Appendices

Appendix FEIR-1

Draft EIR Comment Letters

DEPARTMENT OF TRANSPORTATION
DISTRICT 7- OFFICE OF REGIONAL PLANNING
100 S. MAIN STREET, SUITE 100
LOS ANGELES, CA 90012
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Making Conservation
a California Way of Life.

April 22, 2021

Kathleen King
City of Los Angeles, Department of City Planning
221 N. Figueroa Street Suite 1350
Los Angeles, CA 90012

RE: 1111 Sunset Project – Draft Environmental Impact Report (DEIR)
SCH# 2018051043
GTS# 07-LA-2018-03511
Vic. LA-101 PM 01.771
Vic. LA-110 PM 23.869

Dear Kathleen King,

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above referenced project. The Project proposes 48,000 square feet of office space and up to 95,000 square feet of general commercial floor area. Under the Mixed-Use Development Scenario, up to 737 residential units (including up to 76 restricted affordable housing units) would be constructed with up to 180 hotel rooms. Under the No Hotel Development Scenario, a maximum of up to 827 residential units (including up to 76 restricted affordable housing units) would be constructed. Under either development scenario, the proposed uses would be built above a screened six-level parking podium, which would be partially below grade and partially above grade. Implementation of the Project would also require the removal of the existing vacant buildings within the Project Site. The existing Elysian apartment building, which is located on the Project Site, but not a part of the Project, would remain.

The nearest State facilities to the proposed project are SR 110 and US 101. After reviewing the DEIR, Caltrans has the following comments:

Caltrans acknowledges and supports infill development that provides a mix of land uses which allow a neighborhood to meet their needs for housing, work, and services, like the proposed Project aims to facilitate. Caltrans also concurs with Project Design Feature TR-PDF-2, which unbundles car parking, strengthens first-mile/last-mile resources, and builds new crosswalks and wider sidewalks. While Caltrans enthusiastically applauds the establishment and/or significant widening of sidewalks throughout the Plan area, this community benefit should not be primarily achieved through expanded right-of-way or private setback conditions. Improving safety and comfort for people walking or riding bicycles presents a rare opportunity to put existing road space to better use. When the extra space for sidewalks or bikeways is achieved through narrowing or eliminating car travel lanes, the bike- and walkability is further enhanced by calmed traffic and shorter crossing distances. These effects feed into one another, creating greater levels of comfort and allowing the area to become safer for all travelers.

The Project also includes 436 or 421 bike parking spaces depending on which development scenario is chosen. While this is a step in the right direction, Caltrans recommends increasing the amount of bike parking to provide at least one long-term bicycle parking space per residential unit. Since the intention of TR-PDF-2 is to reduce car dependency and lower Vehicle Miles Travelled (VMT), Caltrans also recommends reducing the amount of car parking to the fewest number of spaces possible. Research looking at the relationship between land-use, parking, and transportation indicates that car parking prioritizes driving above all other travel modes and undermines a community's ability to choose public transit and active modes of transportation. Additionally, Rates of car ownership and vehicle miles traveled (VMT) are significantly lower for low-income households than they are for high-income households. Seeing as this project includes affordable housing, this should be taken into serious consideration. There is sufficient justification to reducing the amount of car parking built for affordable housing projects in order to promote affordability and achieve the project's goals.

If the car parking must be built, it should be designed in a way that is conducive to adaptive reuse. They should contain flat floors with ramps on the exterior edge, so that they can be more easily converted to beneficial uses in the future.

Regarding Section (h): *Caltrans Analysis*
Office of Corridor Management (South) requests that detailed sheets be provided for review. Detailed sheets should include all inputs and outputs generated according to the Highway Capacity Manual, 6th Edition for the 95th percentile ramp queue analysis.

A detailed Construction Management Plan (CMP) will be provided under Project Design Feature (TR-PDF-1). It is expected that the following elements will be included in the CMP:

- Advance notification to adjacent property owners and occupants, as well as nearby schools, of upcoming construction activities, including durations and daily hours of construction, and to not impede school drop-off and pickup activities and students using identified pedestrian routes to nearby schools.

- Signs shall be posted along roads identifying construction traffic access or flow limitations due to single lane conditions during periods of truck traffic, if needed.

- Pedestrian/bicycle connections to the bus stops shall remain unblocked. If a bus stop is temporarily relocated during construction, advance notification of alternative bus stop sites and the temporary location of the relocated stop shall be provided to public.

- Any work that would affect the freeways and its facilities, Caltrans has the jurisdiction for review and approval.

Additionally, transportation of heavy construction equipment and/or materials which requires use of oversized-transport vehicles on State highways will need a Caltrans transportation permit. We recommend large size truck trips be limited to off-peak commute periods.

If you have any questions, please contact project coordinator Anthony Higgins, at anthony.higgins@dot.ca.gov and refer to GTS# 07-LA-2018-03511.

Sincerely,

Miya Edmonson

MIYA EDMONSON
IGR/CEQA Branch Chief
cc: Scott Morgan, State Clearinghouse

FORM GEN. 160 (Rev. 8-12)

CITY OF LOS ANGELES

INTER-DEPARTMENTAL CORRESPONDENCE

DATE: April 26, 2021

TO: Vincent P. Bertoni, Director of Planning
Department of City Planning

Attn: Kathleen King, City Planner
Department of City Planning

FROM: Ali Poosti, Division Manager
Wastewater Engineering Services Division
LA Sanitation and Environment

SUBJECT: **1111 SUNSET - NOTICE OF COMPLETION AND AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT REPORT**

This is in response to your March 11, 2021 Notice of Completion and Availability of Draft Environmental Impact Report for the proposed mixed-use project located at 1111-1115 Sunset Boulevard, Los Angeles, CA 90012. LA Sanitation, Wastewater Engineering Services Division has received and logged the notification. Upon review, it has been determined the project is in the final stages of the California Environmental Quality Act review process and requires no additional hydraulic analysis. Please notify our office in the instance that additional environmental review is necessary for this project.

If you have any questions, please call Christopher DeMonbrun at (323) 342-1567 or email at chris.demonbrun@lacity.org

CD/AP: sa

c: Shahram Kharaghani, LASAN
Michael Scaduto, LASAN
Wing Tam, LASAN
Christopher DeMonbrun, LASAN

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Kathleen King <kathleen.king@lacity.org>

SAFER Comment - 1111 Sunset Project, Case No. ENV-2018-177-EIR

2 messages

Paige Fennie <paige@lozeaudrury.com> Mon, Apr 26, 2021 at 1:08 PM
To: kathleen.king@lacity.org
Cc: Richard Drury <richard@lozeaudrury.com>, Stacey Oborne <stacey@lozeaudrury.com>, Komalpreet Toor <komal@lozeaudrury.com>

Dear Ms. King,

Please find attached a comment letter concerning the DEIR prepared for the 1111 Sunset Project, Case No. ENV-2018-177-EIR, on behalf of the Supporters Alliance for Environmental Responsibility ("SAFER").

Thank you,

--
Paige Fennie
Legal Fellow
Lozeau | Drury LLP
1939 Harrison Street, Suite 150
Oakland, California 94612
(510) 836-4200
(510) 836-4205 (fax)
paige@lozeaudrury.com

2021.04.26 DEIR Comment on 1111 Sunset Project.pdf
191K

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 1:25 PM
To: Paige Fennie <paige@lozeaudrury.com>
Cc: Richard Drury <richard@lozeaudrury.com>, Stacey Oborne <stacey@lozeaudrury.com>, Komalpreet Toor <komal@lozeaudrury.com>

Ms. Fennie,

The 1111 Sunset Project Draft EIR comment letter has been received and included in the project file.

Thank you,

LOS ANGELES CITY PLANNING
Kathleen King
Pronouns: She/Hers/Her
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E-NEWS

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Via Email

April 26, 2021

Kathleen King
City of Los Angeles
Department of City Planning
221 N. Figueroa Street, Suite 1350
Los Angeles, CA 90012
kathleen.king@lacity.org

Re: Comment on Draft Environmental Impact Report, 1111 Sunset Project; Case No. ENV-2018-177-EIR

Dear Ms. King:

I am writing on behalf of Supporters Alliance for Environmental Responsibility ("SAFER") regarding the Draft Environmental Impact Report ("DEIR") prepared for the Project known as 1111 Sunset Project, including all actions related or referring to the proposed 994,982 square foot mixed-use development proposed on a 6.72 acre site located at 1111 and 1115 Sunset Boulevard in the City of Los Angeles ("Project").

After reviewing the DEIR, we conclude that the DEIR fails as an informational document and fails to impose all feasible mitigation measures to reduce the Project's impacts. SAFER request that the Department of City Planning address these shortcomings in a revised draft environmental impact report ("RDEIR") and recirculate the RDEIR prior to considering approvals for the Project. We reserve the right to supplement these comments during review of the Final EIR for the Project and at public hearings concerning the Project. *Galante Vineyards v. Monterey Peninsula Water Management Dist*., 60 Cal. App. 4th 1109, 1121 (1997).

Sincerely,

Paige Fennie

Connect Create Collaborate

Kathleen King <kathleen.king@lacity.org>

1111 Sunset Project DEIR Comments (ENV-2018-177-EIR)

2 messages

Yelena Zeltser <yelena@seaca-la.org> Mon, Apr 26, 2021 at 12:37 PM
To: kathleen.king@lacity.org

Dear Ms. King,
On behalf of SEACA, I'm submitting the attached comment letter regarding the 1111 Sunset Project located at 1111-1115 Sunset Blvd (ENV-2018-177-EIR).
Thank you.

--
Yelena Zeltser (she/her)
Southeast Asian Community Alliance
840 N. Broadway, Suite 203E
Los Angeles, CA 90012
(310) 463-8714
www.seaca-la.org

1111 Sunset_DEIR Comments_4.26.21.pdf
828K

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 1:25 PM
To: Yelena Zeltser <yelena@seaca-la.org>

Ms. Zeltser,

The 1111 Sunset Project Draft EIR comment letter has been received and included in the project file.

Thank you,

LOS ANGELES CITY PLANNING

Kathleen King
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E-NEWS

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LOS ANGELES CITY PLANNING

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April 26, 2021

Via Email

Kathleen King
City of Los Angeles, Department of City Planning
221 N. Figueroa Street, Suite 1350
Los Angeles, CA 90012
kathleen.king@lacity.org

Re: Southeast Asian Community Alliance Comments on 1111 Sunset Project (1111 and 1115 Sunset Blvd) Draft Environmental Impact Report (ENV-2018-177-EIR)

Dear Ms. King,

On behalf of the Southeast Asian Community Alliance (SEACA) I respectfully submit comments on the Draft Environmental Impact Report (DEIR) prepared for the 1111 Sunset Project (Project) proposed by Palisades Capital Partners, LLC (Applicant). Specifically, we object to the conclusion that the Project would have less than significant land use impacts and complies with the goals and policies of the Community plan. In addition, the Project would seriously disrupt circulation in the area both during construction and operation causing significant traffic and congestion problems, as well as contributing to greenhouse gas emissions, and poor air quality. Lastly, the analysis fails to adequately address the impacts on park and recreation infrastructure created by the Project. For all these reasons we find the analysis in the DEIR lacking and ask the City to withhold project approvals until the issues raised are addressed and a revised DEIR is recirculated.

SEACA is a community organization that represents low-income immigrant and refugee youth and families in Chinatown, Victor Heights, Solano Canyon, and Lincoln Heights neighborhoods of Los Angeles. Our youth come from deeply low-income families, earning $25,000 or less annually, that rely on public transportation and public open space amenities in their daily lives. Our office is located within one mile from the Project site and many of our youth and families use local Metro and LADOT bus lines directly surrounding the Project site. In addition, our members who live in Victor Heights and/or go to school or work in close proximity to the project will be directly impacted by the traffic, congestion, and temporary displacement of Metro and LADOT lines, as well as by the GHG and air quality impacts generated by the Project.

I. Project Description

The Applicant is requesting 2 programmatic options to be included in the DEIR: the Mixed-Use option would result in the development of up to 737 residential units (with up to 76 income restricted units at very-low income level), an 180-room hotel, commercial and office uses; and the No-Hotel option would result in up to 827 residential units (with up to 76 income restricted units at very-low income level), commercial and office uses. In either case the project will consist of a 49-story, 572 foot residential tower, a 30-story, 408 foot residential tower, a 17-story, 211 foot tower with hotel or residential units, a 57,500 square foot commercial/office use building, all on a 6 level parking podium, and 29 other low-rise residential and commercial buildings on a 994,982 square foot project site. The Project is seeking Density Bonus incentives pursuant to LAMC Section 12.22 A25, and is located in the Central City North Community Plan Area.

II. Project Conflicts with Community Plan

The DEIR erroneously states that the Project will have no significant land use impacts. In fact, the Project is inconsistent with Objective 1-1 of the Central City North Community Plan (Community Plan) "To provide for the preservation of existing housing and for the development of new housing to meet the diverse economic and physical needs of the existing residents and projected population".[1] Although the project does produce new housing, and includes a small percentage of affordable units, the affordability level of the new housing does not match the income level of the surrounding community and therefore the Project cannot meet the diverse needs of the existing residents. Similarly, the Project does not comport with Policy 1-4.2 of Objective 1-4 or the Community Plan, to "Ensure that new housing opportunities minimize displacement of the existing residents"[2] since the development of between 661-751 new market rate units (units affordable to households earning above $92,750 annually[3]) in a community with a median income between $20,417-$49,183[4] is very likely to result in changes in the local real estate market causing displacement of current residents.

In addition, Los Angeles is undeniably in the midst of an affordable housing crisis, which has been exacerbated by the economic recession due to the coronavirus pandemic, where 56% of all renters in the county are cost burdened - meaning they spend more than 30% of household income on rent. However, the crisis is even more acute for Extremely Low Income (ELI) households (those earning 30% of AMI), 74% of which are *severely* rent burdened - meaning they spend more than 50% of their income on housing costs.[5] As such, to be consistent with the Community Plan and the City's General plan, the Project must strive to further the City's housing goals, and provide more affordable units and include units at deeper affordability levels. Under the City's

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[1] https://planning.lacity.org/odocument/e06434a6-341a-48ed-97dc-8f6a85780951/Central_City_North_Community_Plan.pdf. Page III-2.
[2] https://planning.lacity.org/odocument/e06434a6-341a-48ed-97dc-8f6a85780951/Central_City_North_Community_Plan.pdf. Page III-4.
[3] https://www.hcd.ca.gov/grants-funding/income-limits/state-and-federal-income-limits/docs/income-limits-2020.pdf
[4] Data.census.gov. 2019: ACS 5-Year Estimates Subject Tables. Median Income in the Past 12 Months (In 2019 Inflation Adjusted Dollars)
[5] https://1p08d91kd0c03rlxhmhtydpr-wpengine.netdna-ssl.com/wp-content/uploads/2020/07/2020-Los-Angeles-County-Affordable-Housing-Outcomes-Report.pdf

Transit Oriented Communities Incentive Program (TOC) the Project could qualify under Tier 3 Incentives due to proximity of a Rapid Metro line as well as multiple local Metro lines. Under Tier 3 the Project could include up to 10% (or between 74 and 91) ELI units (30% AMI), or 14% (or between 104 and 116) very low income units (50% AMI)[6] while receiving the same level of density incentives as currently requested under the Density Bonus. Given the City's deep housing affordability crisis, the Project must consider an alternative with more and deeper residential affordability. For these reasons the Project cannot be found to be compatible with the Community and General plans.

III. Project Will Have Significant Traffic Impacts

The DEIR errs in its assertion that the Project would not conflict with any plan, ordinance, or policy addressing the circulation system since the project fails to comply with Mobility Plan 2035 and the Plan for a Healthy Los Angeles. In addition, the DEIR incorrectly calculates the VMT household and work VMT thresholds, and should be updated to reflect the correct data.

Policy 1.1 Roadway User Vulnerability and *Policy 3.1 Access for All* of the Mobility Plan 2035 prioritize the safety of "most vulnerable" roadway users and recognizes the need for a multi-modal transportation system[7]. Although the Project claims to be a pedestrian and transit-oriented development, the Project description fails to provide detailed description of pedestrian infrastructure incorporated in the interior of the project. It also fails to articulate *how* the project will support the needs of most vulnerable residents, workers and visitors such as children and youth, low-income people, seniors, and people with limited mobility. A detailed plan of pedestrian infrastructure, internal bike paths, the location of bike parking, and the programmatic way in which vulnerable users will be served by the mobility infrastructure must be produced as part of the Project description and the DEIR analysis.

Similarly, the Project doesn't fulfill many policies of the Plan for a Healthy Los Angeles, including *Policy 1.5 Plan for Health*, *Policy 1.6 Poverty and Health*, and *Policy 1.7 Displacement and Health*[8]. As stated above the affordability level of the income restricted units included in the project does not match the income of the surrounding community, thus these units would not prevent indirect displacement of current surrounding residents or alleviate the circumstances of low-income people with incomes below 30 % AMI. To this end the Project misses a key strategy to reduce VMTs, support multi-modal circulation, and improve the health of vulnerable populations. By including ELI residential units on-site, the Project would create the opportunity for those employed in the retail and service industries on-site to also reside within the Project and potentially walk or bike to work. The Project as currently proposed cannot be said to promote health or improve mobility for low-income community members and thus does not comport.

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[6] https://planning.lacity.org/odocument/39fae0ef-f41d-49cc-9bd2-4e7a2eb528dd/TOCGuidelines.pdf. Section IV Eligibility. Page 7.
[7] https://planning.lacity.org/eir/1111_sunset/deir/files/D_IVL.pdf. Page IV.L-29 of the DEIR
[8] https://planning.lacity.org/eir/1111_sunset/deir/files/D_IVL.pdf. Page IV.L-34 of the DEIR

In addition, the DEIR incorrectly calculates the VMT thresholds[9] by identifying the Project as being located within the East LA APC TAG area. The Project is located within the Central City North Community Plan area and thus with the Central LA APC. The VMT Thresholds should be recalculated and the error addressed in a recirculated draft.

Lastly, a project of this size and scope will inevitably have negative impacts on circulation during the construction phase. The Project anticipates a construction period of 44-63 month during which the Site will experience up to 280 haul truck trips per day[10]. This will put a significant strain on the low-income residents, youth, and people with limited mobility who are transit dependent. It is clear that bus routes will be disrupted due to increased traffic congestion, which puts undue burden on the most vulnerable population. The Project's Construction Management Plan (CMP) must include measures that specifically address the needs of transit dependent populations in order to comply.

IV. Project Fails to Properly Assess and Mitigate GHG Impacts

The DEIR improperly analyzes potentially significant GHG impacts of the Project on the surrounding community, especially those most vulnerable to GHG effects such as children and elderly. According to CalEnviroScreen the Project is located within an area that is in the 98th percentile for diesel emissions, and in the 99th Pollution Burden Percentile[11]. The Project Site and the adjacent community of Chinatown are home to region's most vulnerable population of low-income immigrants and refugees, including a disproportionate number of seniors[12]. The Project is also located within half a mile from Castelar Elementary, Downtown Magnets High School, and Alpine Recreation Center a ½ mile park that is the only recreation and gathering space for seniors, families, and youth in the area; and within 1 mile of the Roybal Learning Center, and the Cortines School of Visual & Performing Arts.

The DEIR does not set a threshold for GHG emissions but sets evaluation criteria according to CEQA Guidelines Section 15064.4(b). Although under CEQA lead agencies have the discretion to select a quantitative or qualitative analysis, both shall be "based to the extent possible on scientific and factual data" and "must reasonably reflect evolving scientific knowledge and state regulatory schemes."[13]. The selected analysis must be supported by substantial evidence and be supported by evliving scientific knowledge and regulatory policies. None of the plans cited in the DEIR (i.e., AB 32 Scoping Plan, SCAG's 2016-2040 RTP/SCS, City's ClimateLA Plan, City's Green Building Ordinance, City's Mobility 2035 Plan, and City's Green LA Plan) contain vital features of a Climate Action Plan (pursuant to CEQA Guidelines §§ 15064.4(b)(3) and 15183.5(b)(1)), nor do they contain the mandatory, project-specific measures that satisfy CEQA Guidelines § 15064(h)(3). In addition, the DEIR rejects the use of the South Coast Air Quality Management District (SCAQMD)'s 10,000 $MTCO_2e$ threshold despite applying these thresholds

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[9] https://planning.lacity.org/eir/1111_sunset/deir/files/D_IVL.pdf. Table IV.l-3
[10] https://planning.lacity.org/eir/1111_sunset/deir/files/App_Q.pdf. Page 139
[11] https://oehha.ca.gov/calenviroscreen/maps-data
[12] http://maps.latimes.com/neighborhoods/neighborhood/chinatown
[13] https://opr.ca.gov/ceqa/climate-change.html. CEQA Guidelines § 15064.4 subds. (a) & (b)

in other cases. Under the SCAQMD's thresholds the Project would be found to have significant GHG impacts, and merit mitigation measures. Lastly, the DEIR cites SCAG's 2016-2040 RTP/SCS regulatory framework for analysis despite an updated 2020-2045 RTP/SCS having been adopted.

V. Project Cannot Be Properly Evaluated on Open Space Resources

The Project description fails to provide any meaningful details about the features, design elements, or programmatic components associated with the Project's open space areas. Despite providing for between 82,925 square feet (under the mixed use option) and 93,050 square feet (under no-hotel option) of open space, the Applicant did not see fit to include any plan for how this space will be used to benefit future residents, workers, visitors or the surrounding community. Therefore, the DEIR cannot properly analyze any impacts or mitigating features of the Project.

The Project area is located adjacent to one of the poorest and open-space limited communities in the City of Los Angeles. Furthermore, the transit-dependent community members face barriers in accessing the broader network of City parks and the green infrastructure of the broader region. At full buildout the Project will bring between 1,777 (mixed use option) and 1,994 (no hotel option) additional residents into the community, and add between 582 (mixed use option) and 492 (no hotel option) workers daily to the area. Here, again, the low-income residents, seniors, and children and youth will be most affected by the Project's impacts since these populations most rely on local, public open-space infrastructure. The Project must be updated with a plan for public-serving open space and green infrastructure focused on addressing the needs of the local community. A new DEIR analyzing specific impacts and mitigation measures must be updated and recirculated.

VI. Conclusion

SEACA appreciates the opportunity to provide these comments on the Project's DEIR. We are committed to make our City and especially the Chinatown community a thriving and safe community where our youth and families can live, work, and recreate. We see ourselves and our community as stakeholders in the Project and have a direct interest in seeing that the State's environmental laws and the City's land-use laws are being followed, that the City satisfies its affordable housing obligations, and that new development not contribute to the climate-change crisis that threatens low-income communities of color. For the above reasons we urge the City to address our concerns through and amended and recirculated DEIR with additional mitigation measures.

Sincerely,

Yelena Zeltser
Policy Coordinator

P: (626) 381-9248
F: (626) 389-5414
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Mitchell M. Tsai
Attorney At Law

155 South El Molino Avenue
Suite 104
Pasadena, California 91101

VIA U.S. MAIL & E-MAIL

April 26, 2021

Kathleen King, City Planner
City of Los Angeles Planning Department
221 N. Figueroa St., Suite 1350
Los Angeles, CA 90012
Em: Kathleen.king@lacity.org

RE: 1111 Sunset Mixed-Use Project

Dear Ms. King,

On behalf of the Southwest Regional Council of Carpenters ("**Commenter**" or "**Carpenter**"), my Office is submitting these comments on the City of Los Angeles' ("**City**" or "**Lead Agency**") Draft Environmental Impact Report ("**DEIR**") (SCH No. 2018051043) for the 1111 Sunset Mixed-Use Project, a new mixed-use development proposed on a 272,918-square-foot (6.27-acre) site with 994, 982 square feet of floor area under two different development scenarios ("**Project**").

The Southwest Carpenters is a labor union representing 50,000 union carpenters in six states and has a strong interest in well ordered land use planning and addressing the environmental impacts of development projects.

Individual members of the Southwest Carpenters live, work and recreate in the City and surrounding communities and would be directly affected by the Project's environmental impacts.

Commenters expressly reserves the right to supplement these comments at or prior to hearings on the Project, and at any later hearings and proceedings related to this Project. Cal. Gov. Code § 65009(b); Cal. Pub. Res. Code § 21177(a); *Bakersfield Citizens for Local Control v. Bakersfield* (2004) 124 Cal. App. 4th 1184, 1199-1203; see *Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal. App. 4th 1109, 1121.

Commenters expressly reserves the right to supplement these comments at or prior to hearings on the Project, and at any later hearings and proceedings related to this Project. Cal. Gov. Code § 65009(b); Cal. Pub. Res. Code § 21177(a); *Bakersfield Citizens*

for Local Control v. Bakersfield (2004) 124 Cal. App. 4th 1184, 1199-1203; see *Galante Vineyards v. Monterey Water Dist.* (1997) 60 Cal. App. 4th 1109, 1121.

Commenters incorporates by reference all comments raising issues regarding the EIR submitted prior to certification of the EIR for the Project. *Citizens for Clean Energy v City of Woodland* (2014) 225 Cal. App. 4th 173, 191 (finding that any party who has objected to the Project's environmental documentation may assert any issue timely raised by other parties).

Moreover, Commenter requests that the Lead Agency provide notice for any and all notices referring or related to the Project issued under the California Environmental Quality Act ("**CEQA**"), Cal Public Resources Code ("**PRC**") § 21000 *et seq*, and the California Planning and Zoning Law ("**Planning and Zoning Law**"), Cal. Gov't Code §§ 65000–65010. California Public Resources Code Sections 21092.2, and 21167(f) and Government Code Section 65092 require agencies to mail such notices to any person who has filed a written request for them with the clerk of the agency's governing body.

The City should require the Applicant provide additional community benefits such as requiring local hire and use of a skilled and trained workforce to build the Project. The City should require the use of workers who have graduated from a Joint Labor Management apprenticeship training program approved by the State of California, or have at least as many hours of on-the-job experience in the applicable craft which would be required to graduate from such a state approved apprenticeship training program or who are registered apprentices in an apprenticeship training program approved by the State of California.

Community benefits such as local hire and skilled and trained workforce requirements can also be helpful to reduce environmental impacts and improve the positive economic impact of the Project. Local hire provisions requiring that a certain percentage of workers reside within 10 miles or less of the Project Site can reduce the length of vendor trips, reduce greenhouse gas emissions and providing localized economic benefits. Local hire provisions requiring that a certain percentage of workers reside within 10 miles or less of the Project Site can reduce the length of vendor trips, reduce greenhouse gas emissions and providing localized economic benefits. As environmental consultants Matt Hagemann and Paul E. Rosenfeld note:

> [A]ny local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

March 8, 2021 SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling.

Skilled and trained workforce requirements promote the development of skilled trades that yield sustainable economic development. As the California Workforce Development Board and the UC Berkeley Center for Labor Research and Education concluded:

> . . . labor should be considered an investment rather than a cost – and investments in growing, diversifying, and upskilling California's workforce can positively affect returns on climate mitigation efforts. In other words, well trained workers are key to delivering emissions reductions and moving California closer to its climate targets.[1]

The City should also require the Project to be built to standards exceeding the current 2019 California Green Building Code to mitigate the Project's environmental impacts and to advance progress towards the State of California's environmental goals.

I. EXPERTS

This comment letter includes comments from air quality and greenhouse gas experts Matt Hagemann, P.G., C.Hg. and Paul Rosenfeld, Ph.D. concerning the DEIR. Their comments, attachments, and Curriculum Vitae ("CV") are attached hereto and are incorporated herein by reference.

Matt Hagemann, P.G., C.Hg. ("Mr. Hagemann") has over 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Mr. Hagemann also served as Senior

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[1] California Workforce Development Board (2020) Putting California on the High Road: A Jobs and Climate Action Plan for 2030 at p. ii, *available at* https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf

Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closer. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring.

For the past 15 years, Mr. Hagemann has worked as a founding partner with SWAPE (Soil/Water/Air Protection Enterprise). At SWAPE, Mr. Hagemann has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality, and greenhouse gas emissions.

Mr. Hagemann has a Bachelor of Arts degree in geology from Humboldt State University in California and a Masters in Science degree from California State University Los Angeles in California.

Paul Rosenfeld, Ph.D. ("Dr. Rosenfeld") is a principal environmental chemist at SWAPE. Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts on human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risks, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from unconventional oil drilling operations, oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, and many other industrial and agricultural sources. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particular matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants, Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at dozens of sites and has testified as an expert witness on more than ten cases involving exposure to air contaminants from industrial sources.

Dr. Rosenfeld has a Ph.D. in soil chemistry from the University of Washington, M.S. in environmental science from U.C. Berkeley, and B.A. in environmental studies from U.C. Santa Barbara.

II. THE PROJECT WOULD BE APPROVED IN VIOLATION OF THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

A. Background Concerning the California Environmental Quality Act

CEQA has two basic purposes. First, CEQA is designed to inform decision makers and the public about the potential, significant environmental effects of a project. 14 California Code of Regulations ("**CCR**" or "**CEQA Guidelines**") § 15002(a)(1).[2] "Its purpose is to inform the public and its responsible officials of the environmental consequences of their decisions *before* they are made. Thus, the EIR 'protects not only the environment but also informed self-government.' [Citation.]" *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal. 3d 553, 564. The EIR has been described as "an environmental 'alarm bell' whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return." *Berkeley Keep Jets Over the Bay v. Bd. of Port Comm'rs.* (2001) 91 Cal. App. 4th 1344, 1354 ("*Berkeley Jets")*; *County of Inyo v. Yorty* (1973) 32 Cal. App. 3d 795, 810.

Second, CEQA directs public agencies to avoid or reduce environmental damage when possible by requiring alternatives or mitigation measures. CEQA Guidelines § 15002(a)(2) and (3). *See also, Berkeley Jets,* 91 Cal. App. 4th 1344, 1354; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal. 3d 553; *Laurel Heights Improvement Ass'n v. Regents of the University of California* (1988) 47 Cal. 3d 376, 400. The EIR serves to provide public agencies and the public in general with information about the effect

[2] The CEQA Guidelines, codified in Title 14 of the California Code of Regulations, section 15000 *et seq*, are regulatory guidelines promulgated by the state Natural Resources Agency for the implementation of CEQA. (Cal. Pub. Res. Code § 21083.) The CEQA Guidelines are given "great weight in interpreting CEQA except when . . . clearly unauthorized or erroneous." *Center for Biological Diversity v. Department of Fish & Wildlife* (2015) 62 Cal. 4th 204, 217.

that a proposed project is likely to have on the environment and to "identify ways that environmental damage can be avoided or significantly reduced." CEQA Guidelines § 15002(a)(2). If the project has a significant effect on the environment, the agency may approve the project only upon finding that it has "eliminated or substantially lessened all significant effects on the environment where feasible" and that any unavoidable significant effects on the environment are "acceptable due to overriding concerns" specified in CEQA section 21081. CEQA Guidelines § 15092(b)(2)(A–B).

While the courts review an EIR using an "abuse of discretion" standard, "the reviewing court is not to 'uncritically rely on every study or analysis presented by a project proponent in support of its position.' A 'clearly inadequate or unsupported study is entitled to no judicial deference.'" *Berkeley Jets*, 91 Cal. App. 4th 1344, 1355 (emphasis added) (quoting *Laurel Heights,* 47 Cal. 3d at 391, 409 fn. 12). Drawing this line and determining whether the EIR complies with CEQA's information disclosure requirements presents a question of law subject to independent review by the courts. *Sierra Club v. Cnty. of Fresno* (2018) 6 Cal. 5th 502, 515; *Madera Oversight Coalition, Inc. v. County of Madera* (2011) 199 Cal. App. 4th 48, 102, 131. As the court stated in *Berkeley Jets*, 91 Cal. App. 4th at 1355:

> A prejudicial abuse of discretion occurs "if the failure to include relevant information precludes informed decision-making and informed public participation, thereby thwarting the statutory goals of the EIR process.

The preparation and circulation of an EIR is more than a set of technical hurdles for agencies and developers to overcome. The EIR's function is to ensure that government officials who decide to build or approve a project do so with a full understanding of the environmental consequences and, equally important, that the public is assured those consequences have been considered. For the EIR to serve these goals it must present information so that the foreseeable impacts of pursuing the project can be understood and weighed, and the public must be given an adequate opportunity to comment on that presentation before the decision to go forward is made. *Communities for a Better Environment v. Richmond* (2010) 184 Cal. App. 4th 70, 80 (quoting *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal. 4th 412, 449–450).

B. CEQA Requires Revision and Recirculation of an Environmental Impact Report When Substantial Changes or New Information Comes to Light

Section 21092.1 of the California Public Resources Code requires that "[w]hen significant new information is added to an environmental impact report after notice has been given pursuant to Section 21092 … but prior to certification, the public agency shall give notice again pursuant to Section 21092, and consult again pursuant to Sections 21104 and 21153 before certifying the environmental impact report" in order to give the public a chance to review and comment upon the information. CEQA Guidelines § 15088.5.

Significant new information includes "changes in the project or environmental setting as well as additional data or other information" that "deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative)." CEQA Guidelines § 15088.5(a). Examples of significant new information requiring recirculation include "new significant environmental impacts from the project or from a new mitigation measure," "substantial increase in the severity of an environmental impact," "feasible project alternative or mitigation measure considerably different from others previously analyzed" as well as when "the draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded." *Id.*

An agency has an obligation to recirculate an environmental impact report for public notice and comment due to "significant new information" regardless of whether the agency opts to include it in a project's environmental impact report. *Cadiz Land Co. v. Rail Cycle* (2000) 83 Cal. App. 4th 74, 95 [finding that in light of a new expert report disclosing potentially significant impacts to groundwater supply "the EIR should have been revised and recirculated for purposes of informing the public and governmental agencies of the volume of groundwater at risk and to allow the public and governmental agencies to respond to such information."]. If significant new information was brought to the attention of an agency prior to certification, an agency is required to revise and recirculate that information as part of the environmental impact report.

For all of the reasons outlined below, the DEIR should be revised and recirculated for additional public comment.

C. Due to the COVID-19 Crisis, the City Must Adopt a Mandatory Finding of Significance that the Project May Cause a Substantial Adverse Effect on Human Beings and Mitigate COVID-19 Impacts

CEQA requires that an agency make a finding of significance when a Project may cause a significant adverse effect on human beings. PRC § 21083(b)(3); CEQA Guidelines § 15065(a)(4).

Public health risks related to construction work requires a mandatory finding of significance under CEQA. Construction work has been defined as a Lower to High-risk activity for COVID-19 spread by the Occupations Safety and Health Administration. Recently, several construction sites have been identified as sources of community spread of COVID-19.[3]

SWRCC recommends that the Lead Agency adopt additional CEQA mitigation measures to mitigate public health risks from the Project's construction activities. SWRCC requests that the Lead Agency require safe on-site construction work practices as well as training and certification for any construction workers on the Project Site.

In particular, based upon SWRCC's experience with safe construction site work practices, SWRCC recommends that the Lead Agency require that while construction activities are being conducted at the Project Site:

Construction Site Design:

- The Project Site will be limited to two controlled entry points.
- Entry points will have temperature screening technicians taking temperature readings when the entry point is open.
- The Temperature Screening Site Plan shows details regarding access to the Project Site and Project Site logistics for conducting temperature screening.
- A 48-hour advance notice will be provided to all trades prior to the first day of temperature screening.

[3] Santa Clara County Public Health (June 12, 2020) COVID-19 CASES AT CONSTRUCTION SITES HIGHLIGHT NEED FOR CONTINUED VIGILANCE IN SECTORS THAT HAVE REOPENED, *available at* https://www.sccgov.org/sites/covid19/Pages/press-release-06-12-2020-cases-at-construction-sites.aspx.

- The perimeter fence directly adjacent to the entry points will be clearly marked indicating the appropriate 6-foot social distancing position for when you approach the screening area. Please reference the Apex temperature screening site map for additional details.
- There will be clear signage posted at the project site directing you through temperature screening.
- Provide hand washing stations throughout the construction site.

Testing Procedures:

- The temperature screening being used are non-contact devices.
- Temperature readings will not be recorded.
- Personnel will be screened upon entering the testing center and should only take 1-2 seconds per individual.
- Hard hats, head coverings, sweat, dirt, sunscreen or any other cosmetics must be removed on the forehead before temperature screening.
- Anyone who refuses to submit to a temperature screening or does not answer the health screening questions will be refused access to the Project Site.
- Screening will be performed at both entrances from 5:30 am to 7:30 am.; main gate [ZONE 1] and personnel gate [ZONE 2]
- After 7:30 am only the main gate entrance [ZONE 1] will continue to be used for temperature testing for anybody gaining entry to the project site such as returning personnel, deliveries, and visitors.
- If the digital thermometer displays a temperature reading above 100.0 degrees Fahrenheit, a second reading will be taken to verify an accurate reading.

- If the second reading confirms an elevated temperature, DHS will instruct the individual that he/she will not be allowed to enter the Project Site. DHS will also instruct the individual to promptly notify his/her supervisor and his/her human resources (HR) representative and provide them with a copy of Annex A.

Planning

- Require the development of an Infectious Disease Preparedness and Response Plan that will include basic infection prevention measures (requiring the use of personal protection equipment), policies and procedures for prompt identification and isolation of sick individuals, social distancing (prohibiting gatherings of no more than 10 people including all-hands meetings and all-hands lunches) communication and training and workplace controls that meet standards that may be promulgated by the Center for Disease Control, Occupational Safety and Health Administration, Cal/OSHA, California Department of Public Health or applicable local public health agencies.[4]

The United Brotherhood of Carpenters and Carpenters International Training Fund has developed COVID-19 Training and Certification to ensure that Carpenter union members and apprentices conduct safe work practices. The Agency should require that all construction workers undergo COVID-19 Training and Certification before being allowed to conduct construction activities at the Project Site.

D. The Project Description is Not Stable and Finite

"[A]n accurate, stable and finite project description is the *sine qua non* of an informative and legally sufficient" environmental document. (*County of Inyo v. City of Los Angeles* (1977) 71 Cal. App. 3d 185, 200.) "A curtailed or distorted project description

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[4] *See also* The Center for Construction Research and Training, North America's Building Trades Unions (April 27 2020) NABTU and CPWR COVIC-19 Standards for U.S Constructions Sites, *available at* https://www.cpwr.com/sites/default/files/NABTU_CPWR_Standards_COVID-19.pdf; Los Angeles County Department of Public Works (2020) Guidelines for Construction Sites During COVID-19 Pandemic, *available at* https://dpw.lacounty.gov/building-and-safety/docs/pw_guidelines-construction-sites.pdf.

..

may stultify the objectives of the reporting process" as an accurate, stable and finite project description is necessary to allow "affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance. (*Id.* at 192 – 93.) Courts determine *de novo* whether an agency proceeded "in a manner required by law" in maintaining a stable and consistent project description. (*Id.* at 200.)

Here, the project description is not stable and finite. The project description in DEIR states that the DEIR contemplates two development scenarios. (DEIR, II-1.) The first Project scenario is a mixed-use development with a hotel use; and the second scenario is a mixed-use development without a hotel use. The DEIR then speculates that under either scenario, the environmental impacts would be the same because the Project would be comprised of a maximum of 994,982 square feet of floor area. This is inaccurate. The DEIR also states no basis for a future decision of which scenario would ultimately be chosen or how a decision would be made.

This description is also unstable because the DEIR precludes a full environmental analysis of both scenarios. A scenario with additional residential units and no hotel use would not have the same impacts as a scenario with a hotel use and a reduction in residential uses. There is insufficient information in the DEIR to analyze and evaluate both development scenarios.

E. The DEIR's Mitigation Measures are Impermissibly Vague and Defer Critical Details

The DEIR improperly defers critical details of mitigation measures. Feasible mitigation measures for significant environmental effects must be set forth in an EIR for consideration by the lead agency's decision makers and the public before certification of the EIR and approval of a project. The formulation of mitigation measures generally cannot be deferred until after certification of the EIR and approval of a project. CEQA Guidelines § 15126.4(a)(1)(B) ("…[f]ormulation of mitigation measures should not be deferred until some future time.").

Deferring critical details of mitigation measures undermines CEQA's purpose as a public information and decision-making statute. "[R]eliance on tentative plans for future mitigation after completion of the CEQA process significantly undermines CEQA's goals of full disclosure and informed decisionmaking; and[,] consequently, these mitigation plans have been overturned on judicial review as constituting improper deferral of environmental assessment." *Communities for a Better Environment v. City of Richmond* (2010) 184 Cal. App. 4th 70, 92 ("*Communities*"). As the Court noted in *Sundstrom v. County of Mendocino* (1988) 202 Cal.App.3d 296, 307, "[a] study conducted after approval of a project will inevitably have a diminished influence on decision-making. Even if the study is subject to administrative approval, it is analogous to the sort of post hoc rationalization of agency actions that has been repeatedly condemned in decisions construing CEQA."

A lead agency's adoption of an EIR's proposed mitigation measure for a significant environmental effect that merely states a "generalized goal" to mitigate a significant effect without committing to any specific criteria or standard of performance violates CEQA by improperly deferring the formulation and adoption of enforceable mitigation measures. *San Joaquin Raptor Rescue Center v. County of Merced* (2007) 149 Cal.App.4th 645, 670; *Communities*, 184 Cal.App.4th at 93 ("EIR merely proposes a generalized goal of no net increase in greenhouse gas emissions and then sets out a handful of cursorily described mitigation measures for future consideration that might serve to mitigate the [project's significant environmental effects."); cf. *Sacramento Old City Assn. v. City Council* (1991) 229 Cal.App.3d 1011, 1028-1029 (upheld EIR that set forth a range of mitigation measures to offset significant traffic impacts where performance criteria would have to be met, even though further study was needed and EIR did not specify which measures had to be adopted by city).].

Here, the DEIR features several mitigation measures which are impermissibly vague and defer critical details:

- *AIR-MM-4-6*: AIR-MM-4 specifies that construction equipment will be maintained and operated to minimize exhaust emissions but no plans or details are included other than minimization of idling times which lack enforcement. AIR-MM-5 specifies that "to the extent possible" diesel/gasoline power generator use should be minimized and should be placed 100 feet from sensitive land uses. AIR-MM-6 states that the Project "would include…to the extent commercially available and feasible…"solar-powered generators for construction use.
- *CUL-MM-1*: States that a qualified archaeologist will be retained to prepare a Cultural Resource Monitoring and Treatment Plan but fails to include details of

that plan in the DEIR or include any performance standards by which a future plan would be prepared.

- *GEO-MM-1*: Calls for a paleontologist to develop a site-specific Paleontological Resource Mitigation and Treatment Plan but fails to specify any details of that plan or any performance standard by which a future plan would be prepared.

Particularly problematic is the DEIR's analysis, findings and subsequent mitigation of the Project's hazards and hazardous materials impacts. As found by SWAPE in their April 23 letter regarding this Project[5], the DEIR and Phase I ESA describe six abandoned oil wells which were abandoned before modern standards were even published. (Ex. D, 1-2.) There are also onsite contaminations from oilfield operations with impacts to soil and vapor with methane present. Yet, MM-HAZ-1 calls for all wells to be abandoned in accordance with the California Geologic Energy Management Division standards—which will not be done until prior to the issuance of a building permit. (DEIR, I-24.)

Furthermore, HAZ-MM-3 calls for a soil and management plan to address on-site contaminated soil which will also be deferred until such time that a building permit will issue for the Project. (DEIR, I-25.) But any soil contamination plan should be included in the DEIR with a full site characterization and evaluation of the potential risks with a cleanup certified by DTSC.

As a result of the above deficiencies in the DEIR's analysis and mitigation efforts, the DEIR needs to be revised and recirculated with a full site characterization and cleanup plans that are subjected to public comment and an appropriate level of specificity to ensure adequacy and enforceability.

E. <u>The DEIR Fails to Support Its Findings with Substantial Evidence</u>

When new information is brought to light showing that an impact previously discussed in the DEIR but found to be insignificant with or without mitigation in the DEIR's analysis has the potential for a significant environmental impact supported by substantial evidence, the EIR must consider and resolve the conflict in the evidence. See *Visalia Retail, L.P. v. City of Visalia* (2018) 20 Cal. App. 5th 1, 13, 17; see also *Protect the Historic Amador Waterways v. Amador Water Agency* (2004) 116 Cal. App. 4th 1099, 1109. While a lead agency has discretion to formulate standards for determining

[5] April 23, 2021 SWAPE Letter to Greg Sonstein re Comments on 1111 Sunset Project. Attached hereto as Exhibit D.

significance and the need for mitigation measures—the choice of any standards or thresholds of significance must be "based to the extent possible on scientific and factual data and an exercise of reasoned judgment based on substantial evidence. CEQA Guidelines § 15064(b); *Cleveland Nat'l Forest Found. v. San Diego Ass'n of Gov'ts* (2017) 3 Cal. App. 5th 497, 515; *Mission Bay Alliance v. Office of Community Inv. & Infrastructure* (2016) 6 Cal. App. 5th 160, 206. And when there is evidence that an impact could be significant, an EIR cannot adopt a contrary finding without providing an adequate explanation along with supporting evidence. *East Sacramento Partnership for a Livable City v. City of Sacramento* (2016) 5 Cal. App. 5th 281, 302.

In addition, a determination that regulatory compliance will be sufficient to prevent significant adverse impacts must be based on a project-specific analysis of potential impacts and the effect of regulatory compliance. In *Californians for Alternatives to Toxics v. Department of Food & Agric.* (2005) 136 Cal. App. 4th 1, the court set aside an EIR for a statewide crop disease control plan because it did not include an evaluation of the risks to the environment and human health from the proposed program but simply presumed that no adverse impacts would occur from use of pesticides in accordance with the registration and labeling program of the California Department of Pesticide Regulation. *See also Ebbetts Pass Forest Watch v Department of Forestry & Fire Protection* (2008) 43 Cal. App. 4th 936, 956 (fact that Department of Pesticide Regulation had assessed environmental effects of certain herbicides in general did not excuse failure to assess effects of their use for specific timber harvesting project).

1. *The DEIR Fails to Support its Findings on Greenhouse Gas Impacts with Substantial Evidence.*

CEQA Guidelines § 15064.4 allow a lead agency to determine the significance of a project's GHG impact via a qualitative analysis (e.g., extent to which a project complies with regulations or requirements of state/regional/local GHG plans), and/or a quantitative analysis (e.g., using model or methodology to estimate project emissions and compare it to a numeric threshold). So too, CEQA Guidelines allow lead agencies to select what model or methodology to estimate GHG emissions so long as the selection is supported with substantial evidence, and the lead agency "should explain the limitations of the particular model or methodology selected for use." CEQA Guidelines § 15064.4(c).

CEQA Guidelines sections 15064.4(b)(3) and 15183.5(b) allow a lead agency to consider a project's consistency with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

CEQA Guidelines §§ 15064.4(b)(3) and 15183.5(b)(1) make clear qualified GHG reduction plans or CAPs should include the following features:

> (1) **Inventory**: Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities (e.g., projects) within a defined geographic area (e.g., lead agency jurisdiction);
>
> (2) **Establish GHG Reduction Goal**: Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable;
>
> (3) **Analyze Project Types**: Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area;
>
> (4) **Craft Performance Based Mitigation Measures**: Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level;
>
> (5) **Monitoring**: Establish a mechanism to monitor the CAP progress toward achieving said level and to require amendment if the plan is not achieving specified levels;

Collectively, the above-listed CAP features tie qualitative measures to quantitative results, which in turn become binding via proper monitoring and enforcement by the jurisdiction—all resulting in real GHG reductions for the jurisdiction as a whole, and the substantial evidence that the incremental contribution of an individual project is not cumulatively considerable.

Here, the DEIR's analysis of greenhouse gas emissions impacts is not supported by substantial evidence for all of the reasons outlined in SWAPE's April 23, 2021 letter regarding their review of the DEIR:

- The DEIR utilized an incorrect and unsubstantiated quantitative analysis of emissions;

- The DEIR incorrect relied upon GHG reduction measures and project design features (PDFs);
- The DEIR failed to identify a potentially significant GHG impact when applying a 2.6 MT CO_2e/SP/year threshold per AEP guidance[6]; and
- The DEIR incorrectly relied upon SCAG's Outdated RTP/SCS, and failed to consider performance-based standards under SCAG's latest RTP/SCS plan.

(Exhibit D, 30-36.)

2. *The DEIR Fails to Support its Findings on Air Quality Impacts with Substantial Evidence.*

Second, the DEIR's Air Quality analysis is fundamentally flawed and not supported by substantial evidence for all the reasons outlined in SWAPE's comments, including:

- Use of unsubstantiated input parameters to estimate project emissions,
  - Unsubstantiated reduction to default CO2 intensity factor;
  - Unsubstantiated changes to individual construction phase lengths;
  - Unsubstantiated changes to number of construction days per week;
  - Unsubstantiated changes to off-road construction equipment unit amounts;
  - Unsubstantiated changes to hauling, vendor, and worker trip lengths and numbers;
  - Unsubstantiated operational vehicle trip rates;
  - Unsubstantiated reduction to energy use value;
  - Unsubstantiated changes to stationary generator emissions factors;
  - Incorrect application of Tier 4 Final mitigation for construction, coating, and paving phases;
  - Incorrect application of operational mitigation measures; and
  - Failing to adequately analyze diesel particulate matter health risk emissions and identify a potentially significant health risk impact.

(Exhibit D, 1-30.)

Additionally, as noted above, the DEIR fails to consider or include many feasible mitigation measures proposed by SWAPE to reduce significant air quality impacts.

[6] "Beyond Newhall and 2020: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California." Association of Environmental Professionals (AEP), October 2016, available at: https://califaep.org/docs/AEP-2016_Final_White_Paper.pdf, p. 40.

(DEIR, 24-31.) The DEIR needs to be revised and recirculated with a substantiated air quality analysis that includes all feasible mitigation measures to reduce impacts.

3. The DEIR Fails to Support its Findings on Transportation Impacts with Substantial Evidence.

CEQA Guidelines § 15064.3(b) requires analysis of a Project's vehicle miles traveled (VMT) impacts as part of the environmental document's transportation impacts analysis. The OPR technical guidance suggests that projects which have a VMT per capita of 15% or more below existing conditions may indicate a less than significant transportation impact relating to VMT.[7] Assuming then this is the proper methodology, the DEIR fails to demonstrate a less than significant impact with respect to VMT.

The DEIR utilizes the East LA APC impact thresholds for a significance determination which underestimates resident and worker trips for the Project site and is unsubstantiated. The proper Project baseline should be the existing conditions at the site and the DEIR needs to demonstrate a 15% or below reduction in VMT to demonstrate a less than significant impact.

F. The DEIR Improperly Labels Mitigation Measures as "Project Design Features"

The DEIR improperly labels mitigation measures for "Project Design Features" or "PDFs" which the DEIR purports will "reduce the potential for environmental effects." (DEIR, I-14~19.)

Relying on the PDFs, the DEIR concludes in many instances that the Project's impacts are less than significant and that no mitigation is required.

However, it is established that "'[a]voidance, minimization and / or mitigation measure' . . . are not 'part of the project.' . . . compressing the analysis of impacts and mitigation measures into a single issue . . disregards the requirements of CEQA." *Lotus v. Department of Transportation* (2014) 223 Cal. App. 4th 645, 656.

When "an agency decides to incorporate mitigation measures into its significance determination, and relies on those mitigation measures to determine that no significant effects will occur, that agency must treat those measures as though there were adopted

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[77] OPR Technical Advisory, On Evaluating Transportation Impacts in CEQA (Dec. 2018), available at https://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf.

following a finding of significance." *Lotus, supra*, 223 Cal. App. 4th at 652 [citing CEQA Guidelines § 15091(a)(1) and Cal. Public Resources Code § 21081(a)(1).

By labeling mitigation measures as project design features, the City violates CEQA by failing to disclose "the analytic route that the agency took from the evidence to its findings." Cal. Public Resources Code § 21081.5; CEQA Guidelines § 15093; *Village Laguna of Laguna Beach, Inc. v. Board of Supervisors* (1982) 134 Cal. App. 3d 1022, 1035 (quoting *Topanga Assn for a Scenic Community v. County of Los Angeles* (1974) 11 Cal. 3d 506, 515).

The DEIR's use of "Project Design Features" further violates CEQA because such measures would not be included in the Project's Mitigation Monitoring and Reporting Program CEQA requires lead agencies to adopt mitigation measures that are fully enforceable and to adopt a monitoring and/or reporting program to ensure that the measures are implemented to reduce the Project's significant environmental effects to the extent feasible. PRC § 21081.6; CEQA Guidelines § 15091(d). Therefore, using Project Design Features in lieu of mitigation measures violates CEQA.

II. THE PROJECT VIOLATES THE STATE PLANNING AND ZONING LAW AS WELL AS THE CITY'S GENERAL PLAN

A. Background Regarding the State Planning and Zoning Law

Each California city and county must adopt a comprehensive, long-term general plan governing development. *Napa Citizens for Honest Gov. v. Napa County Bd. of Supervisors* (2001) 91 Cal. App.4th 342, 352, citing Gov. Code §§ 65030, 65300. The general plan sits at the top of the land use planning hierarchy (See *DeVita v. County of Napa* (1995) 9 Cal. App. 4th 763, 773), and serves as a "constitution" or "charter" for all future development. *Lesher Communications, Inc. v. City of Walnut Creek* (1990) 52 Cal. App. 3d 531, 540.

General plan consistency is "the linchpin of California's land use and development laws; it is the principle which infused the concept of planned growth with the force of law." See *Debottari v. Norco City Council* (1985) 171 Cal. App. 3d 1204, 1213.

State law mandates two levels of consistency. First, a general plan must be internally or "horizontally" consistent: its elements must "comprise an integrated, internally consistent and compatible statement of policies for the adopting agency." (See Gov. Code § 65300.5; *Sierra Club v. Bd. of Supervisors* (1981) 126 Cal. App. 3d 698, 704.) A general plan amendment thus may not be internally inconsistent, nor may it cause the general plan as a whole to become internally inconsistent. See *DeVita*, 9 Cal. App. 4th at 796 fn. 12.

Second, state law requires "vertical" consistency, meaning that zoning ordinances and other land use decisions also must be consistent with the general plan. (See Gov. Code § 65860(a)(2) [land uses authorized by zoning ordinance must be "compatible with the objectives, policies, general land uses, and programs specified in the [general] plan."]; see also *Neighborhood Action Group v. County of Calaveras* (1984) 156 Cal. App. 3d 1176, 1184.) A zoning ordinance that conflicts with the general plan or impedes achievement of its policies is invalid and cannot be given effect. See *Lesher*, 52 Cal. App. 3d at 544.

State law requires that all subordinate land use decisions, including conditional use permits, be consistent with the general plan. See Gov. Code § 65860(a)(2); *Neighborhood Action Group*, 156 Cal. App. 3d at 1184.

A project cannot be found consistent with a general plan if it conflicts with a general plan policy that is "fundamental, mandatory, and clear," regardless of whether it is consistent with other general plan policies. See *Endangered Habitats League v. County of Orange* (2005) 131 Cal. App. 4th 777, 782-83; *Families Unafraid to Uphold Rural El Dorado County v. Bd. of Supervisors* (1998) 62 Cal. App. 4th 1332, 1341-42 ("*FUTURE*").

Moreover, even in the absence of such a direct conflict, an ordinance or development project may not be approved if it interferes with or frustrates the general plan's policies and objectives. See *Napa Citizens*, 91 Cal. App. 4th at 378-79; see also *Lesher*, 52 Cal. App. 3d at 544 (zoning ordinance restricting development conflicted with growth-oriented policies of general plan).

B. The DEIR is Required to Review the Project's Consistency with Regional Housing Plans, Sustainable Community Strategy and Regional Transportation Plans

CEQA Guidelines section 15125(d) requires that an environmental impact report "discuss any inconsistencies between the proposed project and applicable general plans, specific plans and regional plans. *See also Golden Door Properties, LLC v. County of San Diego* (2020) 50 Cal. App. 5th 467, 543.

1. *The DEIR Fails to Demonstrate Consistency with SCAG's RTP/SCS Plan.*

Senate Bill No. 375 requires regional planning agencies to include a sustainable communities strategy in their regional transportation plans. Gov. Code § 65080, sub.(b)(2)(B).) CEQA Guidelines § 15125(d) provides that an EIR "shall discuss any inconsistencies between the proposed project and…regional plans. Such regional plans include…regional transportation plans." Thus, CEQA requires analysis of any inconsistencies between the Project and the relevant RTP/SCS plan.

In April 2012, SCAG adopted its 2012-2035 RTP/ SCS ("2012 RTP/SCS"), which proposed specific land use policies and transportation strategies for local governments to implement that will help the region achieve GHG emission reductions of 9 percent per capita in 2020 and 16 percent per capita in 2035.

In April 2016, SCAG adopted the 2016-2040 RTP/SCS ("2016 RTP/SCS")[8], which incorporates and builds upon the policies and strategies in the 2012 RTP/SCS[9], that will help the region achieve GHG emission reductions that would reduce the region's per capita transportation emissions by eight percent by 2020 and 18 percent by 2035.[10] SCAG's RTP/SCS plan is based upon the same requirements outlined in CARB's 2017 Scoping Plan and SB 375.

On September 3, 2020, SCAG adopted the 2020 – 2045 RTP / SCS titled Connect SoCal ("2020 RTP/ SCS").[11] The 2020 RTP / SCS adopts policies and strategies aimed at reducing the region's per capita greenhouse gas emissions by 8% below 2005 per capita emissions levels by 2020 and 19% below 2005 per capita emissions levels by 2035. [12]

For both the 2012 and 2016 RTP/SCS, SCAG prepared Program Environmental Impact Reports ("PEIR") that include Mitigation Monitoring and Reporting Programs ("MMRP") that list project-level environmental mitigation measures that directly and/or indirectly relate to a project's GHG impacts and contribution to the region's

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[9] SCAG (Apr. 2016) 2016 RTP/SCS, p. 69, 75-115 (attached as Exhibit D).
[10] *Id.*, p. 8, 15, 153, 166.
[11] SCAG (Sept 2020) Connect Socal: The 2020 – 2045 Regional Transportation Plan / Sustainable Communities Strategy of the Southern California Association of Governments, *available at* https://scag.ca.gov/sites/main/files/file-attachments/0903fconnectsocal-plan_0.pdf?1606001176
[12] *Id.* At xiii.

GHG emissions.[13] These environmental mitigation measures serve to help local municipalities when identifying mitigation to reduce impacts on a project-specific basis that can and should be implemented when they identify and mitigate project-specific environmental impacts.[14]

Here, the Original FEIR claims the Project is consistent with SCAG's 2016-2040 RTP/SCS Plan ("RTP/SCS Plan") through the analysis of nine general goals or policies of that plan. (FEIR, pp. 257-259.) However, the goals that the FEIR analyzes for Project consistency are not applicable at the project level, only at a plan level to inform implementation of the RTP/SCS Plan. Thus, the FEIR incorrectly relies upon plan level goals outlined in the RTP/SCS. In the 2016 RTP/SCS Plan, SCAG states that:

> The RTP/SCS is a <u>long-range visioning plan</u> that balances future mobility and housing needs with goals for the environment, the regional economy, social equity and environmental justice, and public health. Ultimately, the Plan is intended to <u>help guide</u> transportation and land use decisions and public investments…This Plan's goals are intended to <u>help carry out</u> our vision for improved mobility, a strong economy and sustainability."[15]

The City's Responses to Comments merely dispute that Commenter has failed to present evidence to refute the conclusions of the Original FEIR. (Responses to Comments, p. 157.) As stated in our initial comment letter, which is reiterated here below, neither the RFEIR nor the Original FEIR demonstrates that it is consistent with many of the RTP/SCS Plan's *project-level* goals, including:

<u>Land Use and Transportation</u>

- Providing transit fare discounts[16];
- Implementing transit integration strategies[17]; and
- Anticipating shared mobility platforms, car-to-car communications, and

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[13] *Id*., p. 116-124; see also SCAG (April 2012) Regional Transportation Plan 2012 – 20135, fn. 38, p. 77-86 (attached as Exhibit E).
[14] SCAG 2012 RTP/SCS (attached as Exhibit E), p. 77; see also SCAG 2016 RTP/SCS, fn. 41, p. 115.
[15] SCAG 2016-2040 RTP/SCS Plan, pp. 63, 65 (emphasis added)
[16] SCAG 2016 RTP/SCS, pp. 75-114
[17] *Id.*

automated vehicle technologies.[18]

GHG Emissions Goals[19]

- Reduction in emissions resulting from a project through implementation of project features, project design, or other measures, such as those described in Appendix F of the State CEQA Guidelines,[20] such as:
  - o Potential measures to reduce wasteful, inefficient and unnecessary consumption of energy during construction, operation, maintenance and/or removal. The discussion should explain why certain measures were incorporated in the project and why other measures were dismissed.
  - o The potential siting, orientation, and design to minimize energy consumption, including transportation energy.
  - o The potential for reducing peak energy demand.
  - o Alternate fuels (particularly renewable ones) or energy systems.
  - o Energy conservation which could result from recycling efforts.
- Off-site measures to mitigate a project's emissions.
- Measures that consider incorporation of Best Available Control Technology (BACT) during design, construction and operation of projects to minimize GHG emissions, including but not limited to:
  - o Use energy and fuel-efficient vehicles and equipment;
  - o Deployment of zero- and/or near zero emission technologies;

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[18] *Id.*

[19] SCAG 2012 RTP/SCS (Mar. 2012) Final PEIR MMRP, p. 6-2—6-14 (including mitigation measures ("MM") AQ3, BIO/OS3, CUL2, GEO3, GHG15, HM3, LU14, NO1, POP4, PS12, TR23, W9 [stating "[l]ocal agencies can and should comply with the requirements of CEQA to mitigate impacts to [the environmental] as applicable and feasible …[and] may refer to Appendix G of this PEIR for examples of potential mitigation to consider when appropriate in reducing environmental impacts of future projects." (Emphasis added)]),; see also id., Final PEIR Appendix G (including MMs AQ1-23, GHG1-8, PS1-104, TR1-83, W1-62),; SCAG 2016 RTP/SCS (Mar. 2016) Final PEIR MMRP, p. 11–63 (including MMs AIR-2(b), AIR-4(b), EN- 2(b), GHG-3(b), HYD-1(b), HYD-2(b), HYD-8(b), TRA-1(b), TRA-2(b), USS-4(b), USS-6(b)).

[20] CEQA Guidelines, Appendix F-Energy Conservation, http://resources.ca.gov/ceqa/guidelines/Appendix_F.html.

- o Use cement blended with the maximum feasible amount of flash or other materials that reduce GHG emissions from cement production;
- o Incorporate design measures to reduce GHG emissions from solid waste management through encouraging solid waste recycling and reuse;
- o Incorporate design measures to reduce energy consumption and increase use of renewable energy;
- o Incorporate design measures to reduce water consumption;
- o Use lighter-colored pavement where feasible;
- o Recycle construction debris to maximum extent feasible;

- Adopting employer trip reduction measures to reduce employee trips such as vanpool and carpool programs, providing end-of-trip facilities, and telecommuting programs.
- Designate a percentage of parking spaces for ride-sharing vehicles or high-occupancy vehicles, and provide adequate passenger loading and unloading for those vehicles;
- Land use siting and design measures that reduce GHG emissions, including:
  - o Measures that increase vehicle efficiency, encourage use of zero and low emissions vehicles, or reduce the carbon content of fuels, including constructing or encouraging construction of electric vehicle charging stations or neighborhood electric vehicle networks, or charging for electric bicycles; and
  - o Measures to reduce GHG emissions from solid waste management through encouraging solid waste recycling and reuse.

<u>Hydrology & Water Quality Goals</u>

- Incorporate measures consistent in a manner that conforms to the standards set by regulatory agencies responsible for regulating water quality/supply requirements, such as:
  - o Reduce exterior consumptive uses of water in public areas, and should promote reductions in private homes and businesses, by shifting to drought-tolerant native landscape plantings(xeriscaping), using weather-based irrigation systems, educating other public agencies about water use, and installing related

water pricing incentives.

o Promote the availability of drought-resistant landscaping options and provide information on where these can be purchased. Use of reclaimed water especially in median landscaping and hillside landscaping can and should be implemented where feasible.

o Implement water conservation best practices such as low-flow toilets, water-efficient clothes washers, water system audits, and leak detection and repair.

o Ensure that projects requiring continual dewatering facilities implement monitoring systems and long-term administrative procedures to ensure proper water management that prevents degrading of surface water and minimizes, to the greatest extent possible, adverse impacts on groundwater for the life of the project. Comply with appropriate building codes and standard practices including the Uniform Building Code.

o Maximize, where practical and feasible, permeable surface area in existing urbanized areas to protect water quality, reduce flooding, allow for groundwater recharge, and preserve wildlife habitat. Minimized new impervious surfaces to the greatest extent possible, including the use of in-lieu fees and off-site mitigation.

o Avoid designs that require continual dewatering where feasible.

o Where feasible, do not site transportation facilities in groundwater recharge areas, to prevent conversion of those areas to impervious surface.

- Incorporate measures consistent in a manner that conforms to the standards set by regulatory agencies responsible for regulating and enforcing water quality and waste discharge requirements, such as:

o Complete, and have approved, a Stormwater Pollution Prevention Plan ("SWPPP") before initiation of construction.

o Implement Best Management Practices to reduce the peak stormwater runoff from the project site to the maximum extent practicable.

o Comply with the Caltrans stormwater discharge permit as applicable; and identify and implement Best Management Practices to manage site erosion, wash water runoff, and spill control.

- o Complete, and have approved, a Standard Urban Stormwater Management Plan, prior to occupancy of residential or commercial structures.
- o Ensure adequate capacity of the surrounding stormwater system to support stormwater runoff from new or rehabilitated structures or buildings.
- o Prior to construction within an area subject to Section 404 of the Clean Water Act, obtain all required permit approvals and certifications for construction within the vicinity of a watercourse (e.g., Army Corps § 404 permit, Regional Waterboard § 401 permit, Fish & Wildlife § 401 permit).
- o Where feasible, restore or expand riparian areas such that there is no net loss of impervious surface as a result of the project.
- o Install structural water quality control features, such as drainage channels, detention basins, oil and grease traps, filter systems, and vegetated buffers to prevent pollution of adjacent water resources by polluted runoff where required by applicable urban stormwater runoff discharge permits, on new facilities.
- o Provide structural stormwater runoff treatment consistent with the applicable urban stormwater runoff permit where Caltrans is the operator, the statewide permit applies.
- o Provide operational best management practices for street cleaning, litter control, and catch basin cleaning are implemented to prevent water quality degradation in compliance with applicable stormwater runoff discharge permits; and ensure treatment controls are in place as early as possible, such as during the acquisition process for rights-of-way, not just later during the facilities design and construction phase.
- o Comply with applicable municipal separate storm sewer system discharge permits as well as Caltrans' stormwater discharge permit including long-term sediment control and drainage of roadway runoff.
- o Incorporate as appropriate treatment and control features such as detention basins, infiltration strips, and porous paving, other features to control surface runoff and facilitate groundwater recharge into the design of new transportation projects early on in the process to ensure that adequate acreage and elevation contours are provided during the right-of-way acquisition

process.

o Design projects to maintain volume of runoff, where any downstream receiving water body has not been designed and maintained to accommodate the increase in flow velocity, rate, and volume without impacting the water's beneficial uses. Pre-project flow velocities, rates, volumes must not be exceeded. This applies not only to increases in stormwater runoff from the project site, but also to hydrologic changes induced by flood plain encroachment. Projects should not cause or contribute to conditions that degrade the physical integrity or ecological function of

any downstream receiving waters.

o Provide culverts and facilities that do not increase the flow velocity, rate, or volume and/or acquiring sufficient storm drain easements that accommodate an appropriately vegetated earthen drainage channel.

o Upgrade stormwater drainage facilities to accommodate any increased runoff volumes. These upgrades may include the construction of detention basins or structures that will delay peak flows and reduce flow velocities, including expansion and restoration of wetlands and riparian buffer areas. System designs shall be completed to eliminate increases in peak flow rates from current levels.

o Encourage Low Impact Development ("LID") and incorporation of natural spaces that reduce, treat, infiltrate and manage stormwater runoff flows in all new developments, where practical and feasible.

- Incorporate measures consistent with the provisions of the Groundwater Management Act and implementing regulations, such as:

o For projects requiring continual dewatering facilities, implement monitoring systems and long-term administrative procedures to ensure proper water management that prevents degrading of surface water and minimizes, to the greatest extent possible, adverse impacts on groundwater for the life of the project, Construction designs shall comply with appropriate building codes and standard practices including the Uniform Building Code.

o Maximize, where practical and feasible, permeable surface area in existing urbanized areas to protect water quality, reduce flooding, allow for groundwater recharge, and preserve wildlife habitat. Minimize to the greatest extent possible, new impervious surfaces, including the use of in-lieu fees and off-site mitigation.

o Avoid designs that require continual dewatering where feasible.

o Avoid construction and siting on groundwater recharge areas, to prevent conversion of those areas to impervious surface.

o Reduce hardscape to the extent feasible to facilitate groundwater recharge as appropriate.

- Incorporate mitigation measures to ensure compliance with all federal, state, and local floodplain regulations, consistent with the provisions of the National Flood Insurance Program, such as:

o Comply with Executive Order 11988 on Floodplain Management, which requires avoidance of incompatible floodplain development, restoration and preservation of the natural and beneficial floodplain values, and maintenance of consistency with the standards and criteria of the National Flood Insurance Program.

o Ensure that all roadbeds for new highway and rail facilities be elevated at least one foot above the 100-year base flood elevation. Since alluvial fan flooding is not often identified on FEMA flood maps, the risk of alluvial fan flooding should be evaluated and projects should be sited to avoid alluvial fan flooding. Delineation of floodplains and alluvial fan boundaries should attempt to account for future hydrologic changes caused by global climate change.

<u>Transportation, Traffic, and Safety</u>

- Institute teleconferencing, telecommute and/or flexible work hour programs to reduce unnecessary employee transportation.
- Create a ride-sharing program by designating a certain percentage of parking spaces for ride sharing vehicles, designating adequate passenger loading and unloading for ride sharing vehicles, and providing a web site or message board for coordinating rides.
- Provide a vanpool for employees.
- Provide a Transportation Demand Management (TDM) plan containing

strategies to reduce on-site parking demand and single occupancy vehicle travel. The TDM shall include strategies to increase bicycle, pedestrian, transit, and carpools/vanpool use, including:

- o Inclusion of additional bicycle parking, shower, and locker facilities that exceed the requirement.
- o Direct transit sales or subsidized transit passes.
- o Guaranteed ride home program.
- o Pre-tax commuter benefits (checks).
- o On-site car-sharing program (such as City Car Share, Zip Car, etc.).
- o On-site carpooling program.
- o Distribution of information concerning alternative transportation options.
- o Parking spaces sold/leased separately.
- o Parking management strategies; including attendant/valet parking and shared parking spaces.

- Promote ride sharing programs e.g., by designating a certain percentage of parking spaces for high-occupancy vehicles, providing larger parking spaces to accommodate vans used for ride-sharing, and designating adequate passenger loading and unloading and waiting areas.
- Encourage the use of public transit systems by enhancing safety and cleanliness on vehicles and in and around stations, providing shuttle service to public transit, offering public transit incentives and providing public education and publicity about public transportation services.
- Build or fund a major transit stop within or near transit development upon consultation with applicable CTCs.
- Work with the school districts to improve pedestrian and bike access to schools and to restore or expand school bus service using lower-emitting vehicles.
- Purchase, or create incentives for purchasing, low or zero-emission vehicles.
- Provide the necessary facilities and infrastructure to encourage the use of low or zero-emission vehicles.

- Promote ride sharing programs, if determined feasible and applicable by the Lead Agency, including:
  - o Designate a certain percentage of parking spaces for ride-sharing vehicles.
  - o Designate adequate passenger loading, unloading, and waiting areas for ride-sharing vehicles.
  - o Provide a web site or message board for coordinating shared rides.
  - o Encourage private, for-profit community car-sharing, including parking spaces for car share vehicles at convenient locations accessible by public transit.
  - o Hire or designate a rideshare coordinator to develop and implement ridesharing programs.
- Support voluntary, employer-based trip reduction programs, if determined feasible and applicable by the Lead Agency, including:
  - o Provide assistance to regional and local ridesharing organizations.
  - o Advocate for legislation to maintain and expand incentives for employer ridesharing programs.
  - o Require the development of Transportation Management Associations for large employers and commercial/ industrial complexes.
  - o Provide public recognition of effective programs through awards, top ten lists, and other mechanisms.
- Implement a "guaranteed ride home" program for those who commute by public transit, ridesharing, or other modes of transportation, and encourage employers to subscribe to or support the program.
- Encourage and utilize shuttles to serve neighborhoods, employment centers and major destinations.
- Create a free or low-cost local area shuttle system that includes a fixed route to popular tourist destinations or shopping and business centers.
- Work with existing shuttle service providers to coordinate their services.
- Facilitate employment opportunities that minimize the need for private vehicle trips, such as encourage telecommuting options with new and existing

employers, through project review and incentives, as appropriate.

- Organize events and workshops to promote GHG-reducing activities.
- Implement a Parking Management Program to discourage private vehicle use, including:
  - o Encouraging carpools and vanpools with preferential parking and a reduced parking fee.
  - o Institute a parking cash-out program or establish a parking fee for all single-occupant vehicles.

Utilities & Service Systems

- Integrate green building measures consistent with CALGreen (Title 24, part 11), U.S. Green Building Council's Leadership in Energy and Environmental Design, energy Star Homes, Green Point Rated Homes, and the California Green Builder Program into project design including, but not limited to the following:
  - o Reuse and minimization of construction and demolition (C&D) debris and diversion of C&D waste from landfills to recycling facilities.
  - o Inclusion of a waste management plan that promotes maximum C&D diversion.
  - o Development of indoor recycling program and space.
  - o Discourage exporting of locally generated waste outside of the SCAG region during the construction and implementation of a project. Encourage disposal within the county where the waste originates as much as possible. Promote green technologies for long-distance transport of waste (e.g., clean engines and clean locomotives or electric rail for waste-by-rail disposal systems) and consistency with SCAQMD and 2016 RTP/SCS policies can and should be required.
  - o Develop ordinances that promote waste prevention and recycling activities such as: requiring waste prevention and recycling efforts at all large events and venues; implementing recycled content procurement programs; and developing opportunities to divert food waste away from landfills and toward food banks and composting facilities.

- o Develop alternative waste management strategies such as composting, recycling, and conversion technologies.
- o Develop and site composting, recycling, and conversion technology facilities that have minimum environmental and health impacts.
- o Require the reuse and recycle construction and demolition waste (including, but not limited to, soil, vegetation, concrete, lumber, metal, and cardboard).
- o Integrate reuse and recycling into residential industrial, institutional and commercial projects.
- o Provide recycling opportunities for residents, the public, and tenant businesses.
- o Provide education and publicity about reducing waste and available recycling services.
- o Implement or expand city or county-wide recycling and composting programs for residents and businesses. This could include extending the types of recycling services offered (e.g., to include food and green waste recycling) and providing public education and publicity about recycling services.

The RFEIR and the Original FEIR fail to mention or demonstrate consistency with the above listed measures and strategies of the SCAG RTP/SCS Plan. The RFEIR should be revised to indicate what *specific project-level* mitigation measures that will be followed to demonstrate consistency with the RTP/SCS Plan.

1) The City fails to review the Project's consistency with the 2020 RTP/SCS

CEQA Guidelines section 15125(d) requires that an environmental impact report "discuss any inconsistencies between the proposed project and applicable general plans, specific plans and regional plans. *See also Golden Door Properties, LLC v. County of San Diego* (2020) 50 Cal. App. 5th 467, 543.

The Project's environmental documents fail as an informational document since the Project' RFEIR fails to discuss consistency with the 2020 RTP / SCS.

2) The DEIR Fails to Demonstrate Consistency with the State Housing Law's Regional Housing Needs Assessment Requirements and the City's Obligations to Fulfill those Requirements in its Housing Element

State law requires that jurisdictions provide their fair share of regional housing needs and adopt a general plan for future growth (California Government Code Section 65300). The California Department of Housing and Community Development (HCD) is mandated to determine state-wide housing needs by income category for each Council of Governments (COG) throughout the state. The housing need is determined based on four broad household income categories: very low (households making less than 50 percent of median family income), low (50 to 80 percent of median family income), moderate (80 to 120 percent of median family income), and above moderate (more than 120 percent of median family income). The intent of the future needs allocation by income groups is to relieve the undue concentration of very low and low-income households in a single jurisdiction and to help allocate resources in a fair and equitable manner.

CEQA requires the DEIR analyze the Project's consistency with the State's housing goals. CEQA Guidelines section 15125(d) requires that an environmental impact report "discuss any inconsistencies between the proposed project and applicable general plans, specific plans and regional plans. *See also Golden Door Properties, LLC v. County of San Diego* (2020) 50 Cal. App. 5th 467, 543.

The City fails to conduct any consistency analysis with SCAG's 6th Cycle RHNA Allocation Plan.[21]

The DEIR should be revised and recirculated with an analysis of how the Project is consistent with the City of Los Angeles' 6th Cycle RHNA allocation.

III. CONCLUSION

Commenters request that the City revise and recirculate the Project's environmental impact report to address the aforementioned concerns. If the City has any questions or concerns, feel free to contact my Office.

Sincerely,

[21] Available at https://scag.ca.gov/sites/main/files/file-attachments/6th-cycle-rhna-final-allocation-plan.pdf?1616462966.

Mitchell M. Tsai
Attorneys for Southwest Regional
Council of Carpenters

Attached:

March 8, 2021 SWAPE Letter to Mitchell M. Tsai re Local Hire Requirements and Considerations for Greenhouse Gas Modeling (Exhibit A);

Air Quality and GHG Expert Paul Rosenfeld CV (Exhibit B);

Air Quality and GHG Expert Matt Hagemann CV (Exhibit C);

SCAG (Apr. 2016) 2016 RTP/SCS (Exhibit D);

SCAG (April 2012) Regional Transportation Plan 2012 – 20135 (Exhibit E);

SCAG (Sept 2020) Connect Socal: The 2020 – 2045 Regional Transportation Plan / Sustainable Communities Strategy of the Southern California Association of Governments (Exhibit F); and

April 23, 2021 letter from SWAPE to Greg Sonstein re 1111 Sunset Project (Exhibit G).

EXHIBIT A

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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March 8, 2021

Mitchell M. Tsai
155 South El Molino, Suite 104
Pasadena, CA 91101

Subject: Local Hire Requirements and Considerations for Greenhouse Gas Modeling

Dear Mr. Tsai,

Soil Water Air Protection Enterprise ("SWAPE") is pleased to provide the following draft technical report explaining the significance of worker trips required for construction of land use development projects with respect to the estimation of greenhouse gas ("GHG") emissions. The report will also discuss the potential for local hire requirements to reduce the length of worker trips, and consequently, reduced or mitigate the potential GHG impacts.

Worker Trips and Greenhouse Gas Calculations

The California Emissions Estimator Model ("CalEEMod") is a "statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects."[1] CalEEMod quantifies construction-related emissions associated with land use projects resulting from off-road construction equipment; on-road mobile equipment associated with workers, vendors, and hauling; fugitive dust associated with grading, demolition, truck loading, and on-road vehicles traveling along paved and unpaved roads; and architectural coating activities; and paving.[2]

The number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[3]

[1] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[2] "California Emissions Estimator Model." CAPCOA, 2017, *available at:* http://www.aqmd.gov/caleemod/home.
[3] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.

Specifically, the number and length of vehicle trips is utilized to estimate the vehicle miles travelled ("VMT") associated with construction. Then, utilizing vehicle-class specific EMFAC 2014 emission factors, CalEEMod calculates the vehicle exhaust, evaporative, and dust emissions resulting from construction-related VMT, including personal vehicles for worker commuting.[4]

Specifically, in order to calculate VMT, CalEEMod multiplies the average daily trip rate by the average overall trip length (see excerpt below):

"$VMT_d = \Sigma(\text{Average Daily Trip Rate}_i * \text{Average Overall Trip Length}_i)_n$

Where:

n = Number of land uses being modeled."[5]

Furthermore, to calculate the on-road emissions associated with worker trips, CalEEMod utilizes the following equation (see excerpt below):

"$Emissions_{pollutant} = VMT * EF_{running,pollutant}$

Where:

$Emissions_{pollutant}$ = emissions from vehicle running for each pollutant

VMT = vehicle miles traveled

$EF_{running,pollutant}$ = emission factor for running emissions."[6]

Thus, there is a direct relationship between trip length and VMT, as well as a direct relationship between VMT and vehicle running emissions. In other words, when the trip length is increased, the VMT and vehicle running emissions increase as a result. Thus, vehicle running emissions can be reduced by decreasing the average overall trip length, by way of a local hire requirement or otherwise.

Default Worker Trip Parameters and Potential Local Hire Requirements

As previously discussed, the number, length, and vehicle class of worker trips are utilized by CalEEMod to calculate emissions associated with the on-road vehicle trips required to transport workers to and from the Project site during construction.[7] In order to understand how local hire requirements and associated worker trip length reductions impact GHG emissions calculations, it is important to consider the CalEEMod default worker trip parameters. CalEEMod provides recommended default values based on site-specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act ("CEQA") requires that such changes be justified by substantial evidence.[8] The default number of construction-related worker trips is calculated by multiplying the

[4] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14-15.
[5] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 23.
[6] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[7] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[8] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 1, 9.

number of pieces of equipment for all phases by 1.25, with the exception of worker trips required for the building construction and architectural coating phases.[9] Furthermore, the worker trip vehicle class is a 50/25/25 percent mix of light duty autos, light duty truck class 1 and light duty truck class 2, respectively."[10] Finally, the default worker trip length is consistent with the length of the operational home-to-work vehicle trips.[11] The operational home-to-work vehicle trip lengths are:

> "[B]ased on the *location* and *urbanization* selected on the project characteristic screen. These values were *supplied by the air districts or use a default average for the state*. Each district (or county) also assigns trip lengths for urban and rural settings" (emphasis added). [12]

Thus, the default worker trip length is based on the location and urbanization level selected by the User when modeling emissions. The below table shows the CalEEMod default rural and urban worker trip lengths by air basin (see excerpt below and Attachment A).[13]

Worker Trip Length by Air Basin		
Air Basin	**Rural (miles)**	**Urban (miles)**
Great Basin Valleys	16.8	10.8
Lake County	16.8	10.8
Lake Tahoe	16.8	10.8
Mojave Desert	16.8	10.8
Mountain Counties	16.8	10.8
North Central Coast	17.1	12.3
North Coast	16.8	10.8
Northeast Plateau	16.8	10.8
Sacramento Valley	16.8	10.8
Salton Sea	14.6	11
San Diego	16.8	10.8
San Francisco Bay Area	10.8	10.8
San Joaquin Valley	16.8	10.8
South Central Coast	16.8	10.8
South Coast	19.8	14.7
Average	**16.47**	**11.17**
Minimum	**10.80**	**10.80**
Maximum	**19.80**	**14.70**
Range	**9.00**	**3.90**

[9] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 34.
[10] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 15.
[11] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 14.
[12] "Appendix A Calculation Details for CalEEMod." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/02_appendix-a2016-3-2.pdf?sfvrsn=6, p. 21.
[13] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-84 – D-86.

As demonstrated above, default rural worker trip lengths for air basins in California vary from 10.8- to 19.8-miles, with an average of 16.47 miles. Furthermore, default urban worker trip lengths vary from 10.8- to 14.7-miles, with an average of 11.17 miles. Thus, while default worker trip lengths vary by location, default urban worker trip lengths tend to be shorter in length. Based on these trends evident in the CalEEMod default worker trip lengths, we can reasonably assume that the efficacy of a local hire requirement is especially dependent upon the urbanization of the project site, as well as the project location.

Practical Application of a Local Hire Requirement and Associated Impact

To provide an example of the potential impact of a local hire provision on construction-related GHG emissions, we estimated the significance of a local hire provision for the Village South Specific Plan ("Project") located in the City of Claremont ("City"). The Project proposed to construct 1,000 residential units, 100,000-SF of retail space, 45,000-SF of office space, as well as a 50-room hotel, on the 24-acre site. The Project location is classified as Urban and lies within the Los Angeles-South Coast County. As a result, the Project has a default worker trip length of 14.7 miles.[14] In an effort to evaluate the potential for a local hire provision to reduce the Project's construction-related GHG emissions, we prepared an updated model, reducing all worker trip lengths to 10 miles (see Attachment B). Our analysis estimates that if a local hire provision with a 10-mile radius were to be implemented, the GHG emissions associated with Project construction would decrease by approximately 17% (see table below and Attachment C).

Local Hire Provision Net Change	
Without Local Hire Provision	
Total Construction GHG Emissions (MT CO_2e)	3,623
Amortized Construction GHG Emissions (MT CO_2e/year)	120.77
With Local Hire Provision	
Total Construction GHG Emissions (MT CO2e)	3,024
Amortized Construction GHG Emissions (MT CO_2e/year)	100.80
% Decrease in Construction-related GHG Emissions	***17%***

As demonstrated above, by implementing a local hire provision requiring 10 mile worker trip lengths, the Project could reduce potential GHG emissions associated with construction worker trips. More broadly, any local hire requirement that results in a decreased worker trip length from the default value has the potential to result in a reduction of construction-related GHG emissions, though the significance of the reduction would vary based on the location and urbanization level of the project site.

This serves as an example of the potential impacts of local hire requirements on estimated project-level GHG emissions, though it does not indicate that local hire requirements would result in reduced construction-related GHG emission for all projects. As previously described, the significance of a local hire requirement depends on the worker trip length enforced and the default worker trip length for the project's urbanization level and location.

[14] "Appendix D Default Data Tables." CAPCOA, October 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4, p. D-85.

Disclaimer

SWAPE has received limited discovery. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,

M Hagemann

Matt Hagemann, P.G., C.Hg.

Paul Rosenfeld

Paul E. Rosenfeld, Ph.D.

EXHIBIT B

SOIL WATER AIR PROTECTION ENTERPRISE
2656 29th Street, Suite 201
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Paul Rosenfeld, Ph.D.

Chemical Fate and Transport & Air Dispersion Modeling

Principal Environmental Chemist

Risk Assessment & Remediation Specialist

Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from unconventional oil drilling operations, oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, and many other industrial and agricultural sources. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at dozens of sites and has testified as an expert witness on more than ten cases involving exposure to air contaminants from industrial sources.

Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex H_2O Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

Publications:

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P**., (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

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Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

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Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

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Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

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Rosenfeld, P. E., M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

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Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

Rosenfeld P. E., J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004.* New Orleans, October 2-6, 2004.

Rosenfeld, P.E., and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49(9), 171-178.

Rosenfeld, P. E., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

Rosenfeld, P.E., Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

Rosenfeld, P.E., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

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Rosenfeld, P.E., C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

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Rosenfeld, P. E. (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

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Rosenfeld, P. E. (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

Rosenfeld, P. E. (1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

Presentations:

Rosenfeld, P.E., Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society.* Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

Rosenfeld, P.E. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

Rosenfeld, P.E. (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

Rosenfeld, P. E. (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld P. E. (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

Rosenfeld P. E. (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting.* Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition.* Lecture conducted from Boston Massachusetts.

Paul Rosenfeld Ph.D. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference.* Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

Paul Rosenfeld Ph.D. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

Paul Rosenfeld Ph.D. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference.* Lecture conducted from Hilton Hotel in Irvine, California.

Paul Rosenfeld Ph.D. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference.* Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

Paul Rosenfeld Ph.D. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference.* Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

Paul Rosenfeld, Ph.D. (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

Paul Rosenfeld, Ph.D. (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

Rosenfeld, P. E., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

Paul Rosenfeld, Ph.D. (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

Paul Rosenfeld, Ph.D. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

Rosenfeld, P.E. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conferenc*e. Lecture conducted from Indianapolis, Maryland.

Rosenfeld. P.E. (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

Rosenfeld. P.E. (October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

Rosenfeld, P.E. (2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

Rosenfeld, P.E., C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

Rosenfeld, P.E, C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

Deposition and/or Trial Testimony:

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs,* vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs,* vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" *Defendant.*
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case: No 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No 1923
Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs,* vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Jerry Dovico, et al., Plaintiffs vs. Valley View Sine LLC, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Doug Pauls, et al.,, et al., Plaintiffs vs. Richard Warren, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action N0. 14-C-30000
Rosenfeld Deposition, June 2015

In The Third Judicial District County of Dona Ana, New Mexico
Betty Gonzalez, et al. Plaintiffs vs. Del Oro Dairy, Del Oro Real Estate LLC, Jerry Settles and Deward DeRuyter, Defendants
Rosenfeld Deposition: July 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case Number CACE07030358 (26)
Rosenfeld Deposition: December 2014

In the United States District Court Western District of Oklahoma
Tommy McCarty, et al., Plaintiffs, v. Oklahoma City Landfill, LLC d/b/a Southeast Oklahoma City Landfill, et al. Defendants.
Case No. 5:12-cv-01152-C
Rosenfeld Deposition: July 2014

In the County Court of Dallas County Texas
Lisa Parr et al, *Plaintiff*, vs. Aruba et al, *Defendant.*
Case Number cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial: April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., *Plaintiffs,* vs. Republic Services, Inc., et al., *Defendants*
Case Number: 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition: October 2012

In the United States District Court of Southern District of Texas Galveston Division
Kyle Cannon, Eugene Donovan, Genaro Ramirez, Carol Sassler, and Harvey Walton, each Individually and on behalf of those similarly situated, *Plaintiffs,* vs. BP Products North America, Inc., *Defendant.*
Case 3:10-cv-00622
Rosenfeld Deposition: February 2012
Rosenfeld Trial: April 2013

In the Circuit Court of Baltimore County Maryland
Philip E. Cvach, II et al., *Plaintiffs* vs. Two Farms, Inc. d/b/a Royal Farms, Defendants
Case Number: 03-C-12-012487 OT
Rosenfeld Deposition: September 2013

EXHIBIT C

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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Tel: (949) 887-9013
Email: mhagemann@swape.com

Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

Geologic and Hydrogeologic Characterization
Industrial Stormwater Compliance
Investigation and Remediation Strategies
Litigation Support and Testifying Expert
CEQA Review

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certifications:

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2014;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

<u>Senior Regulatory and Litigation Support Analyst:</u>

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 100 environmental impact reports since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, Valley Fever, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Manager of a project to provide technical assistance to a community adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.

- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

<u>Executive Director:</u>

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

<u>Hydrogeology:</u>

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt taught physical geology (lecture and lab and introductory geology at Golden West College in Huntington Beach, California from 2010 to 2014.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

EXHIBIT D

SOUTHERN CALIFORNIA
ASSOCIATION of
GOVERNMENTS
50 YEARS

2016
2040
RTPSCS

THE **2016-2040** REGIONAL TRANSPORTATION PLAN/ SUSTAINABLE COMMUNITIES STRATEGY

A Plan for Mobility, Accessibility, Sustainability and a High Quality of Life

ADOPTED
APRIL 2016

ADOPTED
APRIL 2016

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of Transportation
Federal Highway Administration

U.S. Department
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CALIFORNIA DEPARTMENT OF TRANSPORTATION

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MISSION STATEMENT

LEADERSHIP | VISION | PROGRESS

Leadership, vision and progress which promote economic growth, personal well-being and livable communities for all Southern Californians.

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS WILL ACCOMPLISH THIS MISSION BY:

- Developing long-range regional plans and strategies that provide for efficient movement of people, goods and information; enhance economic growth and international trade; and improve the environment and quality of life
- Providing quality information services and analysis for the region
- Using an inclusive decision-making process that resolves conflicts and encourages trust
- Creating an educational and work environment that cultivates creativity, initiative and opportunity

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Hon. Andrew Masiel, Sr.,
Pechanga Band of Luiseño Indians
Hon. Kathryn McCullough, Lake Forest
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RESOLUTION NO. 16-578-2

A RESOLUTION OF THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS APPROVING THE 2016-2040 REGIONAL TRANSPORTATION PLAN/SUSTAINABLE COMMUNITIES STRATEGY (2016 RTP/SCS); RELATED CONFORMITY DETERMINATION; AND RELATED CONSISTENCY AMENDMENT #15-12 TO THE 2015 FEDERAL TRANSPORTATION IMPROVEMENT PROGRAM (FTIP)

WHEREAS, the Southern California Association of Governments (SCAG) is a Joint Powers Agency established pursuant to California Government Code Section 6502 et seq.; and

WHEREAS, SCAG is the designated Metropolitan Planning Organization (MPO) for the counties of Los Angeles, Riverside, San Bernardino, Ventura, Orange, and Imperial, pursuant to Title 23, United States Code Section 134(d); and

WHEREAS, SCAG is responsible for maintaining a continuing, cooperative, and comprehensive transportation planning process which involves the preparation and update every four years of a Regional Transportation Plan (RTP) pursuant to Title 23, United States Code Section 134 et seq., Title 49, United States Code Section 5303 et seq., and Title 23, Code of Federal Regulations Section 450 et seq.; and

WHEREAS, SCAG is the multi-county designated transportation planning agency under state law, and as such, is responsible for preparing and adopting the FTIP (regional transportation improvement program, under state law) every two years pursuant to Government Code §§ 14527 and 65082, and Public Utilities Code §130301 et seq.; and

WHEREAS, pursuant to Senate Bill (SB) 375 (Steinberg, 2008) as codified in Government Code §65080(b) et seq., SCAG must also prepare a Sustainable Communities Strategy (SCS) that will be incorporated into the RTP and demonstrates how the region will meet its greenhouse gas (GHG) reduction targets as set forth by the California Air Resources Board (ARB); and

WHEREAS, ARB set the per capita GHG emission reduction targets from automobiles and light trucks for the SCAG region at 8% below 2005 per capita emissions levels by 2020 and 13% below 2005 per capita emissions levels by 2035; and

WHEREAS, pursuant to Government Code §65080(b)(2)(B), the SCS must: (1) identify the general location of uses, residential densities, and building intensities within the region; (2) 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; (3) identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Government Code Section 65584; (4) identify a transportation network to service the transportation needs of the region; (5) gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (1) and (b) of the Government Code Sections 65080 and 65581; and (6) consider the statutory housing goals specified in Sections 65580 and 65581, (7) 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 GHG emissions from automobiles and light trucks to achieve the GHG reduction targets, and (8) allow the RTP to comply with air quality conformity requirements under the federal Clean Air Act; and

WHEREAS, through the conduct of a continuing, comprehensive and coordinated transportation planning process in conformance with all applicable federal and state requirement, SCAG developed and prepared its latest RTP/SCS, the Final 2016-2040 RTP/SCS ("2016 RTP/SCS"); and

WHEREAS, the 2016 RTP/SCS sets forth the long-range regional plan, policies and strategies for transportation improvements and regional growth throughout the SCAG region through the horizon year of 2040; and

WHEREAS, the 2016 RTP/SCS includes a regional growth forecast that was developed by working with local jurisdictions using the most recent land use plans and policies and planning assumptions; and

WHEREAS, the 2016 RTP/SCS includes a financially constrained plan and a strategic plan. The constrained plan includes transportation projects that have committed, available or reasonably available revenue sources, and thus are probable for implementation. The strategic plan is an illustrative list of additional transportation investments that the region would pursue if additional funding and regional commitment were secured; and such investments are potential candidates for inclusion in the constrained RTP/SCS through future amendments or updates. The strategic plan is provided for information purposes only and is not part of the financially constrained and conforming Final 2016 RTP/SCS; and

WHEREAS, the 2016 RTP/SCS includes a financial plan identifying the revenues committed, available or reasonably available to support the SCAG region's surface transportation investments. The financial plan was developed following basic principles including incorporation of county and local financial planning documents in the region where available, and utilization of published data sources to evaluate historical trends and augment local forecasts as needed; and

WHEREAS, the 2016 RTP/SCS includes a sustainable communities strategy which sets forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportations measures and policies, if implemented, will reduce the GHG emissions from automobiles and light trucks to achieve the regional GHG targets set by ARB for the SCAG region; and

WHEREAS, the 2016 RTP/SCS must be consistent with all applicable provisions of federal and state law including:

(1) The Moving Ahead for Progress in the 21st Century Act (MAP-21, PL 112-141) and the metropolitan planning regulations at 23 U.S.C. §134 et seq., as was amended by the Fixing America's Surface Transportation Act (P.L. 114-94, December 4, 2015);

(2) The metropolitan planning regulations at 23 C.F.R. Part 450, Subpart C;

(3) California Government Code §65080 et seq.; Public Utilities Code §130058 and 130059; and Public Utilities Code §44243.5;

(4) §§174 and 176(c) and (d) of the federal Clean Air Act [(42 U.S.C. §§7504 and 7506(c) and (d)] and Environmental Protection Agency (EPA) Transportation Conformity Rule, 40 C.F.R. Parts 51 and 93;

(5) Title VI of the 1964 Civil Rights Act and the Title VI assurance executed by the State pursuant to 23 U.S.C. §324;

(6) The Department of Transportation's Final Environmental Justice Strategy (60 Fed. Reg. 33896; June 29, 1995) enacted pursuant to Executive Order 12898, which seeks to avoid disproportionately high and adverse impacts on minority and low-income populations with respect to human health and the environment;

(7) Title II of the 1990 Americans with Disabilities Act (42 U.S.C. §§12101 et seq.) and accompanying regulations at 49 C.F.R. §27, 37, and 38; and

(8) SB 375 (Steinberg, 2008) as codified in California Government Code §65080(b) et seq.;

WHEREAS, SCAG is further required to comply with the California Environmental Quality Act (CEQA) (Cal. Pub. Res. Code § 21000 et seq.) in preparing the 2016 RTP/SCS; and

WHEREAS, SCAG prepared a program environmental impact report (PEIR) for the 2016 RTP/SCS. The PEIR serves as a programmatic document that conducts a region-wide assessment of potential significant environmental effects of the 2016 RTP/SCS; and

WHEREAS, in non-attainment and maintenance areas for transportation-related criteria pollutants, the MPO, as well as the Federal Highways Administration (FHWA) and Federal Transit Administration (FTA), must make a conformity determination on any updated or amended RTP in accordance with the federal Clean Air Act to ensure that federally supported highway and transit project activities conform to the purpose of the State Implementation Plan (SIP); and

WHEREAS, transportation conformity is based upon a positive conformity finding with respect to the following tests: (1) regional emissions analysis, (2) timely implementation of Transportation Control Measures, (3) financial constraint, and (4) interagency consultation and public involvement; and

WHEREAS, on April 4, 2012, the SCAG Regional Council found the 2012 RTP/SCS to be in conformity with the State Implementation Plans for air quality, pursuant to the federal Clean Air Act and the EPA Transportation Conformity Rule. Thereafter, FHWA and FTA made a conformity determination on the 2012 RTP/SCS with said determination to expire on June 4, 2016; and

WHEREAS, on September 11, 2014, in accordance with federal and state requirements, the SCAG Regional Council approved the 2015/16 – 2020/21 Federal Transportation Improvement Program (2015 FTIP), which was federally approved on December 15, 2014. The 2015 FTIP represents a staged, multi-year, intermodal program of transportation projects which covers six fiscal years and includes a priority list of projects to be carried out in the first four fiscal years; and

WHEREAS, pursuant to Government Code §65080(b)(2)(F) and federal public participation requirements, including 23 C.F.R. §450.316(b)(1)(iv), SCAG must prepare the RTP/SCS by providing adequate public notice of public involvement activities and time for public review. On April 3, 2014, SCAG approved and adopted a Public Participation Plan, to serve as a guide for SCAG's public involvement process, including the public involvement process to be used for the 2016 RTP/SCS, and included an enhanced outreach program that incorporates the public participation requirements of SB 375 and adds strategies to better serve the underrepresented segments of the region; and

WHEREAS, pursuant to Government Code §65080(b)(2)(F)(iii), during the summer 2015, SCAG held a series of RTP/SCS public workshops throughout the region, including residents, elected officials, representatives of public agencies, community organizations, and environmental, housing and business stakeholders; and

WHEREAS, in accordance with the interagency consultation requirements, 40 C.F.R. 93.105, SCAG consulted with the respective transportation and air quality planning agencies, including but not limited to, extensive discussion of the Draft Conformity Report before the Transportation Conformity Working Group (a forum for implementing the interagency consultation requirements) throughout the 2016 update process; and

WHEREAS, the Transportation Conformity Report contained in the Final 2016 RTP/SCS makes a positive transportation conformity determination. Using the final motor vehicle emission budgets released by ARB and found to be adequate by the EPA, this conformity determination is based upon staff's analysis of the applicable transportation conformity tests; and

WHEREAS, each project or project phase included in the FTIP must be consistent with the approved RTP, pursuant to 23 C.F.R. §450.324(g). Amendment #15-12 to the 2015 FTIP has been prepared to ensure consistency with the Final 2016 RTP/SCS; and

WHEREAS, conformity of Amendment #15-12 to the 2015 FTIP has been determined simultaneously with the Final 2016 RTP/SCS in order to address the consistency requirement of federal law; and

WHEREAS, on November 5, 2015, SCAG Policy Committees (comprising the Community, Economic and Human Development Committee; the Energy and Environment Committee; and the Transportation Committee) recommended that the Regional Council at its December 4, 2015 meeting authorize release of the Draft 2016 RTP/SCS PEIR for a public review and comment period concurrent with the public review and comment period for the Draft 2016 RTP/SCS; and

WHEREAS, on December 3, 2015, the Regional Council approved release of the Draft 2016 RTP/SCS PEIR concurrent with release of the Draft 2016 RTP/SCS for a 60-day public review and comment period; and

WHEREAS, SCAG released the Draft 2016 RTP/SCS and the associated Draft Amendment #15-12 to the 2015 FTIP for a 60-day public review and comment period that began on December 4, 2015 and ended on February 1, 2016; and

WHEREAS, the SCAG also released the Draft 2016 RTP/SCS PEIR concurrently with the release of the Draft 2016 RTP/SCS, and issued a Notice of Availability for the same 60-day public review and comment period of December 4, 2015 to February 1, 2016; and

WHEREAS, SCAG followed the provisions of its adopted Public Participation Plan regarding public involvement activities for the Draft 2016 RTP/SCS and Draft 2016 RTP/SCS PEIR. Public outreach efforts included publication of the Draft 2016 RTP/SCS and Draft 2016 RTP/SCS PEIR on SCAG's website, distribution of public information materials, held four (4) duly-noticed public hearings (three public hearings were video-conferenced to four regional offices in different counties), and 14 elected official briefings within the SCAG region to allow stakeholders, elected officials and the public to comment on the Draft 2016 RTP/SCS and the Draft 2016 RTP/SCS PEIR; and

WHEREAS, during the public review and comment period, SCAG received 162 verbal and written comment submissions on the Draft 2016 RTP/SCS and 81 comment submissions on the Draft 2016 RTP/SCS PEIR; and

WHEREAS, SCAG staff presented an overview of the comments received on the Draft 2016 RTP/SCS and Draft 2016 RTP/SCS PEIR, and a proposed approach to the responses, to the Policy Committees and Regional Council at a joint meeting on March 3, 2016; and

WHEREAS, comment letters and SCAG staff responses on the Draft 2016 RTP/SCS and Draft 2016 RTP/SCS PEIR were posted on the SCAG web page on March 14, 2016, and included as part of the Final 2016 RTP/SCS, Public Participation and Consultation Appendix. SCAG also notified all commenters of the availability of the comments and responses; and

WHEREAS, on March 18, 2016, SCAG posted the proposed Final 2016 RTP/SCS and proposed Final 2016 RTP/SCS PEIR on its website; and

WHEREAS, on March 24, 2016, SCAG's three Policy Committees held a public, special joint meeting to consider a recommendation to the Regional Council to approve and adopt the proposed Final 2016 RTP/SCS and certify the proposed Final 2016 RTP/SCS PEIR at the April 7, 2016 Regional Council meeting; and

WHEREAS, prior to the adoption of this resolution, the Regional Council certified the Final 2016 RTP/SCS PEIR prepared for the 2016 RTP/SCS to be in compliance with CEQA; and

WHEREAS, the Regional Council has had the opportunity to review the Final 2016 RTP/SCS and its related appendices as well as the staff report related to the Final 2016 RTP/SCS, and consideration of the Final 2016 RTP/SCS was made by the Regional Council as part of a public meeting held on April 7, 2016.

NOW, THEREFORE BE IT RESOLVED, the Regional Council hereby approves and adopts the Final 2016 RTP/SCS.

BE IT FURTHER RESOLVED by the Regional Council that:

1. In adopting this Final 2016 RTP/SCS, the Regional Council finds as follows:

a. The Final 2016 RTP/SCS complies with all applicable federal and state requirements, including the metropolitan planning provisions as identified in the Code of Federal Regulations Title 23 Part 450 and Title 49, Part 613, and the SCS and other State RTP requirements as identified in California Government Code Section 65080. Specifically, the Final 2016 RTP/SCS fully addresses the requirements relating to the development and content of metropolitan transportation plans as set forth in 23 C.F.R.§450.322 et seq., including issues relating to: identification of transportation facilities that function as an integrated metropolitan transportation system; operational and management strategies; safety and security; performance measures; environmental mitigation; the need for a financially constrained plan; consultation and public participation; and transportation conformity;

b. The Final 2016 RTP/SCS complies with the emission reduction targets established by the California ARB and meets the requirements of SB 375 (Steinberg, 2008) as codified in Government Code §65080(b) et seq. by achieving per capita GHG emission reductions relative to 2005 of 8% by 2020 and 18% by 2035; and

c. The Final 2016 RTP/SCS's preferred land use scenario and corresponding forecast of population, household and employment growth is adopted at the jurisdictional level, and any corresponding sub-jurisdictional level data and/or maps is advisory only.

2. The Regional Council hereby makes a positive transportation conformity determination of the Final 2016 RTP/SCS and Amendment #15-12 to the 2015 FTIP. In making this determination, the Regional Council finds as follows:

a. The Final 2016 RTP/SCS and Amendment #15-12 to the 2015 FTIP passes the four tests and analyses required for conformity, namely: regional emissions analysis; timely implementation of Transportation Control Measures; financial constraint analysis; and interagency consultation and public involvement;

3. In approving the Final 2016 RTP/SCS, the Regional Council also approves and adopts Amendment #15-12 to the 2015 FTIP, in compliance with the federal requirement of consistency with the RTP;

4. That the foregoing recitals are true and correct and incorporated herein by this reference; and

5. SCAG's Executive Director or his designee is authorized to transmit the Final 2016 RTP/SCS and its conformity findings to the FTA and the FHWA to make the final conformity determination in accordance with the Federal Clean Air Act and EPA Transportation Conformity Rule, 40 C.F.R. Parts 51 and 93.

TO BE PASSED, APPROVED AND ADOPTED by the Regional Council of the Southern California Association of Governments at its regular meeting on the 7th day of April, 2016.

Cheryl Viegas-Walker
President
Council Member, City of El Centro

Attest:

Hasan Ikhrata
Executive Director

Approved as to Form:

Joann Africa
Chief Counsel

EXECUTIVE SUMMARY

Image courtesy of Samer Momani

EXECUTIVE SUMMARY HIGHLIGHTS

ENVISIONING OUR REGION IN 2040

Transport yourself 25 years into the future. What kind of Southern California do you envision? SCAG envisions a region that has grown by nearly four million people—sustainably. In communities across Southern California, people enjoy increased mobility, greater economic opportunity and a higher quality of life.

OUR VISION

In our vision for the region in 2040, many communities are more compact and connected seamlessly by numerous public transit options, including expanded bus and rail service. People live closer to work, school, shopping and other destinations. Their neighborhoods are more walkable and safe for bicyclists. They have more options available besides driving alone, reducing the load on roads and highways. People live more active and healthy lifestyles as they bike, walk or take transit for short trips. Goods flow freely along roadways, highways, rail lines and by sea and air into and out of the region—fueling economic growth.

Southern California's vast transportation network is preserved and maintained in a state of good repair, so that public tax dollars are not expended on costly repairs and extensive rehabilitation. The region's roads and highways are well-managed so that they operate safely and efficiently, while demands on the regional network are managed effectively by offering people numerous alternatives for transportation.

Housing across the region is sufficient to meet the demands of a growing population with shifting priorities and desires, and there are more affordable homes for all segments of society. With more connected communities, more choices for travel and robust commerce, people enjoy more opportunities to advance educationally and economically. As growth and opportunity are distributed widely, people from diverse neighborhoods across the region share in the benefits of an enhanced quality of life.

With more alternatives to driving alone available, air quality is improved and the greenhouse gas emissions that contribute to global climate change are reduced. Communities throughout Southern California are more prepared to confront and cope with the inevitable consequences of climate change, including droughts and wildfires, heat waves, rising seas and extreme weather. Meanwhile, natural lands and recreational areas that offer people a respite from the busier parts of the region are preserved and protected.

At mid-century, technology has transformed how we get around. Automated cars have emerged as a viable option for people and are being integrated into the overall transportation system. Shared mobility options that rely on instantaneous communication and paperless transactions have matured, and new markets for mobility are created and strengthened.

Above all, people across the region possess more choices for getting around and with those choices come opportunities to live healthier, more economically secure and higher quality lives.

This vision for mid-century, which is built on input received from thousands of people across Southern California, is embodied in the 2016 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS, or Plan), a major planning document for our regional transportation and land use network. It balances the region's future mobility and housing needs with economic, environmental and public health goals. This long-range Plan, required by the State of California and the federal government, is updated by SCAG every four years as demographic, economic and policy circumstances change. The 2016 RTP/SCS is a living, evolving blueprint for our region's future.

OUR OVERARCHING STRATEGY

It is clear that the path toward realizing our vision will require a single unified strategy, one that integrates planning for how we use our land with planning for how we get around.

Here is what we mean: we can choose to build new sprawling communities that pave over undeveloped natural lands, necessitating the construction of new roads and highways—which will undoubtedly become quickly overcrowded and contribute to regional air pollution and ever-increasing greenhouse gas emissions that affect climate change.

Or, we can grow in more compact communities in existing urban areas, providing neighborhoods with efficient and plentiful public transit, abundant and safe opportunities to walk, bike and pursue other forms of active transportation, and preserving more of the region's remaining natural lands for people to enjoy. This second vision captures the essence of what people have said they want during SCAG outreach to communities across the region.

SCAG acknowledges that more compact communities are not for everyone, and that many residents of our region prefer to live in established suburban neighborhoods. The agency supports local control for local land use decisions, while striving for a regional vision of more sustainable growth.

Within the 2016 RTP/SCS, you will read about plans for "High Quality Transit Areas," "Livable Corridors" and "Neighborhood Mobility Areas." These are a few of the key features of a thoughtfully planned, maturing region in which people benefit from increased mobility, more active lifestyles, increased economic opportunity and an overall higher quality of life. These features embody the idea of integrating planning for how we use land with planning for transportation.

As we pursue this unified strategy, it will be vital that we ensure that the benefits of our initiatives are widely distributed and that the burdens of development are not carried by any one group disproportionately. Social equity and environmental justice are key considerations of our overall Plan.

CHALLENGES WE FACE

We are living at a time of great change in Southern California. Our region must confront several challenges as we pursue the goals outlined in the 2016 RTP/SCS:

- **We are growing slower:** But our region is projected to grow to 22 million people by 2040—an increase of nearly four million people.
- **Our overall population will be older:** The median age of our region's overall population is expected to rise, with an increasing share of senior citizens. This demographic shift will have major impacts on transportation needs and on our transportation plans. A key challenge for the region will be to provide seniors with more transportation options for maintaining their independence as they age.
- **A smaller percentage of us will be working:** The share of younger people of working age is expected to fall. The ratio of people over the age of 65 to people of working age (15 to 64) is expected to increase. This means that our region could face a labor shortage and a subsequent reduction in tax revenues.
- **A large number of us want more urban lifestyles:** Today's Millennials, born between 1980 and 2000, are expected to demand more compact communities and more access to transit—shifting regional priorities for the overall transportation system and the types of housing that are constructed. Baby Boomers are also expected to increasingly desire these kinds of communities.
- **Many of us will continue to live in the suburbs and drive alone:** Despite the emerging trends discussed above, many people in the region will continue to live in suburban neighborhoods and drive alone to work, school, shopping and other destinations—rather than use public transit and other transportation alternatives. The 2016 RTP/SCS will not change how everyone chooses to get around, but the Plan is designed to offer residents more choices so that we can experience regionwide benefits.
- **Housing prices are increasing:** Housing prices are rising steadily and affordability is declining. As communities are redeveloped to be more compact with new transit options and revitalized urban amenities, existing residents may risk displacement.
- **Our transportation system requires rehabilitation and maintenance:** Southern California's transportation system is becoming increasingly compromised by decades of underinvestment in maintaining and preserving our infrastructure. These investments have not kept pace with the demands placed on the system and the quality of many of our roads, highways, bridges, transit and bicycle and pedestrian facilities is continuing to deteriorate. If we continue on our current path of seriously underfunding system preservation, the cost of bringing our system back to a reasonable state of good repair will grow exponentially.
- **Transportation funding is scarce and insufficient:** Full funding for transportation improvements is currently not sustainable, given the projected needs. Projected revenues from the gas tax, the historic source of transportation funding, will not meet transportation investment needs—and gas tax revenues, in real terms, are actually in decline as tax rates (both state and federal) have not been adjusted in more than two decades while the number of more fuel efficient and alternative powered vehicles continues to grow.
- **Moving goods through the region faces growing pains:** The movement of goods will face numerous challenges as consumer demand for products increases and the region continues to grow as a major exchange point for global trade. Infrastructure for freight traffic will be strained, current efforts to reduce air pollution from goods movement sources will not be sufficient to meet national air quality standards, capacity at international ports will be over-burdened and warehouse space could fall short of demands.
- **Technology is transforming transportation:** Mobility innovations including electric cars, the availability of real-time traveler information, the expansion of car sharing and ridesourcing due to smart phones and other technological advances will require updated planning to smoothly integrate these new travel options into the overall transportation system.
- **Millions suffer from chronic diseases:** Many people in our region suffer from chronic diseases related to poor air quality and physical inactivity. Heart disease, stroke, cancer, chronic lower respiratory disease and diabetes are responsible for 72 percent of all deaths in our region. Nine percent of residents have been diagnosed with diabetes, 27 percent with hypertension and 13 percent with asthma, and more

than 60 percent are overweight or obese, according to the California Health Interview Survey.

- **Climate change demands that we adapt:** The consequences of climate change will continue to impact everyday life for millions of people. The region is expected to experience more droughts and wildfires, water shortages because of drought but also because of declining snowpack in our mountains, rising seas, extreme weather events, and other impacts. Communities will need to make their neighborhoods more resilient to these changes.

OUR PROGRESS SINCE 2012

Although our challenges are great, the region has made significant progress over the past few years.

TRANSIT

Transit service continues to expand throughout the region and the level of service has exceeded pre-recessionary levels—mainly due to a growth in rail service. Significant progress has been made toward completing capital projects for transit, including the Los Angeles County Metropolitan Transportation Authority (Metro) Orange Line Extension and the Metro Expo Line. Meanwhile, five major Metro Rail projects are now under construction in Los Angeles County.

PASSENGER RAIL

Passenger rail is expanding and improving service on several fronts. The Amtrak Pacific Surfliner is now being managed locally by the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor Agency; Riverside County Transportation Commission (RCTC) completed the Perris Valley Line in early 2016; Metrolink became the first commuter railroad in the nation to implement Positive Train Control and purchase fuel-efficient, low-emission Tier IV locomotives; and the California High-Speed Train is under construction in the Central Valley, and planning and environmental work is underway in our region to the Los Angeles/Anaheim Phase One terminus. Several other capital projects are underway or have been completed, including the Anaheim Regional Intermodal Transportation Center (ARTIC) and the Burbank Bob Hope Airport Regional Intermodal Transportation Center, among others.

HIGHWAYS

The expansion of highways has slowed considerably over the last decade because of land, financial and environmental constraints. Still, several projects have been completed since 2012 to improve access and close critical gaps and congestion chokepoints in the regional network. These include the Interstate 10 westbound widening in Redlands and Yucaipa, the Interstate 215 Bi-County HOV Project in Riverside and San Bernardino Counties, and a portion of the Interstate 5 South Corridor Project in Los Angeles County (between North Fork Coyote Creek to Marquardt Avenue), among others.

REGIONAL HIGH-OCCUPANCY VEHICLE (HOV) AND EXPRESS LANE NETWORK

The demands on our region's highways continue to exceed available capacity during peak periods, but several projects to close HOV gaps have been completed. The result has been 39 more lane miles of regional HOV lanes on Interstates 5, 405, 10, 215 and 605, on State Routes 57 and 91, and on the West County Connector Project (direct HOV connection between Interstate 405, Interstate 605 and State Route 22) within Orange County. The region is also developing a regional express lane network. Among the milestones: a one-year demonstration of express lanes in Los Angeles County along Interstate 10 and Interstate 110 was made permanent in 2014; and construction has begun on express lanes on State Route 91 extending eastward to Interstate 15 in Riverside County.

ACTIVE TRANSPORTATION

Our region is making steady progress in encouraging more people to embrace active transportation and more than $650 million in Active Transportation Program investments are underway. Nearly 38 percent of all trips are less than three miles, which is convenient for walking and biking. As a percentage share of all trips, bicycling has increased more than 70 percent since 2007 to 1.12 percent. More than 500 miles of new bikeways have been constructed in the region, and safety and encouragement programs are helping people choose walking and biking.

GOODS MOVEMENT

The region continues to make substantial progress toward completing several major capital initiatives to support freight transportation and reducing harmful emissions generated by goods movement sources. Progress since 2012 has included implementation of the San Pedro Bay Ports Clean Air Action Program (CAAP), which is reducing diesel particulate matter dropping by 82 percent, nitrogen oxides by 54 percent and sulfur oxides by 90 percent; and the San Pedro Bay Ports Clean Truck Program, which has led to an 80 percent reduction in port truck emissions. The region has also shown progress in advanced technology for goods movement, including a one-mile Overhead Catenary System (OCS) in the City of Carson. Construction of the Gerald Desmond Bridge has begun. Seventeen out of 71 planned grade separation projects throughout the region have been completed, and another 21 are expected to be complete in 2016. Double tracking of the Union Pacific (UP) Alhambra Subdivision has been initiated. The Colton Crossing, which physically separated two Class I railroads with an elevated 1.4-mile-long overpass that lifts UP trains traveling east-west, was completed in August 2013.

SUSTAINABILITY IMPLEMENTATION

Since 2012, SCAG's Sustainability Planning Grant Program has funded 70 planning projects (totaling $10 million) to help local jurisdictions link local land use plans with 2012 RTP/SCS goals. Local jurisdictions have updated outmoded General Plans and zoning codes; completed specific plans for town centers and Transit Oriented Development (TOD); implemented sustainability policies; and adopted municipal climate action plans. Thirty of the 191 cities and two of the six counties in the SCAG region report having updated their General Plans since 2012, and another 42 cities have General Plan updates pending. Fifty-four percent of the cities reporting adopted or pending General Plan updates include planning for TOD, 55 percent plan to concentrate key destinations, and 76 percent include policies encouraging infill development. Of the counties reporting updates or pending updates to their General Plans, 75 percent include TOD elements, 100 percent encourage infill development, 75 percent promote concentrated destinations, and 75 percent feature policies to address complete communities. To protect water quality, 91 percent of cities have adopted water-related policies and 85 percent have adopted measures to address water quality. To conserve energy, 86 percent of cities have implemented community energy efficiency policies, with 80 percent of those cities implementing municipal energy efficiency policies and 76 percent implementing renewable energy policies. Of the region's 191 cities, 189 have completed sustainability components, with 184 cities implementing at least ten or more policies or programs and ten cities implementing 20 or more policies or programs. This last group includes Pasadena, Pomona and Santa Monica.

AFFORDABLE HOUSING

The state is offering new opportunities to help regions promote affordable housing. In spring 2015, California's Affordable Housing Sustainable Communities (AHSC) program awarded its first round of funding to applicants after a competitive grant process. Of $122 million available statewide, $27.5 million was awarded to ten projects in the SCAG region. Eight-hundred forty-two affordable units, including 294 units designated for households with an income of 30 percent or less of the area median income, will be produced with this funding. Meanwhile, Senate Bill 628 (Beall) and Assembly Bill 2 (Alejo) provide jurisdictions with an opportunity to establish a funding source to develop affordable housing and supportive infrastructure and amenities.

PUBLIC HEALTH

The SCAG region has several ongoing efforts to promote public health. The Los Angeles County Departments of Public Health and City of Los Angeles Planning Department are developing a Health Atlas that highlights health disparities among neighborhoods. In Riverside County, the Healthy Riverside County Initiative has formed a Healthy City Network to continue to successfully work with the county's 28 cities to enact Healthy City Resolutions and Health Elements into their General Plans. The County of San Bernardino has recently completed the Community Vital Signs Initiative, which envisions a "county where a commitment to optimizing health and wellness is embedded in all decisions by residents, organizations and government."

ENVIRONMENTAL JUSTICE

Since the adoption of the 2012 RTP/SCS, social equity and environmental justice have become increasingly significant priorities in regional plans. For example, plans to promote active transportation, improve public health, increase access to transit, preserve open space, cut air pollution and more are all evaluated for how well the benefits of these efforts are distributed among all demographic groups. The State of California's Environmental Protection Agency (Cal/EPA) developed a new tool, CalEnviroScreen, which helps to identify areas in the state that have higher levels of environmental vulnerability due to historical rates of toxic exposure and certain social factors. Based on this tool, much of the region can stand to benefit from Cap-and-Trade grants that give priority to communities that are disproportionately impacted.

SETTING THE STAGE FOR OUR PLAN

SCAG began developing the 2016 RTP/SCS by first reaching out to the local jurisdictions to hear directly from them about their growth plans. The next step was to develop scenarios of growth, each one representing a different vision for land use and transportation in 2040. More specifically, each scenario was designed to explore and convey the impact of where the region would grow, to what extent the growth would be focused within existing cities and towns and how it would grow—the shape and style of the neighborhoods and transportation systems that would shape growth over the period. The refinement of these scenarios, through extensive public outreach and surveys, led to a "preferred scenario" that helped guide the strategies, programs and projects detailed in the Plan.

MAJOR INITIATIVES

With the preferred scenario selected, the 2016 RTP/SCS, which includes $556.5 billion in transportation investments, has proposed several major initiatives to strive toward our vision for 2040.

PRESERVING THE TRANSPORTATION SYSTEM WE ALREADY HAVE (FIX-IT-FIRST)

The 2016 RTP/SCS calls for the investment of $275.5 billion toward preserving our existing system. The allocation of these expenditures includes the transit and passenger rail systems, the State Highway System, and regionally significant local streets and roads.

EXPANDING OUR REGIONAL TRANSIT SYSTEM TO GIVE PEOPLE MORE ALTERNATIVES TO DRIVING ALONE

The 2016 RTP/SCS includes $56.1 billion for capital transit projects and $156.7 billion for operations and maintenance. This includes significant expansions of the Metro subway and Light Rail Transit (LRT) system in Los Angeles County. Meanwhile, new Bus Rapid Transit (BRT) routes will expand higher-speed bus service regionally; new streetcar services will link major destinations in Orange County; and new Metrolink extensions will further connect communities in the Inland Empire. Other extensive improvements are planned for local bus, rapid bus, BRT and express service throughout the region. To make transit a more attractive and viable option, the 2016 RTP/SCS also supports implementing and expanding transit signal priority; regional and inter-county fare agreements and media; increased bicycle carrying capacity on transit and rail vehicles; real-time passenger information systems to allow travelers to make more informed decisions; and implementing first/last mile strategies to extend the effective reach of transit.

EXPANDING PASSENGER RAIL

The 2016 RTP/SCS calls for an investment in passenger rail of $38.6 billion for capital projects and $15.7 billion for operations and maintenance. The Plan calls for maintaining the commitments in the 2012 RTP/SCS, including Phase 1 of the California High-Speed Train and the Southern California High-Speed Rail Memorandum of Understanding (MOU), which identifies a candidate project list to improve the Metrolink system and the LOSSAN rail corridor, thereby providing immediate, near-term benefits to the region while laying the groundwork for future integration with California's High-Speed Train project. These capital projects will bring segments of the regional rail network up to the federally defined speed of 110 miles per hour or greater and help lead to a blended system of rail services.

IMPROVING HIGHWAY AND ARTERIAL CAPACITY

The 2016 RTP/SCS calls for investing $54.2 billion in capital improvements and $103.0 billion in operations and maintenance of the State Highway System and regionally significant local streets and roads throughout the region. This includes focusing on achieving maximum productivity by adding capacity, primarily by closing gaps in the system and improving access and other measures including the deployment of new technology. The Plan also continues to support a regional network of express lanes, building on the success of the State Route 91 Express Lanes in Orange County, as well as Interstate 10 and Interstate 110 Express Lanes in Los Angeles County.

MANAGING DEMANDS ON THE TRANSPORTATION SYSTEM

The 2016 RTP/SCS calls for investing $6.9 billion toward Transportation Demand Management (TDM) strategies throughout the region. These strategies focus on reducing the number of drive-alone trips and overall vehicle miles traveled (VMT) through ridesharing, which includes carpooling, vanpooling and supportive policies for ridesourcing services such as Uber and Lyft; redistributing or eliminating vehicle trips from peak demand periods through incentives for telecommuting and alternative work schedules; and reducing the number of drive-alone trips through increased use of transit, rail, bicycling, walking and other alternative modes of travel.

OPTIMIZING THE PERFORMANCE OF THE TRANSPORTATION SYSTEM

The 2016 RTP/SCS earmarks $9.2 billion for Transportation System Management (TSM) improvements. These include extensive advanced ramp metering, enhanced incident management, bottleneck removal to improve flow (e.g., auxiliary lanes), expansion and integration of the traffic signal synchronization network, data collection to monitor system performance, integrated and dynamic corridor congestion management, and other Intelligent Transportation System (ITS) improvements. Recent related initiatives include the Caltrans Advanced Traffic Management (ATM) study for Interstate 105 and the Regional Integration of ITS Projects (RIITS) and Information Exchange Network (IEN) data exchange efforts at Los Angeles Metro.

PROMOTING WALKING, BIKING AND OTHER FORMS OF ACTIVE TRANSPORTATION

The 2016 RTP/SCS plans for continued progress in developing our regional bikeway network, assumes all local active transportation plans will be implemented, and dedicates resources to maintain and repair thousands of miles of dilapidated sidewalks. The Plan invests $12.9 billion in active transportation strategies. The Plan also considers new strategies and approaches beyond those proposed in 2012. To promote short trips, these include improving sidewalk quality, local bike networks and neighborhood mobility areas. To promote longer regional trips, these strategies include developing a regional greenway network and continuing investments in the regional bikeway network and access to the California Coastal Trail. Active transportation will also be promoted by integrating it with the region's transit system; increasing access to 224 rail, light rail and fixed guideway bus stations; promoting 16 regional corridors that support biking and walking; supporting bike share programs; educating people about the benefits of active transportation for students; and promoting safety campaigns.

STRENGTHENING THE REGIONAL TRANSPORTATION NETWORK FOR GOODS MOVEMENT

The 2016 RTP/SCS includes $70.7 billion in goods movement strategies. Among these are establishing a system of truck-only lanes extending from the San Pedro Bay Ports to downtown Los Angeles along Interstate 710; connecting to the State Route 60 east-west segment and finally reaching Interstate 15 in San Bernardino County; working to relieve the top 50 regional truck bottlenecks; adding mainline tracks for the Burlington Northern Santa Fe (BNSF) San Bernardino and Cajon Subdivisions and the Union Pacific Railroad (UPRR) Alhambra and Mojave Subdivisions; expanding/modernizing intermodal facilities; building highway-rail grade separations; improving port area rail infrastructure; reducing environmental impacts by supporting the deployment of commercially available low-emission trucks and locomotives; and, in the longer term, advancing technologies to implement a zero- and near zero-emission freight system.

LEVERAGING TECHNOLOGY

Advances in communications, computing and engineering—from shared mobility innovations to zero-emission vehicles—can lead to a more efficient transportation system with more mobility options for everyone. Technological innovations also can reduce the environmental impact of existing modes of transportation. For example, alternative fuel vehicles continue to become more accessible for retail consumers and for freight and fleet applications—and as they are increasingly used, air pollution can be reduced. Communications technology, meanwhile, can improve the movement of passenger vehicles and connected transit vehicles. As part of the 2016 RTP/SCS, SCAG has focused location-based strategies specifically on increasing the efficiency of Plug-in Hybrid Electric Vehicles (PHEV) in the region. These are electric vehicles that are powered by a gasoline engine when their battery is depleted. The 2016 RTP/SCS proposes a regional charging network that will increase the number of PHEV miles driven on electric power, in addition to supporting the growth of the PEV market generally. In many instances, the additional chargers will create the opportunity to increase the electric range of PHEVs, reducing vehicle miles traveled that produce tail-pipe emissions.

IMPROVING AIRPORT ACCESS

Recognizing that the SCAG region is one of the busiest and most diverse commercial aviation regions in the world and that air travel is an important contributor to the region's economic activity, the 2016 RTP/SCS includes strategies for reducing the impact of air passenger trips on ground transportation congestion. Such strategies include supporting the regionalization of air travel demand; continuing to support regional and inter-regional projects that facilitate airport ground access (e.g., High-Speed Train); supporting ongoing local planning efforts by airport operators, county transportation commissions and local jurisdictions; encouraging the development and use of transit access to the region's airports; encouraging the use of modes with high average vehicle occupancy; and discouraging the use of modes that require "deadhead" trips to/from airports (e.g., passengers being dropped off at the airport via personal vehicle).

FOCUSING NEW GROWTH AROUND TRANSIT

The 2016 RTP/SCS plans for focusing new growth around transit, which is supported by the following policies: identifying regional strategic areas for infill and investment; structuring the Plan on centers development; developing "Complete Communities"; developing nodes on a corridor; planning for additional housing and jobs near transit; planning for changing demand in types of housing; continuing to protect stable, existing single-family areas; ensuring adequate access to open space and preservation of habitat; and incorporating local input and feedback on future growth. These policies support the development of:

- **High Quality Transit Areas (HQTAs):** areas within one-half mile of a fixed guideway transit stop or a bus transit corridor where buses pick up passengers at a frequency of every 15 minutes or less during peak commuting hours. While HQTAs account for only three percent of total land area in SCAG region, they are planned and projected to accommodate 46 percent of the region's future household growth and 55 percent of the future employment growth.
- **Livable Corridors:** arterial roadways where jurisdictions may plan for a combination of the following elements: high-quality bus frequency; higher density residential and employment at key intersections; and increased active transportation through dedicated bikeways.
- **Neighborhood Mobility Areas (NMAs):** strategies are intended to provide sustainable transportation options for residents of the region who lack convenient access to high-frequency transit but make many short trips within their urban neighborhoods. NMAs are conducive to active transportation and include a "Complete Streets" approach to roadway improvements to encourage replacing single- and multi-occupant automobile use with biking, walking, skateboarding, neighborhood electric vehicles and senior mobility devices.

IMPROVING AIR QUALITY AND REDUCING GREENHOUSE GASES

It is through integrated planning for land use and transportation that the SCAG region, through the initiatives discussed in this section, will strive toward a more sustainable region. The SCAG region must achieve specific federal air quality standards. It also is required by state law to lower regional greenhouse gas emissions. California law requires the region to reduce per capita greenhouse gas emissions in the SCAG region by eight percent by 2020—compared with 2005 levels—and by 13 percent by 2035. The strategies, programs and projects outlined in the 2016 RTP/SCS are projected to result in greenhouse gas emissions reductions in the SCAG region that meet or exceed these targets.

PRESERVING NATURAL LANDS

Many natural land areas near the edge of existing urbanized areas do not have plans for conservation and are vulnerable to development pressure. The 2016 RTP/SCS recommends redirecting growth from high value habitat areas to existing urbanized areas. This strategy avoids growth in sensitive habitat areas, builds upon the conservation framework and complements an infill-based approach.

FINANCING OUR FUTURE

To accomplish the ambitious goals of the 2016 RTP/SCS through 2040, SCAG forecasts expenditures of $556.5 billion—of which $275.5 billion is budgeted for operations and maintenance of the regional transportation system and another $246.6 billion is reserved for transportation capital improvements.

Forecasted revenues comprise both existing and several new funding sources that are reasonably expected to be available for the 2016 RTP/SCS, which together total $556.5 billion. Reasonably available revenues include short-term adjustments to state and federal gas excise tax rates and the long-term replacement of gas taxes with mileage-based user fees (or equivalent fuel tax adjustment). These and other categories of funding sources were identified as reasonably available on the basis of their potential for revenue generation, historical precedence and the likelihood of their implementation within the time frame of the Plan.

WHAT WE WILL ACCOMPLISH

Overall, the transportation investments in the 2016 RTP/SCS will provide a return of $2.00 for every dollar invested. Compared with an alternative of not adopting the Plan, the 2016 RTP/SCS would accomplish the following:

- The Plan would result in an eight percent reduction in greenhouse gas emissions per capita by 2020, an 18 percent reduction by 2035 and a 21 percent reduction by 2040—compared with 2005 levels. This meets or exceeds the state's mandated reductions, which are eight percent by 2020 and 13 percent by 2035.
- Regional air quality would improve under the Plan, as cleaner fuels and new vehicle technologies help to significantly reduce many of the pollutants that contribute to smog and other airborne contaminants that impact public health in the region.
- The combined percentage of work trips made by carpooling, active transportation and public transit would increase by about four percent,

with a commensurate reduction in the share of commuters traveling by single occupant vehicle.

- The number of Vehicle Miles Traveled (VMT) per capita would be reduced by more than seven percent and Vehicle Hours Traveled (VHT) per capita by 17 percent (for automobiles and light/medium duty trucks) as a result of more location efficient land use patterns and improved transit service.
- Daily travel by transit would increase by nearly one-third, as a result of improved transit service and more transit-oriented development patterns.
- The Plan would reduce delay per capita by 39 percent and heavy-duty truck delay on highways by more than 37 percent. This means we would spend less time sitting in traffic and our goods would move more efficiently.
- More than 351,000 additional new jobs annually would be created, due to the region's increased competitiveness and improved economic performance that would result from congestion reduction and improvements in regional amenities as a result of implementing the Plan.
- The Plan would reduce the amount of previously undeveloped (greenfield) lands converted to more urbanized uses by 23 percent. By conserving open space and other rural lands, the Plan provides a solid foundation for more sustainable development in the SCAG region.
- The Plan would result in a reduction in our regional obesity rate from 26.3 percent to 25.6 percent in areas experiencing land use changes, and a reduction in the share of our population that suffers with high blood pressure from 21.5 percent to 20.8 percent.

HOW WE WILL ENSURE SUCCESS

Our Plan includes several performance outcomes and measures that are used to gauge our progress toward meeting our goals. These include:

- Location Efficiency, which reflects the degree to which improved land use and transportation coordination strategies impact the movement of people and goods.
- Mobility and Accessibility, which reflects our ability to reach desired destinations with relative ease and within a reasonable time, using reasonably available transportation choices.
- Safety and Health, which recognize that the 2016 RTP/SCS has impacts beyond those that are exclusively transportation-related (e.g., pollution-related disease).
- Environmental Quality, which is measured in terms of criteria pollutants and greenhouse gas emissions.
- Economic Opportunity, which is measured in terms of additional jobs created as a result of the transportation investments provided through the 2016 RTP/SCS.
- Investment Effectiveness, which indicates the degree to which the Plan's expenditures generate benefits that transportation users can experience directly.
- Transportation System Sustainability, which reflects how well our transportation system is able to maintain its overall performance over time in an equitable manner with minimum damage to the environment and without compromising the ability of future generations to address their transportation needs.

The 2016 RTP/SCS is designed to ensure that the regional transportation system serves all segments of society. The Plan is subject to numerous performance measures to monitor its progress toward achieving social equity and environmental justice. These measures include accessibility to parks and natural lands, roadway noise impacts, air quality impacts and public health impacts, among many others.

LOOKING BEYOND 2040

The 2016 RTP/SCS is based on a projected budget constrained by the local, state and federal revenues that SCAG anticipates the region receiving between now and 2040. The Strategic Plan discusses projects and strategies that SCAG would pursue if new funding were to become available. The Strategic Plan discussion includes long-term emission reduction strategies for rail and trucks; expanding the region's high-speed and commuter rail systems; expanding active transportation; leveraging technological advances for transportation; addressing further regional reductions in greenhouse gas emissions; and making the region more resilient to climate change—among other topics. We anticipate that these projects and strategies may inform the development of the next Plan, the 2020 RTP/SCS.

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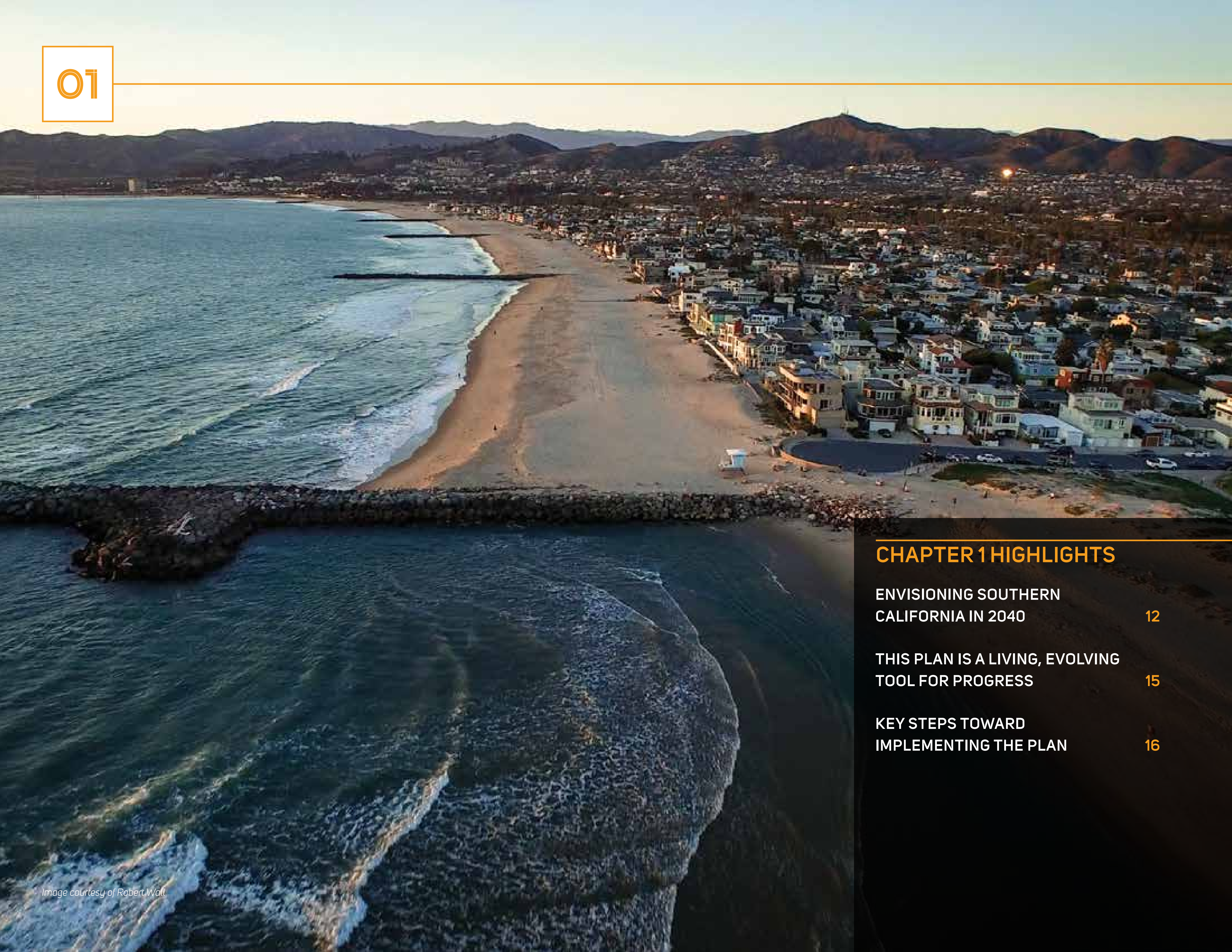


Image courtesy of Robert Wall

CHAPTER 1 HIGHLIGHTS

INTRODUCTION

Southern California is one of the most dynamic and beautiful places on the planet. A global center for entertainment and culture, commerce, tourism and international trade, our region is graced by a temperate climate, a spectacular coastline, rolling hills and inland valleys, towering mountain ranges, and expansive deserts. It is no wonder Southern California has become home to more than 18 million people.

ENVISIONING SOUTHERN CALIFORNIA IN 2040

OUR CHANGING REGION

Today, our region is in the midst of great changes. Our population continues to increase and demographics are shifting. In the coming years, Baby Boomers, born between 1946 and 1964, and Millennials, born between 1980 and 2000, will have an increasingly greater impact on how and where we live and how we travel. Overall, our region will continue to grow more racially and ethnically diverse in the coming decades. These and other changes will transform the character of Southern California over the next 25 years as people choose different places to live and more efficient ways to get around. People will have new expectations for the health and vibrancy of their communities. They will want a greater degree of mobility with transportation options that are more accessible and flexible. People will also expect to have more options for recreational space. They will want cleaner air. How our region responds to growth and the evolving priorities and desires of the people who live here will significantly shape our overall quality of life.

This 2016 RTP/SCS charts a course for closely integrating land use and transportation in certain areas of the region—so that we as a whole can grow smartly and sustainably. It outlines $556.5 billion in transportation system investments through 2040. The Plan was prepared through a collaborative, continuous and comprehensive (3 Cs) process by SCAG, the largest Metropolitan Planning Organization (MPO) in the nation. It serves as an update to SCAG's 2012 RTP/SCS.

It might seem obvious that as a region we should coordinate decisions about where people live, work, go to school, shop and spend their free time with decisions about the transportation system that serves them. But in a region as large and complex as ours, closely integrating strategies for land use and transportation is a huge undertaking. This Plan, more than just a list of projects and initiatives, tells an important story about our future. It is a story about how we will meet complex and daunting challenges in one of the biggest and most influential metropolitan regions in the world, and ultimately how working together we can integrate decisions about transportation and using land to realize a regional transportation system that promotes economic growth and sustainability.

CHALLENGES WE FACE

As we look to the future, we will confront many challenges, some of which we already face today and others that will emerge as we continue to grow. We are living now with the consequences of growth: more people, more houses, more jobs, more freight traffic and more cars. The six counties that encompass our region—Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura—have all experienced the consequences of that growth. In our urban and suburban areas, roads and highways have grown increasingly congested. As a result, regional air pollution has worsened and greenhouse gas emissions that contribute to climate change have increased. Everyday trips to work, school, shopping and more have become more time consuming and in some cases more costly.

Neighborhoods that many people once considered affordable are now priced out of reach—particularly in established urban communities that have seen major public and private investments such as new transit access and new developments that mix upscale housing with popular stores and restaurants.

As our region's demographics change, there will be a greater desire for housing situated closer to jobs, healthcare, shopping and other amenities, and more public transportation options. The region will have to find ways to meet these demands.

Maintaining and enhancing a transportation system that can tackle these challenges will require adequate funding, and securing that funding for a better transportation system will be perhaps the region's biggest challenge. Our overall transportation system is aging rapidly and deteriorating. Deferring maintenance because of a lack of funding will continue to strain the system.

As our economy grows, freight traffic will increase on our roadways, along rail lines, and at our airports and seaports. This will place new demands on general transportation infrastructure such as highways and surface streets, as well as infrastructure specific to international trade and domestic commerce. This growth in goods movement also will contribute to air pollution, making it harder for the region to attain federal standards for air quality and comply with new state rules for lowering greenhouse gas emissions.

Meanwhile, our region faces huge public health challenges, as people suffer from chronic diseases associated with poor air quality and a lack of physical activity. This is why it is so critical to integrate decisions about where we live and work with decisions about how we travel. It matters how neighborhoods

SUSTAINABILITY

The practice of analyzing the impacts of decisions, policies, strategies and development projects on the Environment, the Economy and Social Equity

are laid out and linked to bus lines, bike and walking paths, and other transportation options.

Finally, our region faces the huge challenge of confronting and coping with the consequences of climate change. Making communities more resilient to heat waves, wildfires, rising seas, extreme rainstorms and other projected impacts will depend on smart planning. We'll review these challenges in more depth in Chapter 3.

REALIZING OUR VISION FOR A BETTER FUTURE

The 2016 RTP/SCS outlines concrete steps for meeting these challenges, and creating the conditions and infrastructure that result in increased mobility, easier access to destinations, and more transportation options. The Plan also analyzes the impacts of its decisions, policies, strategies and development projects on the environment, the economy and social equity. By doing this, the 2016 RTP/SCS promotes a sustainable future in which the environment is protected, economic growth is supported and the Plan's benefits are widely distributed.

The 2016 RTP/SCS envisions vibrant, livable communities that are healthy and safe with transportation options that provide easy access to schools, jobs, services, health care and other basic needs. These communities will be conducive to walking and bicycling and will offer residents improved access to amenities such as parks and natural lands. Collectively, these communities will support opportunities for business, investment and employment and fuel for a more prosperous economy. This vision recognizes the region's tremendous diversity, and that no single solution will work everywhere.

SCAG worked closely with local jurisdictions to develop the Plan, which incorporates local growth forecasts, projects and programs and includes complementary regional policies and initiatives. Because SCAG encompasses six counties, it is important that the 2016 RTP/SCS reflect the region's diverse needs and priorities. Every effort was made to ensure that this happened.

Since 2009, every MPO in California has been required to develop a Sustainable Communities Strategy as part of its Regional Transportation Plan—therefore the name "RTP/SCS." This SCS is a vital part of the overall Plan. It charts a course for how the SCAG region will reach state-mandated reductions in greenhouse gas emissions from cars and light trucks, which contribute to climate change. This SCS will be discussed extensively in the coming pages. The SCS is a driving force of this Plan, although not the only one. Once implemented along with the rest of the Plan, it will improve the overall quality of life for all residents of the region.

While our region faces great challenges, we are living at a time of technological and economic innovation that will help us meet those challenges. New mobility innovations can help the region meet the challenges of growth and increasing demands on our transportation system. Automated vehicles, drivers available on demand, data-driven infrastructure, and vehicles that respond to both their passengers and the environment are among the new mobility innovations that will reshape how we travel throughout the region. Many people, particularly Millennials, are already embracing some of these mobility innovations and are likely to be early adopters as new ones emerge. But these advances in mobility also have the potential to help all generations maintain their independence as they age.

The Plan considers new patterns of development as the regional economy continues to recover and grow, the composition of our population changes, the housing market responds to evolving needs, and demands and mobility innovations emerge. The Plan also includes a long-term strategic vision for the region that will help guide decisions for transportation and how we use land, as well as the public investments in both, through 2040.

MAJOR THEMES IN THE 2016 RTP/SCS

Throughout this Plan you will read about important themes that resonate throughout the document and help define its focus. A few have already been introduced. These themes include:

Integrating strategies for land use and transportation. The Plan recognizes that transportation investments and future land use patterns are inextricably linked, and continued recognition of this close relationship will help the region make choices that sustain our existing resources and expand efficiency, mobility and accessibility for people across the region. In particular, the Plan draws a closer connection between where we live and work, and it offers a blueprint for how Southern California can grow more sustainably.

Striving for sustainability. Creating a more sustainable region means growing and living in ways that use our resources efficiently to survive and prosper—from the water we drink, to the air we breathe, to the energy we consume. It is essential that we strive for regional environmental sustainability as we also confront the potential impacts of continued climate change on our transportation infrastructure and communities. In Southern California, striving for sustainability includes achieving state-mandated targets for reducing greenhouse gas emissions from cars and light trucks and federal air quality conformity requirements, and also adapting wisely to a changing environment and climate.

Protecting and preserving our existing transportation infrastructure. The Plan places a priority on investing in the transportation system we already have, to maintain and extend its life and utility. It recognizes that deferring maintenance of infrastructure leads to costlier repairs in the future.

Increasing capacity through improved systems management. Pouring new concrete is not the only way to add capacity to our roadways. Transportation Systems Management, or TSM, is a powerful strategy that aims to improve the capacity and efficiency of the existing transportation system without resorting to large-scale and expensive capital improvements. Examples of TSM projects include coordinating traffic signals along a corridor; deploying changeable message signs that display real-time road information; and ramp meters that control the timing of vehicles driving onto highways.

Giving people more transportation choices. The Plan will provide people with more options for transportation and mobility, offering them various alternatives to driving alone. This will be accomplished by enhancing public transit capacity and increasing its viability by making it more accessible; completing critical road connections; providing greater opportunities for biking and walking, particularly for short trips; exploring how people might use alternative fuel vehicles within their neighborhoods and beyond; increasing telecommuting and flexible work schedules; encouraging new mobility innovations; and improving safety. These Transportation Demand Management, or TDM, strategies will help us better manage the demand we place on the roadway network by reducing the number of people who drive alone and encouraging them to use alternative modes of travel.

Leveraging technology. Advances in communications, computing and engineering—from shared mobility innovations to zero-emissions vehicles—can lead to a more efficient transportation system with more mobility options for everyone. Technological innovations also can reduce the environmental impact of existing modes of transportation. For example, alternative fuel vehicles continue to become more accessible for retail consumers and for freight and fleet applications—and as they are increasingly used, air pollution can be reduced. Communications technology, meanwhile, can improve the movement of passenger vehicles and connected transit vehicles. Moreover, the way urban and suburban areas are shaped can support and encourage shared mobility and other new forms of transportation.

Responding to demographic and housing market changes. The region's demographics and housing market are fluid and dynamic. The housing market has rebounded since the 2012 RTP/SCS was adopted, and the number of Millennials and empty nesters has continued to increase with many seeking smaller housing and a more walkable lifestyle. For many households in the region, minimizing transportation and housing costs remains a priority. The Plan includes strategies focused on compact infill development, superior placemaking (the process of creating public spaces that are appealing), and expanded housing and transportation choices. The goal is to create a region that can respond to changing demographics and markets.

Supporting commerce, economic growth and opportunity. The Plan supports economic growth by building the infrastructure the region needs to promote the smooth flow of goods and easier access to jobs, services, educational facilities, healthcare and more. The Plan also preserves natural lands, improves air quality and creates vibrant urban centers—all of which are critical for attracting and retaining the people and jobs Southern California needs to thrive.

Promoting the links among public health, environmental protection and economic opportunity. The Plan places a priority on implementing the integration of transportation and land use strategies to improve our overall health. The Plan will result in improved air quality, provide more opportunities for people to be physically active, and protect natural lands and habitats. The result: communities will become healthier places to live, allowing people and businesses to thrive.

Building a Plan based on the principles of social equity and environmental justice. The Plan is designed to create regionwide benefits that are distributed equitably, while avoiding having any one group carrying the burdens of development disproportionately. It is particularly important that the Plan consider the consequences of transportation projects on low-income and minority communities and minimize negative impacts. In striving for environmental justice, the Plan provides specific measures to lessen the negative environmental impacts of transportation projects on these communities, as well as metrics to monitor how successful these measures are throughout the communities.

THIS PLAN IS A LIVING, EVOLVING TOOL FOR PROGRESS

WHY SCAG UPDATES THIS PLAN

The State of California and the federal government require that SCAG and other regional planning agencies update their respective Regional Transportation Plan/Sustainable Communities Strategy every four years. Key laws and requirements drive our work. Two primary mandates include:

- SCAG is required by federal law to prepare and update a long-range (minimum of 20 years) RTP (23 U.S.C.A. §134 et seq). Most areas within the SCAG region have been designated as nonattainment or maintenance areas for one or more transportation-related criteria pollutants. Pursuant to the federal Clean Air Act, SCAG's 2016 RTP/SCS is required to meet all federal transportation conformity requirements, including: regional emissions analysis, financial constraint, timely implementation of transportation control measures, and interagency consultation and public involvement (42 U.S.C. §7401 et seq).
- California Senate Bill 375 (SB 375) requires that the RTP also include an SCS, which outlines growth strategies that better integrate land use and transportation planning and help reduce the state's greenhouse gas emissions from cars and light trucks (California Government Code §65080 (b)(2)(B). The RTP is combined with the SCS to form the RTP/SCS, which is further detailed in Chapter 5. For the SCAG region, the California Air Resources Board (ARB) has set greenhouse gas reduction targets at eight percent below 2005 per capita emissions levels by 2020, and 13 percent below 2005 per capita emissions levels by 2035. As we will discuss in this Plan, the region will meet or exceed these targets, lowering greenhouse gas emissions (below 2005 levels) by eight percent by 2020; 18 percent by 2035; and 21 percent by 2040.

While SCAG is required to meet these statutory requirements, all good long-term plans are routinely re-evaluated and updated. SCAG is committed to ensuring that the RTP/SCS is a living document that evolves as the region's demographics, priorities, desires and economy change.

BENEFITS BEYOND CLEANER AIR

This Plan, of course, is about much more than cleaner air and reduced greenhouse gas emissions, although those are primary goals. SCAG must plan for accommodating another 3.8 million residents in its region. The region also expects to add another 2.4 million jobs and 1.5 million new households by the Plan horizon of 2040. The strategies contained in the 2016 RTP/SCS are expected to produce numerous benefits. Among them are:

MOBILITY AND ACCESSIBILITY

MOBILITY refers to how quickly and efficiently people can travel from one location to another. ACCESSIBILITY refers to how connected people's destinations are to transportation options.

