Coronado	✓	✓	$3.0
San Luis Rey River Trail	Oceanside, Unincorporated	✓	✓	$37.0
Encinitas-San Marcos Corridor – Double Peak Dr to San Marcos Blvd	San Marcos	✓	✓	$12.0
Escondido Creek Bikeway – Quince St to Broadway	Escondido	✓	✓	$2.0
Escondido Creek Bikeway – Escondido Creek to Washington Ave	Escondido	✓	✓	$1.0
Escondido Creek Bikeway – 9th Ave to Escondido Creek	Escondido	✓	✓	$1.0
Escondido Creek Bikeway – El Norte Pkwy to northern bikeway terminus	Escondido	✓	✓	$6.0
Encinitas to San Marcos Corridor – Leucadia Blvd to El Camino Real	Carlsbad, Encinitas	✓	✓	$2.0
I-15 Bikeway – Via Rancho Pkwy to Lost Oak Ln	Escondido	✓	✓	$4.0
I-15 Bikeway – Rancho Bernardo Community Park to Lake Hodges Bridge	San Diego	✓	✓	$3.0
I-15 Bikeway – Camino del Norte to Aguamiel Rd	San Diego	✓	✓	$13.0
I-15 Bikeway – Poway Rd interchange to Carmel Mountain Rd	San Diego	✓	✓	$17.0
SR 56 Bikeway – Azuaga St to Rancho Penasquitos Blvd	San Diego	✓	✓	$2.0
I-15 Bikeway – Murphy Canyon Rd to Affinity Ct	San Diego	✓	✓	$40.0
SR 56 Bikeway – El Camino Real to Caminito Pointe	San Diego	✓	✓	$2.0
SR 52 Bikeway – I-5 to Santo Rd	San Diego	✓	✓	$30.0
SR 52 Bikeway – SR 52/Mast Dr to San Diego River Trail	San Diego	✓	✓	$2.0
I-8 Corridor – San Diego River Trail to Riverside Dr	Unincorporated	✓	✓	$2.0
I-805 Connector – Bonita Rd to Floyd Ave	Chula Vista, Unincorporated	✓	✓	$6.0
SR 125 Connector – Bonita Rd to U.S.-Mexico Border	Chula Vista, San Diego	✓	✓	$39.0
SR 905 Connector – E Beyer Blvd to U.S.-Mexico Border	San Diego, Unincorporated	✓	✓	$34.0
El Camino Real Bike Lanes – Douglas Dr to Mesa Dr	Oceanside	✓	✓	$1.0
Vista Way Connector from Arcadia	Vista, Unincorporated	✓	✓	$2.1
I-15 Bikeway – W. Country Club Ln to Nutmeg St	Escondido	✓	✓	$0.6

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Active Transportation Projects (continued)

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
El Camino Real Bike Lanes – Marron Rd to SR 78 offramp	Carlsbad	✓	✓	$0.3
Carlsbad to San Marcos Corridor – Paseo del Norte to Avenida Encinas	Carlsbad	✓	✓	$0.4
Encinitas to San Marcos Corridor – Kristen Ct to Ecke Ranch Rd	Encinitas	✓	✓	$0.4
Encinitas to San Marcos Corridor – Encinitas Blvd/I-5 Interchange	Encinitas	✓	✓	$0.2
Mira Mesa Corridor – Reagan Rd to Parkdale Ave	San Diego	✓	✓	$0.4
Mira Mesa Corridor – Scranton Rd to I-805	San Diego	✓	✓	$0.4
Mira Mesa Corridor – Sorrento Valley Rd to Sorrento Valley Blvd	San Diego	✓	✓	$0.8
Mid-County Bikeway – I-5/Via de la Valle Interchange	San Diego	✓	✓	$0.3
Mid-County Bikeway – Rancho Santa Fe segment	San Diego, Unincorporated	✓	✓	$3.0
El Camino Real Bike Lanes – Manchester Ave to Tennis Club Dr	Encinitas	✓	✓	$0.5
Mid-County Bikeway – Manchester Ave/I-5 Interchange to San Elijo Ave	Encinitas	✓	✓	$0.8
Central Coast Corridor – Van Nuys St to San Rafael Pl	San Diego	✓	✓	$1.0
Clairemont – Centre-City Corridor – Coastal Rail Trail to Genesee Ave	San Diego	✓	✓	$2.0
Clairemont – Centre-City Corridor – Coastal Rail Trail to Genesee Ave	San Diego	✓	✓	$2.0
SR 125 Corridor – Mission Gorge Rd to Glen Vista Way	Santee	✓	✓	$0.3
SR 125 Corridor – Prospect Ave to Weld Blvd	Santee, El Cajon	✓	✓	$0.8
I-8 Corridor – Lakeside Ave to SR 67	Unincorporated	✓	✓	$0.5
I-8 Corridor – Willows Rd to SR 79	Unincorporated	✓	✓	$5.0
E County Northern Loop – N Marshall Ave to El Cajon Blvd	El Cajon	✓	✓	$0.3
E County Northern Loop – Washington Ave to Dewitt Ct	El Cajon	✓	✓	$1.0
E County Northern Loop – SR 94 onramp to Del Rio Rd	Unincorporated	✓	✓	$0.2
E County Southern Loop – Pointe Pkwy To Omega St	Unincorporated	✓	✓	$0.8
SR 125 Corridor – SR 94 to S of Avocado St	Unincorporated	✓	✓	$1.1
Centre City – La Mesa Corridor – Gateside Rd to Campo Rd	La Mesa, Unincorporated	✓	✓	$0.4
Bay to Ranch Bikeway – River Ash Dr to Paseo Ranchero	Chula Vista	✓	✓	$0.5

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Active Transportation Projects (continued)

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
Mid-County Bikeway – San Elijo Ave to 101 Terminus	Encinitas	✓	✓	$1.0
Central Coast Corridor – Van Nuys St	San Diego	✓	✓	$0.2
E County Northern Loop – El Cajon Blvd to Washington Ave	El Cajon	✓	✓	$1.0
E County Northern Loop – Calavo Dr to Sweetwater Springs Blvd	Unincorporated	✓	✓	$0.7
Central Coast Corridor – Torrey Pines Rd to Nautilus St	San Diego	✓	✓	$6.0
Central Coast Corridor – Via Del Norte to Van Nuys St	San Diego	✓	✓	$5.0
Kearny Mesa to Beaches Corridor – Ingraham St from Garnet Ave to Pacific Beach Dr	San Diego	✓	✓	$2.0
Kearny Mesa to Beaches Corridor – Clairemont Dr to Genesee Ave	San Diego	✓	✓	$10.0
Kearny Mesa to Beaches Corridor – Genesee Ave to Linda Vista Dr	San Diego	✓	✓	$6.0
Bay to Ranch Bikeway – E J St from 2nd Ave to Paseo Del Rey	Chula Vista	✓	✓	$12.0
Chula Vista Greenbelt – Bay Blvd to Oleander Ave	Chula Vista	✓	✓	$17.0
Safe Routes to Transit at new transit stations	Various	✓	✓	$1,025.0
Local Bike Projects	Various	✓	✓	$728.4
Local pedestrian/safety/traffic calming projects	Various	✓	✓	$180.4
Regional Bicycle and Pedestrian Programs	Various	✓	✓	$30.4
Regional Bicycle and Pedestrian Programs	Various	✓	✓	$30.4
Regional Safe Routes to School Implementation	Various	✓	✓	$76.7
			Subtotal	**$2,849**

Active Transportation Retrofits - Safe Routes to Transit at Existing Stations

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
Plaza Camino Real Transit Center	Carlsbad		✓	
El Camino Real at Cannon/College	Carlsbad		✓	
Carlsbad Poinsettia COASTER Station	Carlsbad		✓	
Carlsbad Village COASTER Station	Carlsbad		✓	
E St Trolley Station	Chula Vista		✓	
Old Highway 80 between El Cajon and Alpine	County - Fallbrook		✓	
Fallbrook High School	County - Fallbrook		✓	

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Active Transportation Retrofits - Safe Routes to Transit at Existing Stations (continued)

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
WB Jamacha Blvd at Sweetwater Springs Blvd	County - Spring Valley		✓	
Jamacha Blvd at Lamplighter Village Dr	County - Spring Valley		✓	
SB Sweetwater Rd at Troy St	County - Spring Valley		✓	
Sweetwater Rd between Jamacha Blvd and Broadway	County - Spring Valley		✓	
Buena Creek SPRINTER Station	County of San Diego		✓	
Encinitas COASTER Station	Encinitas		✓	
Encinitas pedestrian undercrossing connections	Encinitas		✓	
Escondido Transit Center	Escondido		✓	
Del Lago Transit Station	Escondido		✓	
Amaya Trolley Station	La Mesa		✓	
70th St Trolley Station	La Mesa		✓	
National City Blvd and E 32nd St/W 33rd St	National City		✓	
Oceanside Transit Center	Oceanside		✓	
Coast Highway SPRINTER Station	Oceanside		✓	
Crouch St SPRINTER Station	Oceanside		✓	
El Camino Real SPRINTER Station	Oceanside		✓	
Rancho Del Oro SPRINTER Station	Oceanside		✓	
College Blvd SPRINTER Station	Oceanside		✓	
Oceanside High School	Oceanside		✓	
San Luis Rey Transit Center	Oceanside		✓	
Tri-City Medical Center	Oceanside		✓	
32nd and Commercial Trolley Station	San Diego - Barrio Logan		✓	
Euclid Ave between Home Ave and Roselawn Ave	San Diego - City Heights		✓	
Alvarado Trolley Station	San Diego - College Area		✓	
70th St between El Cajon Blvd and Alvarado Rd	San Diego - College Area		✓	
12th and Imperial Transit Center	San Diego - Downtown		✓	
Harbor Dr Pedestrian Bridge	San Diego - Downtown		✓	

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Active Transportation Retrofits - Safe Routes to Transit at Existing Stations (continued)

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
Harborside Trolley Station	San Diego - Harborside		✓	
Pacific Fleet Trolley Station	San Diego - Harborside		✓	
Washington St at Hancock St/I-5 Overcrossing	San Diego - Mission Hills		✓	
WB Hotel Circle S. at Bachman Pl	San Diego - Mission Valley		✓	
Fenton Parkway Trolley Station	San Diego - Mission Valley		✓	
Grantville Trolley Station	San Diego - Mission Valley		✓	
Morena/Linda Vista Trolley Station	San Diego - Mission Valley		✓	
54th St between Euclid Ave and Chollas Pkwy	San Diego - Oak Park		✓	
EB Airway Rd at Dublin Dr	San Diego - Otay Mesa		✓	
EB Airway Rd at Excellante St (Southwestern College)	San Diego - Otay Mesa		✓	
La Media Rd at Airway Rd	San Diego - Otay Mesa		✓	
WB Siempre Vida Rd at La Media Rd	San Diego - Otay Mesa		✓	
SB Hollister St at Conifer Ave (Palm St Trolley Station)	San Diego - Palm City		✓	
NB S. Vista Ave at Beyer Blvd Trolley Station	San Diego - San Ysidro		✓	
Calle Primera between Willow Rd and Via de San Ysidro	San Diego - San Ysidro		✓	
Sorrento Valley COASTER Station	San Diego - Sorrento Valley		✓	
SB Gilman Dr at Villa La Jolla Dr	San Diego - University City		✓	
EB Eastgate Mall between I-805 and Miramar Rd	San Diego - University City		✓	
Palomar College SPRINTER Station	San Marcos		✓	
San Marcos Civic Center SPRINTER Station	San Marcos		✓	
Cal State San Marcos SPRINTER Station	San Marcos		✓	
Nordahl Rd SPRINTER Station	San Marcos		✓	
Rancheros Dr/State Department of Rehabilitation	San Marcos		✓	

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Active Transportation Retrofits - Safe Routes to Transit at Existing Stations (continued)

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
Solana Beach COASTER Station	Solana Beach		✓	
Melrose Dr SPRINTER Station	Vista		✓	
Vista Transit Center	Vista		✓	
Civic Center-Vista SPRINTER Station	Vista		✓	
Sweetwater Rd between Jamacha Blvd and Broadway	County - Spring Valley		✓	
			Subtotal	**$500**[11]

Active Transportation Retrofits - Bicycle/Pedestrian Improvements at Freeway Interchanges

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
Navajo Rd at SR 125	El Cajon		✓	
Fletcher Parkway/Graves Rd at SR 67	El Cajon		✓	
West Bernardo / Pomerado Rd at I-15	San Diego		✓	
Rancho Bernardo Rd at I-15	San Diego		✓	
Bernardo Center Dr at I-15	San Diego		✓	
Balboa Ave at SR 163	San Diego		✓	
Balboa Ave at SR 163	San Diego		✓	
Friars Rd at SR 163	San Diego		✓	
Quince St at SR 163	San Diego		✓	
6th St / University Ave at SR 163	San Diego		✓	
Washington St at SR 163	San Diego		✓	
Richmond St at SR 163	San Diego		✓	
SR 905 / Tocayo Ave at I-5	San Diego		✓	
Dairy Mart Rd / San Ysidro Rd at I-5	San Diego		✓	
Via De San Ysidro at I-5	San Diego		✓	
Camino De La Plaza at I-5, I-805	San Diego		✓	
West Mission Bay Dr at I-8	San Diego		✓	
E San Ysidro Blvd at I-805	San Diego		✓	
SR 905 at I-805	San Diego		✓	
Picador Blvd/ Smythe Ave at SR 905	San Diego		✓	
Camino Del Rio West at I-5 NB/I-8 EB	San Diego		✓	
Camino Del Rio West at I-5 SB	San Diego		✓	

Table A.5 (continued)

Revenue Constrained and Unconstrained Projects

Active Transportation Retrofits - Bicycle/Pedestrian Improvements at Freeway Interchanges (continued)

Project	Jurisdiction(s)	Revenue Constrained	Unconstrained	Unconstrained Capital Cost ($2014) millions
Winter Gardens Blvd at SR 67	San Diego County		✓	
Riverford Rd at SR 67	San Diego County		✓	
Bradley Ave at SR 67	San Diego County		✓	
Tavern Rd at I-8	San Diego County		✓	
Willows Rd at I-8	San Diego County		✓	
Japatul Valley Rd at I-8	San Diego County		✓	
Sunrise Highway at I-8	San Diego County		✓	
Pine Valley Rd at I-8	San Diego County		✓	
Buckman Springs Rd at I-8	San Diego County		✓	
Kitchen Creek Rd at I-8	San Diego County		✓	
Crestwood Rd at I-8	San Diego County		✓	
Campo Blvd at I-8	San Diego County		✓	
Jacumba at I-8	San Diego County		✓	
In-Ko-Pah Park Rd at I-8	San Diego County		✓	
Magnolia Ave at SR 52	Santee		✓	
Prospect Ave at SR 67	Santee		✓	
			Subtotal	**$56**[12]
			TOTAL	**$74,217**

[1] Unconstrained rail facilities (shared use freight and passengers)

[2] *Rapid* Route 550 appeared only as a Trolley route in the Unconstrained Network

[3] Capital cost to be funded by the City of San Marcos

[4] Streetcar cost is representative of 10 percent of the total capital cost

[5] Implementation of these services is dependent upon funding from aviation and other private sources

[6] Unconstrained Managed Lanes/Highway improvements (shared use freight and passengers)

[7] Unconstrained Freeway Connectors improvements (shared use freight and passengers)

[8] Projects that require innovative financing strategies which require development with multiple parties

[9] Projects of interest to SANDAG; to be financed by other parties

[10] Figure A.9 includes Regional Bicycle Network segments built by others; such segments are not included in Table A.5.

[11] The subtotal reflects estimated Safe Routes to Transit Retrofit project costs ranging from $186,000 to $7.5 million per stop area or station area

[12] The subtotal reflects estimated Freeway Interchange Retrofit project costs ranging from $500,000 to $3 million per interchange

Table A.6

No-Build Projects

Transit Services

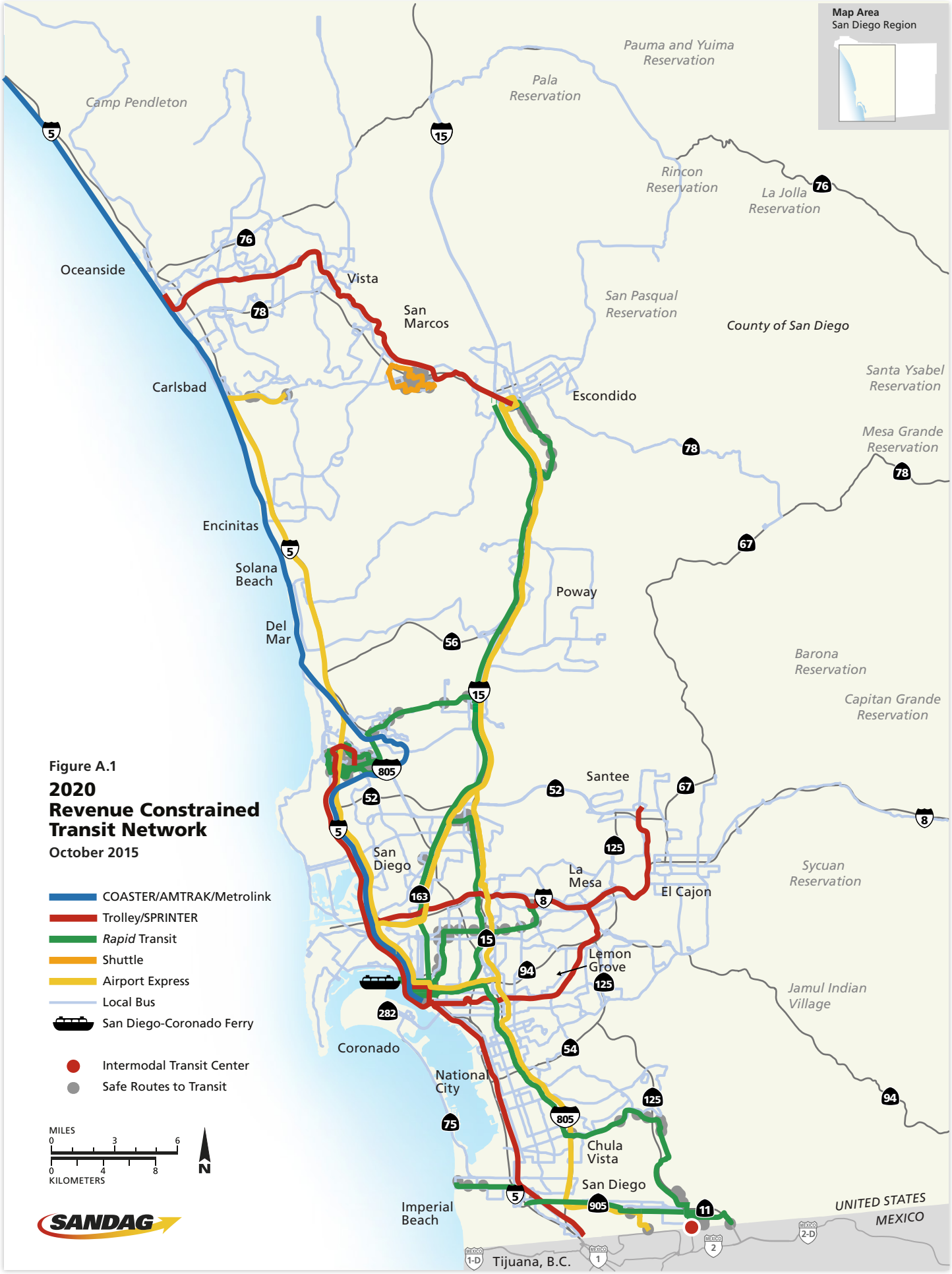
Route #	Description	Note
215	Mid-City *Rapid* Downtown to SDSU	In Service
225	South Bay *Rapid* Otay Mesa to Downtown (formerly Route 628)	Final Design
235/280/290	I-15 *Rapid* Escondido to Downtown	In Service
237	Rancho Bernardo to UC San Diego *Rapid*	In Service
398	LOSSAN Double Tracking (selected segments)	Under Environmental and Construction Phase
510	Mid-Coast LRT Old Town to University Towne Centre	Under Design and Construction Phase

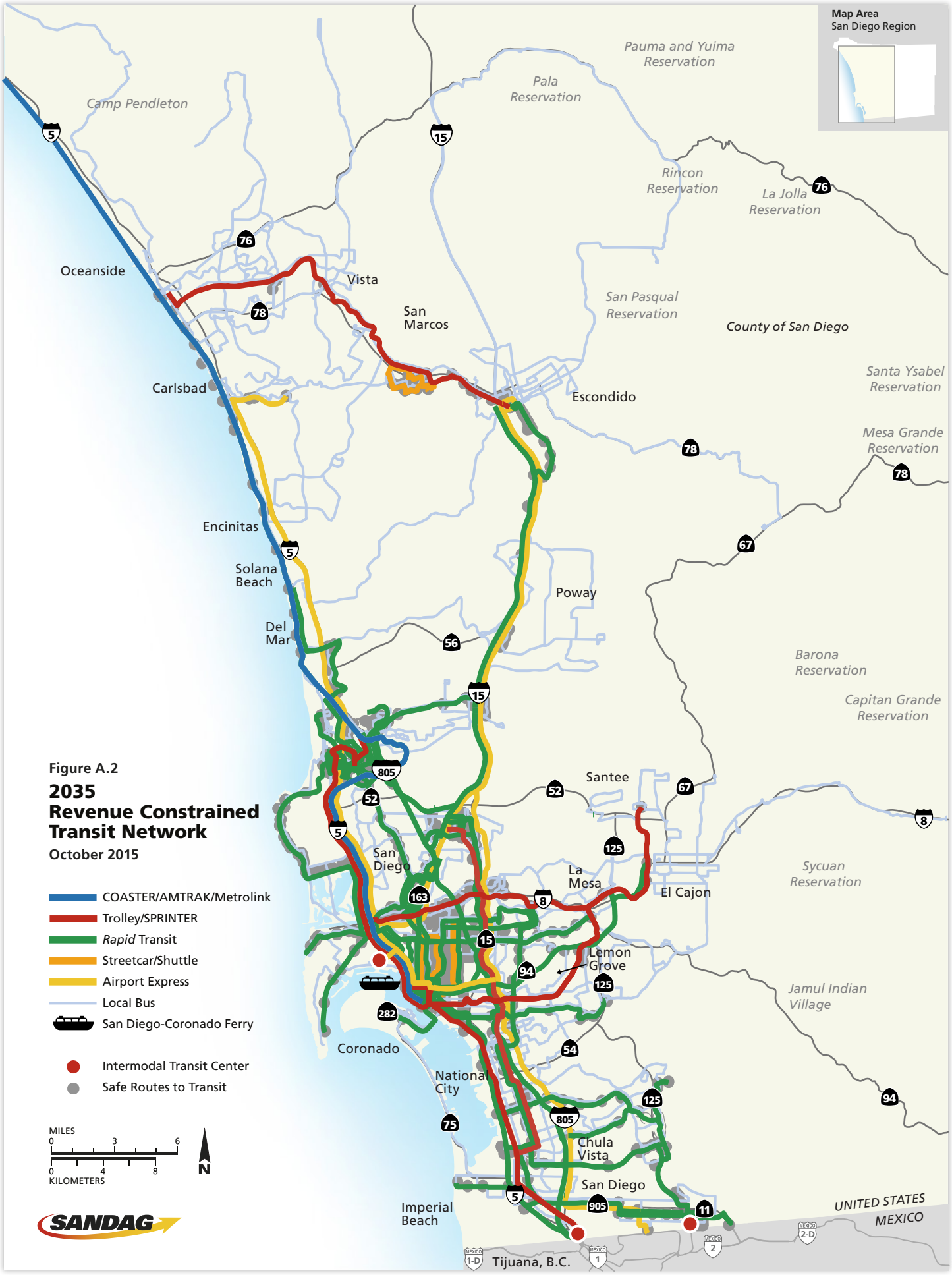
Managed Lanes / Highway Projects

Segment	From	To	Improvement	Note
I-805	SR 52	Carroll Canyon Rd	+2ML	Under construction
SR 11 (Phase I)	SR 125	Enrico Fermi Dr	+4T	Under construction
SR 15	I-805	I-8	+2TL	Under construction
SR 76	Mission Rd	I-15	+2C	Under construction

Tables A.1 – A.6 Legend

BNSF = Burlington Northern Santa Fe Railway	POE = Port of Entry
Const. = Construction	R = Reversible
C = Conventional Highway	ROW = Right-of-Way
DAR = Direct Access Ramp	SDIV = San Diego and Imperial Valley Railroad
Eng. = Engineering	T = Toll Lanes
F = Freeway Lanes	TL = Transit Lanes
ML = Managed Lanes	


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.1
2020
Revenue Constrained
Transit Network
October 2015
COASTER/AMTRAK/Metrolink
Trolley/SPRINTER
Rapid Transit
Shuttle
Airport Express
Local Bus
San Diego-Coronado Ferry
Intermodal Transit Center
Safe Routes to Transit
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
Tijuana, B.C.
UNITED STATES
MEXICO
Figure A.2
2035
Revenue Constrained
Transit Network
October 2015
COASTER/AMTRAK/Metrolink
Trolley/SPRINTER
Rapid Transit
Streetcar/Shuttle
Airport Express
Local Bus
San Diego-Coronado Ferry
Intermodal Transit Center
Safe Routes to Transit
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

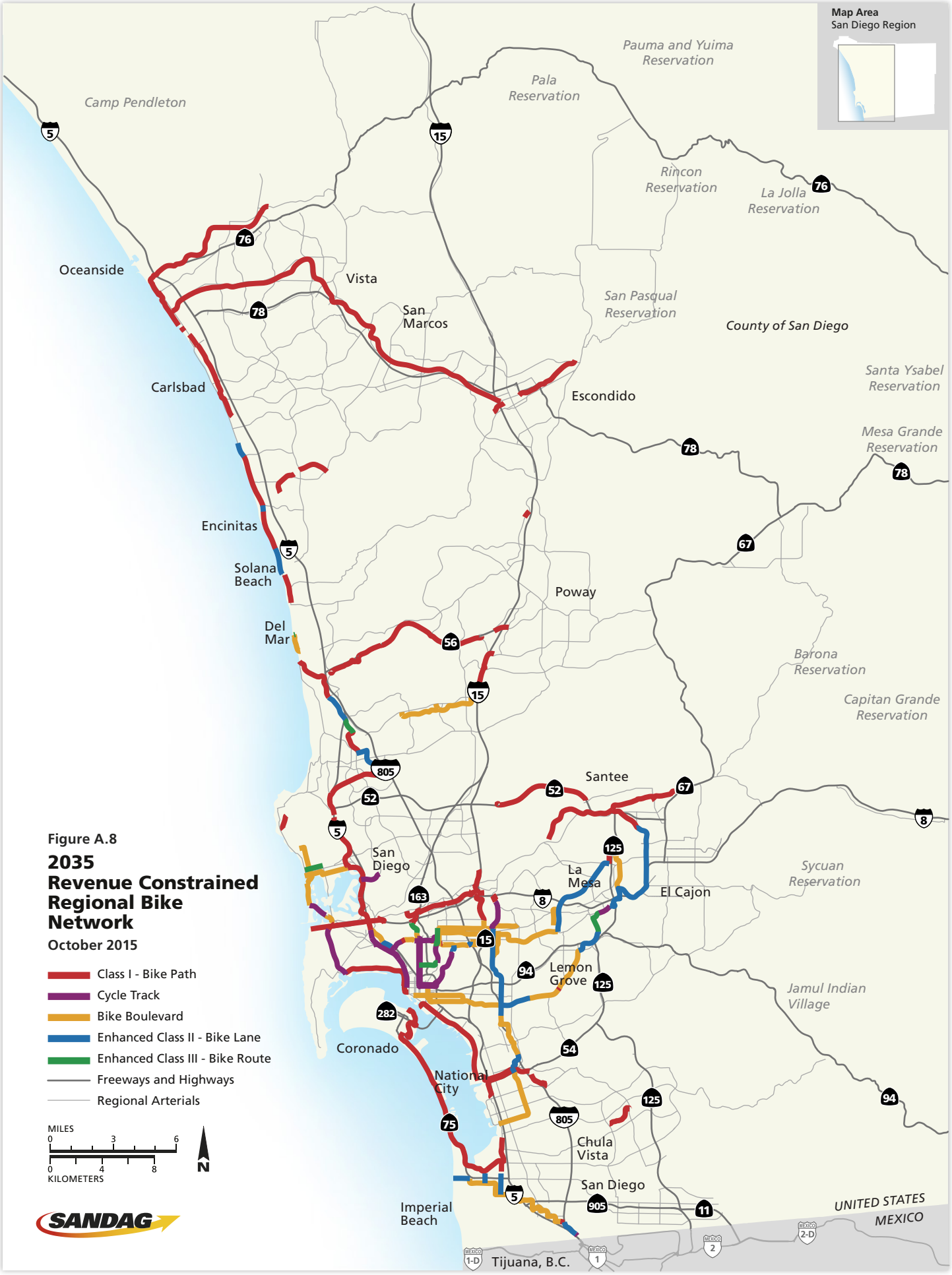

Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Figure A.3
2050
Revenue Constrained
Transit Network
October 2015
High Speed Rail
COASTER/AMTRAK/Metrolink
Trolley/SPRINTER
SPRINTER Express
Rapid Transit
Streetcar/Shuttle
Airport Express
Local Bus
San Diego-Coronado Ferry
Intermodal Transit Center
Safe Routes to Transit
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Camp Pendleton
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
Imperial Beach
San Diego
Tijuana, B.C.
UNITED STATES
MEXICO
8F
4C
2C
8F+2ML
8F+4ML
10F+4ML
6F
4F
8F/10F
4T
Figure A.4
2020
Revenue Constrained Managed Lanes and Highway Network
October 2015
Existing Managed Lanes
Managed Lanes
General Purpose Lanes
Toll Lanes
Existing Facility
Bicycle/Pedestrian Improvements at Freeway Interchanges
C = Conventional Highway
F= Freeway
ML = Managed Lanes
T = Toll Lanes
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

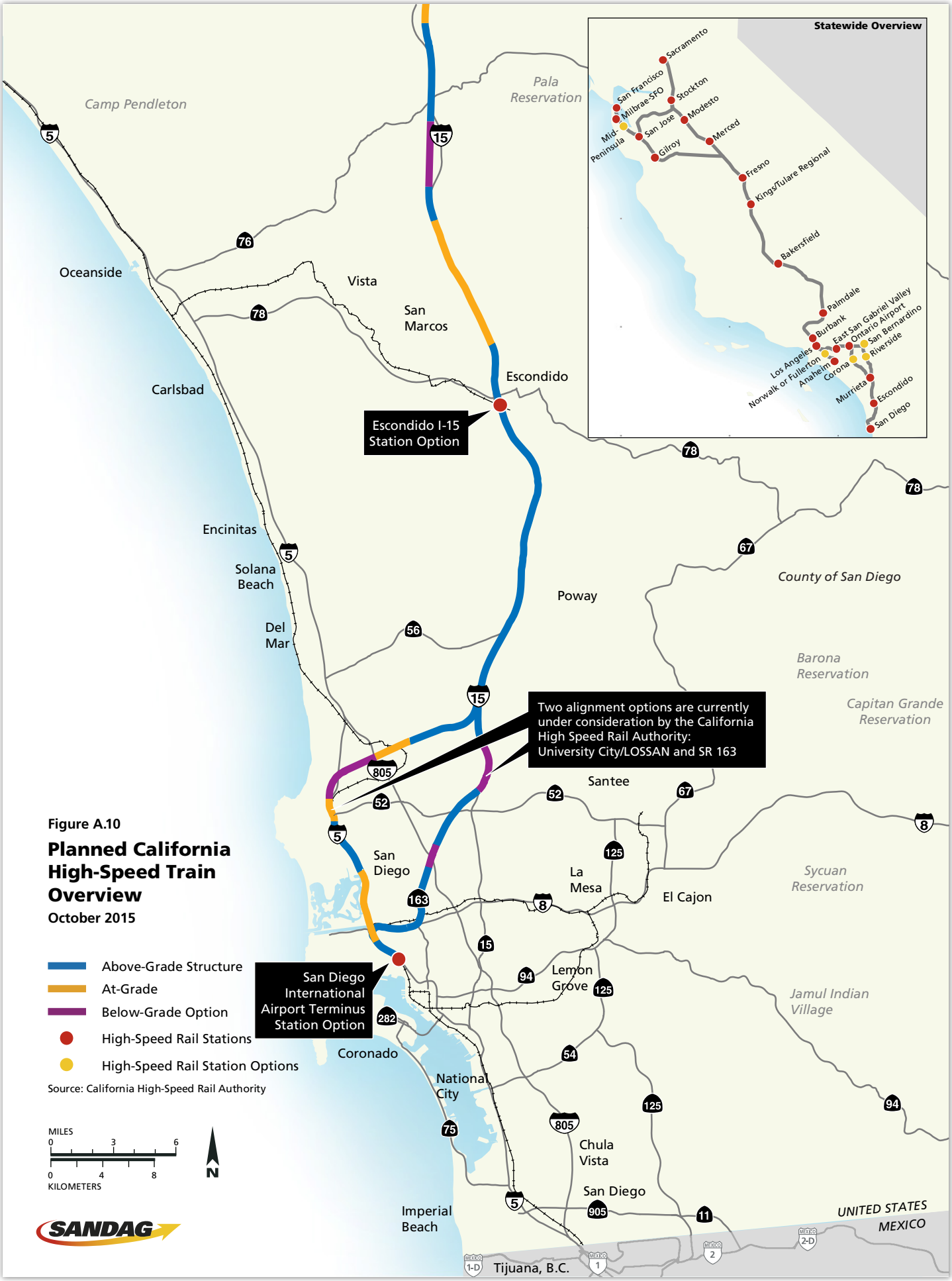

Figure A.5
2035 Revenue Constrained Managed Lanes and Highway Network
October 2015
Existing Managed Lanes
Managed Lanes
General Purpose Lanes
Toll Lanes
Existing Facility
Bicycle/Pedestrian Improvements at Freeway Interchanges
Freeway Connectors
Managed Lanes Connectors
Freeway & Managed Lanes Connectors
C = Conventional Highway
F = Freeway
ML = Managed Lanes
T = Toll Road
MILES
KILOMETERS
N
SANDAG
Map Area
San Diego Region
Camp Pendleton
Oceanside
Vista
San Marcos
Carlsbad
Encinitas
Solana Beach
Del Mar
Escondido
Poway
Santee
El Cajon
La Mesa
San Diego
Lemon Grove
National City
Coronado
Chula Vista
Imperial Beach
Tijuana, B.C.
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
County of San Diego
Santa Ysabel Reservation
Mesa Grande Reservation
Barona Reservation
Capitan Grande Reservation
Sycuan Reservation
Jamul Indian Village
UNITED STATES
MEXICO
8F
4C
2C
6F+2ML
8F+2ML
8F+4ML
10F+4ML
4F
8F/14F+4ML
8F/14F+2ML
6F
8F/10F
6F+2ML
8F+4ML
10F+2ML
8F+2ML
4T