Direct improvements to the transportation system can increase mobility. Two examples are speeding up train service and relieving congestion on highways. Improving accessibility requires better coordinating our investments for how we use land with our investments for transportation. Developing housing, businesses and other "Transit Oriented Development" around train stations, for example, improves accessibility.

GREENHOUSE GASES

Components of the atmosphere (carbon dioxide, methane, nitrous oxide and fluorinated gases) that contribute to the greenhouse effect

- **Better Placemaking:** The Plan will promote the development of better places to live and work through measures that encourage more compact development in certain areas of the region, varied housing options, bicycle and pedestrian improvements, and efficient transportation infrastructure.
- **Improved Access and Mobility:** The Plan will encourage strategic transportation investments that add appropriate capacity and improve critical road conditions in the region, increase transit capacity and expand mobility options. Meanwhile, the Plan outlines strategies for developing land in coming decades that will place destinations closer together, thereby decreasing the time and cost of traveling between them.
- **Households save more money:** The Plan is expected to result in less energy and water consumption across the region, as well as lower transportation costs for households.
- **Improved Public Health and a Healthier Environment:** Improved placemaking and strategic transportation investments will help improve air quality; improve health as people have more opportunities to bicycle, walk and pursue other active alternatives to driving; and better protect natural lands as new growth is concentrated in existing urban and suburban areas.

These benefits add up to a simple and powerful idea: a more efficient transportation network and more livable and sustainable communities throughout our region.

KEY STEPS TOWARD IMPLEMENTING THE PLAN

To move forward on the Plan, SCAG needs to take some critical steps. Here are a few of them:

1. **Funding the Plan**

   The 2016 RTP/SCS includes a $556.5 billion financial plan, discussed in Chapter 6 and detailed further in the Transportation Finance Appendix, that identifies how much money will be available to support the region's capital, operating, maintenance and transportation system preservation needs over the life of the Plan. It includes a core revenue forecast of existing local, state and federal funding sources, along with new funding sources that are reasonably expected to be available through 2040.

   These new sources of funding include anticipated adjustments to state and federal gas tax rates based on historical trends and recommendations from two national commissions created by Congress; efforts to further leverage existing local sales tax measures; value capture strategies (e.g., tax increment financing); potential national freight program/freight fees; and passenger and commercial vehicle tolls for specific facilities. Other reasonably expected revenues in the future will come from innovative financing strategies, such as private equity participation. The Plan includes strategies to ensure that these sources of revenue are available, in accordance with federal guidelines.

   There is also a need to identify and secure funding to support deployment and implementation of the land use policies and strategies contained in the Plan to fully realize a sustainable regional vision. It will be essential to secure resources from the California Greenhouse Gas Reduction Fund, also know as Cap-and-Trade, in order to support the Plan's objectives. Additionally, innovative and emerging financing options such as Enhanced Infrastructure Finance Districts will need to be explored and implemented by local jurisdictions.

2. **Collaborating with Local Jurisdictions and Stakeholders**

   Implementing the Plan will require SCAG to continue working closely with all jurisdictions, just as it did during its development. In particular, SCAG will need to work with the six county transportation commissions responsible for managing and prioritizing the portfolio of transportation investments in their respective counties. SCAG also must work with the California Department of Transportation (Caltrans), transit operators, port and airport authorities, and other implementing agencies. In addition, the agency will have to work with the local jurisdictions and counties responsible for land use and transportation planning, and the air quality management districts in charge of monitoring conditions throughout the region. The agency will also have to work with key stakeholders including local public health departments to ensure that the Plan benefits the economy and promotes social equity. To ensure that the region makes progress on its goals, SCAG will monitor its own progress toward achieving its targets and will share this information with its partners and the public.

3. **Looking Ahead Beyond 2040**

   To fully address our region's long-term needs, SCAG must consider strategies and investments beyond what is contained in the financially constrained portion of the 2016 RTP/SCS—that is, the investment plan built on revenues that are reasonably expected over the life of the Plan. Chapter 9 provides an overview of potential programs and policies that may be implemented if additional funding becomes available in the future. These include:

   - Long-term emission-reduction investments for trucks and rail
   - Unfunded operational improvements
   - Unfunded capital improvements
   - Expansion of our region's high-speed rail and commuter rail systems
   - Increased use of active transportation
   - Technology and new mobility innovations
   - Expansion of the regional network of express lanes

SCAG expects that the 2016 RTP/SCS Strategic Plan will influence the next update to the RTP/SCS in 2020, and the strategies detailed above will eventually be incorporated into future investment plans.

Chapter 2 discusses the current transportation system in the region, how we use land today and also a graphic overview of progress achieved since the 2012 RTP/SCS was adopted. It will be followed in Chapter 3 with a review of challenges we face as a region. The first three chapters of the 2016 RTP/SCS set the stage for a discussion of the Plan's development in Chapter 4 and a comprehensive review of the Plan's strategies, programs and projects in Chapter 5.

THE RTP/SCS

WHAT'S REQUIRED

- Long-term vision of how the region will address regional transportation and land use challenges and opportunities
- Investment framework

FEDERAL

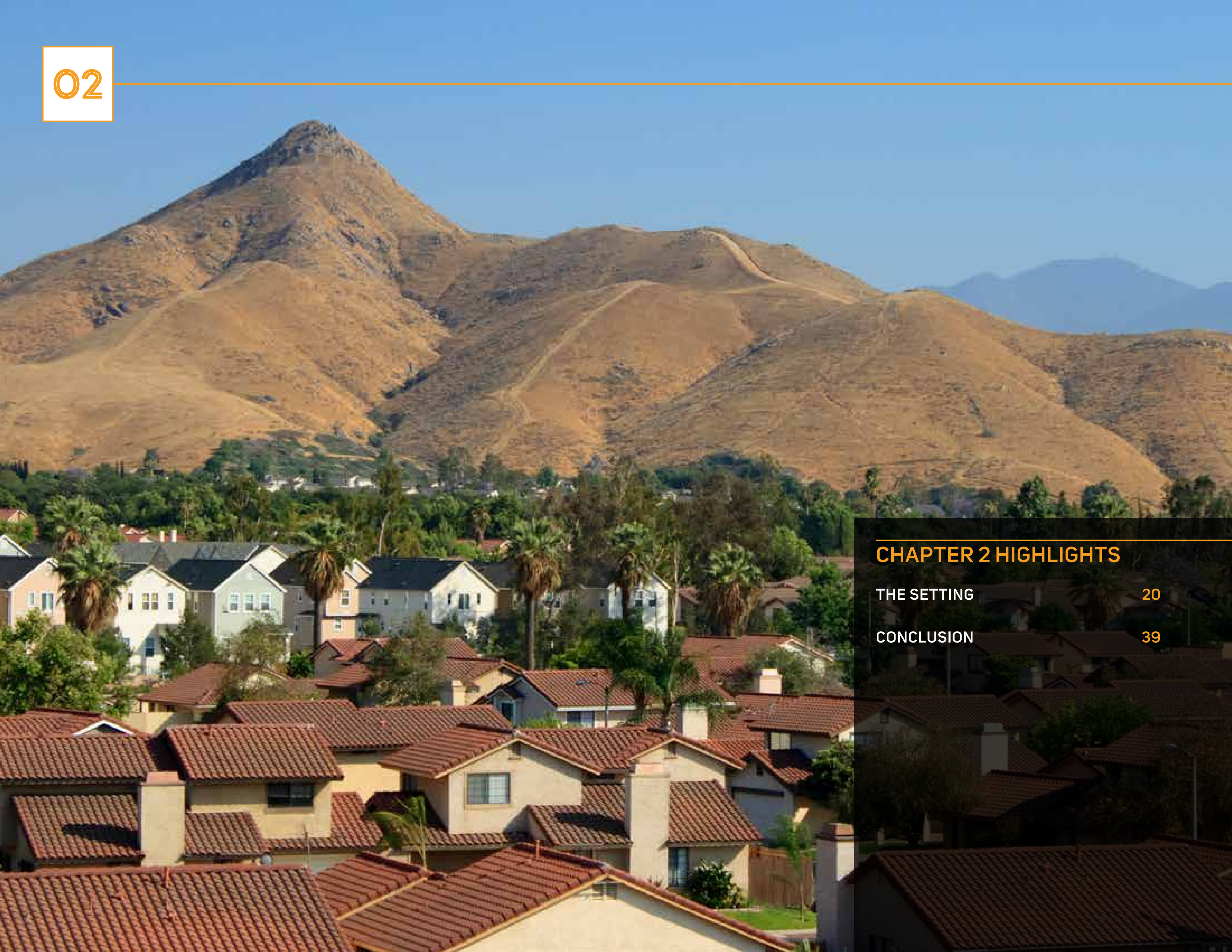
- Updated every four years to maintain eligibility for federal funding
- Long-range: 20+ years into the future
- Demonstrate transportation conformity
  - Regional emissions analysis
  - Financially-constrained (revenues = costs)
  - Timely implementation of transportation control measures
  - Interagency consultation and public involvement
- Must be developed in consultation/coordination with key stakeholders

STATE

- Achieve SB 375 requirements (reduce greenhouse gas emissions from cars and light trucks)

WHAT'S INCLUDED

- Vision, policies and performance measures
- Forecasts (e.g., population, households, employment, land use and housing needs)
- Financial plan
- List of projects (to be initiated and/ or completed by 2040)
- Analysis of priority focus areas (e.g., goods movement and active transportation)



02

CHAPTER 2 HIGHLIGHTS

WHERE WE ARE TODAY

To plan effectively for the future, it is important to understand the current conditions of land use and transportation throughout our large and complex region. This chapter reviews those current conditions.

THE SETTING

HOW WE USE LAND TODAY

SCAG recognizes that decisions by local jurisdictions about how land is used can impact the regional transportation system, and decisions about regional transportation investments can impact land use. The agency also understands that most land use planning is typically conducted by local jurisdictions, while regional and state agencies often make major decisions about transportation investments.

This is why it is critical for the region to integrate strategies for our transportation system with strategies for how we use land. Only by doing this can we achieve sustainable growth and a high quality of life for our region. This first section of Chapter 2 offers an overview of how we use land in the SCAG region, and its relevance to improving our regional transportation system as we head toward 2040.

CATEGORIZING LAND USE

Of the 38,000 square miles of total land in the SCAG region, only 21 percent is suitable for development. Of this limited developable land, more than half has already been fully developed. However, of the remaining developable land, only a small portion of it can be developed as sustainable transit-ready infill—meaning it can be reached via planned transit service and that it can readily access existing infrastructure (water resources, sewer facilities, etc.). According to regional land use data, only two percent of the total developable land in the region is located in High Quality Transit Areas (HQTAs), defined as areas within one-half mile of a well-serviced fixed guideway transit stop, and including bus transit corridors where buses pick up passengers every 15 minutes or less during peak commute hours. A more compact land development strategy is needed, which will be discussed in Chapter 5. Please note that this limited remaining land for future development does not account for potential reductions of developable acreage resulting from conservation efforts currently underway.

As the agency prepared the 2016 RTP/SCS, it needed to organize the many different types and classifications of land uses in the region for required technical analyses. The SCAG region is diverse and large, and the types and classifications of land use used by one jurisdiction often differ from those used by another. The result is that there are many different land use types and classifications that SCAG must organize for its own analyses.

To accurately represent land uses throughout the region, SCAG aggregated information from jurisdictions and simplified the types and classifications of land use into a consolidated set of land use types. The agency then converted these consolidated land uses into 35 "Place Types" to reflect the diversity of land use planning. Descriptions, standards and graphic examples of each Place Type can be found in the Reference Documents section of the SCS Background Documentation Appendix. These Place Types were used in an urban setting design tool known as the Urban Footprint Scenario Planning Model (SPM), to demonstrate urban development in the Plan in terms of form, scale and function in the built environment.

SCAG then classified the Place Types into three Land Development Categories (LDCs). A table of how the 35 Place Types were categorized into the three LDCs can be found in the Reference Documents section of the SCS Background Documentation Appendix. The agency used these categories to describe the general conditions that exist and/or are likely to exist within a specific area. They reflect the varied conditions of buildings and roadways, transportation options, and the mix of housing and employment throughout the region. The three Land Development Categories that SCAG used are:

1. **Urban:** These areas are often found within and directly adjacent to moderate and high density urban centers. Nearly all urban growth in these areas would be considered infill or redevelopment. The majority of housing is multifamily and attached single-family (townhome), which tend to consume less water and energy than the larger types found in greater proportion in less urban locations. These areas are supported by high levels of regional and local transit service. They have well-connected street networks, and the mix and intensity of uses result in a highly walkable environment. These areas offer enhanced access and connectivity for people who choose not to drive or do not have access to a vehicle.
2. **Compact:** These areas are less dense than those in the Urban Land Development Category, but they are highly walkable with a rich mix of retail, commercial, residential and civic uses. These areas are most likely to occur as new growth on the urban edge, or as large-scale redevelopment. They have a rich mix of housing, from multifamily and attached single-family (townhome) to small- and medium-lot single-family homes. These areas are well served by regional

and local transit service, but they may not benefit from as much service as urban growth areas and are less likely to occur around major multimodal hubs. Streets in these areas are well connected and walkable, and destinations such as schools, shopping and entertainment areas can typically be reached by walking, biking, taking transit, or with a short auto trip.

3. **Standard:** These areas comprise the majority of separate-use, auto-oriented developments that have characterized the American suburban landscape for decades. Densities in these areas tend to be lower than those in the Compact Land Development Category, and they are generally not highly mixed. Medium- and larger-lot single-family homes comprise the majority of this development form. Standard areas are not typically well served by regional transit service, and most trips are made by automobile.

NATURAL LANDS AND FARM LAND

Southern California is one of the most biodiverse areas on the planet, with an enormous wealth of natural habitats, and flora and fauna that include species that only exist in Southern California. Our iconic mountain ranges, chaparrals, numerous rivers and expansive deserts make up our regional identity. Additionally, Southern California has a rich agricultural history and continues to be a food producer for the rest of the country. However, issues such as infrastructure needs, continuing development pressure, climate change and limited financial resources present significant challenges in protecting and maintaining the quality and quantity our natural lands and farm lands.

A considerable amount of the region's natural lands, including some key habitat areas, are already protected.[1] Some areas, especially near the edge of existing urbanized areas, do not have plans for conservation and are susceptible to development. These include lands that are important and unique habitats and have high per-acre habitat values, such as riparian habitat (i.e., areas adjacent to bodies of water such as streams or rivers). These habitat types tend to have high per-acre habitat values—meaning these areas are home to a high number of species and serve as highly functional habitats. Some key habitat types are underrepresented within areas of the region already under protection.

Local land use decisions play a pivotal role in the future of some of the region's most valuable habitat and farm lands. Many local governments have taken steps toward planning comprehensively for conserving natural lands and farm lands, while also meeting demands for growth. Across the region, transportation agencies and local governments have used tools, such as habitat conservation plans, to link land use decisions with comprehensive conservation plans in order to streamline development.

To support those and other comprehensive conservation planning efforts and to inform the local land use decision making process, SCAG has studied regional-scale habitat values (see EXHIBIT 2.1), developed a conservation framework and assembled a natural resource database.[2] Over the past several years, SCAG and regional partners such as county transportation commissions (CTCs), environmental organizations and local governments have supported natural land restoration, conservation and acquisition in ways that could contribute to reducing greenhouse gas emissions, streamlining projects and addressing climate change impacts to natural habitats. Please see the Natural & Farm Lands Appendix for additional details.

SHIFTING HOUSING TYPES

In the postwar era that shaped the physical landscape and popular image of Southern California, most households consisted of parents with children—often residing on large suburban lots with single-family houses. But in the 21st century, the region is witnessing demographic shifts that are influencing housing choices. Today, a smaller percentage of households have younger children at home, and the number of households without children is dramatically increasing. The housing market is expected to reflect these trends with an increased demand for smaller-lot single-family houses, as well as multifamily housing close to shopping, transit services and other amenities. Currently, 55 percent of the region's homes are detached single-family houses. Over the next 20 years, the region is projected to add another 1.5 million homes, and much of this increase will be homes on smaller lots and multifamily housing (33 percent single-family housing to 67 percent multifamily housing). Though new housing will tend to be multifamily housing, the region's overall housing stock will remain similar to the existing housing stock, with a breakdown of 49 percent single-family housing and 51 percent multifamily housing (see FIGURE 2.1).

OUR HOUSING NEEDS

As a Council of Governments, SCAG is required by California housing law to

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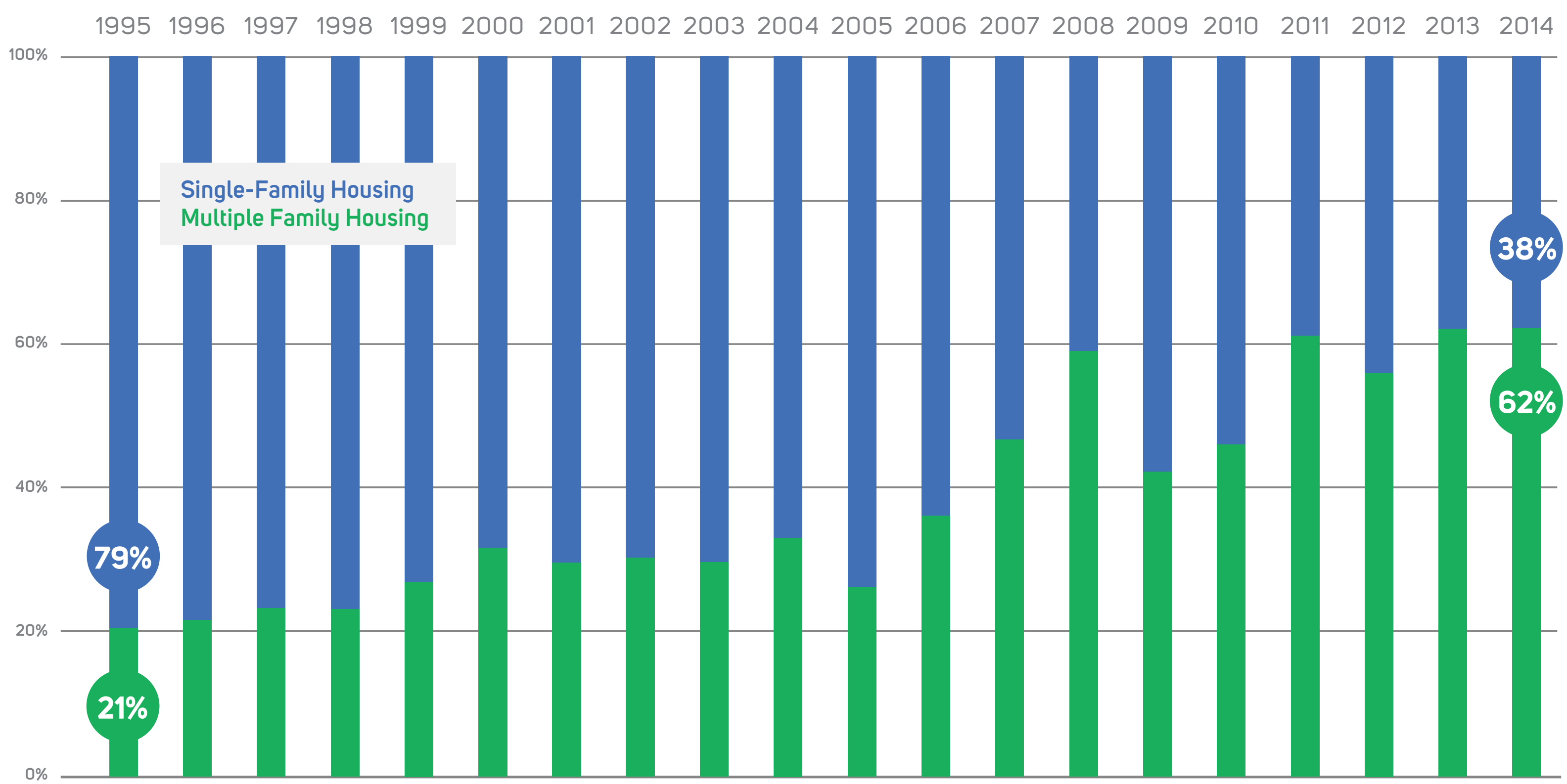
1 O'Neill, T., & Bohannon, J. (2015). Conservation Framework and Assessment. SCAG.

2 These documents can be found at: http://sustain.scag.ca.gov/Pages/LinksResources.aspx.

conduct a Regional Housing Needs Assessment (RHNA) every eight years. This assessment determines future housing needs for every jurisdiction in a given region for a specific time period. This determination is referred to as the RHNA allocation, which represents projected housing needs for an eight-year period, as required by state law. For our region, the most recent RHNA allocation, also known as the fifth RHNA cycle, was adopted by the SCAG's Regional Council in October 2012 and it covers a projection period between January 2014 and October 2021. The RHNA allocation breaks down housing needs into four income categories: very low (less than 50 percent of the county's median income); low (50 to 80 percent of the median); moderate (80 to 120 percent); and above moderate (more than 120 percent). For the fifth RHNA cycle, the regional RHNA allocation was 412,137 units, broken down as follows: 100,632 very low; 64,947 low; 72,053 moderate; and 174,505 above moderate.

However, although these housing units are planned and zoned for, available data sources indicate that the supply of affordable housing has not met needs, despite strong building activity for market rate housing. For example, during the last RHNA cycle (2006–2014), nearly 22,000 units were constructed using Low Income Housing Tax Credits (LIHTC), a rough benchmark in affordable housing building activity for households with very low income. This building activity represents about 12 percent of the 165,457 units in this category regionally. In contrast, more than 150,000 single-family homes, most likely

FIGURE 2.1 SCAG REGION SHARE OF MULTIPLE/SINGLE BUILDING PERMITS ISSUED



Source: U.S. Census Bureau, Security Pacific National Bank (Prior to 1987) and Construction Industry Research Board (1988 to present)
Single-family housing units include detached, semi-detached, row house and town house units. Multifamily housing includes duplexes, 3-4 unit structures, and apartment type structures with five units or more.

EXHIBIT 2.1 HABITAT VALUE

Per-Acre Habitat Value

Urban/Agricultural (2.39 to 8.75) | Low (8.76 to 14.20) | Medium (14.21 to 17.48) | High (17.49 to 20.28) | Very High (20.29 to 24.43) | Basin | County Boundaries

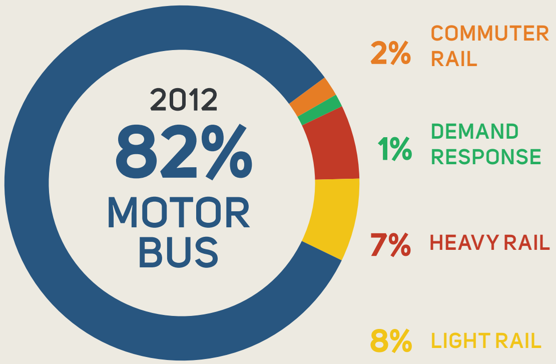
Habitat value refers to the numeric value of a site or area based on an assessment that takes into account species, habitat and functional relationship. The assessment tool aims to spatially capture biodiversity and complexity based on peer-reviewed informational data sets. Please see the Natural & Farm Lands Appendix for a more detailed description of the assessment used to develop the Habitat Value map.

(Source: SCAG)

FOCUS **TRANSIT**

Transit Trips by Mode

The share of bus trips in the region has decreased over time but buses still represent the majority of all transit modes.



Public Transportation Benefits

Enhances personal mobility and access to opportunities.

SAVES MONEY
$13,000
saved per year for 2-person household

REDUCES GASOLINE CONSUMPTION & GHG EMISSIONS

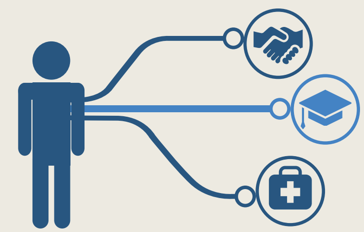
10%–30%
LESS GREENHOUSE GAS EMISSIONS
per household

4,000
FEWER MILES DRIVEN
reduced gas consumption

$4
RETURN FOR EVERY $1 INVESTED IN TRANSIT

42%
PROPERTY VALUES PERFORM BETTER WHEN NEAR TRANSIT

PROVIDES ECONOMIC OPPORTUNITIES

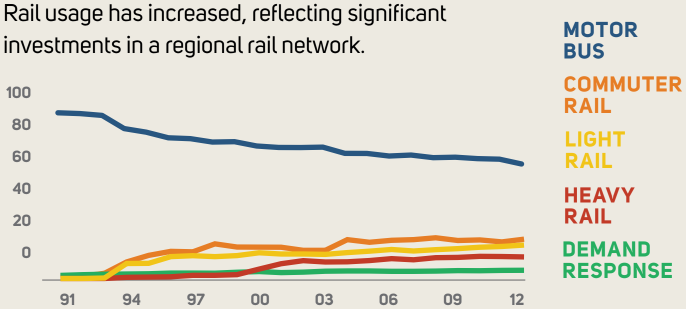


Source: American Public Transportation Association

Passenger Miles by Mode

(percent)

Rail usage has increased, reflecting significant investments in a regional rail network.



Transit Passenger Miles

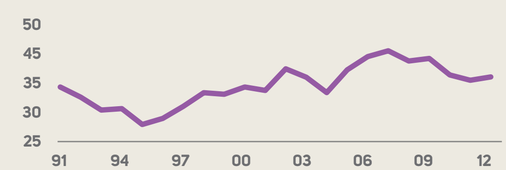
(millions)

Transit use has increased over the last 20 years. In 2012, transit riders took 711 million trips, traveling more than 3.6 billion miles. Growth in passenger miles was driven by a 15% increase in average transit trip length.

Transit Trips

(per capita)

Growth in transit use has not always kept up with population. The number of transit trips per person is about the same as it was 20 years ago.



suitable for the above moderate income category, representing more than 52 percent of the 293,547 above moderate units needed, were built over the same period. A similar trend can be seen in the first two years after the adoption of the fifth cycle RHNA (2013 and 2014), with barely 2,000 units of new construction reporting use of LIHTC while nearly 30,000 single-family units have been built during this time. No new construction using LIHTC was reported in 2014. Although LIHTC has historically been used in about one out of five new multifamily construction, this data suggests that market rate building activity is far stronger than building activity for very low income housholds and that the need for affordable housing continues to increase.

Within the housing elements of their General Plans, each jurisdiction in our region is required to show how it would accommodate its RHNA allocation for the designated period. This is accomplished through a sites and inventory analysis that evaluates zoning and land use policies. SCAG is tasked with providing the regional RHNA allocation, but housing elements are reviewed and approved by the California Department of Housing and Community Development. Since the fifth cycle adoption due date of October 2013, 84 percent of the region's jurisdictions have housing elements in compliance with state housing law. The next RHNA allocation for our region is anticipated to be adopted by SCAG in October 2020, with housing elements due by October 2021.

TABLE 2.1 2012 HQTA

COUNTY	WITHIN HQTA			
	HOUSEHOLDS	%	EMPLOYMENT	%
Imperial	0	-	0	-
Los Angeles	1,552,900	48%	2,357,400	56%
Orange	173,500	17%	392,900	26%
Riverside	3,200	0.50%	24,500	4%
San Bernardino	17,200	3%	39,600	6%
Ventura	6,800	3%	22,400	7%
SCAG	1,753,600	30%	2,836,800	38%

HIGH QUALITY TRANSIT AREAS (HQTAs) AND TRANSIT PRIORITY AREAS (TPAs)

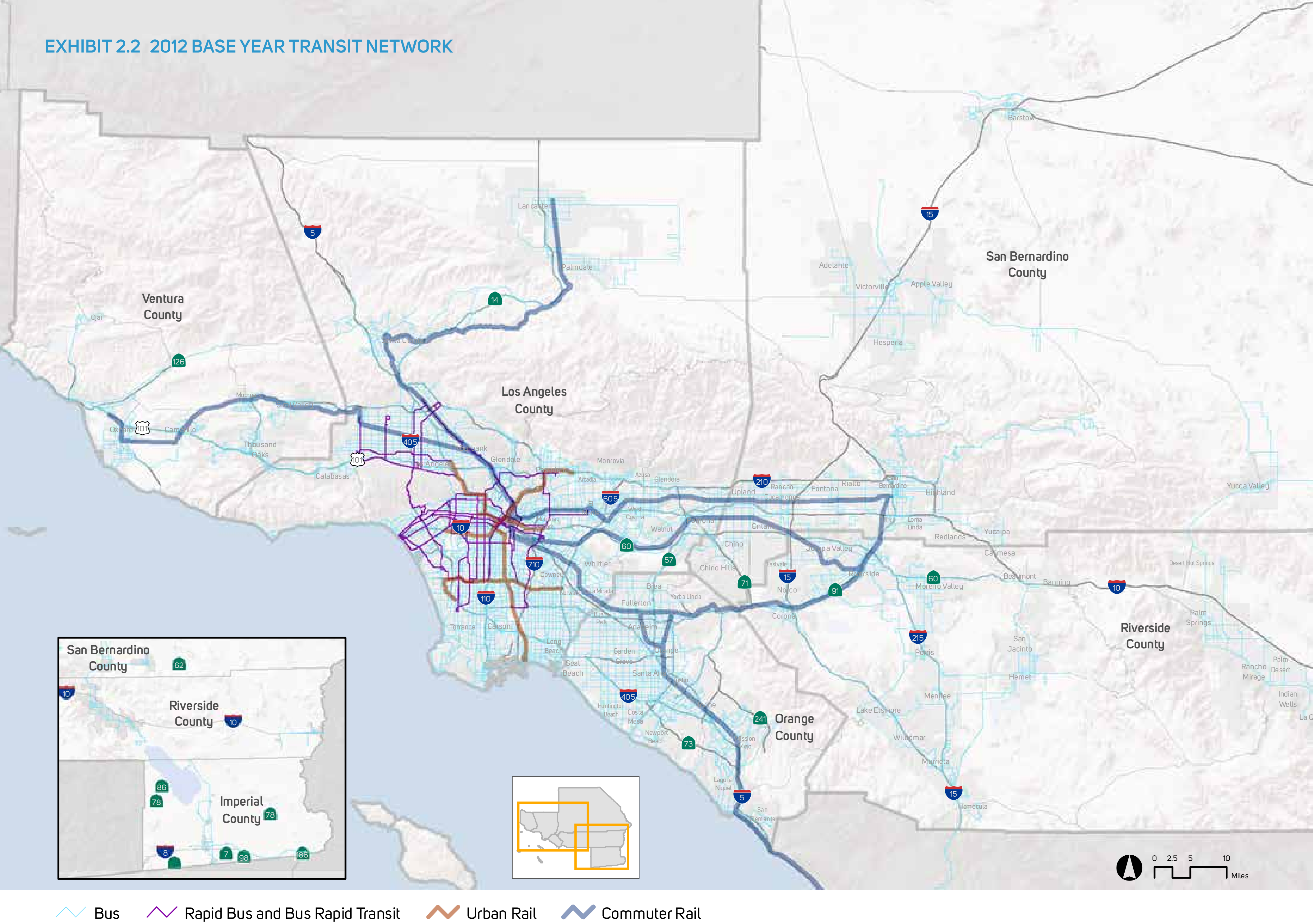
The overall land use pattern detailed in the 2012 RTP/SCS reinforced the idea of focusing new housing and employment within the region's HQTAs. For planning purposes, an HQTA, as we have mentioned, is defined as an area within one-half mile of a well-serviced fixed guideway transit stop, and it includes bus transit corridors where buses pick up passengers every 15 minutes or less during peak commute hours. The 2012 RTP/SCS also identified Transit Priority Areas (TPAs), which are defined as locations where two or more high-frequency transit routes intersect. Currently, more than five million residents in the region live within HQTAs. These HQTAs currently accommodate 2.8 million jobs (see TABLE 2.1).

High density development could also produce high quality housing with consideration of urban design, construction and durability, and result in increased ridership on important public transit investments. Local jurisdictions throughout the region are applying more sophisticated planning practices in the specific plans and zoning codes that govern these areas in order to promote this kind of development. As housing density increases in cities and HQTAs, local governments are investing in pedestrian and bike infrastructure and reducing parking requirements to support people who choose not to have a car or cannot afford one. Local jurisdictions are also creating and retaining affordable housing near transit, helping to increase connectivity to employment opportunities and reducing reliance on automobile ownership.

The positive effects on real estate values, retail sales and property taxes, as well as the social benefits of developing within HQTAs are also well documented.[3] For example, less automobile-dependent settings, like HQTAs, spur volunteerism, social interaction and community engagement with more opportunities for face-to-face contact. Creating active places that are busy throughout the day and evening also improves safety and reduces crime rates within the surrounding neighborhood. Increased retail sales and easy transit accessibility translate into higher business profits, rent, commercial real estate values and government property taxes. Similarly, housing value premiums associated with being near a transit station (usually expressed as being within one-quarter to one-half mile of a station) average 17 percent to 30 percent higher than comparable properties located elsewhere.

[3] Center for Neighborhood Technology. (2013). The New Real Estate Mantra: Location Near Public Transportation. Washington, D.C.

EXHIBIT 2.2 2012 BASE YEAR TRANSIT NETWORK



(Source: SCAG)

HQTAs and TPAs are powerful examples of how integrating strategies for land use and transportation can help us achieve our long-term goals for greater mobility, a strong economy and sustainable growth. In the next section of this chapter, we will discuss the state of our overall transportation system today. That will help us set the stage for Chapter 5, where we will review our strategies, programs and projects for our transportation system and explain how we will integrate them with how we use land. Efficient use of our land is the basis for an efficient transportation system.

HOW WE TRAVEL TODAY

TRANSIT

Our regional transit system today is comprised of an extensive network of services provided by dozens of operators. This network includes fixed-route local bus lines, community circulators, express and rapid buses, Bus Rapid Transit (BRT), demand response,[4] light rail transit, heavy rail transit (subway) and commuter rail.[5] The region's providers of transit offer the second largest amount of service in the country, after that of the New York City metropolitan area (see EXHIBIT 2.2).

Transit plays an important role in Southern California's integrated transportation system. It provides an alternative to driving for many and provides mobility to people who do not have cars. The transit network is the region's largest non-automotive passenger transportation mode by trip volume, by a huge degree. Riders of transit took more than eight times as many trips as air travelers in FY2011-12 and nearly 267 times as many trips as passenger rail travelers.

Transit use provides external benefits to the region's transportation system, through investment, reduced traffic congestion and air pollution emissions reductions. The American Public Transportation Association (APTA) estimates that for every billion dollars invested in transit (as of 2007) about 36,000 jobs are created. This includes the direct purchasing power of transit agencies and also the spending power of the employees of transit agencies.[6] Were this rate to have held constant into FY2011-12, transit spending in the SCAG region would have resulted in the creation or maintenance of roughly 150,000 jobs.

The Texas Transportation Institute (TII), in its annual Urban Mobility Report, estimates traffic congestion delay averted due to the use of the region's public transportation system. In 2011, using transit helped residents of the SCAG region avoid 10 hours of delay per person, and saved the region more than $250 million in averted traffic delay costs.

Each of the region's residents take an average of 39 transit trips each year, at an operating and maintenance cost of $3.46 per trip (this amount increases to roughly $5.05 when both operations and capital expenditures are accounted for). Transit users typically pay 25 percent of the operating and maintenance cost of their travel, with the remaining 75 percent paid for by state and local public subsidies. Most capital expenditures are also funded with public subsidies, including a larger share of federal grants. Despite recent service cuts, the region's total combined capital and operations spending exceeded $3.59 billion in FY2011-12.

The past eight years have been tough economically for Southern California's transit agencies. Although bus service accounted for 82 percent of the region's transit trips in FY2011-12, the agencies that provide it have been hit particularly hard. Many have had to cut service. Total bus service provided by the Los Angeles County Metropolitan Transportation Authority (Metro) has declined by 10 percent, Orange County providers have cut bus service by 11 percent, and Los Angeles County Municipal Operators bus service has fallen by three percent.

These declines in service are tied to the Great Recession, as total ridership and per-capita ridership have stagnated. In FY2011-12, ridership of just under 711 million trips was up 1.7 percent compared with the prior year, but it represented a six percent decline from a pre-recession high of more than 750 million trips. The per-capita trip total of nearly 39 for FY2011-12 represents a loss of seven percent from the pre-recession high of more than 42 per-capita trips. Preliminary data for FY2014-15 show that total ridership and per capita ridership have continued to decline. Total transit trips are expected to fall below 700 million for the first time since FY2003-04.

4 "Demand response" is defined as a transit mode comprised of passenger cars, vans or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations.

5 Commuter rail is discussed separately in more detail, along with intercity passenger rail such as Amtrak and CA High-Speed Train, as part of "Passenger Rail."

6 American Public Transportation Association, 2009, "Job Impacts of Spending on Public Transportation: An Update." White Paper.

Since 1991, transit agencies in the region have provided about 13.22 billion transit trips. In that time, urban rail and commuter rail have grown from 1.3 percent of transit trips to 16.1 percent of trips in 2012. Bus trips have declined from 98.6 percent of trips to about 83 percent. Urban and commuter rail together supply 11.6 percent of all Vehicle Revenue Miles because the per vehicle capacity is much higher than that of buses. Urban and commuter rail services are 20.9 percent of all transit operating expenses in our region.

PASSENGER RAIL

Southern California is served by an ever expanding passenger rail network, including intercity, commuter and freight services, and this network is expanding and improving in terms of capacity, efficiency and safety. Many capital, operational and safety improvements are underway and planned throughout this existing network, including transportation corridors currently not served by rail.

The region's passenger rail network, along with the number of passengers and service levels, has steadily grown since 1990, except for a dip during the Great Recession. In 1990, the only passenger rail service operating in the region was the Pacific Surfliner and Amtrak's long-distance trains such as the Coast Starlight and Southwest Chief. Metrolink began commuter rail service in October 1992, and it continues to expand its network and levels of service. The Pacific Surfliner, which carried 2.7 million passengers in FY2013-14, operates 11 daily round-trips between Los Angeles and San Diego, five round-trips between Los Angeles and Santa Barbara/Goleta, and two round-trips north to San Luis Obispo. The Pacific Surfliner is Amtrak's second busiest corridor, behind the Northeast Corridor between Washington, D.C. and Boston. The line's average speed is 46 miles per hour (mph).

The Southern California Regional Rail Authority (SCRRA), the operator of Metrolink, operates 165 weekday trains on seven lines and the system carried 11.7 million passengers in FY2013-14. Weekend service provides 34 trains on Saturdays and 28 on Sundays. Metrolink operates two round-trip express trains: one round-trip on the San Bernardino Line and one round-trip on the Antelope Valley Line (to Palmdale only). System-wide average speed is 37 mph.

Notable recent efforts include the first Metrolink e-ticketing program rollout in 2016. Also, the LOSSAN Rail Corridor (Los Angeles–San Diego–San Luis Obispo Rail Corridor) received a Cap-and-Trade Transit and Intercity Rail Capital Program grant in the spring of 2015 to re-establish a cooperative fare agreement with local connecting transit agencies for free transfers to and from the Pacific Surfliner. This program had never been fully developed by Caltrans Division of Rail (DOR), and recently it had been discontinued.

These cooperative fare agreements and media efforts include effective marketing across passenger rail markets and transit riders. Metrolink has been successful with its special service trains for both Dodgers' and Angels' games and other special events. These types of services introduce passenger rail to the general public and can lead to new regular customers.

In July 2015, Metrolink started a pilot fare project on the Antelope Valley Line. It included a 25-percent reduction in fares (except for the weekend day pass) and allowed station-to-station travel for just $2.00. Due to the success of this pilot program, on January 1, 2016 Metrolink implemented a $3.00 station-to-station fare system-wide. (The $2.00 station-to-station program was discontinued on the Antelope Valley Line, however the 25 percent fare reduction was extended to June 30, 2016.) Since 2012, Metrolink has offered its successful weekend pass, allowing unlimited travel throughout the entire Metrolink system on both Saturday and Sunday for just $10.00. (The fare has since increased to $10.00 per weekend day.) Monthly pass holders can take unlimited trips on the weekend.

The renaissance of rail travel in our region is exciting. However, significant challenges are keeping our commuter and intercity rail networks from realizing their full potential to help reduce highway congestion, and cut air pollution and lower greenhouse gas emissions. Among these challenges:

More than half of the commuter and intercity rail network operates on one track, some of which is owned by freight railroads that maintain priority for their own operations. Passenger trains are assigned "slots," meaning that they are allowed to move in a particular direction for a fixed time period. This results in the relatively slow average speeds noted above, reducing the incentive for commuters to use the train system (and instead prompting them to commute by car), as well as reducing the number of passenger trains that can serve our region.

One-track operations present other challenges. Even a minor delay can lead to a train losing its slot, thereby causing cascading delays throughout the network and throughout the day. Commuter and intercity rail networks in Chicago and on the East Coast have much higher service frequencies than we do in our region, mainly because they have fewer single-track segments and fewer conflicts with freight railroads. Our region has a large list of rail improvements either in the planning phases or which are ready for construction. These improvements include adding double-tracking, sidings, station improvements and grade separations to increase speed and service levels. However, there is no dedicated long-term funding for commuter and intercity rail to move these projects forward.

ACTIVE TRANSPORTATION

Our region has made steady progress in encouraging people to embrace active transportation, that is, human-powered transportation such as walking and biking. Across our region today, many people live and work in areas where trips are short enough to be completed by walking or biking. Walking and biking as a share of all trips is more than 18 percent in our most urban areas where there are abundant nearby destinations/land uses, yet still reaches 11 percent in rural areas where land uses are less diverse.[7] There is a strong relationship between land use and travel behavior. Land use characteristics play a key role in determining the conditions for and feasibility of walking and biking in a community, due to the sensitivity of these modes to trip length.

7 California Department of Transportation (2012). California Household Travel Survey.

HOW WE GET TO WORK

14% CARPOOL

76% DRIVE ALONE

5% TRANSIT *(Bus/Rail)*

5% NON-MOTORIZED *(Walk/Bike)*

Source: SCAG Regional Travel Demand Model

The regional bike network is expanding but remains fragmented. Nearly 500 additional miles of bikeways were built since SCAG's 2012 RTP/SCS, but only 3,919 miles of bikeways exist regionwide, of which 2,888 miles are bike paths/lanes (see EXHIBIT 2.3).

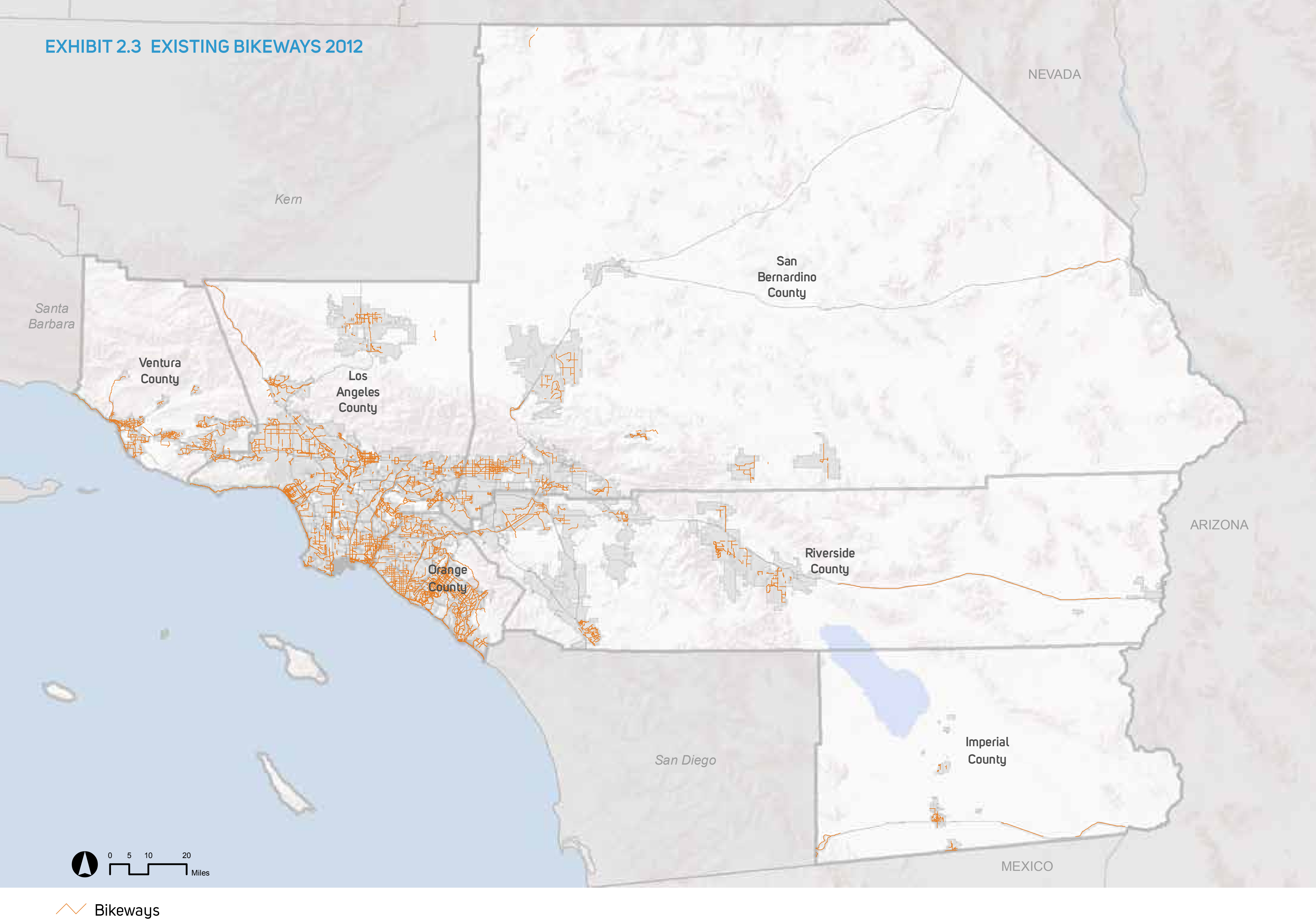
Walking represents nearly 17 percent of all trips in the SCAG region, with the largest share in Los Angeles County. It is how most transit riders reach their station. Most walk trips (83 percent) are less than one half mile; walkers are less likely to travel further because of a lack of pedestrian friendly infrastructure. Routes to stops and stations are often circuitous and/or obstructed, increasing the time it takes to complete a trip by transit and therefore making the choice to use transit less attractive. A study in Los Angeles County found that the most common barriers to station access on foot or bicycle include: long blocks, highway over/underpasses, concerns about safety and security, sidewalk maintenance, legibility/lack of signage and right-of-way constraints leading to limited space for safe walking and biking.[8] Currently, all six counties in the SCAG region are pursuing first/last mile solutions to make transit or border crossing stations more accommodating to active transportation. Their efforts are aided by the Federal Transit Administration (FTA), which has extended the "walk-shed" (the area encircling a destination point) from transit stations from a quarter mile to a half mile, enabling transit funding to be used for larger areas around transit stations.[9] The "bike-shed," as defined through FTA guidance, extends three miles in all directions from a station.

While the number of bicyclists and pedestrians is increasing, so are injuries and fatalities—although not as fast as the growth overall in active transportation. Nevertheless, injuries among those who bike and walk are increasing at a time when the total number of traffic-related injuries and fatalities is dropping regionwide. Improving safety will likely require pursuing innovative strategies (as described in the following sections) to reduce conflicts among bicyclists, pedestrians and automobiles. In 2015, the City of Los Angeles began its Vision Zero Campaign. Vision Zero is a road safety policy that promotes smart behaviors and roadway design that anticipates mistakes, so that collisions do not result in severe injury or death.

8 Los Angeles County Metropolitan Transportation Authority (2014) First Last Mile Strategic Plan & Planning Guidelines.

9 Department of Transportation (Friday, August 19, 2011): Final Policy Statement on the Eligibility of Pedestrian and Bicycle Improvements Under Federal Transit Law. Federal Register Volume 76, Number 161 Pages 52046-52053.

EXHIBIT 2.3 EXISTING BIKEWAYS 2012



(Source: SCAG)

HIGHWAYS AND ARTERIALS

Our region's highways and arterials continue to be the backbone of our overall transportation network, and they are vital to moving people and goods throughout the region. Across the Southern California region, our highway and arterial system covers about 70,000 roadway lane miles and accommodates 66 million trips per day. Our roadways are not only used by automobiles and freight trucks, they are also used for transit and for those who choose to walk, bike and use other forms of active transportation. According to SCAG's Regional Travel Demand Model (RTDM), more than nine out of 10 trips rely either entirely or in part on the highway and arterial system. Based on currently available data, there are 3.6 million person-hours of daily delay and 11.8 minutes of daily delay per capita along our region's highways and local arterials.

Maintaining the operational efficiency of our roadways is crucial if we are to maintain the mobility of our region. Unfortunately, traffic congestion continues to adversely affect our highway and arterial system every day. Although we have made improvements, the increasing travel demands that will come with a growing population in coming years will lead to increased congestion. This traffic congestion will not only make life difficult for commuters, it will also degrade our region's air quality and our overall quality of life. To address congestion and to improve our transportation network's efficiency, the region has been investing in Transportation Systems Management and Transportation Demand Management projects as described in the following sections.

TRANSPORTATION SYSTEMS MANAGEMENT (TSM) AND TRANSPORTATION DEMAND MANAGEMENT (TDM)

For our regional transportation system to operate efficiently and smoothly, operators must manage the system effectively, as well as the demands placed on it. To do so, they implement TSM and TDM strategies.

TSM employs a series of techniques designed to maximize the capacity and efficiency of the existing transportation system and its facilities. One of these techniques deploys Intelligent Transportation Systems (ITS), which will be discussed below. TDM involves a variety of strategies to manage the demand placed on our roadway network and to reduce our dependence on driving alone. These include promoting ridesharing, value pricing,[10] telecommuting or alternative work schedules and alternative modes of travel such as transit, passenger rail and active transportation.

[10] Value pricing is a user fee applied during peak demand periods on congested roadways to improve the reliability and efficiency of the transportation system and provide travelers with greater choices.

The common goals of TSM and TDM are to improve the productivity of our transportation system, reduce traffic congestion, improve air quality and reduce or eliminate the need to construct new and expensive transportation infrastructure.

Transportation Systems Management (TSM)

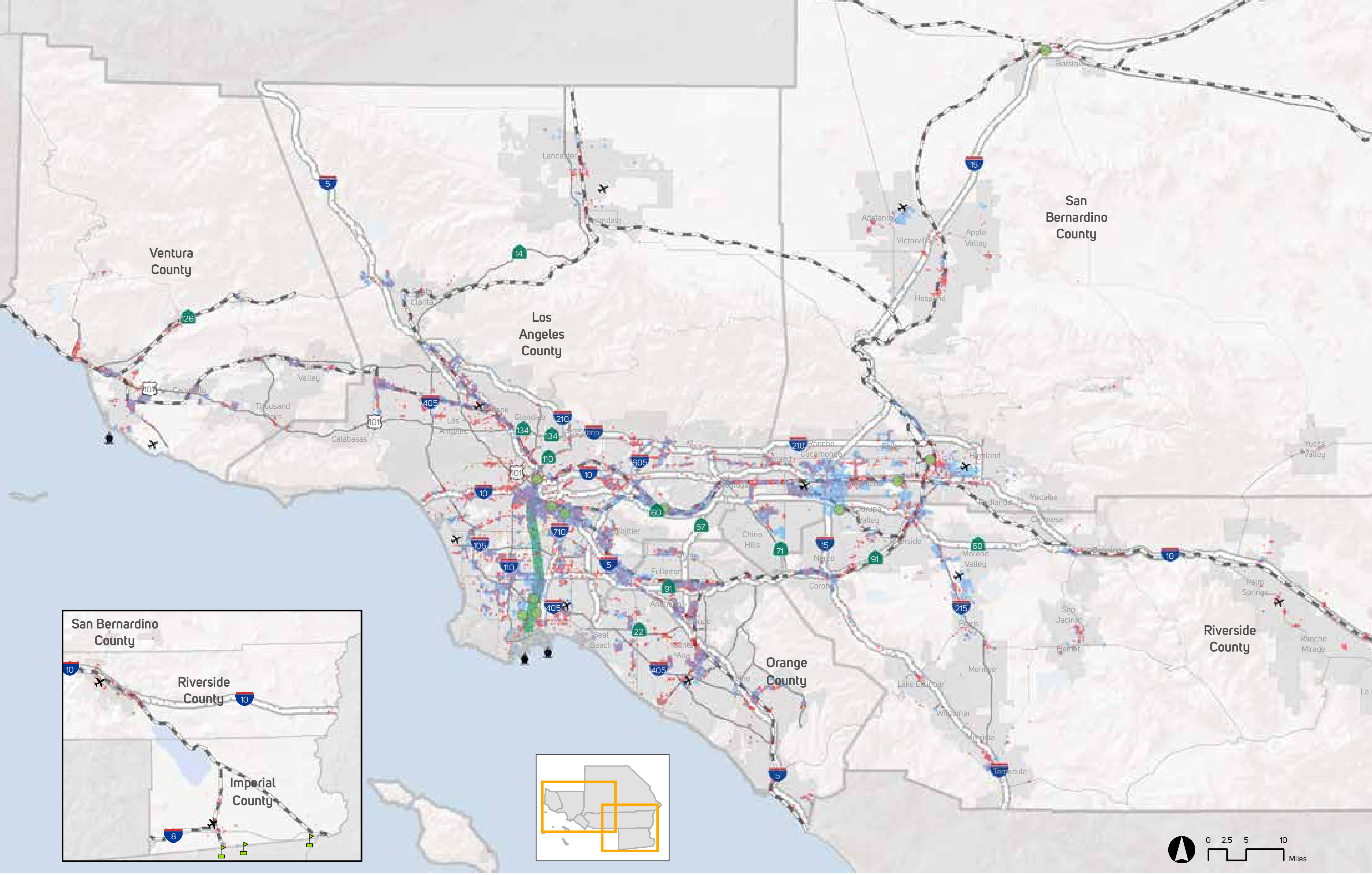
A critical TSM technique is Intelligent Transportation Systems, or ITS, which makes use of advanced detection, communications and computing technologies to improve the safety and efficiency of our surface transportation network. These systems allow system operators and users to better manage and optimize the capacity of the region's transportation system. Data is collected about the status of our highways, traffic signals, transit vehicles, freight vehicles, passenger trains and shared-ride vehicles and is integrated in ways that improve the efficiency of the overall transportation system.

SCAG has a critical role to play in the development and management of ITS in the region. As the region's Metropolitan Planning Organization, SCAG is charged with developing and maintaining the Southern California Regional ITS Architecture. This architecture is the regional planning tool for ensuring a cooperative process to prioritize and deploy ITS technologies and for identifying critical data connections between institutional stakeholders (e.g., connecting two transit operators). This architecture helps the region deploy ITS systems that are truly integrated. Stakeholders are able to share information among many agencies in consistent and compatible formats to achieve improved safety and efficiency. SCAG works closely with the CTCs, local governments and Caltrans Districts to update and maintain the regional architecture and assure the use of required systems, engineering requirements and applicable standards—which is required when federal funds are used on ITS projects.

The Southern California highway system has an extensive ITS system that covers most of the urbanized portion of our region. Loop detectors in the pavement and video cameras provide information on speed and volume, and identify congestion and incidents that are fed to Caltrans/California Highway Patrol (CHP) Transportation Management Centers (TMCs). Arterial ITS systems are in place throughout the region as well. Local arterial systems include advanced signal synchronization capabilities to increase the flow of traffic and also to detect and respond to changes in traffic volume or direction of travel and manage incidents. Like the highway network, these systems include loop and video detection and also rely on wireless data such as that provided by Google.

Most medium- to large-scale, fixed-route and Dial-a-Ride operators in our region have implemented transit ITS components. These include automatic

EXHIBIT 2.4 EXISTING REGIONAL GOODS MOVEMENT SYSTEM



Ports
Ports of Entry
Major Airports
Intermodal Facilities

Routes
Major Freight Highway Corridors
Main Line Rail Network
Alameda Corridor

Warehouses
>= 50,000 sq ft
< 50,000 sq ft

(Source: SCAG, CoStar Realty Information Inc.)

vehicle location (AVL) and transit signal priority (TSP) systems. Automatic vehicle location systems have greatly increased the effectiveness of real-time scheduling information, increasing convenience for transit passengers. TSP gives transit vehicles signal priority to improve passenger throughput and bus speed. The TSP system is an integral part of Metro's Rapid Bus program, which has 20 routes. Santa Monica's Big Blue Bus, Culver City Bus and Torrance Transit are others that employ TSP systems as well. Using a combination of hard-wired loop technology and wireless technology, they reduce travel times by up to 25 percent.

Transportation Demand Management (TDM)

Our region employs an array of TDM strategies to better manage the demand placed on our roadway network by reducing the number of people who drive alone as well as encouraging them to use alternative modes. As a consequence, these strategies have helped reduce air pollution and greenhouse gas emissions. These strategies include promoting carpooling and vanpooling; biking and walking; car sharing and bike sharing; telecommuting; flexible work schedules; and intelligent parking, among other strategies. The region has a long history of investing in a comprehensive High-Occupancy Vehicle (HOV) or carpool lane system, supported by investments in park-and-ride facilities, rideshare matching and vanpooling services. A 2014 national study of employers by the Families and Work Institute and the Society for Human Resource Management showed that employers are becoming more willing to provide employees with flexible work arrangements and more choices in managing work time, without loss of pay. As Baby Boomers continue to retire in increasing numbers and are replaced by younger, more tech-savvy workers, and as employers continue to embrace technology and remote access capabilities, we expect to see increases in the percentage of workers who telecommute or have flexible work schedules.

A significant amount of travel in the region is still by people who choose to drive alone (42 percent of all trips and nearly 76 percent of work trips). So, the challenge of getting individuals to seek alternative modes of travel remains.

GOODS MOVEMENT

Our region's transportation network for moving goods, referred to as our "goods movement" system, relies today on multiple modes of transportation and complex infrastructure. Whether carrying imported goods from the ports to regional distribution centers, supplying materials for local manufacturers, or delivering consumer goods to residents, our goods movement system sustains regional industries and consumer needs every day. This system includes deep-water marine ports, international border crossings, Class I rail lines, interstate highways, state routes and local connector roads, air cargo facilities, intermodal facilities, and distribution and warehousing centers. EXHIBIT 2.4 depicts our region's multimodal goods movement system.

Major Elements of the Goods Movement System:

- **Seaports (Ports of Los Angeles, Long Beach and Hueneme):** Serving as the largest container port complex in the U.S., the Ports of Los Angeles and Long Beach (together called the San Pedro Bay Ports) handled about 117 million metric tons of imports and exports in 2014—for a total value of about $395.7 billion.[11] The Port of Hueneme in Ventura County specializes in the import and export of automobiles, fresh fruit and produce and serves as the primary support facility for the offshore oil industry. In 2014, two-way trade activities through the Port of Hueneme were valued at nearly $9.2 billion and generated $1.1 billion in economic activities in the immediate region.[12]
- **Land Ports:** The international border crossings in Imperial County are busy commercial land ports, and they were responsible for more than $8 billion in imports and $6 billion in exports in 2014. This cross-border commerce was driven by the maquiladora trade, as well as the movement of agricultural products. [13]
- **Air Cargo Facilities:** The region is home to numerous air cargo facilities, including Los Angeles International Airport (LAX) and Ontario International Airport (ONT). Together they handled more than 99 percent of the region's air cargo, valued at more than $96 billion,[14] in 2014.
- **Highways and Local Roads:** Our region has more than 70,000 roadway lane miles.[15] Sections of Interstate 710, Interstate 605, State Route 60 and State Route 91 carry the highest volumes of truck traffic in the region and averaged more than 25,000 trucks per day in 2013. Other major components of the regional highway network also serve significant numbers of trucks. These include Interstates 5, 10, 15 and 210. More than 20,000 trucks per day travel on some sections.

11 American Association of Port Authorities and U.S. Trade Online, U.S. Census.
12 U.S. Trade Online, U.S. Census and Port of Hueneme.
13 The term maquiladora refers to a manufacturing operation in Mexico. The majority of them are located along the US border and within the Foreign Trade Zones (FTZs) to capitalize on duty-free and tariff-free provisions for assembly and material processing.
14 U.S. Trade Online, U.S. Census.
15 Highway Performance Monitoring System, California Department of Transportation, http://www.dot.ca.gov/hq/tsip/hpms/.

FOCUS

GOODS MOVEMENT

THE SCAG REGION IS THE LARGEST INTERNATIONAL GATEWAY IN THE U.S.

supported by AIRPORTS, LAND PORTS OF ENTRY, SEAPORTS, RAILWAYS, HIGHWAYS and WAREHOUSE & DISTRIBUTION CENTERS

FACTORY

STORE

REGIONAL AIRPORTS HANDLED NEARLY

$96 BILLION

IN INTERNATIONAL AIR CARGO IN 2014

#1 SOUTHERN CALIFORNIA has the **LARGEST CONTAINER PORT COMPLEX** in the UNITED STATES

#9 and has the **NINTH LARGEST CONTAINER PORT COMPLEX** in the WORLD

SOUTHERN CALIFORNIA HAS

3,747 MILES

OF HIGHWAYS

(that is 41% of all the highway road miles in California)

2 CLASS 1 RAILROADS

6 INTERMODAL RAIL YARDS**

** Not including carload and automobile terminals

CLOSE TO

1.2 BILLION SQ. FT.

OF WAREHOUSING & DISTRIBUTION SPACE

CLOSE TO

750 MILLION SQ. FT.

ARE FACILITIES >50K SQ. FT. IN SIZE

(2014)

In 2014, the VALUE OF INTERNATIONAL TRADE that moved through the SCAG region was over

$515 BILLION

includes maritime and cross-border trade and air freight

In 2014, Goods Movement dependent industries generated

2.9 MILLION

JOBS

HOW CAN WE GROW WITH LESS IMPACT?

$2.6 BILLION

COST OF WASTED LABOR HOURS & FUEL

from Truck Congestion on Highways

ANNUAL COST OF AIR POLLUTION

in the SCAG region is at least

$14.6 BILLION

371% GROWTH

in VEHICLE HOURS OF DELAY per day at rail-highway grade crossings across the region by 2040

These roads carry a mix of cargo loads, including local, domestic and international. The arterial roadway system also plays a critical role in goods movement, providing first/last mile connections to regional ports, manufacturing facilities, intermodal terminals, warehousing and distribution centers, and retail outlets.

- **Class I Railroads:** Critical to the growth of the region's economy, the Burlington Northern Santa Fe Railway (BNSF) and Union Pacific (UP) carry international and domestic cargo to and from distant parts of the country. The BNSF mainline operates on the Transcontinental Line (and San Bernardino Subdivision). The UP operates on the Coast Line, Saugus Line through Santa Clarita, Alhambra and Los Angeles Subdivisions and Yuma Subdivision to El Paso. Both railroads operate on the Alameda Corridor, which connects directly to the San Pedro Bay Ports. The San Pedro Bay Ports also provide several on-dock rail terminals, along with the six major intermodal terminals operated by the BNSF and UP.
- **Warehouse and Distribution Centers:** The SCAG region is home to one of the largest clusters of logistics activity in North America. In 2014, the region had close to 1.2 billion square feet of facility space for warehousing, distribution, cold storage and truck terminals.[16] Nearly 750 million square feet of this space, in 4,900 buildings, were facilities larger than 50,000 square feet. An estimated ten percent of the occupied warehouse space served port-related uses, while the remaining 90 percent supported domestic shippers.[17] Many of these warehouses are clustered along key goods movement corridors. Port-related warehousing is concentrated in the Gateway Cities subregion, while national and regional distribution facilities tend to be located in the Inland Empire.

Key Goods Movement Functions and Markets

Our region's goods movement system serves a wide range of markets including international, domestic and local trade. Although the international trade market has a significant presence in the region, most freight activities are generated by local businesses moving goods to local customers and supporting national domestic trade. These businesses are sometimes referred to as "goods movement-dependent industries." In 2014, these industries, including manufacturing, wholesale and retail trade, construction, and warehousing, employed nearly three million people throughout the region and contributed $291 billion to the regional gross domestic product (GDP). These industries are anticipated to grow substantially, with manufacturing projected to increase its GDP contribution 130 percent by 2040 and wholesale trade growing 144 percent.[18]

Growth of E-Commerce and Goods Movement

The retail industry provided nearly $30 billion in wages and salaries for the region in 2014.[19] This industry includes a wide variety of subsectors such as motor vehicles, furniture, electronics and appliances, building materials, health and personal care products, clothing, sporting goods, and books. One of the most notable changes in the retail industry is the strong growth in e-commerce sales. E-commerce sales for U.S. retailers totaled $261 billion in 2013, an increase of 13.6 percent from 2012. Total retail sales increased by 3.8 percent in the same period. Within the e-commerce sales merchandise category, clothing and clothing accessories had the largest sales at $40 billion, followed by electronics and appliances at nearly $23 billion. E-commerce provides consumers with a broad range of shopping options, including the ability to compare product prices instantaneously from mobile devices and to opt for home delivery or store pick-up of merchandise. Simultaneously, e-commerce has changed how traditional distribution centers and retail outlets are operating to meet customer demand. Distribution centers in the past delivered bulk size goods to their customers or vendors. Because e-commerce orders tend to be smaller in size (i.e., a single item order as compared to a bulk-case order), many retailers and distribution center/warehouse operators are upgrading their facilities, or developing new facilities, to meet surging e-commerce orders. These changes are also generally characterized by the use of smaller trucks and integrator delivery vans (such as UPS, FedEx and DHL) due to overnight or two-day delivery requirements of e-commerce customers.

Same-Day Delivery Demands

Consumers are increasingly demanding quicker fulfillment of their orders. More recent developments include same-day delivery options. To meet the same-day delivery promise, distribution or fulfillment center proximity to population centers becomes critical. This is exemplified by large-scale e-commerce fulfillment center developments at the periphery of urban population centers. At the same time, small to medium size buildings that are narrow, but with ample loading doors and docks in urban cores, have also been attractive as they provide even quicker access to dense population centers than those in the outskirts. Additionally, retailers are increasingly using products available

[16] CoStar Reality Information, Inc. www.costar.com, based on November 2014 data downloads.
[17] Industrial Warehousing in the SCAG Region Study, SCAG, based on the Avison-Young methodology for port-related and non-port related warehousing needs.
[18] REMI TranSight SCAG, CA, USv3.6.5.
[19] Regional Economic Model Inc. TranSight SCAG, CA, US v3.6.5.

at their stores to fulfill e-commerce orders. Parcel hubs, delivery centers and accessibility to local streets and highways throughout the region will continue to be critical to e-commerce growth.[20 21 22]

[20] E-commerce Evolutions – Element 4: Distribution and Fulfillment Centers, NAIOP, May 2015, http://www.naiop.org/en/E-Library/Business-Trends/Distribution-and-Fulfillment-Centers.aspx.

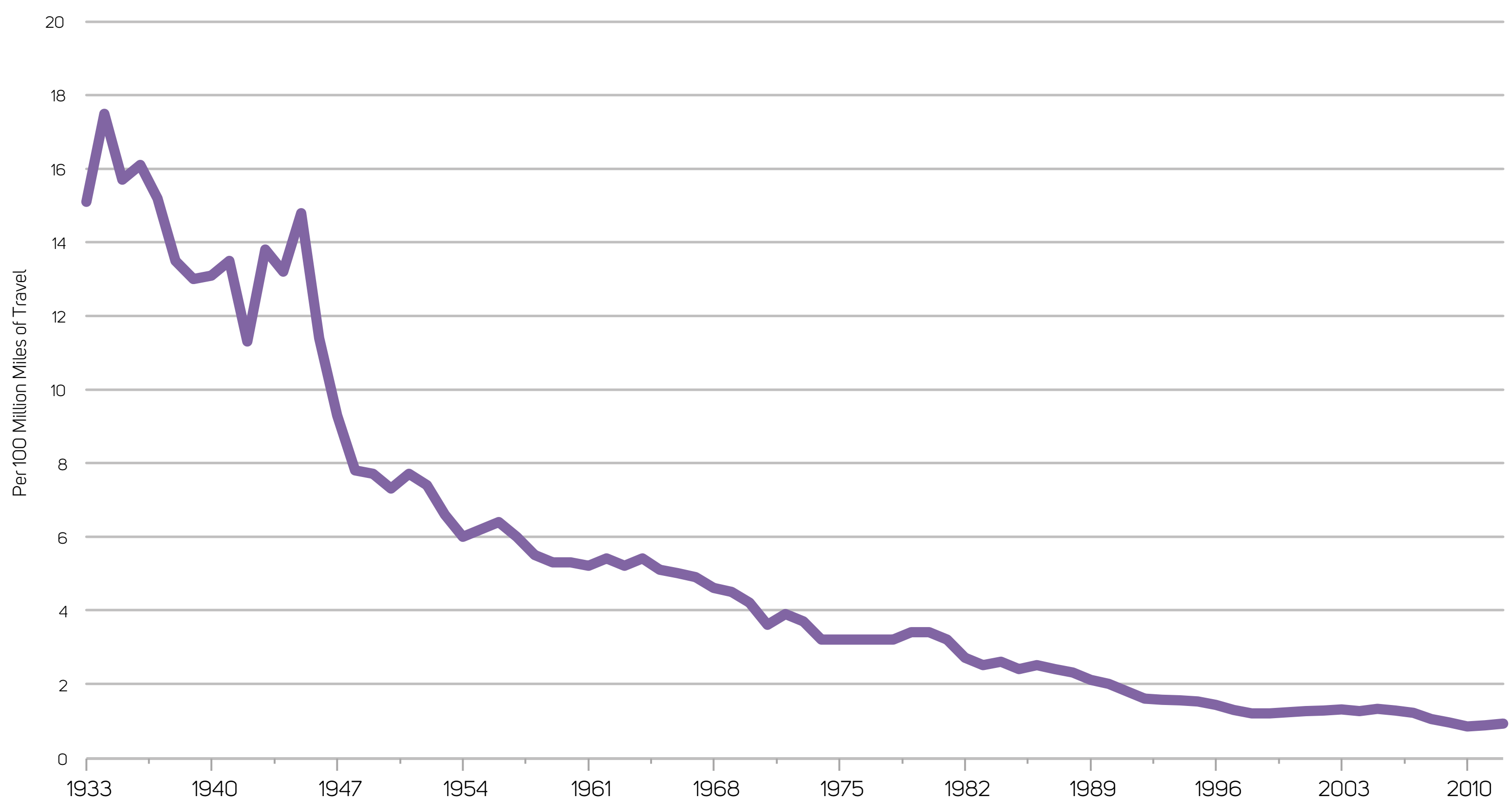
[21] Retailers must overcome logistics lag for same-day delivery, Kris Bjornson, JLL, April 2014, http://www.joneslanglasalleblog.com/investor/retailers-must-overcome-logistics-lag-for-same-day-delivery/.

[22] Same-day delivery is transforming the CRE industry, Kris Bjornson, JLL, June 2015, http://www.joneslanglasalleblog.com/investor/same-day-delivery-is-transforming-the-cre-industry/?utm_source=us-retail-ecom&utm_medium=jll-website&utm_campaign=featured-post.

STATE OF SAFETY

The safety of people and goods is one of the most important considerations in developing, maintaining and operating our diverse transportation system. Throughout California, the rate of fatal and injury collisions on highways has declined dramatically since the California Highway Patrol began keeping such data in the 1930s (see FIGURE 2.2). California has led the nation in roadway safety for many of the past 20 years. Only recently have roadways nationally become as safe as those in California. California's most recently recorded mileage death rate (MDR)—defined as fatalities per 100 million vehicle miles traveled (VMT)—was 0.91, while the MDR within the SCAG region was slightly lower at 0.83. Both MDRs for the state and SCAG region are lower than the national MDR of 1.09.

FIGURE 2.2 MAKING OUR ROADWAYS SAFER: CALIFORNIA MILEAGE DEATH RATE (1933–2012)



Source: https://www.chp.ca.gov/InformationManagementDivisionSite/Documents/2012-sec1.pdf

Our region has an extensive transportation system, with more than 70,000 lane miles of highway and arterial lanes and 3,900 miles of bikeways. As of 2014, the region had 14.9 million licensed drivers and 11.8 million registered vehicles. As of 2012 (the most recent year that data was available), more than 1,300 people died and 121,000 were injured (of which 6,800 were considered severe) in traffic collisions in the region.

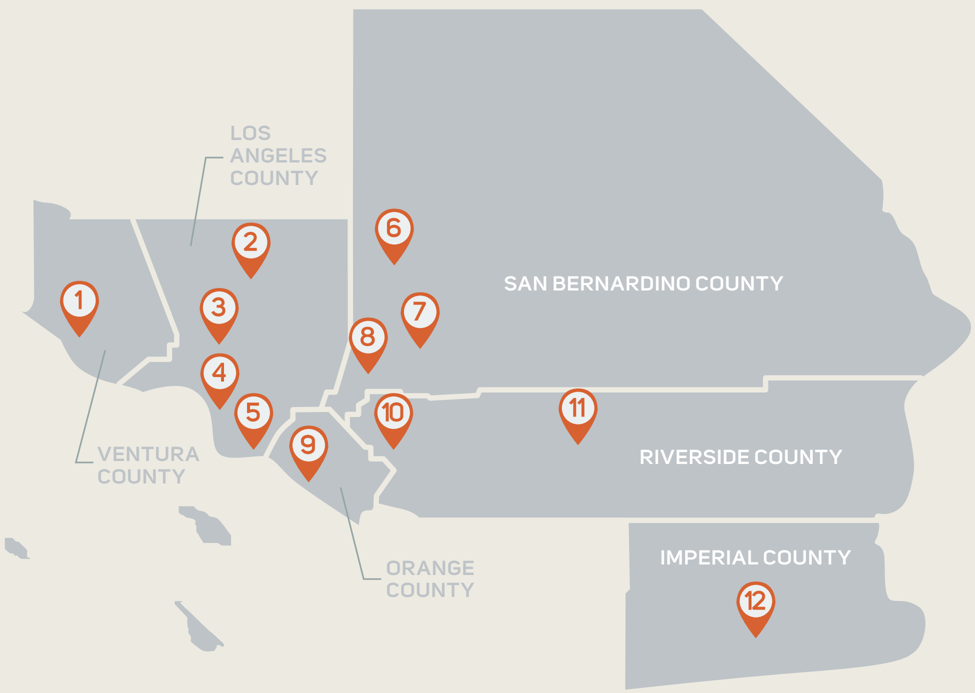
In 2012 President Obama signed into law MAP-21, the Moving Ahead for Progress in the 21st Century Act, which funded surface transportation programs and required states to develop Strategic Highway Safety Plans (SHSPs).[23] The California Department of Transportation (Caltrans) responded by developing an updated SHSP through a participatory process. Throughout 2014, Caltrans conducted an extensive outreach effort to more than 50 agencies and organizations throughout the state—including SCAG—to gather feedback on improving the overall SHSP. This effort led to the release of the final California SHSP in 2015. California's ultimate goal is to reach zero deaths on our highways—a concept known as "Toward Zero Deaths" (TZD). Specifically, California aims to achieve a three percent per year reduction for the number

[23] In December 2015, the Fixing America's Surface Transportation Act, or "FAST Act," was signed into law, which authorizes funding for surface transportation programs. SCAG expects to work with Caltrans to monitor the rulemaking process to implement FAST Act provisions.

Map of Airports

12

EXISTING & PLANNED COMMERCIAL AIRPORTS SERVING THE SCAG REGION



1. Oxnard
2. Palmdale
3. Burbank Bob Hope
4. Los Angeles International
5. Long Beach
6. Southern California Logistics
7. San Bernardino International
8. Ontario International
9. John Wayne
10. March Inland Port
11. Palm Springs International
12. Imperial County

AIRLINE PASSENGER VOLUME

71 MILLION IN 1994

91 MILLION IN 2014

and rate of fatalities and a 1.5 percent per year reduction for the number and rate of severe injuries. Although the SHSP and previous California SHSPs set various actions that state agencies can take to reduce fatalities, there are complementary strategies that local governments can pursue, such as Vision Zero initiatives. For additional details regarding strategies, please see the Safety &Security Appendix.

As we continue to work to improve safety for motorists, we also must tackle the alarming fatality rates of those who use other modes of transportation. Safety is a priority for all modes of transportation, and improving safety for people who walk and bike is critical. Based on currently available data, about 27 percent of all traffic-related fatalities in our region involved pedestrians and five percent of traffic-related fatalities involved bicyclists, according to data from the Statewide Integrated Traffic Records System (SWITRS).

AVIATION AND GROUND ACCESS

The SCAG region is one of the busiest and most diverse commercial aviation regions in the world. In 2014, more than 60 airlines offered scheduled service to one or more of our region's airports, providing more than 1,200 daily commercial departures—one every 70 seconds. These departing flights travel all over the United States and to every corner of the globe; a total of 169 destinations in 37 countries had non-stop service from our region in 2014. Our airports also play a critical role in the region's goods movement network, and they impact the operations of our ground transportation network as well. The passengers arriving at or departing from our airports generate more than 200,000 daily trips on our region's ground transportation system.

Passenger and cargo air travel in the region is supported by a multiple airport system that spans six counties. There are seven commercial airports with scheduled passenger service, five additional facilities with the infrastructure to accommodate scheduled service, seven active military air fields and more than forty general aviation airports. Worldwide, few other regions have as many commercial airports within a comparable geographic area, making Southern California one of the world's most complex aviation systems.

In 2014, the airports in our region handled more than 1.5 million aircraft operations (take-offs and landings), nearly 800,000 of which were commercial operations. In the face of this huge number of air travelers and aircraft, our airports work efficiently. Flights to our region arrive on schedule more than 80 percent of the time. Thanks to favorable weather conditions, lengthy tarmac delays that occur in other regions are virtually unheard of here. The size of the regional market for air travel and the absence of a single dominant air carrier in the region result in healthy competition among airlines, so air travelers enjoy some of the lowest average airfares in the country.

Air travel is an important contributor to the region's economic activity. Nearly half of the air travel in the region consists of visitors from other parts of the country and the world traveling here to conduct business, enjoy a vacation or visit friends and relatives. About one-third of air travel to the region is business related. Therefore, any passenger who arrives at or departs from an airport in our region is good for the region as a whole. Spending by passengers who used our airports to visit the region in 2012 contributed nearly $27.4 billion to the regional economy. The money spent by visitors on meals, lodging, entertainment, transportation and other purchases supported nearly 275,000 jobs.

As with other modes of transportation, the demand for air travel was impacted heavily by the recession that began in 2007. In 2014, the airports in our region served 91.2 million total passengers, surpassing the previous peaks of 89.4 million in 2007 and 88.7 million in 2000.

The demand for air cargo was even more sharply impacted by the recessions of 2001 and 2007. The 2.4 million metric tons of cargo transported through the airports in our region in 2014 remained ten percent below the pre-recession peak of 2.7 million metric tons in each year from 2004–2006 and five percent below year 2000 levels.

In addition to its commercial airports, the SCAG region is also home to a large general aviation (GA) system. Included in this segment are airports serving non-commercial corporate jets, single engine planes, helicopters, emergency and firefighting operations, and flight training activity. General aviation airport facilities also act as relievers to commercial airports and provide diversionary locations for commercial planes that require emergency landings.

There are more than 40 general aviation airports in the SCAG region, and they are as diverse in size and market area as the commercial facilities. Van Nuys Airport (VNY), the second busiest general aviation facility in the United States, serves several important functions for the region, including serving as the base for many corporate jets. As of May 2015, Van Nuys Airport began offering U.S. Customs and Border Protection services for international general aviation flights to benefit business travelers and reduce airspace congestion.

CONCLUSION

Today we face numerous challenges on the road toward greater mobility, a stronger economy and sustainable growth that maintains a high quality of life regionwide. In the Chapter 3, we'll review some of these challenges.

OUR PROGRESS SINCE 2012

THE 2012 RTP/SCS WAS THE FIRST REGIONAL PLAN THAT SCAG DEVELOPED WITH A SUSTAINABLE COMMUNITIES STRATEGY,

a new state requirement following the passage of SB 375, the Sustainable Communities and Climate Protection Act of 2008. The legislation required that land use and transportation planning be integrated to achieve its prescribed greenhouse gas reduction targets and air quality requirements. At its core, the 2012 RTP/SCS envisioned a future in which an abundance of safe and efficient transportation choices provide ready access to jobs, education and healthcare—and the region's economy, public health and overall quality of life are strong. Since 2012, the region has made considerable progress. Here are some highlights:

TRANSIT

Transit service continues to expand throughout the region and the level of service has exceeded pre-recessionary levels—mainly due to a growth in rail service. Significant progress has been made toward completing capital projects for transit, including the Metro Orange Line Extension and the Metro Expo Line. Meanwhile, five major Metro Rail projects are now under construction in Los Angeles County.

PASSENGER RAIL

Passenger rail is expanding and improving service on several fronts. The Amtrak Pacific Surfliner is now being managed locally by the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor Agency; Riverside County Transportation Commission (RCTC) completed the Perris Valley Line in early 2016; Metrolink became the first commuter railroad in the nation to implement Positive Train Control and purchase fuel-efficient, low-emission Tier IV locomotives; and the California High-Speed Train is under construction in the Central Valley, and planning and environmental work is underway in our region to the Los Angeles/Anaheim Phase One terminus. Several other capital projects are underway or have been completed, including the Anaheim Regional Intermodal Transportation Center (ARTIC) and the Burbank Bob Hope Airport Regional Intermodal Transportation Center, among others.

HIGHWAYS

The expansion of highways has slowed considerably over the last decade because of land, financial and environmental constraints. Still, several projects have been completed since 2012 to improve access and close critical gaps and congestion chokepoints in the regional network. These include the Interstate 10 westbound widening in Redlands and Yucaipa, the Interstate 215 Bi-County HOV Project in Riverside and San Bernardino Counties, and a portion of the Interstate 5 South Corridor Project in Los Angeles County (between North Fork Coyote Creek to Marquardt Avenue), among others.

REGIONAL HIGH-OCCUPANCY VEHICLE (HOV) AND EXPRESS LANE NETWORK

The demands on our region's highways continue to exceed available capacity during peak periods, but several projects to close HOV gaps have been completed. The result has been 39 more lanes miles of regional HOV lanes on Interstates 5, 405, 10, 215 and 605, on State Routes 57 and 91 and on the West County Connector Project (direct HOV connection between Interstate 405, Interstate 605 and State Route 22) within Orange County. The region is also developing a regional express lane network. Among the milestones: a one-year demonstration of express lanes in Los Angeles County along Interstate 10 and Interstate 110 was made permanent in 2014; and construction has begun on express lanes on State Route 91 extending eastward to Interstate 15 in Riverside County.

ACTIVE TRANSPORTATION

Our region is making steady progress in encouraging more people to embrace active transportation and more than $650 million in Active Transportation Program investments are underway. Nearly 38 percent of all trips are less than three miles, which is convenient for walking or biking. As a percentage share of all trips, bicycling has increased more than 70 percent since 2007 to 1.12 percent. More than 500 miles of new bikeways have been constructed in the region and safety and encouragement programs are helping people choose walking and biking as options.

GOODS MOVEMENT

The region continues to make substantial progress toward completing several major capital initiatives to support freight transportation and reducing harmful emissions generated by goods movement sources. Progress since 2012 has included implementation of the San Pedro Bay Ports Clean Air Action Program (CAAP), reducing diesel particulate matter by 82 percent, nitrogen oxide by 54 percent and sulfur dioxide by 90 percent; and the San Pedro Bay Ports Clean Truck Program has led to an 80 percent reduction in port truck emissions. The region has also shown progress in advanced technology for goods movement, including a one-mile Overhead Catenary System (OCS) in the City of Carson. Construction of the Gerald Desmond Bridge has begun. Seventeen out of 71 planned grade separation projects throughout the region have been completed, and another 21 should be completed in 2016. Double tracking of the Union Pacific (UP) Alhambra Subdivision has been initiated. The Colton Crossing, which physically separated two Class I railroads with an elevated 1.4-mile-long overpass that lifts UP trains traveling east-west, was completed in August 2013.

SUSTAINABILITY IMPLEMENTATION

Since 2012, SCAG's Sustainability Planning Grant Program has funded 70 planning projects (totaling $10 million) to help local jurisdictions link local land use plans with 2012 RTP/SCS goals. Local jurisdictions have updated outmoded General Plans and zoning codes; completed specific plans for town centers and Transit Oriented Development (TOD); implemented sustainability policies; and adopted municipal climate action plans. Thirty of the 191 cities and two of the six counties in the SCAG region report having updated their General Plans since 2012, and another 42 cities have General Plan updates pending. Fifty-four percent of the cities reporting adopted or pending General Plan updates include planning for Transit Oriented Development (TOD), 55 percent plan to concentrate key destinations, and 76 percent include policies encouraging infill development. Of the counties reporting updates or pending updates to their General Plans, 75 percent include TOD elements, 100 percent encourage infill development, 75 percent promote concentrated destinations, and 75 percent feature policies to address complete communities. To protect water quality, 91 percent of cities have adopted water-related policies and 85 percent have adopted measures to address water quality. To conserve energy, 86 percent of cities have implemented community energy efficiency policies, with 80 percent of those cities implementing municipal energy efficiency policies and 76 percent implementing renewable energy policies. Of the region's 191 cities, 189 have completed sustainability components, with 184 cities implementing at least ten or more sustainability policies or programs and ten cities implementing 20 or more sustainability policies or programs. This last group includes Pasadena, Pomona and Santa Monica.

AFFORDABLE HOUSING

The state is offering new opportunities to help regions promote affordable housing. In spring 2015, California's Affordable Housing Sustainable Communities (AHSC) program awarded its first round of funding to applicants after a competitive grant process. Of $122 million available statewide, $27.5 million was awarded to ten projects in the SCAG region. Eight-hundred forty-two affordable units, including 294 units designated for households with an income of 30 percent or less of the area median income, will be produced with this funding. Meanwhile, Senate Bill 628 (Beall) and Assembly Bill 2 (Alejo), provide jurisdictions with an opportunity to establish a funding source to develop affordable housing and supportive infrastructure and amenities.

PUBLIC HEALTH

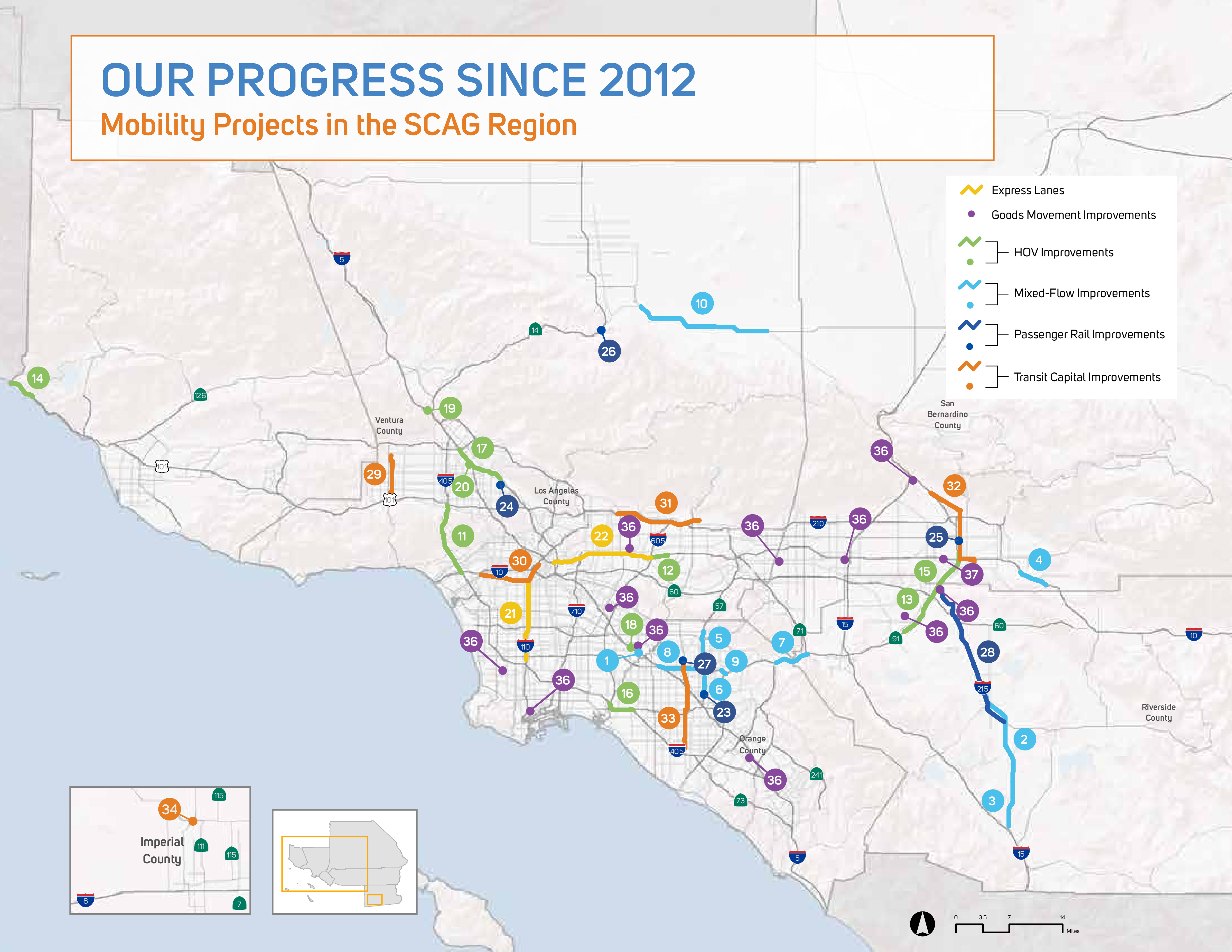
The SCAG region has several ongoing efforts to promote public health. The Los Angeles County Departments of Public Health and the City of Los Angeles Planning Department are developing a Health Atlas that highlights health disparities among neighborhoods. In Riverside County, the Healthy Riverside County Initiative has formed a Healthy City Network to continue to successfully work with the county's 28 cities to enact Healthy City Resolutions and Health Elements into their General Plans. The County of San Bernardino has recently completed the Community Vital Signs Initiative, which envisions a "county where a commitment to optimizing health and wellness is embedded in all decisions by residents, organizations and government."

ENVIRONMENTAL JUSTICE

Since the adoption of the 2012 RTP/SCS, social equity and environmental justice have become increasingly significant priorities in regional plans. For example, plans to promote active transportation, improve public health, increase access to transit, preserve open space, cut air pollution and more are all evaluated for how well the benefits of these efforts are distributed among all demographic groups. The State of California's Environmental Protection Agency (Cal/EPA) developed a new tool, CalEnviroScreen, which helps to identify areas in the state that have higher levels of environmental vulnerability due to historical rates of toxic exposure and certain social factors. Based on this tool, much of the region can stand to benefit from Cap-and-Trade grants that give priority to communities that are disproportionately impacted.

OUR PROGRESS SINCE 2012

Mobility Projects in the SCAG Region



1. **I-5 South Corridor**
One mixed-flow lane on I-5 from OC line to I-605 (currently in construction, however portion between North Fork Coyote Creek to Marquardt Avenue is complete).

2. **I-215 Central**
One mixed-flow lane in each direction between Scott Road and Nuevo Road.

3. **I-215 South**
One mixed-flow lane in each direction between Murrieta Hot Springs Road and Scott Road.

4. **I-10 Widening**
One westbound mixed flow lane on I-10 between Live Oak Canyon Road in Yucaipa and Ford Street in Redlands.

5. **State Route 57 Widening (Northern Segment)**
One northbound mixed-flow lane on SR-57 between Orangethorpe Avenue and Lambert Road.

6. **State Route 57 Widening (Southern Segment)**
One northbound mixed-flow lane on SR-57 between Katella Avenue and Lincoln Avenue.

7. **SR-91 Lane Addition (Eastern Segment)**
One mixed-flow lane on SR-91 between SR-241 and SR-71.

8. **SR-91 Lane Addition (Western Segment)**
One westbound mixed-flow lane on SR-91 between SR-57 and I-5.

9. **SR-91 Lane Extension and Reconstruction**
Addition of a Tustin Avenue exit bypass lane, reconstructing the auxiliary lane and modifying the number one and two lanes of the connector to serve as two general purpose lanes that merge into one general purpose lane just west of Tustin Avenue off- ramp.

10. **SR-138 Corridor Improvements**
Lane widening on SR-138 between Avenue T and SR-18.

11. **I-405 Sepulveda Pass Improvements**
Addition of northbound HOV lane on I-405 between I-10 and US-101.

12. **I-10 HOV Lane (Phase I)**
Addition of HOV lane on I-10 between I-605 and Puente Avenue as permanent facility.

13. **SR-91 HOV Lane**
Addition of HOV lane on SR-91 from Adams Street to SR-60/I-215 Interchange.

14. **US-101 HOV Lane**
Addition of HOV lane on US-101 from Mobil Pier Road to Casitas Pass Road.

15. **I-215 Bi-County HOV Gap Closure**
Addition of HOV lane on I-215 from Orange Show Road to SR-91/SR-60 Interchange.

16. **West County Connector**
Direct HOV connector between I-405/I-605/SR-22.

17. **I-5 HOV Lane**
Addition of HOV lane on I-5 from Hollywood Way to SR-118.

18. **I-5 South Corridor**
Addition of HOV lane on I-5 from OC line to I-605 (currently in construction, however portion between North Fork Coyote Creek to Marquardt Avenue is complete).

19. **I-5/SR-14 HOV Connector**
Addition of HOV connector between I-5 and SR-14.

20. **SR-170/I-5 HOV Connector**
Addition of HOV connector between SR-170 and I-5.

21. **I-110 Express Lanes**
Conversion of the I-110 Harbor Transitway HOV lanes (Harbor Gateway Transit Center to Adams Blvd.) to permanent Express Lanes.

22. **I-10 Express Lanes**
Conversion of the I-10 El Monte Busway HOV lanes (I-605 to Alameda St.) to permanent Express Lanes.

23. **Anaheim Regional Intermodal Transportation Center (ARTIC)**
An Intermodal transportation center in Orange County serving Orange County Transportation Authority (OCTA) buses and various intercity buses, as well as Metrolink and the Amtrak Pacific Surfliner.

24. **Burbank Bob Hope Airport Regional Intermodal Transportation Center**
A multimodal transportation center which includes a consolidated rental car center, bike storage and a bus transit center. A pedestrian bridge to the existing Amtrak and Metrolink station is in the planning stage.

25. **Downtown San Bernardino Transit Center and Metrolink Extension**
One-mile Metrolink extension to downtown San Bernardino, from the previous terminus at the Santa Fe Depot. This multimodal center serves Metrolink, sbX (bus rapid transit), the future Redlands Rail and local Omnitrans bus lines.

26. **Vincent Grade/Acton Siding and Platform**
Adds significant capacity to the northern portion of the Antelope Valley Line, which is mostly single track.

27. **Fullerton Metrolink Station Parking Structure**
Construction of a parking structure providing an additional 814 parking spaces serving Metrolink and OCTA patrons.

28. **Metrolink Perris Valley Line**
A 24-mile extension of existing Metrolink service from downtown Riverside to south Perris, with four new stations constructed at Riverside Hunter Park, Moreno Valley/March Field, Downtown Perris and South Perris.

29. **Metro Orange Line Extension**
A four-mile northward extension of the Metro Orange Line from Canoga Station to the Chatsworth Station.

30. **Metro Exposition Line**
An 8.6 mile light rail corridor connecting Downtown LA and Culver City, including ten new light rail stations.

31. **Metro Gold Line Foothill Extension Phase 2A**
An 11.5-mile light rail extension between Pasadena and Azusa serving six new stations.

32. **Omnitrans E Street sbX**
A 16-mile bus rapid transit project including 6-miles of dedicated bus lanes on E Street, providing service between California State University San Bernardino and the City of Loma Linda.

33. **OCTA Bravo! Route 543**
A new 12-mile limited-stop bus service along Harbor Boulevard, from the Fullerton Transportation Center through the cities of Anaheim, Garden Grove, Santa Ana and terminating at MacArthur Boulevard in Costa Mesa.

34. **The Brawley Transit Transfer Center**
Transit transfer station in Imperial County serving various Imperial Valley Transit routes including the new Gold Line circulator shuttle.

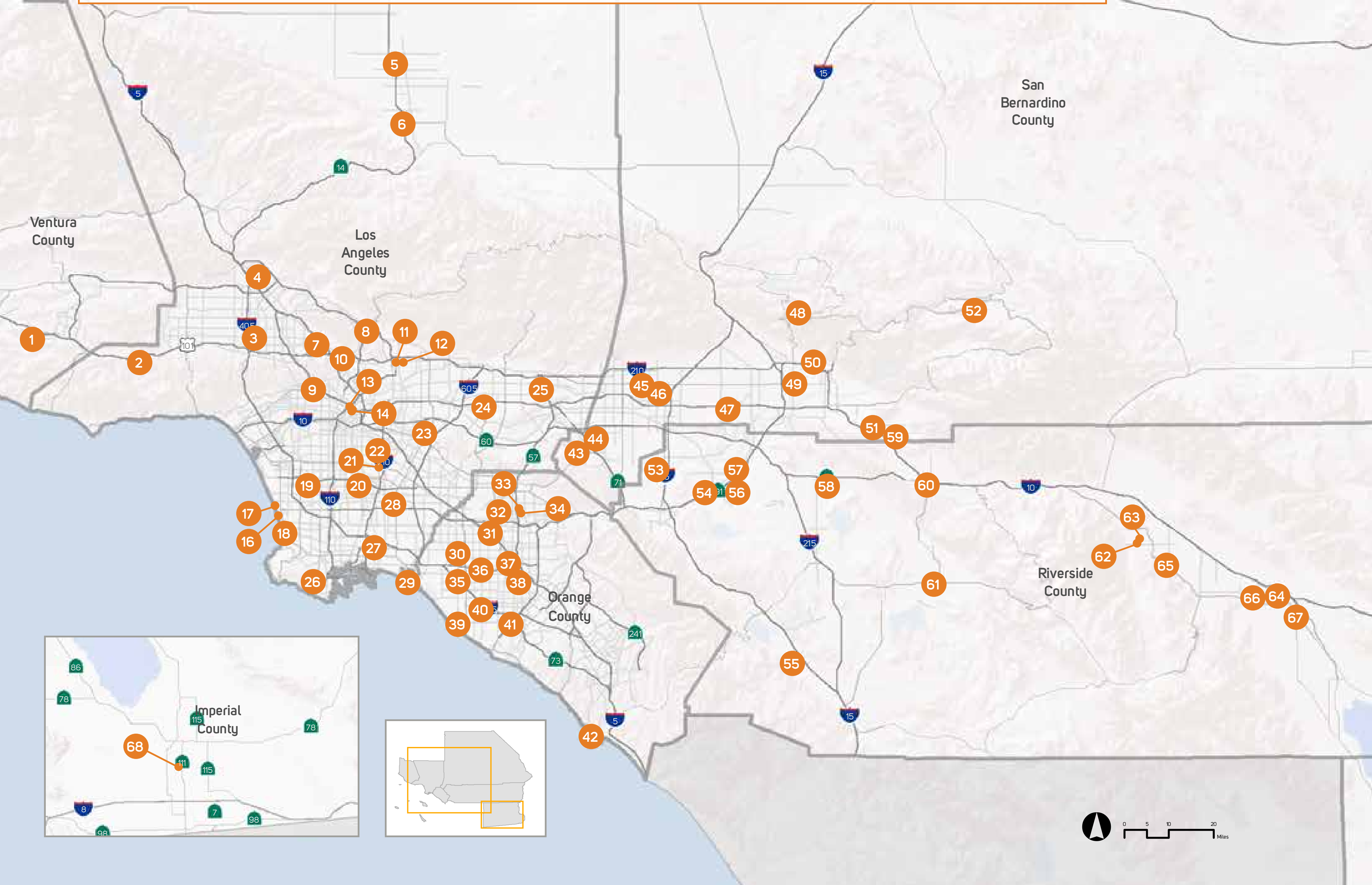
35. **SunLine Transit Administrative Facility**
New SunLine Transit administrative building in Coachella Valley.

36. **Grade Separations**
Various grade separation improvements throughout the region.

37. **Colton Crossing**
A rail to rail grade separation project that physically separated two Class I mainline rail tracks with an elevated 1.4 mile-long overpass that lifts UP trains traveling east-west. This project removed the chokepoint that existed where the Burlington Northern Santa Fe (BNSF) mainline crossed UP tracks in Colton.

OUR PROGRESS SINCE 2012

Sustainability Planning Grant Projects in the SCAG Region



VENTURA COUNTY

1. Ventura County Connecting Newbury Park Multi-Use Pathway Plan

LOS ANGELES COUNTY

2. Las Virgenes-Malibu Council of Governments Multi-Jurisdictional Regional Bicycle Plan
3. Los Angeles Van Nuys & Boyle Heights Modified Parking Requirements
4. Los Angeles Northeast San Fernando Sustainability & Prosperity Strategy
5. Lancaster Complete Streets Master Plan
6. Palmdale Avenue Q Feasibility Study
7. Burbank Mixed-Use Development Standards
8. La Cañada Flintridge Climate Action Plan
9. Los Angeles Hollywood Central Park
10. Glendale Space 134
11. Pasadena Form-Based Street Design Guidelines
12. Pasadena GHG Emission Reduction Evaluation Protocol
13. Los Angeles CEQA Streamlining Assessment
14. Los Angeles Park 101 District
15. Los Angeles Bicycle Plan Performance Evaluation
16. Hermosa Beach Carbon Neutral Plan
17. South Bay Bicycle Coalition Mini-Corral Plan
18. South Bay COG Neighborhood-Oriented Development Graphics
19. Hawthorne Crenshaw Station Area Active Transportation Plan
20. Lynwood Safe and Healthy Community Element
21. South Gate Gateway District/Eco Rapid Transit Station Specific Plan
22. Bell General Plan Update
23. Pico Rivera Kruse Rd. Open Space Study
24. West Covina Downtown Central Business District
25. San Dimas Downtown Specific Plan
26. Rancho Palos Verdes/Los Angeles Western Ave. Corridor Design Implementation Guidellines
27. Long Beach Willow Springs Wetland Habitat Creation Plan
28. Paramount/Bellflower Regional Bicycle Connectivity - West Santa Ana Branch Corridor

ORANGE COUNTY

29. Seal Beach Climate Action Plan
30. Stanton Green Planning Academy
31. Anaheim Bicycle Master Plan Update
32. Fullerton East Wilshire Avenue Bicycle Boulevard
33. Orange County Parks OC Bicycle Loop
34. Placentia General Plan/Sustainability Element & Development Code
35. Westminster General Plan Update - Circulation Element
36. Garden Grove Re:IMAGINE Pedals & Feet
37. Orange County “From Orange to Green” Zoning Code Update
38. Santa Ana Complete Streets Plan
39. Huntington Beach Neighborhood Electric Vehicle Plan
40. Fountain Valley Euclid/I-405 Overlay Zone
41. Costa Mesa Implementation Plan for Multi-Purpose Trails
42. Dana Point General Plan Update

SAN BERNARDINO COUNTY

43. Chino Hills Climate Action Plan and Implementation Strategy
44. Chino Bicycle & Pedestrian Master Plan
45. Rancho Cucamonga Healthy RC Sustainability Action Plan
46. Rancho Cucamonga Metrolink Station and TOD Feasibility Report
47. San Bernardino Bloomington Area Valley Blvd. Specific Plan Health & Wellness Element
48. SANBAG Climate Action Plan Implementation Tools
49. SANBAG Countywide Bicycle Route Mobile Application
50. SANBAG Countywide Complete Streets Strategy and Safe Routes to School Study
51. Yucaipa College Village/Greater Dunlap Neighborhood Sustainable Community
52. Big Bear Lake Rathbun Corridor Sustainability Plan

RIVERSIDE COUNTY

53. Eastvale Bicycle & Pedestrian Master Plan
54. WRCOG Public Health: Implementing the Sustainability Framework
55. WRCOG Land Use, Transportation and Water Quality Planning Framework
56. WRCOG Climate Action Plan Implementation
57. Riverside Restorative Growthprint
58. Moreno Valley Nason St. Corridor Plan
59. Calimesa Wildwood & Calimesa Creek Trail Master Plan
60. Beaumont Climate Action Plan
61. Hemet Downtown Specific Plan
62. Palm Springs Urban Forestry Initiative
63. Palm Springs Sustainablility Master Plan Update
64. Indio General Plan Sustainability & Mobility Elements
65. Cathedral City General Plan Update - Sustainability
66. CVAG CV Link Health Impact Assessment
67. Coachella La Plaza East Urban Development Plan

IMPERIAL COUNTY

68. Imperial County Transportation Commission Safe Routes to School Plan

03

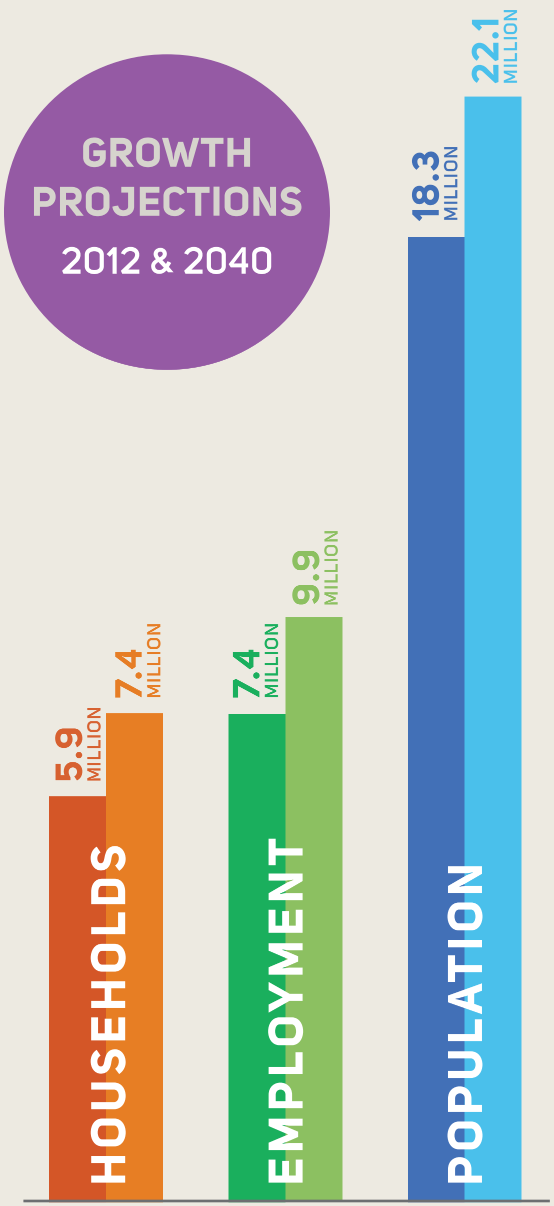
CHAPTER 3 HIGHLIGHTS

CHALLENGES IN A CHANGING REGION

The challenges facing our region are formidable and require that we strategically plan now. This chapter explores some of our more pressing challenges as we head toward 2040.

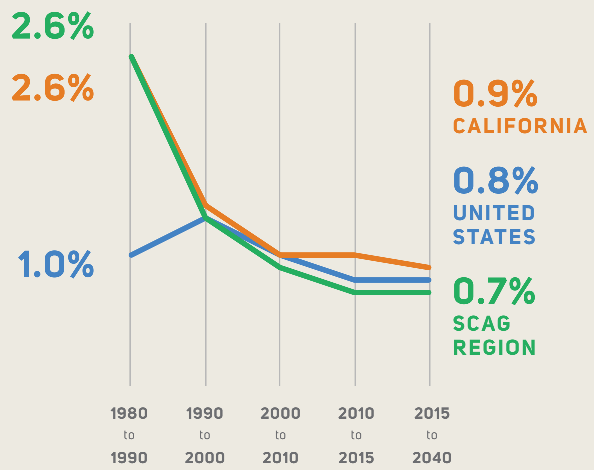
FOCUS **DEMOGRAPHICS**

GROWTH PROJECTIONS 2012 & 2040



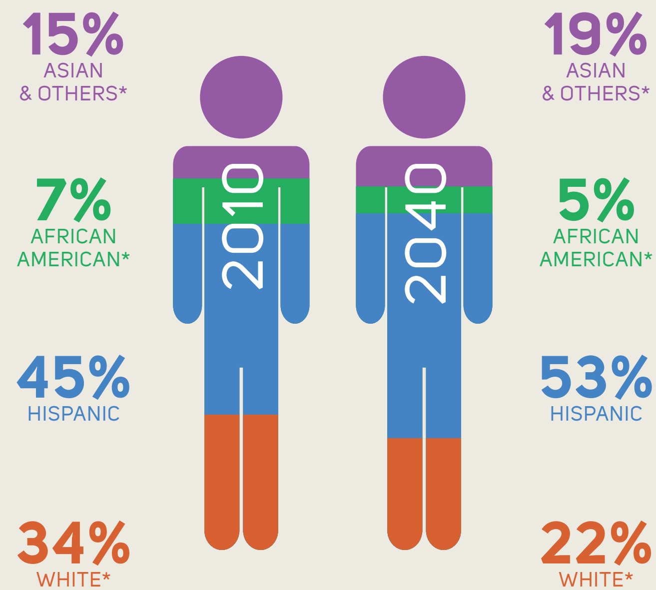
Source: CA DOF, CA EDD, SCAG

Average Annual Population Growth Rate



Source: US Census Bureau, CA DOF, SCAG

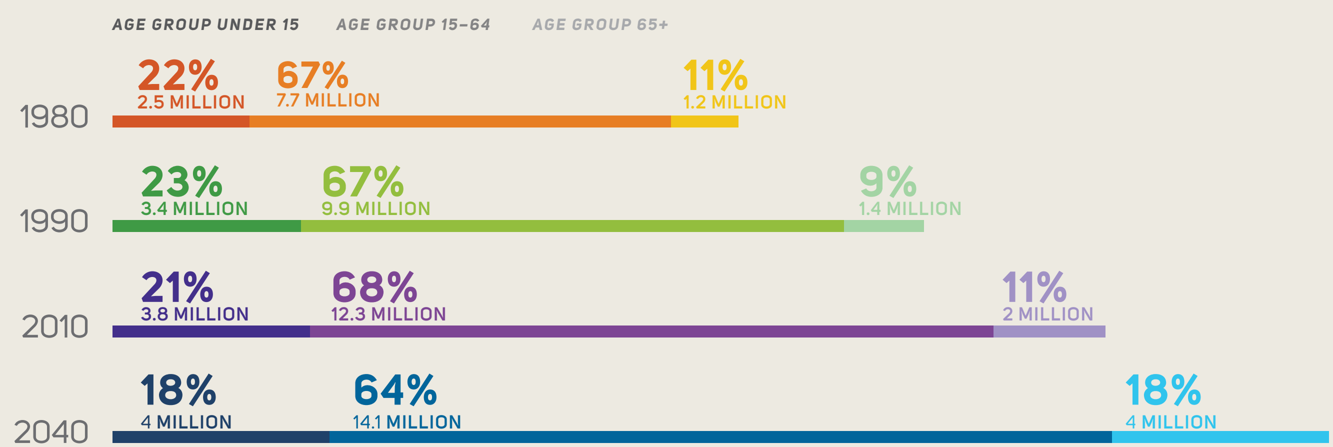
Changes in Ethnic Composition of Population



Due to rounding total may not be 100 percent

** Non-Hispanic | Source: US Census Bureau, SCAG*

More Baby Boomers Will Age & Retire



Source: US Census Bureau, SCAG

RECESSION, RECOVERY AND CURRENT ECONOMIC CHALLENGES

The Great Recession, which lasted from December 2007 through June 2009, caused massive job losses and had a devastating impact on our region's economic well-being and population growth. Now that the recession is behind us and our region has experienced a decline in unemployment and housing foreclosures, challenges still remain. Though the region's employment levels are now where they were in 2007, our population continues to grow slowly. Also, the region's median household income (adjusted for inflation) has declined as wages have stagnated for a larger population base. This is because of not only the lack of high income jobs for the median household, but the inability to access higher paying jobs that are available but require higher education and/or technical skills. An increase in the number of low-paying jobs, and the resulting lower income, has contributed to more people slipping into poverty.

The health of Southern California's economy depends on the well-being of businesses and households, and a strong and efficient regional transportation system can go a long way in helping businesses and households succeed. An efficient transportation system can lead to an increase in productivity, personal income and ultimately public tax revenues. Businesses depend on a reliable transportation network to create products and services that reach their customers at a reasonable cost. Households depend on an integrated, accessible and dependable transportation network to provide reliable access to education, jobs, shopping and recreational activities. A sustainable, time-efficient and cost-effective transportation system can help neighborhood businesses compete more effectively with those in neighboring jurisdictions. Relieving congestion contributes greatly to future employment growth. For our region to remain a competitor in the global economy, SCAG must continue to invest strategically in transportation infrastructure, while ensuring that it obtains the maximum return on those investments.

CURRENT DEMOGRAPHIC TRENDS

The six counties that comprise our region have experienced significant demographic changes and they can expect even more changes over the next 25 years. The overall population will continue to grow more slowly than in the past, and it will also change in terms of its age distribution and racial and ethnic breakdown. Where people choose to live will also change. More people in our region will increase the demands on our already strained transportation system, as well as on available land for development.

According to the California Department of Finance, our region is now home to 18.9 million people, or about 5.9 percent of the U.S. population and 48.3 percent of California's population. The region is the second-largest metropolitan area in the country, after the New York metropolitan area. If it were a state, our region would rank fifth in the U.S. in terms of the size of its population, just behind New York and ahead of Illinois.

By 2040, the region's population is expected to grow by more than 20 percent to 22 million people—an increase of 3.8 million people. Importantly, we expect the region to grow differently than in the past. Before 1990, population growth was driven largely by both a natural increase and migration. That is, people moved into Southern California from other states and countries and there was additional population growth due to a net increase in the existing population (births minus deaths). Since 1990, however, any gains from immigration have been offset by domestic migration losses and Southern California's population growth has been fueled mostly by a natural increase (more births than deaths)—despite declining fertility rates. This continuing trend is expected to account for most of the Southern California's future population growth by 2040.

As we approach the middle of the century, Southern California's population will still remain racially and ethnically diverse. Currently, we are 47 percent Hispanic, 31 percent non-Hispanic White, 16 percent non-Hispanic Asian/Other and six percent non-Hispanic African American. In particular, the rapid growth of the region's Hispanic population is expected to continue; by 2040 it is projected that 53 percent of the region's residents will be Hispanic. The region's non-Hispanic Asian/Other population is also expected to increase, growing to 19 percent of the population.

Notably, the median age of our region's overall population is projected to rise, with more older people throughout Southern California as we approach the middle of the century. As the Baby Boomer generation continues to age, our region will experience a significant increase in its senior population—a trend expected nationwide. Today, people who are 65 and older represent around 12 percent of the region's total population. But by 2040, the number of seniors will increase to 18 percent (i.e., nearly one in five people in our region). This demographic shift will have major impacts on the locations and types of housing we build and our plans for transportation. This demographic group of seniors covers a wide range of needs; residents in their late sixties and early seventies will have different needs than those in their eighties and nineties. Nonetheless, a key challenge for the region will be to help seniors maintain their independence in their homes and communities.

STATE HIGHWAY SYSTEM PRESERVATION

TOTAL NEEDS =

$65.8 BILLION

EXISTING FUNDS =

$26.7 BILLION

GAP =

$39.0 BILLION

Note: Numbers may not sum to total due to rounding.

As the number and share of seniors are projected to increase, the percentage share of younger people of working age is expected to fall. The ratio of people older than 65 to people of working age (15 to 64) is expected to increase to 28 seniors per 100 working age residents by 2040—up from 16 in 2010. This means that our region could face a labor shortage and a subsequent reduction in tax revenues.

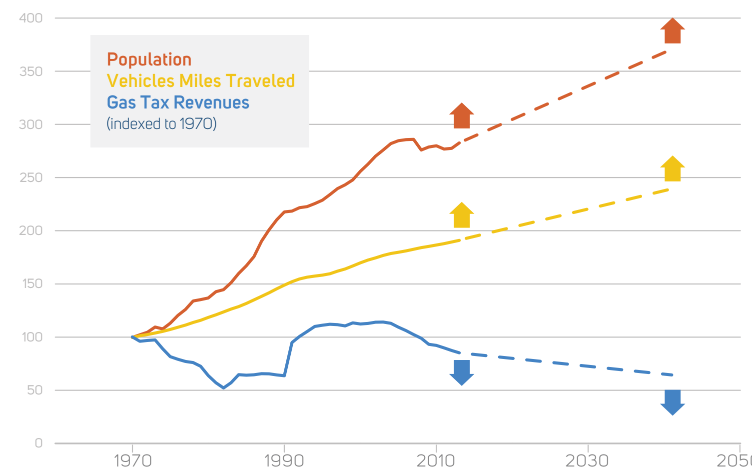
As we plan for the future and face these challenges, we also expect an interesting convergence of interests between two distinct population groups—namely Millennials, who today range in age from 20 to 35, and aging Baby Boomers, who range in age from 51 to 70. Millennials represent 22.4 percent of our region's total population and rely less on automobiles than have previous generations; they are less apt to acquire drivers licenses, drive fewer miles and conduct fewer overall trips. Research also shows that Millennials often prefer to live in denser, mixed-use urban areas well served by transit, rather than decentralized suburban areas. This trend could explain why there has been increasing demand for new multifamily housing.[1] Millennials also are more likely than other groups to embrace a range of mobility options, including shared cars, biking, transit and walking. These evolving preferences for transportation and housing are significant because Millennials will account for a large part of Southern California's overall population in 2040. In the near term, their housing and transportation preferences, when combined with the need of Baby Boomers to maintain their independence, could significantly change how Southern California develops.

FINANCING TRANSPORTATION

Perhaps our most critical challenge is securing funds for a transportation system that promotes a more sustainable future. The cost of a multimodal transportation system that will serve the region's projected growth in population, employment and demand for travel surpasses the projected revenues expected from the gas tax—our historic source of transportation funding. The purchasing power of our gas tax revenues is decreasing and will continue on a downward trajectory as tax rates (both state and federal) have not been adjusted in more than two decades while transportation costs escalate, fuel efficiency improves and the number of alternative-fuel vehicles continues to grow. FIGURE 3.1 highlights the decline in gas tax revenues, in relation to the growing population and demand for travel.

To backfill limited state and federal gas tax revenues, our region has continued to rely on local revenues to meet transportation needs. In fact, 71 percent of SCAG's core revenues are local revenues. Seven sales tax measures have been adopted throughout the region since the 1980s, so the burden of raising tax dollars has shifted significantly to local agencies. In reality, we need a stronger state and federal commitment to raising tax dollars for the Southern California transportation system—given its prominence and importance to the state and national economy, particularly when it comes to the movement of goods. Our region's transportation system should be able to rely on more consistent tax revenues raised at all levels of government.

FIGURE 3.1 CALIFORNIA POPULATION, TRAVEL AND GAS TAX REVENUE TRENDS



Source: Caltrans, California Department of Finance, California State Board of Equalization, White House Office of Management and Budget

[1] Dutzik, T., Inglis, J., & Baxandall, Ph.D., P. (2014). Millennials in Motion: Changing Travel Habits of Young Americans and the Implications for Public Policy. U.S. PIRG Education Fund.

TABLE 3.1 PROPOSED 2016–2040 RTP/SCS GROWTH FORECAST

	POPULATION				HOUSEHOLDS				EMPLOYMENT			
REGION	2012	2020	2035	2040	2012	2020	2035	2040	2012	2020	2035	2040
IMPERIAL	180,000	234,000	272,000	282,000	49,000	72,000	89,000	92,000	59,000	102,000	121,000	125,000
LOS ANGELES	9,923,000	10,326,000	11,145,000	11,514,000	3,257,000	3,494,000	3,809,000	3,946,000	4,246,000	4,662,000	5,062,000	5,226,000
ORANGE	3,072,000	3,271,000	3,431,000	3,461,000	999,000	1,075,000	1,135,000	1,152,000	1,526,000	1,730,000	1,870,000	1,899,000
RIVERSIDE	2,245,000	2,480,000	3,055,000	3,183,000	694,000	802,000	1,009,000	1,055,000	617,000	849,000	1,112,000	1,175,000
SAN BERNARDINO	2,068,000	2,197,000	2,638,000	2,731,000	615,000	687,000	825,000	854,000	659,000	789,000	998,000	1,028,000
VENTURA	835,000	886,000	945,000	966,000	269,000	285,000	306,000	312,000	332,000	375,000	409,000	420,000
SCAG	18,322,000	19,395,000	21,486,000	22,138,000	5,885,000	6,415,000	7,172,000	7,412,000	7,440,000	8,507,000	9,572,000	9,872,000

Source: SCAG
Note: All figures are rounded to the nearest 1,000. The County numbers may not sum to the region total due to rounding.

FOCUS

IMPORTANCE OF SYSTEM PRESERVATION

We Will Pay More–If We Do Not Fix-it-First

EACH $1 SPENT HERE...
Seals, Thin Overlays (Preventive Maintenance)
SURFACE DAMAGE
4–7 Years

DELAYS SPENDING $3 HERE...
Thicker Overlays
MINOR DAMAGE
6–7 Years

DELAYS SPENDING $8 HERE...
Rehabilitation/Reconstruction
MAJOR DAMAGE
10+ Years

Source: 2013 State of the Pavement Report

The State of Disrepair

17% OF HIGHWAYS ARE **DISTRESSED**

6% OF LOCAL ROADS IN **FAILED CONDITION IN 2012**

25% OF LOCAL ROADS WILL BE IN **FAILED CONDITION** IN 2022 UNDER CURRENT (2012) FUNDING

18% OF BRIDGES RATED AS **FUNCTIONALLY OBSOLETE**

10% OF BRIDGES RATED AS **STRUCTURALLY DEFICIENT**

$103 BILLION

of all **proposed expenditures** through **2040** are allocated to highway & arterial system operations & maintenance in the **2016 RTP/SCS**

Source: Federal Highway Administration National Bridge Inventory & 2014 State Highway Operation & Protection Program

A Bumpy & Costly Ride

Annual Vehicle Maintenance Costs by Metropolitan Area Due to Poor Road Conditions

Area	Cost	Cost	Area
LOS ANGELES/ ORANGE COUNTY	$832	$542	MISSION VIEJO
HEMET	$738	$534	VENTURA COUNTY
TEMECULA/MURRIETA	$664	$501	INDIO-CATHEDRALCITY-PALM SPRINGS
INLAND EMPIRE	$638	$421	LANCASTER-PALMDALE

Bumpy Roads Ahead Study & TRIP, A National Transportation Research Group, 2013

PRESERVING OUR TRANSPORTATION SYSTEM

Southern California's transportation system is in an unfortunate state of disrepair due to decades of underinvestment. Quite simply, investments to preserve the system have not kept pace with the demands placed on it. The inevitable consequence of this deferred maintenance is poor road pavement, which is particularly evident on our highways and local arterials. The rate of deterioration is expected to accelerate significantly as maintenance continues to be deferred. And as maintenance is deferred, the cost of bringing these assets back to a state of good repair is projected to grow exponentially. SCAG estimates that the cost to maintain our transportation system at current conditions, which is far from ideal, will be in the tens of billions of dollars beyond what is currently committed. For instance, the gap between needs and existing funding for the State Highway System through 2040 is now estimated at $39.0 billion. It should be noted that Caltrans is the owner and operator of the State Highway System and is responsible for funding the operation and maintenance of state highways, while local jurisdictions are responsible for the funding of operations and maintenance of local arterials.

Moving forward, the region needs to continue to "Fix-it-First" as a top priority—that is, focusing the necessary funds on preserving the existing transportation network while strategic investments are made in system expansions. Failing to adequately invest in the preservation of Southern California's roads, highways, bridges, railways, bicycle and pedestrian facilities, and transit infrastructure will only lead to further deterioration, which has the potential to worsen our congestion challenges. In addition, potholes and other imperfections in the roadway come with real costs to motorists, estimated by one study at more than $700 per household each year. The region's transportation system represents billions of dollars of investments that must be protected in order to serve current and future generations. The loss of even a small fraction of these assets could significantly compromise the region's overall mobility.

Preservation of the region's transit system, for example, is more important than ever as Baby Boomers, one of the fastest growing groups requiring transportation services, age. The region needs to plan for this projected increase in seniors with increased funding for transit and paratransit maintenance and preservation. Preserving infrastructure that encourages active transportation, such as walking and biking, is also important for maintaining mobility for those unable or uninterested in driving. It is also a cost-effective way to increase the number of roadway users without increasing roadway congestion.

MOVING GOODS EFFICIENTLY IN A HUGE AND COMPLEX REGION

The smooth and efficient movement of goods is critical to our regional economy, particularly as our region continues to recover from the recession. A number of key trends and drivers are expected to impact our region's goods movement system. Some of these, along with associated challenges, are highlighted below.

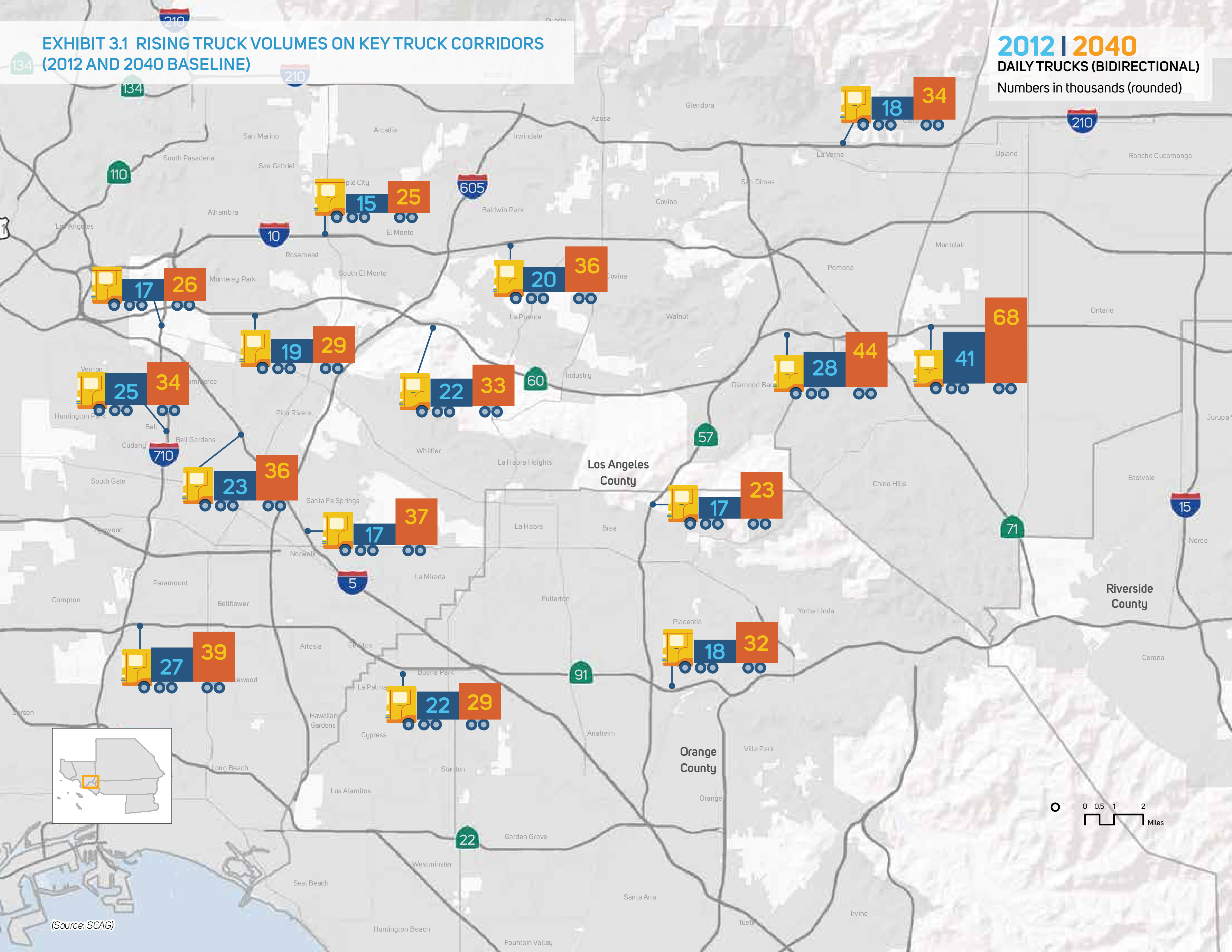
Population and Employment Growth: The regional population and rate of employment in our region are key indicators of economic health, and both are projected to grow rapidly over the next two decades. Our region's population growth is expected to fuel consumer demand for products and the goods movement services that provide them. This increased demand will drive stronger growth in freight traffic on already constrained highways and rail lines. Truck volumes on many key corridors are anticipated to grow substantially, as shown in EXHIBIT 3.1. Truck and auto delays will increase, as will truck-involved accidents. Levels of harmful emissions also will rise. The increase in rail volumes is expected to exacerbate vehicle hours of delay at rail and highway crossings.[2] Moreover, growing demand for commuter rail services on rail lines owned by the freight railroads will create additional capacity challenges.

Continued Growth in International Trade: The San Pedro Bay Ports anticipate cargo volumes to grow to 36 million containers by 2040—despite increasing competition with other North American ports, the expansion of the Panama Canal and more recent delays at port terminals due to labor negotiations. Port of Hueneme in Ventura County is also positioned to grow as a preferred port for specialized cargo such as automobiles, break bulk and military cargo. This growth will place further demands on marine terminal facilities, highway connections and rail intermodal terminals. If port-related rail traffic and commuter demands are to be met, mainline rail capacity improvements will be required as well. Meanwhile, mitigating the impacts of increased train traffic in communities will continue to be a challenge.

Logistics Epicenter: Southern California is the nation's epicenter for distribution and logistics activity, and it will continue to be a significant source of well-paying jobs in the region through 2040. The region has close to 1.2 billion square feet of facility space for warehousing, distribution, cold storage and truck terminals.[2] Nearly 1.1 billion square feet of this space is occupied. By 2040,

[2] CoStar Realty Information, Inc. www.costar.com, based on November 2014 data downloads.

EXHIBIT 3.1 RISING TRUCK VOLUMES ON KEY TRUCK CORRIDORS (2012 AND 2040 BASELINE)



(Source: SCAG)

the region may experience a shortfall of more than 527 million square feet of warehouse space, relative to demand.[3]

Air Quality Issues: Goods movement emissions contribute to regional air pollution problems (e.g., NOx and PM 2.5) and pose public health challenges. Emissions generated by the movement of goods are being reduced through efforts such as the San Pedro Bay Ports Clean Air Action Plan, as well as regulations such as the statewide Heavy Duty Truck and Bus Rule. But these reductions alone are unlikely to be sufficient to meet regional air quality goals.

Currently, much of the SCAG region does not meet federal ozone and fine particulate air quality standards as mandated by the federal Clean Air Act. The South Coast Air Basin has a deadline to reduce ozone concentrations to 80 parts per billion (ppb) by 2023 under the revoked 1997 eight-hour ozone standards, and further down to 75 ppb by 2031 under the current 2008 eight-hour ozone standards. Moreover, new federal ozone standards are expected to be finalized by the Environmental Protection Agency (EPA) in the 2015/2016 time frame, with an expected new attainment deadline of 2037. This means that NOx emissions in the South Coast Air Basin must be reduced 65 percent by 2023 and 75 percent (beyond projected 2023 emissions) by 2032 in order to attain federal ozone standards.[4] Additional attainment deadlines are in effect for PM 2.5.

Reducing greenhouse gas emissions is also a priority, as determined by the landmark California legislation Assembly Bill 32 and Senate Bill 375, and the more recent Executive Order B-30-15 signed by Governor Brown in April 2015. Several state measures have been implemented to reduce greenhouse gas emissions, with some implications for freight. These include the Low Carbon Fuel Standard and the inclusion of greenhouse gas emissions from transportation fuels under the California's Cap-and-Trade Program. Additional state programs are under development as part of the state's Sustainable Freight Strategy (SFS).

3 Industrial Warehousing in the SCAG Region Study, Task 4 Warehousing Demand Forecast.
4 Preliminary Draft AQMD Air Quality Management Plan White Paper, Goods Movement, June 2015.

HOUSING AFFORDABILITY, GENTRIFICATION AND DISPLACEMENT

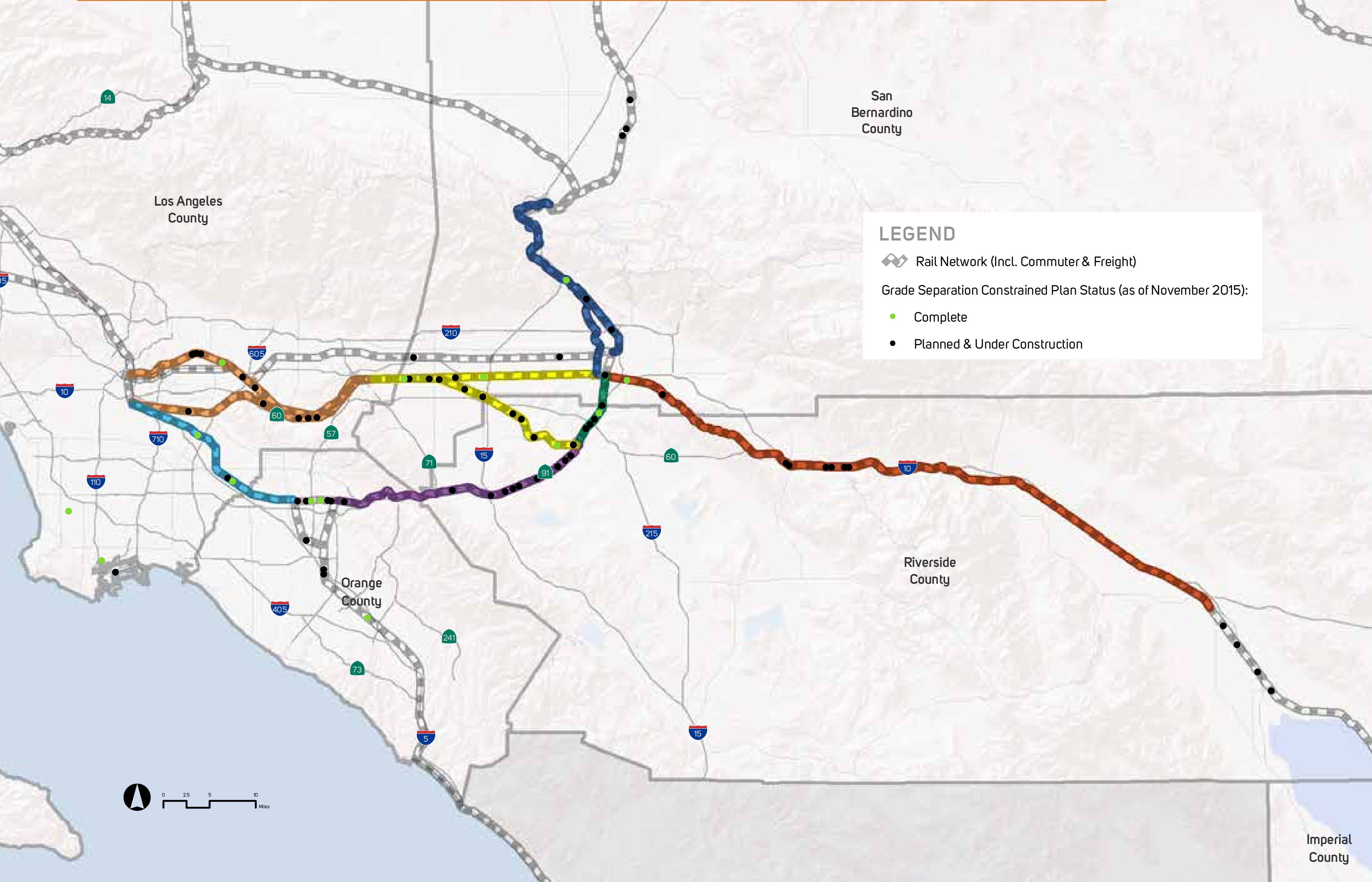
The cost of housing in Southern California is among the highest in the nation. Across our region, home prices and rents continue to rise, and the region continues to experience a shortage of affordable housing. The California Association of Realtors' (CAR) affordability index, which measures the percentage of households that can afford to purchase a median priced home in the state, remains around 35 percent for the SCAG region. Nearly 55 percent of renters and 45 percent of homeowners spend more than 30 percent of their income on rent or mortgage payments.

Affordability is becoming a significant issue in many communities, particularly in urban areas after the implementation of a new rail line, transit station or other major public investment. Housing unaffordability can undermine the overall goals of the RTP/SCS because it can contribute to suburban sprawl, longer job commutes and higher greenhouse gas emissions. As wealthier "outsiders" move into established communities, the increased demand for housing and business/retail space can lead to escalating costs for residential and commercial real estate. Many traditionally low-income, urban core communities at risk for gentrification are seeing dramatic changes in housing, retail stores, schools and other neighborhood amenities.

The region's overall affordability issues are particularly troubling because the region has a disproportionately high concentration of low-income and minority populations that are unemployed, live under the poverty line, have lower educational attainment, and live in close proximity to environmentally stressed areas. The region accounts for 67 percent of Californians who live in disadvantaged communities, as defined by Senate Bill 535, which requires investment in disadvantaged communities from California's Cap-and-Trade revenues. This represents more than 6.36 million people. Investments in transportation and other public infrastructure, affordable housing, economic development and job creation can help these communities in need.

As our region builds communities that are more compact and more transit-oriented, regional greenhouse gas emissions are anticipated to decline and residents from a variety of income levels will continue to make housing choices that allow them to use an increasing number of mobility options. The overall quality of life is expected to increase for many people. Transit investments and strategies will be most effective if coordinated with land use strategies,

PEAK DAY TRAIN VOLUME BY SEGMENT
(2012 to 2040)



RAIL SEGMENTS

BNSF Cajon Subdivision
San Bernardino-Silverwood PLUS

UPRR Mojave Subdivision
W. Colton-Silverwood

	PASSENGER TRAINS PER DAY	FREIGHT TRAINS PER DAY
2012	2	89
2040	2	167

UPRR LA Subdivision
East LA-Pomona PLUS

UP Alhambra Subdivision
Yuma Jct. - Pomona

	PASSENGER TRAINS PER DAY	FREIGHT TRAINS PER DAY
2012	54	37
2040	98	100

UP LA Subdivision
Pomona-W. Riverside PLUS

UPRR Alhambra Subdivision
Pomona-W. Colton

	PASSENGER TRAINS PER DAY	FREIGHT TRAINS PER DAY
2012	13	43
2040	48	112

UPRR Yuma Subdivision
Colton - Indio

	PASSENGER TRAINS PER DAY	FREIGHT TRAINS PER DAY
2012	1	40
2040	2	95

BNSF San Bernardino Subdivision
Atwood-W. Riverside

	PASSENGER TRAINS PER DAY	FREIGHT TRAINS PER DAY
2012	27	40
2040	62	91

BNSF San Bernardino Subdivision
Hobart-Fullerton

	PASSENGER TRAINS PER DAY	FREIGHT TRAINS PER DAY
2012	49	36
2040	110	80

BNSF San Bernardino Subdivision
W. Riverside-Colton

	PASSENGER TRAINS PER DAY	FREIGHT TRAINS PER DAY
2012	39	60
2040	108	139

GRADE SEPARATION PROJECTS

24
CURRENTLY UNDER CONSTRUCTION

+

42
PLANNED

WOULD **SAVE** AN ESTIMATED

5,500
DAILY VEHICLE HOURS OF DELAY IN 2040

AFFORDABLE HOUSING TOOLBOX FOR LOCAL JURISDICTIONS

1. Streamline the residential project permitting process
2. Reduced fees or waivers for affordable housing development
3. Reduce parking requirements, especially in transit-rich areas
4. Adopt an affordable housing overlay zone
5. Preservation of mobile homes
6. Establish a housing trust fund
7. Add inclusionary zoning to the housing ordinance
8. Density Bonus ordinance
9. Increase density in transit-rich areas
10. Link a housing program with other policies such as active transportation and public health
11. Consider new building types and models, such accessory dwelling units or small units
12. Establish a Community Revitalization and Investment Authority (per AB 2) or Enhanced Infrastructure Financing District (per SB 628)

including transit-oriented development and providing affordable housing. However, people from low-income communities near new transit infrastructure may face displacement. Generally, displacement refers to a situation in which gentrification places pressure (through eviction or because of market forces) on people from existing communities to relocate to more affordable places. If those communities are priced out and move away from newly constructed transit facilities, those facilities lose the very people who are more likely to use them. Research suggests that lower income residents generate fewer vehicle miles traveled (VMT) and demonstrate the largest relative VMT reductions with location efficiency.[5]

This Plan's vision and goals include ensuring that regionwide benefits improve social equity—that is, the benefits of our Plan are realized by all populations in our Southern California region while its burdens are not carried disproportionately by one group over another. Providing people throughout our region with access to high quality transit and ensuring that they also have access to more affordable housing are related objectives. Currently, SCAG is partnering with the state and other regional agencies to study issues related to displacement and travel behavior near transit. Those results will inform future regional policies. Community advocates and other housing stakeholders are working to ensure that investments in traditionally low-income communities benefit existing residents and businesses instead of dividing communities. SCAG encourages municipalities to pursue strategies that avoid displacement, especially near transit stations, and ensure that existing communities retain their housing options.

The integration of affordable housing development with the goals of Senate Bill 375 has been the focus of several recently enacted state legislative bills. Bills such as Assembly Bill 2222 (Nazarian) and Assembly Bill 313 (Atkins) aim to preserve affordable housing in rapidly changing development environments, such as in projects that apply for local density bonuses and within Enhanced Infrastructure Financing Districts, respectively. Other bills, such as Assembly Bill 744 (Chau), reduce parking requirements for housing designed for low income households and seniors and meet certain thresholds for transit access, which not only lower the cost of building affordable housing but also encourages the development of affordable housing near transit—a clear goal of Senate Bill 375.

On a local level, there are a variety of tools available for jurisdictions to consider to increase the supply of affordable housing available (please see Affordable Housing Toolbox graphic). These tools are designed to reduce the cost of building affordable housing or establish a funding source for preserving or building affordable housing. While there is not a "one size fits all" approach, SCAG encourages jurisdictions to consider these strategies in order to address local housing affordability challenges.

[5] Newmark, Ph.D, G., & Haas Ph.D., P. (2015). Income, Location Efficiency, and VMT: Affordable Housing as a Climate Strategy. San Francisco: California Housing Partnership.

Additionally, there are a number of statewide programs and resources to assist local jurisdictions in funding the production of affordable housing. As mentioned in earlier chapters, there are several new funding opportunities to help regions and jurisdictions promote affordable housing. California's Affordable Housing Sustainable Communities (AHSC) program, funded by the statewide Greenhouse Gas Reduction Fund created by Assembly Bill 32, provides funding to certain projects that provide affordable housing through a competitive grant process. Moreover, other programs such as the California Department of Housing and Community Development (HCD)'s Housing-related Parks Program, provides funds to local jurisdictions to maintain and rehabilitate parks and open space based on the number of affordable housing units built. Other opportunities to build housing also include Senate Bill 628 (Beall) and Assembly Bill 2 (Alejo), which allow jurisdictions to establish special reinvestment districts to develop affordable housing and supportive infrastructure and amenities. As the regional MPO, SCAG is committed to providing jurisdictions and stakeholders applying for funding opportunities with data, technical and policy support in order to further the progress of establishing more affordable housing in the region aligned with the goals of the RTP/SCS.

IMPROVING PUBLIC HEALTH

Today, many people in our region suffer from poor health due to chronic diseases related to poor air quality and physical inactivity. Chronic diseases including heart disease, stroke, cancer, chronic lower respiratory disease and diabetes are responsible for 72 percent of all deaths in our region, according to the California Department of Public Health. Furthermore, more than 60 percent of residents are overweight or obese, more than eight percent have diabetes, 27 percent suffer from hypertension and more than 12 percent suffer from asthma, according to the California Health Interview Survey. Health care costs resulting from being physically inactive, obese and overweight and from asthma cost our Southern California region billions of dollars annually in medical expenses, lost life and lost productivity, research shows.[6] For example, one study showed that health care costs resulting from physical inactivity and obesity reached an estimated $41.2 billion in 2006 in California.

A growing body of evidence shows that how a neighborhood is laid out and linked to transportation options can shape the lifestyles that people have—how physically active they are and how safe their everyday lives can be.[7] As a result, regional planning for land use and transportation across the U.S. has increasingly incorporated strategies to improve public health. MPOs such as SCAG are focusing on improving transportation safety, offering people more opportunities to walk, bike and embrace other forms of active transportation, improve first/last mile connections to transit, and improve access to natural lands. They are also pursuing strategies to make neighborhoods more walkable, improve air quality, help people cope with climate change impacts such as extreme heat events, improve accessibility to essential destinations such as hospitals and schools, and work overall toward a transportation system and land use patterns that promote regional economic strength.

One of the challenges that SCAG faces as it strives to improve public health is the sheer size and diversity of our region. Public health varies widely by geographic location, income and race. There is no one size fits all approach to meeting this complex challenge. It requires flexibility and creativity to ensure that initiatives are effective in both rural and urban areas.

To gain more insight on the connection between how we use land and public health, SCAG has identified seven focus areas for further analysis: access to essential destinations, affordable housing, air quality, climate adaptation, economic opportunity, physical activity and transportation safety. For more details, see the Plan's Public Health Appendix.

CONFRONTING A CHANGING ENVIRONMENT

The consequences of continued climate change already are impacting California and more intensified changes are expected. Ongoing drought conditions, water shortages due to less rainfall as well as declining snowpack in our mountains, and an agriculture industry in crisis have become hard realities in recent years. Climate change is transforming the state's natural habitats and overall biodiversity. Continued changes are expected to impact coastlines as sea levels rise and storm surges grow more destructive. Forests will continue to be impacted by drought and wildfire. Climate change also will impact how we use energy and the quality of public health. Our statewide transportation

6 Peck, C., Logan, J., Maizlish, N., & Van Court, J. (2013). The Burden of Chronic Disease and Injury: California. 2013. California Department of Public Health.

7 Frank, L. D., Schmid, T. L., Sallis, J. F., Chapman, J., & Saelens, B. E. (2005). "Linking Objectively Measured Physical Activity with Objectively Measured Urban Form: Findings from SMARTRAQ." American Journal of Preventive Medicine, 28(2S2), 117-125.

system will experience new challenges as well as the global and regional climate continues to change.[8]

Researchers project that both coastal and inland Southern California will see many more days of extreme heat, with temperatures exceeding 95 degrees Fahrenheit.[9] This is expected to increase heat-related mortality, lower labor productivity and boost demands for energy. Meanwhile, changing patterns of rain and snowfall—including the amount, frequency and intensity of precipitation across the state—will have serious long-term impacts on the supply and quality of water in Southern California.

It is clear that our region needs to prepare for these projected challenges and a big part of that effort is to make individual communities and the region as a whole more resilient to the consequences of climate change. "Climate resiliency" can be defined as the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization and the capacity to adapt to stress and change.[10] Without advance planning and effective action, the consequences of climate change will negatively impact our transportation system, our economy and our everyday lives.

The state's Adaptive Planning Guide encourages our region and others across California to evaluate the local impacts of climate change. These impacts include increased temperatures, reduced precipitation, rising sea levels, a fall in tourism, reduced water supplies, a heightened risk of wildfire, threats to public health related to degraded air quality and heat, stresses on endangered and threatened species, diminished snowpack and coastal erosion.[11] Our region is still facing a serious drought that began in 2012 and its length and severity has led to mandatory water restrictions for the first time in state history. At the same time, state programs designed to meet future climate challenges proactively are underway. These include initiatives such as the Safeguarding California[12] plan, as well as Governor Brown's Executive Order calling for new actions to mitigate and adapt to the impacts of climate change. These initiatives present regional agencies such as SCAG with opportunities to show leadership as the state confronts climate change challenges.

Continued climate change will impact our region in various ways and we are now getting a clearer picture of how it will impact the day-to-day lives of those of us who are most vulnerable—such as the poor, the elderly and the disabled. Responding effectively to climate change requires us to cooperate more with one another, to use limited resources more wisely, and to think more creatively to align our goals. The impacts of climate change, like other environmental challenges, are expected to hit hardest those communities that are least equipped to handle them. Particularly in Southern California, public agencies must focus on safeguarding people who are most vulnerable to extreme heat and air pollution. The elderly and children under five years old are most vulnerable to heat-related illness.[13] As our demographics change, proactive planning that ensures the health of these distinct populations will be increasingly important.

Our region certainly cannot fight climate change alone. It will be a global effort. However, it is up to us to make sure we can adapt to climate change and mitigate its impacts in our own region. We cannot expect anyone else to do this work for us. Long-range regional planning inherently recognizes the relationship between today's investments and tomorrow's outcomes. Confronting climate change and building climate resilient communities is, at its core, an exercise in smart planning. We will need to build on actions we have already taken by integrating considerations of climate and sustainability into the approaches we take to grow our economy, protect the environment and public health, and plan for the future.

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8 California Resources Agency. (n.d.) Fact Sheets on California Climate Risks [Fact Sheet]. Retrieved from http://resources.ca.gov/docs/climate/Safeguarding_Handout_All.pdf.

9 Rogers, J., Barba, J., & Kinniburgh, F. (2015). From Boom to Bust? Climate Risk in the Golden State. Risky Business Project. Accessed at http://riskybusiness.org/uploads/files/California-Report-WEB-3-30-15.pdf.

10 Safeguarding California: Reducing Climate Risk. (2014). California Natural Resources Agency. Accessed at http://resources.ca.gov/docs/climate/Final_Safeguarding_CA_Plan_July_31_2014.pdf.

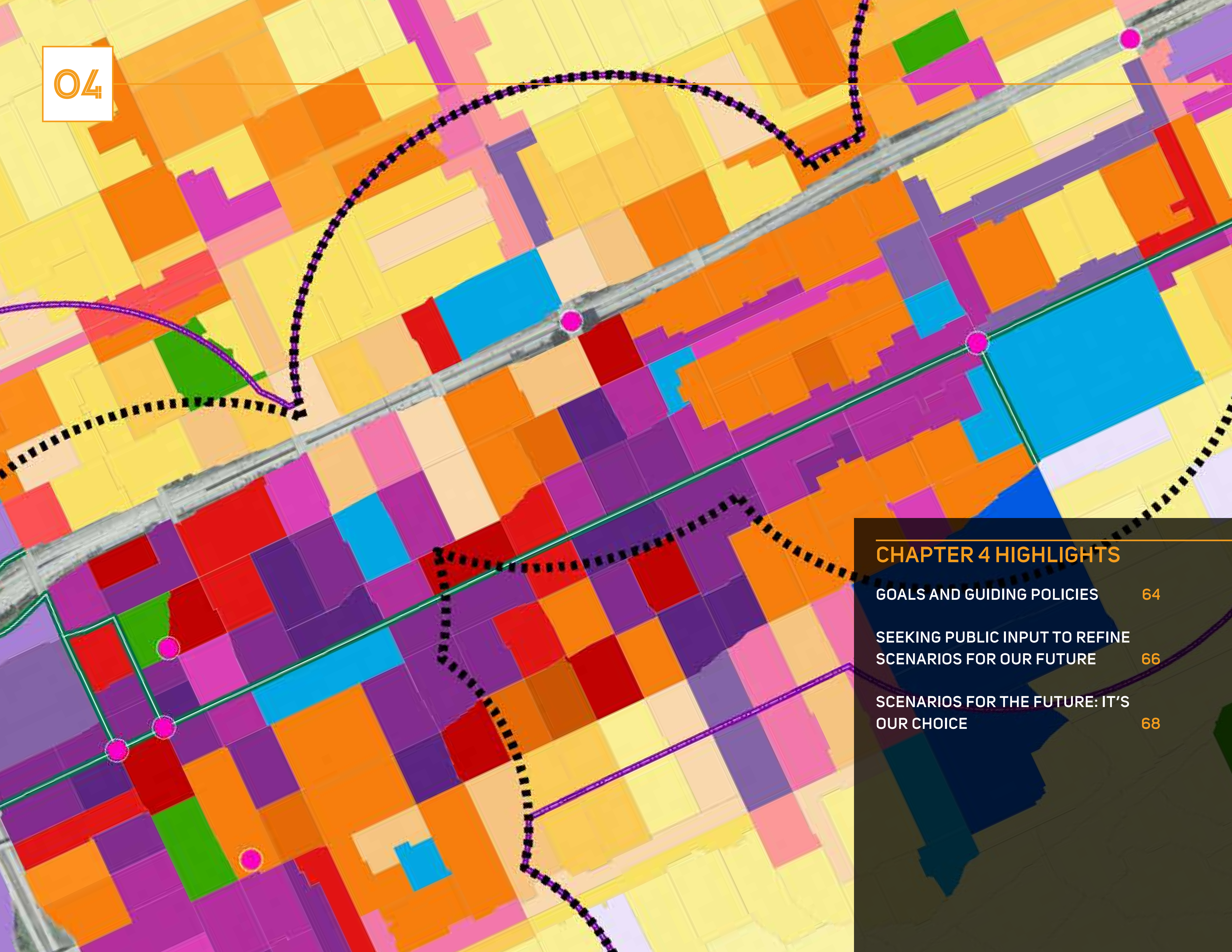
11 California Adaptation Planning Guide: Planning for Adaptive Communities. (2012). California Emergency Management Agency & California Natural Resources Agency. Accessed at http://resources.ca.gov/docs/climate/01APG_Planning_for_Adaptive_Communities.pdf.

12 California Adaptation Planning Guide: Planning for Adaptive Communities. (2012). California Emergency Management Agency & California Natural Resources Agency. Accessed at http://resources.ca.gov/docs/climate/01APG_Planning_for_Adaptive_Communities.pdf.

13 California Adaptation Planning Guide: Planning for Adaptive Communities. (2012). California Emergency Management Agency & California Natural Resources Agency.

CONCLUSION

We will now turn to a discussion of how SCAG developed the 2016 RTP/SCS, with a particular emphasis on the extensive public outreach that SCAG conducted to develop the best Plan possible to address our challenges. The 2016 RTP/SCS, after all, is the region's Plan for the future. By design, it reflects the region's needs, priorities and desires—as well as the statutory requirements of the State of California and the federal government.



04

CHAPTER 4 HIGHLIGHTS

CREATING A PLAN FOR OUR FUTURE

The RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with goals for the environment, the regional economy, social equity and environmental justice, and public health. Ultimately, the Plan is intended to help guide transportation and land use decisions and public investments.

This update, the 2016 RTP/SCS, reflects goals and guiding policies and a vision developed through extensive outreach to the general public and numerous stakeholders across our region. SCAG values the region's tremendous diversity and acknowledges that it cannot tackle challenges in the same way everywhere. This chapter discusses how the Plan was developed, and it offers an overview of SCAG's "preferred scenario" for land use and transportation in our region in 2040. SCAG developed this preferred scenario to guide its update of the 2012 RTP/SCS and then settle on a final set of strategies, programs and projects that will place the region more firmly on the road toward achieving its goals. Those strategies, programs and projects are reviewed in Chapter 5.

GOALS AND GUIDING POLICIES

As SCAG updated the 2012 RTP/SCS, it evaluated its existing goals, guiding policies and performance measures to determine whether they should be refined. Since the adoption of the 2012 RTP/SCS, several developments have occurred that influenced the development of the 2016 RTP/SCS. These include:

- A surface transportation funding and authorization bill known as "Moving Ahead for Progress in the 21st Century Act" (MAP-21) was signed into law by President Obama on July 6, 2012. MAP-21 includes specific goals for safety; improving the condition of transportation infrastructure; reducing congestion and making the transportation system more reliable; freight movement and economic vitality; and environmental sustainability. MAP-21 now requires that Metropolitan Planning Organizations such as SCAG set performance targets for improving transportation safety and system preservation in coordination with state departments of transportation.

  At the time this document was being prepared, the federal rulemaking process to implement MAP–21 was not yet complete. SCAG will continue to monitor rulemaking to understand the implications for the Plan, and take the necessary steps to fully evaluate the final rule. Also, in December 2015, the Fixing America's Surface Transportation Act, or "FAST Act," was signed in to law. The FAST Act is a five-year transportation funding and authorization bill that maintains many of the MAP-21 provisions, but also has new provisions including a national freight program. As with MAP-21, SCAG will monitor the rulemaking process to implement FAST Act provisions.

2016 RTP/SCS GOALS

1. Align the plan investments and policies with improving regional economic development and competitiveness.
2. Maximize mobility and accessibility for all people and goods in the region.
3. Ensure travel safety and reliability for all people and goods in the region.
4. Preserve and ensure a sustainable regional transportation system.
5. Maximize the productivity of our transportation system.
6. Protect the environment and health of our residents by improving air quality and encouraging active transportation (e.g., bicycling and walking).
7. Actively encourage and create incentives for energy efficiency, where possible.
8. Encourage land use and growth patterns that facilitate transit and active transportation.
9. Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies.*

**SCAG does not yet have an agreed-upon security performance measure.*

2016 RTP/SCS GUIDING POLICIES

1. Transportation investments shall be based on SCAG's adopted regional Performance Indicators.
2. Ensuring safety, adequate maintenance and efficiency of operations on the existing multimodal transportation system should be the highest RTP/SCS priorities for any incremental funding in the region.
3. RTP/SCS land use and growth strategies in the RTP/SCS will respect local input and advance smart growth initiatives.
4. Transportation demand management (TDM) and active transportation will be focus areas, subject to Policy 1.
5. HOV gap closures that significantly increase transit and rideshare usage will be supported and encouraged, subject to Policy 1.
6. The RTP/SCS will support investments and strategies to reduce non-recurrent congestion and demand for single occupancy vehicle use, by leveraging advanced technologies.
7. The RTP/SCS will encourage transportation investments that result in cleaner air, a better environment, a more efficient transportation system and sustainable outcomes in the long run.
8. Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan.

- The rapid advancement of new technologies such as real-time traveler information, on-demand shared mobility services enabled by smartphone applications, car sharing and bike sharing is influencing how households travel and their choices about vehicle ownership. New technologies are encouraging more efficient transportation choices, which help public agencies manage the multimodal transportation system more efficiently.
- There is a continuing emphasis on reducing greenhouse gas emissions, even after the adoption of Senate Bill 375. On April 29, 2015, Governor Brown issued Executive Order B-30-15, which establishes a California greenhouse gas reduction target of 40 percent below 1990 levels by 2030. Because the transportation sector is the largest contributor to California's greenhouse gas emissions (more than 36 percent), SCAG anticipates updated and more stringent regional emissions reduction targets.

This Plan's goals are intended to help carry out our vision for improved mobility, a strong economy and sustainability. Based on our assessment of these developments, the goals of the 2016 RTP/SCS, which are represented graphically in this chapter, remain unchanged from those adopted in the 2012 RTP/SCS.

The guiding policies for the 2016 RTP/SCS are intended to help focus future investments on the best-performing projects and strategies to preserve, maintain and optimize the performance of the existing transportation system. Two additional guiding policies have been added since 2012. The first addition (Guiding Policy 6) addresses emerging technologies and the potential for such technologies to lower the number of collisions, improve traveler information, reduce the demand for driving alone and lessen congestion related to road incidents and other non-recurring circumstances (a car collision, for example). The second addition (Guiding Policy 7) recognizes the potential for transportation investments to improve both the efficiency of the transportation network and the environment.

SEEKING PUBLIC INPUT TO REFINE SCENARIOS FOR OUR FUTURE

To develop a preferred scenario for the region at 2040, SCAG first generated four preliminary scenarios for our region's future—each one representing a different vision for land use and transportation in 2040. More specifically, each scenario was designed to explore and convey the impact of where the region would grow, to what extent the growth would be focused within existing cities and towns, and how it would grow—in other words, the shape and style of the neighborhoods and transportation systems that would shape growth over the period. To help the agency refine these four scenarios, SCAG reached out extensively to the general public and numerous stakeholders to seek their views and input. Refining the scenarios was an important step on the road toward settling on a preferred scenario—which offers a comprehensive picture of what kind of future we want. The scenarios and the selected preferred scenario proved to be powerful planning tools to solidify our vision for our region at the middle of the century. These preliminary scenarios are not the ones modeled in the Program Environmental Impact Report (PEIR).

Public outreach was integral to the development of the entire RTP/SCS, but particularly during the refinement of scenarios. To ensure that the 2016 RTP/SCS was developed openly and inclusively, the agency implemented a comprehensive public outreach and involvement program. This was based on a Public Participation Plan adopted by SCAG's Regional Council in April 2014. Specific public engagement strategies used during the development of the Draft 2016 RTP/SCS included:

- Developing materials for public outreach in a variety of formats to reach broad audiences, including a short video, fact sheets, surveys, PowerPoint presentations and poster boards.
- Centralizing RTP/SCS information on a new easy-to-use microsite, developed to be mobile/tablet friendly and compliant with the 1990 Americans with Disabilities Act.
- Supporting multiple committees, task forces and working groups made up of SCAG partners, stakeholders and interested groups to develop the key components of the Plan.
- Holding multiple public open houses before the release of the Draft RTP/SCS, to allow direct and interactive participation with interested parties.

OUR COUNTY TRANSPORTATION COMMISSIONS

The SCAG region includes a total of six county transportation commissions (CTCs), one for each county—Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura. Each CTC is responsible for planning and implementing countywide transportation improvements, allocating locally-generated transportation revenues, state and federal funding, and, in some cases, operating transit services. During each RTP/SCS update, the CTCs provide SCAG with extensive project lists that are then incorporated into the Plan. The projects included on these lists are regarded as regionally significant and/or anticipated to receive (or already receiving) federal and state funds. In addition, the CTCs anticipate that these projects will be initiated or completed by the Plan's horizon year (in this case, 2040). The 2016 RTP/SCS includes more than 4,000 projects—ranging from highway improvements, railroad grade separations, bicycle lanes, new transit hubs and replacement bridges. CTCs are a valuable resource for learning more about projects that are coming to your community by 2040.

ICTC IMPERIAL COUNTY TRANSPORTATION COMMISSION

Metro

OCTA

RCTC Riverside County Transportation Commission

Governments SANBAG Working Together

VCTC Ventura County Transportation Commission

CALIFORNIA TRANSPORTATION PLAN 2040

INTEGRATING CALIFORNIA'S TRANSPORTATION FUTURE

The State of California, with direction from the California Department of Transportation (Caltrans), developed a statewide, long-range transportation plan with a 25-year planning horizon, the California Transportation Plan 2040 (CTP 2040). The Draft CTP 2040 provides a long-range policy framework to meet California's future mobility needs and reduce greenhouse gas emissions. Caltrans is required to develop this plan per Senate Bill 391 (2009). Specifically, emissions must be reduced to 1990 levels from current levels by 2020, and 80 percent below the 1990 levels by 2050 as described by Assembly Bill 32 (2006) and Executive Order S-03-05 (2015). The CTP 2040 will demonstrate how major metropolitan areas, rural areas, and state agencies can coordinate planning efforts to achieve critical statewide goals. Like the CTP 2040, the 2016 RTP/SCS aims to motivate the development of an integrated, multi-modal transportation system that is sustainable, improves mobility and enhances our quality of life. Though the CTP 2040 is not yet finalized (anticipated approval in the next year), it helped inform the goals, policies and strategies included in the 2016 RTP/SCS.

- Announcing the schedule for the open houses through a wide variety of means, including community calendars, distributing flyers at local events and libraries, email newsletters, social media and ethnic media.
- Seeking the assistance of transit agencies, stakeholder organizations and their communication channels to maximize outreach opportunities.
- Reaching out to traditionally underrepresented and/or underserved audiences.
- Evaluating public participation activities to continually improve the outreach process.

The overall Plan was developed with input from local governments, county transportation commissions (CTCs), tribal governments, non-profit organizations, businesses and local stakeholders within Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura counties. Outreach and coordination efforts also included work with providers of public transportation, county transportation commissions, and designated Consolidated Transportation Services Agencies (CTSAs) to ensure consistency with the plans and programs of these agencies, including short and long range plans of Coordinated Public Transit Human Services Transportation Plans. A fuller discussion of these plans can be found on pages 61–65 of the Transit Appendix.

From past plan development cycles, SCAG had heard from many participants about the need for early engagement during the development of the RTP/SCS. For members of the public, SCAG conducted public engagement activities between May and July 2015, with 23 open house events held across six counties. These events helped educate residents on the goals of the Plan, explore topics included in the Plan and gather input on priorities with an electronic survey. Participants reviewed poster boards showing projected changes in population and demographics within their county and the region, and then were asked for their input on how the region could accommodate growth in a variety of areas. These include providing transportation options, improving public health, preserving natural lands and supporting economic opportunities.

During discussion of the scenarios, major components were presented with maps, charts and figures. SCAG presented results associated with each scenario at public open houses held throughout the region to help stakeholders understand regional growth options. Participants learned about:

- The impact that different options for growth would have on transportation, land use, the economy and the environment
- The degree to which growth could be focused within the region's local jurisdictions over the next 25 years
- The potential shape and style of neighborhoods and transportation systems
- How varying combinations of land use and transportation strategies lead to different land consumption, travel, energy, water and pollutant impacts

Specific details on the scenarios can be found in the SCS Background Documentation Appendix.

Recognizing that not all members of the public could attend the open houses, SCAG provided an opportunity to participate virtually by providing workshop materials and a survey online. Hundreds of Southern Californians participated online and gave input on transit accessibility, transportation investments and other topics. A summary report from the survey was presented at a special joint meeting of SCAG's Regional Council and Policy Committees, and this report is also included in the Public Participation & Consultation Appendix.

In addition to these outreach efforts, all regular and special meetings of SCAG's Transportation Committee; Community, Economic and Human Development Committee; Energy and Environment Committee; Legislative/Communications and Membership Committee; Executive Administration Committee; and Regional Council were publicly noticed and opportunities for public comment were provided at each meeting. Federally required interagency consultation was done through the monthly meetings of the Transportation Conformity Working Group. Additional outreach strategies that were implemented are outlined in Public Participation & Consultation Appendix.

SCAG is not an implementing agency, so it is not directly involved in the construction or operation of transportation projects and other infrastructure improvements discussed in this Plan. The significance of the 2016 RTP/SCS is that the vision contained within the Plan sets the tone for policy development by other government agencies throughout the region. The public involvement discussed in this chapter helped the SCAG board and staff members understand the needs and concerns of stakeholders, leading to a more meaningful collective vision for the region's future.

SCENARIOS FOR THE FUTURE: IT'S OUR CHOICE

To refine the scenarios and ultimately develop a preferred scenario, SCAG gathered a large amount of feedback at the public meetings we have discussed. An important part of this process involved conducting comprehensive surveys.

SURVEY PARTICIPATION

Participants at public workshops were asked to complete a 37-question survey to provide input on their priorities, and open-ended feedback was encouraged. The survey was also available for completion on SCAG's website. Survey questions and a summary of responses are included in Public Participation & Consultation Appendix. Between the 2016 RTP/SCS Open Houses and the 2016 RTP/SCS website, more than 650 residents from throughout the SCAG region participated in the survey. About 75 percent of open house attendees participated in the survey, indicating that stakeholders were engaged during the workshops and wanted to participate in a meaningful way. The majority of survey participants resided in Los Angeles County, making up 51 percent of the total, followed by Orange County at 15 percent and Riverside, San Bernardino and Ventura Counties at nine percent each. Five percent of online participants did not state in which county they reside.

SURVEY RESULTS

Expanding transportation choices was clearly a priority for survey participants. Whether it is through public transportation, express lanes, bicycles or personal vehicles, our region wants as wide a range of choices as possible. When asked what our top priority should be for managing our regional highway and road system, the top two responses were almost evenly split. Most respondents wanted to protect and preserve existing transportation infrastructure—supporting a "Fix-it-First" policy—and they wanted to achieve maximum productivity through system management and demand management.

Moreover, the general open-ended comments received suggested there should be less focus on constructing new roads and lanes to build capacity. When asked about transportation budget priorities, survey respondents primarily favored creating more public transportation options, followed closely by constructing bikeways and then improving traffic flow. Regarding transit, feedback received from comment cards was particularly helpful. The most prevalent comments stated a desire for:

- More efficient posting of time schedules
- More accurate system maps
- Better integration of fare systems
- Increasing space for bicycles on public transit
- Creating a comprehensive, efficient and regional-scale bus system
- Exploring opportunities such as double-decker highways that explicitly allow transit operations on one level
- Expanding transit commuter options

Open-ended written comments provided helpful direction in the area of active transportation. Many commenters preferred enhancing non-motorized infrastructure such as bike lanes and sidewalks to improve access to transit and increasing transportation options for all. Suggested strategies included:

- Simultaneously funding road improvements and prioritizing pedestrian infrastructure
- Increasing resources for Complete Streets and protected bike lanes
- Providing public education for motorists, cyclists and pedestrians to help everyone understand how roads are to be shared

Survey participants recognized the connection between public health, active transportation and the environment. When asked about which areas of public health they were most concerned about, air quality was the top health concern among respondents. Having safe areas for walking, biking and physical activity was also a concern, as was access to healthy food.

There is no "one size fits all" type of land use or density in a region as diverse as ours. However, it is fair to say that survey participants generally favored infill development rather than expanding our urban footprint into natural areas or farmland; 80 percent of respondents preferred development in existing areas. For example, when asked where future residential development should mostly occur, the majority of participants said they preferred part mixed-use, part urban areas. Some suburban mixed-use areas were also desired, but strictly urban or suburban areas were least favored. When asked what type of housing should be built to accommodate our region's future population, multifamily attached housing was the leading response. Small-lot detached homes and townhouses were somewhat favored, and large lot detached housing was least favored. About 90 percent of survey participants found protecting natural habitat areas to be important or very important.

Collectively, the survey responses offered an invaluable guide to help finalize the Plan's investments, strategies and priorities. They reflect how regional stakeholders want us to address priority areas such as transit and roadway investments, system management, active transportation, land use and public health.

OUR PREFERRED SCENARIO

The extensive public outreach, coupled with detailed analysis of each scenario and coordination with technical and policy committees, led to our selection of a preferred scenario for the 2016 RTP/SCS based upon SCAG's "Policy Growth Forecast." This preferred scenario also incorporated inputs from local jurisdictions, including the land use and transportation strategies, investments and policies reflected in the 2012 RTP/SCS.

The preferred scenario envisions future regional growth that is well coordinated with the transportation system improvements of the approved 2012 RTP/SCS, as well as anticipated new transportation projects planned by the region's CTCs and transit providers. It also incorporates best practices for increasing transportation choices; reducing our dependence on personal automobiles; allowing future growth in walkable, mixed-use communities and in High-Quality Transit Areas (HQTAs); and further improving air quality.

Regional investments in making transit trips quicker and easier are expanded to increase transit ridership. New land use concepts such as "Livable Corridors" and "Neighborhood Mobility Areas" are also introduced. These are described in more detail later in the Plan. In the preferred scenario for the 2016 RTP/SCS, new residential growth from 2012 to 2040 is split between multifamily housing (66 percent) and detached single-family homes (34 percent). The preferred scenario is the result of an investment plan that is assumed to be financially constrained.

To help our regional partners envision how the preferred scenario fosters development on the ground, SCAG built upon its earlier outreach and solicited feedback from local jurisdictions on the distribution of new households and employment at the neighborhood level, through 2040. During the review of the draft policy growth forecast in summer 2015, jurisdictions were asked to provide input on the growth scenario, including information on specific planned development projects with entitlements, other planned projects, or recently completed developments. Accordingly, the following core principles provided the framework for the preferred scenario:

- **Principle #1:** The preferred scenario will be adopted at the jurisdictional level, thus directly reflecting the population, household and employment growth projections derived from the local input process and previously reviewed and approved by local jurisdictions. The preferred scenario maintains these projected jurisdictional growth totals, meaning future growth is not reallocated from one local jurisdiction to another.
- **Principle #2:** The preferred scenario at the Transportation Analysis Zone (TAZ) level is controlled to be within the density ranges* of local general plans or input received from local jurisdictions.
- **Principle #3:** For the purpose of determining consistency for California Environmental Quality Act (CEQA), lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency with the 2016 RTP/SCS.
- **Principle #4:** TAZ level data or any data at a geography smaller than the jurisdictional level has been utilized to conduct required modeling analyses and is therefore advisory only and non-binding given that sub-jurisdictional forecasts are not adopted as part of the 2016 RTP/SCS. TAZ level data may be used by jurisdictions in local planning as it deems appropriate. There is no obligation by a jurisdiction to change its land use policies, General Plan, or regulations to be consistent with the 2016 RTP/SCS.
- **Principle #5:** SCAG will maintain communication with agencies that use SCAG sub-jurisdictional level data to ensure that the "advisory and non-binding" nature of the data is appropriately maintained.

Consistent with the above stated principles, the preferred scenario and corresponding forecast of population, household and employment growth is adopted at the jurisdictional level as part of the 2016 RTP/SCS and sub-jurisdictional level data and/or maps associated with the 2016 RTP/SCS is advisory only. For purposes of qualifying for future funding opportunities and/or other incentive programs, sub-jurisdictional data and/or maps used to determine consistency with the Sustainable Communities Strategy shall only be used at the discretion and with the approval of the local jurisdiction. However, this does not otherwise limit the use of the sub-jurisdictional data and/or maps by SCAG, CTCs, Councils of Governments, SCAG Subregions, Caltrans and other public agencies for transportation modeling and planning purposes. Any other use of the sub-jurisdictional data and/or maps not specified herein, shall require agreement from the Regional Council, respective policy committees and local jurisdictions.

The preferred scenario improves the reduction of greenhouse gas emissions in the region and enhances public health and other co-benefits from large transportation investments and improvements in technology—particularly those that focus on transit and first/last mile strategies.

Furthermore, the preferred scenario offers a vision for how we want our region to grow over the next quarter century and it gives us a clear-eyed view of what we want to achieve. Guided by goals and policies, built through analysis and refined with extensive public input, developing the preferred scenario set the stage for the hard work of building a comprehensive plan of land use and transportation strategies, programs and projects designed to confront our many challenges and move our region toward the vision embodied in the preferred scenario.

**With the exception of the six percent of TAZs that have average density below the density range of local general plans. The TAZs showing lower densities than GP designations are consistent with existing conditions and future land use and growth projections provided by local jurisdictions. SCAG did not lower the growth.*

Chapter 5 reviews those strategies, programs and projects that collectively will move the region toward realizing the outcomes seen in the preferred scenario—including more livable, healthy and economically strong communities and a more sustainable future.

05

CHAPTER 5 HIGHLIGHTS

THE ROAD TO GREATER MOBILITY & SUSTAINABLE GROWTH

At the beginning of Chapter 1, we reviewed several themes that resonate throughout the 2016 RTP/SCS. The first of these was: "Integrating strategies for land use and transportation." This is SCAG's overarching strategy for achieving its goals of regional economic development, maximized mobility and accessibility for all people and goods in our region, safe and reliable travel, a sustainable regional transportation system, a protected natural environment, health for our residents, and more.

INTEGRATING TRANSPORTATION AND LAND USE PLANNING: THE KEY TO ACHIEVING OUR GOALS

By integrating our strategies for transportation with our strategies for using land—in other words, considering in tandem how we grow and how we get around—we can build the communities that we want. Planning that does not strive for this close integration can result in sprawling suburbs connected haphazardly to poorly managed highways and isolated communities that lack easy access to public transportation connecting people from home to work, school and other destinations. Precious resources are squandered: time, energy, money, productivity, clean air and good health, among others.

As the region's transportation planning agency, SCAG has long promoted the concept of integrating transportation planning and land use planning. Since 2002, with the Southern California Compass and Shared Growth Vision for the region and the subsequent Compass Blueprint program (now the Sustainability Planning Grant Program), SCAG has promoted integrated planning tools for local governments that want their residents to have more mobility options, make their communities more livable, increase prosperity among all people and strive for sustainability. Subsequent policies adopted at the regional level in 2004, 2008 and 2012 have supported and advanced the integration of transportation and land use planning.

With the passage of Senate Bill 375 in 2008, the State of California formalized the idea of integrating planning statewide when the California Air Resources Board (ARB) set regional targets for reducing greenhouse gas emissions and required every Metropolitan Planning Organization (MPO) in the state to develop an SCS that charted a course toward reduced emissions and a more sustainable future. A central tenet of the SCS requirement is for MPOs to integrate land use and transportation planning.

Here is one example: High Quality Transit Areas (HQTAs) are places where people live in compact communities and have ready access to a multitude of safe and convenient transportation alternatives to driving alone—including walking and biking, taking the bus, light rail, commuter rail, the subway and/or shared mobility options. Along high quality bus corridors, for instance, a bus arrives at least every 15 minutes. Residential and commercial development is integrated with plans for transit, active transportation and other alternatives to driving alone.

The integrated strategies, programs and projects reviewed in this chapter are designed to improve a region with very specific changes underway: Over the next 25 years, our region's population is projected to grow by more than 20 percent, from about 18 million people to more than 22 million people. Diverse households will reside in all types of communities, including urban centers, cities, towns, suburban neighborhoods and rural areas. Much of the region will continue to be populated by households living in detached single-family dwellings located in lower-density suburban areas. However, 67 percent of new residences will be higher density multifamily housing, built as infill development within HQTAs. Households will demand more direct and easier access to jobs, schools, shopping, healthcare and entertainment, especially as Millennials mature and seniors grow in number. Concurrently, our Southern California region will remain a vital gateway for goods and services, an international center for innovation in numerous industries and a place that offers its residents a high standard of living. We know that our future growth will add new pressures to our transportation system and to our communities. However, through long-term planning that integrates strategies for transportation and land use, we can ensure that our region grows in ways that enhance our mobility, sustainability and quality of life.

OUR STRATEGIES FOR TRANSPORTATION AND LAND USE

In the discussion that follows, transportation and land use strategies are grouped separately, but it will nevertheless become clear how closely they are related to one another. The section that follows is the heart of the 2016 RTP/SCS, and by the end of the chapter our region's course toward a more mobile and sustainable future should be evident.

Serving as an MPO, Regional Transportation Planning Agency and Council of Governments, SCAG has an essential responsibility to develop an RTP/SCS that is dedicated to detailing recommended regional transportation investments and strategies. The agency has developed these transportation strategies in the context of how we are projected to grow and live as a region in coming decades. In this chapter we will first review regional strategies for growth and land use and then move into a comprehensive review of the agency's plans for the region's multi-faceted transportation system.

LAND USE STRATEGIES

The land use strategies included in this Plan are built on a foundation of contributions from communities, cities, counties and other local agencies across our region. The land use patterns reviewed here, for example, are based on local general plans as well as input from local governments. For this Plan update, SCAG was committed to preserving the growth forecasts provided by local jurisdictions at the jurisdictional level.

At the same time, Senate Bill 375 requires that SCAG, as the region's MPO, strive to develop a vision of regional development patterns that integrate with and support planned transportation investments. As part of that mandate, an overall land use pattern has been developed that respects local control, but also incorporates best practices for achieving state-mandated reductions in greenhouse gas emissions through decreases in per capita vehicle miles traveled (VMT) regionally.

2016 RTP/SCS LAND USE POLICIES

The 2016 RTP/SCS reaffirms the 2008 Advisory Land Use Policies that were incorporated into the 2012 RTP/SCS. These foundational policies, which have guided the development of this Plan's strategies for land use, are:

- Identify regional strategic areas for infill and investment
- Structure the plan on a three-tiered system of centers development[1]
- Develop "Complete Communities"
- Develop nodes on a corridor
- Plan for additional housing and jobs near transit
- Plan for changing demand in types of housing
- Continue to protect stable, existing single-family areas
- Ensure adequate access to open space and preservation of habitat
- Incorporate local input and feedback on future growth.

2016 RTP/SCS LAND USE STRATEGIES

For this Plan, land use strategies are described in this section.

Reflect The Changing Population And Demands

The SCAG region, home to about 18.3 million people in 2012, currently features 5.9 million households and 7.4 million jobs. By 2040, the Plan projects that these figures will increase by 3.8 million people, with nearly 1.5 million more homes and 2.4 million more jobs. HQTAs will account for three percent of regional total land, but will accommodate 46 percent and 55 percent of future household and employment growth respectively between 2012 and 2040. The 2016 RTP/SCS land use pattern contains sufficient residential capacity to accommodate the region's future growth, including the eight-year regional housing need, as shown in TABLE 5.1. The land use pattern accommodates about 530,000 additional households in the SCAG region by 2020 and 1.5 million more households by 2040. The land use pattern also encourages improvement in the jobs-housing balance by accommodating 1.1 million more jobs by 2020 and about 2.4 million more jobs by 2040.

This 2016 RTP/SCS reflects a continuation of the shift in demographics and household demand since 2012. This shift is apparent in the land use development pattern, which assumes a significant increase in small-lot, single-family and multifamily housing that will mostly occur in infill locations near bus corridors and other transit infrastructure. In some cases, the land use pattern assumes that more of these housing types will be built than currently anticipated in local General Plans. This shift in housing type—especially the switch from large-lot to small-lot single-family homes—is already occurring as developers respond to new demands. In 2008, 45 percent of all housing units were multifamily homes. From 2012 through 2040, the Plan projects that 66 percent of the 1.5 million new homes expected to be built in the SCAG region will be multifamily units, reflecting demographic shifts and anticipated market demand. This will result in an increase of multifamily units in the region to 49 percent of all housing units in the region.

Combating Gentrification and Displacement

The 2012 RTP/SCS discussed strategies to combat gentrification and displacement, a continuing challenge that we discussed in Chapter 3. Jurisdictions in the SCAG region should continue to be sensitive to the possibility of gentrification and work to employ strategies to mitigate its potential negative community impacts. Generally, the SCAG region will benefit from higher-density infill development, which means that neighborhoods will be adding to the local housing stock rather than maintaining the current stock and simply changing the residential population. In addition, local jurisdictions are encouraged to pursue the production of permanent affordable housing through deed restrictions or development by non-profit developers, which will ensure that some units will remain affordable to lower-income households. SCAG will

[1] Complete language: "Identify strategic centers based on a three-tiered system of existing, planned and potential relative to transportation infrastructure. This strategy more effectively integrates land use planning and transportation investment." A more detailed description of these strategies and policies can be found on pps. 90–92 of the SCAG 2008 Regional Transportation Plan, adopted in May 2008.

work with local jurisdictions and community stakeholders to seek resources and provide assistance to address possible gentrification impacts of new development on existing communities and vulnerable populations.

Focus New Growth Around Transit

The 2016 RTP/SCS overall land use pattern reinforces the trend of focusing new housing and employment in the region's HQTAs (see EXHIBIT 5.1). While maintaining jurisdictional totals, the overall land use pattern moves new development from areas outside of HQTAs into these areas. SCAG incorporated land use plans provided by local jurisdictions into this pattern. While many residents and employees within half a mile of a transit stop or corridor can walk or bike to transit, not all of these areas are targeted for new growth and/or land use changes. The 2016 RTP/SCS assumes that 46 percent of new housing and 55 percent of new employment locations developed between 2012 and 2040 will be located within HQTAs, which comprise only three percent of the total land area in the SCAG region. Since adoption of the 2012 RTP/SCS, jurisdictions have referenced HQTAs in their planning documents and have positioned themselves to compete for California's Cap-and-Trade auction proceeds to support Transit Oriented Development (TOD) and active transportation infrastructure.

HQTAs are a cornerstone of land use planning best practice in the SCAG region because they concentrate roadway repair investments, leverage transit and active transportation investments, reduce regional life cycle infrastructure costs, improve accessibility, avoid greenfield development, create local jobs, and have the potential to improve public health and housing affordability. Here, households have expanded transportation choices with ready access to a multitude of safe and convenient transportation alternatives to driving alone—including walking and biking, taking the bus, light rail, commuter rail, the subway and/or shared mobility options. Households have more direct and easier access to jobs, schools, shopping, healthcare and entertainment, especially as Millennials form households and the senior population increases. Moreover, focusing future growth in HQTAs can provide expanded housing choices that nimbly respond to trends and market demands, encourage adaptive reuse of existing structures, revitalize main streets and increase Complete Street investments.

Additional local policies that ensure that development in HQTAs achieve the intended reductions in VMT and greenhouse gas emissions include:

TABLE 5.1 REGIONAL HOUSING NEEDS ASSESSMENT, ADOPTED 2012

Projection period 2014–2021

COUNTY	NUMBER OF VERY LOW INCOME HOUSEHOLDS	NUMBER OF LOW INCOME HOUSEHOLDS	NUMBER OF MODERATE INCOME HOUSEHOLDS	NUMBER OF ABOVE MODERATE INCOME HOUSEHOLDS	TOTAL
Imperial	4,194	2,553	2,546	7,258	16,551
Los Angeles	45,672	27,469	30,043	76,697	179,881
Orange	8,734	6,246	6,971	16,015	37,966
Riverside	24,117	16,319	18,459	42,479	101,374
San Bernardino	13,399	9,265	10,490	24,053	57,207
Ventura	4,516	3,095	3,544	8,003	19,158
SCAG	100,632	64,947	72,053	174,505	412,137

EXHIBIT 5.1 HIGH QUALITY TRANSIT AREAS IN THE SCAG REGION FOR 2040 PLAN

High Quality Transit Areas (including rail stations and qualifying bus corridors, see glossary for definition)

2012 Base Year

2040 Plan (Note: 2040 Plan Rail Station Alternatives shown as ⊙)

(Source: SCAG)

- Affordable housing requirements
- Reduced parking requirements
- Adaptive reuse of existing structures
- Density bonuses tied to family housing units such as three- and four-bedroom units
- Mixed-use development standards that include local serving retail
- Increased Complete Streets investments around HQTAs. Complete Streets are streets designed, funded and operated to enable safe access for roadway users of all ages and abilities, including pedestrians, bicyclists, motorists and transit riders.

The State of California is also trying to encourage growth around transit with the passage of Senate Bill 743 (SB 743), which seeks to facilitate transit-oriented projects in existing urbanized areas. The bill creates a new exemption from CEQA for certain projects that are residential or employment centers or mixed-used projects located within a Transit Priority Area (TPA), a part of a specific plan with a certified EIR and consistent with the SCS or APS.

Transit Oriented Development, HQTAs and Local Air Quality Impacts

The 2016 RTP/SCS recognizes guidance from the 2005 ARB air quality manual, which recommends limiting the siting of sensitive uses within 500 feet of highways and urban roads carrying more than 100,000 vehicles per day. This ARB guidance is carefully applied in areas that support Transit Oriented Development. Less than 10 percent of HQTAs planned in the 2016 RTP/SCS would fall within 500 feet of highways and highly traveled corridors, according to geographic information system (GIS) analyses. While density is increased in some areas of HQTAs, growth remains constant in areas within 500 feet of highways and urban roads to reflect local input, thereby balancing the growth distribution.

Plan for Growth Around Livable Corridors

The Livable Corridors strategy seeks to revitalize commercial strips through integrated transportation and land use planning that results in increased economic activity and improved mobility options. Since 2006, SCAG has provided technical assistance for 19 planning efforts along arterial roadway corridors. These corridor planning studies focused on providing a better understanding of how corridors function along their entire length. Subsequent research has distinguished the retail density and the specific kinds of retail needed to make these neighborhood nodes destinations for walking and biking.

From a land use perspective, Livable Corridors strategies include a special emphasis on fostering collaboration between neighboring jurisdictions to encourage better planning for various land uses, corridor branding, roadway improvements and focusing retail into attractive nodes along a corridor.

Livable Corridors Network

SCAG identified 2,980 miles of Livable Corridors along arterial roadways discussed in corridor planning studies funded through the Sustainability Planning Grant program and along enhanced bus transit corridors identified by regional partners. However, the land use strategies proposed in the 2016 RTP/SCS are not tied to a specific corridor. Livable Corridors are predominately a subset of the HQTAs, however 154 miles are not designated as HQTAs. These miles were identified in Sustainability Planning Grant projects and are proposed for active transportation improvements and the land use planning strategies described below.

Livable Corridors Strategies

The Livable Corridors concept combines three different components into a single planning concept to model the VMT and greenhouse gas emission reduction benefits:

- **Transit improvements:** The associated county transportation commissions (CTCs) have identified some of these corridors for on-street, dedicated lane Bus Rapid Transit (BRT) or semi-dedicated BRT-light. The remaining corridors have the potential to support other features that improve bus performance. These other features include enhanced bus shelters, real-time travel information, off-bus ticketing, all door boarding and longer distances between stops to improve speed and reliability.
- **Active transportation improvements:** Livable Corridors should include increased investments in Complete Streets to make these corridors and the intersecting arterials safe for biking and walking.
- **Land use policies:** Livable Corridor strategies include the development of mixed-use retail centers at key nodes along the corridors, increasing neighborhood-oriented retail at more intersections and zoning that allows for the replacement of under-performing auto-oriented strip retail between nodes with higher density residential and employment. These strategies will allow more context sensitive density, improve retail performance, combat blight and improve fiscal outcomes for local communities.

Provide More Options For Short Trips

Thirty-eight percent of all trips in the SCAG region are less than three miles. The 2016 RTP/SCS includes land use strategies, Complete Streets integration and a set of state and local policies to encourage the use of alternative modes of transportation for short trips in new and existing Neighborhood Mobility Areas (NMAs) and Complete Communities. In addition to the active transportation strategies that will be discussed below, land use strategies include pursuing local policies that encourage replacing motor vehicle use with Neighborhood Electric Vehicle (NEV) use. NEVs are a federally designated class of passenger vehicle rated for use on roads with posted speed limits of 35 miles per hour or less.

Neighborhood Mobility Areas

NMAs have a high intersection density, low to moderate traffic speeds and robust residential retail connections. These areas are suburban in nature, but can support slightly higher density in targeted locations. The land use strategies include shifting retail growth from large centralized retail strip malls to smaller distributed centers throughout an NMA. This strategy has shown to improve the use of active transportation or NEVs for short trips. Steps needed to support NEV use include providing state and regional incentives for purchases, local planning for charging stations, designating a local network of low speed roadways and adopting local regulations that allow smaller NEV parking stalls. NMAs are applicable in a wide range of settings in the SCAG region. The strategies associated with this concept are intended to provide sustainable transportation options for residents of the region who do not have convenient access to high-frequency transit options.

Complete Communities

Development of "complete communities" can provide households with a range of mobility options to complete short trips. The 2016 RTP/SCS supports the creation of these mixed-use districts through a concentration of activities with housing, employment, and a mix of retail and services, located in close proximity to each other. Focusing a mix of land uses in strategic growth areas creates complete communities wherein most daily needs can be met within a short distance of home, providing residents with the opportunity to patronize their local area and run daily errands by walking or cycling rather than traveling by automobile.

Support Local Sustainability Planning

To implement the SCS, SCAG supports local planning practices that help lead to a reduction of greenhouse gas emissions. Many local governments in the SCAG region serve as models for implementing the SCS. Sustainable Planning & Design, Zoning Codes and Climate Action Plans are three methods that local agencies have been adopting and implementing to help meet the regional targets for greenhouse gas emission reductions outlined in the SCS.

Sustainable Planning & Design

Many of the local policy documents that SCAG has reviewed are based on best practices that encourage infill and mixed-use development. Mixed-use design guidelines embrace and encourage increased densities and a mixing of uses, while also reflecting community character. For example, numerous suburban specific plans in the SCAG region encourage the revitalization of traditional main streets, downtowns and corridors. Other plans provide guidance for converting single-use office parks and industrial districts into mixed employment, retail and residential districts.

Sustainable Zoning Codes

Many cities and counties in the SCAG region have adopted form-based zoning codes that are tailored to local conditions, such as specifying building size and design parameters but allowing for more flexibility regarding use. Moreover, several cities and counties are updating their zoning codes to make development standards more environmentally friendly and equitable. One example is the City of San Gabriel's "Greening the Code" strategy, which identifies ways for the city's existing development code to facilitate more sustainability. New policies can involve coordinating landscaping practices with water conservation, best management practices for stormwater management and capture, creating better pedestrian connectivity, allowing more flexibility for mixed-use development and promoting energy efficient designs.

Climate Action Plans

SCAG is supporting several local governments throughout the region in the formation of Climate Action Plans (CAP). CAPs outline strategies for reducing greenhouse gas emissions in a cost effective manner. This is done by creating greenhouse gas inventories so that local governments can efficiently target their emission reduction practices to sources that pollute the most. Strategies outlined by CAPs in the SCAG region include Green Building guidelines for municipal buildings and facilities, implementing public electric vehicle charging stations and establishing energy retrofit incentive programs for residents.

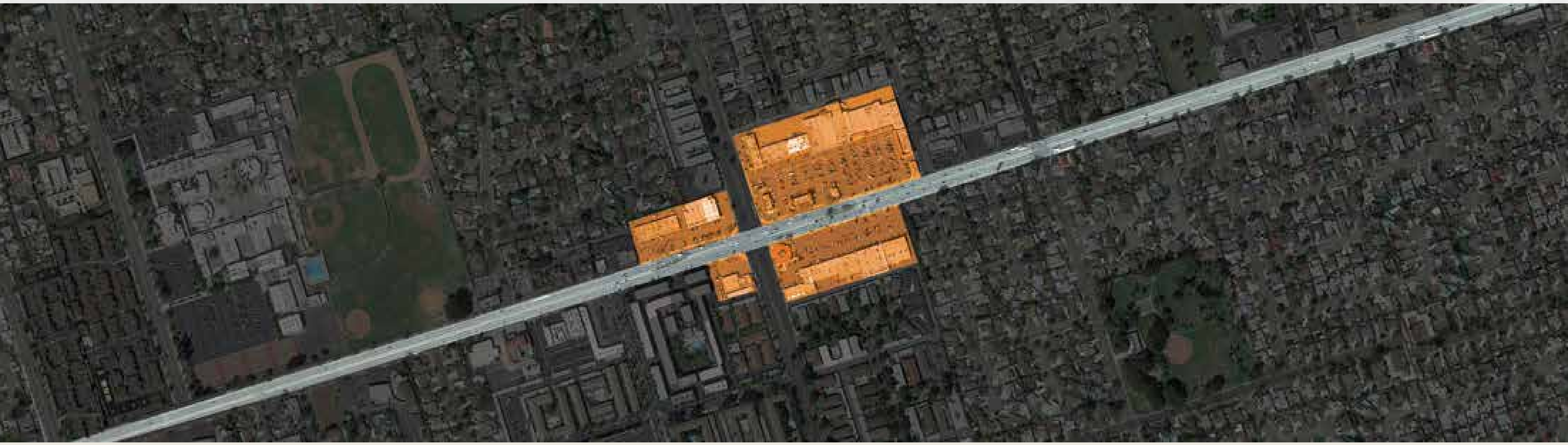
LIVABLE CORRIDORS

Enhancing the Connection Between Transit and Land Use

The SCAG region is crisscrossed by long arterial corridors, many of which are a legacy of Spanish colonial routes that linked the early missions and post-colonial ranchos. The suburban communities that developed rapidly after World War II were formed between these corridors, on a large (often one square mile) grid system. The inland portions of the South Bay, the Gateway Cities, the San Fernando and San Gabriel valleys, as well as the northern portions of Orange County follow this pattern. SCAG's Livable Corridors Strategy considers these suburban development patterns and proposes to encourage development along the boulevards that not only serve as major travel routes, but also destinations.

As the region transitions to higher investments in infill development and high quality, high frequency transit, these arterials are well suited to connect the region. The Livable Corridor Strategy specifically advises local jurisdictions to plan and zone for increased density at key nodes along the corridor and replacement of single-story under-performing strip retail with well-designed higher density housing and employment centers. This development along key corridors, when coordinated with improvements to the frequency and speed of buses along the corridors, will make transit a more convenient and viable option. Additionally, enhanced roadway designs to accommodate active transportation will also increase the vibrancy along these boulevards.

Several important transit investments in the SCAG region will help encourage this land use strategy. The Santa Ana Harbor Blvd Specific Plan incorporates the improved Orange County Transportation Authority (OCTA) Bravo! Route 543 and the planned OC Streetcar into its vision of the future. In Rancho Cucamonga, the City received a SCAG grant to reconcile the various specific plans along Foothill Blvd in anticipation of a future extension of the Omnitrans SbX. Across Los Angeles County, the Los Angeles County Metropolitan Transportation Authority (Metro) is planning for a high frequency network of buses with fewer stops. And the City of Los Angeles incorporated a "Transit Enhanced Network" as part of its General Plan Mobility Element to complement these investments.



Example of a Livable Corridor

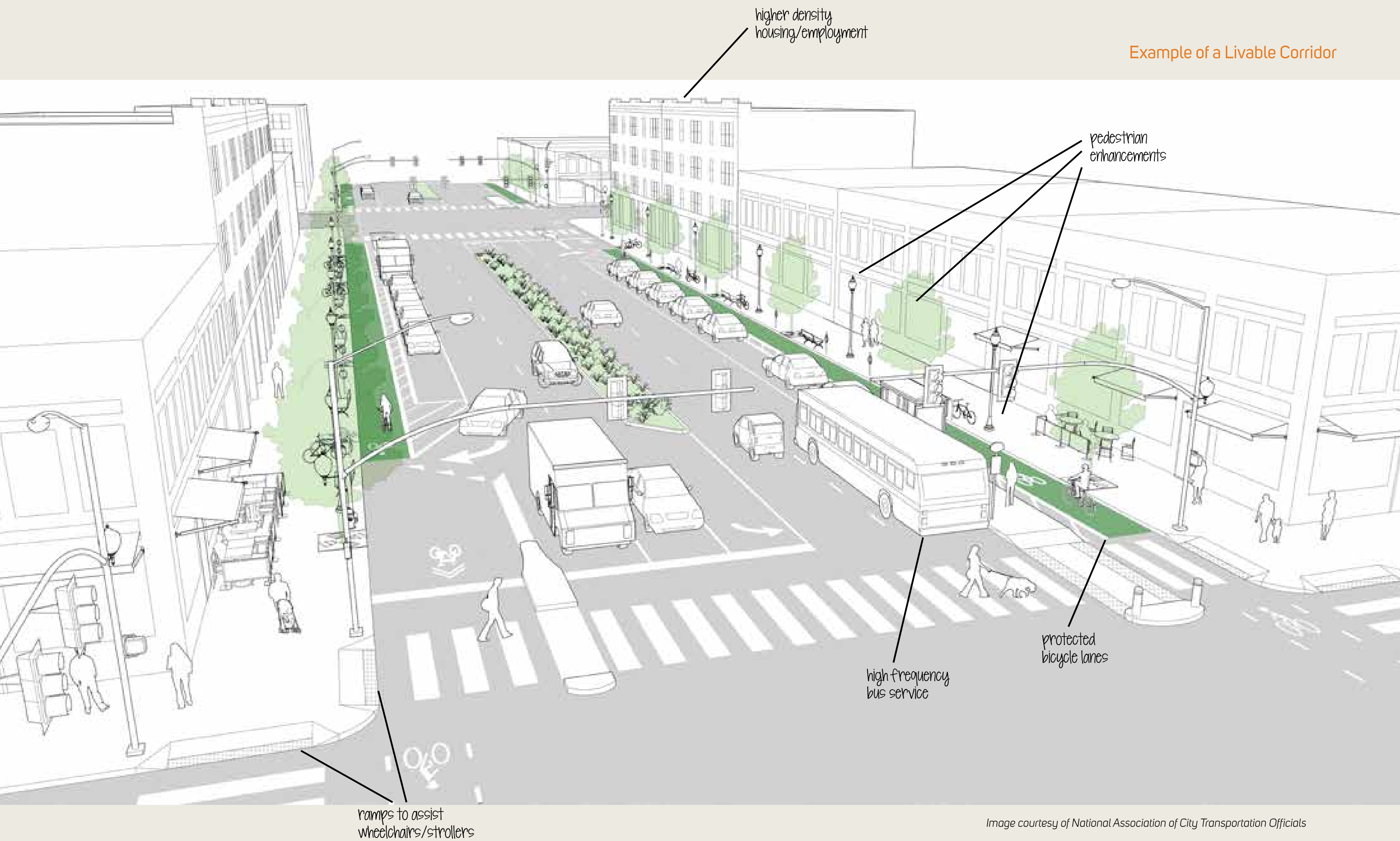


Image courtesy of National Association of City Transportation Officials

2016 RTP/SCS Strategy

NEIGHBORHOOD MOBILITY AREAS

Encouraging Active Transportation for Short Trips

About 38 percent of all trips in the region are three miles or less. That is a short enough distance that can be covered by walking or biking, but more than 78 percent of these trips are made by driving. While convenient, driving for short trips can cause unnecessary congestion and pollution. What can be done to make it more convenient for people to walk, bike or even skate instead of driving, when practical?

The Neighborhood Mobility Areas strategy represents a set of state and local policies to encourage the use of active and other non-automobile modes of transportation, particularly for short trips in many suburban areas in Southern California developed between the late 1890s and the early 1960s. These suburban developments often were designed for streetcars and walking, in addition to automobiles and are characterized by small to medium lot single-family homes, a denser grid network of local roads, a higher density of intersections and accessibility to neighborhood retail establishments. By employing Complete Streets strategies, such as bike lanes, roundabouts, wider sidewalks or better lighting, the neighborhood design could encourage a return to greater active transportation use for those short trips. Similarly, planning a connected network of dedicated lanes and roadways with speed limits 35 mph and under can encourage more use of Neighborhood Electric Vehicles (NEV) for short trips. NEVs produce negligible greenhouse gas missions (based on energy production) and zero local pollution. In addition, NEVs take up less roadway capacity, less parking area at both the origin and destination and reduce the probability of an injury or fatality in the event of a collision with a pedestrian or bicyclist.

The Neighborhood Mobility Area concept is not new. Across the country, they are referred to as streetcar suburbs, first generation suburbs or suburban villages. But its application here in Southern California, when coupled with the renaissance some parts of the region are experiencing with transit and active transportation, would provide residents with greater mobility choices and an alternative to driving short distances.

Example of a Neighborhood Mobility Area

Image courtesy of National Association of City Transportation Officials

Protect Natural and Farm Lands

Many natural and agricultural land areas near the edge of existing urbanized areas do not have plans for conservation and they are susceptible to the pressures of development. Many of these lands, such as riparian areas, have high per-acre habitat values and are host to some of the most diverse yet vulnerable species that play an important role in the overall ecosystem.

Developing Conservation Strategies

Local land use decisions play a pivotal role in the fate of some of the region's most valuable habitat and farm lands. Many local governments have taken steps toward planning comprehensively for conserving natural lands and farm lands, while also meeting demands for growth. Across the region, transportation agencies and local governments have used habitat conservation plans and other tools to link land use decisions with comprehensive conservation plans in order to streamline development.

To support those and other comprehensive conservation planning efforts and to inform the local land use decision making process, SCAG studied regional scale habitat values, developed a conservation framework and assembled a natural resource database.[2] To coordinate with and support the viability of the Livable Corridors and HQTA land use strategies, this Plan suggests redirecting growth away from high value habitat areas to existing urbanized areas.

SCAG is engaging numerous stakeholders as it creates a Natural Lands Conservation Plan. Building on this effort may lead to a regional conservation program that CTCs, jurisdictions, agencies and non-profits can align with and support. This strategic and comprehensive approach allows the region to meet its housing and transportation needs, while ensuring that important natural lands, farm lands and water resources are protected. The 2012 RTP/SCS committed to a regional mitigation plan for inclusion in the 2016 RTP/SCS. With that as the foundation, the following are next steps for further developing a conservation strategy. More information can be found in the Natural & Farm Lands Appendix.

- Expanding upon the Open Space Conservation Database and Framework by incorporating strategic mapping layers to build the database and further refine the priority conservation areas
- Encouraging CTCs to develop advanced mitigation programs and/or include them in future transportation measures

2 SCAG 2014 Inventory of Natural Resources Databases in SCAG region. Accessed at http://sustain.scag.ca.gov/Sustainability%20Portal%20Document%20Library/SCAG%20Inventory%20Natural%20Resources%20GIS%20Databases.pdf.

- Aligning with funding opportunities and pilot programs to begin implementation of the Natural Lands Conservation Plan through acquisition and restoration
- Providing incentives to jurisdictions that cooperate across county lines to protect and restore natural habitat corridors, especially where corridors cross county boundaries.

TRANSPORTATION STRATEGIES

The strategies for land use are tightly integrated with considerations for transportation, and that relationship is vital for our region to achieve its long-term regional goals. The same applies to our discussion of transportation strategies. The success of strategies related to transportation can only be achieved if they are tied closely to how we use land—how and where we grow, where we live, work, go to school, shop and so on. SCAG is pursuing numerous strategies divided into two broad categories: Maximizing Our Current System and Completing Our System. In all, the 2016 RTP/SCS includes $556.5 billion in transportation system investments through 2040.

MAXIMIZING OUR CURRENT SYSTEM

Working to make sure our existing transportation system is operating at maximum efficiency is a leading regional priority—and doing this is critical for the land use strategies discussed above to be effective. Over the past half century, the SCAG region has invested hundreds of billions of dollars into building and expanding the multimodal transportation system that we rely on today. Our investments must be protected and properly maintained to ensure that maximum productivity and efficiency are gained from the system. Under the system management approach, priority is given to maintaining and preserving the system, as well as ensuring that it is being operated as safely, efficiently and effectively as possible. This approach is illustrated in the system management pyramid (FIGURE 5.1). Protecting our previous investments and getting the most out of every component is the highest priority for our region.

Preserve Our Existing System

Southern California's transportation system is becoming increasingly compromised by decades of underinvestment in maintaining and preserving our infrastructure. These investments have not kept pace with the demands placed on the system and the quality of many of our roads, highways, bridges, transit, and bicycle and pedestrian facilities are continuing to deteriorate. Unfortunately, the longer they deteriorate the more expensive they will be to fix in the future. Even worse, deficient conditions compromise the safety of users throughout the network. For all of these reasons, system preservation and achieving a state of good repair are top priorities of the 2016 RTP/SCS.

About $275.5 billion, or nearly half of all of the 2016 RTP/SCS proposed expenditures through 2040, is allocated to system preservation and operation (see FIGURE 5.2). Chapter 6 reflects the allocation of these expenditures for the transit and passenger rail systems, the State Highway System, and regionally significant local streets and roads within the 2016 RTP/SCS. Note that the allocation for the State Highway System includes bridges; the allocation for transit includes funding to both preserve and operate the transit system; and the allocation for regionally significant local streets and roads includes bridges and active transportation safety improvements. The 2016 RTP/SCS system preservation strategies include:

- Protecting and preserving what we have first, supporting a "Fix-it-First" principle.
- Considering life-cycle costs beyond construction.
- Continuing to work with stakeholders to identify and support new sustainable funding sources and/or increased funding levels for preservation and maintenance.

Manage Congestion

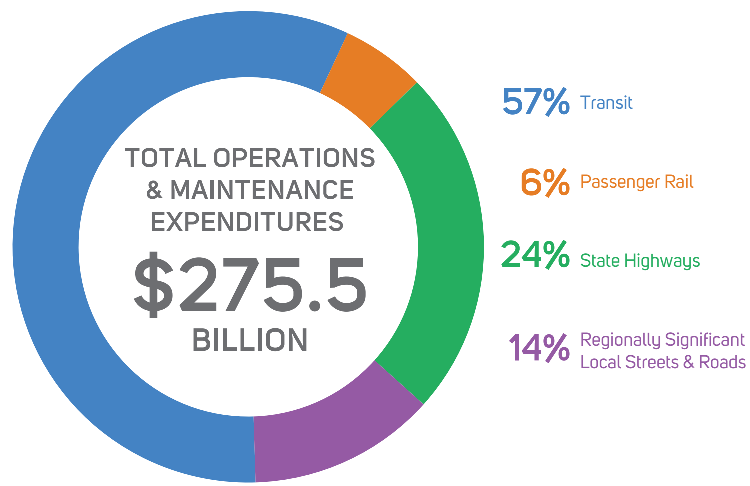
Congestion Management Process (CMP)

Federal regulations for Metropolitan Transportation Planning and Programming require the development, establishment and implementation of a CMP that is fully integrated into the regional planning process.[3] The Federal Highway Administration (FHWA) defines the CMP as a "systematic approach . . . that provides for effective management and operation, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under title 23 U.S.C. and title 49 U.S.C., through the use of operational management strategies." In compliance

[3] 23 CFR 450.320.

FIGURE 5.1 SYSTEM MANAGEMENT PYRAMID

FIGURE 5.2 PRESERVATION AND OPERATIONS EXPENDITURES



Note: Numbers may not sum to total due to rounding.

with federal law,[4] SCAG has made the CMP an integral part of the regional transportation planning process, including the 2016 RTP/SCS and the Federal Transportation Improvement Program (FTIP). The CMP is part of SCAG's integrated approach to improving and optimizing the transportation system, to provide for the safe and effective management of the regional transportation system through the use of monitoring and maintenance, demand reduction, land use, operational management strategies and strategic capacity enhancements. SCAG undertakes eight actions that are considered by FHWA to be the core of the CMP. These include developing regional objectives for congestion management; using performance measures and monitoring to understand the causes of congestion; identifying problems and needs; developing alternative strategies; and evaluating effectiveness. A more complete discussion of SCAG's CMP is provided in the Congestion Management Appendix.

The CMP requires that roadway projects that significantly increase the capacity for single-occupancy vehicles (SOVs) be addressed through a CMP that provides appropriate analysis of reasonable, multimodal travel demand reduction and operational management strategies for the corridor. If alternative strategies are neither practical nor feasible, appropriate management strategies must be considered in conjunction with roadway capacity improvement projects that would increase SOV capacity. SCAG previously used a $50 million threshold to identify SOV capacity-enhancing projects, but the agency is replacing this criterion with a project distance-based length criterion of one mile or more for the 2017 FTIP. Further details of this process are included in the upcoming 2017 FTIP.

Transportation Demand Management (TDM)

The 2016 RTP/SCS commits $6.9 billion toward TDM strategies throughout the region. There are three main areas of focus:

- Reducing the number of SOV trips and overall vehicle miles traveled (VMT) through ridesharing, which includes carpooling, vanpooling and supportive policies for shared ride services such as Uber and Lyft.
- Redistributing or eliminating vehicle trips from peak demand periods through incentives for telecommuting and alternative work schedules.
- Reducing the number of SOV trips through the use of other modes of travel such as transit, rail, bicycling and walking.

In addition, the following strategies expand and encourage the implementation of TDM strategies to their fullest extent:

- Rideshare incentives and rideshare matching.
- Parking management and parking cash-out policies.
- Preferential parking or parking subsidies for carpoolers.
- Intelligent parking programs.
- Promotion and expansion of Guaranteed Ride Home programs.
- Incentives for telecommuting and flexible work schedules.
- Integrated mobility hubs and first/last mile strategies.
- Incentives for employees who bike and walk to work.
- Investments in active transportation infrastructure.
- Investments in Safe Routes to School programs and infrastructure.

Transportation Systems Management (TSM)

The 2016 RTP/SCS includes $9.2 billion for TSM improvements. These include extensive advanced ramp metering, enhanced incident management, bottleneck removal to improve flow (e.g., auxiliary lanes), expansion and integration of the traffic signal synchronization network, data collection to monitor system performance, and other Intelligent Transportation System (ITS) improvements.

The 2016 RTP/SCS identifies a comprehensive set of strategies that work in concert to optimize the performance of the transportation system. This set of strategies does not focus solely on expanding the system, but also considers how we operate the system; how we coordinate land use planning with transportation planning; how we deal with incidents such as collisions or special events; how we provide information to the traveling public so people can make informed decisions about how, where and when to travel; and how we maintain the system. All of these strategies are based on a foundation of comprehensive system monitoring so that we can understand how the transportation system is performing and where we need improvement. This approach is based in part on work that California Department of Transportation (Caltrans) has done for many years to optimize the performance of the State Highway System. Two important categories for TSM strategies are:

1. **Corridor Mobility and Sustainability Improvement Plans:** Caltrans, SCAG and county partners in the past have worked together to improve the efficiency of our highways and arterials through the development of Corridor System Management Plans (CSMPs). Since the passage of Proposition 1B in November 2006 and with the creation Corridor Mobility Improvement Account (CMIA), which

[4] 23 USC 134 and 49 USC 5303-5305.

served to improve mobility on the State Highway System, several CSMPs have been developed for various corridors throughout the SCAG region. Historically, the response to congestion has been to add additional capacity. However, CSMPs have provided a lower cost, higher benefit option toward making highways and parallel arterial systems, transit and incident response management more efficient and were designed to focus primarily on operational strategies to optimize corridor performance through ITS strategies, in conjunction with operational and capacity improvements towards improving productivity along highway corridors. SCAG recognizes the efforts taken thus far under the current CSMP framework to improve mobility, but believes that CSMPs can be further improved upon. SCAG encourages the development of Corridor Sustainability Studies (CSS) which will build upon the existing CSMP framework by analyzing the corridor from a multimodal perspective. More specifically, these studies will include a focus on newer planning priorities such as Complete Streets and a Smart Mobility Framework (not addressed by current CSMPs). SCAG recognizes that the region could benefit from a site specific CSS focused on improving mobility for all modes of travel throughout the region.

2. **Integrated Corridor Management (ICM):** The ICM Initiative was first introduced by the U.S. Department of Transportation (U.S. DOT) back in 2006. Under the ICM approach, all elements within a corridor are considered to evaluate opportunities that move people and goods in the most efficient manner possible, while simultaneously ensuring that the greatest operational efficiencies are achieved. Since the introduction of ICM, great progress has been made. In Los Angeles, Caltrans (in coordination with Los Angeles County Metropolitan Transportation Authority or Metro) and various cities have embarked on the first Integrated Corridor Management pilot project on Interstate 210. This project aims to minimize congestion due to collisions and is also referred to as the Connected Corridors initiative. Over the next ten years, Caltrans plans to implement similar projects on 25 additional congested corridors statewide. ICM strategies to be considered as part of the Interstate 210 project include:
   - Integration of highway ramp meters and arterial signal systems
   - Arterial signal coordination
   - Traffic re-routing due to incidents or events
   - Transit signal priority on arterials and on-ramps
   - Parking management
   - Traveler communication (via changeable message signs, 511, radio, social networks, mobile app) of traffic conditions, transit services, parking, alternate route/trip/mode options
   - System coordination/communication between Caltrans (highway operator) and local jurisdictions (arterial operators).

Additional System Management Initiatives include:

- Arterial Signal Synchronization projects that have been completed on various arterials through the region to optimize traffic flow
- The Dynamic Corridor Congestion Management (DCCM) initiative in Los Angeles County, in which Caltrans is developing a corridor management initiative on Interstate 110 to coordinate highway ramp metering with arterial signals. Various efforts have been completed to inform the traveling public of expected travel times to various destinations and in some cases provide travel time comparisons with transit.
- The Caltrans Advanced Traffic Management (ATM) study for Interstate 105 and the Regional Integration of ITS Projects (RIITS) and IEN data exchange efforts at Los Angeles Metro.

Promote Safety and Security

Ensuring the safety and security of our transportation network for residents and visitors is a top priority. SCAG supports the implementation of the Strategic Highway Safety Plan (SHSP), which has an overarching goal of Toward Zero Deaths. The state's short-term goals are to reduce the number and rate of fatalities by three percent per year and to reduce the number and rate of severe injuries by 1.5 percent per year. SCAG is continuing to work with Caltrans and the CTCs toward identifying other means of improving the safety and security of our transportation system.

Regarding our transportation network's security, there are numerous agencies that participate in the response to incidents and assist with hazard preparations for individual jurisdictions. These include the California Emergency Management Agency, county offices of emergency management, fire departments, police departments and the California Highway Patrol. Collaboration among many of these agencies is essential when addressing incidents regionwide. The Federal Emergency Management Agency (FEMA) oversees this coordination. However, FEMA defines metropolitan areas differently than the U.S. DOT, so this limits SCAG's ability to participate at an agency level. Nevertheless, SCAG seeks to use its strengths and organization to assist first responders, recovery teams and planners alike in a supporting role.

FOCUS

BENEFITS OF TRANSPORTATION SYSTEMS MANAGEMENT/ TRANSPORTATION DEMAND MANAGEMENT (TSM/TDM)

Enhanced Incident Management
Reduces incident-related congestion, which is estimated to represent half of the total congestion in urban areas

Transit Automatic Vehicle Location
Enables monitoring of transit vehicles and ensures on-time performance

Advanced Ramp Metering
Alleviates congestion and reduces collisions at on-ramps and highway-to-highway interchanges

Traffic Signal Synchronization
Minimizes wait times at traffic signals and therefore reduces travel time

Improved Data Collection
Allows implementing agencies and operators to monitor system performance and optimize the impact of transportation investments

Advanced Traveler Information
Provides real-time traffic conditions and alternative routing, and therefore allows the public to make more informed travel decisions

Universal Transit Fare Cards (Smart Cards)
Reduces time required to purchase transit tickets and allows interoperability among transit providers

Case Study: Interstate 210 Pilot Project

Historically, efforts to reduce congestion have focused solely on individual networks, in which underutilized capacity in parallel highway lanes, arterial lanes and transit services were often not considered. In recent years, TSM/TDM strategies have been developed to increase efficiency through the use of technologies. The application of these technologies, such as intelligent transportation systems (ITS), and a commitment by Caltrans and its partner agencies to work together have the potential to transform the ways that corridors are currently operated.

In 2012, Caltrans, with assistance from Metro and California Partners for Advanced Transportation Technology (PATH) at UC Berkeley, developed the first Integrated Corridor Management (ICM) pilot project within the SCAG region along the Interstate 210 (I-210) corridor. The purpose of the pilot is to look at all opportunities to move people and goods in the most efficient manner possible, to ensure the greatest potential gains in operational performance. This includes seeking ways to improve how arterials, highways, transit and parking systems work in conjunction with one another.

Strategies to be considered as part of the project include:

- Integration of highway ramp meters and arterial signal systems
- Arterial signal coordination
- Traffic re-routing due to incidents or events
- Transit signal priority on arterials and on-ramps
- Parking management (e.g., smart parking—locating available parking spaces at transit stations and private parking garages)
- Variable lane configuration systems
- Traveler communication (via changeable message signs, 511, radio, social networks, mobile app) of traffic conditions, transit services, parking, alternate route/trip/mode options
- System coordination/communication between Caltrans and local jurisdictions

The pilot is still under development, but it has already changed the way state and local transportation agencies work together in managing transportation systems. Caltrans aims to eventually expand the application of ICM concepts to other corridors over the next ten years. In this context, the Interstate 210 Pilot is a test bed to demonstrate how an ICM project can be developed by engaging and building consensus among corridor stakeholders, to address congestion for the betterment of an entire network.

Caltrans® CALIFORNIA PATH

SCAG continues to pursue the following strategies toward ensuring safety and security:

- Ensure transportation safety, security and reliability for all people and goods throughout the region.
- Prevent, protect, respond to and recover from major human-caused or natural events in order to minimize the threat and impact to lives, property, the transportation network and the regional economy.
- Provide a policy forum to help develop regional consensus and education on security policies and emergency responses.
- Assist in expediting the planning and programming of transportation infrastructure repairs from major disasters.
- Encourage the integration of transportation security measures into transportation projects early in the development process by leveraging SCAG's relevant plans, programs and processes (including regional Intelligent Transportation Systems (ITS) architecture).

For more details on safety and security and additional policies and strategies, please review the Transportation Safety & Security Appendix.

COMPLETING OUR SYSTEM

Strategies for improving and expanding the many modes of transportation that make up the regional network must be integrated closely with our strategies for how we use land. The success of transit; passenger rail; walking, biking and other forms of active transportation; our highways and arterials; the efficient movement of goods; and our regional airport system all depend on a close relationship with how our region uses land and how we grow. This is particularly true when it comes to improving and building a transit system that can best serve people in communities throughout our region. It is the first transportation category for which numerous strategies are reviewed.

Transit

Since 1991, the SCAG region has spent more than $50 billion dollars on public transportation. This includes high profile investments in rail transit and lower profile, vital investments in operations and maintenance. Looking toward 2040, the 2016 RTP/SCS maintains a significant investment in public transportation across all transit modes and also calls for new household and employment growth to be targeted in areas that are well served by public transportation to maximize the improvements called for in the Plan. This investment package includes a selection of major capital investments described in TABLE 5.2, which displays all locally notable transit capital projects and additional capital investment packages totaling more than $500 million. These investments include new rail transit facilities, vehicle replacements, bus system improvements and capitalized maintenance projects.

When these projects are completed, the region will have a greatly expanded urban rail network, including ten light rail projects and three heavy rail projects on the Metro Rail system. New BRT and rapid bus routes will provide additional higher speed bus service in Los Angeles and Orange Counties and the Inland Empire. Orange County will add new streetcar services to link major destinations in Anaheim, Santa Ana and Garden Grove to the Metrolink system. Riverside County will extend Metrolink to San Jacinto and San Bernardino County will connect Metrolink to Ontario International Airport and to Redlands via Downtown San Bernardino.

In addition, the 2016 RTP/SCS includes extensive local bus, rapid bus, BRT and express service improvements. An expanded point-to-point express bus network will take advantage of the region's carpool and express lane network. New BRT service, limited-stop service and increased local bus service along key corridors, in coordination with transit-oriented development and land use, will encourage greater use of transit for short local trips. See EXHIBIT 5.2.

Also included in the investment package are renewed commitments to asset management and maintaining a state of good repair. TABLE 5.3 describes all transit operations and maintenance investments over $500 million. This list includes bus, urban rail and paratransit operations, the implementation of the Orange County Transportation Authority's (OCTA's) Short Range Transit Plan, expanded bus service on targeted corridors, preventative maintenance and an increased commitment on asset preservation funded from innovative revenue sources.

Aside from capital projects, there are many improvements that can help make transit operate more efficiently and effectively, make it more accessible to more travelers and increase ridership. The 2016 RTP/SCS recommends additional transit initiatives. Among them:

TABLE 5.2 SELECTED TRANSIT CAPITAL PROJECTS

COUNTY	PROJECT
Los Angeles	Airport Metro Connector
Los Angeles	Crenshaw LAX Transit Corridor
Los Angeles	East San Fernando Valley Transit Corridor
Los Angeles	Eastside Transit Corridor Phase 2
Los Angeles	Exposition Transit Corridor, Phase 2 to Santa Monica
Los Angeles	Metro Gold Line Foothill Extension Phase 2A
Los Angeles	Metro Gold Line Foothill Extension: Azusa to County Line
Los Angeles	Purple Line Extension to La Cienega, Century City, Westwood
Los Angeles	Regional Connector
Los Angeles	Sepulveda Pass Corridor
Los Angeles	South Bay Metro Green Line Extension
Los Angeles	West Santa Ana Branch Transit Corridor
Los Angeles	Bus & Rail Capital—LA County Near Term
Los Angeles	Countywide Bus System Improvement–Metro Fleet
Los Angeles	Countywide Bus System Improvement—LA County Muni Fleet
Los Angeles	Metro Rail System Improvements (Capital Costs Only)
Los Angeles	Metro Rail Rehabilitation and Replacement (Capital Costs Only)
Los Angeles	Transit contingency/new rail yards/additional rail cars (Capital costs only)—LA County
Los Angeles	Vermont Short Corridor
Los Angeles	Metro Red Line Extension: Metro Red Line Station North Hollywood to Burbank Bob Hope Airport
Los Angeles	Metro Green Line Extension: Metro Green Line Norwalk Station to Norwalk Metrolink Station
Los Angeles	Slauson Light Rail: Crenshaw Corridor to Metro Blue Line Slauson Station
Orange	Anaheim Rapid Connection
Orange	Countywide Fixed-Route, Express and Paratransit Capital (Baseline)—Orange County
Orange	OC Streetcar
Riverside	Coachella Valley Bus Rapid Service
Riverside	Perris Valley Line
Riverside	Perris Valley Line Extension to San Jacinto
San Bernardino	Foothill/5th Bus Rapid Transit
San Bernardino	Gold Line Phase 2B to Montclair
San Bernardino	Metrolink San Bernardino Line Double tracking
San Bernardino	Passenger Rail Service from San Bernardino to Ontario Airport
San Bernardino	Redlands Rail
San Bernardino	West Valley Connector Bus Rapid Transit

Source: 2016 RTP/SCS Project List

TABLE 5.3 MAJOR TRANSIT OPERATIONS AND MAINTENANCE PROJECTS AND INVESTMENTS

(Over $500 Million)

COUNTY	PROJECT
Los Angeles	Access Services Incorporated (Paratransit)—Metro subsidy
Los Angeles	Preventive Maintenance (Capital & Operating Maintenance Items Only)—LA County
Orange	Countywide Fixed-Route, Express and Paratransit Operations—Orange County
Orange	OCTA SRTP Implementation
Orange	Metrolink Operations—Orange County
Orange	Transit Extensions to Metrolink–Go Local Operations—Orange County
San Bernardino	San Bernardino Countywide Local Transit Service Operations
Regionwide	Regionwide Transit Operations and Maintenance—Preservation
Regionwide	Expand Bus Service: Productive Corridors
Regionwide	Expand Bus Service: BRT
Regionwide	Expand Bus Service: Point-to-Point

Source: 2016 RTP/SCS Project List

EXHIBIT 5.2 2040 TRANSIT NETWORK PLANNED AND EXISTING

(Source: SCAG)

Implement and Expand Transit Priority Strategies: Transit priority strategies include transit signal priority, queue jumpers and bus lanes. Signal priority is a highly effective treatment that speeds up bus service and attracts new transit riders. The Metro Rapid program in Los Angeles County has increased speeds by more than 20 percent, compared with the local service on the same street. It also has brought new riders to its system. Bus lanes are even more effective at increasing speeds, however in our region there is a dearth of such lanes. SCAG encourages transit agencies and local jurisdictions to implement them, where appropriate.

Implement Regional and Inter-County Fare Agreements and Media: Implementing additional inter-jurisdictional fare agreements and media, such as Los Angeles County's EZ Pass, will make transit more attractive and accessible. A pass that would cover all transit services in Los Angeles and Orange counties, or the whole SCAG region, is an example. OCTA, the LOSSAN Managing Agency, recently secured a California Cap-and-Trade grant to establish fare agreements between the Pacific Surfliner and local transit operators along its corridor where an Amtrak ticket will be good for a connecting transit fare.

Implement New BRT and Limited-Stop Bus Service: BRT service provides frequent, high quality bus service and is characterized by features such as dedicated lanes, traffic signal priority, limited stops, pre-boarding fare payment and unique branding. BRT is about 20 percent faster than traditional local bus service. It is a premium service and has proven to attract new riders to transit. BRT implementation does require some capital investment, but it is scalable so that transit agencies can implement a range of elements to improve bus service depending upon the resources available. In an environment of scarce funding, offering limited-stop service is also an excellent alternative to BRT because it involves strategically reducing the number of stops a bus would serve along a given route. Limited-stop service has been shown to be about 15 percent faster than traditional local service.

Increase Bicycle Carrying Capacity on Transit and Rail Vehicles: Bicycling is becoming more popular and our transit system can do more to accommodate bicyclists. Many buses have bike racks with capacity for only two bikes. Meanwhile, Metro and Metrolink are now allowing more bicycles on their railcars and providing bicycle lockers at rail and fixed guideway bus stations. Allowing more bikes on transit vehicles, to a reasonable point, will increase transit ridership.

Expand and Improve Real-Time Passenger Information Systems: Most medium to large size transit agencies now offer up-to-the-minute updates on arrival and departure times. This allows passengers to make more informed travel decisions and improve the overall travel experience.

Implement First/Last Mile Strategies to Extend the Effective Reach of Transit: This is an area of study with recent focus. Making transit more accessible for biking or walking that first mile to a transit station, or from a transit station, or both, will encourage more transit use and reduce air pollution and greenhouse gas emissions. More than 90 percent of Metrolink riders drive to their origin station, representing a significant potential for providing alternatives. As mentioned before, several cities in Orange County are planning streetcar services to connect Metrolink riders to their final destinations.

Implement Local Circulators: Many jurisdictions in the region already have networks of local community circulators and fixed-route systems. Implementing more of these services would provide alternatives for residents of increasingly compact communities.

Passenger Rail

The 2016 RTP/SCS proposes three main passenger rail strategies that will improve speed, service and safety and provide an attractive alternative to driving alone. They are:

- Improving the Los Angeles–San Diego–San Luis Obispo Rail Corridor (LOSSAN Corridor)
- Improving the existing Metrolink system
- Implementing Phase One of the California High-Speed Train

The state's High-Speed Train will provide an additional intrastate transportation option in California, offering an alternative to air and auto travel and providing new capacity for travel on the state's highways and airports. The California High-Speed Rail Authority (CHSRA), in partnership with the Federal Railroad Administration (FRA), which has provided $3.6 billion in High-Speed and Intercity Passenger Rail funding, have chosen to begin construction in the San Joaquin Valley. The system will then be built south to our region, connecting to Palmdale, Burbank Bob Hope Airport, Los Angeles Union Station and Anaheim by 2029. This is consistent with the CHSRA's adopted 2014 Business Plan and Draft 2016 Business Plan.

Existing passenger rail facilities in Southern California and the Bay Area (the "bookends" of the Phase One system) will also be improved to provide immediate, near-term benefits while laying the groundwork for future integration with High-Speed Train. This "blended approach" to deliver the full integrated system, through phased implementation over time, will help reduce costs and environmental impacts. With the adoption of the 2012 RTP/SCS, the region and the CHSRA committed to spending $1 billion in Prop. 1A funds and other fund sources on these early investments in the "bookends."

This commitment by CHSRA and the transportation agencies was formalized in the memorandum of understanding (MOU) between CHSRA, Metrolink, SCAG, San Diego Association of Governments (SANDAG), Metro, Riverside County Transportation Commission (RCTC) and the City of Anaheim. The MOU includes a candidate project list to which $1 billion will be programmed in order to provide interconnectivity to the California High-Speed Train project and improve the speed, capacity and safety of our existing passenger rail network. The list includes 74 projects totaling nearly $4 billion and it shows the need for capital investments to improve the speed and service of the existing rail network regionwide. The top six projects on this list are each of the five county's (Los Angeles, Orange, Riverside, San Bernardino and San Diego) top projects—plus the Southern California Regional Interconnector Project (SCRIP, formerly called the Los Angeles Union Station Run-Through Tracks). See TABLE 5.4.

TABLE 5.4 TOP SIX MOU PROJECTS

Los Angeles	Southern California Regional Interconnector Project
Los Angeles	CP Brighton to CP Roxford Double Track
Orange	State College Blvd. Grade Separation
Riverside	McKinley St. Grade Separation
San Bernardino	CP Lilac to CP Rancho Double Track
San Diego	San Onofre to Pulgas Double Track

CP = A track switch, or the location of a track signal or other marker with which dispatchers can specify when controlling trains.

SCRIP is number one on the list because it will deliver regional benefits for all counties. Los Angeles Union Station was originally designed as a "stub" rail facility, with tracks only leaving the station in a northerly direction and no through-train operation capability. Up to six tracks will be built to extend out of the south of Union Station and across U.S. Route 101 to connect with the main tracks along the Los Angeles River. These additional tracks will increase Union Station's capacity by 40 to 50 percent, enabling the scheduling of many more through trains with improved running times. They will also result in sharply reduced air pollution and greenhouse gas emissions from idling locomotives.

Several additional strategies are designed to increase rail ridership in our region by making rail travel more attractive as an alternative to commuting alone by car. These strategies will serve three distinct rail markets: commuter, intercity and interregional. The first is served by Metrolink, the second by Amtrak and the third will be served by California High-Speed Train service. However, the three carriers can be attractive to multiple rail travel markets. Passenger rail strategies for these markets include:

Increase Speed and Service: As noted above, the high-speed rail system MOU partners are in the process of planning and implementing the MOU capital projects to improve capacity, speed and service, bringing at least some segments of our rail network up to the federally defined high speed of 110 miles per hour or greater and to implement a blended system of rail services. In addition to the MOU project list, these projects are detailed in the LOSSAN Strategic Implementation Plan for 2030 and the Metrolink 2015 Strategic Assessment that looks out 10 years to 2025. As speeds and service levels improve, these services will become more competitive with SOV travel and as a result ridership will continue to grow. Further, their schedules should be adjusted once the state's High-Speed Train project is implemented, so that all rail services complement and feed one another.

Improve Accessibility and Connectivity: This strategy includes establishing rail connections to our region's airports, and improving transit, bicycling and walking accessibility and connectivity to rail stations. Burbank Bob Hope Airport is presently the region's best-served airport by rail, and will soon host two rail stations in the near future with service provided by two Metrolink lines, Amtrak and the state's High-Speed Train in the future. Ontario International Airport (ONT) is not directly served by rail, although SCAG together with Metro, SANBAG and CHSRA are studying various options to provide direct rail service to the airport. LAX is also currently not served by any rail, but will be within the next decade via the Crenshaw Line and the Airport Metro Connector. Improving transit bicycling and walking accessibility to our region's passenger rail stations is also critical. Increasing rail feeder bus services in our region to passenger rail stations would reduce the incentive for SOV travel. Establishing more transit services such as OCTA's Stationlink service would provide this incentive. Finally, there is still little BRT or BRT-Lite service in our region outside of Los Angeles County, and establishing more BRT routes to serve rail stations such as the current Omnitrans sbX Green Line and the Riverside Transit Agency's future RapidLink Line 1 will help meet this goal.

Secure Increased Funding and Dedicated Funding Sources: Passenger rail has traditionally lacked dedicated funding streams. Amtrak is funded annually by the U.S. Congress, usually resulting in funding amounts insufficient to meet state of good repair needs or to increase Amtrak's levels of service and expand the network. With local control of the Pacific Surfliner now complete, the State of California has guaranteed funding levels to maintain current service levels (but not to increase service levels) for the first three years. One new funding source is California's Cap-and-Trade Transit and Intercity Rail Capital Program, which received $25 million in FY2014-15 and 10 percent of annual Cap-and-Trade auction proceeds beginning in FY2015-16. This FY2015-16 allocation is currently estimated to be more than $200 million. Similarly, the CHSRA has been given a dedicated Cap-and-Trade funding stream of 25 percent of funds, beginning in FY2015-16 (for FY2014-15 CHSRA received $250 million). FY2015-16 funding is estimated at more than $600 million.

Support Increased TOD and First/Last Mile Strategies: Increased TOD and first/last mile planning and investments are crucial to passenger rail station area planning. Increased and effective TOD improves our region's jobs/housing balance, and it reduces VMT, air pollution and greenhouse gas emissions. First/last mile investments also reduce VMT, air pollution and greenhouse gas emissions and encourage rail users to access rail stations with options other than driving alone.

Implement Cooperative Fare Agreements and Media: Cooperative fare agreements and media also offer opportunities for increasing rail ridership and attracting new riders. For example, the Rail2Rail pass allows Metrolink monthly pass riders who have origin and destination points along the LOSSAN corridor to ride Amtrak. In 2014, the North County Transit District (NCTD) reached an agreement with Caltrans Division of Rail (DOR), in which five daily Pacific Surfliner trains stop at all non-Pacific Surfliner Amtrak (Coaster) stops in San Diego County. This service has proven quite popular and successful. Agreements like this one could be expanded once the California High-Speed Train is built.

Active Transportation

The 2016 RTP/SCS includes $12.9 billion for active transportation improvements, including $8.1 billion in capital projects and $4.8 billion as part of the operations and maintenance expenditures on regionally significant local streets and roads. The Active Transportation portion of the 2016 Plan updates the Active Transportation portion of the 2012 Plan, which has goals for improving safety, increasing active transportation usage and friendliness, and encouraging local active transportation plans. It proposes strategies to further develop the regional bikeway network, assumes that all local active transportation plans will be implemented, and dedicates resources to maintain and repair thousands of miles of dilapidated sidewalks. To accommodate the growth in walking, biking and other forms of active transportation regionally, the 2016 Active Transportation Plan also considers new strategies and approaches beyond those proposed in 2012. Among them:

- Better align active transportation investments with land use and transportation strategies to reduce costs and maximize mobility benefits
- Increase the competitiveness of local agencies for federal and state funding
- Develop strategies that serve people from 8–80[5] years old to reflect changing demographics and make active transportation attractive to more people
- Expand regional understanding of the role that short trips play in achieving RTP/SCS goals and performance objectives, and provide a strategic framework to support local planning and project development geared toward serving these trips
- Expand understanding and consideration of public health in the development of local plans and projects.

[5] 8–80 years old is an age span that is used as a shorthand to refer to expanding the potential for all people to use active transportation. The term refers to addressing the needs school aged children who would be conceivably allowed to walk or bike to school unaccompanied if the environment were safer and older senior citizens who prefer physical separation from the noise and speed of vehicles.

Active Transportation has 11 specific strategies to maximize active transportation in the SCAG region. These are grouped into four broad categories: regional trips, transit integration, short trips and education/encouragement. All 11 strategies are based on a comprehensive local bikeway and pedestrian network that uses Complete Streets principles. These strategies include:

Regional Trips Strategies:

1. Regional Greenway Network
2. Regional Bikeway Network
3. California Coastal Trail Access

Transit Integration Strategies:

4. First/last mile (to transit)
5. Livable Corridors
6. Bike Share Services

Short Trips Strategies:

7. Sidewalk Quality
8. Local Bikeway Networks
9. Neighborhood Mobility Areas

Education/Encouragement Strategies:

10. Safe Routes to School
11. Safety/Encouragement Campaigns

Regional Trips Strategies

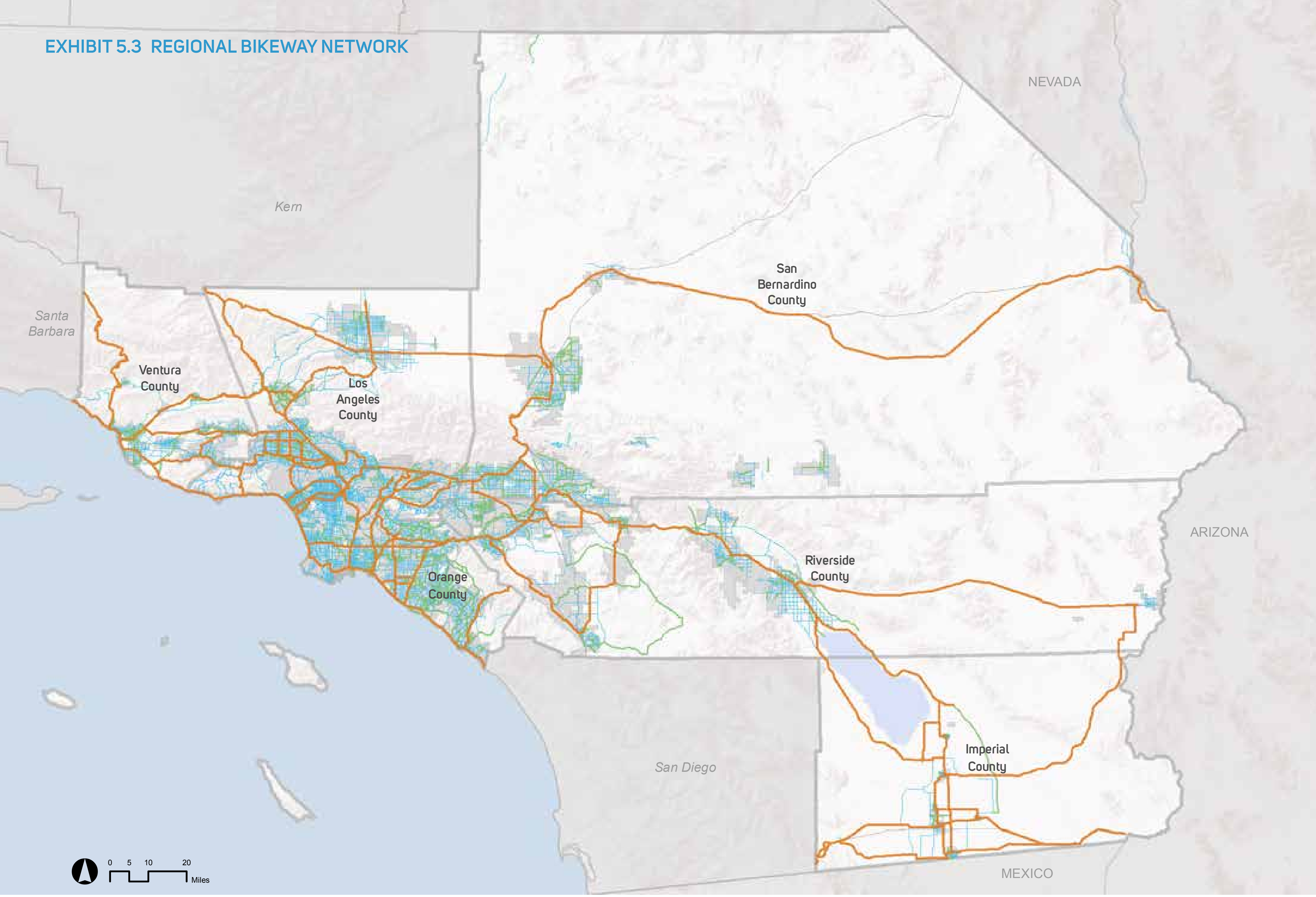
Developing the following networks will serve those longer trips that people make less frequently, but add to total miles traveled. They are primarily biking trips for commuting and recreation. Although trips covering the full length of these corridors may be a small percentage of active transportation travel, the networks provide a backbone for shorter trips, much in the way the Interstate Highway System is used by many people as a bypass for short trips from one on-ramp to the next off-ramp. Completing the following networks are key strategies for promoting regional trips:

1. **Regional Greenway Network (RGN):** The planned RGN is a 2,200-mile system of separated bikeways mostly using riverbeds, drainage channels and utility corridors. The RGN connects to the regional bikeway network. This strategy provides the opportunity to better integrate urban green space, active transportation and watershed management, providing new urban green space for residents to go to for travel and recreation, including low-stress access to the California Coastal Trail. Benefits include increased health, improved safety and enhanced quality of life. These low-stress bikeways, connected to the regional bikeway network and local bikeways, should provide an attractive option for those bicyclists who do not wish to ride along roadways with motor vehicles. They include the High Desert Corridor; Santa Ana River Trail; OC Loop; Los Angeles River; San Gabriel River; San Jose Creek; Rio Hondo River; Ballona Creek; Bike Route 33; and CVLink.

2. **Regional Bikeway Network (RBN):** The planned RBN consists of 2,220 miles of interconnected bikeways that connect to jurisdictions, local bikeways and destinations. It connects to the RGN and has designated routes and wayfinding signage that help bicyclists easily understand the route structure and destinations. The primary purpose is to serve regional trips, commuting and recreational bicycling. Using locally existing and planned local bikeways as the foundation, the RBN closes gaps, connects jurisdictions, and provides a regional backbone for local bikeways and greenways. By having assigned route names/numbers, bicyclists can more easily travel across jurisdictions without having to frequently consult maps or risk having bikeways end on busy streets. It is anticipated that trips longer than three miles will likely be used in part on the RBN. SCAG has identified 12 regionally significant bikeways that connect the region. These include Bike Route 66; Bike Route 10; Bike Route 126; Pacific Coast Bike Route; Bike Route 5; Santa Ana River Trail; High Desert Corridor; Bike Route 33; Los Angeles River; San Gabriel River; Bike Route 86; and Bike Route 76 (see EXHIBIT 5.3).

3. **California Coastal Trail (CCT)Access:** Trails along the coast of California have been utilized as long as people have inhabited the region. The CCT was established by the Coastal Act of 1976 to develop 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." The 2016 RTP/SCS Active Transportation Appendix identifies the improvements necessary to help complete the portions of the CCT in Ventura, Los Angeles and Orange counties and to provide biking and walking access to the CCT.

EXHIBIT 5.3 REGIONAL BIKEWAY NETWORK



Regional Bikeway Network   Regional Greenway Network   Local Bikeway Networks

(Source: SCAG)

Transit Integration Strategies

Transit Integration refers to a suite of strategies designed to better integrate active transportation and transit by improving access for pedestrians, bicyclists and other people traveling under their own power around transit stations. Active transportation projects that fall within this suite of strategies are particularly competitive for Cap-and-Trade funding programs. Cap-and-Trade funding programs include the Affordable Housing and Sustainable Communities Program (AHSC), which aims to better link housing, transit and active transportation to reduce greenhouse gas emissions. With this in mind, the strategies detailed below will be most successful if they are coordinated with land use strategies such as TOD and providing affordable housing.

4. **First/Last Mile (to rail):** This strategy uses a Complete Streets approach to maximize the number of people walking or biking to rail. By 2040, 11 percent of people will live within one half mile of a rail station, and 27 percent will live within one mile of a rail station. By increasing the comfort and removing barriers to walking or biking, more people will walk or bike to transit stations. These stations include all Los Angeles County light rail, subway and fixed guideway bus stations and Metrolink stations; all Orange County Metrolink Stations and OC Bravo busways; all San Bernardino County Metrolink stations and SBx busways; all Riverside County Metrolink stations; and all Ventura County Metrolink stations.

   The existing transit access "shed" is considered the half-mile radius around a station (requiring a 10-minute walk), although in many cases the access shed is much smaller due to barriers in the built environment (a lack of crosswalks, long blocks, unsafe overpasses or underpasses). The strategy of developing first/last mile solutions will increase the number of people walking within and beyond one half mile, by creating the conditions that allow people to travel a longer distance in the same amount of time (10 minutes). The number of bicyclists accessing transit is also anticipated to increase, both within the one-mile bike access shed and beyond to a new bike access shed of three miles (requiring a 15-minute bike ride). Infrastructure improvements may include dedicated bike routes, sidewalk enhancements, mid-block crossings (short-cuts), reduced waiting periods at traffic signals, bicycle parking, signage and wayfinding, and others.

   In Los Angeles County, Metro has proposed an extensive active transportation network to support first/last mile access, including pathways that extend one half mile around each of the Metro stations. The pathways are envisioned to provide facilities and design elements that are consistent across the transit system, enabling seamless and intuitive door-to-door journeys. Pathways will be established along the most heavily traveled routes to transit stations, connecting riders to and from population and employment centers and other major destinations. They will improve and shorten the time it takes to access transit, enhancing the overall transit experience. The pathways will also facilitate transfers between modes, including traditional modes such as buses and park and ride lots, as well as new mobility options such as bike share and car share that can be integrated throughout active transportation networks.

   First/last mile plans that include many of the same investments as outlined in Metro's first/last mile plan have been completed in Orange and San Bernardino counties as well. The regional strategy builds upon these planned investments, proposing enhancements at 224 rail stations by 2040.

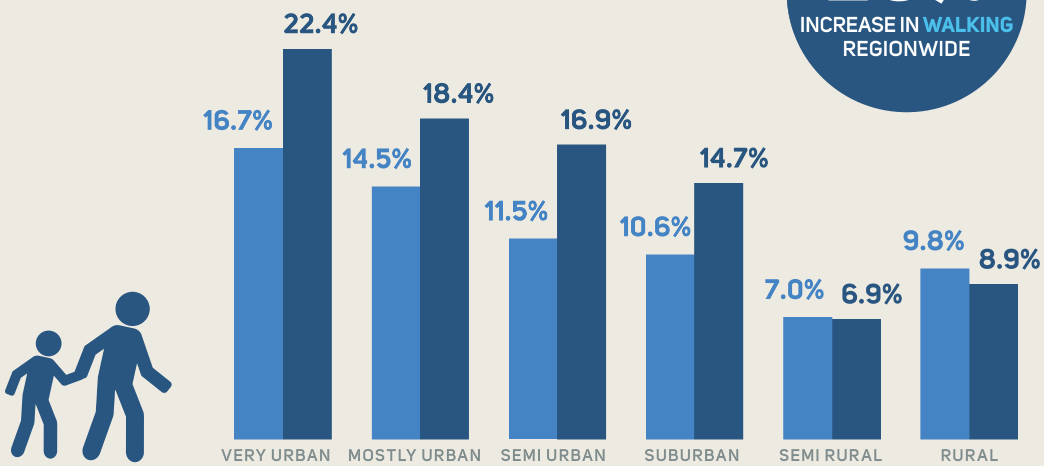
5. **Livable Corridors:** From an active transportation standpoint, this strategy is similar to the first/last mile strategy noted above, but it targets high-quality bus corridors rather than the rail and fixed guideway system. (Planning for growth around Livable Corridors is also an important land use strategy) Livable Corridors share many of the same characteristics as transit-oriented rail corridors, but they have lower density development. Active transportation investments focus on sidewalk maintenance/enhancement, intersection improvements, bicycle lanes and bicycle boulevards to facilitate safe and easy access to mixed-use commercial nodes where residents can meet most of their daily needs and access bus service. In addition, this strategy promotes the inclusion of bike lanes, shared bus-bike lanes or separated bikeways. These run along or parallel to the main corridor to promote inter-regional connectivity. In developing the 2016 RTP/SCS, SCAG identified just under 3,000 miles of potential Livable Corridors. However, the investments proposed in the Plan under this strategy are not tied to a specific corridor; rather, the Plan assumes resources to support 670 miles accessing and along 154 miles of corridor. The Plan also provides policy language to support a much broader rollout of Livable Corridors to inspire and support local planning for projects. Having plans prepared with shovel-ready projects will allow our region to effectively compete for Affordable Housing and Sustainable Communities Program Inter-Connected Projects.

FOCUS ACTIVE TRANSPORTATION

Biking & Walking in the Region

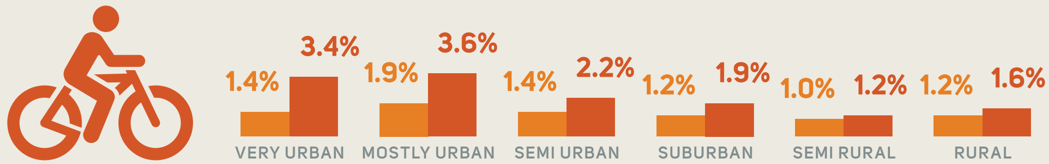
28% INCREASE IN WALKING REGIONWIDE

WALK TRIPS — 2012 BASE YEAR / 2040 PLAN



71% INCREASE IN BIKING REGIONWIDE

BIKE TRIPS — 2012 BASE YEAR / 2040 PLAN



Go Human and Traffic Safety

Across the SCAG region, the nature of streets and types of travel on them is changing dramatically. Bicycling is growing in popularity and the expansion of transit and explosion of new mobility services, like Uber and Lyft, means more people are walking and biking to make connections. However, as more people bicycle and walk, safety for these modes becomes increasingly important. In the SCAG region in 2012, 27 percent and five percent of all traffic fatalities were pedestrians and bicyclists, respectively.

Funded by a $2.3 million grant from the 2014 California Active Transportation Program, SCAG and its partners launched Go Human, a campaign to promote traffic safety and encourage people to walk or bike. Go Human is a reminder to all that people on the road are not just objects that get in our way—they are human beings. In late September 2015, messaging encouraging drivers to slow down and look for pedestrians and cyclists was distributed across all six counties in both English and Spanish. Advertisements appeared on local transit buses, bus shelters, Facebook, Pandora and local radio stations throughout the region. The launch date coincided with the decline in daylight hours, a period when pedestrian collisions begin to peak.

Go Human is a collaborative effort with county transportation commissions, county health departments and local cities and jurisdictions across the region. SCAG has worked with partners to expand the initial advertising purchases through partner newsletters, advertisements on websites, posters in local facilities and on social media. For example, the Los Angeles County Department of Public Works donated advertising space at 100 bus shelters. SCAG's funding also includes the production of toolkits and trainings to promote active transportation and the implementation of open streets and temporary events starting in spring 2016. For more information on the campaign, visit **www.gohumansocal.org**.

gohuman

6. **Bike Share Services:** Bike share is a point-to-point service combining the convenience of a bicycle with the accessibility of public transportation.[6] Using closely packed bike rental kiosks in heavily urbanized areas, bike share is designed to replace short-distance motor vehicle trips, reduce parking demand and complement local bus services such as DASH in the City of Los Angeles. Most importantly, bike share acts as a first/last mile strategy and it will be closely integrated with high quality transit stations. Los Angeles Metro, Santa Monica and Long Beach are currently implementing bike share within Los Angeles County. Bike share is anticipated to grow beyond these initial areas over the course of the Plan. A pilot program was recently completed in the City of Fullerton, in Orange County. The University of California, Irvine already has a bike share system in place for students and faculty. The regional bike share system will be comprised of about 8,800 bikes and 880 stations/kiosks.

Short Trips Strategies

For the purposes of this RTP/SCS, SCAG considers short trips as any trip less than three miles. These trips are primarily the utilitarian trips we take every day to the store, school or a restaurant. Planning policy objectives, including reducing VMT and greenhouse gas emissions and improving public health, depend highly on our region's ability to address these short trips. That's because trips less than three miles account for 38 percent of all trips in the region. Short trips can easily be taken by walking or biking.

The land use strategies described earlier in this chapter and promoted by the 2016 RTP/SCS seek to improve location efficiency—in other words, minimize the distance between origins and destinations to create even more short trips in the future. The short trip strategies described below aim to ensure that the roadway network evolves to help realize the walkable/bikeable vision advanced by land use strategies in regional and local plans, and improve mobility and reduce travel times in locations that are already considered location-efficient.

7. **Sidewalk Quality:** The Plan calls for 10,500 miles of sidewalks to be repaired or improved. This includes making them Americans with Disabilities Act (ADA) compliant and adding amenities such as exercise spots (logs or other no-maintenance objects that can be used for sitting, stretching or mild exercise) and rest seats for older walkers.

   These improvements are in addition to sidewalk enhancements incorporated into the other active transportation strategies.

8. **Local Bikeway Networks:** The region's Local Bikeway Networks promote local mobility, while also providing the needed bikeway density to interconnect with the regional bikeway network. The Plan proposes expanding the local bikeway network by an additional 6,016 miles. This is in addition to the 2,760 additional bikeway miles incorporated into other active transportation strategies, bringing total regional, local and greenway bikeway mileage to 12,700.

9. **Neighborhood Mobility Areas:** This strategy is targeted to locations that have a high proportion of short trips due to the mix of land uses, a fairly dense street grid pattern and the presence of locally serving retail destinations. These locations, however, do not benefit from high quality transit. Where Livable Corridors focus on connections to a corridor, Neighborhood Mobility Areas focus on connections within the neighborhood—to schools, places of worship, parks or greenways, and other destinations. SCAG has identified potential locations in the region to establish Neighborhood Mobility Areas. However, the investments proposed in the Plan under this strategy are not tied to a specific community. Some of the practices that inform this concept include: Level of Traffic Stress (LTS) bicycle planning, NEV planning, Plug-in Vehicle (PEV) readiness planning and a geographic analysis of commute trip lengths. These planning practices are based on the idea that non-auto trips increase as the perceived danger and anxiety for the user decreases.

Education/Encouragement Strategies

Getting more people to bike and walk is not just about building the infrastructure. Individuals must feel safe biking and walking. The 2016 RTP/SCS Safety campaigns have two strategies: Safe Routes to School, which focuses on instilling safe habits at a young age while encouraging walking and biking to school; and a Safety/Encouragement campaign, which aims to reach all roadway users through a mix of education and training seminars and encouragement strategies.

10. **Safe Routes to School:** Safe Routes to School is a comprehensive TDM strategy aimed at encouraging children to walk and bicycle to school. It includes a wide variety of implementation strategies centered on the "6 Es"—Education, Encouragement, Engineering,

[6] King County Bike Share Business Plan. (2012). The Bike Share Partnership. Accessed at http://altaplanning.com/wp-content/uploads/King_County_Bike_Share_Business_Plan_0.pdf.

EXHIBIT 5.4 MAJOR HIGHWAY PROJECTS

Express Lanes Toll Lanes Mixed-Flow Lanes Freight Corridors HOV Lanes Improvement TBD

Planned/Proposed Express Lane Direct Connectors Proposed HOV-to-Express Lane Direct Connector Conversions HOV Lane Connectors

(Source: SCAG)

Enforcement, Evaluation and Equity. When implemented, the 6 Es improve safety, reduce congestion and VMT, improve air quality and increase the physical activity of students and their parents—which improves public health outcomes. SCAG works with each county through SCAG's sustainability joint work programs, which are collaborative planning programs designed to support regional sustainability goals through local projects. Each joint-work program includes a Safe Routes to School program component.

11. **Education/Encouragement Campaigns:** Safety campaigns that employ advertising, public service announcements and media kits are designed to educate the public on the importance of safety. Other efforts aim to educate bicyclists, pedestrians and motorists on the rights and responsibilities of sharing the road. The 2016 RTP/SCS anticipates that these campaigns will be conducted every five years during the course of the Plan.

Highways and Arterials

The majority of trips in our region today is still made on our region's highways and arterials. Yet, the expansion of our highways and arterials has slowed down over the last decade. Revenue from traditional sources to fund transportation improvements is declining and costly expansions to address congestion may not be financially feasible. However, given that critical gaps and congestion chokepoints still exist within the network, improvements beyond TSM and TDM strategies need to be considered. Closing these gaps to complete the system will allow residents and visitors alike to enjoy improved access to opportunities such as jobs, education, recreation and healthcare.

Our highways and arterials serve as a crucial backbone of our overall regional transportation network. As part of the 2016 RTP/SCS, SCAG continues to advocate for a comprehensive solution based on a system management approach to manage and maintain our highway and arterial network. Although we recognize that we can no longer rely on system expansion alone to address our mobility needs, critical gaps and congestion chokepoints in the network still hinder access to certain parts of the region. County transportation plans have identified projects to close these gaps, eliminate congestion chokepoints and complete the system. Such improvements are included in the 2016 RTP/SCS. EXHIBIT 5.4 and TABLE 5.5 highlight some of the proposed highway completion projects. For projects that are currently or will be going through environmental clearance, SCAG would update the list as part of future RTP amendments if warranted by the nature of the project changes. A comprehensive list of projects is provided in the Project List Appendix.

Our region boasts one of the most comprehensive High Occupancy Vehicle (HOV) systems in the nation and heavy investments have been made to expand it. As part of the Plan, strategic HOV gap closures, highway-to-highway direct HOV connectors, and HOV direct access ramps need to be proposed as a strategy to complete the system. In addition, it should be noted that various highways within Orange County feature continuous access on certain HOV lanes. Studies have shown that continuous access HOV lanes do not perform any worse compared with limited access HOV lanes. TABLE 5.6 highlights some of the Plan's major HOV projects.

Our region's arterial system is comprised of local streets and roads that serve many different functions. One is to link our region's residents with schools, jobs, healthcare, recreation, retail and other destinations. Our region's arterials account for more than 80 percent of the total road network and they carry a majority of overall traffic. A number of arterials run parallel to major highways and they can provide alternatives to them. Beyond motor vehicles, our arterials serve other modes of travel, including transit and active transportation. The 2016 RTP/SCS proposes a variety of arterial projects and improvements throughout the region. Operational and technological improvements can maximize system productivity through various cost-effective and non-labor intensive means—beyond improvements to expand capacity. These include signal synchronization, spot widening and adding grade separations at major intersections. In addition, as part of the Complete Streets Deputy Directive[7] (DD-64-R2), improvements such as bicycle lanes, lighting, landscaping, sidewalk widening and ADA compliance measures have shifted the focus of arterials toward considering multiple users—while also providing a greater sense of place. The 2016 RTP/SCS highways and local arterials framework and guiding principles are summarized here:

- Focus on achieving maximum productivity through strategic investments in system management and demand management.
- Focus on adding capacity primarily (but not exclusively) to:
  - Close gaps in the system.
  - Improve access where needed.
- Support policies and system improvements that will encourage the seamless operation of our roadway network from a user perspective.

[7] Complete Streets – Integrating the Transportation System. (2014) [Deputy Directive]. California Department of Transportation. Accessed at: http://www.dot.ca.gov/hq/tpp/offices/ocp/docs/dd_64_r2.pdf.

TABLE 5.5 SAMPLE MAJOR HIGHWAY PROJECTS COMMITTED BY THE COUNTIES

	COUNTY	ROUTE	DESCRIPTION	COMPLETION YEAR	COST ($1,000s)
MIXED-FLOW LANES	Imperial	SR-98	Widen and improve SR-98 or Jasper Rd to 4/6 lanes	2025	$1,170,483
	Imperial	SR-111	Widen and improve to a 6-lane highway with interchanges to Heber, McCabe, and Jasper, and overpass at Chick Rd	2030	$999,136
	Los Angeles	SR-57/SR-60	Improve the SR-57/SR-60 interchange	2029	$475,000
	Orange	I-5	Add one mixed-flow lane in each direction from SR-57 to SR-91	2040	$305,924
	Orange	SR-55	Add one mixed-flow lane in each direction and fix chokepoints from I-405 to I-5 and add one auxiliary lane in each direction between select on/off ramps and operational improvements through project limits	2030	$274,900
	Orange	SR-91	Add one eastbound mixed-flow lane on SR-91 from SR-57 to SR-55 and one westbound mixed-flow lane from Kraemer to State College	2030	$425,000
	Orange	I-405	Add one mixed-flow lane in each direction from I-5 to SR-55	2030	$374,540
	Orange	I-405	Add one mixed-flow lane in each direction from SR-73 and I-605	2022	$1,300,000
	Ventura	SR-118	Add one mixed-flow lane in each direction from Tapo Canyon Rd to LA Avenue	2025	$216,463
EXPRESS LANES	Los Angeles	I-110	Construct express lane off-ramp connector from 28th St to Figueroa St	2023	$55,000
	Riverside	I-15	Add one express lane in each direction from Cajalco Rd to SR-7	2029	$453,174
	San Bernardino	I-15	Add two express lanes in each direction from US-395 to I-15/I-215 interchange	2030	$687,994
HOV LANES	Los Angeles	I-5	Add one HOV lane in each direction from Weldon Canyon Rd to SR-14	2017	$410,000
	Los Angeles	SR-14	Add one HOV lane in each direction from Ave P-8 to Ave L	2027	$120,000
	Los Angeles	SR-71	Convert expressway to highway-add one HOV lane and one mixed-flow lane	2028	$13,392
	Orange	I-5	Add one HOV lane in each direction from Pico to SD County Line	2040	$237,536
	Riverside	I-15	Add one HOV lane in each direction from SR-74 to I-15/I-215 interchange	2039	$375,664
	San Bernardino	I-10	Add one HOV lane in each direction from Ford to RV County Line	2030	$126,836
	San Bernardino	I-215	Add one HOV lane in each direction from SR-210 to I-15	2035	$249,151
	San Bernardino	I-210	Add one HOV lane in each direction from I-215 to I-10	2040	$178,780
	Ventura	US-101	Add one HOV lane in each direction from LA/VEN County Line to SR-33	2029	$132,000

TABLE 5.6 MAJOR HOV LANE PROJECTS

COUNTY	ROUTE	FROM	TO	COMPLETION YEAR
Los Angeles	I-5	Weldon Canyon	SR-14	2017
Los Angeles	I-5	Pico Canyon	Parker Rd	2025
Los Angeles	SR-14	Ave P-8	Ave L	2027
Los Angeles	SR-71	Mission Blvd	Rio Rancho Rd	2028
Orange	I-5	Pico	SD County Line	2040
Orange	I-5	SR-55	SR-57	2018
Orange	SR-73	I-405	MacArthur	2040
Riverside	I-15	SR-74	I-15/I-215 Interchange	2039
Riverside	I-215	Nuevo Rd	Box Springs Rd	2030
San Bernardino	I-10	Ford St	RV/SB County Line	2030
San Bernardino	I-215	SR-210	I-15	2035
San Bernardino	I-210	I-215	I-10	2040
Ventura	US-101	Moorpark Rd	SR-33	2029
HIGHWAY TO HIGHWAY HOV CONNECTORS				
Los Angeles	I-5/I-405	Connector (partial)		2029
Los Angeles	I-405/I-110	Connector Improvements		2021
Orange	I-405/SR-73	Connector		2040
San Bernardino	I-10/I-15	Connector (partial)		2035

TABLE 5.7 REGIONAL EXPRESS LANE NETWORK

	COUNTY	ROUTE	FROM	TO
EXPRESS LANE ADDITIONS	Los Angeles	I-10	I-605	San Bernardino County Line
	Los Angeles	I-105*	I-405	I-605
	Los Angeles	I-405**	I-5	Orange County Line
	Los Angeles	I-605	I-10	Orange County Line
	Orange	SR-55	SR-91	I-405
	Orange	SR-73	I-405	MacArthur Boulevard
	Orange	I-405**	Los Angeles County Line	SR-55
	Orange	I-605	Los Angeles County Line	I-405
	Riverside	I-15**	San Bernardino County Line	SR-74
	Riverside	SR-91*	Orange County Line	I-15
	San Bernardino	I-10**	Los Angeles County Line	Ford Street
	San Bernardino	I-15**	High Desert Corridor	Riverside County Line
EXPRESS LANE DIRECT CONNECTORS	Los Angeles	I-405/I-110	I-405 NB to I-110 NB and I-110 SB to I-405 SB	
	Orange	I-5/SR-55	Existing HOV to proposed express lane direct connector	
	Orange	SR-91/SR-55	Existing HOV to proposed express lane direct connector	
	Orange	SR-91/SR-241	SR-241 NB to SR-91 EB and SR-91 WB to SR-241 SB	
	Orange	I-405/SR-55	Existing HOV to proposed express lane direct connector	
	Orange	I-405/SR-73	Planned HOV to proposed express lane direct connector	
	Orange	I-405/I-605	Existing HOV to proposed express lane direct connector	
	Riverside	SR-91/I-15	SR-91 EB to I-15 SB and I-15 NB to SR-91 WB	

*Notes: * Dual express lanes for entire length ** Dual express lanes for a section*

- Any new roadway capacity project must be developed with consideration and incorporation of congestion management strategies, including demand management measures, operational improvements, transit and ITS, where feasible.
- Focus on addressing non-recurring congestion with new technology.
- Support Complete Streets opportunities where feasible and practical.

Regional Express Lane Network

Consistent with our regional emphasis on the system management pyramid, recent planning efforts have focused on enhanced system management, including the integration of value pricing to better use existing capacity and offer users greater travel time reliability and choices. Express lanes that are appropriately priced to reflect demand can outperform non-priced lanes in terms of throughput, especially during congested periods. Moreover, revenue generated from priced lanes can be used to deliver the needed capacity provided by the express lanes sooner and to support complementary transit investments.

The regional express lane network included in the 2016 RTP/SCS builds on the success of the State Route 91 express lanes in Orange County, as well as the Interstate 10 and Interstate 110 express lanes in Los Angeles County. Additional efforts underway include the extension of the State Route 91 express lanes to Interstate 15, as well planned express lanes on Interstate 15 in Riverside County. Express lanes are also planned for Interstate 15 and Interstate 10 in San Bernardino County and Interstate 405 in Orange County. TABLE 5.7 displays the segments in the proposed regional express lane network.

Goods Movement

Recent regional efforts have focused on strategies to develop a coherent, refined and integrated regional goods movement system that would address expected growth trends. Key strategies are highlighted below.

Regional Clean Freight Corridor System

The 2016 RTP/SCS continues to envision a system of truck-only lanes extending from the San Pedro Bay Ports to downtown Los Angeles along Interstate 710, connecting to the State Route 60 east-west segment and finally reaching Interstate 15 in San Bernardino County. Such a system would address the growing truck traffic and safety issues on core highways through the region and serve key goods movement industries. Truck-only lanes add capacity in congested corridors, improve truck operations and safety by separating trucks and autos, and provide a platform for the introduction of zero- and near zero-emission technologies. Ongoing evaluation of a regional freight corridor system is underway, including recent work on an environmental impact report (expected to be recirculated in 2016) for the Interstate 710 segment. Additionally, as a part of the 2016 RTP/SCS, SCAG continues to refine the east-west corridor component of the system along the State Route 60 corridor. Current efforts have focused on working to identify an initial operating segment. Additional study is underway to evaluate the East-West Freight Corridor project concept.

The East-West Freight Corridor would carry between 58,000 and 78,000 clean trucks per day that would be removed from adjacent general-purpose lanes and local arterial roads. The corridor would benefit a broad range of goods movement markets, both port-related and local goods movement-dependent industries. Truck delay would be reduced by up to 11 percent. Truck traffic on State Route 60 general purpose lanes would be reduced by 42 to 82 percent, depending on location; it would be reduced by as much as 33 percent on Interstate 10 and as much as 20 percent on adjacent arterials. Separating trucks and autos would also reduce truck-involved collisions on east-west highways that currently have some of the highest collision levels in the region (20–30 collisions a year on certain segments).

The regional freight corridor system also includes an initial segment of Interstate 15 that would connect to the East-West Freight Corridor, reaching just north of Interstate 10. Additional study is anticipated for this segment.

Truck Bottleneck Relief Strategy

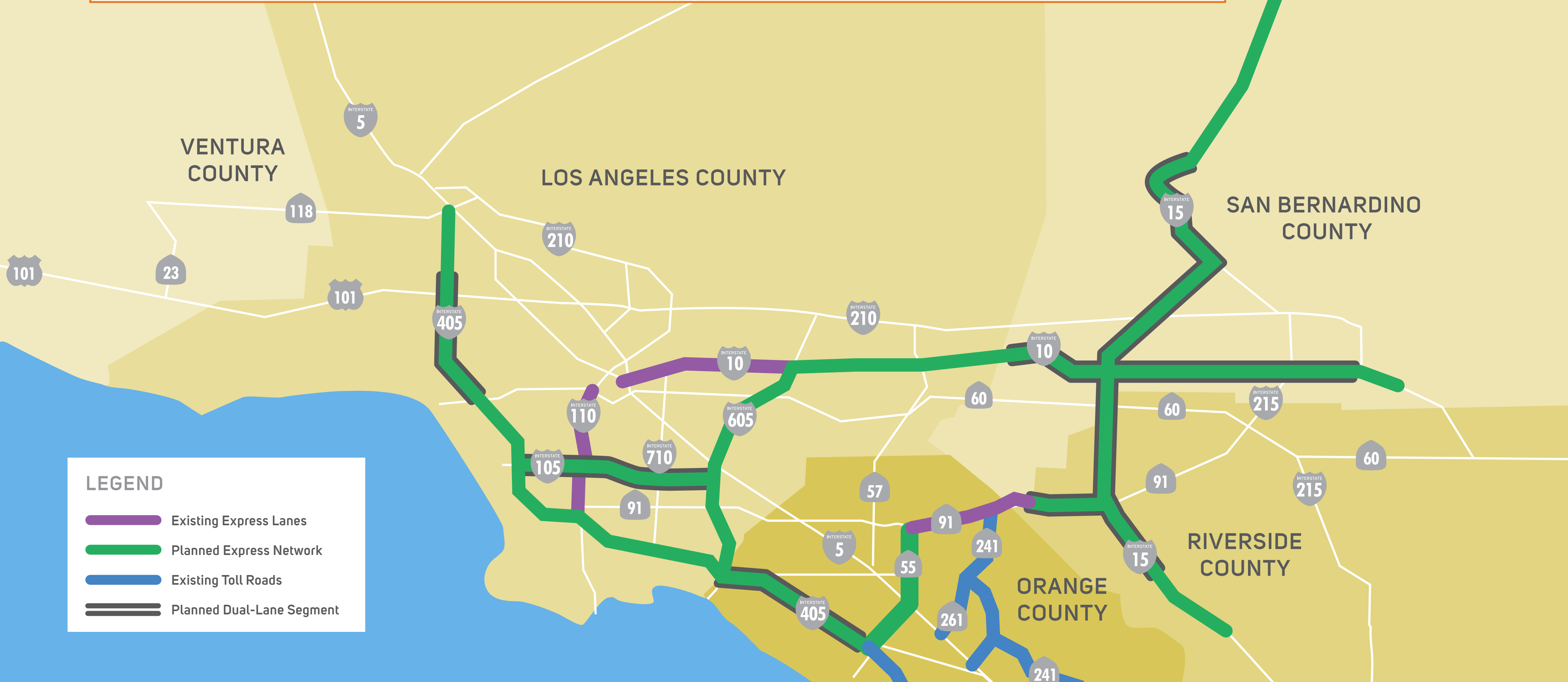
In 2013, the American Transportation Research Institute (ATRI) identified the Los Angeles Metropolitan Area as leading the nation in costs to the trucking industry caused by traffic congestion, with nearly $1.1 billion in added operational costs to truckers.[8] The SCAG region had five of the top 100 truck bottlenecks in the U.S. in 2014—identified by ATRI as follows:

#8	State Route 60 at State Route 57 in Los Angeles County
#17	Interstate 710 at Interstate 105 in Los Angeles County
#37	Interstate 10 at Interstate 15 in San Bernardino County
#39	Interstate 15 at State Route 91 in Riverside County
#55	Interstate 110 at Interstate 105 in Los Angeles County.[9]

8 Cost of Congestion to the Trucking Industry. (2014). American Transportation Research Institute.

9 Congestion Impact Analysis of Freight Significant Highway Locations. (2014). American Transportation Research Institute.

REGIONAL EXPRESS LANE NETWORK



Regional Express Lane Network Concept of Operations

SCAG, in partnership with the California Department of Transportation (Caltrans), the Federal Highway Administration (FHWA), the Los Angeles County Metropolitan Transportation Authority (Metro), the Orange County Transportation Authority (OCTA), the San Bernardino Associated Governments (SANBAG), and the Riverside County Transportation Commission (RCTC) collaborated on the development of a regional concept of operations for a regional express lane network. The Concept of Operations provides a blueprint for a regional express lane network that integrates express lane facilities into a regional system with consistent or compatible operating, design and policy rules. This development process also resulted in the recommended regional express lane network (illustrated here).

With driver wages and fuel costs representing more than 50 percent of total motor carrier costs, truck congestion has major impacts on the bottom line of the trucking industry. Truck bottlenecks are also emission "hot spots" that generally have significantly degraded localized air quality because of increased idling from passenger vehicles and trucks.

In past RTPs, SCAG directly addressed truck bottlenecks by developing a coordinated strategy to identify and mitigate the top-priority truck bottlenecks. This analysis has been updated for the 2016 RTP/SCS and includes a "refresh" of truck bottleneck delays for the locations where congestion data were available. It also identifies potential new truck bottlenecks.

The 2016 RTP/SCS allocates an estimated $5 billion toward strategies to relieve goods movement bottlenecks. Examples of bottleneck relief strategies include ramp meterings, extending merging lanes, improving ramps and interchanges, improving capacity and adding auxiliary lanes. Additional information is provided in the Goods Movement Appendix.

Rail Strategy

The region's railroad system provides critical connections between the largest port complex in the country and producers and consumers throughout the U.S. More than half of the international cargo arriving at the San Pedro Bay Ports uses rail. Railroads also serve domestic industries, predominantly for long-haul freight leaving the region. The extensive rail network in the SCAG region offers shippers the ability to move large volumes of goods over long distances at lower costs, compared with other transportation options. The 2016 RTP/SCS continues to incorporate the following rail strategies for goods movement:

- **Mainline Rail Improvements and Capacity Expansion:** This includes double or triple tracking certain rail segments, implementing new signal systems, building universal crossovers and constructing new sidings. These improvements would benefit both freight rail and passenger rail service, depending on their location.
- **Rail Yard Improvements:** This includes upgrades to existing rail yards, as well as construction of new yards to handle the projected growth in cargo volumes.
- **Grade Separations of Roads From Rail Lines:** These projects reduce vehicular delay, improve emergency vehicle access, reduce the risk of accidents and lower emissions levels.
- **Rail Operation Safety Improvements:** This includes technology such as Positive Train Control (PTC) that can greatly reduce the risk of rail collisions.

The benefits of the rail strategies to the region are considerable and include mobility, safety and environmental gains. These strategies could eliminate nearly 5,500 hours of vehicle delay per day at grade crossings, decrease emissions (NOx, CO2 and PM 2.5) by nearly 44,000 lb. per day, and reduce overall train delay to the year 2000 level.

Goods Movement Environmental Strategy

Along with growth in the region's population and economy comes a growing demand to deliver goods in areas where people live and work. As a result, goods movement transportation has been a major source of emissions that contributes to regional air pollution problems, as well as localized air pollution "hot spots" that can have adverse health impacts. Moreover, much of the SCAG region (and nearly all of the urbanized area) does not meet federal ozone and fine particulate (PM 2.5) air quality standards. The transportation of goods is also a major source of greenhouse gas emissions that contribute to global climate change. Because of the need to maintain and improve our quality of life, economically and environmentally, SCAG proposes the environmental strategy below to address the air quality impacts of goods movement, while also allowing for the efficient and safe goods movement flow throughout the region. A critical component of this strategy, as described below, is the integration of advanced technologies that have co-benefits such as air quality, energy security and economic growth opportunities.

The 2016 RTP/SCS focuses on a two-pronged approach for achieving an efficient freight system that reduces environmental impacts. For the near term, the regional strategy supports the deployment of commercially available low-emission trucks and locomotives while centering on continued investments into improved system efficiencies. For example, the region envisions increased market penetration of technologies already in use, such as heavy-duty hybrid trucks and natural gas trucks. Applying ITS solutions to improve operational efficiency is also recommended. In the longer term, the strategy focuses on advancing technologies—taking critical steps now toward the phased implementation of a zero- and near zero-emission freight system. SCAG is cognizant of the need to incorporate evolving technologies with plans for new infrastructure. These include technologies to fuel vehicles, as well as to charge batteries and provide power.

The plan to develop and deploy advanced technologies includes phased implementation, during which technology needs are defined, prototypes are tested and developed, and efforts are scaled up. FIGURE 5.3 illustrates this process. The phases are summarized as follows:

FIGURE 5.3 PHASES OF TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

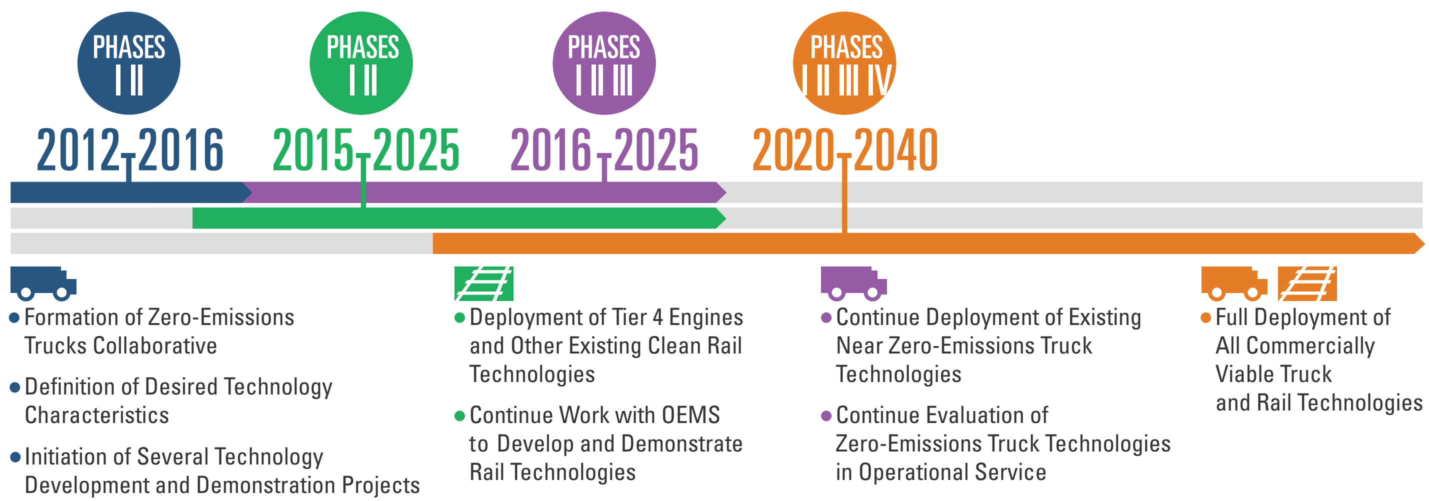
PHASE I **Project Scoping and Evaluation of Existing Work:** Continue to build on current regional research and technology testing efforts to further define the needs that the new technology must provide and to better understand the current capabilities, costs and stage of development of potential technologies.

PHASE II **Evaluation, Development and Prototype Demonstrations:** Evaluate, develop and test initial vehicle prototypes. Work with public and private sector partners to secure funding commitments for the development of new technology prototypes and demonstrations.

PHASE III **Initial Deployment and Operational Demonstration:** Initially deploy potential technologies, preferably with industry partners who can evaluate and report on their performance in the real world. Funding may be used for incentives for initial deployment and the continued evaluation and development of technologies.

PHASE IV **Full-Scale Demonstrations and Commercial Deployment:** Scale up deployment of viable technologies and implement needed regulatory and market mechanisms to launch them commercially. The Phase IV time frame accommodates the readiness of different levels of technology for various applications.

FIGURE 5.4 TRUCK AND RAIL TECHNOLOGY DEVELOPMENT AND DEPLOYMENT TIMELINE



Phases of New Technology Development and Deployment

The time frames illustrated in FIGURE 5.4 suggest a path toward implementing the phases described above. This cycle of technology development is continuous, and it will renew itself as new innovations emerge and technologies continue to evolve. The timelines presented are broad, to capture the breadth of technologies in various stages of development and to allow for further innovation in this sector. This path is discussed in greater detail in the Goods Movement Appendix.

Since SCAG adopted the 2012 RTP/SCS, the region has attracted outside funding and committed its own funding to support research and development efforts. Several studies have been conducted to date that contribute to "project scoping" by providing a greater understanding of the regional truck market and how truck use defines key performance parameters such as range and power needs. To evaluate and develop prototypes, three large-scale research and development efforts are underway to develop and test zero-emission trucks and charging infrastructure. These projects require continuing collaboration between original equipment manufacturers and public sector agencies.

Meeting Airport Demand

As discussed in Chapter 2, our region is served by a multiple airport system that includes commercial airports, military airfields and general aviation airports. All of these airports function as part of a system that provides a high level of air service to our residents and to visitors. Services that are not practical or financially viable at one airport in the system can be provided at an alternative facility. In addition, many of our airports function as relievers for other airports in case of emergencies or irregular operations due to inclement weather or other unusual events.

The commercial passenger and cargo airports in our region, especially those in the urbanized areas, each face constraints on their operations. At each airport, these constraints may include airspace conflicts, runway configurations, terminal capacity, ground access congestion and legal restrictions such as noise control ordinances. Because of the varying constraints on individual airports, it is important to maintain a diverse group of airports to serve the overall air travel demand of the region extending into the future.

Accommodating the future demand for air passenger and air cargo is critical to the economic health of the region. The economic impact of air travel to the region is expected to increase from $27.4 billion in 2012 to $43.8 billion in 2040 (in 2012 dollars), an increase of nearly 60 percent. The number of jobs supported by visitors arriving by air is expected to increase from 275,000 to 452,000. If the region's aviation system and supporting ground access network cannot accommodate the expected demand, some of this potential economic activity could be lost to other regions.

Forecasting Air Passenger Demand Based on the historical relationship between economic activity and the demand for air travel, as well as expected future economic conditions in our and other regions, total air passenger demand in our region is expected to increase from 91.2 million annual passengers (MAP) in 2014 to 136.2 MAP in 2040. This represents a 1.6 percent annual growth rate over the forecast period. This regional demand forecast for air passenger travel is strong and reflects the potential for the region to have long-term economic recovery and growth. More detail about the forecast methodology is presented in the Aviation & Airport Ground Access Appendix.

Some of the airports in our region benefit from having long runways, uncongested airspace and spacious, modern terminals. Airports with these benefits are expected to be able to accommodate any growth in demand foreseeable through 2040. However, four of the commercial airports in urban parts of the region face physical or policy constraints that may limit their capacity to accommodate increases in demand by 2040. The individual airport demand forecasts reflect the following constraints:

- Burbank Bob Hope Airport: 7.3 MAP (airfield capacity)
- Los Angeles International Airport: 82.9–96.6 MAP (airfield capacity)
- Long Beach Airport: 5.0 MAP (noise compatability ordinance)
- John Wayne Airport: 12.5 MAP (settlement agreement adopted by Board of Supervisors)

An analysis of these constraints is included in the Aviation & Airport Ground Access Appendix.

Several recent trends in the airline industry were considered in the capacity analyses. For example, the average number of seats on commercial flights in and out of airports in our region increased from 107 in 2007 to 119 in 2014, so each "operation" (take-off or landing) on the airfield and each "turn" (arrival and departure) of a gate can include more passengers. Therefore, as a result of airline industry trends, the estimated capacity of several constrained airports has increased compared to prior analyses, although there may not have been any physical change at the airport itself.

2040 AIR PASSENGER FORECAST

Airport Specific Demand, Million Annual Passengers (MAP)

Midpoint of 2040 Total Regional Aviation Demand:

136.2 MAP

Based on the overall forecast regional demand for air travel, the origins and destinations of trips within the region and the capacity constraints of individual airports, the figure "2040 Airport Demand Forecasts" on the previous page presents the anticipated air travel demand at each commercial airport in our region in 2040.

Forecasting Air Cargo

The development of the air cargo demand forecasts is similar to that of the air passenger forecasts. The demand for air cargo is driven largely by the economic interrelationship of our region and other regions around the world. Because of its high cost, shipment by air is used primarily for time-sensitive and high-value goods. Total air cargo transported through our region's airports has experienced an uneven recovery since the recession of 2007, but remained below year 2000 levels even in 2014. Based on the historical relationship between economic activity and the demand for air cargo, as well as expected future economic conditions in our and other regions, total air cargo demand in our region is expected to increase from 2.43 million metric tons in 2014 to 3.78 million metric tons in 2040. This represents a 1.8 percent annual growth rate over the forecast period.

In 2014, more than 99 percent of air cargo in our region was handled at five airports: Los Angeles International Airport (77 percent), Ontario International Airport (19 percent), Burbank Bob Hope Airport (2 percent), John Wayne Airport (0.7 percent) and Long Beach Airport (0.6 percent). Air cargo can be classified as "belly" cargo (carried in the bellies of passenger airplanes) or full-freighter cargo (carried in dedicated freighter aircraft). LAX handled nearly 99 percent of the region's belly cargo and 70 percent of the full-freighter cargo.

Following the 2012 RTP/SCS, the air cargo forecasts assume some redistribution of air cargo across the airports in the region. Cargo carried on passenger airlines or by their cargo divisions is unlikely to be redistributed because these carriers benefit from consolidation of their passenger and cargo facilities at the same airport. Cargo carried by integrated delivery services, such as FedEx and UPS, is also unlikely to be redistributed because of the major investments these companies have made in facilities at individual airports (primarily, Ontario International Airport). Therefore, only cargo carried by charter airlines or all-cargo airlines would potentially diversify to other airports and, of the cargo that could potentially diversify, only some actually will.

Airport Ground Access

The ground access network serving the region's airports is critical to both the aviation system and the ground transportation system. Passengers' choice of airports is based in part on the travel time to the airport and the convenience of access, so facilitating airport access is essential to the efficient functioning of the aviation system. In addition, airport related ground trips can contribute to local congestion in the vicinity of the airports.

Currently, more than 200,000 air passengers arrive at or depart from the region's airports every day. By 2040, this number is forecast to increase to more than 330,000. Passenger surveys indicate that three percent of passengers take transit to LAX and one percent take transit to Burbank Bob Hope Airport. Surveys are not available at other airports, but because these two airports have the best transit access in the region it is likely that the transit share at the remaining airports is significantly below one percent.

The large majority of air passengers use a motor vehicle, either their own or a rental vehicle, to get to and from the airport. About half of all air passengers in the region are picked up or dropped off at the airport by a friend or relative. Each end of these pick-up/drop-off air trips results in two ground trips: one to the airport followed by one returning from the airport. Therefore, taking steps to encourage travelers to use transit or other modes of shared transportation is vital.

To reduce ground transportation congestion related to air passenger travel, the 2016 RTP/SCS includes the following strategies:

- Support the regionalization of air travel demand
- Continue to support regional and inter-regional projects that facilitate airport ground access (e.g., High-Speed Train, High Desert Corridor)
- Support ongoing local planning efforts by airport operators, CTCs and local jurisdictions
- Encourage the development and use of transit access to the region's airports
- Encourage the use of modes with high average vehicle occupancy (AVO)
- Discourage the use of modes that require "deadhead" trips to/from airports

In recent years, airport operators, CTCs and SCAG have all undertaken their own initiatives to improve ground access at the region's aviation facilities. The sections below discuss recent efforts and recommended strategies to improve ground access at three existing commercial airports in the region that have invested considerably in improving ground access. A more detailed discussion of ground access improvement strategies at airports across the region is included in the Aviation & Airport Ground Access Appendix.

Burbank Bob Hope Airport

Burbank Bob Hope Airport is the only airport in the region with a direct rail-to-terminal connection, via the recently completed Regional Intermodal Transportation Center (RITC). The RITC serves multiple modes, including public parking, a consolidated rental car facility, regional bus service and bicycles, and commuter rail at the Metrolink Ventura line station. A pedestrian bridge currently in design will further facilitate access between the train station and the airport. In addition, a second rail station is currently planned on the Metrolink Antelope Valley line. BurbankBus has recently begun operating all-day bus service between the North Hollywood Metro Red Line Station and the airport, utilizing the RITC.

Key 2016 RTP/SCS projects for Burbank Bob Hope Airport include:

- Increased Metrolink service systemwide
- Metro Red Line extension from North Hollywood to Burbank Bob Hope Airport
- New east-west BRT service from Orange Line/North Hollywood to Pasadena (no direct connection to Burbank Bob Hope Airport)

Additional strategies include:

- Construct new Metrolink Station on Antelope Valley Line
- Support increased Metrolink service to stations on Ventura Line and Antelope Valley Line
- Support recommendations of recent Ground Transportation and Land Use Study:
  - Improve transit connection to North Hollywood Red/Orange Line Station
  - Improve transit connection to Pasadena and Glendale
- Support the development of a High-Speed Train station on Hollywood Way and provide convenient access between the station and the airport

Los Angeles International Airport

LAX is owned and operated by Los Angeles World Airports (LAWA), a proprietary department of the City of Los Angeles. In December 2014, LAWA's Board of Airport Commissioners approved a plan to overhaul and modernize LAX's ground access and transportation connections for arriving and departing passengers. The approved program includes:

- The LAX Train (Automated People Mover System)
- Intermodal Transportation Facilities (ITF)
- Consolidated Rent-A-Car Center (CONRAC)
- Central terminal area improvements
- Connection with the under-construction Metro Crenshaw Line

The CONRAC will consolidate the numerous off-site rental car facilities in the surrounding area into one convenient location 1.5-miles east of LAX and adjacent to Interstate 405 for convenient regional highway access. Two ITFs are included in the program offering airport travelers locations for parking, passenger pick-up and drop off, and flight check-in outside the terminal and away from the congested World Way roadway within LAX. The eastern ITF will include Metro facilities to connect with Metro's planned 96th Street/Aviation Boulevard Station serving the under-construction Metro Crenshaw/LAX Transit Project and existing Metro Green Line, as well as a bus plaza for Metro and municipal buses. The LAX Train will be an elevated automated people mover system with six stations connecting the CONRAC, both ITFs and Metro facilities to the LAX passenger terminals. The environmental review process for this project began in 2015 and construction is expected to begin in 2017.

Key 2016 RTP/SCS projects for LAX include:

- New Crenshaw/Green Line station at 96th/Aviation
- Automated People Mover

Additional strategies include:

- Support construction of Automated People Mover (APM) with connection to Metro Crenshaw Line
- Support construction of Consolidated Rental Car facility and Intermodal Transportation Facilities to reduce private vehicles and shuttles in Central Terminal Area
- Support expansion of FlyAway service to new markets
- Support ability of ride-hailing services to pick up passengers, to reduce deadhead trips in the central terminal area

Ontario International Airport

The 2014 SANBAG Ontario Airport Rail Access Study examined six alternatives to connect Ontario Airport to the regional rail system. One of these alternatives is the Metro Gold Line Foothill Extension Phase 2C that would extend the eastern terminus of the Metro Gold Line to the airport. However, Phase 2C is not funded at this time. Improved transit access from the Rancho Cucamonga Metrolink Station is included in the 2016 RTP/SCS project list.

Key 2016 RTP/SCS projects for Ontario Airport include:

- New Rancho Cucamonga Metrolink to ONT rail connection
- Numerous local highway interchange, arterial and grade separation improvements

Additional strategies include:

- Support recommendations of SANBAG Ontario Airport Rail Access Study to initiate transit connection to Metrolink and build transit market
- Continue analysis of transit options in upcoming SCAG Inter-County Transit and Rail Study
- Support development of intermodal transportation center
- Explore possibility of direct access from future Interstate 10 Express Lanes
- Consider focus on tourist charters that can attract passengers and use high-capacity vehicles for ground access
- Continue improvements to highways and arterials

For more details on how the region is expected to meet demands for airport service in the future, see the Aviation & Airport Ground Access Appendix.

TECHNOLOGICAL INNOVATION AND 21ST CENTURY TRANSPORTATION

Since SCAG adopted the 2012 RTP/SCS, technology and innovation have emerged as major themes of this Plan update. Technology as a concept is a very broad topic. The term has myriad connotations and encompasses products such as smart phones and electric cars; advancements in software development such as real-time travel information and online banking; and new service paradigms such as ride sourcing and peer-to-peer home sharing. Some of these so-called "new" concepts have actually been around for a long time, but only recently have they scaled up because of technological innovations. For example, car sharing and bike sharing concepts have been in development since the 1980s, but only in recent years has the ubiquity of cellular phones with Internet access, precise geographic mapping and the ability to instantly approve payments between users and providers made these systems more useful to a wider audience. The 2016 RTP/SCS uses the term "mobility innovations" to characterize the new technologies that help us move about the region.

MOBILITY INNOVATIONS

The 2016 RTP/SCS includes policies and analyzes the market growth of four key new mobility innovations: Zero-Emissions Vehicles, Neighborhood Electric Vehicles, Car sharing services and Ridesourcing (also known as Transportation Network Companies or TNCs). Please see the Mobility Innovations Appendix for policy recommendations and additional information.

Zero-Emissions Vehicles

While SCAG's policies are technology neutral with regard to supporting zero- and/or near zero-emissions vehicles, this section will focus on zero-emissions vehicles. Since SCAG adopted the 2012 RTP/SCS, the Governor's Office released the Zero Emissions Vehicle (ZEV) Action Plan for 2013 and 2015. These plans identified state level funding to support the implementation of Plug-in Electric Vehicle (PEV) and Hydrogen Fuel Cell refueling networks. As part of the 2016 RTP/SCS, SCAG modeled PEV growth specific to Plug-in Hybrid Electric Vehicles (PHEV) in the SCAG region. These are electric vehicles that are powered by a gasoline engine when their battery is depleted. The 2016 RTP/SCS proposes a regional charging network that will increase the number of PHEV miles driven on electric power. In many instances, these chargers may double the electric range of PHEVs. A fully funded regional charging network program would result in a reduction of one percent per capita greenhouse gas emissions.

Neighborhood Electric Vehicles (NEVs)

Neighborhood Mobility Areas reflect state and local policies to encourage the use of alternative modes of transportation for short trips. In the SCAG region, about 38 percent of all trips are three miles or less, but nearly 78 percent of these trips are made by driving full-sized cars. These short trips can easily be taken using an NEV. Policies to increase the purchase and roadway designs that increase the use of NEVs for short trips in Neighborhood Mobility Areas would result in a reduction of 0.1 percent per capita greenhouse gas emissions.

Shared Mobility (Includes the concept of Ridesourcing)

Shared Mobility refers to new mobility paradigms as well as old models that

GHG REDUCTIONS FROM MOBILITY INNOVATIONS 2040

ZERO-EMISSIONS VEHICLE (ZEV)

1.0%

NEIGHBORHOOD ELECTRIC VEHICLE (NEV)

0.1%

CARSHARING/ RIDESOURCING

0.9%

are finding new markets and methods of delivery, thanks to new technology platforms. Shared Mobility encompasses a wide range of services including:

- Return Trip Car Sharing
- Point-to-Point Car Sharing
- Peer-to-Peer Car Sharing
- Ridesourcing (also known as Transportation Network Companies)
- Dynamic On-Demand Private Transit
- Vanpool and Private Employer Charters

For all these services, mobile computing and payment systems are reducing transaction costs and opening up traditional mobility services to a wider population of producers and consumers. The net effect of these services on transportation mode choices and per capita VMT is still to be determined. However, preliminary research shows that the availability and use of these services correlates with a reduction in individual vehicle ownership. This reduction in ownership, meanwhile, results in an increase in non-motor vehicle modes for discretionary trips. In other words, people who no longer own a car will be more selective in their car trips.

In developing the 2016 RTP/SCS, SCAG looked at areas in which shared mobility services are expected to increase. The Plan anticipates robust growth in car sharing and ridesourcing. Ridesourcing is a term coined by researchers to refer to mobile phone-based applications that put riders in touch with drivers for a fee. Some drivers on one platform are professionals, while many other drivers are non-professionals earning income from giving rides. Policies to increase the use of car sharing and ridesourcing would result in a combined reduction of 0.9 percent greenhouse gas emissions.

ANTICIPATING CAR-TO-CAR COMMUNICATION AND AUTOMATED VEHICLE TECHNOLOGIES

Automakers already are manufacturing and installing advanced driver assist systems that can automatically center, reduce speed and brake in anticipation of vehicles ahead. Trucking companies are road testing automated driving and "platooning"—in which automated trucks safely follow or draft each other at very close distances to conserve fuel. Global corporations and research labs are testing small, fully automated vehicles on public roads. Certain automakers have begun experimenting with new service models like "fractional ownership" in which targeted customers collectively lease and share a vehicle. Locking and ignition packages are being offered to simplify the use of peer-to-peer car sharing platforms. These developments point to a very different vehicle ownership paradigm 25 years from now.

Automated/Connected Vehicle (ACV) innovations cover a range of enabling advancements that allow vehicles to operate with less driver input and coordinate with other vehicles to achieve improvements in safety, throughput and user experience. The term ACV covers on-board sensing capabilities, data integration and vehicle-to-vehicle (V2V) communication. ACV covers two distinct innovation paths: autonomous operation, where vehicles rely on digital maps and on-board sensing to operate without any driver input; and connected vehicle operation, where vehicles communicate with one another as well as the roadways they are traveling on. However, these two paths are being developed simultaneously and they may need to be integrated to achieve full benefits in terms of safety and reducing congestion, as promised by researchers. Vehicle to Infrastructure (V2I) communication is another aspect that is covered under roadway ITS operations. It is important to note that vehicles capable of partially automated operation, such as the top-of-the-line Mercedes S-Class and Infiniti Q35, are already available to the public. The California and Nevada Departments of Motor Vehicles (DMV) have already licensed manufacturers for on-road testing and those agencies will be releasing consumer model permitting rules by 2016.

Due to the uncertainty of deployment timelines and operational characteristics, initial research shows inconsistent impacts on travel behavior and locational choice. Some traffic simulations show that in the initial phases ACVs may increase congestion, especially if safety features are mandated at the expense of system operational efficiency. On the other hand, if fully automated vehicles change the vehicle ownership paradigm, they may facilitate more on-demand transportation services and an increased reduction in household vehicle ownership. In the long term, ACVs have the ability to dramatically increase the carrying capacity of the regional roadway network.

PROTECTING THE ENVIRONMENT

Integrating the many transportation and land use strategies discussed in this chapter will help protect the region's natural environment—in numerous ways. SCAG has been committed to this integration, as well as protecting the environment, for years. However, environmental protection is now a major requirement of Moving Ahead for Progress in the 21st Century Act (MAP-21). Pursuant to Section 23 U.S. Code Section 134, "a long-range transportation plan shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan." The 2016 RTP/SCS also considers and is consistent with the provisions of the Fixing America's Surface Transportation Act (FAST Act).

The 2016 RTP/SCS, therefore, includes a discussion of mitigation measures consistent with these requirements. As a public agency in California, SCAG first and foremost fulfills mitigation requirements by complying with the California Environmental Quality Act (CEQA), so this section of the Plan includes a summary of mitigation as laid out in the Program Environmental Impact Report (PEIR) accompanying the 2016 RTP/SCS.

In addition, as part of the planning process, MPOs "shall consult, as appropriate, with State and local agencies responsible for land use management, natural resources, environmental protection, conservation and historic preservation concerning the development of the transportation plan." They also must consider, if available, "State conservation plans or maps" and "inventories of natural or historic resources."

California law requires SCAG to prepare and certify a PEIR prior to adopting the 2016 RTP/SCS. The PEIR evaluates potential environmental impacts of the 2016 RTP/SCS when compared with existing conditions, and proposes measures at the program level to mitigate impacts to the maximum extent feasible for those resource areas that would be affected by the Plan (and associated induced growth). These impact areas include Aesthetics; Agriculture and Forestry Resources; Air Quality; Biological Resources; Cultural Resources; Energy; Geology and Soils; Greenhouse Gas Emissions and Climate Change; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Mineral Resources; Noise; Population, Housing and Employment; Public Services; Recreation; Transportation, Traffic and Safety; and Utilities and Service Systems. The 2016 RTP/SCS also acts as a "self-mitigating" plan in certain impact areas, in that its policies and strategies lead to improved environmental outcomes for air quality, greenhouse gas emissions, public health, congestion and other indicators, while accommodating existing and projected population growth. The section below summarizes the mitigation program contained within the PEIR for this Plan. The general purpose of the mitigation measures included in the PEIR is to identify how to protect the environment, and natural and cultural resources; improve the linkage between transportation and environmental planning; and enhance public health in concert with the proposed transportation improvements and related land use planning strategies.

It should be clearly noted that the 2016 RTP/SCS itself leads to improved environmental outcomes for per capita greenhouse gas emissions, the preservation of natural lands, recreational and active transportation opportunities and improved public health, among other key environmental indicators compared to the No Project Alternative. Nevertheless, the implementation of Plan programs, policies and strategies may lead to environmental impacts compared to the existing conditions. As such, program-level performance-based mitigation measures designed to offset any identified potentially significant adverse programmatic level environmental effects are summarized below. Project-level environmental mitigation should be appropriately identified and prepared by implementing agencies on a project-by-project or site-by-site basis as projects proceed through the design and decision-making process. Transportation project implementation and development decisions are subject to their own environmental review process and are expected to implement project-specific mitigation measures to minimize environmental impacts. This section, along with more detailed information in the PEIR, provides a framework that identifies feasible measures as resources which lead agencies can and should implement when they identify and mitigate project-level environmental impacts.

MITIGATION STRATEGIES

The PEIR provides a list of mitigation measures, which would be implemented by SCAG on a regional level, in order to assist in reducing environmental impacts related to implementation of the 2016 RTP/SCS. SCAG is also responsible for developing a plan to monitor mitigation activities to track progress on implementation of these measures at the regional level. SCAG's mitigation is consistent with the general role played by a Metropolitan Planning Organization, including developing and sharing information, collaborating with partners and developing regional policies. SCAG works with member agencies and stakeholders but it does not identify, evaluate or implement projects or project-specific mitigation.

In addition, the PEIR includes a "catch-all" mitigation measure for each of the CEQA resource categories, stating that lead agencies "can and should" comply with generally applicable performance standards that are linked to existing statutes, regulations and adopted general plans, where available and appropriate. They are not intended to supersede compliance with existing law, regulations and adopted general plans. Instead, they help explain to lead agencies that the existing regulatory framework that could assist in mitigating potential environmental impacts at the project level.

CONSERVATION PLANNING POLICY

Long-range transportation plans are required to discuss the types of potential environmental mitigation activities and potential areas to carry out these activities. This includes activities that may have the greatest potential to restore and maintain the environmental functions affected by the Plan [23 U.S. Code Sec. 134]. As such, this is being addressed in the 2016 RTP/SCS and is separate and distinct from the mitigation measures addressed in the PEIR.

SCAG could approach federal requirements for mitigation by continuing and expanding the efforts already undertaken since the adoption of the 2012 RTP/SCS. Those efforts included mapping potential priority conservation areas, engaging partners, and developing regional mitigation policies and approaches for this plan. As outlined in the 2012 RTP/SCS, the goal of these efforts is the development of a program of large-scale acquisition and management of important habitats lands to mitigate impacts related to future transportation projects. In the 2016 RTP/SCS, regional goals also include supporting local land use strategies that reduce the demand for building outside of the existing development footprint, especially in important habitat areas. Building on this effort has the potential to create a regional conservation program that stakeholders such as CTCs, local jurisdictions, agencies, and non-profits can align with and support. SCAG has already engaged many of these stakeholders by convening a working group. This strategic and comprehensive approach allows for regional growth and progress, while at the same time ensuring that important natural and working lands and water resources are protected in perpetuity. With that as the foundation, the following suggested next steps for further development of a conservation policy could include the following:

• Expanding on the Natural Resource Inventory Database and Conservation Framework and Assessment by incorporating strategic mapping layers to build the database and further refine the priority conservation areas

• Encouraging CTCs to develop advance mitigation programs or include them in future transportation measures

• Aligning with funding opportunities and pilot programs to begin implementation of the Conservation Plan through acquisition and restoration

• Providing incentives to jurisdictions that cooperate across county lines to protect and restore natural habitat corridors, especially where corridors cross county boundaries

Please see the Natural & Farm Lands Appendix for additional detail.

SUMMARY OF THE ENVIRONMENTAL MITIGATION PROGRAM

The 2016 RTP/SCS includes an environmental mitigation program that links transportation planning to the environment. Building on its strong commitment to the environment as demonstrated in the 2012 RTP/SCS, SCAG's mitigation program is intended to function as a resource for lead agencies to consider in identifying mitigation measures to reduce impacts anticipated to result from future projects as deemed applicable and feasible by such agencies. This mitigation discussion also utilizes documents created by federal, state and local agencies to guide environmental planning for transportation projects. The following discussion focuses on specific resource areas and example mitigation measures to avoid or substantially reduce the significant environmental impacts in these areas.

AESTHETICS

The SCAG region includes several highway segments that are recognized by the State as designated scenic highways or are eligible for such designation. Construction and implementation of projects in the 2016 RTP/SCS could impact designated scenic highways and restrict or obstruct views of scenic resources such as mountains, ocean, rock outcroppings, etc. In addition, some transportation projects could add urban visual elements, such as transportation infrastructure (highways, transit stations) to previously natural areas.