Figure A.6
2050
Revenue Constrained
Managed Lanes and
Highway Network
October 2015
Existing Managed Lanes
Managed Lanes
General Purpose Lanes
Toll Lanes
Operational Improvements
Existing Facility
Freeway Connectors
ML Connectors
Freeway & ML Connectors
Bicycle/Pedestrian Improvements at Freeway Interchanges
C = Conventional Highway
F = Freeway
ML = Managed Lanes
T = Toll Road
R = Reversible Lanes
OPS = Operational Improvements
MILES
KILOMETERS
N
SANDAG
Map Area
San Diego Region
Camp Pendleton
Oceanside
Vista
San Marcos
Carlsbad
Encinitas
Solana Beach
Del Mar
Escondido
Poway
Santee
La Mesa
El Cajon
Lemon Grove
San Diego
Coronado
National City
Chula Vista
Imperial Beach
Tijuana, B.C.
Pauma and Yuima Reservation
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Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
County of San Diego
Santa Ysabel Reservation
Mesa Grande Reservation
Barona Reservation
Capitan Grande Reservation
Sycuan Reservation
Jamul Indian Village
UNITED STATES
MEXICO
4C/6C+OPS
8F+4T
8F+4ML
6F+2ML
10F+4ML
8F/14F +4ML
8F+2ML
6F+2ML(R)
6F/8F +OPS
8F/10F +OPS
8F/10F+2ML
8F+OPS
8F+ 4ML
8F+ 2ML
8F/10F +2ML
10F+2ML
6F
6C
4F
4C
2C
4T


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
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San Pasqual Reservation
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Sycuan Reservation
San Diego
La Mesa
El Cajon
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.7
2020
Revenue Constrained
Regional Bike
Network
October 2015
Class I - Bike Path
Cycle Track
Bike Boulevard
Enhanced Class II - Bike Lane
Enhanced Class III - Bike Route
Freeways and Highways
Regional Arterials
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Camp Pendleton
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
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Santee
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La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.8
2035
Revenue Constrained
Regional Bike
Network
October 2015
Class I - Bike Path
Cycle Track
Bike Boulevard
Enhanced Class II - Bike Lane
Enhanced Class III - Bike Route
Freeways and Highways
Regional Arterials
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Camp Pendleton
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
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Santee
Sycuan Reservation
San Diego
La Mesa
El Cajon
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
Imperial Beach
San Diego
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.9
2050
Revenue Constrained
Regional Bike
Network
October 2015
Class I - Bike Path
Cycle Track
Bike Boulevard
Enhanced Class II - Bike Lane
Enhanced Class III - Bike Route
Freeways and Highways
Regional Arterials
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Statewide Overview
Sacramento
San Francisco
Millbrae-SFO
Stockton
Modesto
Mid-Peninsula
San Jose
Merced
Gilroy
Fresno
Kings/Tulare Regional
Bakersfield
Palmdale
Burbank
East San Gabriel Valley
Ontario Airport
San Bernardino
Riverside
Los Angeles
Norwalk or Fullerton
Anaheim
Corona
Murrieta
Escondido
San Diego
Camp Pendleton
Pala Reservation
Oceanside
Vista
San Marcos
Escondido
Carlsbad
Escondido I-15 Station Option
Encinitas
Solana Beach
Del Mar
Poway
County of San Diego
Barona Reservation
Capitan Grande Reservation
Two alignment options are currently under consideration by the California High Speed Rail Authority: University City/LOSSAN and SR 163
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
San Diego International Airport Terminus Station Option
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.10
Planned California High-Speed Train Overview
October 2015
Above-Grade Structure
At-Grade
Below-Grade Option
High-Speed Rail Stations
High-Speed Rail Station Options
Source: California High-Speed Rail Authority
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Camp Pendleton
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
Imperial Beach
San Diego
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.11
2020 and 2035 High Frequency Local Bus Routes
October 2015
High Frequency Local Bus
by 2020: 15 minutes (peak period)
by 2035: 10 minutes (peak period)
Regional and Corridor Routes
Urban Area Transit Strategy
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

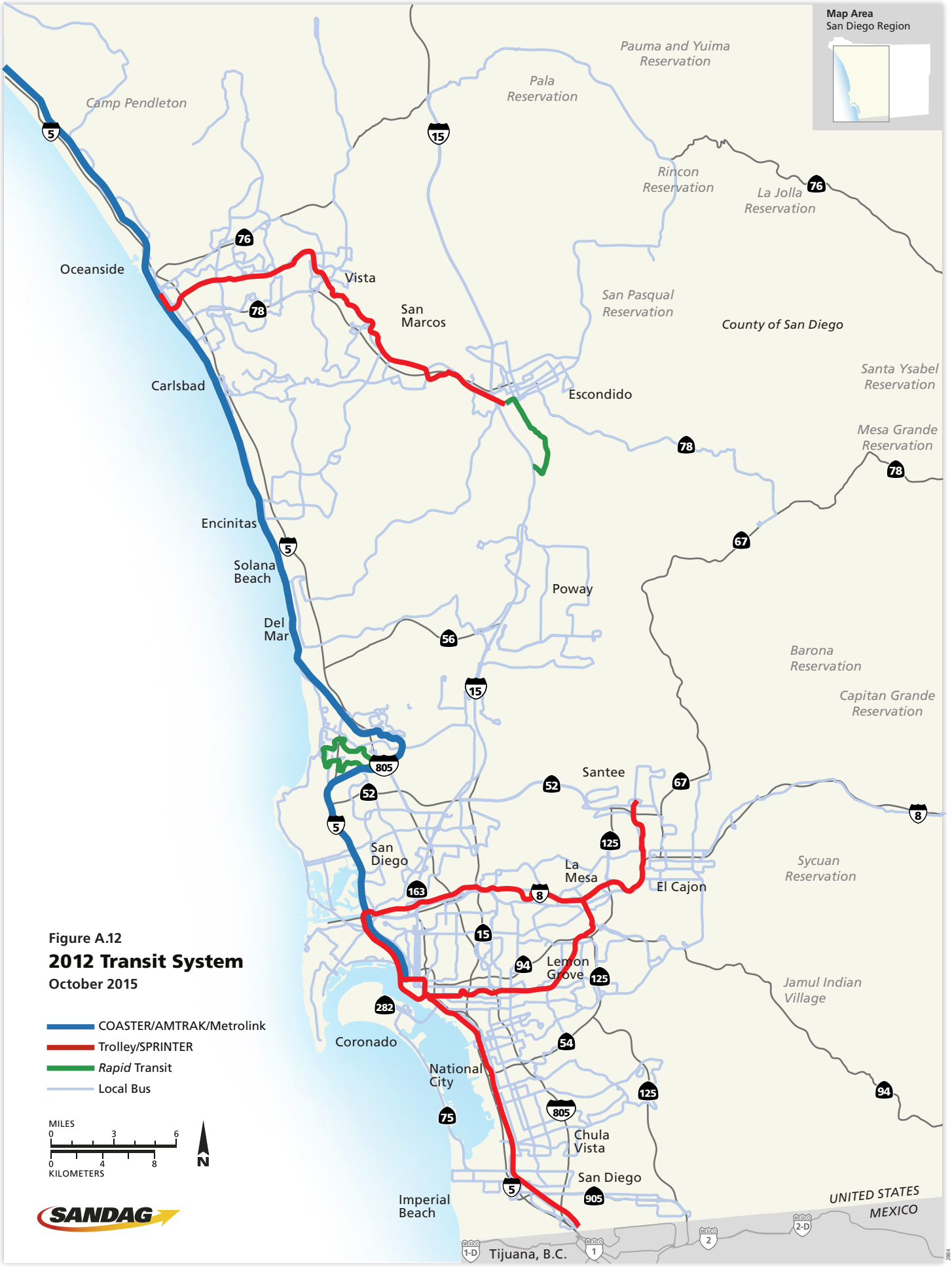


Figure A.12

2012 Transit System

October 2015


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
10F+4ML
Solana Beach
Poway
8F+2ML
Del Mar
Barona Reservation
Capitan Grande Reservation
10F+4ML
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
8F+2ML
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.13
2012
Managed Lanes and Highway Network
October 2015
Existing Managed Lanes
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
Sycuan Reservation
San Diego
La Mesa
El Cajon
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.14
2012 Regional Bike Network
October 2015
Bike Network
Freeways and Highways
Regional Arterials
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
Sycuan Reservation
San Diego
La Mesa
El Cajon
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.15
Regional Arterial System
October 2015
Freeways and Highways
Regional Arterials
MILES
KILOMETERS
N
SANDAG

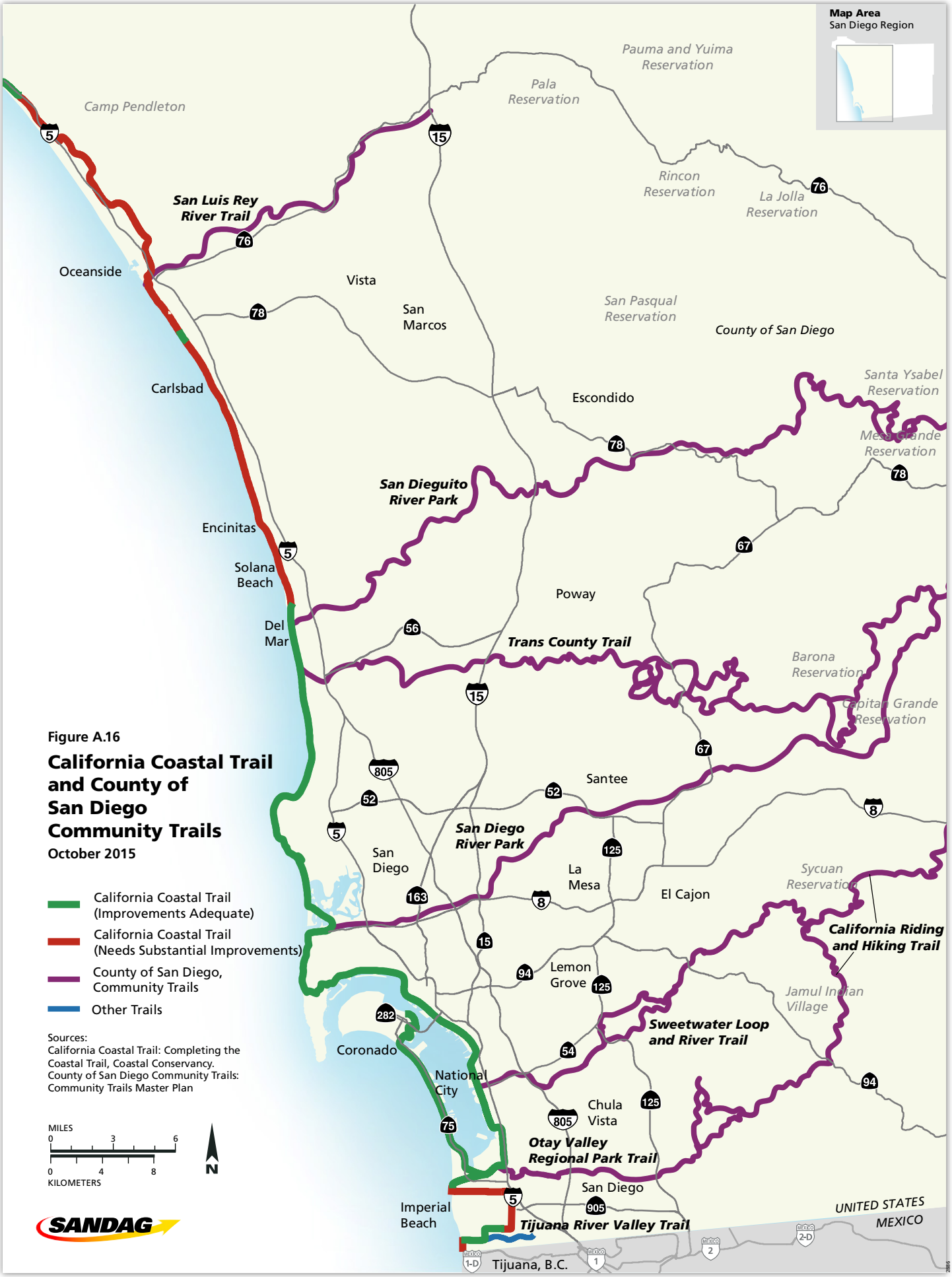

Map Area
San Diego Region
Camp Pendleton
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
San Luis Rey River Trail
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
San Dieguito River Park
Encinitas
Solana Beach
Del Mar
Poway
Trans County Trail
Barona Reservation
Capitan Grande Reservation
Santee
San Diego River Park
San Diego
La Mesa
El Cajon
Sycuan Reservation
California Riding and Hiking Trail
Lemon Grove
Jamul Indian Village
Sweetwater Loop and River Trail
Coronado
National City
Chula Vista
Otay Valley Regional Park Trail
San Diego
Imperial Beach
Tijuana River Valley Trail
Tijuana, B.C.
UNITED STATES
MEXICO
Figure A.16
California Coastal Trail and County of San Diego Community Trails
October 2015
California Coastal Trail (Improvements Adequate)
California Coastal Trail (Needs Substantial Improvements)
County of San Diego, Community Trails
Other Trails
Sources:
California Coastal Trail: Completing the Coastal Trail, Coastal Conservancy.
County of San Diego Community Trails: Community Trails Master Plan
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Figure A.17
2050 Unconstrained Transit Network
October 2015
High Speed Rail
COASTER/AMTRAK/Metrolink
Trolley/SPRINTER
Trolley/SPRINTER Express
Rapid Transit
Streetcar/Shuttle
Airport Express
Local Bus
San Diego-Coronado Ferry
Intermodal Transit Center
Safe Routes to Transit including retrofits
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG
Camp Pendleton
Oceanside
Vista
San Marcos
Carlsbad
Escondido
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
County of San Diego
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
Tijuana, B.C.
UNITED STATES
MEXICO


Figure A.18
2050 Unconstrained Managed Lanes and Highway Network
October 2015
Existing Managed Lanes
Managed Lanes
General Purpose Lanes
Toll Lanes
Operational Improvements
Existing Facility
Freeway Connectors
ML Connectors
Freeway & ML Connectors
Bicycle/Pedestrian Improvements at Freeway Interchanges
C = Conventional Highway
F = Freeway
ML = Managed Lanes
T = Toll Road
R = Reversible Lanes
OPS = Operational Improvements
E = Expressway
MILES
KILOMETERS
N
SANDAG
Map Area
San Diego Region
Camp Pendleton
Oceanside
Carlsbad
Encinitas
Solana Beach
Del Mar
Vista
San Marcos
Escondido
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
La Jolla Reservation
San Pasqual Reservation
County of San Diego
Santa Ysabel Reservation
Mesa Grande Reservation
Barona Reservation
Capitan Grande Reservation
Sycuan Reservation
Jamul Indian Village
Poway
Santee
El Cajon
La Mesa
Lemon Grove
National City
Chula Vista
Coronado
Imperial Beach
San Diego
Tijuana, B.C.
UNITED STATES
MEXICO
2C+OPS
4C
4C/6C+OPS
8F+4T
6E
8F+4ML
6F+2ML
10F+4ML
4F
8F/14F+4ML
8F+4ML
6F+2ML
6F+3ML(R)
6F+3ML(R)
6F
6F/8F
6F/8F +OPS
8F/14F+ 4ML
8F+ 2ML
8F+2ML
6F+2ML
8F/10F+ 2ML
8F+ 4ML
8F/10F+OPS
8F+OPS
8F/10F +2ML
6F+ 2ML
10F+2ML
6C
6F/8F+ 2ML
8F
4T


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Poway
Del Mar
Barona Reservation
Capitan Grande Reservation
Santee
Figure A.19
2050 Unconstrained Regional Bike Network
October 2015
San Diego
La Mesa
El Cajon
Sycuan Reservation
Class I - Bike Path
Cycle Track
Bike Boulevard
Enhanced Class II - Bike Lane
Enhanced Class III - Bike Route
Freeways and Highways
Regional Arterials
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
MILES
0 3 6
0 4 8
KILOMETERS
N
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
SANDAG


Figure A.20
Unconstrained Goods Movement Strategy
October 2015
Commercial/Industrial Land Use
2012 San Diego Data and 2013 Baja California Data
Highway/Road/Managed Lanes
Freight Rail
Burlington Northern Santa Fe Railway (BNSF)
shared with COASTER/SPRINTER
San Diego and Imperial Valley Railroad (SDIY)
shared with MTS Trolley
Baja California Railroad, Inc. (BJRR) in Mexico/Desert Line in USA
Air Cargo
Port of San Diego
Land Port of Entry
San Ysidro Rail Port of Entry
Otay Mesa Truck Port of Entry
Tecate Truck Port of Entry
Otay Mesa East
Future Truck Port of Entry
Logistics Center/Yard (Concept)
not location-specific
Potential Truck Rest Stops
MILES
KILOMETERS
N
SANDAG
Map Area
San Diego Region
Key Project Locations
Air Cargo
1 San Diego International Airport Access Improvements
Border
2 Southbound Truck Route Improvements
3 SR 11/Future Otay Mesa East Border Truck Crossing
4 SR 125
Maritime
5 Port Terminal and Access Improvements Harbor Drive
Rail
6 LOSSAN/SPRINTER Burlington Northern Santa Fe Railroad (BNSF)
7 Baja California Railroad, Inc. (BJRR) in Mexico/Desert Line in USA
Freeway/Highway
8 I-5
9 I-15
10 I-805
11 SR 94/125, I-8
12 SR 52/54/56/94
13 SR 78
Pechanga Reservation
Camp Pendleton
County of San Diego
Pauma and Yuima Reservation
Pala Reservation
Rincon Reservation
San Pasqual Reservation
Viejas Reservation
Sycuan Reservation
Jamul Indian Village
Oceanside
Vista
San Marcos
Carlsbad
Escondido
Encinitas
Solana Beach
Del Mar
Poway
Santee
El Cajon
La Mesa
San Diego
Coronado
National City
Chula Vista
Imperial Beach
Tijuana, B.C.
Tecate
UNITED STATES
MEXICO

Appendix B

Air Quality Planning and Transportation Conformity

Appendix Contents

Background
Transportation Conformity: Modeling Procedures
Motor Vehicle Emissions Modeling
Exempt Projects
Implementation of Transportation Control Measures (TCMs)
Interagency Consultation Process and Public Input
Revenue Constrained Scenario Project Tables

Air Quality Planning and Transportation Conformity

Background

The federal Clean Air Act (CAA) (42 U.S.C. §7401, et seq.), which was last amended in 1990, requires the United States Environmental Protection Agency (U.S. EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. Pursuant to California Health & Safety Code §39606, California has adopted state air quality standards that are more stringent than the NAAQS. Areas with levels that violate the standard for specified pollutants are designated as non-attainment areas.

The U.S. EPA requires that each state containing non-attainment areas develop plans to attain the NAAQS by a specified attainment deadline. The attainment plan is called the State Implementation Plan (SIP). The San Diego County Air Pollution Control District (APCD) prepares the San Diego portion of the California SIP. Once the standards are attained, further plans – called Maintenance Plans – are required to demonstrate continued maintenance of the NAAQS.

Pursuant to Section 176(c) of the federal CAA (42 USC §7506(c)), the San Diego Association of Governments (SANDAG) and the United States Department of Transportation (U.S. DOT) must make a determination that the Regional Transportation Plan (RTP) and the Regional Transportation Improvement Program (RTIP) conform to the SIP for air quality. Conformity to the SIP means that transportation activities will not create new air quality violations, worsen existing violations, or delay the attainment of the NAAQS. Regulations regarding conformity to the SIP are specific to the NAAQS. The RTP's impacts on California Ambient Air Quality Standards (CAAQS) are discussed and analyzed in the San Diego Forward: The Regional Plan environmental impact report, Section 4.3.

On April 15, 2004, the U.S. EPA designated the San Diego air basin as non-attainment for the 1997 Eight-Hour Ozone Standard. This designation took effect on June 15, 2004. However, several areas that are tribal lands in eastern San Diego County were excluded from the non-attainment designation.

The air basin initially was classified as a basic non-attainment area under Subpart 1 of the CAA, and the attainment date for the 1997 Eight-Hour Ozone Standard was set as June 15, 2009. In cooperation with SANDAG, the San Diego APCD developed an Eight-Hour Ozone Attainment Plan for the 1997 standard, which was submitted to the U.S. EPA on June 15, 2007. (The Regional Plan may be found at: sdapcd.org/planning/8-Hour-O3-Attain-Plan.pdf.) Emissions budgets set an upper limit which on-road mobile sources are permitted to emit. The budgets in the Eight-Hour Ozone Attainment Plan for San Diego County were found adequate for transportation conformity purposes by the U.S. EPA, effective June 9, 2008.

However, on April 27, 2012, in response to a court decision (*South Coast Air Quality Management District, et al., v. EPA*, 472 F.3d 882 (D.C. Cir. 2006) reh'g denied 489 F.3d 1245), the U.S. EPA ruled that the San Diego basic non-attainment area be reclassified as a Subpart 2, moderate non-attainment area, with an attainment deadline of June 15, 2010. This reclassification became effective on June 13, 2012. Air quality data for 2009, 2010, and 2011 demonstrated that the San Diego air basin attained the 1997 ozone standard; APCD prepared a Maintenance Plan, with a request for redesignation to attainment/maintenance. (The Maintenance Plan may be found at: sdapcd.org/planning/8_Hour_O3_Maint-Plan.pdf.) On December 6, 2012, the California Air Resources Board (ARB) approved the Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County for submittal to the U.S. EPA as a SIP revision. Effective July 5, 2013, the U.S. EPA approved California's

request to redesignate the San Diego County ozone non-attainment area to attainment for the 1997 Eight-Hour Ozone Standard and the Maintenance Plan for continuing to attain this standard for ten years beyond redesignation.

On May 21, 2012, the U.S. EPA designated the San Diego air basin as a non-attainment area for the new 2008 Eight-Hour Ozone Standard and classified it as a marginal area with an attainment date of December 31, 2015. This designation became effective on July 20, 2012. SANDAG determined conformity to the new standard on May 24, 2013, using the model approved by the U.S. EPA to forecast regional emissions (EMFAC 2011). The U.S. DOT, in consultation with the U.S. EPA, made its conformity determination on June 28, 2013. (Letter may be found at: sandag.org/uploads/projectid/projectid_410_16214.pdf.) For this non-attainment designation, tribal areas that were previously excluded are now included as part of the San Diego region non-attainment designation.[1] In addition, the U.S. EPA final rule also provides for the revocation of the 1997 Eight-Hour Ozone NAAQS for transportation conformity purposes effective July 20, 2013. In a D.C. Circuit Court decision on December 23, 2014 (*NRDC v. EPA*, No. 12-1321) it was determined that the attainment date for marginal areas would be set for July 20, 2015.

The San Diego region also has been designated by the U.S. EPA as a federal maintenance area for the Carbon Monoxide (CO) standard. On November 8, 2004, ARB submitted the 2004 revision to the California SIP for CO to the U.S. EPA. Effective January 30, 2006, the U.S. EPA has approved this Maintenance Plan as a SIP revision.

Transportation Conformity: Modeling Procedures

Introduction

SANDAG has developed the Revenue Constrained Scenario for San Diego Forward: The Regional Plan (Regional Plan) which serves as the basis for the required air quality conformity analysis. Conformity of the 2014 RTIP Amendment No. 7 has been determined simultaneously for consistency purposes. Tables B.9 and B.11 include the conformity analysis for both the 2050 Revenue Constrained Regional Plan and the 2014 RTIP Amendment No. 7. The Regional Plan provides information on revenue assumptions and the Revenue Constrained Scenario (Chapter 3). In addition, this conformity determination fulfills the requirement of SB 375, which requires a Sustainable Communities Strategy that allows for compliance with Section 176 of the federal CAA. (California Government Code, Section 65080(b)(2)(B)(viii).)

Growth forecasts

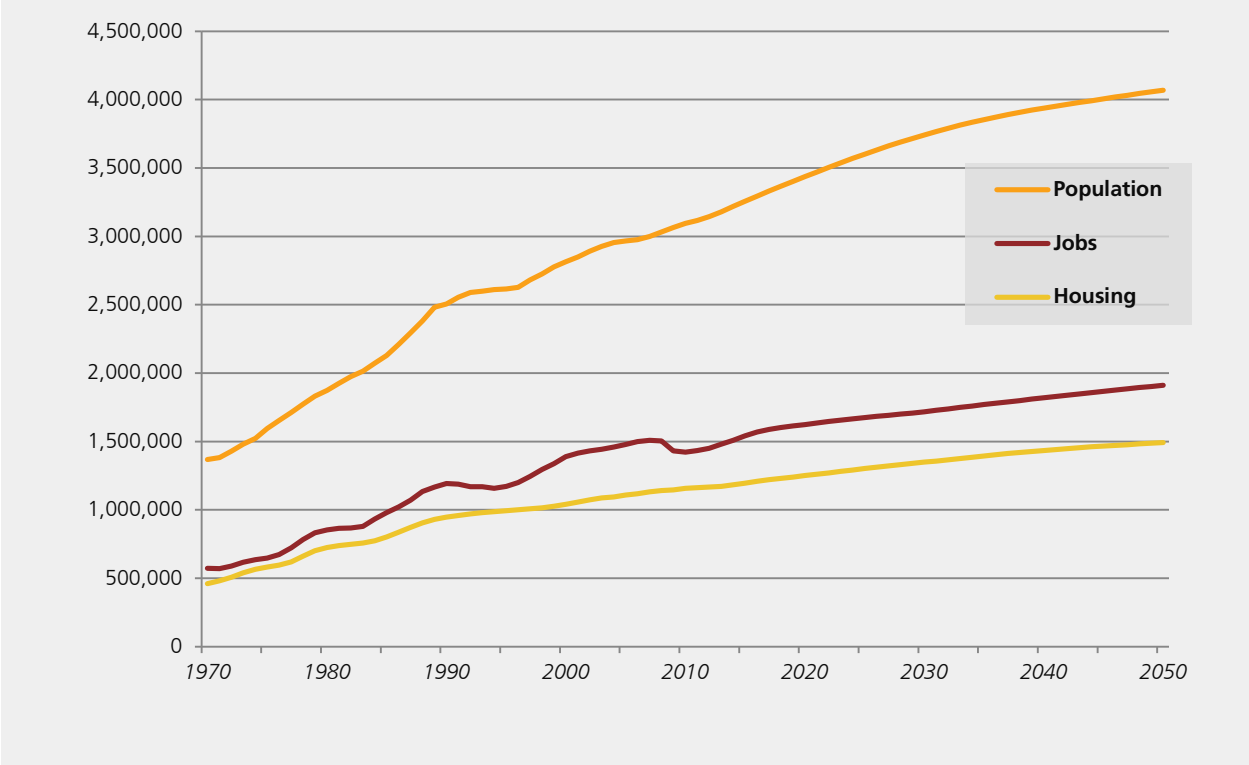
Every three to five years, SANDAG produces a long-range forecast of population, housing, and employment growth for the San Diego region. The most recent forecast is the Series 13, 2050 Regional Growth Forecast (accepted for planning purposes by the SANDAG Board on October 25, 2013), which was utilized in the development of the Regional Plan and the 2014 RTIP Amendment No. 7. (Item No. 8, sandag.org/uploads/meetingid/meetingid_3489_16764.pdf.)

The forecast process relies upon three integrated forecasting models. The first model, the Demographic and Economic Forecasting Model (DEFM), provides a detailed econometric and demographic forecast for the entire region. The second model, the Production, Exchange, Consumption, Allocation Model (PECAS), considers land economics and the potential for redevelopment in determining subregional allocation of employment and housing. The third model, the Urban Development Model (UDM), allocates the results of the first two models to Master Geographic Reference Areas (MGRA) based upon the current plans and policies of the jurisdictions. MGRAs are the base unit of geography for SANDAG subregional land use models. Similar in size to Census blocks or block groups, MGRAs are designed to nest within other administrative boundaries such as Census tracts, school districts, and jurisdictions among others, allowing MGRA-level forecast data to be aggregated up to larger areas.

On August 6, 2014, SANDAG consulted with the San Diego Region Conformity Working Group (CWG), comprised of representatives of SANDAG, Caltrans, SDAPCD, U.S. EPA, U.S. DOT, and ARB, on the use of the Series 2013, 2050 Regional Growth Forecast (2013) for the air quality conformity analysis of the Regional Plan and the 2014 RTIP Amendment No. 7 conformity redetermination. Previously, both the U.S. DOT and the U.S. EPA concurred that approved local land use plans should be used as input in the air quality conformity process and concurred that these plans have been appropriately incorporated into the Series 2013, 2050 Regional Growth Forecast. Figure B.1 and Table B.1 show the regional population, jobs, and housing growth forecast for the San Diego region through 2050.

Figure B.1

San Diego Regional Population, Jobs, and Housing Forecast



Source: Series 13, 2050 Regional Growth Forecast, SANDAG, October 2013

Table B.1

San Diego Regional Population and Employment Forecast

Series 2013, 2050 Regional Growth Forecast

Year	Population	Employment
2012	3,143,429	1,450,913
2020	3,435,713	1,624,124
2035	3,853,698	1,769,938
2050	4,068,759	1,911,405

Source: Series 13, 2050 Regional Growth Forecast, SANDAG, October 2013

The Series 13, 2050 Regional Growth Forecast is based largely upon the adopted general plans and community plans, and policies of the 18 cities and the County. Because many of the local general plans have horizon years of 2030 – 20 years before the 2050 Growth Forecast horizon year, the later part of the forecast was developed in collaboration with each of the local jurisdictions through an iterative process that allowed each city to provide their projections for

land uses in those later years. The planning assumptions used for the Regional Plan were less than five years old at the time the conformity analysis began. Federal RTP guidelines require that the Regional Plan cover a forecast period of a minimum of 20 years.

Transportation modeling

SANDAG uses a calibrated and validated activity-based model (ABM) to support the development of the Regional Plan.[2] An ABM simulates individual and household transportation decisions that comprise their daily travel itinerary. It predicts whether, where, when, and how people travel outside their home for activities such as work, school, shopping, healthcare, and recreation.

ABMs are becoming the standard travel demand modeling technology used by large Metropolitan Planning Organizations (MPOs), including the Southern California Association of Governments, and the Bay Area Metropolitan Transportation Commission. These models allow for a more nuanced analysis of complex policies and projects. The powerful analytic capabilities of an ABM are particularly helpful in evaluating social equity, carpooling, transit access, parking conditions, tolling, and pricing. Because an ABM tracks the characteristics of each person, the model can be used to analyze the travel patterns of a wide range of socio-economic groups. For example, a household with many members may be more likely to carpool, own multiple vehicles, and share shopping responsibilities.

ABM outputs are used as inputs for regional emissions forecasts. The estimates of regional transportation-related emissions analyses conducted for the Regional Plan meet the requirements established in the Transportation Conformity Regulation (40 CFR §93.122(b) and §93.122(c)). These requirements relate to the procedures to determine regional transportation-related emissions, including the use of network-based travel models, methods to estimate traffic speeds and delays, and the estimation of vehicle miles traveled (VMT).

The regionally significant projects, and the timing for when they are expected to be open to traffic in each analysis year, are documented in Tables B.13 - B.15. The design concept and scope of projects allows adequate model representation to determine intersections with regionally significant facilities, route options, travel times, transit ridership, and land use.