Mitigation measures developed by SCAG to minimize impacts to Aesthetics include, but are not limited to, information sharing regarding the locations of designated scenic vistas, and regional program development as part of SCAG's ongoing regional planning efforts, such as web-based planning tools for local government and direct technical assistance efforts such as the Toolbox Tuesday Training series and the sharing of associated online training materials.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines and review of county and city general plans and Caltrans designated scenic vistas, aesthetics performance standards-based mitigation measures may include, but are not limited to:

- Encourage the implementation of design guidelines by counties and cities, local policies, and programs aimed at protecting views of scenic corridors and avoiding visual intrusions in design of projects to minimize contrasts in scale and passing between the project and surrounding natural forms and developments.
- Design landscaping along highway corridors to add significant natural elements and visual interest to soften the hard-edged, linear transportation corridors.

- Remove blight or nuisances that compromise visual character or visual quality of project areas including graffiti abatement, trash removal, landscape management, maintenance of signage and billboards in good condition, and replacing compromised native vegetation and landscape.

AGRICULTURE AND FORESTRY RESOURCES

Approximately 2.6 million acres of important agricultural lands in the SCAG region currently exists. Out of the 2.6 million acres, 1.1 million acres are designated as Important Farmland and the other 1.5 million acres are designated as grazing land. With respect to forests and timberlands, forest lands include the Angeles National Forest, Cleveland National Forest, Los Padres National Forest, and San Bernardino National Forest, as well as forest lands with open space zones in Imperial and Los Angeles counties. No Timberland Production Zone exists within the SCAG region. However, the harvesting of timberland is only permitted in two agricultural zones, with one limited to Christmas tree harvesting. The 2016 RTP/SCS includes transportation projects and strategies that would have the potential to convert some Prime Farmland, Farmland of Statewide Importance, and Unique Farmland in all six counties and affect Local Farmland and Grazing land in five of the six counties. Forest and timberland zones would result in less than significant impacts.

SCAG-developed mitigation measures include, but are not limited to, coordination among applicable resource agencies, information sharing, and regional program development as part of SCAG's ongoing regional planning efforts, such as web-based planning tools for local government including CA LOTS, and other GIS tools and data services, including, but not limiting to, Map Gallery, GIS library, and GIS applications; and direct technical assistance efforts such as the Toolbox Tuesday Training series and sharing of associated online Training materials. Lead agencies, such as county and city planning departments, shall be consulted during this update process.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, review of county and general plans and consistent with the Farmland Protection Policy Act of 1981 and the Farmland Mapping and Monitoring Program of the California Resources Agency, agriculture and forestry resource performance standards-based mitigation measures may include, but are not limited to:

- Encourage enrollments of agricultural lands that have Williamson Act programs.
- Develop project relocation realignment to avoid lands in Williamson Act contracts.
- Establish conservation easements consistent with the recommendations of the Department of Conservation, Farmland Security Zones, Williamson Act contracts, or other conservation tools.

AIR QUALITY

The 2016 RTP/SCS includes programs, policies and measures to address air emissions. Measures that help mitigate air emissions are comprised of strategies that reduce congestion, increase access to public transportation, improve air quality, and enhance coordination between land use and transportation decisions. In order to disclose potential environmental effects of the 2016 RTP/SCS, SCAG has prepared an estimated inventory of the region's emissions, and identified mitigation measures. The mitigation measures seek to achieve the maximum feasible and cost-effective reductions in emissions.

Mitigation measures developed by SCAG to minimize impacts to Air Quality include, but are not limited to, the determination as part of its conformity findings, pursuant to the federal CAA, that the Plan and its subsequent updates provided for the timely implementation of transportation control measures (TCM). Demonstration of TCM timely implementation including a list of these TCMs is documented in the Transportation Conformity Analysis Appendix. Additionally, during the 2016 to 2040 planning period, SCAG shall pursue activities to reduce the impacts associated with health risks for sensitive receptors within 500 feet of highways and high-traffic volume roadways.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, and within the responsibility and jurisdiction of ARB, air quality management districts and other regulatory agencies, air quality performance standards-based mitigation measures may include, but are not limited to:

- Reduce emissions with the use of clean fuels and reducing petroleum dependency.
- Use watering trucks to minimize dust; watering should be sufficient to confine dust plumes to the project work areas.
- Revegetate disturbed lands, including vehicular paths created during construction to avoid future off-road vehicular activities.
- As appropriate, require that portable engine-driven equipment units used at the project work site, with the exception of on-road and off-road motor vehicles, obtain ARB Portable Equipment Registration with the state or local district permit.

BIOLOGICAL RESOURCES

The 2016 RTP/SCS seeks to minimize transportation-related impacts on wildlife, and also better integrate transportation infrastructure into the environment.

Impacts to biological resources generally include displacement of native vegetation and habitat on previously undisturbed land; habitat fragmentation and decrease in habitat connectivity; and displacement and reduction of local, native wildlife including sensitive species. Building new transportation routes and facilities through undisturbed land or expanding facilities and increasing the number of vehicles traveling on existing routes will directly injure wildlife species, cause wildlife fatalities, and disturb natural behaviors such as breeding and nesting. Without appropriate mitigation, this will result in the direct reduction or elimination of species populations (including sensitive and special-status species) and native vegetation (including special-status species and natural communities) as well as the disruption and impairment of ecosystem services provided by native habitat areas.

Mitigation measures developed by SCAG to minimize impacts to biological resources include, but are not limited to, consultation with resource agencies, as well as local jurisdictions to incorporate any local HCPs or other similar planning documents. Development of a conservation strategy with local jurisdictions and agencies and maintaining a list/map of potential conservation opportunity areas based on the most recent land use data.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, within county and city general plans, the responsibility and jurisdiction of the USFWS, the CDFW, and other applicable agencies, biological resources performance standards-based mitigation measures may include, but are not limited to:

- Design projects to avoid sensitive natural communities and riparian habitats.
- Install fencing and/or mark sensitive habitat to be avoided during construction activities.
- Salvage and stockpiling topsoil and perennial plants for use in restoring native vegetation to all areas of temporary disturbance within the project area.

CULTURAL RESOURCES

Impacts to cultural resources, inclusive of tribal cultural resources, generally include substantial adverse changes to historical and archaeological resources and direct or indirect changes to unique paleontological resources or sites or unique geological features. These impacts can occur at the localized scale and in relation to existing conditions, as the Plan itself does not affect the total amount of growth in the region. Adverse changes include the destruction of culturally and historically (recent or geologic time) significant and unique historical, archaeological, paleontological, and geological features.

Mitigation measures developed by SCAG to minimize impacts to Cultural resources include, but are not limited to, sharing of information and SCAG's ongoing regional planning efforts such as web-based planning tools for local government including CA LOTS, and direct technical assistance efforts such as the Toolbox Tuesday series. Resource agencies, such as the Office of Historic Preservation shall be consulted during this process.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, and review of county and city general plans, cultural resources performance standards-based mitigation measures may include, but are not limited to:

- Comply with Section 106 of the National Historic Preservation Act (NHPA) including, but not limited to, projects for which federal funding or approval is required for the individual project.
- Employ design measures to avoid historical resources and undertake adaptive reuse where appropriate and feasible. If resources are to be preserved, as feasible, project sponsors should carry out the maintenance, repair, stabilization, rehabilitation, restoration, preservation, conservation or reconstruction in a manner consistent with the Secretary of the Interior's Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.
- Comply with California Health and Safety Code, Section 7050 and Sections 18950–18961, in the event of discovery or recognition of any human remains during construction or excavation activities associated with the project, in any location other than a dedicated cemetery, ceasing further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the coroner of the county has been informed and has determined that no investigation of the cause of death is required.

ENERGY

California consumes more energy than any other state except Texas. However, in terms of energy consumption per person, California ranks 49th among the 50 states and District of Columbia. Current annual energy consumption in

California (including transportation) is approximately 7,641 trillion Btu, which represents approximately 7.9 percent of the nation's energy consumption. Transporting water into California is also a very energy intensive process. The California State Water Project (SWP) is the single largest user of energy in the state. The SWP uses approximately 5 billion kWh/year of electricity which is equal to 2 to 3 percent of the total electricity consumed in California. Water-related energy consumes approximately 20 percent of the total electricity in California. Implementation of the 2016 RTP/SCS would result in an increase in energy use due to the increase in households and transportation projects in the SCAG region.

SCAG developed mitigation measures include, but are not limited to, working with local jurisdictions and energy providers, through its Energy and Environment Committee, and administration of the Clean Cities program, Sustainability Planning grants program, and other SCAG energy-related planning activities, to encourage energy efficient building development. Additional measures include, pursuing partnerships with Southern California Edison, municipal utilities, and the California Public Utilities Commission to promote energy efficient development in the SCAG region, through coordinated planning, data and information sharing activities

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, county and city form-based zoning codes and future updated zoning codes, energy performance standards-based mitigation measures may include, but are not limited to:

- Using energy efficient materials in building design, construction, rehabilitation, and retrofit.
- Reduce lighting, heating, and cooling needs by taking advantage of light colored roofs, trees for shade, and sunlight.

GEOLOGY AND SOILS

Impacts to geological resources generally include the disturbance of unstable geologic units (rock type) or soils, causing the loss of topsoil and soil erosion, slope failure, subsidence, project-specific seismic activity and structural damage from expansive soils. These activities, in addition to building projects on and around Alquist-Priolo Fault Zones and other local faults, could expose people and/or structures to the risk of loss, injury, or death.

Mitigation measures developed by SCAG to minimize impacts to Geology and Soils include, but are not limited to, sharing of information, and regional program development as part of SCAG's ongoing regional planning efforts, such as web-based planning tools for local government including CA LOTS, and direct technical assistance efforts such as the Toolbox Tuesday series. Resource agencies, such as the U.S. Geology Survey shall be consulted during this update process.

Based on County and City General Plans, geology and soils performance standards-based mitigation measures may include, but are not limited to:

- Comply with Section 4.7.2 of the Alquist-Priolo Earthquake Fault Zoning Act, requiring a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.
- Comply with the CBC and local regulatory agencies with oversight of development associated with the project, ensuring that projects are designed in accordance with county and city code requirements for seismic ground shaking.
- Adhere to design standards described in the California Building Code and all standard geotechnical investigation, design, grading, and construction practices to avoid or reduce impacts from earthquakes, ground shaking, ground failure, and landslides.

GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

California is the fifteenth largest emitter of greenhouse gases on the planet. The transportation sector, primarily cars and trucks that move goods and people, is the largest contributor with 37 percent of the state's total greenhouse gas emissions in 2013. On road emissions (from passenger vehicles and heavy duty trucks) constitute 90 percent of the transportation sector total. In order to disclose potential environmental effects of the 2016 RTP/SCS, SCAG has prepared an estimated inventory of the region's existing greenhouse gas emissions, identified mitigation measures, and compared alternatives in the PEIR. Although the 2016 RTP/SCS demonstrates a reduction in per capita greenhouse gas emissions and meets Senate Bill 375 targets, mitigation is identified here in summary form, and in the PEIR, to provide information on how greenhouse gas emissions can be reduced from other sectors as well as through subsequent planning and implementation.

SCAG developed mitigation measures include, but are not limited to, updating any future RTP/SCS to incorporate polices and measures that lead to reduced greenhouse gas emissions in accordance with Assembly Bill 32; coordination with ARB and air districts in efforts to implement the Assembly Bill 32 plan; continuing the coordination with other metropolitan planning organizations regarding statewide strategies to reduce greenhouse gas emissions and facilitate the implementation of Senate Bill 375. Additional measures include, working with utilities, sub-regions, and other stakeholders to promote an accelerated penetration of zero (and/or near zero) emission vehicles in the region, including developing a strategy for the deployment of public charging infrastructure.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, and within the responsibility and jurisdiction of ARB, local air districts, and/or lead agencies, greenhouse gas emissions and climate change standards-based mitigation measures may include, but are not limited to:

- Reduce emissions resulting from a project through implementation of project features, project design, or other measures.
- Incorporate Best Available Control Technology (BACT) during design, construction and operation of projects to minimize greenhouse gas emissions.
- Adopt plan or mitigation program for the reduction of emissions that are required as part of the Lead Agency's decision.
- Use energy and fuel efficient vehicles and equipment.
- Use the minimum feasible amount of greenhouse gas emitting construction materials that is feasible.
- Incorporate design measures to reduce greenhouse gas emissions from solid waste management through encouraging solid waste recycling and reuse.
- Incorporate design measures to reduce energy consumption and increase use of renewable energy.
- Plant shade trees in or near construction projects where feasible.
- Construct buildings to Leadership in Energy and Environmental Design (LEED) certified standards.

HAZARDS AND HAZARDOUS MATERIALS

Implementation of the 2016 RTP/SCS would affect the transportation and handling of hazardous materials in the SCAG region. Expected significant impacts include risk of accidental releases due to an increase in the transportation of hazardous materials and the potential for such releases to reach neighborhoods and communities adjacent to transportation facilities. The hazardous materials mitigation program aims to minimize the significant hazard to the public or the environment that involves the release of hazardous materials into the environment.

SCAG developed mitigation measures include, but are not limited to, coordination efforts with the United States Department of Transportation (U.S. DOT), the Office of Emergency Services, California Department of Transportation (Caltrans) and the private sector to continue to conduct driver safety training programs. Additionally, SCAG shall encourage the U.S. DOT and the California Highway Patrol to continue to enforce speed limits and existing regulations governing goods movement and hazardous materials transportation.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, provisions of the Hazardous Waste Control Act, the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program, the Hazardous Waste Source Reduction and Management Review Act of 1989, and the California Vehicle Code, hazards and hazardous materials standards-based mitigation measures may include, but are not limited to:

- Provide a written plan of proposed routes of travel demonstrating use of roadways designated for the transport of hazardous materials.
- Follow the manufacturer's recommendations on use, storage, and disposal of chemical products used during construction.
- During routine maintenance of construction equipment, properly contain and remove grease and oils.

HYDROLOGY AND WATER QUALITY

Impacts to hydrology and water quality from the 2016 RTP/SCS include potential water quality impairment from increased impervious surfaces. Increased impervious surfaces in water recharge areas potentially impact groundwater recharge and groundwater quality. Cumulative impacts include increased impervious surfaces; increased development in alluvial fan floodplains; and increased water demand and associated impacts, such as drawdown of groundwater aquifers. These impacts can occur at the localized scale and in relation to existing conditions, as the Plan itself does not affect the total amount of growth in the region. Increased output of greenhouse gases from the region's transportation system impacts the security and reliability of the imported water supply.

SCAG developed mitigation measures include, but are not limited to, working with local jurisdictions and water quality agencies, to encourage regional-scale planning for improved water quality management/demand and pollution prevention, providing opportunities for information sharing with respect to wastewater treatment and regional program development to promote Low Impact Development (LID) and reduce hydromodification.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, and within the jurisdiction and authority of the Regional Water Quality Control Boards and other regulatory agencies, hydrology and water quality standards-based mitigation measures may include, but are not limited to:

- Complete, and have approved, a Stormwater Pollution Prevention Plan (SWPPP) prior to initiation of construction.
- Complete, and have approved, a Standard Urban Stormwater Management Plan, prior to occupancy of residential or commercial structures.
- Incorporate as appropriate, treatment and control features such as detention basins, infiltration strips, and porous paving, other features to control surface runoff and facilitate groundwater recharge into the design of new projects early on in the process to ensure that adequate acreage and elevation contours are provided during the right-of-way acquisition process.

LAND USE AND PLANNING

The 2016 RTP/SCS contains transportation projects to help more efficiently distribute population, housing, and employment growth, as well as a forecasted Land Development Category pattern of development described in detail in the SCS. These transportation projects and land use strategies are generally consistent with the county- and regional-level general plan data available to SCAG; however, general plans are not updated consistently. The Plan includes a projected Land Development Category pattern of development that, in order to maximize the effectiveness of the transportation system differs from local General Plan land uses beyond 2020.

SCAG developed mitigation measures include, but are not limited to, coordinate with member cities and counties to encourage that general plans consider and reflect as appropriate RTP/SCS policies and strategies. Other measures include infill, mixed-use, higher density and other sustainable development, and work with partners to identify incentives to support the creation of affordable housing in mixed-use zones. Additionally, SCAG shall work with its member cities and counties to encourage that transportation projects and growth are consistent with the RTP/SCS and general plans.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines and review of county and city general plans, land use and planning standards-based mitigation measures may include, but are not limited to:

- Ensure that the project is consistent with the applicable goals and policies of the adopted general plan where the project is located.
- Where an inconsistency is identified, determine if the environmental, social, economic, and engineering benefits of the proposed land use strategy or transportation improvement warrant a variance from adopted zoning or an amendment to the general plan.
- Wherever feasible incorporate direct crossings, overcrossings, or undercrossings at regular intervals for multiple modes of travel (e.g., pedestrians, bicyclists, vehicles).

MINERAL RESOURCES

Transportation projects as well as Land Development Category development patterns influenced by land use strategies identified in the 2016 RTP/SCS would require substantial amounts of aggregate resources to construct facilities. This would result in a significant impact. The six-county and 191 cities SCAG region has about 1,446 million tons of permitted aggregate reserves. The California Geological Survey (CGS) estimates that the SCAG region would need about 4,728 million tons of aggregate over the next 50 years. The difference of 3,282 million tons in demand could result in a shortage of aggregate supply. Based on this anticipated shortage of aggregate supply over the next 50 years, there would be an anticipated shortage during the next 25 years during implementation of the 2016 RTP/SCS.

SCAG developed mitigation measures include, but are not limited to, the coordination with the Department of Conservation, the CGS to maintain a database of (1) available mineral resources in the SCAG region including permitted and un-permitted aggregate resources and (2) the anticipated 50-year demand for aggregate and other mineral resources. Based on the results of this survey, SCAG shall work with local agencies on strategies to address anticipated demand, including identifying future sites that may seek permitting and working with industry experts to identify ways to encourage and increase recycling to reduce the demand for aggregate.

Based on County and City General Plans, mineral resources standards-based mitigation measures may include, but are not limited to:

- Recycle and reuse building materials resulting from demolition, particularly aggregate resources, to the maximum extent practicable.
- Identify and use building materials, particularly aggregate materials, resulting from demolition at other construction sites in the SCAG region, or within a reasonable hauling distance of the project site.

- Design transportation network improvements in a manner (such as buffer zones or the use of screening) that does not preclude adjacent or nearby extraction of known mineral and aggregate resources following completion of the improvement and during long-term operations.

NOISE

Some of the principal noise generators within the SCAG region are associated with transportation (i.e., airports, highways, arterial roadways, seaports, and railroads). Additional noise generators include stationary sources, such as industrial manufacturing plants and construction sites. Noise impacts resulting from the 2016 RTP/SCS generally include exposure of sensitive receptors to noise in excess of normally acceptable noise levels or substantial increases in noise as a result of the operation of expanded or new transportation facilities.

SCAG developed mitigation measures include, but are not limited to, the coordination with member agencies as part of SCAG's outreach and technical assistance to local governments under Toolbox Tuesday Training series, to encourage that projects involving residential and commercial land uses are encouraged to be developed in areas that are normally acceptable to conditionally acceptable, consistent with the Governor's Office of Planning and Research Noise Element Guidelines.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines and review of county and city general plans, noise standards-based mitigation measures may include, but are not limited to:

- Install temporary noise barriers during construction.
- Include permanent noise barriers and sound-attenuating features as part of the project design.
- Schedule construction activities consistent with the allowable hours pursuant to applicable general plan noise element or noise ordinance where construction activities are authorized outside the limits established by the noise element of the general plan or noise ordinance; notify affected sensitive noise receptors and all parties who will experience noise levels in excess of the allowable limits for the specified land use, of the level of exceedance and duration of exceedance; and provide a list of protective measures that can be undertaken by the individual, including temporary relocation or use of hearing protective devices.

POPULATION, HOUSING AND EMPLOYMENT

Transportation projects and land use strategies including new and expanded infrastructure are necessary to improve travel time and can enhance quality of life for those traveling throughout the region. The package of transportation improvements in the 2016 RTP/SCS is designed to accommodate total growth while maintaining or improving for mobility. The Plan would not affect the total growth in population in the region. The 2016 RTP/SCS can affect the distribution of that growth. Land use and housing impacts associated with transportation projects and development influenced by land use strategies, such as dividing established communities through right-of-way acquisition, can occur at a localized scale.

SCAG developed mitigation measures include, but are not limited to, working with member agencies to encourage and assist growth strategies to create an urban form designed to focus development in HQTAs in accordance with the polices, strategies and investments contained in the 2016 RTP/SCS, enhancing mobility and reducing land consumption.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines and review of county and city general plans, population, housing and employment standards-based mitigation measures may include, but are not limited to:

- Evaluate alternate route alignments and transportation facilities that minimize the displacement of homes and businesses. Use an iterative design and impact analysis where impacts to homes or businesses are involved to minimize the potential of impacts on housing and displacement of people.
- Prioritize the use of existing ROWs, wherever feasible.
- Develop a construction schedule that minimizes potential neighborhood deterioration from protracted waiting periods between right-of-way acquisition and construction.
- Construct affordable housing units, deed restricted to remain affordable for an appropriate period of time, as feasible or payment of fee, with the appropriate nexus to the impact, where such fees were established to address loss of affordable housing.

PUBLIC SERVICES

Any impacts to public services are identified only in relation to existing conditions or at a localized scale. These impacts generally include additional demands on fire and police services, schools and landfills. Additional police and fire personnel would be needed to adequately respond to emergencies and routine calls, particularly on new or expanded transportation facilities. Other potential impacts at a localized scale could entail demands on public schools, solid waste facilities and disposal facilities.

SCAG developed mitigation measures include, but are not limited to, supporting local jurisdictions and other service providers in their efforts to develop sustainable communities and provide, equally to all members of society, accessible and effective services such as: public education, housing, health care, social services, recreational facilities, law enforcement, and fire protection.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines and review of county and city general plans, public services standards-based mitigation measures may include, but are not limited to:

- Coordinate with local public protective security services to ensure that the existing public protective security services would be able to handle the increase in demand for their services. If the current levels of services at the project site are found to be inadequate, provide fair share contributions towards infrastructure improvements and/or personnel requirements for the appropriate public services
- Identify projects that have the potential to generate the need for expanded emergency response services. Where such services and related staffing needs exceed the capacity of existing facilities, provide for the construction of new facilities directly as an element of the project or through a dedicated fair share contributions toward infrastructure improvements.

RECREATION

Impacts to recreation from the 2016 RTP/SCS would result from an increase in population. The use of regional parks and other recreational facilities are expected to increase and result in a substantial physical deterioration of facilities at an accelerated rate. Additionally, transportation projects included in the 2016 RTP/SCS could result in potentially significant impacts to recreational facilities which include closures to gaps in the highway network through areas that currently service as open space lands.

SCAG developed mitigation measures include, but are not limited to, facilitating the reduction of impacts as a result of increased use in recreational facilities through cooperation with member agencies, information sharing, and program development in order to ensure consistency with planning for expansion of new neighborhood parks within or in nearby accessible locations to HQTAs in funding opportunities and programs administered by SCAG.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines and review of county and city general plans, recreation standards-based mitigation measures may include, but are not limited to:

- Where projects require the construction or expansion of recreational facilities or the payment of equivalent Quimby fees, consider increasing the accessibility to natural areas and lands for outdoor recreation from the proposed project area, in coordination with local and regional open space planning or management agencies.
- Where construction or expansion of recreational facilities is included in the project or required to meet public park service ratios, apply necessary mitigation measures to avoid or reduce significant environmental impacts associated with the construction or expansion of such facilities, through the imposition of conditions required to be followed to avoid or reduce impacts associated with air quality, noise, traffic, biological resources, greenhouse gas emissions, hydrology and water quality, and others that apply to specific construction or expansion of new or expanded public service facilities.

TRANSPORTATION, TRAFFIC AND SAFETY

The 2016 RTP/SCS takes into account the population, households, and employment projected for 2040, and therefore the largest demand on the transportation system expected during the lifetime of the plan. In accounting for the effects of regional population growth, the model output provides a regional, long-term and cumulative level of analysis for the impacts of the 2016 RTP/SCS on transportation resources. The regional growth, and thus, cumulative impacts, is captured in the vehicle miles traveled (VMT), vehicle hours traveled (VHT), and heavy-duty truck VHT data. Consistent with Senate Bill 375 Regional Target Advisory Committee's final report to the California Air Resources Board, the 2016 RTP/SCS includes projects and strategies to reduce congestion and promote friendly speeds on the roadways. A subset of projects included in the 2016 RTP/SCS reduces greenhouse gas emissions by providing relief of existing and projected congestion. Those include toll roads, express lanes, high occupancy vehicle lanes, and dedicated truck toll lanes. Congestion pricing is a transportation demand management tool incorporated into the 2016 RTP/SCS that would reduce greenhouse gas emissions in addition to more efficient utilization of existing facilities. The SCAG region is vulnerable to numerous threats that include both natural and human caused incidents. As such, a mitigation program related to safety is included in the PEIR.

SCAG developed mitigation measures include, but are not limited to, the facilitation of minimizing impacts to emergency access through ongoing regional planning efforts such as meetings with local member agencies, maintain forums with policy makers, and workshops with local, regional, and state partners such as Department of Transportation, Congestion Management Agencies, Fire Department, and other local enforcement agencies during consultation on development and maintenance of the Regional Transportation Plan.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, county and city general plans and congestion management programs, transportation standards-based mitigation measures may include, but are not limited to:

- Promote ride sharing programs e.g., by designating a certain percentage of parking spaces for high-occupancy vehicles, providing larger parking spaces to accommodate vans used for ride-sharing, and designating adequate passenger loading and unloading and waiting areas.
- Encourage bicycling to transit facilities by providing additional bicycle parking, locker facilities, and bike lane access to transit facilities when feasible.
- Encourage the use of public transit systems by enhancing safety and cleanliness on vehicles and in and around stations, providing shuttle service to public transit, offering public transit incentives and providing public education and publicity about public transportation services.
- Encourage bicycling and walking by incorporating bicycle lanes into street systems in regional transportation plans, new subdivisions, and large developments, creating bicycle lanes and walking paths directed to the location of schools and other logical points of destination and provide adequate bicycle parking, and encouraging commercial projects to include facilities on-site to encourage employees to bicycle or walk to work.
- Build or fund a major transit stop within or near transit, or transit-oriented development.

UTILITIES AND SERVICE SYSTEMS

Impacts to utilities and service systems from the 2016 RTP/SCS include the potential for the construction of new utility infrastructure or expansion of existing infrastructure. Additional impacts could result in an increased amount of pollutants in urban runoff attributed to landscape irrigation, highway runoff, and illicit dumping. As mentioned previously, implementation of the Plan would increase impervious surfaces in the SCAG region through a combination of transportation projects and development influenced by land use strategies. Additional impacts such as insufficient water supply, strain to wastewater and solid waste treatment plants could also occur.

SCAG developed mitigation measures include, but are not limited to, working with local jurisdictions and water quality agencies, to encourage regional-scale planning for improved water quality management/demand and pollution prevention, providing opportunities for information sharing with respect to wastewater treatment and program development in the region.

Consistent with the provisions of Section 15091 of the State CEQA Guidelines, and within the responsibility of local jurisdictions including the Imperial, Riverside, San Bernardino, Los Angeles, Ventura and Orange Counties Flood Control District, utilities and service systems standards-based mitigation measures may include, but are not limited to:

- Reduce exterior consumptive uses of water in public areas, and should promote reductions in private homes and businesses, by shifting to drought-tolerant native landscape plantings (xeriscaping), using weather-based irrigation systems.
- Reuse and minimize construction and demolition (C&D) debris and diversion of C&D waste from landfills to recycling facilities.
- Implement or expand city or county-wide recycling and composting programs for residents and businesses.

CONCLUSION

These transportation and land use strategies, programs and projects are ambitious, but based on our history SCAG is confident that together they will advance our movement toward a more mobile and sustainable region that achieves our long-term goals for people across our region. By closely integrating transportation and land use planning, the 2016 RTP/SCS places the region firmly on that path. For more details on the planned investments reviewed in this chapter, including a project list, please see the Project List Appendix.

The following chapter, "Paying for Our Plan," presents a review of how we expect to fund our ambitious list of transportation investments—that is, where the money will come from and what economic and policy developments could impact the availability of public funds needed to realize our goals.

06

Image courtesy of Samer Momani

CHAPTER 6 HIGHLIGHTS

PAYING FOR THE PLAN

In accordance with federal fiscal constraint requirements, this chapter and a more detailed appendix on our financial plan identify how much money SCAG reasonably expects will be available to support our region's surface transportation investments.

INTRODUCTION

The financially constrained 2016 RTP/SCS includes both a "traditional" core revenue forecast comprised of existing local, state and federal sources and more innovative but reasonably available sources of revenue to implement a program of infrastructure improvements that keeps freight and people moving. As in the past, the financial plan describes steps we can take to obtain needed revenues to implement the region's transportation vision.

The financial plan highlights the importance of finding new and innovative ways to pay for transportation, including our ever-expanding backlog of projects to preserve our existing transportation system. Nationally, we continue to face an insolvency crisis with the Federal Highway Trust Fund, as fuel tax receipts have declined precipitously. Similarly, the viability of California's State Highway Account remains in question, as only a fraction of our needs are funded through state sources. Our region continues to rely heavily on local sources of tax revenue. Seven sales tax measures in the region generate 71 percent of core revenues for transportation improvements.

It is vital that we find new ways to make transportation funding more sustainable in the long term, and efforts are underway to explore how we can transition from our current system based on fuel taxes to a more direct system based on user fees. Recent action by the state Legislature to launch the California Road Charge Pilot Program is a critical step in this transition.

In our region, numerous policy and technical studies have been conducted on the subject and more work is planned to examine and demonstrate the viability of user fee systems, including toll networks. Our region has successfully implemented toll systems in the past, with the Transportation Corridor Agencies' network of privately financed toll roads, the State Route 91 Express Lanes in Orange County and more recently with the express lanes along Interstate 10 and Interstate 110 in Los Angeles County.

The SCAG region has secured the necessary resources to support transportation investments detailed in past RTPs, and our current financial plan will continue to meet necessary milestones to implement the 2016 RTP/SCS. The following sections describe the financial assumptions and methodologies used for forecasting revenues and expenditures for transportation investments. Other SCS implementation costs are not included in this analysis.

ECONOMIC OUTLOOK AND KEY FINANCIAL ASSUMPTIONS

SCAG's financial model reflects historical growth trends and reasonable future expectations for key revenue sources. The inability of existing excise taxes to keep pace with increasing transportation needs and the impacts of increasing fuel efficiency on traditional revenue sources are key considerations in the financial plan.

INFLATION

Inflation can have a profound impact over the long-term time horizon of our Plan. SCAG's revenue model accounts for historical inflation trends, as measured by the Gross Domestic Product (GDP) Price Deflator.

FIGURE 6.1 shows the trends in inflation by the GDP Price Deflator. Although inflation rates have varied considerably over time, they have generally trended between two and four percent. Accordingly, a 2.4 percent inflation rate is used to adjust constant dollar (revenue) forecasts into nominal (year-of-expenditure) dollars.

CONSTRUCTION COST INCREASES

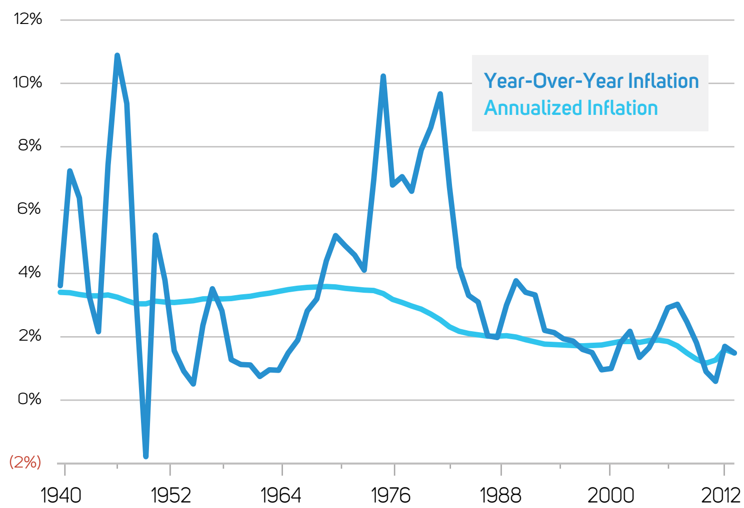
The rise in construction costs can further erode the purchasing power of transportation revenues. FIGURE 6.2 shows the increase and decline in California highway construction costs since the early 1970s. While recent corrections have slowed the longer-term increase in costs, the growth still remains above general inflation. The financial plan uses a 3.2 percent annual inflation factor to estimate future and nominal (year-of-expenditure) costs.

RETAIL SALES GROWTH

Changes in personal consumption patterns and the overall population are main contributors to the growth in retail sales. Over the 30-year period from FY1981-82 to FY2011-12, statewide retail sales grew by 1.8 percent in real terms (when the effects of inflation are eliminated). The financial plan assumes retail sales growth ranging from 1.8 percent to 3.9 percent in real terms.

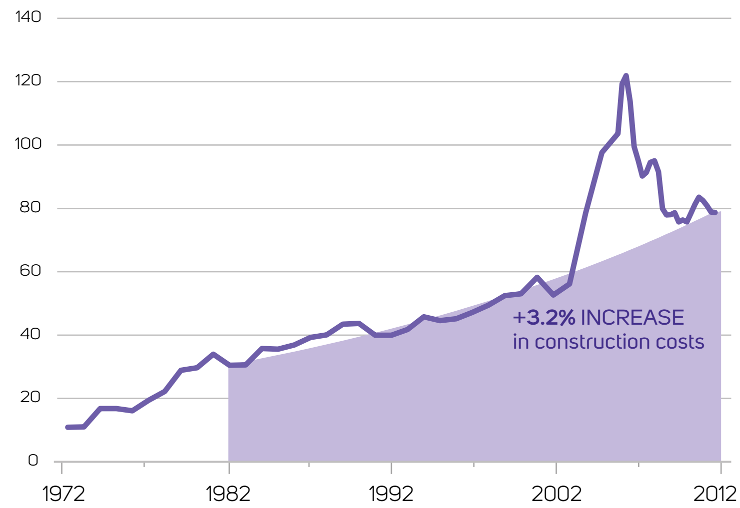
Growth in construction costs (3.2%) outpaces general inflation (2.4%)

FIGURE 6.1 HISTORICAL INFLATION TRENDS (ANNUAL INFLATION)



Source: Office of Management and Budget, Budget of the United States Government, FY 2016 Budget

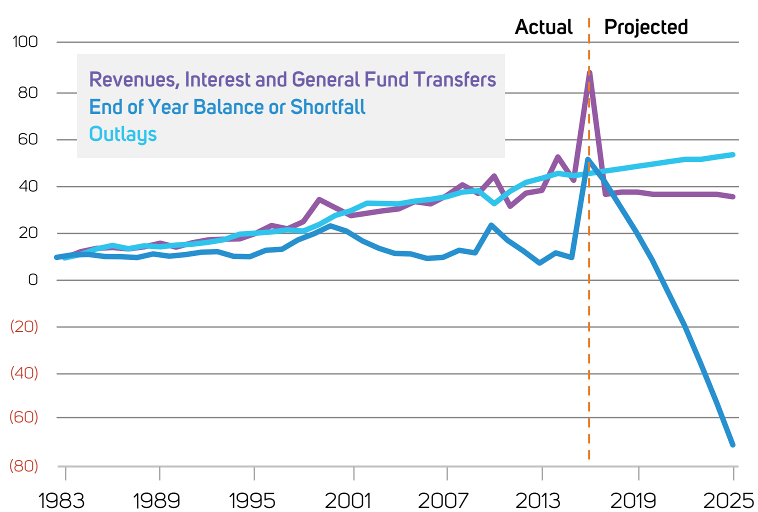
FIGURE 6.2 GROWTH IN HIGHWAY CAPITAL COSTS (INDEX VALUE)



Source: California Department of Transportation

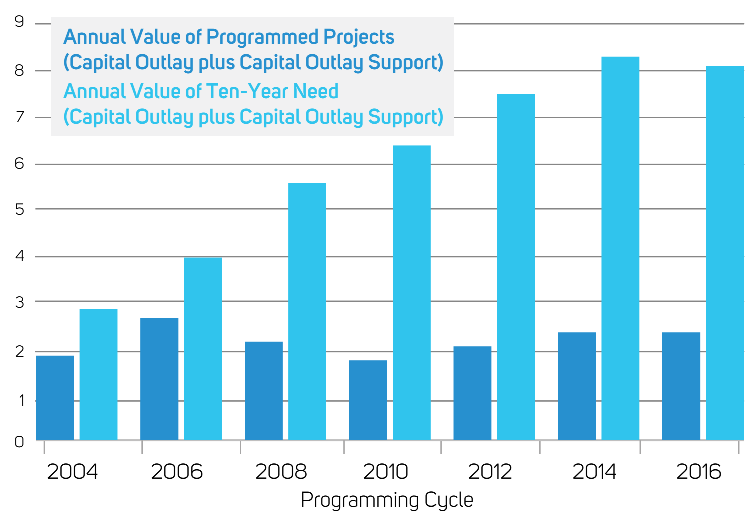
The viability of the state and federal revenue sources is of concern

FIGURE 6.3 STATUS OF THE FEDERAL HIGHWAY TRUST FUND ($ BILLIONS)



Source: Congressional Budget Office and Federal Highway Administration

FIGURE 6.4 STATUS OF THE STATE HIGHWAY OPERATION AND PROTECTION PROGRAM (SHOPP) ($ BILLIONS)



Source: California Department of Transportation, 2015 Ten-Year SHOPP Plan

FUEL CONSUMPTION

Excise taxes on gasoline and diesel fuels are the basis of most federal and state transportation funding sources. Since these taxes are based on cents-per-gallon purchased, they depend solely on fuel consumption and are not indexed to inflation or construction costs. While changes in vehicle miles traveled (VMT) will continue to play a role during the Plan period, increases in conventional fuel efficiency and the adoption of alternative fuel vehicles will reduce overall fuel consumption. The financial plan assumes that increases in vehicle fuel efficiency will reduce fuel consumption by 0.9 percent per year during the Plan period.

STATUS OF THE FEDERAL HIGHWAY TRUST FUND

The Federal Highway Trust Fund provides federal highway and transit funding from a nationally-imposed 18.3 cent-per-gallon gasoline excise tax. Since 2008, the Trust Fund has failed to meet its obligations and has required the United States Congress to authorize $141.1 billion in transfers from the General Fund to keep it solvent. The negative balances shown on FIGURE 6.3 illustrate the projected inability of the Trust Fund to pay its obligations into the highway account.

At the time of the 2016 RTP/SCS, nearly a decade has passed without substantive Congressional agreement on a long-term solution to provide adequate funding for the Trust Fund. The recently passed transportation reauthorization known as the FAST Act relies on $70 billion of one-time, non-user fees to keep the Trust Fund solvent through 2020. It does not address the present, long-term structural deficiency that exists in funding the Trust Fund. Although the financial plan assumes that Congress will reach agreement on reauthorizing federal spending for transportation programs over the Plan horizon, the core revenues available from the Trust Fund are expected to decline due to increasing fuel efficiency and other factors.

STATUS OF THE STATE HIGHWAY ACCOUNT

Despite the "Gas Tax Swap," the effective state gas excise tax rate of 18 cents-per-gallon has remained unadjusted for more than 20 years. Gas tax revenues remain the only source of funding for the State Highway Operation and Protection Program (SHOPP), which funds projects to maintain the State Highway System. As shown in FIGURE 6.4, previous levels of funding have been considerably less than actual needs. Statewide, the 2015 Ten-Year SHOPP Plan identifies $8.0 billion in statewide annual needs, while expenditures programmed for the next four years are only $2.3 billion annually. Continued underinvestment in the maintenance needs of the State Highway System will only increase the cost of bringing our highway assets back to a state of good repair.

LOCAL SALES TAX MEASURES

The SCAG region continues to rely heavily on local sales tax measures for the timely delivery of transportation projects. While most counties impose a 0.5 percent sales tax to fund transportation projects, Los Angeles County levies a 1.5 percent tax—a combination of two permanent half-cent sales taxes and Measure R at 0.5 percent. Measure R is not permanent and expires in 2039. Riverside County's Measure A also expires in 2039. Measure I in San Bernardino County expires in 2040, followed by Orange County's Measure M in 2041. Measure D in Imperial County expires in 2050. Ventura County is the only county in the region without an existing dedicated sales tax for transportation. However, Ventura County is in the process of seeking voter approval on a half-cent sales tax, which is reflected as part of the reasonably available revenues.

TRANSIT OPERATING AND MAINTENANCE (O&M) COSTS

Future transit O&M costs depend on a variety of factors, such as future revenue-miles of service, labor contracts and the age of rolling stock. For the 2016 RTP/SCS, transit O&M costs are estimated based upon historical increases. The regional average increase of 2.7 percent is used for most operators. For Los Angeles County, the financial plan relies on detailed forecasts from the county transportation commission, which is also consistent with historical data.

MULTIMODAL SYSTEM PRESERVATION AND MAINTENANCE

The 2016 RTP/SCS identifies $275.5 billion in total system preservation and maintenance needed to bring transit, passenger rail, regionally significant local streets and roads, and the State Highway System to a state of good repair. While the Plan includes core revenue sources for system preservation, these sources are limited due to restrictions on the use of funds and voter-approved commitments to major capital initiatives.

REVENUE & EXPENDITURE CATEGORIES

CORE AND REASONABLY AVAILABLE REVENUES

The 2016 RTP/SCS financial plan includes two types of revenue forecasts. Both are included in the financially constrained plan:

- Core revenues
- Reasonably available revenues

The *core revenues* identified are existing transportation funding sources projected to FY2039-40. The core revenue forecast does not include future increases in state or federal gas excise tax rates (other than the adjustments reflecting the state gasoline sales tax swap) or adoptions of regional gasoline taxes, mileage-based user fees and new tax measures. These revenues provide a benchmark from which additional funding can be identified.

The region's *reasonably available revenues* include new sources of transportation funding likely to materialize within the 2016 RTP/SCS time frame. These sources include adjustments to existing state and federal gas tax rates, value capture strategies, potential national freight program funds, tolls for specific facilities and private equity participation. Federal guidelines on fiscal constraint permits the inclusion of revenues that are reasonably available. In accordance with federal guidelines, the Plan includes strategies for ensuring the availability of these sources.

EXPENDITURE CATEGORIES

Transportation expenditures in the SCAG region are summarized into three main categories:

- Capital costs for transit, state highways and regionally significant arterials (local streets and roads)
- Operating and maintenance costs for transit, state highways and regionally significant arterials (local streets and roads)
- Debt service payments (for current and anticipated bond issuances)

CORE REVENUES

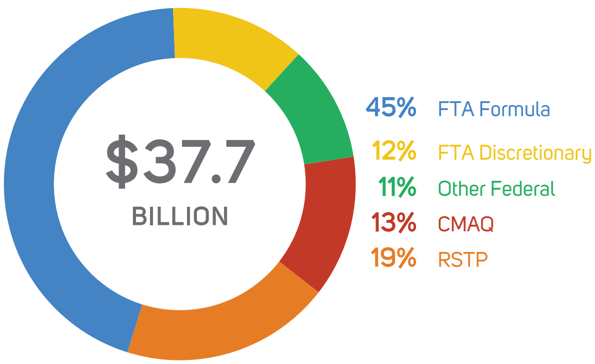
SCAG's regional core revenue model forecasts transportation revenues over the entire 2016 RTP/SCS time horizon. The revenue model is comprehensive and supports analysis by county or funding source. The revenue forecast was developed using the following framework:

- Incorporate financial planning documents developed by local county transportation commissions and transit operators in the region, where available
- Ensure consistency with both local and state planning documents
- Utilize published data sources to evaluate historical trends
- Conduct sensitivity testing of assumptions to augment local forecasts, as needed

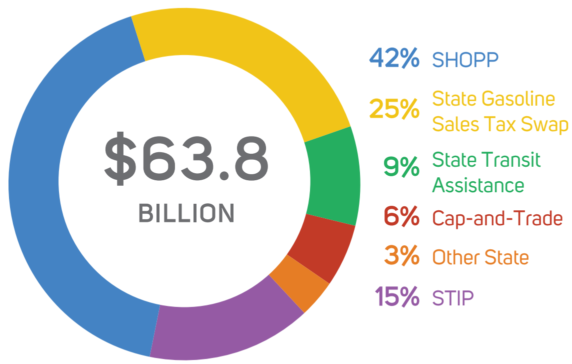
The region's revenue forecast horizon for the financial plan is FY2015-16 through FY2039-40. Consistent with federal guidelines, the plan takes into account inflation and reports statistics in nominal (year-of-expenditure) dollars. TABLE 6.1 shows these core revenues in five-year increments by county.

FIGURE 6.5 CORE REVENUES (IN NOMINAL DOLLARS)

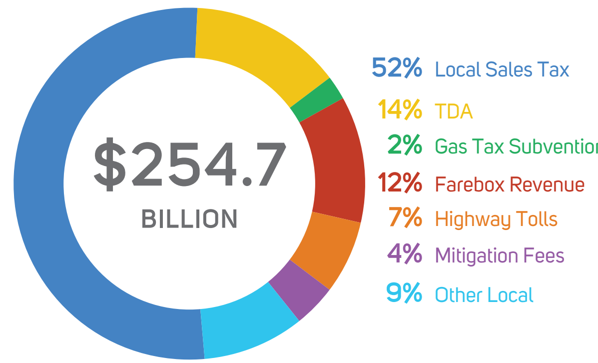
FEDERAL Federal sources are expected to comprise a small portion of overall transportation funds ($37.7 billion). Federal Transit Administration (FTA) funds account for 57 percent of federal funding in the SCAG region. The financial plan also assumes that CMAQ funding will decline in 2022, 2031 and 2036 due to the region achieving attainment for a number of criteria pollutants and reducing the severity level of others.



STATE The State Transportation Improvement Program (STIP), the State Highway Operations and Protection Program (SHOPP) and the State Gasoline Sales Tax Swap account for the bulk of the state funding available.



LOCAL Local sales taxes provide the largest single source of local funding. When local sales taxes in all five counties with such measures are included, these taxes account for more than half (52 percent) of local sources.



The majority of revenues in the SCAG region come from local sources. The share of state sources (18 percent) has increased since the last RTP as a result of Cap-and-Trade Auction Proceeds.

LOCAL + STATE + FEDERAL= **$356.1 BILLION**

TABLE 6.1 CORE REVENUE FORECAST FY 2016–2040

(in Nominal Dollars, Billions)

COUNTY	FY 2016–2020	FY 2021–2025	FY 2026–2030	FY 2031–2035	FY 2036–2040	TOTAL
Imperial	$0.5	$0.5	$0.6	$0.7	$0.8	**$3.2**
Los Angeles	$34.3	$38.0	$45.4	$53.1	$55.0	**$225.8**
Orange	$8.5	$8.5	$10.1	$12.1	$14.2	**$53.4**
Riverside	$5.4	$6.3	$7.6	$9.3	$10.0	**$38.6**
San Bernardino	$4.2	$4.8	$5.6	$6.5	$7.5	**$28.6**
Ventura	$1.0	$1.1	$1.3	$1.5	$1.7	**$6.5**
TOTAL	**$53.9**	**$59.2**	**$70.6**	**$83.1**	**$89.3**	**$356.1**

Source: SCAG Revenue Model 2015 Note: Numbers may not sum to total due to rounding.

REASONABLY AVAILABLE REVENUES

There are several new funding sources that are reasonably expected to be available for the 2016 RTP/SCS. The following guiding principles were used for identifying reasonably available revenues:

- Establish a user fee-based system that better reflects the true cost of transportation, provides firewall protection for new and existing transportation funds, and ensures an equitable distribution of costs and benefits.
- Promote national and state programs that include return-to-source guarantees, while maintaining flexibility to reward regions that continue to commit substantial local resources.
- Leverage locally available funding with innovative financing tools (e.g., tax credits and expansion of the Transportation Infrastructure Finance and Innovation Act [TIFIA]) to attract private capital and accelerate project delivery.
- Promote funding strategies that strengthen the federal commitment to the nation's goods movement system, recognizing the pivotal role that our region plays in domestic and international trade.

TABLE 6.2 identifies eight categories of funding sources that are considered to be reasonably available and are included in the financially constrained plan. These sources were identified on the basis of their potential for revenue generation, historical precedence and the likelihood of their implementation within the time frame of the 2016 RTP/SCS. For each funding source, SCAG has examined the policy and legal context of implementation and has prepared an estimate of the potential revenues generated. Additional documentation of funding sources included in the financial plan are provided in the Transportation Finance Appendix.

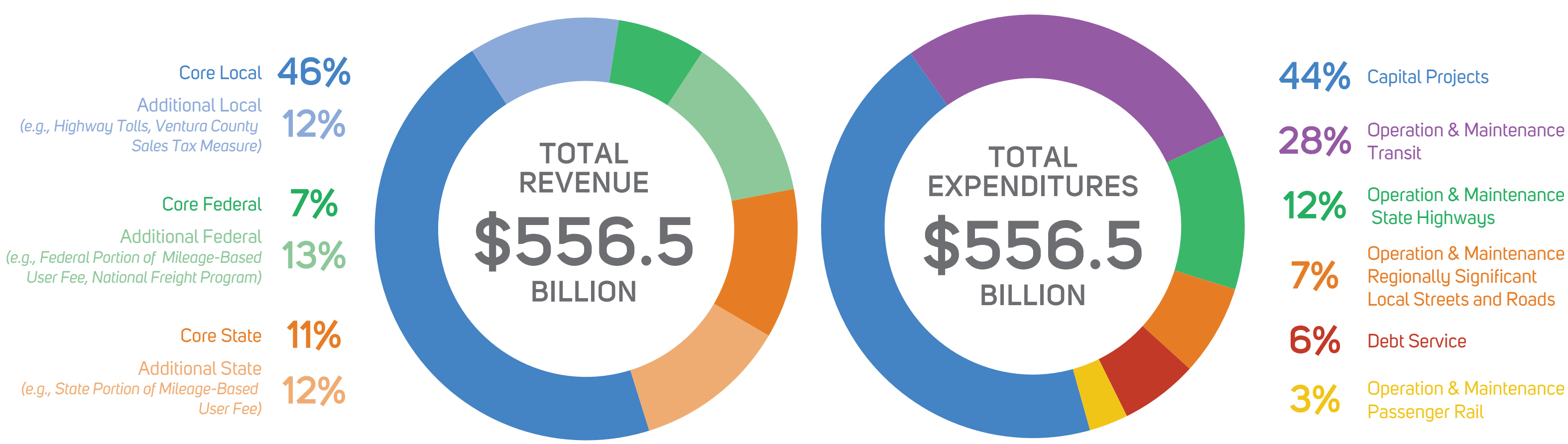
SUMMARY OF REVENUE SOURCES AND EXPENDITURES

The SCAG region's financially constrained 2016 RTP/SCS includes revenues from both core and reasonably available revenue sources, which together total $556.5 billion from FY2015-16 through FY2039-40 (see TABLE 6.3). The Plan is funded 57 percent by local sources, 23 percent by state sources and 19 percent by federal sources, as illustrated in FIGURE 6.6.

Capital projects total $246.6 billion in nominal dollars. Operating and maintenance (O&M) costs total $275.5 billion, while debt service obligations total $34.5 billion. Transit-related costs comprise the largest share of O&M costs for the region, totaling $156.7 billion.

TABLE 6.4 presents the SCAG region's revenue forecast by source in five-year increments, from FY2015-16 through FY2039-40. This is followed by TABLE 6.5, which provides details of the region's expenditures by category in five-year increments.

FIGURE 6.6 FY 2016–2040 SUMMARY OF REVENUE AND EXPENDITURES (IN NOMINAL DOLLARS)



Source: SCAG Revenue Model 2015 Note: Numbers may not sum to total due to rounding.

TABLE 6.2 NEW REVENUE SOURCES AND INNOVATIVE FINANCING STRATEGIES

(in Nominal Dollars, Billions)

REVENUE SOURCE	DESCRIPTION	AMOUNT	ACTIONS TO ENSURE AVAILABILITY	RESPONSIBLE PARTY(IES)
State and Federal Gas Excise Tax Adjustment to Maintain Historical Purchasing Power	Additional $0.10 per gallon gasoline tax imposed at the state and the federal levels starting in 2020 to 2024 to maintain purchasing power.	$6.0	Requires action of state Legislature and Congress. Strategy is consistent with recommendations from two national commissions to move immediately with augmenting fuel tax resources through conventional Highway Trust Fund mechanisms. Rate is also consistent with proposals introduced in state Legislature during 2015–2016 session.	State Legislature, Congress
Mileage-Based User Fee (or equivalent fuel tax adjustment)	Mileage-based user fees would be implemented to replace gas taxes—estimated at about $0.04 (in 2015 dollars) per mile starting in 2025 and indexed to maintain purchasing power.	$124.8 (est. increment only)	Requires action of state Legislature and Congress. Strategy is consistent with recommendations from two national commissions to move toward a mileage-based user fee system. In 2014, state Legislature passed Senate Bill (SB) 1077 (DeSaulnier) directing California to conduct a pilot program to study the feasibility of a road charge as a replacement to the gas tax beginning no later than January 1, 2017. The FAST Act establishes the Surface Transportation System Funding Alternatives program, which provides grants to states to demonstrate alternative user-based revenue mechanisms that could maintain the long-term solvency of the Trust Fund.	State Legislature, Congress
Highway Tolls (includes toll revenue bond proceeds)	Toll revenues generated from East-West Freight Corridor and regional express lane network.	$23.5	Assembly Bill (AB) 1467 (Nunez) Chapter 32, Statutes of 2006 authorized Caltrans and regional transportation agencies to enter into comprehensive development lease agreements with public and private entities or consortia of those entities for certain types of transportation projects. Further, AB 521 (Runner) Chapter 542, Statutes of 2006 modified provisions in AB 1467. Senate Bill Second Extraordinary Session 4 (SBX2 4) Chapter 2, Statutes of 2009 (Cogdill) established the legislative authority until January 1, 2017, allowing for regional transportation agencies and Caltrans to enter into an unlimited number of public-private partnerships (PPP) and deleted the restrictions on the number and type of projects that may be undertaken. Chapter 474, Statutes of 2009 (AB 798) established the California Transportation Financing Authority (CTFA). Highway projects that meet planning and environmental review requirements are eligible for tolling subject to meeting requirements of the CTFA. AB 798 also lifted the requirement for express lane projects authorized under AB 1467 to have separate legislative approval. SB 1316 (Correa) enabled RCTC to impose tolls along SR-91 Express Lanes. The I-15 Express Lanes in Riverside County were authorized by AB 1954 (Jeffries). SB 1298 (Hernandez) authorized continued tolling along the I-10 and I-110 Express Lanes in Los Angeles County. AB 914 (Brown) allowed express lanes along I-10 and the I-15 in San Bernardino County. AB 194 (Frazier) allowed the California Transportation Commission to authorize additional express lane projects.	MPO, CTCs, Caltrans, CTFA, and FHWA as may be applicable

TABLE 6.2 CONTINUED

REVENUE SOURCE	DESCRIPTION	AMOUNT	ACTIONS TO ENSURE AVAILABILITY	RESPONSIBLE PARTY(IES)
Private Equity Participation	Private equity share as may be applicable for key initiatives: e.g., toll facilities; also, freight rail package assumes railroads' share of costs for main line capacity and intermodal facilities.	$3.4	Region has authority as noted above. Current funding plans for specific intermodal facilities assume private sources.	MPO, CTCs, private consortium, state Legislature, and Union Pacific/ BNSF as appropriate for specific facilities
Freight Fee/National Freight Program	The recent reauthorization of the federal surface transportation act (the FAST Act) provides dedicated federal funding for infrastructure improvements supporting the national freight network through the newly created National Highway Freight Program and the Nationally Significant Freight and Highway Projects program. These programs are funded at approximately $2.1 billion per year nationally. Regional estimate assumes a conservative percentage of national totals.	$5.4	Current efforts at the local/regional level continue to endorse a federal program for freight. Other mechanisms to ensure the establishment of a funding program for freight may entail working with local/regional, state, and federal stakeholders to assess a national freight fee. Freight fees could be assessed in proportion to relative impacts on the transportation system.	Congress and potentially state Legislature as well as local/regional stakeholders
State Bond Proceeds, Federal Grants & Other for California High-Speed Rail Program	State general obligation bonds authorized under the Bond Act approved by California voters as Proposition 1A in 2008; federal grants authorized under American Recovery and Reinvestment Act and High-Speed Intercity Passenger Rail Program; Cap-and-Trade Auction Proceeds; potential use of qualified tax credit bonds; and private sources.	$34.0	Estimate for Southern California segments based on statewide system total per 2014 California High-Speed Rail Business Plan. Further coordination anticipated with the California High-Speed Rail Authority in finalizing business plan; additionally, the High-Speed Rail Authority will pursue private-sector participation as a source of system financing.	MPO, California High-Speed Rail Authority, local/regional stakeholders, private-sector partners
Value Capture Strategies	Assumes formation of special districts (Enhanced Infrastructure Financing Districts) including use of tax increment financing for specific initiatives.	$1.2	Pursue necessary approvals for special districts by 2020. Benefit assessment districts require majority approval by property owners; community facility districts require two-thirds approval; work with private entities for joint development opportunities as may be applicable.	MPO, CTCs, local jurisdictions, property owners along project corridors, developers
Local Option Sales Tax	Half-cent sales tax measure for Ventura County	$2.1	Local sales tax measure to be placed on ballot by 2020	Ventura County

TABLE 6.3 SUMMARY OF REVENUE SOURCES

TABLE 6.3.1 CORE AND REASONABLY AVAILABLE REVENUE PROJECTIONS—LOCAL REVENUE SOURCES

(in Nominal Dollars, Billions)

REVENUE SOURCE	REVENUE PROJECTION ASSUMPTIONS	REVENUE ESTIMATE
Local Option Sales Tax Measures	**Description:** Locally imposed ½ percent sales tax in four counties (Imperial, Orange, Riverside, and San Bernardino). Permanent 1 percent (combination of two ½ cent sales taxes) plus Measure R through 2039 in Los Angeles County. Measure D in Imperial County expires in 2050; Measure M in Orange County expires in 2041; Measure A in Riverside County expires in 2039; and Measure D in San Bernardino County expires in 2040. **Assumptions:** Sales taxes grow consistent with county transportation commission forecasts and historical trends.	$132.7
Transportation Development Act (TDA)—Local Transportation Fund	**Description:** The Local Transportation Fund (LTF) is derived from a ¼ cent sales tax on retail sales statewide. Funds are returned to the county of generation and used mostly for transit operations and transit capital expenses. **Assumptions:** Same sales tax growth rate as used for local option sales tax measures.	$35.6
Gas Excise Tax Subventions (to Cities and Counties)	**Description:** Subventions to counties and local jurisdictions in region from the California state gas tax. Revenues for the forecast are proportionate to the percentage of streets and roads that are regionally significant. **Assumptions:** Gasoline fuel consumption declines in real terms by 1.6 percent due to increasing fuel efficiency in conventional vehicles and adoption of electric and hybrid vehicles. Regionally significant streets and roads (28 to 48 percent of total roads) are classified as either arterials or collectors.	$5.6
Transit Farebox Revenue	**Description:** Transit fares collected by transit operators in the SCAG region. **Assumptions:** Farebox revenues increase consistent with historic trends, planned system expansions, and operator forecasts.	$29.7
Highway Tolls (in core revenue forecast)	**Description:** Revenues generated from toll roads operated by the Transportation Corridor Agencies (TCA), from the SR-91 Express Lanes operated by the Orange County Transportation Authority (OCTA) and Riverside County Transportation Commission (RCTC), and from the express lanes along I-10 and I-110 in Los Angeles County. **Assumptions:** Toll revenues grow consistent with county transportation commission forecasts and historical trends.	$17.2
Mitigation Fees	**Description:** Revenues generated from development impact fees. The revenue forecast includes fees from the Transportation Corridor Agency (TCA) development impact fee program, San Bernardino County's development impact fee program and Riverside County's Transportation Uniform Mitigation Fee (TUMF) for both the Coachella Valley and Western Riverside County. **Assumptions:** The financial forecast is consistent with revenue forecasts from TCA, Riverside County Transportation Commission (RCTC), and the San Bernardino Associated Governments (SANBAG).	$10.1
Other Local Sources	**Description:** Includes committed local revenue sources such as transit advertising and auxiliary revenues, lease revenues, and interest and investment earnings from reserve funds. **Assumptions:** Revenues are based on financial data from transit operators and local county transportation commissions.	$23.8
LOCAL SUBTOTAL		$254.7

Note: Numbers may not sum to total due to rounding.

TABLE 6.3.2 CORE AND REASONABLY AVAILABLE REVENUE PROJECTIONS—STATE REVENUE SOURCES

(in Nominal Dollars, Billions)

REVENUE SOURCE	REVENUE PROJECTION ASSUMPTIONS	REVENUE ESTIMATE
State Transportation Improvement Program (STIP)	**Description:** The STIP is a five-year capital improvement program that provides funding from the State Highway Account (SHA) for projects that increase the capacity of the transportation system. The SHA is funded through a combination of state gas excise tax, the Federal Highway Trust Fund, and truck weight fees. The STIP may include projects on state highways, local roads, intercity rail, or public transit systems. The Regional Transportation Planning Agencies (RTPAs) propose 75 percent of STIP funding for regional transportation projects in Regional Transportation Improvement Programs (RTIPs). Caltrans proposes 25 percent of STIP funding for interregional transportation projects in the Interregional Transportation Improvement Program (ITIP). **Assumptions:** Funds are based upon the 2014 Report of STIP Balances County and Interregional Shares, August 1, 2014. Fuel consumption declines in real terms by 0.9 percent due to increasing fuel efficiency in conventional vehicles and adoption of electric and hybrid vehicles.	$9.6
State Highway Operation and Protection Plan (SHOPP)	**Description:** Funds state highway maintenance and operations projects. **Assumptions:** Short-term revenues are based on overlapping 2012 and 2014 SHOPP programs. Long-term forecasts are consistent with STIP forecasts and assume decline in fuel consumption.	$26.7
State Gasoline Sales Tax Swap	**Description:** Prior to 2010, state sales tax on gasoline funded discretionary projects through the Transportation Investment Fund, which distributed revenues to the STIP, local streets and roads, and transit. In 2010, the sales tax revenues were "swapped" for an increased excise tax (initially 17.3 cents) recalculated each year to ensure revenue neutrality. **Assumptions:** The forecast is based on current funding levels as reported by the State Controller. Future revenues grow by 1.8 percent (in real terms) to be revenue neutral consistent with the gasoline sales tax swap.	$15.7
State Transit Assistance Fund (STA)	**Description:** STA is funded from the diesel sales tax and is distributed by population share and revenue share of the transit operators. **Assumptions:** The forecast is based on current funding levels reported by the State Controller. Future funding declines with fuel consumption using assumptions consistent with other sources.	$5.8
Cap-and-Trade Auction Proceeds	**Description:** The Global Warming Solutions Act of 2006 (AB 32) established the goal of reducing greenhouse gas (GHG) emissions statewide to 1990 levels by 2020. In order to help achieve this goal, the California Air Resources Board (ARB) adopted a regulation to establish a Cap-and-Trade program that places a "cap" on the aggregate GHG emissions from entities responsible for roughly 85 percent of the state's GHG emissions. As part of the Cap-and-Trade program, ARB conducts quarterly auctions where it sells emission allowances. Revenues from the sale of these allowances fund projects that support the goals of AB 32, including transit and rail investments. Funds associated with non-transportation investments and High-Speed Rail are not included in this amount. Funds associated with High-Speed Rail are address under Innovative Financing and New Revenue Sources. **Assumptions:** The forecast is based on current revenue estimates from the Legislative Analyst's Office (LAO). The LAO projects statewide revenues to reach a cumulative program total of $15 billion by 2020. Given the uncertainty about future allowance prices, annual growth is assumed to be flat beyond 2020. SCAG's revenue projection for Cap-and-Trade Auction Proceeds is conservative and represents a bottom floor estimate for the region. Proceeds for transportation could be significantly greater.	$3.7
Other State Sources	**Description:** Other state sources include remaining Highway Safety, Traffic, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B), Active Transportation Program, and other miscellaneous state grant apportionments for the SCAG region. **Assumptions:** Short-term revenues are based on actual apportionments. Future Active Transportation Program funding declines with fuel consumption using assumptions consistent with other sources.	$2.2
STATE SUBTOTAL		$63.8

Note: Numbers may not sum to total due to rounding.

TABLE 6.3.3 CORE AND REASONABLY AVAILABLE REVENUE PROJECTIONS—FEDERAL REVENUE SOURCES

(in Nominal Dollars, Billions)

REVENUE SOURCE	REVENUE PROJECTION ASSUMPTIONS	REVENUE ESTIMATE
FHWA Non-Discretionary Congestion Mitigation and Air Quality (CMAQ) Program	**Description:** Program to reduce traffic congestion and improve air quality in non-attainment areas. **Assumptions:** Short-term revenues are based upon the Caltrans apportionment estimates. Long-term revenues assume that fuel consumption declines by 0.9 percent (in real terms) annually. CMAQ funding is assumed to be reduced by 25 percent in 2022, an additional 25 percent in 2031, and an additional 25 percent in 2036 due to improved air quality.	$4.9
FHWA Non-Discretionary Regional Surface Transportation Program (RSTP)	**Description:** Projects eligible for RSTP funds include rehabilitation and new construction on any highways included in the National Highway System (NHS) and Interstate Highways (including bridges). Also, transit capital projects, as well as intracity and intercity bus terminals and facilities, are eligible. **Assumptions:** Short-term revenues are based upon the Caltrans apportionment estimates. Long-term revenues assume that fuel consumption declines by 0.9 percent (in real terms) annually.	$7.3
FTA Formula Programs 5307 Urbanized Area Formula, 5310 Enhanced Mobility of Seniors and Individuals with Disabilities Formula, 5311 Rural Formula, 5337 State of Good Repair Formula, and 5339 Bus and Bus Facilities Formula	**Description:** This includes a number of FTA programs distributed by formula. 5307 is distributed to state urbanized areas with a formula based upon population, population density, number of low-income individuals, and transit revenue and passenger miles of service. Program funds capital projects, planning, job access and reverse commute projects, and operations costs under certain circumstances. 5310 funds are allocated by formula to states for projects providing enhanced mobility to seniors and persons with disabilities. 5311 provides capital, planning, and operating assistance to states to support public transportation in rural areas with populations less than 50,000. 5337 is distributed based on revenue and route miles and provides funds for repairing and upgrading rail transit systems, high-intensity bus systems that use High-Occupancy Vehicle (HOV) lanes, including bus rapid transit (BRT). 5339 provides capital funding to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities. **Assumptions:** Formula funds are assumed to decline in proportion with the Federal Highway Trust Fund. As with the FHWA sources, fuel consumption declines by 0.9 percent (in real terms) annually.	$16.8
FTA Non-Formula Program 5309 Fixed Guideway Capital Investment Grants ("New Starts")	**Description:** Provides grants for new fixed guideways or extensions to fixed guideways (projects that operate on a separate right-of-way exclusively for public transportation, or that include a rail or a catenary system), bus rapid transit projects operating in mixed traffic that represent a substantial investment in the corridor, and projects that improve capacity on an existing fixed guideway system. **Assumptions:** Operators are assumed to receive FTA discretionary funds in rough proportion to what they have received historically. As with the FHWA sources, fuel consumption declines by 0.9 percent (in real terms) annually.	$4.7
Other Federal Sources	**Description:** Includes other federal programs, such as Transportation Investment Generating Economic Recovery (TIGER) competitive grant program, Highway Safety Improvement Program, Federal Safe Routes to School, Highway Bridge Program, and earmarks. **Assumptions:** Short-term revenues are based on actual apportionments. Long-term revenues assumes a 0.9 percent (in real terms) annual decline in fuel consumption as used for other federal funding sources.	$4.0
FEDERAL SUBTOTAL		$37.7

Note: Numbers may not sum to total due to rounding.

TABLE 6.3.4 CORE AND REASONABLY AVAILABLE REVENUE PROJECTIONS—INNOVATIVE FINANCING AND NEW REVENUE SOURCES

(in Nominal Dollars, Billions)

REVENUE SOURCE	REVENUE PROJECTION ASSUMPTIONS	REVENUE ESTIMATE
State and Federal Gas Excise Tax Adjustment to Maintain Historical Purchasing Power	**Description:** Additional 10-cents-per-gallon gasoline tax imposed by the state and federal government starting in 2020 through 2024. **Assumptions:** Forecast consistent with historical tax rate adjustments for both state and federal gas taxes.	$6.0
Mileage-Based User Fee (or equivalent fuel tax adjustment)	**Description:** Mileage-based user fees would be implemented to replace existing gas taxes (state and federal) by 2025. **Assumptions:** Consistent with recommendations from two national commissions established under SAFETEA-LU, it is assumed that a national mileage-based user fee system would be established during the latter years of the RTP/SCS. An estimated $0.04 per mile (in 2015 dollars) is assumed starting in 2025 to replace existing gas tax revenues.	$124.8 (est. increment only)
Highway Tolls (includes toll revenue bond proceeds)	**Description:** Toll revenues generated from regional toll facilities (e.g., East-West Freight Corridor and regional express lane network). **Assumptions:** Toll revenues based on recent feasibility studies for applicable corridors. Also includes toll revenue bond proceeds.	$23.5
Private Equity Participation	**Description:** Private equity share as may be applicable for key initiatives. **Assumptions:** Private capital is assumed for a number of projects, including toll facilities; also, freight rail package assumes railroads' share of costs for main line capacity and intermodal facilities.	$3.4
Freight Fees/National Freight Program	**Description:** Establishment of a national freight program consistent with federal surface transportation reauthorization (FAST ACT) and/or establishment of freight fees imposed nationally. **Assumptions:** The recently passed federal transportation reauthorization bill provides dedicated freight funding of approximately $2.1 billion per year nationally. Regional estimate assumes a conservative percentage of proposed national program.	$5.4
State Bond Proceeds, Federal Grants & Other for California High-Speed Rail Program	**Description:** Estimated total per 2014 California High-Speed Rail Business Plan. **Assumptions:** State general obligation bonds authorized under the Bond Act approved by California voters as Proposition 1A in 2008; federal grants authorized under ARRA and the High-Speed Intercity Passenger Rail Program (HSIPR); Cap-and-Trade Auction Proceeds; potential use of qualified tax credit bonds; and private sources.	$34.0
Value Capture Strategies	**Description:** Formation of special districts—Enhanced Infrastructure Financing Districts. **Assumptions:** This strategy refers to capturing the incremental value generated by transportation investments. Specifically, SCAG assumes the formation of special districts, including Enhanced Infrastructure Financing Districts (EIFDs) for specific projects (e.g., East-West Freight Corridor).	$1.2
Local Option Sales Tax	**Description:** Locally imposed ½ percent sales tax measure for Ventura County. **Assumptions:** Sales tax grows consistent with historical trends in county retail sales.	$2.1
NEW REVENUE SOURCE SUBTOTAL		$200.4
GRAND TOTAL		$556.5

Note: Numbers may not sum to total due to rounding.

TABLE 6.4 FY 2016–2040 RTP/SCS REVENUES

(in Nominal Dollars, Billions)

	REVENUE SOURCES	FY 2016–2020	FY 2021–2025	FY 2026–2030	FY 2031–2035	FY 2036–2040	TOTAL
LOCAL	Sales Tax	$21.1	$26.6	$32.8	$40.9	$46.8	$168.3
	• Local Option Sales Tax Measures	$16.8	$21.2	$26.1	$32.4	$36.3	$132.7
	• Transportation Development Act (TDA)—Local Transportation Fund	$4.3	$5.4	$6.8	$8.5	$10.6	$35.6
	Gas Excise Tax Subventions (to Cities and Counties)	$1.0	$1.1	$1.1	$1.2	$1.2	$5.6
	Transit Farebox Revenue	$3.9	$4.9	$5.9	$6.9	$8.2	$29.7
	Highway Tolls (in core revenue forecast)	$2.0	$2.6	$3.3	$4.2	$5.2	$17.2
	Mitigation Fees	$1.7	$1.9	$2.1	$2.3	$2.1	$10.1
	Other Local Sources	$7.0	$3.6	$5.3	$5.6	$2.4	$23.8
	Local Total	$36.7	$40.5	$50.5	$61.0	$65.9	$254.7
STATE	State Transportation Improvement Program (STIP)	$1.4	$1.8	$2.0	$2.1	$2.3	$9.6
	• Regional Transportation Improvement Program (RTIP)	$1.1	$1.4	$1.5	$1.6	$1.7	$7.2
	• Interregional Transportation Improvement Program (ITIP)	$0.4	$0.5	$0.5	$0.5	$0.6	$2.5
	State Highway Operation and Protection Plan (SHOPP)	$4.3	$5.0	$5.4	$5.8	$6.2	$26.7
	State Gasoline Sales Tax Swap	$2.0	$2.4	$3.0	$3.7	$4.6	$15.7
	State Transit Assistance Fund (STA)	$0.9	$1.0	$1.2	$1.3	$1.4	$5.8
	Cap-and-Trade Auction Proceeds	$0.7	$0.8	$0.8	$0.8	$0.8	$3.7
	Other State Sources	$0.7	$0.3	$0.4	$0.4	$0.4	$2.2
	State Total	$10.0	$11.4	$12.6	$14.1	$15.7	$63.8
FEDERAL	Federal Transit	$4.0	$4.1	$4.2	$4.7	$4.3	$21.5
	• Federal Transit Formula	$2.9	$3.1	$3.3	$3.6	$3.9	$16.8
	• Federal Transit Non-Formula	$1.2	$1.0	$0.9	$1.1	$0.5	$4.7
	Federal Highway & Other	$3.1	$3.1	$3.3	$3.3	$3.3	$16.2
	• Congestion Mitigation and Air Quality (CMAQ)	$1.2	$1.1	$1.1	$0.9	$0.7	$4.9
	• Regional Surface Transportation Program (RSTP)	$1.2	$1.3	$1.4	$1.6	$1.7	$7.3
	• Other Federal Sources	$0.7	$0.7	$0.8	$0.9	$0.9	$4.0
	Federal Total	$7.2	$7.3	$7.5	$8.0	$7.7	$37.7
INNOVATIVE FINANCING & NEW REVENUE SOURCES	State and Federal Gas Excise Tax Adjustment	$1.3	$4.8	$0.0	$0.0	$0.0	$6.0
	Mileage-Based User Fee	$0.0	$5.5	$31.9	$39.6	$47.9	$124.8
	Highway Tolls (includes toll revenue bond proceeds)	$0.2	$9.0	$4.2	$4.6	$5.5	$23.5
	Private Equity Participation	$1.1	$0.1	$2.1	$0.1	$0.0	$3.4
	Freight Fee/National Freight Program	$0.7	$0.9	$1.0	$1.2	$1.5	$5.4
	State Bond Proceeds, Cap-and-Trade Auction Proceeds, & Other for California High-Speed Rail Program	$6.0	$10.0	$8.0	$5.0	$5.0	$34.0
	Value Capture Strategies	$0.0	$1.2	$0.0	$0.0	$0.0	$1.2
	Local Option Sales Tax (Ventura County)	$0.1	$0.4	$0.5	$0.6	$0.7	$2.1
	Innovative Financing & New Revenue Sources Total	$9.4	$31.8	$47.6	$51.1	$60.5	$200.4
REVENUE TOTAL		$63.3	$91.1	$118.2	$134.2	$149.8	$556.5

Note: Numbers may not sum to total due to rounding.

TABLE 6.5 FY 2016–2040 RTP/SCS EXPENDITURES

(in Nominal Dollars, Billions)

RTP COSTS	FY 2016–2020	FY 2021–2025	FY 2026–2030	FY 2031–2035	FY 2036–2040	TOTAL
CAPITAL PROJECTS:	$27.6	$46.7	$56.0	$57.0	$59.2	$246.6
Arterials	$3.3	$2.2	$2.4	$5.0	$5.4	$18.4
Goods Movement (includes Grade Separations)	$8.0	$18.9	$19.5	$12.2	$12.1	$70.7
High-Occupancy Vehicle/Express Lanes	$2.7	$2.2	$2.5	$3.7	$4.1	$15.2
Mixed-Flow and Interchange Improvements	$2.2	$1.4	$2.6	$2.9	$3.0	$12.2
Toll Facilities	$1.8	$3.2	$2.3	$0.6	$0.5	$8.4
Transportation Systems Management (including ITS)	$0.9	$1.1	$1.4	$2.9	$2.9	$9.2
Transit	$6.4	$8.6	$11.0	$14.4	$15.7	$56.1
Passenger Rail	$0.8	$6.3	$10.3	$10.4	$10.8	$38.6
Active Transportation	$0.8	$1.7	$1.7	$2.0	$2.0	$8.1
Transportation Demand Management	$0.2	$0.2	$1.6	$2.3	$2.6	$6.9
Other (includes Environmental Mitigation, Landscaping, and Project Development Costs)	$0.5	$0.6	$0.7	$0.7	$0.2	$2.7
OPERATIONS AND MAINTENANCE:	$30.8	$38.0	$54.9	$69.3	$82.5	$275.5
State Highways	$9.0	$10.5	$12.4	$15.7	$18.2	$65.8
Transit	$18.5	$23.3	$29.4	$38.6	$46.9	$156.7
Passenger Rail	$1.6	$2.3	$3.0	$3.8	$5.0	$15.7
Regionally Significant Local Streets and Roads*	$1.7	$1.9	$10.1	$11.1	$12.5	$37.3
DEBT SERVICE	$4.9	$6.4	$7.3	$7.9	$8.0	$34.5
COST TOTAL	$63.3	$91.1	$118.2	$134.2	$149.8	$556.5

Note: Numbers may not sum to total due to rounding.

** Includes $4.8 billion for active transportation in addition to capital project investment level of $8.1 billion for a total of $12.9 billion for active transportation improvements*

07

CHAPTER 7 HIGHLIGHTS

Image courtesy of Alameda Corridor-East Construction Authority

A PLAN THAT CREATES ECONOMIC OPPORTUNITY: THE BIG PICTURE

Southern California is a huge geographic region. Often, employers in one area cannot easily access workers living in another. A more efficient transportation system, with increased public transit, will create a more efficient and competitive labor market and add economic activity and jobs into the economy.

The 2016 RTP/SCS outlines strategies for investing in transportation infrastructure that will benefit Southern California, the state and the nation in terms of economic development, job creation, economic growth and poverty reduction—as well as overall business and economic competitive advantages in the global economy. Over the 2016–2040 period, the 2016 RTP/SCS calls for spending more than $556.5 billion on transportation improvement projects. The economic analysis prepared for the 2016 RTP/SCS, shown in more detail in the Economic & Job Creation Analysis Appendix, shows that significant employment will be generated throughout our region over the 25-year period of the Plan. The 2016 RTP/SCS boosts employment in two ways—providing jobs for people in highway and rail construction, operation and maintenance; and boosting the economic competitiveness of the region by making it a more attractive place to do business.

Even though we have gained back many of the jobs lost in the Great Recession, the region is contending with a larger population base and stagnant wages, which has resulted in even more of Southern California's population slipping into poverty. More concerning is the fact that a staggering one in four children live below the poverty line in the region. The 2016 RTP/SCS is a major job creation engine, and the types of jobs created by the Plan, coupled with improved access to those jobs, have the potential to provide greater economic opportunity throughout the region. With jobs that can help sustain people in need, we can rebuild our infrastructure, rebuild our middle class and move citizens throughout Southern California from poverty to prosperity.

The economic analysis shows that construction, maintenance and operations expenditures specified in the 2016 RTP/SCS, as well as the indirect and induced jobs that flow from those expenditures, will generate an average of more than 188,000 new jobs annually on average.

When investments are made in the transportation system, the economic benefits go far beyond the jobs created building, operating and maintaining it. Unlike spending to satisfy current needs, infrastructure delivers benefits for decades. The infrastructure, once built, can enhance the economic competitiveness of a region. Projects that reduce congestion may help firms produce at lower cost, or allow those firms to reach larger markets or hire more capable employees. An economy with a well-functioning transportation system is a more attractive place for firms to do business, enhancing the economic competitiveness of our region. An additional 351,000 annual jobs will be created by the SCAG region's increased competitiveness and improved economic performance that will result from congestion reduction and improvements in regional amenities due to implementation of the 2016 RTP/SCS.

THE ECONOMIC BENEFITS OF INVESTING IN TRANSPORTATION

As we mentioned briefly above, the 2016 RTP/SCS will lead to more jobs in at least two ways:

1. Providing direct jobs in highway and rail construction, transportation, and transit operations and maintenance
2. Enhancing economic competitiveness in the region by making it a more attractive place to do business and to live

These two impacts are summarized below.

- **Providing direct jobs in highway and rail construction, transportation, and transit operations and maintenance:** The 2016 RTP/SCS will employ people to build, operate and maintain transportation projects as a result of the Plan's regional infrastructure investments. Economists refer to these jobs as the "direct effect" of the investments. Direct effects ripple through the economy, creating additional jobs in two ways:
  - **Indirect Effects:** Indirect effects are the jobs in companies that support the direct jobs created by the RTP/SCS spending. The firms and agencies that build and maintain the transportation system with RTP/SCS funding buy materials, office supplies and business services. All of those supply purchases that are necessitated by the RTP/SCS spending are indirect effects.
  - **Induced Effects:** Additionally, employees of the firms and agencies that build, operate and maintain the Southern California regional transportation system use their wages to buy all kinds of goods—housing, food, clothing, entertainment and more—and that supports additional jobs. This ripple effect creates what economists call "induced effects." Employees who build, operate and maintain the RTP/SCS will earn wages to buy goods and services associated with daily living.
- **Enhancing economic competitiveness in the region by making it a more attractive place to do business:** Academic scholars have long understood that public infrastructure investments create direct jobs and additional multiplier effects from those jobs. But recently, economic research has illuminated how transportation spending also improves the viability and productivity of firms in regions, by increasing economic competitiveness through the increased

efficiency of a transportation system. A well-planned, well-functioning transportation system and integrated land use pattern can allow firms to communicate and conduct business with one another more quickly, draw workers from larger labor market pools, and ship and receive goods and services at lower costs. All of this can contribute to enhanced regional economic competitiveness, raising the productivity of firms in the region and leading to more jobs than those generated to build, operate and maintain the RTP/SCS.

WHY TRANSPORTATION ACCESS IS IMPORTANT FOR THE REGIONAL ECONOMY

Two economic transformations have occurred over the past two to three decades that have made transportation access an increasingly important element of regional economies. First, metropolitan economies increasingly rely on the value of proximity—what urban economists call "agglomeration economies," or the propensity of successful local economies to cluster. Second, congestion has risen to levels that limit economic growth, research shows.

- **Agglomeration Economies and the Need for Access:** Firms benefit from being near other firms. Santa Monica's "Silicon Beach" is a location where technology firms have easy access to other nearby peer firms, creating an environment of shared ideas, talent and interaction. Yet, that access is not always as readily available as it might seem. A video gaming company in Santa Monica might benefit from access to talent at Caltech or movie studios in Burbank, but both are easily an hour away during much of the day because of traffic congestion. So, the benefit of agglomeration—nearby access to business partners, customers and ideas—is diminished by a congested transportation system.

  The benefits of local concentrations of firms are increasingly based on face-to-face communication. Research has shown that firms have higher productivity when locating near other firms, and those productivity benefits are often short-distance phenomena. Good transportation access "shrinks distance" by allowing businesses to more quickly access knowledge, suppliers and customers. Well-performing transportation systems, by contributing to dense, lively, walkable neighborhoods, can also create communities that are conducive to serendipitous meetings and face-to-face communication. This is particularly important in knowledge-intensive or creative industries.

- **Congestion and Employment:** Traffic congestion has been increasing in nearly all U.S. metropolitan areas. Research shows that traffic delays inhibit job growth. In the Los Angeles metropolitan area, actual employment growth from 1990 to 2003 was 567,983 new jobs, but researchers have estimated that with a 50 percent reduction in congestion in the region's metropolitan areas, employment growth from 1990 to 2003 would have been 700,235 new jobs. Research suggests that the employment enhancing effect of reducing congestion by implementing the 2016 RTP/SCS investments is larger in more congested urban areas. This is intuitive; the "distance shrinking" effect of managing congestion is more important in more congested urban areas. This is also a non-linear effect; congestion relief grows more important for the economy as congestion levels rise.

This sets the background and context for the economic impact study of the 2016 RTP/SCS. Metropolitan economies are increasingly relying on agglomeration benefits, as knowledge-based firms desire to locate near other similar firms. This phenomenon has long been familiar in Silicon Valley, and evidence suggests that the need to locate near similar firms is becoming pervasive in many segments of modern economies. At the same time, congestion has increased the "effective distance" within metropolitan areas and the evidence suggests that the negative economic effects of congestion are largest (and growing) in our most congested cities. Creating better access and mobility, a key goal of 2016 RTP/SCS, can be a clear pathway toward stimulating economic growth.

There are five possible paths through which transportation improvements can increase regional economic competitiveness. Each of these is described in the following sections.

1. **Improved labor market matching:** Reducing travel time allows firms to hire from a larger geographic area. This effectively increases the firm's labor market—particularly in a large urban area like the SCAG region where reductions in commuting time can yield access to many more potential employees. Increasing the size of the labor pool allows firms to find a better employee match for its needs. By hiring employees who better suit their needs, the firm can produce more (i.e., employees are more productive) for the same cost. This allows the firm to be more competitive and capture a larger market share. And that, in turn, can lead to increased hiring if the increase in market share overcomes

the tendency of firms to produce more with fewer employees due to improved employer-employee job matches.

2. **Firms move into the region in response to enhanced economic competitiveness:** This effect flows in part from the first effect. If the region's transportation system supports more efficient commutes, then employers will be encouraged to draw from larger labor market pools. And if that larger employee pool allows firms to hire better employees, eventually those firms will move into the region in response to those improved hiring prospects. This is especially true for firms that rely on a skilled workforce. The increases in firm productivity that initially come from improved labor market matching will result in firms moving into the SCAG region from other locations over longer periods of time.

3. **Reduced congestion increases labor supply:** Metropolitan regions compete for mobile labor. That means that those regions with lower traffic congestion will (when all else is equal) lure more migrants—simply due to the value of offering commuters lower traffic congestion. This increases the supply of available labor. In metropolitan areas with high traffic congestion and longer commutes, the labor pool will have to be compensated either in the form of higher wages, lower house prices or both. These two related effects are, in fact, one and the same—the higher wages in high congestion metropolitan areas reflect the need to lure in a labor pool that otherwise might choose to locate in lower congestion locales. Reduced congestion can attract more workers to a region, allowing a firm to hire quality workers at reasonable wages.

4. **Increased market for firms' products:** Reductions in travel time also can allow firms to supply a larger market area, leading to increased economic competitiveness and regional job growth. One example is the goods movement/freight traffic that moves through the Ports of Los Angeles and Long Beach. Larger ports can build infrastructure that speeds up the processing of shipments, therefore lowering costs. Supply chain managers favor Southern California because of the speed and reliability that goods can be moved around the region and to the rest of the nation. As the economy expands, congestion robs the area of this competitive advantage. Reducing shipping times for landside freight, from the ports to points within and beyond the region, can help increase shipping volumes and lead to lower costs. This ultimately can add up to higher productivity, making the region's ports more cost effective than other competitive points of entry.

5. **Learning:** In a growing knowledge-based economy, cities are increasingly engines of economic innovation. Nearly all economic advances—in consumer products, technology, medicine, consumer services, retailing and logistics, and entertainment and fine arts—are created in metropolitan areas. A large and growing body of literature argues that much of the economic advantage of cities is the learning that is possible when individuals and firms are in close proximity. Engineers in Silicon Valley interact regularly, within and across different firms, creating a world-class hub of knowledge and innovation that is unrivaled in the computing, advanced electronics and software industries. The movie industry in Los Angeles provides the same center for knowledge and learning in the entertainment industry. Such learning effects are central to many industries, including manufacturing processes and services that increasingly rely on innovations to remain competitive. Transportation investments that reduce traffic congestion can allow people to interact more readily with a larger pool of like-minded experts, increasing the learning and innovation in a regional economy. That can allow local firms to innovate in ways that lowers costs, improves products and leads to larger market share. Over time, that improved innovation environment will attract mobile labor and capital (workers and firms) from other regions, further boosting economic activity.

QUANTIFYING THE ECONOMIC IMPACT OF THE PLAN

To quantify the economic impact of the Plan's implementation, the SCAG economic team used data and software from Regional Economic Models, Inc. (REMI). The REMI TranSight model is an advanced economic analysis model that combines input-output approaches, coupled with a model of resident and firm migration into and out of our region to model the direct, indirect and induced effects of the 2016 RTP/SCS spending. REMI also includes a general equilibrium model combined with New Economic Geography approaches to model changes in economic competitiveness. REMI TranSight is the most advanced tool commercially available for analysis that forecasts the total economic effects of changes to transportation systems. All of the economic analysis of the Plan was conducted using REMI models. More details on the REMI models and the methodologies that SCAG used can be found in the Economic & Job Creation Analysis Appendix.

THE RESULTS OF OUR ANALYSIS

Results are reported in two parts:

1. Jobs that result from the 2016 RTP/SCS investment spending (direct, indirect and induced effects)
2. Additional jobs that flow from the improvements to the transportation network, resulting in network efficiencies and related increases in regional economic and business competitiveness

JOBS THAT RESULT FROM THE RTP/SCS INVESTMENT SPENDING (DIRECT, INDIRECT AND INDUCED EFFECTS)

TABLE 7.1 shows the annual average new jobs from the 2016 RTP/SCS financial plan spending. The job impact is reported as annual average jobs in five-year periods (starting with 2016–2020), for each county and for the entire region. The last column in TABLE 7.1 shows jobs, averaged over all Plan years, from 2016 RTP/SCS construction, operations and maintenance spending.

REMI TranSight model outputs predicted that jobs from transit operations and maintenance (O&M) expenditures in the region grow from an annual average of 119,000 in 2016–2020 to 173,000 in the last five years of the Plan (2036–2040). As a fraction of the total jobs from the Plan's spending (construction and O&M), transit O&M jobs grow from half of the jobs in 2016–2020 to nearly two-thirds of all jobs in 2036–2040. Transit O&M spending, as a fraction of the total Plan spending, was virtually constant across those two time periods—increasing from 37 percent of total Plan spending in 2016–2020 to 39 percent of Plan spending in 2036–2040. The large increase in the share of the Plan's jobs from transit O&M while the share of the Plan's spending from transit O&M stays constant is not consistent.

Upon examination, the research team concluded that the size of the SCAG region's transit spending is outside of what REMI can accurately model in the later years of the Plan. In the years 2036–2040, the region will spend $7.5 billion per year on transit O&M, while REMI's baseline forecast of the size of the transit industry in the region during that same time period is about $2 billion per year. The large difference is not due to any fault of the REMI model, but rather is due to the fact that the SCAG region is building the largest transit public works project in the history of the U.S.—an investment at a scale well beyond what has been experienced in other similar metropolitan areas during recent decades and even of a magnitude unprecedented compared to prior SCAG RTPs. The scale of the transit investment and the resulting magnitude of the increase in transit O&M are beyond what the research team believes the REMI TranSight model can reliably forecast at this point in time, therefore, the growth in jobs from transit O&M spending was adjusted downward.

TABLE 7.1 2016 RTP/SCS EMPLOYMENT IMPACT FROM CONSTRUCTION, OPERATIONS AND MAINTENANCE SPENDING

Annual Average Jobs Relative to Baseline (Thousands)

REGION	2016–2020	2021–2025	2026–2030	2031–2035	2036–2040	AVG PER YEAR
Imperial	1.68	2.14	4.54	4.55	4.55	3.49
Los Angeles	110.74	112.71	99.16	86.01	93.78	100.48
Orange	52.99	21.17	16.75	17.41	20.05	25.67
Riverside	31.99	19.33	25.09	28.84	24.90	26.03
San Bernardino	32.53	26.41	26.98	27.11	25.13	27.63
Ventura	7.13	6.00	6.02	3.71	4.04	5.38
SCAG REGION	237.06	187.76	178.53	167.63	172.45	188.69

Source: SCAG calculations from 2016 RTP/SCS financial plan input into REMI model. Note that the REMI model reports full and part-time jobs and the job numbers include both full-time and part-time jobs. Figures may not add up due to rounding.

ADDITIONAL JOBS THAT FLOW FROM THE IMPROVEMENTS TO THE TRANSPORTATION NETWORK, RESULTING IN NETWORK EFFICIENCIES AND RELATED INCREASES IN REGIONAL ECONOMIC AND BUSINESS COMPETITIVENESS

Network efficiency in the form of improved transportation access is a second source of job growth. TABLE 7.2 shows the jobs from improved economic competitiveness that result from decreases in travel times and less costly trip-making relative to the baseline. Note that the economic competitiveness jobs grow over time, as the effect of the 2016 RTP/SCS relative to baseline results in increasingly larger transportation improvements and resulting cumulative network efficiencies over the course of the Plan.

FULL RESULTS

The full economic results of the 2016 RTP/SCS investment are summarized in the table, with millions of new jobs (annual average) resulting from the Plan in five-year time periods and an annual average shown for 2016-2040. The total combined jobs from the two effects—Plan investment (construction, operations and maintenance spending) and network efficiency/economic competitiveness—are shown summed together in the table to highlight the total economic impact of the 2016 RTP/SCS.

TABLE 7.2 2016 RTP/SCS JOBS FROM ENHANCED ECONOMIC COMPETITIVENESS, REMI ESTIMATES OF JOBS FROM NETWORK EFFICIENCY PLUS AMENITIES AND OPERATIONS

Annual Average Jobs Relative to Baseline (Thousands)

REGION	2016–2020	2021–2025	2026–2030	2031–2035	2036–2040	AVG PER YEAR
Imperial	0.1	0.4	0.73	1.19	1.73	0.83
Los Angeles	40.62	137.22	225.15	292.13	320.1	203.04
Orange	7.43	25.6	42.42	65.98	99	48.09
Riverside	9.11	31.37	48.78	66.25	83.43	47.78
San Bernardino	6.36	25.56	47.08	65.72	79.91	44.93
Ventura	0.81	3.6	7.33	10.1	10.7	6.51
SCAG REGION	64.4	223.74	371.49	501.38	594.87	351.19

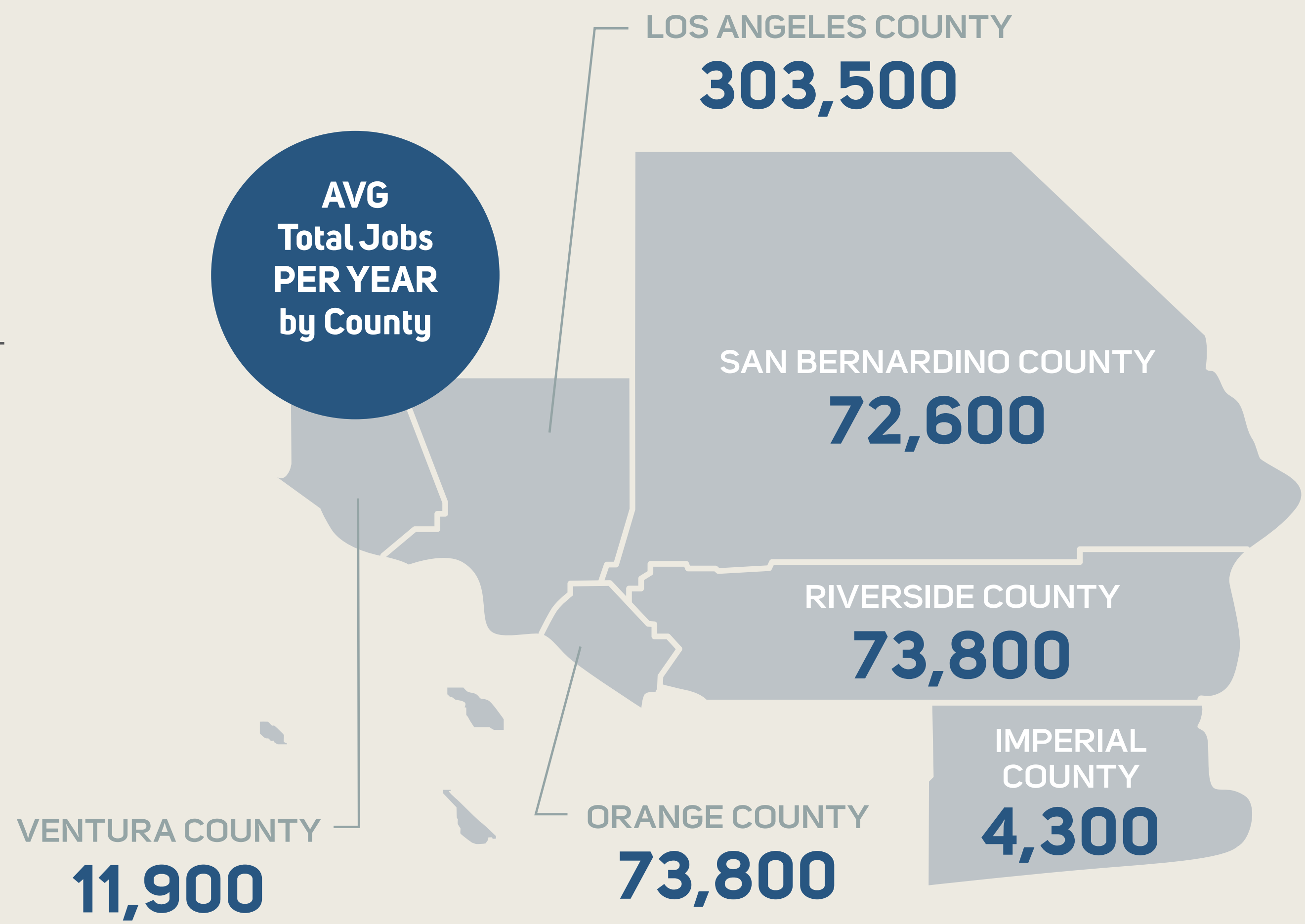
Source: SCAG calculations from 2016 RTP/SCS travel model results input into REMI TranSight model.
Figures may not add up due to rounding.

CREATING JOBS IN THE SCAG REGION

539,900

AVG Total JOBS
per year
in the SCAG region

Total jobs, all sources, construction, operations and maintenance, network benefits, from 2016 RTP/SCS. In comparison, the 2012 RTP/SCS would create 528,500 average total jobs during the life of the plan.



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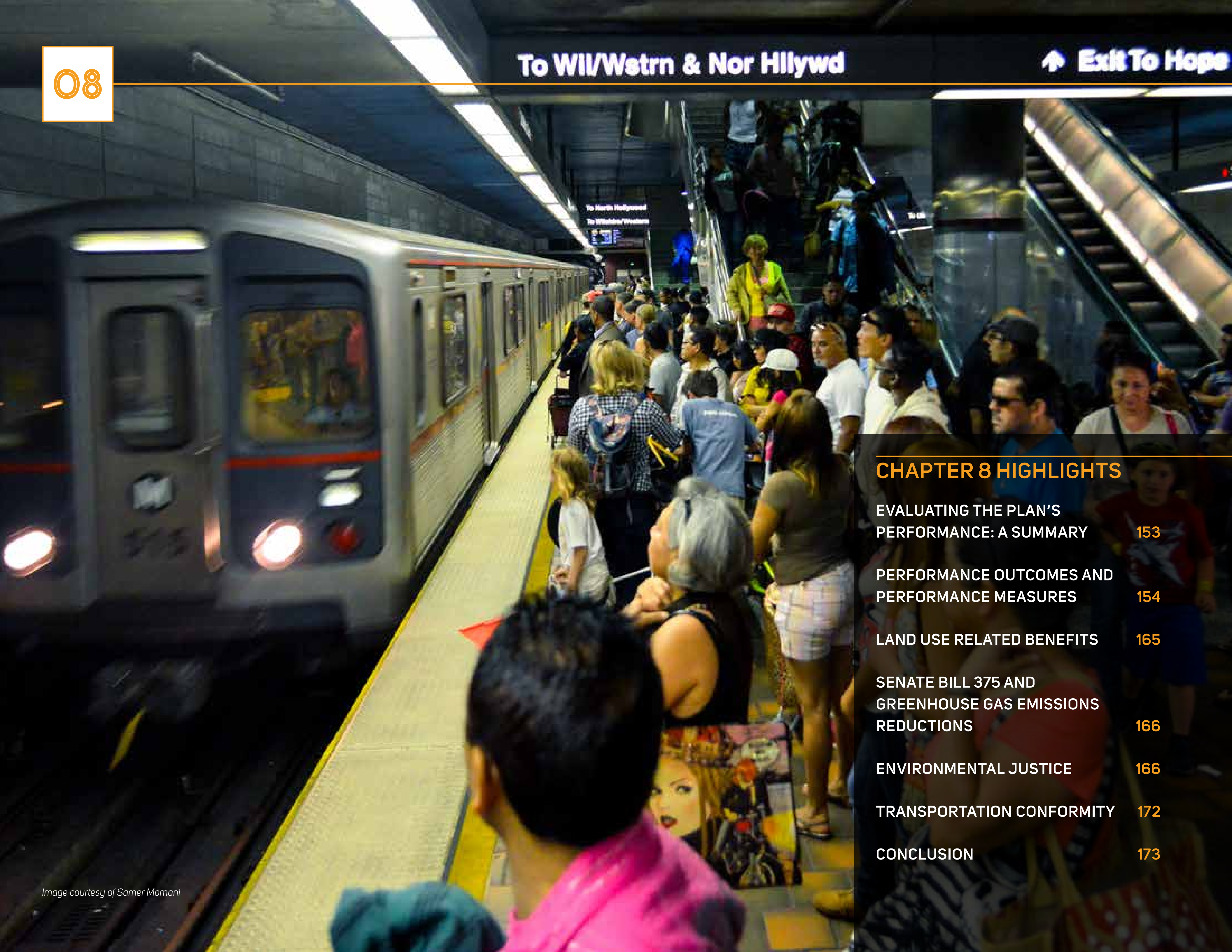


Image courtesy of Samer Momani

CHAPTER 8 HIGHLIGHTS

MEASURING OUR PROGRESS FOR THE FUTURE

The 2016 RTP/SCS uses a number of performance measures to help gauge progress toward meeting the goals and objectives of our region, as well as how the Plan meets federal requirements, including the intent of the current federal transportation authorization. The measures also address state requirements for reducing greenhouse gas emissions and planning for a more sustainable future. The 2016 RTP/SCS is expected to result in significant benefits to our region with respect to mobility and accessibility, air quality, economic growth and job creation, sustainability, and environmental justice. An extended discussion on how the Plan performs, along with the outcomes it achieves, is the topic of this chapter.

FOCUS

PLAN PERFORMANCE RESULTS

This graphic highlights the key benefits of implementing the 2016 RTP/SCS in terms of mobility, economy, efficiency and air quality.

Spending Less Time on the Road

20.5 miles
average daily vehicle miles driven per person

7.4% ↓

9.2 mins
daily delay per capita (extra time spent in traffic)

39% ↓

More Economic Opportunities

$1.00 INVESTMENT = **$2.00** BENEFIT

351,000
additional jobs supported by improving competitiveness

Efficiency Cost Savings

HOUSEHOLD COSTS
(transportation/energy/water use)
$14,000/yr

12% ↓

REDUCTION IN BUILDING ENERGY COSTS

4% ↓

PASSENGER VEHICLE FUEL USE

10% ↓

Improved Air Quality

ROG
49.1 TONS
↓ 8%
45.0 TONS

CO
338.6 TONS
↓ 9%
307.7 TONS

NOx
96.4 TONS
↓ 9%
88.2 TONS

PM2.5
13.3 TONS
↓ 5%
12.6 TONS

GHG REDUCTIONS

2020	↓ 8%
2035	↓ 18%
2040	↓ 21%

EVALUATING THE PLAN'S PERFORMANCE: A SUMMARY

COMPARING THE PLAN VS. NO PLAN

Implementation of the 2016 RTP/SCS will secure a safe, efficient, sustainable and prosperous future for our region. To demonstrate how effective the Plan would be toward achieving our regional goals, SCAG conducted a "Plan vs. No Build" (or Baseline) analysis—essentially comparing how the region would perform with and without implementation of the Plan. This analysis is summarized in this chapter. More details on this analysis and its results can be found in the Performance Measures Appendix.

First and foremost, the 2016 RTP/SCS meets all of the federal and state requirements. It meets all provisions for transportation conformity under the federal Clean Air Act. Cleaner fuels and new vehicle technologies will help significantly reduce many of the pollutants that contribute to smog and other airborne contaminants that may impact public health in the region. The Plan also performs well when it comes to meeting state-mandated targets for reducing greenhouse gas emissions from cars and light trucks. The state-determined targets for the SCAG region are an eight percent per capita reduction in greenhouse gas emissions from automobiles and light trucks by 2020, and a 13 percent reduction by 2035 (compared with 2005 levels). The Plan would result in an eight percent reduction in emissions by 2020, an 18 percent reduction by 2035, and a 21 percent reduction by 2040 as compared to 2005 levels.

Overall, the analysis clearly demonstrates that implementing the 2016 RTP/SCS would result in a regional transportation network that improves travel conditions and air quality, while also promoting an equitable distribution of benefits—that is, social equity. Trips to work, schools and other key destinations would be quicker and more efficient under the Plan. The 2016 RTP/SCS integrates multiple transportation modes, leading to increases in carpooling, demand for transit and use of active transportation modes for trips during peak travel hours and at other times. More specifically, our analysis found that, in comparison to the Baseline, the Plan will:

- Increase the combined percentage of work trips made by active transportation and public transit by about four percent, with a commensurate reduction in the share of commuters traveling by single occupant vehicle.
- Reduce Vehicle Miles Traveled (VMT) per capita by 7.4 percent and Vehicle Hours Traveled (VHT) per capita by about 17 percent (for automobiles and light/medium duty trucks) as a result of more location efficient land use patterns and improved transit service.
- Increase daily transit travel by nearly one-third, as a result of improved transit service and more transit-oriented development patterns.
- Reduce delay per capita by 39 percent.
- Reduce total heavy duty truck delay by 40 percent.
- Create an estimated 351,000 (or more) additional new jobs annually, due the region's increased competitiveness and improved economic performance that will result from congestion reduction and improvements in regional amenities with implementation of the Plan.
- Reduce the amount of previously undeveloped (greenfield) lands converted to more urbanized use by 23 percent. Conservation of open space and other rural lands is achieved by focusing new residential and commercial development in higher density areas. Through this strategy of conservation, the Plan provides a solid foundation for more sustainable development in the SCAG region.

The 2016 RTP/SCS also focuses on improving public health outcomes in the SCAG region. Some key performance results include a reduction in our regional obesity rate and reductions in the share of our population that suffers with hypertension and type 2 diabetes. The total annual health costs for respiratory disease will be reduced under the Plan more than 13 percent compared with the Baseline. These public health improvements are the result of investments in active transportation, more walkable communities and improved regional air quality as promoted in the 2016 RTP/SCS.

PERFORMANCE OUTCOMES AND PERFORMANCE MEASURES

This section summarizes how well the 2016 RTP/SCS is expected to perform when fully implemented. TABLE 8.1 lists the 2016 RTP/SCS performance outcomes and the associated measures used to evaluate performance, using the SCAG Regional Travel Demand Model (RTDM) and other tools. The table also includes specific performance results for both the Baseline and the Plan for each of the measures. Additional performance measures that will be used for ongoing regional monitoring are discussed in the Performance Measures Appendix.

In the discussion of performance outcomes, three scenarios are referenced: Base Year, Baseline and Plan.

- **Base Year** represents existing conditions as of 2012—that is, our region as it was in 2012: our transportation system, land use patterns and socio-economic characteristics (e.g., households and employment). The year 2012 was selected as the Base Year for this analysis because it is the year of the previous RTP/SCS.
- **Baseline** assumes a continuation of the development trends of recent decades, with local General Plans not including the intensified policies regarding growth distribution as promoted in the Plan. This scenario represents a future in 2040 in which only the following have been implemented: transportation projects currently under construction or undergoing right-of-way acquisition; those transportation programs and projects programmed and committed to in the 2015 Federal Transportation Improvement Program (FTIP); and/or transportation projects that have already received environmental clearance.
- **Plan** represents future conditions in 2040, in which the transportation investments and strategies detailed in the 2016 RTP/SCS are fully realized.

The Base Year, Baseline and Plan scenarios discussed in this chapter were developed to help evaluate the performance of the strategies, programs and projects presented in Chapter 5—the core of the 2016 RTP/SCS—and to meet various state and federal requirements.

On the following pages, a summary is provided of the Plan's performance outcomes, along with their associated performance measures. Some of the significant co-benefits provided by the Plan are summarized in TABLE 8.2.

LOCATION EFFICIENCY

The Location Efficiency outcome reflects the degree to which improved coordination of land use and transportation planning impacts the movement of people and goods in the SCAG region. This outcome has several associated performance measures that will be used for monitoring the degree to which the region is advancing toward our Location Efficiency goals:

1. Share of Growth in High Quality Transit Areas (HQTAs)
2. Land Consumption
3. Vehicle Miles Traveled (VMT)
4. Transit Mode Share
5. Average Distance for Work and Non-Work Trips
6. Percent of Trips Less than Three Miles
7. Work Trip Length Distribution

In addition to these seven metrics, measures of mobility and accessibility also serve to further reinforce the importance of the location efficiency outcome. Measures supporting the Mobility and Accessibility outcome are discussed in the next section of this chapter.

The following is a summary of the Location Efficiency performance measures:

SHARE OF GROWTH IN HIGH QUALITY TRANSIT AREAS (HQTAS)

Between 2012 and 2040, growth in the regional share of both households and employment in the HQTAs is projected to increase from the Baseline scenario to the Plan scenario.

LAND CONSUMPTION

The land consumption metric measures the amount of agricultural land that has changed from rural to more intensive development patterns to accommodate new growth. Greenfield land consumption refers to development that occurs on land that has not previously been developed for, or otherwise impacted by, urban uses, including agricultural lands, forests, deserts and other undeveloped sites. As shown in TABLE 8.2, new land consumption under the Plan would be substantially less than what would occur under the Baseline.

PLAN PERFORMANCE RESULTS IN THE SCAG REGION

Daily Vehicle Miles Traveled (VMT)
per capita

2012 BASE YEAR	2040 BASELINE	2040 PLAN
22.8 MILES	22.1 MILES	20.5 MILES

Baseline to Plan Comparison **-7.4%**

Base Year to Plan Comparison **-10.2%**

Daily Minutes of Delay
per capita

2012 BASE YEAR	2040 BASELINE	2040 PLAN
11.8 MINUTES	15.0 MINUTES	9.2 MINUTES

Baseline to Plan Comparison **-39%**

Base Year to Plan Comparison **-22%**

County	Measure	2012 BASE YEAR	2040 BASELINE	2040 PLAN
IMPERIAL COUNTY	DAILY VMT *per capita*	24.8 MILES	26.3 MILES	25.1 MILES
IMPERIAL COUNTY	DAILY DELAY *per capita*	0.7 MINUTES	2.7 MINUTES	2.0 MINUTES
LOS ANGELES COUNTY	DAILY VMT *per capita*	21.5 MILES	20.2 MILES	18.4 MILES
LOS ANGELES COUNTY	DAILY DELAY *per capita*	14.7 MINUTES	16.4 MINUTES	11.5 MINUTES
ORANGE COUNTY	DAILY VMT *per capita*	23.8 MILES	22.8 MILES	21.4 MILES
ORANGE COUNTY	DAILY DELAY *per capita*	11.9 MINUTES	13.2 MINUTES	7.9 MINUTES
RIVERSIDE COUNTY	DAILY VMT *per capita*	23.3 MILES	23.7 MILES	21.7 MILES
RIVERSIDE COUNTY	DAILY DELAY *per capita*	5.9 MINUTES	12.3 MINUTES	5.6 MINUTES
SAN BERNARDINO COUNTY	DAILY VMT *per capita*	26.6 MILES	27.1 MILES	25.9 MILES
SAN BERNARDINO COUNTY	DAILY DELAY *per capita*	7.6 MINUTES	17.1 MINUTES	7.4 MINUTES
VENTURA COUNTY	DAILY VMT *per capita*	22.4 MILES	21.9 MILES	20.2 MILES
VENTURA COUNTY	DAILY DELAY *per capita*	7.0 MINUTES	11.5 MINUTES	5.7 MINUTES

TABLE 8.1 2016 RTP/SCS PERFORMANCE MEASURES AND RESULTS (IN THOUSANDS OF HOURS)

PERFORMANCE MEASURE	DEFINITION	OBJECTIVE	CATEGORY	2040 BASELINE	2040 PLAN	INDICATOR
OUTCOME: LOCATION EFFICIENCY						
Share of growth in High Quality Transit Areas (HQTAs)	Share of the region's growth in households and employment in HQTAs	Improvement (increase) over No Project Baseline	Percent of households in HQTAs	36%	46%	
			Percent of jobs in HQTAs	44%	55%	
Land consumption	Greenfield land consumed and refill land consumed	Improvement (decrease) over No Project Baseline	Greenfield land consumed	154 sq miles	118 sq miles	
Vehicle Miles Traveled (VMT) per capita	Average daily vehicle miles driven per person	Improvement (decrease) over No Project Baseline	Automobiles and light-duty trucks	22.1 miles	20.5 miles	
Transit mode share	The share of total trips that use transit for work and non-work trips	Improvement (increase) over No Project Baseline	All Trips	2.2%	3.1%	
			Work Trips	5.6%	8.2%	
Average distance traveled for work and non-work trips	The average distance traveled for work or non-work trips	Improvement (decrease) over No Project Baseline	Work Trips	15.1 miles	15.5 miles	
			Non-Work Trips	7.8 miles	7.9 miles	
Percent of trips less than 3 miles	The share of work and non-work trips which are fewer than 3 miles	Improvement (increase) over No Project Baseline	Work Trips	20.4%	20.3%	
			Non-Work Trips	41.7%	41.9%	
Work trip length distribution	The statistical distribution of work trip length in the region	Improvement (increase) over No Project Baseline	Trip Length: 10 miles or Less	51.6%	50.9%	
			Trip Length: 25 miles or Less	81.8%	81.0%	
OUTCOME: MOBILITY AND ACCESSIBILITY						
Person delay per capita*	Delay per capita can be used as a supplemental measure to account for population growth impacts on delay	Improvement (decrease) over No Project Baseline	Daily minutes of delay per capita	15.0 mins	9.2 mins	
Person delay by facility type*	Delay: Excess travel time resulting from the difference between a reference speed and actual speed	Improvement (decrease) over No Project Baseline	Highway	3,035,105 hrs	2,023,417 hrs	
			HOV	251,547 hrs	42,590 hrs	
			Arterial	2,254,896 hrs	1,327,235 hrs	
Truck delay by facility type*	Delay: Excess travel time resulting from the difference between a reference speed and actual speed	Improvement (decrease) over No Project Baseline	Highway	274,456 hrs	171,828 hrs	
			Arterial	47,561 hrs	20,998 hrs	
Travel time distribution for transit, SOV and HOV modes for work and non-work trips*	Travel time distribution for transit, SOV and HOV for work and non-work trips	Improvement (increase) over No Project Baseline	% of PM peak transit trips <45 minutes	22%	26%	
			% of PM peak HOV trips <45 minutes	72%	79%	
			% of PM peak SOV trips <45 minutes	82%	89%	

TABLE 8.1 CONTINUED

PERFORMANCE MEASURE	DEFINITION	OBJECTIVE	CATEGORY	2040 BASELINE	2040 PLAN	INDICATOR
OUTCOME: SAFETY AND HEALTH						
Collision rates by severity by mode (per 100 million vehicle miles)*	Collision rate per 100 million vehicle miles by mode and number of fatalities and serious injuries by mode (all, bicycle/pedestrian)	Improvement (decrease) over No Project Baseline	Serious injuries	N/A	1.60	
			Fatalities	N/A	0.31	
Criteria pollutants emissions (tons per day)	CO, NOx, PM 2.5, PM 10 and VOC	Meet Federal air quality conformity requirements (FR)	Reactive organic gases (ROG)	49.1 tons	45.0 tons	↓
			Carbon monoxide (CO)	338.6 tons	307.7 tons	↓
			Oxides of nitrogen (NOx)	96.4 tons	88.2 tons	↓
			Particulate matter (PM 10)	32.6 tons	30.8 tons	↓
			Particulate matter (PM 2.5)	13.3 tons	12.6 tons	↓
			Nitrogen dioxide (NO2)	94.6 tons	86.8 tons	↓
Air pollution-related health measures	Pollution-related respiratory disease incidence and cost	Improvement (decrease) over No Project Baseline	Pollution-related health incidences (annual)	270,328	234,363	↓
			Pollution-related health costs (annual)	$4.48 billion	$3.88 billion	↓
Physical activity-related health measures	Physical activity/weight related health issues and costs	Improvement over No Project Baseline	Daily per capita walking	12.1 mins	16.0 mins	↑
			Daily per capita biking	1.6 mins	2.0 mins	↑
			Daily per capita driving	64.8 mins	61.9 mins	↓
			Obese population (%)**	26.3%	25.6%	↓
			High blood pressure (%)**	21.5%	20.8%	↓
			Heart disease (%)**	4.4%	4.2%	↓
			Diabetes Type 2 (%)**	6.1%	6.0%	↓
Mode share of walking and bicycling	Mode share of walking and biking for work trips, non-work trips and all trips	Improvement (increase) over No Project Baseline	Walk share (Work)	4.4%	5.6%	↑
			Bike share (Work)	0.5%	0.7%	↑
			Walk share (Non-Work)	12.0%	15.0%	↑
			Bike share (Non-Work)	1.8%	2.5%	↑
			Walk share (All Trips)	10.7%	13.5%	↑
			Bike share (All Trips)	1.6%	2.2%	↑

TABLE 8.1 CONTINUED

PERFORMANCE MEASURE	DEFINITION	OBJECTIVE	CATEGORY	2040 BASELINE	2040 PLAN	INDICATOR
OUTCOME: ENVIRONMENTAL QUALITY						
Greenhouse gas emissions	CO, NOx, PM 2.5, PM 10 and VOC emissions; and per capita greenhouse gas emissions (CO2)	Meet state greenhouse gas reduction targets (SR)	Reduction in per capita greenhouse gas emissions from 2005 levels	N/A	8% in 2020 18% in 2035 21% in 2040	
OUTCOME: ECONOMIC OPPORTUNITY						
Additional jobs supported by improving competitiveness	Number of jobs added to the economy as a result of improved transportation conditions which make the region more economically competitive	Improvement (increase) over No Project Baseline	Annual number of new jobs generated	N/A	351,000+	
Additional jobs supported by transportation investments	Total number of jobs supported in the economy as a result of transportation expenditures	Improvement (increase) over No Project Baseline	Annual number of new jobs generated	N/A	188,000+	
OUTCOME: INVESTMENT EFFECTIVENESS						
Benefit/Cost Ratio	Ratio of monetized user and societal benefits to the agency transportation costs	Greater than 1.0	Benefit ratio per $1 investment	N/A	2.0	
OUTCOME: TRANSPORTATION SYSTEM SUSTAINABILITY						
Cost to preserve multimodal system to current and state of good repair	Annual cost per capita required to preserve the regional multimodal transportation system to current conditions	Improvement (decrease) over Base Year	Cost per capita (per year)	N/A	$368	
OUTCOME: ENVIRONMENTAL JUSTICE						
See Table 8.4: Performance Measures: Environmental Justice		Meet Federal requirements. No unaddressed disproportionately high and adverse effects for low income or minority communities (FR)				

Notes:

(FR) Federal requirement

(SR) State requirement

* MAP-21 calls for performance measures and targets associated with congestion, safety, reliability, freight movement, infrastructure condition, environment and project delivery. However, federal rule-making in support of MAP-21 performance measures in still in progress.

** Results are for areas experiencing land use and population changes not the entire SCAG region.

Acronyms

HOV: High-Occupancy Vehicle

SOV: Single-Occupancy Vehicle

TABLE 8.2 2016 RTP/SCS KEY BENEFITS

BENEFIT CATEGORIES	BASELINE	RTP/SCS	SAVINGS	% SAVINGS
Local Infrastructure and Services Costs: Capital and Operations and Maintenance Costs to Support New Growth, 2012–2040[1]	$40.6 billion	$37.3 billion	$3.3 billion	8.1%
Household Costs: Transportation and Home Energy/Water Use, All Households, Annual (2040)	$16,000	$14,000	$2,000	12.3%
Land Consumption: New (greenfield) Land Consumed to Accommodate New Growth 2012–2040	154 sq miles	118 sq miles	36 sq miles	23.4%
Building Energy Use: Residential and Commercial Buildings, Cumulative, 2012–2040 (measured in British Thermal Units (BTUs))	20,311 trillion	19,563 trillion	748 trillion	3.7%
Building Energy Costs: Residential and Commercial Buildings, Cumulative, 2012–2040	$762 billion	$735 billion	$27 billion	3.5%
Building Water Use: Residential and Commercial Buildings, Cumulative, 2012–2040 (measured in Acre Feet (AF))	134 million	133.2 million	0.8 million	0.6%
Building Water Costs: Residential and Commercial Buildings, Cumulative, 2012–2040	$186 billion	$185 billion	$1 billion	0.5%
Household Driving: Annual Passenger VMT, 2040	177.7 billion	150 billion	27.7 billion	15.6%

Note: [1] Operations and maintenance costs referenced here include costs beyond those for transportation (e.g., sewer and water operations and maintenance costs).

VEHICLE MILES TRAVELED (VMT) PER CAPITA

This measure is new to the 2016 RTP/SCS. VMT (for automobiles and light trucks) per capita has become an increasingly significant metric since the passage of Senate Bill 375, which led to state-determined reduction targets for regional greenhouse gas emissions from automobiles and light trucks. Automobiles and light duty trucks are a major contributor to greenhouse gas emissions, producing more than 60 percent of transportation sector emissions. Therefore, VMT reduction is a critical component of a comprehensive regional strategy for reducing greenhouse gas emissions. By monitoring progress in reducing per capita VMT through implementation of the various transportation investments and land use strategies outlined in this Plan, we will be better able to accurately gauge our momentum toward achieving our goals for reducing regional greenhouse gas emissions. Daily per capita VMT in the SCAG region is projected to decrease significantly in 2040 under the Plan.

TRANSIT MODE SHARE

Transit mode share is another new metric for the 2016 RTP/SCS. It measures the share of transit trips made throughout the region for work and non-work purposes. This new measure will help us to identify how well the transit strategies and improvements proposed in the 2016 RTP/SCS are working toward providing better and more diverse commuting options for the traveling public. Ideally, with better transit service, more commuters will choose that option over driving alone, further reducing VMT and regional greenhouse gas emissions. TABLE 8.3 shows transit mode share by county for work trips and for all trips in 2040 as projected under the Plan.

TABLE 8.3 TRANSIT MODE SHARE BY COUNTY

(Plan 2040)

COUNTY	WORK TRIPS	ALL TRIPS
Imperial	0.6%	0.3%
Los Angeles	12.0%	4.7%
Orange	3.8%	1.7%
Riverside	1.1%	0.5%
San Bernardino	2.1%	0.7%
Ventura	1.6%	0.7%
SCAG Region	8.2%	3.1%

AVERAGE DISTANCE FOR WORK AND NON-WORK TRIPS

The average distance for work trips in 2040 is projected to increase slightly under the Plan. The average distance traveled for non-work trips in 2040 is projected to remain relatively constant between the Baseline and the Plan.

PERCENT OF TRIPS LESS THAN THREE MILES

The vast majority of trips in Southern California today are made by people driving alone. As the length of trips becomes shorter, particularly to within a few miles, people are more likely to use transit, bike, walk or choose other alternatives to driving alone. By 2040, the share of work trips and non-work trips less than three miles is projected to remain relatively unchanged.

WORK TRIP LENGTH DISTRIBUTION

The share of trips less than ten miles in 2040 is projected to be just over 50 percent under both the Baseline and the Plan. Likewise, the share of trips under 25 miles would be about 81 percent for both the Baseline and the Plan.

MOBILITY AND ACCESSIBILITY

The Mobility and Accessibility outcome is defined as the ability to reach desired destinations with relative ease and within a reasonable time, using reasonably available transportation choices. This section discusses the mobility and accessibility performance measures for the 2016 RTP/SCS.

MOBILITY

The Mobility performance measure relies on the commonly used measure of delay. Delay is defined as the difference between actual travel time and the travel time at a pre-defined reference or optimal speed for each modal alternative. It is measured in vehicle-hours of delay (VHD), which can then be used to derive person-hours of delay. The mobility measures used to evaluate alternatives for this outcome include:

- Person Delay by Facility Type (Highway, High Occupancy Vehicle (HOV) Lanes, Arterials)
- Person Delay per Capita
- Truck Delay by Facility Type (Highway, Arterial)

One additional measure for delay that is readily available for ongoing monitoring, but which cannot be readily forecast, is non-recurrent delay. Recurrent delay is the day-to-day delay that occurs because too many vehicles are on the road at the same time. Non-recurrent delay is the delay that is caused by collisions, weather, special events or other atypical incidents. Non-recurrent delay can be mitigated or reduced by improving incident management strategies. Other uses of intelligent transportation technologies, such as traffic signal coordination and the provision of real-time information about unexpected delays, allow travelers to make better informed decisions regarding the availability of transportation alternatives, including transit. Non-recurrent delay as an on-going regional monitoring measure is discussed in greater detail in the Performance Measures Appendix.

Person Delay by Facility Type (Highway, High Occupancy Vehicle (HOV) Lanes, Arterials)

Since the 2012 RTP/SCS, the person delay measure has been expanded to differentiate between single-occupancy vehicle (SOV) and HOV delay. Person delay on our highways under the Plan would improve on Baseline conditions, while delay on HOV facilities will be reduced more dramatically. Delay on our regional arterial roadways would also improve between the Baseline and the Plan. FIGURE 8.1 shows total person hours of delay by facility type.

Person Delay Per Capita

Normalizing delay by the number of people living in an area provides insight as to how well the region is mitigating traffic congestion in light of increasing population growth. Delay per capita is expected to grow considerably, particularly in the Inland Empire counties of Riverside and San Bernardino, under Baseline conditions. However, implementation of the Plan would reduce per capita delay substantially to below 2012 levels.

Truck Delay by Facility Type (Highway, Arterial)

This measure estimates the average daily truck delay by facility type for highways and arterials. The 2016 RTP/SCS includes significant investments in a regional freight corridor and other improvements to facilitate goods movement. It is estimated that the Plan would reduce heavy-duty truck delay on the highway and arterial systems. However, truck delay under the Plan would still be above Base Year levels, partly due to the projected growth in trade and associated truck traffic.

Highway Non-Recurrent Delay

As indicated previously, this measure will be used only for ongoing regional monitoring, not for evaluation of alternatives for the 2016 RTP/SCS. Non-recurrent delay refers to the share of congestion that is considered to be atypical. FIGURE 8.2 shows the relative proportion of highway congestion that is estimated to be caused by non-recurrent events by county.

Highway Speed Maps

Maps illustrating highway speed conditions during the afternoon peak period (3 PM to 7 PM) based upon the SCAG RTDM results for the Base Year, Baseline and Plan are provided in the Performance Measures Appendix. Additional speed maps are provided in the Highways & Arterials Appendix.

ACCESSIBILITY

The Accessibility outcome is used to evaluate how well the transportation system performs in providing people access to opportunities. Opportunities may include jobs, education, medical care, recreation, shopping or any other activities that may help enhance a person's quality of life. For the 2016 RTP/SCS, accessibility is simply defined as the distribution of trips by mode by travel time.

As with the 2012 RTP/SCS, accessibility is measured by taking afternoon or PM peak period travel demand model results for the base and forecast years and identifying the percentage of commute or home-based work trips that are completed within 45 minutes. Peak periods are those times during the weekday when commuting travel on regional roadways reaches its highest levels. Typically, peak periods occur twice daily, first during the morning commute when people are traveling to their workplaces and again in the late afternoon when people are returning home from work. FIGURE 8.3 shows these results. In all cases, the 2040 Plan would improve accessibility for home-based work trips over the Baseline.

The 2016 RTP/SCS provides a comprehensive measure of accessibility, including the transit, SOV, and HOV modes, for both work and non-work trips. The results of these mode-specific accessibility analyses can be found in the Performance Measures Appendix.

FIGURE 8.1 DAILY PERSON-HOURS OF DELAY BY FACILITY TYPE (IN THOUSANDS)

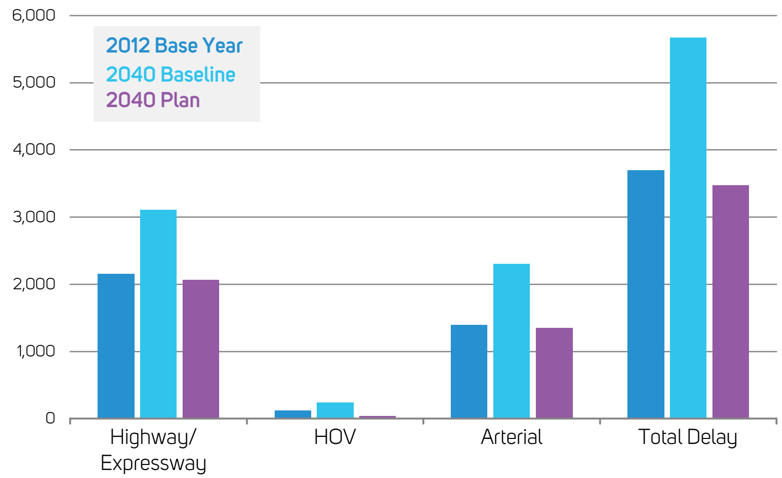


FIGURE 8.3 WORK TRIPS COMPLETED WITHIN 45 MINUTES

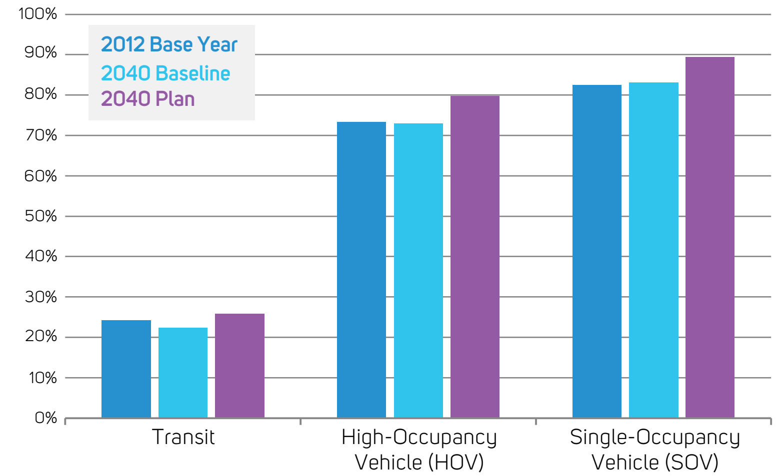
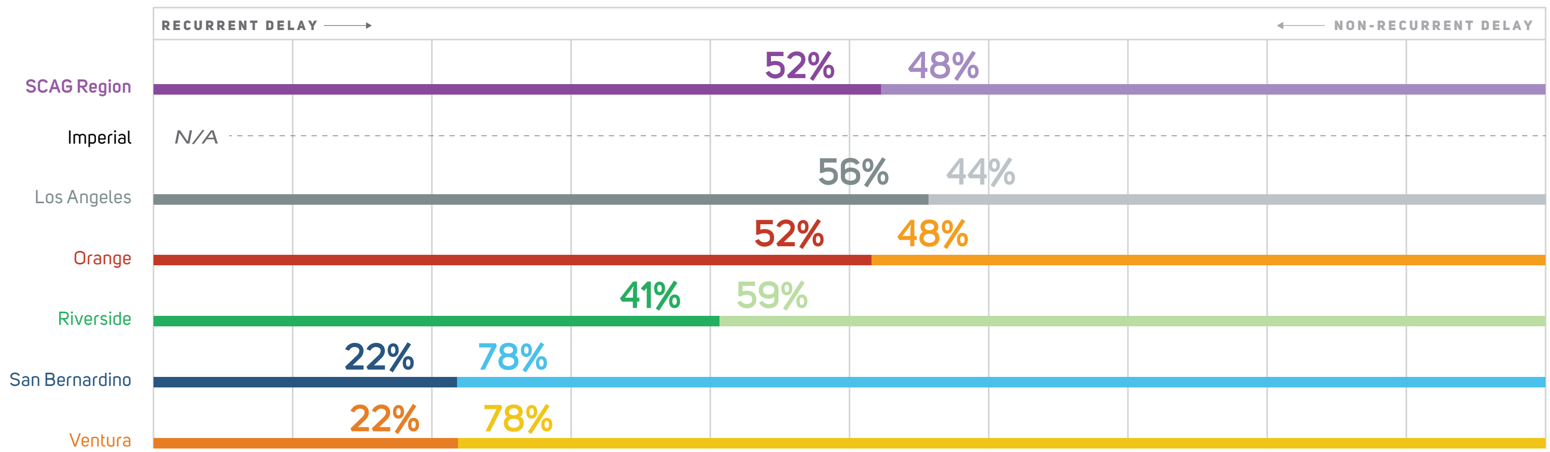


FIGURE 8.2 RECURRENT AND NON-RECURRENT CONGESTION (2011)



SAFETY AND HEALTH

The Safety and Health outcomes have been carried over from the 2012 RTP/SCS. In addition, the 2016 RTP/SCS includes new measures to evaluate the health outcomes of the Plan, including three new measures discussed below. The safety and health impacts of regional transportation improvements cannot be easily forecast, but total collisions can show a reduction in future years, particularly if people shift from travel modes with higher collision risk to modes with lower collision risk. The total number of collisions is generally used as the performance measure for safety and it can be partially projected by using mode and facility specific collision rates (highways, arterials and transit). This approach is used for the 2016 RTP/SCS, but it is important to note that this methodology does not take into account safety improvements specific to each mode. It only reflects changes based on modal or facility shifts. For monitoring, this measure can be reported historically by time period (month) and by mode (including for active transportation). Safety and Health outcome trends are discussed in greater detail in the Performance Measures Appendix.

Recognizing that the RTP/SCS integrates transportation and land use and has impacts beyond those exclusively transportation-related, the 2016 RTP/SCS includes three new health-related measures: mode share for walking and biking, rates of physical activity and weight-related disease, and incidence of respiratory/pollution-related disease.[1]

The health benefits of an active lifestyle have become increasingly apparent in recent years, and there is growing support for improving the walkability and bikability of the communities where we live and work. The linkage between obesity and disease has been well documented, and providing the appropriate community design and infrastructure to support a more active lifestyle is an important first step toward promoting healthy communities. Walking and biking mode shares can be used to evaluate the 2016 RTP/SCS alternatives, while the disease-focused measures may also be useful for on-going regional monitoring.

A health measure carried over from the 2012 RTP/SCS is tons of criteria air pollutants, which is highly correlated to public health concerns such as asthma. There are six common air pollutants that are monitored in accordance with federal air quality regulations.[2] These criteria pollutants include particulate matter (PM 10 and PM 2.5), carbon monoxide (CO), nitrogen oxides (NOx), and nitrogen dioxide (NO2). These pollutants require careful monitoring because of their known adverse effects on human health. While children, older residents and persons with existing respiratory illnesses are most vulnerable to the effects of air pollutants, the health effects of long-term exposure are a concern for everyone in the region. Some of the major health concerns of exposure to high levels of these criteria pollutants include respiratory irritation, reduced lung capacity, chest pain, and aggravation of asthma and other respiratory illnesses.[3]

Airborne particulate matter comes in all sizes. However, particles smaller than ten micrometers in diameter are considered the most dangerous to human health because they are small enough to be absorbed into the lungs. The finer the particle size, the more dangerous they are. Particulate matter smaller than 2.5 micrometers is a particularly serious concern for people with existing heart or lung disease, as even short-term exposure to high levels of PM 2.5 may aggravate symptoms. High levels of carbon monoxide (CO) is also considered a health hazard, especially for people with compromised respiratory or coronary function, as CO is known to reduce the flow of oxygen through the human body. Long-term exposure to high levels of nitrogen dioxide, which is produced primarily through the burning of fossil fuels, may cause a narrowing of the bronchial airways, resulting in chronic bronchitis or aggravation of asthma symptoms.[4] The criteria pollutant performance measure supports both the Safety and Health outcome and the Environmental Quality outcome.

The 2016 RTP/SCS would improve physical activity outcomes through improved location efficiency, which increases the share of short trips and through the provision of additional investments in active transportation networks including first/last mile improvements, Safe Routes to School projects and regional bikeway infrastructure. It would also increase access to natural lands and parks, which would further increase opportunities for physical activity.

New to the 2016 RTP/SCS is the development of a new Public Health module for the Urban Footprint/Scenario Planning Model to measure the Plan's impact on physical activity. The model was evaluated by a statewide review panel consisting of representatives of state, regional and local agencies. The Plan is expected to result in 4.3 additional minutes of physical activity per capita over the Baseline in areas experiencing changes in land use, which would improve

1 Ogden, Ph.D., C., & Carroll, M.S.P.H, M. (2010). Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 Through 2007–2008. Center for Disease Control and Prevention. Accessed at http://www.cdc.gov/nchs/data/hestat/obesity_adult_07_08/obesity_adult_07_08.htm.

2 For more information on Federal air quality standards, see U.S. Environmental Protection Agency, National Ambient Air Quality Standards (NAAQS): http://www3.epa.gov/ttn/naaqs/criteria.html.

3 For more information on the health impacts of criteria air pollutants, see U.S. Environmental Protection Agency, Six Common Air Pollutants: http://www3.epa.gov/airquality/urbanair/.

4 For more information on the health impacts of particulate matter, see U.S. Environmental Protection Agency, Particle Matter (PM) Health, Last Accessed October 7, 2015: http://www3.epa.gov/pm/health.html.

health outcomes related to obesity by 2.7 percent and high blood pressure by 3.3 percent for residents in those areas. For a broader discussion of the Scenario Planning Model, please see the SCS Background Documentation Appendix. For more detailed information on the connection between physical activity and health outcomes, please see the Public Health Appendix.

ENVIRONMENTAL QUALITY

This outcome is measured in terms of criteria pollutant and greenhouse gas emissions. Emissions are estimated using the SCAG RTDM results, which are used as input to the California Air Resources Board's (ARB) Emission Factors (EMFAC) model. Pollutant emissions are reported in detail as part of the Transportation Conformity Analysis Appendix. The impact of air quality on public health is discussed in the Safety and Health outcome section of this chapter. Monitoring of regional greenhouse gas emissions is discussed in the Performance Measures Appendix.

ECONOMIC OPPORTUNITY

The economic opportunity outcome is measured in terms of additional jobs created through improved regional economic competitiveness as a result of the transportation investments provided through the 2016 RTP/SCS. An annual average of more than 188,000 new jobs would be generated by the construction and operations expenditures in the 2016 RTP/SCS, in addition to more than 351,000 annual jobs that would be created in a broad cross-section of industries by the region's increased competitiveness and improved economic performance—as a result of the improved transportation system. Additional economic benefits of the 2016 RTP/SCS are discussed in Chapter 7.

INVESTMENT EFFECTIVENESS

The investment effectiveness outcome indicates the degree to which the Plan's expenditures generate benefits that transportation users can experience directly. This outcome is important because it describes how the Plan's transportation investments make productive use of increasingly scarce funds.

The benefit/cost ratio is the measure used to evaluate the cost-effectiveness outcome, as it compares the incremental benefits with the incremental costs of multimodal transportation investments. The benefits are divided into several categories, including:

- Savings resulting from reduced travel delay
- Air quality improvements
- Safety improvements
- Reductions in vehicle operating costs

For these categories, travel demand and air quality models are used to estimate the benefits of the Plan compared with the Baseline. Most of these benefits are a function of changes in VMT and VHT. Not all impacts are linear, so reductions in congestion can increase or decrease vehicle operating costs and emissions. Delay savings are reflected directly in the VHT statistics. To estimate the benefit/cost ratio, the benefits in each category are converted into dollars and added together. These are divided by the total incremental costs of the Plan's transportation improvements to produce a ratio. The investments in the 2016 RTP/SCS would provide a return of $2.00 for every dollar invested, for a benefit/cost ratio of 2.0. For this analysis, all benefits and costs are expressed in 2012 dollars. Benefits are estimated over the RTP/SCS planning period through 2040. The user benefits are estimated using California's Cal-B/C framework and incorporate SCAG's RTDM outputs. The costs include the incremental public expenditures over the entire 2016 RTP/SCS planning period.[5]

TRANSPORTATION SYSTEM SUSTAINABILITY

A transportation system is sustainable if it maintains its overall performance over time in an equitable manner with minimum damage to the environment, and at the same time does not compromise the ability of future generations to address their transportation needs. Sustainability, therefore, pertains to how our decisions today impact future generations. One of the measures used to evaluate system sustainability is the total inflation-adjusted cost per capita to maintain our overall multimodal transportation system performance at current conditions. The 2016 RTP/SCS includes two additional new measures to support this outcome: State Highway System pavement condition and local roads pavement condition. These additional performance measures will strengthen the transportation system sustainability outcome and further support implementation of MAP-21.

[5] California Department of Transportation. (2009). California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C) User's Guide (Version 4.0). Accessed at http://www.dot.ca.gov/hq/tpp/offices/eab/benefit_files/CalBC_User_Guide_v8.pdf.

The 2016 RTP/SCS is committed to maintaining a sustainable regional transportation system by allocating $275.5 billion toward maintaining and operating the system in a state of good repair over the period of the Plan. This amounts to an average annual per capita investment of about $368 (in 2015 dollars) for each year of the Plan period. More details on performance measures for the Transportation System Sustainability outcome are presented in the Performance Measures Appendix.

LAND USE RELATED BENEFITS

Unlike the Plan, the Baseline scenario relies more heavily on growth in undeveloped lands at the edges of cities and beyond and focuses more new housing toward single-family developments in suburban settings. Using a different modeling process from that used for the mobility-based performance measures, additional land use related performance results were derived using the single framework model as described in the SCS Background Documentation Appendix.

The land use strategy of the 2016 RTP/SCS promotes location efficiency by orienting new housing and job growth in areas served by high quality transit and in other targeted opportunity areas including existing main streets, downtowns and corridors where infrastructure already exists. This more compact land use pattern, combined with the transportation network improvements and strategies identified in the 2016 RTP/SCS, would result in improved pedestrian and bicycle access to community amenities, shorter average trip lengths and reduced vehicle miles traveled. This strategy also supports the development of more livable communities that provide more housing choices, conserve natural resources, offer more and better transportation options, and promote an overall better quality of life.

The more focused land use pattern promoted in the Plan also reduces the need for significant capital investments. Because new development is focused in areas where infrastructure already exists, there is not as much need to extend or build new local roads, water and sewer systems, and parks. However, in other instances, modernization of utilities needs to be considered and completed to accommodate the additional use.There are also operations and maintenance (O&M) cost savings. O&M costs include the ongoing local expenditures required to operate and maintain the infrastructure serving new residential growth. It is important to note the O&M costs referred to in this section are not the same O&M costs discussed in other sections of the 2016 RTP/SCS.

The 2016 RTP/SCS land use strategy also reduces the average household costs associated with driving and residential energy and water use. A land use pattern that contains more mixed-use/walkable and urban infill development accommodates a higher proportion of growth in more energy-efficient housing types like townhomes, apartments and smaller single-family homes, as well as more compact commercial building types. It should be noted that location is also an important factor in determining energy costs: buildings located in the warmer areas of the region use more energy each year, in part because they require more energy for cooling during the summer months.

As California is facing major constraints on water supplies due to ongoing drought conditions throughout the state, there is a strong emphasis on reducing residential water use. Residential water use is a function of both indoor and outdoor water needs, with outdoor use (landscape irrigation) accounting for the majority of the difference among housing types. Because homes with

RTP/SCS GREENHOUSE GAS REDUCTIONS

Percent Reduction from 2005 Levels Per Capita

	2020	2035	2040
ARB TARGET	8%	13%	N/A
2016 RTP/SCS	8%	18%	21%
% DIFFERENCE	0%	5%	N/A

* ARB has set GHG emissions reduction targets for 2020 and 2035, but not for 2040

larger yards require more water for landscape irrigation, lot size is generally highly correlated with a household's overall water consumption. Therefore, a land use pattern with a greater proportion of large lot single-family homes will require more water than a land use pattern that features a larger share of compact and urban infill development, which includes more attached and multifamily homes. And, as is the case for energy use, the location and type of new development has a significant bearing on water use: homes in the warmer and more arid locations of the region will consume more water to maintain lawns and other landscaping.

SENATE BILL 375 AND GREENHOUSE GAS EMISSIONS REDUCTIONS

As discussed previously in this Plan, Senate Bill 375 requires that SCAG and other Metropolitan Planning Organizations (MPOs) throughout the state develop a Sustainable Communities Strategy to reduce per capita greenhouse gas emissions through integrated transportation, land use, housing and environmental planning.

Pursuant to Senate Bill 375, ARB set per capita greenhouse gas emissions reduction targets from passenger vehicles for each of the state's 18 MPOs. For the SCAG region, the targets are set at eight percent below 2005 per capita emissions levels by 2020 and 13 percent below 2005 per capita emissions levels by 2035. Although ARB has not adjusted SCAG's regional targets since the 2012 RTP/SCS, SCAG anticipates that the region's targets could change—considering the Governor's recent Executive Order.[6] Because the transportation sector is the largest contributor to California's greenhouse gas emissions (more than 36 percent), SCAG anticipates updated and more stringent regional greenhouse gas reduction targets may be forthcoming.[7]

In the meantime, the 2016 RTP/SCS achieves per capita greenhouse gas emissions reductions relative to 2005 of eight percent in 2020, 18 percent in 2035, and 21 percent in 2040—exceeding the reductions that ARB currently requires. For more detailed information and analysis regarding monitoring of air quality and greenhouse gas emissions in the SCAG region, please see the Transportation Conformity Analysis Appendix.

[6] California Air Resources Board. (2015). Frequently Asked Questions About Executive Order B-30-15 2030 Carbon Target and Adaptation. [Fact Sheet]. Retrieved from http://www.arb.ca.gov/newsrel/2030_carbon_target_adaptation_faq.pdf

[7] California Air Resources Board. California Greenhouse Gas Emission Inventory. (2015) [Website]. Retrieved from http://www.arb.ca.gov/cc/inventory/data/data.htm.

ENVIRONMENTAL JUSTICE

The concept of environmental justice is about equal and fair access to a healthy environment, with the goal of protecting minority and low-income communities from incurring disproportionate negative environmental impacts. SCAG's environmental justice program includes two main elements: technical analysis and public outreach. In the regional transportation-planning context, SCAG's role is to 1) ensure that when transportation decisions are made, low-income and minority communities have ample opportunity to participate in the decision-making process, and 2) identify whether such communities receive an equitable distribution of benefits and not a disproportionate share of burdens.

As such, SCAG adheres to all federal and state directives on environmental justice. All public agencies that use federal funding must make environmental justice part of their mission and adhere to three fundamental environmental justice principles:

1. To avoid, minimize or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
2. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
3. To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

The 2016 RTP/SCS program of environmental justice public outreach and analysis, described in detail in the Environmental Justice Appendix, reviews federal legislation pertaining to environmental justice; major equity issues specific to our region; SCAG policies and programs related to this important topic; outreach efforts in communities across the region; and SCAG's efforts to identify demographic groups to ensure environmental justice in all of our communities.

TABLE 8.4 2016 RTP/SCS PERFORMANCE MEASURES: ENVIRONMENTAL JUSTICE

PERFORMANCE MEASURE	DEFINITION	PERFORMANCE TARGET	SUMMARY OF IMPACTS
2016 RTP/SCS revenue sources in terms of tax burdens[1]	Proportion of 2016 RTP/SCS revenue sources (taxable sales, income, and gasoline taxes) for low income and minority populations	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—households in poverty will not contribute disproportionately to the overall funding of the Plan. Minority households will not pay a higher proportion of taxes to fund the 2016 RTP/SCS than their relative representation in the region as a whole
Share of transportation system usage[1]	Comparison of transportation system usage by mode for low income and minority households vs each group's population share in the greater region	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—low income and minority groups show a higher usage of transit and active transportation modes and positions these communities to benefit from the investments in the 2016 RTP/SCS
2016 RTP/SCS investments[1]	Allocation of Plan investments by mode (bus, HOV lanes, commuter/high speed rail, highways/arterials, and light/heavy rail transit)	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—the share of transportation investments for low income and minority communities outpaces these groups' financial burdens for the 2016 RTP/SCS
Distribution of travel time savings and travel distance reductions[1]	Details what groups are overall benefiting as a result of the Plan in terms of travel time and distance savings	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—the Plan's travel time and person-mile savings for low income households and minority communities is in line with each group's usage of the transportation system
Geographic distribution of transportation investments	Examination of transit, roadway and active transportation infrastructure investments in various communities throughout the region	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—the Plan's transportation infrastructure investments are distributed throughout the region in proportion to population density
Jobs-housing imbalance[1]	Comparison of median earnings for intra-county vs inter-county commuters for each county in the SCAG region; analysis of relative housing affordability and jobs throughout the region	Establish existing conditions (not a performance measure for the Plan)	Existing conditions show that higher wage workers tend to commute longer distances than lower wage workers. Inland counties show a lower job-to-worker ratio than coastal counties, indicating that there are more long distance commuters in inland counties. Please refer to the Environmental Justice Appendix for potential strategies to improve conditions at the local level
Accessibility to employment and services[1]	Percentage of employment and shopping destinations within a one- and two-mile travel buffer from each neighborhood; also, share of employment and shopping destinations that can be reached within 30 minutes by auto or 45 minutes by bus or all transit modes during the evening peak period	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—the Plan will improve the number of accessible destinations within 45 minutes of travel and within short distances for low income and minority communities both by auto and transit
Accessibility to parks and schools	Share of population within a one- and two-mile travel buffer from a regional park or school; also, share of park acreage that can be reached within 30 minutes by auto or 45 minutes by bus or all transit modes during the evening peak period	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—the Plan will improve the number of destinations accessible within 45 minutes of travel and short distances for low income and minority communities both by auto and transit
Gentrification and displacement[1]	Examination of historical demographic and economic trends for areas surrounding rail transit stations	Establish existing conditions (not a performance measure for the Plan)	Historic trends from 2000 to 2012 show that population living in areas within a half mile of rail transit stations are not strongly influenced by the larger region's demographic and economic trends. For example, the growth of Hispanics and seniors (age 65 and above) in these areas has not kept pace with regional trends. Patterns in residents' income and housing prices suggest that gentrification may be happening and low income and minority households are at risk for displacement. Refer to the Environmental Justice Appendix for potential strategies to reduce impacts at the local level
Emissions Impact Analysis[1]	Comparison of Plan and Baseline scenarios; identification of areas that are lower performing as a result of the Plan, along with a breakdown of demographics for those areas	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—the Plan will result in reductions in carbon monoxide and particulate matter emissions for on-road vehicles and benefits will be experienced both by minority and low income households and in communities with a high concentration of minority and low income groups

TABLE 8.4 CONTINUED

PERFORMANCE MEASURE	DEFINITION	PERFORMANCE TARGET	SUMMARY OF IMPACTS
Air quality health impacts along highways and highly traveled corridors[1]	Comparison of Plan and Baseline scenarios and demographic analysis of communities in close proximity to highways and highly traveled corridors	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—the Plan will result in an overall reduction in emissions in areas that are near roadways, which have been seen to have a higher concentration of minority and low income groups than the region as a whole
Aviation noise impacts[1]	Comparison of Plan and Baseline scenarios; breakdown of population by race and ethnicity for low performing airport noise impacted areas	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—the Plan will result in aviation noise areas that are geographically smaller than the Baseline scenario, and will benefit minority and low income households as a result
Roadway noise impacts[1]	Comparison of Plan and Baseline scenarios, identification of areas that are low performing as a result of the Plan; breakdown of population for these impacted areas by race/ethnicity and income	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—the Plan results in a reduction of roadway noise when compared to the Baseline scenario, which has a benefit to minority and low income households who represent a higher share of population who live in close proximity to major roadways
Active transportation hazard	Breakdown of population by demographic group for areas that experience the highest rates of bicycle and pedestrian collisions	Establish existing conditions (not a performance measure for the Plan)	Collision data from 2012 shows that low income and minority communities incur a higher rate of bicycle and pedestrian risk. Improvements in active transportation infrastructure and Complete Streets measures, such as those proposed in the Plan, have been shown to reduce hazard to bicyclists and pedestrians. Refer to the Environmental Justice Appendix for potential strategies to reduce risk at the local level
Rail-related impacts[1]	Breakdown of population by demographic group for areas in close proximity to rail corridors and planned grade separations	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—there is no significant difference between the Plan and the Baseline in the concentration of minority and low income communities in areas directly adjacent to commercial and passenger railways
Public health analysis	Historical emissions and health data summarized for areas that have high concentrations of minority and low income population	Establish existing conditions (not a performance measure for the Plan)	Recent trends indicate that air quality is improving throughout the region. For select areas that show increase, there is sometimes a higher proportion of minority and low income population. When examining public health indicators from the CalEnviroScreen tool, it appears that areas with the highest concentrations of minority and low income population incur some of the highest risks in the region. Refer to the Environmental Justice Appendix for potential strategies to improve conditions at the local level
Climate vulnerability	Breakdown of population by demographic group for areas potentially impacted by substandard housing, sea level rise and wildfire risk	Establish existing conditions (not a performance measure for the Plan)	Existing conditions indicate that minority and low income populations are at a greater risk for experiencing negative impacts of climate change. Refer to the Environmental Justice Appendix for potential strategies to reduce impacts at the local level.
Proposed mileage-based user fee impacts	Examination of potential impacts from implementation of a mileage-based user fee on low income households in the region	No unaddressed disproportionately high and adverse effects for low income or minority communities	No unaddressed disproportionate impacts—results show that the mileage-based user fee is less regressive to low income residents than the current gasoline tax.

Note: [1] Performance measures used in the Environmental Justice Analysis for the 2012 RTP/SCS

ENVIRONMENTAL JUSTICE PERFORMANCE MEASURES

In the development of the analysis, SCAG identified 18 performance measures to analyze existing environmental justice parameters in the region and to address any potential impacts of the 2016 RTP/SCS on the various environmental justice population groups. SCAG also examined potential impacts at various geographies and specifically employed a community-based approach for the 2016 RTP/SCS based on guidance from stakeholders. A brief description of the environmental justice performance measures is provided in this section. A more detailed presentation of the results of the 2016 RTP/SCS environmental justice analysis can be found in the Environmental Justice Appendix. TABLE 8.4 describes the 2016 RTP/SCS environmental justice performance measures and provides a summary of impacts for each of the measures.

PERFORMANCE MEASURE 1: 2016 RTP/SCS REVENUE SOURCES IN TERMS OF TAX BURDENS

Different funding sources (i.e., income, property, sales and fuel taxes) can impose disproportionate burdens on lower-income and minority groups. Sales and gasoline taxes, which are the primary sources of funding for the region's transportation system, were evaluated for the purposes of this analysis. The amount of taxes paid was broken down to demonstrate how tax burdens fall on various demographic groups. As in previous RTP environmental justice reports, the 2016 RTP/SCS environmental justice analysis examined in detail the incidence, distribution and burden of taxation.

PERFORMANCE MEASURE 2: SHARE OF TRANSPORTATION SYSTEM USAGE

SCAG analyzed the use of various transportation modes by race/ethnicity and by income quintile (an income quintile is a category into which 20 percent of households ranked by income fall).

PERFORMANCE MEASURE 3: 2016 RTP/SCS INVESTMENTS

The strategy that public agencies pursue to invest in transportation has a huge impact on environmental justice. In short, it can determine what transportation choices will be available to low-income and minority communities. A disproportionate allocation of resources for various transit investments, for example, can indicate a pattern of discrimination.

PERFORMANCE MEASURE 4: DISTRIBUTION OF TRAVEL TIME SAVINGS AND TRAVEL DISTANCE REDUCTIONS

SCAG assessed both the distribution of travel time and distance savings that are expected to result from implementing the 2016 RTP/SCS, by analyzing demographic data and the associated mode usage statistics for each Transportation Analysis Zone (TAZ) in the region. With this input, an estimate for the time savings for each income group and ethnic group can be identified for trips involving transit (bus and rail) and automobiles.

PERFORMANCE MEASURE 5: GEOGRAPHIC DISTRIBUTION OF TRANSPORTATION INVESTMENTS

This section is a new addition to the environmental justice analysis for the 2016 RTP/SCS and examines where transportation investments are planned throughout the region. Building on the new community-based approach for the overall effort, a summary of investments for areas with a high concentration of minority population and/or low income population is included for roadway, transit and active transportation investments.

PERFORMANCE MEASURE 6: JOBS-HOUSING IMBALANCE

An imbalance or mismatch between employment and housing in a community is considered to be a key contributor to local traffic congestion. Some argue that these imbalances and mismatches are also impediments to environmental justice. Driving is expensive and people who can't afford to own a car generally need to live near to their jobs so they can get to work using transit, or by walking or biking.

PERFORMANCE MEASURE 7: ACCESSIBILITY TO EMPLOYMENT AND SERVICES

Accessibility is vital for social and economic interactions. As a measure, accessibility is determined by the spatial distribution of potential destinations; the ease of reaching each destination by various transportation modes; and the magnitude, quality and character of the activities at the destination sites. Travel costs are central: the lower the costs of travel, in terms of time and money, the more places people can reach within a certain budget—that is, the greater the accessibility. The number of destination choices that people have is equally crucial: the more destinations and the more varied the destinations, the higher the level of accessibility.

PERFORMANCE MEASURE 8: ACCESSIBILITY TO PARKS AND NATURAL LANDS

Similar to the method used for measuring accessibility to jobs, accessibility to parks is defined as the percentage of park acreage reachable within a 30-minute travel time by auto and 45-minute travel time by local bus and all transit options. For this round of SCAG's environmental justice effort, analysis was included that measured accessibility to the recently designated San Gabriel Mountains National Monument. Also included in our accessibility analysis (for employment and services) is a measurement of the share of population within a one- and two-mile travel distance of all regional parks and open space under the Plan and Baseline scenario, based on the principle that shorter trips should be encouraged through implementation of the 2016 RTP/SCS.

PERFORMANCE MEASURE 9: GENTRIFICATION AND DISPLACEMENT

The integration of transportation and land use planning has been recognized for its ability to reduce VMT, air pollution and greenhouse gases, while also increasing opportunities for physical activity. However, there has been some criticism of smart growth strategies in relation to housing affordability, specifically in regard to Transit-Oriented Development (TOD). In response to these concerns, SCAG developed a methodology to monitor demographic trends in and around transit-oriented communities. For the 2016 RTP/SCS, recent indicators show that emerging trends for areas in close proximity to rail transit stations (one half mile surrounding a rail transit stop) are not consistent with those for the greater region. From 2000 to 2012, the region experienced huge growth for certain cohorts, specifically the Hispanic population and seniors aged 65 and over. This same trend was also seen in areas near rail transit stations, but to a much lesser degree. At the same time, median household income has decreased less, and median gross rent has increased more, in these transit oriented communities than has been the trend for the greater region. These divergent growth patterns represent evidence indicating likely gentrification, which may lead to displacement for low income households.[8]

SCAG will continue to monitor growth in TOD areas and is committed to promoting affordable housing throughout the region. Additional tools that local jurisdictions may use to combat displacement of low income and minority residents are provided in the Environmental Justice Toolbox, located in the Plan's Environmental Justice Appendix.

[8] Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWAHEP-11-024 (2011). U.S. Department of Transprtation, Federal Highway Administration.

PERFORMANCE MEASURE 10: EMISSIONS IMPACT ANALYSIS

Air pollution comes from many different sources and can be classified into two types: ozone and particulate matter. Ozone pollution takes a gaseous form and is generated as vapor emitted from fuels commonly used in motor vehicles and industrial processes. Ozone is formed by the reaction between volatile organic compounds (VOC) and oxides of nitrogen (NOx) in the presence of sunlight. Ozone negatively impacts the respiratory system. Particulate matter (PM 10 and PM 2.5) are very fine particles made up of materials such as soot, ash, chemicals, metals and fuel exhaust that are released into the atmosphere. Particulate pollution has been linked to significant health problems, including aggravated asthma, respiratory disease, chronic bronchitis, decreased lung function and premature death.

Transportation projects can have both positive and negative impacts on the environment. Conversely, appropriate transportation investments can motivate travelers to shift to less polluting modes (e.g., bus, train, carpooling or commuter rail). On the other hand, investments that increase traffic on a particular facility typically degrade air quality in the immediate vicinity of that facility. Low-income and minority groups may be at particular risk for health hazards resulting from air pollution, and the objective for this analysis is to assess impacts for these groups as a result of the Plan versus Baseline (no-build) scenario.

PERFORMANCE MEASURE 11: AIR QUALITY HEALTH IMPACTS ALONG HIGHWAYS AND HIGHLY TRAVELED CORRIDORS

Exposure to air pollutants is considered an environmental justice issue due to the disproportionate share of minority and low-income populations living in close proximity to heavily traveled corridors, particularly near port and logistics activities. This exposure to unhealthy air results in nearly 5,000 premature deaths annually in the SCAG region, as well as 140,000 children with asthma and other respiratory symptoms. More than half of Americans exposed to PM 2.5 pollution that exceeds the national standard live in the SCAG region.[9] This measure examines the potential emissions impacts of the RTP/SCS for PM and ozone emissions that result from on-road vehicles both at the TAZ level and for areas in close proximity to highways and highly traveled corridors.

[9] California Air Resources Board, South Coast Air Quality Management District, and SCAG. (2011). Powering the Future: A Vision for Clean Energy, Clear Skies, and a Growing Economy. [Fact Sheet]. http://www.arb.ca.gov/newsrel/2011/powering_the_future.pdf.

PERFORMANCE MEASURE 12: AVIATION NOISE IMPACTS

The SCAG region supports the nation's largest regional airport system, in terms of the number of airports and overall aircraft operations operating in a very complex airspace environment. This system has six established air carrier airports, including Los Angeles International (LAX), Burbank Bob Hope, John Wayne, Long Beach, Ontario and Palm Springs. There are also four emerging air carrier airports within the Inland Empire and in North Los Angeles County. These include San Bernardino International Airport, March Inland Port (joint use with March Air Reserve Base), Southern California Logistics Airport and Palmdale Airport (joint use with Air Force Plant 42).

The regional aviation system also includes more than 40 general aviation airports and two commuter airports—for a total of more than 55 public use airports. Although the projected demand for airport capacity has decreased in comparison with what was projected in the 2012 RTP/SCS, there is still moderate growth expected in the future. The challenge is striking a balance between the aviation capacity needs of Southern California and the quality of life for people living near airports. This measure evaluates the impact of aviation noise on neighborhoods close to airports and examines the potential impacts on environmental justice populations specifically.

PERFORMANCE MEASURE 13: ROADWAY NOISE IMPACTS

The SCAG region has an extensive roadway system consisting of more than 70,000 lane miles. It includes one of the country's most extensive HOV lane systems and a growing network of toll lanes, as well as express lanes. The region also has a vast network of arterials and other minor roadways and noise may cause significant environmental concerns. Noise associated with highway traffic depends on a number of factors that include traffic volumes, vehicle speed, vehicle fleet mix (cars, trucks) and the location of the highway with respect to schools, daycare facilities, parks and other "sensitive receptors." According to FHWA guidance, noise impacts occur when noise levels increase substantially in comparison with existing levels. Impacts are assessed in this section by examining how the RTP/SCS affects roadway noise and by determining the population groups that could potentially be most impacted by roadway noise.

PERFORMANCE MEASURE 14: ACTIVE TRANSPORTATION HAZARDS

Encouraging a healthier, more active lifestyle in all of our communities is one of the featured goals of this Plan. Making walking and bicycling safer transportation options is key to attracting more people to choose these alternatives. Bicycling or walking along roadways in close proximity with motor vehicles is often perceived as dangerous, and reducing hazards in the pedestrian and cycling environment is a primary strategy toward achieving our goal of promoting healthier, more active communities.

As a new environmental justice indicator for the 2016 RTP/SCS, Active Transportation Hazards seeks to evaluate incidences of motor vehicle collisions involving bicyclists and pedestrians in our communities, with the goal of promoting an improved environment for active transportation users and encouraging more residents to make the choice to walk or bicycle in their communities. As with other environmental justice performance measures, this indicator will be used to identify patterns of active transportation hazards and potential disparities among our various communities.

PERFORMANCE MEASURE 15: RAIL-RELATED IMPACTS

Freight rail emissions account for five percent of all NOx emissions and four percent of all PM emissions generated by regional goods movement activities, as described in the Goods Movement Appendix. When compared with all regional PM and NOx sources, the contributions by freight rail emissions is even lower. However, environmental pollution from locomotives, rail yards and other rail facilities must be considered, as concentrations of rail activities can cause localized rail-related pollution. In response to input from our federal partners, SCAG developed a summary analysis to address potential environmental justice impacts in areas adjacent to railroads and rail facilities, although further discussion and analysis is recommended. This outcome analyzes environmental justice communities adjacent to railroads and rail facilities, rail impacts to sensitive receptors, and examines environmental justice concerns that may potentially be alleviated by grade separation projects.

PERFORMANCE MEASURE 16: PUBLIC HEALTH IMPACT

A new environmental justice indicator for the 2016 RTP/SCS, the Public Health measure seeks to evaluate the potential disparity among communities in the SCAG region in terms of public health issues that may be associated with historical toxic exposure and local transportation infrastructure. Like the Active Transportation Hazards measure discussed previously, inclusion of this new analysis is intended to further the goal of fostering healthier lifestyle choices in all of our communities. It is a key goal of this Plan to provide more and better opportunities for physical activity and other healthy lifestyle choices throughout the SCAG region.

PERFORMANCE MEASURE 17: CLIMATE VULNERABILITY

This is another new environmental justice performance indicator that seeks to identify regional disparities in regard to vulnerability to the consequences of climate change among the various communities in the SCAG region. Of particular interest in this analysis will be relative risk for sea level rise, wildfires, and flooding. It is understood that climate change is expected to impact different regions in different ways. In Southern California, we may expect development of a general trend of warmer temperatures, less precipitation and higher sea levels along our coasts.

This combination of climatic changes will likely result in increased wildfire danger, particularly in the foothill areas where our cities adjoin our local mountains. Due to melting ice caps in the polar regions, a steady rise in global sea level is expected. This may impact the coastal regions of Southern California. This new measure will allow SCAG to obtain a better understanding of how these anticipated changes in our local climate may impact our more vulnerable communities.[10]

PERFORMANCE MEASURE 18: PROPOSED MILEAGE-BASED USER FEE IMPACTS

This analysis is based on a proposed transportation improvement funding strategy that recommends implementation of a user fee based on VMT. If implemented, the mileage-based user fee would replace the current gasoline tax and is estimated to cost about four cents (2015 value) per mile and would be indexed to maintain its purchasing power beginning in 2025. Implementation of this financing strategy would require action by the California State Legislature and/or the U.S. Congress. This measure examines the impact of the gasoline tax on low income households and assesses the mileage-based user fee as a replacement option.

[10] For more information on potential climate change impact in Southern California, see Southern California Association of Governments and Dan Cayan, Climate Change: What Should Southern California Prepare for?: http://www.scag.ca.gov/documents/climat-echange_dancayan.pdf.

TRANSPORTATION CONFORMITY

REQUIREMENTS

The Federal Clean Air Act (CAA) establishes the National Ambient Air Quality Standards (NAAQS) and planning requirements for certain air pollutants. To comply with the CAA in achieving the national air quality standards, the ARB develops a State Implementation Plan (SIP) for each federal designated non-attainment and maintenance area within California. SIP development is a joint effort of the local air agencies and ARB working with federal, state and local agencies, including regional MPOs.

Transportation conformity is required under the CAA section 176(c) to ensure that federally supported highway and transit project activities "conform" to, or are consistent with, the purpose of the applicable SIP. Conformity for the purpose of the SIP means that transportation activities including regional transportation plans, transportation improvement programs and transportation projects will not cause new air quality violations, worsen existing air quality violations, or delay timely attainment of the relevant NAAQS. Conformity applies to areas that are designated by the U.S. Environmental Protection Agency (EPA) as being in non-attainment or maintenance for the following transportation related criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO2), ozone, and particulate matter (PM 2.5 and PM 10).

Under the U.S. Department of Transportation Metropolitan Planning regulations and the EPA's Transportation Conformity regulations, the 2016 RTP/SCS is required to pass the following four conformity tests in order to demonstrate transportation conformity:

- Regional Emissions
- Timely Implementation of Transportation Control Measures (TCMs)
- Financial Constraint
- Interagency Consultation and Public Involvement

The Regional Council adopts the initial transportation conformity determination, while FHWA/Federal Transit Administration (FTA) approves the final transportation conformity determination for the 2016 RTP/SCS.

CONFORMITY ANALYSIS AND FINDINGS

As documented in the Transportation Conformity Analysis Appendix, the 2016 RTP/SCS meets all federal transportation conformity requirements and demonstrates transportation conformity. The findings associated with the conformity tests are described in detail in the Transportation Conformity Analysis Appendix.

TRANSPORTATION CONFORMITY AND GREENHOUSE GAS EMISSION REDUCTION TARGETS

Although transportation conformity is a federal requirement and reducing greenhouse gas emissions is a state mandate, both requirements are highly interrelated. First of all, each of the 2016 RTP/SCS policies, strategies, programs and projects that contribute to transportation conformity are the same policies, strategies, programs and projects that help to meet state targets for reducing greenhouse gas emissions—and vice versa. Secondly, although transportation conformity addresses emissions of criteria pollutants and their precursors, such emissions originate from the same source as greenhouse gas emissions: the combustion of fossil fuels in motor vehicles.

Any strategies that result in reduction or elimination of use of fossil fuels in motor vehicles may help the 2016 RTP/SCS meet both federal transportation conformity requirements and state greenhouse gas emissions reduction targets. In addition, the regional emissions analysis used for transportation conformity and the emissions analysis conducted for meeting greenhouse gas reduction targets use the same regional transportation model and ARB's Emission Factors (EMFAC) model. Finally, there is greater awareness of the need for more concerted efforts at the federal, state and local levels to integrate the SIP development process with planning and actions to address climate change. As a result, transportation conformity and greenhouse gas emissions reductions will become even more interconnected and more mutually supportive.

CONCLUSION

As we look toward mid-century, it is important to consider what the region can do beyond the transportation projects for which we expect to have funding. In our final chapter, 'Looking Ahead,' additional strategies and investments will be presented that would bring the SCAG region closer to achieving our goals for improved mobility and accessibility, a strong economic future, sustainable growth, and ultimately an enhanced quality of life for everyone in our region.

09

Image courtesy of Allan Crawford

CHAPTER 9 HIGHLIGHTS

LOOKING AHEAD

This Plan has discussed many long-term needs for our region's transportation system. Despite $556.5 billion in investments reviewed in the 2016 RTP/SCS, this still will not be enough to address all of our needs as we head toward mid-century. In addition, as noted earlier, state policies will continue to push the region to achieve sustainability goals beyond the horizon of the plan.

INTRODUCTION

The implication of the Governor's Executive Order B-30-15, referenced earlier, is that state-mandated targets to reduce greenhouse gas emissions will likely become more ambitious and will be extended to target years beyond 2040. The first part of this chapter describes the 2016 Regional Strategic Plan, a list of projects without identified funding that would benefit mobility in the region. The second part of this chapter, which concludes this presentation of the 2016 RTP/SCS, provides insight into developments that will impact the region beyond 2040.

THE 2016 STRATEGIC PLAN

This chapter serves as a Strategic Plan for discussing what strategies, programs and projects the region should pursue in coming decades if and when additional funding becomes available. This Strategic Plan is intended to help inform future updates to SCAG's RTP/SCS, beyond the 2016 RTP/SCS. Back in 2008, SCAG first developed a Strategic Plan to guide long-term decisions for transportation investments and strategies. The Strategic Plan in the agency's 2008 RTP helped inform what kinds of investments to include in the 2012 RTP/SCS—as part of that Plan's financially constrained transportation network.

Not surprisingly, the Strategic Plan included in the 2012 RTP/SCS played a large role in informing the investments and strategies detailed in the Financially Constrained Plan of the 2016 RTP/SCS (also referred to as the "Constrained Plan"). Among these are:

- **Promoting Active Transportation:** The 2012 Strategic Plan called for further enhancements to the active transportation system, including an increased focus on first/last mile connections to and from public transit, increasing the density of bikeways, incorporating Complete Streets practices that make streets friendlier to pedestrians and bicyclists, and increasing connectivity for pedestrians and bicyclists between jurisdictions. As part of the 2012 RTP/SCS, $6.7 billion was allocated for active transportation. Since the 2012 RTP/SCS was adopted, active transportation has been recognized as a regional priority, not just a local priority. Orange County began work on a strategic bikeway network and completed the first portion in 2012, and it is fully incorporated into the 2016 RTP/SCS. Meanwhile, Los Angeles County is developing its own Active Transportation Strategic Plan.
- **Expanding the High-Occupancy Vehicle (HOV) Lanes System:** The 2012 Strategic Plan recommended expanding our regionwide HOV lane network, although these improvements were unfunded. The 2016 RTP/SCS now fully funds an HOV expansion project within Orange County as part of its Constrained Plan.
- **Improving Local Highway Grade Separations:** The 2012 Strategic Plan recommended constructing grade separations on our local highways, although these improvements were unfunded as well. The 2016 RTP/SCS fully funds several grade separation projects throughout the region as part of its Constrained Plan.

It is clear that the 2012 Strategic Plan played a large role in influencing the 2016 Constrained Plan, as intended. Moving forward, we expect the Strategic Plan discussed in this chapter will help inform future RTP/SCS updates. Should additional funding become available to pursue projects beyond our Constrained Plan, more consensus would be needed and in some cases further studies would be warranted before specific projects could move forward.

LONG-TERM EMISSIONS-REDUCTION STRATEGIES FOR RAIL

As part of our current Strategic Plan, we will continue ongoing work with railroads, air quality management agencies and other stakeholders to reach our goal of a zero-emissions rail system.

FREIGHT RAIL

Achieving a rail system with zero emissions will be challenging because freight rail operates as a national system and locomotives cannot remain captive to our region. Any new technology will require an operational strategy to change out locomotive types, or it will require compatible infrastructure nationwide to provide new types of cleaner power and/or fuel to locomotives.

These challenges are formidable, but several near zero- and zero-emissions rail technologies are actually under development. A zero-emissions rail system would require full electrification and such a system could be powered by electric catenary or linear synchronous motors. There are also options for a hybrid-electric engine or a battery tender car, which provide additional power, allowing locomotives to operate in zero-emissions mode while battery power is available.

Opportunities for near zero-emissions include incorporating liquid natural gas tender cars and after treatment systems. Tier 4 engines and earlier engine types can be retrofitted to operate with natural gas, though safety and operational issues remain challenging. Additional after-treatment options are in the conceptual stage, which could go beyond Tier 4 standards.

Please see the Goods Movement Appendix for more detail on these technologies, as well as a plan to deploy these technologies as they become commercially viable.

CALIFORNIA HIGH-SPEED TRAIN

The California High-Speed Train will be electrified and will therefore produce no emissions along its operating corridors. Furthermore, the California High-Speed Rail Authority (CHSRA) has committed to using 100 percent renewable energy to power its trains. Because of the expected reduction in air and auto travel, the CHSRA estimates its service will save 2.0 million to 3.2 million barrels of oil annually, beginning in 2030.[1] With plans for a zero-emissions high-speed rail system in Southern California, and as the freight rail sector makes advances in near zero- and zero-emissions technologies, the region's passenger and commuter rail systems should pursue a similar strategic vision.

LONG-TERM EMISSIONS-REDUCTION STRATEGIES FOR TRUCKS

The reduction or elimination of emissions from heavy-duty trucking is equally important to our long-term vision of a zero-emissions goods movement system. In the near term, our 2016 RTP/SCS proposes an aggressive program to bring into service more clean fuel trucks and hybrid trucks that are now available. For the longer term, we provide a detailed plan to advance zero-emissions truck technologies, as described in the Goods Movement Appendix.

The trucking market offers unique challenges because of heavy vehicle and load weights, operational performance requirements, and high incremental costs. However, several reduced-emissions trucks are commercially available now and many zero- and near zero-emissions trucks are under development. Reduced-emissions natural gas trucks already have been deployed at our region's ports and several hundred hybrid electric trucks are on the road due to the Hybrid Truck and Bus Voucher Incentive Project (HVIP) at the California Air Resources Board.

Other promising technologies include plug-in hybrid-electric trucks, which have batteries that are charged through an external power source; battery-electric trucks, which can generate their own power or receive power from an outside source; and hydrogen fuel cell electric trucks. The South Coast Air Quality Management District (SCAQMD) is leading several ongoing demonstration programs, with funding from regional partners and state and federal agencies that are developing prototype zero-emissions trucks. These programs are also accessing the compatibility of these trucks with wayside power charging infrastructure. These demonstration programs rely on partnerships with original equipment manufacturers that can develop truck prototypes and with private sector partners that can test and evaluate prototypes in real world operating conditions.

For more information on the steps toward development and deployment of these technologies and more detail about potential technologies, please see the Goods Movement Appendix.

UNFUNDED OPERATIONAL IMPROVEMENTS

Well-targeted investments to improve our roadways can yield numerous benefits. Adding auxiliary lanes and managed lanes; improving interchanges; deploying on-ramp metering devices and adaptive signals; and other ITS enhancements can make the entire roadway system more efficient, increase capacity and help reduce congestion. Caltrans Corridor System Management Plans (CSMPs) have identified a number of improvements throughout the State Highway System (SHS) to improve productivity. The future development of corridor mobility and sustainability improvement plans (i.e., Corridor Sustainability Studies) for various corridors throughout the SCAG region may also identify future operational improvements not only within the SHS, but for all modes of travel throughout the region.

UNFUNDED CAPITAL IMPROVEMENTS

Regionally significant major corridor improvements and strategies described in the Strategic Plan are identified in TABLE 9.1. A complete list is contained in the 2016 RTP/SCS Project List contained as part of Project List Appendix.

[1] California High Speed Rail Authority. Environmental Fact Sheet, August 2014.

EXPANDING OUR REGION'S HIGH-SPEED TRAIN SYSTEM

CALIFORNIA HIGH-SPEED TRAIN

The California High-Speed Train will provide people with an additional option for traveling within the state, offering an alternative to flying and driving. This will be especially important as highways and airports continue to become more congested and constrained as California's population continues to grow. Phase One of the system, approved by voters, extends from the Kern County line in our region through Palmdale and Burbank to Los Angeles Union Station and Anaheim. Phase Two, extending from downtown Los Angeles to San Diego, will link many urban areas and other destinations within our Southern California region via the San Gabriel Valley and the Inland Empire. This corridor is about 160 miles long and it traverses Los Angeles, Riverside, San Bernardino and San Diego counties. With more than 21 million residents, these four counties make up about 56 percent of the state's current population. And they're projected to grow significantly by 2050.

Upon completion, Phase Two will provide important access to planned and existing regional centers, including Ontario International Airport, the March Inland Port, and potentially San Bernardino International and Corona airports—helping to meet SCAG's long-term goal of regionalizing air travel in Southern California. Eventually, Phase Two is expected to be the basis for further high-speed rail extensions into Nevada and Arizona.

Phase One and Two of the California High-Speed Train will provide excellent regional connectivity to our region by connecting with a robust network of intercity and commuter rail, subway, light rail, modern streetcars and fixed-route transit systems. Integrated planning will allow these regional and local transportation networks to complement the High-Speed Train. Commuter, intercity and interregional rail services and transit serve distinct travel markets, but coordinating their schedules will further increase the region's rail and transit ridership by attracting new and crossover passengers to these different market segments.

XPRESSWEST

In addition to the California High-Speed Train, our region has other important high-speed rail projects in development. XpressWest is a high-speed rail service that will connect Victorville and Las Vegas along the Interstate 15 corridor and connect via the High Desert Corridor to Palmdale and California High-Speed Train Phase One. It will use "steel wheel on steel rail" electric multiple unit train technology, at speeds of up to 150 miles per hour (mph).

TABLE 9.1 MAJOR STRATEGIC PLAN PROJECTS
IMPERIAL COUNTY
SR-111 Corridor Improvements
LOS ANGELES COUNTY
Metro Blue Line Extension to California State University Long Beach
Metro Gold Line Eastside Extension Beyond Phase II Terminus
Metro Green Line Extension to San Pedro, Long Beach and LA/Orange County Line
Metro Orange Line Extension to Burbank Bob Hope Airport
Orangeline High-Speed Transit (Union Station to Santa Clarita)
I-605 HOV lanes from I-10 to I-210
ORANGE COUNTY
Additional Transit Station Improvements to Fullerton Transportation Center and Santa Ana Regional Transportation Center
Fullerton College Connector
SR-133 Multimodal Corridor Improvements
RIVERSIDE COUNTY
Coachella Valley Daily Rail Service between Downtown Los Angeles and Indio
CETAP - Riverside County to Orange County
Perris Valley Line Extension to Temecula
SAN BERNARDINO COUNTY
San Bernardino Mountain-Valley Railway System between San Bernardino/Highland and Big Bear Lake
VENTURA COUNTY
Santa Paula Branch Line
VARIOUS COUNTIES
Cordon Pricing Demonstration Projects (locations to be determined)
California High-Speed Train System Phase 2
California/Nevada Super-Speed Train Anaheim to Las Vegas
Expanded Express Lane Network (beyond Constrained Plan)
Long-Term Goods Movement Emission-Reduction Strategies for Rail and Trucks
Mileage-Based User Fee Demonstration Projects and Implementation Strategy
Additional Metrolink and LOSSAN Improvements (beyond financially constrained plan)
XpressWest High-Speed Rail Between Palmdale-Victorville-Las Vegas

That would result in a trip between Victorville and Las Vegas lasting only 80 minutes. XpressWest has secured federal environmental Records of Decision and authorization to construct and operate. In November 2015, XpressWest was awarded the franchise to construct and operate high-speed rail service within Nevada between Southern California and Las Vegas by the Nevada High Speed Rail Authority.

SOUTHWEST HIGH-SPEED RAIL

In September 2014, the Federal Railroad Administration (FRA) released the *Southwest Multi-State Rail Planning Study*. This study analyzed candidate high-speed rail corridors in several southwest states. California, Nevada and Arizona are included as the "primary" area and New Mexico, Utah and Colorado are included as the "extended" area. The study includes:

1. "Core Express" with top speeds greater than 125 mph
2. "Regional" with top speeds of 90 mph to 125 mph
3. "Emerging/Feeder" with top speeds up to 90 mph

The California High-Speed Train and XpressWest corridors were identified as Core Express corridors in the study. The study also recommended a particular emphasis on the Phoenix to Southern California corridor as a future high-speed rail market to be studied.

EXPANDING OUR REGION'S COMMUTER RAIL SYSTEM

METROLINK AND PACIFIC SURFLINER

Both the Amtrak Pacific Surfliner and Metrolink are forecast to significantly increase their ridership and number of daily trains through 2040. The Constrained Plan of this 2016 RTP/SCS includes funding the first $1 billion of the Southern California High-Speed Rail Memorandum of Understanding (MOU). However, this $1 billion investment only funds the top 12 projects on the project list, which contains 74 projects totaling $4 billion. Metrolink recently completed its long-range Strategic Assessment in 2016 and it forecasts growth in the number of daily trains from 165 current weekday trains today to 240 weekday trains by 2025. In addition, the 2012 Los Angeles–San Diego–San Luis Obispo Rail Corridor (LOSSAN) Strategic Implementation Plan (SIP) forecasts up to 310 weekday Metrolink trains by 2040. For the Amtrak Pacific Surfliner, the SIP forecasts up to 18 daily round trips between downtown Los Angeles and San Diego, and additional round trips between downtown Los Angeles and Santa Barbara and San Luis Obispo. Additionally, the SIP includes:

- New East Ventura to Santa Barbara commuter service with four round trips per day
- New Los Angeles to San Diego commuter service with five round trips per day (operations split between Metrolink and Coaster)
- New express service with four round trips per day (operations split between Metrolink and the Pacific Surfliner)
- New Metrolink service to San Jacinto with eight round trips per day

Today, the average speed for Metrolink is about 37 mph, and the average speed for the Pacific Surfliner is 46 mph. Average speeds vary by line, and while top speeds are 79 mph (and a segment of 90 mph through Camp Pendleton), predominant one-track operations in our region greatly reduce the average system speed. Even if all 74 of the MOU projects are built, our region will still have large portions of its rail network constrained by one-track operations. This reinforces the need to fund capital projects in order to speed up service and make passenger rail more attractive to the commuter who drives alone. SCAG's Strategic Plan vision for speed and service improvements to Metrolink and Pacific Surfliner calls for an intensive investment in capital projects to further increase speed and service levels over and above the Constrained Plan. The Strategic Plan results in even more segments of the network operating at speeds of 110 mph or more. These projects include additional double tracking, sidings, station improvements, grade separations and grade crossings. Not only will this benefit commuter rail trips in our region, it will benefit Amtrak intercity and California High-Speed Train interregional trips also, as the three systems feed and complement one another. While these rail networks serve three distinct travel markets, improving all three will encourage people to consider and use all three in their travel decisions, rather than be limited to any single mode of transportation.

In addition to capital improvements, our strategic vision calls for considerably more express trips, regular special event services, and implementation of new Bus Rapid Transit (BRT) services that directly connect with Metrolink and the Pacific Surfliner.

EXPANDING ACTIVE TRANSPORTATION

There is great potential for walking, biking and other forms of active transportation to expand beyond what is proposed in this 2016 RTP/SCS. Policies designed to reduce greenhouse gas emissions will continue to highlight active transportation as a key step toward a more sustainable region. As transit service expands and a wider range of shared-mobility options become available, active transportation will serve regional mobility, ensuring that people can quickly, easily and safely transfer from one mode of transportation to the next. Active transportation also plays a critical role in helping the region to realize its vision for how it uses land, which includes accommodating more people in vibrant, mixed-use communities and urban centers. Sidewalks and active transportation networks contribute to the attractiveness and economic vitality of mixed-use communities. They also play an important role in reducing congestion and increasing mobility.

EXPANDED REGIONAL GREENWAY NETWORK

New active transportation plans by local jurisdictions will aspire beyond what is considered in the 2016 RTP/SCS Constrained Plan, and as a result new innovative strategies will be tested and proven effective throughout our region. One expected innovation is to create greater physical separations between bicyclists and motor vehicles, particularly on higher-speed streets. Separated bikeways and Class 1 bikeways are considerably more expensive options than installing bike lanes or sharrows, but these more expensive options have been shown to increase ridership.[2] The SCAG region currently has four miles of separated bikeways and these now operate on an "experimental" basis in local jurisdictions such as Long Beach and Redondo Beach. Caltrans is developing guidelines to incorporate separated bikeways into the California Manual for Uniform Traffic Control Devices (MUTCD). Once incorporated, local governments will be able to freely incorporate separated bikeways without incurring liability. In this Strategic Plan, SCAG assumes that our region will have about 230 miles of new separated bikeways converted from bike lanes on arterial streets. As part of the effort to develop separated bikeways, this Strategic Plan envisions greater integration of watershed planning, river rehabilitation, and access for bicyclists and pedestrians. It further envisions the use of open area drainage channels that were once creeks, and the maintenance roads next to them for walking and biking. It envisions greater coordination of rights of way under utility lines.

[2] Chapter 3: Why Choose Separated Bike Lanes? (2015). In Separated Bike Lane Planning and Design Guide. Federal Highway Administration.

EXPANDED BIKE SHARE

Bike Share, an innovative program in which people can share bicycles, can be expanded beyond the 880 stations regionwide that are envisioned in the Constrained Plan. Because it is such a new service, more local jurisdictions may wish to deploy bike share facilities where they can. This Strategic Plan anticipates an additional 1,084 stations regionwide, should funding become available.

FIRST/LAST MILE

The first/last mile challenge, which deters many people from using transit, can be alleviated as more than 200 high quality transit stations identified in the Strategic Plan Project List increases to nearly 700 stations as urban areas become more developed and more bus routes offer people higher quality transit choices.

LIVABLE CORRIDORS

Pedestrian travel will also increase substantially as a consequence of higher density development. New treatments installed as part of routine roadway maintenance, such as bulb-outs, sanctuary islands and innovative midblock crossing signals such as the high-intensity activated crosswalk beacon (commonly referred to as "HAWK") will increase pedestrian safety. These treatments will expand livable corridors by 93 percent beyond the 16 areas in the Constrained Plan into new areas focusing on transit growth and new "village" development along new corridors. Funding for some of these treatments will come during the development process, through focused developer fees, or by pursuing other innovative funding strategies. Meanwhile, bicycle treatments such as bike racks and long-term secure bike parking will increase the convenience of biking.

NEIGHBORHOOD MOBILITY AREAS

Utilizing Complete Streets principles and applying them aggressively in the planning and implementation of neighborhood roadway improvements will increase mobility further. Traffic calming, combined with land use changes, will provide more opportunities for bicycling and walking in less urban settings such as local "village areas" with sidewalk café seating and local farmers markets. Connections to these villages will be promoted by strategies that tackle the first/last mile challenge that transit faces. Bicycle boulevards and other lower-speed streets that give bicycles priority have been shown to be effective at calming traffic, while increasing safety and bicyclist connectivity. This Strategic Plan sees local governments increasing the use of Complete Streets principles in their roadway improvements, expanding these areas beyond what is in the

Constrained Plan, increasing bikeway density and improving the quality of life for even more residents.

STRATEGIC FINANCE

VALUE PRICING STRATEGY

Following the adoption of the 2008 RTP, SCAG initiated a comprehensive study of value pricing strategies, which has come to be known as the Express Travel Choices Study. The emerging regional value pricing strategy is structured to help the region meet its transportation demand management and air quality goals, while also providing a reliable and dedicated source of revenue. The value pricing strategy could allow users of the transportation system to know the true cost of their travel, resulting in informed decision-making and a more efficient use of the transportation system. Value pricing strategies evaluated through the Express Travel Choices Study include a regional express lane network, cordon pricing and a mileage-based user fee. Although some of these pricing concepts have been incorporated into the Constrained Plan as elements are pursued as pilot initiatives or are under construction for implementation (e.g., segments of the regional express lane network), these strategies still face a number of significant hurdles before their full benefits can be realized. A second phase of the Express Travel Choices Study, initiated after the adoption of the 2012 RTP/SCS and ongoing, continues to establish an implementation plan for the regional value pricing strategy.

As we discussed in Chapter 6, SCAG will also continue to participate in state and national efforts to address the long-term transition of excise fuel taxes to mileage-based user fees.

OUR REGION BEYOND 2040

TECHNOLOGY AND NEW MOBILITY INNOVATIONS BEYOND 2040

Technological innovations have the potential to make existing transportation choices more widely available and easier to use throughout the region. By providing more options for local and regional trips, technological innovations have the potential to shift travel to less environmentally damaging modes, lessen the negative environmental impacts associated with current vehicle use, increase system efficiency, improve safety, and reduce auto-related collisions and fatalities. However, realizing the potential benefits (and potential negative impacts) depends on the rate of development and the adoption of a wide range of public and private sector innovations. Although SCAG and its partners should be prepared for the widest possible range of technological advancements related to the transportation system, quantifying the benefits of certain new mobility innovations may be premature due to uncertain fluctuations in future market demand.

Many of these new applications and transportation services are being discussed in the media, and there are some reservations about how long they will last. Although they may have limited applicability in many parts of our region today, there is little doubt that certain technological innovations in transportation will grow significantly during the time frame of the 2016 RTP/SCS and beyond. The population in 2040 will have an entirely different expectation of the role of technology in their everyday lives than generations past. Changing demographics and broad economic trends have led to a demand for more flexible transportation options, the expansion of the sharing economy and calls for communities where people can live, work and play within a small area. This Plan reflects the ever-expanding portfolio of new mobility innovations that advanced technologies can enable and considers their long-term, regional impacts.

Currently, the clean technology industry and application developers outpace government in delivering technological innovation to the transportation sector. In light of this, SCAG continues to research the impacts of transportation innovation in terms of scale and longevity, looking at things such whether a technology or innovation will be amenable to only a small segment of the population and/or last for 10, 15 or 30 years? Or, are we at the outset of a major paradigm shift? Are tipping points just around the corner? Will the longstanding trend of the majority of trips taken by automobile persist?

The 2012 RTP/SCS identified policies to support a number of best practices and technological innovations that were not fully modeled at the time, such as alternative fuel vehicles and neighborhood electric vehicles. This 2016 RTP/SCS addresses new transportation innovations that have been planned and deployed since 2012, such as neighborhood electric vehicles (NEV), car sharing, bike sharing and ridesourcing (identified by the California Public Utilities Commission (CPUC) as Transportation Network Companies). SCAG has developed modeling assumptions and methodologies to analyze these mobility innovations and local land use regulations.

In addition to the new mobility innovations mentioned above, the region can expect to see significant growth in the deployment and use of automated vehicles. By some estimates, automation features being introduced within the next five years could be available in up to 70 percent of the vehicles on the road in 2040. The following are some examples of automated driving features that need to be considered and supported. There are a wide range of demonstration projects that could be pursued by SCAG and its partners, in collaboration with private sector organizations with increased federal, state and local funding:

- **Jam-Assist and Advanced Collision Avoidance:** Combining advanced collision detection and avoidance technology currently in development, vehicles will operate "hands-off" and "feet-off" on highways. These features could also improve operation in low-speed environments. Equipping transit vehicles with jam assist could dramatically improve vehicle throughput in congested transit-only corridors, or in Bus Rapid Transit systems.
- **Semi-Automated Mode Vehicles:** Vehicles will operate without driver input under certain limited conditions, while requiring driver input for most portions of the trip. This is the current state of technology with the Google car. However, safety and traffic benefits will begin to spread throughout the roadway network as this technology advances. Vehicles will be able to operate without driver input, although the driver will need to monitor the vehicle's operation. These features could be available in both consumer and commercial vehicles as early as 2018–2020 and could represent a sizable minority of the fleet mix as early as 2030–2035.
- **Fully Automated Mode Vehicles:** Vehicles will operate without driver input in certain conditions, requiring driver input for other portions of the trip. Most researchers agree that this will be the mid-term state of vehicle automation. In highway driving conditions, drivers will turn over full control of the vehicle and vehicle systems will communicate with one another. Vehicles will be able to form "platoons" in order to operate at closer distances (less than 1.8 seconds apart in one Japanese study) in order to improve fuel consumption and traffic flows. Freight industry representatives are interested in whether the National Highway Traffic Safety Administration (NHTSA) will waive driver work hour limits for following vehicles under platooning conditions. In low-speed conditions, "platooning" could improve transit bus operations and automation could improve bus/curb alignment. To some researchers, this could facilitate a new business model of mobility—as a service similar to the way cellphone plans are priced, especially in dense urban areas.
- **Fully Automated Vehicles:** Vehicles will operate without driver input, but will still require a driver to monitor the vehicle. The vehicle will navigate trips from beginning to end and possibly self-park within low-speed environments. This technology could potentially be available as early as 2025–2030, but it will not be used in a significant share of vehicles until 2035–2040.
- **Fully Autonomous Vehicles:** Passenger vehicles will operate with or without drivers, resulting in radical changes to urban form. Cars will park themselves, attend to maintenance and refueling, or alter ownership patterns so that they stay in constant circulation. Driverless taxi, freight and transit vehicles could have a dramatic impact on various professional driving careers.

ADDRESSING SUSTAINABILITY AND GREENHOUSE GAS EMISSIONS BEYOND 2040

In addition to Governor Brown's Executive Order discussed earlier, a number of policy trends are converging that will continue to push the state and region toward increasing de-carbonization of the transportation and energy sectors. Over the past 20 years, the international community has outlined a goal of limiting global warming to two degrees Celsius above pre-industrial levels. In the context of California, these trends include advancing beyond the Governor's Executive Order goal of reducing greenhouse gas emissions by 80 percent below 1990 levels by 2050 to reducing greenhouse gas emissions by 100 percent later in the century. This could be accomplished in stages through various market and regulatory tools such as the Cap-and-Trade program and updates to the Assembly Bill 32 Scoping Plan. Electrification of the transportation sector over the next few decades is likely to be one outcome of these trends. The California Energy Commission (CEC) is also developing net zero energy building policies. Caltrans has prepared a new state transportation plan to significantly reduce vehicle miles traveled. Through the Senate Bill 375 target setting process, ARB will likely propose higher greenhouse gas reduction targets for metropolitan planning organizations through the continued integration of transportation and land use planning. Finally, Cap-and-Trade Triennial Investment Plans will continue to be updated to fund the implementation of greenhouse reduction goals.

However, the international science community is increasingly concerned that the two degrees Celsius goal is not stringent enough to avoid significant and perhaps irreversible climate damage to the planet, and serious discussions are occurring to reduce the international goal to 1.5 degrees Celsius. Whether or not a consensus develops to intensify the climate change goals, California policymakers recognize the incredibly significant role of local jurisdictions and regions in taking climate action. Local jurisdictions and regions should expect to face new regulations and targets to significantly reduce greenhouse gas emissions for many decades ahead.

PREPARING THE REGION FOR RESILIENCY AGAINST CLIMATE CHANGE

In addition to creating a low-carbon sustainable future, the state and region will also be facing the human and infrastructure costs of adapting to climate change impacts that already are occurring. These include growing wildfire threats, sea-level rise and coastal flooding, increased mudslides and flooding, extreme heat waves and large reductions in water supplies.

Our region must prepare to confront these changes, and an important objective of this Strategic Plan is to build a region that is more resilient to these and other consequences of climate change. The twin policy goals of mitigation and adaptation will dominate state, regional and local planning for energy, water and transportation for the rest of this century. New collaborative programs and partnerships between businesses, academia, community groups, residents and all levels of government will be required.

Here is a simple but compelling example of how our region can become more resilient to the consequences of climate change: first/last mile strategies call for steps to make it easier for people to get to and from transit stops, such as building sidewalks and bike paths and installing places where people can lock up their bicycles near transit stations. These investments make transit more accessible while helping the region meet its goal of reducing the number of miles that people travel alone in their cars. But to make first/last mile strategies effective as our region faces more frequent days of extreme heat and intense rainstorms, they have to be refined. A more climate resilient strategy would be to design sidewalks and bike paths with native drought tolerant shade trees, as well as adding shade features at transit stations. Also, as pedestrian infrastructure is built, it should include adequate drainage and other storm water management features, to ensure access and safety during heavy rainstorms.

Looking to the state for recommendations on how to mitigate and adapt to climate change is challenging because its policies are evolving. Still, they come with a sense of urgency.[3] The State of California recognizes the increasingly significant role that regional planning and local actions can play in meeting the state-level goals related to climate change. SCAG will continue to help the region further develop into a hub for local and regional government innovation, leadership and collaboration. For example, SCAG funded the Green Region Initiative category of projects, as part of the Sustainability Planning Grant Program. These grants provide local governments with technical expertise so they can develop local climate action plans, energy plans, water plans, open space strategies and public health plans. Working to make our region more resilient to the inevitable consequences of continued climate change is a major priority of this Plan, and it will continue to resonate in future updates as we head toward 2040 and well beyond.

CONCLUSION

As our region continues to grow in the coming years, we must ensure that effective strategies are in place toward fulfilling the needs of our growing population. With the understanding that our Constrained Plan can only get us so far, additional strategies must be considered to truly address the diverse needs of everyone who uses the regional transportation network.

The challenges ahead as we strive toward increased mobility, more livable and healthy communities and a more sustainable region are significant. But this Plan, the 2016 RTP/SCS, charts a course toward progress. It serves as a roadmap toward 2040 and a vision for a better future. It is a living document and it will change as circumstances change as we progress toward mid-century.

Above all, our RTP/SCS is a collective and inclusive effort—one that aims for a bright future for all of us.

[3] See California State Executive Order B-30-15.

GLOSSARY

AASHTO American Association of State Highway and Transportation Officials – A nonprofit, non-partisan association representing highway and transportation departments in the 50 states, the District of Columbia and Puerto Rico.

AB 32 Assembly Bill 32 – Signed into law on September 26, 2006, it requires that the state's global warming emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012 in addition to other measures. In order to effectively implement the cap, AB 32 directs the California Air Resources Board (ARB) to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels.

AB 169 Assembly Bill 169 – Provides for the sixteen federally recognized tribes in the SCAG region to join the SCAG Joint Powers Authority (JPA) to participate in the Southern California Association of Governments by voting at the SCAG General Assembly.

ACE Alameda Corridor East – A 35-mile corridor extending through the San Gabriel Valley between East Los Angeles and Pomona and connecting the Alameda Corridor to the transcontinental railroad network.

Active Transportation A mode of transportation that includes walking, running, biking, skateboarding and other human powered forms of transportation. It can also include low-speed electrical devices such as motorized wheel chairs, Segways, electric-assist bicycles and neighborhood electric vehicles, such as golf carts.

ADA Americans with Disabilities Act of 1990 – Guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, state and local government services and telecommunications. It prescribes federal transportation requirements for transportation providers.

Agricultural Lands Land designated for farming; specifically the production of crops and rearing of animals to provide food and other products.

AHSC Affordable Housing and Sustainable Communities – A state grant program from the Greenhouse Gas Reduction Fund that addresses land-use, housing, transportation and land preservation projects to support infill and compact development to reduce greenhouse gas emissions.

AJR 40 Assembly Joint Resolution No. 40 – Introduced on August 23, 2007, the resolution calls upon the governor to declare a state of emergency in respect to the air quality health crisis in the South Coast Air Quality Basin related to emissions of PM 2.5 and to direct steps necessary to address the emergency.

ANCA Federal Airport Noise and Capacity Act of 1990 – Establishes a national aviation noise policy that reviews airport noise and access restrictions on operations for Stage 2 and Stage 3 aircraft.

Antelope Valley AQMD Antelope Valley Air Quality Management District – The air pollution control agency for the portion of Los Angeles County north of the San Gabriel Mountains.

AQMP Air Quality Management Plan – Regional plan for air quality improvement in compliance with federal and state requirements.

ARB Air Resources Board – State agency responsible for attaining and maintaining healthy air quality through setting and enforcing emissions standards, conducting research, monitoring air quality, providing education and outreach and overseeing/assisting local air quality districts. ARB is also responsible for implementing AB 32 and establishing regional greenhouse gas emission reduction targets for automobile and light trucks under SB 375.

ATIS Advanced Traveler Information Systems – Technology used to provide travelers with information, both pre-trip and in-vehicle, so they can better utilize the transportation system.

ATMS Advanced Transportation Management Systems – Technology used to improve the operations of the transportation network.

ATP Active Transportation Program – Provides state funds for city and county projects that improve safety and convenience for bicycle commuters, recreational riders and safe routes to school programs. Replaces the Bicycle Transportation Account (BTA).

Automated Vehicle U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) has defined five increasing levels of vehicle automation at five levels:
0. No-Automation: The driver is in complete and sole control of the primary vehicle controls .
1. Function-Specific Automation: Automation at this level involves one or more specific control functions.
2. Combined Function Automation: This level involves automation of at least two primary control functions designed to work in unison to relieve the driver of control of those functions.
3. Limited Self-Driving Automation: Vehicles at this level of automation enable the driver to cede full control of all safety-critical functions under certain traffic or environmental conditions.
4. Full Self-Driving Automation: The vehicle is designed to perform all safety-critical driving functions and monitor roadway conditions for an entire trip.

Autonomous Vehicle Vehicles in which operation of the vehicle occurs without direct driver input to control the steering, acceleration and braking and are designed so that the driver is not expected to constantly monitor the roadway while operating in self-driving mode.

AVO Average Vehicle Occupancy – Calculated by dividing the total number of travelers by the total number of vehicles.

Base Year The year 2012, used in the RTP/SCS performance analysis as a reference point for current conditions.

Baseline Future scenario which includes only those projects that are existing, undergoing right-of-way acquisition or construction, come from the first year of the previous RTP or RTIP, or have completed the NEPA process. The Baseline is based upon the adopted 2015 FTIP. The Baseline functions as the "No Project" alternative used in the RTP/SCS Program EIR.

BEV Battery Electric Vehicle – An electric drive vehicle powertrain that is powered by an on-board battery. A BEV is a sub-class of Plug-in Electric Vehicle.

Bikeway Common term for any designated bicycle facility, such as a bike path, bike lane, bike route, sharrow, bicycle boulevard or cycle-track.

Bike Share An integrated network of bicycle rental kiosks in heavily urbanized areas. The bike share network is intended to reduce short-distance driving by providing low-cost bicycle rentals at regular intervals (200 yards apart) throughout the heavily urbanized area.

BLS Bureau of Labor Statistics – The principal fact-finding agency for the federal government in the broad field of labor economics and statistics.

BNSF Burlington Northern and Santa Fe Railway Company.

BTA Bicycle Transportation Account – Provides state funds for city and county projects that improve safety and convenience for bicycle commuters. Replaced by the California Active Transportation Program (ATP).

Bus A transit mode comprised of rubber-tired passenger vehicles operating on fixed-routes and schedules over roadways.

BRT Bus Rapid Transit – Bus transit service that seeks to reduce travel time through measures such as traffic signal priority, automatic vehicle location, dedicated bus lanes, limited-stop service and faster fare collection policies.

CAA Clean Air Act – 1970 federal act that authorized EPA to establish air quality standards to limit levels of pollutants in the air. EPA has promulgated such standards (or NAAQS) for six criteria pollutants sulfur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), ozone, lead and particulate matter (PM 10). All areas of the United States must maintain ambient levels of these pollutants below the ceilings established by the NAAQS; any area that does not meet these standards is a "non-attainment" area. States must develop SIPs to explain how they will comply with the CAA. The act was amended in 1977 and again in 1990.

CAFR Comprehensive Annual Financial Report – Official annual financial report that encompasses all funds and financial components associated with any given organization.

Cal B/C Model California Life-Cycle Benefit/Cost Analysis Model – Developed for the California Department of Transportation (Caltrans) as a tool for benefit-cost analysis of highway and transit projects. It is an Excel (spreadsheet) application structured to analyze several types of transportation improvement projects in a corridor where there already exists a highway facility or a transit service (the base case).

Caltrans California Department of Transportation – State agency responsible for the design, construction, maintenance and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries.

Cap-and-Trade A market based regulation that is designed to reduce greenhouse gases (GHGs) from multiple sources. Cap-and-Trade sets a firm limit or cap on GHGs and minimize the compliance costs of achieving California's AB 32 goals. The cap will decline approximately 3 percent each year beginning in 2013. Trading creates incentives to reduce GHGs below allowable levels through investments in clean technologies. With a carbon market, a price on carbon is established for GHGs. Market forces spur technological innovation and investments in clean energy. Cap-and-Trade is an environmentally effective and economically efficient response to climate change.

Car Share An integrated network of passenger vehicles available for short-term rental in heavily urbanized areas. Car share can take the form of return systems in which a vehicle must be returned to the parking space from which it was rented. Alternatively, it can take the form of point-to-point systems in which the car can be returned to another space, or left anywhere within a pre-determined geographic zone.

Catalytic Demand Additional aviation demand that is created by companies that locate in the proximity of expanding airports with developable land around them to reduce airport ground access time and costs for their employees and clients. Catalytic demand is greatest for large hub airports, particularly international airports.

CEHD Community, Economic and Human Development Committee – A SCAG committee that studies the problems, programs and other matters which pertain to the regional issues of community, economic and human development and growth. This committee reviews projects, plans and programs of regional significance for consistency and conformity with applicable regional plans.

CEQA California Environmental Quality Act – State law providing certain environmental protections that apply to all transportation projects funded with state funds.

CETAP Community Environmental and Transportation Acceptability Process – Part of the Riverside County Integrated Project that is examining where to locate possible major new multimodal transportation facilities to serve the current and future transportation needs of Western Riverside County, while minimizing impacts on communities and the environment.

CHSRA California High-Speed Rail Authority – Agency responsible for planning, designing, constructing and operating a state-of-the-art high-speed rail system in California.

CIP Capital Improvement Program – Long-range strategic plan that identifies capital projects; provides a planning schedule and financing options.

CMAQ Congestion Mitigation and Air Quality Program – Federal program initiated by ISTEA to provide funding for surface transportation and other related projects that contribute to air quality improvements and reduce congestion.

CMIA Corridor Mobility Improvement Account – These funds would be allocated by the California Transportation Commission to highly congested travel corridors in the state. Projects in this category must be a high priority; be able to start construction by 2012; improve mobility in a highly congested corridor by improving travel times and reducing vehicle hours of delay; connect the State Highway System; and improve access to jobs, housing, markets and commerce.

CMP Congestion Management Program – Established by Proposition 111 in 1990, requires each county to develop and adopt a CMP that includes highway and roadway system monitoring, multimodal system performance analysis, transportation demand management program, land-use analysis program and local conformance.

CNSSTC California-Nevada Super-Speed Train Commission – Public-private partnership developed to promote a high-speed link between California and Nevada.

CO Carbon Monoxide – A colorless, odorless, poisonous gas formed when carbon in fuels is not burned completely. It is a byproduct of highway vehicle exhaust, which contributes about 60 percent of all CO emissions nationwide.

COG Council of Governments – Under state law, a single or multi-county council created by a joint powers agreement.

Complete Streets Streets designed and operated to enable safe access for all roadway users of all ages and abilities, including pedestrians, bicyclists, motorists and transit riders.

Complete Streets Approach An approach to funding for planning, designing and maintaining roadways that incorporates Complete Streets implementation as the variable costs in larger road construction or rehabilitation projects. This approach can dramatically reduce the costs of Complete Streets as compared to implementation of stand-alone projects.

Commuter Bus (CB) Fixed-route bus systems that are primarily connecting outlying areas with a central city through bus service that operates with at least five miles of continuous closed-door service. This service typically operates using motorcoaches (aka over-the-road buses) and usually features peak scheduling, multiple-trip tickets and multiple stops in outlying areas with limited stops in the central city.

Commuter Rail (CR) A transit mode that is an electric or diesel propelled railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs. Service must be operated on a regular basis by or under contract with a transit operator for the purpose of transporting passengers within urbanized areas (UZAs), or between urbanized areas and outlying areas. Such rail service, using either locomotive hauled or self-propelled railroad passenger cars, is generally characterized by multi-trip tickets, specific station to station fares, railroad employment practices and usually only one or two stations in a central business district. Commuter Rail does not include heavy rail rapid transit, or light rail/streetcar transit service, or intercity rail service.

Congestion Management Process Systematic approach required in transportation management areas (TMAs) that provides for effective management and operation, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under Title 23 U.S.C. and Title 49 U.S.C., through the use of operational management strategies.

Connected/ Automated Vehicles Refers to the interrelated nature of connectivity and automation in new vehicle technology. Connected vehicles are vehicles that use any of a number of different communication technologies to communicate with the driver, other cars on the road (vehicle-to-vehicle [V2V]), roadside infrastructure (vehicle-to-infrastructure [V2I]) and the "Cloud" to improved safety, user experience and collision avoidance.

Constant Dollars Dollars expended/received in a specific year adjusted for inflation/deflation relative to another time period.

Corridor In planning, a broad geographical band that follows a general directional flow or connects major sources of trips. It may contain a number of streets and highways, as well as transit lines and routes.

CSMP Corridor System Management Plans.

CTC California Transportation Commission – Eleven voting members and two non-voting ex-officio members. Nine of the members are appointed by the Governor, one is appointed by the Senate Rules Committee and one is appointed by the Speaker of the Assembly, to oversee and administer state and federal transportation funds and provide oversight on project delivery.

CTIPS California Transportation Improvement Program System – A project programming database system used to efficiently and effectively develop and manage various transportation programming documents as required under state and federal law.

CTP California Transportation Plan – A statewide, long-range transportation policy plan that provides for the movement of people, goods, services and information. The CTP offers a blueprint to guide future transportation decisions and investments that will ensure California's ability to compete globally, provide safe and effective mobility for all persons, better link transportation and land-use decisions, improve air quality and reduce petroleum energy consumption.

CVO Commercial Vehicle Operations – Management of commercial vehicle activities through ITS.

Deficiency Plan Set of provisions contained in a Congestion Management Plan to address congestion when unacceptable levels of congestion occur. Projects implemented through the Deficiency Plan must, by statute, have both mobility and air quality benefits.

Demand Response A transit mode comprised of automobiles, vans, or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations. A demand response (DR) operation is characterized by vehicles that do not operate over a fixed route or on a fixed schedule except on a temporary basis.

Displacement The process that occurs when the increasing property values brought about through gentrification drive out the existing residents and business operators and attract a new and different demographic population to an area. Lower income residents may also become unable to access housing in certain areas due to increasing housing prices. Please also see Gentrification.

DTIM Direct Travel Impact Model – A vehicle emissions forecasting model.

EDF Environmental Defense Fund – A national non-profit organization that seeks to protect the environmental rights of all people, including future generations.

EIR Environmental Impact Report – An informational document, required under CEQA, which will inform public agency decision-makers and the public generally of the significant environmental effects of a project, possible ways to minimize significant effects and reasonable alternatives to the project.

EIS Environmental Impact Statement (federal) – National Environmental Policy Act (NEPA) requirement for assessing the environmental impacts of federal actions that may have a significant impact on the human environment.

EMFAC Emission Factor – Model that estimates on-road motor vehicle emission rates for current year as well as backcasted and forecasted inventories.

Enabling Technology This term refers to a technological innovation which lays the foundation or creates a platform that allows a separate unrelated technology to achieve commercialization. For example, car share and bike share systems have been under development since the early 1970s. However the explosion of smart phone usage and the convergence of mobile banking and GPS location services have made these systems viable for a larger portion of the population.

Environmental Justice (EJ) The concept of Environmental Justice is about equal and fair access to a healthy environment, with the goal of protecting minority and low-income communities from incurring disproportionate negative environmental impacts.

EPA Environmental Protection Agency – Federal agency established to develop and enforce regulations that implement environmental laws enacted by Congress to protect human health and safeguard the natural environment.

Executive Order B-30-15 Executive Order signed by Governor Brown on April 29, 2015, which establishes a California Greenhouse Gas (GHG) reduction target of 40 percent below 1990 levels by 2030.

Express Lane An HOV lane that single-occupant drivers can pay to drive in, also referred to as "High Occupancy Toll Lanes."

EWFC An east-west segment of the Regional Clean Freight Corridor System that connects I-710 to the west and I-15 to the east.

EV Electric Vehicle – A vehicle fully or partially powered by an electric engine. Synonymous with Plug-In Electric Vehicle (PEV).

EV Charging Station A location where a vehicle can be parked and the electric storage or battery can be recharged. EV Charging Stations can be private or publicly accessible and can be free to the user or used for a fee. EV Charging Stations are configured in three different levels defined by the amount of electricity that can be transmitted to the vehicle. Level 1 provides energy through a 120 Volt AC Plug comparable to a household product. Based on the battery type and vehicle, AC Level 1 charging adds about 2 to 5 miles of range to a PEV per hour of charging time. Level 2 equipment offers charging through 208 or 240 V AC electrical connection comparable to a household appliance such as a washing machine. AC Level 2 adds about 10 to 20 miles of range per hour of charging time. Direct-current (DC) fast charging equipment, or Level 3 (typically 208/480 V AC three-phase input), enables rapid charging along heavy traffic corridors and can add 50 to 70 miles of range in about 20 minutes.

FAA Federal Aviation Administration – Federal agency responsible for issuing and enforcing safety regulations and minimum standards, managing air space and air traffic and building and maintaining air navigation facilities.

FAST Act Fixing America's Surface Transportation Act (H.R. 22) – Signed into law by President Obama on December 4, 2016. Funding surface transportation programs at over $305 billion for five years through 2020.

FCV Fuel Cell Vehicle – Electric vehicles that are powered by hydrogen fuel cells.

FHWA Federal Highway Administration – Federal agency responsible for administering the Federal-Aid Highway Program, which provides federal financial assistance to the states to construct and improve the National Highway System, urban and rural roads and bridges.

Financially Constrained Expenditures are said to be financially constrained if they are within limits of anticipated revenues.

First Mile/Last Mile Strategies designed to increase transit usage by making it more convenient and safe to walk or bike to transit stations. Includes such strategies as wayfinding, bikeways, sidewalk repair and bike share.

FRA Federal Railroad Administration – Federal agency created to promulgate and enforce rail safety regulations, administer railroad assistance programs, conduct research and development in support of improved railroad safety and national rail transportation policy and consolidate government support of rail transportation activities.

FTA Federal Transit Administration – The federal agency responsible for administering federal transit funds and assisting in the planning and establishment of areawide urban mass transportation systems. As opposed to FHWA funding, most FTA funds are allocated directly to local agencies, rather than to Caltrans.

FTIP Federal Transportation Improvement Program – A six-year comprehensive listing of transportation projects proposed for federal funding, that require a federal action, or are regionally significant and are within the planning area of an MPO. The last two years are for informational purposes only.

FTZ Foreign Trade Zones.

FY Fiscal Year – The twelve-month period on which the budget is planned. The state fiscal year begins July 1 and ends June 30 of the following year. The federal fiscal year begins October 1 and ends September 30 of the following year.

GAO Government Accountability Office – Congressional agency responsible for examining matters related to the receipt and payment of public funds.

Gentrification While holding many definitions, is commonly understood as a change process in historically low-wealth communities that results in rising real estate values coupled with shifts in the economic, social and cultural demographics and feel of the communities. Please also see Displacement.

GHG Greenhouse Gases – Components of the atmosphere that contribute to the greenhouse effect. The principal greenhouse gases that enter the atmosphere because of human activities are carbon dioxide, methane, nitrous oxide and fluorinated gases.

GGRF Greenhouse Gas Reduction Funds are administered by state and local agencies for a variety of greenhouse gas (GHG) emission reductions programs, including energy efficiency, public transit, low-carbon transportation and affordable housing.

GIS Geographic Information System – Powerful mapping software that links information about where things are with information about what things are like. GIS allows users to examine relationships between features distributed unevenly over space, seeking patterns that may not be apparent without using advanced techniques of query, selection, analysis and display.

GNP Gross National Product – An estimate of the total value of goods and services produced in any specified country in a given year. GNP can be measured as a total amount or an amount per capita.

Grade Crossing A crossing or intersection of highways, railroad tracks, other guideways, or pedestrian walks, or combinations of these at the same level or grade.

Greenfield Also known as "raw land," land that is privately owned, lacks urban services, has not been previously developed and is located at the fringe of existing urban areas.

GRP Gross Regional Product.

HCP Habitat Conservation Plan – Established under Section 10 of the federal Endangered Species Act to allow development to proceed while protecting endangered species. A federal Habitat Conservation Plan is typically accompanied by a state Natural Communities Conservation Plan or NCCP.

HDT Heavy-Duty Truck – Truck with a gross vehicle weight of 8,500 pounds or more.

Heavy Rail A transit mode that is an electric railway with the capacity for a heavy volume of traffic. It is characterized by high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails, separate rights-of-way (ROW) from which all other vehicular and foot traffic are excluded, sophisticated signaling and raised platform loading.

HiAP Health in All Policies – HiAP is a collaborative strategy that aims to improve public health outcomes by including health considerations in the decision-making process across sectors and policy areas. HiAP addresses the social determinants of health by encouraging transportation practitioners to work with nontraditional partners who have expertise related to public health outcomes, such as city and county public health departments.

HQTA High-Quality Transit Areas – Generally a walkable transit village or corridor, consistent with the adopted RTP/SCS and is within one half-mile of a well-serviced transit stop or a transit corridor with 15-minute or less service frequency during peak commute hours. The definition that SCAG has been using for the HQTA is based on the language in SB 375 which defines:

> **Major Transit Stop** A site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods (CA Public Resource Code Section 21064.3).
>
> **HQTC** High-Quality Transit Corridor – A corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

HICOMP Highway Congestion Monitoring Program (Caltrans) – A report that measures the congestion that occurs on urban area highways in California.

Home-Based Work Trips Trips that go between home and work, either directly or with an intermediate stop. Home-based work trips include telecommuting, working at home and non-motorized transportation work trips.

HOT Lane High-Occupancy Toll Lane – An HOV lane that single-occupant drivers can pay to drive in, also referred to as “Express Lanes.”

HOV Lane High-Occupancy Vehicle Lane – A lane restricted to vehicles with two (and in some cases three) or more occupants to encourage carpooling. Vehicles include automobiles, vans, buses and taxis.

HPMS Highway Performance Monitoring System – A federally mandated program designed by FHWA to assess the performance of the nation’s highway system.

HSIPR High-Speed Intercity Passenger Rail Program – A Federal Railroad Administration program created to invest in new high-speed rail corridors and existing rail corridors to improve speed and service.

HST High-Speed Train – Intercity passenger rail service that is reasonably expected to reach speeds of at least 110 mile per hour.

HUD U.S. Department of Housing and Urban Development – Federal agency charged with increasing homeownership, supporting community development and increasing access to affordable housing free from discrimination.

ICAPCD Imperial County Air Pollution Control District – Local air pollution control agency mandated by state and federal regulations to implement and enforce air pollution rules and regulations.

ICE Internal Combustion Engine – Refers traditional vehicle engines that are powered by the burning of fuel sources, including gasoline, diesel and natural gas.

ICTC Imperial County Transportation Commission – Agency responsible for planning and funding countywide transportation improvements and administering the county’s transportation sales tax revenues.

ICTF Intermodal Container Transfer Facility – a near-dock intermodal rail facility owned and operated by Union Pacific Rail Road, adjacent to the SPB ports.

IGR Intergovernmental Review Process – The review of documents by several governmental agencies to ensure consistency of regionally significant local plans, projects and programs with SCAG’s adopted regional plans.

Infrastructure The basic facilities, equipment, services and installations needed for the growth and functioning of a community.

IOS Initial Operating Segment.

ISTEA Intermodal Surface Transportation Efficiency Act – Signed into federal law on December 18, 1991, it provided authorization for highways, highway safety and mass transportation for FYs 1991–1997 and served as the legislative vehicle for defining federal surface transportation policy.

ITIP Interregional Transportation Improvement Program – The portion of the STIP that includes projects selected by Caltrans (25 percent of STIP funds).

ITS Intelligent Transportation Systems – Systems that use modern detection, communications and computing technology to collect data on system operations and performance, communicate that information to system managers and users and use that information to manage and adjust the transportation system to respond to changing operating conditions, congestion, or accidents. ITS technology can be applied to arterials, highways, transit, trucks and private vehicles. ITS include Advanced Traveler Information Systems (ATIS), Advanced Public Transit Systems (APTS), Advanced Traffic Management Systems (ATMS), Advanced Vehicle Control Systems (AVCS) and Commercial Vehicle Operations (CVO).

JPA Joint Powers Authority – Two or more agencies that enter into a cooperative agreement to jointly wield powers that are common to them. JPAs are a vehicle for the cooperative use of existing governmental powers to finance and provide infrastructure and/or services in a cost-efficient manner.

LACMTA Los Angeles County Metropolitan Transportation Authority, also referred to as "Metro" – Agency responsible for planning and funding countywide transportation improvements, administering the county's transportation sales tax revenues and operating bus and rail transit service.

LAWA or LAX Los Angeles World Airports – Aviation authority of the City of Los Angeles. LAWA owns and operates Los Angeles International (LAX), Ontario International, Van Nuys and Palmdale Airports.

LCV Longer-Combination Vehicles – Includes tractor-trailer combinations with two or more trailers that weigh more than 80,000 pounds.

LEM Location Efficient Mortgage – Allows people to qualify for larger loan amounts if they choose a home in a densely populated community that is well served by public transit and where destinations are located close together so that they can also walk and bike instead of driving everywhere.

LRT Light Rail Transit – A mode of transit that operates on steel rails and obtains its power from overhead electrical wires. LRT may operate in single or multiple cars on separate rights-of-way or in mixed traffic.

Livable Communities Any location in which people choose may be viewed as "livable." However, communities that contain a healthy mix of homes, shops, workplaces, schools, parks and civic institutions coupled with a variety of transportation choices, give residents greater access to life's daily essentials and offer higher quality of life to a wider range of residents. In 2009, the U.S. DOT, EPA and HUD established the following 6 Principles of Livability:

1. Provide more transportation choices
2. Expand location- and energy-efficient housing choices
3. Improve economic competitiveness of neighborhoods
4. Target federal funding toward existing communities
5. Align federal policies and funding
6. Enhance the unique characteristics of all communities

Livable Corridors Arterial roadways where local jurisdictions may plan for a combination of the following elements: high-quality bus frequency; higher density residential and employment at key intersections; and increased active transportation through dedicated bikeways. Most, but not all Livable Corridors would be located within HQTAs. Livable Corridor land-use strategies include development of mixed use retail centers at key nodes along corridors, increasing neighborhood-oriented retail at more intersections, applying a "Complete Streets" approach to roadway improvements and zoning that allows for the replacement of underperforming auto-oriented strip retail between nodes with higher density residential and employment.

LTF Local Transportation Fund – A fund which receives TDA revenues.

MAP Million Annual Passengers – Used to quantify airport activity.

MAP-21 Moving Ahead for Progress in the 21st Century – Signed into law by President Obama on July 6, 2012. Funding surface transportation programs at over $105 billion for fiscal years (FY) 2013 and 2014, MAP-21 was the first long-term highway authorization enacted since 2005. To allow more time for development and consideration of a long-term reauthorization of surface transportation programs, Congress has enacted short term extensions of the expiring law, MAP-21.

Market Incentives Measures designed to encourage certain actions or behaviors. These include inducements for the use of carpools, buses and other HOVs in place of single-occupant automobile travel. Examples include HOV lanes, preferential parking and financial incentives.

MCGMAP Multi-County Goods Movement Action Plan

MDAB Mojave Desert Air Basin – Area defined by state law as comprising the desert portions of Los Angeles, Kern, Riverside and San Bernardino Counties.

MDAQMD Mojave Desert Air Quality Management District – Local air agency mandated by state and federal regulations to implement and enforce air pollution rules and regulations; encompasses the desert portion of San Bernardino County from the summit of the Cajon Pass north to the Inyo County line, as well as the Palo Verde Valley portion of Riverside County.

Measure A Revenues generated from Riverside County's local half-cent sales tax.

Measure D Revenues generated from Imperial County's local half-cent sales tax.

Measure I Revenues generated from San Bernardino County's local half-cent sales tax.

Measure M Revenues generated from Orange County's local half-cent sales tax.

Measure R Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has two permanent local sales taxes (Propositions C and A) and one temporary local sales tax (Measure R).

Metrolink Regional commuter rail system connecting Los Angeles, Orange, Riverside, San Bernardino and Ventura Counties and operated by SCRRA.

MIS Major Investment Study – The preliminary study, including preliminary environmental documentation, for choosing alternative transportation projects for federal transportation funding. An MIS is a requirement, which is conducted cooperatively by the study sponsor and the MPO.

Mixed Flow Traffic movement having autos, trucks, buses and motorcycles sharing traffic lanes.

Mode A particular form of travel (e.g., walking, traveling by automobile, traveling by bus, or traveling by train).

Mode Split The proportion of total person trips using various specified modes of transportation.

Model A mathematical description of a real-life situation that uses data on past and present conditions to make a projection.

MPO Metropolitan Planning Organization – A federally required planning body responsible for transportation planning and project selection in a region.

MTS Metropolitan Transportation System – Regional network of roadways and transit corridors.

Multimodal A mixture of the several modes of transportation, such as transit, highways, non-motorized, etc.

NAAQS National Ambient Air Quality Standards – Targets established by the U.S. Environmental Protection Agency (EPA) for the maximum contribution of a specific pollutant in the air.

NAFTA North American Free Trade Agreement – An agreement between the governments of Canada, Mexico and the United States to eliminate barriers to trade and facilitate the cross-border movement of goods and services.

NCCP Natural Communities Conservation Plan – Program under the Department of Fish and Game that uses a broad-based ecosystem approach toward planning for the protection of plants, animals and their habitats, while allowing compatible and appropriate economic activity.

NEPA National Environmental Protection Act – Federal environmental law that applies to all projects funded with federal funds or requiring review by a federal agency.

NGV Natural Gas Vehicle – Vehicles that are powered by internal combustion engines that burn compressed or liquid natural gas.

NIMS National Incident Management System – Nationwide template that enables all government, private-sector and non-governmental organizations to work together during a domestic incident.

Nominal Dollars Actual dollars expended/received in a specific year without adjustments for inflation/deflation.

Non-Reportable TCM The following de minimis committed TCMs are defined in the Final 2015 FTIP Guidelines as non-reportable TCMs for the purpose of TCM timely implementation reporting:
1. Bus/shuttle/paratransit fleet expansion projects with fewer than 5 vehicles
2. Bus stop improvement projects
3. Bicycle facility less than 1 mile and pedestrian facility less than 1/4 mile
4. Intelligent transportation systems/control system computerization projects with fewer than 3 traffic signals,
5. Changeable message sign projects with fewer than 5 signs
6. Bike parking facilities, new or expansion, with nine or fewer bike lockers/slots
7. Expansion of bus station/shelter/transfer facilities with nine or fewer bike lockers/slots and
8. Rail station expansion with addition of nine or fewer bike lockers/slots.

NOx Nitrogen oxides – A group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. NOx are a major component of ozone and smog and they are one of six principal air pollutants tracked by the EPA.

NMA Neighborhood Mobility Areas – Areas Neighborhood Mobility Areas with roadway networks where Complete Streets and sustainability policies support and encourage replacing single and multi-occupant automobile use with biking, walking, skateboarding and slow speed electric vehicles (such as e-bikes, senior mobility devices and neighborhood electric vehicles.) Complete Streets strategies can include traffic calming, bicycle priority streets (bicycle boulevards) and pedestrian connectivity to increase physical activity, improve connectivity to the regional bikeway/greenway networks, local businesses and parks. NEV strategies include network identification, signage, intersection treatments and shared NEV/bike lanes to connect low speed roadway areas.

NTD National Transit Database – The Federal Transit Administration's (FTA) national database for transit statistics.

O&M Operations and Maintenance – The range of activities and services provided by the transportation system and for the upkeep and preservation of the existing system.

OCS Overhead Catenary System – A type of wayside power where vehicles may connect to and draw power from overhead wires.

OCTA Orange County Transportation Authority – Agency responsible for planning and funding countywide transportation improvements, administering the county's transportation sales tax revenues and operating bus transit service.

OEM Original Equipment Manufacturer.

OLDA Orangeline Development Authority – Joint exercise of powers authority developed by the cities located along the Orangeline corridor.

OnTrac Orange-North America Trade Rail Access Corridor – Formed in April of 2000 to build and support the Orangethorpe Avenue Grade Separation and Trade Corridor project, a 5-mile-long railroad-lowering project that will completely grade separate 11 rail crossings in the cities of Placentia and Anaheim.

Open Space Generally understood as any area of land or water which, for whatever reason, is not developed for urbanized uses and which therefore enhances residents' quality of life. However, note that each county and city in California must adopt an open space element as part of its general plan. The element is a statement of local planning policies focusing on the use of unimproved land or water for 1) the preservation or managed production of natural resources, 2) outdoor recreation and 3) the promotion of public health and safety. Therefore, open space will be defined by each jurisdiction based on their own unique resources and environment.

OWP Overall Work Program – SCAG develops an OWP annually, describing proposed transportation planning activities for the upcoming fiscal year, including those required by federal and state law.

Parking Cash-Out Program An employer-funded program under which an employer offers to provide a cash allowance to an employee equivalent to the parking subsidy that the employer would otherwise pay to provide the employee with a parking space.

Parking Subsidy The difference between the out-of-pocket amount paid by an employer on a regular basis in order to secure the availability of an employee parking space not owned by the employer and the price, if any, charged to an employee for use of that space.

PMT Passenger Miles Traveled – The cumulative sum of the distances ridden by each public transportation passenger.

PATH Partners for Advanced Transit and Highways – Joint venture of Caltrans which includes the University of California and other public and private academic institutions and industries.

PEIR Program Environmental Impact Report – An information document that analyzes and discloses potential environmental effects of large-scale plans or programs in accordance with provisions of the California Environmental Quality Act (CEQA).

PeMS Highway Performance Measurement System – A service provided by the University of California, Berkeley, to collect historical and real-time highway data from highways in the state of California in order to compute highway performance measures.

Person Trip A trip made by a person by any mode or combination of modes for any purpose.

PEV Plug-in Electric Vehicle – Refers to all vehicles that can be plugged into an external source of electricity in order to recharge an on-board battery which will provide some or all power to an electric engine.

PHEV Plug-in Hybrid Electric Vehicle – A vehicle powertrain that combines an electric engine with a traditional internal combustion engine. The two engines can operate in parallel with the electric engine operating at certain speeds, or the engines can operate sequentially, with all power being provided by the electric engine until the battery power is exhausted.

PHL Pacific Harbor Line, Inc.

PM 10 Particulate Matter – A mixture of solid particles and liquid droplets found in the air 10 micrometers or less in size (a micrometer is one-millionth of a meter). These coarse particles are generally emitted from sources such as vehicles traveling on unpaved roads, materials handling and crushing and grinding operations, as well as windblown dust.

PM 2.5 Particulate Matter – A mixture of solid particles and liquid droplets found in the air 2.5 micrometers or less in size (a micrometer is one-millionth of a meter). These fine particles result from fuel combustion from motor vehicles, power generation and industrial facilities, as well as from residential fireplaces and wood stoves.

PMD LA/Palmdale Regional Airport – Regional airport located in Palmdale.

POLA Port of Los Angeles.

POLB Port of Long Beach.

PPP Public-Private Partnership – Contractual agreements formed between a public agency and private-sector entity that allow for greater private-sector participation in the delivery of transportation projects.

PRC Peer Review Committee – An "informal" committee of technical experts usually organized and invited to review and comment on various technical issues and processes used in the planning process.

Proposition 1A Passed by voters in 2006, Proposition 1A protects transportation funding for traffic congestion relief projects, safety improvements and local streets and roads. It also prohibits the state sales tax on motor vehicle fuels from being used for any purpose other than transportation improvements and authorizes loans of these funds only in the case of severe state fiscal hardship.

Proposition 1B Highway Safety, Traffic Reduction, Air Quality and Port Security State of California – Passed in November 2006, Proposition 1B provides $19.9 billion to fund state and local transportation improvement projects to relieve congestion, improve movement of goods, improve air quality and enhance safety and security of the transportation system.

Proposition A Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has two permanent local sales taxes (Propositions C and A) and one temporary local sales tax (Measure R).

Proposition C Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has two permanent local sales taxes (Propositions C and A) and one temporary local sales tax (Measure R).

PSR Project Study Report – Defines and justifies the project's scope, cost and schedule. PSRs are prepared for state highway projects and PSR equivalents are prepared for projects not on the State Highway System. Under state law, a PSR or PSR equivalent is required for STIP programming.

PTA Public Transportation Account – The major state transportation account for mass transportation purposes. Revenues include a portion of the sales tax on gasoline and diesel fuels.

Public Transportation As defined in the Federal Transit Act, "Transportation by a conveyance that provides regular and continuing general or special transportation to the public, but does not include school bus, charter, or intercity bus transportation or intercity passenger rail transportation provided by the entity described in chapter 243 (Amtrak or a successor to such entity)."

PUC Public Utilities Commission – Regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit and passenger transportation companies.

Railroad Siding A short stretch of railroad track used to store rolling stock or enable trains on the same line to pass; also called sidetrack.

RBN Regional Bikeway Network – A system of regionally interconnected bikeways linking cities and counties in the SCAG region.

RC Regional Council – Conducts the affairs of SCAG; implements the General Assembly's policy decisions; acts upon policy recommendations from SCAG policy committees and external agencies; appoints committees to study specific problems; and amends, decreases or increases the proposed budget to be reported to the General Assembly.

RCP Regional Comprehensive Plan – Developed by SCAG, the RCP is a vision of how Southern California can balance resource conservation, economic vitality and quality of life. It will serve as a blueprint to approach growth and infrastructure challenges in an integrated and comprehensive way.

RCTC Riverside County Transportation Commission – Agency responsible for planning and funding countywide transportation improvements and administering the county's transportation sales tax revenues.

RGN Regional Greenway Network – A regional system of bikeways physically separate from traffic. It makes use of riverbeds and under-utilized utility corridors. It is part of the Regional Bikeway Network (RBN).

RHNA Regional Housing Needs Assessment – Quantifies the need for housing within each jurisdiction of the SCAG region based on population growth projections. Communities then address this need through the process of completing the housing elements of their General Plans.

Ridesourcing A generic term coined by researchers at University of California, Berkeley for the act of using a Transportation Network Company such as Lyft or Uber. The term distinguishes this mode from car sharing and from taxi use. A user is "sourcing" a ride from an online community, in exchange for a brokered payment.

Riparian Area Habitats, vegetation, and ecosystems adjacent to or part of rivers and streams.

Robust Flight Portfolio Providing a range of flight offerings in different haul length categories including short-haul, medium-haul, long-haul and international flights.

ROG Reactive Organic Gas – Organic compounds assumed to be reactive at urban/regional scales. Those organic compounds that are regulated because they lead to ozone formation.

RSTIS Regionally Significant Transportation Investment Study – Involves identifying all reasonable transportation options, their costs and their environmental impacts. RSTIS projects are generally highway or transit improvements that have a significant impact on the capacity, traffic flow, level of service, or mode share at the transportation corridor or sub-area level.

RSTP Regional Surface Transportation Program – Established by California state statute utilizing federal Surface Transportation Program funds. Approximately 76 percent of the state's RSTP funds must be obligated on projects located within the 11 urbanized areas of California with populations of 200,000 or more.

RTMS Regional Transportation Monitoring System – Internet-based transportation monitoring system. The RTMS will be the source for real-time and historical transportation data collected from local, regional and private data sources.

RTP Regional Transportation Plan – Federally required 20-year plan prepared by metropolitan planning organizations and updated every four years. Includes projections of population growth and travel demand, along with a specific list of proposed projects to be funded.

RTSS Regional Transit Security Strategy – Strategy for the region with specific goals and objectives related to the prevention, detection, response and recovery of transit security issues.

Rural Areas Rural locales consist of all of the areas within the SCAG region that are not within Urban Areas (please see definition).

SAFETEA-LU Safe, Accountable, Flexible, Efficient Transportation Equity Act A Legacy for Users – Signed into law by President Bush on August 10, 2005, it authorized the federal surface transportation programs for highways, highway safety and transit for the 5-year period of 2005–2009.

SANBAG San Bernardino Associated Governments – The council of governments and transportation planning agency for San Bernardino County. SANBAG is responsible for cooperative regional planning and developing an efficient multimodal transportation system countywide.

SANDAG San Diego Association of Governments.

SB 45 Senate Bill 45 (Chapter 622, Statutes of 1997, Kopp) – Established the current STIP process and shifted control of decision-making from the state to the regional level.

SB 375 Senate Bill 375 (Chapter 728, Steinberg) – Established to implement the state's greenhouse gas (GHG) emission-reduction goals, as set forth by AB 32, in the sector of cars and light trucks. This mandate requires the California Air Resources Board to determine per capita GHG emission-reduction targets for each metropolitan planning organization (MPO) in the state at two points in the future—2020 and 2035. In turn, each MPO must prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its GHG reduction target through integrated land use, housing and transportation planning.

SB 535 Senate Bill 535 (Chapter 830, De León) – Established that a quarter of the proceeds from the Greenhouse Gas Reduction Fund must also go to projects that provide a benefit to disadvantaged communities. A minimum of 10 percent of the funds must be for projects located within those communities. The legislation gives the California Environmental Protection Agency responsibility for identifying those communities.

SB 974 Senate Bill 974 – Introduced by Senator Alan Lowenthal, SB 974 would impose a $30 fee on each shipping container processed at the Ports of Los Angeles, Long Beach and Oakland for congestion management and air quality improvements related to ports.

SBD San Bernardino International Airport – International airport located in San Bernardino.

SCAB South Coast Air Basin – Comprises the non–Antelope Valley portion of Los Angeles County, Orange County, Riverside County and the non-desert portion of San Bernardino County.

SCAG Southern California Association of Governments – The metropolitan planning organization (MPO) for six counties including Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura.

SCAQMD South Coast Air Quality Management District – The air pollution control agency for Orange County and major portions of Los Angeles, Riverside and San Bernardino Counties in Southern California.

SCCAB South Central Coast Air Basin – Comprises San Luis Obispo, Santa Barbara and Ventura Counties.

SCIG Southern California International Gateway, a proposed rail near-dock facility for the BNSF adjacent to the SPB ports.

SCRIFA Southern California Railroad Infrastructure Financing Authority.

Scrip A form of fare payment transferrable among transportation providers, often issued by Dial-A-Ride transit service providers to be used on taxis.

SDOH Social Determinants of Health – Includes the circumstances in which people are born, grow up, live, work, play and age. Economic opportunities, government policies and the built environment all play a role in shaping these circumstances and influencing public health outcomes.

SED Socioeconomic Data – Population, employment and housing forecast.

SFS Sustainable Freight Strategy – A new plan underway by ARB.

SGC The Strategic Growth Council is a state agency tasked with encouraging the development of sustainable communities.

SHA State Highway Account – The major state transportation account for highway purposes. Revenues include the state excise taxes on gasoline and diesel fuel and truck weight fees.

Shared Mobility Services Refers to a wide variety of new mobility services and encompasses bike share, car share, app-based transit services and ridesourcing. This term refers to the way in which these modes are offered as services brokered by a mobile application and each vehicle is shared amongst multiple users.

SHOPP State Highway Operation and Protection Program – A four-year capital improvement program for rehabilitation, safety and operational improvements on state highways.

SHSP Strategic Highway Safety Plan – A statewide, coordinated safety plan that provides a comprehensive framework for reducing fatalities and severe injuries to motorists, pedestrians, and bicyclists on all public roads. SHSP goals and objectives are data-driven and results are measured. Actions designed to achieve the objectives are developed by hundreds of safety stakeholders from the four E's of highway safety: engineering, education, enforcement and emergency medical services. In California, Caltrans coordinates the effort to develop the plan.

SIP State Implementation Plan – State air quality plan to ensure compliance with state and federal air quality standards. In order to be eligible for federal funding, projects must demonstrate conformity with the SIP.

Smart Growth Principles The following principles developed by the Smart Growth Network, a partnership of government, business and civic organizations created in 1996:
1. Mix land uses
2. Take advantage of compact building design
3. Create a range of housing opportunities and choices
4. Create walkable neighborhoods
5. Foster distinctive, attractive communities with a strong sense of place
6. Preserve open space, farmland, natural beauty and critical environmental areas
7. Strengthen and direct development towards existing communities
8. Provide a variety of transportation choices
9. Make development decisions predictable, fair and cost effective
10. Encourage community and stakeholder collaboration in development decisions

Social Equity Equal opportunity in a safe and healthy environment.

SOV Single-Occupant Vehicle – Privately operated vehicle that contains only one driver or occupant.

SOx Sulfur oxide – Any of several compounds of sulfur and oxygen, formed from burning fuels such as coal and oil.

SPB Ports San Pedro Bay Ports.

SRTS Safe Routes to School – Part of a nationwide/region-wide program to increase students walking or biking to school. Includes engineering, educational and enforcement activities. Funded through the State Active Transportation Program (ATP).

SSAB Salton Sea Air Basin – Comprises the Coachella Valley portion of Riverside County and all of Imperial County.

STA State Transit Assistance – State funding program for mass transit operations and capital projects. Current law requires that STA receive 50 percent of PTA revenues.

STIP State Transportation Improvement Program – A five-year capital outlay plan that includes the cost and schedule estimates for all transportation projects funded with any amount of state funds. The STIP is approved and adopted by the CTC and is the combined result of the ITIP and the RTIP.

STP Surface Transportation Program – Provides flexible funding that may be used by states and localities for projects on any federal-aid highway, bridge projects on any public road, transit capital projects and intracity and intercity bus terminals and facilities. A portion of funds reserved for rural areas may be spent on rural minor collectors.

Sustainability The practice of analyzing the impact of decisions, policies, strategies and development projects on the Economy, the Environment and Social Equity (commonly referred to as the three E's). In the 2008 Agency Strategic Plan, SCAG adopted the following definition of Sustainability as one of its core operational values: "We work with our partners and local governments to achieve a quality of life that provides resources for today's generation while preserving an improved quality of life for future generations."

TANN Traveler Advisory News Network – Provides real-time traffic and transportation information content to communications service providers and consumer media channels both nationally and internationally.

TAZ Traffic Analysis Zone – Zone system used in travel demand forecasting.

TC Transportation Committee – Committee used to study problems, programs and other matters which pertain to the regional issues of mobility, air quality, transportation control measures and communications.

TCM Transportation Control Measure – A project or program that is designed to reduce emissions or concentrations of air pollutants from transportation sources. TCMs are referenced in the State Implementation Plan (SIP) for the applicable air basin and have priority for programming and implementation ahead of non-TCMs.

TCWG Transportation Conformity Working Group – Forum used to support interagency coordination to help improve air quality and maintain transportation conformity.

TDA Transportation Development Act – State law enacted in 1971 that provided a 0.25 percent sales tax on all retail sales in each county for transit, bicycle and pedestrian purposes. In non-urban areas, funds may be used for streets and roads under certain conditions.

TDM Transportation Demand Management – Strategies that result in more efficient use of transportation resources, such as ridesharing, telecommuting, park-and-ride programs, pedestrian improvements and alternative work schedules.

TEA-21 Transportation Equity Act for the 21st Century – The predecessor to SAFETEA-LU, it was signed into federal law on June 9, 1998. TEA-21 authorized the federal surface transportation programs for highways, highway safety and transit for the six-year period of 1998–2003. TEA-21 builds upon the initiatives established in ISTEA.

TEU Twenty-Foot Equivalent Unit – A measure of shipping container capacity.

TIFIA Transportation Infrastructure Finance and Innovation Act of 1998 – Established a new federal credit program under which the U.S. DOT may provide three forms of credit assistance—secured (direct) loans, loan guarantees and standby lines of credit—for surface transportation projects of national or regional significance. The program's fundamental goal is to leverage federal funds by attracting substantial private and other non-federal co-investment in critical improvements to the nation's surface transportation system. Sponsors may include state departments of transportation, transit operators, special authorities, local governments and private entities.

TNC Transportation Network Companies – This is the technical term for ridesourcing companies used by the California Public Utilities Commission in order to create a new class of mobility provider distinguished from taxi companies and limousines.

TOD Transit-Oriented Development – A planning strategy that explicitly links land-use and transportation by focusing mixed housing, employment and commercial growth around bus and rail stations (usually within ½ mile). TODs can reduce the number and length of vehicle trips by encouraging more bicycle/pedestrian and transit use and can support transit investments by creating the density around stations to boost ridership.

TP&D Transportation Planning and Development Account – A state transit trust fund that is the funding source for the STA program.

TSP Transit Signal Priority – A set of operational improvements that use technology to facilitate the movement of transit vehicles and reduce their dwell time at traffic signals by holding green lights longer or shortening red lights. TSP may be implemented at individual intersections or across corridors or entire street systems. Objectives of TSP include improved schedule adherence and improved transit travel time efficiency while minimizing impacts to normal traffic operations.

Trantrak RTIP Database Management System.

TSWG Transportation Security Working Group – Advises the operating organizations on transportation safety matters associated with the transfer or shipment of hazardous materials.

TUMF Transportation Uniform Mitigation Fee – Ordinance enacted by the Riverside County Board of Supervisors and cities to impose a fee on new development to fund related transportation improvements.

TZEV Transitional Zero Emissions Vehicles – Terminology used by the Air Resources Board (ARB) to refer to Plug-in Hybrid Electric Vehicles, since these vehicles produce emissions when they are powered by the internal combustion engine.

Union Station Los Angeles Union Station is the main railway station in Los Angeles.

UPT Unlinked Passenger Trips – The number of passengers who board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination.

UP Union Pacific Railroad.

Urban Areas Urban Areas in the SCAG region represent densely developed territory, and encompass residential, commercial and other non-residential urban land uses where population is concentrated over 2,500 people in a given locale.

Urban Growth Boundary A regional boundary that seeks to contain outward urban expansion by limiting development outside of the boundary, while focusing new growth within the boundary. Urban growth boundaries lead to the preservation of natural and agricultural lands, redevelopment and infill in existing communities and optimization of existing infrastructure and transportation investments.

U.S. DOT U.S. Department of Transportation – Federal agency responsible for the development of transportation policies and programs that contribute to providing fast, safe, efficient and convenient transportation at the lowest cost consistent with those and other national objectives, including the efficient use and conservation of the resources of the United States. U.S. DOT is comprised of ten operating administrations, including FHWA, FTA, FAA and FRA.

Value Pricing A user fee applied during peak demand periods on congested roadways to improve the reliability and efficiency of the transportation system and provide travelers with greater choices.

VCTC Ventura County Transportation Commission – Agency responsible for planning and funding countywide transportation improvements.

Vehicle Hours of Delay The travel time spent on the highway due to congestion. Delay is estimated as the difference between vehicle hours traveled at a specified free-flow speed and vehicle hours traveled at a congested speed.

VRH Vehicle Revenue Hours – The hours that a public transportation vehicle actually travels while in revenue service. Vehicle revenue hours include layover/recovery time, but exclude deadheading, operator training, vehicle maintenance testing and school bus and charter services.

VRM Vehicle Revenue Miles – The miles that a public transportation vehicle actually travels while in revenue service. Vehicle revenue miles include layover/recovery time, but exclude deadheading, operator training, vehicle maintenance testing and school bus and charter services.

VHDD Vehicle Hours of Daily Delay – Hours of delay attributed to congestion for vehicles each day.

VMT Vehicle Miles Traveled – On highways, a measurement of the total miles traveled by all vehicles in the area for a specified time period. It is calculated by the number of vehicles times the miles traveled in a given area or on a given highway during the time period. In transit, the number of vehicle miles operated on a given route or line or network during a specified time period.

VOC Volatile Organic Compounds – Organic gases emitted from a variety of sources, including motor vehicles, chemical plants, refineries, factories, consumer and commercial products and other industrial sources. Ozone, the main component of smog, is formed from the reaction of VOCs and NOx in the presence of heat and sunlight.

ZEV Zero Emissions Vehicles – Vehicles that produce no tailpipe emissions of criteria pollutants. Generally, ZEVs feature electric powertrains. Technically, ZEVs are still responsible for some greenhouse gas (GHG) emissions, as the GHG content from the electricity generation must be accounted for.

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2016
2040 RTPSCS

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50 YEARS

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<u>EXHIBIT E</u>

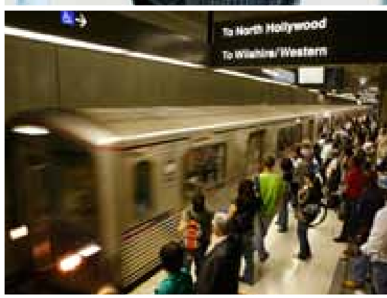



REGIONAL TRANSPORTATION PLAN

2012–2035 RTP

SUSTAINABLE COMMUNITIES STRATEGY

Towards a Sustainable Future



Southern California Association of Governments

ADOPTED APRIL 2012

Southern California Association of Governments

REGIONAL TRANSPORTATION PLAN 2012–2035 RTP

SUSTAINABLE COMMUNITIES STRATEGY

Towards a Sustainable Future

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Leadership | Vision | Progress

Leadership, vision and progress which promote economic growth, personal well-being, and livable communities for all Southern Californians.

THE ASSOCIATION WILL ACCOMPLISH THIS MISSION BY:

- Developing long-range regional plans and strategies that provide for efficient movement of people, goods and information; enhance economic growth and international trade; and improve the environment and quality of life.
- Providing quality information services and analysis for the region.
- Using an inclusive decision-making process that resolves conflicts and encourages trust.
- Creating an educational and work environment that cultivates creativity, initiative, and opportunity.

Funding: The preparation of this document was financed in part through funds from the Federal Highway Administration and Federal Transit Administration. Additional financial assistance was provided by the California Department of Transportation.

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RESOLUTION

RESOLUTION NO. 12-538-2

A RESOLUTION OF THE SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS APPROVING THE 2012–2035 REGIONAL TRANSPORTATION PLAN/SUSTAINABLE COMMUNITIES STRATEGY (2012–2035 RTP/SCS); RELATED CONFORMITY DETERMINATION; AND RELATED CONSISTENCY AMENDMENT #11-24 TO THE 2011 FEDERAL TRANSPORTATION IMPROVEMENT PROGRAM

WHEREAS, the Southern California Association of Governments (SCAG) is a Joint Powers Agency established pursuant to California Government Code §6500 et seq.; and

WHEREAS, SCAG is the designated Metropolitan Planning Organization (MPO) pursuant to 23 U.S.C. §134(d) for the counties of Los Angeles, Riverside, San Bernardino, Ventura, Orange, and Imperial, and as such, is responsible for preparing and updating the Regional Transportation Plan (RTP) and the Federal Transportation Improvement Program (FTIP) pursuant to 23 U.S.C. §134 et seq., 49 U.S.C. §5303 et seq., and 23 C.F.R. §450.312; and

WHEREAS, SCAG is the designated Regional Transportation Planning Agency (RTPA) under state law, and as such, is responsible for preparing, adopting and updating the RTP and Sustainable Communities Strategy every four years pursuant to Government Code §65080 et seq., and for preparing and adopting the FTIP (regional transportation improvement program, under state law) every two years pursuant to Government Code §§ 14527 and 65082, and Public Utilities Code §130301 et seq.; and

WHEREAS, pursuant to Senate Bill (SB) 375 (Steinberg, 2008) as codified in Government Code §65080(b) et seq., SCAG must prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its greenhouse gas (GHG) reduction targets as set forth by the California Air Resources Board (ARB) and that will be incorporated into the RTP. As provided by Government Code §65080(d), the subregional Sustainable Communities Strategy for the subregions of Orange County Council of Governments and Gateway Cities Council of Governments are incorporated in their entirety into the Final 2012–2035 RTP/SCS; and

WHEREAS, pursuant to SB 375, ARB set the per capita GHG emission reduction targets from passenger vehicles for the SCAG region at 8% below 2005 per capita emissions levels by 2020 and 13% below 2005 per capita emissions levels by 2035; and

WHEREAS, pursuant to Government Code §65080(b)(2)(B), the SCS must: (1) identify the general location of uses, residential densities, and building intensities within the region; (2) 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; (3) identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Government Code Section 65584; (4) identify a transportation network to service the transportation needs of the region; (5) gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (1) and (b) of the Government Code Sections 65080 and 65581; and (6) consider the statutory housing goals specified in Sections 65580 and 65581, (7) 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 GHG emissions from automobiles and light trucks to achieve the GHG reduction targets, and (8) allow the RTP to comply with air quality conformity requirements under the federal Clean Air Act; and

WHEREAS, SCAG is further required to comply with the California Environmental Quality Act ("CEQA") (Cal. Pub. Res. Code § 21000 et seq.) in preparing the 2012–2035 RTP/SCS; and

WHEREAS, the 2012–2035 RTP/SCS must be consistent with all other applicable provisions of federal and state law including:

(1) The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (23 U.S.C. §134 et seq.);

(2) The metropolitan planning regulations at 23 C.F.R. Part 450, Subpart C;

(3) California Government Code §65080 et seq.; Public Utilities Code §130058 and 130059; and Public Utilities Code §44243.5;

(4) §§174 and 176(c) and (d) of the federal Clean Air Act [(42 U.S.C. §§7504 and 7506(c) and (d)] and EPA Transportation Conformity Rule, 40 C.F.R. Parts 51 and 93;

(5) Title VI of the 1964 Civil Rights Act and the Title VI assurance executed by the State pursuant to 23 U.S.C. §324;

(6) The Department of Transportation's Final Environmental Justice Strategy (60 Fed. Reg. 33896; June 29, 1995) enacted pursuant to Executive Order 12898, which seeks to avoid disproportionately high and adverse impacts on minority and low-income populations with respect to human health and the environment;

(7) Title II of the 1990 Americans with Disabilities Act (42 U.S.C. §§12101 et seq.) and accompanying regulations at 49 C.F.R. §27, 37, and 38;

(8) Senate Bill 375 (Steinberg, 2008) as codified in California Government Code §65080(b) et seq.; and

WHEREAS, in non-attainment and maintenance areas for transportation-related criteria pollutants, the MPO, as well as the Federal Highways Administration (FHWA) and Federal Transit Administration (FTA), must make a conformity determination on any updated or amended RTP in accordance with the federal Clean Air Act to ensure that federally supported highway and transit project activities conform to the purpose of the State Implementation Plan (SIP); and

WHEREAS, transportation conformity is based upon a positive conformity finding with respect to the following tests: (1) regional emissions analysis, (2) timely implementation of Transportation Control Measures, (3) financial constraint, and (4) interagency consultation and public involvement; and

WHEREAS, on May 8, 2008, the SCAG Regional Council found the 2008 RTP to be in conformity with the State Implementation Plans for air quality, pursuant to the federal Clean Air Act and Environmental Protection Agency (EPA) Transportation Conformity Rule. Thereafter, FHWA and FTA made a conformity determination on the 2008 RTP with said determination to expire on June 5, 2012; and

WHEREAS, on September 2, 2010, in accordance with federal and state requirements, , the SCAG Regional Council approved the 2010/11–2015/16 Federal Transportation Improvement Program (2011 FTIP), which was federally approved on December 14, 2010. The 2011 FTIP represents a staged, multi-year, intermodal program of transportation projects which covers six fiscal years and includes a priority list of projects to be carried out in the first four fiscal years; and

WHEREAS, SCAG staff has engaged in the continuing, cooperative, and comprehensive transportation planning process mandated by 23 U.S.C. §134(c) (3) and 23 C.F.R. §450.312, resulting in the development of the 2012–2035 RTP/SCS; and

WHEREAS, pursuant to Government Code §65080(b)(2)(F) and federal public participation requirements, including 23 C.F.R. §450.316(b)(1)(iv), SCAG must prepare the RTP, including its SCS, by providing adequate public notice of public involvement activities and time for public review. In March 2007, SCAG approved and adopted a Public Participation Plan, to serve as a guide for SCAG's public involvement process. SCAG staff further enhanced the outreach program by incorporating the public participation requirements of SB 375 and adding strategies to better serve the underrepresented segments of the region. As a result of this process, the SCAG Regional Council adopted Amendments #2 and #3 to the Public Participation Plan on December 3, 2009 and January 5, 2012, respectively; and

WHEREAS, pursuant to Government Code §65080(b)(2)(F)(iii), during the summer 2011, SCAG held a series of Sustainable Communities Strategy public workshops throughout the region, with over 700 attendees, including residents, elected officials, representatives of public agencies, community organizations, and environmental, housing and business stakeholders; and

WHEREAS, in accordance with the interagency consultation requirements, 40 C.F.R. 93.105, SCAG consulted with the respective transportation and air quality planning agencies, including but not limited to, extensive discussion of the Draft Conformity Report before the Transportation Conformity Working Group (a forum for implementing the interagency consultation requirements) throughout the 2012–2035 RTP/SCS update process; and

WHEREAS, SCAG released the Draft 2012–2035 RTP/SCS and the associated Draft Amendment #11-24 to the 2011 FTIP and issued a Notice of Availability, for a 55-day public review and comment period that began on December 20, 2011 and ended on February 14, 2012; and

WHEREAS, the Draft Program Environmental Impact Report for the 2012–2035 RTP/SCS (PEIR), was released on December 30, 2011 for a 45-day public review and comment period ending on February 14, 2012; and

WHEREAS, as part of a "bottom up" planning process, SCAG followed the provisions of its adopted Public Participation Plan regarding public involvement activities for the Draft 2012–2035 RTP/SCS. Public outreach efforts included publication of the Draft 2012–2035 RTP/SCS on an interactive web site, distribution of public information materials, six duly-noticed public hearings, and twelve subregional workshops within the SCAG region to allow stakeholders, elected officials and the public to comment on the Draft 2012–2035 RTP/SCS and the Draft PEIR; and

WHEREAS, during the public review and comment period, SCAG received over 260 individual communications (over 1,800 separate comments) in total, regarding either the Draft 2012–2035 RTP/SCS or Draft PEIR, or both; and approximately 2 comments on the Draft Amendment 11-24 to the 2011 FTIP; and

WHEREAS, SCAG staff presented an overview of the comments received on the Draft PEIR, and a proposed approach to the responses, to the Policy Committees and Regional Council at a joint meeting on February 21, 2012; and

WHEREAS, SCAG staff further presented an overview of the comments received on the Draft 2012–2035 RTP/SCS, and a proposed approach to the responses, to the RTP Subcommittee on February 28, 2012 and to the Policy Committees and Regional Council at a joint meeting on March 1, 2012. Each of the comments, letters, and e-mails received was made available on the SCAG web page on March 1, 2012; and

WHEREAS, SCAG staff responses to each comment are provided in the Final 2012–2035 RTP/SCS, Public Participation and Consultation Appendix; and

WHEREAS, in accordance with the interagency consultation requirements, 40 C.F.R. 93.105, SCAG consulted with the respective transportation and air quality planning agencies, including but not limited to, extensive discussion of the Draft 2012–2035 RTP/SCS Conformity Report before the Transportation Conformity Working Group (a forum for implementing the interagency consultation requirements) throughout the update process; and

WHEREAS, the Final 2012–2035 RTP/SCS includes a financially constrained plan and a strategic plan. The constrained plan includes transportation projects that have committed, available or reasonably available revenue sources, and thus are probable for implementation. The strategic plan is an illustrative list of additional transportation investments that the region would pursue if additional funding and regional commitment were secured; and such investments are potential candidates for inclusion in the constrained RTP/SCS through future amendments or updates. The strategic plan is provided for information purposes only and is not part of the financially constrained and conforming Final 2012–2035 RTP/SCS; and

WHEREAS, the Final 2012–2035 RTP/SCS includes a financial plan identifying the revenues committed, available or reasonably available to support the SCAG region's surface transportation investments. The financial plan was developed following basic principles including incorporation of county and local financial planning documents in the region where available, and utilization of published data sources to evaluate historical trends and augment local forecasts as needed; and

WHEREAS, the Transportation Conformity Report contained in the Final 2012–2035 RTP/SCS makes a positive transportation conformity determination. Using the final motor vehicle emission budgets released by ARB and found to be adequate by the U.S. Environmental Protection Agency (EPA), this conformity determination is based upon staff's analysis of the applicable transportation conformity tests; and

WHEREAS, each project or project phase included in the FTIP must be consistent with the approved RTP, pursuant to 23 C.F.R. §450.324(g). Amendment #11-24 to the 2011 FTIP has been prepared to ensure consistency with the Final 2012–2035 RTP/SCS; and

WHEREAS, conformity of Amendment #11-24 to the FTIP has been determined simultaneously with the 2012 Final RTP/SCS in order to address the consistency requirement of federal law; and

WHEREAS, prior to the adoption of this resolution, the Regional Council certified the Final PEIR prepared for the 2012–2035 RTP/SCS to be in compliance with CEQA; and

WHEREAS, the Regional Council has had the opportunity to review the 2012 Final RTP/SCS and its related appendices as well as the staff report related to the 2012 Final RTP/SCS, and consideration of the 2012 Final RTP/SCS was made by the Regional Council as part of a public meeting held on April 4, 2012.

NOW, THEREFORE BE IT RESOLVED, by the Regional Council of the Southern California Association of Governments, as follows:

1. The Regional Council approves and adopts the Final 2012–2035 RTP/SCS for the purpose of complying with the requirements of SAFETEA-LU and all other applicable laws and regulations as referenced in the above recitals. In adopting this Final 2012–2035 RTP/SCS, the Regional Council finds as follows:

a. The Final 2012–2035 RTP/SCS complies with all applicable federal and state requirements, including the SAFETEA-LU planning provisions. Specifically, the Final 2012–2035 RTP/SCS fully addresses the requirements relating to the development and content of metropolitan transportation plans as set forth in 23 C.F.R.§450.322 et seq., including issues relating to: transportation demand, operational and management strategies, safety and security, environmental mitigation, the need for a financially constrained plan, consultation and public participation, and transportation conformity; and

b. The Final 2012–2035 RTP/SCS complies with the emission reduction targets established by the California Air Resources Board and meets the requirements of Senate Bill 375 (Steinberg, 2008) as codified in Government Code §65080(b) et seq. by achieving per capita GHG emission reductions relative to 2005 of 9% by 2020 and 16% by 2035; and

2. The Regional Council hereby makes a positive transportation conformity determination of the Final 2012–2035 RTP/SCS and Amendment #11-24 to the 2011 FTIP. In making this determination, the Regional Council finds as follows:

a. The Final 2012–2035 RTP/SCS and Amendment #11-24 to the 2011 FTIP passes the four tests and analyses required for conformity, namely: regional emissions analysis; timely implementation of Transportation Control Measures; financial constraint analysis; and interagency consultation and public involvement; and

3. In approving the Final 2012–2035 RTP/SCS, the Regional Council also approves and adopts Amendment #11-24 to the 2011 FTIP, in compliance with the federal requirement of consistency with the RTP; and

4. In approving the Final 2012–2035 RTP/SCS, the Regional Council incorporates all of the foregoing recitals into this Resolution; and

5. SCAG's Executive Director or his designee is authorized to transmit the Final 2012–2035 RTP/SCS and its conformity findings to the FTA and the FHWA to make the final conformity determination in accordance with the Federal Clean Air Act and EPA Transportation Conformity Rule, 40 C.F.R. Parts 51 and 93.

APPROVED AND ADOPTED by the Regional Council of the Southern California Association of Governments at its regular meeting on the 4th day of April, 2012.

Pam O'Connor

Pam O'Connor
President
Council Member, City of Santa Monica

Attested by:

Hasan Ikhrata

Hasan Ikhrata
Executive Director

Joann Africa
Chief Counsel

EXECUTIVE SUMMARY

Image courtesy of Metro © 2012 LACMTA

Our Vision

Towards a Sustainable Future

For the past three decades, the Southern California Association of Governments (SCAG) has prepared Regional Transportation Plans (RTPs) with the primary goal of increasing mobility for the region's residents and visitors. While mobility is a vital component of the quality of life that this region deserves, it is by no means the only component. SCAG has placed a greater emphasis than ever before on sustainability and integrated planning in the 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), whose vision encompasses three principles that collectively work as the key to our region's future: mobility, economy, and sustainability.

The 2012–2035 RTP/SCS includes a strong commitment to reduce emissions from transportation sources to comply with SB 375, improve public health, and meet the National Ambient Air Quality Standards as set forth by the federal Clean Air Act. As such, the 2012–2035 RTP/SCS contains a regional commitment for the broad deployment of zero- and near-zero emission transportation technologies in the 2023–2035 time frame and clear steps to move toward this objective. This is especially critical for our goods movement system. The development of a world-class zero- or near-zero emission freight transportation system is necessary to maintain economic growth in the region, to sustain quality of life, and to meet federal air quality requirements. The 2012–2035 RTP/SCS puts forth an aggressive strategy for technology development and deployment to achieve this objective. This strategy will have many co-benefits, including energy security, cost certainty, increased public support for infrastructure, GHG reduction, and economic development.

Never before have the crucial linkages and interrelationships between the economy, the regional transportation system, and land use been as important as now. For the first time, the 2012–2035 RTP/SCS includes a significant consideration of the economic impacts and opportunities provided by the transportation infrastructure plan set forth in the 2012–2035 RTP/SCS, considering not only the economic and job creation impacts of the direct investment in transportation infrastructure, but also the efficiency gains in terms of worker and business economic productivity and goods movement. The 2012–2035 RTP/SCS outlines a transportation infrastructure investment strategy that will benefit Southern California, the state, and the nation in terms of economic development, competitive advantage, and overall competitiveness in the global economy in terms of attracting and retaining employers in the Southern California region.

The 2012–2035 RTP/SCS provides a blueprint for improving quality of life for our residents by providing more choices for where they will live, work, and play, and how they will move around. Its safe, secure, and efficient transportation systems will provide improved access to opportunities, such as jobs, education, and healthcare. Its emphasis on transit and active transportation will allow our residents to lead a healthier, more active lifestyle. It will create jobs, ensure our region's economic competitiveness through strategic investments in our goods movement system, and improve environmental and health outcomes for its 22 million residents by 2035. More importantly, the RTP/SCS will also preserve what makes the region special, including our stable and successful neighborhoods and our array of open spaces for future generations to enjoy.

The Setting

In order to successfully overcome the challenges that lie before us, this RTP/SCS first recognizes the impacts that recent events and long-term trends will have on how people choose to live and move around.

ECONOMIC RECESSION

[**800,000**] jobs have been lost in the region due to the Great Recession

The economic turmoil faced by many of the region's residents is likely to impact their housing choices and travel behavior, including their transportation mode choice and day-to-day travel patterns. This will potentially require different types of transportation solutions.

POPULATION GROWTH

The region will add [**4 million**] people by 2035

This growth in population will only exacerbate our region's existing mobility challenges. The SCAG region is already home to 18 million people, or 49 percent of California's population. If it were its own state, the SCAG region would be the fifth most populous in the nation. Furthermore, this expected growth will occur mainly in the suburban inland counties of Riverside and San Bernardino, adding to the existing imbalance of jobs and housing in the region, and requiring people to travel, which contributes to transportation and air quality challenges. In addition, with the aging of the Baby Boomer generation (the share of the population 65 years or older will increase from 11 percent in 2010 to 18 percent in 2035), the region will have a greater need for more efficient modes of transportation for those who can no longer drive as their main form of transportation.

Image courtesy of Metro © 2012 LACMTA

MULTIMODAL TRANSPORTATION SYSTEM

Over the past few decades, the region has invested heavily in a multimodal transportation system that serves as the backbone of the region's economic well-being.

THE SYSTEM AT A GLANCE

[**21,690**] miles of highways and arterials

[**470**] miles of passenger rail

[**6**] air carrier airports

Nine out of ten trips in the region utilize our extensive highway and arterial network, which supports a host of modes, including the automobile, transit, and active transportation. The region is also home to a growing number of passenger rail lines, none of which existed 20 years ago. Our regional aviation system is the nation's largest and most complex in terms of number of airports and aircraft, and our goods movement industry plays a critical role in sustaining the economy of our region. The importance of this system to our region cannot be overstated.

THE REGION IN MOTION

[**446 million**] miles driven each day

[**81 million**] air passengers each year

[**45%**] more urban rail riders between 2000 and 2006

[**34%**] of our jobs depend on the goods movement industry

Challenges

The challenges facing the region are daunting. When combined, our mobility, air quality, and funding challenges present an imposing threat to the quality of life for both current and future residents.

MOBILITY CHALLENGES

The region wastes over [**3 million**] hours each year sitting in traffic

The region's roadways are the most congested in the nation, and traffic relief is critical, even more so in our current economic situation. By failing to address our congestion, we have foregone jobs—every 10 percent decrease in congestion can bring an employment increase of about 132,000 jobs.

SAFETY CHALLENGES

On the brighter side, our roadways are among the nation's safest, with rate of fatal and injury collisions declining dramatically since the 1930s. But as we continue to successfully improve safety for our motorists, we cannot neglect the alarming fatality rates of those traveling on other modes of transportation.

[**21%**] of all traffic-related fatalities involve pedestrians

This fatality rate is unacceptable, and if we plan to successfully move toward a more sustainable future that includes plenty of active transportation, we must address the safety deficiencies in all modes of transportation.

AIR QUALITY CHALLENGES

In addition, while Southern California is a leader in reducing emissions, and ambient levels of air pollutants are improving, the SCAG region continues to have the worst air quality in the nation, and air pollution still causes thousands of premature deaths every year, as well as other serious adverse health effects. The South Coast Air Quality Management District (AQMD) estimates the monetary cost of air pollution in Southern California to be at least $14.6 billion annually.

Even with ongoing aggressive control strategies, ever more stringent national ozone standards require further oxide of nitrogen (NOx) emission reductions in the SCAG region. In the South Coast Air Basin, for example, it is estimated that NOx emissions will need to be reduced by approximately two-thirds in 2023 and three-quarters in 2030. This is a daunting challenge. The level of emission reduction required is so significant that 2030 emissions forecasted from just three sources—ships, trains, and aircraft—would lead to ozone levels near the federal standard. Because most sources, including cars and factories, are already controlled by over 90 percent, attainment of ozone standards will require broad deployment of zero- and near-zero emission technologies in the 2023–2035 time frame.

Senate Bill 375

New to this RTP, California's Sustainable Communities and Climate Protection Act, or Senate Bill (SB) 375, calls for this RTP to include an SCS that reduces greenhouse gas (GHG) emissions from passenger vehicles by 8 percent per capita by 2020 and 13 percent per capita by 2035 compared to 2005, as set by the California Air Resources Board (ARB). SB 375 enhances the State's goals of Assembly Bill 32, the Global Warming Solutions Act of 2006. Meeting the required targets will not be easy, but it must be done for the health and quality of life of current and future generations. Meeting these targets will point the region toward overall sustainability and will provide benefits beyond reducing carbon emissions.

FINANCIAL CHALLENGES

Of all the challenges facing us today, there is perhaps none more critical than funding. With the projected growth in population, employment, and demand for travel, the costs of our multimodal transportation needs surpass projected revenues available from our historic transportation funding source—the gas tax.

State and federal gas taxes have not changed in nearly [20] years

Yet, highway construction costs have grown by [82%]

As a result of years of underinvestment, a significant number of our roadways and bridges have fallen into a state of disrepair. It is imperative that this situation be addressed. The rate of deterioration will only accelerate with continued deferral, significantly increasing the cost of bringing our transportation assets back into a state of good repair. Furthermore, with recent declines in transit funding, the region's transit operators continue to face major obstacles to providing frequent and convenient transit service.

Rail operating costs have increased by over [40%] in the past decade

Intercity transit operators have been forced to cut service by up to [20%]

The region must consider ways to stabilize existing revenue sources and supplement them with reasonably available new sources. This region needs a long-term, sustainable funding plan that ensures the region receives its fair share of funding, supports an efficient and effective transportation system that grows the economy, provides mobility choices, and improves our quality of life.

Our Approach

To address these challenges, SCAG performed a careful analysis of our transportation system, the future growth of our region, and potential new sources of revenue, and embarked on a massive outreach undertaking to hear what the region had to say. While SCAG continued to work closely through hundreds of meetings with stakeholder agencies with which it has always collaborated, it also conducted a series of planning sessions throughout the region to find out what Southern Californians want to see in their future. The result of this multi-year effort is the 2012–2035 RTP/SCS, a shared vision for the region's sustainable future.

Transportation Investments

The RTP/SCS contains a host of improvements to our multimodal transportation system. These improvements include closures of critical gaps in the network that hinder access to certain parts of the region, as well as the strategic expansion of our transportation system where there is room to grow in order to provide the region with the mobility it needs. These improvements are outlined in **TABLE 1**.

Image courtesy of the Riverside Transit Agency

TABLE 1 Transportation Investments (Nominal Dollars, Billions)

Component	Description	Cost
Transit		$55.0 billion
Bus Rapid Transit (BRT)	New BRT routes, extensions, and/or service enhancements in Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties	$4.6 billion
Light Rail Transit (LRT)	New Light Rail routes/extensions in Los Angeles and San Bernardino Counties	$16.9 billion
Heavy Rail Transit (HRT)	Heavy Rail extension in Los Angeles County	$11.8 billion
Bus	New and expanded bus service in Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties	$21.7 billion
Passenger and High-Speed Rail		$51.8 billion
Commuter Rail	Metrolink extensions in Riverside County and Metrolink systemwide improvements to provide higher speeds	$4.1 billion
High-Speed Rail	Improvements to the Los Angeles to San Diego (LOSSAN) Rail Corridor with an ultimate goal of providing San Diego-Los Angeles express service in under two hours Phase I of the California High-Speed Train (HST) project that would provide high-speed service from Los Angeles to the Antelope Valley	$47.7 billion
Active Transportation		$6.7 billion
Various Active Transportation Strategies	Increase our bikeways from 4,315 miles to 10,122 miles, bring significant amount of sidewalks into compliance with the Americans with Disabilities Act (ADA), safety improvements, and various other strategies	$6.7 billion
Transportation Demand Management (TDM)		$4.5 billion
Various TDM Strategies	Strategies to incentivize drivers to reduce solo driving: ▪ Increase carpooling and vanpooling ▪ Increase the use of transit, bicycling, and walking ▪ Redistribute vehicle trips from peak periods to non-peak periods by shifting work times/days/locations ▪ Encourage greater use of telecommuting ▪ Other “first mile/last mile” strategies to allow travelers to easily connect to and from transit service at their origin and destination. These strategies include the development of mobility hubs around major transit stations, the integration of bicycling and transit through folding-bikes-on-buses programs, triple bike racks on buses, and dedicated racks on light and heavy rail vehicles	$4.5 billion

Component	Description	Cost
Transportation Systems Management (TSM) (includes Intelligent Transportation Systems (ITS))		$7.6 billion
Various TSM Strategies	Enhanced incident management, advanced ramp metering, traffic signal synchronization, advanced traveler information, improved data collection, universal transit fare cards (Smart Cards), and Transit Automatic Vehicle Location (AVL) to increase traffic flow and reduce congestion	$7.6 billion
Highways		$64.2 billion
Mixed Flow	Interchange improvements to and closures of critical gaps in the highway network to provide access to all parts of the region	$16.0 billion
High-Occupancy Vehicle (HOV)/ High-Occupancy Toll (HOT)	Closure of gaps in the high-occupancy vehicle (HOV) lane network and the addition of freeway-to-freeway direct HOV connectors to complete Southern California's HOV network A connected network of Express/HOT lanes	$20.9 billion
Toll Facilities	Closure of critical gaps in the highway network to provide access to all parts of the region	$27.3 billion
Arterials		$22.1 billion
Various Arterial Improvements	Spot widenings, signal prioritization, driveway consolidations and relocations, grade separations at high-volume intersections, new bicycle lanes, and other design features such as lighting, landscaping, and modified roadway, parking, and sidewalk widths	$22.1 billion
Goods Movement (includes Grade Separations)		$48.4 billion
Various Goods Movement Strategies	Port access improvements, freight rail enhancements, grade separations, truck mobility improvements, intermodal facilities, and emission-reduction strategies	$48.4 billion
Aviation and Airport Ground Access		Included in modal investments
Various Airport Ground Access Improvements	Rail extensions and improvements to provide easier access to airports, and new express bus service from remote terminals to airports	Included in modal investments
Operations and Maintenance		$216.9 billion
Transit		$139.3 billion
Highways	Operations and maintenance to preserve our multimodal system in a good state of repair	$56.7 billion
Arterials		$20.9 billion

Financial Plan

The 2012–2035 RTP/SCS financial plan identifies how much money is available to support the region's transportation investments. The plan includes a core revenue forecast of existing local, state, and federal sources along with funding sources that are reasonably available over the time horizon of the RTP/SCS. These new sources include adjustments to state and federal gas tax rates based on historical trends and recommendations from two national commissions (National Surface Transportation Policy and Revenue Study Commission and National Surface Transportation Infrastructure Financing Commission) created by Congress, further leveraging of existing local sales tax measures, value capture strategies, potential national freight program/freight fees, as well as passenger and commercial vehicle tolls for specific facilities. Reasonably available revenues also include innovative financing strategies, such as private equity participation. In accordance with federal guidelines, the plan includes strategies for ensuring the availability of these sources.

TABLE 2 presents ten categories of new revenue sources and innovative financing techniques that are considered to be reasonably available and are included in the financially constrained plan. For each funding source, SCAG has examined the policy and legal context of implementation, prepared an estimate of the revenue potential, and identified action steps to ensure the funds are available to implement the region's transportation vision.

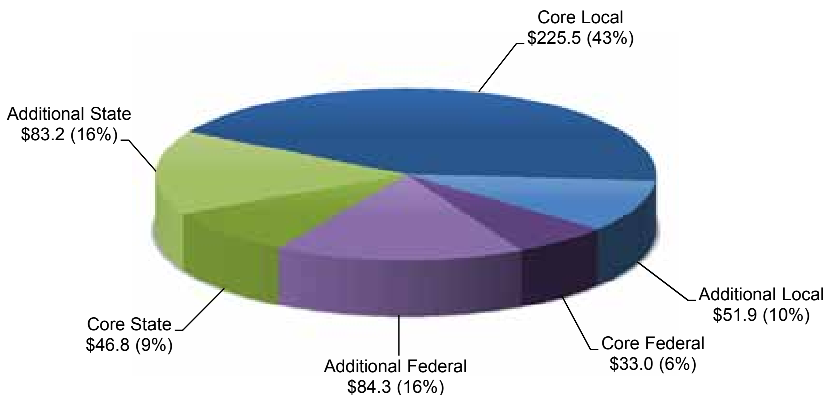
Revenue Sources and Expenditures

FIGURES 1 and **2** provide a summary of the plan's forecasted revenues and expenditures. As shown in these figures, the region's budget over the next 25 years totals an estimated $524.7 billion.

TABLE 2 New Revenue Sources and Innovative Financing Strategies (Nominal Dollars, Billions)

Revenue Source	Description	Amount
Bond Proceeds from Local Sales Tax Measures	Issuance of debt against existing sales tax revenues: Los Angeles, Orange, Riverside, and San Bernardino Counties.	$25.6 bil
State and Federal Gas Excise Tax Adjustment to Maintain Historical Purchasing Power	Additional $0.15 per gallon gasoline tax imposed at the state and federal levels starting in 2017 to 2024—to maintain purchasing power.	$16.9 bil
Mileage-Based User Fee (or equivalent fuel tax adjustment)	Mileage-based user fees would be implemented to replace gas taxes—estimated at about $0.05 (in 2011 dollars) per mile starting in 2025 and indexed to maintain purchasing power.	$110.3 bil (est. increment only)
Highway Tolls (includes toll revenue bond proceeds)	Toll revenues generated from SR-710 North Extension, I-710 South Freight Corridor, East-West Freight Corridor, segment of the High Desert Corridor, and Regional Express/HOT Lane Network.	$22.3 bil
Private Equity Participation	Private equity share as may be applicable for key initiatives: e.g., toll facilities; also, freight rail package assumes railroads' share of costs for main line capacity and intermodal facilities.	$2.7 bil
Freight Fee/National Freight Program	A national freight program is anticipated with the next federal reauthorization of the surface transportation act. The U.S. Senate's proposal would establish federal formula funding for the national freight network.	$4.2 bil
E-Commerce Tax	Although these are existing revenue sources, they generally have not been collected. Potentially, the revenue could be used for transportation purposes, given the relationship between e-commerce and the delivery of goods to California purchasers.	$3.1 bil
Interest Earnings	Interest earnings from toll bond proceeds.	$0.2 bil
State Bond Proceeds, Federal Grants & Other for California High-Speed Rail Program	State general obligation bonds authorized under the Bond Act approved by California voters as Proposition 1A in 2008; federal grants authorized under American Recovery and Reinvestment Act and High-Speed Intercity Passenger Rail Program; potential use of qualified tax credit bonds; and private sources.	$33.0 bil
Value Capture Strategies	Assumes formation of special districts including use of tax increment financing for specific initiatives.	$1.2 bil

FIGURE 1 Revenue Summary
$524.7 Billion (Nominal Dollars) FY2011–FY2035



Source: SCAG Revenue Model 2011
Note: Numbers may not sum to total due to rounding

FIGURE 2 Expenditure Summary
$524.7 Billion (Nominal Dollars) FY2011–FY2035

Source: SCAG Revenue Model 2011

Note: Numbers may not sum to total due to rounding

Sustainable Communities Strategy

Within the RTP, the SCS demonstrates the region's ability to attain and exceed the GHG emission-reduction targets set forth by the ARB. The SCS outlines our plan for integrating the transportation network and related strategies with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands. The regional vision of the SCS maximizes current voluntary local efforts that support the goals of SB 375, as evidenced by several Compass Blueprint Demonstration Projects and various county transportation improvements. The SCS focuses the majority of new housing and job growth in high-quality transit areas and other opportunity areas in existing main streets, downtowns, and commercial corridors, resulting in an improved jobs-housing balance and more opportunity for transit-oriented development. This overall land use development pattern supports and complements the proposed transportation network that emphasizes system preservation, active transportation, and transportation demand management measures. Finally, the RTP/SCS fully integrates the two subregional SCSs prepared by the Gateway Cities and Orange County Council of Governments.

Photo by Alan Thompson

Measuring Up

The investments in this RTP/SCS are expected to result in significant benefits to the region with respect to transportation and mobility, as well as air quality, economic activity and job creation, sustainability, and environmental justice. They will result in better placemaking, lower overall costs, improvements in public health and the environment, responsiveness to a changing housing market, and improved accessibility and mobility.

Air Quality and GHG Targets

We will reduce greenhouse gas emissions by [**9%**] by 2020, and by [**16%**] by 2035

This RTP/SCS successfully achieves and exceeds our greenhouse gas emission-reduction targets set by ARB by achieving a 9 percent reduction by 2020 and 16 percent reduction by 2035 compared to the 2005 level on a per capita basis. This RTP/SCS also meets criteria pollutant emission budgets set by the EPA. With each passing year, Southern Californians should expect to breathe cleaner air and live healthier lives.

This air quality benefit is made possible largely by more sustainable planning, integrating transportation and land use decisions to allow Southern Californians to live closer to where they work and play, and to high-quality transit service. As a result, more residents will be able to use transit and active transportation as a safe and attractive means of travel.

Location Efficiency

Over [**twice**] as many households will live near high-quality transit

Share of households living in the High-Quality Transit Area will more than double over the plan period, signaling a more efficient overall development pattern in the future.

Mobility

Delay on our roadway system will improve over today's condition

Our roadways will be less congested, allowing our region's residents to spend less time in traffic onboard a bus or behind the wheel, and more time with their families.

Safety

Not only will residents be more mobile, they will also be safer. This RTP/SCS's emphasis on safety will result in significantly lower accident rates, giving our residents the peace of mind to travel freely throughout the day and come home to their loved ones every night.

Economy

We will generate [**500,000**] jobs per year

Not only will the region be more mobile, it will also be more prosperous. An annual average of 174,500 new jobs will be generated by the construction and operations expenditures in the RTP/SCS, and an additional 354,000 annual jobs will be created in a broad cross-section of industries by the region's increased competitiveness and improved economic performance as a result of the improved transportation system.

Investment Effectiveness

We will get [**$2.90**] back for every $1 spent

The RTP/SCS makes dollar sense. While overall expenditures by 2035 are a significant investment, the region will recover $2.90 for every $1 this RTP/SCS commits, which will only help propel the region to more prosperous days ahead.

Public Participation

The development of the Draft 2012–2035 RTP/SCS involved implementation of one of the most comprehensive and coordinated public participation plans ever undertaken by SCAG. The public and stakeholder involvement program went above and beyond meeting the requirements of SB 375 and the SAFETEA-LU. SCAG engaged the widest range of stakeholder groups, elected officials, special interest groups, and the general public through a series of workshops and public meetings, as well as SCAG's policy committees, task forces, and subcommittee structure. The input received through this process has truly shaped the Draft 2012–2035 RTP/SCS in a meaningful way. Furthermore, SCAG continued to involve and engage the stakeholders and the public in the process of refining and finalizing the 2012–2035 RTP/SCS through the close of the formal comment period in February 2012. SCAG developed a state-of-the-art video and the iRTP, an interactive RTP/SCS website, that enhanced our capability to engage and involve the stakeholders and the public in shaping the 2012–2035 RTP/SCS in an unprecedented way.

Strategic Plan—Looking Ahead—Beyond the Horizon

The 2012–2035 RTP/SCS proposes investing over $524 billion over the next 25 years to improve the quality of life of the region's residents by enhancing our transportation system. However, additional strategies and projects are needed. The Strategic Plan identifies additional long-term initiatives such as zero- and/or near zero emission transportation strategies, new operational improvements, expanded transit investments and high-speed rail system, as well as increased commitment to active transportation. Although elements of these strategies are included in the financially constrained plan, further work is needed to ensure there is regional consensus and commitment to fund the balance in subsequent RTPs.

01 VISION

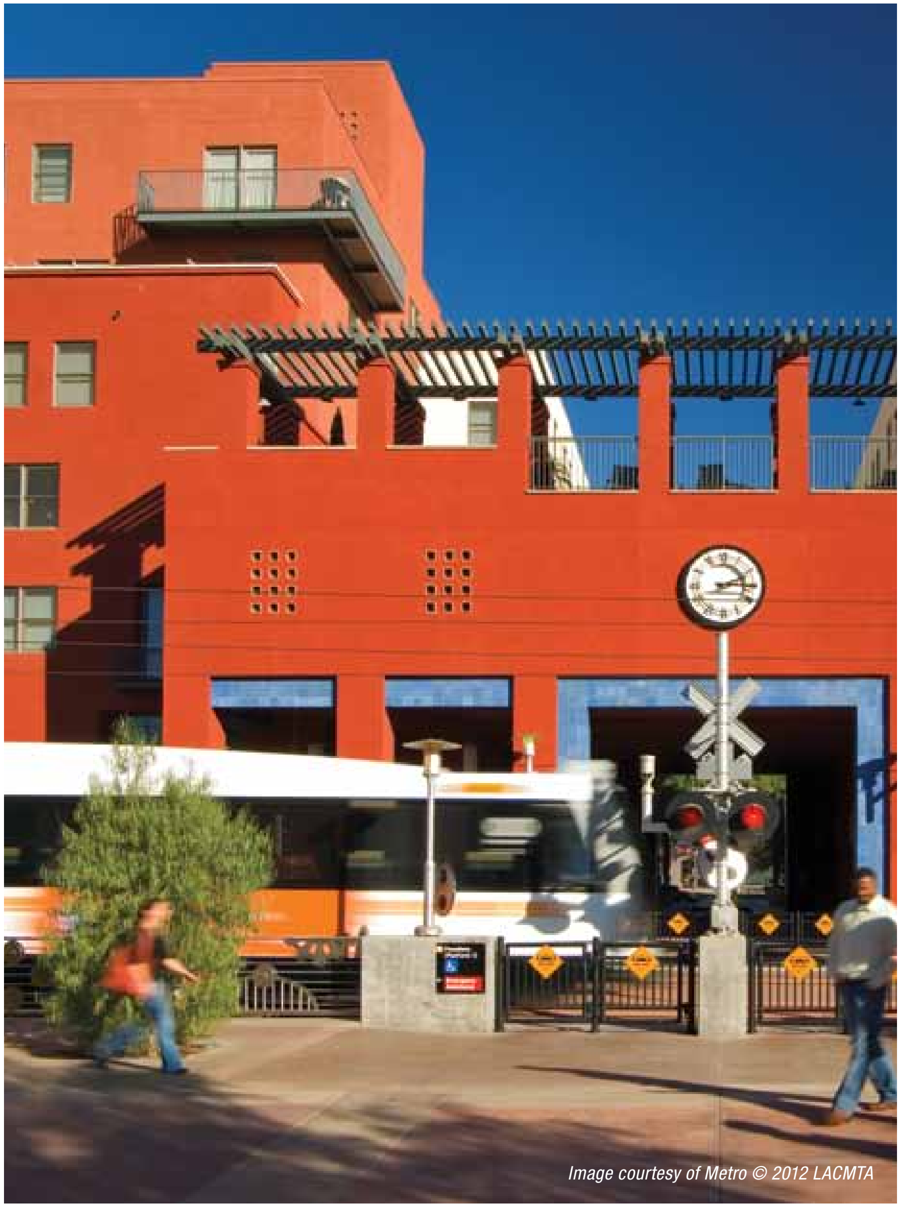


Image courtesy of Metro © 2012 LACMTA

Towards a Sustainable Future

SCAG has prepared and adopted Regional Transportation Plans (RTPs) since 1976. Throughout this history, SCAG has considered the RTP primarily as an investment in the six-county (Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura) region's mobility. The RTP identifies infrastructure projects and improvements in order to reduce traffic and generally make it easier to get around. As the process has evolved and RTPs have been updated, we have gradually broadened our viewpoint, particularly by elevating air quality considerations in the plan. This evolution has now culminated in the 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which has mobility as an important component of a much larger picture that incorporates added emphasis on sustainability and integrated planning. The vision for the 2012–2035 RTP/SCS encompasses three principles as the key to our region's future: mobility, economy, and sustainability.

The RTP/SCS is an investment in the region's future well-being through 2035. It contains projects, policies, and strategies that will achieve a range of positive outcomes when implemented. In one sense, the RTP/SCS is an accounting of revenues and expenditures. It identifies our available and reasonably foreseeable sources of funding and directs that funding to multimodal transportation projects that benefit our communities. The RTP/SCS strategies and policies are designed to assure that, to the greatest extent possible, the money we invest has the best chance of achieving our shared objectives.

In a broader sense, the RTP/SCS is a blueprint for improving the quality of life for our residents by making the best transportation and land use choices for the future and supporting those choices with wise investments. The RTP/SCS will result in more and better travel choices as well as safe, secure, and efficient transportation systems that provide improved access to opportunities, such as jobs, education, and healthcare for our residents. Furthermore, the RTP/SCS will create jobs, ensure our region's economic competitiveness through strategic investments in our goods movement system, and improve environmental and health outcomes for our region's 22 million residents by 2035.

Our Vision – Mobility, Economy, Sustainability

Our vision is built upon themes regional leaders discussed at the 2011 General Assembly. The vision has been further shaped by an unprecedented level of outreach and direct engagement with stakeholders. For example, the public workshops held through the summer of 2011 gathered distinct feedback from a wide range of stakeholders on objectives for this plan. Taking all input into account, the 2012–2035 RTP/SCS sets forth a vision to advance Southern California's mobility, economy, and sustainability through 2035.

MOBILITY

A successful transportation plan allows the residents of the region to access daily needs, including work, school, shopping, and recreation, without undue burdens of cost, time, or physical danger. This includes the pressing need to preserve and maintain our infrastructure at adequate levels. Residents should be able to rely on their ability to get from one place in the region to another in a safe and timely manner. They should be able to choose from a variety of transportation modes that suit their preferences and needs, including active, non-motorized modes such as biking and walking that allow for physical activity and greater health.

ECONOMY

A successful RTP/SCS creates opportunities for business, investment, and employment in Southern California. This plan does so by proposing over $524 billion of investment in the next 25 years. This constitutes the largest regional-scale infrastructure jobs program in Southern California's history. This will put thousands of Southern Californians back to work in much-needed jobs, not only in construction, but also in a broad cross-section of industry clusters. Over the twenty-five-year period, the plan will generate 4.2 million jobs in the six-county region. This represents the direct economic effect of designing, building, and maintaining projects, as well as the indirect and induced benefits of the investments.

Moreover, the economic benefits of the RTP/SCS are likely far broader and greater. The recommended investments and strategies in the draft RTP/SCS set the conditions for economic activity in the region by improving mobility and reducing congestion and commute times, allowing businesses in the region to operate more efficiently and maintain their competitiveness. The plan does so by addressing the needs for logistics, shipping, distribution, and goods movement in the region—a key component of the Southern California Economic Recovery and Job Creation Strategy adopted by the Regional Council in June 2011. These investments not only serve local businesses, but also allow the region to further capitalize on its unique position as a center for international trade. Also, through the integration of a regional housing policy, residents will have better access to affordable housing in all communities, and residents will have lower overall combined costs for housing and transportation. In more subtle ways, the RTP/SCS encourages continued investment and job creation by ensuring a more livable, efficient, desirable, and competitive region where employers want and are able to do business over the long term.

SUSTAINABILITY

The RTP/SCS is subject to specific requirements for environmental performance. The strategies and projects identified in the following chapters satisfy those requirements. However, this RTP/SCS will be successful only if we define sustainability in the broadest manner possible. A successful RTP/SCS allows future residents to enjoy a better quality of life than we do today, including the ability to lead a healthy lifestyle and enjoy clean air and water and ample opportunities for recreation and physical activity. It will have direct and substantial benefits to public health by reducing pollutant emissions and expanding the opportunities for active transportation. It also demonstrates how we can transition from things we know to be unsustainable over the long term and beyond the term of this RTP/SCS—such as reliance on fossil fuels—to new technologies for the future. Finally, a successful RTP/SCS establishes how we preserve what makes the region special, including our stable and successful neighborhoods and our array of open spaces for future generations to enjoy.

Realizing the Vision – Goals and Objectives

Developing the RTP/SCS is no simple task, particularly given the economic struggles we are facing today. Transportation funds are limited for sustaining our existing system, and the regional initiatives that reduce pollution and congestion while increasing mobility and economic development require more money. Cities, businesses, and taxpayers are coping with an acute economic struggle. We are also a large region with a diversity of views and a diffuse decision-making structure. Nevertheless, the RTP/SCS provides an opportunity to set a course for 2035 that not only accomplishes what we are required to do, but also delivers a future that benefits residents, cities, and businesses.

In crafting a plan to address these challenges, SCAG and the region have several advantages. These include local commitments to dramatically increase the reach of transit, ongoing progress in creating new voluntary templates for growth and development, and our existing rich and vibrant neighborhoods. Our ability to succeed will also be the result of layering projects, programs, and strategies that leverage each other to achieve better results.

To guide the development of these projects, programs, and strategies, the Regional Council adopted specific goals and objectives that help carry out the RTP/SCS vision for improved mobility, economy, and sustainability.

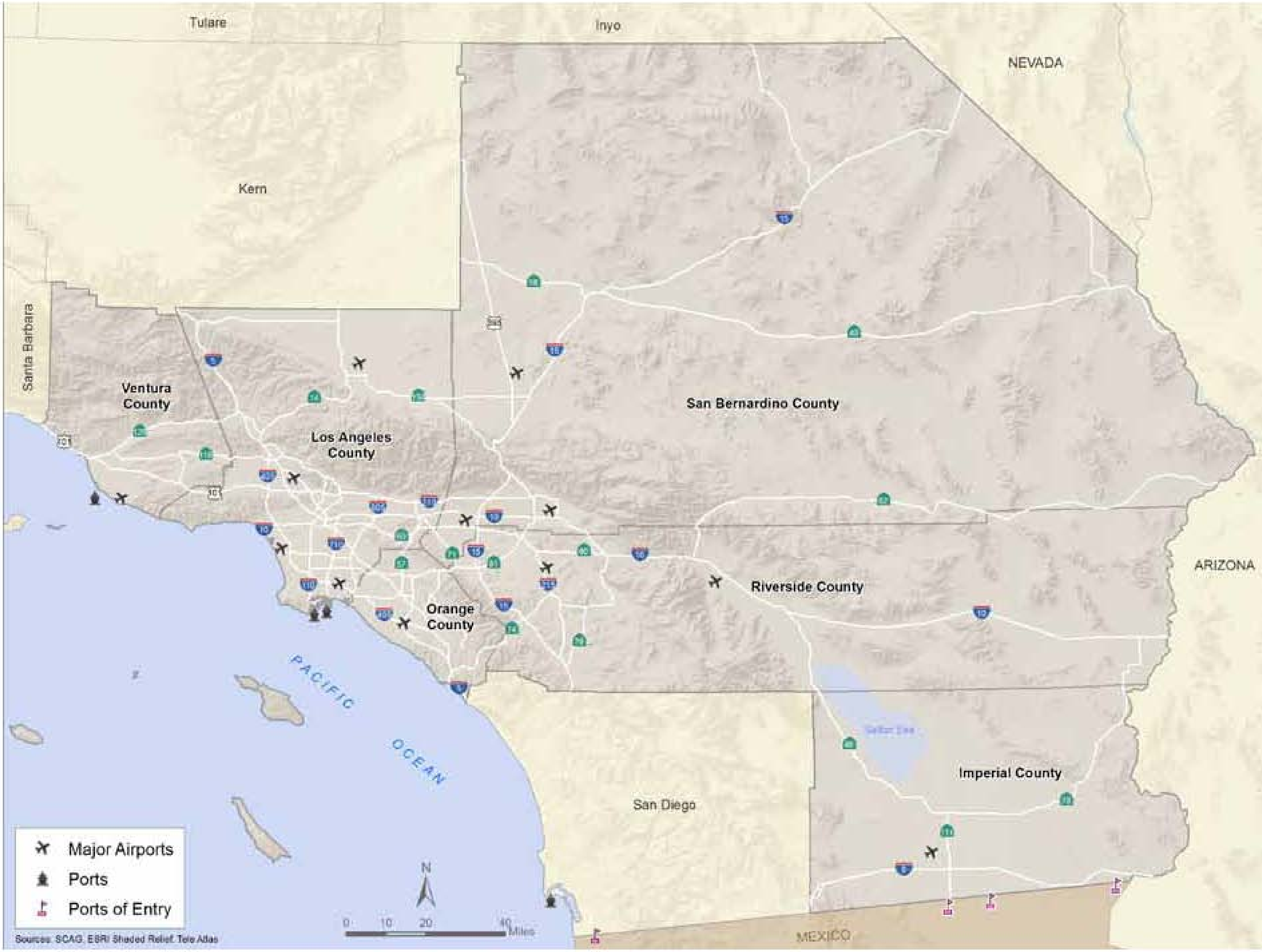
REGIONAL GOALS

The regional goals reflect the wide-ranging challenges facing transportation planners and decision-makers in achieving the RTP/SCS vision. The goals demonstrate the need to balance many priorities in the most cost-effective manner. These goals and overarching policies were discussed and approved by the RTP Subcommittee and the Transportation Committee. They will be adopted by the Regional Council as part of the 2012–2035 RTP/SCS.

TABLE 1.1 RTP/SCS Goals

RTP/SCS Goals
▪ Align the plan investments and policies with improving regional economic development and competitiveness
▪ Maximize mobility and accessibility for all people and goods in the region
▪ Ensure travel safety and reliability for all people and goods in the region
▪ Preserve and ensure a sustainable regional transportation system
▪ Maximize the productivity of our transportation system
▪ Protect the environment and health of our residents by improving air quality and encouraging active transportation (non-motorized transportation, such as bicycling and walking)
▪ Actively encourage and create incentives for energy efficiency, where possible
▪ Encourage land use and growth patterns that facilitate transit and non-motorized transportation
▪ Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies

EXHIBIT 1.1 SCAG Region



RTP/SCS GUIDING POLICIES

The 2012–2035 RTP/SCS guiding policies help to focus future investments on the best-performing projects and strategies that seek to preserve, maintain, and optimize the performance of the existing system (**TABLE 1.2**).

TABLE 1.2 RTP/SCS Policies

	RTP/SCS Policies
1	Transportation investments shall be based on SCAG's adopted regional Performance Indicators
2	Ensuring safety, adequate maintenance, and efficiency of operations on the existing multimodal transportation system should be the highest RTP/SCS priorities for any incremental funding in the region
3	RTP/SCS land use and growth strategies in the RTP/SCS will respect local input and advance smart growth initiatives
4	Transportation demand management (TDM) and non-motorized transportation will be focus areas, subject to Policy 1
5	HOV gap closures that significantly increase transit and rideshare usage will be supported and encouraged, subject to Policy 1
6	Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan

PERFORMANCE MEASURES

In accordance with RTP/SCS Policy 1, the 2012–2035 RTP/SCS is a performance-based plan. Performance measures allow us to quantify regional goals, estimate the impacts of proposed investments, and evaluate progress over time. The performance indicators for the RTP/SCS represent a continuing evolution that builds upon earlier successes and adds refinements to meet expanded policy objectives. **TABLE 1.3** describes the relationship between the RTP/SCS goals and performance measures.

TABLE 1.3 RTP/SCS Goals and Related Performance Outcomes

RTP/SCS Goals	Mobility/Accessibility	Reliability	Location Efficiency	Productivity	Safety and Health	Economic Well-Being	Cost Effectiveness	System Sustainability	Environmental Quality
Align the plan investments and policies with improving regional economic development and competitiveness						✓			
Maximize mobility and accessibility for all people and goods in the region	✓						✓		
Ensure travel safety and reliability for all people and goods in the region		✓			✓				
Preserve and ensure a sustainable regional transportation system								✓	✓
Maximize the productivity of our transportation system	✓			✓					
Protect the environment and health of our residents by improving air quality and encouraging active transportation					✓				✓
Actively encourage and create incentives for energy efficiency, where possible			✓						
Encourage land use and growth patterns that facilitate transit and non-motorized transportation			✓						
Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies*									

* SCAG does not yet have an agreed-upon security performance measure; therefore it is not included in the table.

The Setting

The 2012–2035 RTP/SCS vision was developed by taking into account recent events and long-term trends. This includes the recent recession and its aftermath; continuing growth in population and demand on the transportation system; and a growing expectation by planners, policymakers, and the general public that a comprehensive and integrated approach to addressing the region's transportation issues is needed. This setting provides the backdrop for the challenges and opportunities facing the region.

Economic Recession

Approximately 800,000 jobs have been lost in the region since the last Plan due to the continuing economic downturn. This could have a long-term effect on where and how people choose to live, work, and play. It could also impact people's travel behavior, including mode choice and travel patterns, potentially requiring different types of transportation solutions. This downturn may also provide an opportunity to plan a more comprehensive approach for leveraging our infrastructure investments to improve the region's economic competitiveness and to create much-needed jobs by expediting project delivery through innovative financing. There is an opportunity to put more people to work sooner with implementation of this plan.

Without the projects and strategies in the RTP/SCS, the region would fail to meet critical investment needs, increasing congestion and travel time delay to the detriment of our economy. By doing nothing, the SCAG region would forego approximately $580 billion in gross regional product (GRP) through 2035. To compete effectively in the global economy, we should invest strategically in our transportation infrastructure, while ensuring that we obtain the maximum return on investment. SCAG's analysis also indicates that every 10 percent decrease in congestion is associated with an employment increase of approximately 132,000 jobs. Congestion relief will be a major contributing factor to our future employment growth.

Population Growth

The region's mobility challenges are driven and exacerbated by the anticipated growth in population, households, and employment over the next 25 years. While this growth will increase the demand on the already-strained transportation system, there are also implications for land use consumption. Furthermore, demographic changes such as the aging and diversity of the population will affect the future demand for certain types of housing and transportation services.

According to the 2010 Census, the SCAG region is now home to 18 million people, or approximately 5.8 percent of the U.S. population and 49 percent of California's population. The region includes the second-largest metropolitan area in the country after New York City. If it were a state, the SCAG region would rank fifth in population, just behind Florida and ahead of Illinois.

After experiencing different growth stages with growth rates above the U.S. national average, the region entered a period of slow growth in 1990 (**TABLE 1.4**). The slow growth period (1990–2010) represents the mature stage of regional growth and urbanization, during which the region added 3.4 million people and grew at a rate comparable to that of both the state and the nation. The growth was a result of natural increase (adding 3.56 million) and net migration (subtracting 130,000).