This document describes the key modeling units, ABM model flow, the San Diego residents travel module, highway and transit networks, data sources, and emissions modeling.

Key modeling units

An ABM simulates individual and household travel decisions through tours, that is, a journey that begins and ends at home. A tour includes a chain of trips (segments of travel with a given origin and destination). The advantage of modeling tours and trips hierarchy is to ensure spatial, temporal, and modal consistency and integrity across trips within a tour.

To simulate trips and tours made by individuals and households, the SANDAG ABM includes a total of eight person-types, shown in Table B.2. The person-types are mutually exclusive with respect to age, work status, and school status.

Table B.2
Person Types

Number	Person-Type	Age	Work Status	School Status
1	Full-time worker[3]	18+	Full-time	None
2	Part-time worker	18+	Part-time	None
3	College student	18+	Any	College+
4	Non-working adult	18 – 64	Unemployed	None
5	Non-working senior	65+	Unemployed	None
6	Driving age student	16 – 17	Any	Pre-college
7	Non-driving student	6 – 15	None	Pre-college
8	Pre-schooler	0 – 5	None	None

Further, workers are stratified by their occupation to take full advantage of information provided by the land use and demographic models. Table B.3 outlines the worker categories. These models are used to segment destination choice attractiveness for work location choice, based on the occupation of the worker.

Table B.3
Occupation Types

Number	Description
1	Management, Business, Science, and Arts
2	Services
3	Sales and Office
4	Natural Resources, Construction, and Maintenance
5	Production, Transportation, and Material Moving
6	Military

The SANDAG ABM assigns one of the activity types to each out-of-home location that a person travels to in the simulation, shown in Table B.4. The activity types are grouped according to whether the activity is mandatory, maintenance, or discretionary. The classification scheme of activities into the three categories helps differentiate the importance of the activities. Mandatory includes work and school activities. Maintenance includes household-related activity such as drop-off and pick-up of children, shopping, and medical appointments. Discretionary includes social and recreational activities. To determine which person-types can be used for generating each activity type, the model assigns eligibility requirements. For example, a full-time worker will generate mandatory work activities while a non-working adult, or senior, is eligible for non-mandatory activities. The classification scheme of each activity type reflects the relative importance or natural hierarchy of the activity, where work and school activities are typically the most inflexible in the person's daily travel itinerary.

Table B.4

Activity Types

Type	Purpose	Description	Classification	Eligibility
1	Work	Working at regular workplace or work-related activities outside the home	Mandatory	Workers and students
2	University	College+	Mandatory	Age 18+
3	High School	Grades 9-12	Mandatory	Age 14-17
4	Grade School	Grades K-8	Mandatory	Age 5-13
5	Escorting	Pick-up/drop-off passengers (auto trips only)	Maintenance	Age 16+
6	Shopping	Shopping away from home	Maintenance	5+ (if joint travel, all persons)
7	Other Maintenance	Personal business/services and medical appointments	Maintenance	5+ (if joint travel, all persons)
8	Social/Recreational	Recreation, visiting friends/family	Discretionary	5+ (if joint travel, all persons)
9	Eat Out	Eating outside of home	Discretionary	5+ (if joint travel, all persons)
10	Other Discretionary	Volunteer work, religious activities	Discretionary	5+ (if joint travel, all persons)

The SANDAG ABM models a full travel day of activity broken into one-half hour intervals. These one-half hour increments begin at 3 a.m. and end at 3 a.m. the next day, though the hours between 1 a.m. and 5 a.m. are aggregated to reduce computational burden. The ABM ensures temporal integrity so that no activities are scheduled with conflicting time windows, with the exception of short activities/tours that are completed within a one-half hour increment. The ABM assigns auto and transit traffic at five discrete time-of-day periods aggregated from the five half-hour intervals shown in Table B.5.

Table B.5

Time Periods for Level of Service Skims and Assignment

Number	Description	Begin Time	End Time
1	Early	3:00 a.m.	5:59 a.m.
2	A.M. Peak	6:00 a.m.	8:59 a.m.
3	Midday	9:00 a.m.	3:29 p.m.
4	P.M. Peak	3:30 p.m.	6:59 p.m.
5	Evening	7:00 p.m.	2:59 a.m.

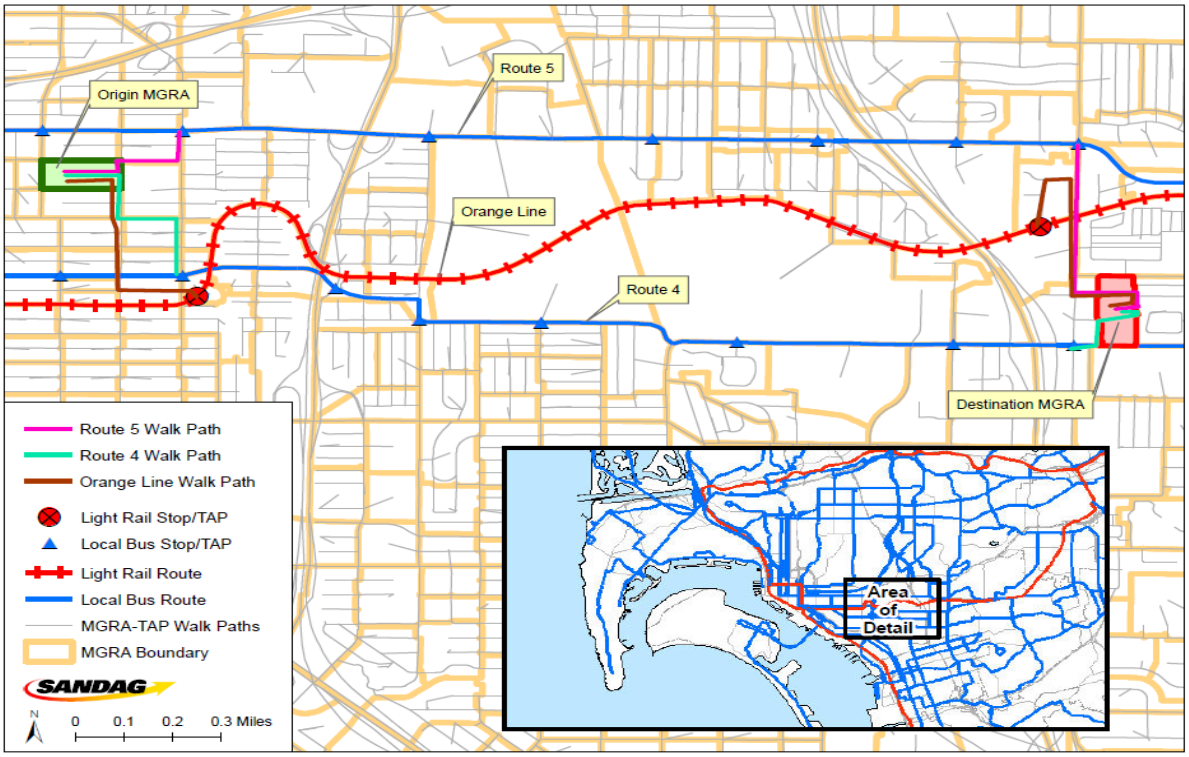
The SANDAG ABM uses three-tier zone systems shown in Table B.6: Zone System. The Master-Geographic Reference Area (MGRA) zone system is used for transit access and calculations, and location choice models; the Traffic Analysis

Zone (TAZ) system is used for highway path building and assignment; and the pseudo-TAZ called Transit Access Point (TAP) is used for transit path building and assignment. The 23,000 MGRAs are roughly equivalent to census block groups. The ABM uses generalized transit stops as TAPs, and relies on the traffic assignment software to generate TAP-TAP level of service (LOS) matrices (also known as "skims") such as in-vehicle time, first wait, transfer wait, and fare for transit calculation at the MGRA level. A custom-built software calculates walk access time from MGRA to TAP through paths from an all-street active transportation network including bike paths and walkways for non-motorized travel, and build paths following the Origin MGRA – Boarding TAP – Alighting TAP – Destination MGRA patterns. Figure B.2: Example MGRA - TAP Transit Accessibility shows a graphical depiction of MGRA-TAP transit paths. It displays potential walk paths from an origin MGRA through three potential boarding TAPs (two of which are local bus, and one of which is rail), with three potential alighting TAPs at the destination end.

Table B.6
Zone System

Zone System	Description	Number of Zones
MGRA	Master-Geographic Reference Area	23,000
TAZ	Traffic Analysis Zone	4,996
TAP	Transit Access Point	2,500

Figure B.2
Example MGRA – TAP Transit Accessibility



The ABM includes 26 modes available to residents, including auto by occupancy, toll/non-toll choice and lanes for high occupancy vehicle (HOV) or non-HOV, walk and bike modes, and walk and drive access to five different transit line-haul modes. Pay modes are those that involve paying a choice or "value" toll.

Table B.7 lists the trip modes defined in the SANDAG ABM.

To model transit flow, the ABM uses five transit line-haul modes: (1) Commuter Rail (COASTER), (2) Light Rail Transit (LRT) (including Trolley, SPRINTER, and Streetcar), (3) Bus *Rapid* Transit (BRT)/*Rapid* Bus, (4) Express Bus, and (5) Local Bus. The mode of access to transit includes walk, park & ride (PNR), and kiss & ride (KNR or drop-off).

Table B.7
Trip Modes

Number	Mode
1	Drive Alone (Non-Toll)
2	Drive Alone (Toll)
3	Share Ride 2 Person (Non-Toll, Non-HOV)
4	Share Ride 2 Person (Non-Toll, HOV)
5	Share Ride 2 Person (Toll, HOV)
6	Share Ride 3+ Person (Non-Toll, Non-HOV)
7	Share Ride 3+ Person (Non-Toll, HOV)
8	Share Ride 3+ Person (Toll, HOV)
9	Walk-Local Bus
10	Walk-Express Bus
11	Walk-BRT
12	Walk-Light Rail
13	Walk-Heavy Rail
14	PNR-Local Bus
15	PNR-Express Bus
16	PNR-Bus *Rapid* Transit (BRT)/*Rapid* Bus
17	PNR-Light Rail
18	PNR-Heavy Rail
19	KNR-Local Bus
20	KNR-Express Bus
21	KNR-BRT
22	KNR-Light Rail
23	KNR-Heavy Rail
24	Walk
25	Bike
26	School Bus (only available for school purpose)

ABM model flow

To simulate San Diego residents and non-residents travel, and freight travel, the SANDAG ABM includes several models and steps.

Figure B.3 outlines the overall flow of the SANDAG ABM. It starts with building highway and transit networks in the traffic assignment software followed by highway assignment to create congested highway and transit travel times. A parallel step is to create a year-specific active transportation network and generate walking accessibility measures between MGRAs, between MGRA and TAP, and bike accessibility measures between MGRAs and between TAZs. The congested highway and transit skims, and the walking and biking accessibility measures, are inputs to the simulated models. The congested highway skims are also inputs to the aggregate models. Once the simulated and aggregated models generate trips by residents or various travelers, the ABM aggregates the vehicle trips from MGRA to TAZ to TAZ matrices by time of day, by toll and non-toll, and by vehicle class, and assigns the vehicle trips to the highway network. The highway assignment generates the congested networks by time of day. The ABM then skims the congested networks to provide accessibility for the next iteration of the simulated and aggregated models. The process iterates three feedback loops. The last iteration assigns both highway and transit trips and creates skims for land use models. The outputs from the final step are used to generate input for EMFAC emissions modeling.

At the heart of the SANDAG ABM is the San Diego County residents' travel module. It simulates San Diegan's daily travel choices. In addition to the residents' travel, there are trips made by visitors, commercial vehicles, and freight transportation. A number of special travel models (commercial vehicle model, truck model, air passenger model, external trip model, visitor model, and crossborder model) account for these other sources of transportation demand. The models are run in parallel with the residents' travel module. Trips generated from the simulated and aggregate models are summed up to an auto trip matrix and transit trip matrix by time of day by mode, and assigned to highway and transit networks.

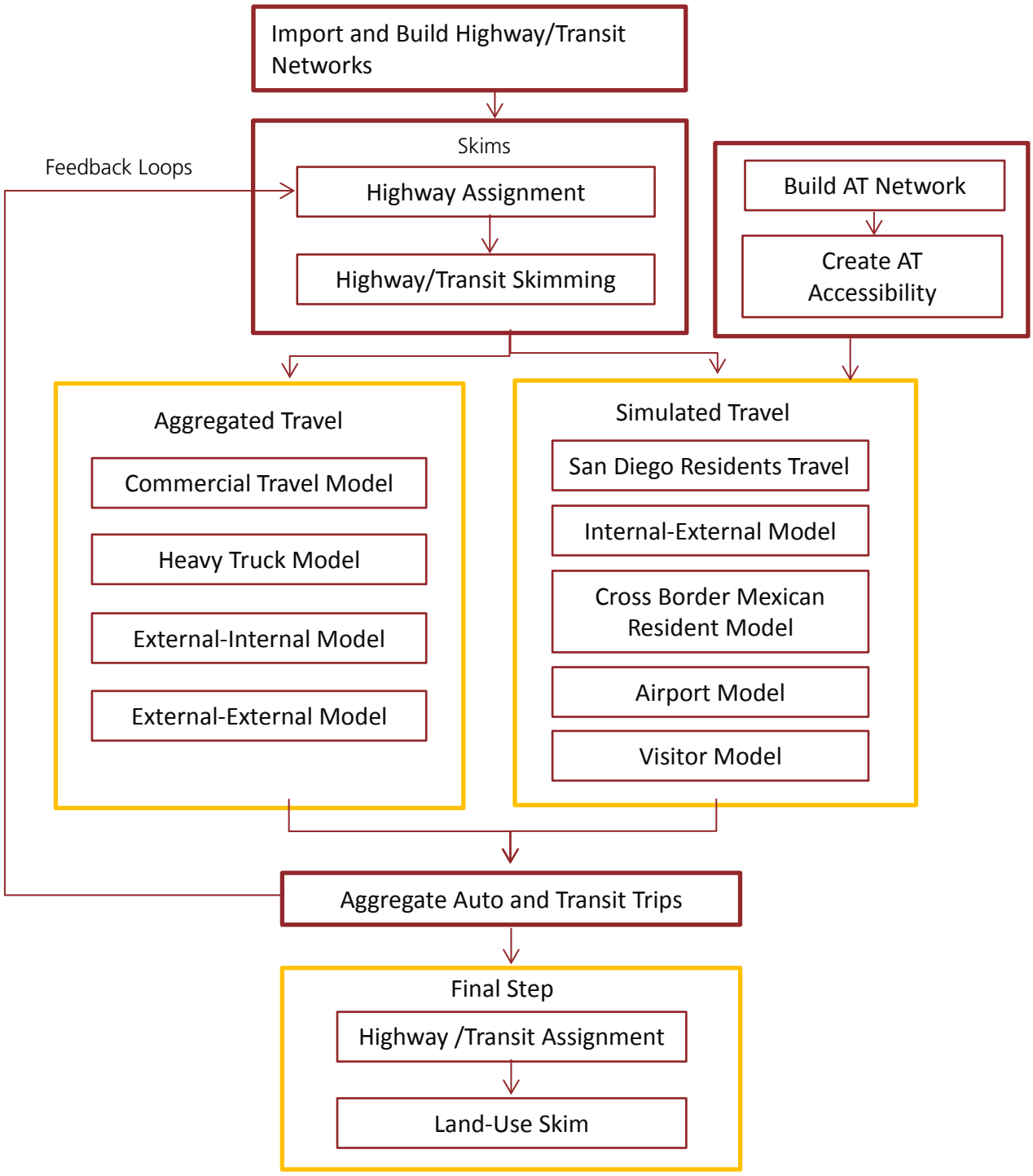
After network assignment, the EMFAC model is used to generate emissions summaries based on the inputs generated by the post processing of highway assignment outputs.

San Diego residents travel module

The San Diego residents' travel module is comprised of numerous interacting components called "sub-modules." It starts with generating a representative population for the San Diego region. Once a representative population is created, the model predicts long-term and medium-term decisions such as a choice of work or school location and a household's choice of number of cars to own. Next, each person's day is scheduled, taking into account the priority of various activities and interaction among the household members. Once all journeys to and from home have been scheduled, the model predicts specific travel details such as mode, the number of stops to make, where to stop, and when to depart from each stop to continue the tour. The final step of the ABM is traffic assignment where trips are summarized by traffic analysis zones and assigned to the transportation network.

Figure B.3

SANDAG ABM Flow Chart



The following section discusses the sub-modules, in the order that each sub-module is taken within the San Diego residents' travel module.

Step 1: Population synthesis (build a representative population that looks like San Diego)
The first step is to create a 'synthetic' population of San Diego County. A synthetic population is a table that has a record for every individual and household, with the individual's and the household's characteristics. For example, if there are 41,000 18-year-old males in the region in 2050, there would be approximately 41,000 records in the table for males age 18, with each record also having other characteristics such as school enrollment and labor force participation status. Taken as a whole, this synthetic population represents the decision-makers whose travel choices the model will simulate in later steps. For each simulation year, a full population is synthesized to match the forecasted socio-economic and housing characteristics of each part of the region at the zonal level. These forecasts, a key ABM input, come from the land use model. Synthesis works by replicating a sample of census records (each containing complete household and individual characteristics) and placing them around the region in such a way that the forecasted characteristics of each zone are matched.

Step 2: Work and school location (assign a work location to workers and a school location to students)
The second step predicts where each individual will go to work or school, if applicable. The work and school location sub-module simulates each worker's choice of work location, taking into account many factors, including ease-of-travel and the number of employees by occupation type in each location. The sub-module also simulates each student's choice of school, taking into account factors that include the distance from home to school, school enrollment, and district boundaries. The results from this step affect later travel choices significantly because of the prominent role that workplace and school usually play in the itinerary of workers and students.

Step 3: Determine certain mobility characteristics of individuals and households
This step predicts the number of automobiles each household owns, whether each household owns a toll transponder, and whether worker parking costs are employer-reimbursed. The sub-module assigns each household zero cars, one car, two cars, three cars, or 'four or more' cars, taking into account a number of criteria, including household size, income, number of drivers, and how easy it is to reach destinations from the household's place of residence. This step sets certain mobility characteristics that influence how people travel.

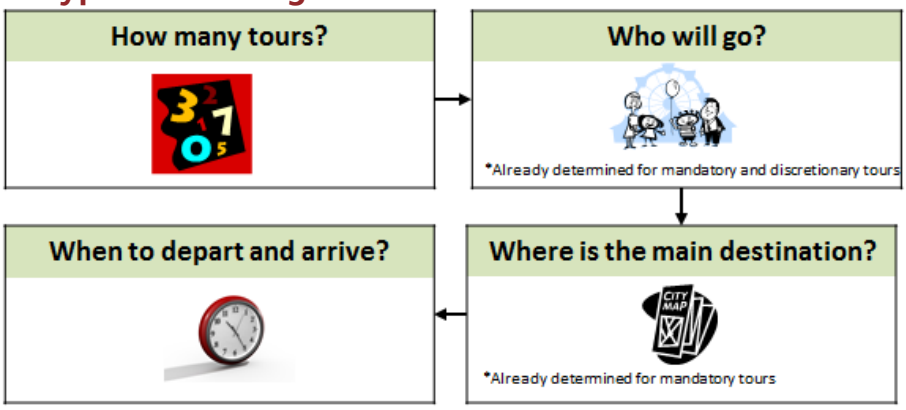
Step 4: Schedule the day
The fourth step begins by predicting a 'daily activity' pattern for each individual. A daily activity pattern is a theme that dictates an individual's schedule. A 'mandatory' pattern means that an individual travels to work and/or school, and then schedules other activities around work/school. An 'at-home' pattern means that an individual's daily schedule involves no travel in the region. A 'non-mandatory' pattern means that an individual's daily schedule involves traveling, but only to destinations other than work or school. The pattern-type of other household members influences an individual's daily pattern type. For example, if a child stays home from school, a working parent might be more likely to stay home from work as well.

Once the sub-module selects an individual's daily activity pattern, it schedules the tours that he or she will take. Recall that a tour is a journey that begins and ends at home, and it can include stops at other destinations on the way to or from the primary destination. The ABM deals with three main categories of tours: (1) mandatory tours, (2) joint tours, and (3) non-mandatory tours. Mandatory tours have work or school as the primary destination. Joint tours involve out-of-home activities that multiple members of a household partake in together. Non-mandatory tours involve purposes other than work or school that an individual undertakes independent of other members of his or her

household. The sub-module schedules each tour type by predicting how many tours of that type there are, who will participate in the tour, where the main destination is, and when to depart and arrive (see Figure B.4).

Figure B.4

Predicting Tour Type Scheduling Details

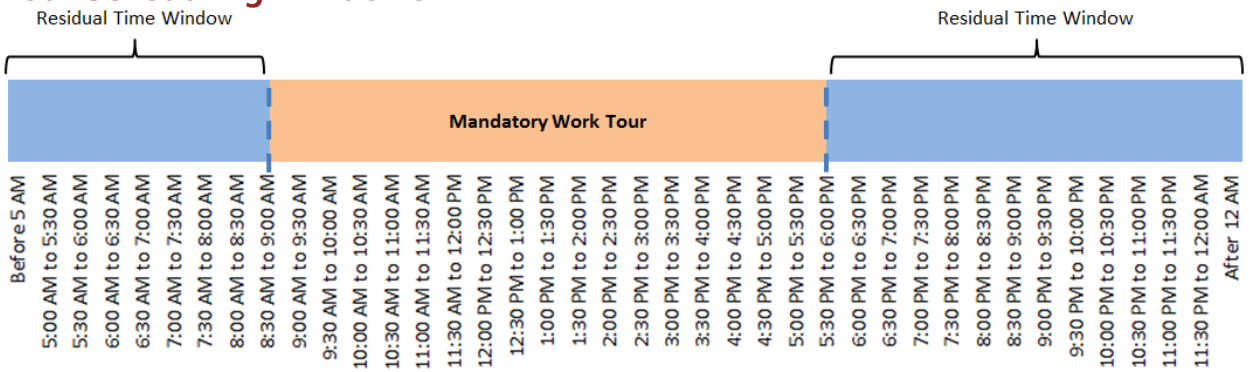


For individuals assigned a 'mandatory' activity pattern, the sub-module first assigns *the number* of work tours and/or school tours they will make. After the number of these mandatory tours has been determined, the sub-module selects the time of departure from and arrival back home for each tour.

After scheduling the mandatory tours, the sub-module calculates time remaining for other tours. Remaining intervals of time are called "residual time windows," and other tours can only be scheduled in these open slots (see Figure B.5 for an example) to guarantee temporal consistency.

Figure B.5

Tour Scheduling Windows



In time remaining after mandatory tours are scheduled, the sub-module determines the number of joint tours to be made for each household. It only schedules joint tours in the time windows that overlap *between individuals* after it accounts for mandatory activities. After the number and purpose of these joint tours has been determined, the sub-module decides which household members will participate in each joint tour and whether the joint tour must involve a combination of children and adults. The sub-module then chooses a specific destination for the tour and the specific times when tour participants will depart from and arrive back home together. Next, 'non-mandatory' tours are scheduled. For each household, the sub-module decides what other tours need to be made for the purpose of household 'maintenance' activities such as shopping. These tours are assigned to specific household members to carry out individually. For the person who is assigned each maintenance tour, the model selects a specific destination and schedules the tour to take place in a time window that mandatory tours and joint tours have left open. Finally, in what time remains, the model decides whether each individual will take non-mandatory 'discretionary' tours. These low-priority tours involve activities related to recreation, eating out, and social functions. Discretionary tours can only

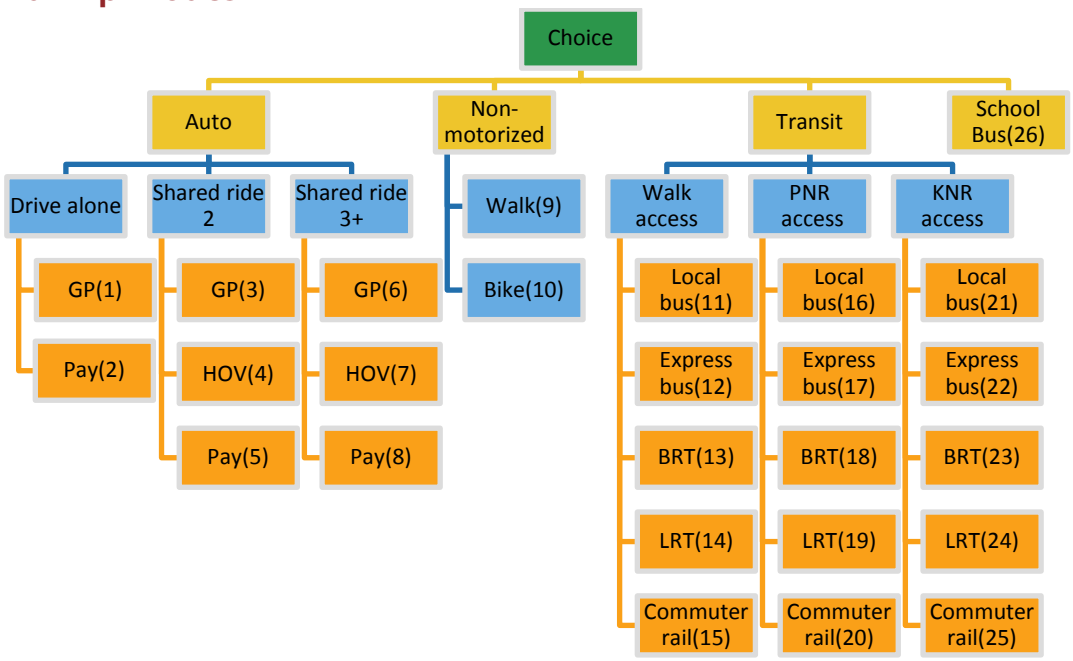
take place in time windows that remain after all other tours have been scheduled. The sub-module chooses a specific destination and departure/arrival combination for each discretionary tour a person makes.

Step 5: Make tour and trip-level decisions

The ABM then selects more detailed characteristics of each tour for every traveler. This step fills in travel details after the major aspects of the day have been scheduled. Tour characteristics that need to be determined include: primary mode of the tour, how many times to stop, where to stop, and when to depart from each stop to continue the tour. Figure B.6 includes the available modes and mode hierarchy. After tour characteristics are set, the sub-module determines the mode of each trip (conditional upon tour mode). Recall that trips are segments of tours that have a given origin and destination. If the trip mode involves an automobile and the destination is a parking-constrained area, then the model chooses a parking location for the traveler at the trip destination.

Figure B.6

Tour and Trip Modes[4]



Step 6: Aggregating and assigning auto and transit trips

The previous step provided travel details for each person down to the trip level. In this final step, the model sums all trips taken by individuals in San Diego County along with trips generated by other models that represent special categories of travel within the region that are not covered by the ABM. The model aggregates auto trips in TAZ to TAZ matrices by time of day and assigns trips to the highway network, and aggregates transit trips in TAP to TAP matrices by time of day and assigns to the transit network.

SANDAG loads traffic using the Multimodal Multiclass Assignment function of the traffic assignment software. Multiclass assignment allows SANDAG to assign the eight vehicle modes (drive alone non-toll, drive alone toll, share ride 2 non-toll non HOV, share ride 2 non-toll HOV, share ride 2 toll HOV, share ride 3+ non-toll non HOV, share ride 3+ non-toll HOV, and share ride 3+ toll HOV) plus the six truck toll, and non-toll by truck class modes (light-heavy duty non-toll/toll, medium-heavy duty non-toll/toll, and heavy-heavy duty non-toll/toll) in one combined procedure.

The highway assignment model works by finding roads that provide the shortest travel impedance between each zone pair. Trips between zone pairs are then accumulated on road segments making up minimum paths. Highway

impedances consider posted speed limits, signal delays, congestion delays, and costs. The model computes congestion delays for each segment based on the ratio of the traffic volume to roadway capacity. Motorists may choose different paths during peak hours, when congestion can be heavy, and off-peak hours, when roadways are typically free flowing. For this reason, traffic is assigned separately for five time periods (as defined in the Key Modeling Units section). Vehicle trip tables for each scenario reflect increased trip-making due to population growth and variations in travel patterns due to the alternative transportation facilities/networks proposed. Customized programs process outputs from highway assignment and generate total VMTs by vehicle class, and percentage of VMTs by speed bin and by vehicle class. This information is input to the EMFAC program to generate emissions summaries.

For transit assignment, traffic assignment software assigns TAP to TAP transit trips to the network. Altogether, 75 separate transit assignments are produced for five time periods: (1) walk, (2) park & ride, (3) kiss & ride, (4) auto access, and (5) line-haul modes. These individual assignments are summed to obtain total transit ridership forecasts.

Model inputs

The SANDAG ABM utilizes a variety of data as inputs. Besides the growth forecast inputs (used to provide existing and planned land use and demographic characteristics) there are three major inputs: (1) highway networks used to describe existing and planned roadway facilities, (2) transit networks used to describe existing and planned public transit service, and (3) an active transportation network used to describe non-motorized bicycle and pedestrian facilities.

The regionally significant projects, and the years they are expected to open to traffic for each analysis year, are documented in Tables B.13 - B.15. The design concept and scope of projects allow adequate model representation to determine intersections with regionally significant facilities, route options, travel times, transit ridership, and land use. The VMT for non-regionally significant federal projects is also accounted for in the regional emissions analysis.

Highway networks

The regional highway networks in the Regional Plan and 2014 RTIP Amendment No. 7 include all roads classified by local jurisdictions in their general plan circulation elements. These roads include freeways, expressways, and the Regional Arterial System (RAS). The RAS consists of all conventional state highways, prime arterials, and selected major streets. In addition, some local streets are included in the networks for connectivity between TAZs.

The route improvements and additions in the Regional Plan and 2014 RTIP Amendment No. 7 are developed to provide adequate travel service that is compatible with adopted regional policies for land use and population growth. All regionally significant projects are included in the quantitative emissions analysis. These include all state highways, all proposed national highway system routes, all regionally significant arterials, and all "other principal arterials" functionally classified by the Federal Highway Administration (FHWA). These include both federal and non-federal regionally significant projects.

The networks also account for programs intended to improve the operation of the highway system, including HOV lanes, Managed Lanes, and ramp metering. Existing and proposed toll facilities also are modeled to reflect time, cost, and capacity effects of these facilities. State Route (SR) 125 South, SR 11, SR 241, and additional lanes on Interstate 15 (I-15) north of SR 78, and additional lanes on I-5 north of Vandegrift Boulevard, are modeled toll facilities included in the Revenue Constrained Plan for the San Diego region.

In addition, several Managed/HOV lanes are included in the Revenue Constrained Plan (Table B.14). Facilities with proposed Managed Lanes include I-5, I-15, I-805, SR 52, SR 54, SR 78, SR 94, and SR 125. Managed Lanes are defined as reversible HOV routes and HOV routes with two or more lanes in the peak direction. Additionally, one-lane

HOV facilities that operate as two-person carpool lanes in the earlier years of the Regional Plan transition to Managed Lanes by 2035. It is assumed that the excess capacity not utilized by carpools and transit on these facilities would be managed so that single occupant vehicles could use these lanes under a pricing mechanism. Traffic flows would be managed so that the facility would operate at Level of Service (LOS) D or better.

SANDAG maintains a master transportation network from which a specific year network, between the years 2010 and 2050, can be built. For air quality conformity analyses of the Regional Plan and 2014 RTIP Amendment No. 7, SANDAG built and verified five highway networks (2015, 2025, 2035, 2040, and 2050) from the master transportation network.

A list of the major highway and near-term regional arterial projects included in the conformity analysis, along with information on phasing for their implementation, are included in Tables B.14 and B.15. Locally funded, regionally significant projects have also been or are included in the air quality conformity analysis. These projects are funded with *TransNet* Extension funds – a 40-year, half-cent local sales tax extension approved by voters in 2004 – that expires in 2048; and other local revenue sources.

Transit networks

SANDAG also maintains transit network datasets for existing and proposed transit systems. Most transit routes run over the same streets, freeways, HOV lanes, and ramps used in the highway networks. The only additional facilities that are added to the master transportation network for transit modeling purposes are:

- Rail lines used by commuter rail, Trolleys, Streetcars
- Streets used by buses that are not part of local general plan circulation elements

BRT service has stop spacing similar to commuter rail stations and operating characteristics midway between rail and bus service. BRT service is provided by advanced design buses operating on HOV lanes or Managed Lanes, some grade-separated transit ways, and surface streets with priority transit systems.

Bus speeds assumed in the transit networks are derived from modeled highway speeds and reflect the effects of congestion. Higher bus speeds may result for transit vehicles operating on highways with HOV lanes and HOV bypass lanes at ramp meters, compared to those routes that operate on highways where these facilities do not exist.

In addition to transit travel times, transit fares are required as input to the mode choice model. A customized procedure using the traffic assignment software replicates the San Diego region's fare policies for riders (seniors, disabled, students), which differ among :

- Local Buses, which collect a flat fare of between $1 and $2.50 (depending on the type of service)
- Trolleys, which charge $2.50 for all trips
- SPRINTER, which charges $2
- Commuter rail (COASTER), which has a zone-based fare of between $4 and $5.50
- Proposed regional BRT routes, which are assumed to charge $2.50 ($5 for *Rapid* BRT)
- Proposed *Rapid* Bus routes, which are assumed to charge $2.25

Fares are expressed in 2010 dollars and are assumed to remain constant in inflation-adjusted dollars over the forecast period.

Near-term transit route changes are drawn from the Coordinated Plan, which was produced in cooperation with the region's transit agencies. Longer range improvements are proposed as a part of the Regional Plan development and other transit corridor studies. In addition to federal and state-funded projects, locally-funded transit projects that are regionally significant have been included in the air quality conformity analysis of the Regional Plan and the 2014 RTIP Amendment No. 7. Once network coding is completed, the ABM is run for the applicable scenarios (2015, 2025, 2035, 2040, and 2050). There have been no transit fares or operating policy changes since the adoption of the 2050 RTP.

Active transportation networks

SANDAG maintains an all-street active transportation network including existing and planned bike projects to support bike project evaluation and impact analysis. Based on the proposed bike projects in the regional bikeway system developed through Riding to 2050 - San Diego Regional Bike Plan, SANDAG generates year-specific active transportation networks and uses these networks to create accessibility measures from MGRA to MGRA, and from TAZ to TAZ for walking and biking modes. These active transportation accessibility measures are inputs to the SANDAG ABM to simulate people's choice of travel mode and choice of bike routes.

The active transportation networks include five classification types for bike facilities in the regional bikeway system: (1) class I – bike path, (2) class II – bike lanes, (3) class III – bike routes, (4) bike boulevard, and (5) cycle track. Appendix U.16 includes detailed description of the bike facility classification system.

Data sources

Besides network inputs, SANDAG relies on several survey data to estimate and calibrate the model parameters. The most important survey data is household travel survey data. The latest household travel survey conducted for SANDAG was the 2006 Household Travel Behavior Survey (TBS06). Since 1966, consistent with the state of the practice for the California Household Travel Survey, and National Household Travel Survey, SANDAG and Caltrans conduct a comprehensive travel survey of San Diego county every ten years. TBS06 surveyed 3,651 households in San Diego County. The survey asked all household members to record all trips for a specified 24-hour weekday period using a specially designed travel log.

Additional data needed for the mode choice components of the ABM come from a transit on-board survey. The most recent SANDAG survey of this kind is the 2009 Transit On-Board Survey (OBS09). OBS09 collected data on transit trip purpose, origin and destination address, access and egress mode to and from transit stops, the on/off stop for surveyed transit routes, number of transit routes used, and demographic information. The total number of OBS09 survey records is 42,854.

Population synthesis requires two types of data: (1) individual household and person census records from San Diego County, and (2) aggregate data pertaining to the socio-demographic characteristics of each zone in the region. The first type of data is available from the Public Use Micro-data Sample (PUMS), a representative sample of complete household and person records that is released with the Census and American Communities Survey. The second type of data is from the census for the base-year and from land use forecasts for future years.

Table B.8 lists data sources mentioned above, along with other necessary sources of data. Modeling parking location choice, and employer-reimbursement of parking cost, depends on parking survey data collected from 2010 into early 2011 as well as a parking supply inventory. The transponder ownership sub-model requires data on transponder users. Data needed for model validation and calibration include traffic counts, transit-boarding data, Census Transportation Planning Package (CTPP) data, and Caltrans Performance Measurement System (PeMS) and Highway Performance Monitoring System (HPMS) data.

Table B.8
ABM Input Data

SANDAG Surveys	Outside Data Sources

• Household Travel Behavior Survey (2006)
• Interregional Travel Behavior Survey (2006)
• Transit On-Board Survey (2009)
• Parking Inventory Survey (2010)
• Parking Behavior Survey (2010)
• Border Crossing Survey (2011)
• Visitor Survey (2011)
• Special Events Survey (2011)
• Commercial Vehicles Survey (2011)
	• San Diego International Airport Air Passenger Survey
	• Traffic and Bicycle counts
	• Census data
	  ◦ Census Transportation Planning Package (CTPP)
	  ◦ Public Use Micro-data Sample (PUMS)
	• American Communities Survey (ACS)
	  ◦ Census Transportation Planning Package (CTPP)
	  ◦ Public Use Micro-data Sample (PUMS)
	• Transponder ownership data
	• Caltrans' Performance Measurement System (PeMS)
	• Caltrans' Highway Performance Monitoring System (HPMS)

Motor Vehicle Emissions Modeling

Emissions model

In September 2011, ARB released EMFAC 2011 and the U.S. EPA approved this emissions model for use in conformity determinations on March 6, 2013. EMFAC 2011 is an integrated model that combines emission rate data with vehicle activity to calculate regional emissions. EMFAC 2011 reflects ARB rulemakings for on-road diesel fleet rules, Pavley Clean Car Standards, and the Low Carbon Fuel Standard (LCFS). EMFAC 2011 is made up of three modules: (1) EMFAC 2011-SG (scenario air quality assessment), (2) EMFAC 2011-LDV (passenger vehicle emissions), and (3) EMFAC 2011-HD (diesel trucks and buses). As noted in ARB's EMFAC 2011 Technical Documentation, EMFAC 2011-SG takes the output from EMFAC 2011-LDV and EMFAC 2011-HD and applies scaling factors to estimate emissions consistent with regional VMT and speeds. Scaling factors are based on changes in total VMT, VMT distribution by vehicle class, and speed distribution. The SG module reports total emissions as tons per average weekday for each pollutant by vehicle class, and the total vehicle fleet for years between 1990 and 2035.

Using EMFAC 2011-SG, projections of daily regional emissions were prepared for reactive organic gases (ROG), nitrogen oxides (NOx), and CO.

The following process emissions are generated for each pollutant:

- All Pollutants – Running Exhaust, Idling Exhaust, Starting Exhaust, Total Exhaust
- ROG and total organic gasses – Diurnal Losses, Hot-Soak Losses, Running Losses, Resting Losses, Total Losses
- EMFAC 2011 models two fuels (gasoline and diesel) and 42 vehicle classes, including the following categories:
  - Passenger cars
  - Motorcycles
  - Motor homes
  - Light-duty trucks

- Medium-duty trucks
- Light-heavy duty trucks
- Medium-heavy duty trucks
- Heavy-heavy duty trucks
- School buses
- Urban buses
- Motor coaches
- Other bus types

The air quality analysis of the Regional Plan and 2014 RTIP Amendment No. 7 conformity redetermination was conducted using EMFAC 2011-SG.

On December 30, 2014, ARB released EMFAC 2014. EMFAC 2014 represents ARB's current understanding of motor vehicle travel activities and their associated emission levels. On May 15, 2015, ARB released an updated version, EMFAC 2014 v1.0.7; however, it has not yet been approved by U.S. EPA for use in conformity determinations. The draft conformity analysis also was performed with EMFAC2014 v1.0.7 and all projected emissions met the applicable SIP budgets.

The regional emissions projections for the Regional Plan and 2014 RTIP Amendment No. 7 were produced with EMFAC 2011 and are included in Tables B.9 and B.11.

Regional emissions forecasts

Regional travel demand forecasts were initiated in October 2014. Output from the SANDAG ABM was then processed to be useful for emissions modeling for the conformity determination of the Regional Plan and 2014 RTIP Amendment No. 7 conformity redetermination.

The analysis years were selected to comply with 40 CFR §93.106(a)(1) and §93.118(a) of the Transportation Conformity Regulations and the approved methodology for conducting the air quality conformity analyses for the Regional Plan and 2014 RTIP Amendment No. 7. According to these sections of the Conformity Regulation, the first horizon year (2015) must be within ten years from the base year used to validate the regional transportation model (2012), the last horizon year must be the last year of the transportation plan's forecast period (2050), and the horizon years may be no more than ten years apart (2025, 2035, and 2040). Federal RTP guidelines require that the Regional Plan cover a forecast period of a minimum of 20 years.

Eight-hour ozone standard

Effective April 4, 2013, the U.S. EPA found the Eight-Hour Ozone budgets included in the *Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County* adequate for transportation conformity purposes. Beginning in October 2014, SANDAG prepared countywide forecasts of average weekday ROG and NOx emissions for 2015, 2020 (interpolated), 2025, 2035, 2040, and 2050. ROG and NOx emissions are based upon the summer season. ROG and NOx data for 2020 are included to demonstrate conformity to the budgets included in the Maintenance Plan.

CO standard

Beginning in October 2014, CO regional emissions were projected for 2015, 2018 (interpolated), 2025, 2035, 2040, and 2050. CO emissions are based upon the winter season. CO data for 2018 is included to demonstrate conformity to the budget included in the Maintenance Plan.

Emissions modeling results

An emissions budget is the part of the SIP that identifies emissions levels necessary for meeting emissions reduction milestones, attainment, or maintenance demonstrations. To determine conformity of the Regional Plan and the 2014 RTIP Amendment No. 7, the Regional Plan must comply with the emission analysis described in the Regional Emissions Forecast section. Table B.9 shows that the projected ROG and NOx emissions from the Regional Plan and 2014 RTIP Amendment No. 7 are below the ROG and NOx budgets and satisfy the requirements of 40 CFR §93.118(a). Air quality conformity ozone standards relate to ozone that occurs near ground level as a result of various human activities. At the ground level, ozone is formed by chemical reactions of "precursor" pollutants – oxides of nitrogen (NOx) and volatile organic compounds – also known as reactive organic gases (ROG).

Table B.9

San Diego Forward: The Regional Plan
Revenue Constrained Plan and 2014 RTIP Amendment No. 7 Air Quality Conformity Analysis for 2008 Eight-Hour Ozone Standard (EMFAC 2011)

Year	Average Weekday Vehicle Starts (1,000s)	Average Weekday Vehicle Miles (1,000s)	ROG		NOx	
			SIP Emissions Budget Tons/Day	ROG Emissions Tons/Day	SIP Emissions Budget Tons/Day	NOx Emissions Tons/Day
2015	13,311	78,631	53	21	98	38
2020	13,998	82,963	23	17	38	29
2025	14,664	87,295	21	14	30	20
2035	15,185	90,671	21	12	30	17
2040[(1)]	15,442	92,256	21	12	30	18
2050[(1)]	15,799	94,461	21	13	30	19

[(1)] The emissions data for 2040 and 2050 was prepared using 2035 emission factors, as emission factors for 2040 and 2050 are not available in EMFAC 2011. Also, adjustment factors are not available for 2035, 2040, and 2050. Modeled emission results for 2035, 2040, and 2050 likely are overestimated due to these two factors.

Note: Emission budgets from the Eight-Hour Ozone Attainment Plan for San Diego County, which were found adequate for transportation conformity purposes by the U.S. EPA effective June 9, 2008, are used for the 2015 analysis year. Emissions budgets from the *Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County*, which were found adequate for transportation conformity purposes by the U.S. EPA, effective April 4, 2013, are used for all other analysis years. SANDAG utilizes the default EMFAC travel data for some vehicle classes such as school buses. The same ABM travel data was used for the analysis performed with EMFAC 2011 and 2014. Differences in the number of average weekday vehicle starts and vehicle miles traveled in the tables created with EMFAC 2011 and EMFAC 2014 are due to differences in the default assumptions included in EMFAC for the vehicle classifications where SANDAG utilizes the default data (school bus, other bus, motor coach, and all other bus).

Adjustment factors for ROG and NOx were provided by ARB to account for regulations and minor technical improvements not yet included in the California Emissions Forecasting System inventories at the time of EMFAC 2011 development. Table B.10 includes the adjustment factors by category and analysis year. Adjustment factors were

provided for the years 2015, 2020, and 2025. Factors for later years were not available from ARB and, therefore, the adjustment factors for 2025 were carried over into later years.

Table B.10
EMFAC 2011 Adjustment Factors

	ROG Adjustment Factor (tons/day)						NOx Adjustment Factor (tons/day)					
	2015	2020	2025	2035	2040	2050	2015	2020	2025	2035	2040	2050
AB 1493	0.12	0.22	0.35	0.35	0.35	0.35	0.01	0.01	0.02	0.02	0.02	0.02
Reformulated Gasoline	0.97	0.72	0.54	0.54	0.54	0.54	-	-	-	-	-	-
Smog Check	1.05	0.87	0.50	0.50	0.50	0.50	0.54	0.38	0.20	0.20	0.20	0.20
Advanced Clean Cars	0.04	0.21	0.39	0.39	0.39	0.39	0.08	0.24	0.94	0.94	0.94	0.94
Total*	2.17	2.03	1.78	1.78	1.78	1.78	0.63	0.63	1.16	1.16	1.16	1.16

* Totals represent unrounded adjustment factors.

Note: Adjustment factors were provided by ARB. The tons listed are subtracted from the EMFAC 2011 output of tons per day for ROG and NOx. Adjustment factors are not available for years 2035, 2040, and 2050 and, therefore, reflect 2025 adjustments for those years.

Table B.11 shows that projected CO emissions from the Regional Plan and 2014 RTIP Amendment No. 7 are below the 2003 CO budget of 730 tons per day and satisfy the requirements of 40 CFR §93.118(a).

Table B.11

San Diego Forward: The Regional Plan
Revenue Constrained Plan and 2014 RTIP Amendment No. 7 Air Quality Conformity Analysis for Carbon Monoxide Standard (EMFAC 2011)

Year	Average Weekday Vehicle Starts (1,000s)	Average Weekday Vehicle Miles (1,000s)	CO SIP Emissions Budget Tons/Day	CO Emissions Tons/Day
2015	13,311	78,631	730	223
2018	13,717	81,230	730	195
2025	14,664	87,295	730	131
2035	15,185	90,671	730	114
2040[(1)]	15,442	92,256	730	116
2050[(1)]	15,799	94,461	730	119

[(1)] The emissions data for 2040 and 2050 was prepared using 2035 emission factors, as emission factors for 2040 and 2050 are not available in EMFAC 2011. Modeled emission results for 2040 and 2050 likely are overestimated due to this factor.

Note: Emissions budgets for the San Diego region from 2004 Revision to California SIP for CO, Updated Maintenance Plan for Ten Federal Planning Areas (approved as SIP revision in January 2006). Emissions results do not reflect ARB adjustment factors. SANDAG utilizes the default EMFAC travel data for some vehicle classes such as school buses. The same ABM travel data was used for the analysis performed with EMFAC 2011 and 2014. Differences in the number of average weekday vehicle starts and vehicle miles traveled in the tables created with EMFAC 2011 and EMFAC 2014 are due to differences in the default assumptions included in EMFAC for the vehicle classifications where SANDAG utilizes the default data (school bus, other bus, motor coach, and all other bus).

Exempt projects

Section 93.126 of the Transportation Conformity Regulations exempts certain highway and transit projects from the requirement to determine conformity. The categories of exempt projects include safety, mass transit, air quality (ridesharing, bike, and pedestrian facilities), and other (such as planning studies).

Table B.12 illustrates the exempt projects considered in the Regional Plan and 2014 RTIP Amendment No. 7. This table shows short-term exempt projects. Additional unidentified projects could be funded with revenues expected to be available from the continuation of existing state and federal programs.

Table B.12

Exempt Projects

Bikeway, Rail Trail, and Pedestrian Projects

Project/Program Description	Project/Program Description
Bayshore Bikeway	Maple Street Pedestrian Plaza
Bay-to-Ranch Bikeway	Mid-County Bikeway
Border Access Bicycle Corridor	Mira Mesa Bicycle Corridor
Camp Pendleton Trail	Mission Valley – Chula Vista Bicycle Corridor
Carlsbad – San Marcos Bicycle Corridor	National City – Highland Avenue Community Corridor
Central Coast Bicycle Corridor	North Park – Centre City Bicycle Corridor
Chula Vista Greenbelt	Oceanside – Bicycle Master Plan
City Heights – Old Town Bicycle Corridor	Otay Mesa Port of Entry Pedestrian/Bicycle Facilities
Clairemont – Centre City Bicycle Corridor	Park Boulevard Bicycle Connector
Coastal Rail Trail	Poway Bicycle Loop
East County Northern Bicycle Loop	San Diego Regional Bicycle Plan
East County Southern Bicycle Loop	San Diego River Multi-Use Bicycle and Pedestrian Path
El Camino Real Bicycle Corridor	San Luis Rey River Trail
Encinitas – San Marcos Bicycle Corridor	Santee – El Cajon Bicycle Corridor
Escondido Creek Bike Path Bridge and Bikeway	SR 52 Bikeway
Gilman Bicycle Connector	SR 56 Bikeway
Hillcrest – El Cajon Bicycle Corridor	SR 56/Black Mountain Road Bikeway Interchange
Imperial Beach Bicycle Connector	SR 125 Bicycle Corridor
Inland Rail Trail	SR 905 Bicycle Corridor
Interstate 8 Bicycle Corridor	Sweetwater River Trail
SR 15 Bikeway	Tecate International Border Crossing Pedestrian Facilities
Interstate 805 Bicycle Corridor	Ted Williams Parkway Pedestrian Bridge at Shoal Creek
Kearny Mesa – Beaches Bicycle Corridor	Third Avenue Bicycle and Pedestrian Access

Table B.12 (continued)

Exempt Projects

Bikeway, Rail Trail, and Pedestrian Projects

Project/Program Description	Project/Program Description
Kensington – Balboa Park Bicycle Corridor	Vista Way Bicycle Connector
	West Bernardo Bike Path
Bridge Rehabilitation/Preservation/Retrofit	Traveler Information Program
Collision Reduction	Bus on Shoulder Service
Emergency Response	Compass Card
Hazard Elimination/Safe Routes to School	FasTrak®
Highway Maintenance	Freeway Service Patrol
Safety Improvement Program	Vehicle Automation
Roadway/Roadside Preservation	Regional Vanpool Program
Smart Growth Incentive Program	Multimodal Integration and Performance-Based Management
Safe Routes to Transit	Arterial, Freeway, and Transit Management
Safe Routes to School	Intelligent Transportation System for Transit
Transit Terminals	ITS Operations
Airport Intermodal Transit Center/Terminal	Joint Transportation Operations Center
San Ysidro Intermodal Transit Center/Terminal	Trolley Fiber Communication Network
	Electronic Payment Systems and Universal Transportation Account
	Various Traffic Signal Optimization/Prioritization
	Transit Infrastructure Electrification
	Employer Services and Outreach
	Commuter Services and Bike Program
	Mobility Hubs
	Active Traffic and Demand Management
	Shared Mobility Services

Implementation of Transportation Control Measures

There are four federally-approved Transportation Control Measures (TCMs) that must be implemented in San Diego, which the SIP refers to as transportation tactics. They include: (1) ridesharing, (2) transit improvements, (3) traffic flow improvements, and (4) bike facilities and programs.

These TCMs were established in the 1982 SIP, which identified general objectives and implementing actions for each tactic. The TCMs have been fully implemented. Ridesharing, transit, biking, and traffic flow improvements continue to be funded, although the level of implementation established in the SIP has been surpassed. Information regarding transit projects can be seen in Table B.13, and Appendix A. More detailed information regarding ridesharing and traffic flow improvements is included in Appendix E and information regarding bike facilities and programs is included in Appendix A.

Interagency Consultation Process and Public Input

The consultation process followed to prepare the Air Quality Conformity Analysis for the Regional Plan and 2014 RTIP Amendment No. 7 complies with the San Diego Transportation Conformity Procedures adopted in July 1998. In turn, these procedures comply with federal requirements under 40 CFR §93.106(a)(1). Interagency consultation involves SANDAG (as the MPO for San Diego County), the APCD, Caltrans, ARB, U.S. DOT, and U.S. EPA.

Consultation is a three-tier process that:

- Formulates and reviews drafts through a conformity working group
- Provides local agencies and the public with opportunities for input through existing regional advisory committees and workshops
- Seeks comments from affected federal and state agencies through participation in the development of draft documents and circulation of supporting materials prior to formal adoption

SANDAG consulted on the development of the Air Quality Conformity Analysis of the Regional Plan and 2014 RTIP Amendment No. 7 at public meetings of the San Diego Region CWG, the Transportation Committee, and Board of Directors, as follows:

- On September 5, 2012, SANDAG staff presented information on the agencywide Public Participation Plan (PPP), which serves as an umbrella document for all planning efforts conducted by the agency for discussion. Staff also presented information on Regional Plan draft work program, schedule, and Public Involvement Plan (PIP) for discussion.
- On December 5, 2012, SANDAG staff held a discussion with the CWG on the draft PPP update, which was accepted by the SANDAG Board of Directors at the October 26, 2012, meeting and released for a 45-day public comment period.
- On February 6, 2013, SANDAG staff held a discussion with the CWG on the draft PIP, which was released for public review and comment on January 7, 2013, for a 30-day review period.
- On December 4, 2013, SANDAG staff presented information on the Regional Plan schedule, 2050 regional growth forecast, and transportation modeling for discussion.
- On August 6, 2014, SANDAG staff presented the schedule and updates for the preparation of the Regional Plan and its air quality conformity analysis. Staff presented information on the Series 13 2050 Regional Growth Forecast, 2050 Revenue Forecast, and latest emissions model and emissions budgets.

- On September 12, 2014, the SANDAG Board of Directors selected the Revenue Constrained Transportation Scenario for use in developing the Draft Regional Plan. SANDAG staff initiated the air quality conformity modeling for the Draft Regional Plan in September 2014.
- On October 1, 2014, SANDAG staff presented further information about the criteria and procedures to be followed for the conformity analysis. Staff presented information on the schedule, transportation modeling, latest emissions model and emissions budgets, TCMs, and public involvement and outreach. Staff confirmed that a redetermination of conformity would be done for the 2014 RTIP Amendment No. 7, in conjunction with the Regional Plan for consistency purposes.
- On October 3, 2014, SANDAG staff distributed the draft list of capacity increasing and non-capacity increasing projects to be included in the draft 2014 RTIP Amendment No. 7 for interagency consultation.
- On November 14, 2014, SANDAG released the draft air quality conformity analysis of the Regional Plan and 2014 RTIP Amendment No. 7 to the CWG for a 30-day review-and-comment period. The draft air quality analysis was discussed at the December 3, 2014, meeting of the CWG.
- On January 30, 2015, SANDAG released the revised draft air quality conformity analysis of the Regional Plan and 2014 RTIP Amendment No. 7, which incorporates emissions analysis utilizing the EMFAC 2014 model, to the CWG for a 30-day review-and-comment period. The draft air quality analysis was discussed at the February 4, 2015, meeting of the CWG.
- On April 24, 2015, the SANDAG Board of Directors released the Draft Regional Plan and the 2014 RTIP Amendment No. 7 and its conformity analysis for public review and comment.
- On May 21, 2015, the draft Regional Plan EIR was released for a 55-day public comment period. The comment period for the Draft Regional Plan and its conformity analysis, and draft EIR closed on July 15, 2015.
- Two public hearings were held on the draft Regional Plan and its conformity determination and the 2014 RTIP Amendment No. 7 conformity determination on June 12, 2015, and June 18, 2015.
- Based on comments received from the public and member agencies, refinements were made to the final Regional Plan network. The air quality conformity analysis was released to the CWG and the public on August 19, 2015. The comment period closed on September 25, 2015. The emissions analysis was conducted using the EMFAC2011 and EMFAC2014 v.1.0.7 models.
- Members of the public are able to provide comments at meetings of the CWG, the Transportation Committee, and the SANDAG Board of Directors.

Table B.13

Revenue Constrained Scenario Transit Services

Conformity Analysis Year	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2025	COASTER	398	Double tracking (20-minute peak frequencies and 120-minute off-peak frequencies and station/platform at Del Mar Fairgrounds)	$445	$445
2025	SPRINTER	399	SPRINTER efficiency improvements (20-minute frequencies by 2025); double tracking Oceanside to Escondido for 10-minute frequencies and six rail grade separations at El Camino Real, Melrose Dr, Vista Village Dr/ Main St, North Dr, Civic Center, Auto Pkwy and Mission Ave	$946	$1339
2025	Trolley	510	Mid-Coast Trolley Extension	$1,753	$1,753
2025	*Rapid*	2	North Park to downtown San Diego via 30th St	$39	$52
2025	*Rapid*	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	$87	$117
2025	*Rapid*	120	Kearny Mesa to downtown via Mission Valley	$78	$104
2025	*Rapid*	SR 163 DARs	Kearny Mesa to downtown via SR 163. Stations at Sharp/Children's Hospital, University Ave, and Fashion Valley Transit Center	$150	$196
2025	*Rapid*	550	SDSU to Palomar Station via East San Diego, Southeast San Diego, National City	$59	$78
2025	*Rapid*	225	South Bay *Rapid* (Otay Mesa to downtown) and Otay Mesa ITC (formerly Route 628)	$206	$206
2025	*Rapid*	709	H St Trolley Station to Millennia via H St Corridor, Southwestern College	$37	$49
2025	*Rapid*	905	Extension of Iris Trolley Station to Otay Mesa Port of Entry (POE) route with new service to Otay Mesa East POE and Imperial Beach	$2	$2
2025	Streetcar	554	Hillcrest/Balboa Park/downtown San Diego Loop[1]	$29	$38
2025	Airport Express	--	Airport Express Routes[2]	$52	$62
2025	Shuttle	448/449	San Marcos Shuttle[3]	$0	$0
2025	Transit Lanes	SR 15 from I-805 to I-8	Transit Lane improvement for routes 235, 280/290, 653, and Airport Express Route to Tijuana International Airport. Existing facility at 8F, with improvement of 8F+2TL	$56	$56

Table B.13 (continued)

Revenue Constrained Scenario Transit Services

Conformity Analysis Year	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2025			Local Bus Routes - 15 minutes in key corridors	--	--
2035	COASTER	398	Double tracking (20-minute peak frequencies and 60-minute off-peak frequencies, grade separations at Leucadia Blvd, stations/platforms at Convention Center/Gaslamp Quarter, and extension to Camp Pendleton)	$900	$1,357
2035	Trolley	510	Phase I - Blue Line Frequency Enhancements and rail grade separations at 28th St, 32nd St, E St, H St, Palomar St, and Blue/Orange Track Connection at 12th/Imperial	$205	$292
2035	Trolley	520	Orange Line Frequency Enhancements and four rail grade separations at Euclid Ave, Broadway/Lemon Grove Ave, Allison Ave/University Ave, Severin Dr	$267	$402
2035	Trolley	561	UTC to COASTER Connection (extension of Route 510)	$343	$602
2035	Trolley	562	Phase I - San Ysidro to Kearny Mesa via Chula Vista via Highland Ave/4th Ave, National City, Southeast San Diego, Mid-City, and Mission Valley	$2,333	$4,028
2035	*Rapid*	11	Spring Valley to SDSU via Southeast San Diego, downtown, Hillcrest, Mid-City	$113	$173
2035	*Rapid*	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	$49	$76
2035	*Rapid*	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	$105	$161
2035	*Rapid*	41	Fashion Valley to UTC/UC San Diego via Linda Vista and Clairemont	$55	$96
2035	*Rapid*	90	El Cajon Transit Center to San Diego International Airport ITC via SR 94, City College (peak only)	$20	$27
2035	*Rapid*	473	Phase I – Solana Beach to UTC/UC San Diego via Hwy 101 Coastal Communities, Carmel Valley	$43	$66
2035	*Rapid*	635	Eastlake to Palomar Trolley via Main St Corridor	$56	$98

Table B.13 (continued)

Revenue Constrained Scenario Transit Services

Conformity Analysis Year	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2035	*Rapid*	638	Iris Trolley Station to Otay Mesa via Otay, Airway Dr, SR 905 Corridor	$38	$67
2035	*Rapid*	640A/640B	Route 640A: I-5 - San Ysidro to Old Town Transit Center via City College 640B: I-5 Iris Trolley/Palomar to Kearny Mesa via Chula Vista, National City and City College	$153	$206
2035	*Rapid*	688/689/690	Route 688: San Ysidro to Sorrento Mesa via I-805/I-15/SR-52 Corridors (Peak Only) Route 689: Otay Mesa Port of Entry (POE) to UTC/Torrey Pines via Otay Ranch/ Millennia, I-805 Corridor (Peak Only) Route 690: Mid-City to Sorrento Mesa via I-805 Corridor (Peak Only)	$458	$653
2035	*Rapid*	910	Coronado to Downtown via Coronado Bridge	$26	$39
2035	Streetcar	553	Downtown San Diego: Little Italy to East Village[1]	$14	$21
2035	Streetcar	555	30th St to Downtown San Diego via North Park/Golden Hill[1]	$26	$45
2035			Local Bus Routes - 10 minutes in key corridors	--	--
2040	SPRINTER	588	SPRINTER Express	$244	$492
2040	Trolley	510	Phase II - Blue Line rail grade separations at Taylor St and Ash St	$226	$449
2040	Trolley	563	Pacific Beach to Balboa and Grossmont to Kearny Mesa	$610	$1,229
2040	*Rapid*	103	Solana Beach to Sabre Springs *Rapid* station via Carmel Valley	$67	$135
2040	*Rapid*	440	Carlsbad to Escondido Transit Center via Palomar Airport Rd	$51	$104
2040	*Rapid*	473	Phase II - Oceanside to Solana Beach via Hwy 101 Coastal Communities	$87	$176
2040	*Rapid*	477	Camp Pendleton to Carlsbad Village via College Blvd, Plaza Camino Real	$80	$161
2040	*Rapid*	235	Temecula (peak only) Extension of Escondido to Downtown *Rapid* (formerly Route 610)	$98	$198

Table B.13 (continued)

Revenue Constrained Scenario Transit Services

Conformity Analysis Year	Service	Route	Description	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
2040	*Rapid*	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	$39	$79
2040	*Rapid*	637	North Park to 32nd St Trolley Station via Golden Hill	$33	$66
2040	*Rapid*	650	Chula Vista to Palomar Airport Rd Business Park via I-805/I-5 (peak only)	$82	$166
2040	*Rapid*	653	Mid-City to Palomar Airport Rd via Kearny Mesa/I-805/I-5	$10	$21
2040	Streetcar	565	Mission Beach to La Jolla via Pacific Beach	$25	$50
2050	COASTER	398	COASTER double tracking (completes double tracking; includes Del Mar Tunnel) and grade separations	$1,365	$3,372
2050	SPRINTER	399	Branch Extension to Westfield North County	$176	$437
2050	Trolley	530	Green Line Frequency Enhancements	$0	$0
2050	Trolley	560	SDSU to Downtown via El Cajon Blvd/Mid-City (transition of Mid-City *Rapid* to Trolley)	$2,390	$5,005
2050	Trolley	562	Phase II - Kearny Mesa to Carmel Valley	$633	$1,443
2050	Trolley	563	Phase II - Balboa to Kearny Mesa	$689	$1,708
2050	*Rapid*	471	Downtown Escondido to East Escondido	$32	$80
2050	*Rapid*	474	Oceanside to Vista via Mission Ave/Santa Fe Rd Corridor	$50	$127
2050	*Rapid*	870	El Cajon to UTC via Santee, SR 52, I-805	$7	$17
2050	*Rapid*	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	$12	$29

Notes: [1] Streetcar cost is representative of 10 percent of the total capital cost.
[2] Implementation of these services is dependent upon funding from aviation and other private sources.
[3] Capital cost to be funded by the City of San Marcos.