TABLE 1.4 Annual Average Growth Rate of the SCAG Region During Growth Periods (1850–2010)

	Very Rapid Growth 1850–1910	Rapid Growth 1910–1960	Average Growth 1960–1990	Slow Growth 1990–2010
SCAG region	311.0%	21.6%	2.9%	1.2%
California	41.1%	11.2%	3.0%	1.3%
United States	5.0%	1.9%	1.3%	1.2%

Source: U.S. Census, 1850–2010

Migration and population growth are affected by the economy. While economic growth is typically a major source of net domestic and international migration, in a similar fashion, economic downturns can also have a serious impact on the region's growth. Although the recession officially ended in 2009, the region is still struggling to get back to pre-recession job levels. The stability of future growth depends in part on how the region successfully addresses these economic challenges.

Although the rate of regional growth has stabilized in the last 20 years, urbanization and suburbanization of the region have continued (**TABLE 1.5**). The suburban inland counties of Riverside and San Bernardino together accounted for 23.4 percent of the region's population in 2010, up from 17.7 percent in 1990. Over this same period, Los Angeles County grew more slowly and its share of the region's population declined from 60.5 percent in 1990 to 54.4 percent in 2010. The fast growth of population relative to employment in Riverside and San Bernardino Counties highlights the imbalance of jobs and housing in the region. It also poses a serious transportation and air quality challenge to local and regional planners.

TABLE 1.5 County Share of Regional Population (1990–2010)

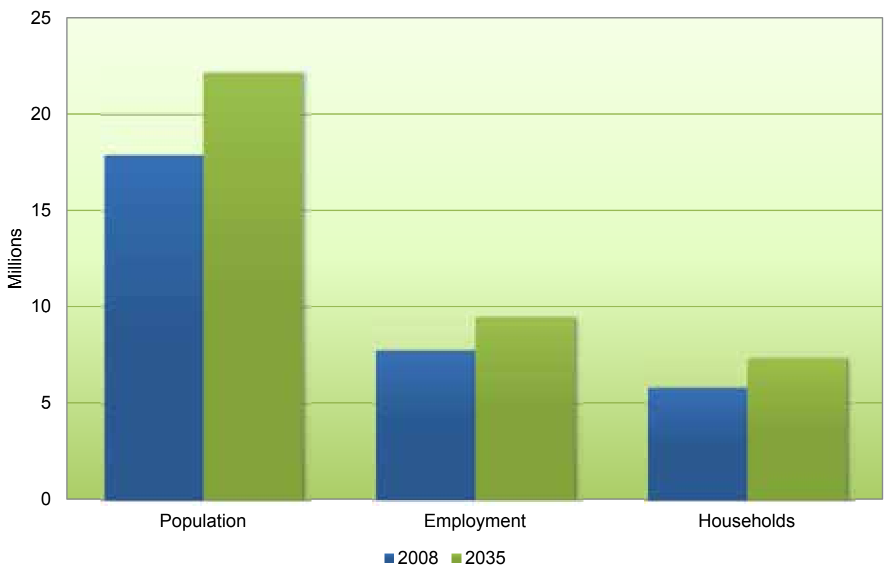
County	1990		2000		2010	
Imperial	109	0.7%	142	0.9%	175	1.0%
Los Angeles	8,863	60.5%	9,519	57.6%	9,819	54.4%
Orange	2,411	16.5%	2,846	17.2%	3,010	16.7%
Riverside	1,170	8.0%	1,545	9.4%	2,190	12.1%
San Bernardino	1,418	9.7%	1,709	10.4%	2,035	11.3%
Ventura	669	4.6%	753	4.6%	823	4.6%
SCAG Total	**14,641**	**100.0%**	**16,516**	**100.0%**	**18,052**	**100.0%**

Population in thousands
Numbers may not sum to total due to rounding
Source: SCAG

Although the latest 2010 Census data indicates slower growth in population, households, and employment than forecasted in the 2008 RTP, the region is still expected to grow over the RTP/SCS planning period—adding four million new residents by 2035 (**FIGURE 1.1**). The projected annual growth rate is only 0.9 percent, lower than the past 20-year growth rate. Most of this growth is through natural increase.

The aging of the population is one of the major demographic changes expected in the region. With the aging of the Baby Boomer generation (those born between 1946 and 1964), the median age of the population will increase from 34.2 years in 2010 to 36.7 years in 2035. The share of the population 65 years or older will increase from 11 percent in 2010 to 18 percent in 2035. Meanwhile, the working-age population (ages 16 to 64 years) will sharply decline, implying a future shortage in the regional labor force and a sharp increase in the old-age dependency ratio from 17 percent in 2010 to 30 percent in 2035.

FIGURE 1.1 Projection of Population, Household, and Employment Growth (2008–2035)



Source: SCAG

Another major demographic trend is the growing racial and ethnic diversity of the population. The region's diversity was already high in 2010, with 45 percent of the population Hispanic, 34 percent non-Hispanic White, 14 percent non-Hispanic Asian/Other, and 7 percent non-Hispanic Black. By 2035, there will be a majority Hispanic population (56 percent) while the non-Hispanic White population will drop to 22 percent.

Economic recessions and globalization of the economy were major factors contributing to slow growth in the region over the past 20 years. However, employment in the region is still expected to increase over the RTP/SCS period from 7.2 million jobs in 2010 to 9.4 million in 2035. This is an annual rate of over 1 percent. From a longer-term perspective, the region is expected to recover fully from the recession and return to reasonable labor force participation rates and employment levels. But, the region's industrial mix will experience continuous change over time due to globalization. The region will also transform its industrial structure from manufacturing-oriented industries to service-oriented industries.

Safety

The safety of people and goods is one of the most important considerations in developing, maintaining, and operating our multimodal transportation system. This section briefly describes the trends in accidents on our transportation system.

The rate of fatal and injury collisions on California's highways has declined dramatically since the California Highway Patrol began keeping such data in the 1930s (**FIGURE 1.2**). California has led the nation in roadway safety for much of the past 20 years. Only recently have roadways nationally become as safe as those in California. California's 2008 mileage death rate (MDR)—fatalities per 100 million vehicle miles traveled (VMT)—is 1.05, much lower than the national MDR of 1.25.

The SCAG region has an extensive transportation system with about 67,000 freeway and arterial lane-miles. The region had 11.1 million licensed drivers and 13.4 million registered vehicles in 2008. The same year, over two million people rode public transit daily. Unfortunately, 1,533 people died and 124,975 were injured in traffic collisions in the SCAG region.

FIGURE 1.2 California Mileage Death Rate (1933–2009)

Source: California Highway Patrol Statewide Integrated Traffic Records System (SWITRS)

In 2005, Congress passed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which required states to develop Strategic Highway Safety Plans (SHSPs). The California Department of Transportation (Caltrans) responded by developing its SHSP through a participatory process with over 300 stakeholders throughout California. The overarching goal was to reduce the California roadway fatality rate to less than 1.0 fatality per 100 million vehicle miles traveled (VMT) by 2010.

In 2006, the State of California initiated its SHSP to reduce transportation fatalities in the state in absolute numbers by 2010. Targets were set for strategies in 16 challenge areas (impaired driving, street crossing, bicycling, older drivers, etc). While the targets in most challenge areas were met by 2010, the SHSP Steering Committee is establishing new targets to reduce fatalities even further. The new targets will be finalized in 2012. While the California SHSP sets various actions that state agencies can perform to reduce fatalities, there are complementary strategies that can be performed by local governments.

As we continue to successfully improve the safety of our motorists, we cannot neglect the alarming fatality rates of those traveling on other modes of transportation. As safety is a multimodal issue, walking and bicycling safety are included in the SHSP as challenge areas. Based on data from the Statewide Integrated Traffic Records System (SWITRS), in 2008, 21 percent of all traffic-related fatalities in the SCAG region involved pedestrians, and 5.7 percent of traffic-related injuries involved pedestrians. Additionally, 4 percent of all traffic-related fatalities in the SCAG region involved bicyclists, and 4.3 percent of all traffic-related injuries involved bicyclists.

Multimodal System

HIGHWAYS AND ARTERIALS

The region's highway and arterial system extends for 67,000 lane-miles and serves 62 million trips each weekday. It is the backbone of the region's economic well-being and facilitates the movement of people and goods via multiple modes of transportation, including automobiles, public transit, and active transportation. According to SCAG's Regional Travel Demand Model (RTDM), nine out of every ten trips rely either entirely or in part on the highway and arterial system. The RTDM also estimates the following:

- 3.6 million vehicle-hours of daily delay,
- 5.1 million person-hours of daily delay, and
- 17.3 minutes of daily delay per capita.

Despite the importance of the system, improvements have not kept pace with the region's increasing population and transportation demand. As a result, the region's traffic congestion has increased dramatically, leading to a less productive transportation system with negative consequences such as wasted time and fuel and poor air quality.

TRANSIT

Despite a common perception of an auto-oriented culture, the region's transit system includes an extensive network of services provided by dozens of operators that includes fixed-route local bus, community circulators, express bus, bus rapid transit (BRT), demand response, commuter rail, heavy rail, and light rail. Ridership in our region continues to grow, and significant progress is being made in making transit more available and attractive by virtue of a burgeoning rail network, transit-oriented development (TOD), and other service improvements. Between 2000 and 2008, bus ridership increased by 17 percent, and urban rail ridership increased by 50 percent. Furthermore, there was an 81 percent growth in Metrolink ridership. **TABLE 1.6** depicts rail ridership by passenger boardings and passenger miles for 2000 and 2008.

TABLE 1.6 Urban Rail Ridership

Urban Rail Operators	2000	2008	Difference
Metro Subway			
Passenger Boardings	27,957,650	43,584,566	56%
Passenger Miles	74,729,093	217,964,955	192%
Metro Light Rail			
Passenger Boardings	29,859,558	43,122,565	44%
Passenger Miles	208,824,385	306,848,462	47%
Metrolink			
Passenger Boardings	6,978,588	12,680,973	82%
Passenger Miles	256,386,730	436,565,493	70%

Source: 2000 & 2008 National Transit Database

The recent and future improvements to the region's transit system are accompanied by land use developments around transit centers and stations and along transit corridors that encourage transit usage. Many residential and commercial developments have been built or are planned alongside transit facilities to offer residents and employees an opportunity to make a trip by transit, or bicycling or walking, instead of by car.

These developments have been significantly undermined by recent revenue declines and cutbacks in funding. Since Fiscal Year 2007–2008, transit providers within the SCAG region have seen a decrease in State Transit Account (STA) funds of approximately $759 million. By February of 2011, half of the agencies providing intercity service had cut service by anywhere from 2 percent to 20 percent. During this same period, 14 out of 25 of the intercity operators saw boardings fall between 2 percent and 27 percent. To offset this large revenue decline, almost all operators have raised fares, which reduces the incentive to ride transit.

In parallel with the revenue setbacks, costs for transit providers are rising faster than inflation. Every transit mode has experienced increases in cost per passenger mile traveled (PMT) over the past decade: bus service by 24 percent, Metro Rail by 41 percent, and Metrolink by 48 percent. Fare revenue, or "farebox recovery," has decreased from 32 percent of the cost of service to just 27 percent since 2000.

These cost and revenue trends weaken the long-term stability of transit services in the SCAG region. Unless transit operators in our region find ways to improve the ratio of fare revenue to costs, transit services will require much greater subsidies or cuts in services. This conflict will grow as new capital projects currently in development are ready for revenue service.


Image courtesy of the Southern California Regional Rail Authority (Metrolink)

PASSENGER AND HIGH-SPEED RAIL

The SCAG region is served by a network of intercity passenger and commuter rail services which operate on the region's rail network, often sharing facilities with freight rail. They operate at higher speeds and have less frequent station stops than traditional transit services, and are more likely to serve intercity and interregional trips.

Amtrak operates interregional and intercity passenger rail service. Four of Amtrak's fifteen long-distance routes serve our region, and of these, only two offer daily service. Amtrak provides much more frequent intercity passenger rail service via the Pacific Surfliner. This 351-mile-long service traverses the Los Angeles-San Diego-San Luis Obispo (LOSSAN) corridor. Amtrak's Pacific Surfliner is the second-most-used service in Amtrak's national fleet, moving nearly 9 percent of the system's total national ridership. Pacific Surfliner ridership is growing at a rate of over 8 percent a year.

The Southern California Regional Rail Authority (Metrolink) is the sole operator of the Metrolink system, which serves primarily as a commuter rail service in our region. Metrolink provides service on 512 track miles along seven routes in Ventura, Orange, Los Angeles, San Bernardino, Riverside, and San Diego Counties. Five routes (i.e., the Ventura County Line, the Orange County Line, the Antelope Valley Line, the Inland Empire/Orange County Line, and the SR-91 Line) share portions of the LOSSAN Corridor with the Pacific Surfliner.

Metrolink has recently been pursuing innovative marketing, ticket pricing, and operations strategies to increase ridership and reduce costs. In May 2011, Metrolink started express service demonstration programs on its San Bernardino and Antelope Valley lines. This service shaves a large amount of time off conventional trips. By skipping most stops, travel time is reduced by 33 percent to just one hour on the San Bernardino Line, and by 25 percent to an hour-and-a-half on the Antelope Valley Line. Metrolink has also implemented specific train service for sporting, as well as other special events.

Despite these services, fast and efficient interregional and intercity ground transportation remains an issue within our region. One potential solution is high-speed rail. In November of 2008, California voters passed Proposition 1A, authorizing nearly $9 billion in bonds to build a statewide high-speed train (HST) system and an additional $950 million to upgrade connectivity of current rail services to the proposed HST. Subsequently, the federal government committed $3.6 billion through the American Recovery and Reinvestment Act (ARRA) of 2009. Phase I of the HST program will connect San Francisco with Los Angeles and Anaheim and include several intermediate stops. Phase I is expected to be implemented during the RTP/SCS timeframe. Phase II will add connections to Sacramento, Ontario, Riverside, and San Diego.

The HST program presents an enormous opportunity for the state and the region, but faces significant challenges. The latest total costs for Phase I are estimated at $98.5 billion, and the state has secured only $12.6 billion in funds for Phase I to date. The California High-Speed Rail Authority, in partnership with the Federal Railroad Administration (FRA), has chosen to begin construction in the San Joaquin Valley, using federal High-Speed and Intercity Passenger Rail funds.

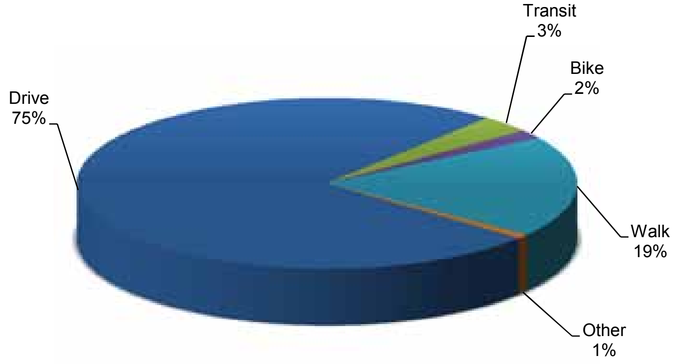
Due to the federal mandate of building the initial operating segment in the San Joaquin Valley, local stakeholders are seeking to divert a portion of unallocated Proposition 1A revenues to fund and construct speed improvements to the LOSSAN and Metrolink corridors. This would provide faster speeds and better service to our region sooner and act as a phased high-speed rail implementation. Once the high-speed train is built, three different rail passenger markets will be served through complementary systems.

ACTIVE TRANSPORTATION

Active transportation modes (e.g., bicycling and walking) are essential and increasingly important modes of transportation. These non-motorized modes are low-cost, do not emit greenhouse gases, help reduce roadway congestion, and increase health and the quality of life. As the region works toward reducing congestion and air pollution, walking and bicycling will become more essential to meet the future needs of our residents.

National Household Travel Survey (NHTS) data indicate that approximately 21 percent of all trips in the region in 2009 were conducted by walking (19 percent) or bicycling (2 percent), representing an approximately 75 percent increase from the 12 percent active transportation mode share in 2000 (**FIGURE 1.3**). The 2009 NHTS data also showed that there was an 11 percent decrease in driving, from 84 percent to 75 percent. More active transportation has placed a greater focus on the preservation, maintenance, and expansion of active transportation infrastructure. As the population in the SCAG region grows and matures, and as parts of the region move toward denser, mixed-use, and transit-oriented development, the demand for and use of active transportation will increase.

FIGURE 1.3 Mode of Travel for Total Trips (2009)



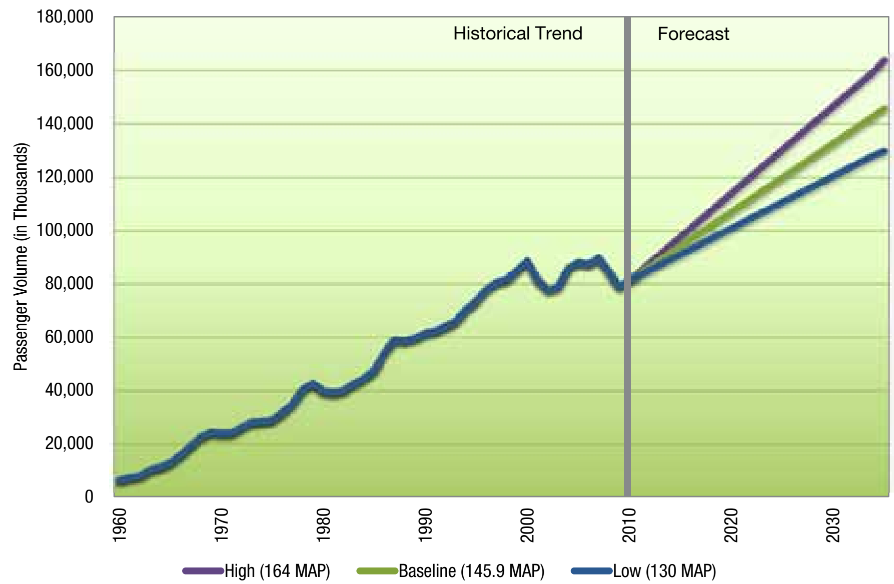
Source: National Household Travel Survey, 2009

Aviation and Ground Access

The SCAG region supports the nation's largest regional airport system with the most airports and aircraft operations, operating in a very complex airspace environment. The system has six air carrier airports, including Los Angeles International (LAX), Bob Hope (formerly Burbank), John Wayne, Long Beach, Ontario, and Palm Springs. There are also four new and emerging air carrier airports in the Inland Empire and North Los Angeles County, as well as 44 general aviation airports and two commuter airports, for a total of 56 public-use airports.

The events of September 11, 2001, and the Great Recession have significantly impacted regional air passenger demand. **FIGURE 1.4** shows historical growth in regional air passenger activity since 1960 and the marked slowdown in regional air passenger demand growth over the last decade. The exhibit also illustrates three potential scenarios for growth: High Growth, Medium Growth/Baseline, and Low Growth Scenarios. The Medium Growth/Baseline scenario is the aviation demand forecast adopted for this plan. At 145.9 million annual air passengers (MAP) in 2035, the adopted forecast is much more conservative than the 165.3 MAP 2035 forecast adopted for SCAG's last (2008) RTP and the 170 MAP 2030 forecast adopted for SCAG's 2004 RTP. The adopted forecast reflects recent trends in the region and in the airline industry, and its 2.5 percent annual air passenger growth rate to 2035 is lower than growth rates in recent passenger forecasts published by the Federal Aviation Administration, Boeing, and Airbus.

FIGURE 1.4 Historical Trend and Forecasts of Air Passenger Activity (1960–2035)



Source: SCAG

Despite the slowdown in aviation demand growth, meeting the future airport capacity needs of Southern California is still challenging. Even with a much more conservative regional air passenger forecast, an Aviation Decentralization Strategy is needed to meet forecasted air passenger demand. All four urban air carrier airports in Los Angeles and Orange Counties—LAX, Bob Hope, Long Beach, and John Wayne—are highly constrained. Their collective acreage amounts to 5,540 acres, which is less than 17 percent of the 34,000 acres of Denver International and less than the 7,700 acres of Chicago O'Hare. Despite being the third-busiest airport in the country and fifth-busiest in the world in terms of passengers served, LAX is a very small international airport, with only 3,500 acres. The urban airports in the SCAG region have little room to expand because of severe encroachment by surrounding communities. In addition, two of these airports—Long Beach and John Wayne—have strict limits on allowable flights. These limits (one is a city ordinance and the other is a court settlement agreement) are legally enforceable because they predate the Federal Airport Noise and Capacity Act of 1990 (ANCA). Air passenger growth at LAX is also limited by a settlement agreement constraint.

The challenge of meeting future aviation demand in the SCAG region is tied to improving regional airport ground access. To meet that demand, future air passengers from the urban areas of Los Angeles and Orange Counties need convenient access to available airport capacity at airports in the Inland Empire and North Los Angeles County. This challenge is complicated by the fact that the regional roadway system will become increasingly congested and unreliable unless we are successful in implementing improvements proposed in this plan. This will require air passengers to allow more time to get to the airport to meet flights in a timely fashion. An unreliable and unpredictable airport ground access system will make it difficult to accommodate future aviation demand by fully utilizing the region's airports with available capacity. They will have higher ground access time and costs associated with them. Until they fully mature, they will have few alternative flights to offer air travelers who miss their flights because of unreliable ground access.

Southern California airports play a crucial role in international trade, particularly with Pacific Rim countries, and to the regional economy. Unless the regional airport ground access system is substantially improved, many potential air passengers will choose not to fly at all, and growing ground access congestion could hamper the ability of air cargo trucks to access airports and make timely deliveries. This will translate to substantial economic loss to the region and a threat to our regional economy and well-being. A regional airport ground access strategy is therefore needed to help address the challenges posed by a highly constrained regional aviation system.

The recession has had a substantial impact on airports in the regional system. Ontario Airport, for example, lost about a third of its air passenger activity from 2007 to 2010. It is in the region's interest to help sustain and preserve airports like Ontario that have ample capacity to serve future aviation demand until economic conditions improve and they can provide significant capacity relief to constrained urban airports in the region. The challenge is to identify how best to support the development of new air services at uncongested and unconstrained airports like Ontario and to develop appropriate regional marketing strategies and economic incentives that can sustain these airports into the future.

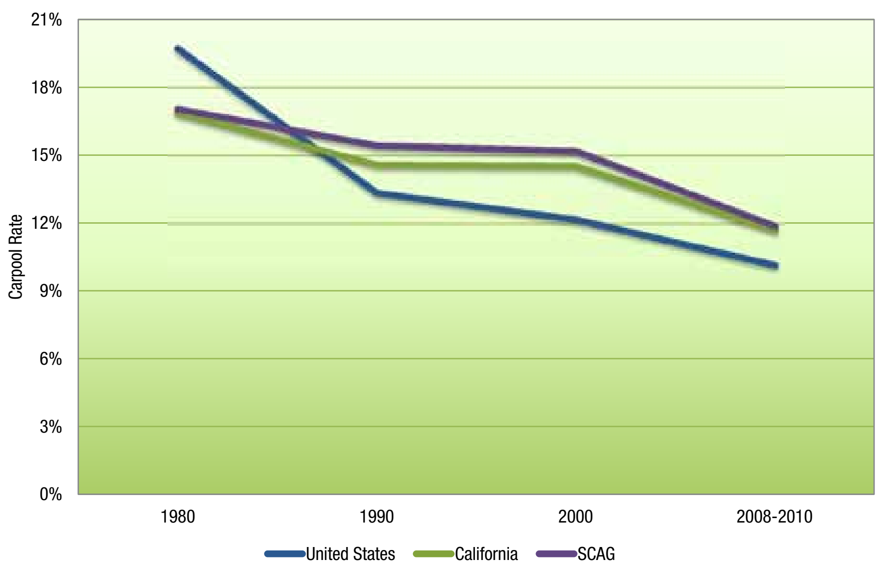
Transportation Demand Management

Transportation demand management (TDM) strategies are designed to reduce congestion, particularly during peak periods, by managing or reducing demand on the system. This can be accomplished by a variety of strategies, including increasing carpooling, supporting active transportation modes, promoting telecommuting, and shifting demand to off-peak periods. TDM strategies help to make the most efficient use of our existing resources.

The SCAG region has a long history of investing in a comprehensive High-occupancy vehicle (HOV) lane system to support and promote carpooling. Additionally, park-and-ride facilities, rideshare matching and vanpooling services, and Guaranteed Ride Home programs support carpooling as a viable travel alternative. However, a review of Census journey-to-work data suggests that the carpool rate for commute trips has been on a downward trend for at least three decades (**FIGURE 1.5**).

While the national average of carpooling rates dropped from about 20 percent in 1980 to 10 percent in 2010, the regional carpooling rate remained above 15 percent through 2000. However, by 2010, it too had dropped to just under 12 percent. Over the same period, work trip drive-alone rates for the region increased from 70 percent to 74 percent, while at the national level they rose from 64 percent to 76 percent. The only other mode to see an increase in this period was work-at-home, or telecommuting, which increased dramatically over the past decade. Nearly 2.6 percent of all workers in the SCAG region telecommute. An even greater number telecommute at least one day per month. Investments in high-speed Internet accessibility could increase full-time (equivalent) telecommuters to 5 percent in 2020 and 10 percent in 2035.

FIGURE 1.5 Commute Trip Carpool Rates (1980–2010)



Source: U.S. Census, 1980–2000; American Community Survey 3-Year Estimates (2008–2010)

Transportation System Management

Transportation system management (TSM) strategies increase the efficiency of the existing transportation system and reduce the need for costly system expansion. TSM strategies often use intelligent transportation system (ITS) technologies. These measures include signal synchronization, ramp metering, "at-speed" truck scales, and 5-1-1 traveler information systems. Strategic application of ITS technology on our transportation system can increase system productivity by as much as 5 percent.

Projects expected to significantly increase single-occupancy vehicle capacity are required to implement strategies (TDM and TSM) to mitigate the capacity increase. Key TSM strategies in the RTP/SCS include:

- Enhanced Incident Management
- Advanced Ramp Metering
- Traffic Signal Synchronization
- Advanced Traveler Information
- Improved Data Collection

The California Department of Transportation (Caltrans) recently implemented a statewide effort to develop Corridor System Management Plans (CSMPs) for corridors funded under the Corridor Mobility Improvement Account (CMIA). This integration of transportation planning and operations seeks to maintain over the long term, through identification of multimodal, operational, and minor capacity enhancements, the mobility benefits gained from major corridor projects.

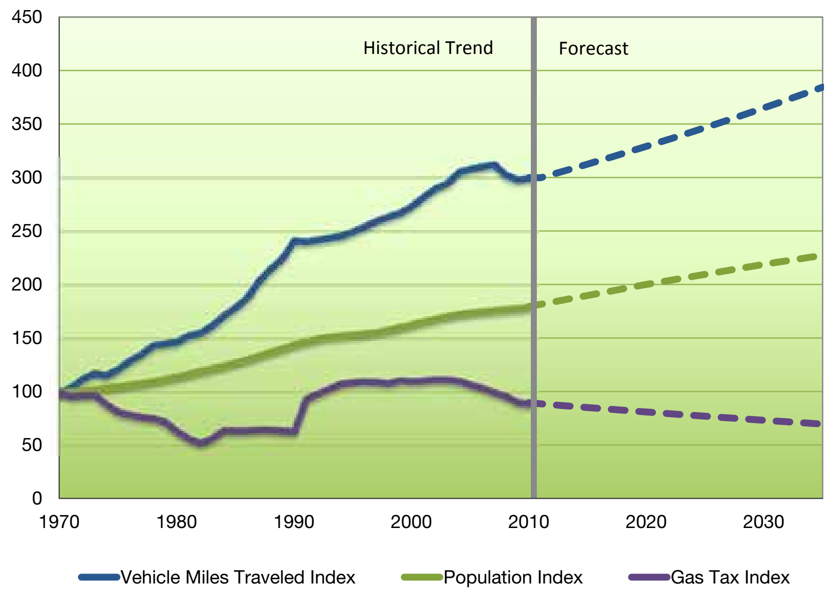
Challenges and Opportunities

Within the economic, demographic, and transportation setting described in the preceding section, SCAG developed the RTP/SCS vision in response to the challenges facing our region today. These challenges are a combination of recent events since the 2008 RTP and ongoing long-term trends. Taken together, they present an imposing threat to the quality of life for both current and future residents. The RTP/SCS vision is linked to these challenges, but also seeks to build upon the strengths and opportunities that the region provides to address them.

Transportation Finance

Perhaps the most critical challenge is the need for sustainable transportation funding sources. With the projected growth in population, employment, and demand for travel, the costs of our multimodal transportation system needs surpass projected revenues available from our historic transportation funding source—the gas tax. Improved fuel efficiency and the growth of alternative-fuel vehicles have reduced fuel consumption and eroded gas tax revenues. Additionally, state and federal gas taxes have not kept up with inflation—the latest adjustments occurred nearly two decades ago. **FIGURE 1.6** highlights the decline in the gas tax in relation to growing population and travel demand.

FIGURE 1.6 California Population, Travel, and Gas Tax Revenue Trends



Source: Caltrans, California Department of Finance, California State Board of Equalization, White House Office of Management and Budget

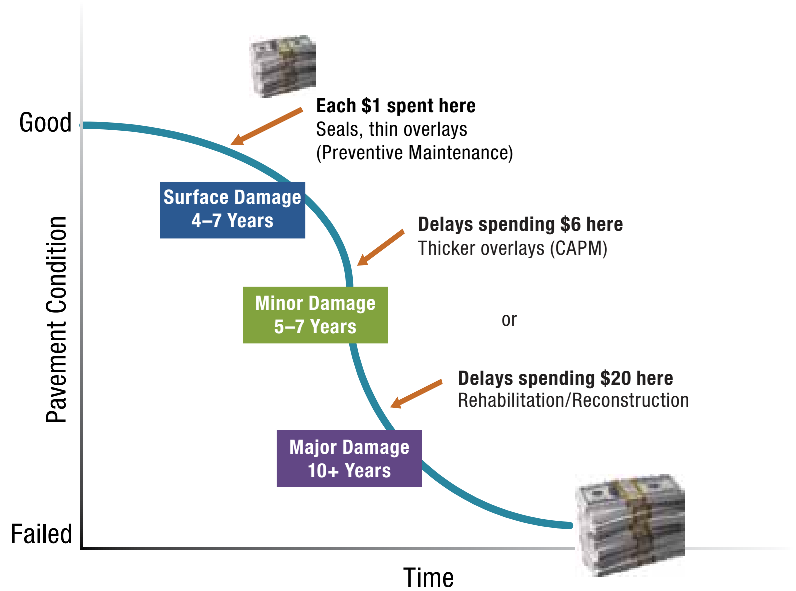
To backfill limited state and federal gas tax revenues, our region has continued to rely upon local initiatives (74 percent of core revenues) to meet transportation needs. With a total of seven sales tax measures throughout the region since the 1980s, we have shifted the burden to local agencies. However, the national purpose served by Southern California's transportation system—particularly in the movement of goods—points to the need for stronger state and federal commitment. Our transportation system is the responsibility of all levels of government.

System Preservation

The region's aging transportation system is facing increasing preservation costs in the face of diminishing revenues. These regional assets represent trillions of dollars of investments that must be protected in order to serve current and future generations. The loss of even a small fraction of these assets could significantly compromise the region's mobility.

Unfortunately, the region and the state have underinvested in system preservation and deferred critical maintenance of our multimodal transportation system. The inevitable consequences of deferred maintenance include deficient road pavement conditions, particularly evident on our highways. The rate of deterioration is expected to accelerate significantly with continued deferral. In turn, the cost of bringing these assets back into a state of good repair is projected to grow exponentially (**FIGURE 1.7**). SCAG estimates the cost to maintain our transportation system at current conditions, which are far from the ideal, will be in the tens of billions of dollars beyond currently committed funds.

FIGURE 1.7 Preservation Cost-Effectiveness

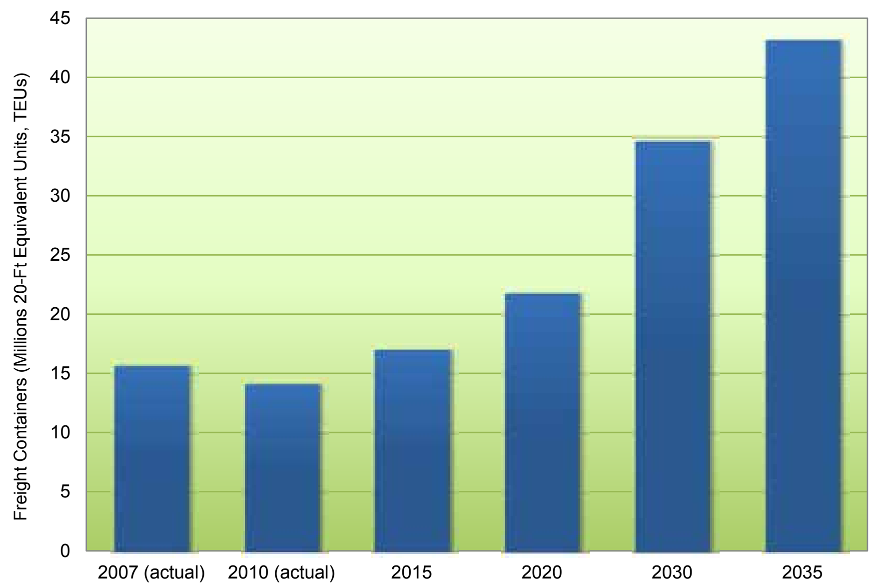


Goods Movement

The SCAG region is the largest international trade gateway in the U.S., supported by marine ports, air cargo facilities, railroads, regional highways, and state routes. In 2010, the LA Customs District (Ports of Los Angeles, Long Beach, and Hueneme and Los Angeles International Airport) handled $336 billion of maritime cargo and $78 billion in air cargo. In the same year, $10.4 billion of trade passed through the international ports of entry (POEs) between the U.S. and Mexico in Imperial County.

In 2010, five major sectors contributed the majority of freight demand in the SCAG region: manufacturing, retail trade, wholesale trade, construction, and transportation and warehousing. These sectors are dependent on goods movement and comprised $253 billion, or 34 percent of the regional gross domestic product (GDP). These same sectors employed 2.9 million people, or 34 percent of the SCAG region's employment. With port traffic expected to triple during the timeframe of the RTP/SCS (**FIGURE 1.8**), the region's economic competitiveness depends upon a transportation system that facilitates the safe and reliable movement of goods.

FIGURE 1.8 San Pedro Bay Ports Container Volume Trend and Projections



Source: Port of Long Beach and Port of Los Angeles

To continue growing, the SCAG region's businesses must be cost-competitive in producing their goods and shipping them to market. The same is true for raw materials, components, and other inputs transported to the region for manufacturing and processing. Reduced congestion and improved travel time reliability are critical.

However, the economic benefits of the industry must be balanced, given the significant mobility, community, and environmental costs associated with goods movement. Goods movement is a major source of emissions that contribute to the region's air pollution. An essential element to improving the region's goods movement system is to reduce its current and long-term impacts on public health and the environment. The RTP/SCS goods movement strategy ensures that investments in transportation infrastructure and associated transportation programs contribute to achievement of the region's air quality goals. Efforts are already underway, as the San Pedro Bay Ports have invested heavily in deploying clean trucks over the last several years. Additionally, planning efforts are underway to establish a regional zero-emission freight system.

Integrated Land Use and Transportation

California's Sustainable Communities and Climate Protection Act, or Senate Bill (SB) 375, requires SCAG to develop a Sustainable Communities Strategy (SCS) to reduce greenhouse gas (GHG) emissions from automobiles and light trucks through integrated transportation, land use, housing, and environmental planning. The SCS provides a plan for meeting the greenhouse gas emission-reduction targets set by the California Air Resources Board (ARB) for the SCAG region. The 2012–2035 RTP/SCS achieves a 9 percent per capita reduction for 2020 and 16 percent per capita reduction for 2035.

The SCS is envisioned to integrate transportation and land use strategies to meet the GHG-reduction targets and must:

- Identify existing land use,
- Identify areas to accommodate long-term housing needs,
- Identify areas to accommodate an eight-year projection of regional housing needs,
- Identify transportation needs and the planned transportation network,
- Consider resource areas and farmland,
- Consider state housing goals and objectives,
- Set forth a forecasted growth and development pattern, and
- Comply with federal law for developing an RTP.

The SCS requirements are meant to lay a regional policy foundation that local governments may build upon, and do not take away local land use authority. The Gateway Cities COG and Orange County COG each developed a subregional SCS under SB 375 provisions. The subregional SCS documents submitted by Gateway Cities COG and OCCOG are incorporated into the regional 2012–2035 RTP/SCS in their entirety, and as such, the policies and strategies included are endorsed by the regional plan for implementation in the sub-region.

Based on SCAG's analysis of recent land use trends in the region, it is clear that a significant trend of development policies supporting better integrated land use and transportation planning has emerged over time. Some of these recent trends include:

1. Changing demographics and housing market demand,
2. Redevelopment of main streets, downtowns, and corridors to vibrant mixed-use places,
3. Transit-oriented development adjacent to rail station areas and along major bus corridors, and
4. Protection of resource areas and farmland.

Image courtesy of Metro © 2012 LACMTA

The RTP/SCS does not envision a wholesale redevelopment of the Southern California region. The vast majority of neighborhoods and business districts that will exist in 2035 are already on the ground, and most of them—especially residential neighborhoods, which include large-lot single-family homes—will be unchanged in the next 25 years. Rather, the RTP/SCS envisions a new development pattern for new neighborhoods and revitalized neighborhoods and business districts that builds upon the current pattern to give residents more choices and more opportunities as they consider where to live and work in the future.

Air Quality

While Southern California is a leader in reducing emissions, and ambient levels of air pollutants are improving, the SCAG region continues to have the worst air quality in the nation, and air pollution still causes thousands of premature deaths every year, as well as other serious adverse health effects. The South Coast Air Quality Management District (AQMD) estimates the monetary cost of air pollution in Southern California to be at least $14.6 billion annually.

TRANSPORTATION CONFORMITY

The SCAG region contains 14 non-attainment and maintenance areas in parts of four air basins that are administered by five air districts (**TABLE 1.7**). SCAG must demonstrate that the RTP/SCS complies with the Clean Air Act (CAA) for each of these areas pursuant to the U.S. Environmental Protection Agency's (EPA) Transportation Conformity Regulations, including demonstrating that emissions from on-road mobile sources stay within emission budgets set forth by local air districts and the ARB for each of the 14 federally designated non-attainment and maintenance areas. Without a conforming RTP, transportation projects can be delayed and federal funding interrupted or curtailed.

TABLE 1.7 SCAG Region Non-Attainment and Maintenance Areas

Criteria Pollutant	Air Basin
Ozone	SCCAB, Ventura County portion SCAB MDAB, Western portion SSAB, Coachella Valley portion SSAB, Imperial County portion
PM_{10}	SCAB SSAB, Coachella Valley portion MDAB, San Bernardino portion MDAB, Searles Valley portion SSAB, Imperial County portion
$PM_{2.5}$	SCAB SSAB, Imperial County portion
CO	SCAB
NO2	SCAB

SCCAB: South Central Coast Air Basin; SCAB: South Coast Air Basin; SSAB: Salton Sea Air Basin; MDAB: Mojave Desert Air Basin

Complying with the Transportation Conformity Regulations is a complicated and increasingly challenging effort. As passenger vehicles have become cleaner, the positive air quality impacts of transportation strategies that reduce vehicle use or change congestion conditions (i.e., non-fuel or engine-based strategies) have been significantly diminished. Furthermore, the CAA process creates a confusing and uncertain regulatory environment due to the time it takes for federal action on air plans combined with the requirement to review and set national ambient air quality standards (NAAQS) every five years. Addressing these transportation-related and other issues in implementing the CAA should be a high priority for all stakeholders and particularly for federal agencies.

EMISSION REDUCTION CHALLENGE

A key component of air pollution is nitrogen oxides (NOx). NOx is emitted whenever fuel is combusted and reacts in the air to form ozone (smog) and fine particulates. Cars, trucks, trains, power plants, and refineries are examples of sources that generate NOx. Even with ongoing aggressive control strategies, ever more stringent national ozone standards require further reductions of NOx emissions in the SCAG region. In the South Coast Air Basin, for example, it is estimated that NOx emissions will need to be reduced by approximately two-thirds in 2023 and three-quarters in 2030. This is a daunting challenge. Emissions from most sources, including cars and factories, have already been reduced by over 90 percent. Emissions forecasted for 2030 from just three sources—ships, trains, and aircraft—would lead to ozone levels near the federal standard.

OPPORTUNITIES

The air quality challenge also provides opportunities for the region. As an innovator and leader, Southern California can develop solutions to mobility and air quality problems that help set important national policies. To support a shared long-term vision for Southern California, decisions and actions should be part of an integrated strategy that addresses multiple needs with single investments, wherever possible. We can start by aligning our actions to improve mobility and air quality with efforts to reduce petroleum consumption. The 2012–2035 RTP/SCS sets forth a roadmap to this end through the comprehensive set of transit, active transportation, TDM, pricing, goods movement, and land use strategies.

The air quality challenge also creates an opportunity for economic leadership, since technologies for global climate protection, air quality improvement, and energy security are needed for Southern California to attain federal air quality standards. We should support Southern California industries and universities as technology innovators that serve emerging global needs. The region can give our industries and universities every opportunity to succeed by developing partnerships and accelerating demand for clean air and energy solutions.

SCAG and its partners can implement the vision and programs of the 2012–2035 RTP/SCS by continued collaborations.

Energy

Gasoline is the most-used transportation fuel in California. Within the transportation sector, gasoline is used primarily by light-duty vehicles. In 2009, 98 percent of the light-duty vehicle fleet was powered by gasoline, and 82 percent of the fleet was for personal trips. In 2010, California consumed gasoline at a rate of 40.7 million gallons per day, or 10.7 percent of the national demand of 379.4 million gallons per day.[1]

Environmental and geopolitical factors are causing energy and climate experts to question the long-term viability of continued reliance on fossil fuels. The RTP/SCS recognizes the uncertainty of a petroleum-based future and lays out the implications of future energy constraints. Travel demand forecasts generally assume that the future will include an abundant and relatively inexpensive supply of transportation fuels. However, this

1 California Energy Commission. Transportation Energy Forecasts and Analyses for the 2011 Integrated Energy Policy Report, Draft Staff Report. CEC-600-2011-007-SD. August 2011. Last accessed September 30, 2011, from http://energy.ca.gov/2011publications/CEC-600-2011-007/CEC-600-2011-007-SD.pdf.

assumption is in question based on the International Energy Agency's (IEA) 2010 World Energy Outlook.

The IEA forecasts that the emerging economies of India and China will drive global energy demand higher. The IEA further states that China overtook the United States in 2009 as the world's largest energy consumer and their consumption will continue to grow. If governments act more vigorously to increase fuel efficiency and promote demand for alternative fuels, the demand for oil will decrease, avoiding price increases and supply disruptions.[2]

However, if fuel prices continue to increase, it would have a ripple effect on numerous areas, including construction costs, gas tax revenue, travel and aviation demand, air emissions, mode choice, and growth patterns. In response, the 2012–2035 RTP/SCS supports the increased adoption of near-zero- and zero-emission technologies to lessen the region's exposure to fossil fuel price spikes resulting from an uncertain energy future and reduce GHGs and emissions of criteria pollutants.

In addition to reducing vehicle miles traveled (VMT) through the integration of transportation and land use planning, building design can also affect energy use. Electricity generation, both in state and out of state, and other residential and commercial energy use account for 32 percent of California's greenhouse gas (GHG) emissions. This contribution is second only to the transportation sector.[3] Energy efficiency reduces energy costs for owners, increases reliability and availability of electricity for the state, improves building occupant comfort, and reduces environmental impact. Furthermore, improving energy efficiency through both performance-based and prescriptive improvements could reduce emissions of pollutants for which federal and state standards exist.[4]

The RTP/SCS includes the following actions to address energy uncertainty and reduce the region's contribution to global climate change:

- Supporting new automobile technologies to increase fuel efficiency
- Planning for the electrification or other near zero alternatives of the vehicle fleet
- Adopting mitigation measures to reduce household energy consumption
- Testing an informal alternative that examines plan performance should the price of fuel double compared to what is assumed in other alternatives

Public Health

The RTP/SCS recognizes the impact that transportation and land use decisions have on the health of the region's residents. A substantial body of research shows that certain aspects of the transportation infrastructure, including public transit, sidewalks and safe street crossings near schools, and bicycle paths, are associated with more walking and bicycling, greater physical activity, and lower obesity rates. A 2004 analysis of development patterns, travel behaviors, and health in the Atlanta region found that higher land use densities and greater connectivity resulted in reduced rates of obesity. The study also found that each additional hour spent in a car per day was associated with a 6 percent increase in the likelihood of obesity.[5] A recent study of the health costs of transportation policies found that the health expenditure reductions from meeting federal air quality standards for NOx and ozone could reach $22 billion per year within the South Coast Air Basin.[6]

The RTP/SCS supports the integration of transportation and land use policies as well as initiatives to promote a cleaner fleet of vehicles to address a range of public health issues. The RTP/SCS allocates over $6 billion for active transportation projects, which is a 200 percent increase over expenditures in the 2008 RTP. It also seeks to promote active transportation options, increased funding, and a decrease in bicycle and pedestrian fatalities and injuries. The 2012–2035 RTP/SCS also sets forth a vision for a less-carbon-intensive vehicle fleet. Through near-zero- and zero-emission vehicle technologies, the RTP/SCS promotes a more sustainable future that creates an economic leadership opportunity for the region.

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2 International Energy Agency. World Energy Outlook 2010. November 2010. Last accessed October 6, 2011, from http://www.worldenergyoutlook.org.

3 California Air Resources Board. Climate Change Proposed Scoping Plan: A Framework for Change. Sacramento: California Air Resources Board. October 2008. Last accessed October 11, 2011, from http://www.arb.ca.gov/cc/scopingplan/document/psp.pdf.

4 California Energy Commission. Energy Aware Planning Guide. CEC– 600-200-013. February 2011. Last accessed October 5, 2011, from http://www.energy.ca.gov/energy_aware_guide/index.html.

5 Frank LD, Andresen MA, Schmid TL. Obesity relationships with community design, physical activity, and time spent in cars. *American Journal of Preventive Medicine*. 2004 Aug;27(2):87–96.

6 American Public Health Association. The Hidden Health Costs of Transportation. February 2010. Last accessed October 6, 2011, from http://www.apha.org/NR/rdonlyres/E71B4070-9B9D-4EE1-8F43-349D21414962/0/FINALHiddenHealthCostsShortNewBackCover.pdf.

Lastly, the 2012–2035 RTP/SCS analyzes environmental justice (EJ) impacts to address equitability of the costs and benefits of the Plan.

The Environmental Justice Appendix includes an analysis of pollution exposure within 500 feet of highly traveled corridors in the region, i.e., urban roads with more than 100,000 vehicles per day or rural roads with more than 50,000 vehicles per day. Additionally, SCAG conducted a Health Risk Assessment as part of the 2012–2035 RTP/SCS Program Environmental Impact Report. This analysis evaluated emissions and cancer risk impacts resulting from transportation-related toxic emissions. The results are contained within the Program Environmental Impact Report. In partnership with our regional stakeholders, these actions will support a healthy future for Southern California.


Photo by Gary Leonard

Adaptation

Climate change mitigation means reducing or sequestering greenhouse gases, whereas adaptation is preparing for known impacts of climate change. Over the coming century, some climate change studies, such as the 2009 California Adaptation Strategy, project that Southern California will be expected to manage extremes of precipitation and temperature, increased storm frequency and intensity, and sea-level rise. These climate changes would impact streamflow, flooding, water supply, sea level, and soil water content. These impacts would affect agriculture, stormwater, waste-water treatment, wildfire risk, roads, forest health, and biodiversity. These impacts will also have consequences for public health, economic livelihoods, the financial sector, the insurance industry, individual comfort, and recreation. In practice, these impacts would mean coping with:

- Longer and hotter heat waves,
- Increased urban heat island impacts, such as heat-related illness and higher cooling demand and costs,
- More damaging storms and storm surges,
- Greater river flooding,
- Increased frequency and intensity of combined sewer overflows,
- More intense and extended duration of droughts,
- Longer water supply shortages, and
- Declines in local ecosystem services, such as species loss or the loss of specific ecosystem types (e.g., forests or coastal wetlands).[7]

The associated impacts on buildings, water and transportation infrastructure, emergency preparedness, planning, and quality-of-life issues have only now begun to be considered. Climate and impact modeling can offer a scientific basis for more informed planning, including improved data gathering. However, additional monitoring, development of improved management practices, and coordination among state and local agencies and the private sector are critical needs as well. Failure to anticipate and plan for climate variability and the prospect of extreme weather and related events could have serious

[7] 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008. Available at http://resources.ca.gov/climate_adaptation/docs/Statewide_Adaptation_Strategy.pdf

impacts on the regional economy and quality of life. Starting now and continuing in the years and decades ahead, we can adapt to these risks through resilient resource and land use choices.

Plan Overview

The 2012–2035 RTP/SCS is based on a careful analysis of our transportation system, the future growth of our region, and our vision for a sustainable future. The RTP/SCS is a living document that must be updated to reflect the most current information and conditions in order to remain relevant and useful. Updating the plan requires us to examine the progress we are making as a region, not just in terms of delivering projects, but also in terms of meeting our vision, goals, and objectives.

Our Approach

SCAG is the federally designated MPO for the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. As the MPO, SCAG develops the RTP/SCS and updates it every four years through a bottom-up and comprehensive, cooperative, and continuous ("3-C") process involving numerous stakeholders. Transportation investments in the SCAG region that receive state and federal funds or require federal approvals (such as environmental clearance) must be consistent with the RTP/SCS and must be included in SCAG's Federal Transportation Improvement Program (FTIP) when ready for funding. The FTIP is a four-year program and represents the immediate, near-term commitments of the RTP/SCS.

The development of the 2012–2035 RTP/SCS has required a greater level of collaboration than in past plans. SCAG has worked together with stakeholders to develop a technically solid growth forecast, multimodal transportation and land use strategies, economic impact analysis, and a realistically achievable financial plan.

The RTP/SCS has been developed using a "bottom-up" approach respecting local communities' General Plans and growth input.

STAKEHOLDER INVOLVEMENT AND PUBLIC PARTICIPATION

SCAG develops the RTP/SCS in close coordination with stakeholder agencies such as the county transportation commissions (CTCs), subregional councils of governments (COGs), transit operators, Caltrans, local jurisdictions, port authorities, air quality management districts, state and federal resource agencies, and other transportation stakeholders (**TABLE 1.8**). More stakeholder groups are identified and listed in the Public Participation Chapter (Chapter 6) and the supporting technical report.

Each of the six counties in the SCAG region has a CTC responsible for countywide transportation planning and implementation, allocating locally generated transportation revenues, and, in some cases, operating transit services. Additionally, the SCAG region includes 15 COGs, which are groups of neighboring cities and communities that work together to identify, prioritize, and seek transportation funding for needed investments in their respective areas.

The SCAG region includes all or part of 14 air quality non-attainment or maintenance areas in five air basins. Federal law requires that transportation and air quality planning are coordinated in these non-attainment and maintenance areas. The SCAG region further includes the Caltrans Districts 7, 8, and 12, and the Imperial County portion of District 11.

TABLE 1.8 Stakeholders in the Development of the 2012–2035 RTP/SCS

County Transportation Commissions (CTCs)	
Imperial County Transportation Commission (ICTC)	
Los Angeles County Metropolitan Transportation Authority (Metro)	
Orange County Transportation Authority (OCTA)	
Riverside County Transportation Commission (RCTC)	
San Bernardino Associated Governments (SANBAG)	
Ventura County Transportation Commission (VCTC)	
Subregional Councils of Governments (COGs)	
Arroyo Verdugo Cities	SANBAG
Coachella Valley Association of Governments	San Fernando Valley COG
Gateway Cities COG	San Gabriel Valley COG
ICTC	South Bay Cities COG
Las Virgenes-Malibu-Conejo COG	Ventura County COG
City of Los Angeles	Western Riverside County COG
North Los Angeles County	Westside Cities COG
Orange County COG	
Local, County, and Tribal Governments	
Other Operators and Implementing Agencies	
Caltrans	Transportation Corridor Agencies (TCA)
Airport Authorities	Transit/Rail Operators
Port Authorities	
Resource/Regulating Agencies	
US Department of Transportation ▪ Federal Highway Administration (FHWA) ▪ Federal Transit Administration (FTA)	 ▪ Federal Aviation Administration (FAA) ▪ Federal Railroad Administration (FRA)
US Environmental Protection Agency (EPA)	
California Air Resources Board (ARB)	
California Environmental Protection Agency (Cal/EPA)	
California Transportation Commission	
Air Districts	

In accordance with federal and state requirements, including new public participation requirements identified in SB 375, SCAG implements a public involvement process to provide complete information, timely public notice and full public access to key decisions, and to support early and continuing public involvement in developing its regional plans. Since its inception, SCAG has engaged in a public involvement process in developing its regional transportation plans and programs. The RTP/SCS is developed in consultation with all interested parties, and SCAG ensures that they have a reasonable opportunity to comment on the contents of the RTP/SCS. SCAG's broad-based participation activities are outlined in the adopted Public Participation Plan.

ALTERNATIVES DEVELOPMENT AND EVALUATION

Beginning in January 2011, SCAG conducted a series of 13 planning sessions to gather critical data from local jurisdictions on transportation and land use efforts to be used as the basis, or starting point, for the 2012–2035 RTP/SCS. Planning sessions were conducted in each subregion, with a nearly 90 percent participation rate by jurisdictions. Prior to that, SCAG had been working with local jurisdictions since 2009, focusing on the local growth forecasts for 2020 and 2035.

Utilizing information from these planning sessions and additional survey responses, SCAG developed four preliminary RTP/SCS scenarios representing different conceptual futures of land use and transportation through 2035. SCAG modeled the impact of these scenarios using a set of high-level transportation, economic, and environmental indicators. During July and August 2011, SCAG held a series of 18 public outreach workshops throughout the region to present the major components of the four scenarios and gather feedback from a wide range of stakeholders and the general public.

The interactive format of these public outreach workshops offered a variety of methods for input that included facilitating small group discussions, real-time polling, and staffing information kiosks. In total, more than 700 individuals participated at these workshops.

The input gathered from these workshops along with continued extensive input from partner agencies and key stakeholders allowed for a further refinement and development of specific alternatives for more detailed evaluation and assessment. The guiding principles used to keep these alternatives realistic are:

- Alternatives should strongly consider regional economic competitiveness and overall economic development to help the region recover and prosper,

- Transportation investment commitments made by the CTCs through local sales tax expenditure plans, adopted long-range plans, and board-adopted resolutions will be fully respected,
- The subregional SCS submitted by the Gateway COG and the Orange County COG will be respected and integrated into the alternatives,
- New investment strategies proposed over and beyond the CTC commitments will be funded only through new funding sources identified and approved by the Regional Council,
- Ensuring an appropriate level of funding for system preservation will be given a priority, and
- Each of the alternatives will be evaluated using a set of accepted performance measures.

Based on these considerations, three alternatives were defined and compared against a "No Project Baseline" representing projects in the 2011 FTIP that have received full environmental clearance. Out of this evaluation, a preferred alternative was selected for the 2012–2035 RTP/SCS. The preferred alternative builds on the region's success over the last four years in implementing the previous 2008 RTP and moves the region forward in meeting mobility, air quality, public health, integrated land use and transportation strategies, and other regional goals. The components of the RTP/SCS are described briefly in the next section and in more detail in the succeeding chapters of this document.

Strategies and Investments

Given the setting and the challenges our region is facing, this Plan recognizes that our approach must be balanced, systematic, multimodal, and at the same time targeted to yield the best performance outcomes based on the established set of performance measures. Additionally, we recognize that much of the groundwork has already been laid out by our stakeholder agencies, particularly the CTCs in their countywide, long-range transportation plans and local sales tax expenditure plans. The 2012–2035 RTP/SCS supports and builds upon these local commitments.

We start first with the transportation investments, described in Chapter 2. This chapter proposes an integrated approach that would first make the most out of our existing transportation system by investing in system preservation and maintenance, transportation demand management, and transportation systems management, followed by completing the system and closing critical gaps, and finally, strategic system expansion. The investments outlined in this chapter will provide more efficient and attractive travel choices for future generations on multiple modes of transportation.

In Chapter 3, we lay out a strategy to establish a long-term, sustainable funding plan. While recognizing financial constraints, the Plan sets forth funding strategies that are reasonably available within the timeframe of the RTP/SCS. The financial plan ensures that the region can afford to implement the region's near-term commitments as identified in the FTIP, the county commitments as identified in countywide transportation plans and sales tax measures, and the regional investments which are the focus of Chapter 2.

In Chapter 4, the SCS identifies a future land use and development pattern, integrated with the future transportation network and other transportation strategies, to reduce greenhouse gas emissions.

The outcomes and benefits of the RTP/SCS are presented in Chapter 5 in the form of performance measures that attempt to quantify the mobility, economic, and environmental benefits of the Plan investments. SCAG further recognizes that there are numerous co-benefits to implementing the RTP/SCS, not only in terms of transportation and the environment, but also public health and livable communities. Chapter 5 also addresses the statutory requirements of the RTP/SCS, including environmental justice outcomes, reductions in greenhouse gas emissions, and transportation conformity.

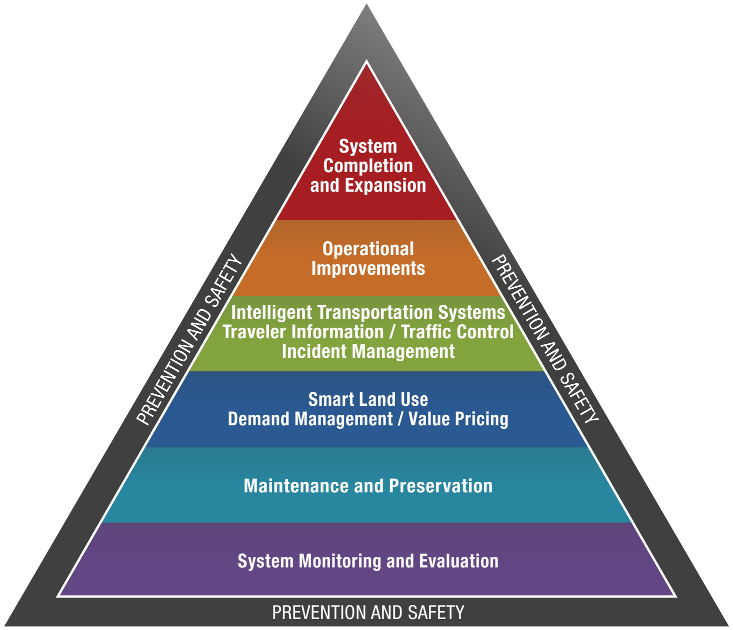
The public participation plan for developing the RTP/SCS is described in Chapter 6. Finally, recognizing that despite our best efforts, there simply may not be enough money to implement solutions for all of our transportation needs, the RTP/SCS includes a strategic component in Chapter 7. The Strategic Plan identifies projects that cannot be funded at this point, but merit further consideration in future plan updates based on additional studies, funding support, and stakeholder consensus.

02 TRANSPORTATION INVESTMENTS

Introduction

SCAG has consistently advocated a system management approach that aims to protect, maximize the productivity of, and strategically expand our region's transportation system. This approach recognizes that we can no longer afford to rely on system expansion alone to address our mobility needs. Rather, an integrated approach is needed, based upon comprehensive system monitoring and evaluation and the use of performance measures to ensure that the best-performing projects and strategies are included in the RTP/SCS. This approach is depicted as the mobility pyramid shown in **FIGURE 2.1**.

FIGURE 2.1 Mobility Pyramid



Over the course of developing the plan, we have heard from our stakeholders that we need to make sure we are investing our scarce transportation dollars more efficiently and effectively before we expect our taxpayers to pay more. Making sure that every dollar available is spent wisely is at the heart of this philosophy. At the bottom of this pyramid is System Monitoring and Evaluation. In order to be effective system managers, we must have an in-depth understanding of how our system performs and why it performs the way it does. Only by understanding these causes can we identify the optimal mix of strategies and projects that yield the highest returns on our investments. Next, we must take care of what we have and make sure that what we have is performing at the most efficient level possible. So, the basic idea as you move up the "mobility pyramid" is to implement less capital intensive strategies or less invasive strategies before we consider implementing more drastic measures to deal with our challenges. At the same time, we must be realistic about our ability to address our challenges with "soft solutions" alone in the face of the tremendous growth that we anticipate over the next 25 years. Therefore, at the top of the pyramid are the capital improvement projects that will allow us to expand our system strategically to accommodate such future growth and maintain and improve our economic prosperity.

Following the system management philosophy, this chapter sets forth the investments and strategies that constitute the 2012–2035 RTP/SCS. First, transportation investments should seek to optimize the performance of the existing system, and this includes system maintenance and preservation, integrated land use, operational improvements, transportation demand management, and transportation systems management strategies. Second, investments should seek to complete the system by addressing gaps. Finally, our investments should expand the system strategically. As a result, Southern Californians will enjoy more and better travel choices via an efficient multimodal transportation system with improved access to the vast opportunities this region has to offer.

Getting the Most Out of Our System

Over the past half century, the SCAG region has invested billions of dollars into building and expanding the multimodal transportation system that we have and rely on today. This investment must be protected. Under the system management approach, priority should be given to maintaining and preserving this system, as well as ensuring that it is being operated as safely, efficiently, and effectively as possible. Protecting our previous investments in developing the region's transportation system and getting the most out of every one of its components is the highest priority for this RTP/SCS.

Safety and Security First

SCAG recognizes how important the safety and security of our transportation system is to our residents. The good news is we have made significant progress in improving safety, particularly highway safety, which accounts for the majority of transportation-related accidents, around the state and in our region. But, we can do more. SCAG continues to support the implementation of the State Highway Safety Plan (SHSP) and works in partnership with Caltrans and the CTCs around the region to improve the safety and security of our transportation system.

Safety improvements are intricately woven into the RTP/SCS at all levels. Many of the strategy and investment categories in this RTP/SCS aim to improve the safety of our multimodal transportation system. For instance, enhancing maintenance and preservation of the region's buses, rail track, bridges, and roadway pavements will contribute toward reduced accidents and improved safety. Similarly, expanding the network of bike lanes and sidewalks and bringing them into ADA (American with Disabilities Act) compliance will reduce accidents directly related to these modes. Furthermore, deploying technology such as advanced ramp metering to manage traffic flow also reduces collisions at on-ramps and critical freeway-to-freeway interchanges. In short, almost every category of investments discussed in this chapter leads to safety benefits.

SCAG has two main safety and security goals:

- Ensure transportation safety, security, and reliability for all people and goods in the region.
- Prevent, protect, respond to, and recover from major human-caused or natural events in order to minimize the threat and impact to lives, property, the transportation network, and the regional economy.

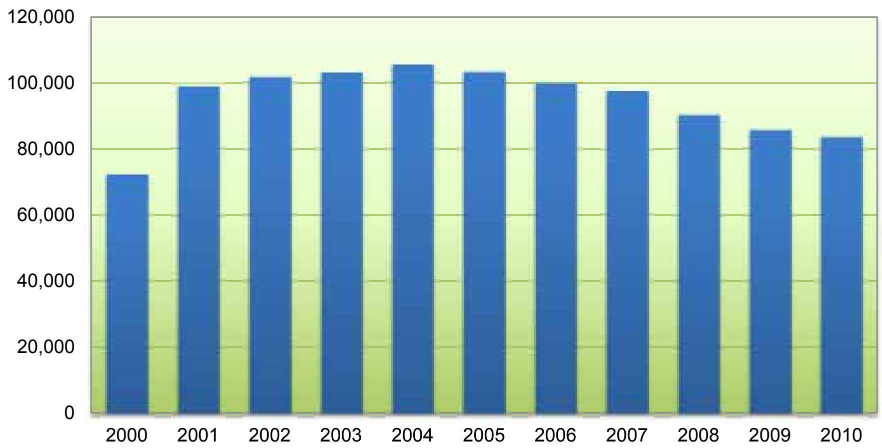
SAFETY

The rate of fatal and injury collisions on California's highways has declined dramatically since the California Highway Patrol began keeping such data in the 1930s. California has led the nation in roadway safety for much of the past 20 years. Only recently have roadways nationally become as safe as those in California. **FIGURE 2.2** shows the improvement in roadway accidents in the SCAG region over the last 10 years.

While the trend indicates a long-term decline in fatalities compared to VMT, it remains an unacceptable personal burden to those involved. In 2008, over 1,500 people died on roadways in the SCAG region, and just under 125,000 were injured. The average costs for each traffic death, traffic injury, or 2012–2035 RTP property damage crash were (in 2005):

- Death – $1,150,000
- Nonfatal Disabling Injury – $52,900
- Property Damage, Including Non-Disabling Injuries – $7,500

FIGURE 2.2 Annual Collisions on the State Highway System in the SCAG Region



SAFETEA-LU required states to develop Strategic Highway Safety Plans (SHSPs). The California Department of Transportation (Caltrans) responded by developing its SHSP through a participatory process with over 300 stakeholders throughout California. The overarching goal was to reduce the California roadway fatality rate to less than 1.0 fatality per 100 million vehicle miles traveled (VMT) by 2010. The efforts culminated with 17 challenge areas and over 150 actions designed to reduce fatalities in each challenge area. The state achieved its goal in 2009 and is now focusing on reducing transportation fatalities further with a new SHSP in development.

SECURITY

Currently, there are numerous agencies that participate in the response to incidents and assist with hazard preparedness for individual jurisdictions. Collaboration occurs between many of these agencies. The Federal Emergency Management Agency (FEMA) oversees coordination. However, FEMA defines metropolitan areas and coordination differently than the U.S. Department of Transportation, limiting SCAG's ability to participate at an agency level. SCAG seeks to utilize its strengths and organization to assist planners, first responders, and recovery teams in a supporting role.

There are three areas in which SCAG can assist both before a major emergency and during the recovery period:

- Provide a policy forum to help develop regional consensus and education on security policies and emergency responses
- Assist in expediting the planning and programming of transportation infrastructure repairs from major disasters
- Encourage integration of transportation security measures into transportation projects early in the project development process by leveraging SCAG's relevant plans, programs, and processes, including regional ITS architecture

Beginning in 2008, SCAG participated in the development of the draft Southern California Catastrophic Earthquake Preparedness Plan. The Plan was based on the 2007 Operation Golden Guardian scenario, which SCAG also assisted in developing, and envisioned a 7.8 earthquake starting in the Salton Sea area and traveling across the SCAG region to the Grapevine area where I-5 meets SR-138.

The Plan examines the initial impacts, inventory of resources, and care for the wounded and homeless, and it developed a long-term recovery process. The process of Long-Term Regional Recovery (LTRR) provides a mechanism for coordinating federal support to state, tribal, regional, and local governments, nongovernmental organizations (NGOs), and the private sector to enable recovery from the long-term consequences of extraordinary disasters. The LTRR process accomplishes this by identifying and facilitating availability and use of sources of recovery funding and providing technical assistance (such as impact analyses) for recovery and recovery planning support. "Long-Term Regional Recovery" refers to the need to reestablish a healthy, functioning region that will sustain itself over time. Long-term recovery is NOT debris removal and restoration of utilities, which are considered immediate or short-term recovery actions.

Once a disaster has been proclaimed, the LTRR process may be activated for incidents that require a coordinated federal, state, tribal, regional, and local government response to address significant long-term impacts (e.g., impacts on housing, government operations, agriculture, businesses, employment, regional infrastructure, the environment, human health, and social services) to foster sustainable recovery. The three main focus areas of LTRR are:

- Housing,
- Infrastructure, and
- Economic Development.

When a disaster occurs, the initial operational focus is centered on response activities. This effort may last from a few hours to an extended period of time (several days or longer) depending on the situation. As response activities begin to taper off and non-life-threatening safety issues begin to be addressed, the operational focus begins to shift from response to recovery. Federal and state support will be heaviest during the beginning phase of the recovery effort when:

- Long-term impact analyses are performed,
- Necessary technical support to establish local long-term recovery strategies and/or plans is provided, and
- Coordination of long-term recovery resources needed by the region to launch its recovery efforts are complete.

Federal and state support lessens by the later stages of the LTRR process once the region has sufficient capacity to implement its long-term recovery plan.

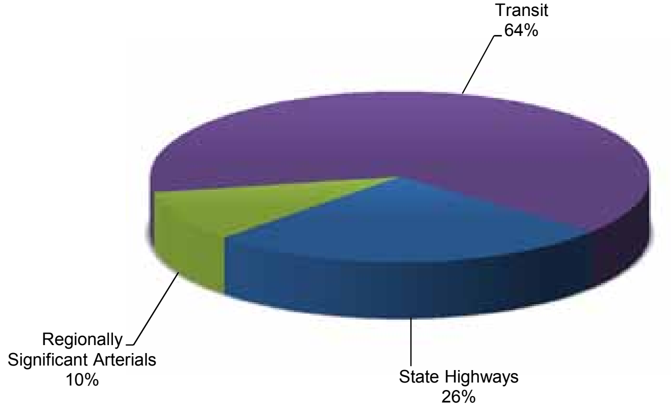
System Preservation

Recognizing that deferring the maintenance of our transportation system will only result in much costlier repairs in the future, preserving our assets now is a critical priority of this RTP/SCS. Approximately $217 billion, or almost half of all of its proposed expenditures through 2035, is allocated to system preservation and maintenance. As indicated in Chapter 1, to a great extent, this high cost is a result of three decades of preservation

underinvestment. Deficient road conditions are all too familiar to the region's drivers, and without a renewed commitment to improving the condition of our transportation infrastructure, costs will increase even more dramatically. Therefore, SCAG will continue to work with its stakeholders, particularly county transportation commissions and Caltrans, to identify new funding sources and/or increased funding levels for preservation and maintenance.

FIGURE 2.3 presents the allocation of these expenditures among the transit system, the state highway system, and arterials of regional significance within the 2012–2035 RTP/SCS. Note that the allocation for the state highway system includes bridges and the allocation for transit includes funding to both preserve and operate the transit system.

FIGURE 2.3 Preservation and Operations Funding



Smart Land Use

Since initiating one of the nation's first large-scale regional growth visioning efforts in 2000, SCAG has sought to integrate land use and transportation by working with subregions and local communities to increase development densities and improve the jobs/housing balance. Implementing such smart land use strategies encourages walking, biking, and transit use, and therefore reduces vehicular demand. This saves travel time, reduces pollution, and leads to improved health. The SCS (in Chapter 4) describes the successes of the previous smart land use efforts in the region and lays the foundation for significant further improvements moving forward.

Transportation Demand Management

Transportation demand management (TDM) strategies reduce vehicular demand and thereby congestion, particularly during peak periods. Successful TDM combines two complementary strategies: "soft," or "pull," strategies—such as vanpool subsidies and preferential parking for carpools, with "hard," or "push," strategies—such as congestion pricing.

The first encourages or incentivizes travelers to reduce automobile use by making alternatives more desirable. The second discourages travelers from using automobiles by increasing out-of-pocket travel costs.

The RTP/SCS financial plan (Chapter 3) identifies reasonably available revenue sources that provide much-needed funding for infrastructure preservation and critical regional projects. Increasing driving costs over the RTP/SCS timeframe will also encourage some to look for more cost-effective travel options. In total, the RTP/SCS allocates $4.5 billion to TDM strategies to target such drivers and others and incentivize them in three ways:

- **Increase carpooling and vanpooling.**
  Carpooling is supported by a host of strategies. High-occupancy vehicle (HOV) lanes and convenient park-and-ride lots increase carpool usage. Other strategies include vanpool services for larger employers and rideshare matching services. Los Angeles, Orange, Riverside, and San Bernardino Counties jointly sponsor a regional "Guaranteed Ride Home Program," which provides transportation for carpoolers and transit users in emergency situations.
- **Increase the use of transit, bicycling, and walking.**
  The RTP/SCS extends the reach of transit by focusing on "first mile/last mile" solutions. One of the biggest challenges in attracting new riders to transit is providing a reasonable and practical means of accessing transit at the origin and destination. "First mile/last mile" strategies are TDM strategies that offer reasonable and practical solutions to this problem, resulting in higher ridership for our transit services. Specific "first mile/

last mile" strategies include development of mobility hubs around major transit stations to provide easier access to destinations. Other strategies include integrating bicycling and transit through folding bikes on buses programs, triple racks on buses, and dedicated racks on light and heavy rail vehicles. A study by the Los Angeles County Metropolitan Authority (Metro) indicates that 1.3 percent of all annual Metro Rail riders access transit stations via bicycle. The percentage of bicyclists accessing transit is expected to increase as investments are made.

The RTP/SCS commits $6.7 billion to active transportation, which will expand bikeways, improve local streets, and address ADA requirements. Additional strategies include traffic calming and Complete Streets strategies, particularly near transit stations and schools, so as to further reduce vehicle trips by improving safety and desirability of active transportation.

- **Redistribute vehicle trips from peak demand periods to non-peak periods by shifting work times/days/locations.**

  The TDM investments also aim to reduce peak-hour congestion by promoting flexible work schedules and telecommuting, where applicable. Flexible work schedules allow employees to work fewer days in exchange for longer hours on the days they do work. For example, many employers offer a 9/80 schedule, where employees work 9 hours each day and have one extra day off every two weeks.

Telecommuting has increased dramatically over the past decade. Nearly 2.6 percent of all workers in the SCAG region telecommute most of the time, and an even greater number telecommute at least one day per month. Strategic investments put forth by the private sector that would remove barriers associated with telecommuting are expected to increase the number of full-time (equivalent) telecommuters to 5 percent in 2020 and 10 percent in 2035.

Congestion Management Process

The federal requirement for a Congestion Management Process (CMP) was initially enacted in the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 and continued in the Transportation Equity Act for the 21st Century (TEA-21) in 1998 and subsequently in SAFETEA-LU. CMP requires monitoring, performance measures, and, in certain cases, mitigation measures. Above all, CMP requires and ensures that highway capacity projects that significantly increase the capacity for single-occupancy vehicles (SOV) be developed in a comprehensive context that considers all possible alternatives, including transit, TDM, and TSM strategies. Furthermore, if alternative strategies are demonstrably neither practical nor feasible, appropriate mitigation strategies must be considered in conjunction with significant roadway capacity improvement projects that would increase SOV capacity.

Each county transportation commission (CTC) in the SCAG region, with the exception of Imperial County, is also designated a Congestion Management Agency (CMA) and is required to develop Congestion Management Plans (CMPs) pursuant to California Government Code Section 65089 and update it every two years. Imperial County, the least-populated county in the region, has not reached the population threshold that would require them to opt in or out of the state CMP process at present. Nevertheless, Imperial County has embraced the spirit of CMP and is actively seeking to incorporate its key elements into their next long-range transportation plan update. So, effectively, SCAG's CMP is comprised of the CMPs developed by each of the CTCs integrated into the RTP/SCS and FTIP process as a unified response to reducing congestion in our region.

SCAG is proposing two critical improvements to our current CMP process, partly in response to the federal certification review that was concluded in the spring of 2010. First, SCAG will incorporate a requirement into the FTIP Guidelines that calls for submittal of documentation by the sponsoring agencies associated with significant roadway capacity projects (greater than $50 million) to ensure documentation of all the alternatives considered in defining the project as well as identifying appropriate mitigations that would be implemented in conjunction with the project.

Second, this RTP/SCS recognizes the importance of addressing non-recurring congestion (collisions, stalled cars, severe weather). Non-recurring congestion accounts for almost 50 percent of all congestion on our roadway system. So, for the first time, this RTP/SCS identifies non-recurring congestion delay on the state highway system, both for general purpose lanes and carpool lanes, as a key performance metric that will be monitored and reported over time to ensure we are making progress toward addressing this critical issue.

A more complete discussion of our regional CMP is provided in a separate technical report.

Transportation Systems Management

Transportation systems management (TSM) increases the productivity of the existing multimodal transportation system, thereby reducing the need for costly system expansion. TSM relies in part on intelligent transportation system (ITS) technologies to increase traffic flow and reduce congestion. This RTP/SCS dedicates up to $7.6 billion to TSM. Examples of TSM categories and their associated benefits are described in **TABLE 2.1**.

TABLE 2.1 TSM Categories and Benefits

Category	Benefit
Enhanced Incident Management	Reduces incident-related congestion which is estimated to represent half of the total congestion in urban areas
Advanced Ramp Metering	Alleviates congestion and reduces accidents at on-ramps and freeway-to-freeway interchanges
Traffic Signal Synchronization	Minimizes wait times at traffic signals and therefore reduces travel time
Advanced Traveler Information	Provides real-time traffic conditions, alternative routing, and transportation choices to the public
Improved Data Collection	Allows agencies to monitor system performance and optimize the impact of transportation investments
Universal Transit Fare Cards (Smart Cards)	Reduces time required to purchase transit tickets and allows interoperability among transit providers
Transit Automatic Vehicle Location (AVL)	Enables monitoring of transit vehicles and ensures on-time performance

TSM will also play an increasingly larger role in regional goods movement improvements. The Ports of Los Angeles and Long Beach have identified ITS technologies, specifically automated vehicle location (AVL), as a major component in their proposed air quality mitigation strategies. Advanced monitoring will assist in achieving system efficiencies in ports and intermodal operations, reducing delays and wait times at gates and destinations, and allowing for more flexible dispatching, all of which reduce emissions. Weigh-in motion systems and enhanced detection will allow for better enforcement of commercial vehicles rules, reducing pavement damage, and identifying critical paths for goods movement planning in the future.

Corridor System Management Plans

With the passage of Proposition 1B by California voters in November 2006, a program of funding called the Corridor Mobility Improvement Account (CMIA) was created to improve mobility on the state highway system. The California Transportation Commission adopted guidelines for the CMIA program that required the development of Corridor System Management Plans (CSMPs) for those projects receiving CMIA funding to ensure that mobility improvements would be maintained over time. In the SCAG region, CSMPs were developed by Caltrans for the following corridors:

- I-5 and I-405 in Los Angeles County;
- SR-57, SR-91, and SR-22/I-405/I-605 in Orange County;
- SR-91 and I-215 in Riverside County;
- I-10 and I-215 in San Bernardino County; and
- US-101 in Ventura County.

The CSMPs include several key components: a comprehensive corridor description and understanding; a performance assessment and bottleneck identification; identification of operational and minor infrastructure improvements to relieve congestion; and development of simulation models to estimate improvements from those projects and strategies. The recommended improvements include TSM investments such as ramp metering and enhanced incident management. The recommendations also include small infrastructure improvements such as auxiliary lanes and ramp and interchange improvements. The RTP/SCS includes $840 million of funding for the CSMP-recommended improvements.

Completing Our System

Southern California's highways and arterials extend for almost 22,000 center-line miles and 67,000 lane-miles and serve 62 million travelers each weekday. However, there are still critical gaps in the network that hinder access to certain parts of the region. Closing these gaps to complete the system will allow our residents to enjoy improved access to opportunities such as jobs, education, healthcare, and recreation.

Highways and Local Arterials

The expansion of highways and local arterials has slowed down over the last decade. This has occurred in part due to increasing costs and environmental concerns. However, there are still critical gaps and congestion chokepoints in the network that hinder access to certain parts of the region. Locally developed county transportation plans have identified projects to close these gaps, eliminate congestion chokepoints and complete the system. They are included in the RTP/SCS. **TABLE 2.2** highlights some of these highway completion projects. The full list of RTP/SCS projects is provided in the Project List Appendix.

TABLE 2.2 Major Highway Completion Projects

County	Project	Completion Year*
Imperial	SR-115 Expressway	2030
Los Angeles	SR-710 North Extension (tunnel) (alignment TBD)	2030
Los Angeles, San Bernardino	High Desert Corridor	2020
Orange	SR-241 Improvements	2030
Riverside	SR-79 Realignment and I-215 Improvements	2018
Ventura	US-101 and SR-118 Improvements	2018

* Represents the Plan network year for which the project was analyzed for the RTP/SCS modeling and regional emissions analysis

Image courtesy of the Orange County Transportation Authority

Image courtesy of Metro © 2012 LACMTA

Southern California's heavy investment in high-occupancy vehicle (HOV) lanes has given it one of the nation's most comprehensive HOV networks and highest rideshare rates. The Plan proposes strategic HOV gap closures and freeway-to-freeway direct HOV connectors to complete the system. The HOV lane network will serve as the backbone of the regional HOT lane system proposed in the "HOT Lanes Network" section later in this chapter. Another key HOV strategy in the Plan is the conversion of certain HOV lanes in the region to allow for continuous access. Orange County has taken a leadership role on this over the past few years, and their recent studies have concluded that continuous-access HOV lanes do not perform any worse than limited-access HOV lanes. At the same time, they provide carpoolers with greater freedom of movement in and out of HOV lanes. As a result, nearly every HOV lane in Orange County will be converted to allow for continuous access by the year 2013. **TABLE 2.3** highlights some of the Plan's major HOV projects and **EXHIBIT 2.1** provides a glance of major highway improvements proposed by the Plan.

TABLE 2.3 Major HOV Projects

County	Route	From	To	Completion Year*
HOV Lane Additions				
Los Angeles	I-10	I-605	Puente Ave	2014
Los Angeles	I-10	Puente Ave	SR-57/I-210	2018
Los Angeles	I-5	LA/OC County Line	I-605	2018
Los Angeles	I-5	Pico Canyon	Parker Rd	2030
Los Angeles	I-405	I-10	US-101	2018
Los Angeles	SR-14	Ave P-8	Ave L	2030
Orange	I-5	Avenida Pico	San Juan Creek Rd	2018
Orange	I-5	SR-55	SR-57	2018
Orange	SR-73	I-405	MacArthur	2035
Riverside	I-215	Riv/SB County Line	Spruce St	2014
Riverside	I-215	Nuevo Rd	Box Springs Rd	2030
Riverside	SR-91	Adams St	SR-60/I-215	2018
Riverside	I-15	Riv/SB County Line	I-15/I-215	2020
San Bernardino	I-10	Haven Ave	Ford St	2020
San Bernardino	I-10	Ford St	Riv/SB County Line	2030
San Bernardino	I-215	Orange Show Rd	Riv/SB County Line	2014
San Bernardino	I-215	SR-210	I-15	2030
San Bernardino	I-15	Riv/SB County Line	SR-18/Mojave River	2020
Freeway-to-Freeway HOV Connectors				
Los Angeles	I-5/SR-14	Connector		2014
Los Angeles	I-5/I-405	Connector (partial)		2030
Orange	I-405/SR-73	Connector		2035

* Represents the Plan network year for which the project was analyzed for the RTP/SCS modeling and regional emissions analysis

Our region's local streets and roads account for over 80 percent of the total road network and carry almost 50 percent of total traffic. They serve different purposes in different parts of the region, or even in different parts of the same city. Many streets serve as major thoroughfares or even alternate parallel routes to congested freeways. At the same time, within our urban areas, where a street right-of-way can account for as much as 40 percent of the total land area, streets shape the neighborhoods they pass through and often support different modes of transportation besides the automobile, including bicycles, pedestrians, and transit. The RTP/SCS contains a host of arterial projects and improvements to achieve different purposes in different areas. In all parts of the region, it includes operational and technological improvements to maximize system productivity in a more cost-effective way than simply adding capacity. Such strategic improvements include spot widening, signal prioritization, driveway consolidation and relocation, and grade separations at high-volume intersections. Finally, in a quickly growing number of areas, street improvement projects include new bicycle lanes and otdher design features such as lighting, landscaping, and modified roadway, parking, and sidewalk widths that work in concert to achieve both functional mobility for multiple modes of transportation and a great sense of place.

TABLE 2.4 Arterial Investment Summary (in Nominal Dollars, Billions)

County	Investment
Imperial	$ 1.6
Los Angeles	$ 6.7
Orange	$ 4.4
Riverside	$ 6.1
San Bernardino	$ 2.6
Ventura	$ 0.7
Total	**$22.1**

Strategically Expanding Our System

While the RTP/SCS's multimodal strategy aims to reduce per capita vehicle miles traveled (VMT) over the next 25 years, total demand to move people and goods will continue to grow due to the region's population increase. A strategic expansion of our transportation system is needed in order to provide the region with the mobility it needs. The RTP/SCS targets this expansion around transportation systems that have room to grow, including transit, high-speed rail, active transportation, Express/HOT lanes, and goods movement. Some of these systems, such as transit, active transportation, and Express/HOT lanes, have proven over the years to be reliable and convenient forms of transportation for those who are able to easily access them. However, these systems must be improved and expanded in order to provide the accessibility and connectivity needed to become a truly viable alternative for the region as a whole. Other systems, such as high-speed rail, are new to the region and are needed to expand the number of choices available to our residents for convenient longer-haul travel. In addition, to address both the need to move more goods throughout the region for our growing population and maintain regional economic benefits of our goods movement industry, we must strategically expand our goods movement system in a way that addresses the associated quality of life issues.

Transit

The Plan calls for an impressive expansion of transit facilities and services over the next 25 years. The local county sales tax programs, most recently Measure R in Los Angeles County, are providing for most of this expansion in facilities and services.

The region should be proud of what it has accomplished so far and what it plans to accomplish beyond that by 2035. **EXHIBITS 2.2**, **2.3**, and **2.4** demonstrate this point. All three exhibits present the passenger rail system in the region. In 1990, as shown in **EXHIBIT 2.2**, the region did not have any passenger rail service at all. **EXHIBIT 2.3** shows how successful the region had been in building an extensive passenger rail network by 2010, a mere 20 years later. This RTP/SCS builds upon this success and proposes to strategically expand our rail system over the next 25 years. A more robust network in 2035 is depicted in **EXHIBIT 2.4**.

EXHIBIT 2.1 Major Highway Projects

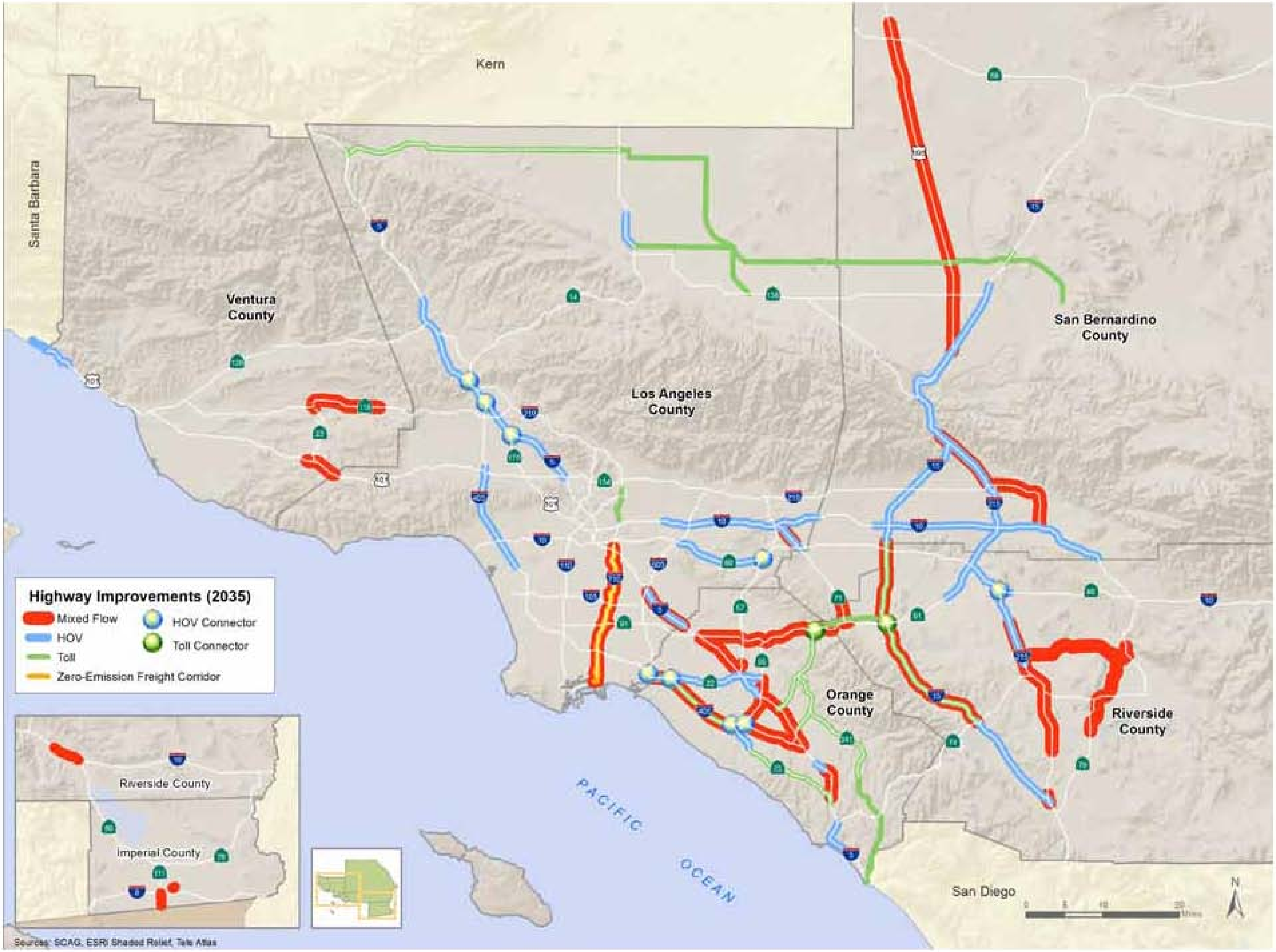


EXHIBIT 2.2 Rail Transit System (1990)

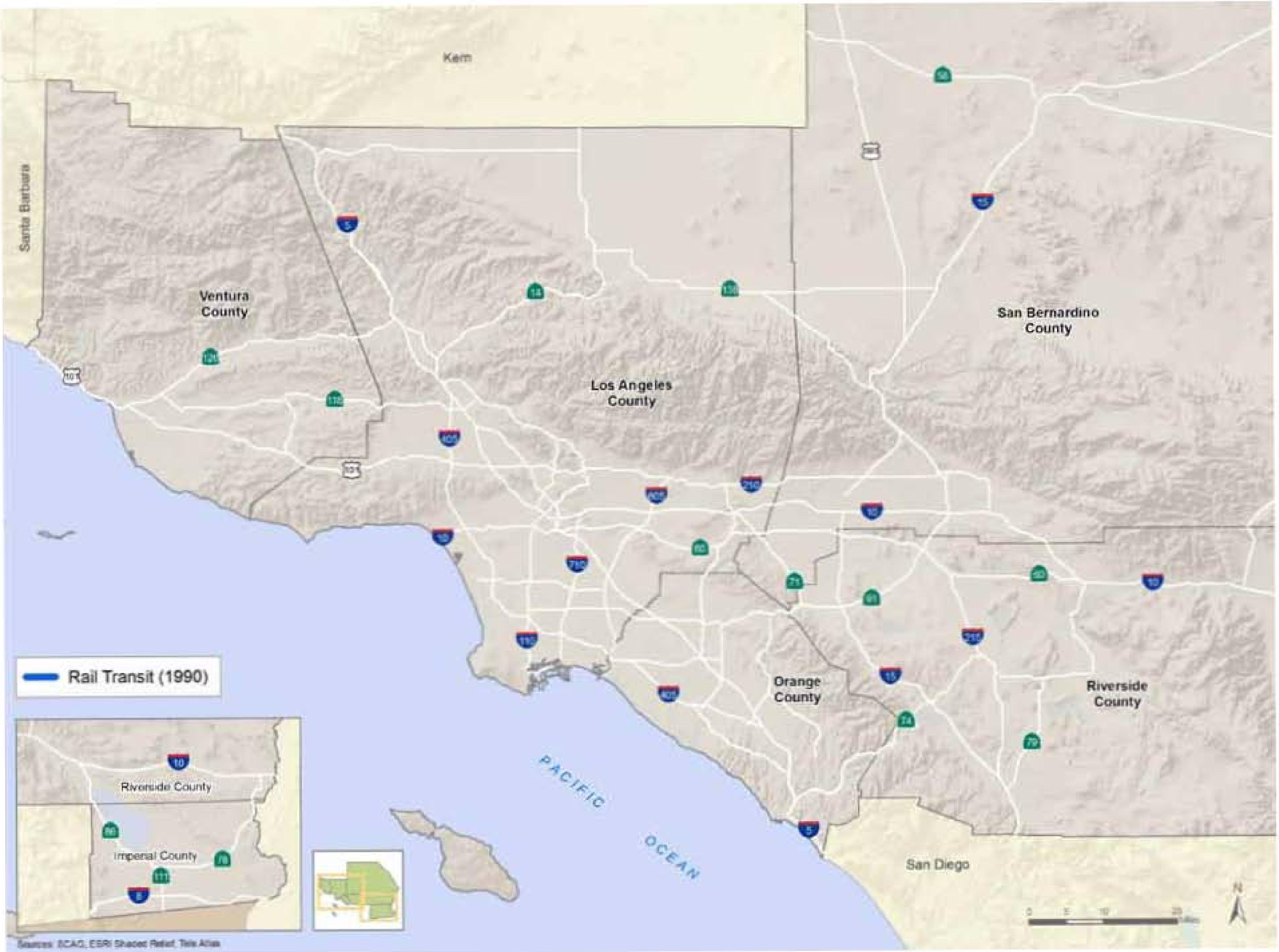


EXHIBIT 2.3 Rail Transit System (2010)

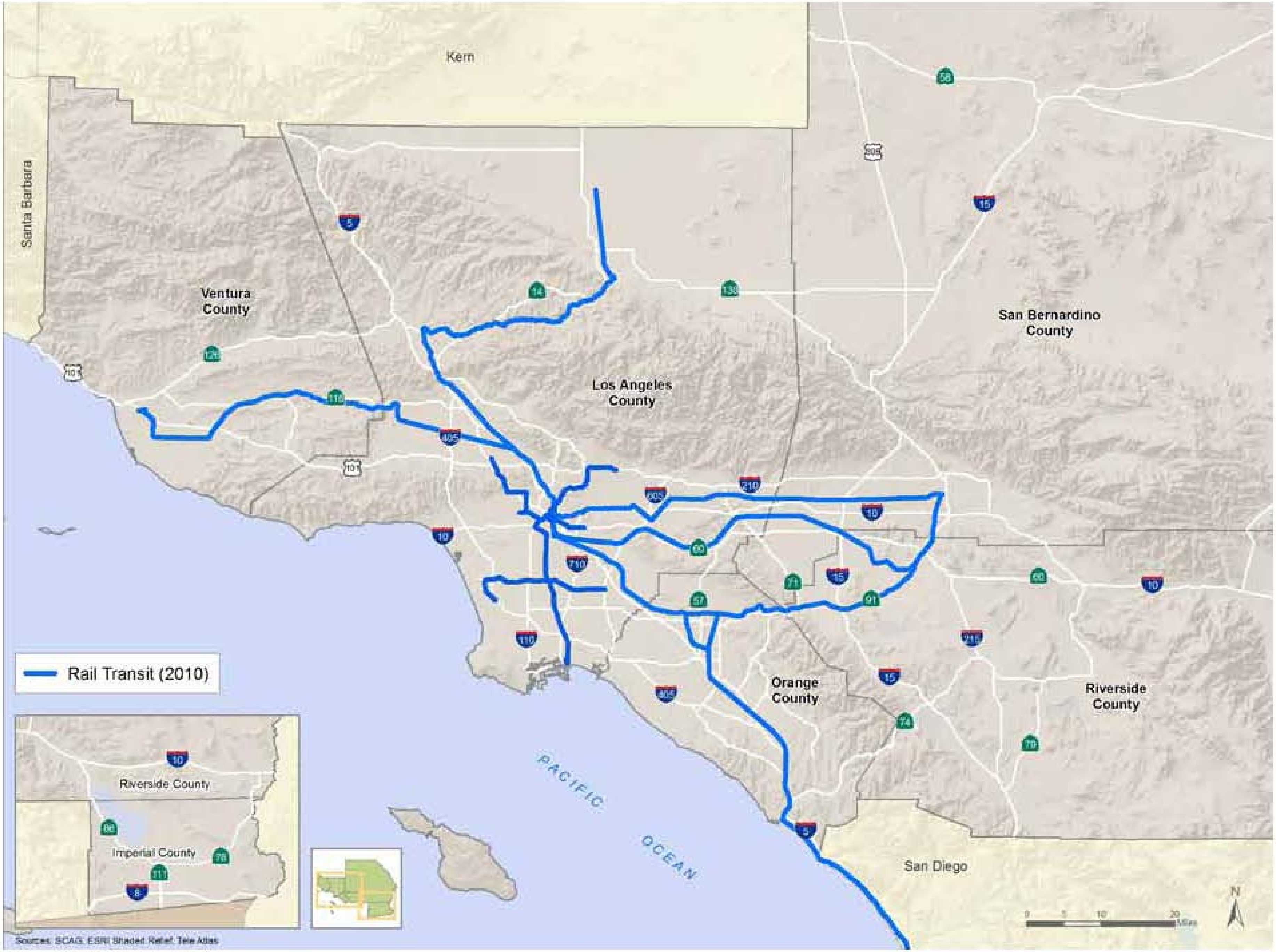


EXHIBIT 2.4 Rail Transit System (2035)

Once built out, Los Angeles County will have a greatly expanded rail network, adding entire new corridors and lengthening existing ones. Orange County will greatly improve its Metrolink service and implement a host of new bus rapid transit (BRT) routes, Riverside County will introduce various extensions to its Metrolink line, and San Bernardino County will introduce Redlands Rail.

TABLE 2.5 Major Transit Projects

County	Project	Completion Year*
Los Angeles	Crenshaw/LAX Transit Corridor	2018
Los Angeles	Gold Line Eastside Transit Corridor–Phase 2	2035
Los Angeles	Exposition Line–Phase 2 to Santa Monica	2018
Los Angeles	Gold Line Extension to Glendora	2018
Los Angeles	Gold Line Extension to Montclair	2035
Los Angeles	Green Line LAX Extension	2030
Los Angeles	South Bay Green Line Extension	2035
Los Angeles	Regional Connector	2020
Los Angeles	San Fernando Valley North/South Transitways	2018
Los Angeles	San Fernando Valley Orange Line Canoga Extension	2014
Los Angeles	West Santa Ana Branch Corridor	2030
Los Angeles	Westside Subway Extension to La Cienega	2023
Los Angeles	Westside Subway Extension to Century City	2030
Los Angeles	Westside Subway Extension to Westwood	2035
Orange	Anaheim Rapid Connection	2020
Orange	Bristol/State College, Harbor, and Westminster BRT	2030
Orange	Santa Ana/Garden Grove Fixed Guideway	2020
Riverside	Metrolink Perris Valley Line Extensions to San Jacinto and Temecula	2035
San Bernardino	E Street BRT (sbX)	2014
San Bernardino	Redlands Rail–Phase 1	2018
San Bernardino	Redlands Rail–Phase 2	2020

* Represents the Plan network year for which the project was analyzed for the RTP/SCS modeling and regional emissions analysis

These capital transit projects will provide our region with a much more mature public transportation system. Operational improvements and new transit programs and policies will also contribute greatly to attracting more trips to transit and away from single-occupancy vehicle (SOV) travel. First, the expanding HOV and Express/HOT lane networks call for the development of an extensive express bus point-to-point network. Second, transit-oriented and land use developments call for increasing the frequency and quality of fixed-route bus service by virtue of adding new BRT service, limited-stop service, increased frequencies along targeted corridors, and the introduction of local community circulators to provide residents of smart growth developments with the option of taking transit over using a car to make short, local trips.

Another emphasis on transit network improvements includes transit priority facilities, such as bus lanes and traffic signal priority. Our region has few existing dedicated bus lanes, but has implemented the Metro Orange Line, Harbor Transitway, and El Monte Busway. The Los Angeles County Metro Rapid Bus network employs bus signal priority that gives buses up to 10 percent more green light time from the normal green light phase. This should be expanded to other counties in our region.

Additional enhancements to our region's transit services include expanding bike-carrying capacity on transit vehicles; implementing regional and intercounty fare agreements and media, such as LA County's EZ Pass; and expanding and improving real-time passenger information systems.

TRANSIT POLICIES

In addition to the specific transit plans, projects, and programs proposed, the 2012–2035 RTP/SCS also supports the following policies and actions:

- Encourage the development of new transit modes in our subregions, such as BRT, rail, limited-stop service, and point-to-point express services utilizing the HOV and Express/HOT lane networks,
- Encourage transit providers to increase frequency and span of service in TOD and High-Quality Transit Areas (HQTAs) and along targeted corridors where there is latent demand for transit service,
- Collaborate with local jurisdictions to provide a network of local community circulators that serve new TOD and HQTAs, providing an incentive for residents and employees to make trips on transit,

- Develop "first mile/last mile" strategies on a local level to facilitate access to the transit system via local circulators, active transport, scrip, or vehicle sharing. Continue partnering with member cities and subregions to do localized "first mile/ last mile" planning,
- Encourage transit fare discounts and local vendor product and service discounts for residents and employees of TOD/HQTAs or for a jurisdiction's local residents in general who have fare media,
- Advocate for increased operational funding for transit service from state sources,
- Encourage transit properties to pursue cost-containment strategies,
- Work with cities to identify and mitigate choke points in the regional transportation system that affect transit, and
- Work with county transportation commissions, municipalities, and transit operators to develop dedicated bus facilities.


Image courtesy of Metro © 2012 LACMTA

Passenger and High-Speed Rail

The Plan proposes three Passenger Rail strategies that will provide additional travel options for long-distance travel within our region and to neighboring regions. These are improvements to the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor, improvements to the existing Metrolink system, and the implementation of Phase I of the California High-Speed Train (HST) project.

The recent release of the Draft 2012 California HST Business Plan confirmed the funding and implementation challenges of the project. The plan now estimates a statewide Phase I cost of $98.5 billion (in year of expenditure dollars). Within the draft Business Plan, there are a variety of strategies to connect Northern and Southern California to the state network. This plan assumes that Phase I will be completed in 2033, but that incremental improvements can be made in advance of and in preparation for that connection. Further, a Central Valley Initial Operating Segment (IOS) may connect to the Metrolink system in Palmdale as early as 2021. Therefore, stakeholders throughout Southern California are seeking to implement a phased and blended implementation strategy for high-speed rail by employing state and federal high-speed rail funds to improve existing services, eventually meeting the Federal Rail Administration's (FRA) 110 MPH definition of high-speed service. These speed and service improvements to the existing LOSSAN and Metrolink corridors will deliver the California High-Speed Rail Authority's (Authority) new blended approach and at the same time permanently improve our region's commuter and intercity rail services.

IMPLEMENTATION OF PHASE I OF THE CALIFORNIA HIGH-SPEED TRAIN (HST) PROJECT

The Authority has worked since 1996 to plan and build an HST system linking Northern and Southern California. In 2005, the Authority issued a Programmatic Environmental Impact Report (EIR) selecting a Phase I alignment that would travel from Anaheim to Los Angeles, on to the Antelope Valley via the San Fernando Valley, along SR-99 through the San Joaquin Valley, and into the Bay Area via San Jose and along the San Francisco Peninsula. In January 2012, the Authority passed a resolution dropping the Grapevine alignment as an alternative to the Antelope Valley alignment after completing a second study comparing the two. This is supported by Metro, SCAG and the North Los Angeles County Subregion. Phase II would add connections to the Inland Empire, San Diego, Sacramento, and possibly the East Bay. In November of 2008, California voters approved Proposition 1A (Prop 1A), allocating $9 billion in bond funds for the project and another $950 million in funds for connecting projects. In 2009 and 2010, the FRA awarded the Authority $3.6 billion in High-Speed and Intercity Passenger Rail discretionary grants that will be used in the San Joaquin Valley as per FRA direction. As mentioned above, the new business plan has put total statewide Phase I construction costs at $98.5 billion (in year-of-expenditure dollars). Prop 1A also included $950 million for upgrading and improving connectivity for current rail services that will connect with the HST project, so the need to make speed and service improvements for our current rail services, coupled with the CHSRA's new blended implementation approach, calls for the need to spend these funds in the next few years.

The primary benefits of Phase I will be realized on a statewide level; however, our region's interregional travel facilities will also benefit. If successful, the HST system will attract many interregional trips now made by car or airplane, providing an alternative to congested interregional highways and relieving ground congestion near local airports. The Los Angeles to the Bay Area travel market is currently the nation's seventh-busiest aviation corridor and our region's second busiest. Phase I has the potential to free up gate space at regional airports for more international and long-haul routes, and relieve some airfield congestion. Similarly, when both Phase I and II are complete, the system will offer connectivity to Palmdale, Bob Hope (Burbank), Los Angeles, Ontario International, and San Bernardino International Airports, helping to meet SCAG's long-term goal of regionalizing air travel in Southern California. Phase I will also provide excellent regional connectivity. The planned HSR stops at Palmdale, Sylmar, Burbank Airport, Los Angeles Union Station, Norwalk, and Anaheim will readily connect with a robust network of intercity and commuter rail, subway and light rail, and fixed-route transit systems. All these connections will complement and feed each other, thereby boosting rail and transit ridership across our region.

IMPROVEMENTS TO THE LOSSAN RAIL CORRIDOR

Currently the SCAG region is served by a network of intercity passenger and commuter rail services. These services operate on the region's rail network, often sharing facilities with freight rail. They operate at higher speeds and have less frequent station stops than traditional transit services and are more likely to serve intercity and interregional trips.

As discussed in Chapter 1, intercity passenger rail service is operated by Amtrak, and commuter services are operated by the Southern California Regional Rail Authority (Metrolink). Amtrak's Pacific Surfliner traverses the 351-mile-long Los Angeles-San Diego-San Luis Obispo (LOSSAN) corridor. The Pacific Surfliner is the second-most-used service in Amtrak's national fleet, moving nearly 9 percent of the system's total national ridership. Surfliner ridership is growing over 8 percent a year. While Amtrak service remains a small portion of all transit trips in the region, it does provide a significant option for travel between regions.

Since the 1990s, stakeholders along the LOSSAN corridor have been participating in the LOSSAN Rail Corridor Agency, a Joint Powers Authority (JPA) that coordinates planning along the corridor with the goal of increasing safety, ridership, revenue, and reliability. In early 2010, the agency released a Strategic Assessment, which found that capital investment in speed and capacity improvements could serve latent demand along the corridor.

As such, the LOSSAN JPA partners have begun work on a Strategic Implementation Plan, which will guide service and business planning and provide a corridor-wide implementation plan for capital improvement projects. Strategies in the LOSSAN program will include intersection safety improvements such as installation of quad gates and raised medians, grade separations, the installation of sidings and double tracks, electronic and positive train control technologies, track straightening, and other speed and capacity improvements. Ultimately, it is hoped that express services in the corridor will travel between San Diego and Los Angeles in under two hours.

Image courtesy of the Southern California Regional Rail Authority (Metrolink)

IMPROVEMENTS TO THE EXISTING METROLINK SYSTEM

Similarly, the Southern California Regional Rail Authority is currently the sole operator of the Metrolink system, which serves primarily as a commuter rail service in our region. Metrolink operates 512 track miles of service along seven routes in Ventura, Orange, Los Angeles, San Bernardino, Riverside, and San Diego Counties. Metrolink passengers travel much further than most transit passengers, having an average trip length of 36.9 miles. In Fiscal Year 2008–2009, Metrolink reported serving 12,241,830 passengers. Five routes, the Ventura County Line, the Antelope Valley Line, the Orange County Line, the Inland Empire/Orange County Line, and the SR-91 Line, share portions of the LOSSAN Corridor with the Pacific Surfliner.

Metrolink's service will also share a corridor with Phase I of the California High-Speed Train Project. The CA HST will provide a high-speed travel option to the Bay Area and the Central Valley via the existing Valley Subdivision, which is currently used by the Metrolink Antelope Valley Line (AVL). A recent express service demonstration project revealed that the Metrolink AVL travel time between Palmdale and Los Angeles Union Station could be shortened by 33 percent simply by skipping selected station stops. A study is underway to look at how to reduce this travel time even more significantly, and could include track straightening, grade separations, and track and siding expansions.

When Phase I of the state HST project is completed, Metrolink and Amtrak routes will serve as feeders, providing access to a new long-distance travel mode. Travelers are expected to access the state HST project at stations in the cities of Los Angeles, Burbank, San Fernando, Palmdale, Norwalk, and Anaheim. The Authority's 2009 Business Plan posits that passengers will travel between Los Angeles and San Francisco in less than three hours for about 80 percent of comparable airfare.

RAIL POLICIES

In addition to the specific plans, projects, and programs proposed, the 2012–2035 RTP/SCS supports the following policies and actions related to our passenger and high-speed rail program:

- Implement cooperative fare agreements and media between Amtrak and LOSSAN, and California HST when it begins revenue service,
- Implement cooperative marketing efforts between Amtrak and LOSSAN, and California HST when it begins revenue service,
- Encourage regional and local transit providers to develop rail interface services at Metrolink, Amtrak, and high-speed rail stations, and
- Work with the California High-Speed Rail Authority and local jurisdictions to plan and develop optimal levels of retail, residential, and employment development that fully take advantage of new travel markets and rail travelers.

Bus Transit

The RTP/SCS allocates additional funding to bus transit in the region. Fixed-route bus lines in the region are continuously evaluated and adjusted. Los Angeles County also offers bus rapid transit (BRT) on many of its core corridors. In addition, new services are planned across the region, including:

- Orange County's first BRT services and new trolley systems in Santa Ana, Anaheim, and Garden Grove,
- Riverside and San Bernardino Counties' first BRT services,
- Development of an extensive express bus point-to-point network based on the expanding HOV and Express/HOT lane networks,

Image courtesy of the Victor Valley Transit Authority

- Increasing the frequency and quality of fixed-route bus service and the introduction of local community circulators to provide residents of smart growth developments with the option of taking transit over using a car to make short, local trips, and
- The implementation of transit priority facilities, such as bus lanes and traffic signal priority.

Active Transportation

Active transportation refers to transportation such as walking or using a bicycle, tricycle, velomobile, wheelchair, scooter, skates, skateboard, push scooter, trailer, hand cart, shopping car, or similar electrical devices. For the purposes of the RTP/SCS, active transportation generally refers to bicycling and walking, the two most common methods. Walking and bicycling are essential parts of the SCAG transportation system, are low cost, do not emit greenhouse gases, can help reduce roadway congestion, and increase health and the quality of life of residents. As the region works toward reducing congestion and air pollution, walking and bicycling will become more essential to meet the future needs of Californians.

The majority of commuters within the SCAG region commute via car, truck, or van. According to the American Community Survey, in 2009, more than 85 percent of all commuters traveled to work by car, truck, or van, and less than 4 percent traveled to work via an active transportation mode (0.7 percent bicycled and 2.5 percent walked to work). In addition, the National Household Travel Survey (NHTS) data indicate that approximately 20.9 percent of all trips were conducted by walking (19.2 percent) or bicycling (1.7 percent). This represents an approximately 75 percent increase from the 11.9 percent active transportation mode share in 2000. In addition, NHTS data indicate that 75.0 percent of all trips in 2009 were conducted by driving, and this is an approximately 10.6 percent decrease from the 83.9 percent mode share in 2000.

Additional analysis regarding active transportation needs to be conducted in order to develop a better understanding of the users and their needs. The current level of data is extremely limited and does not provide a comprehensive overview of the current active transportation community. Active transportation users have differing levels of experience and confidence, which influences their decision to utilize active transportation. SCAG recognizes that there are a number of factors that motivate people to use active transportation. Increased data collection may provide a clearer understanding of the needs and deficiencies associated with active transportation.

Active transportation is not only a form of transportation in itself; it is also a means by which to access rail and bus service. Accessibility is one of the primary performance measures used to evaluate active transportation, by measuring how well the current infrastructure provides individuals with the opportunity to access destinations or facilities.

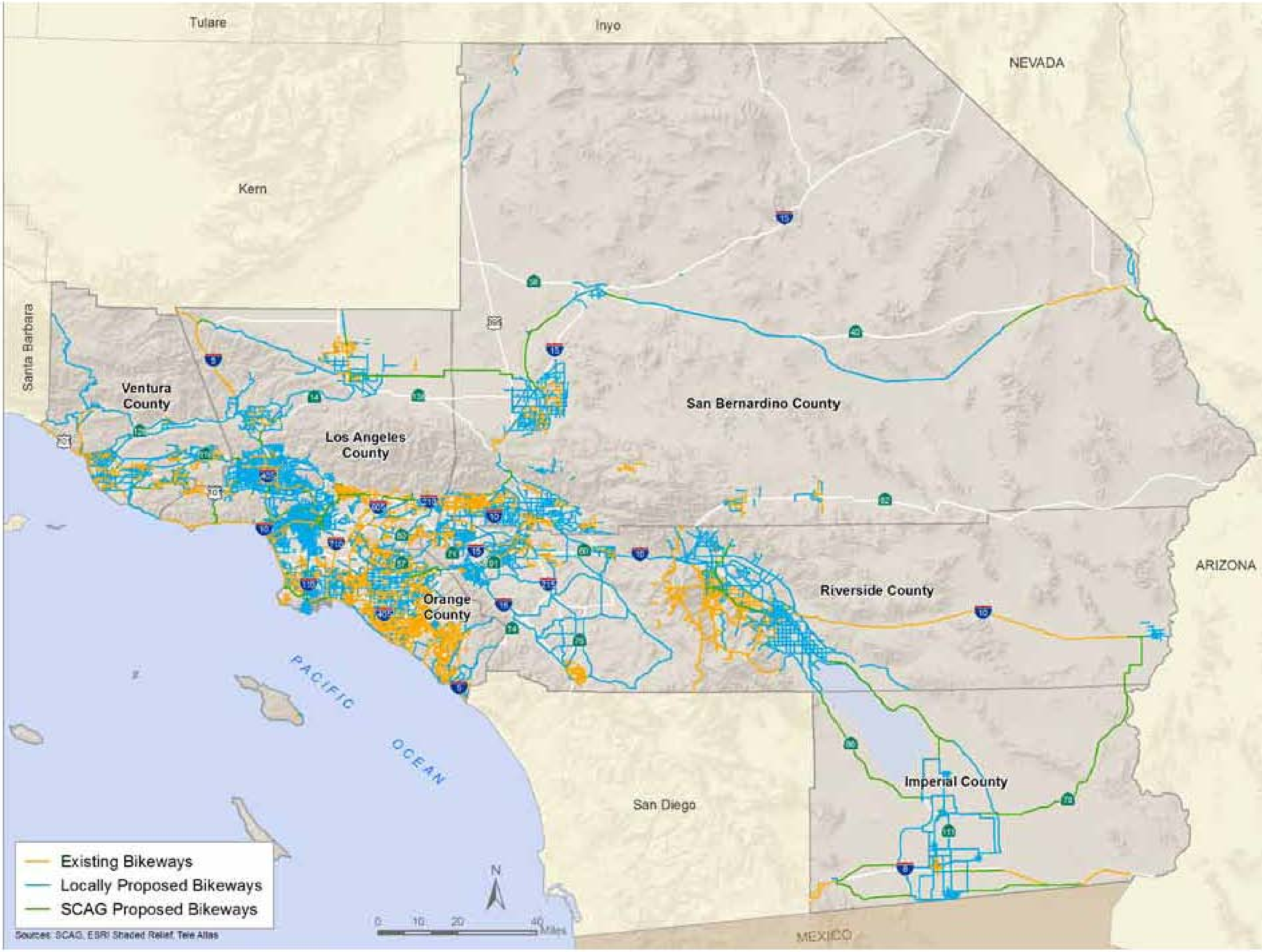
Using a two-mile buffer for bicyclists and a half-mile buffer for pedestrians, we found that our current transit infrastructures provides 97 percent of our residents access to transit via bicycle and 86 percent access to transit by walking. While many individuals have access to transit stations by biking or walking, numerous other factors may influence an individual's decision to use active transportation.

Safety is an important factor that individuals consider when determining whether or not they should walk or bike to their destination. Based on data from the Statewide Integrated Traffic Records System (SWITRS), in 2008, 4.0 percent of all traffic-related fatalities in the SCAG region involved bicyclists, and 4.3 percent of all traffic-related injuries involved bicyclists. In addition, 20.9 percent of all traffic-related fatalities in the SCAG region involved a pedestrian, and 5.7 percent of traffic-related injuries involved pedestrians.

While each of the counties in the SCAG region currently has its own active transportation plan, the RTP/SCS aims at developing a regional active transportation system that closes the gaps and provides connectivity between counties and local jurisdictions. While bicyclists are legally allowed to use any public roadway in California unless specifically prohibited, many bicyclists may be more inclined to utilize bikeways. Currently, 42.6 percent of the region's residents have easy access to 4,315 miles of bikeways. Local jurisdictions in the region have proposed an additional 4,980 miles of bikeways in this RTP/SCS that would increase this access to 62.4 percent of all residents. In order to close the remaining gaps in the bikeway network, this RTP/SCS goes a step further to include an additional 827 miles of bikeways to complete the SCAG Regional Bikeway Network.

In order to make active transportation a more attractive and feasible mode of travel for the different users in our region, additional infrastructure improvements need to be made. The 2012–2035 RTP/SCS calls for improvements that would bring significant amount of deficient sidewalks into compliance with the Americans with Disabilities Act (ADA). Given that all trips, including vehicular trips, start with walking, it is important to ensure that the sidewalks and streets are accommodating to all users. In all, the RTP/SCS's active transportation improvements exceed $6.7 billion.

EXHIBIT 2.5 Regional Bicycle Network



Sources: SCAG, ESRI Shaded Relief, Tele Atlas

COASTAL TRAILS

In addition to bikeways, local trails have played an important role in increasing accessibility and providing opportunities for active transportation. Trails along the coast of California have been utilized as long as people have inhabited the region. In an effort to develop 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 coastal trekking through hiking and other complementary modes of non-motorized transportation," the California Coastal Trail (CCT) was established. SCAG proposes the completion of the CCT to increase active transportation access to the coast. Completion of the CCT would provide 183 miles of multipurpose trails.

SAFE ROUTES TO SCHOOL

SAFETEA-LU established the Safe Routes to School (SRTS) program to "enable and encourage primary and secondary school children to walk and bicycle to school" and to support infrastructure-related and behavioral projects that are "geared toward providing a safe, appealing environment for walking and bicycling that will improve the quality of our children's lives and support national health objectives by reducing traffic, fuel consumption, and air pollution in the vicinity of schools." Safe Route to School programs can play a critical role in eliminating some of the vehicle trips that occur during peak periods to drop off or pick up students by ensuring safe routes to bike or walk to school.

COMPLETE STREETS

The Complete Streets Act of 2008 (AB 1358) requires cities and counties to incorporate the concept of Complete Streets in their General Plan updates to ensure that transportation plans meet the needs of all users of our roadway system. SCAG supports and encourages implementation of Complete Streets policies in the 2012–2035 RTP/SCS. SCAG will work with the local jurisdictions as they implement Complete Streets strategies within their jurisdictions by providing information and resources to support local planning activities. SCAG also supports the following policies and actions related to active transportation:

- Encourage and support local jurisdictions to develop "Active Transportation Plans" for their jurisdictions if they do not already have one,
- Encourage and support local jurisdictions to develop comprehensive educational programs for all road users,
- Encourage local jurisdictions to direct enforcement agencies to focus on bicycling and walking safety to reduce multimodal conflicts,
- Support local advocacy groups and bicycle-related businesses to provide bicycle-safety curricula to the general public,
- Encourage children, including those with disabilities, to walk and bicycle to school,
- Encourage local jurisdictions to adopt and implement the proposed SCAG Regional Bikeway Network,
- Support local jurisdictions to connect all of the cities within the SCAG region via bicycle facilities,
- Encourage local jurisdictions to complete the California Coastal Trail,
- Encourage the use of intelligent traffic signals and other technologies that detect slower pedestrians in signalized crosswalks and extend signal time as appropriate,
- Support the facilitation, planning, development, and implementation of projects and activities that will improve safety and reduce traffic and air pollution in the vicinity of primary and middle schools, and
- Encourage local jurisdictions to prioritize and implement projects/policies to comply with ADA requirements.

Express/HOT Lane Network

Despite our concerted effort to reduce traffic congestion through years of infrastructure investment, the region's system demands continue to exceed available capacity during peak periods. Consistent with our regional emphasis on the mobility pyramid (**FIGURE 2.1**), recent planning efforts have focused on enhanced system management, including integration of pricing to better utilize existing capacity and to offer users greater travel time reliability and choices. Express/HOT Lanes that are appropriately priced to reflect demand can outperform non-priced lanes in terms of throughput, especially during congested periods. Moreover, revenue generated from priced lanes can be used to deliver the needed capacity provided by the Express/HOT Lanes sooner and to support complementary transit investments.

Based on recent analysis of critical corridors performed for the CSMPs, intercounty trips comprise more than 50 percent—suggesting the value of a regional network of Express Lanes that would seamlessly connect multiple counties. As such, the 2012–2035 RTP/SCS includes a regional Express/HOT Lane network that would build upon the success of the SR-91 Express Lanes in Orange County and two demonstration projects in Los Angeles County planned for operation in late 2012.

Image courtesy of the Orange County Transportation Authority

Additional efforts underway include the extension of the SR-91 Express Lanes to I-15 in Riverside County along with planned Express Lanes on I-15. Also, traffic and revenue studies are proceeding for I-10 and I-15 in San Bernardino County.

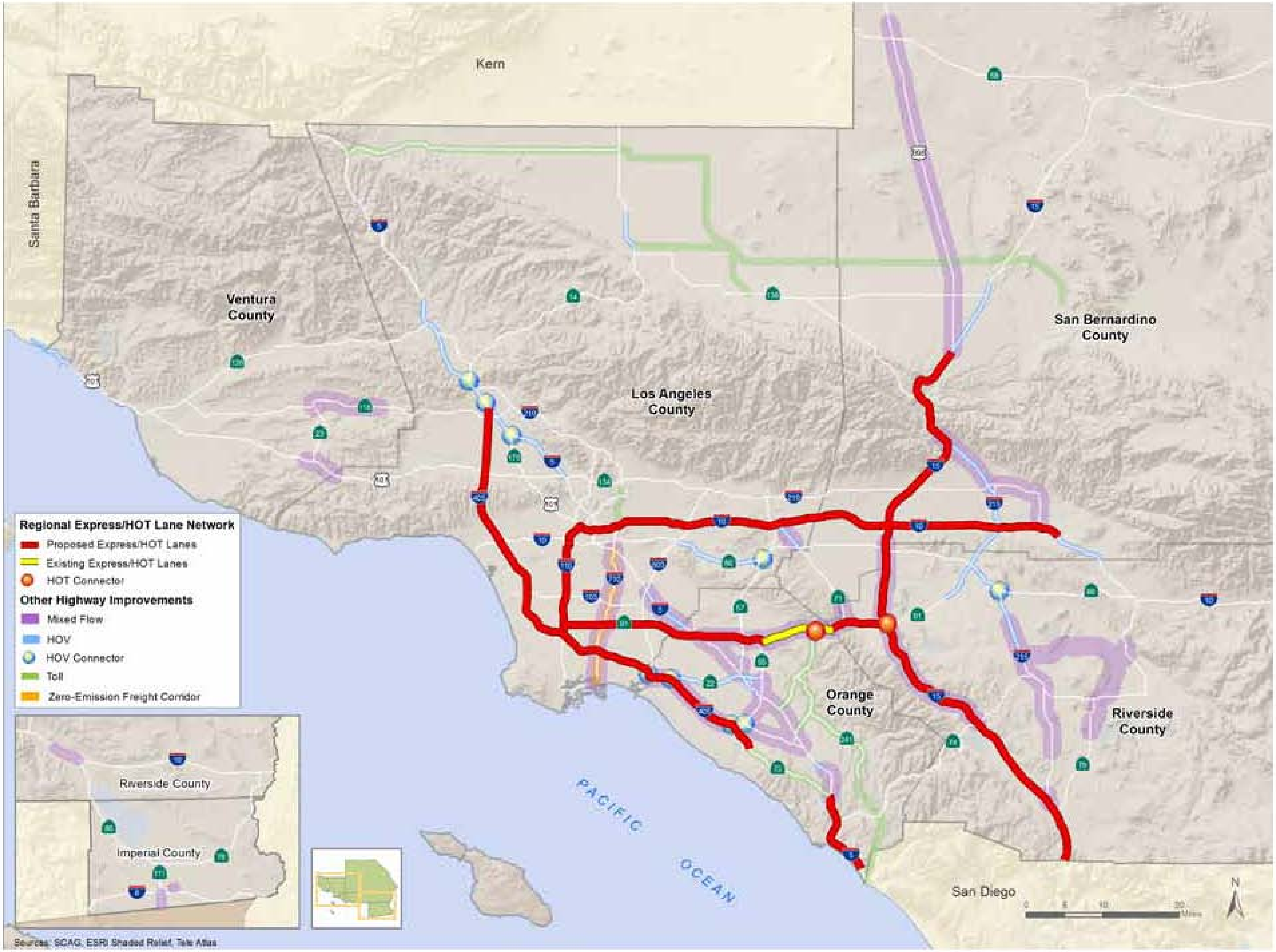
TABLE 2.6 and **EXHIBIT 2.6** display the segments in the proposed Express Lane network.

TABLE 2.6 Express/HOT Lane Network

County	Route	From	To
Los Angeles	I-405	I-5 (North SF Valley)	LA/OC County Line
Los Angeles	I-110	Adams Blvd (s/o I-10)	I-405
Los Angeles	I and SR-110/	Adams Blvd	US-101
Los Angeles	US-101	SR-110	I-10
Los Angeles	I-10	US-101	I-710
Los Angeles	I-10	I-710	I-605
LA, Orange	SR-91	I-110	SR-55
LA, SB	I-10	I-605	I-15
Orange	I-405	LA/OC Line	SR-55
Orange	I-5	SR-73	OC/SD County Line
Orange	SR-73	I-405	MacArthur
Riverside	SR-91	OC/RV County Line	I-15
Riverside	I-15	Riv/SB County Line	SR-74
Riverside	I-15	SR-74	Riv/SD County Line
San Bernardino	I-10	I-15	SR-210
San Bernardino	I-10	SR-210	Ford St
San Bernardino	I-15	SR-395	Sierra Ave
San Bernardino	I-15	Sierra Ave	6th St
San Bernardino	I-15	6th St	Riv/SB County Line

The Express/HOT Lane Network is assumed to be operational by 2035. Implementation plans, including corridor limits, will be refined through the Express Travel Choices Phase II Study.

EXHIBIT 2.6 Express/HOT Lane Network



Meeting Our Airport Demand

Although at a rate much slower than those seen in previous decades, air travel in the SCAG region continues to grow and is expected to pick up the pace when the region economically recovers. This RTP/SCS's regional air passenger demand forecast of 145.9 million annual air passengers (MAP) in 2035 is a very conservative forecast compared to forecasts adopted by past SCAG RTPs, such as the 165.3 MAP 2035 forecast adopted by the 2008 RTP. However, like previous forecasts, this new long-range forecast is also based on interim forecasts that show the urban capacity-constrained airports of Los Angeles International (LAX), Bob Hope, Long Beach, and John Wayne all reaching their defined legally allowable or physical capacity constraints well before 2035. The remaining air travel demand is served by the other, suburban airports with ample capacity to serve future demand, including Ontario International, San Bernardino International, March Inland Port, Palmdale Regional, Southern California Logistics, and Palm Springs airports. A small amount of future air passenger demand would also be served by the two commuter airports in the region, Oxnard and Imperial airports.

TABLE 2.7 displays Low Growth, Baseline/Medium Growth, and High Growth air passenger forecast scenarios that were considered for inclusion in this RTP/SCS. At 164 MAP in 2035, the High Growth Scenario is only slightly less than the 165.3 MAP forecast adopted for the 2008 RTP in 2035, and its average annual growth rate is consistent with recent industry forecasts developed by the FAA, Boeing, and Airbus. This Plan's regional air passenger demand forecast is the Baseline/Medium Growth Forecast that is more conservative than the High Growth Scenario and is consistent with recent passenger trends. At 145.9 MAP, it is virtually identical to the Constrained/No Project Scenario that was modeled for the 2008 RTP. **FIGURE 2.4** shows the airport allocations for this RTP/SCS's regional air passenger demand forecast.

The Plan's regional air passenger demand forecast recognizes defined legally allowable and physical capacity constraints at the constrained urban airports, including LAX, Bob Hope, Long Beach, and John Wayne. However, the legal settlement agreement constraints at both LAX and John Wayne expire in the 2015–2020 time period. Relaxation or elimination of these constraints could significantly impact forecast allocations of aviation demand at other airports in the region. For example, relaxation of the 78.9 MAP settlement agreement constraint at LAX could significantly impact the future demand at nearby Bob Hope Airport. (The Burbank-Glendale-Pasadena Airport Authority does not think that Bob Hope Airport will exceed 8.0 MAP in 2035 because of the likelihood that LAX will exceed its settlement agreement constraint before that date.) Future updates of the regional aviation passenger demand forecast, such as for the 2016 RTP, will incorporate any new information provided by local authorities on revised legally-allowable or physical capacity constraints at capacity-constrained airports in the region.

At 5.61 million tons of cargo in 2035, this RTP/SCS's regional air cargo demand forecast is also much more conservative than what was adopted by the 2008 RTP for 2035 (8.28 million tons). **FIGURE 2.5** shows the airport allocations for this RTP/SCS's regional air cargo demand forecast. A more complete discussion of the methodology used to develop these forecasts can be found in the Aviation and Airport Ground Access Appendix.

TABLE 2.7 2035 Airport Forecasts (Million Annual Air Passengers)

Airport	Low	Baseline	High
Bob Hope	9.4	9.4	9.4
John Wayne	10.8	10.8	10.8
LAX	78.9	78.9	78.9
Long Beach	4.2	4.2	4.2
March Inland Port	0.4	0.6	2.5
Ontario	19.2	30.7	31.6
Palmdale	1.6	2.6	6.1
Palm Springs	2.6	4.1	9.6
San Bernardino	1.8	2.8	6.7
SoCal Logistics	0.4	0.7	1.6
Imperial	0.6	0.9	2.1
Oxnard	0.1	0.2	0.5
Total	**130.0**	**145.9**	**164.0**

FIGURE 2.4 2035 Air Passenger Demand Airport Allocations

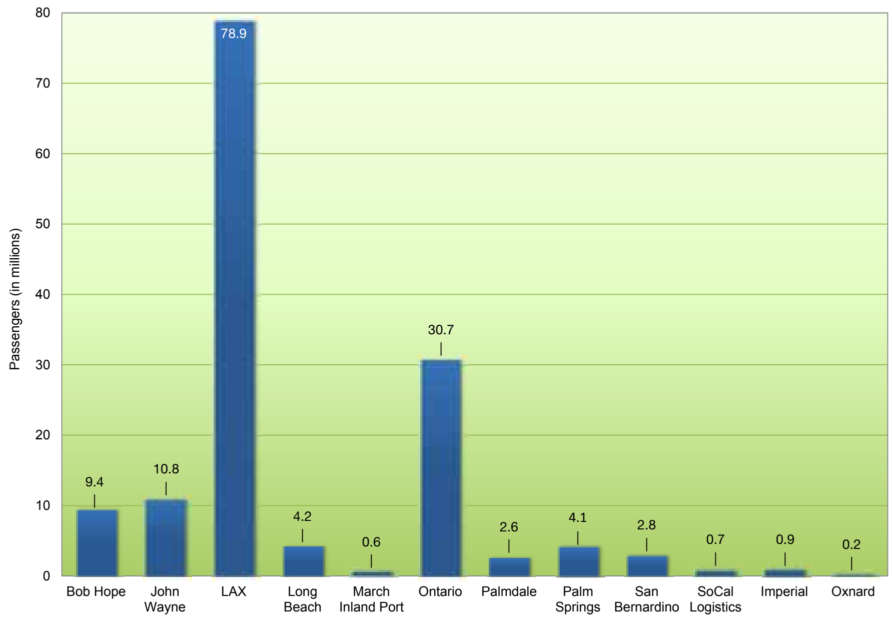
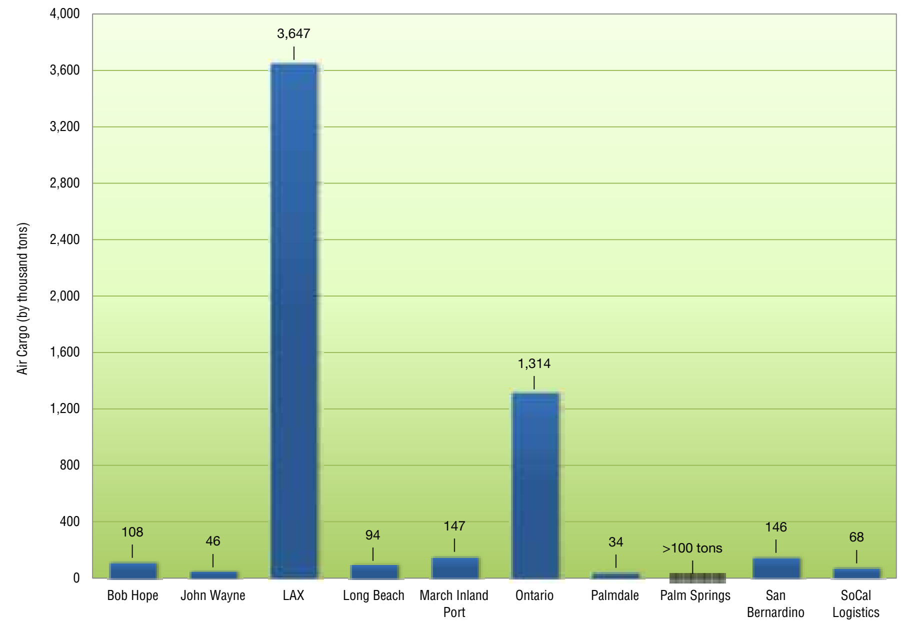


FIGURE 2.5 2035 Air Cargo Demand Airport Allocations



The past few years have seen deep cutbacks in flights by the airlines, particularly at mid-sized airports. There have also been several significant mergers in the U.S. airline industry. These mergers will likely lead to the elimination of duplicate service that may decrease airline competition, increase fares, and reduce the number of flights in many markets. However, the merged carriers may find it advantageous to offer service at multiple airports in a given market, rather than add frequency at LAX. The other recent dynamic in the aviation industry has been the transition of the low-cost carriers, as they have gained market share, from primarily serving secondary airports in large metropolitan regions to competing directly with the legacy network carriers at the primary airport. A recent example is the decision by both Virgin America and Southwest to introduce or expand service at LAX, rather than primarily serve the region through the secondary airports. One consequence of this strategy has been a significant decline in passenger traffic at both Bob Hope Airport and Ontario International Airport.

These and other recent trends call into question the ability to shift air traffic from the existing constrained airports in the urban core to the outlying/suburban airports that have the capacity to accommodate the forecast growth, which is necessary to meet this RTP/SCS's 145.9 MAP forecast in 2035. In order to attract the number of passengers to the suburban airports envisaged in the 2035 regional air passenger demand forecast, some incentives are likely to be needed to encourage airlines to offer service at these airports. Potential incentives fall into three broad categories:

1. Improvements to the airport ground access system that would make the alternate airports more accessible to travelers from those parts of the region that currently find the core urban airports more convenient,
2. Measures that would reduce the cost to the airlines of offering service at the alternate airports, either through direct subsidy or by reducing airport fees and charges relative to the more congested airports, and
3. Marketing programs to encourage air travelers to consider using the air services at the alternate airports.

General Aviation

SCAG also updated regional general aviation demand forecasts for the 44 general aviation airports in the region, as well as for the 10 commercial airports in the region that support general aviation activity. Regional general aviation demand forecasts were last developed by SCAG in 2003. The new forecasts employed a sophisticated "cohort" methodology that considers the amount of flying done by pilots as they pass through different age groups and the extent to which older pilots are replaced by new pilots. The forecast shows a decline in regional general aviation operations by about 32 percent from 2010 to 2035. The main reason for the anticipated decline is the fact that the aging pilot population is not expected to be adequately replenished by new student pilot starts. The regional general aviation demand forecast and methodology can be found in the Aviation and Airport Ground Access Appendix.

Airport Ground Access Strategy

Improvements to airport ground access (and egress) fall under SCAG's domain of responsibility. SCAG works closely with the airport authorities and county transportation commissions to identify and pursue implementation of specific projects. To be effective in attracting passengers to air service at the alternate airports, ground access improvements will need to significantly reduce the travel time and/or cost of accessing the alternate airports. This is likely to be a particular concern with airports such as Palmdale, which is almost 70 miles from downtown Los Angeles and around 50 miles from communities in the San Fernando Valley.

While the cost of significantly reducing freeway travel times beyond those improvements that will be implemented for other reasons would be prohibitive, particularly for the relatively small number of travelers likely to use the alternate airports, there may be opportunities to take advantage of improved transit and rail services that are being planned. These include the extension of the Metro Gold Line to Ontario and improvements to Metrolink service on the Antelope Valley and San Bernardino lines. While the volume of airport passengers alone would not justify the cost of these projects, if they are being done anyway to address other travel needs, SCAG can collaborate with the relevant agencies to ensure that the connections to the alternate airports are well planned and marketed. In the case of Ontario Airport, airport passenger volumes may be high enough to support express bus service from remote terminals at such locations as the Anaheim Regional Transportation Intermodal Center, Los Angeles Union Station, and the Van Nuys FlyAway terminal in the San Fernando Valley. These facilities all currently exist or will by 2035, so it would only be necessary to operate the bus service. These services may need to be subsidized until ridership reaches a level where the fare revenue can support the operation. SCAG could work with local airport authorities and regional transportation agencies to develop a regional consensus for identifying new sources of funding for these services. Potential sources of funding could include charging fees for private vehicles picking up and dropping off passengers at the congested airports. This would have a number of advantages:

- It would encourage resident passengers to use airport parking instead of being dropped off and picked up, which would increase airport revenues,
- By discouraging pick-up and drop-off trips, it would reduce vehicle trips generated by the airport on surrounding streets, and
- It would encourage more passengers to use public transportation or express buses from remote terminals, which would reduce vehicle miles of travel (VMT) on the region's arterial and freeway system.

It is unlikely that the volumes of air passengers at the other three alternate airports would be high enough to support dedicated express bus service. It might be feasible to serve San Bernardino International Airport as an extension of express bus service to Ontario Airport from Union Station or Van Nuys.

A more thorough discussion and listing of recommended ground access projects for each airport, both roadway and public transit projects, can be found in the Airport Ground Access Element in the Aviation and Airport Ground Access Appendix.

AIRPORT FINANCIAL STRATEGY

SCAG does not have a source of funding to provide subsidies for air service or to reduce airport fees and charges to the airlines. SCAG can work with the various airport authorities in the region and build a regional consensus to establish a regional funding mechanism to support the development of airport facilities and infrastructure at the alternate airports, using revenues generated at the congested airports as part of efforts to limit traffic growth at those airports. This strategy is currently prohibited by the U.S. Department of Transportation regulations on airport revenue diversion, except in cases where both airports are operated by the same airport authority. If a regional consensus of airport authorities is developed for advancing a regional airport financial strategy, SCAG can work with the congressional representatives from the region to obtain legislation that allows joint programs by congested and uncongested airports, even if they are operated by different agencies. Over the long term, congested airports may have an interest in shifting traffic to less-congested airports. For airports like LAX, which has a significant component of international traffic that generates more revenue than domestic flights, it may be more efficient to limit domestic flights that could be accommodated at other airports in the region, thereby freeing up capacity for more lucrative international flights.

AIRPORT MARKETING STRATEGY

SCAG does not have a source of funding to support marketing efforts to encourage air travelers in the region to consider using air service at the alternate airports. There is potential for the various airport authorities and the region's business community to develop a regional consensus to initiate a region-wide marketing effort to promote alternatives to the use of congested airports. This program could be funded through a variety of sources, such as airport parking and rental car transactions. SCAG would need to work with the various stakeholders to identify the benefits of an effective marketing program to all the region's airports and develop a regional consensus on how to fund and implement such a program.

AIRPORT POLICIES AND ACTION STEPS

This section outlines the additional policies and action steps associated with the aviation program contained in this RTP/SCS.

Regional Aviation Demand, Airport Infrastructure, and Airport Ground Access

The following outlines key policies:

- The capability of uncongested secondary airports in the region to accommodate future aviation demand, where such growth is desired, should be preserved during periods of declining or stagnant air traffic
- Uncongested secondary airports in the region, where additional activity is desired, should be supported through appropriate incentives, marketing, and projects that enhance their capacity and regional accessibility
- The factors that most influence the growth in demand for air travel and the composition of the market should be identified
- A regional consensus should be developed on how best to support the development of new air services at uncongested secondary airports, where such growth is desired
- State-of-the-art aviation demand forecast methodologies should be employed to accurately forecast future aviation demand in the region's complex multi-airport system, and regional aviation demand forecasts should be regularly updated to address changing conditions
- Existing and planned regional highway and high-occupancy transit improvements should be leveraged to the extent possible to increase the regional accessibility of uncongested secondary airports, where traffic is desired, while minimizing improvement needs

The following outlines additional action steps to improve aviation and airport ground access in the region:

- Work with the region's airport operators to conduct a region-wide air passenger survey on an ongoing basis, designed to enhance and inform regional aviation demand forecasting and airport marketing efforts
- Develop an in-house aviation demand forecasting model that can support the development of future forecasts and allocation of forecast demand to airports in a complex multi-airport regional system. The model should be fully integrated with SCAG's regional transportation model and should have airport ground access modeling capabilities

- Work with the region's airport operators and business community to define a region-wide marketing effort to promote alternatives to increased use of congested urban airports, consistent with the policy directions of airport operators
- Identify and define incentives that airports can effectively use to encourage airlines to provide new air service
- Establish a Regional Airport Ground Access Task Force to define potential projects and programs to improve airport accessibility to secondary airports and reduce vehicular traffic generated by the large urban airports. The task force would help plan and promote rail and express bus service improvements and extensions to airports in the region, as well as an integrated regional system of remote air terminals ("FlyAways")

Airport Economics, Finance, and Funding

The following policies are related to Airport Economics, Finance, and Funding:

- New funding mechanisms should be identified for implementing regional infrastructure and airport ground access improvements
- Efforts by airport operators to develop strategic financial plans and explore non-aeronautical revenue-generating use of underutilized airport property should be supported
- Strategies that enhance the economic contribution of aviation to the regional economy should be identified and implemented

The following are recommended action steps:

- Sponsor and support new legislation that allows for more flexible use of airport revenues for off-airport ground access projects when requested by airport operators
- The Airport Ground Access Task Force should explore and develop potential new funding sources to support specific projects they have identified for improving regional airport accessibility
- Coordinate with the region's county transportation commissions and other transportation agencies to include joint funding of airport ground access projects identified in SCAG's Regional Transportation Plan in those agencies' plans
- Conduct regional aviation economic impact studies that identify the economic benefits to the region of different types and levels of regional aviation activity and the likely economic impacts of implementing alternative policy options for serving future regional aviation demand

Airport Land Use Compatibility and Environmental Impacts

The following policies are related to Land Use Compatibility and Environmental Impacts:

- Promote increased coordination between airport planning and land use planning on both regional and local levels
- Regional support and coordination should be extended to the region's airport land use commissions
- Disseminate information on aviation environmental "best practices"
- Support mechanisms for promoting cleaner and quieter aircraft at the region's

The following are related action steps:

- Continue to pursue airport "smart growth" projects, using the Airport Smart Growth Framework developed for the Chino Airport Smart Growth Demonstration Project and applying it to different airport settings
- Incorporate airport "smart growth" land use principles in land use forecasts used by future regional transportation plans
- Periodically conduct information sharing forums for the region's airport land use commissions in cooperation with the Caltrans Division of Aeronautics on "best practices" for airport land use compatibility planning
- Serve as a clearinghouse for information on aviation environmental "best practices" by airports for mitigating air, noise, and water pollution; and reducing greenhouse gas emissions
- Support legislation for creating substantial incentives for airlines to upgrade their aircraft fleets to cleaner, quieter aircraft and NextGen-compatible aircraft

Airspace Planning and New Technologies

The following are policies related to Airspace Planning and New Technologies:

- Modifications to the regional airspace system that reduce potential airspace conflicts, increase passenger safety, reduce costs to airlines, and reduce noise and air quality impacts should be identified and promoted Opportunities should be pursued for increasing the region's airspace capacity, reducing potential future airspace conflicts, and increasing airline efficiencies through new navigation and air traffic control technologies

- Existing and potential future airspace constraints should be incorporated into regional aviation planning

The following are related action steps:

- Continue to coordinate and provide input to the FAA's Optimization of Airspace and Procedures in the Metroplex (OAPM) Program for Southern California and similar airspace modernization activities, including updated operational forecasts
- SCAG Aviation Technical Advisory Committee (ATAC) should continue and enhance its coordination with the Southern California Airspace Users Working Group (SCAUWG) on airspace issues of regional importance
- Continue to advocate that the region should serve as an early "test bed" for the phased implementation of new airspace technologies, including new satellite-based NextGen technologies developed by the FAA, that have the potential to reduce airspace conflicts and reduce noise and air quality impacts on local communities
- Explore how new navigation and air traffic control technologies can contribute to the region's airspace capacity and should incorporate potential airspace constraints in aviation demand forecasts developed for future regional transportation plans

Goods Movement System

System Vision

Improving Southern California's global competitiveness is critical to a vibrant economy. Reliable freight transportation infrastructure, to move goods to market, is essential to support the SCAG regional economy and quality of life. In 2010, over 1.15 billion tons of cargo valued at almost $2 trillion moved across the region's system.[1] Whether carrying imported goods from the San Pedro Bay Ports to regional distribution centers, supplying materials for local manufacturers, or delivering consumer goods to SCAG residents, the movement of freight provides the goods needed to sustain regional industries and consumer needs on a daily basis.

Working with its public and private-sector partners, SCAG has established a vision for the goods movement system that is reflected in the 2012–2035 RTP/SCS.

A world-class, coordinated Southern California goods movement system that accommodates growth in the throughput of freight to the region and nation in ways that support the region's economic vitality, attainment of clean air standards, and the quality of life for our communities

[1] FHWA Freight Analysis Framework: http://faf.ornl.gov/fafweb/Extraction0.aspx.

Key Function and Markets

The goods movement system has developed in the SCAG region to serve a wide range of user markets. Each of these markets has unique performance needs that dictate the components of the system that they will use. A brief summary of these markets follows.

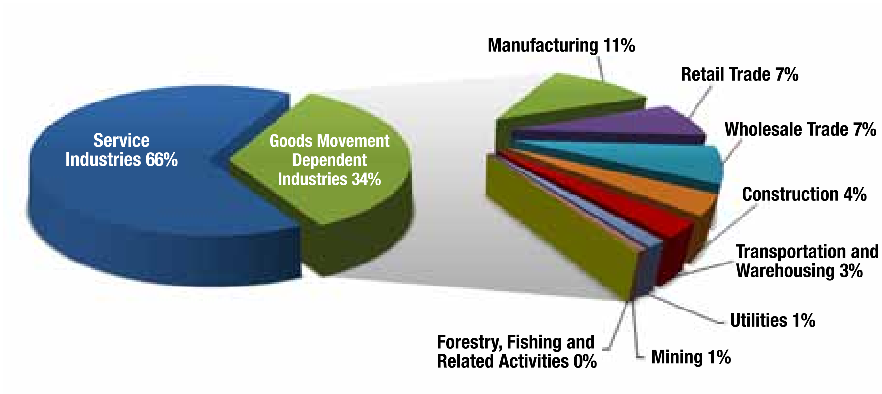
INTERNATIONAL TRADE

The SCAG region is the largest international trade gateway in the U.S. In 2010, the Los Angeles Customs District (which includes the Ports of Los Angeles, Long Beach, and Hueneme and Los Angeles International Airport) handled $336 billion of maritime cargo and $78 billion of air cargo. In the same year, $10.4 billion of trade passed through the international ports of entry (POEs) between the U.S. and Mexico in Imperial County. Trade moving through these international gateways is supported by an extensive transportation system including a highly developed network of roadways and railroads, air cargo facilities, intermodal facilities, and an abundance of regional distribution and warehousing clusters.

DOMESTIC AND LOCAL GOODS MOVEMENT

An overwhelming majority of the goods movement activity in the SCAG region is generated by local businesses moving goods to local customers and supporting national domestic trade systems. These businesses are sometimes referred to as "goods movement-dependent industries." In 2010, these industries, including manufacturing, wholesale and retail trade, construction and warehousing, employed over 2.9 million people throughout the region and contributed $253 billion to the regional gross domestic product (GDP) (**FIGURE 2.6**).[2] These industries are anticipated to grow substantially, with manufacturing forecasted to increase its GDP contribution 130 percent by 2035 and wholesale trade growing 144 percent.

FIGURE 2.6 GDP Contribution of Goods Movement-Dependent Industries (2010)



LOGISTICS ACTIVITIES—INCLUDING WAREHOUSE AND DISTRIBUTION FACILITIES

The SCAG region hosts one of the largest clusters of logistics activity in North America. Logistics activities, and the jobs they provide, depend on a network of warehousing and distribution facilities, highway and rail connections, and intermodal railyards. In addition to carrying needed inventories, many warehouses and distribution centers in the SCAG region provide transloading services, or the deconsolidation and reloading of freight from marine containers to domestic containers. Because domestic containers are larger than marine containers, importers and shippers are able to realize significant cost savings in transportation costs through economies of scale by transloading. In addition, regional warehouse and distribution facilities may provide value added services. The abundance of warehousing and distribution facilities, along with the highly developed highway and rail network, serves as a competitive advantage for the SCAG region by attracting transloading activities that supply numerous local and regional jobs and revenue. Trucking access is particularly critical to warehousing and logistics businesses and the transloading industry.

2 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy, REMI.

Components of the Regional Goods Movement System

EXHIBIT 2.7 depicts the region's multimodal goods movement system. This system is comprised of the following major elements:

- **Seaports (Ports of Los Angeles, Long Beach, and Hueneme):** Serving as the largest container port complex in the U.S., the Ports of Los Angeles and Long Beach handled just under 120 million metric tons of cargo inports and exports, valued at $336 bilion in 2010.[3] Port Hueneme, in Ventura County, specializes in the import and export of automobiles, fresh fruit, and produce and serves as the primary support facility for the offshore oil industry.
- **Land Ports:** The international border crossings in Imperial County are busy commercial land ports responsible for over $7 billion in imports and $5 billion in exports in 2007 driven by the maquiladora trade and movement of agricultural products.
- **Air Cargo Facilities:** The SCAG region is home to numerous air cargo facilities, including Los Angeles International Airport (LAX) and Ontario International Airport (ONT), that together handled over 96 percent of the region's air cargo in 2010.
- **Interstate, Highways, and Local Roads:** The region has about 53,400 road miles, 1,630 miles of which are interstate and freeway type.[4] Sections of I-710, I-605, SR-60, and SR-91 carry the highest volumes of truck traffic in the region, averaging over 25,000 trucks per day in 2008. Other major components of the regional highway network also serve significant numbers of trucks, including I-5, I-10, I-15, and I-210, some with sections that carry over 20,000 trucks per day. These roads carry a mix of local, domestic trade, and international cargoes. The arterial roadway system also plays a critical role, providing "last mile" connections to regional ports, manufacturing facilities, intermodal terminals and warehouses, and distribution centers.
- **Class I Railroads:** Critical to the growth of the region's economy, the Burlington Northern Santa Fe Railway (BNSF) and Union Pacific (UP) carry international and domestic cargo to and from distant parts of the country. The BNSF main line operates on the Transcontinental Line (and San Bernardino Subdivision) while the UP operates on the Coast Line, Santa Clarita Line, Alhambra Line, LA Subdivision, and El Paso Line. Both railroads operate on the Alameda Corridor that connects directly to the San Pedro Bay Ports. The San Pedro Bay Ports also provide several on-dock rail terminals along with the six major intermodal terminals operated by the BNSF and UP.
- **Warehouse and Distribution Centers:** In 2008, the region had about 837 million square feet of warehousing space[5] and another 185 million square feet in developable land.[6] An estimated 15 percent of the occupied warehouse space served port-related uses, while the remaining 85 percent supported domestic shippers.[7] Many of these warehouses are clustered along key goods movement corridors (**EXHIBIT 2.7**). Port-related warehousing is concentrated in the Gateway Cities subregion, while national and regional distribution facilities tend to be located in the Inland Empire.

3 American Association of Port Authorities, U.S. Waterborne Foreign Trade, 2010 Ranking of US Customs Districts by Value of Cargo and by Volume of Cargo, November 23, 2011, http://www.aapa-ports.org/Industry/content.cfm?ItemNumber=900&navItemNumber=551 (last accessed February 2012)

4 http://www.dot.ca.gov/hq/tsip/hpms/hpmslibrary/hpmspdf/2009PRD.pdf (last accessed on December 10, 2010.

5 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy.

6 Potentially developable warehouse space is estimated based on land zoned and suitable for warehouse development.

7 Some domestic warehouse space may include use by domestic shippers mixing internationally sourced and domestically sourced goods.