Table B.14

Revenue Constrained Scenario Managed Lane and Highway Project List

Conformity Analysis Year	Freeway	From	To	Existing	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
Managed Lanes / Toll Lanes							
2025	I-5	La Jolla Village Dr	I-5/805 Merge	8F/14F	8F/14F+2ML	$206	$249
2025	I-5	SR 78	Vandegrift Blvd	8F	8F+2ML	$76	$100
2025	I-5	Manchester Ave	SR 78	8F	8F+2ML	$701	$789
2025	SR 11 /Otay Mesa East Port of Entry (POE)	SR 125	Mexico	--	4T + POE	$832	$876
2025	I-15	I-8	SR 163	8F	8F+2ML	$56	$73
2025	SR 78	I-5	College Blvd	6F	6F+2ML	$227	$299
2025	SR 78	Twin Oaks	I-15	6F	6F+2ML	$177	$232
2025	SR 94	I-5	I-805	8F	8F+2ML	$535	$703
2025	SR 241	Orange County	I-5	--	4T	$416	$503
2025	I-805	SR 52	Carroll Canyon Rd	8F	8F+2ML	$255	$255
2025	I-805	SR 94	SR 15	8F	8F+2ML	$172	$226
2035	I-5	I-5/I-805 Merge	SR 56	8F/14F +2ML	8F/14F+4ML	$91	$137
2035	I-5	Manchester Ave	SR 78	8F+2ML	8F+4ML	$1,076	$1,863
2035	I-5	SR 905	SR 54	8F	8F +2ML	$308	$416
2035	I-5	SR 54	SR 15	8F	10F+2ML	$343	$464
2035	I-5	SR 56	Manchester Ave	8F+2ML	8F+4ML	$455	$686
2035	SR 15	SR 94	I-805	6F	6F+2ML	$30	$52

Table B.14 (continued)

Revenue Constrained Scenario Managed Lane and Highway Project List

Conformity Analysis Year	Freeway	From	To	Existing	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
Managed Lanes / Toll Lanes (continued)							
2035	SR 78	College Blvd	Twin Oaks	6F	6F+2ML	$788	$1,189
2035	SR 241	Orange County	I-5	4T	6T	$63	$95
2035	I-805	SR 52	Carroll Canyon Rd	8F+2ML	8F+4ML	$394	$562
2035	I-805	SR 54	SR 94	8F +2ML	8F+4ML	$704	$1,096
2035	I-805	SR 163	SR 52	8F	8F+2ML	$229	$346
2035	I-805	SR 905	Palomar St	8F	8F+2ML	$343	$595
2040	I-5	SR 78	Vandegrift Blvd	8F+2ML	8F+4ML	$606	$1,205
2040	SR 52	I-805	I-15	6F	6F+2ML	$91	$181
2040	SR 125	SR 94	I-8	8F	8F+2ML	$66	$131
2040	I-805	SR 15	SR 163	8F/10F	8F/10F+4ML	$1,152	$2,292
2040	I-805	SR 94	SR 15	8F+2ML	8F+4ML	$61	$121
2040	I-805	SR 163	SR 52	8F+2ML	8F+4ML	$322	$640
2050	I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	$556	$1,378
2050	I-5	Vandegrift Blvd	Orange County	8F	8F+4T	$1,812	$4,496
2050	I-15	SR 78	Riverside County	8F	8F+4T	$1,029	$2,554
2050	I-15	Viaduct		8F	8F+2ML	$842	$2,092
2050	SR 15	I-5	SR 94	6F	8F+2ML	$136	$338
2050	SR 52	I-15	SR 125	4F/6F	4F/6F+2ML R)	$298	$662
2050	SR 54	I-5	SR 125	6F	6F+2ML	$111	$276
2050	SR 94	I-805	SR 125	8F	8F+2ML	$369	$775
2050	SR 125	SR 54	SR 94	6F	6F+2ML	$76	$188
2050	SR 125	SR 94	I-8	8F+2ML	10F+2ML	$227	$564

Table B.14 (continued)

Revenue Constrained Scenario Managed Lane and Highway Project List

Conformity Analysis Year	Freeway	From	To	Existing	With Improvements	Capital Cost ($2014); millions	Capital Cost ($YOE); millions
Highway Projects							
2025	SR 67	Mapleview St	Gold Bar Ln	2C	4C	$60	$79
2025	SR 76	Mission	I-15	2C	4C	$305	$305
2035	SR 52	Mast Blvd	SR 125	4F	6F	$76	$131
2040	SR 67	Gold Bar Ln	Scripps Poway	2C/4C	4C	$180	$357
2040	SR 94	SR 125	Avocado Blvd	4F	6F	$111	$221
2050	I-8	2nd St	Los Coches	4F/6F	6F	$35	$88
2050	SR 52	I-5	I-805	4F	6F	$111	$276
2050	SR 56	I-5	I-15	4F	6F	$141	$351
2050	SR 94	Avocado Blvd	Jamacha	4C	6C	$91	$225
2050	SR 94	Jamacha	Steele Canyon Rd	2C/4C	4C	$40	$100
2050	SR 125	San Miguel Rd	SR 54	4F	8F	$177	$438
2050	SR 125	SR 905	San Miguel Rd	4T	8F	$323	$661
2050	SR 67	Scripps Poway	Dye Rd	2C/4C	4C	$396	$982
Operational Projects							
2040	SR 76	I-15	Couser Canyon	2C/4C	4C/6C+ Operational	$131	$261
2050	I-5	I-15	I-8	8F	8F+ Operational	$1,177	$2,919
2050	I-8	I-5	SR 125	8F/10F	8F/10F+ Operational	$667	$1,654

Conformity Analysis Year	Freeway	From	To	Capital Cost ($2014); millions	Capital Cost ($YOE): millions
Managed Lanes Connectors					
2025	I-5	SR 78	South to East & West to North, North to East & West to South	$253	$332
2025	I-5	I-805	North to North & South to South	$51	$66
2025	I-15	SR 78	East to South & North to West	$106	$139
2025	SR 15	I-805	North to North & South to South	$81	$106

Table B.14 (continued)

Revenue Constrained Scenario Managed Lane and Highway Project List

Conformity Analysis Year	Freeway	From	To	Capital Cost ($2014); millions	Capital Cost ($YOE): millions
Managed Lanes Connectors (continued)					
2025	I-805	SR 94	North to West & East to South	$101	$133
2035	SR 15	SR 94	South to West & East to North	$71	$122
2040	I-805	SR 52	West to North & South to East	$91	$181
2050	I-15	SR 52	West to North & South to East	$130	$326
Freeway Connectors					
2025	I-5	SR 78	South to East & West to South	$273	$358
2025	SR 11/SR 905	SR 125	EB SR 905 and WB SR 11 to NB SR 125, NB SR 905 to NB SR 125	$26	$28
2025	SR 11/SR 905	SR 125	SB 125 to WB SR 905, SB SR 125 to EB SR 11, SB SR 125 to SB SR 905	$74	$90
2025	SR 94	SR 125	South to East	$69	$88
2035	I-5	SR 56	West to North & South to East	$273	$411
2035	SR 94	SR 125	West to North	$81	$122
2050	I-15	SR 56	North to West	$101	$265

Table B.15

Revenue Constrained Scenario: Arterial Projects

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2015	CB04A	Carlsbad	El Camino Real Widening - Tamarack Ave to Chestnut Ave	In Carlsbad, widen El Camino Real to prime arterial standards with three travel lanes, bike lanes, and sidewalks in each direction including intersection improvements at Tamarack Avenue and Chestnut Avenue
2015	CHV08	Chula Vista	Willow St Bridge Project - Bonita Rd to Sweetwater Rd	Replace 2-lane bridge with 4-lane bridge (Phase I)
2015	SD32	San Diego	Carroll Canyon Rd	Carroll Canyon Road from Scranton Road to I-805: extend Carroll Canyon under I-805 including improvements to on/off ramps
2025	CB04B	Carlsbad	El Camino Real and Cannon Rd	In Carlsbad, along the eastside of El Camino Real just south of Cannon Road, widen to prime arterial standards with three through lanes, a right turn lane, and a sidewalk approaching the intersection
2025	CB04C	Carlsbad	El Camino Real - Lisa St to Crestview Dr	In Carlsbad, along the west side of El Camino Real, roadway widening to provide three southbound through lanes, curb, gutter, and sidewalk per prime arterial standards
2025	CB12	Carlsbad	College Blvd Reach A - Badger Ln to Cannon Rd	In Carlsbad, from Badger Lane to Cannon Road, construct a new segment of College Boulevard to provide 4-lane roadway with raised median, bike lanes, and sidewalks/trails in accordance with major arterial standards
2025	CB13	Carlsbad	Poinsettia Ln Reach E - Cassia Dr to Skimmer Ct	In Carlsbad, from Cassia Drive to Skimmer Court, construct a new 4-lane roadway with median, bike lanes, and sidewalks/trails to major arterial standards
2025	CB22	Carlsbad	Avenida Encinas, widen from Palomar Airport Rd to EWPCF	In Carlsbad, Avenida Encinas from Palomar Airport Road southerly to existing improvements adjacent to the Embarcadero Lane, roadway widening to secondary arterial standards
2025	CB30	Carlsbad	El Camino Real – El Camino Real to Tamarack Ave	In Carlsbad, at the intersection of El Camino Real and Tamarack Avenue, construct a second left turn lane from El Camino Real to westbound Tamarack

Table B.15 (continued)

Revenue Constrained Scenario: Arterial Projects

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2025	CB31	Carlsbad	El Camino Real – La Costa Ave to Arenal Rd	In Carlsbad, along El Camino Real from 700 feet north of La Costa Avenue to Arenal Road, widening along the southbound side of the roadway to provide three travel lanes and a bike lane in accordance with prime arterial standards
2025	CB32	Carlsbad	El Camino Real Widening - Cassia to Camino Vida Roble	In Carlsbad, widen El Camino Real from 900 feet north of Cassia Road to Camino Vida Roble, along the northbound side of the roadway to provide three travel lanes and a bike lane in accordance with prime arterial standards
2025	CB34	Carlsbad	Palomar Airport Rd - Palomar Airport Rd to Paseo Del Norte	In Carlsbad, widening along eastbound Palomar Airport Road to provide a dedicated right turn lane to southbound Paseo Del Norte
2025	CB35	Carlsbad	Palomar Airport Rd - Palomar Airport Rd to Paseo Del Norte	In Carlsbad, lengthen the left turn pocket along eastbound Palomar Airport Road to northbound Paseo Del Norte
2025	CB38	Carlsbad	El Camino Real – Cannon Rd to Tamarack Ave	El Camino Real from Cannon Road to Tamarack, widen along both sides of El Camino Real from Cannon Road to Tamarack Avenue excluding the limits of project CB04C, to provide a raised median, three travel lanes, bike lane, curb, gutter, and walkway along both sides per prime arterial standards, and a new traffic signal at Lisa Street
2025	CHV08	Chula Vista	Willow St Bridge Project - Bonita Rd to Sweetwater Rd	Replace 2-lane bridge with 4-lane bridge (Phase II)
2025	CHV69	Chula Vista	Heritage Rd Bridge	Heritage Road from Main Street/Nirvana Avenue to Entertainment Circle, widen and lengthen bridge over Otay River from 4-lane to 6-lane bridge that accommodates shoulders, sidewalk, and medial; project is on Heritage Road from the intersection of Main Street and Nirvana Avenue to Entertainment Circle

Table B.15 (continued)

Revenue Constrained Scenario: Arterial Projects

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2025	CNTY14	San Diego County	South Santa Fe Ave North - Montgomery Dr to South of Woodland Dr	Vista City limits to 700 feet south of Woodland, reconstruct and widen from 2 to 4 lanes including bicycle lane; more detail in 2014 RTIP Project List
2025	CNTY14A	San Diego County	South Santa Fe Ave South	South Santa Fe from 700 feet south of Woodland Drive to Smilax Road, widening of South Santa Fe Avenue to a 5-lane major road with a center left turn lane, curb, gutter, sidewalk, bike lanes, and drainage improvements from 700 feet south of Woodland Drive to Smilax Road
2025	CNTY21	San Diego County	Bradley Ave Overpass at SR 67	Widen Bradley Avenue from Magnolia Avenue to Mollison Avenue; widen from 2 lanes to 4 lanes plus sidewalks. Replace 2-lane bridge over SR 67 with a 6-lane bridge which accommodates turn pockets.
2025	CNTY24	San Diego County	Cole Grade Rd	Cole Grade Road from north of Horse Creek Trail to south of Pauma Heights Road, widen to accommodate 14-foot traffic lane in both directions, 12-foot center 2-way left turn, 6-foot bike lane and 10-foot pathway
2025	CNTY34	San Diego County	Dye Rd Extension	Dye Road to San Vicente Road - in Ramona, study, design, and construct a 2-lane community collector road with intermittent turn lanes, bike lanes, curb, gutter, and pathway/walkway
2025	CNTY35	San Diego County	Ramona St Extension	From Boundary Avenue to Warnock Drive - in the community of Ramona, construct new road extension, 2 lanes with intermittent turn lanes, bike lanes, and walkway/pathway
2025	CNTY36	San Diego County	San Vicente Rd Improvements	From Warnock Drive to Wildcat Canyon Road - in Ramona, design and reconstruct road improvements, including 2-lane community collector road with intermittent turn lanes, bike lanes, asphalt concrete dike, and pathway/walkway

Table B.15 (continued)

Revenue Constrained Scenario: Arterial Projects

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2025	CNTY39	San Diego County	Bear Valley Pkwy North	From San Pasqual Valley Road to Boyle Avenue - widen from 2 to 4 lanes, with a center median, a bike lane and shoulder in each direction of travel
2025	CNTY82	San Diego County	Alpine Blvd Streetscape Improvements	From Tavern Road to South Grade Road – in unincorporated community of Alpine, widen from 2-lane to 3-lane roadway including a median turn-lane with bicycle, parking, and pedestrian improvements
2025	CNTY83	San Diego County	SR67/Highland/Dye Intersection	From SR 67 to 1,000 feet SE of SR 67 – in Ramona, intersection widening (double left turn lanes on Dye/Highland and double through lanes with dedicated right turn lanes on SR 67), signal modification with bicycle and pedestrian improvements, and associated improvements
2025	CNTY88	San Diego County	Ashwood Street Corridor Improvements – Mapleview to Willow	Ashwood Street/Wildcat Canyon Road from Mapleview Street to 1100 feet north of Willow Road in Lakeside- traffic signal improvements at Mapleview and Ashwood; traffic signal installation at Willow and Ashwood/Wildcat Canyon; and the addition of turn lanes, addition of a passing lane in a non-urbanized area, bike lanes, and pedestrian facilities
2025	ESC02A	Escondido	East Valley/Valley Center	Widen roadway from 4 to 6 lanes with raised medians and left turn pockets; modify signal at Lake Wohlford and Valley Center Road; widen bridge over Escondido Creek
2025	ESC04	Escondido	Citracado Pkwy II	West Valley to Harmony Grove, widen from 2 to 4 lanes with raised medians; construct bridge over Escondido Creek
2025	ESC06	Escondido	El Norte Pkwy Bridge at Escondido Creek - Kaile Ln to Key Lime Way	Construct missing 2-lane bridge at Escondido Creek

Table B.15 (continued)

Revenue Constrained Scenario: Arterial Projects

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2025	ESC08	Escondido	Felicita Ave/Juniper St - from Escondido Blvd to Juniper St and from Juniper St to Chestnut St	Widen from 2 to 4 lanes with left turn pockets, raised medians on Felicita; new traffic signals at Juniper and Chestnut, Juniper, and 13th Avenue, Juniper and 15th Avenue; modify traffic signal at Juniper and Felicita
2025	ESC09	Escondido	Ninth Ave – La Terraza Blvd to Spruce St	Widen from 2 to 4 lanes with raised median and modify traffic signals at Ninth Avenue and Tulip Street - design phase
2025	ESC24	Escondido	Centre City Pkwy	Mission Road to SR 78, widen 4 lanes to 6 lanes with intersection improvements
2025	LG13	Lemon Grove	Lemon Grove Ave Realignment Project	Lemon Grove Avenue at SR 94 - a key project in the redevelopment of the city's downtown Village Specific Plan, this project will realign Lemon Grove Avenue at SR 94 adding traffic lanes and improving access to and from SR 94, reducing motorist delays and emissions
2025	NC01	National City	Plaza Blvd Widening	Plaza Boulevard from Highland Avenue to Euclid Avenue, widen from 2 to 3 lanes including a new traffic lane in each direction, new sidewalks, sidewalk widening, traffic signal upgrades, and interconnection at Plaza Boulevard
2025	O06	Oceanside	Melrose Dr Extension	Melrose Drive from North Santa Fe Avenue to Spur Avenue - in Oceanside, future construction of Melrose Drive; 4-lane arterial highway with medians, sidewalks, and bike lanes between North Santa Fe Avenue and Spur Avenue
2025	O22	Oceanside	College Blvd - Vista Way to Old Grove Rd	In Oceanside, widen from the existing 4 lanes to 6 lanes with bike lanes and raised median
2025	SD34	San Diego	El Camino Real	In San Diego on El Camino Real from San Dieguito Road to Via de la Valle, reconstruct and widen from 2 to 4 lanes and extend transition lane and additional grading to avoid biological impacts (CIP 52-479.0)
2025	SD70	San Diego	West Mission Bay Dr Bridge	In San Diego, replace bridge and increase from 4- to 6-lane bridge including Class II bike lane (52-643/S00871)

Table B.15 (continued)

Revenue Constrained Scenario: Arterial Projects

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2025	SD83	San Diego	SR 163/Friars Rd Interchange Modification	Friars Road from Avenida de las Tiendas to Mission Center Road, widen and improve Friars Road and overcrossing; reconstruct interchange including improvements to ramp intersections (Phase I). Construct new connector roadways and structures (Phase II). Construct auxiliary lanes along northbound and southbound SR 163 (Phase III).
2025	SD90	San Diego	SR 163/Clairemont Mesa Blvd Interchange	From Kearny Villa Road to Kearny Mesa - in San Diego, widen from 4- to 6-lane prime arterial; Phase II of the project - west ramps
2025	SD102A	San Diego	Otay Truck Route Widening	On Otay Truck Route in San Diego from Drucker Lane to La Media, add one lane (total 3 lanes) for trucks; from Britannia to La Media, add one lane for trucks and one lane for emergency vehicles (border patrol/fire department access); along Britannia from Britannia Court to the Otay Truck Route - add one lane for trucks
2025	SD103	San Diego	I-5/Genesee Ave Interchange	In San Diego, replace Genesee Avenue over-crossing from 4-lane bridge with 6-lane bridge; construct auxiliary lanes and replace Voigt Drive bridge; add additional lane at on/off ramp to Sorrento Valley Road; add one carpool lane and one general purpose lane to on-ramp from Sorrento Valley Road to southbound I-5; install ramp meters at on-ramp and construct a southbound auxiliary lane between Sorrento Valley Road and Genesee Avenue
2025	SD189	San Diego	Sea World Dr Widening and I-5 Interchange Improvements	In San Diego, replace existing 4-lane bridge with an 8-lane bridge with new on/off ramps; widen approachways to add right turn lanes to improve access to Interstate 5 (CIP 52-706.0)

Table B.15 (continued)

Revenue Constrained Scenario: Arterial Projects

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2025	SD190	San Diego	Palm Ave/I-805 Interchange	Improvements to the Palm Avenue Bridge over I-805; including repairs to the bridge approaches; a new Project Study Report (PSR) and Preliminary Environmental Assessment Report (PEAR). Phase II of the project will include widening of the bridge, realignment of existing ramps, possible addition of northbound looping entrance ramp, restriping of traffic lanes, and signal modifications.
2025	SM19	San Marcos	Grand Ave Bridge and Street Improvements	From Discovery Street to San Marcos Boulevard, construct 4-lane arterial bridge and a 6-lane arterial street from Craven to Grand Avenue
2025	SM22	San Marcos	South Santa Fe - Bosstick to Smilax	From Bosstick to Smilax, realign and signalize the South Santa Fe/Smilax intersection (Phase I)
2025	SM24	San Marcos	Woodland Pkwy Interchange Improvements	From La Moree Road to Rancheros Drive, modify existing ramps at Woodland Parkway and Barham Drive; widen and realign SR 78 undercrossing and associated work
2025	SM31	San Marcos	Discovery St Improvements	From Via Vera Cruz to Bent Avenue/Craven Road, widen roadway to 4-lane secondary arterial
2025	SM32	San Marcos	Via Vera Cruz Bridge and Street Improvements	From San Marcos Boulevard to Discovery Street, widen to 4-lane secondary arterial and construct a bridge at San Marcos Creek
2025	SM42	San Marcos	Street Improvements: Discovery St - Craven Rd to West of Twin Oaks Valley Rd	In the City of San Marcos, on Discovery Street from Craven Road to west of Twin Oaks Valley Road, construct approximately 5,100 lineal feet of a new 6-lane roadway
2025	SM43	San Marcos	Street Improvements and Widening on Barham Dr	Twin Oaks Valley Road to La Moree Road in the City of San Marcos, on Barham Drive between Twin Oaks Valley Road and La Moree Road, widen and reconstruct the north side of Barham Drive to a 6-lane prime arterial and associated work

Table B.15 (continued)

Revenue Constrained Scenario: Arterial Projects

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2025	SM48	San Marcos	Creekside Dr	Construct approximately 3,000 feet of a 2-lane collector road from Via Vera Cruz to Grand Avenue in the City of San Marcos. The road will include two 12-foot lanes, diagonal parking on the north side, and parallel parking on the south side. In addition, the project also will include a 10-foot bike trail meandering along the south side.
2025	SM55	San Marcos	Borden Rd Widening and Improvements	Borden Road from Vineyard to Richland, widening of Borden Road will add an additional roadway capacity to accommodate increase in traffic volumes
2035	SD81	San Diego	Genesee Ave - Nobel Dr to SR 52	In San Diego, future widening to 6-lane major street north of Decoro Street and to a 6-lane primary arterial south of Decoro Street and included Class II bicycle lanes (CIP 52-458.0)
2035	SD190	San Diego	Palm Avenue/Interstate I-805 Interchange	Phase III will provide the ultimate build-out of the project which will incorporate improvements of Phase II plus the northbound and southbound entrance ramps (CIP 52-640.0)
2035	SM10	San Marcos	SR 78/Smilax	Construct new interchange at Smilax Road interchange and SR 78 improvements

* The arterials listed in this table reflect locally initiated projects that were submitted by local jurisdictions in the 2014 Regional Transportation Improvement Program.

Endnotes

1 One small portion of tribal land (approximately 119 acres) of the Pechanga Band of Luiseño Indians purchased within the north portion of San Diego County was excluded from the San Diego region 2008 Eight-Hour Ozone Standard non-attainment designation. All other tribal lands within San Diego County were included in the designation.

2 Appendix T: SANDAG Travel Demand Model and Forecasting Documentation includes additional detail regarding the overall model structure.

3 Full-time employment is defined in the SANDAG 2006 household survey as at least 30 hours/week. Part-time is less than 30 hours/week on a regular basis.

4 GP: general purpose lanes of a freeway.

Appendix C

Sustainable Communities Strategy Documentation and Related Information

Appendix Contents

SB 375 Greenhouse Gas Reduction Targets set by the California Air Resources Board and Results of Greenhouse Gas Emissions Reductions
Housing Goals, Capacity, and Proximity to Transit
SANDAG Sustainable Communities Strategy Documentation
Figures Supporting the Sustainable Communities Strategy

Attachments:

1. Correspondence on Technical Methodology to Estimate Greenhouse Gas Emissions
2. SANDAG Off-Model Greenhouse Gas Reduction Methodology

Sustainable Communities Strategy Documentation and Related Information

This appendix includes documentation in support of the Sustainable Communities Strategy (SCS) pursuant to Senate Bill 375 (Steinberg, 2008) (SB 375). This appendix includes a matrix that outlines the requirements in SB 375 and where the Regional Plan addresses the requirements, either in specific chapters of the Regional Plan or in specified appendices (Table C.4). The resource mapping prepared by SANDAG is based on the best practically available scientific information regarding resource areas and farmland. The source data includes: (1) 1995 data for the eastern two-thirds of the County, which cover the entire region and use the Holland classification system (Holland 1996; Oberbauer et al., 2008); (2) 2012 data which cover much of the western one-third of the region and use a classification system of groups, alliances, and associations based on the National Vegetation Classification Standard and the California Manual of Vegetation (Sproul et al., 2011; Sawyer et al., 2009); and (3) Department of Conservation Farmland Mapping and Monitoring Program data, 2010.

This appendix includes the following figures to support the SCS:

- Figure C.1: Housing Near High Frequency Transit
- Figure C.2: 2020 Land Use[1]
- Figure C.3: 2035 Land Use[2]
- Figure C.4: San Diego Region Wetlands
- Figure C.5: San Diego Region Important Agricultural Lands
- Figure C.6: San Diego Regional Habitat Preserved Lands
- Figure C.7: San Diego Region Generalized Vegetation
- Figure C.8: Potential Aggregate Supply Sites
- Figure C.9: 2020 Employment and Housing Density
- Figure C.10: 2035 Employment and Housing Density
- Figure C.11: 2035 Potential Transit Priority Project Areas

Appendix C also contains links to two SANDAG Board of Directors reports that support the development of the transportation network selected for San Diego Forward: The Regional Plan:

- August 15, 2014 – Draft Revenue Constrained Transportation Scenarios[3]
- September 12, 2014 – Preferred Revenue Constrained Transportation Scenario[4]

The Technical Methodology to estimate greenhouse gas emissions submitted to the California Air Resources Board (ARB) on June 7, 2013, as well as ARB's acknowledgment of receiving this methodology also are included in Appendix C, Attachment 1.

- June 7, 2013 – Correspondence from SANDAG to ARB regarding Technical Methodology to estimate greenhouse gas emissions from the San Diego Association of Governments Sustainable Communities Strategy.
- August 12, 2013 – Correspondence from ARB to SANDAG regarding Technical Methodology to estimate greenhouse gas emissions.

SB 375 Greenhouse Gas Reduction Targets set by the California Air Resources Board and Results of Greenhouse Gas Emissions Reductions

The path toward living more sustainably is clear: focus housing and job growth in urbanized areas where there is existing and planned transportation infrastructure, protect sensitive habitat and open space, invest in a transportation network that provides people with transportation options that reduce greenhouse gas emissions, and implement the plan through incentives and collaboration.

As part of its mandate under SB 375, in 2010 the California Air Resources Board (ARB) set specific targets for reducing greenhouse gas emissions for cars and light trucks for each of the state's regions from a 2005 base year. The greenhouse gas targets set for the San Diego region call for a 7 percent per capita reduction by 2020, and a 13 percent per capita reduction by 2035. The SCS will result in a 15 percent reduction in emissions by 2020, and a 21 percent reduction by 2035 – far more than what the state mandates require – as shown in Table C.1. The greenhouse gas reductions for the final Regional Plan were calculated using the ARB model EMFAC 2014 v. 1.0.7 and adjustment factors provided by ARB to account for differences in emission rates between EMFAC 2007 (used to set the targets) and this latest version of the emissions model (EMFAC 2014 v.1.0.7). The per capita greenhouse gas reductions for 2020 and 2035 have changed from the draft Regional Plan to the final Regional Plan by 3 percentage points. The ARB adjustment factor for SANDAG reduces the per capita results for both 2020 and 2035 by 2 percentage points. For example, before the ARB adjustment, per capita reductions for 2020 were 17 percent, and after applying the adjustment, the reductions become 15 percent. The additional 1 percentage point difference for 2020 and 2035 is due to final travel demand model runs, which also use EMFAC 2014 v.1.0.7 to estimate greenhouse gas emissions. Attachment 2 describes the off-model greenhouse gas reduction methodology that supplements the SANDAG Activity Based Model calculations as well as the ARB adjustment referenced above.

Table C.1
SB 375 Greenhouse Gas Reduction Targets and Regional Plan Greenhouse Gas Emissions Reductions Results

	2020	2035
ARB Targets	7 percent	13 percent
Greenhouse Gas Emissions Reductions	15 percent	21 percent

Note: Average weekday per capita carbon dioxide reductions for cars and light trucks from 2005.

Source: ARB and SANDAG

Breakdown of the Regional Plan's SCS Components that Contribute to SB 375 Per Capita Greenhouse Gas Reductions

Several components and strategies contribute toward SB 375 per capita greenhouse gas reductions from passenger vehicles. Approximately half of the reductions would result from the Regional Plan's investments in transit projects and their operations, managed lanes, active transportation projects, and TDM measures that support teleworking (i.e., working from home or telecommuting). About one-quarter of the reductions are estimated from changing land use and population characteristics, while another quarter are projected from increases in the cost of driving (auto operating costs).

Housing Goals

Figure C.1 and Table C.2 show that the number of homes located within one half-mile of high frequency public transit services will increase from 35 percent in 2012 to 63 percent in 2050 (for population this increase is 35 percent to 61 percent). This increase is due to new transit services, detailed in Appendix A: Transportation Projects, Costs, and Phasing, and to growth being primarily concentrated in the urbanized areas.

Figure C.1

Housing Near High Frequency Public Transit

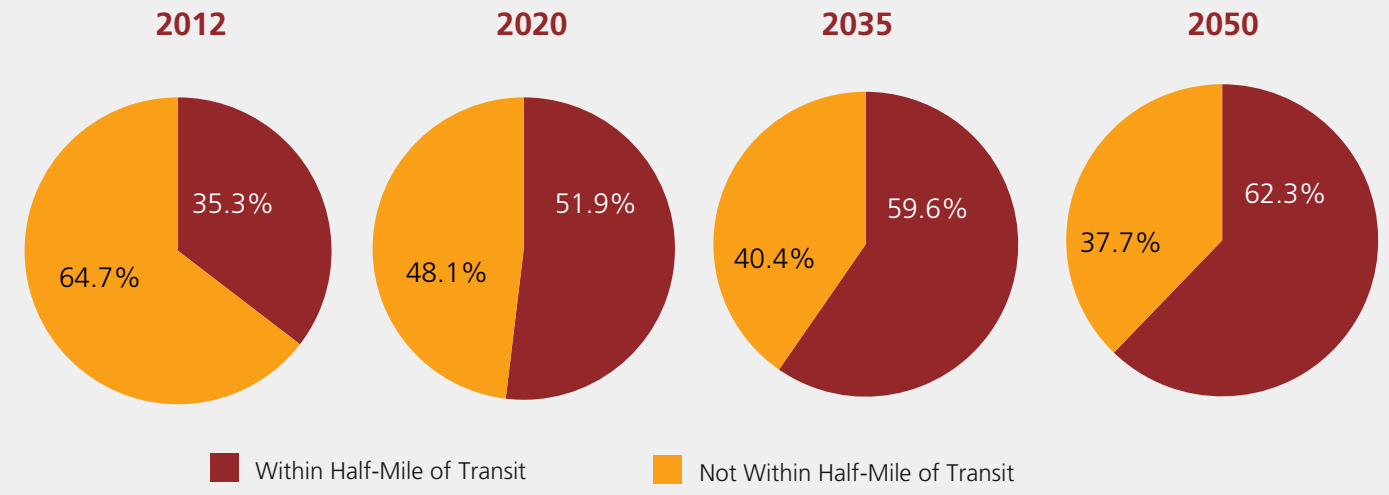


Table C.2

Housing Near High Frequency Public Transit

	2012		2020		2035		2050	
	Numeric	Percent	Numeric	Percent	Numeric	Percent	Numeric	Percent
Within Half Mile of Transit	412,050	35.3%	648,622	51.9%	831,837	59.6%	929,785	62.3%
Not Within Half Mile of Transit	753,768	64.7%	601,062	48.1%	562,946	40.4%	562,150	37.7%
Total	1,165,818	100.0%	1,249,684	100.0%	394,783	100.0%	1,491,935	100.0%

Table C.3 shows that the projected increase in new housing capacity is generally higher for areas with densities above 20 dwelling units per acre. The increases reflect extensive work by local jurisdictions to update general and specific plans to accommodate future growth and development in the urbanized areas of the region where existing and planned public transit is located.

Table C.3

Series 13 Regional Growth Forecast Estimated Housing Capacity by Jurisdiction and Subregion

	Dwelling Units Per Acre				
	0 to 10	10 to 20	20 to 30	30+	Total
City of San Diego	46,446	11,328	49,508	84,747	192,029
Unincorporated	40,625	11,330	4,621	5,794	62,370
North County Coastal	7,526	2,734	1,654	3,140	15,054
Carlsbad	4,106	1,507	-	-	5,613
Del Mar	(28)*	44	-	-	16
Encinitas	1,204	764	741	-	2,709
Oceanside	2,170	398	403	3,140	6,111
Solana Beach	74	21	510	-	605
North County Inland	16,484	1,635	1,077	12,622	31,818
Escondido	6,194	745	133	3,923	10,995
Poway	900	17	35	452	1,404
San Marcos	8,468	(112)*	187	395	8,938
Vista	922	985	722	7,852	10,481
East County	3,014	1,555	1,457	19,702	25,728
El Cajon	(283)*	763	566	10,633	11,679
La Mesa	759	188	215	7,055	8,217
Lemon Grove	201	168	180	1,372	1,921
Santee	2,337	436	496	642	3,911
South Bay	21,166	597	2,856	43,424	68,043
Chula Vista	20,356	441	1,561	10,070	32,428
Coronado	61	2	94	24	181
Imperial Beach	6	62	341	1,431	1,840
National City	743	92	860	31,899	33,594
Total	135,261	29,179	61,173	169,429	395,042

* Negative capacity is a result of redevelopment to either a different density range or to commercial land.