EXHIBIT 2.7 Existing Regional Goods Movement System

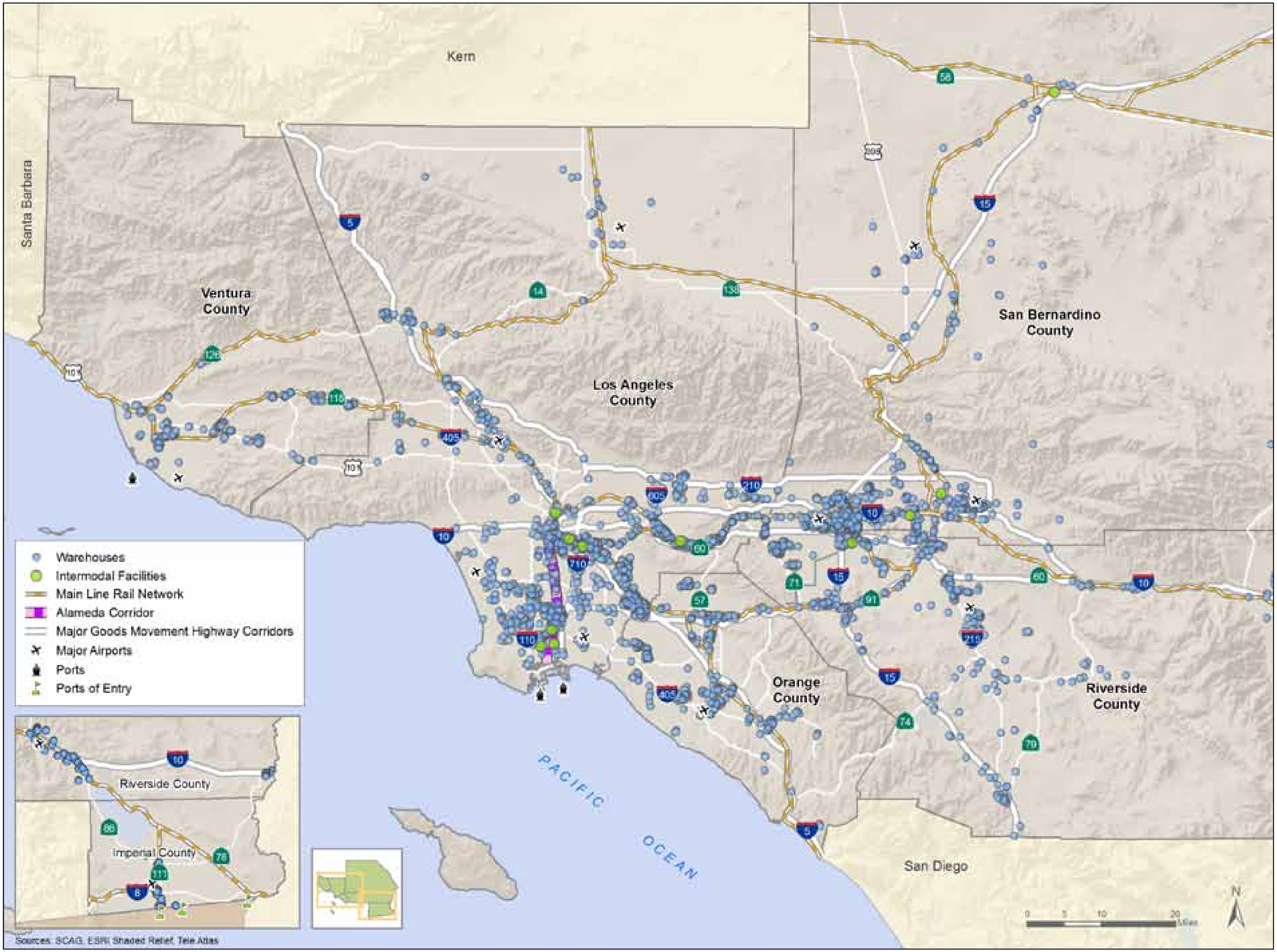


Image courtesy of the Port of Long Beach

Goods Movement Trends and Drivers

There are a number of key trends that are anticipated to have major impacts on the goods movement system. These trends include:

- **Population and General Economic Growth:** Despite a current economic downturn brought on by challenging global conditions, population and employment in the SCAG region are expected to grow by approximately 24 percent and 22 percent by 2035, respectively. This growth will create increased consumer demand for products and the goods movement services that provide them. The increased demand will drive stronger growth in freight traffic on shared highway and rail facilities. Truck traffic on many key corridors is anticipated to grow substantially. Truck volumes on major corridors are shown in **EXHIBIT 2.8** for both 2008 and the 2035 baseline forecast. Without an increase in capacity, truck and auto delay will increase substantially, truck-involved accidents will be more frequent, and the levels of harmful emissions will rise. Moreover, growing demand for commuter rail services on rail lines owned by the freight railroads will create needs for expanded capacity on these facilities.
- **Recovery and Expansion of International Trade:** Within the RTP/SCS time horizon, international trade is anticipated to recover with renewed demand for both import and export capabilities. Despite increasing competition with other North American ports and the expansion of the Panama Canal, the San Pedro Bay Ports anticipate cargo volumes to grow to 43 million containers by 2035[8]—more than tripling from current levels. This will create the need to expand marine terminal facilities, improve highway connections (particularly those connecting directly to the San Pedro Bay Ports, like I-710 and SR-47), and address on-dock and off-dock intermodal terminal capacities. If port-related rail traffic and commuter demand are to be satisfied, additional main line capacity improvements will be required. Mitigating the impacts of increased train traffic on communities will continue to be a considerable challenge.
- **Continued Expansion of Warehouse and Logistics Activity:** Southern California is an ideal place for expanded distribution and logistics activity and will continue to be a significant source of good-paying jobs in the region through 2035. Demand for port-related warehouse space is projected to grow at a faster pace than demand for domestic warehousing. As space near the San Pedro Bay Ports reaches capacity, port warehousing will push out to the Inland Empire. Expansion in national and regional distribution facilities is also likely to occur in the Inland Empire, resulting in substantial congestion problems due to the increased truck volumes on regional highways. By 2035, the region may experience a shortfall of more than 228 million square feet in warehouse space relative to demand.
- **Air Quality Issues:** Much of the SCAG region does not meet federal ozone and fine particulate matter ($PM_{2.5}$) air quality standards. Goods movement emissions contributes to regional air pollution problems (NOx and $PM_{2.5}$). While emissions from goods movement are being reduced through efforts such as the San Pedro Bay Ports Clean Air Action Plan, these reductions are unlikely to be sufficient to meet regional air quality goals.

8 San Pedro Bay Ports Container Forecast.

EXHIBIT 2.8 Rising Truck Volumes on Key Truck Corridors (2008 and 2035 Baseline)

Goods Movement Strategy

To ensure global competitiveness and realize the benefits of efficient and sustainable goods movement, it is critical to identify strategies and projects that address expected growth trends. Recent regional efforts have focused on strategies to develop a coherent, refined, and fully integrated regional goods movement system. Following the completion of the 2008 RTP, SCAG initiated the Comprehensive Regional Goods Movement Plan and Implementation Strategy. This effort, involving diverse regional stakeholders, is intended to identify a multimodal regional freight plan that integrates existing strategies and projects with newly developed regional initiatives advanced through the study. Some of these strategies are highlighted below.[9]

REGIONAL CLEAN FREIGHT CORRIDOR SYSTEM

In past RTPs, SCAG has envisioned a system of truck-only lanes extending from the San Pedro Bay Ports to downtown Los Angeles along I-710, connecting to an east-west segment, and finally reaching I-15 in San Bernardino County. Such a system would address the growing truck traffic on core highways through the region and serve key goods movement industries in a manner that mitigates negative impacts on communities and the environment. Truck-only freight corridors are effective, as they add capacity in congested corridors, improve truck operations and safety by separating trucks and autos, and provide a platform for the introduction and adoption of zero- and/or near zero emission technologies. Significant progress toward a regional freight corridor system has continued, as evidenced by recent work on an environmental impact report (expected to be completed in 2013) for the I-710 segment. As part of the 2012–2035 RTP/SCS, SCAG includes a refined concept for the east-west corridor component of the system and connections to an initial segment of I-15.

While numerous potential east-west freight corridor options were examined, the 2012–2035 RTP/SCS identifies a corridor concept to be explored further that could fall within a five-mile span of the route illustrated in **EXHIBIT 2.9**. More information on the corridor selection process is available in the Goods Movement Appendix.

[9] For more detailed information on the SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy, please see the Goods Movement Appendix.

EXHIBIT 2.9 Potential East-West Freight Corridor

Non-freeway alignments may provide an opportunity to move the facility away from neighborhoods and closer to the industrial uses that it would serve. Approximately 50 percent of the region's warehousing space and 25 percent of its manufacturing employment lie along the identified route. After adoption of the 2012–2035 RTP/SCS, additional study of alignments will be conducted, including an alternatives analysis completed as part of a full environmental review.

The East-West Freight Corridor would carry between 58,000 and 70,000 clean trucks per day that would be removed from adjacent general purpose lanes and local arterial roads. As highlighted in **TABLE 2.8**, the corridor would benefit a broad range of goods movement markets: Between 25–40 percent of the trucks would be port-related, almost 40 percent would serve local goods movement-dependent industries, and the remainder would support domestic trade. Truck delay would be reduced by up to 11 percent, while speeds for autos on SR-60 would be improved by 11–12 percent. Truck traffic on SR-60 general purpose lanes would be reduced by 42–82 percent, depending on location; by as much as 33 percent on I-10; and by as much as 20 percent on adjacent arterials. Separating trucks and autos would also reduce truck-involved accidents on east-west freeways that currently have some of the highest accident levels in the region (20–30 accidents a year on certain segments).[10]

For the 2012–2035 RTP/SCS, the regional freight corridor system also includes an initial segment of I-15 that would connect to the East-West Freight Corridor, reaching just north of I-10. Additional study will be undertaken to complete specification of the I-15 component of this project.

TABLE 2.8 Benefits of an East-West Corridor Strategy

Mobility	▪ Truck delay reduction of approximately 11% ▪ All traffic delay reduction of approximately 4.3% ▪ Reduces truck volumes on general purpose lanes—42–82% reduction on SR-60
Safety	▪ Reduced truck/automobile accidents (up to 20–30 per year on some segments)
Environment	▪ 100% zero-emission truck utilization removes 4.7 tons NOx, 0.16 tons $PM_{2.5}$, and 2,401 tons CO_2 daily (2.7–6% of region's total)
Community	▪ Preferred alignment has least impact on communities ▪ Removes traffic from other freeways ▪ Zero- and/or near- zero-emission technology (ZET)—reduces localized health impacts
Economic	▪ Supports mobility for goods movement industries, which comprise 34% of SCAG regional economy and jobs

10 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy.

BOTTLENECK RELIEF STRATEGY

In recent analysis of critical issues affecting the trucking industry conducted by the American Transportation Research Institute (ATRI), traffic congestion ranked near the top in 2011 after being less of a concern in 2009–2010 as a result of the economic downturn.[11] Besides causing delays to other highway users, heavy truck congestion results in wasted labor hours and fuel. In 2010, it was estimated that the cost of truck congestion in 439 major urban areas was approximately $23 billion.[12] Truck congestion in urban areas within the SCAG region resulted in approximately $2.6 billion in costs.[13] Given that driver wages and fuel costs represent over 50 percent of total motor carrier costs, truck congestion has major impacts on the bottom line of the trucking industry. Truck bottlenecks are also emission “hot spots” and generally have significantly degraded localized air quality caused by increased idling from passenger vehicles and trucks.

A coordinated strategy to address the top-priority truck bottlenecks is a cost-effective way to improve the efficiency of goods movement in the SCAG region. Bottleneck projects may also be easier to implement since they are often less intrusive than other types of projects; contribute to the region's environmental goals (by reducing emissions “hot spots”); and result in substantial, tangible benefits to commuters and goods movement industries alike.

SCAG recently studied key regional truck bottlenecks and associated projects. Through this analysis, project concepts that may address the highest-priority truck bottlenecks and have the most significant impact on delay were identified and continue to be evaluated. The 2012–2035 RTP/SCS allocates an estimated $5 billion toward goods movement bottleneck-relief strategies. Examples of bottleneck-relief strategies include ramp metering, extension of merging lanes, ramp and interchange improvements, capacity improvements, and auxiliary lane additions. Annually, over 1 million hours of heavy truck delay during the most congested time periods on area roadways could be eliminated if the highest-priority truck bottlenecks in the region are addressed. Additional information is provided in the Goods Movement Appendix.

11 http://www.atri-online.org/2011_top_industry_issues.pdf.
12 Texas Transportation Institute 2011 Urban Mobility Report.
13 Texas Transportation Institute 2011 Urban Mobility Report. Urban areas as defined in the report include Los Angeles-Long Beach-Santa Ana, Riverside-San Bernardino, Lancaster-Palmdale, Bakersfield, Indio-Cathedral City-Palm Springs, and Oxnard-Ventura.

RAIL STRATEGY

The health of the Southern California economy depends on an efficient railroad system that has the capacity to accommodate projected growth in international and domestic freight. The railroad system in the SCAG region provides a critical connection between the largest port complex in the country and producers and consumers throughout the U.S. Over half of the international cargo arriving at the San Pedro Bay Ports utilizes rail (including on-, near-, and off-dock). Railroads also serve a myriad of domestic industries, predominantly for long-haul freight leaving the region. The extensive rail network in the SCAG region is a critical link in the regional supply chain, offering shippers the ability to move large volumes of goods over long distances at lower costs versus other transportation options.

The SCAG region is served by two Class I freight railroads: Burlington Northern Santa Fe Railway (BNSF) and Union Pacific Railroad (UP). BNSF operates a single main line extending from connections to the Alameda Corridor near downtown Los Angeles to Barstow with a terminus in Chicago. UP operates two main lines between downtown Los Angeles and the City of Colton. Both railroads share trackage rights on rail segments between West Riverside and Barstow through existing agreements. The Alameda Corridor, a 20-mile, multitrack freight rail expressway, connects the San Pedro Bay Ports with railyards and BNSF and UP rail lines in downtown Los Angeles.

The railroad network connects the SCAG region with many locations in the U.S. Major rail hubs in Illinois (Chicago in particular) and Texas constitute over 50 percent of total tonnage moving to and from the SCAG region. In order to deliver the benefits of rail transport to the region and the nation, the Southern California freight rail system needs to address future capacity needs on both the Class I main lines and at intermodal terminals where capacity is likely to be strained in light of future demand. The investments needed to meet these capacity needs will be made largely by the private railroads.

At the same time that the rail system is expanding to meet future demand, rail emissions need to be reduced further in order to contribute to the region's goal of meeting ambient air quality standards for the South Coast Air Basin. In addition, issues of grade crossing delay and safety in communities will need to be addressed. Lastly, growth in passenger rail services is an important component of regional mobility strategies and this will require expanded capacity. To the extent that passenger rail shares space on the freight rail system, the ability of the public sector to achieve regional goals within this capacity-constrained environment will be challenged. SCAG's recent analysis of train volumes for selected rail segments is shown in **TABLE 2.9**.[14]

TABLE 2.9 Peak Day Train Volumes 2010, 2035 (Metrolink Volumes in Parentheses)

Line Segments	Type	2010	2035
BNSF San Bernardino Subdivision Hobart-Fullerton	Passenger	54(28)	77(51)
	Freight	45	90
BNSF San Bernardino Subdivision Atwood-W. Riverside	Passenger	26(24)	42(40)
	Freight	49	99
BNSF San Bernardino Subdivision W. Riverside-Colton	Passenger	10(8)	42(40)
	Freight	67	147
BNSF Cajon Subdivision San Bernardino-Silverwood PLUS UP Mojave Subdivision W. Colton-Silverwood	Passenger	2(0)	2(0)
	Freight	93	147
UP Los Angeles Subdivision East LA-Pomona PLUS UP Alhambra Subdivision Yuma Jct.-Pomona	Passenger	13(12)	21(20)
	Freight	52	98
UP Los Angeles Subdivision Pomona-W. Riverside PLUS UP Alhambra Subdivision Pomona-West Colton	Passenger	13(12)	21(20)
	Freight	51	109
UP Yuma Subdivision Colton-Indio	Passenger	1(0)	1(0)
	Freight	45	93

14 These forecasts are based upon simulation analysis conducted for planning purposes only as part of the SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy. BNSF and UP do not forecast train volumes through 2035. Passenger volume totals include Amtrak and Metrolink.

As part of the Comprehensive Regional Goods Movement Plan and Implementation Strategy, SCAG worked closely with regional stakeholders to develop a set of rail strategies aimed at increasing freight and passenger mobility, promoting job creation and retention, improving safety, and mitigating environmental impacts.

Several different components comprise this rail package:

Main line rail improvements and capacity expansion: This includes rail-to-rail grade separations, double or triple tracking certain rail segments, implementing new signal systems, building universal crossovers, and constructing new sidings. These improvements would benefit both freight rail and passenger rail service, depending on their location.

Railyard improvements: This includes upgrades to existing railyards as well as construction of new yards. These projects would provide vital improvements to the region's ability to handle the projected growth in cargo volumes.

Grade separations of streets from rail lines: These projects reduce vehicular delay, improve emergency vehicle access, reduce the risk of accidents, and lower emissions levels.

Rail operation safety improvements: This includes technology such as Positive Train Control (PTC) that can greatly reduce the risk of rail collisions.

Key rail projects in the 2012–2035 RTP/SCS include:

- Rail-to-rail grade separation at Colton Crossing
- Additional main line tracks for the BNSF San Bernardino and Cajon Subdivisions and the UPRR Alhambra and Mojave Subdivisions
- Southern California International Gateway (SCIG)
- Modernization of the Intermodal Container Transfer Facility (ICTF)
- Highway-rail grade separations
- Port-area rail improvements, including on-dock rail enhancements

The benefits of the rail strategies to the region are considerable and include mobility, safety, and environmental gains. As shown in **TABLE 2.10**, these strategies could eliminate almost 6,000 hours of vehicle delay per day at grade crossings, decrease emissions (NOx, CO_2, and $PM_{2.5}$) by almost 23,000 lb. per day, and reduce overall train delay to 2000 levels.

TABLE 2.10 Benefits of the SCAG Regional Rail Strategy

Mobility	▪ Reduces train delay to 2000 levels ▪ Provides main line capacity to handle projected demand in 2035 (includes 43.2 million twenty-foot equivalent units, or TEUs, port throughput) ▪ Eliminates 5,782 vehicle hours of delay per day at grade crossings in 2035
Safety	▪ Eliminates 71 at-grade railroad crossings
Environment	▪ Reduces 22,789 lb. of emissions per day (CO_2, NOx, and $PM_{2.5}$ combined) from idling vehicles at grade crossings ▪ Facilitates on-dock rail ▪ Reduces truck trips to downtown railyards and associated emissions

GOODS MOVEMENT ENVIRONMENTAL STRATEGY

In Southern California, goods movement and air quality are inextricably linked. Much of the SCAG region (and nearly all of the urbanized area) does not meet federal ozone and fine particulate ($PM_{2.5}$) air quality standards. Goods movement is a major source of emissions that contributes to these regional air pollution problems as well as localized air pollution "hot spots" that can have adverse health impacts.

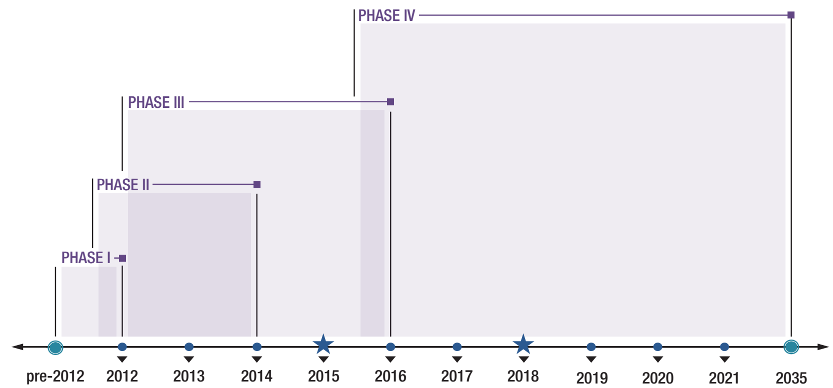
Goods movement is also a major source of greenhouse gas (GHG) emissions that contribute to global climate change. Although reduction in GHG emissions from goods movement is not required under California Senate Bill 375 (which focuses solely on light-duty vehicle emissions), the State has established GHG-reduction goals under California Assembly Bill 32. Clean goods movement activities can contribute to these goals. As such, the region's goods movement strategy is complementary to sustainable communities planning.

The two air pollutants of greatest concern in Southern California are nitrogen oxides (NOx) and fine particulate matter ($PM_{2.5}$). The South Coast Air Basin is classified as an extreme non-attainment area per the federal ambient ozone standard, with a required attainment date of 2023. By approximately 2031, a second, more stringent federal ozone standard must be attained. The federal Clean Air Act requires the region to demonstrate timely attainment of these standards or federal sanctions may result, such as interruption or curtailment of funding for transportation projects. To attain the federal ozone standards, the region will need broad deployment of zero- and near-zero-emission transportation technologies in the 2023 to 2035 timeframe. The 2012–2035 RTP/SCS includes a path forward to achieve this objective. Integration of advanced technologies into the region's goods movement strategies can contribute to other regional objectives, such as energy security, economic development opportunities, and potentially broader public support for infrastructure initiatives.

The 2012–2035 RTP/SCS focuses on a two-pronged approach for achieving an efficient freight system that reduces environmental impacts. For the near term, the regional strategy supports the deployment of commercially available low-emission trucks and locomotives while centering on continued investments into improved system efficiencies. For example, heavy-duty hybrid trucks and natural gas trucks are already in use, but market penetration can be increased. In the longer term, the strategy focuses on advancing technologies—taking critical steps now toward phased implementation of a zero- and near-zero-emission freight system. SCAG's planning efforts are cognizant of the need to incorporate evolving technologies into new infrastructure. These include technologies to fuel vehicles, as well as to charge batteries and provide power. As noted in the text box, the constrained RTP/SCS includes a near-term project for the demonstration and initial operational deployment of zero-emission trucks receiving wayside power.

Substantial investment will be required to develop and deploy the technologies needed for a zero- and near-zero emission goods movement system. A regional approach to meet this objective follows and is summarized in **FIGURE 2.7**. This path is discussed in greater detail in the Goods Movement Appendix.

FIGURE 2.7 Timeline to Implement a Zero- and Near-Zero-Emission Freight System



Major Milestones

• 2012 – Identify potential funding to support early demonstration efforts; incorporate into financially constrained RTP/SCS

• 2012 – Implement plan of advocacy to secure action by federal or other governments

• 2012–2013 – Continue to evaluate truck technology implementation and funding mechanisms; initiate testing of zero-emission container movement system along the Terminal Island Freeway and connecting routes to the Ports (or alternative routes serving the same locations)

• 2012–2013 – Continue to evaluate practicability of applying electrified rail or other zero-/near-zero-emission technologies and evaluate funding and implementation mechanisms

• 2015–2016 – Incorporate decisions on wayside power and technology direction, including strategy, funding, and timeframe into 2016 RTP update and SIP revisions; if existing rail technologies are practicable, identify technologies, infrastructure, and implementation mechanisms in RTP update and SIP

• 2015–2016 – Begin deployment of appropriate zero- and/or near-zero-emission trucks and continue operational demonstration

• 2018–2020 – If existing rail applications were not practicable, resolve need for new rail technologies and incorporate planning into the 2020 RTP

• 2017–2035 – Full deployment of appropriate zero-and near-zero-emission trucks for substantially all regional transport; if existing electrified rail technologies can be practicably applied to the region, fully deploy such technologies

Near-Term Zero-Emission Technology Demonstration and Initial Deployment

Description: This project is for near-term demonstration and, if successful, initial operational deployment of zero-emission trucks receiving wayside power.

Location: The project will be located in Los Angeles County along the Terminal Island Freeway and connecting routes to the Ports, (or alternative routes serving the same locations).

Schedule:

- By 2013 – Demonstration: Develop and build trucks and wayside power infrastructure sufficient for demonstration within the transport corridor consisting of the Terminal Island Freeway and connecting routes to the Ports (or alternative routes serving the same locations); commence demonstration upon completion of trucks and infrastructure.
- By 2015 – Initial Operational Deployment: Build wayside power infrastructure sufficient for operation on the Terminal Island Freeway and connecting routes to the Ports (or alternative routes serving the same locations), and build maximum number of trucks for initial operational deployment allowed by available funding (with all feasible leveraging of private resources), unless a zero-emission technology not utilizing wayside power is determined to be superior and can be implemented in a similar or earlier time frame. In the latter case, remaining funds allocated to this project will be applied to demonstration and deployment of zero-emission trucks not utilizing wayside power.

Cost: Project cost is $35 million, for both demonstration and initial operational deployment phases. This includes construction of infrastructure, design and build of demonstration trucks, and acquisition of a small fleet for initial operational deployment.

Funding: AQMD will actively partner in supporting this effort by providing available funding for vehicle technology or infrastructure (staff will make a proposal to the AQMD Board in 2012), seeking funding partners, and developing other support. Additionally, SCAG will work with local transportation agencies, the Ports, and other private and public stakeholders in 2012 to identify funding for this project. Other potential co-funding sources include:

- California Energy Commission AB 118 program
- California Air Resources Board
- California greenhouse gas cap and trade auction revenues
- Federal grants
- In-kind contributions and public private partnerships with technology developers, drayage companies, etc.
- Funds available for project mitigation

Project Rationale: The Ports, vehicle manufacturers, and other entities are currently demonstrating new zero-emission truck technologies, including battery-electric, fuel-cell, and hybrid-electric trucks with all electric range (AER). The purpose of this project is to demonstrate and initially deploy wayside power technology to provide power to these and other types of vehicles along certain high-volume corridors, thus allowing extended zero-emission range. Wayside technology has been used for many decades to power electric buses, mining trucks, and rail systems. It is thus a particularly proven and promising technological approach to achieving zero-emission transport. If coupled with hybrid AER technologies currently in use for passenger cars and now being demonstrated for heavy trucks, wayside power could provide flexibility, range, and compatibility with current port, railyard, and warehouse operations. Hybrid AER trucks could produce zero-emissions along key high-volume corridors (e.g. Terminal Island Freeway, I-710, east-west freight corridor), but could operate off the electrified corridor powered by conventional natural gas or diesel fuels, by fuel cells, or—within certain range—by batteries. Such vehicles thus could provide zero emissions where most needed, and would have range to travel long distances in other modes. The Terminal Island Freeway corridor, as a short, high-volume transport corridor with substantial air pollution impacts to local communities, is an important and ideal venue to initially deploy such technology. Deployment of wayside power technology is compatible with, and builds upon, the current Port efforts to develop and demonstrate electric and hybrid-electric trucks.

Phase I: Project Scoping – continue to build on current regional research and technology testing efforts.

Phase II: Evaluation, Development, and Prototype Demonstrations – convene working groups and increase understanding of operational needs. Evaluate, develop, and test prototype trucks and wayside power options. Continue to evaluate feasibility of zero- and/or near-zero-emission rail technologies. Work with public and private-sector partners to secure funding commitments for the development of new technology prototypes and demonstrations. Evaluation in this phase will address technology readiness, operational feasibility and funding availability.

Phase III: Initial Deployment and Operational Demonstration – truck fleet evaluation testing and deployment of zero-emission trucks along the Terminal Island Freeway and connecting routes to the Ports (or alternative routes serving the same locations). Additional deployment of zero- and/or near-zero emission trucks where feasible. Advanced technology locomotive prototype testing and demonstrations.

Phase IV: Full-Scale Demonstrations and Commercial Deployment – includes implementation of regulatory and market mechanisms needed to launch commercialization. The phase 4 timeframe accommodates the different technology readiness levels of various applications.

It is important that the region work collaboratively to pursue advanced technologies and secure funding for their development and deployment. Although several regional forums currently exist, SCAG anticipates building on these efforts by establishing a logistics working group with key stakeholders. Participants may include government agencies, logistics industry representatives, and original equipment manufacturers (OEMs). Future evaluation will ensure that any technology implemented meets regional emissions objectives while maintaining the efficiency, safety, and reliability of the goods movement system.

Modeling of environmental strategies has determined that significant emissions benefits could be achieved from implementation of different zero- and/or near-zero-emission technologies. As summarized in **TABLE 2.11**, zero-emission vehicles on the East-West Freight Corridor would eliminate 4.7 tons of NOx, 0.16 tons of $PM_{2.5}$, and 2,401 tons of CO_2 emissions daily and would set the stage for broader regional deployment of zero- and/or near-zero-emission technologies. Full electrification of the rail system, though still a concept at this point, would remove comparable amounts of NOx, $PM_{2.5}$, and CO_2. Regionally, a 20 percent market penetration of plug-in hybrid trucks would achieve a reduction of 8.3 tons of NOx, 0.16 tons of $PM_{2.5}$, and 3,200 tons of CO_2 daily.

TABLE 2.11 Environmental Benefits

Strategy	Impact		
	NOx	$PM_{2.5}$	CO_2
East-West Freight Corridor with 100% Zero-Emission Vehicles (ZEVs)	4.7	0.16	2,401
Full Railroad Main Line Electrification*	10.4	0.19	2,400
20% Penetration of Plug-in Hybrid Trucks	8.3	0.16	3,200

* Further evaluation is required to determine feasible options for implementation of rail electrification or other zero- and/or near-zero-emission rail systems.
Table source: SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy

2012–2035 RTP/SCS Environmental Mitigation

SAFETEA-LU, the reauthorization of TEA-21, was enacted into law on August 10, 2005. Pursuant to Section 6001 of this legislation, statewide or metropolitan long-range plans must include a discussion of "types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan." As such, the 2012–2035 RTP/SCS includes a discussion of mitigation in order to comply with this requirement. As a public agency in California, SCAG first and foremost fulfills mitigation requirements by complying with the California Environmental Quality Act (CEQA), and as such this discussion includes a summary of mitigation as laid out in the Program Environmental Impact Report (PEIR) accompanying the 2012–2035 RTP/SCS.

In addition, as part of the planning process, states and Metropolitan Planning Organizations (MPOs) "shall consult, as appropriate, with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning the development of a long-range transportation plan." They also must consider, if available, "conservation plans and maps" and "inventories of natural or historic resources."

California law requires SCAG to prepare and certify a PEIR prior to adopting the 2012–2035 RTP/SCS. The PEIR evaluates the environmental impacts of the 2012–2035 RTP/SCS when compared to existing conditions and proposes measures at the program level to mitigate impacts to the maximum extent feasible for those resources areas that would be affected by the Plan (and associated growth). These impact areas include, but are not limited to, land use, biological resources and open space, water and greenhouse gases. The 2012–2035 RTP/SCS also acts as a "self-mitigating" plan in certain impact areas, in that its policies and strategies lead to improved environmental outcomes for air quality, public health, congestion and other indicators, while accommodating population growth. The section below summarizes the mitigation program contained within the PEIR for this plan. The general purpose of the mitigation measures included in the PEIR is to identify how to protect the environment, improve air quality, promote energy efficiency and enhance public health in concert with the proposed transportation improvements and related planning.

It should be clearly noted that the 2012–2035 RTP/SCS itself leads to improved environmental outcomes for greenhouse gases, open space preservation, and improved public health among other key environmental indicators. Nevertheless, the implementation of plan projects and strategies may lead to environmental impacts. Transportation project implementation and development decisions are subject to their own environmental review processes. This mitigation discussion, along with more detailed information in the PEIR, is laid out as an informational resource as localized impacts are identified and mitigated.

Mitigation Strategies

The PEIR provides a list of mitigation measures which would be implemented by SCAG on a regional level, in order to assist in reducing environmental impacts related to implementation of the 2012–2035 RTP/SCS. SCAG is also responsible for developing a mitigation monitoring plan to track progress on implementation of these measures at the regional level. SCAG's mitigation is consistent with the general role played by a MPO including developing and sharing information, collaborating with partners, and developing regional policies. SCAG works with member agencies and stakeholders but does not implement projects or project-specific mitigation.

In addition, an Appendix to the PEIR (Appendix G) is included which extensively lists example measures that lead agencies may consider when identifying mitigation to reduce impacts on a project-specific basis. This list is meant to serve as a resource and base of information, which does not imply feasibility or applicability for any specific project. Some of the mitigation measures included in the appendix restate or describe, whole or in part, legal requirements and regulations affecting project implementation. These are included for informational purposes, and are not intended to supersede compliance with existing law or regulation. These mitigation measures help explain to the public the existing regulatory framework that could assist in mitigating potential environmental impacts.

Conservation Planning Policy

SAFETEA-LU requires that the RTP contain a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities. This includes activities that may have the greatest potential to restore and maintain environmental functions affected by the plan [Sec. 6001(i)(2)(B)(i)]. As such, this is being addressed in the 2012–2035 RTP/SCS and is separate and distinct from the mitigation measures addressed in the PEIR. SCAG could demonstrate progress and satisfy SAFETEA-LU requirements through development of a program with the goal of large-scale acquisition and management of important habitat lands to mitigate impacts related to future transportation projects.

Suggested steps to develop a conservation policy of this type could include the following:

- Engage in a strategic planning process to determine the critical components and implementation steps for identifying and addressing open space resources;
- Identify and map regional priority conservation areas based on the most recent land use data for future consideration and potential inclusion in future plans;
- Engage with various partners, including CTCs, and build from existing local efforts to identify priority conservation areas and develop an implementable plan; and
- Develop regional mitigation policies or approaches for the 2016 RTP/SCS.

This strategy supports natural land restoration, conservation, protection and acquisition offering greenhouse gas (GHG) emissions reduction benefits. Post-2012–2035 RTP/SCS strategic planning efforts would include addressing various aspects of this proposed approach such as identifying appropriate agencies to partner with and determining specific mapping parameters (for example, geographic scale). In addition, this type of strategic planning approach could also be applied to address impacts to other resource areas.

Summary of the Environmental Mitigation Program

As required by SAFETEA-LU, the 2012–2035 RTP/SCS includes an environmental mitigation program that links transportation planning to the environment. Building on its strong commitment to the environment as demonstrated in the 2008 RTP, SCAG's mitigation program is intended to function as a resource for lead agencies to consider in identifying mitigation measures to reduce impacts anticipated to result from future projects as deemed applicable and feasible by such agencies. This mitigation discussion also utilizes documents created by federal, state and local agencies to guide environmental planning for transportation projects. The following discussion focuses on specific resource areas and example approaches to mitigate impacts in these areas.

BIOLOGICAL RESOURCES AND OPEN SPACE

The PEIR includes two regional scale maps that identify sensitive environmental resources, such as protected lands and sensitive habitats. According to the Federal Highway Administration, there are more than 3.9 million centerline miles of public roads that span the United States. Each year, millions of vertebrates – birds, reptiles, and amphibians, are killed on roads, making road kill the greatest human cause of wildlife mortality in the country.[15] As in previous RTPs, the 2012–2035 RTP/SCS seeks to minimize transportation-related impacts on wildlife, and also better integrate transportation infrastructure into the environment.

Impacts to biological resources generally include displacement of native vegetation and habitat on previously undisturbed land; habitat fragmentation and decrease in habitat connectivity; and displacement and reduction of local, native wildlife including sensitive species. Building new transportation routes and facilities through undisturbed land or expanding facilities and increasing the number of vehicles traveling on existing routes will directly injure wildlife species, cause wildlife fatalities, and disturb natural behaviors such as breeding and nesting. Without appropriate mitigation, this will result in the direct reduction or elimination of species populations (including sensitive and special-status species) and native vegetation (including special-status species and natural communities) as well as the disruption and impairment of ecosystem services provided by native habitat areas.

The biological resources mitigation program includes the following types of example measures:

- Planning transportation routes to avoid/minimize removal of native vegetation, displacement of wildlife, and impacts to regionally and locally significant habitat types such as oak woodlands, vernal pools, estuaries, lagoons, and other riparian areas;
- Including provisions for habitat enhancement such as mitigation banking, improving/retaining habitat linkages, preserving wildlife corridors and wildlife crossings to minimize the impact of transportation projects on wildlife species and habitat fragmentation;
- Conducting appropriate surveys to ensure no sensitive species' habitator special status natural communities is unnecessarily destroyed;
- Avoiding and minimizing impacts to wildlife activities (such as breeding, nesting, and other behaviors) during construction of the project by avoiding construction during critical life stages or sensitive seasons;
- Avoiding and minimizing impacts to habitat during project construction through actions such as fencing off sensitive habitat, minimizing vehicular accessibility, and salvaging native vegetation and topsoil; and
- Minimizing further impacts to wildlife and their habitats after project construction by replanting disturbed areas; providing vegetation buffers at transportation facilities with heavy traffic; and restoring local, native vegetation.

LOCATIONS FOR MITIGATION

As part of the development of the 2012–2035 RTP/SCS, SCAG prepared maps of natural resources areas, protected open space, and farmland (see Chapter 4, Exhibits 4.6, 4.7, and 4.8). These maps also show the location of county-level conservation efforts such as Habitat Conservation Plans (HCPs) and Natural Communities Conservation Plans (NCCPs). For example, Riverside County's Multiple Species Habitat Conservation Plan efforts in WRCOG and CVAG were included in the inventory of county-level conservation plans. In addition, as part of the 2008 Regional Comprehensive Plan, SCAG mapped locations of the protected and unprotected areas in relation to wildlife linkages, linkage design areas, park and recreation areas (from SCAG's 2008 land use inventory), agricultural lands, and developed lands. Together, these maps form the region's open space infrastructure. These maps will be updated as a function of post-RTP/SCS planning efforts, including identification of appropriate areas based on input from stakeholders.

[15] U.S. Department of Transportation, Federal Highway Administration, Wildlife and Highways: An Overview.

Specifically, those areas that are "unprotected" could be possible locations for future mitigation. SCAG does not have the authority to purchase or manage lands. Conservation of these areas will build upon already-established programs, including but not limited to OCTA's Measure M Mitigation Program, which ensures open space conservation in a voluntary manner working with willing land owners. SCAG will continue to work with its regional partners to help facilitate conservation.

Types of Mitigation Activities

The mitigation program of the 2012–2035 RTP/SCS generally includes strategies to reduce impacts where transportation and sensitive lands intersect and also encourages smart land use strategies that maximize the existing system and eliminate the need for new facilities that might impact open space and habitat. Potential mitigation programs include planning of transportation projects to avoid or lessen impacts to open space, recreation land, and agricultural lands through information and data sharing, increasing density in developed areas and minimizing development in previously undeveloped areas that may contain important open space.

The mitigation program also emphasizes the importance of integrating consideration of wildlife and habitat into the design of transportation facilities in those areas where impacts cannot be avoided. SCAG encourages project sponsors to review Ventura County's Wildlife Crossing Guidelines and FHWA's Critter Crossings. Both documents provide examples of context-sensitive solutions (CSS) which is a way of involving all stakeholders to develop transportation facilities that fit their physical setting and preserve scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility. CSS is an approach that considers the total context within which a transportation improvement project will exist. CSS principles include the employment of early, continuous, and meaningful involvement of the public and all stakeholders throughout the project development process. Additional information on CSS is available on FHWA's website at: http://www.fhwa.dot.gov/context/index.cfm.

In summary, the biological resources and open space mitigation program includes, but is not limited to, the following types of example measures:

- Identifying open space areas that can be preserved and developing mitigation measures such as mitigation banking, transfer of development rights (for agricultural lands), and payment of in lieu fees;
- Updating General Plan information from cities to provide the most recent land use data to the region;
- Coordinating with cities and counties on growth strategies that maximize the existing transportation network;
- Evaluating project alternatives and alternative route alignments where projects intersect with sensitive habitats; and
- Integrating the planning of transportation facilities with context-sensitive design elements such as wildlife crossings.

GREENHOUSE GASES

California is the fifteenth largest emitter of GHGs on the planet. The transportation sector, primarily, cars and trucks that move goods and people, is the largest contributor with 36.5 percent of the State's total GHG emissions in 2008. On road emissions (from passenger vehicles and heavy duty trucks) constitute 93 percent of the transportation sector total. Emissions from passenger vehicles, which are subject to SB 375 and this 2012–2035 RTP/SCS, constitute 78 percent of the state's GHG emissions from the transportation sector. In order to disclose potential environmental effects of the 2012–2035 RTP/SCS, SCAG has prepared an estimated inventory of the region's existing GHG emissions, identified mitigation measures, and compared alternatives in the PEIR. Although the 2012–2035 RTP/SCS demonstrates a reduction in per capita greenhouse gas emissions and meets SB 375 targets, mitigation is identified here in summary form, and in the PEIR, to provide information on how GHG can be reduced from other sectors as well as through subsequent planning and implementation.

The GHG mitigation program includes, but is not limited to, the following types of example measures:

- Land use changes included in the SCS that reduce the number and length of trips;
- Encouragement of green construction techniques such as using the minimum amounts of GHG emitting construction equipment;
- Public outreach campaigns publicizing the importance of reducing GHG emissions; and
- Promotion of pedestrian and bicycle as modes of transportation.

AIR QUALITY

The 2012–2035 RTP/SCS includes programs, policies and measures to address air emissions. Measures that help mitigate air emissions are comprised of strategies that reduce congestion, increase access to public transportation, improve air quality, and enhance coordination between land use and transportation decisions. SCAG's vision includes the introduction of a high-speed, high-performance regional transport system that may potentially reduce airport and freeway congestion and provide an alternative to the single-occupancy automobile. In order to disclose potential environmental effects of the 2012–2035 RTP/SCS, SCAG has prepared an estimated inventory of the region's emissions, identified mitigation measures, and compared alternatives in the PEIR. The mitigation measures seek to achieve the maximum feasible and cost-effective reductions in emissions. As noted above under "Greenhouse Gases," the Plan shows across-the-board improvements air emissions. Nevertheless, mitigation is identified for information and to aid in subsequent planning and project delivery.

The air quality mitigation program includes, but is not limited to, the following example measures:

- ARB measures that set new on-road and off-road engine standards and accelerate turnover of higher emitting engines from the in-use fleet;
- Project specific measures to reduce impacts from construction activities such as the use of water and dust suppressants and restrictions on trucks hauling dirt, sand and soil; and
- Incorporating planting of shade trees into construction projects where feasible.

In addition, the 2012–2035 RTP/SCS includes Transportation Control Measures (TCMs), which are those projects that reduce congestion and improve air quality in the region. For a comprehensive discussion and details of TCMs, please see the Transportation Conformity Analysis appendix.

TRANSPORTATION AND SAFETY

The 2012–2035 RTP/SCS takes into account the population, households, and employment projected for 2035, and therefore the largest demand on the transportation system expected during the lifetime of the plan. In accounting for the effects of regional population growth, the model output provides a regional, long-term and cumulative level of analysis for the impacts of the 2012–2035 RTP/SCS on transportation resources. The regional growth, and thus, cumulative impacts, is captured in the vehicle miles traveled (VMT), vehicle hours traveled (VHT), and heavy-duty truck VHT data.

Implementation of the 2012–2035 RTP/SCS includes a series of projects which are described in the 2012–2035 RTP/SCS. Consistent with SB 375 Regional Target Advisory Committee's final report to the California Air Resources Board, the 2012–2035 RTP/SCS includes projects and strategies "to smooth extreme congestion to more carbon friendly speeds." A subset of projects included in the 2012–2035 RTP/SCS reduces GHG emissions by providing relief of existing and projected congestion. Those include toll roads, express lanes, high occupancy vehicle lanes, and dedicated truck toll lanes. Congestion pricing is a transportation demand management tool incorporated into the 2012–2035 RTP/SCS for reducing GHG emissions. More information on SCAG's congestion management efforts can be found in Chapter 2, Transportation Investments. Orange County's Toll Road Network is a prime example of priced congestion relief projects.

The 2035 transportation system performance is compared to the performance of the existing (2011) system for the purpose of determining the significance of impacts. The SCAG region is vulnerable to numerous threats that include both natural and human-caused incidents. As such, a mitigation program related to safety is included in the PEIR. The mitigation program for the 2012–2035 RTP/SCS aims for extensive coordination, collaboration and flexibility among all of the agencies and organizations involved in planning, mitigation, response and recovery.

The transportation and safety mitigation program includes, but is not limited to, the following types of example measures:

- Increasing rideshare and work-at-home opportunities to reduce demand on the transportation system;
- Investments in active transportation and maximizing the benefits of the land use transportation connection;
- Transportation Demand Management (TDM) measures;
- Goods movement capacity enhancements;
- Key transportation investments targeted to reduce heavy-duty truck delay;
- Establishing transportation infrastructure practices that promote and enhance security;
- Helping to enhance the region's ability to deter and respond to terrorist incidents, and human-caused or natural disasters by strengthening relationships and coordination with transportation agencies; and
- Working to enhance emergency preparedness awareness among public agencies and with the public at large.

POPULATION AND HOUSING

Transportation projects including new and expanded infrastructure are necessary to improve travel time and can enhance quality of life for those traveling throughout the region. The package of transportation improvements in the 2012–2035 RTP/SCS is designed to accommodate total growth while allowing for mobility. The Plan would not affect the total growth in population in the region. The 2012–2035 RTP/SCS can affect the distribution of that growth. Land use and housing impacts associated with transportation projects, such as dividing established communities through right-of-way acquisition, can occur at a localized scale.

The population and housing mitigation program includes, but is not limited to, the following types of example measures:

- Encourage project implementation agencies to provide relocation assistance, as required by law, for residences and businesses displaced; and
- Encourage project implementation agencies to design new transportation facilities that consider existing communities.

LAND USE

The 2012–2035 RTP/SCS contains transportation projects to help more efficiently distribute population, housing, and employment growth, as well as a forecasted pattern of development described in detail in the SCS (Chapter 4). These transportation projects are generally consistent with the county- and regional-level general plan data available to SCAG; however, general plans are not updated consistently. The Plan includes a projected pattern of development that, in order to maximize the effectiveness of the transportation system, differs from local General Plan land uses beyond 2020.

The land use mitigation program includes, but is not limited to, the following types of example measures:

- Encourage cities and counties to update their general plans and provide the most recent plans to SCAG;
- Work with member cities to encourage that transportation projects are consistent with the 2012–2035 RTP/SCS and general plans; and
- Work with cities and counties to encourage general plans reflect 2012–2035 RTP/SCS policies.

AESTHETICS

The SCAG region includes several highway segments that are recognized by the State as designated scenic highways or are eligible for such designation. Construction and implementation of projects in the 2012–2035 RTP/SCS could impact designated scenic highways and restrict or obstruct views of scenic resources such as mountains, ocean, rock outcroppings, etc. In addition, some transportation projects could add urban visual elements, such as transportation infrastructure (highways, transit stations) to previously natural areas.

In summary, the aesthetics mitigation program includes, but is not limited to, the following types of example measures:

- Encourage project implementation agencies to implement design guidelines to protect views of scenic corridors; encourage project implementation agencies to use construction screens and barriers that complement the existing landscape;
- Encourage project implementation agencies to complete design studies for projects in designated or eligible scenic highways; and
- In visually sensitive areas, encourage local land use agencies to apply development standards and guidelines that maintain compatibility.

PUBLIC SERVICES AND UTILITIES

As noted above under “Population and Housing,” the 2012–2035 RTP/SCS will not affect the total amount of growth in the region, nor will it increase growth for any jurisdiction beyond local input. As such, any impacts to public services and utilities are identified only in relation to existing conditions or at a localized scale. These impacts generally include additional demands on fire and police services, schools and landfills. Additional police and fire personnel would be needed to adequately respond to emergencies and routine calls, particularly on new or expanded transportation facilities. Other potential impacts at a localized scale could entail demands on public schools, solid waste facilities and disposal facilities.

In summary, the public services and utilities mitigation program includes, but is not limited to, the following types of example measures:

- Encourage the project implementation agencies to identify police protection, fire service, emergency medical service, waste collection and public school needs and coordinate with local officials to ensure that the existing public services would be able to handle the increase in demand for their services;
- Encourage the project implementation agencies to identify the locations of existing utility lines and avoid all known utility lines during construction;
- Encourage green building measures to reduce waste generation and reduce the amount of waste sent to landfills; and
- Encourage the use of fire-resistant materials and vegetation when constructing projects in areas with high fire threat.

As the region continues to add more people, households and jobs, the demand for energy will continue to grow. Every day, the SCAG region consumes more than 23 million gallons of oil and the SCAG region's vehicle fuel consumption has increased 20 percent over the last ten years. In the face of this growth in energy demand and concerns about future oil supplies, there is the mounting realization that we are living in an energy-constrained world. As such, the 2012–2035 RTP/SCS includes strategies to reduce VMT, and as a result, per capita energy consumption from the transportation sector. The PEIR also includes measures relating to energy designed to reduce consumption and increase the use and availability of renewable sources of energy in the region. Since these measures not only reduce energy consumption but also reduce GHG emissions they are addressed above under the GHG section.

SCAG acknowledges the substantial efforts occurring locally to reduce energy consumption including, but not limited to, the Palmdale Energy Action Plan, the City of San Bernardino Energy Efficiency Conservation Strategy, and energy efficiency partnerships in the San Gabriel Valley, South Bay Cities Council of Governments, Coachella Valley Association of Governments, Ventura County, and Los Angeles County. These efforts demonstrate a commitment to achieving energy efficiency and sustaining economic, environmental, and physical health at the local and regional levels. They also provide a good starting point for any subsequent planning and analysis at the regional level.

GEOLOGY, SOILS, AND SEISMICITY

Impacts to geological resources generally include the disturbance of unstable geologic units (rock type) or soils, causing the loss of topsoil and soil erosion, slope failure, subsidence, project-specific seismic activity and structural damage from expansive soils. These activities, in addition to building projects on and around Alquist-Priolo Fault Zones and other local faults, could expose people and/or structures to the risk of loss, injury, or death.

The geological mitigation program includes, but is not limited to, the following types of example measures:

- Employing appropriate grading, construction practices, siting, and design standards, such as adherence to the California Building Code and State of California design standards;
- Obtaining site-specific geotechnical data from qualified geotechnical experts; and
- Encouraging compliance with all relevant local, state, and federal construction and design requirements for structures located on or across Alquist-Priolo Fault Zones and other local faults.

CULTURAL RESOURCES

Impacts to cultural resources generally include substantial adverse changes to historical and archaeological resources and direct or indirect changes to unique paleontological resources or sites or unique geological features. Similar to the discussion under "Land Use and Housing," these impacts can occur at the localized scale and in relation to existing conditions, as the Plan itself does not affect the total amount of growth in the region. Adverse changes include the destruction of culturally and historically (recent or geologic time) significant and unique historical, archaeological, paleontological, and geological features.

The cultural resources mitigation program includes, but is not limited to, the following types of example measures:

- Obtaining consultations from qualified cultural and paleontological resource experts to identify the need for surveys and preservation of important historical, archaeological, and paleontological resources;
- Implementing design and siting measures that avoid disturbance of cultural and paleontological resource areas, such as creating visual buffers/landscaping or capping/filling the site to preserve the contextual setting of the resource;
- Monitoring construction activity in areas with moderate to high potential to support paleontological resources and overseeing salvage operations of paleontological resources; and
- Consulting local tribes and the Native American Heritage Commission for project impacts to sacred lands and burial sites.

WATER RESOURCES

Impacts to water resources from the 2012–2025 RTP/SCS include potential water quality impairment from increased impervious surfaces. Increased impervious surfaces in water recharge areas potentially impact groundwater recharge and groundwater quality. Cumulative impacts include increased impervious surfaces; increased development in alluvial fan floodplains; and increased water demand and associated impacts, such as drawdown of groundwater aquifers. Similar to the discussion under "Land Use and Housing," these impacts can occur at the localized scale and in relation to existing conditions, as the Plan itself does not affect the total amount of growth in the region. Increased output of greenhouse gases from the region's transportation system impacts the security and reliability of the imported water supply.

The water resources mitigation program includes, but is not limited to, the following types of example measures:

- Utilizing advanced water capture and filtration techniques, showing a preference for naturalized systems and designs, to control stormwater at the source;
- Avoiding any new construction of impervious surfaces in non-urbanized areas, such as wetlands, habitat areas, parks, and near river systems;
- Avoiding any new construction that provides access to flood-prone areas, such as in alluvial fans and slide zones;
- Protection and preservation of existing natural flood control systems, such as wetlands and riparian buffers, and expansion of such systems in areas where they do not currently exist;
- Constructing projects according to Best Management Practices for water quality protection and water conservation, including low-impact development and green building standards; and
- Coordinating project development and construction efforts across jurisdictional, agency, and departmental boundaries, to increase project benefits.

HAZARDOUS MATERIALS

Implementation of the 2012–2035 RTP/SCS would affect the transportation and handling of hazardous materials in the SCAG region. Expected significant impacts include risk of accidental releases due to an increase in the transportation of hazardous materials and the potential for such releases to reach neighborhoods and communities adjacent to transportation facilities. The hazardous materials mitigation program aims to minimize the significant hazard to the public or the environment that involves the release of hazardous materials into the environment. Potential mitigation programs include active coordination with regulatory agencies and first responders in order to ensure proper handling and transport of hazardous materials and their containers.

Mitigation measures also involve ensuring that the project implementation agency complies, when applicable and feasible, with all laws, regulations, and health and safety standards set forth by federal, state, and local authorities that regulate the proper handling of such materials and their containers and that the routine transport, use, and disposal of hazardous materials does not create a significant hazard to the public or the environment.

The hazardous materials mitigation program includes, but is not limited to, the following types of example measures:

- Coordinating with regulatory agencies and first responders in order to continue to govern goods movement and hazardous materials transportation throughout the region;
- Considering existing and known planned school locations when determining the alignment of new transportation projects and modifications to existing transportation facilities;
- Encouraging project sponsors to consider published lists of contaminated properties, which are continually updated, in order to identify cases where new development would involve the disturbance of contaminated properties;
- Developing applicable mitigation measures to assure that worker and public exposure is minimized to an acceptable level and to prevent any further environmental contamination as a result of construction; and
- Encouraging that project implementation agencies comply with all applicable laws, regulations, and health and safety standards set forth by federal, state, and local authorities that regulate the proper handling of such materials and their containers and that the routine transport, use, and disposal of hazardous materials does not create a significant hazard to the public or the environment.

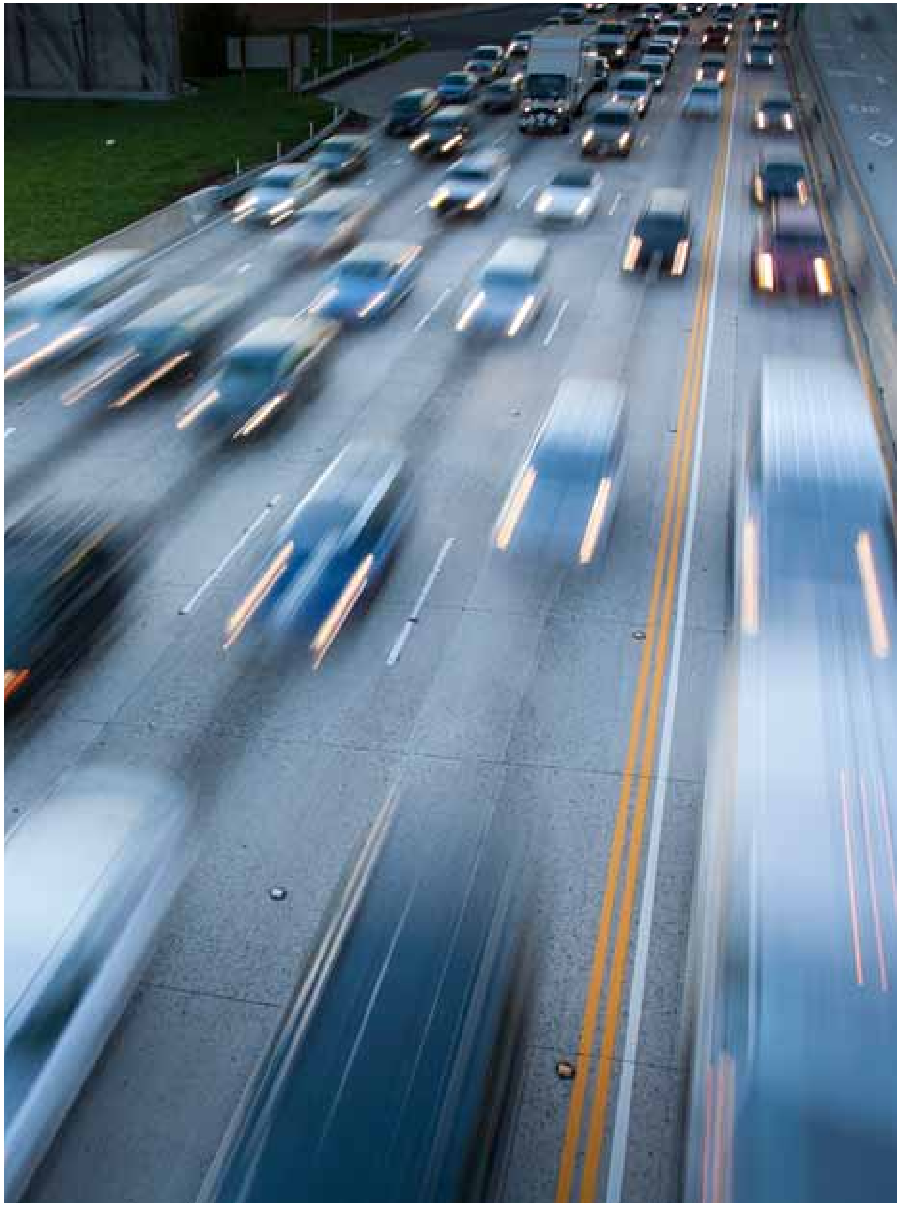
NOISE

Some of the principal noise generators within the SCAG region are associated with transportation (i.e., airports, freeways, arterial roadways, seaports, and railroads). Additional noise generators include stationary sources, such as industrial manufacturing plants and construction sites. Noise impacts resulting from the 2012–2035 RTP/SCS generally include exposure of sensitive receptors to noise in excess of normally acceptable noise levels or substantial increases in noise as a result of the operation of expanded or new transportation facilities. As such, the noise mitigation program includes measures designed to minimize the impact of noise on sensitive receptors. These measures include encouraging that project implementing agencies, when applicable and feasible, comply with all local sound control and noise level rules, regulations, and ordinances; utilizing the best available noise control techniques (including mufflers, intake silencers, ducts, engine enclosures and acoustically attenuating shields or shrouds) in order to minimize construction noise impacts; and utilizing land use planning measures, such as zoning, restrictions on developments, buffers, etc., to minimize exposure to sensitive receptors.

The noise mitigation program includes, but is not limited to, the following types of example measures:

- Encouraging project implementing agencies to comply with all local sound control and noise level rules, regulations, and ordinances;
- Developing the best available noise control techniques in order to minimize construction noise impacts;
- Conducting a project-specific noise evaluation as part of the appropriate environmental review of each project; and
- Encouraging project implementation agencies to maximize the distance between noise-sensitive land uses and new roadway lanes, roadways, rail, transit centers, park-and-ride lots, and other new noise-generating facilities.

03 FINANCIAL PLAN



Introduction

The financial plan identifies how much money is available to support the region's surface transportation investments, including transit, highways, local road improvements, system preservation, and demand management goals. It also addresses the need for investment in goods movement infrastructure. Improving ground access in and around major goods movement facilities and enhancing major highways and railways are critical to maintaining the health of Southern California's economy. The 2012–2035 RTP/SCS calls for traditional and non-traditional revenue sources for implementing a program of infrastructure improvements to keep freight and people moving.

The 2012–2035 RTP/SCS includes a number of reasonably available revenue sources to supplement existing transportation dollars. The SCAG region's financially constrained plan includes a core revenue forecast of existing local, state, and federal sources along with funding sources that are reasonably available over the time horizon of the RTP/SCS. The financial plan also includes action steps to obtain the revenues necessary for implementing the region's transportation vision.

SCAG acknowledges the considerable challenges associated with financing transportation investments. The plan highlights the importance of finding new and innovative ways to pay for transportation, including our ever-expanding backlog of investment needs just to maintain the existing transportation system. Nationally, we are facing a very real, near-term insolvency crisis with the Federal Highway Trust Fund, as fuel tax receipts continue to take a precipitous decline. Additionally, the viability of California's State Highway Account remains in question, as only a fraction of our needs are funded through state sources.

To backfill limited state and federal sources, our region continues to rely upon local initiatives (74 percent of core revenues) to meet transportation needs. With a total of seven sales tax measures throughout the region, including the passage of Measure R in Los Angeles County since the adoption of the 2008 RTP, we are increasingly becoming self-reliant. However, the national purpose served by Southern California's transportation system—particularly in the movement of goods—points to the need for stronger state and federal commitment. Our transportation system is the responsibility of all levels of government.

In the SCAG region, our decision-makers continue to take a leadership role in advancing innovative transportation solutions. The financial plan establishes a framework toward a more sustainable funding future with emphasis on continued research and development for transitioning our fuel tax-based system toward a more direct, user fee approach. Such a change requires additional investigation and legislative action by state and federal leaders over the time horizon of the plan. Our region has undertaken numerous policy and technical studies in recent years and will continue to make a commitment toward further examining and demonstrating user fee systems, including toll networks and mileage-based user fees.

We have successfully implemented toll systems in the past with the Transportation Corridor Agencies' network of privately financed toll roads and the SR-91 Express Lanes in Orange County. This kind of innovation in transportation continues and offers further opportunities to leverage, including public-private partnerships, as neighboring counties within our region consider a broader network of toll systems. Moreover, federal programs have recently supported demonstration initiatives in the region (e.g., I-110 and I-10 Congestion Reduction Demonstration Program in Los Angeles County). We have secured the necessary resources identified to support transportation investments proposed in past RTPs. This plan will continue to meet the necessary milestones for implementation.

In developing the financial plan, SCAG followed a few basic principles to guide its regional financial forecast:

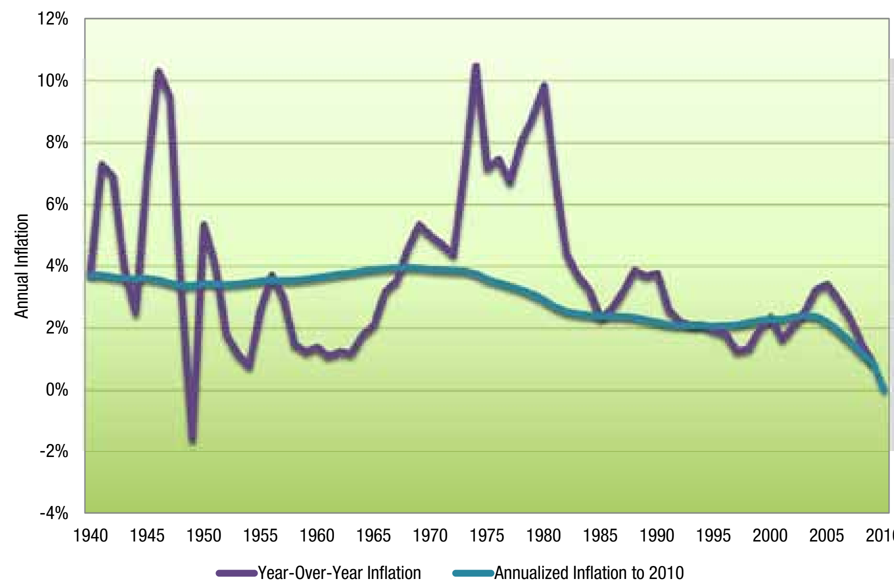
- Incorporate financial planning documents developed by local county transportation commissions and transit operators in the region, where available
- Ensure consistency with both local and state planning documents
- Utilize published data sources to evaluate historical trends and augment local forecasts, as needed
- Recommend new, reasonably available funding sources that target beneficiaries of transportation investments

The rest of the financial plan outlines our financial strategies and provides documentation of the financial assumptions and methodologies used for forecasting revenues and expenditures.

Economic Outlook

Overall economic conditions play a large role in determining the level of revenues available for transportation through 2035. SCAG's financial model takes a conservative approach when forecasting the latter years of the RTP/SCS planning horizon. The approach also reflects historical growth trends and reasonable future expectations for key revenue sources, including locally generated sales tax revenues as well as state and federal gas excise tax revenues. The inability of existing excise taxes to keep pace with increasing transportation needs and the detrimental effects of increasing fuel economy on traditional revenue sources are key considerations in the financial plan.

FIGURE 3.1 Historical Inflation Trends



Source: Office of Management and Budget, Budget of the United States Government, Fiscal Year 2011 Budget (FY2011)

Inflation

SCAG's revenue model takes into account historical inflation trends measured by the Gross Domestic Product (GDP) Price Deflator—an approach consistent with the one used by the Federal Office of Management and Budget in preparing the Budget of the United States Government. Inflation can have a profound effect over the long term, particularly during the final years of the plan, when inflation has had nearly 25 years to erode the value of money.

FIGURE 3.1 shows the trends in inflation since World War II as measured by the GDP Price Deflator. Inflation rates have varied considerably over the time period. However, inflation has dropped dramatically since the late 1970s, when the Federal Reserve needed to adopt measures to "tame" inflation. The recession has put additional downward pressure on the inflation rate and caused some economists to worry about the potential eroding effects of deflation, but inflation has remained positive. Over the long term, inflation has trended between 2 and 4 percent. On the basis of this information, a 2.9 percent inflation rate is used to adjust constant dollar (revenue) forecasts into nominal (or year-of-expenditure) dollars.

Construction Cost Increases

While inflation clearly affects the nominal dollars reported for future revenues, the rise in construction costs can further erode the purchasing power of transportation revenues. After spiking dramatically in 2007, construction costs have corrected in recent years. **FIGURE 3.2** shows the increase and decline in California highway construction costs since the early 1970s. The United States Army Corps of Engineers Index for Roads, Railroads, and Bridges shows similar trends. While the recent correction in construction costs has slowed the longer-term increase in costs, the growth still remains above general inflation. The financial plan uses a 3.2 percent annual inflation factor to estimate future, nominal costs. The faster increase in construction costs than in revenues contributes to a decline in purchasing power for transportation funding over the planning period.

FIGURE 3.2 Highway Project Costs

Source: California Department of Transportation

Retail Sales Growth

Changes in personal consumption, population, available land, and retail locations are the biggest contributors to the growth in retail sales. The recession has dealt a blow to retail sales, which reached their peak in FY2007. Retail sales have begun to improve and are expected to rise over the RTP/SCS planning period. Over the 30-year period from FY1979 to FY2009, retail sales grew 1.4 percent in real terms (when the effects of inflation are eliminated). However, the growth was uneven. The financial plan assumes uneven growth will continue to occur, with retail sales growth ranging from 1.2 percent to 3.9 percent in real terms.

Fuel Consumption

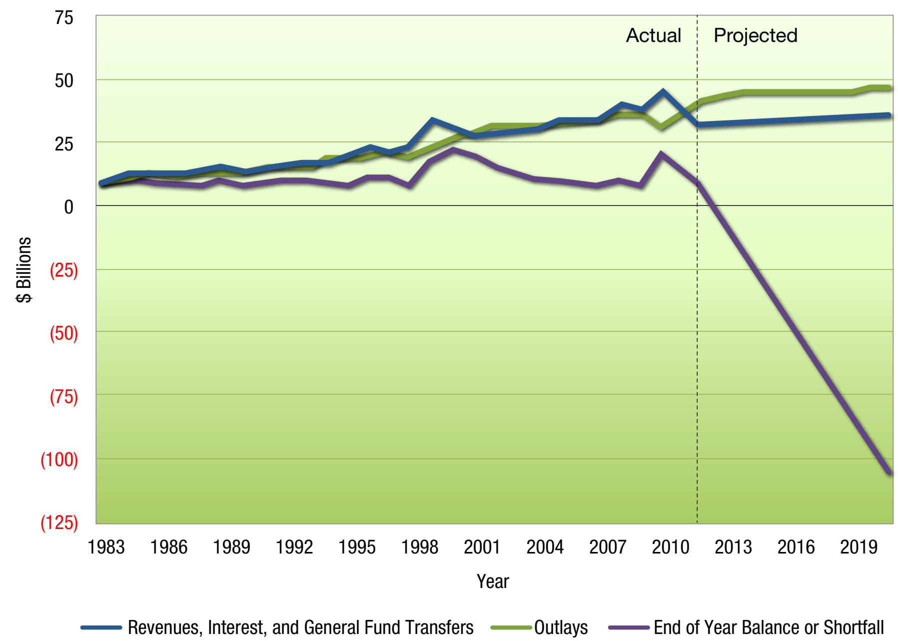
Excise taxes on gasoline and diesel fuels are the basis of most available federal and state transportation funding sources. Since these taxes are levied on a cents-per-gallon basis, they are dependent solely on fuel consumption and are not indexed to inflation or construction costs. Over the last several decades, total fuel consumption and the excise taxes generated grew due to increases in vehicle miles traveled (VMT). While changes in VMT will continue to play a role during the planning period, increases in conventional fuel economy and the adoption of alternative fuel vehicles will reduce overall fuel consumption. The financial plan assumes that increases in vehicle fuel efficiency will reduce fuel consumption by 1 percent per year during the planning period.

Status of the Federal Highway Trust Fund

The Federal Highway Trust Fund provides federal highway and transit funding from a nationally imposed 18.3-cent-per-gallon gasoline excise tax. The health of the Trust Fund is of significant concern. Expenditures authorized under the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) have outstripped revenues generated by the excise tax. Since 2008, the Trust Fund has failed to meet its obligations and has required the United States Congress to authorize $34.5 billion in transfers from the General Fund to keep it solvent.

FIGURE 3.3 shows a chart from a recent Congressional Budget Office (CBO) analysis of the Federal Highway Trust Fund. The negative balances shown on the chart illustrate the projected inability of the Trust Fund to pay its obligations into the highway account as incurred by the states. Since the Trust Fund cannot incur negative balances under current law, the difference would need to be made up by General Fund transfers or slower spending on programs financed by the Trust Fund.

FIGURE 3.3 Status of the Federal Highway Trust Fund



Source: Congressional Budget Office

At the time of the RTP/SCS, Congress is on its ninth extension to SAFETEA-LU without substantive agreement on a long-term solution to provide adequate funding for the Trust Fund despite two national commissions established under SAFETEA-LU that called for immediate action to increase fuel taxes and transition to a mileage-based user fee over the longer term. The financial plan assumes that Congress will reach agreement on maintaining solvency of the Trust Fund over the planning period. However, the core revenues available from the Trust Fund are expected to decline due to increasing fuel efficiency.

Status of the State Highway Account

The viability of the State Highway Account remains another critical issue. Despite a recent "Gas Tax Swap," the effective state fuel excise tax rates have remained unadjusted for more than 15 years. The excise tax revenues, however, remain the only source of funding for the State Highway Operation and Protection Program (SHOPP), which finances projects to maintain the State Highway System.

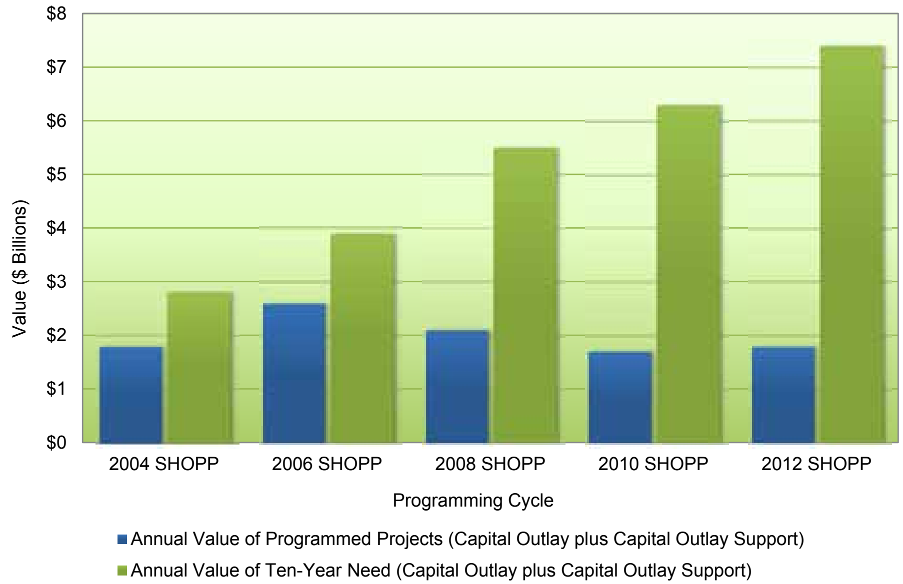
Despite the entire State Highway Account being dedicated to the SHOPP in some years, previous levels of funding have been considerably less than actual needs (see **FIGURE 3.4**). Continued underinvestment in the rehabilitation and maintenance needs of the State Highway System has serious ramifications—rapidly increasing the number of distressed lane-miles on the State Highway System and eroding the condition of the state's bridges. As a result, the cost of bringing the highway assets back to a state of good repair is expected to grow exponentially.

Statewide, the 2011 Ten-Year SHOPP Plan identifies $7.4 billion in statewide annual needs, while expenditures programmed for the next four years are only $1.8 billion annually. Increased fuel efficiency will further erode State Highway Account funding available over the RTP/SCS planning period.

State Gas Tax Swap

In 2010, state gasoline sales tax revenues were "swapped" for an increased state excise tax. Effective July 1, 2010, the gasoline excise tax increased by 17.3 cents. On July 1, 2011, sales taxes on diesel fuel increased by 1.75 percent and the excise tax decreased by a corresponding amount. To partially backfill the State Transit Assistance funding to local transit operators, their share increased from two-thirds to 75 percent. Each year, the California State Board of Equalization is required to adjust the excise tax so that the state Gas Tax Swap remains revenue neutral. As a result, the financial plan assumes that the state Gas Tax Swap generates the same revenues as generated under the prior state sales tax on gasoline.

FIGURE 3.4 Status of the State Highway Operation and Protection Program



Source: California Department of Transportation, 2011 Ten-Year SHOPP Plan

Air Quality Attainment

Air quality determines the amount of Congestion Mitigation and Air Quality (CMAQ) funding available to the SCAG region. SCAG expects that the region will be in attainment for a number of pollutants and the severity level for other pollutants will lessen as a result of air quality initiatives. The financial plan assumes that CMAQ funding will decline by 25 percent in 2020 and another 25 percent in 2025 as a result of these air quality improvements.

Local Sales Tax Measures

As a means of backfilling declining federal and state sources, the SCAG region continues to rely heavily on local sales tax measures for the timely delivery of transportation projects. Most counties in the region voted to support local sales taxes to fund transportation projects. Ventura County is the only county in the region without a dedicated sales tax for transportation. While most counties impose a 0.5 percent sales tax to fund transportation projects, Los Angeles County levies a permanent 1 percent tax (a combination of two half-cent sales taxes).

Since the 2008 RTP, voters in Los Angeles County have passed Measure R, which imposes an additional 0.5 percent sales tax to fund transportation projects. Unlike the other Los Angeles County sales taxes, Measure R is not permanent and expires in 2039.

Additionally, several local sales taxes have been renewed in recent years. Prior to the 2008 RTP, Orange, Riverside, and San Bernardino Counties extended their sales tax measures through 2039 or beyond. Since the 2008 RTP, Imperial County has renewed its Measure D through 2050. As a result of these extensions, revenues from the local sales tax measures will be available for the entire RTP/SCS planning period.

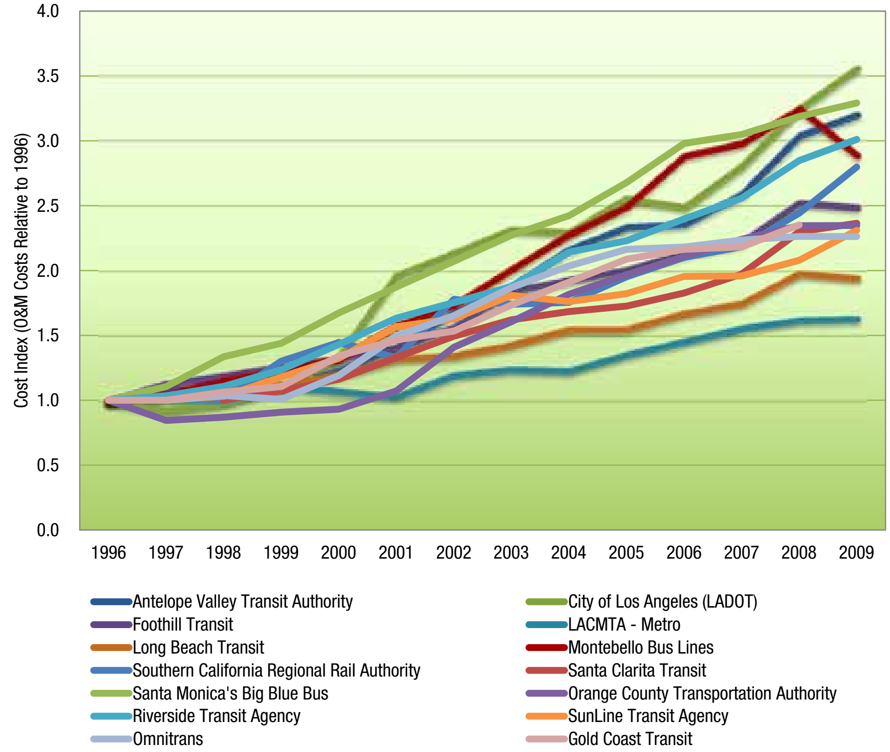
Transit Operating and Maintenance (O&M) Costs

Future transit O&M costs are difficult to predict because they depend on a variety of factors, such as future revenue-miles of service, labor contracts, and the age of rolling stock. The addition of new transit service and capital projects, such as the Exposition Transit Corridor, can add to ongoing O&M costs. Over the last decade, these O&M costs grew 1 to 10 percent annually, depending on the transit operator (see **FIGURE 3.5**). Some of the differences in O&M growth are due to rapid expansion among the newer operators and outsourcing among the older operators.

For the RTP/SCS, transit O&M costs are estimated based upon historical increases:

- The regional average increase (3.6 percent) is used for most operators. This assumes that some of the extraordinary increases for individual operators due to rapid expansion will not continue into the future.
- For Los Angeles County, the financial plan relies on detailed forecasts from the county transportation commission. These forecasts are consistent with historical data and take into account large shifts in O&M costs due to major capital projects.

FIGURE 3.5 Growth in Transit Operating and Maintenance Costs



Source: SCAG Analysis of National Transit Database Statistics

Multimodal System Preservation and Maintenance

Along with deferred maintenance on the State Highway System, the SCAG region faces the need to improve the state of good repair on local streets and roads and in the transit system. In an effort to quantify the extent of transit needs, the California Transit Association in conjunction with Caltrans and the Federal Transit Administration conducted a study of California's unmet transit funding needs. In a similar vein, the League of California Cities and the California State Association of Counties estimated future system preservation and maintenance needs to bring the local streets and roads to a state of good repair. **TABLE 3.1** summarizes the total system preservation and maintenance needs assumed in the RTP/SCS to bring transit, local streets and roads, and the State Highway System to a state of good repair. While the plan includes long-term resources for system preservation, mechanisms to ensure local control will continue to be developed through subsequent implementation efforts.

TABLE 3.1 Multimodal System Preservation and Maintenance Needs (in Nominal Dollars, Billions)

System	State of Good Repair Needs Included in Estimate	Estimated State of Good Repair Cost
Transit	O&M Existing Service; O&M Service Expansion; O&M Major New Service; Preservation	$139.3
Local Streets and Roads	Pavement; Essential Components; Bridges	$20.9
State Highway	Bridges, Pavement, Roadside; Mobility, Collision Reduction; Mandates, Facilities; Emergency Response	$56.7
Total		**$216.9**

Debt Service

Local agencies in the SCAG region have historically relied on debt financing to ensure that revenues are available to meet the cashflow requirements of future expenditures. The Los Angeles County Metropolitan Transportation Authority has a detailed county financial model that estimates debt service on a project basis. Other county transportation commissions prepare debt service forecasts for rating agencies and report current debt service in their comprehensive annual financial reports (CAFRs). The financial plan includes all outstanding commitments and interest payments on future bonds and commercial paper. Issued debt is expected to remain under debt ceilings.

Revenue and Expenditure Categories

Core and Reasonably Available Revenues

For the 2012–2035 RTP/SCS financial plan, SCAG prepared two types of revenue forecasts. Both are included in the financially constrained plan:

- Core revenues
- Reasonably available revenues

The *core revenues* identified are those that have been committed or historically available for the building, operation, and maintenance of the current roadway and transit systems in the SCAG region. Essentially, these revenues are existing transportation funding sources projected to FY2035. The core forecast does not include future increases in state or federal gas excise tax rates (other than the pro forma increases in the state excise tax due to the state gasoline sales tax swap) or adoptions of regional gasoline taxes, vehicle miles traveled (VMT) taxes, and new tax measures. These revenues provide a benchmark from which additional funding can be identified.

The region's *reasonably available revenues* include new sources of transportation funding likely to materialize within the plan timeframe. These sources include adjustments to existing state and federal gas tax rates based on historical trends and recommendations from two national commissions (National Surface Transportation Policy and Revenue Study Commission and National Surface Transportation Infrastructure Financing Commission) created by Congress; further leveraging of existing local sales tax measures; value capture strategies; potential national freight program/freight fees; as well as passenger and commercial vehicle tolls for specific facilities. Reasonably available revenues also include innovative financing strategies, such as private equity participation. In accordance with federal guidelines, the plan includes strategies for ensuring the availability of these sources.

Expenditure Categories

Transportation expenditures in the SCAG region can be summarized into three main categories:

- Capital costs for state highways, regionally significant arterials, local streets and roads, as well as transit
- Operating and maintenance costs for state highways, regionally significant arterials, local streets and roads, as well as transit
- Debt service payments for current and anticipated bond issuances

Core Revenues

A regional revenue model was developed to forecast the revenues over the entire plan time horizon. The revenue model is comprehensive and supports analysis by county or funding source. The basic process for developing the revenue forecast is to:

- Build on the revenue forecasts provided by the county transportation commissions.
- Add assumptions based on historical data.
- Compare historical data to Short-Range Transit Plans and other agency documents.
- Conduct Monte Carlo sensitivity testing of assumptions.
- Work with the county transportation commissions to modify assumptions and forecasts as needed.

The region's revenue forecast horizon for the financial plan is FY2011 through FY2035. Consistent with federal guidelines, the plan takes into account inflation and reports statistics in nominal (year of expenditure) dollars. **TABLE 3.2** shows these core revenues in five-year increments by county.

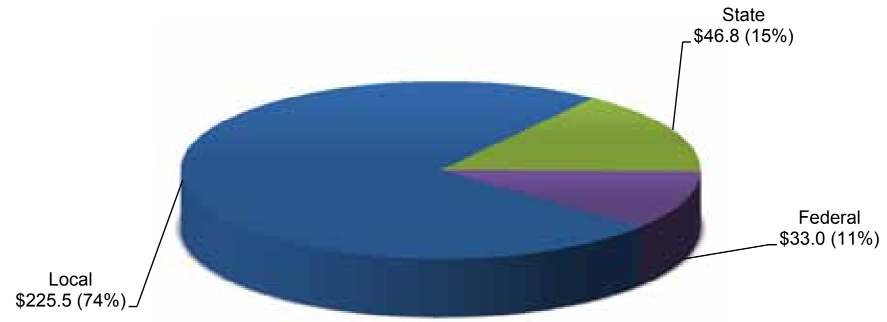
As shown in **FIGURE 3.6**, the majority of revenues in the SCAG region come from local sources. The share of state sources (15 percent) has declined since the last RTP (20 percent) as a result of the forecasted decline in fuel consumption and the increased share of local funds resulting from adoption of an additional sales tax in Los Angeles County.

TABLE 3.2 Core Revenue Forecast FY2011–FY2035 (in Nominal Dollars, Billions)

County	FY2011–FY2015	FY2016–FY2020	FY2021–FY2025	FY2026–FY2030	FY2031–FY2035	Total
Imperial	$0.3	$0.3	$0.4	$0.4	$0.5	$1.9
Los Angeles	$29.4	$32.7	$38.5	$46.2	$53.4	$200.2
Orange	$7.3	$8.1	$9.5	$11.3	$13.4	$49.6
Riverside	$4.2	$4.6	$5.1	$5.9	$6.8	$26.6
San Bernardino	$3.4	$4.0	$4.4	$5.0	$5.6	$22.4
Ventura	$0.8	$0.8	$0.9	$1.0	$1.2	$4.6
Total	**$45.3**	**$50.3**	**$58.7**	**$69.7**	**$80.9**	**$305.3**

Source: SCAG Revenue Model 2011
Note: Numbers may not sum to total due to rounding

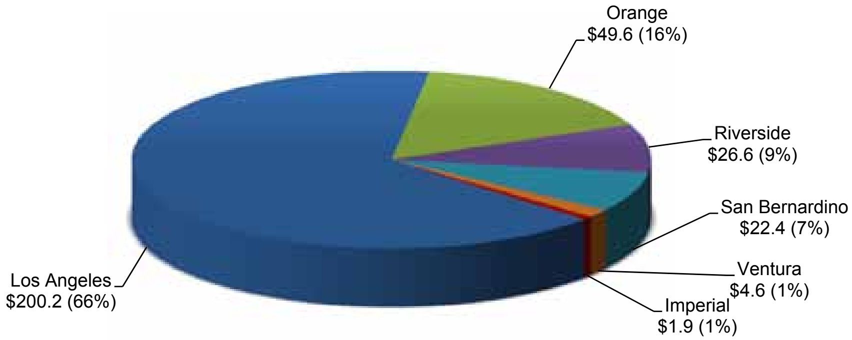
FIGURE 3.6 Core Revenues (in Nominal Dollars) $305.3 Billion Total



Source: SCAG Revenue Model 2011
Note: Numbers may not sum to total due to rounding

FIGURE 3.7 shows the breakdown of revenues by county. With the adoption of Measure R, Los Angeles accounts for nearly two-thirds (65 percent) of the funding available in the SCAG region. This is an increase from the 56 percent share in the 2008 RTP.

FIGURE 3.7 Core Revenues by County (in Nominal Dollars) $305.3 Billion Total

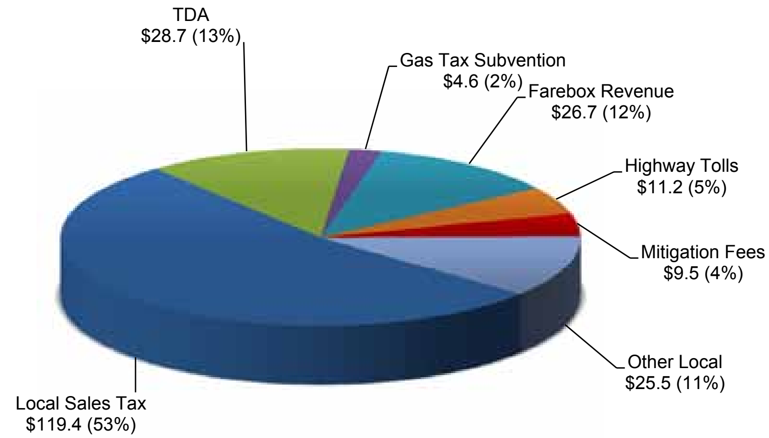


Source: SCAG Revenue Model 2011
Note: Numbers may not sum to total due to rounding

Local option sales taxes provide the largest single source of local funding, as shown in **FIGURE 3.8**. When local sales taxes in all five counties with such measures are included, these taxes account for more than half (53 percent) of local sources and nearly two-fifths (39 percent) of overall funding for the RTP/SCS. Local sales tax revenues have been boosted by the adoption of Measure R, which provides an additional 0.5 percent sales tax in Los Angeles County through 2039. Also, Imperial County extended its tax measure through 2050.

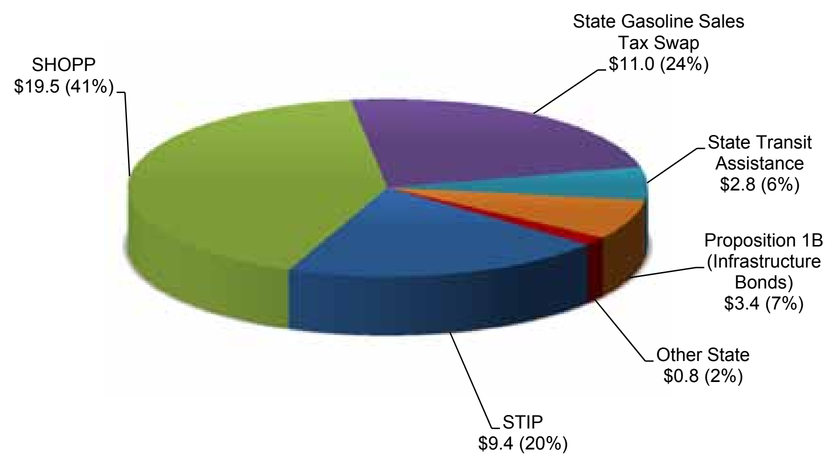
State sources generate a smaller share of revenues than in the 2008 RTP, due mostly to the assumption that fuel consumption declines in the future as a result of increased fuel efficiency. As shown in **FIGURE 3.9**, the State Transportation Improvement Program (STIP), the State Highway Operations and Protection Program (SHOPP), and the State Gasoline Sales Tax Swap account for the largest portions of the state funding available. The adjustments to the State Transit Assistance (STA) available under the Gas Tax Swap are included in the State Gasoline Sales Tax Swap category.

FIGURE 3.8 Core Revenues, Local Sources (in Nominal Dollars) $225.5 Billion Total



Source: SCAG Revenue Model 2011
Note: Numbers may not sum to total due to rounding

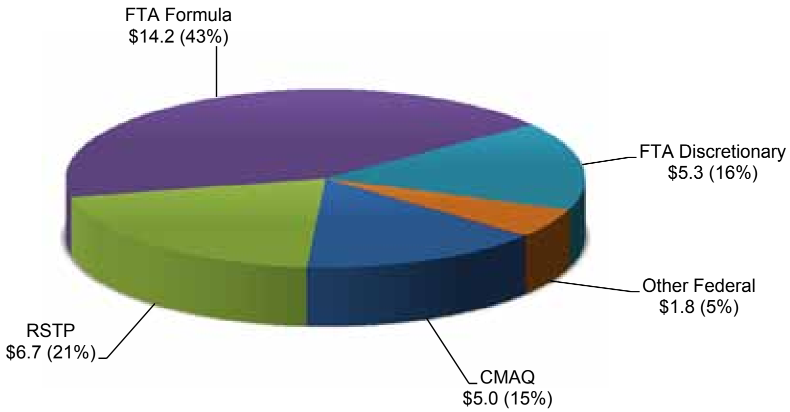
FIGURE 3.9 Core Revenues, State Sources (in Nominal Dollars) $46.8 Billion Total



Source: SCAG Revenue Model 2011
Note: Numbers may not sum to total due to rounding

As shown in **FIGURE 3.10**, federal sources are anticipated to represent a small portion of overall transportation funds ($33.0 billion). The Federal Highway Trust Fund is expected to remain solvent, but as with state funding, federal funding will decline due to increases in fuel efficiency. Federal Transit Administration (FTA) funding represents a larger share of federal funding due to large-scale New Starts in the SCAG region and a recent emphasis on transit allocations. The financial plan also assumes that CMAQ funding will decline in 2020 and 2025 due to the region achieving attainment for a number of pollutants and reducing the severity level of other pollutants.

FIGURE 3.10 Core Revenues, Federal Sources (in Nominal Dollars) $33.0 Billion Total



Source: SCAG Revenue Model 2011
Note: Numbers may not sum to total due to rounding

Reasonably Available Revenues

There are several new funding sources that are reasonably expected to be available for the plan. SCAG considered a set of key guiding principles as a foundation for identifying regionally appropriate revenues that are reasonably available in developing the RTP/SCS financial strategies as follows:

- Establish a user fee based system that better reflects the true cost of transportation, provides firewall protection for transportation funds, and ensures an equitable distribution of costs and benefits.
- Promote national and state programs that include return-to-source guarantees while maintaining flexibility to reward regions that continue to commit substantial local resources.
- Leverage locally available funding with innovative financing tools (e.g., tax credits and expansion of the Transportation Infrastructure Finance and Innovation Act [TIFIA]) to attract private capital and accelerate project delivery.
- Promote funding strategies that strengthen federal commitment to the nation's goods movement system, recognizing the pivotal role that our region plays in domestic and international trade.

Based on these guiding principles, SCAG evaluated a number of revenue options. Various combinations of these options were considered as potential revenue packages. **TABLE 3.3** presents 10 categories of funding sources and financing techniques that were evaluated for the financial plan. These were selected on the basis of their use in other areas of the state, the burgeoning potential, historical precedence, and their likelihood of implementation within the timeframe of the plan.

These funding sources are considered to be reasonably available and are included in the financially constrained plan. For each funding source, SCAG has examined the policy and legal context of implementation and has prepared an estimate of the potential revenues generated. Additional detail on all funding sources included in the financial plan are provided in the Transportation Finance Appendix.

TABLE 3.3 New Revenue Sources and Innovative Financing Strategies (in Nominal Dollars, Billions)

Revenue Source	Description	Amount	Actions to Ensure Availability	Responsible Party(ies)
Bond Proceeds from Local Sales Tax Measures	Issuance of debt against existing sales tax revenues: Los Angeles, Orange, Riverside, and San Bernardino Counties. (Note: although revenue estimates do not include new sales tax measures, this plan recognizes future opportunities including the potential for a sales tax measure in Ventura County if approved by the voters.)	$25.6	Issuance of debt subject to county transportation commissions' respective board policies.	County Transportation Commissions—CTCs (LACMTA, OCTA, RCTC, SANBAG)
State and Federal Gas Excise Tax Adjustment to Maintain Historical Purchasing Power	Additional $0.15 per gallon gasoline tax imposed at the state and the federal levels starting in 2017 to 2024—to maintain purchasing power.	$16.9	Requires action of State Legislature and Congress. Strategy is consistent with recommendations from two national commissions to move immediately with augmenting fuel tax resources through conventional Highway Trust Fund mechanisms.	State Legislature, Congress
Mileage-Based User Fee (or equivalent fuel tax adjustment)	Mileage-based user fees would be implemented to replace gas taxes—estimated at about $0.05 (in 2011 dollars) per mile starting in 2025 and indexed to maintain purchasing power.	$110.3 (est. increment only)	Requires action of State Legislature and Congress. Strategy is consistent with recommendations from two national commissions to move toward a mileage-based user fee system. Immediate steps necessary to take include coalescing state and national partners to fund further RD&D (research, development, and demonstration) in advance of 2025 broad-based implementation.	State Legislature, Congress
Highway Tolls (includes toll revenue bond proceeds)	Toll revenues generated from SR-710 North Extension, I-710 South Freight Corridor, East-West Freight Corridor, segment of the High Desert Corridor, and Regional Express/HOT Lane Network.	$22.3	Assembly Bill (AB) 1467 (Nunez) Chapter 32, Statutes of 2006 authorized Caltrans and regional transportation agencies to enter into comprehensive development lease agreements with public and private entities or consortia of those entities for certain types of transportation projects. Further, AB 521 (Runner) Chapter 542, Statutes of 2006 modified provisions in AB 1467. Senate Bill Second Extraordinary Session 4 (SBX2 4) Chapter 2, Statutes of 2009 (Cogdill) established the legislative authority until January 1, 2017, allowing for regional transportation agencies and Caltrans to enter into an unlimited number of public-private partnerships (PPP) and deleted the restrictions on the number and type of projects that may be undertaken. Chapter 474, Statutes of 2009 (AB 798) established the California Transportation Financing Authority (CTFA). Highway projects that meet planning and environmental review requirements are eligible for tolling subject to meeting requirements of the CTFA. AB 798 also lifts the requirement for High Occupancy Toll (HOT) lane projects authorized under AB 1467 to have separate legislative approval.	MPO, CTCs, Caltrans, CTFA, and FHWA as may be applicable

Revenue Source	Description	Amount	Actions to Ensure Availability	Responsible Party(ies)
Private Equity Participation	Private equity share as may be applicable for key initiatives: e.g., toll facilities; also, freight rail package assumes railroads' share of costs for main line capacity and intermodal facilities such as SCIG and ICTF modernization.	$2.7	Region has authority as noted above. Current funding plans for specific intermodal facilities assume private sources.	MPO, CTCs, private consortium, State Legislature, and Union Pacific/BNSF as appropriate for specific facilities
Freight Fee/National Freight Program	A national freight program is anticipated with the next federal reauthorization of the surface transportation act. The National Freight Program described in Senate-proposed transportation reauthorization bill (MAP-21) would establish federal formula funding for infrastructure improvements supporting the national freight network. Early estimates indicate roughly $2 billion per year nationally. Regional estimate assumes a conservative percentage of national totals.	$4.2	Current efforts at the local/regional level continue to endorse a federal program for freight. A national program may be formula-based as outlined in the recently proposed MAP-21. Other mechanisms to ensure the establishment of a funding program for freight may entail working with local/regional, state, and federal stakeholders to assess a national freight fee. Freight fees could be assessed in proportion to relative impacts on the transportation system.	Congress and potentially State Legislature as well as local/regional stakeholders
E-Commerce Tax	E-commerce sales refers to the sale of goods and services where an order is placed or where price and terms of the sale are negotiated over the Internet or other online system. Potentially, the revenue could be used for transportation purposes, given the relationship between e-commerce and the delivery of goods to California purchasers.	$3.1	The state estimates that most residents do not report use tax and this resulted in $1.1 billion in forgone use tax revenue during 2010. A state cannot compel out-of-state retailers to pay a sales or use tax, as federal law requires that retailers have a physical presence in the state. In its FY2012 budget, the state attempted to compel out-of-state retailers that are part of a commonly controlled group or that work with affiliates to pay a use tax (through ABX1 28). In September 2011, the state repealed ABX1 28 and enacted AB 155, which includes many of the same provisions as ABX1 28, but delays implementation until September 2012.	State Legislature and potentially Congress
Interest Earnings	Interest earnings from toll bond proceeds.	$0.2	See Highway Tolls.	See Highway Tolls
State Bond Proceeds, Federal Grants & Other for California High-Speed Rail Program	State general obligation bonds authorized under the Bond Act approved by California voters as Proposition 1A in 2008; federal grants authorized under American Recovery and Reinvestment Act and High-Speed Intercity Passenger Rail Program; potential use of qualified tax credit bonds; and private sources.	$33.0	Estimate for Southern California segments based on statewide system total per November 1, 2011, Draft California High-Speed Rail Business Plan. Further coordination anticipated with the California High-Speed Rail Authority in finalizing business plan; additionally, the High-Speed Rail Authority will pursue private-sector participation as a source of system financing.	MPO, California High-Speed Rail Authority, local/regional stakeholders, private-sector partners
Value Capture Strategies	Assumes formation of special districts (infrastructure financing districts) including use of tax increment financing for specific initiatives: e.g., East-West Freight Corridor.	$1.2	Pursue necessary approvals for special districts by 2016. Benefit assessment districts require majority approval by property owners; community facility districts require two-thirds approval; work with private entities for joint development opportunities as may be applicable.	MPO, CTCs, local jurisdictions, property owners along project corridors, developers

Summary of Revenue Sources and Expenditures

TABLE 3.4.1 Core and Reasonably Available Revenue Projections—Local Revenue Sources (in Nominal Dollars, Billions)

Revenue Source	Revenue Projection Assumptions	Revenue Estimate
LOCAL REVENUE SOURCES		
Local Option Sales Tax Measures	**Description:** Locally imposed ½ percent sales tax in four counties (Imperial, Orange, Riverside, and San Bernardino). Permanent 1 percent (combination of two ½ cent sales taxes) plus Measure R through 2039 in Los Angeles County. **Assumptions:** Sales taxes grow consistent with county transportation commission forecasts and historical trends.	$119.4
Transportation Development Act (TDA)—Local Transportation Fund	**Description:** The Local Transportation Fund (LTF) is derived from a ¼ cent sales tax on retail sales statewide. Funds are returned to the county of generation and used mostly for transit operations and transit capital expenses. **Assumptions:** Same sales tax growth rate as used for local option sales tax measures.	$28.7
Gas Excise Tax Subventions (to Cities and Counties)	**Description:** Subventions to counties and local jurisdictions in region from the California state gas tax. Revenues for the forecast are proportionate to the percentage of streets and roads that are regionally significant. **Assumptions:** Fuel consumption declines in absolute terms by 1 percent due to increasing fuel efficiency in conventional vehicles and adoption of electric and hybrid vehicles. Regionally significant streets and roads (37 to 50 percent of total roads) are classified as either arterials or collectors.	$4.6
Transit Farebox Revenue	**Description:** Transit fares collected by transit operators in the SCAG region. **Assumptions:** Farebox revenues increase consistent with historic trends, planned system expansions, and operator forecasts.	$26.7
Highway Tolls (in core revenue forecast)	**Description:** Revenues generated from toll roads operated by the Transportation Corridor Agencies (TCA) and from the SR-91 Express Lanes operated by the Orange County Transportation Authority (OCTA). **Assumptions:** Consistent with the TCA Traffic and Revenue Report, revenues grow by 1.5 percent (compared to historical growth of about 8.5 percent) in core revenue forecast scenario.	$11.2
Mitigation Fees	**Description:** Revenues generated from development impact fees. The revenue forecast includes fees from the Transportation Corridor Agency (TCA) development impact fee program, San Bernardino County's development impact fee program and Riverside County's Transportation Uniform Mitigation Fee (TUMF) for both the Coachella Valley and Western Riverside County. **Assumptions:** The financial forecast is consistent with revenue forecasts from TCA, Riverside County Transportation Commission (RCTC), and the San Bernardino Associated Governments (SANBAG).	$9.5
Local Agency Funds	**Description:** Includes committed local revenue sources such as transit advertising and auxiliary revenues, lease revenues, and interest and investment earnings from reserve funds. **Assumptions:** Revenues are based on financial data from transit operators and local county transportation commissions.	$25.5
LOCAL SUBTOTAL		**$225.5**

Note: Numbers may not sum to total due to rounding

TABLE 3.4.2 Core and Reasonably Available Revenue Projections—State Revenue Sources (in Nominal Dollars, Billions)

Revenue Source	Revenue Projection Assumptions	Revenue Estimate
STATE REVENUE SOURCES		
State Transportation Improvement Program (STIP)	**Description:** The STIP is a five-year capital improvement program that provides funding from the State Highway Account (SHA) for projects that increase the capacity of the transportation system. The SHA is funded through a combination of state gas excise tax, the Federal Highway Trust Fund, and truck weight fees. The STIP may include projects on state highways, local roads, intercity rail, or public transit systems. The Regional Transportation Planning Agencies (RTPAs) propose 75 percent of STIP funding for regional transportation projects in Regional Transportation Improvement Programs (RTIPs). Caltrans proposes 25 percent of STIP funding for interregional transportation projects in the Interregional Transportation Improvement Program (ITIP). **Assumptions:** Funds are based upon the 2011 Report of STIP Balances County and Interregional Shares, August 4, 2011 and 2012 STIP Fund Estimate. Long-term forecasts assume no growth in fuel consumption, except in Los Angeles and Orange Counties, where the growth is less than historical trends and consistent with forecasts by the local transportation commissions.	$9.4
State Highway Operation and Protection Plan (SHOPP)	**Description:** Funds state highway maintenance and operations projects. **Assumptions:** Short-term revenues are based on overlapping 2008 and 2010 SHOPP programs. Long-term forecasts are consistent with STIP forecasts and assume no growth in fuel consumption, except in Los Angeles and Orange Counties.	$19.5
State Gasoline Sales Tax Swap	**Description:** Prior to 2010, state sales tax on gasoline funded discretionary projects through the Transportation Investment Fund, which distributed revenues to the STIP, local streets and roads, and transit. In 2010, the sales tax revenues were "swapped" for an increased excise tax (initially 17.3 cents) recalculated each year to ensure revenue neutrality. **Assumptions:** The financial forecast assumes that each county receives its fair share of state gasoline sales tax swap based upon county population. Future revenues grow by 1.5 percent to be revenue neutral consistent with the gasoline sales tax swap.	$11.0
State Transit Assistance Fund (STA)	**Description:** STA is funded with 50 percent of state Public Transit Account (PTA) revenues, which come from the diesel sales tax and "spillover" in the gasoline sales tax swap. Funding is distributed by population share and revenue share of the transit operators. **Assumptions:** The forecast is based on current funding levels reported by the State Controller. Future funding declines with fuel consumption using assumptions consistent with other sources.	$2.8
Highway Safety, Traffic, Air Quality, and Port Security Bond Act of 2006 (Proposition 1B)	**Description:** Proposition 1B authorized $19.9 billion to be spent statewide on existing and new statewide transportation-related infrastructure programs and projects through FY2014. Several programs were included under Proposition 1B. **Assumptions:** The forecast is consistent with Proposition 1B apportionments for the SCAG region in the Federal Transportation Improvement Program (FTIP) through FY2014.	$3.4
Other State Sources	**Description:** Other state sources include Service Authority for Freeways and Expressways (SAFE), Freeway Service Patrol, Air Quality Vehicle Registration Fee (AB 2766), Environmental Enhancement and Mitigation, and other miscellaneous state grants. The Clean Air and Transportation Improvement Act added Proposition 116 to use state general obligation bonds to finance rail infrastructure. **Assumptions:** The RTP uses forecasts provided by LACMTA for Los Angeles County for consistency with the LACMTA long-range transportation plan. These state revenues are not estimated for other counties.	$0.8
STATE SUBTOTAL (State STIP funds include FHWA IM and NHS funding categories)		**$46.8**

Note: Numbers may not sum to total due to rounding

TABLE 3.4.3 Core and Reasonably Available Revenue Projections—Federal Revenue Sources (in Nominal Dollars, Billions)

Revenue Source	Revenue Projection Assumptions	Revenue Estimate
FEDERAL REVENUE SOURCES		
FHWA Non-Discretionary Congestion Mitigation and Air Quality (CMAQ) Program	**Description:** Program to reduce traffic congestion and improve air quality in non-attainment areas. **Assumptions:** Short-term revenues are based upon the Caltrans apportionment estimates. Long-term revenues assume that the Federal Highway Trust Fund stays solvent, but fuel consumption declines by 1 percent annually. CMAQ funding is assumed to be reduced by 25 percent in 2020 and an additional 25 percent in 2025 due to improved air quality.	$5.0
FHWA Non-Discretionary Regional Surface Transportation Program (RSTP)	**Description:** Projects eligible for RSTP funds include rehabilitation and new construction on any highways included in the National Highway System (NHS) and Interstate Highways (including bridges). Also, transit capital projects, as well as intracity and intercity bus terminals and facilities, are eligible. **Assumptions:** Short-term revenues are based upon the Caltrans apportionment estimates. Long-term revenues assume that the Federal Highway Trust Fund stays solvent, but fuel consumption declines by 1 percent annually.	$6.7
FTA Formula Programs 5307 Urbanized Area Formula (Capital), 5310 Elderly and Persons with Disabilities Formula, 5311 Non-Urbanized Area Formula, 5309 Fixed Guideway Program	**Description:** This includes a number of FTA programs distributed by formula. 5307 is distributed annually to state urbanized areas with a formula based upon population, population density, and transit revenue miles of service. Program funds capital projects (and operations expenses in areas under 200,000 in population), preventive maintenance, and planning activities. 5310 funds are allocated by formula to states for capital costs of providing services to the elderly and disabled. The 5311 program provides capital and operating expenses for rural and small urban public transportation systems. Section 5309 Fixed Guideway (FG) funds are also distributed to regions on an urbanized-area formula. **Assumptions:** Formula funds are assumed to decline in proportion with the Federal Highway Trust Fund. As with the FHWA sources, the Trust Fund is expected to stay solvent, but fuel consumption declines by 1 percent annually.	$14.2
FTA Non-Formula Program 5309 New and Small Starts, 5309 Bus & Bus-Related Grants	**Description:** Capital projects include preliminary engineering, acquisition of real property, final design and construction, and initial acquisition of rolling stock for new fixed guideway systems or extensions, including bus rapid transit, light rail, heavy rail, and commuter rail systems. Capital investment grants of less than $75 million are considered "small starts." "Small starts" have a separate funding category. Program funds bus acquisition and other rolling stock, ancillary equipment, and the construction of bus facilities. Also includes bus rehabilitation and leasing, park-and-ride facilities, parking lots associated with transit facilities, and bus passenger shelters. **Assumptions:** Operators are assumed to receive FTA discretionary funds in rough proportion to what they have received historically. The Federal Highway Trust Fund is expected to stay solvent, but fuel consumption declines by 1 percent annually.	$5.3
Other Federal Funds	**Description:** Includes other federal programs, such as Regional Transportation Enhancements, Highway Bridge Replacement and Rehabilitation, Homeland Security Grants, Bus Preferential Signal Systems, Highway Earmarks, Hazard Elimination Safety, and Railroad/Highway Grade Crossing Protection (Section 130). Also includes a marginal amount from the American Recovery and Reinvestment Act (ARRA) for the first year of the forecast. **Assumptions:** LACMTA and OCTA provided forecasted revenues for these programs, which have been adopted in the LRTPs for Los Angeles and Orange Counties. For other counties, Highway Bridge Program revenues are estimated in the short term using program allocations provided by Caltrans through FY2014. ARRA amounts also come from programmed funding. Longer-term estimates are based upon the assumption of a 1 percent annual decline in fuel consumption as used for other federal funding sources referenced above.	$1.8
FEDERAL SUBTOTAL		**$33.0**

Note: Numbers may not sum to total due to rounding

TABLE 3.4.4 Core and Reasonably Available Revenue Projections—Innovative Financing and New Revenue Sources (in Nominal Dollars, Billions)

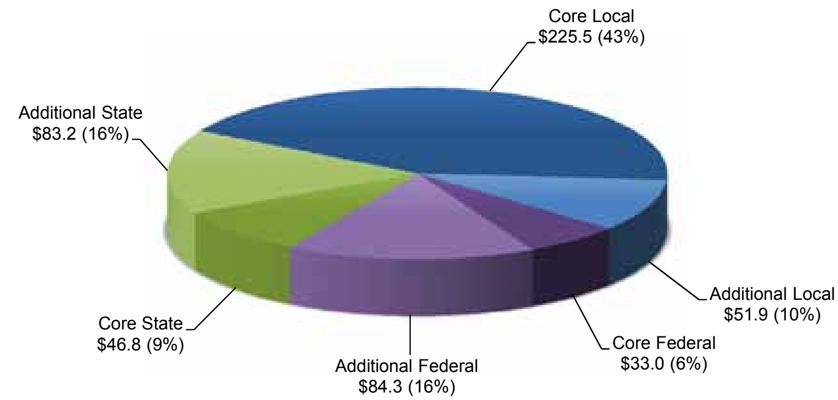
Revenue Source	Revenue Projection Assumptions	Revenue Estimate
INNOVATIVE FINANCING & NEW REVENUE SOURCES		
Bond Proceeds from Local Sales Tax Measures	**Description:** Long-term debt financing secured by locally imposed ½ percent sales tax measures for Los Angeles, Orange, Riverside, and San Bernardino Counties. **Assumptions:** Sales tax grows consistent with county historical trends. Assumes minimum debt service coverage of pledged revenue (net of any local return portion) in any year of 2.5x for Los Angeles County, 1.3x for Orange County, 1.5x for Riverside County (further restricted to a maximum of $975M outstanding), and 1.3x for San Bernardino County—includes currently outstanding and new debt. No debt is assumed to be issued for Imperial County.	$25.6
State and Federal Gas Excise Tax Adjustment to Maintain Historical Purchasing Power	**Description:** Additional 15-cents-per-gallon gasoline tax imposed by the state and federal government starting in 2017 through 2024. **Assumptions:** Forecast consistent with historical tax rate adjustments for both state and federal gas taxes.	$16.9
Mileage-Based User Fee (or equivalent fuel tax adjustment)	**Description:** Mileage-based user fees would be implemented to replace existing gas taxes (state and federal) by 2025. **Assumptions:** Consistent with recommendations from two national commissions established under SAFETEA-LU, it is assumed that a national mileage-based user fee system would be established during the latter years of the RTP/SCS. An estimated $0.05 per mile (in 2011 dollars) is assumed starting in 2025 to replace existing gas tax revenues.	$110.3 (est. increment only)
Highway Tolls (includes toll revenue bond proceeds)	**Description:** Toll revenues generated from regional toll facilities including SR-710 North Extension, I-710 South Freight Corridor, East-West Freight Corridor, segment of the High Desert Corridor, and Regional Express/HOT Lane Network. **Assumptions:** Toll revenues based on recent feasibility studies for applicable corridors. Also includes toll revenue bond proceeds.	$22.3
Private Equity Participation	**Description:** Private equity share as may be applicable for key initiatives. **Assumptions:** Private capital is assumed for a number of projects, including toll facilities; also, freight rail package assumes railroads' share of costs for main line capacity and intermodal facilities such as SCIG and ICTF.	$2.7
Freight Fees/ National Freight Program	**Description:** Establishment of a national freight program consistent with proposal under MAP-21 and/or establishment of a charge imposed nationally on cargo. **Assumptions:** Early estimates indicate roughly $2 billion per year nationally for the National Freight Program under MAP-21. Regional estimate assumes a conservative percentage of proposed national program. Other mechanisms may include establishment of freight fees nationally, whereby rates may be subject to timing and cashflows for qualified projects. Freight fee would be assessed in proportion to relative impacts on the transportation system and would sunset with the completion of qualified projects. Assumes establishment of a national program in scope starting in 2015.	$4.2
E-Commerce Tax	**Description:** E-commerce sales tax on goods and services negotiated over the Internet or other online system. **Assumptions:** Notwithstanding the uncertainty in the amount of revenue that is available from AB 155, the revenue could be used for transportation purposes, given the relationship between e-commerce and the delivery of goods to California purchasers. In the event the revenue is used solely for transportation, the revenue would need to be allocated to specific uses or areas within the state. One possible method would allocate the funds in proportion to population. Under this method, the SCAG region would receive an estimated $3.1 billion through 2035, assuming AB 155 statewide revenue grows at 3 percent per year.	$3.1

Revenue Source	Revenue Projection Assumptions	Revenue Estimate
Interest Earnings	**Description:** Interest earnings from toll bond proceeds. **Assumptions:** Interest earnings are assumed from toll bond proceeds, e.g., East-West Freight Corridor.	$0.2
State Bond Proceeds, Federal Grants & Other for California High-Speed Rail Program	**Description:** Estimated total per November 1, 2011, Draft California High-Speed Rail Business Plan. **Assumptions:** State general obligation bonds authorized under the Bond Act approved by California voters as Proposition 1A in 2008; federal grants authorized under ARRA and the High-Speed Intercity Passenger Rail Program (HSIPR); potential use of qualified tax credit bonds; and private sources.	$33.0
Value Capture Strategies	**Description:** Formation of special districts—infrastructure financing districts and use of tax increment financing. **Assumptions:** This strategy refers to capturing the incremental value generated by transportation investments. Specifically, SCAG assumes the formation of special districts, including infrastructure financing districts (IFDs); also assumes the use of tax increment financing for specific projects (e.g., East-West Freight Corridor).	$1.2
NEW REVENUE SOURCE SUBTOTAL		**$219.5**
GRAND TOTAL		**$524.7**

Note: Numbers may not sum to total due to rounding

The SCAG region's financially constrained RTP/SCS includes revenues from both core and reasonably available revenue sources, which sum to $524.7 billion from FY2011 through FY2035. While core revenues are comprised primarily of local sources (74 percent), the financially constrained RTP/SCS is funded by 53 percent local sources, 25 percent state sources, and 22 percent federal sources, as is illustrated in **FIGURE 3.11**.

FIGURE 3.11 Revenue Summary $524.7 Billion (in Nominal Dollars) FY2011–FY2035



Note: Numbers may not sum to total due to rounding

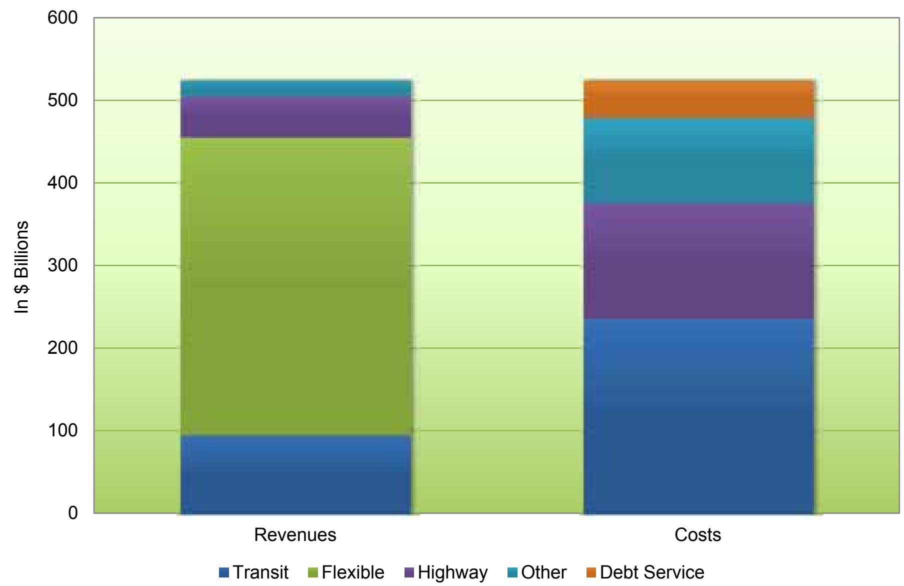
FIGURE 3.12 Expenditure Summary $524.7 Billion (in Nominal Dollars) FY2011–FY2035

Note: Numbers may not sum to total due to rounding

As shown in **FIGURE 3.12**, capital projects total $262.8 billion in nominal dollars. Operating and maintenance (O&M) costs total $216.9 billion, while debt service obligations total $45.1 billion. Transit-related costs comprise the largest share of O&M costs for the region, totaling $139.3 billion.

As shown in **FIGURE 3.13**, transit expenditures account for almost half of the plan costs at 47 percent. Highway expenditures account for 26 percent of the plan costs. About 18 percent of costs are attributable to an “other” category, reflecting proposed investments in goods movement, grade separations, active transportation, transportation demand management, and transportation system management improvements. Consistent with historical practice, agencies in the region are expected to bond against future revenues to provide additional funding in the early years of the plan. As a result, debt service equal to historical payments and future bonding needs has been included as part of the financial plan. Anticipated debt service payments make up 9 percent of total costs.

FIGURE 3.13 Revenues Compared to Costs by Mode



Note: Numbers may not sum to total due to rounding

TABLE 3.5 provides details of the SCAG region’s financial plan revenue forecast by source in five-year increments from FY2011 through FY2035. This is followed by **TABLE 3.6**, which provides details of the region’s expenditures by category in five-year increments.

TABLE 3.5 2012–2035 RTP/SCS Revenues (in Nominal Dollars, Billions)

	REVENUE SOURCES	FY2011–FY2015	FY2016–FY2020	FY2021–FY2025	FY2026–FY2030	FY2031–FY2035	TOTAL
LOCAL	Sales Tax	$16.3	$22.1	$28.7	$36.2	$44.7	$148.0
	– County	$13.1	$17.8	$23.1	$29.2	$36.1	$119.4
	– Transportation Development Act	$3.3	$4.3	$5.5	$6.9	$8.6	$28.7
	Gas Tax (Subvention to Cities & Counties)	$1.0	$1.0	$0.9	$0.9	$0.8	$4.6
	Other Local Funds	$5.3	$4.6	$4.7	$5.6	$5.2	$25.5
	Transit Fares	$3.2	$4.3	$5.3	$6.4	$7.5	$26.7
	Tolls	$1.4	$1.7	$2.1	$2.6	$3.3	$11.2
	Mitigation Fees	$1.4	$1.8	$1.9	$2.1	$2.3	$9.5
	LOCAL TOTAL	**$28.7**	**$35.4**	**$43.5**	**$53.9**	**$64.0**	**$225.5**
STATE	State Highway Operations and Protection Program (SHOPP)	$3.7	$4.2	$4.0	$3.8	$3.6	$19.5
	State Transportation Improvement Program (STIP)	$1.9	$2.0	$1.9	$1.8	$1.7	$9.4
	– Regional – RTIP	$1.3	$1.4	$1.3	$1.2	$1.2	$6.4
	– Interregional – ITIP	$0.6	$0.6	$0.6	$0.6	$0.5	$3.0
	State Gasoline Sales Tax Swap	$1.4	$1.7	$2.1	$2.6	$3.3	$11.0
	State Transit Assistance (STA)	$0.5	$0.5	$0.6	$0.6	$0.7	$2.8
	Proposition 1B (Infrastructure Bonds)	$3.0	$0.4	$0.0	$0.0	$0.0	$3.4
	Other State Funds (1)	$0.3	$0.1	$0.1	$0.1	$0.1	$0.8
	STATE TOTAL	**$10.8**	**$9.0**	**$8.7**	**$9.0**	**$9.4**	**$46.8**
FEDERAL	Federal Transit	$3.0	$3.6	$3.9	$4.3	$4.7	$19.5
	– Federal Transit Formula	$2.3	$2.6	$2.8	$3.1	$3.4	$14.2
	– Federal Transit Non-Formula	$0.7	$1.0	$1.1	$1.2	$1.3	$5.3
	Federal Highway & Other	$2.9	$2.6	$2.6	$2.6	$2.8	$13.5
	– Congestion Mitigation and Air Quality (CMAQ)	$1.3	$1.1	$0.9	$0.8	$0.9	$5.0
	– Surface Transportation Program (Regional)	$1.1	$1.2	$1.3	$1.5	$1.6	$6.7
	– Other Federal Funds (2)	$0.5	$0.3	$0.3	$0.3	$0.4	$1.8
	FEDERAL TOTAL	**$5.9**	**$6.1**	**$6.5**	**$6.9**	**$7.5**	**$33.0**
INNOVATIVE FINANCING & NEW REVENUE SOURCES	Bond Proceeds from Local Sales Tax Measures	$9.4	$10.4	$5.9	$0.0	$0.0	$25.6
	State and Federal Gas Excise Tax Adjustment	$0.0	$8.6	$8.3	$0.0	$0.0	$16.9
	Mileage-Based User Fee	$0.0	$0.0	$8.9	$48.5	$52.9	$110.3
	Highway Tolls (including bond proceeds)	$3.0	$0.0	$9.8	$3.8	$5.7	$22.3
	Private Equity Participation	$1.3	$0.1	$0.1	$1.2	$0.0	$2.7
	Freight Fees/National Freight Program	$0.1	$0.9	$1.0	$1.0	$1.2	$4.2
	E-Commerce Tax	$0.3	$0.6	$0.6	$0.7	$0.9	$3.1
	Interest Earnings	$0.0	$0.0	$0.1	$0.1	$0.1	$0.2
	California High-Speed Rail Program Funding	$0.0	$3.9	$10.2	$14.3	$4.5	$33.0
	Value Capture Strategies	$0.0	$0.0	$1.2	$0.0	$0.0	$1.2
	INNOVATIVE FINANCING & NEW REVENUE SOURCES TOTAL	**$14.1**	**$24.5**	**$46.1**	**$69.6**	**$65.2**	**$219.5**
REVENUE TOTAL		**$59.5**	**$75.0**	**$104.8**	**$139.3**	**$146.1**	**$524.7**

Notes:
(1) Service Authority for Freeways and Expressways (SAFE), Freeway Service Patrol, Air Quality Vehicle Registration Fee (AB 2766), Environmental Enhancement and Mitigation.
(2) Includes other federal programs, e.g., Regional Transportation Enhancements, Highway Bridge Replacement and Rehabilitation, Homeland Security Grants, Bus Preferential Signal Systems, Highway Earmarks, local assistance, Hazard Elimination Safety, and Railroad/Highway Grade Crossing Protection (Section 130).
Numbers may not sum to total due to rounding

TABLE 3.6 2012–2035 RTP/SCS Expenditures (in Nominal Dollars, Billions)

RTP COSTS	FY2011–FY2015	FY2016–FY2020	FY2021–FY2025	FY2026–FY2030	FY2031–FY2035	TOTAL
Capital Projects:	**$37.3**	**$44.8**	**$57.1**	**$63.4**	**$60.2**	**$262.8**
Arterials	$4.4	$3.8	$3.8	$4.7	$5.4	$22.1
Grade Separations & Goods Movement	$8.1	$7.9	$12.9	$14.6	$5.0	$48.4
High-Occupancy Vehicle/High-Occupancy Toll Lanes	$5.2	$2.5	$0.6	$4.2	$8.4	$20.9
Mixed-Flow and Interchange Improvements	$3.4	$4.5	$5.0	$2.7	$0.5	$16.0
Toll Facilities	$1.5	$10.9	$5.8	$3.3	$5.8	$27.3
Transportation System Management (including ITS)	$1.3	$1.2	$0.8	$1.9	$2.4	$7.6
Transit	$11.6	$13.1	$27.3	$28.5	$26.4	$106.9
Active Transportation	$0.7	$0.4	$0.3	$1.9	$3.4	$6.7
Transportation Demand Management	$0.2	$0.2	$0.2	$1.3	$2.5	$4.5
Other (1)	$0.7	$0.4	$0.6	$0.4	$0.4	$2.5
Operations and Maintenance:	**$19.4**	**$22.9**	**$37.4**	**$63.7**	**$73.5**	**$216.9**
Highway	$3.4	$3.0	$12.5	$18.8	$19.1	$56.7
Transit	$14.9	$18.8	$23.8	$37.0	$44.8	$139.3
Local Streets and Roads	$1.1	$1.1	$1.2	$7.9	$9.6	$20.9
Debt Service	**$2.8**	**$7.3**	**$10.3**	**$12.2**	**$12.5**	**$45.1**
COST TOTAL	**$59.5**	**$75.0**	**$104.8**	**$139.3**	**$146.1**	**$524.7**

Note: (1) Includes: environmental mitigation, landscaping, and project development costs.
Numbers may not sum to total due to rounding

04 SUSTAINABLE COMMUNITIES STRATEGY (SCS)

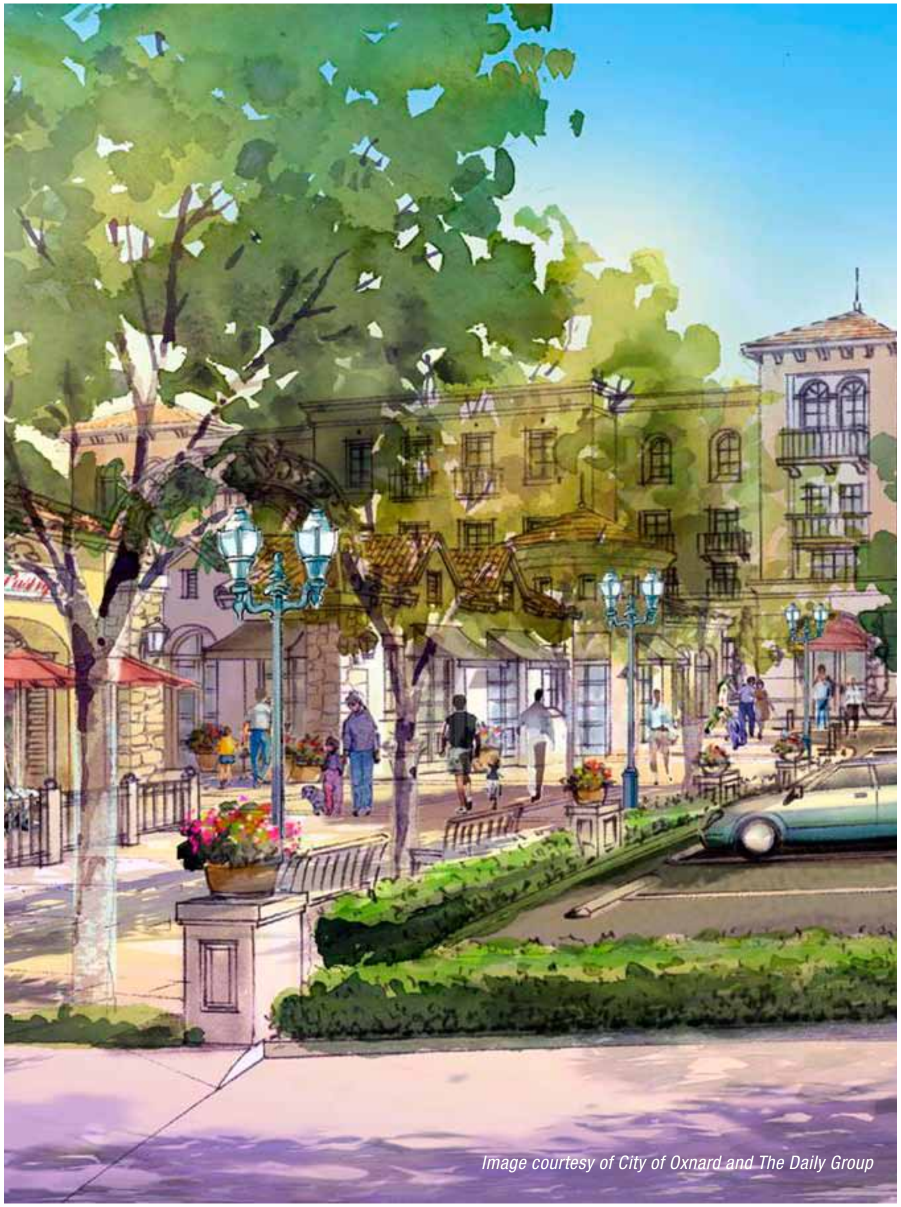


Image courtesy of City of Oxnard and The Daily Group

Introduction

Southern California today faces unprecedented challenges in accommodating the additional population and economic activity expected over the next 25 years. Once a major destination for people from other states, Southern California now sees population growth driven mostly by natural increase from within the region—births over deaths—and by international immigration. Over the last generation it has become one of the most diverse and multicultural regions in the world.

Southern California is now home to 18 million people. The region is seen by some as crowded, congested, and—despite the recent downturn in the housing market—an expensive place to build a life.

While the region was once known worldwide as the "capital of sprawl," today it is projecting growth on only a small fraction of its available raw land. Moreover, the region has struggled in its efforts to generate true economic growth over the past two decades.

In the face of all these long-term trends, Southern California is expected to accommodate an additional 4 million people over the next 25 years, with equally significant household and employment growth (see **FIGURE 4.1**). This future growth will put additional pressure on an already congested transportation system, on communities and neighborhoods that have been in existence for many decades, and on the region's fragile natural environment. **EXHIBITS 4.1**, **4.2**, and **4.3** show the geographical distribution of the region's future growth in 2035.

Addressing these challenges successfully will require a major effort and coordination by the region's people, institutions, and public agencies. These "regional players" will have to agree on a common vision for the future and then work together to make that vision a reality. Through this effort, Southern California will be able to not only accommodate additional growth, but also create an improved quality of life, a resilient economy, and a healthy natural environment.

Since 2000, SCAG has worked actively with the people and institutions of Southern California to create a dynamic regional growth vision based on four principles of *mobility, livability, prosperity and sustainability.* Charged by federal law with preparing a Regional Transportation Plan every four years, SCAG has traditionally focused on the mobility impacts of the region's growth. Under state law, SCAG is also charged with planning for an adequate regional housing supply in coordination with local governments.

The recent passage of Senate Bill 375 directs SCAG with an additional area of responsibility and provides the region with a renewed opportunity for integrated planning for the future.

The purpose of SB 375 is to implement the state's greenhouse gas (GHG) emissions reduction goals in the sector of cars and light trucks. This mandate requires the California Air Resources Board to determine per capita GHG emission reduction targets for each Metropolitan Planning Organization (MPO) in the state at two points in the future—2020 and 2035. In accordance with Govt. Code Section 65080(b)(2)(B)(vii), the 2012–2035 RTP/SCS will achieve GHG emission reductions of 9 percent per capita in 2020 and 16 percent per capita in 2035 (surpassing both reduction targets of 8 and 13 percent for the years 2020 and 2035, respectively).

Because greenhouse gas emissions in the transportation sector are closely related to vehicle miles traveled (VMT), a mandated GHG reduction essentially requires SCAG to devise a regional plan and a series of strategies that will produce a per capita reduction in VMT over the next 25 years. Under SB 375, SCAG and California's 17 other MPOs must address GHG reduction in a "Sustainable Communities Strategy," or SCS, that is part of each MPO's Regional Transportation Plan.

Transportation strategies contained in the RTP—managing transportation demand and making certain transportation system improvements are major components of the SCS. However, the SCS also focuses on the general land use growth pattern for the region, because geographical relationships between land uses—including density and intensity—help determine the need for travel.

Therefore, SCAG's SCS includes not only projections regarding the transportation network, but also regarding land use. Under SB 375, an SCS must, in summary:

- Identify existing and future land use patterns;
- Consider statutory housing goals and objectives;
- Identify areas to accommodate long-term housing needs;
- Identify areas to accommodate 8-year housing needs;
- Consider resource areas and farmland;
- Identify transportation needs and the planned transportation network;
- Set forth a future land use pattern to meet GHG emission reduction targets; and
- Comply with federal law for developing an RTP.

These requirements, as outlined in California Government Code Section 65080(b)(2)(B), do not mean that the SCS creates a mandate for certain land use policies at the local level. In fact, SB 375 specifically states that the SCS cannot dictate local General Plan policies (see Government Code Section 65080(b)(2)(J)). Rather, the SCS is intended to provide a regional policy foundation that local governments may build upon as they choose and generally includes the quantitative growth projections from each city and county in the region going forward. In addition, some projects consistent with the SCS may be eligible for a streamlined environmental review process.

One aspect of SB 375 that is unique to the SCAG region is that subregions within SCAG have the option of creating their own subregional SCS. Of SCAG's 15 subregions, two accepted this option: the Gateway Cities Council of Governments (GCCOG) and the Orange County Council of Governments (OCCOG). The underlying land use, socioeconomic, and transportation data provided in the subsequent subregional SCSs was incorporated without alteration into the regional 2012 RTP/SCS.

FIGURE 4.1 Anticipated Future Growth (2008–2035)

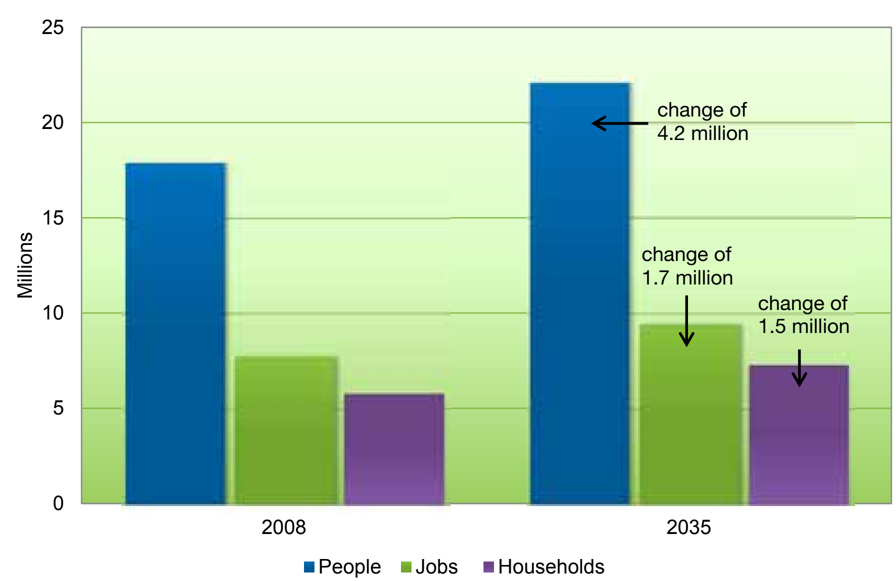


EXHIBIT 4.1 Population Growth SCAG Region (2008–2035)

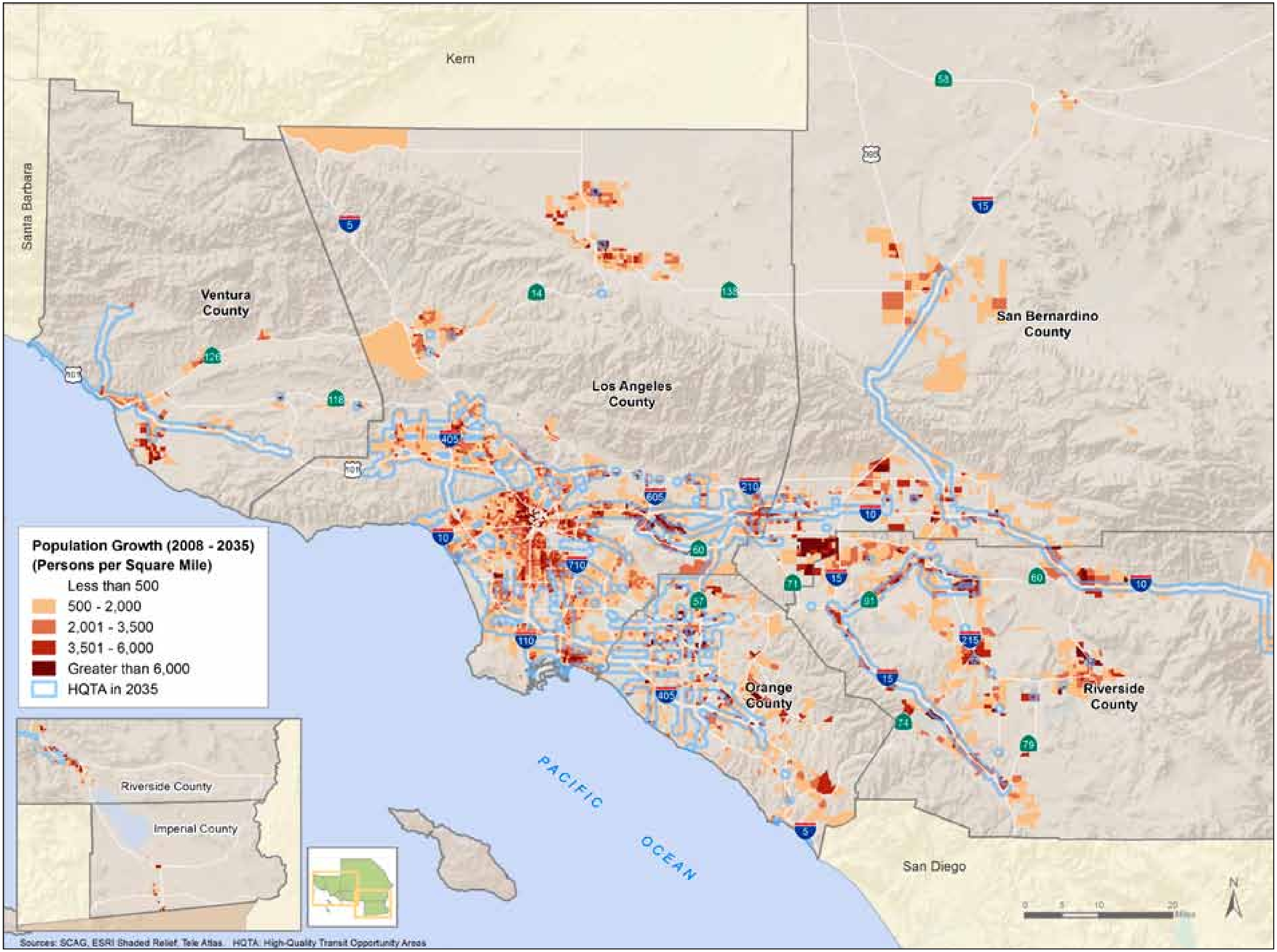


EXHIBIT 4.2 Employment Growth SCAG Region (2008–2035)

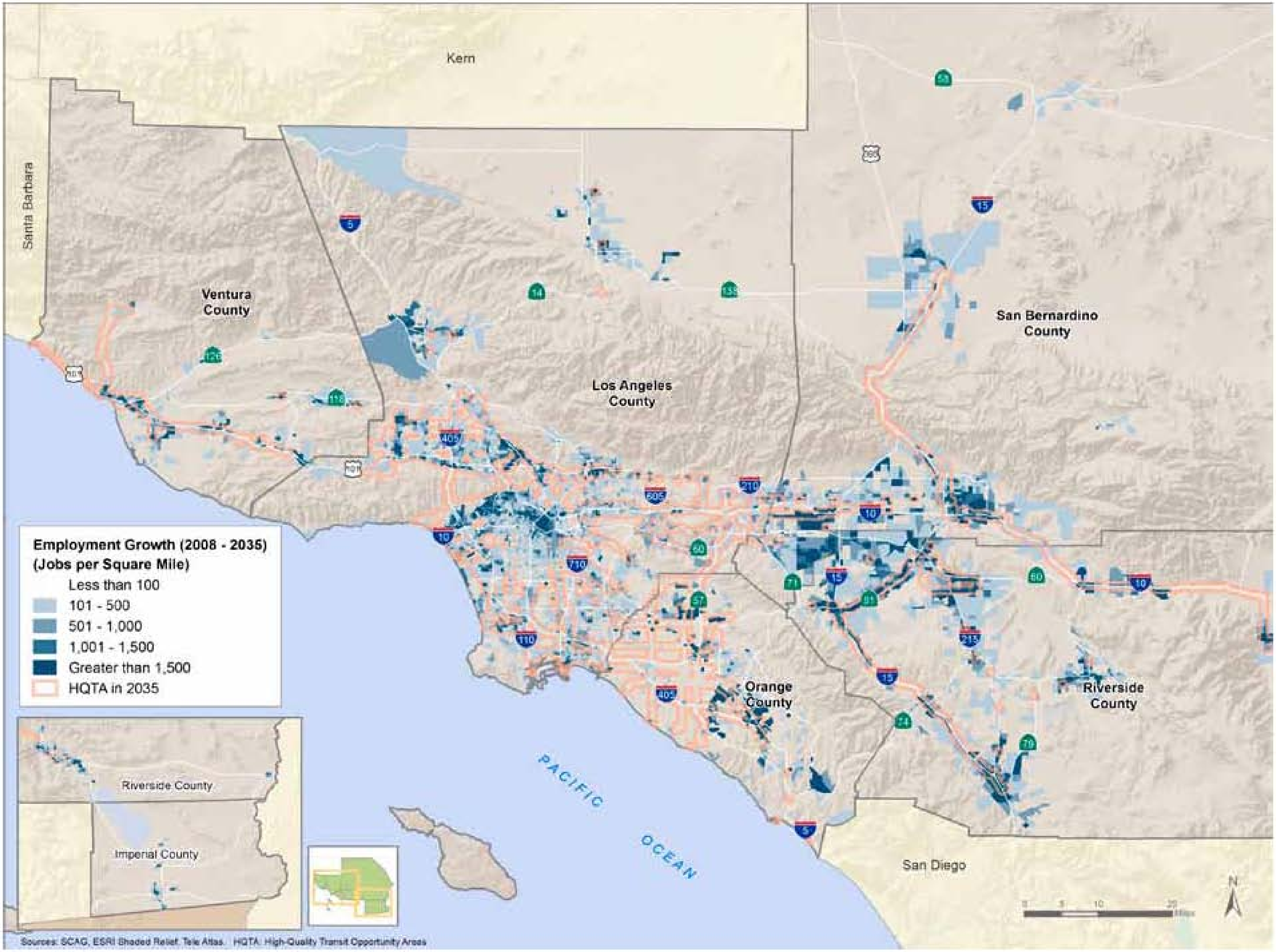
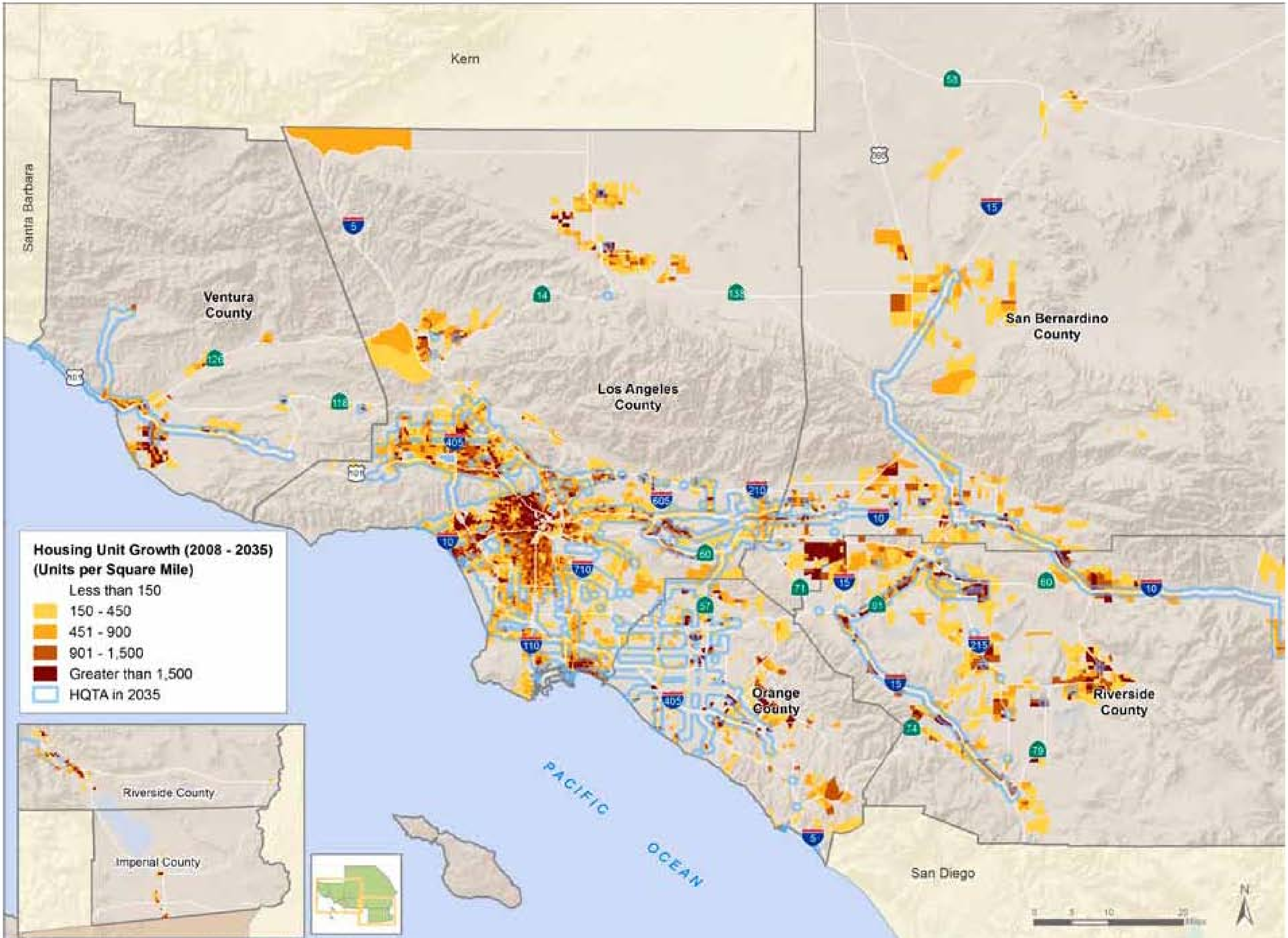


EXHIBIT 4.3 Household Growth SCAG Region (2008–2035)



Sources: SCAG, ESRI Shaded Relief, Tele Atlas. HQTA: High-Quality Transit Opportunity Areas

Goals and Benefits

Under SB 375, the primary goal of the SCS is to provide a vision for future growth in Southern California that will decrease per capita greenhouse gas emissions from automobiles and light trucks. As stated above, this leads to strategies that can help reduce per capita vehicle miles traveled over the next 25 years.

The strategies contained in the 2012–2035 RTP/SCS will produce benefits for the region far beyond simply reducing GHG emissions. Because it is the latest refinement of an evolving regional blueprint that SCAG began in 2000, the 2012–2035 RTP/SCS will help the region contend with many ongoing issues across a wide range of concerns, including placemaking, the cost of living, the environment, health, responsiveness to the marketplace, and mobility.

1. **Better Placemaking**
   As Southern California becomes more congested and crowded, creating better places to live and work has become increasingly important. A completely car-oriented lifestyle made sense in Southern California a couple of generations ago, when the region was less dense and there were few options other than driving. Indeed, Southern Californians still need their cars and highly value the freedom of using them, but because of traffic congestion and the hassle factor, more people today are seeking good "placemaking"—that is, the process of developing options for locations where they can live and work that include a pleasant and convenient walking environment that reduces their reliance on their car. Communities that promote walkable environments and alternative transportation create more opportunities for an active lifestyle, improve safety and accessibility for marginalized communities, and help preserve natural areas and resources. The strategies outlined in the 2012–2035 RTP/SCS promote the development of better places to live and work through measures that encourage more compact development, varied housing options, bike and pedestrian improvements, and efficient transportation infrastructure.

2. **Lower Cost to Taxpayers and Families**
   While attractive in many ways, the traditional suburban lifestyle is expensive both to families and taxpayers. The cost of maintaining a large house and yard and multiple vehicles can consume most of a family's income. The cost of building the roads, water and sewer lines, and other infrastructure required for low density communities is very high, and taxpayers usually pay at least part of the bill, especially for ongoing maintenance. By including options that create more compact neighborhoods and placing everyday destinations closer to homes and closer to one another, the 2012–2035 RTP/SCS's strategies can reduce the cost of development for taxpayers and reduce the everyday costs of housing and transportation.

3. **Benefits to Public Health and the Environment**
   Public health and environmental protection have long been linked to the way our region is planned and the way public services are delivered. Many strategies in the 2012–2035 RTP/SCS will provide widespread benefits within the region for both public health and environmental protection. Municipal water and sewer systems, for example, ensure clean water. Better placemaking will allow people to walk and bicycle more regularly in their daily lives, and promotes the development of urban parks, thus providing more opportunities for recreation and exercise. Reducing the footprint of new development protects farmland that provides regional food, maintains wildlife habitat, decreases air pollution, and improves opportunities for green stormwater solutions that will improve water quality.

4. **Greater Responsiveness to Demographics and the Changing Housing Market**
   The traditional suburban development pattern that characterizes much of Southern

Image courtesy of City of Lancaster

California was appropriate when it was built and still works well for millions of residents. But the demographic profile of the region is changing and the market for housing is changing with it. The number of empty-nesters (parents whose children have grown and left home) is significantly increasing. Many of these empty-nesters are looking for smaller housing and a more manageable, walkable lifestyle. Recent trends suggest that many will be looking to live near their families and other local institutions and amenities rather than commuting long distances. In addition, residents will be looking for a "value lifestyle" in which both housing and transportation costs are minimized even as they maintain a high-quality of life. Strategies focused on high-quality places, compact infill development, and more housing and transportation choices provides a response to these newly emerging market forces.

5. **Improved Access and Mobility**
   Southern California congestion is ever present and additional road construction cannot solve all of the region's mobility challenges. Strategies contained within the 2012–2035 RTP/SCS will help the region confront congestion and mobility issues in a variety of ways, including improvements to bicycle and pedestrian facilities. The transportation strategies contained within the 2012–2035 RTP/SCS will focus on "the most bang for the buck" solutions by improving critical road connections in the region and increasing public transit capacity. Land use strategies in the 2012–2035 RTP/SCS will improve mobility and access by placing destinations closer together and decreasing the time and cost of traveling between them.

It is important to note that the 2012–2035 RTP/SCS does not envision a wholesale redevelopment of the Southern California region. The vast majority of neighborhoods and business districts that will exist in 2035 already exist today, and most of them—especially residential neighborhoods—will be unchanged in the next 25 years. Rather, the 2012–2035 RTP/SCS envisions a new development pattern for new neighborhoods and revitalized neighborhoods and business districts that will build upon the current pattern to give residents more choices and opportunities as they consider where to live and work in the future.

Creating the 2012–2035 RTP/SCS

The 2012–2035 RTP/SCS contains ambitious goals to meet the region's challenges, yet these ideas and strategies are not new. In recent years, SCAG and its local jurisdictions have laid the groundwork for the 2012–2035 RTP/SCS by engaging in a variety of efforts to plan for more sustainable communities. In order to build on this foundation, SCAG's first steps have been to coordinate with its local and regional partners in both information gathering and strategy development in order to create a highly realistic and implementable 2012–2035 RTP/SCS. The "bottom-up" approach has included local jurisdictions, subregional Councils of Government (COGs), County Transportation Commissions (CTCs), air districts, and a wide array of stakeholders.

Data Collection

INTEGRATED GROWTH FORECAST

The 2012–2035 RTP/SCS depends heavily on an accurate and credible forecast for future growth in population, housing, and employment. Beginning in summer 2009, SCAG conducted a series of one-on-one meetings with 175 cities and six counties to gain local input on the integrated population, household, and employment growth forecast for the 2012–2035 RTP/SCS.

Over the last two years, the Integrated Growth Forecast has been updated to reflect the 2010 Census, employment data from the California Employment Development Department, and population and household data from the California Department of Finance. It also underwent an extensive peer-review process over the same two-year period. Ongoing discussions with local jurisdictions led to some additional adjustments, which resulted in SCAG's ability to obtain a consensus on the Integrated Growth Forecast to serve as the foundation for the 2012–2035 RTP/SCS.