Table C.4

SANDAG Sustainable Communities Strategy Documentation

Subject Area		Addressed
SCS Requirement	**CGC Section 65080(b)(2)(B)** Each metropolitan planning organization shall prepare a sustainable communities strategy subject to the requirements of Part 450 of Title 23 of and Part 93 of Title 40 of the Code of Federal Regulations, including the requirement to utilize the most recent planning assumptions considering local general plans and other factors. The sustainable communities strategy shall:	See Regional Plan Chapters 2 and 5. Also see Appendices C (SCS Documentation and Related Information), J (Regional Growth Forecast), L (Regional Housing Needs Assessment Plan), and S (Monitoring Performance)
Land Use	**CGC Section 65080(b)(2)(B)(i)** identify the general location of uses, residential densities, and building intensities within the region;	See Regional Plan Chapter 2 and Appendices C (SCS Documentation and Related Information Figures C-2 and C-3), and J (Regional Growth Forecast)
Housing Goals	**CGC Section 65080(b)(2)(B)(vi)** consider the state housing goals specified in Sections 65580 and 65581;	See Regional Plan Chapter 2 and Appendices C (SCS Documentation and Related Information), L (Regional Housing Needs Assessment Plan), and U.13 (Housing: Providing Homes for all Residents)

Table C.4 (continued)
SANDAG Sustainable Communities Strategy Documentation

Subject Area		Addressed
	CGC Section 65080(b)(2)(B)(ii) identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth;	See Regional Plan Chapter 2 and Appendices J (Regional Growth Forecast), L (Regional Housing Needs Assessment Plan), and U.13 (Housing: Providing Homes for all Residents)
	CGC Section 65080(b)(2)(B)(iii) identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Section 65584;	See Regional Plan Chapter 2 and Appendices L (Regional Housing Needs Assessment Plan), and U.13 (Housing: Providing Homes for all Residents)
Natural Resources	**CGC Section 65080(b)(2)(B)(v)** gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (a) and (b) of Section 65080.01;	See Regional Plan Chapter 2 and Appendix C figures titled: • Figure C.4 San Diego Region Wetlands • Figure C.5 San Diego Region Important Agricultural Lands • Figure C.6 San Diego Region Habitat Conservation Lands • Figure C.7 San Diego Region Generalized Vegetation

Table C.4 (continued)

SANDAG Sustainable Communities Strategy Documentation

Subject Area		Addressed
Transportation Network	**CGC Section 65080(b)(2)(B)(iv)** identify a transportation network to service the transportation needs of the region;	See Regional Plan Chapter 2 and Appendix A (Transportation Projects, Costs, and Phasing)
Meeting Greenhouse Gas Reduction Targets	**CGC Section 65080(b)(2)(B)(vii)** set forth a forecasted development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board;	See Regional Plan Chapter 2 and Appendices C (SCS Documentation and Related Information), J (Regional Growth Forecast), and T (SANDAG Travel Demand Model and Forecasting Documentation)
Meeting Federal Air Quality Requirements	**CGC Section 65080(b)(2)(B)(viii)** allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act (42 U.S.C. §7506).	See Appendix B (Air Quality Planning and Transportation Conformity), Appendix J (Regional Growth Forecast), Appendix T (SANDAG Travel Demand Model and Forecasting Documentation)
Informational Meetings	**CGC Section 65080(b)(2)(E)** The metropolitan planning organization shall conduct at least two informational meetings in each county within the region for members of the board of supervisors and city councils on the sustainable communities strategy and alternative planning strategy, if any. Only one informational meeting is needed in each county if it is attended by representatives of the county board of supervisors and city councils that represent a majority of the cities representing a majority of the population in the incorporated areas of that county.	See Regional Plan Chapter 2 and Appendix F (Public Involvement Program)

Table C.4 (continued)

SANDAG Sustainable Communities Strategy Documentation

Subject Area		Addressed
Public Participation Plan	**CGC Section 65080(b)(2)(F)** Each metropolitan planning organization shall adopt a public participation plan, for development of the sustainable communities strategy and an alternative planning strategy, if any, that includes all of the following:	See Regional Plan Chapter 2 and Appendix F (Public Involvement Program)
Public Participation Plan – outreach	**CGC Section 65080(b)(2)(F)(i)** Outreach efforts to encourage the active participation of a broad range of stakeholder groups in the planning process, consistent with the agency's adopted Federal Public Participation Plan, including, but not limited to, affordable housing advocates, transportation advocates, neighborhood and community groups, environmental advocates, home builder representatives, broad-based business organizations, landowners, commercial property interests, and homeowner associations.	See Appendix F (Public Involvement Program)
Public Participation Plan – consultation	**CGC Section 65080(b)(2)(F)(ii)** Consultation with congestion management agencies, transportation agencies, and transportation commissions.	See Appendix F (Public Involvement Program)
Public Participation Plan - workshops	**CGC Section 65080(b)(2)(F)(iii)** Three workshops throughout the region to provide the public with the information and tools necessary to provide a clear understanding of the issues and policy choices. Each workshop, to the extent practicable, shall include urban simulation computer modeling to create visual representations of the SCS and the alternative planning strategy.	See Appendix F (Public Involvement Program)
Public Participation Plan – SCS public review	**CGC Section 65080(b)(2)(F)(iv)** Preparation and circulation of a draft SCS and an alternative planning strategy, if one is prepared, not less than 55 days before adoption of a final regional transportation plan.	See Appendix F (Public Involvement Program)

Table C.4 (continued)

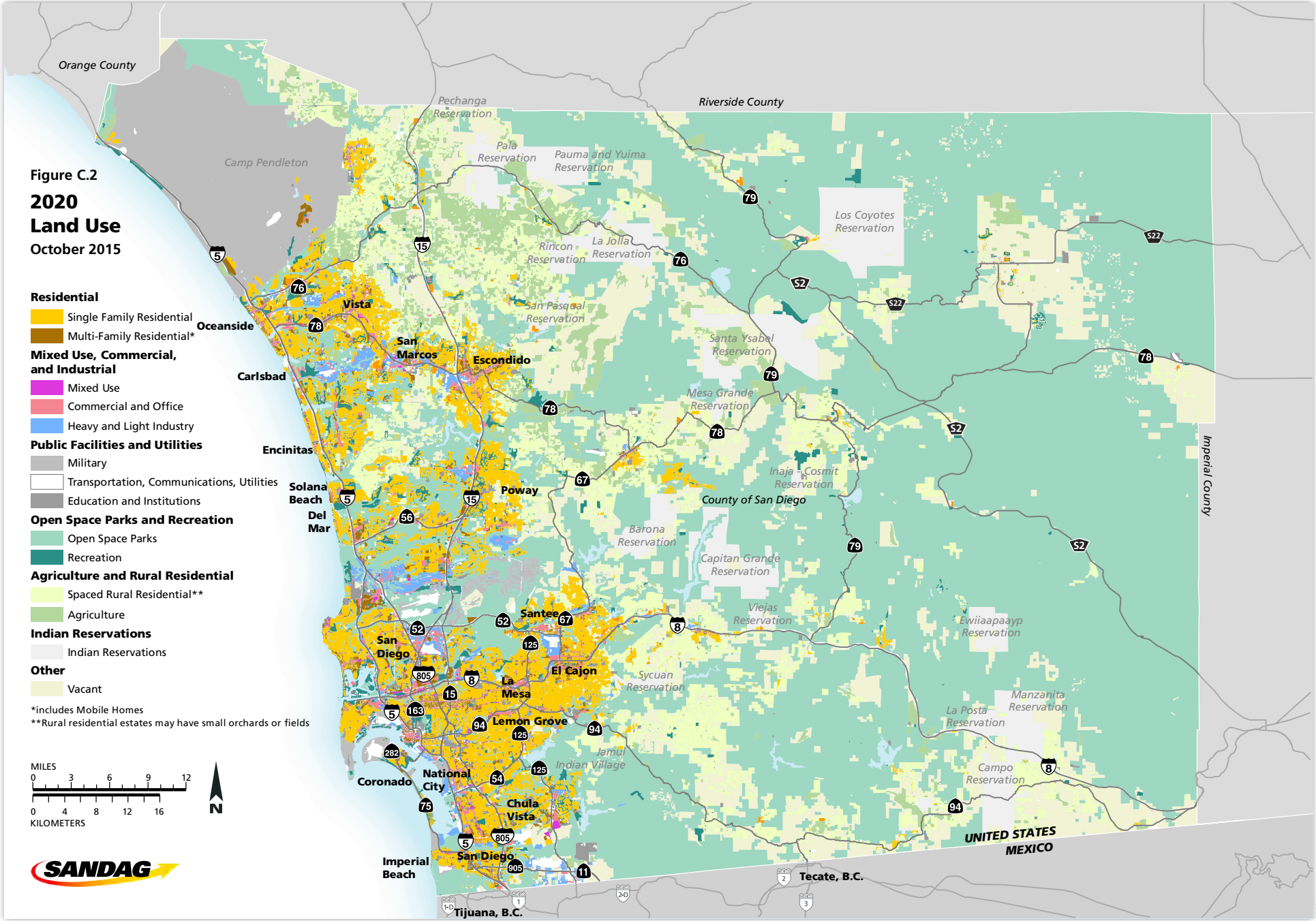
SANDAG Sustainable Communities Strategy Documentation

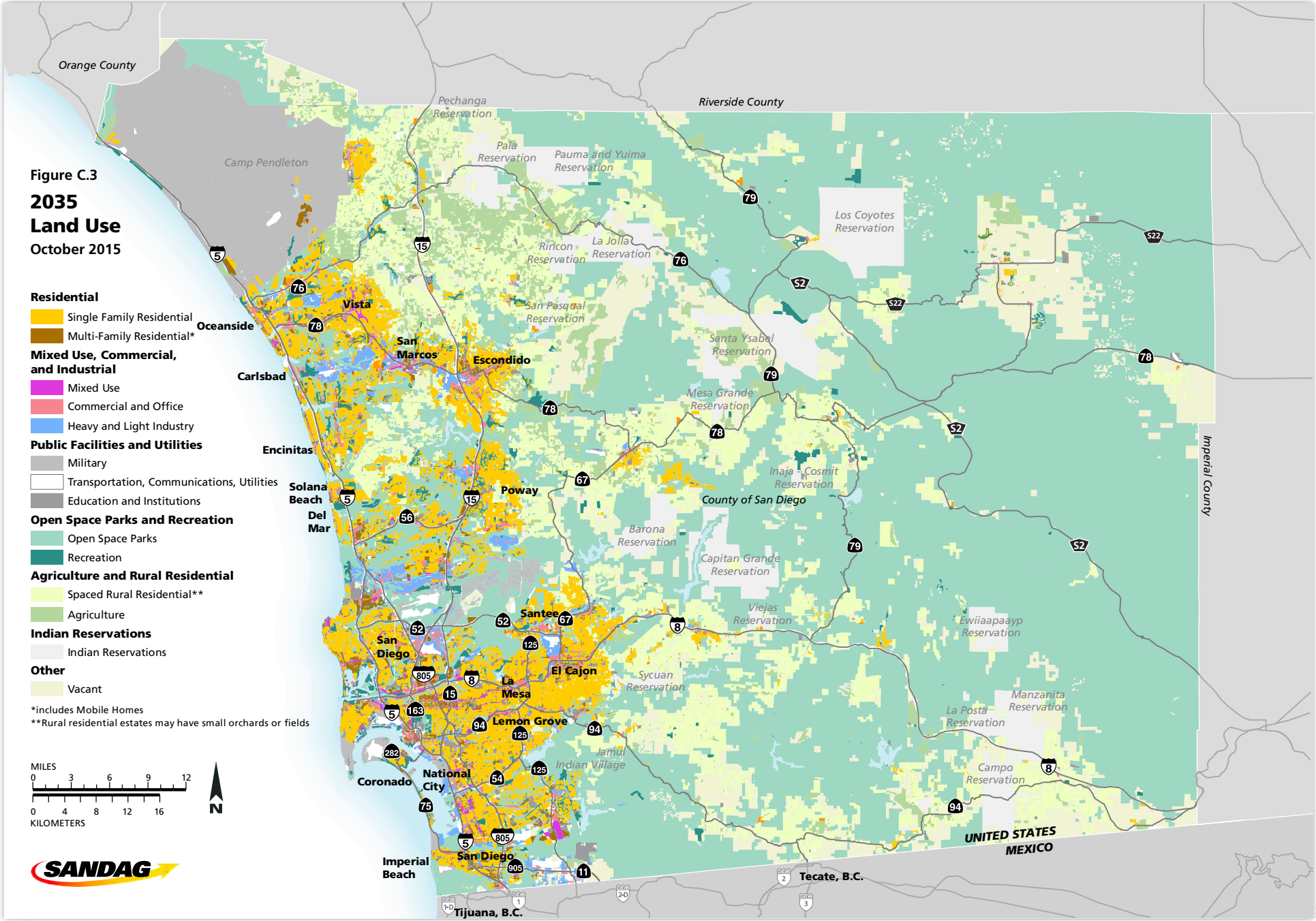
Subject Area		Addressed
Public Participation Plan – public hearings	**CGC Section 65080(b)(2)(F)(v)** At least three public hearings on the draft sustainable communities strategy in the regional transportation plan and alternative planning strategy, if one is prepared. If the metropolitan transportation organization consists of a single county, at least two public hearings shall be held. To the maximum extent feasible, the hearings shall be in different parts of the region to maximize the opportunity for participation by members of the public throughout the region.	See Appendix F (Public Involvement Program)
Public Participation Plan – public notice	**CGC Section 65080(b)(2)(F)(vi)** A process for enabling members of the public to provide a single request to receive notices, information, and updates.	See Appendix F (Public Involvement Program)
Consultation with Local Agency Formation Commission	**CGC Section 65080(b)(2)(G)** In preparing a sustainable communities strategy, the metropolitan planning organization shall consider spheres of influence that have been adopted by the local agency formation commissions within its region.	See Regional Plan Chapter 2 and Appendix I (Consultation with the Local Agency Formation Commission)
ARB Greenhouse Gas Reduction Targets for San Diego Region	**CGC Section 65080(b)(2)(H)** Prior to adopting a sustainable communities strategy, the metropolitan planning organization shall quantify the reduction in greenhouse gas emissions projected to be achieved by the sustainable communities strategy and set forth the difference, if any, between the amount of that reduction and the target for the region established by the state board.	See Regional Plan Chapter 2 and Appendix C (SCS Documentation and Related Information, Table C.1)

Table C.4 (continued)

SANDAG Sustainable Communities Strategy Documentation

Subject Area		Addressed
Consideration of Financial Incentives for Cities and Counties with Resource Areas or Farmlands	**CGC Section 65080(b)(4)(C)** The metropolitan planning organization or county transportation agency, whichever entity is appropriate, shall consider financial incentives for cities and counties that have resource areas or farmland, as defined in Section 65080.01, for the purposes of, for example, transportation investments for the preservation and safety of the city street or county road system and farm-to-market and interconnectivity transportation needs. The metropolitan planning organization or county transportation agency, whichever entity is appropriate, shall also consider financial assistance for counties to address countywide service responsibilities in counties that contribute towards the greenhouse gas emission reduction targets by implementing policies for growth to occur within their cities.	See Regional Plan Chapter 2 and Chapter 5


Figure C.2
2020
Land Use
October 2015
Residential
Single Family Residential
Multi-Family Residential*
Mixed Use, Commercial, and Industrial
Mixed Use
Commercial and Office
Heavy and Light Industry
Public Facilities and Utilities
Military
Transportation, Communications, Utilities
Education and Institutions
Open Space Parks and Recreation
Open Space Parks
Recreation
Agriculture and Rural Residential
Spaced Rural Residential**
Agriculture
Indian Reservations
Indian Reservations
Other
Vacant
*includes Mobile Homes
**Rural residential estates may have small orchards or fields
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG
Orange County
Riverside County
Imperial County
Camp Pendleton
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
La Jolla Reservation
Los Coyotes Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
County of San Diego
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
Manzanita Reservation
La Posta Reservation
Jamul Indian Village
Campo Reservation
Oceanside
Vista
San Marcos
Escondido
Carlsbad
Encinitas
Solana Beach
Del Mar
Poway
Santee
El Cajon
La Mesa
Lemon Grove
National City
Chula Vista
Coronado
Imperial Beach
San Diego
Tijuana, B.C.
Tecate, B.C.
UNITED STATES
MEXICO
2859


Figure C.3
2035
Land Use
October 2015
Residential
Single Family Residential
Multi-Family Residential*
Mixed Use, Commercial, and Industrial
Mixed Use
Commercial and Office
Heavy and Light Industry
Public Facilities and Utilities
Military
Transportation, Communications, Utilities
Education and Institutions
Open Space Parks and Recreation
Open Space Parks
Recreation
Agriculture and Rural Residential
Spaced Rural Residential**
Agriculture
Indian Reservations
Indian Reservations
Other
Vacant
*includes Mobile Homes
**Rural residential estates may have small orchards or fields
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG
Orange County
Riverside County
Imperial County
Camp Pendleton
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
La Jolla Reservation
Los Coyotes Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
Manzanita Reservation
La Posta Reservation
Campo Reservation
Jamul Indian Village
County of San Diego
Oceanside
Vista
Carlsbad
San Marcos
Escondido
Encinitas
Solana Beach
Del Mar
Poway
Santee
El Cajon
La Mesa
Lemon Grove
National City
Coronado
Imperial Beach
San Diego
Tijuana, B.C.
Tecate, B.C.
UNITED STATES
MEXICO

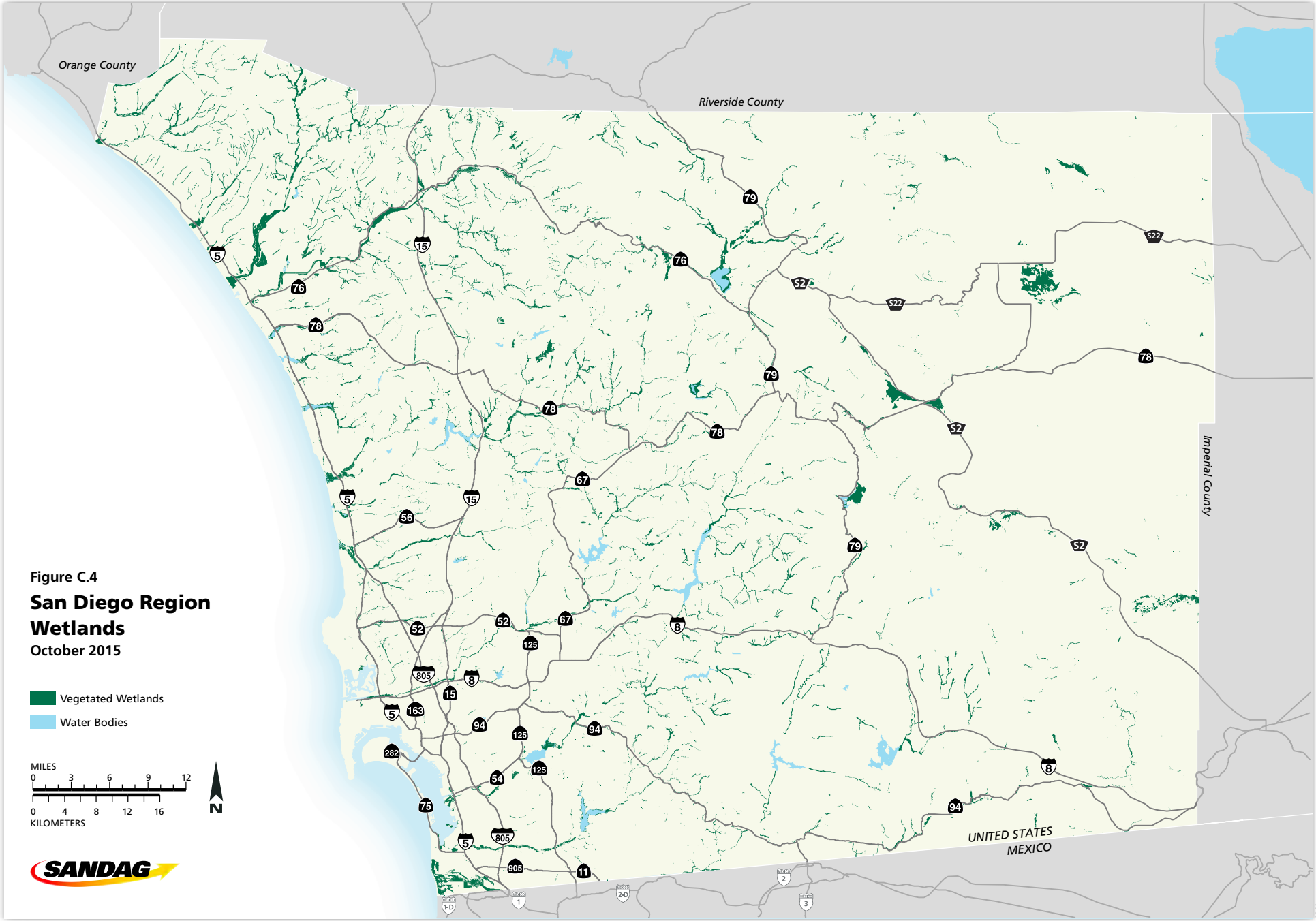
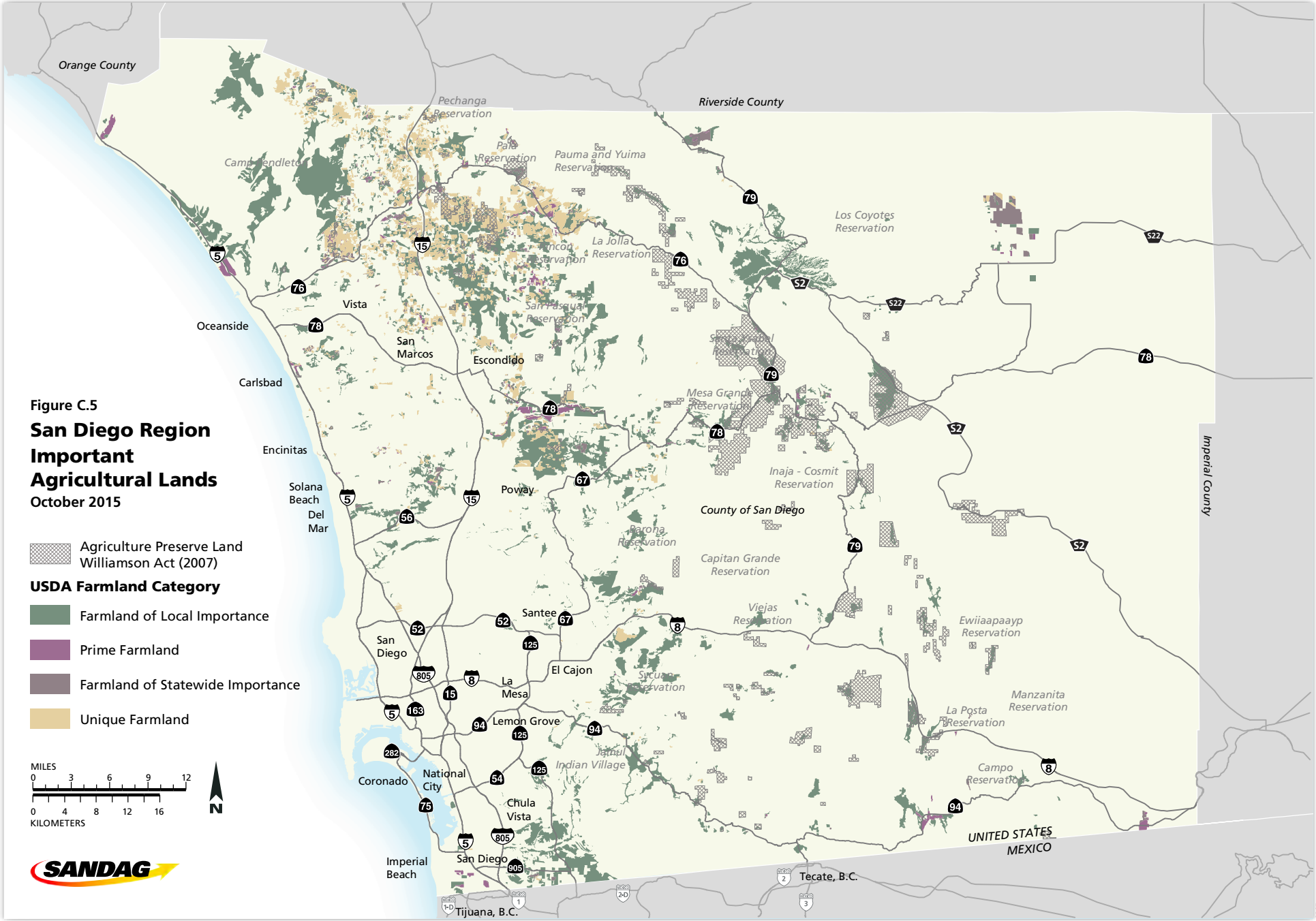
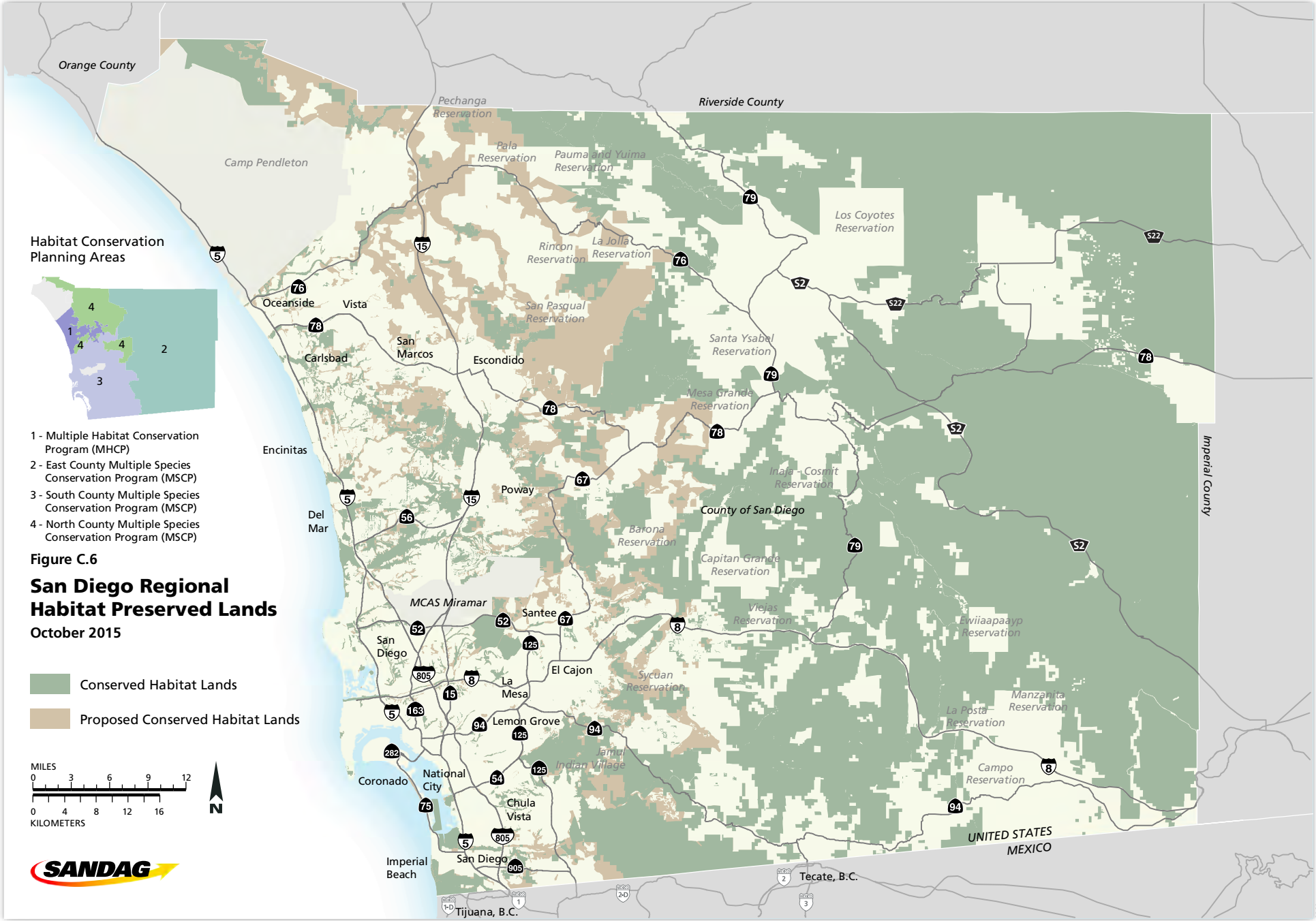


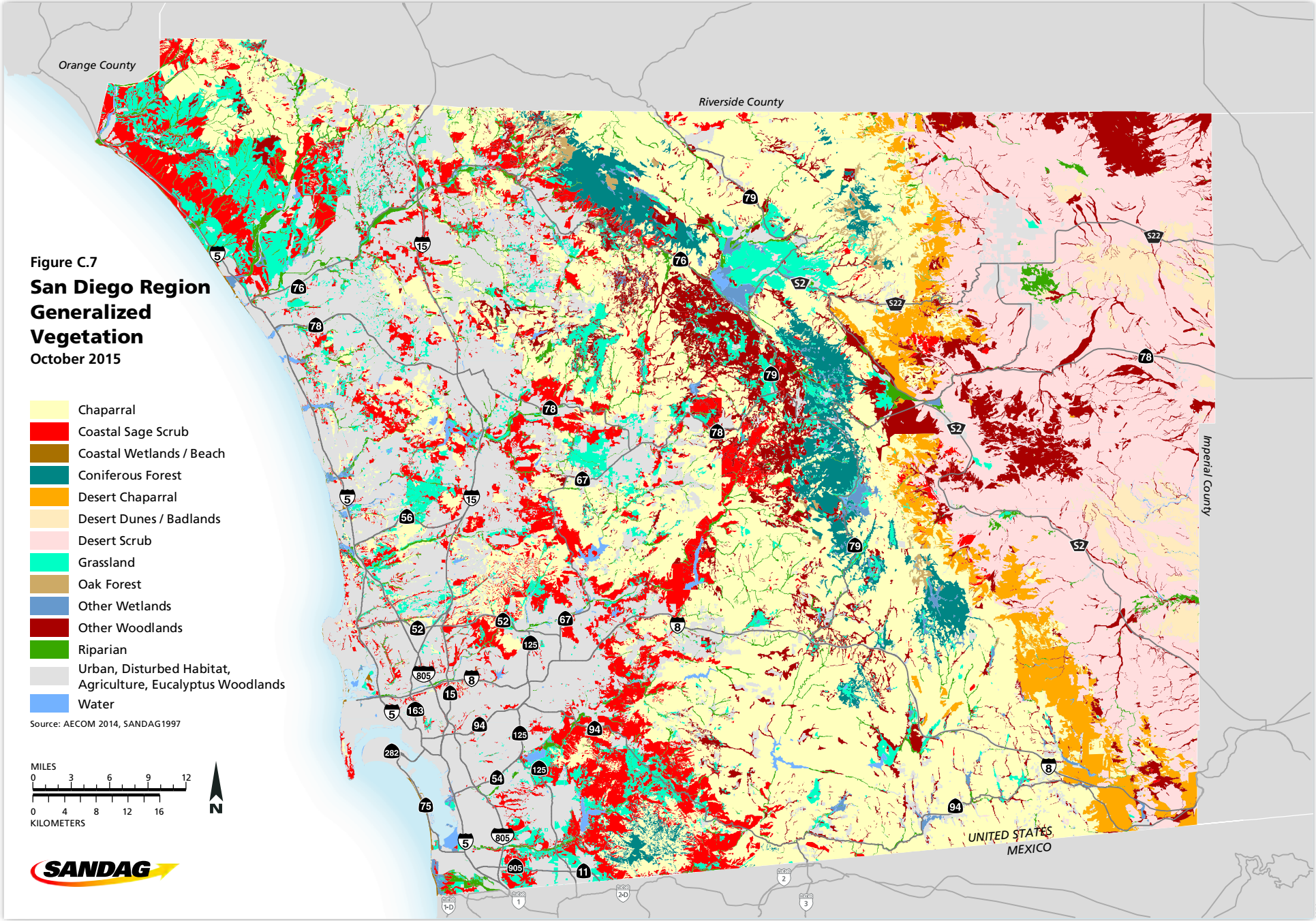
Figure C.4

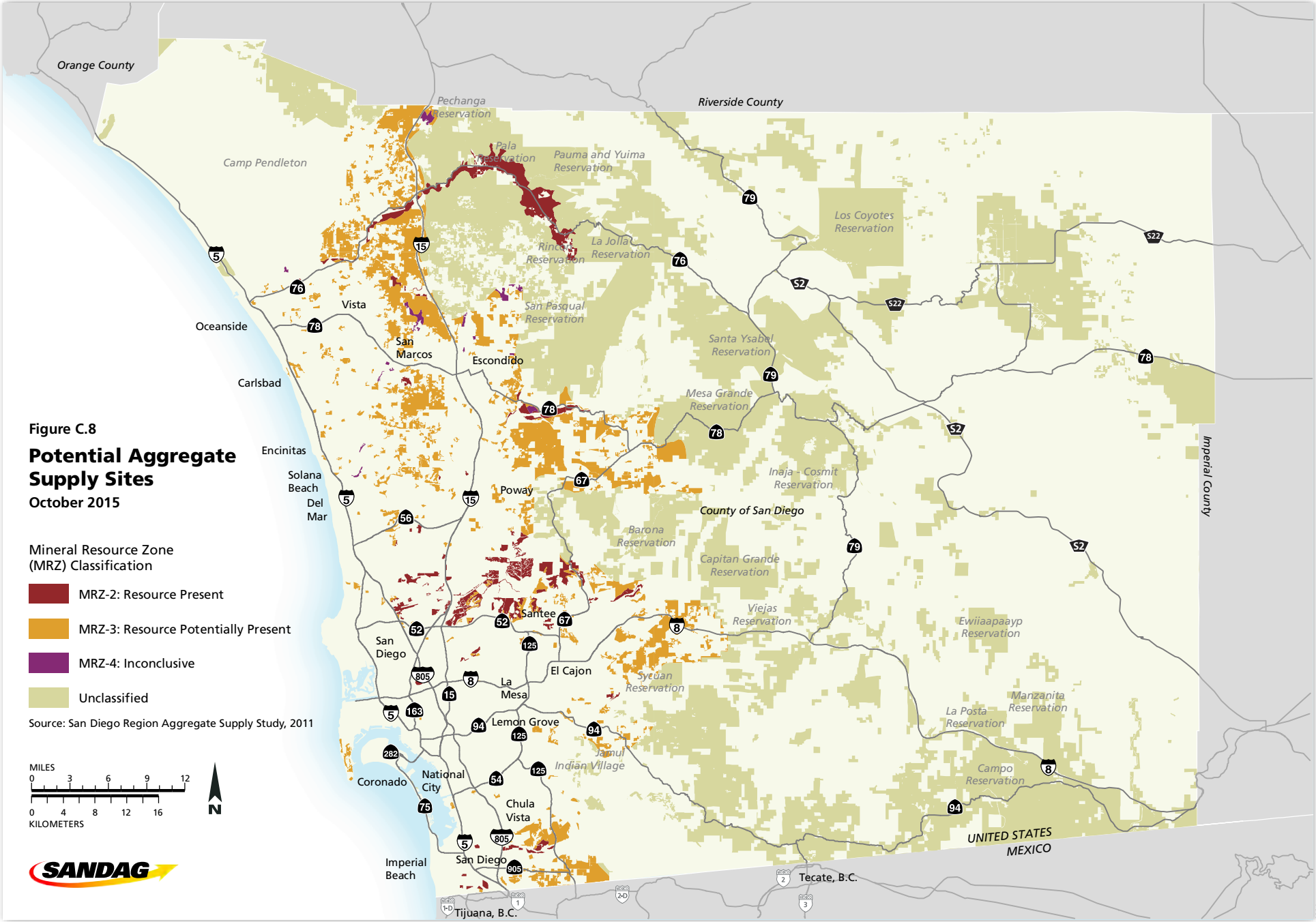
San Diego Region Wetlands

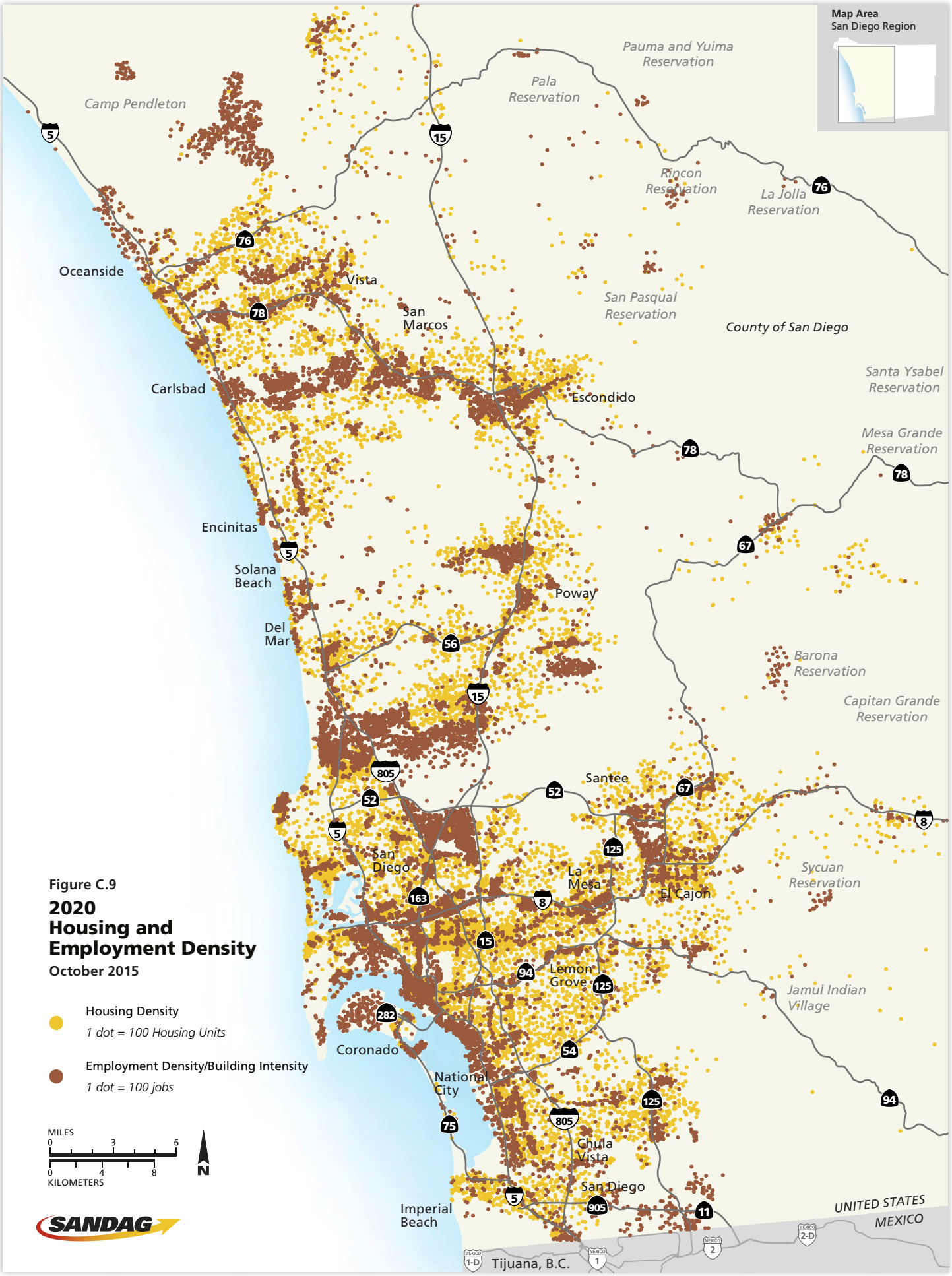
October 2015

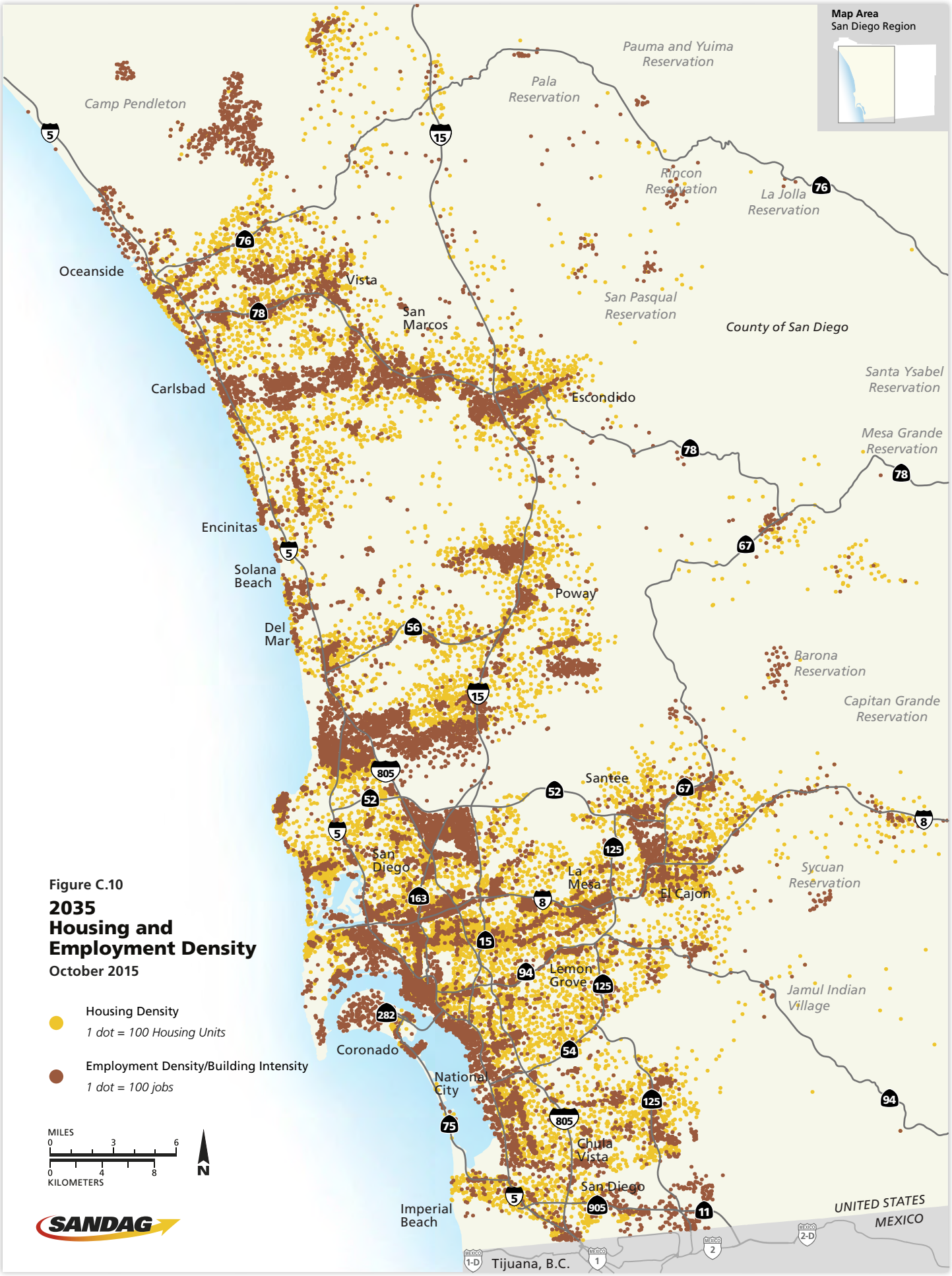

Figure C.5
San Diego Region Important Agricultural Lands
October 2015
Agriculture Preserve Land Williamson Act (2007)
USDA Farmland Category
Farmland of Local Importance
Prime Farmland
Farmland of Statewide Importance
Unique Farmland
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG
Orange County
Riverside County
Imperial County
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Los Coyotes Reservation
La Jolla Reservation
San Pasqual Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
County of San Diego
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
La Posta Reservation
Manzanita Reservation
Campo Reservation
Jamul Indian Village
Oceanside
Vista
San Marcos
Escondido
Carlsbad
Encinitas
Solana Beach
Del Mar
Poway
Santee
El Cajon
La Mesa
Lemon Grove
National City
Chula Vista
Coronado
Imperial Beach
San Diego
UNITED STATES
MEXICO
Tecate, B.C.
Tijuana, B.C.


Habitat Conservation Planning Areas
1 - Multiple Habitat Conservation Program (MHCP)
2 - East County Multiple Species Conservation Program (MSCP)
3 - South County Multiple Species Conservation Program (MSCP)
4 - North County Multiple Species Conservation Program (MSCP)
Figure C.6
San Diego Regional Habitat Preserved Lands
October 2015
Conserved Habitat Lands
Proposed Conserved Habitat Lands
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG
Orange County
Riverside County
Imperial County
County of San Diego
UNITED STATES
MEXICO
Camp Pendleton
MCAS Miramar
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
La Jolla Reservation
Los Coyotes Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
Barona Reservation
Capitan Grande Reservation
Viejas Reservation
Ewiiaapaayp Reservation
Sycuan Reservation
La Posta Reservation
Manzanita Reservation
Campo Reservation
Jamul Indian Village
Oceanside
Vista
Carlsbad
San Marcos
Escondido
Encinitas
Poway
Del Mar
Santee
El Cajon
La Mesa
Lemon Grove
National City
Chula Vista
Coronado
Imperial Beach
San Diego
Tijuana, B.C.
Tecate, B.C.


Orange County
Riverside County
Imperial County
UNITED STATES
MEXICO
Figure C.7
San Diego Region Generalized Vegetation
October 2015
Chaparral
Coastal Sage Scrub
Coastal Wetlands / Beach
Coniferous Forest
Desert Chaparral
Desert Dunes / Badlands
Desert Scrub
Grassland
Oak Forest
Other Wetlands
Other Woodlands
Riparian
Urban, Disturbed Habitat, Agriculture, Eucalyptus Woodlands
Water
Source: AECOM 2014, SANDAG1997
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG


Figure C.8
Potential Aggregate Supply Sites
October 2015
Mineral Resource Zone (MRZ) Classification
MRZ-2: Resource Present
MRZ-3: Resource Potentially Present
MRZ-4: Inconclusive
Unclassified
Source: San Diego Region Aggregate Supply Study, 2011
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG
Orange County
Riverside County
Imperial County
Camp Pendleton
Pechanga Reservation
Pala Reservation
Pauma and Yuima Reservation
Los Coyotes Reservation
La Jolla Reservation
Rincon Reservation
San Pasqual Reservation
Santa Ysabel Reservation
Mesa Grande Reservation
Inaja - Cosmit Reservation
County of San Diego
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Jamul Indian Village
Oceanside
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San Marcos
Escondido
Carlsbad
Encinitas
Solana Beach
Del Mar
Poway
Santee
El Cajon
La Mesa
Lemon Grove
San Diego
Coronado
National City
Chula Vista
Imperial Beach
Tijuana, B.C.
Tecate, B.C.
UNITED STATES
MEXICO
2994


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
Santa Ysabel Reservation
Mesa Grande Reservation
Encinitas
Solana Beach
Poway
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Barona Reservation
Capitan Grande Reservation
Santee
Sycuan Reservation
San Diego
La Mesa
El Cajon
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
Imperial Beach
San Diego
UNITED STATES
MEXICO
Tijuana, B.C.
Figure C.9
2020
Housing and
Employment Density
October 2015
Housing Density
1 dot = 100 Housing Units
Employment Density/Building Intensity
1 dot = 100 jobs
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG


Map Area
San Diego Region
Pauma and Yuima Reservation
Pala Reservation
Camp Pendleton
Rincon Reservation
La Jolla Reservation
Oceanside
Vista
San Marcos
San Pasqual Reservation
County of San Diego
Carlsbad
Escondido
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Sycuan Reservation
San Diego
La Mesa
El Cajon
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
Imperial Beach
Tijuana, B.C.
UNITED STATES
MEXICO
Figure C.10
2035
Housing and
Employment Density
October 2015
Housing Density
1 dot = 100 Housing Units
Employment Density/Building Intensity
1 dot = 100 jobs
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

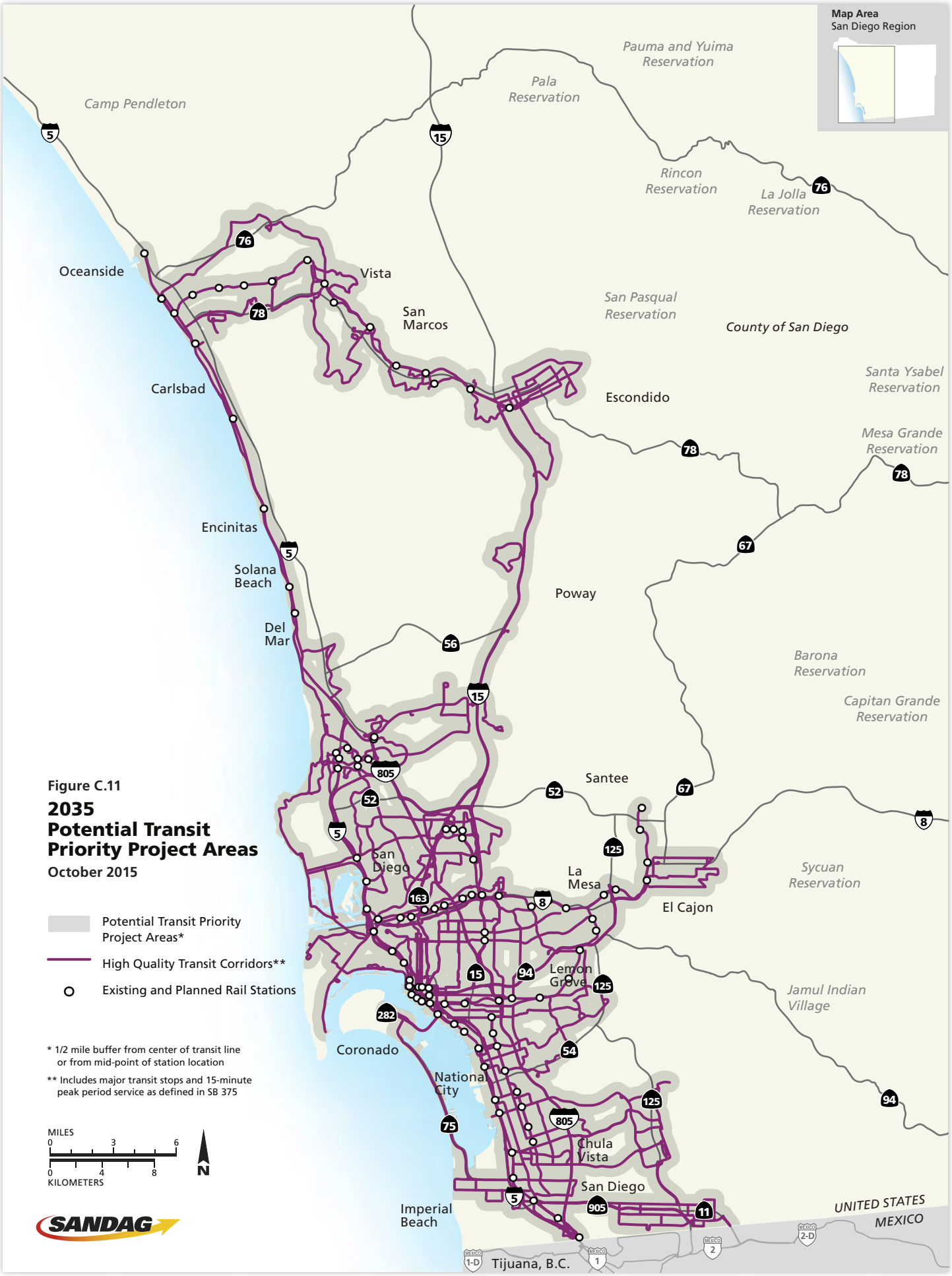


Figure C.11

2035 Potential Transit Priority Project Areas

October 2015

Endnotes

[1] Consistent with SB 375, this map identifies the general location of uses, residential densities, and building intensities in 2020. (Government Code Section 65080(b)(2)(B)(i)).

[2] Consistent with SB 375, this map identifies the general location of uses, residential densities, and building intensities in 2035. (Government Code Section 65080(b)(2)(B)(i)).

[3] http://www.sandag.org/index.asp?meetingID=3957&fuseaction=meetings.detail

[4] http://www.sandag.org/index.asp?meetingID=3851&fuseaction=meetings.detail

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San Diego, CA 92101-4231
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June 7, 2013

File Number 3100000

Mr. Richard Corey
Executive Officer
California Air Resources Board
1001 I Street
Sacramento, CA 95814

Dear Mr. Corey:

SUBJECT: Technical Methodology to Estimate Greenhouse Gas Emissions from the San Diego Association of Governments Sustainable Communities Strategy

California Government Code 65080(b)(2)(I)(i) requires each Metropolitan Planning Organization to submit a description to the state board of the technical methodology it intends to use to estimate the greenhouse gas emissions from its sustainable communities strategy and, if appropriate, its alternative planning strategy. The enclosed document outlines the planning and modeling methodology the San Diego Association of Governments (SANDAG) intends to use to estimate the greenhouse gas emissions from its sustainable communities strategy and alternative planning strategy, if necessary. I am pleased to inform you the upcoming SANDAG Regional Plan will use an open, activity-based model that will be fully integrated with our new Production Exchange, Consumption, and Allocation System (PECAS) land use and economic model. This advancement will allow for a more detailed review of the interaction between land use and transportation in this plan.

Sincerely,

Gary L. Gallegos

GARY L. GALLEGOS
Executive Director

GGA/CDA/bga

Attachment: Technical Methodology to Estimate Greenhouse Gas Emissions

MEMBER AGENCIES
Cities of
Carlsbad
Chula Vista
Coronado
Del Mar
El Cajon
Encinitas
Escondido
Imperial Beach
La Mesa
Lemon Grove
National City
Oceanside
Poway
San Diego
San Marcos
Santee
Solana Beach
Vista
and
County of San Diego

ADVISORY MEMBERS
Imperial County
California Department of Transportation
Metropolitan Transit System
North San Diego County Transit Development Board
United States Department of Defense
San Diego Unified Port District
San Diego County Water Authority
Mexico

This report outlines key San Diego Forward: The Regional Plan (Regional Plan) planning efforts and inputs, including a description of its transportation and land use modeling platform. The Regional Plan serves as the San Diego Association of Governments (SANDAG) long-range planning document for the San Diego region, and it also functions as the Regional Transportation Plan and its Sustainable Communities Strategy (2050 RTP/SCS), which will comply with state and federal regulations including California Senate Bill 375 (Steinberg, 2008) and federal air quality conformity.

The Regional Plan brings together the updates of the SANDAG Regional Comprehensive Plan, the long-range blueprint planning document, and the 2050 RTP/SCS. A unified document provides San Diego residents a more accessible document that includes an overall vision for the region with a concrete implementation program. SANDAG anticipates the Regional Plan and its Environmental Impact Report (EIR) will be adopted by the Board of Directors in summer 2015.

What's New in the Regional Plan

The Regional Plan will continue to build on the planning and implementation progress since the adoption of the 2050 RTP/SCS in October 2011. The list below highlights some of the planning work that has been taking place in the San Diego region since 2011:

- An early action program to advance design and construction of projects included in the Regional Bicycle Plan
- A strategy to implement a broader Active Transportation Program that would include Safe Routes to School and Safe Routes to Transit
- Evaluation of alternative land use and transportation scenarios to further reduce projected Greenhouse Gas (GHG) emission levels
- Completion of a new transportation, land use, and economic modeling framework including an Activity-Based Transportation Model and Production Exchange, Consumption, and Allocation System (PECAS)
- Testing public health analytical tools for potential future planning work
- Development of a Regional Transit Oriented Development strategy to foster a greater level of development that supports investments in public transit
- Development of a Regional Complete Streets Policy for use at the regional and local level

In addition to the planning work, SANDAG and its partners are implementing the 2050 RTP/SCS, including the delivery of the following projects:

- SuperLoop Bus Service connecting the University of California San Diego and the adjacent major employment and housing centers of the North University area
- Expansion of the Bayshore Bikeway in Chula Vista
- New Bus Rapid Transit Stations and Managed Lanes along the Interstate 15 corridor

- Completion of the State Route 905 connecting the Otay Mesa International Port of Entry to the Interstate 5 and Interstate 805 corridors
- Double tracking of the COASTER and Amtrak LOSSAN corridor through northern San Diego County, including improved pedestrian crossings and tidal lagoon enhancements
- Completion of eight Smart Growth Incentive Program Capital Projects, including the Lemon Grove Main Street Promenade which will provide pedestrian enhancements to integrate planned mixed-use development at an existing light rail station

San Diego Forward: The Regional Plan Work Plan

On February 22, 2013, the SANDAG Board of Directors reviewed the work program for the Regional Plan. The work program provides the overall framework and schedule to develop and adopt the Regional Plan in 2015. Highlights of the work plan include the following activities:

- Engage in public outreach and involvement
- Establish the Regional Plan vision, goals, and policy objectives
- Prepare the 2050 Regional Growth Forecast update (Series 13)
- Refine and develop policy areas
- Incorporate recommendations from more detailed planning studies
- Develop Sustainable Community Strategies (SCS) and Alternative Planning Strategy (if needed)
- Update revenue and cost projections for projects, programs, and services
- Update regional arterial system (as needed)
- Update airport multimodal and rail planning
- Update transportation project evaluation criteria
- Update performance measures for the Regional Plan
- Develop financially unconstrained multimodal transportation scenario
- Develop revenue constrained alternative transportation scenarios and select preferred scenario
- Perform air quality conformity analysis
- Produce draft Regional Plan
- Prepare draft EIR
- Address feedback from public comment period

- Adopt final Regional Plan and certify final EIR
- Air quality conformity determination by United States Department of Transportation
- Air Resources Board (ARB) determination on the adopted SCS

Public Involvement Plan

The Public Involvement Plan (PIP) is intended to support the development of the Regional Plan, creating a variety of opportunities for individuals, organizations, agencies, and other stakeholders to provide meaningful input. The PIP was created based on input obtained throughout the fall of 2012 from the SANDAG Board of Directors, Policy Advisory Committees, working groups, surveys, and a public workshop held in October 2012. The PIP was drafted using the guidelines provided by the agency's overall Public Participation Plan, which sets the foundation for specific public outreach approaches. The PIP describes efforts that SANDAG will undertake to secure input on: developing sustainability and land use goals; priorities for transportation projects, programs, and services; transportation networks; infrastructure recommendations; funding alternatives; policies and programs; performance measures; GHG emissions targets; and other related issues.

Implementation of this PIP will accomplish the following:

- Provide a road map to ensure that all interested stakeholders are given the chance to participate in the process
- Reach beyond traditional methods to encourage participation from a wide variety of members of the public
- Communicate the importance of the plan and the opportunities to participate in the process
- Educate the public about SANDAG and its role in the region
- Establish the new Regional Plan as a critical policy document helping to balance our future housing, jobs, land use, transportation, health, social equity, economic, and environmental sustainability needs

This PIP is intended to be a living document. Because of the fluid nature of public participation, this plan may be updated at major milestones and adjusted in response to issues and circumstances that arise throughout the planning process.

Series 13: 2050 Regional Growth Forecast

The Series 13 Regional Growth Forecast serves as the foundation for the Regional Plan and other planning documents (e.g., water, general plans) across the region. SANDAG denotes forecasts by a sequential series number. The forecast under development is known as the Series 13: 2050 Regional Growth Forecast. The forecast used in the 2050 RTP/SCS, adopted in October 2011, was the Series 12: 2050 Regional Growth Forecast.

The regional forecast is developed by SANDAG with input from expert demographers, economists, developers, planners, and natural resource managers. These experts review economic and

demographic assumptions about fertility, migration, inflation, and other indicators. In addition to the traditional expert panel review SANDAG conducts, SANDAG also has reviewed the forecast with key stakeholders across the region, including transportation, land use, and economic development advocates.

SANDAG uses its Demographic and Economic Forecasting Model (DEFM) to develop the regional forecast. The DEFM was first developed to support the Series 4 forecast in the late 1970's. The DEFM uses a standard cohort-survival modeling technique along with econometric tools to estimate future growth. The DEFM has a proven track record of accuracy; since Series 4 (1977), on average, it has been within 4 percent of observed population growth.

The DEFM results will feed the sub-regional allocation models to develop city and neighborhood level forecasts. The Series 13 sub-regional forecast will use a new tool called PECAS. This model offers several enhancements beyond the sub-regional forecasting models used in prior forecasts by introducing economic conditions and return on investment calculations into the projections of development, redevelopment, and infill. In addition to new data sources, PECAS continues to rely upon the land use plans, policies, and zoning ordinances of the 18 cities, the County of San Diego, and other land use authorities. To ensure that local plans and policies are accurately reflected in the subregional forecast, the local jurisdictions and member agencies complete a review of its land use inputs (including general plans, planned land use, and housing capacity) via an online review tool.

Once the sub-regional forecast is complete, the detailed demographic forecast is produced. The Program for Age, Sex, and Ethnicity Forecast (PASEF) is a demographic model designed to forecast detailed demographic characteristics at a neighborhood level. PASEF projects population for 18 five-year age groups (0-4, 5-9,...,80-84, and 85+) broken down by gender and ethnicity for the region and smaller geographies.

A more detailed description of the land use forecasting models is included below in the *Modeling the Regional Plan* section of this report.

Evaluation Criteria and Performance Measure Development and Implementation

Project evaluation criteria is one element of a multistep process used to develop the revenue constrained multimodal transportation network for the Regional Plan. Evaluation criteria have been used in previous transportation plans including in the 2050 RTP/SCS. Project prioritization along with other factors such as funding availability, project readiness, and overall network connectivity are considered when developing the proposed transportation network alternatives.

In past transportation plans, SANDAG also has utilized performance measures to evaluate the performance of proposed revenue constrained transportation networks. The performance measures from the 2050 RTP/SCS included metrics to evaluate safety, multimodal mobility and reliability, goods movement, social equity, environmental impacts, and the relationship between land use and transportation. Performance measures are used to compare the proposed network alternatives and serve as a tool to select the preferred revenue constrained network scenario.

SANDAG is currently analyzing both the evaluation criteria and performance measures to incorporate best practices being used in the transportation planning field. Revisions for evaluation criteria are intended to simplify and standardize the criteria across different modal categories.

Performance measure revisions will assess the effectiveness of existing measures and consider new components including public health factors. Consultant assistance has been retained to research the best practices of other Metropolitan Planning Organizations (MPO) and various transportation research institutions and to develop refinements of the evaluation criteria and performance measures. The revised transportation project evaluation criteria and the updated performance measures will be presented to the SANDAG Board of Directors in fall 2013 for approval.

Land Use and Transportation Scenarios

The development of alternative land use and transportation scenarios, including the evaluation of potential pricing and parking strategies, is proposed to test strategies that could result in further reductions of GHG emissions beyond those forecasted in the 2050 RTP/SCS. The Series 13 sub-regional forecast will provide the baseline scenario against which alternative scenarios are compared.

Initial work on defining the scenario assumptions will begin in spring 2013, and scenario testing will begin in summer 2013. Through this planning process, various scenarios will be prepared, tested, and analyzed by early 2014, so results can inform the development of revenue-constrained transportation network scenarios.

A consultant team is assisting SANDAG in developing inputs and assumptions to assess the alternative land use and transportation scenarios. The scenarios will be measured against indicators, tested for performance, and refined throughout 2013. Sketch planning and travel demand models will be used in this planning effort.

Modeling the Regional Plan

SANDAG will use an integrated land use, economic, and transportation modeling system to estimate the GHG in the Regional Plan. Over the past five years, SANDAG has developed a new PECAS, Population Synthesizer (PopSyn), Activity-Based Model (ABM), Commercial Travel Model (CTM), and updated its Heavy-Duty Truck Model (HDTM).

The integrated system includes: (1) DEFM; (2) PECAS in conjunction with Urban Development Model (UDM); (3) detailed demographic forecast (PASEF and PopSyn); (4) the ABM and CTM; and (5) the latest Emission Factors (EMFAC) model from ARB (currently EMFAC 2011). Depending on model sensitivity to certain transportation policies, SANDAG will consider using off-model factors (or ARB defined Policies and Practices) as recommended by the Regional Targets Advisory Committee (RTAC). The Regional Plan model will have a base year of 2012.

The first model component, DEFM, is an econometric forecasting model with a demographic module. DEFM produces an annual forecast of the size and structure of the region's economy and a demographic forecast consistent with that future economy. For the economic forecast, DEFM relates historical changes in the region's economy to historical changes in the United States' economy using input-output and econometric methodologies. The demographic module uses a cohort survival model to forecast population by age, gender, and ethnicity. DEFM produces a wealth of data about the region's future economic and demographic characteristics. Among the more important elements are the size and composition of the population, employment by industry sector,

household and personal income, housing units by structure type, vacancy status and persons per household, labor force, and school enrollment.

Next, PECAS offers several improvements over more traditional spatial interaction "gravity" models. PECAS attempts to account for variation in the cost and quality of goods and services, as well as individual tastes and preferences. By integrating spatial characteristics (travel distances, land availability) and the economic system (prices, income), PECAS can evaluate a wider range of socio-economic impacts resulting from land use and transportation policies. PECAS is able to model the effects of land use and transportation policies on the wages, rents, productivity, and overall benefit to industrial and socio-economic groups.

PECAS has two component modules: the Activity Allocation (AA) Module and Space Development (SD) Module. The AA Module models the areas in which households and firms locate and who buys what from whom. Households located in one submarket interact with businesses throughout the region by both providing labor and purchasing goods and services. Businesses exchange their products with other businesses located throughout the region and use household labor as part of their production process. The SD Module models the actions of real estate developers who provide space (land use and floor space) in which households and firms can locate, responding to demand from households and businesses in AA for space in certain areas. These modules are run in one-year steps, with SD following AA. As a final step in the PECAS process, zonal control targets for housing and jobs are allocated to the parcel level with the UDM.

The third model component includes PASEF and the PopSyn. PASEF is a demographic model designed to forecast detailed demographic characteristics at a neighborhood level. The detailed demographic forecast comes directly from DEFM, but requires aggregating the single year of age detail into the five-year age groups used in PASEF, and an adjustment for special populations. The model projects population for 18 five-year age groups (0-4, 5-9,...,80-84, and 85+) broken down by gender and ethnicity for the region and smaller geographies. PASEF produces population controls used by the PopSyn.

The PopSyn generates a synthetic population for the region. This synthetic population represents the individual travelers that the ABM will simulate. For each simulation year, a full population is synthesized to match the forecasted socio-economic and housing characteristics of each part of the region at the zonal level. These forecasts, a key ABM input, come from the land use models described above. Synthesis works by replicating a sample of Census or American Community Survey Public Use Microdata Sample records (each containing complete household and individual characteristics) and placing them around the region in such a way that the forecasted characteristics of each zone are matched.

The fourth model component, the ABM, forecasts travel activity. The ABM simulates individual and household transportation decisions that compose their daily travel itinerary. People travel for activities such as work, school, shopping, healthcare, and recreation, and the ABM attempts to predict whether, where, when, and how this travel occurs. The ABM addresses both household-level and person-level travel choices including intra-household interactions between household members. It also offers sensitivity to demographic and socio-economic changes by the enhanced and flexible population synthesis procedures as well as by the fine level of model segmentation.

The ABM operates at fine temporal and spatial resolution: a half hour temporal resolution for the tour generation, mode choice, and trip generation. These 30-minute intervals are aggregated into five time-of-day periods for auto, transit, and non-motorized assignment. The ABM takes advantage of the Master Geographic Reference Area (MGRA) zone system, which is the most disaggregate zonal system currently in use in any travel demand model in the United States. The SANDAG current MGRA system consists of 23,000 zones (Series 13 version), which are roughly equivalent to Census block groups. To avoid computational burden, SANDAG relies on a 4,900 Transportation Analysis Zone (TAZ) system for the auto assignment step, but performs transit calculations at the more detailed MGRA level.

While the ABM addresses personal travel, the CTM addresses travel made in the region for non-personal reasons. Commercial travel is defined as heavy-duty truck trips with both origin and destination in San Diego County; professional service vehicle trips such as trips generated by plumbers, gardeners, and electricians; light-duty freight trips such as trips generated by trash trucks, light construction trucks, food delivery vehicle operators; postal and package couriers (such as FedEx and UPS); and at-work business trips generated by company employees.

The CTM is a disaggregate tour-based model used to forecast "local" intra-region commercial travel. The model starts with aggregate tour generation by industry type followed by disaggregate simulation of the tour attributes such as mode, purpose, exact start time, stop purposes, stop locations, and stop durations. The trip list produced by the CTM is transformed into trip tables by vehicle class for assignment with the ABM person trip tables. This model construct allows for more realistic commercial movements over trip-based models since commercial movements tend to have complex tours with a large number of stops.

An external HDTM addresses external to internal, internal to external, and external to external truck trips for San Diego County. The model is based on disaggregated Freight Analysis Framework forecast data. External trucks by commodity are allocated to TAZs based on employment types. Both the CTM and HDTM external model work on the same TAZ system as the ABM.

At the end of the modeling system is the EMFAC model, which takes vehicle miles traveled (VMT) by vehicle class and fuel type, and VMT speed distributions by vehicle class, post processed from the ABM/Commercial Vehicle Model, and calculates the GHG emissions for the SCS.

SANDAG strives to stay in the forefront of forecasting technology by subjecting its efforts to peer review and presenting the methodology at relevant meetings and conferences.

Active Transportation Enhancements

The Active Transportation Model component enhances the ABM to provide greater sensitivity and broader capabilities to address Active Transportation projects and policies and inform the SANDAG policy development and future decision-making. These enhancements include a complete representation of bike and pedestrian networks, and associated attributes such as facility type, distance, and grade; a new Bike-Route Choice Model; and revised and recalibrated trip and tour mode choices in ABM.

The first phase of the Active Transportation Model development is a seven-month project that is anticipated be completed in the second half of 2013. In this phase, a Bike-Route Choice Model will

be borrowed from San Francisco County and will be calibrated and validated with San Diego local bike count datasets. In cooperation with the County of San Diego and San Diego State University, SANDAG has installed 28 permanent bicycle count stations around the region to continuously monitor bicycle and pedestrian activity on key regional corridors.

A bike travel behavior survey will be conducted in future phases to estimate a San Diego Bike-Route Choice Model. With these enhancements, the integrated ABM and Active Transportation model can be used to assess the impact of bike and pedestrian investments on bike ridership and pedestrian volume changes, diversion of ridership on parallel facilities, mode share changes, VMT reductions, and GHG emission reductions. The Active Transportation Model will produce a set of non-motorized travel related Regional Transportation Plan (RTP) performance measures.

Emissions Modeling

The latest version of EMFAC (currently EMFAC 2011) will be used to calculate the GHG emissions for the Regional Plan based on the transportation model outputs. The transportation model post processes highway and transit assignment information to create EMFAC input files containing vehicle trips by vehicle class and fuel type, VMT by vehicle class and fuel type, and VMT speed distributions by vehicle class and hour. The current version of EMFAC projects the following GHG pollutants: carbon dioxide, carbon monoxide, nitrous oxides, total hydrocarbons, and methane.

Feedback in the Regional Travel Demand Model

A noteworthy feature of the forecasting process is the feedback of information from one model to another. For example, regionwide projections of economic activity from the DEFM are used in the AA Module of PECAS, and then AA Module results are used for the SD Module of PECAS. Similarly, data from AA are major inputs to the transportation model, and then transportation model data are used in subsequent AA calculations. A key feature of the modeling system is the central role that land use and transportation policies play in determining future travel patterns and the associated location of people, houses, and jobs.

Off-Model Techniques to Measure GHG

While the impacts of certain policy scenarios cannot be measured in the Travel Demand Model, SANDAG may use these policy scenarios to meet its GHG targets established by ARB. In these instances, SANDAG will rely on off-model techniques based on academic literature reviews, collaboration with other MPOs, and consultation with ARB's Policies and Practices Guidelines. Any off-model techniques used will be fully documented and justified in the final RTP, SCS, and/or model documentation.

RTP Consistency with RTAC Target Setting Process

SANDAG anticipates using the methodology described in this report to calculate GHG emissions for the Regional Plan and its SCS as well as the current GHG target setting process as outlined by the RTAC and any subsequent updates by ARB. SANDAG may revise the methodology to be used in the regional plan in consultation with ARB if updated software (e.g., EMFAC 2013) or a more accurate methodology becomes available during the target-setting revision process.

Addressing GHG Emissions after 2035 in the Regional Plan

SANDAG will use the modeling methodology outlined in this document to calculate GHG emission for 2020 and 2035 for the SCS as required by California Government Code 65080. SANDAG will perform an analysis of GHG emissions through 2050. As the Regional Plan is being developed, SANDAG will work with the appropriate federal and state agencies to ensure its 2050 methodology is consistent with best practices and conforms to all applicable state and federal regulations.

Air Resources Board

Mary D. Nichols, Chairman
1001 I Street • P.O. Box 2815
Sacramento, California 95812 • www.arb.ca.gov

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

August 12, 2013

Mr. Gary Gallegos
Executive Director
San Diego Association of Governments
401 B Street, Suite 800
San Diego, California 92101-4231

Dear Mr. Gallegos:

Thank you for submitting the San Diego Association of Governments' (SANDAG) proposed technical methodology for quantifying the greenhouse gas emissions resulting from the regional Sustainable Communities Strategy (SCS) currently being developed as part of the next regional transportation plan scheduled to be adopted in 2015. Your letter dated June 7, 2013 satisfies the requirement in Government Code section 65080(b)(2)(J)(i) that each Metropolitan Planning Organization submit to Air Resources Board (ARB) a description of the technical methodology that it will use, prior to beginning the region's public process to develop a strategy for meeting SB 375 targets.

We look forward to continuing our collaboration with SANDAG as you begin to prepare the San Diego region's second SCS. We appreciate the fact that SANDAG is undertaking a significant effort to develop new and updated modeling tools, including an Activity Based Model, which will be used in the planning process for the 2015 SCS.

If you have any questions, please contact Ms. Lynn Terry, Deputy Executive Officer, at (916) 322-2739.

Sincerely,

Richard W. Corey
Executive Officer

cc: Ms. Lynn Terry
Deputy Executive Officer

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: http://www.arb.ca.gov.

SANDAG Off-Model Greenhouse Gas Reduction Methodology

To forecast the outcomes of the transportation network included in the Regional Plan, SANDAG uses the Activity Based Model (ABM) to estimate performance measures. However, some strategies including carshare, vanpool programs, carpool programs, plug-in electric vehicle (PEV) charging stations, managed lane automation, and transit managed lane automation are not captured fully by the SANDAG ABM or the California Air Resources Board (ARB) Emissions Factor model. These off-model strategies are included to account for their additional reductions of greenhouse gas emissions. This attachment documents both the methodology and explanation of benefits from these off-model strategies.

Carshare

Carshare is one aspect of shared mobility highlighted in San Diego Forward: The Regional Plan. Carshare can provide first mile/last mile connections to transit or fill gaps in the region's transit services by providing an efficient transportation alternative for commute and non-commute trips. A carshare service provides members with access to a vehicle for short-term use, such as Car2Go and Zipcar. Shared vehicles are distributed across a network of locations (or specified service area) within urban communities. Members can access the vehicles at any time with a reservation and are charged by time or by mile. Carshare provides some of the benefits of a personal vehicle without the costs associated with owning one. The SANDAG Transportation Demand Management (TDM) program seeks to incentivize and expand the reach of carshare to employment centers and urban communities that are not currently served by this mobility option and that the private market may be hesitant to enter in order to complement and improve access to regional transit services.

Methodology and calculations

A minimum level of density and supporting land use is required to initiate and sustain most carshare services. The following methodology pertains exclusively to investments in carshare, the shared mobility service type with the greatest amount of history and data available, and for which SANDAG is taking credit for under SB 375 in terms of reduced greenhouse gas emissions. Past research on traditional (or round-trip) carshare models[1] has demonstrated that between 10 percent[2] and 13 percent[3] of the eligible population is expected to join a carshare service. In the San Diego region, the eligible population is defined as anyone age 18 or older, the current minimum age requirement for a carshare membership. Additionally, a residential density threshold was established for each milestone year to determine which portions of the San Diego region are most suited for carshare investment through 2050. In 2020, the assumed minimum residential density is 69 persons per acre or higher and in 2035 and 2050 the assumed minimum residential density is 55 persons per acre or higher.[4] In line with past research coupled with the recent introduction of one-way[5] and peer-to-peer[6] carshare in the San Diego region, a conservative proportion of the region's eligible population living in communities that meet these residential density thresholds was considered to estimate the adoption of carshare in the region over time:

- 2020 – 15% of the eligible population, or approximately 52,791 people
- 2035 – 20% of the eligible population, or approximately 146,914 people
- 2050 – 25% of the eligible population, or approximately 227,615 people

The daily VMT reduction for each milestone year is calculated by multiplying the estimated number of carshare members by seven miles (the average daily VMT reduction per carshare member[7]).

SB 375 emissions reduced by milestone year were calculated by multiplying the average daily VMT reduction for each milestone year by the derived CO_2 emission factor of 0.9484 lbs / mile for 2020, 0.9408 lbs / mi for 2035, and 0.9407 lbs / mi for 2050.[8]

Table 1
Carshare VMT and CO_2 Reduction Results

	2020	2035	2050
Daily VMT Reduction	369,536	1,028,398	1,593,305
SB 375 Emissions (lbs)	350,474	967,506	1,498,870

Vanpools

The Regional Vanpool Program is currently offered by SANDAG. Vanpools have been shown to reduce greenhouse gas emissions since only one (albeit larger) vehicle is required to transport the same number of people that would normally take 7 to 15 single-occupant vehicles to transport. Based on historic trends the program is assumed to grow 13 percent by 2020 (approximately 811 vanpools), 62 percent by 2035 (approximately 1,163 vanpools), and 110 percent by 2050 (approximately 1,512 vanpools). Future growth assumptions are based on restructuring the current $400 monthly subsidy program to encourage the formation of larger vanpools and sustain program participation, policy changes that reduce barriers to entry, improved program administration, and targeted marketing to key employment industries and underserved populations.

Methodology and calculations

Growth of the Regional Vanpool Program is tied to the assumption of a slight increase in the monthly subsidy over time and available funding for program administration. Eighty percent of all vans are assumed to carry up to eight passengers, and 20 percent of all vans are assumed to carry up to ten passengers.

Average daily VMT reduction calculation for each milestone year:

(Proportion of eight-passenger vans x Number of projected vanpools in the milestone year x Number of total passengers excluding the driver x Average round-trip vanpool commute distance) + (Proportion of ten-passenger vans x Number of projected vanpools in the milestone year x Number of total passengers excluding the driver x Average round-trip vanpool commute miles)

SB375 emissions reduced by milestone year were calculated by multiplying the average daily VMT reduction for each milestone year by the derived CO_2 emission factor of 0.9484 lbs / mile for 2020, 0.9408 lbs / mi for 2035, and 0.9407 lbs / mi for 2050.

Table 2
Vanpool VMT and CO_2 Reduction Results

	2020	2035	2050
Daily VMT Reduction	678,339	972,797	1,264,438
SB 375 Emissions (lbs)	643,349	915,197	1,189,495

Carpools

SANDAG evaluated the investment in a carpool incentive program to promote the use of fewer vehicles to transport the same number of people to and from work. A carpool incentive was pilot tested with select employers in 2012. Based on lessons learned from the pilot, a formal carpool incentive program is expected to launch in the summer of 2016. The proposed program would incentivize the formation of 17,582 new carpools between now and 2050. Based upon anticipated budget and staffing levels, an incentive of $30 per month per carpooler for three continuous months at a budget of $100,000 per year[9] would reasonably accommodate up to 488 new carpools annually. [10]

Methodology and calculations

Following the initial three-month incentive period, assumed carpool program retention rates per carpool are 90 percent after one year, 50 percent after two years, 25 percent after three years, and 0 percent after four years.[11] It is assumed that approximately 1,293 new carpools carrying 2,716 carpoolers would exist in 2020, 2035, and 2050 based on these retention rates. Carpool size is assumed to be 2.1, and daily VMT per capita is assumed to be 26 miles.[12]

Average daily VMT reduction calculation for each milestone year:

Total number of carpools x Average carpool size (excluding the driver) x Average round-trip commute miles

SB 375 emissions reduced by milestone year were calculated by multiplying the average daily VMT reduction for each milestone year by the derived emission factor of 0.9484 lbs / mile for 2020, 0.9408 lbs / mile for 2035, and 0.9407 lbs / mile for 2050.

Table 3
Carpool VMT and CO_2 Reduction Results

	2020	2035	2050
Daily VMT Reduction	36,986	36,986	36,986
SB 375 Emissions (lbs)	35,078	34,796	34,793

Plug-In Electric Vehicles (PEV) Charging Stations

The State of California has a goal to have 1.5 million zero emissions vehicles (ZEVs) operating in California by 2025. ZEVs include both Plug-in Electric Vehicles (PEVs) and fuel cell electric vehicles. To achieve additional greenhouse gas reductions beyond the state goals, a larger network of electric vehicle charging stations (EVCS) is needed to extend the electric range of plug-in hybrid electric vehicles. SANDAG will establish a Regional Charger Program by setting aside approximately $30 million of Congestion Management and Air Quality (CMAQ) Improvement Program funds expected between 2020 and 2050 (approximately $1 million annually) to fund an incentive program for the installation of publicly available EVCS. According to the Electric Power Research Institute (EPRI), one EVCS is needed for every five PEVs, with a breakdown of 75 percent Level 1 EVCS (which adds 2-5 miles of range per hour of charging) and 25 percent Level 2 EVCS (which adds 10-20 miles of range per hour of charging). Increasing the number of publicly available EVCS would reduce greenhouse gas emissions by extending the electric range of plug-in hybrid electric vehicles that would replace gasoline-powered internal combustion engines. The calculations and expected emissions reductions attributed to the Regional Charger Program are shown here.

Methodology and calculations

By 2025, the state's target is for 15.4 percent of new car sales to be ZEVs; of this, 9 percent would be Plug-in Electric Vehicles (PEVs). SANDAG assumes that after 2025, these percentages for annual sales remain constant, but overall ZEV fleet continues to grow due to vehicle turnover. Currently, plug-in hybrids drive 30 percent of their miles in electric mode and the remainder in gasoline mode. The build-out of a robust charger network would increase this percentage to 41 percent. The 11 percent increase in electric miles from plug-in hybrid vehicles results in the additional greenhouse gas reductions summarized below. The funding for the program would provide incentives for the installation of publicly available EVCS throughout the region. The program currently assumes incentive levels of $250 per Level 1 EVCS and $2,100 per Level 2 EVCS, and would add 6,065 EVCS by 2020, 35,697 EVCS by 2035, and 43,376 EVCS by 2050.

Table 4
Plug-In Hybrid Electric Vehicles and Added e VMT

	2020	2035	2050	
Number of Plug-in Hybrid Vehicles	34,326	182,484	220,882	
Daily VMT per vehicle	21.83	20.48	19.90	
Total Daily VMT	749,259	3,737,510	4,394,701	
eVMT (30%)	224,778	1,121,253	1,318,410	
eVMT with Program (41%)	307,196	1,532,379	1,801,827	
Added eVMT (11%)	82,418	411,126	483,417	
Emission Factor - per mile reduced	0.9484	0.9408	0.9407	lb/mi
CO_2 reduced	78,167	386,783	454,765	lbs CO_2

Table 5
PEV Charging Stations and CO_2 Reduction Results

	2020	2035	2050
SB 375 Emissions (lbs)	78,167	386,783	454,765

Managed Lane Automation

In 2050, assuming vehicle automation technology becomes available to vehicles accessing managed lane facilities, the managed lane facilities will have 80 percent higher capacity to handle these zero emission vehicles.

Methodology and calculations

SANDAG conducted a model run with 80 percent increased capacity on the managed lane system. Using output from the model run, SANDAG calculated total managed lane (ML) VMT for the SB 375 vehicle classes. To account for all ML vehicles operating as zero emission vehicles, the VMT from ML was removed from the EMFAC inputs. Using the ML VMT modified EMFAC file, an emissions profile was created. The off-model calculation reflects the CO_2 emission differences between the Regional Plan preferred scenario and the automated managed lane scenario.

Table 6

Regional Plan and Managed Lane Automated Scenario CO_2 Emissions

	2050
2050 Regional Plan CO_2 Emissions (SB 375)	82,215,442 lbs / day
Automated ML Scenario CO_2 Emissions	77,896,235 lbs / day
Emissions Difference	(4,319,207) lbs / day

Table 7

Managed Lane Automation and CO_2 Reduction Results

	2020	2035	2050
SB 375 Emissions (lbs)	–	–	4,319,207

Transit Managed Lane Automation Programs

In 2050, assuming vehicle automation technology becomes available to transit vehicles, the automated transit vehicles would result in lower operating costs that would potentially allow for more frequent service on certain routes and lower fares.

Methodology and calculations

SANDAG conducted a model run with increased transit operations on well utilized transit routes. Using output from the transit operations model run, SANDAG calculated total greenhouse gas emissions for the SB 375 vehicle classes. The off-model calculation reflects the CO_2 emission differences between the 2050 Regional Plan preferred scenario and the automated transit scenario.

Table 8

Regional Plan and Automated Transit Scenario CO_2 Emissions

	2050
2050 Regional Plan CO_2 Emissions (SB 375)	82,215,442 lbs / day
Automated Transit Scenario CO_2 Emissions	81,282,787 lbs / day
Emissions Difference	(932,655) lbs / day

Table 9

Transit Managed Lane Automation and CO_2 Reduction Results

	2020	2035	2050
SB 375 Emissions (lbs)	–	–	932,655

Summary of Off-Model Strategies

The six off-model greenhouse gas reduction measures described above are projected to reduce daily vehicle miles traveled (VMT) by nearly 3 million miles by 2050, which translates to a daily CO_2 emissions reduction of 4,214 tons per day by 2050 (or approximately 2 lbs. per person) as shown in Table 10.

Table 10
Summary of Off-Model Strategies (CO_2 lbs / day)

	2020	2035	2050
Carshare	(350,474)	(967,506)	(1,498,870)
Vanpools	(643,349)	(915,197)	(1,189,495)
Carpools	(35,078)	(34,796)	(34,793)
Plug-in Electric Vehicle Charging Stations	(78,167)	(386,783)	(454,765)
Managed Lane Automation	–	–	(4,319,207)
Transit Automation	–	–	(932,655)
Total SB 375 CO_2 Off-Model Adjustments	**(1,107,068)**	**(2,304,282)**	**(8,429,785)**

ARB EMFAC 2007 to EMFAC 2014 CO_2 Adjustments

On June 30, 2015, ARB staff transmitted a memorandum to Metropolitan Planning Organization (MPO) technical staff providing "guidance on how to deal with changes arising from different EMFAC versions" for the greenhouse gas quantification determinations for the second round of Sustainable Communities Strategies (SCS). According to the enclosed memorandum, in 2010, ARB established regional SB 375 greenhouse gas targets in the form of a percent reduction per capita from 2005 for passenger vehicles using the ARB Emission Factor model, EMFAC 2007. Since the time when targets were set using EMFAC 2007, ARB has released two subsequent versions, EMFAC 2011 and EMFAC 2014. ARB has updated the carbon dioxide (CO_2) emission rates in EMFAC 2011 and EMFAC 2014, based on recent emission testing data and updated energy consumption for air conditioning. In addition, vehicle fleet mix has been updated in EMFAC 2011 and again in EMFAC 2014 based on the latest available Department of Motor Vehicle data at the time of model development. These changes have lowered the overall CO_2 emission rates in EMFAC 2011 and EMFAC 2014 compared to EMFAC 2007.

ARB staff developed a methodology to allow MPOs to adjust the calculation of percent reduction in per capita CO_2 emissions used to meet the established targets when using either EMFAC 2011 or EMFAC 2014 for their second round RTP/SCS. This method will neutralize the changes in fleet average emission rates between the version used for the first RTP/SCS and the version used for the second RTP/SCS. The adjustment for SANDAG is +2 percent per capita reductions; that is, SANDAG has to reduce the estimated change in CO_2 by two additional percentage points. For example, before the ARB adjustment, SB 375 per capita reductions for 2020 were 17 percent, and after applying the adjustment, the reductions became 15 percent. Table 11 provides a summary of the CO_2 per capita reductions from the on-model components, from the off-model analysis of the six strategies included in this attachment, and the ARB adjustment factor.

Table 11
Summary of CO_2 Per Capita Reductions – On and Off-Model Results

	2020	2035	2050
Per Capita Reduction (On-Model Results Only)	16%	21%	23%
Per Capita Reduction (Off-Model Results Only)	1%	2%	8%
ARB Adjustment Factor	-2%	-2%	-2%
Total Per Capita Reduction	**15%**	**21%**	**29%**

Endnotes

[1] Round-trip carshare services require users to return a rented vehicle to the pick-up location (e.g., Zipcar).

[2] Zipcar. http://www.zipcar.com/business/is-it/greenbenefits. Accessed August 3, 2015.

[3] Zhou, B., Kockelman, K., and Gao, R. "Opportunities for and Impacts of Carsharing: A Survey of the Austin, Texas Market", Transportation Research Board, 2009.

[4] Residential density thresholds align with those established for the SANDAG Smart Growth Opportunity Areas. Mixed-Use Transit Corridors require a residential density minimum of 69 persons per acre while Community Center and/or Town Centers align with a residential density minimum of 55 persons per acre. Additional information on SANDAG Smart Growth Opportunity Areas can be found here: http://www.sandag.org/uploads/projectid/projectid_296_14002.pdf.

[5] A one-way carshare service allows a user to rent a vehicle at one location and end the trip at another location within the carshare service area (e.g., car2go).

[6] Peer-to-peer carshare allows vehicle owners to rent their personal cars to others for a daily or hourly rate via a website or mobile app (e.g., RelayRides). This model offers a way in which vehicle owners can maximize vehicle use in lieu of keeping it parked at a single location.

[7] The daily VMT reduction of seven miles per carshare member was established based on academic research: (1) Shaheen and Cohen, "Innovative Mobility Carsharing Outlook" (Summer 2013); (2) Cervero, Golub, and Nee, "City CarShare: Longer-Term Travel-Demand and Car Ownership Impacts", July 2006, Transportation Research Board 2007 Annual Meeting paper.

[8] Emissions rates from EMFAC 2014 v.1.0.7.

[9] Figure not inclusive of marketing and administrative costs.

[10] ($30 gift card + $2.50 activation fee per card) x 3 months x 2.1 people per carpool.

[11] Retention rates were based on case study research. In 2009 SANDAG commissioned a study to analyze rideshare incentive programs and develop an incentive program framework for the San Diego region. The study evaluated rideshare incentive programs offered by the San Bernardino Association of Governments (SANBAG) and the Riverside County Transportation Commission (RCTC) and found that 90 percent of participants continued to rideshare after participating in the program. A Transportation Research Board (TRB) study entitled "Duration of Carpool and Vanpool by Rides Clients" evaluates the San Francisco Bay Area ridesharing program and found that 50 percent of participants were still carpooling 30 months after they received assistance from the rideshare program. Research from Denver (Survey of Work Commuters in the Denver Area, DRCOG (2010)) and Virginia (Methodologies for Determining Carpooler and Vanpool Average Life Bases and the Average Fuel Economy of Commuter Vehicles, VHTRC) revealed that the average lifespan of a carpool was between 2.25 - 3.2 years.

[12] Per the SANDAG activity-based model.

From: Taylor, Jonathan@ARB [mailto:jonathan.taylor@arb.ca.gov]
Sent: Tuesday, June 30, 2015 5:24 PM
To: Daniels, Clint; 'Guoxiong Huang'; Bruce Griesenbeck (BGriesenbeck@sacog.org); David Ory; Tanisha Taylor (Taylor@sjcog.org); ehahn@Stancog.org; Matt Fell (matt.fell@mcagov.org); terri.king@co.kings.ca.us; jeff@maderactc.org; Kai Han (KHan@fresnocog.org); RBrady@tularecog.org; Vincent Liu (vliu@kerncog.org); Bhupendra Patel (BPatel@ambag.org); JWorthley@slocog.org; blasagna@bcag.org; 'Andrew Orfila'; Sean Tiedgen (stiedgen@srta.ca.gov); Norberg, Keith@TRPA
Cc: Ken Kirkey; ggarry@sacog.org; Stoll, Muggs; Huasha Liu (LIU@scag.ca.gov) (LIU@scag.ca.gov); Mike Bitner (mbitner@fresnocog.org); rball@kerncog.org; terri.king@co.kings.ca.us; patricia@maderactc.org; Marjie.Kirn@mcagov.org; nguyen@sjcog.org; Park, Rosa@DOT; BKimball@tularecog.org; cdevine@bcag.org; hadamson@ambag.org; SDevencenzi@slocog.org; pimhof@sbcag.org; dlittle@srta.ca.gov; Haven, Nick@TRPA; Kalandiyur, Nesamani@ARB; Roberts, Terry@ARB
Subject: Methodology to Adjust EMFAC Output for SB 375 Target Demonstrations

To All MPO Technical Staff,

Now that many of the MPOs are working on their second round of SCSs, and with ARB recently releasing a new version of EMFAC, we want to provide guidance on how to deal with changes arising from different EMFAC versions as you do your GHG quantification determinations for the second round of SCSs.

We request that you use the attached methodology if you will be using a different version of EMFAC for quantifying reductions from your second SCS than the EMFAC version you used for your first SCS. Our intent with this methodology is to maintain the same level of stringency for meeting the current targets even though there are emission rate changes when switching EMFAC versions. When targets are updated next year, they will probably be based on EMFAC 2014, therefore, this methodology would not be required with the new targets until a new version of EMFAC was released to supersede EMFAC 2014. Our plan is to update the methodology at that time.

Please look over this methodology and let us know if you have any questions or concerns. For general questions, please contact me by email at jonathan.taylor@arb.ca.gov or by phone at 916-445-8699. For specific technical questions on the adjustment calculations, please contact Nesamani Kalandiyur at nesamani.kalandiyur@arb.ca.gov or 916-324-0466.

I'd like to take this opportunity to thank all of you for your generous assistance and patience as ARB staff have evaluated your SCSs. I am sure you are all proud of your accomplishments in meeting the goals of SB 375, and we ARB staff look forward to continuing to work with all of you.

Best,

Jon

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Methodology to Calculate CO2 Adjustment to EMFAC Output for SB 375 Target Demonstrations

Background:

In 2010, ARB established regional SB 375 greenhouse gas (GHG) targets in the form of a percent reduction per capita from 2005 for passenger vehicles using the ARB Emission Factor model, EMFAC 2007. EMFAC is a California-specific computer model that calculates weekday emissions of air pollutants from all on-road motor vehicles including passenger cars, trucks, and buses. ARB updates the EMFAC model periodically to reflect the latest planning assumptions (such as vehicle fleet mix) and emissions estimation data and methods. Since the time when targets were set using EMFAC2007, ARB has released two subsequent versions, EMFAC2011[1] and EMFAC2014[2].

ARB has improved the carbon dioxide (CO2) emission rates in EMFAC2011 and EMFAC2014, based on recent emission testing data and updated energy consumption for air conditioning. In addition, vehicle fleet mix has been updated in EMFAC2011 and again in EMFAC2014 based on the latest available Department of Motor Vehicle data at the time of model development. These changes have lowered the overall CO2 emission rates in EMFAC2011 and EMFAC2014 compared to EMFAC2007.

Purpose:

Some metropolitan planning organizations (MPOs) used EMFAC 2007 to quantify GHG emissions reductions from their first Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS); others used EMFAC 2011. As MPOs estimate GHG emissions reductions from subsequent RTP/SCSs, they will use the latest approved version of EMFAC, but using a different model will influence their estimates and their ability to achieve SB 375 targets. The goal of this methodology is to hold each MPO to the same level of stringency in achieving their SB 375 targets regardless of the version of EMFAC used for its second RTP/SCS.

ARB staff has developed this methodology to allow MPOs to adjust the calculation of percent reduction in per capita CO2 emissions used to meet the established targets when using either EMFAC2011 or EMFAC2014 for their second RTP/SCS. This method will neutralize the changes in fleet average emission rates between the version used for the first RTP/SCS and the version used for the second RTP/SCS. The methodology adjusts for the small benefit or disbenefits resulting from the use of a different version of EMFAC by accounting for changes in emission rates, and applies an

[1] EMFAC2011 was approved by USEPA in March 2013.
[2] EMFAC2014 is under review for USEPA approval.

adjustment when quantifying the percent reduction in per capita CO2 emissions using EMFAC2011 or EMFAC2014.

Applicability:

The adjustment is applicable when the first RTP/SCS was developed using either EMFAC2007 or EMFAC2011 and the second RTP/SCS will be developed using a different version of the model (EMFAC2011 or EMFAC2014).

- Hold the 2005 baseline CO2 per capita estimated in the first RTP/SCS constant. Use both the human population and transportation activity data (VMT and speed distribution) from the first RTP/SCS to calculate the adjustment.
- Add the adjustment to the percent reduction in CO2 per capita calculated with EMFAC2011 or EMFAC2014 for the second RTP/SCS. This will allow equivalent comparison to the first RTP/SCS where emissions were established with EMFAC 2007 or EMFAC2011.

Example Adjustment Calculation (hypothetical for illustration purposes):

In this example, the first RTP/SCS was developed using EMFAC2007 and the second RTP/SCS using EMFAC2011 to calculate the CO2 per capita.

Step1: Compile the CO2 per capita numbers from the MPO's first adopted RTP/SCS using EMFAC 2007 without any off-model adjustments for calendar years (CY) 2005, 2020, and 2035 for passenger vehicles.

Calendar Year	EMFAC2007 CO2 Per capita (lbs/day)
2005	30.0
2020	28.8
2035	27.6

Step 2: Calculate the percent reductions in CO2 per capita from the 2005 base year for CY 2020 and 2035 from Step 1.

Calendar Year	EMFAC2007 Percent Reductions (%)
2020	4.0%
2035	8.0%

Step 3: Develop the input files for the EMFAC2011 model using the same activity data for CY 2020 and 2035 from the first adopted RTP/SCS (same activity data used in Step 1) and execute the model.

Step 4: Calculate the CO2 per capita for CY 2020 and 2035 using the EMFAC2011 output from Step 3; do not include Pavley I, LCFS, and ACC benefits for passenger vehicles.

Calendar Year	EMFAC2011 CO2 Per capita (lbs/day)
2020	28.2
2035	27.9

Step 5: Calculate the percent reductions in CO2 per capita for CY 2020 and 2035 calculated in Step 4 from base year 2005 established in Step 1.

Calendar Year	EMFAC2011 Percent Reductions (%)
2020	6.0%
2035	7.0%

Step 6: Calculate the difference in percent reductions between Step 5 and Step 2 (subtract Step 5 results from Step 2 results) for CY 2020 and 2035; this yields the adjustment for the respective CY.

Calendar Year	EMFAC2011 Adjustment (%)
2020	-2.0%
2035	+1.0%

Step 7: Develop the input files for the EMFAC2011 model using the activity data from the new/second RTP/SCS for CY 2020 and 2035 without any off-model adjustments and execute the model.

Step 8: Calculate the CO2 per capita for CY 2020 and 2035 using the EMFAC2011 output from Step 7; do not include Pavley I, LCFS, and ACC benefits for passenger vehicles.

Calendar Year	EMFAC2011 CO2 Per capita (lbs/day)
2020	26.4
2035	26.1

Step 9: Calculate the percent reductions in CO2 per capita for CY 2020 and 2035 calculated in Step 8 from base year 2005 established in Step 1.

Calendar Year	EMFAC2011 Percent Reductions (%)
2020	12.0%
2035	13.0%

Step 10: Add the adjustment factors from Step 6 to the percent reductions calculated for the new/second RTP/SCS (Step 9) using EMFAC 2011 for CY 2020 and 2035.

Calendar Year	Adjusted Percent Reductions (%)
2020	10.0%
2035	14.0%

Follow the same steps to adjust for use of EMFAC2007 or EMFAC2011 to EMFAC2014. Do not include any off-model adjustments during application of the EMFAC adjustment factor.