LOCAL PLANNING SESSIONS

In 2011, SCAG conducted a series of planning sessions with local governments to gather all relevant land use and transportation policies, plans, and data required to formulate the SCS. Using survey instruments, one-on-one discussions, and Geographical Information System (GIS) software, the local governments provided up-to-date information including growth opportunities, local land use plans and measures, transportation demand management (TDM) measures, transportation systems management (TSM) measures, and other local transportation strategies. Results from these local planning sessions can be found in Appendix: Public Participation and Consultation.

COUNTY TRANSPORTATION COMMISSIONS

As the agencies statutorily responsible for the implementation of transportation projects in their respective counties, SCAG's six County Transportation Commissions played an invaluable role in the development of the 2012–2035 RTP/SCS. Early in the development process, the CTCs worked closely with SCAG to identify county priorities for consideration in the 2012–2035 RTP/SCS's alternatives analysis process. The CTCs remained actively involved throughout the entire analysis process, offering meaningful input as SCAG decision-makers considered the various policy alternatives. Given the new requirements of SB 375, it will be critical for the CTCs to embrace the concept of integrating transportation planning with land use planning in order for this region to develop a truly sustainable 2012–2035 RTP/SCS. Fortunately, the CTCs within the SCAG region were moving in this direction long before the passage of SB 375 and served as excellent partners in the development of this 2012–2035 RTP/SCS.

Creation of Land Use Scenarios

Once SCAG collected all relevant data and information from local governments and CTCs, the agency began developing scenarios using a process that would engage the entire region in envisioning a more sustainable future. A single framework model was used, allowing SCAG's technical staff to load the data and research-based assumptions about the future, and to test a variety of land use patterns and their transportation implications. A detailed documentation of the development of the land use scenarios can be found in Appendix: SCS Background Documentation.

Using this model, SCAG created four scenarios for the future of the region. The scenarios were designed to explore and clearly convey the impact of both where the six-county SCAG region grows over the next 25 years—to what extent growth is focused within existing cities and towns, and how it grows—the shape and style of the neighborhoods and transportation systems that will shape growth over the period. These scenarios were precursors to the 2012 RTP/SCS alternatives. The scenarios facilitated public dialogue and feedback, which in turn allowed SCAG to develop substantially more detailed and refined Plan alternatives. These Plan alternatives were extensively analyzed in the 2012–2035 RTP/SCS and the potential impacts of the RTP/SCS Plan alternatives were evaluated in the Program Environmental Impact Report (PEIR). Note that the Plan alternatives are separate and distinct from the scenarios discussed here.

The four scenarios vary in their land use assumptions and in the package of transportation investments that support the quality and location of growth in the scenarios. The range of the four workshop scenarios can be described by how they address the following key elements:

- **Development Location (Dispersed Growth vs. Focused Development):** The four scenarios vary in the proportion of growth accommodated at the edges of cities and the region's urbanized areas versus growth located in and around existing cities and towns, particularly in the region's designated High-Quality Transit Areas (HQTA). An HQTA is generally a walkable transit village or corridor, consistent with the adopted RTP/SCS, and is within one half-mile of a well-serviced transit stop or a transit corridor with 15-minute or less service frequency during peak commute hours. This

Image courtesy of City of Irvine

was represented by the proportion of Greenfield versus Refill (infill and redevelopment) growth in each of the scenarios.

- **Community/Neighborhood Design (Auto-Oriented vs. Walkable):** The shape and quality of growth in the scenarios vary from a focus on walkable and transit-oriented places where most daily needs are within walking, biking, or short driving distance from homes to new communities which are centered around the car as the dominant form of transportation for nearly all trips. This was represented across the four scenarios by the proportion of Standard Suburban, Mixed-Use/Walkable, and Urban Infill development in each of the scenarios.
- **Housing Options and Mix (Single-Family Subdivision vs. Multifamily Focus):** The scenarios varied in future housing mix in order to depict the impacts of meeting (or not meeting) future housing demand, especially given the changing demographics and preferences of current and future Southern Californians. Housing that focuses more on large-lot (>5,500 SF) single-family options are at one end of the spectrum, as compared to varying mixes of townhome and multifamily options at the other.
- **Transportation Investments (Road/Highway vs. Transit/Non-Auto Strategies):** While all scenarios are supported by a range of transportation options, they vary in the proportion of new investments that are focused on transit and non-auto modes versus highway and roadway improvements that facilitate local and regional automobile travel. These transportation "packages" are informed by past and present RTPs and incorporate a range of transit emphasis up to and including Los Angeles County's recent Measure R and 30/10 Initiative. The scenarios were designed to capture a range of potential strategies and investments by considering the relative emphasis on investment by mode or the inclusion of policy mechanisms such as TDM or congestion pricing. The scenarios do not consider or evaluate specific transportation networks or individual projects.

Based on the four elements above, which are illustrated in **FIGURE 4.2**, the four scenarios illustrate different land use "themes" for how the region can grow and the transportation system which supports that growth. **FIGURE 4.3** illustrates the land use themes for each scenario. In turn, each has a different impact on critical fiscal, environmental, and transportation challenges facing the region, as detailed in Appendix: SCS Background Documentation.

Local Sustainability Planning Tool

As part of the SCS process, SCAG developed the Local Sustainability Planning Tool (LSPT), a GIS-based sketch planning tool that allows users to create land use scenarios and analyze their impacts. SCAG made the LSPT available to each of its jurisdictions, trained hundreds of users, and worked one on one with planners to assist in their use of the tool. Provided with preliminary scenarios of their planning areas for the years 2008, 2020, and 2035, local planners were then able to create, modify, and compare a variety of scenarios and their subsequent impacts on vehicle ownership, vehicle miles traveled, mode use, and GHG emissions. This allowed the local government participation in the development of the SCS to be far more fruitful than it otherwise would have been.

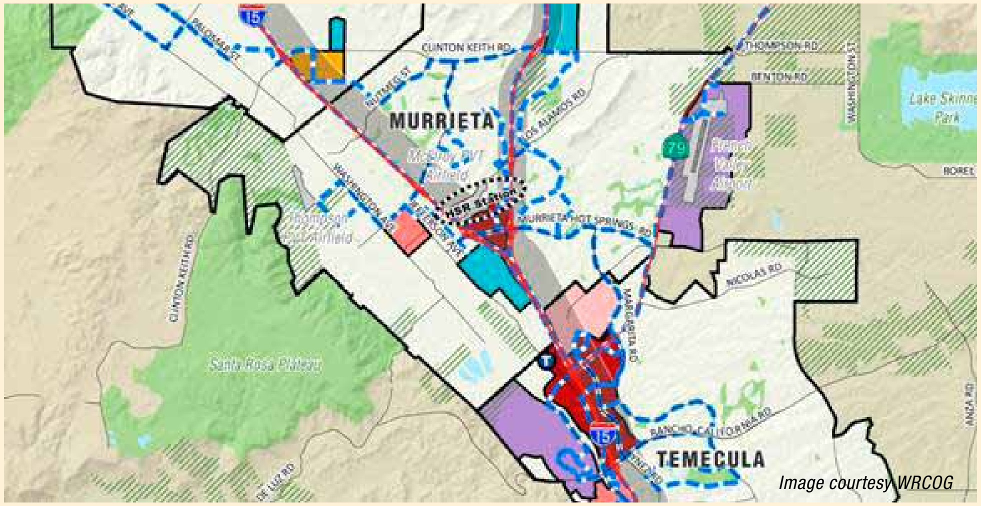
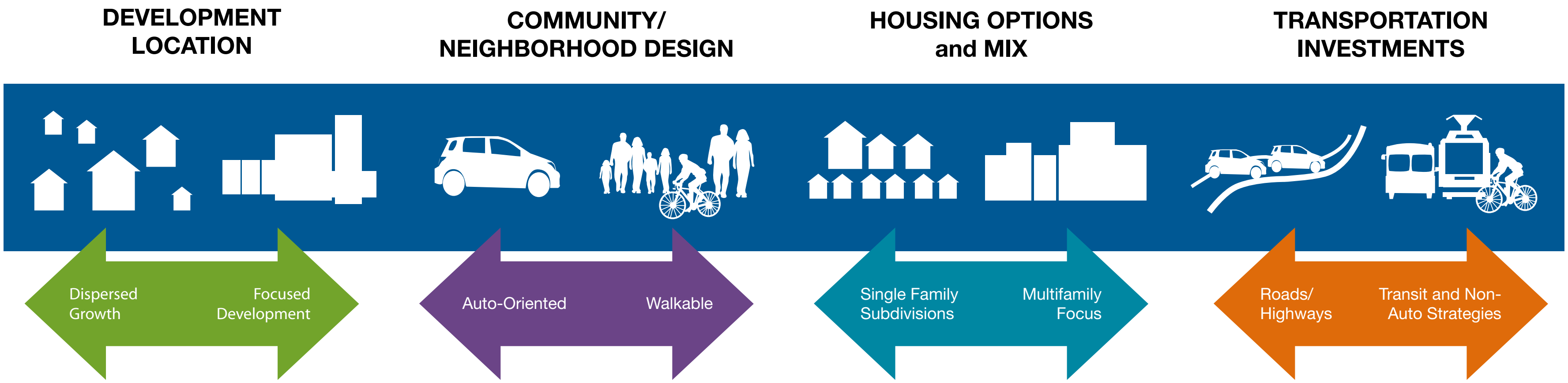


Image courtesy WRCOG

FIGURE 4.2 Workshop Scenario Elements



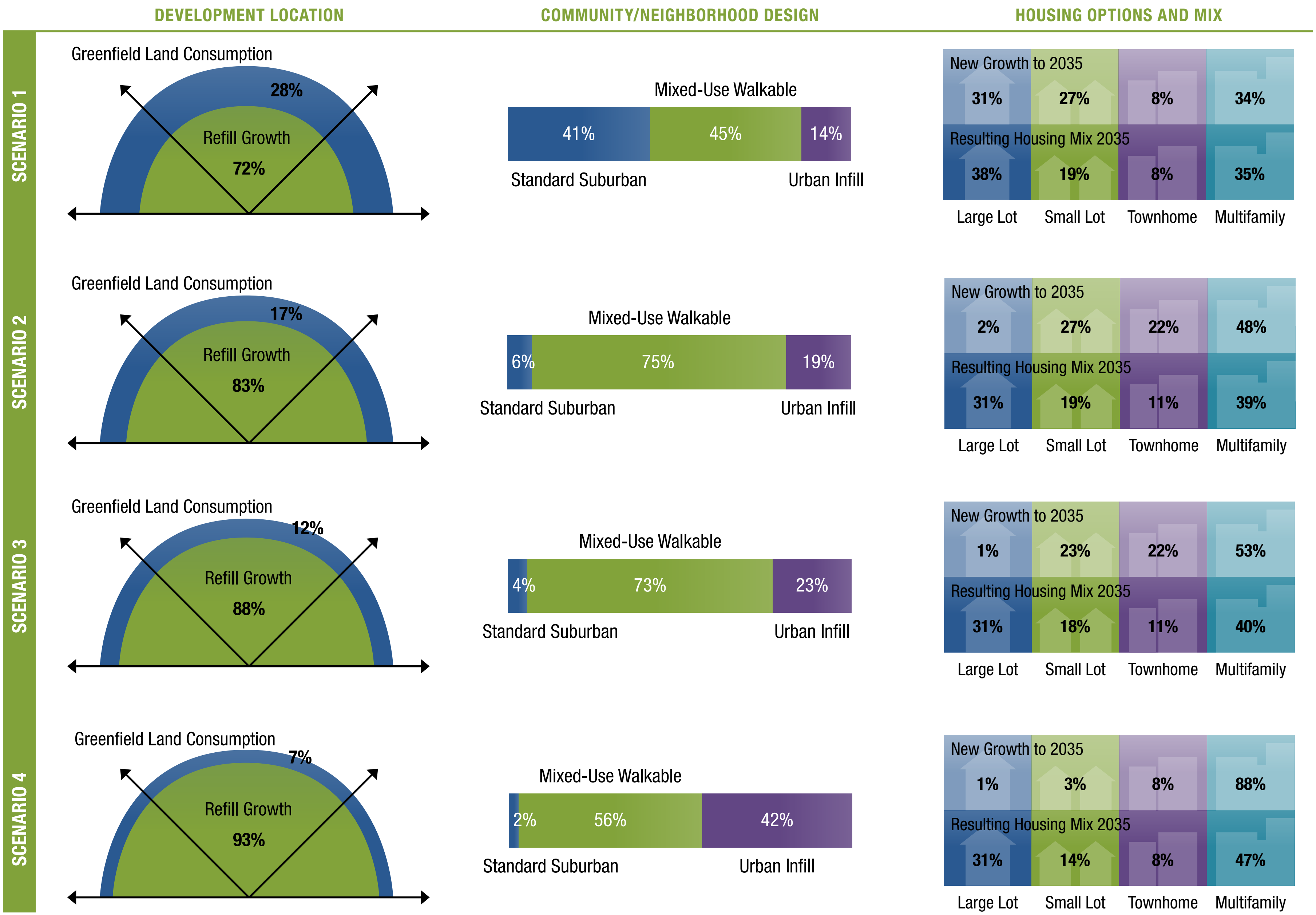
Scenario 1. This scenario is based on the General Plans prepared by cities and compiled by SCAG, with assistance from local planners, using the Local Sustainability Planning Tool (LSPT). It includes a significant proportion of suburban, auto-oriented development, but also recognizes the recent trend of increased growth in existing urban areas and around transit. New housing is mostly single-family (58 percent), with an increase in smaller-lot single-family homes, as well as an increase in multifamily homes (42 percent). The transportation system is based on the package of improvements in the 2008 RTP. While these investments tend to favor automobile infrastructure, they also support new transit lines and other non-auto strategies and improvements.

Scenario 2. This scenario focuses more growth in walkable, mixed-use communities and in existing and planned High-Quality Transit Areas. Under this scenario, there would be an increase in investments in transit and non-auto modes as compared to the 2008 RTP. Employment growth is focused in urban centers, around transit. Fewer new homes (29 percent) are single-family homes, as this scenario comes closer to meeting demand for a broader range of housing types, with new housing weighted less toward large-lot single-family homes (2 percent) and more towards smaller-lot single-family homes (27 percent) and multifamily condos, townhomes, and apartments (70 percent).

Scenario 3. This scenario builds on the walkable, mixed-use focus of the growth in Scenario 2 and also aims to improve fiscal and environmental performance by shifting even more of the region's growth into areas that are closer to transit and less auto-centric. Like Scenario 2, this scenario aims to meet demand for a broader range of housing types, with new housing weighted toward smaller-lot single-family homes, townhomes, multifamily condos, and apartments. In terms of percentage, the mix of housing types is very similar to Scenario 2, but the location of the growth within the region is shifted more toward transit-rich locations. Also like Scenario 2, transportation system investments would be more weighted toward transit investments, TDM, and non-auto strategies, which would support the move away from more auto-oriented development patterns.

Scenario 4. This scenario maximizes growth in urban and mixed-use configurations in already developed areas and around existing and planned transit investments. To support this shift, transportation system investments are heavily weighted toward transit infrastructure and operational improvements (i.e., higher frequencies and more transit feeder service), as well as improvements to bicycle and pedestrian infrastructure. In order to maximize the transit investments and accommodate population in already developed areas, the vast majority of new housing (96 percent) is multifamily, while 4 percent is single-family development.

FIGURE 4.3 Workshop Scenarios (2035)



Although transportation system pricing, vehicle and fuels technology, and power generation policies will also play a role in meeting the region's goals, these factors were all held constant in the scenarios in order to more clearly communicate the impacts of land use and infrastructure policy options.

SCENARIO OUTCOMES

Once the four scenarios were created, the model was used to estimate a broad set of fiscal, environmental, and transportation impacts across the four scenarios in order to facilitate comparison. The comparative metrics generated included the following:

- Land consumption;
- GHG (CO_2e) emissions from cars and buildings ;
- Air pollution and public health impacts;
- Fuel use and cost;
- Building energy and water use and cost; and
- Fiscal impacts, including capital infrastructure costs, operations and maintenance costs, and local revenues.

As each of these metrics was measured across the scenarios, a clear improvement in impacts was observed from Scenario 1 to Scenario 4. For instance, Scenario 1 consumes 251 square miles of undeveloped land—nearly twice as much as Scenario 2, which consumes 127 square miles—to accommodate growth to 2035. Scenario 3 consumes 84 square miles and Scenario 4, which maximizes growth in urban and mixed-use configurations in already developed areas, brings that number down to 46 square miles. Additional results for all of the metrics can be found in Appendix: SCS Background Documentation.

Public Outreach Workshops

The four scenarios were developed specifically to be presented at a series of public workshops during the summer of 2011. These 18 workshops, required under SB 375, were held throughout the region. SCAG sought to make these workshops as transparent and interactive as possible and obtained input from over 700 participants, including residents; public agencies; elected officials; community organizations; and environmental, housing, and business stakeholders.

Through PowerPoint presentations and handouts, participants were provided with a description of each scenario and an understanding of how development location, neighborhood design, housing options and mix, and transportation investments compared between scenarios and resulted in varying impacts for the region.

With these intrinsic tradeoffs in mind, the group then engaged in a discussion of objectives and priorities for the 2012–2035 RTP/SCS, including mobility, environment, health, modes of travel, economy, safety, equity, and housing. Input was collected through anonymous remote polling instruments (the results of which were presented in real time) and group discussions.

Collective input from all of the workshops showed the economy, environment, and transportation as top priorities for the region. Discussions focused on mobility, modes of travel, environmental and community impacts, and potential funding mechanisms. Polling results indicated a preference that future employment and commercial and residential areas be located in mixed-use areas. Most participants also indicated a desire for increased travel mode choice in the region and for transportation investments to be made in all modes (auto, bus, rail, bicycle, etc.). Additional results from the workshops can be found in Appendix: Public Participation and Consultation.

2012–2035 RTP/SCS Overall Land Use Pattern

SCAG used the feedback from local planning sessions, public outreach workshops, and consultation with local jurisdictions to work collaboratively with policymakers, stakeholders, and local governments to develop and analyze a series of 2012–2035 RTP/SCS alternatives and eventually arrive at the regional RTP/SCS.

The 2012–2035 RTP/SCS was built primarily from local General Plans and input from local governments using the Local Sustainability Planning Tool, from the subregional COGs and from the County Transportation Commissions. The adopted Subregional SCSs of the Gateway Cities COG and Orange County COG, including all underlying land use, socioeconomic, and transportation data, were incorporated without alteration into the regional 2012–2035 RTP/SCS. These subregional SCSs were developed in close collaboration with SCAG and include various strategies to help achieve estimated GHG reduction targets.

The Gateway Cities COG (GCCOG) Subregional SCS, found in Appendix: Subregional SCS, was built with each local jurisdiction selecting GHG emission reduction strategies that are a blend of efforts that GCCOG and its communities have been pursuing over the last decade and future efforts that each jurisdiction plans to implement over the next

Delegated Subregions

Unique to SCAG is a special provision within SB 375 that allows any subregional Council of Governments (COGs) the option of developing its own subregional SCS within the region. SCAG adopted a Subregional Framework and Guidelines (see Appendix 20) to establish standards for preparing and submitting a subregional SCS, while laying out SCAG's role in facilitating and supporting the subregional effort with data, tools, and other assistance.

The Orange County Council of Governments and the Gateway Cities Council of Governments chose to develop their own SCS and entered into Memoranda of Understanding with SCAG specifying submission schedules and standards for each component of the subregional SCS. While the subregional COGs were responsible for conducting their own research and outreach to develop their subregional SCS, they worked closely with SCAG through workshop preparation, data and information sharing, and regular meetings. SCAG's Local Sustainability Planning Tool was also made available to the subregions along with trainings and one-on-one working sessions to assist in the review and revision of the preliminary scenarios. The two subregional SCS documents can be found, in their entirety, in Appendix: Subregional SCS Strategies. No adjustments were made to the land use input in either subregional SCS.

25 years. GCCOG implemented an outreach program that provided stakeholders and community members various opportunities to learn about the SCS process and provide feedback. The outreach program included a stakeholder briefing to provide information about the SCS process and to address questions on related topics and public information open houses to present basic information and provide a forum for one-on-one dialogue with project team members.

The Gateway Cities COG SCS combines the following five bundles of strategies to meet estimated GHG reduction targets:

- Transportation Strategies;
- Transportation Demand Management Strategies;
- Land Use Strategies;
- Regional Transportation Projects, including Measure R; and
- Interactive Effects between Land Use and Regional Transit Projects.

The OCCOG Subregional SCS, also found in Appendix: Subregional SCS, combines strategies that show a collective effort by many Orange County jurisdictions, agencies, and groups to link transportation and land uses through a variety of processes and progressive measures. OCCOG conducted a series of outreach events to provide information and to solicit input on the development of the subregional OCCOG SCS. The outreach program included public meetings at various milestones in the development of the OCCOG SCS; a series of roundtable discussions with Orange County non-profit organizations; and a Web tool to facilitate and document public engagement. Each component of the outreach program introduced SB 375 and the OCCOG SCS process, provided status reports, and facilitated the opportunity for public review and comment.

Central to the OCCOG SCS are the strategies identified to reduce GHG emissions. These strategies illustrate that there is already a collective effort among Orange County jurisdictions, agencies, and groups to link transportation and land uses through an array of processes and measures. The sustainability strategies are compiled as completed projects, ongoing projects, future projects, and General Plan policies. The scope of current and planned strategies is broad and encompasses significant investment by both the public and private sectors for implementation strategies, including:

- Promoting a land use pattern that accommodates future employment and housing needs;

- Using land in ways that make developments more compact and improve linkages among jobs, housing, and major activity centers;
- Protecting natural habitats and resource areas;
- Implementing a transportation network of public transit, managed lanes and highways, local streets, bikeways, and walkways built and maintained with available funds;
- Managing demands on the transportation system (TDM) in ways that reduce or eliminate traffic congestion during peak periods of demand;
- Managing the transportation system (TSM) through measures that maximize the efficiency of the transportation network; and
- Utilizing innovative pricing policies to reduce vehicle miles traveled and traffic congestion during peak periods of demand.

COMPONENTS OF THE OVERALL LAND USE PATTERN

A review of local plans and subregional strategies points to the common ground that is inherent in SCAG's 2008 Advisory Land Use Policies. The advisory land use policies are a foundation for the overall regional land use development pattern:

- **Identify regional strategic areas for infill and investment** – Identify strategic opportunity areas for infill development of aging and underutilized areas and increased investment in order to accommodate future growth.
- **Structure the plan on a three-tiered system of centers development** – Identify strategic centers based on a three-tiered system of existing, planned, and potential, relative to transportation infrastructure.
- **Develop "complete communities"** – Create mixed-use districts, or "complete communities," in strategic growth areas through a concentration of activities with housing, employment, and a mix of retail and services, located in close proximity to each other.
- **Develop nodes on a corridor** – Intensify nodes along corridors with people-scaled, mixed-use developments.
- **Plan for additional housing and jobs near transit** – Support and improve transit use and ridership by creating pedestrian-friendly environments and more compact development patterns in close proximity to transit.
- **Plan for a changing demand in types of housing** – Address shifts in the labor force that will likely induce a demand shift in the housing market for additional development types such as multifamily and infill housing in central locations, which will appeal to the needs and lifestyles of these large populations.
- **Continue to protect stable, existing single-family areas** – Continue to protect stable, existing single-family neighborhoods as future growth and a more diverse housing stock are in infill locations near transit stations.
- **Ensure adequate access to open space and preservation of habitat** – Ensure access to open space and habitat preservation despite competing quality-of-life demands driven by growth, housing and employment needs, and traditional development patterns.
- **Incorporate local input and feedback on future growth** – Continue public outreach efforts and incorporate local input through public workshops, scenario planning, and stakeholder outreach.

These policies have evolved over time and serve as the basis for SCAG's Compass Blueprint, a regional voluntary program that offers innovative planning tools, creative strategies, and collaborative partnerships to all local governments within the region. Since its inception, Compass Blueprint has supported local Demonstration Projects that seek to improve mobility for all residents, foster livability in all communities, enable prosperity for all people, and promote sustainability for future generations.

In addition to Compass Blueprint, cities and counties within the SCAG region continue to implement their own local land use and transportation projects that support the goals of the 2012–2035 RTP/SCS. These local efforts were considered in the development of the overall land use pattern of the RTP/SCS. Throughout this chapter, there are examples of plans and projects that advance the goals of the RTP/SCS at the local level. A complete list of RTP/SCS supportive projects can be found in Appendix: SCS Background Documentation and a complete list of transportation projects can be found in Appendix: Project List.

SCAG reviewed the input received from local jurisdictions between May 2009 and August 2011 and analyzed land use trends that have been occurring within the region in recent years. It is clear that there has been, and continues to be, a significant trend of local

Compass Blueprint

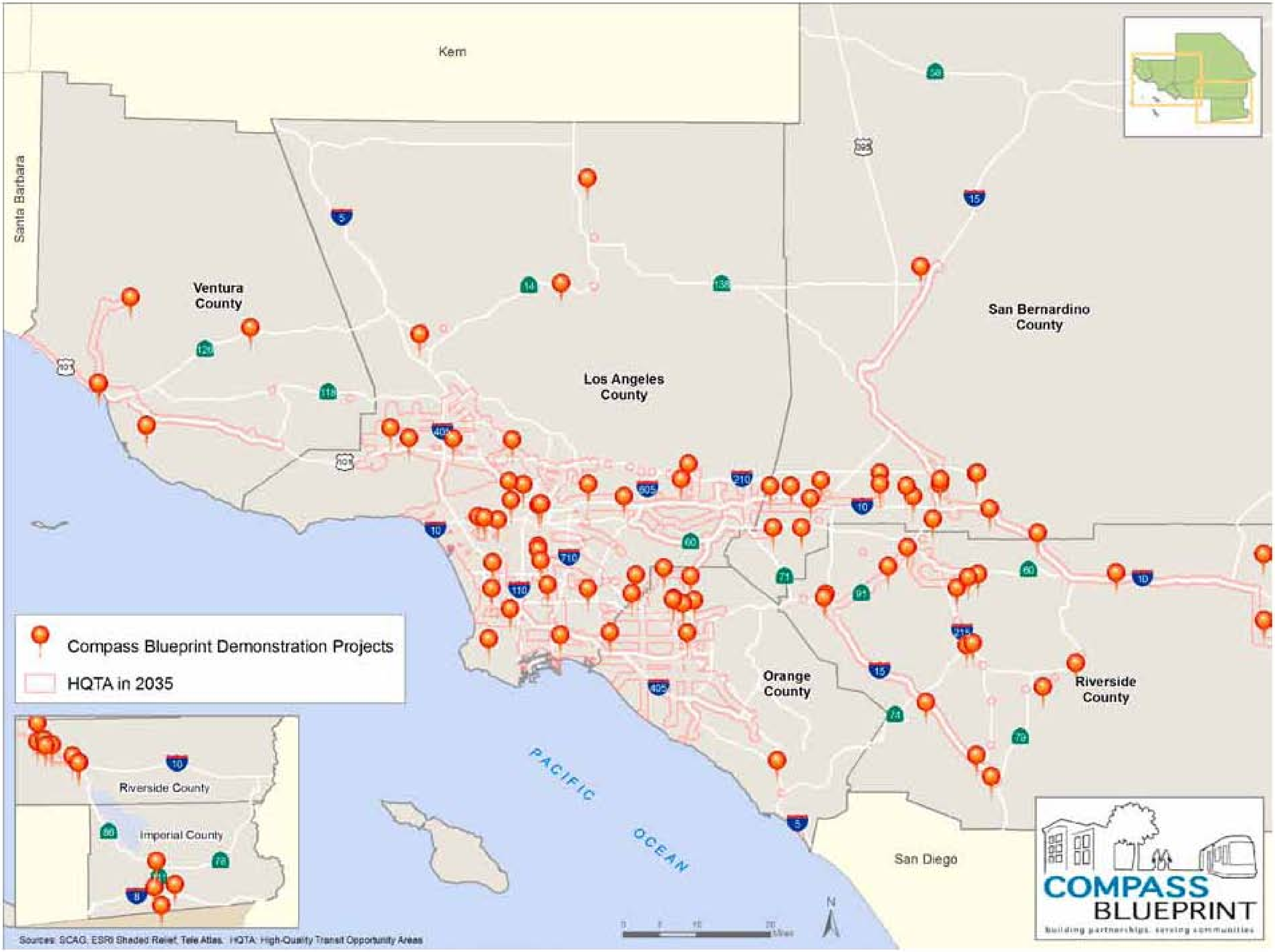
Since 2004, Compass Blueprint has been a model for integrating land use and transportation planning and turning regional vision into local reality. Guided by four core principles–Mobility, Livability, Prosperity and Sustainability–the program has effectively given the region a “jump-start” in building its sustainable communities, and implementing this SCS in partnership with our local partners. At the core of Compass Blueprint are Demonstration Projects–incentive-based, voluntary partnerships between SCAG and local governments that apply innovative approaches and tools to local plans that support regional priorities. As of January 2012, SCAG has provided over $13.6 million in incentive funds for 134 Demonstration Projects in 95 jurisdictions. Projects have included transit-oriented development plans for station areas along new light-rail alignments, downtown revitalization efforts, community visioning projects in low-income communities, and other projects that support shared local and regional goals. **EXHIBIT 4.4** shows all completed Compass Blueprint Demonstration Projects to date. A complete list of past and current Compass Blueprint Demonstration Projects can be found in Appendix: SCS Background Documentation.

Future Demonstration Projects will continue to serve as models for the region by focusing on regionally significant local plans that directly implement the SCS and its goal of translating policy to on-the-ground land use changes and multi-modal transportation improvements. Concurrently, Compass Blueprint will further incentivize local implementation of the SCS through the Compass Blueprint Awards Program, recognizing models of innovative planning in the region, and through the Toolbox Tuesdays program–free, monthly, professional training events for local planners in cutting-edge planning tools and approaches developed in Demonstration Projects.

Image courtesy of SANBAG

Image courtesy of City of Los Angeles

EXHIBIT 4.4 Compass Blueprint Demonstration Projects



development policies and decisions toward increased integration of land use and transportation. Signs of this trend include:

- Changing demographics and housing market demand;
- Redevelopment of main streets, downtowns, and corridors to vibrant mixed-use neighborhoods;
- Transit-oriented development adjacent to rail station areas and along major bus corridors; and
- Protection of resource areas and farmland.

In most cases, current adopted local General Plans do not go out as far in time as the plan's horizon year of 2035. Thus, in developing the overall land use development pattern, SCAG identified strategic opportunity areas within city and county boundaries to logically continue recent development trends to 2035. While maintaining local jurisdictions' input for growth totals for both 2020 and 2035, the 2012–2035 RTP/SCS incorporates the following within the regional model:

- Compass Blueprint Demonstration Projects that can reasonably be expected to be implemented by 2035;
- Additional local growth that jurisdictions have indicated subsequent to the local input process being completed in 2011;
- Future multiple family residential and employment growth that are emphasized in planned High-Quality Transit Areas (HQTA) post-2020 to a greater extent than currently portrayed in current General Plans, which do not go out to 2035;
- Future multiple family residential and employment growth that is also emphasized along main streets, historic downtowns, and other appropriate corridors post-2020 to create mixed-use and walkable "transit-ready" communities to a greater extent than currently portrayed in current General Plans, which do not go out to 2035; and
- A shift from single-family residential development toward multifamily residential development post-2020 to a greater extent than currently portrayed in General Plans to reflect recent trends seen during the past 20 years.

(Note: Land use inputs for OCCOG and GCCOG SCS were unchanged.)

Transportation Analysis Zones (TAZs) and Community/Development Types

To conduct required modeling analysis for the 2012–2035 RTP/SCS, SCAG distributes the growth forecast data to transportation analysis zones (TAZs) to capture localized effects of the interaction of land use and transportation. The TAZ-level maps have been developed for the purpose of modeling performance only. The growth and land use assumptions for the RTP/SCS are to be adopted at the jurisdictional level. Based on statutory requirements of SB 375 (Government Code Section 65584.04(i), subparagraphs (1) and (3)), the Regional Housing Needs Assessment must be consistent with the RTP/SCS land use development pattern. The RHNA allocation being adopted at the jurisdictional level necessitates that the SCS be based on a jurisdictional level growth distribution.

To further facilitate regional modeling of land use information from nearly 200 separate jurisdictions, SCAG developed a simplified series of Community Types to represent the various land use categories contained in the region's many General Plans. Each Community Type is comprised of various characteristics related to employment and housing density, urban design, mix of land uses, and transportation options. The land


Image courtesy of Humane Design

use pattern maps presented in this chapter use five Community Types: urban, city, town, suburban, and rural. These five are further divided into 13 Development Types that each articulates use designations, densities, and building intensities. Details describing the characteristics contained within each of the five Community Types and 13 Development Types are available in Appendix: SCS Background Documentation.

Utilizing TAZs and Community/Development Types and incorporating local input and land use trends, the overall land use pattern considers the following factors:

- Urbanized Core vs. Periphery;
- Changing Demographics and Housing Market Demand;
- Adjustments for Housing Capacity;
- Main Streets, Downtowns, and Corridors;
- Resource Areas and Farmland; and
- Transit Stations and High-Quality Transit Areas (HQTA).

Urbanized Core vs. Periphery

As the largest Metropolitan Planning Organization in the nation, SCAG encompasses a geographical area of great diversity. From its population to its industries, lifestyles, environments, and political climates, planning for a region of this size and scope is never a "one size fits all" approach. The greatest distinction is between the region's urbanized core and its peripheral areas.

EXHIBIT 4.5 shows the locations of urban centers within the SCAG region. These are areas where strategies such as compact community design, mixed-use development, redevelopment of aging retail areas, greater housing variety, and additional transit service are more likely to succeed. Conversely, less dense areas in the periphery may benefit from different strategies. The overall land use pattern takes these differences into account.

Changing Demographics and Housing Market Demand

SB 375 combines transportation and housing planning by integrating the Regional Housing Needs Assessment (RHNA) process with the 2012–2035 RTP/SCS. Specifically, Government Code Section 65080(b)(2)(B), subparagraphs (iii) and (vi), requires that the SCS identify areas within the region sufficient to house an eight-year projection of the regional housing need and consider the state housing goals specified in Government Code Sections 65580 and 65581. SCAG has been engaged in the RHNA process concurrently with the development of the 2012–2035 RTP/SCS. This process requires SCAG to work with its member agencies to identify areas within the region that can provide sufficient housing for all economic segments of the population and ensure that the state's housing goals are met.

The SCAG region's official regional housing need from the California Department of Housing & Community Development (HCD) for the planning period 2014–2021 is 409,000–438,000 housing units. Of these, approximately 164,000–176,000 are expected to be in the very low- and low-income category (affordable to those who make less than 80 percent of area median income), 72,000–77,000 are expected to be in the moderate-income category (affordable to those who make between 80 percent and 120 percent of median income), and 173,000–185,000 are expected to be offered at the above moderate-income category.

The regional target determined by HCD considered projected household growth and socio-economic data based on local input, the 2010 Census, and the California Department of Finance. As part of its determination, HCD considered current economic conditions, which have contributed to a high number of vacancies for many communities, often in excess of a healthy market rate. For this reason, HCD permitted the application of a one-time excess vacancy credit due to abnormal market conditions, slightly lowering preliminary housing unit growth expectations for the eight-year planning period.

The RHNA Allocation was developed with reliance on local input on projected household growth and responses to local surveys. Results from the surveys support consistency with the state housing goals by encompassing a variety of planning factors that identify opportunities and constraints for jurisdictions to plan for housing at all income levels. These factors include the availability of suitable land, market demand for housing, distribution of household growth along transit corridors, and replacement need. To address increasing concerns regarding affordability, each jurisdiction's future housing need is

Community Types

The Community Types employed in the RTP/SCS are not intended to represent detailed land use policies, but are used to describe the general conditions likely to occur within a specific area. The following Community Types are each comprised of specific characteristics related to jobs and housing density, urban design and mix of land uses, and transportation options. These five are further divided into 13 Development Types, which additionally express land use designations, densities, and building intensities. Detailed descriptions of these Community Types and more specific Development Types are found in Appendix: SCS Background Documentation.

Urban

Urban areas are the highest intensity Community Types. These centrally located districts have significant amounts of employment and corresponding residential uses and retail, typically located in a dense cluster of multistory buildings and high-rise buildings. Urban areas are also typically located at the convergence of a number of high-capacity transit facilities complemented by non-auto infrastructure that also provides access and connectivity.

City

The City Community Type is on average one-half the intensity of the Urban Community Type. These areas contain significant employment centers and a mix of medium- and high-density housing, supported by retail and daily services. One to two high-capacity transit facilities, a number of bus routes, and non-auto infrastructure provide access and connectivity to a range of activities and locations.

Town

The Town Community Type provides low- to medium-density housing opportunities that are located close to local-serving retail and daily services. These areas are characterized by an employment core or an independent job center in low- to mid-rise structures. Sidewalks and bike facilities are adequate and the areas benefit from one high-capacity transit facility and local buses.

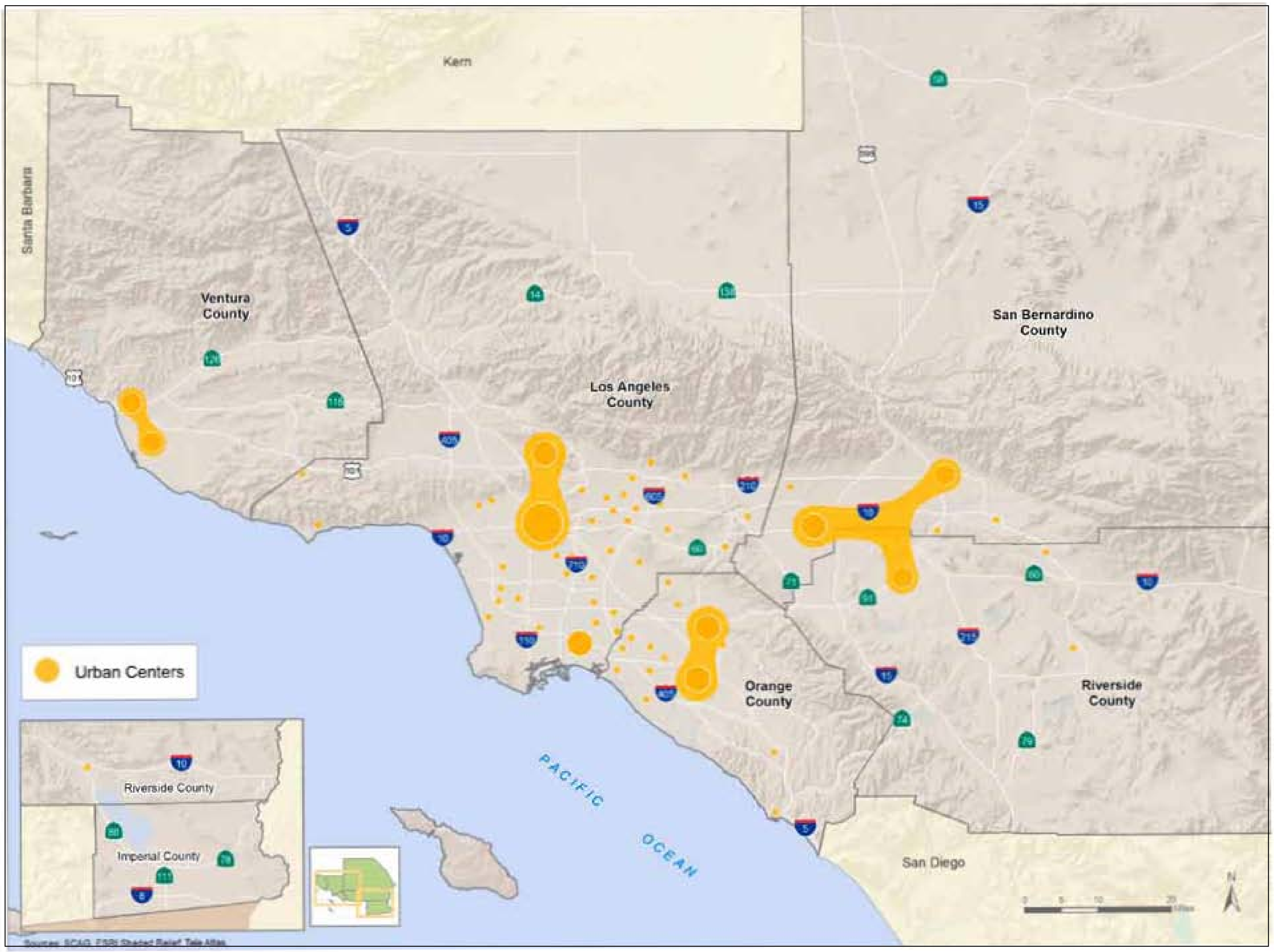
Suburban

Suburban areas contain a mix of uses, but often have one predominant use, such as residential or office. Residential areas are typically low density with larger lots and are separated from retail and other daily service uses. Though these areas are predominantly served by automobiles, bus service and commuter rail may also operate in certain neighborhoods.

Rural

Rural areas include both jobs and housing, though these two uses are rarely found in close proximity to each other. Housing is characterized by acreage lots and ranches and is often far from commercial and employment activities, which occur in isolated nodes located on rural crossroads and highway services zones. Transit and non-auto facilities rarely serve these areas, making automobile use the most frequent mode of travel.

EXHIBIT 4.5 Urban Centers SCAG Region



Local Efforts

El Centro Downtown Revitalization

Downtown El Centro is a historic and distinct part of Imperial County that contains many businesses, restaurants, shops, services, and public spaces. After many years of focusing on new development in other portions of El Centro, the City and local stakeholders recognized a need for revitalization. A highly collaborative visioning effort, undertaken in partnership with SCAG's Compass Blueprint, resulted in a new Downtown Plan that contains incentives and design guidelines for improved walkability and mixed-use development, including housing.

Image courtesy of City of El Centro

adjusted to balance the proportion of affordable housing by county across the region. This adjustment considers areas that have a high proportion of certain income groups and adjusts future household growth toward a goal of social equity. This mitigates overconcentration of income groups and encourages planning for affordable housing in areas with limited opportunities in affordable housing.

The 2012–2035 RTP/SCS incorporates the overall RHNA target for the SCAG region and provides a land use pattern that shows where new housing growth can be accommodated in the future. In 2008, the SCAG region was comprised of about 17.9 million people, 5.8 million homes, and 7.7 million jobs. The 2035 Integrated Growth Forecast projects that the region will grow by another 4 million people by 2035, and nearly 1.5 million households and 1.7 million jobs will be added. The 2012–2035 RTP/SCS land use pattern contains sufficient residential capacity to accommodate the region's future growth, including the eight-year regional housing need, as shown in **TABLE 4.1**. The land use pattern accommodates approximately 644,000 additional households in the SCAG region by 2020 and a total of 1.5 million additional households by 2035. As shown in **TABLE 4.2**, the land use pattern also encourages improvement in the jobs-housing balance by accommodating 676,000 additional jobs by 2020 and approximately 1.7 million additional jobs by 2035.

TABLE 4.1 Summary of Total Households Forecasted in RTP/SCS

Community Type	Existing Households (2008)	Total Forecasted Households (2020)	New Households (2008–2020)	Total Forecasted Households (2035)	New Households (2008–2035)
Urban	138,000	183,000	44,000	224,000	86,000
City	685,000	755,000	70,000	948,000	263,000
Town	2,496,000	2,744,000	248,000	3,088,000	592,000
Suburban	2,333,000	2,562,000	229,000	2,781,000	448,000
Rural	162,000	215,000	53,000	284,000	122,000
Total	**5,814,000**	**6,458,000**	**644,000**	**7,325,000**	**1,511,000**

TABLE 4.2 Summary of Total Jobs Forecasted in RTP/SCS

Community Type	Existing Jobs (2008)	Total Forecasted Jobs (2020)	New Jobs (2008–2020)	Total Forecasted Jobs (2035)	New Jobs (2008–2035)
Urban	503,000	534,000	31,000	577,000	74,000
City	1,029,000	1,078,000	49,000	1,228,000	199,000
Town	2,872,000	3,077,000	205,000	3,493,000	621,000
Suburban	3,185,000	3,530,000	345,000	3,895,000	710,000
Rural	149,000	195,000	46,000	248,000	99,000
Total	**7,738,000**	**8,414,000**	**676,000**	**9,441,000**	**1,703,000**

Currently, SCAG is home to approximately 6 million households, 55 percent of which live in detached single-family homes. The region is expected to add 644,000 new households by 2020 and a total of 1.5 million new households by 2035. The changing nature of these households means that there will most likely be less demand for single-family homes on large lots. In the postwar era that shaped the popular image of Southern California, most households consisted of parents with children. In the 21st century this no longer holds true, and today, only a small number of households have children at home, and the number of households without children—including senior citizens and young people forming their first household—is dramatically increasing. As a result, there is an expected increase in demand for small-lot single-family houses and multifamily housing in close proximity to amenities, including local shopping and transit service.

This shift in demographics and household demand is apparent in the land use development pattern of the 2012–2035 RTP/SCS, which assumes a significant increase in small-lot single-family and multifamily housing that will mostly occur in infill locations near transit infrastructure. In some cases, the land use pattern assumes that more of these housing types will be built than is currently anticipated in local General Plans, and, in most cases, this shift in housing type—especially the switch from large-lot to small-lot single-family homes—will occur naturally in the marketplace as developers shift to products in high demand. In 2008, 45 percent of total households were multifamily products. The RTP/SCS projects that in 2035, 68 percent of new homes built in the SCAG region will be multifamily units.

Of the 644,000 new households expected in 2020, 28 percent will be at a minimum 30 dwelling units per acre, and of the 1.5 million new households expected by 2035, 33 percent will be at a minimum 30 dwelling units per acre. In accordance with Government Code Section 65080(b)(2)(B)(ii), these projected housing densities will help the region accommodate the projected housing needs at all income levels over the life of the RTP, especially at the lower-income categories. Additionally, SCAG moves toward improving the current distribution of households by income category in the region through the allocation of projected housing needs at the local level. Appendix: SCS Background Documentation lists the draft local RHNA allocations by jurisdiction. When the final RHNA plan is adopted in October 2012, SCAG jurisdictions will revise their Housing Elements to accommodate their respective allocations. The SCS's strategies will inform the development of those Housing Elements.

As significant changes occur in existing communities, there is potential for "gentrification," or the displacement of lower-income residents, if new development raises housing costs in a neighborhood. As the 2012–2035 RTP/SCS is implemented, jurisdictions in the SCAG region must be sensitive to the possibility of gentrification and work to employ strategies that can ameliorate it. One strategy is the general approach of higher-density infill development, which means that neighborhoods will be adding to the local housing stock rather than maintaining the current stock and simply changing the residential population. A second is the development of permanently affordable housing, through deed restrictions or development by non-profit developers, which will ensure that some units will remain affordable to lower-income households. SCAG will work with local jurisdictions and community stakeholders to seek resources and provide assistance to address possible gentrification effects of new development on existing communities and vulnerable populations.

Adjustments for Housing Capacity

As SCAG and its partner jurisdictions created the overall land use pattern in the Plan, it became apparent that some parts of the urbanized core planned for household growth greater than the amount in the Integrated Growth Forecast, while some areas in the region's periphery had less housing capacity than the forecast assumptions. For this reason, the land use development pattern of the RTP/SCS shifts an additional 15,000 households from the periphery into the urbanized core by 2020 and an additional 50,000 households by 2035, per consultation with the local jurisdictions.

The areas receiving additional growth between 2020 and 2035 are well served by transit with a mix of uses and other design elements that will relatively reduce the need for auto travel. This adjustment allowed the land use pattern to conform more closely to local General Plans, while reducing the amount of vehicle miles traveled.

Main Streets, Downtowns, and Corridors

The demand for smaller lots and multifamily housing often goes hand in hand with a desire to be close to amenities, retail, restaurants, and recreation. The land use pattern places a high percentage of new housing and jobs in main streets, downtowns, and along corridors where infrastructure already exists. This geographical placement makes sense given the SCAG region's trend toward revitalization of these older, traditionally commercial areas. Such a pattern has many co-benefits, including walking access to community amenities, lower VMT, lower transportation costs for both cities and individuals, and lower overall infrastructure cost.

Resource Areas and Farmland

In identifying the overall land use pattern, the 2012–2035 RTP/SCS also considers areas to be protected from development, as required by Government Code Section 65080(b)(2)(B)(v). These parklands, open space, natural resource areas, and farmland, are critical for the region's environmental and economic health. **EXHIBITS 4.6, 4.7,** and **4.8** show the locations of these areas. Data gathered from the sources listed below were provided to local jurisdictions in the region for review and revision. The updated information was then used to ensure the protection of resource areas in the development of the overall land use pattern.

- California Natural Diversity Database (California Department of Fish and Game);
- Flood Insurance Rate Maps (Federal Emergency Management Agency);
- Natural Community Conservation Planning Program (California Department of Fish and Game);
- California Protected Areas Database (GreenInfo); and
- Farmland Mapping & Monitoring Program (Division of Land Resource Protection in California Department of Conservation).

SCAG is also developing a natural lands acquisition and open space conservation by designated conservancies strategy that encourage acquisition and management of important habitat lands to mitigate impacts, including greenhouse gas emissions, related to future transportation projects. The strategy will identify appropriate agencies to collaborate with to develop a regional conservation plan based on identified priority areas. SCAG will include a regional mitigation plan for inclusion in the 2016 RTP.

Transit Stations and High-Quality Transit Areas (HQTA)

The overall land use pattern focuses jobs and housing in the region's designated High-Quality Transit Areas (HQTA), as illustrated in **EXHIBIT 4.9**. An HQTA is generally a walkable transit village, consistent with the adopted SCS, and is within one-half mile of a well-serviced transit stop, and includes transit corridors with minimum 15-minute or less service frequency during peak commute hours. Within these boundaries, this adjusted growth distribution within a given juridiction is consistent with the Integrated Growth Forecast for that jurisdiction and is distributed according to the jurisdiction's land

Image courtesy of Safe Routes to School use plans. Thus, while areas within ½ mile of a transit stop or corridor are walkable in relation to transit, not all such areas are targeted for growth and/or land use changes. The 2012–2035 RTP/SCS assumes that 51 percent of new housing developed between 2008 and 2035 will be within HQTAs, along with 53 percent of new employment growth (compared with 39 and 48 percent, respectively, in 2008). Aligning a high-quality transit network with new housing and jobs offers Southern Californians more complete communities with a variety of transportation and housing choices, while reducing the negative impacts of automobile use on public health and the environment.

TRANSPORTATION NETWORK AND STRATEGIES

The land use and housing mix in the 2012–2035 RTP/SCS is inextricably linked to a transportation network and a set of transportation strategies that, as required by Government Code Section 65080(b)(2)(B)(iv), services the transportation needs of the region. Chapter 2 of the 2012–2035 RTP/SCS incorporates the following transportation network enhancements and management approaches that offer a variety of mode choices, increase efficiency and mobility, and improve access for all users in the region:

Transportation Network

The 2012–2035 RTP/SCS calls for an expanded transportation network that will complement the overall land use pattern's focus on locating new growth in High-Quality Transit Areas and other opportunity areas, which in turn allows the 2012–2035 RTP/SCS to leverage greater improvement in transportation capacity and system operations than would otherwise be the case. Working together, these complementary land use and transportation strategies can significantly reduce VMT—a primary goal of SB 375—by increasing transit ridership, increasing walking and biking, and reducing the length of auto trips.

Benefits of Integrating Land Use and Transportation

1. Better Placemaking
Creating better places for people to live and work, such as walking and bicycling opportunities, varied housing options, and more compact development, can reduce travel time and relieve road congestion.

2. Lower Cost to Taxpayers and Families
Developing more compact neighborhoods and placing everyday destinations closer together can reduce the burden of development to taxpayers and reduce the everyday costs of housing and transportation for all.

3. Benefits to Public Health and the Environment
Better placemaking and reducing the footprint of new development will provide more opportunities for an active lifestyle and protect natural resources and greenfield sites.

4. Greater Responsiveness to Demographics and the Changing Housing Market
More walkable neighborhoods with varied housing options and transportation choices will be more responsive to the changes in market demand being driven by the region's demographic changes.

5. Improved Access and Mobility
Enhancing critical auto connections and increasing alternative transportation options can improve people's ability to move around the region and provide easy access to everyday destinations.

EXHIBIT 4.6 Natural Resource Areas SCAG Region

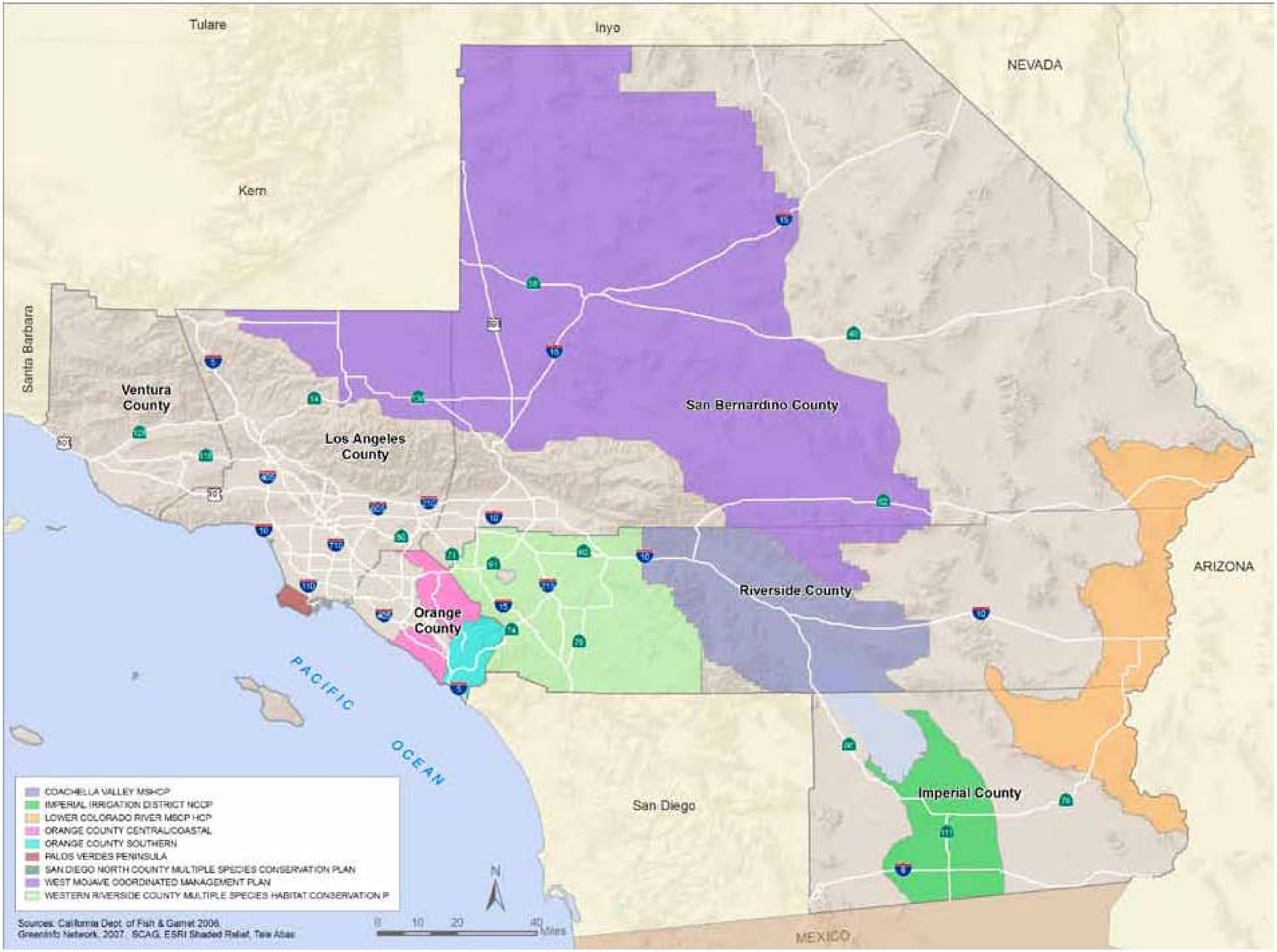


EXHIBIT 4.7 Open Space SCAG Region

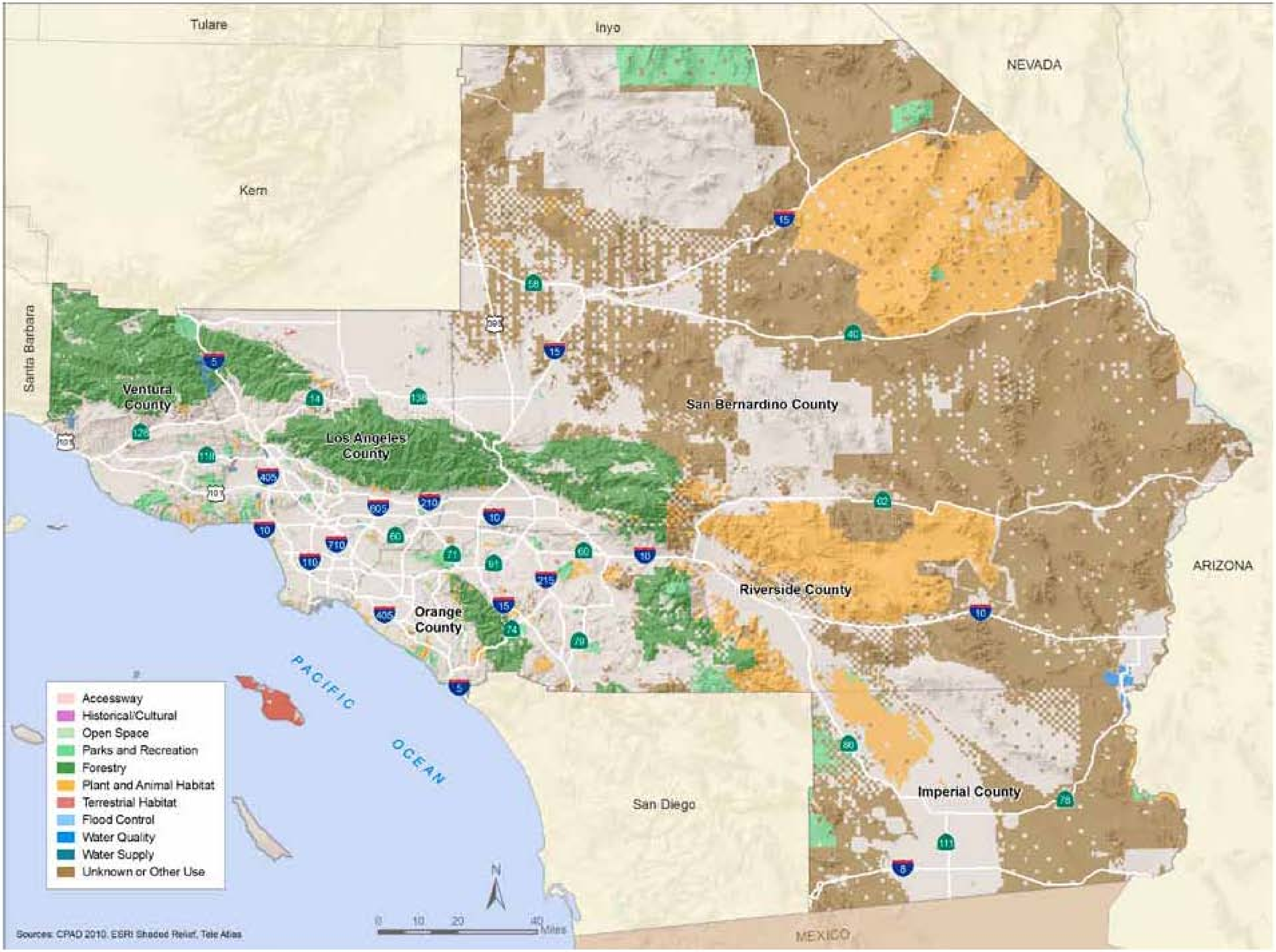
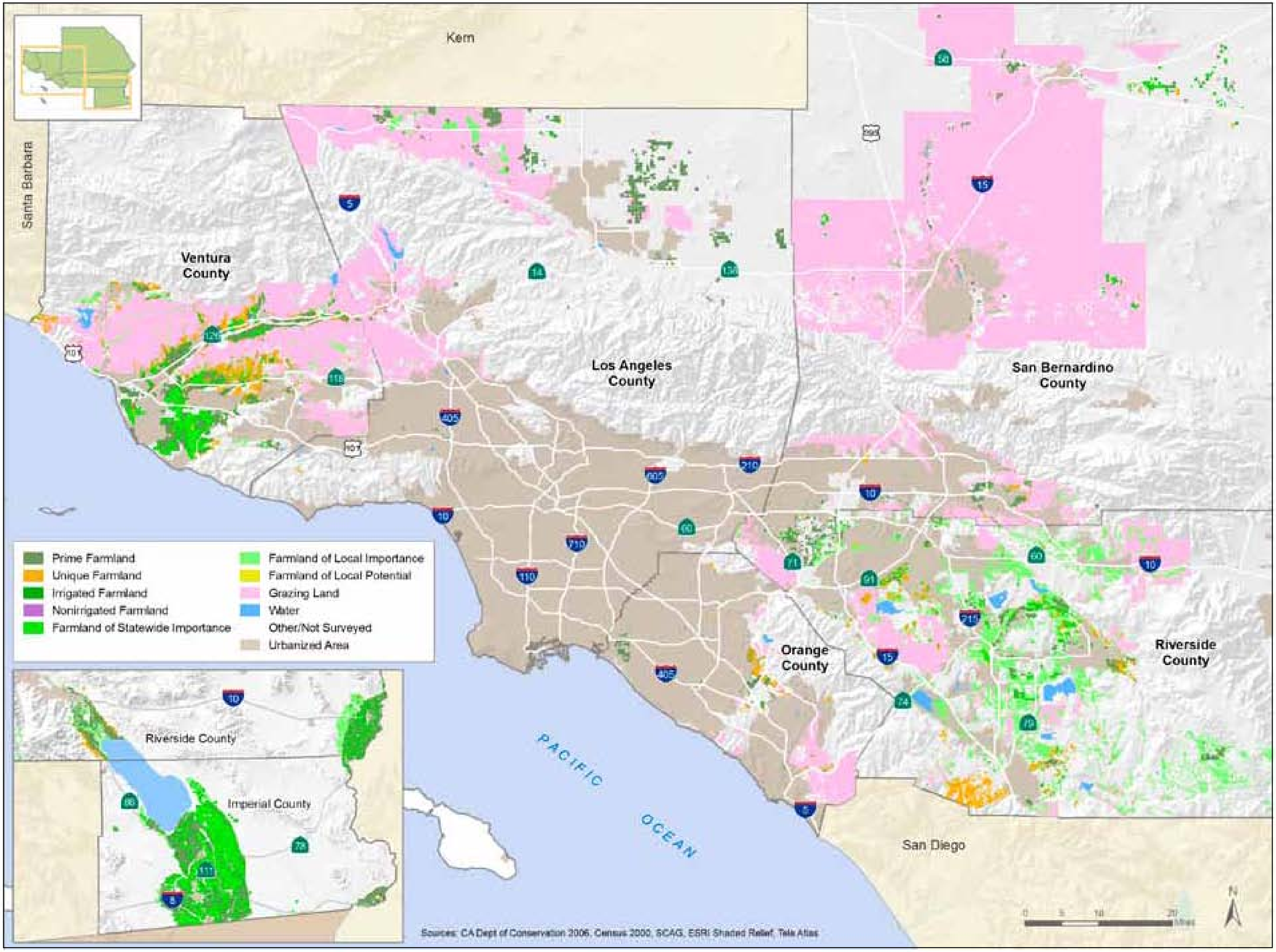


EXHIBIT 4.8 Farmland SCAG Region



As shown in **EXHIBIT 4.10**, the 2012–2035 RTP/SCS calls for an expansion of the public transit network and transit service on new and existing routes, resulting in greater transit accessibility and connectivity throughout the region—a complement to the strategy of focusing new growth in HQTAs. Funded in large part by local county sales tax programs, transit network expansion includes the addition of new corridors and lengthening existing ones in Los Angeles County through Measure R; introduction of the first bus rapid transit (BRT) systems and increasing Metrolink service in Orange County, Riverside County, and San Bernardino County; establishment of new trolley systems in the cities of Santa Ana, Anaheim, and Garden Grove; and the introduction of the rail connection from Downtown San Bernardino to Redlands. The 2012–2035 RTP/SCS also proposes three passenger rail strategies that will provide additional travel options for long distance travel within the region and to neighboring regions. These include improvements to the LOSSAN Corridor, improvements to the existing Metrolink system, and implementation of the California High- Speed Train (HST) project.

The 2012–2035 RTP/SCS also includes a notable increase in the regional active transportation network, as shown in **EXHIBIT 4.11**. Rainfall in the SCAG region typically averages only 30 days per year, which provides ideal conditions for walking and bicycling. Active transportation is an essential part of the SCAG transportation system, is low cost, does not emit greenhouse gases, can help reduce roadway congestion, and increases health and the quality of life of residents. Active transportation will receive a total of $6.7 billion in available revenues under the 2012–2035 RTP/SCS compared to $1.8 billion in the 2008 RTP, which represents an increase of more than 200 percent. This emphasis signifies an important opportunity to advance the goals of SB 375 by increasing non-motorized modes of transportation, thereby expanding access to a variety of land uses and transit and improving public health and air quality.

Along with strategic capacity enhancements and technological improvements to existing highways (as shown in **EXHIBIT 4.12**) and local streets, including the implementation of a high-occupancy toll (HOT) network, these transit, rail, and active transportation expansions complement the preferred land use pattern and support the expected growth throughout the region. The overall land use pattern's focus on locating additional growth in High-Quality Transit Areas relies on the development of high-capacity transit stations and efficient transportation corridors, lead to significant VMT reductions and other benefits due to higher walk/bike mode share, more transit use, and shorter auto trips.

Local Efforts

Feasibility Study of San Bernardino Mountain-Valley Railway System

SCAG recently partnered with the San Bernardino Associated Governments (SANBAG) and Inland Valley Development Agency (IVDA) to study the feasibility of a San Bernardino Mountain-Valley railway system that would provide a reliable, clean form of transportation for residents and visitors between the San Bernardino Valley and the mountain communities, including Big Bear Lake, with connecting travel options at both ends.

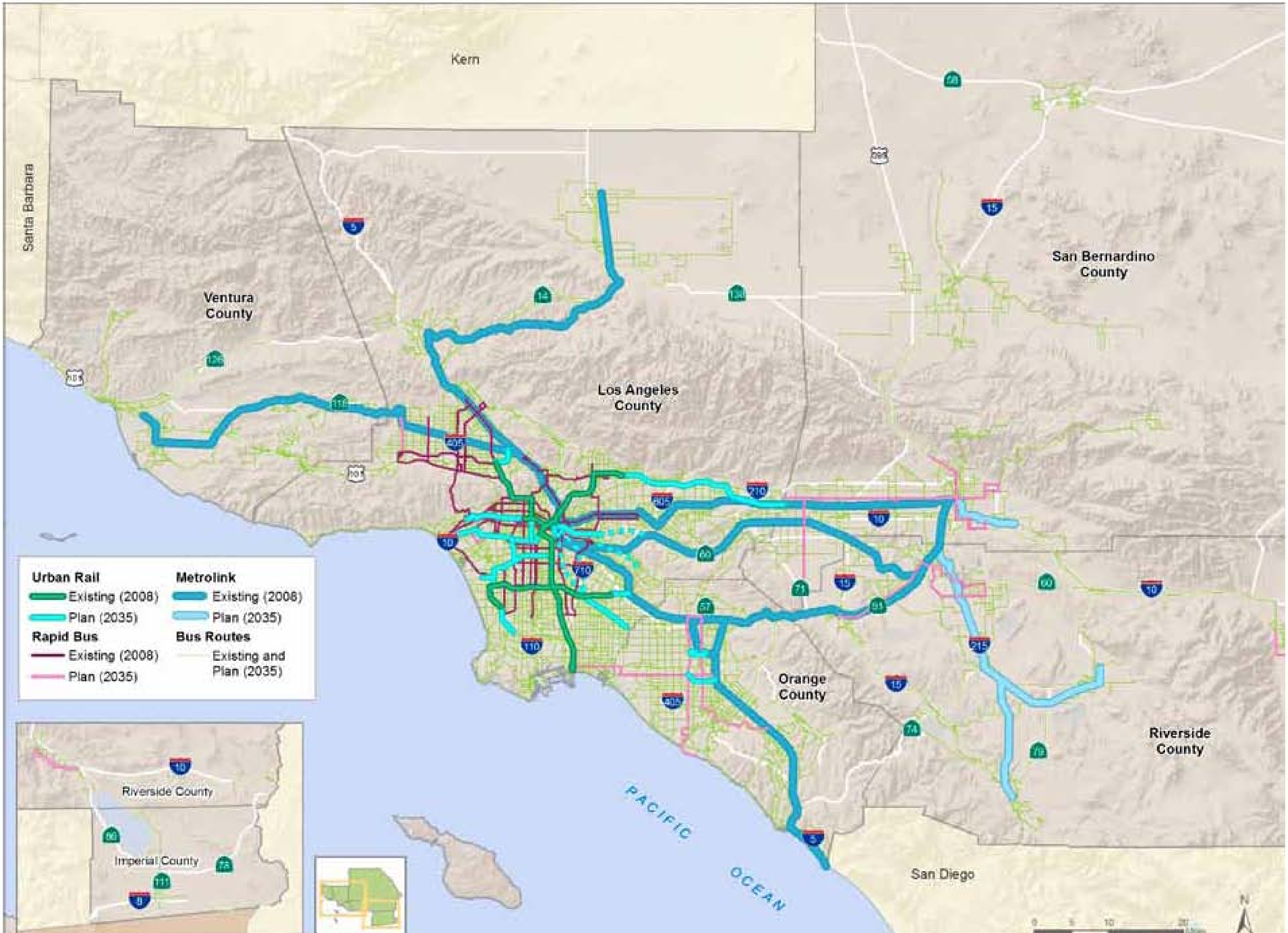
Los Angeles County's Measure R

The 2012 RTP/SCS's network includes all projects funded by the region's newest sales tax measure, Los Angeles County's Measure R. This measure provides more funding to transit than any other category, with about a dozen projects that improve and expand the region's transit system. These projects include Metrolink capital improvements, extensions to several Metro Rail lines, and new clean-fuel bus purchases.

Photograph courtesy of Metro. ©2012 LACMTA

EXHIBIT 4.9 High-Quality Transit Areas (HQTA) SCAG Region

EXHIBIT 4.10 Transit Network SCAG Region



Sources: SCAG, ESRI Shaded Relief, Tele Atlas

EXHIBIT 4.11 Proposed Bikeway Network SCAG Region

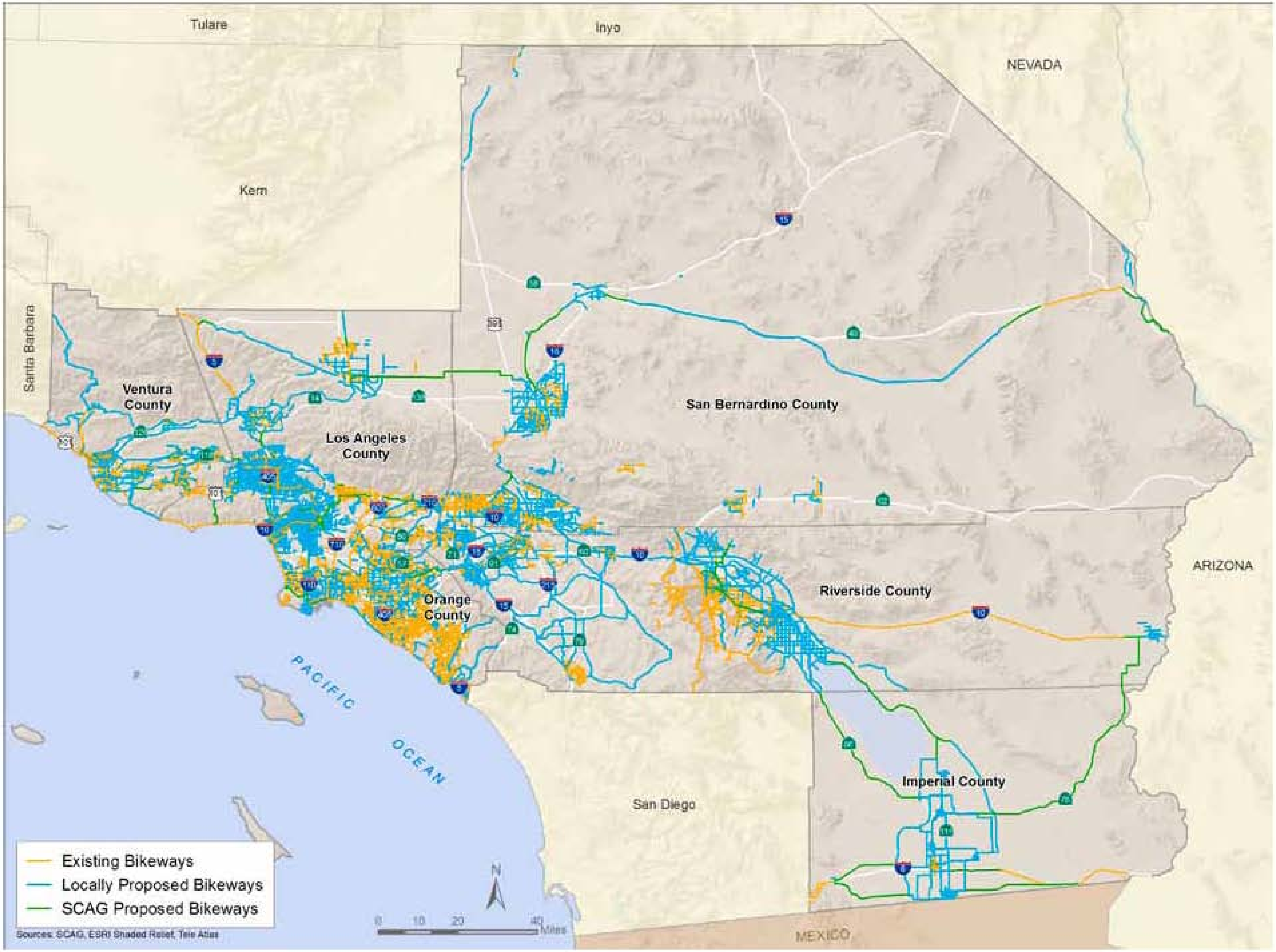


EXHIBIT 4.12 Proposed Highway Improvements SCAG Region

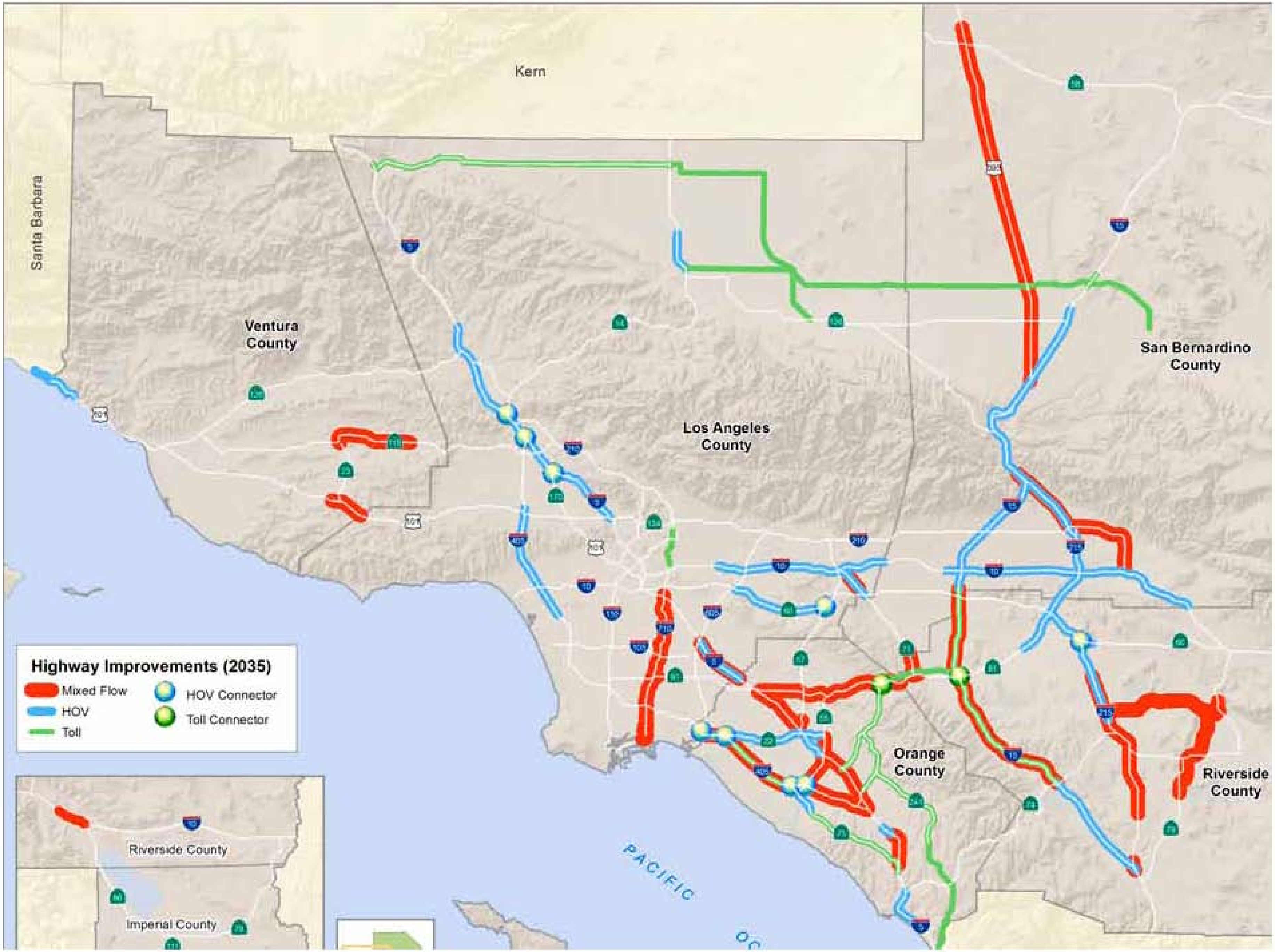



Image courtesy of City of Fullerton


Image courtesy of City of Long Beach

Image courtesy of City of Temecula

Local Efforts

Fullerton Transportation Center and Corridor Redevelopment

The City of Fullerton has embraced sustainability as a framework for planning its future in both the transportation and land use arenas. Most notably, the area around the Fullerton Transportation Center is a model of transit-oriented design that encourages walking, bicycling, and transit. The City's ongoing plans in this area continue to attract development of housing, restaurants, retail, and other amenities. Furthermore, its commitment to redeveloping its auto-oriented corridors serves to improve connections to nearby hospitals, schools, and employment centers.

Long Beach Boulevard Corridor

Along the Long Beach Boulevard Corridor, out-of-date parking standards have hindered development and impacted housing affordability. To address this, the City of Long Beach began a multi-phase project to implement a new zoning code that facilitates transit-oriented development along the Metro Blue Line. The City also continues its commitment to respond to the changing needs of the area by seeking grant funding for new bike and pedestrian infrastructure.

Temecula Old Town Specific Plan

For the residents of Temecula, Old Town represents a place where tradition and new opportunities combine to form the heart of the community. To support this vision, the City updated the Old Town Specific Plan to encourage a pedestrian-oriented, urban downtown that allows for a variety of land uses. The plan sets forth land use designations and development standards for more flexible and creative uses of properties and provides for a balance between commercial and residential development in the area.

Travel Demand Management (TDM)

In addition to the transportation network, the 2012–2035 RTP/SCS also relies on strategic and extensive Travel Demand Management (TDM) measures that support the expected land use pattern. These cost-effective strategies improve the effectiveness and capacity of the transportation system by supporting a shift from single-occupancy vehicle use to other alternatives. Many local jurisdictions in our region have become national leaders in the implementation of TDM strategies. For example, SCAG is working with local jurisdictions to close the gaps in the regional bikeway network and bring 12,000 miles of deficient sidewalks into compliance with the Americans with Disabilities Act (ADA). TDM measures will receive a total of $4.5 billion in available revenues compared to $1.3 billion in 2008, a more than 200 percent increase.

The 2012–2035 RTP/SCS employs the following TDM measures to improve mobility and access:

- Bringing the majority of sidewalks and intersections in our region into American with Disabilities Act (ADA) compliance to increase the usability and effectiveness of our active transportation system;
- Promoting telecommuting and flexible work schedules;
- Development of mobility hubs for first mile/last mile connectivity;
- Expanding parking cash out programs in urban areas; and
- Promoting Guaranteed Ride Home programs.

Transportation System Management (TSM)

Transportation System Management (TSM) measures also support the goals of the RTP/SCS by making improvements to increase capacity and improve operational efficiency. These techniques contribute to improved traffic flow, better air quality, and improved system accessibility and safety. The following TSM measures support the forecasted land use development pattern of the 2012–2035 RTP/SCS:

- Enhanced incident management;
- Advanced ramp metering;
- Corridor System Management plans;
- Traffic signal synchronization; and
- Improved data collection.

Local Efforts

Ventura Downtown Parking Management District

In order to solve the apparent parking shortage in its downtown area, the City of Ventura completed a downtown parking study. The study revealed that plenty of spaces were available in nearby city-owned lots, while other prime spaces in close proximity to local businesses were in high demand and always occupied. Local business employees were parking in the spaces most coveted by customers and patrons. The City's solution to the problem: a flexible, demand-responsive paid parking district. Parking in downtown Ventura has since improved, contributing to a better downtown experience.

Image courtesy of Rachel So

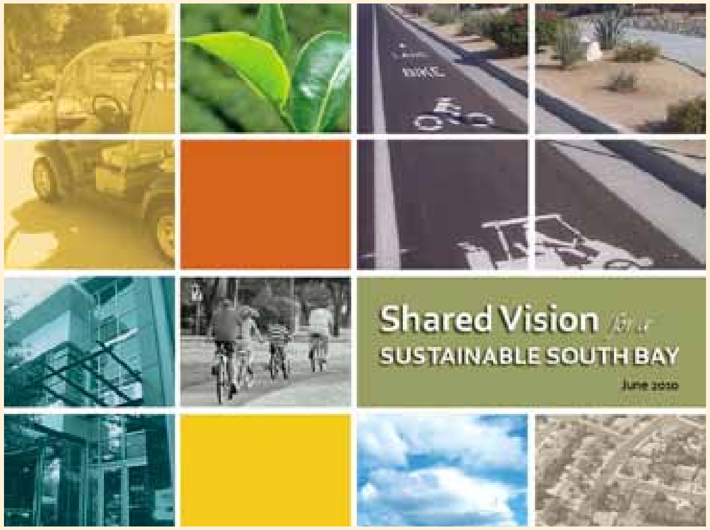
Transportation Conformity

The policy objectives and strategies in the 2012–2035 RTP/SCS are aimed at reducing travel distances and providing additional travel choices. In accordance with Govt. Code Section 65080(b)(2)(B)(viii), the 2012–2035 RTP/SCS complies with the conformity requirements of the Clean Air Act, as further detailed in Appendix: Transportation Conformity.

Photograph courtesy of Safe Routes to School

OVERALL LAND USE PATTERN MAPS

The following maps, **EXHIBIT 4.13** through **EXHIBIT 4.19**, identify the 2012–2035 RTP/SCS overall forecasted land use pattern for the region and its counties in 2035. The 2012–2035 RTP/SCS land use development pattern accommodates over 50 percent of new housing and employment growth in High-Quality Transit Areas (HQTA), while keeping jurisdictional totals consistent with local input. The Plan includes more compact, mixed-use development, leading to more opportunities for walking and biking, more transit use, and shorter auto trips. The Plan includes the demand for a broader range of housing types, including the development of smaller lot single-family homes, townhomes, and multifamily condominiums and apartments. A detailed description of the general location of uses, residential densities, and building intensities can be found in Appendix: SCS Background Documentation pursuant to Govt. Code section 65080(b)(2)(B)(i).



Local Efforts

South Bay Cities Council of Governments Neighborhood-Oriented Design Program

The South Bay Cities Council of Governments adopted the Sustainable South Bay Strategy in September 2010 to promote sustainable land use and transportation investment in the South Bay. Founded on the concept of Neighborhood-Oriented Development (NOD), this plan will create compact, mixed commercial nodes in the center of each residential neighborhood. Specifically, it will intensify commercial uses at the corners of major arterials, transition mid-block strip commercial to residential, and encourage street-fronting buildings with parking at the rear. The resulting development pattern will provide a cluster of destinations within walking distance of every residence, with mid-range trips accessible by local use (electric) vehicles.

EXHIBIT 4.13 Land Use Pattern SCAG Region (2035)

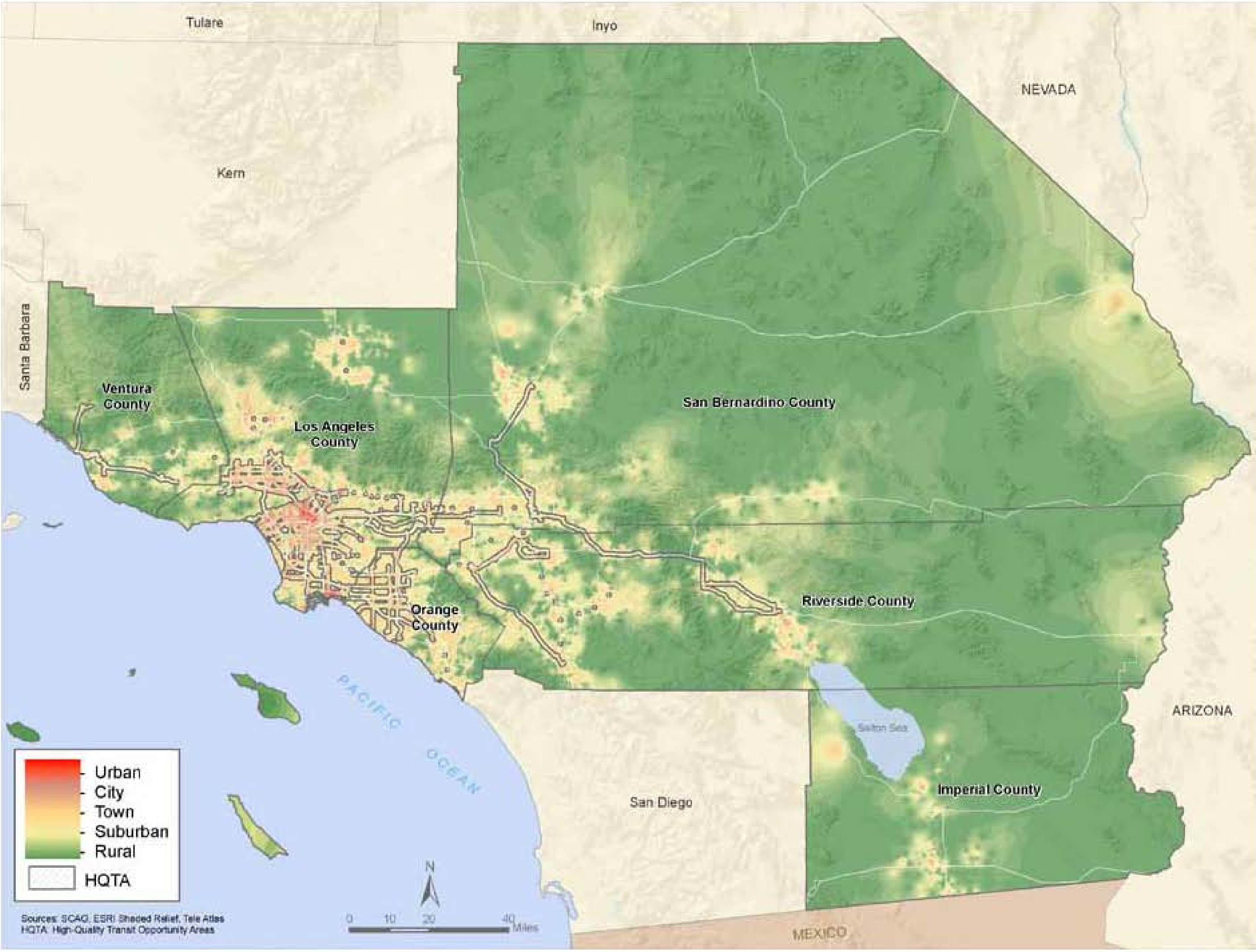


EXHIBIT 4.14 Land Use Pattern Ventura County (2035)

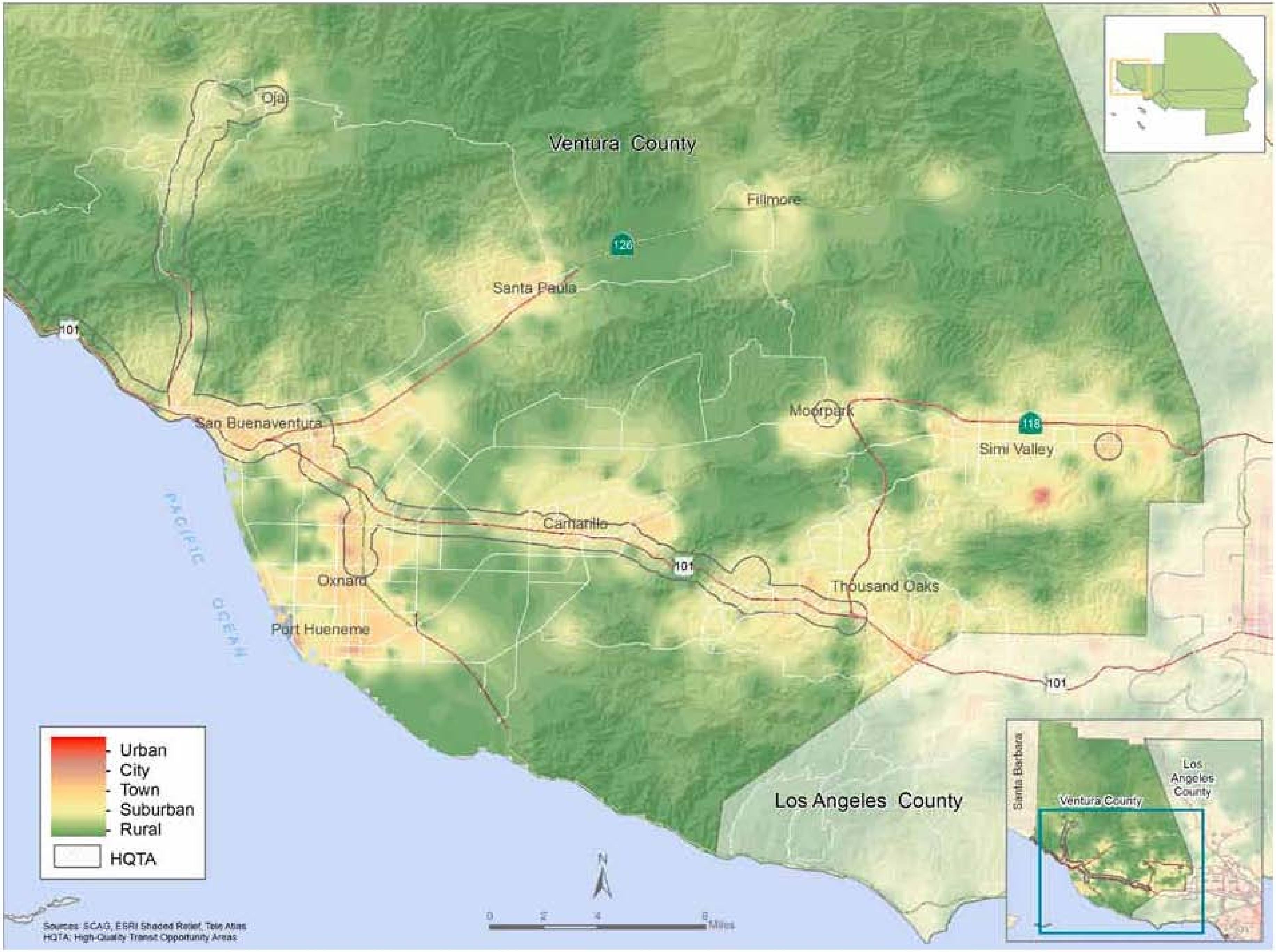
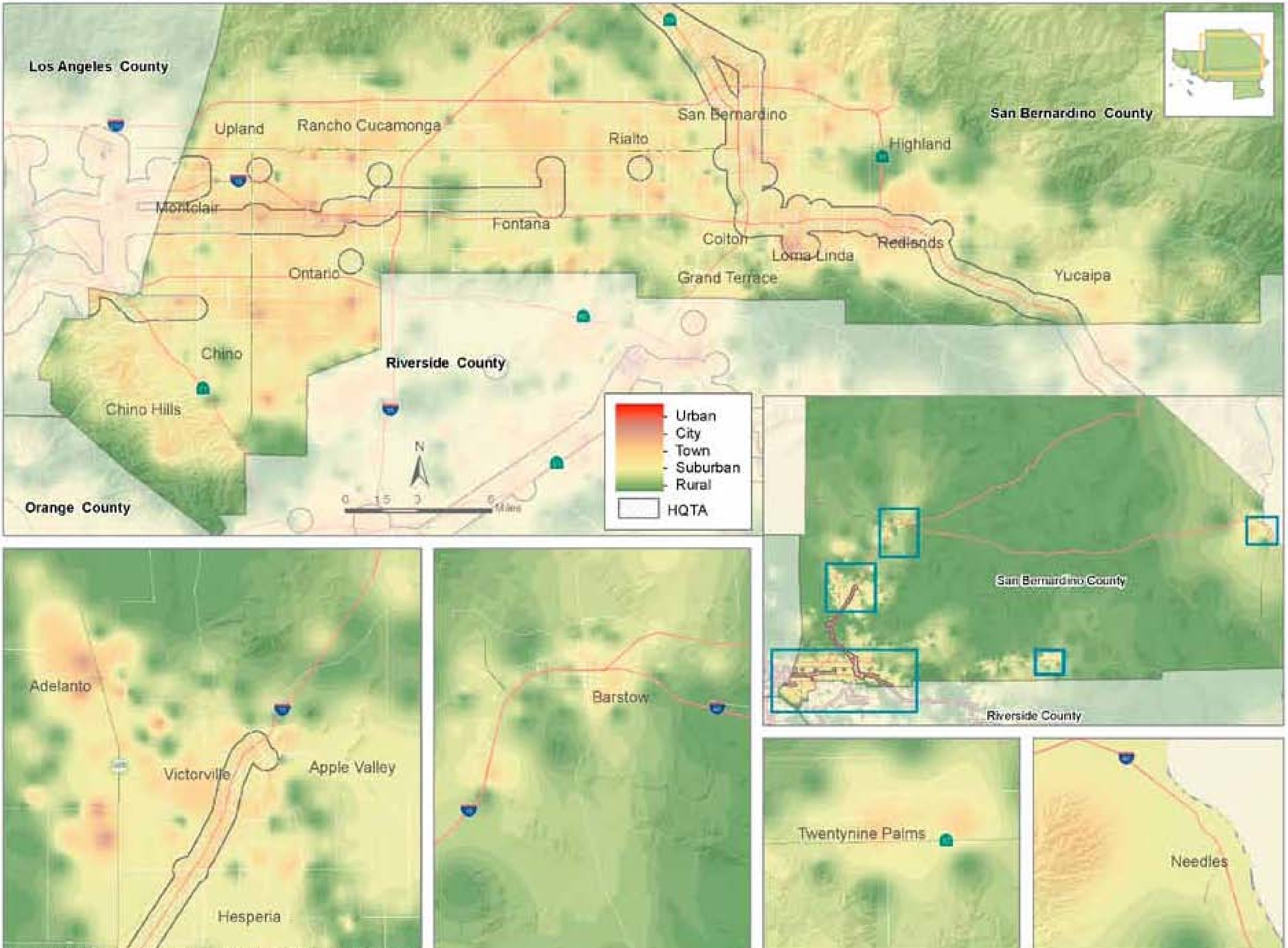


EXHIBIT 4.15 Land Use Pattern Los Angeles County (2035)

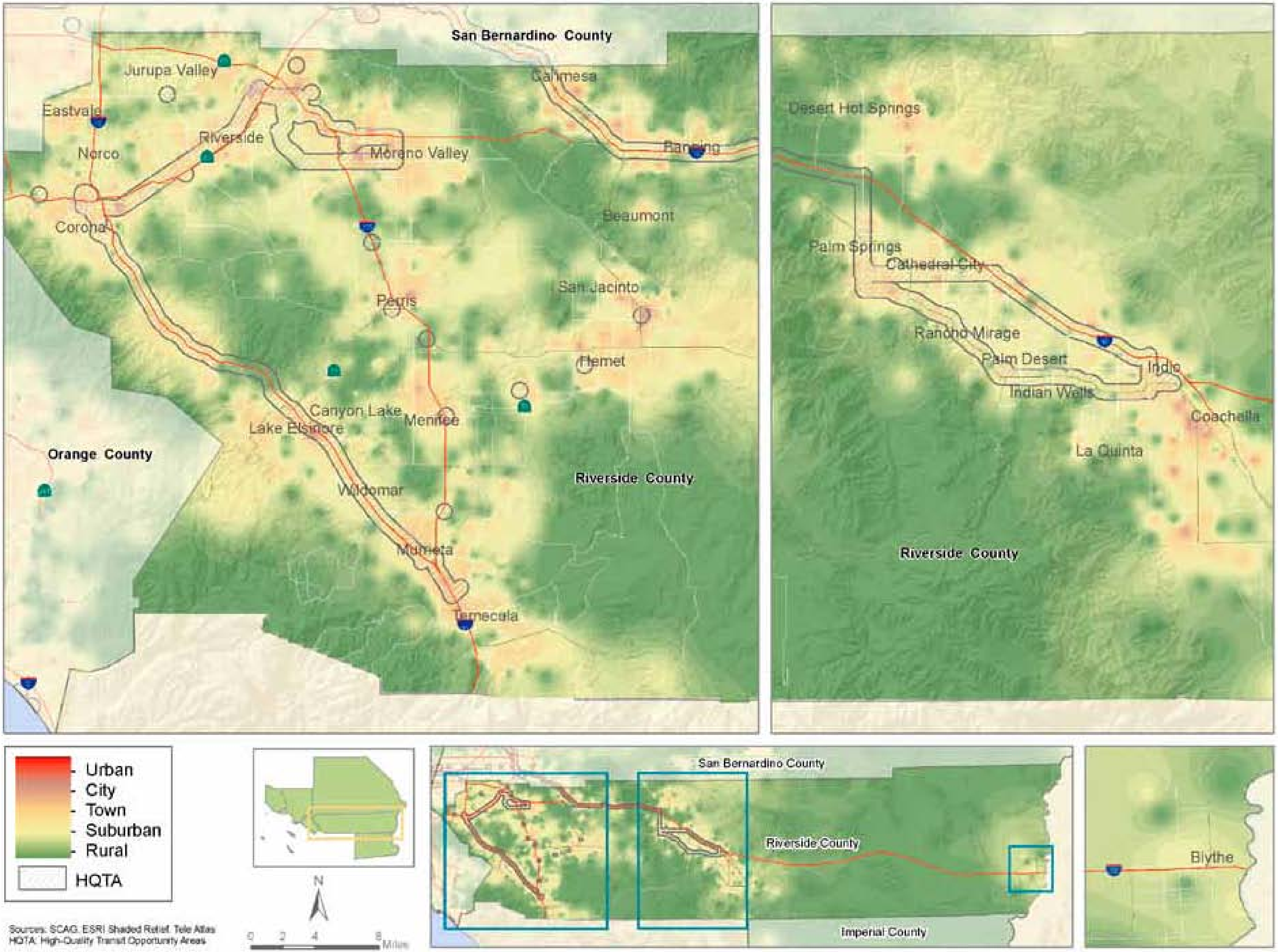
EXHIBIT 4.16 Land Use Pattern San Bernardino County (2035)



Sources: SCAG, ESRI Shaded Relief, Tele Atlas. HQTA: High-Quality Transit Opportunity Areas

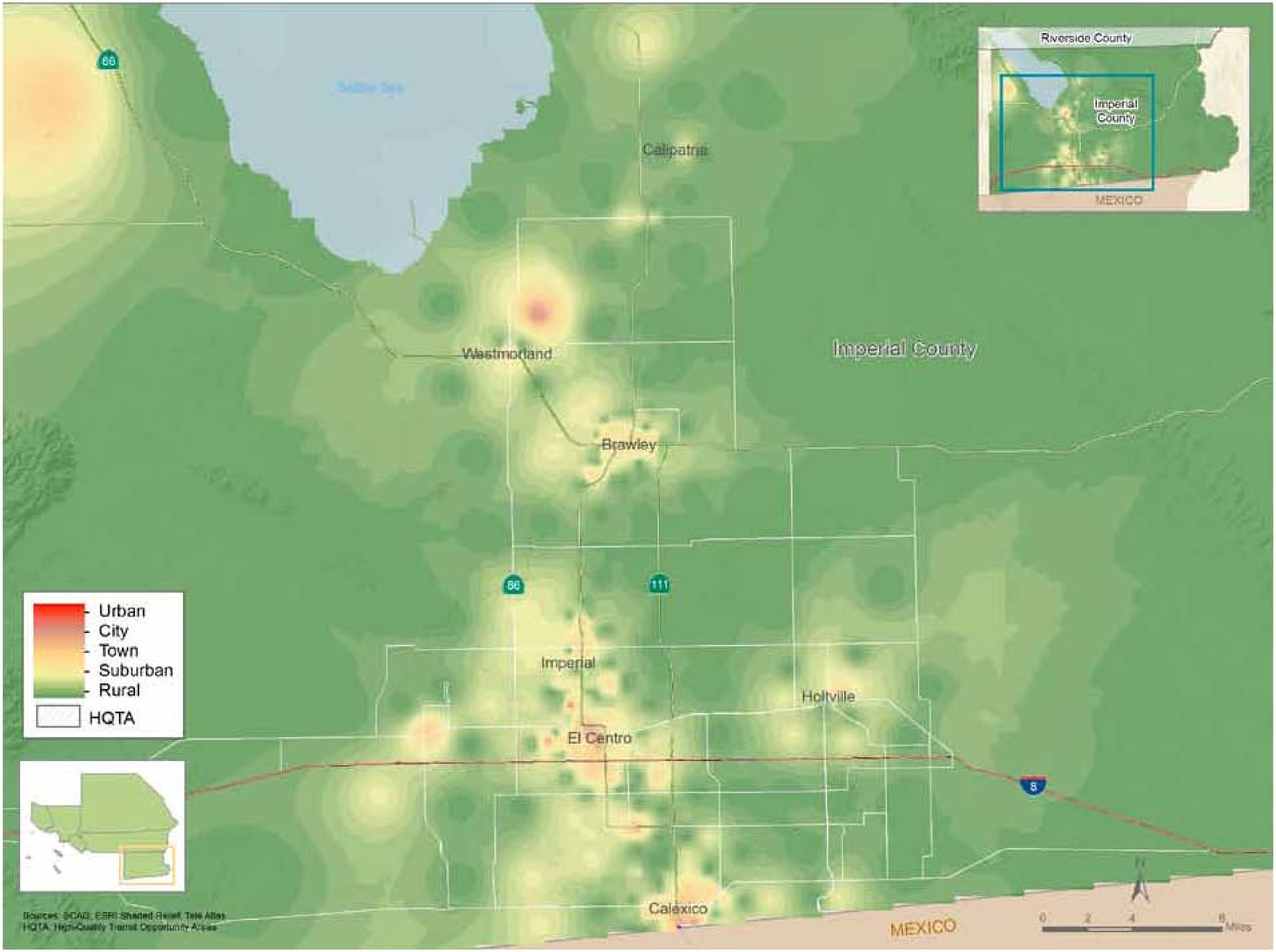
EXHIBIT 4.17 Land Use Pattern Orange County (2035)

EXHIBIT 4.18 Land Use Pattern Riverside County (2035)



Sources: SCAG, ESRI Shaded Relief, Tele Atlas
HQTA: High-Quality Transit Opportunity Areas

EXHIBIT 4.19 Land Use Pattern Imperial County (2035)



CEQA Incentive

SB 375 provides incentives in the form of CEQA streamlining to encourage community design that supports reduction in per capita GHG emissions. Generally, two types of projects are eligible for streamlined CEQA review once a compliant RTP/SCS has been adopted: (1) residential/mixed-use projects (consistent with the SCS) or (2) a Transit Priority Project (TPP). See Appendix: SCS Background Documentation for more information on CEQA streamlining incentives through SB 375.

Residential/Mixed-Use Projects

Residential and mixed-use projects that are consistent with the SCS qualify for streamlined CEQA review if at least 75 percent of the total building square footage consists of residential use (or a project that is a TPP). If a project meets these requirements and is consistent with the use designation, density, building intensity and applicable policy of the SCS, any environmental review conducted will not be required to discuss growth inducing impacts; any project-specific or cumulative impacts from cars and light duty truck trips generated by the project upon its completion on climate change or the regional transportation network; or a reduced density alternative.

Transit Priority Projects (TPP)

A Transit Priority Project (TPP) is eligible for CEQA streamlining if it is consistent with the SCS; contains at least 50 percent residential use; is proposed to be developed at a minimum 20 dwelling units per acre; and is located within ½ mile of a major transit stop or high quality transit corridor that is included in the RTP. If a project meets these criteria, it may be analyzed under a new environmental document created by SB 375, called the Sustainable Communities Environmental Assessment (SCEA), or through an EIR for which the content requirements have been reduced. Alternatively, a TPP can be considered a Sustainable Communities Project (SCP) and be eligible for a new full CEQA exemption if it further meets the additional requirements beyond the base criteria.

Lead agencies (including local jurisdictions) maintain the discretion and will be solely responsible for determining consistency of any future project with the SCS. SCAG staff may provide a lead agency at the time of its request readily available data and documentation to help support its finding upon request.

2012–2035 RTP/SCS Next Steps

The 2012–2035 RTP/SCS is first and foremost a transportation plan. However, the transportation network in the RTP/SCS and the growth patterns envisioned in the Plan Alternative must complement each other. Integration of transportation and land use is essential for improved mobility and access to transportation options.

SB 375 calls for the integration of land use policies with transportation investments and asks that Metropolitan Planning Organizations identify, quantify, and highlight co-benefits throughout the process. SB 375 provides CEQA incentives for development projects that are consistent with the regional SCS and help meet greenhouse gas emission reduction targets. Lead agencies (including local jurisdictions) maintain the discretion and will be solely responsible for determining consistency of any future project with the SCS. Cities and counties maintain their existing authority over local planning and land use decisions, including discretion in certifying the environmental review for a project, regardless of eligibility for streamlining.

To achieve the goals of the 2012–2035 RTP/SCS, public agencies at all levels of government may implement a wide range of strategies that focus on four key areas:

- A Land Use growth pattern that accommodates the region's future employment and housing needs and protects sensitive habitat and natural resource areas;
- A Transportation Network that consists of public transit, highways, local streets, bikeways, and walkways;
- Transportation Demand Management (TDM) measures that reduce peak-period demand on the transportation network; and
- Transportation System Management (TSM) measures that maximize the efficiency of the transportation network.

The following tables list specific implementation strategies that local governments, SCAG, and other stakeholders may consider in order to successfully implement the SCS.

Image courtesy of City of Ontario

Local Efforts

Ontario New Model Colony General Plan

Since 1998, the City of Ontario has been developing a bold vision for its future growth, including the adoption of its General Plan and adding 3,303 acres of former agricultural land into its sphere of influence. The City's recent plans call for 13,000 new housing units across a broad range of housing types and a mix of business spaces oriented toward three mixed-use centers that are served by pedestrian-friendly roadways and a large central park. Emphasizing connections to corridors and transit, the City is creating a major regional center for Southern California.

TABLE 4.3 Land Use Actions and Strategies

Proposed Action/Strategy	Responsible Party(ies)
Coordinate ongoing visioning efforts to build consensus on growth issues among local governments and stakeholders.	SCAG
Provide incentives and technical assistance to local governments to encourage projects and programs that balance the needs of the region	SCAG
Collaborate with local jurisdictions and agencies to acquire a regional fair share housing allocation that reflects existing and future needs.	SCAG, Local Jurisdictions, HCD
Expand Compass Blueprint program to support member cities in the development of bicycle, pedestrian, Safe Routes to Schools, Safe Routes to Transit, and ADA Transition plans.	SCAG, State
Continue to support, through Compass Blueprint, local jurisdictions and sub-regional COGs adopting neighborhood-oriented development, suburban villages, and revitalized main streets as livability strategies in areas not served by high-quality transit.	SCAG, State, Local Jurisdictions, COGs
Encourage the use of range-limited battery electric and other alternative fueled vehicles through policies and programs, such as, but not limited to, neighborhood oriented development, complete streets, and Electric (and other alternative fuel) Vehicle Supply Equipment in public parking lots.	Local Jurisdictions, COGs, SCAG, CTCs
Continue to support, through Compass Blueprint, planning for new mobility modes such as range- limited Neighborhood Electric Vehicles (NEVs) and other alternative fueled vehicles.	SCAG, State
Collaborate with the region's public health professionals to enhance how SCAG addresses public health issues in its regional planning, programming, and project development activities.	SCAG, State, Local Jurisdictions
Support projects, programs, and policies that support active and healthy community environments that encourage safe walking, bicycling, and physical activity by children, including, but not limited to development of complete streets, school siting policies, joint use agreements, and bicycle and pedestrian safety education.	Local Jurisdictions, SCAG
Seek partnerships with state, regional, and local agencies to acquire funding sources for innovative planning projects.	Local Jurisdictions, SCAG, State
Update local zoning codes, General Plans, and other regulatory policies to accelerate adoption of land use strategies included in the 2012–2035 RTP/SCS Plan Alternative, or that have been formally adopted by any sub-regional COG that is consistent with regional goals.	Local Jurisdictions
Update local zoning codes, General Plans, and other regulatory policies to promote a more balanced mix of residential, commercial, industrial, recreational and institutional uses located to provide options and to contribute to the resiliency and vitality of neighborhoods and districts.	Local Jurisdictions
Support projects, programs, policies and regulations that encourage the development of complete communities, which includes a diversity of housing choices and educational opportunities, jobs for a variety of skills and education, recreation and culture, and a full-range of shopping, entertainment and services all within a relatively short distance.	Local Jurisdictions, SCAG
Pursue joint development opportunities to encourage the development of housing and mixed-use projects around existing and planned rail stations or along high-frequency bus corridors, in transit-oriented development areas, and in neighborhood-serving commercial areas.	Local Jurisdictions, CTCs
Working with local jurisdictions, identify resources that can be used for employing strategies to maintain and assist in the development of affordable housing.	SCAG, Local Jurisdictions
Consider developing healthy community or active design guidelines that promote physical activity and improved health.	Local Jurisdictions

Proposed Action/Strategy	Responsible Party(ies)
Support projects, programs, policies, and regulations to protect resources areas, such as natural habitats and farmland, from future development.	Local Jurisdictions, SCAG
Create incentives for local jurisdictions and agencies that support land use policies and housing options that achieve the goals of SB 375.	State, SCAG
Continue partnership with regional agencies to increase availability of state funding for integrated land use and transportation projects in the region.	State, SCAG
Engage in a strategic planning process to determine the critical components and implementation steps for identifying and addressing open space resources, including increasing and preserving park space, specifically in park-poor communities.	Local Jurisdictions, SCAG
Identify and map regional priority conservation areas for potential inclusion in future plans.	SCAG
Engage with various partners, including CTCs and local agencies, to determine priority conservation areas and develop an implementable plan.	SCAG, CTCs
Develop regional mitigation policies or approaches for the 2016 RTP.	SCAG, CTCs

TABLE 4.4 Transportation Network Actions and Strategies

Proposed Action/Strategy	Responsible Party(ies)
Perform and support studies with the goal of identifying innovative transportation strategies that enhance mobility and air quality, and determine practical steps to pursue such strategies, while engaging local communities in planning efforts.	SCAG, CTCs
Cooperate with stakeholders, particularly county transportation commissions and Caltrans, to identify new funding sources and/or increased funding levels for the preservation and maintenance of the existing transportation network.	SCAG, CTCs, Local Jurisdictions
Expand the use of transit modes in our subregions such as BRT, rail, limited-stop service, and point-to-point express services utilizing the HOV and HOT lane networks.	SCAG, CTCs, Local Jurisdictions
Encourage transit providers to increase frequency and span of service in TOD/HQTA and along targeted corridors where cost-effective and where there is latent demand for transit usage.	SCAG, CTCs
Encourage regional and local transit providers to develop rail interface services at Metrolink, Amtrak, and high-speed rail stations.	SCAG, CTCs, Local Jurisdictions
Expand the Toolbox Tuesdays program to include bicycle safety design, pedestrian safety design, ADA design, training on how to use available resources that expand understanding of where collisions are happening, and information on available grant opportunities to improve bicycle and pedestrian safety.	SCAG, State
Prioritize transportation investments to support compact infill development that includes a mix of land uses, housing options, and open/park space, where appropriate, to maximize the benefits for existing communities, especially vulnerable populations, and to minimize any negative impacts.	SCAG, CTCs, Local Jurisdictions
Explore and implement innovative strategies and projects that enhance mobility and air quality, including those that increase the walkability of communities and accessibility to transit via non-auto modes, including walking, bicycling, and neighborhood electric vehicles (NEVs) or other alternative fueled vehicles.	SCAG, CTCs, Local Jurisdictions
Collaborate with local jurisdictions to plan and develop residential and employment development around current and planned transit stations and neighborhood commercial centers.	SCAG, CTCs, Local Jurisdictions
Collaborate with local jurisdictions to provide a network of local community circulators that serve new TOD, HQTAs, and neighborhood commercial centers providing an incentive for residents and employees to make trips on transit.	SCAG, CTCs, Local Jurisdictions
Similar to SCAG's partnership with the City of Los Angeles and LACMTA, offer to all County Transportation Commissions a mutually funded, joint first mile/last mile study for each region.	SCAG, CTCs
Develop first-mile/last-mile strategies on a local level to provide an incentive for making trips by transit, bicycling, walking, or neighborhood electric vehicle or other ZEV options.	CTCs, Local Jurisdictions
Encourage transit fare discounts and local vendor product and service discounts for residents and employees of TOD/HQTAs or for a jurisdiction's local residents in general who have fare media.	Local Jurisdictions
Work with transit properties and local jurisdictions to identify and remove barriers to maintaining on-time performance.	SCAG, CTCs, Local Jurisdictions
Develop policies and prioritize funding for strategies and projects that enhance mobility and air quality.	State
Work with the California High-Speed Rail Authority and local jurisdictions to plan and develop optimal levels of retail, residential, and employment development that fully take advantage of new travel markets and rail travelers.	State

Proposed Action/Strategy	Responsible Party(ies)
Work with state lenders to provide funding for increased transit service in TOD/HQTA in support of reaching SB 375 goals.	SCAG, State
Continue to work with neighboring Metropolitan Planning Organizations to provide alternative modes for interregional travel, including Amtrak and other passenger rail services and an enhanced bikeway network, such as on river trails.	SCAG, State
Encourage the development of new, short haul, cost-effective transit services such as DASH and demand responsive transit (DRT) in order to both serve and encourage development of compact neighborhood centers.	CTCs, Municipal Transit Operators
Work with the state legislature to seek funding for Complete Streets planning and implementation in support of reaching SB 375 goals.	SCAG, State
Continue to support the California Interregional Blueprint as a plan that links statewide transportation goals and regional transportation and land use goals to produce a unified transportation strategy.	SCAG, State

TABLE 4.5 Transportation Demand Management (TDM) Actions and Strategies

Proposed Action/Strategy	Responsible Party(ies)
Examine major projects and strategies that reduce congestion and emissions and optimize the productivity and overall performance of the transportation system.	SCAG
Develop comprehensive regional active transportation network along with supportive tools and resources that can help jurisdictions plan and prioritize new active transportation projects in their cities.	SCAG, CTCs, Local Jurisdictions
Encourage the implementation of a Complete Streets policy that meets the needs of all users of the streets, roads and highways – including bicyclists, children, persons with disabilities, motorists, neighborhood electric vehicle (NEVs) users, movers of commercial goods, pedestrians, users of public transportation and seniors – for safe and convenient travel in a manner that is suitable to the suburban and urban contexts within the region.	Local Jurisdictions, COGs, SCAG, CTCs
Support work-based programs that encourage emission reduction strategies and incentivize active transportation commuting or ride-share modes.	SCAG, Local Jurisdictions
Develop infrastructure plans and educational programs to promote active transportation options and other alternative fueled vehicles, such as neighborhood electric vehicles (NEVs), and consider collaboration with local public health departments, walking/biking coalitions, and/or Safe Routes to School initiatives, which may already have components of such educational programs in place.	Local Jurisdictions
Encourage the development of telecommuting programs by employers through review and revision of policies that may discourage alternative work options.	Local Jurisdictions, CTCs
Emphasize active transportation and alternative fueled vehicle projects as part of complying with the Complete Streets Act (AB 1358).	State, SCAG, Local Jurisdictions

TABLE 4.6 Transportation System Management (TSM) Actions and Strategies

Proposed Action/Strategy	Responsible Party(ies)
Work with relevant state and local transportation authorities to increase the efficiency of the existing transportation system	SCAG, Local Jurisdictions, State
Collaborate with local jurisdictions and subregional COGs to develop regional policies regarding TSM	SCAG, COGs, Local Jurisdictions
Contribute to and utilize regional data sources to ensure efficient integration of the transportation system.	SCAG, CTCs
Provide training opportunities for local jurisdictions on TSM strategies, such as Intelligent Transportation Systems (ITS).	SCAG, Local Jurisdictions
Collaborate with local jurisdictions and subregional COGs to continually update the ITS inventory.	SCAG, COGS, Local Jurisdictions
Collaborate with CTCs to regularly update the county and regional ITS architecture.	SCAG, CTCs, Local Jurisdictions
Collaborate with the state and federal Government and subregional COGs to examine potential innovative TDM/TSM strategies.	SCAG, State, COGs

TABLE 4.7 Clean Vehicle Technology Actions and Strategies

Proposed Action/Strategy	Responsible Party(ies)
Develop a Regional PEV Readiness Plan with a focus on charge port infrastructure plans to support and promote the introduction of electric and other alternative fuel vehicles in Southern California.	SCAG
Support subregional strategies to develop infrastructure and supportive land uses to accelerate fleet conversion to electric or other near zero-emission technologies. The activities committed in the two subregions (Western Riverside COG and South Bay Cities COG) are put forward as best practices that others can adopt in the future (See Appendix: Vehicle Technology, for more information).	SCAG, Local Jurisdictions

Other Supportive Strategies

REGIONAL AND LOCAL EFFORTS TO ADOPT NEAR-ZERO AND ZERO-EMISSION VEHICLE TECHNOLOGY

SCAG is leading a regional effort with the goal of accelerating fleet conversion to near-zero and zero-emission transportation technologies. To accommodate the anticipated increase in alternative fueled vehicles, a significant expansion of infrastructure is needed throughout the region, among other preparedness steps. SCAG's policy with regard to alternative fuels is technology neutral and does not favor any one technology over any other. SCAG's alternative fuel goals are to promote emissions reduction and improved mobility in ways that are effective and cost-effective. Alternative fuels for transportation include, but are not limited to: biodiesel, electricity, ethanol, hydrogen, natural gas, propane, biobutanol, biogas, hydrogenation-derived renewable diesel (HDRD), methanol, P-Series, and xTL Fuels (Fischer-Tropsch).

In support of the goal to promote emissions reduction, SCAG has developed a robust work program to prepare for the influx of new vehicle technology. With funding assistance from the U.S. Department of Energy (DOE) and the California Energy Commission and in collaboration with the South Coast Air Quality Management District, Southern California Edison, Western Riverside Council of Governments (WRCOG), and the South Bay Cities Council of Governments (SBCCOG), SCAG will develop a Regional Plug-In Electric Vehicle (PEV) Readiness Plan with two complementary subregional plans for WRCOG and SBCCOG. The subregional plans will serve as models for other subregions as they begin to develop their own PEV Readiness Plans. A key outcome of the planning effort will be charge port infrastructure plans, including updated maps of prime charging locations and strategies for accelerating the deployment of PEV charging equipment. It will include best practices for "PEV-ready" buildings and guidelines for streamlining the permitting, installation, and inspection of charging equipment. In addition, the Southern California Clean Cities Coalition is currently assisting with the marketing and outreach for three projects. These projects include the UPS Ontario–Las Vegas Liquefied Natural Gas (LNG) Corridor Expansion Project, the Heavy-Duty Natural Gas Drayage Truck Replacement Initiative and a partnership with the San Bernardino Associated Governments (SANBAG) and Ryder Truck Rental, Inc. to deploy 202 heavy-duty natural gas trucks and construct two LNG fueling stations. These efforts promote emissions reduction and improved mobility in ways that are effective and cost-effective.

In conclusion, this RTP/SCS includes policies supporting and promoting the introduction of near-zero and zero-emission vehicles, commits to the work program and pending studies as part of an implementation effort to facilitate acceleration of fleet turnover, and estimates the impact of regional, subregional, and local activities on transportation GHG in the region. Additional information regarding air quality and energy is included in Chapter 1 and Appendix: Vehicle Technology.

Evaluation and Revision

SCAG will update its RTP/SCS in 2016, in accordance with applicable federal and state laws. As part of this update, SCAG will be reviewing its own progress in implementing the strategies identified in this Plan. In addition, the GHG emission reduction targets are reevaluated at least every eight years and may be revised every four years by ARB. This will enable the state and SCAG to consider changes in circumstances, funding availability, technological advances, new legislation, and other considerations that could arise over time.

SCAG will also track its own progress in implementing its 2012–2035 RTP/SCS strategies in conjunction with the preparation and adoption of its Overall Work Program and Annual Budget. The OWP/Budget process provides an opportunity for SCAG to allocate staff resources and funding to implement short-term and mid-term strategies contained within the RTP/SCS. In addition, SCAG will periodically monitor the progress being made by the state, the CTCs, local jurisdictions, and other agencies and entities in implementing the strategies identified in this plan.

Monitoring Progress

While SB 375 places a great deal of attention on meeting GHG emission reduction targets, SCAG has also established other important goals in its 2012–2035 RTP/SCS aimed at improving the overall quality of life in the region. It will be important for SCAG to continue to improve its performance monitoring programs, such as the State of the Region report, to track how well the region is doing in terms of overall progress toward meeting these goals.

Sustainable Communities Strategy Requirements Matrix

The following table outlines the requirements of SB 375 and how each is addressed in the 2012 RTP/SCS.

TABLE 4.8 Sustainable Communities Strategy Requirements Matrix

Required Element	Addressed
CGC Section 65080(b) (2).(B) *Each metropolitan 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 RTP/SCS complies with all requirements. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy
CGC Section 65080(b) (2).(B) i. *Identify the general location of uses, residential densities, and building intensities within the region*	The SCS identifies the future land use pattern of the SCAG region in Exhibit 4.13–Exhibit 4.19 and additional exhibits in Appendix: Background Documentation. Residential densities and building intensities are determined by Development Types, which are made up of information relating to the characteristics of the landscape, including jobs and housing density, urban design, and mix of land uses. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy 2012–2035 RTP/SCS Appendix: SCS Background Documentation 2012–2035 RTP/SCS Appendix: Growth Forecast
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*	The SCS identifies areas sufficient to house the entire population in the region in Exhibit 4.13–Exhibit 4.19 and additional exhibits in Appendix: Background Documentation. Projected capacity for these areas utilized the Integrated Growth Forecast for population, jobs, and households as contained in Appendix: Growth Forecast. Table 4.1 and Table 4.2 show projected housing capacity by Community Type for 2020 and 2035. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy 2012–2035 RTP/SCS Appendix: SCS Background Documentation 2012–2035 RTP/SCS Appendix: Growth Forecast
CGC Section 65080(b) (2).(B) iii. *Identify areas within the region sufficient to housing an eight-year projection of the regional housing need for the region pursuant to Section 65584*	The RTP/SCS identifies areas sufficient to house an eight-year projection of the regional housing need in Exhibit 4.13–Exhibit 4.19 and additional exhibits in Appendix: SCS Background Documentation. Table 4.1 and Table 4.2 show projected housing capacity by Community Type for 2020 and 2035. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy 2012–2035 RTP/SCS Appendix: SCS Background Documentation

Required Element	Addressed
CGC Section 65080(b) (2).(B) iv. *Identify a transportation network to service the transportation needs of the region*	The RTP/SCS identifies the regional transportation network in Exhibit 4.10, Exhibit 4.11, and Exhibit 4.12. Detailed descriptions of SCAG's transportation network are found in Chapter 2 of the 2012–2035 RTP/SCS. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy 2012–2035 RTP/SCS Chapter 2: Transportation Investments
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*	The RTP/SCS lists sources for the best available scientific information regarding resource areas and farmland in the region and identifies these areas in Exhibit 4.6, Exhibit 4.7, and Exhibit 4.8. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy 2012–2035 RTP/SCS Chapter 2: Transportation Investments
CGC Section 65080(b) (2).(B) vi. *Consider the state housing goals specified in Sections 65580 and 65581*	The RTP/SCS considers the state housing goals as specified in Sections 65580 and 65581. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy 2012–2035 RTP/SCS Appendix: SCS Background Documentation
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*	Exhibit 4.13–Exhibit 4.19 of the SCS identifies the forecasted development pattern for the region. Along with the identified transportation network in Exhibit 4.10–Exhibit 4.12, the identified land use pattern exceeds the GHG emission reduction targets of 8% in 2010 and 13% in 2035. Detailed analysis and performance results of the integrated land use pattern and transportation network and strategies are found in Chapter 5 and Appendix: Performance Measures. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy 2012–2035 RTP/SCS Chapter 5: Measuring Up 2012–2035 RTP/SCS Appendix: Transportation Conformity Analysis 2012–2035 RTP/SCS Appendix: Performance Measures
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. Sec. 7506)*	The RTP/SCS complies with this requirement. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy 2012–2035 RTP/SCS Appendix: Transportation Conformity Analysis

Required Element	Addressed
CGC Section 65080(b) (2).(D) *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.*	SCAG has adopted a public participation plan that includes at least two informational meetings in each county for members of city councils and boards of supervisors. Reference: 2012–2035 RTP/SCS Chapter 6: Public Participation Plan 2012–2035 RTP/SCS Appendix: Public Participation and Consultation
CGC Section 65080(b) (2).(E) *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 the following:*	SCAG has adopted a public participation plan. Reference: 2012–2035 RTP/SCS Chapter 6: Public Participation Plan 2012–2035 RTP/SCS Appendix: Public Participation and Consultation
(i) Outreach efforts to encourage 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 interest, and homeowner associations.	The public participation plan details planning efforts that comply with and exceed the requirements. SCAG met extensively with partner agencies and non-profit, advocacy, neighborhood, and community groups beginning with target setting consultation and continuing through the workshop process. Reference: 2012–2035 RTP/SCS Chapter 6: Public Participation Plan 2012–2035 RTP/SCS Appendix: Public Participation and Consultation
(ii) Consultation with congestion management agencies, transportation agencies, and transportation commissions.	The public participation plan includes consultation with these agencies. Reference: 2012–2035 RTP/SCS Chapter 6: Public Participation Plan 2012–2035 RTP/SCS Appendix: Public Participation and Consultation
(iii) Workshops throughout the region to provide the public with the information and tools necessary to provide clear understanding of the issues and policy choices. At least one workshop shall be held in each county in the region. For counties with a population greater than 500,000, at least three workshops shall be held. Each workshop, to the extent practicable shall include urban simulation computer modeling to create visual representation of the sustainable communities strategy and the alternative planning strategy.	The public participation plan details planning efforts that comply with and exceed the requirements. SCAG held 18 workshops throughout the region, in addition to countless local agency planning sessions. Reference: 2012–2035 RTP/SCS Chapter 6: Public Participation Plan 2012–2035 RTP/SCS Appendix: Public Participation and Consultation
(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.	The public participation plan includes at least three public hearings on the draft RTP/SCS. Reference: 2012–2035 RTP/SCS Chapter 6: Public Participation Plan 2012–2035 RTP/SCS Appendix: Public Participation and Consultation

Required Element	Addressed
(vi) A process for enabling members of the public to provide a single request to receive notices, information and updates.	The public participation plan includes a process for members of the public to provide a single request to receive notices, information, and updates on the RTP/SCS. Reference: 2012–2035 RTP/SCS Chapter 6: Public Participation Plan 2012–2035 RTP/SCS Appendix: Public Participation and Consultation
CGC Section 65080(b) (2).(F) *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.*	SCAG's Growth Forecast considers the spheres of influence adopted by the local agency formation commission. Reference: 2012–2035 RTP/SCS Appendix: Growth Forecast
CGC Section 65080(b) (2).(G) *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.*	The RTP/SCS complies with this requirement. Reference: 2012–2035 RTP/SCS Chapter 4: Sustainable Communities Strategy
CGC Section 65080(b) (2).(J) *Neither a sustainable communities strategy nor an alternative planning strategy regulates the use of land, nor, except as provided by subparagraph (I), shall either one be subject to any state approval. Nothing in a sustainable communities strategy shall be interpreted as superseding the exercise of the land use authority of cities and counties within the region. Nothing in this section shall be interpreted to limit the state board's authority under any other provision of law. Nothing in this section shall be interpreted to authorize the abrogation of any vested right whether created by statute or by common law. Nothing in this section shall require a city's or county's land use policies and regulations, including its general plan, to be consistent with the regional transportation plan or an alternative planning strategy. Nothing in this section requires a metropolitan planning organization to approve a sustainable communities strategy that would be consistent with Part 450 of Title 23 of, or Part 93 of Title 40 of, the Code of Federal Regulations and any administrative guidance under those regulations. Nothing in this section relieves a public or private entity or any person from compliance with any other local, state, or federal law.*	The RTP/SCS complies with this requirement.

Required Element	Addressed
CGC Section 65080(b) (2).(K) *Nothing in this section requires projects programmed for funding on or before December 31,2011, to be subject to the provisions of this paragraph if they (i) are contained in the 2007 or 2009 Federal Statewide Transportation Investment Program, (ii) are funded pursuant to Chapter 12.49 (commencing with Section 8879.20) of Division 1 of Title 2, or (iii) were specifically listed in a ballot measure prior to December 31, 2008, approving a sales tax increase for transportation projects. Nothing in this section shall require a transportation sales tax authority to change the funding allocations approved by the voters for categories of transportation projects in a sales tax measure adopted prior to December 31, 2010. For purposes of this subparagraph, a transportation sales tax authority is a district, as defined in Section 7252 of the Revenue and Taxation Code, that is authorized to impose a sales tax for transportation purposes.*	The RTP/SCS complies with this requirement.
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.*	The RTP/SCS complies with this requirement.
CGC Section 65080.1 *Each transportation planning agency designated under Section 29532 or 29532.1 whose jurisdiction includes a portion of the California Coastal Trail, or property designated for the trail, that is located within the coastal zone, as defined in Section 30103 of the Public Resources Code, shall coordinate with the State Coastal Conservancy, the California Coastal Commission, and the Department of Transportation regarding development of the California Coastal Trail, and each transportation planning agency shall include provisions for the California Coastal Trail in its regional plan, under Section 65080.*	The RTP/SCS complies with this requirement.

Required Element	Addressed
CGC Section 65080.3 *(a) Each transportation planning agency with a population that exceeds 200,000 persons may prepare at least one "alternative planning scenario" for presentation to local officials, agency board members, and the public during the development of the triennial regional transportation plan and the hearing required under subdivision (c) of Section 65080.* *(b) The alternative planning scenario shall accommodate the same amount of population growth as projected in the plan but shall be based on an alternative to attempts to reduce the growth in traffic congestion, make more efficient use of existing transportation infrastructure, and reduce the need for costly future public infrastructure.* *(c) The alternative planning scenario shall be developed in collaboration with a broad range of public and private stakeholders, including local elected officials, city and county employees, relevant interest groups, and the general public. In developing the scenario, the agency shall consider all of the following:* *(1) Increasing housing and commercial development around transit facilities and in close proximity to jobs and commercial activity centers.* *(2) Encouraging public transit usage, ridesharing, walking, bicycling, and transportation demand management practices.* *(3) Promoting a more efficient mix of current and future job sites, commercial activity centers, and housing opportunities.* *(4) Promoting use of urban vacant land and "brownfield" development.* *(5) An economic incentive program that may include measures such as transit vouchers and variable pricing for transportation.*	N/A The SCAG region has chosen to prepare an SCS, which is in Chapter 4 of the 2012 RTP/SCS.

Required Element	Addressed
(Continued) *(d) The planning scenario shall be included in a report evaluating all of the following:* *(1)The amounts and locations of traffic congestion.* *(2) Vehicle miles traveled and the resulting reduction in vehicle emissions.* *(3) Estimated percentage share of trips made by each means of travel specified in subparagraph (C) of paragraph (1) of subdivision (b) of Section 65080.* *(4) The costs of transportation improvements required to accommodate the population growth in accordance with the alternative scenario.* *(5) The economic, social, environmental, regulatory, and institutional barriers to the scenario being achieved.* *(e) If the adopted regional transportation plan already achieves one or more of the objectives set forth in subdivision (c), those objectives need not be discussed or evaluated in the alternative planning scenario.* *(f) The alternative planning scenario and accompanying report shall not be adopted as part of the regional transportation plan, but it shall be distributed to cities and counties within the region and to other interested parties, and may be a basis for revisions to the transportation projects that will be included in the regional transportation plan.* *(g) Nothing in this section grants transportation planning agencies any direct or indirect authority over local land use decisions.* *(h) This section does not apply to a transportation plan adopted on or before September 1, 2001, proposed by a transportation planning agency with a population of less than 1,000,000 persons.*	

05 MEASURING UP

Introduction

The investments identified in the 2012–2035 RTP/SCS are expected to result in significant benefits to the region, not only with respect to transportation and mobility, but also air quality, economic activity and job creation, sustainability, and Environmental Justice. This chapter describes the benefits and outcomes projected to result from the implementation of the RTP/SCS with respect to the adopted performance measures. This chapter also describes how the RTP/SCS addresses the statutory requirements regarding Environmental Justice, SB 375, and transportation conformity.

Performance Outcomes

This section summarizes how well the 2012–2035 RTP/SCS performs. **TABLE 5.1** lists the performance outcomes and associated measures used to forecast performance using the SCAG Regional Travel Demand Model (RTDM). In addition, this section provides estimates of performance improvements for two different outcomes that do not rely on the RTDM: productivity and reliability. While this chapter includes summaries of the performance improvements expected from the implementation of the RTP/SCS, more detail is provided under separate cover in the Performance Measures Appendix.

Two new outcomes have been added in the 2012–2035 RTP/SCS: location efficiency and public health. The location efficiency outcome reflects the degree to which land use is improved to provide shorter and easier access to desired destinations, therefore encouraging the transit and active transportation modes. The health outcome monitors pollution emitted from transportation, which causes health problems such as asthma and even premature deaths.

In the discussion of performance and outcomes, three scenarios are referenced: Base Year, Baseline, and Plan. The 2008 Base Year represents existing conditions and is based on the transportation system on the ground and in service in 2008. The 2035 Baseline assumes current land use trends and represents a future in which only committed programs and projects are implemented and is based on projects programmed in the 2011 Federal Transportation Improvement Program (FTIP) that have received environmental clearance. The 2035 Plan represents future conditions in which the 2012–2035 RTP/SCS investments and strategies are fully realized. The specific projects associated with Baseline and Plan are identified in the 2012–2035 RTP/SCS Project List report.

TABLE 5.1 Adopted 2012–2035 RTP/SCS Outcomes and Performance Measures/Indicators

Outcome	Performance Measure/Indicator	Definition	Performance Target	Data Sources Used
Location Efficiency	Share of growth in High-Quality Transit Areas (HQTAs)	Share of the region's growth in households and employment in HQTAs	Improvement over No Project Baseline	Census (including annual American Community Survey), InfoUSA
	Land consumption	Additional land needed for development that has not previously been developed or otherwise impacted, including agricultural land, forest land, desert land, and other virgin sites	Improvement over No Project Baseline	Rapid Fire Model
	Average distance for work or non-work trips	The average distance traveled for work or non-work trips separately	Improvement over No Project Baseline	Travel Demand Model
	Percent of work trips less than 3 miles	The share of total work trips which are fewer than 3 miles	Improvement over No Project Baseline	Travel Demand Model
	Work trip length distribution	The statistical distribution of work trip length in the region	Improvement over No Project Baseline	Travel Demand Model
Mobility and Accessibility	Person delay per capita	Delay per capita can be used as a supplemental measure to account for population growth impacts on delay	Improvement over No Project Baseline	Travel Demand Model
	Person delay by facility type (mixed flow, HOV, arterials)	Delay—excess travel time resulting from the difference between a reference speed and actual speed	Improvement over No Project Baseline	Travel Demand Model
	Truck delay by facility type (highway, arterials)	Delay—excess travel time resulting from the difference between a reference speed and actual speed	Improvement over No Project Baseline	Travel Demand Model
	Travel time distribution for transit, SOV, HOV for work and non-work trips	Travel time distribution for transit, SOV, HOV for work and non-work trips	Improvement over No Project Baseline	Travel Demand Model
Safety and Health	Collision/accident rates by severity by mode	Accident rates per million vehicle miles by mode (all, bicycle/pedestrian, and fatality/killed)	Improvement over Base Year	CHP Accident Data Base, Travel Demand Model Mode Split Outputs
	Criteria pollutants emissions	CO, NOx, $PM_{2.5}$, PM_{10}, and VOC	Meet Transportation Conformity requirements	Travel Demand Model/ ARB EMFAC Model

Outcome	Performance Measure/Indicator	Definition	Performance Target	Data Sources Used
Environmental Quality	Criteria pollutant and greenhouse gas emissions	CO, NOx, $PM_{2.5}$, PM_{10}, and VOC Per capita greenhouse gas emissions (CO_2)	Meet Transportation Conformity requirements and SB 375 per capita GHG-reduction targets	Travel Demand Model/ ARB EMFAC Model
Economic Well-Being	Additional jobs supported by improving competitiveness	Number of jobs added to the economy as a result of improved transportation conditions which make the region more competitive	Improvement over No Project Baseline	Regional Economic Model REMI
	Additional jobs supported by transportation investment	Total number of jobs supported in the economy as a result of transportation expenditures	Improvement over No Project Baseline	Regional Economic Model REMI
	Net contribution to gross regional product	Gross regional product due to transportation investments and increased competitiveness	Improvement over No Project Baseline	Regional Economic Model REMI
Investment Effectiveness	Benefit/cost ratio	Ratio of monetized user and societal benefits to the agency transportation costs	Greater than 1.0	California Benefit/ Cost Model
System Sustainability	Cost per capita to preserve multimodal system to current and state of good repair conditions	Annual costs per capita required to preserve the multimodal system to current conditions	Improvement over Base Year	Estimated using SHOPP Plan and recent California Transportation Commission 10-Year Needs Assessment

Notes:
Performance measures tied to goals for reliability, preservation, productivity, health, energy efficiency, and security cannot currently be reliably forecasted and are not included in Table 5.1. However, SCAG has identified related measures to be used for monitoring purposes, and these are discussed in the Performance Measures technical report.
Performance measures are assessed at the regional level. SCAG encourages, but does not require, agencies to be consistent with the RTP/SCS performance measures to the extent practical in their subregional and project-level planning studies.

Location Efficiency

This is a new outcome for the 2012–2035 RTP/SCS. This outcome has several associated performance measures that reflect the impact of improved land use and transportation coordination in support of the Sustainable Communities Strategies (SCS) required under SB 375.

This outcome reflects the degree to which improved land use and transportation coordination measures impact the efficient movement of people and goods. The measures used to describe this outcome include:

- Share of growth in High-Quality Transit Areas
- Land consumption (total and per capita),
- Average distance for work or non-work trips,
- Percent of work trips less than three miles, and
- Work trip length distribution.

There are several additional measures that will be used for ongoing monitoring, and these will be discussed in the appendix.

SHARE OF GROWTH IN HIGH-QUALITY TRANSIT AREAS (HQTA)

Between 2008 and 2035, growth in both household and employment in the HQTAs is projected to increase from the Baseline scenario to the Plan scenario. Specifically, the share of growth in households in HQTAs increases from 24 percent under the Baseline to 51 percent under the Plan. During the same period, the share of growth in employment in HQTAs increases from 31 percent under the Baseline to 53 percent under the Plan.

LAND CONSUMPTION

Greenfield land consumption refers to development that occurs on land that has not previously been developed or otherwise impacted, including agricultural land, forest land, desert land, and other virgin sites. As discussed above, the Plan directs more growth into the HQTAs than the Baseline. The vast majority of HQTAs are within the existing urbanized areas. Accordingly, the Plan consumes 408 square miles less "greenfield" land than the Baseline, 334 square miles compared to 742 square miles.

AVERAGE DISTANCE FOR WORK OR NON-WORK TRIPS

The average distance for work trips is projected in 2035 to decrease from 14.8 miles under the Baseline to 14.7 miles under the Plan. The average distance for non-work trips is projected to increase from 7.3 miles under the Baseline to 7.5 miles under the Plan.

PERCENT OF WORK TRIPS LESS THAN THREE MILES

The vast majority of work trips in Southern California have consistently relied on the single-occupant automobile. When the work trip length becomes shorter, particularly within a few miles, it increases the likelihood of using alternative modes such as transit or biking. By 2035, the share of work trips less than three miles is projected to increase from 14.8 percent under the Baseline to 15.4 percent under the Plan, which accounts for effects of landuse and investment in active transportation.

WORK TRIP LENGTH DISTRIBUTION

Under the Plan, more than half (51 percent) of the total work trips are less than 10 miles. Thirteen percent of the total work trips are longer than 25 miles. Additional information on work trip length distribution is provided in the Performance Measures Appendix.

Mobility and Accessibility

In the 1998 California Transportation Plan, this outcome is defined as, "Reaching desired destinations with relative ease within a reasonable time, with reasonable choices." In prior RTPs, mobility and accessibility were included as separate outcomes. For the 2012–2035 RTP/SCS, these have been combined into a single outcome with multiple performance measures. This section discusses the mobility and accessibility performance indicators and provides results based on outputs from the SCAG RTDM.

MOBILITY

The mobility performance measure relies on the commonly used measure of delay. Delay is the difference between the actual travel time and the travel time at some predefined reference or "optimal" speed for each mode alternative under analysis. It is measured in vehicle-hours of delay (VHD), which can then be used to derive person-hours of delay. This is a relatively straightforward measure to calculate using real-world and modeled data, is understandable by both transportation professionals and the general public, and can be forecasted for the 2035 future scenarios.

The mobility measures used to evaluate alternatives for this outcome are:

- Person Movement Delay by Facility Type (Mixed Flow, HOV, Arterials),
- Person Delay per Capita, and
- Truck delay by facility (Highway, Arterial).

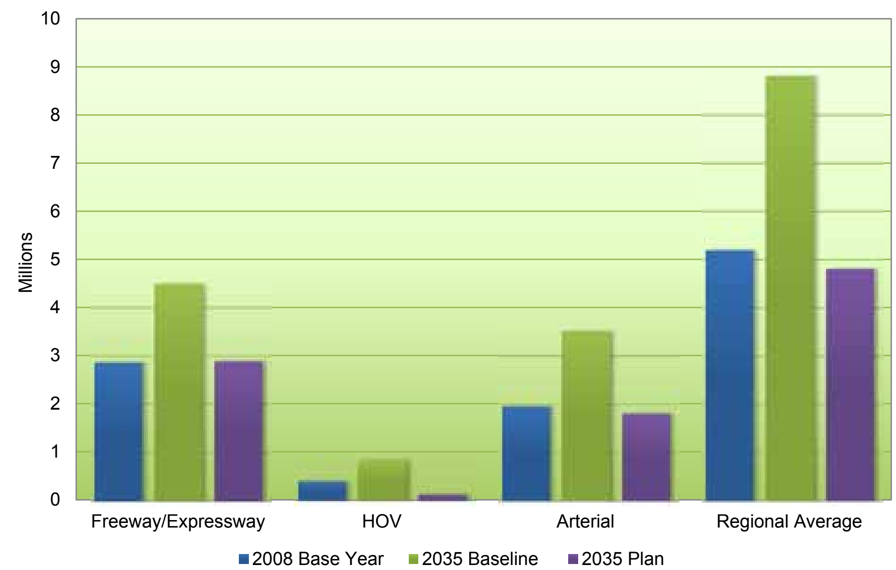
One additional measure for delay that is readily available for ongoing monitoring, but that cannot be readily forecasted, is non-recurrent delay. Recurrent congestion is the day-to-day congestion that occurs because too many vehicles are on the road at the same time. Non-recurrent congestion is the congestion that is caused by accidents, weather, special events, or other atypical incidents.

Non-recurrent congestion can be mitigated or reduced by improving incident management strategies. Other smart uses of technologies such as traffic signal coordination and the provision of real-time information about unexpected delays allow travelers to make better decisions about available transit or other alternatives.

Person Delay by Facility Type (Mixed-Flow Freeways, HOV, Arterials)

For the 2012–2035 RTP/SCS, this measure has been expanded to differentiate between single-occupancy vehicle (SOV) and high-occupancy vehicle (HOV) delay. As shown in **FIGURE 5.1**, person-hours of delay is expected to increase from Base Year to Baseline, but overall the Plan will improve on Baseline conditions by 45 percent, to conditions that are better than what is experienced today.

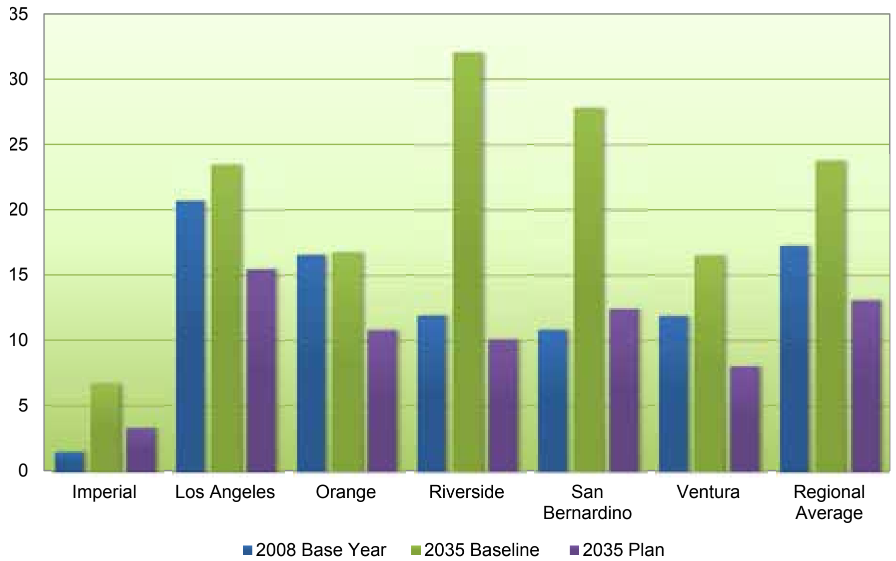
FIGURE 5.1 Daily Person-Hours of Delay by Facility Type



Person Delay per Capita

FIGURE 5.2 shows the person delay per capita for each of the six counties in the region and for the SCAG region as a whole. Normalizing delay by the number of people living in an area provides insight as to how well the region is mitigating traffic congestion in light of increasing population growth. Delay per capita is expected to grow considerably, particularly in the Inland Empire counties of Riverside and San Bernardino, under the Baseline conditions. However, implementation of the Plan is expected to reduce delay substantially, to below 2008 levels. The regional average delay per capita is expected to improve from over 20 minutes under the Baseline to over 10 minutes under the Plan. Not only does this represent a 45 percent improvement over Baseline, but a 24 percent improvement over Base Year as well.

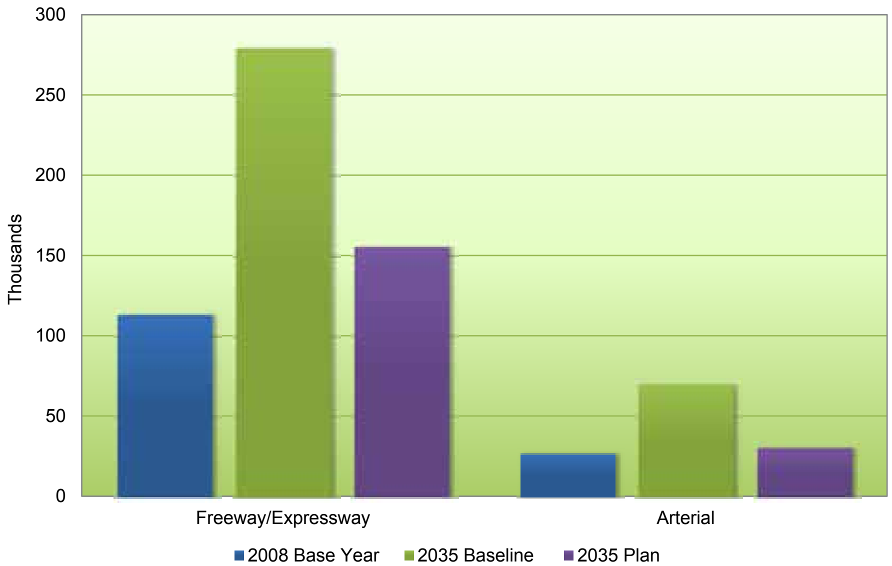
FIGURE 5.2 Daily Person Delay per Capita by County (Minutes)



Truck Delay by Facility Type (Highway, Arterials)

This measure estimates the average daily truck delay by facility type for freeways and arterials (**FIGURE 5.3**). The RTP/SCS includes significant investments in a regional freight corridor and other improvements to facilitate goods movement. The Plan is estimated to reduce truck delay by approximately 40 percent over Baseline on the freeway system and by approximately 55 percent on the arterial system. However, the truck delay under the Plan will still be above Base Year levels.

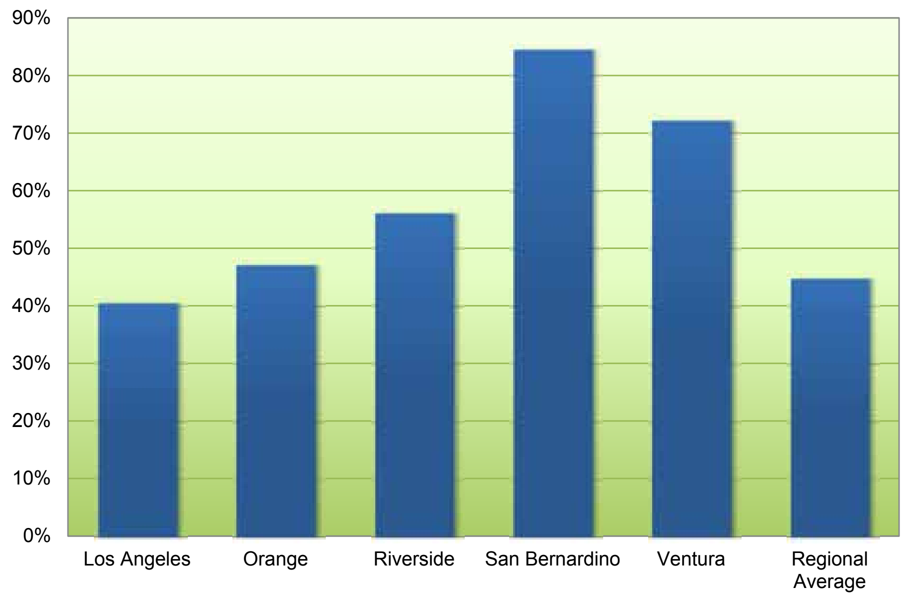
FIGURE 5.3 Daily Heavy-Duty Truck Hours of Delay



Highway Non-Recurrent Delay

This indicator identifies how much congestion can be considered to be atypical. Non-recurrent congestion is the congestion caused by accidents, weather, special events, or other incidents. This type of congestion can be addressed by strategic operational investments such as traveler information, incident management, and ramp metering. **FIGURE 5.4** shows the relative amount of freeway congestion that is estimated to be caused by non-recurrent events. Region-wide, approximately 45 percent of freeway congestion is estimated to be non-recurrent, but this estimate varies widely by county.

FIGURE 5.4 Non-Recurrent Congestion Share by County (2009)



More suburban or rural areas with less overall congestion have a higher percentage of all congestion represented by non-recurring events. San Bernardino County, for example, is estimated to have a majority of its congestion as non-recurrent in 2009. (The actual percentage is likely exaggerated due to the manner in which PeMS handles some data; more research is needed to verify this assessment.) In contrast, the more urbanized Los Angeles County had just over 40 percent of its total congestion represented by non-recurring incidents.

Speed Maps

EXHIBITS 5.1 through **5.3** depict the region's freeway speed conditions during the afternoon peak period (3 pm to 7 pm) based upon the SCAG RTDM results for Base Year 2008, Baseline 2035, and Plan 2035. Additional speed maps are provided in the Highways and Arterials Appendix.

EXHIBIT 5.1 Base Year 2008 Freeway Speed – PM Peak (3pm–7pm)

EXHIBIT 5.2 Baseline 2035 Freeway Speed – PM Peak (3pm–7pm)

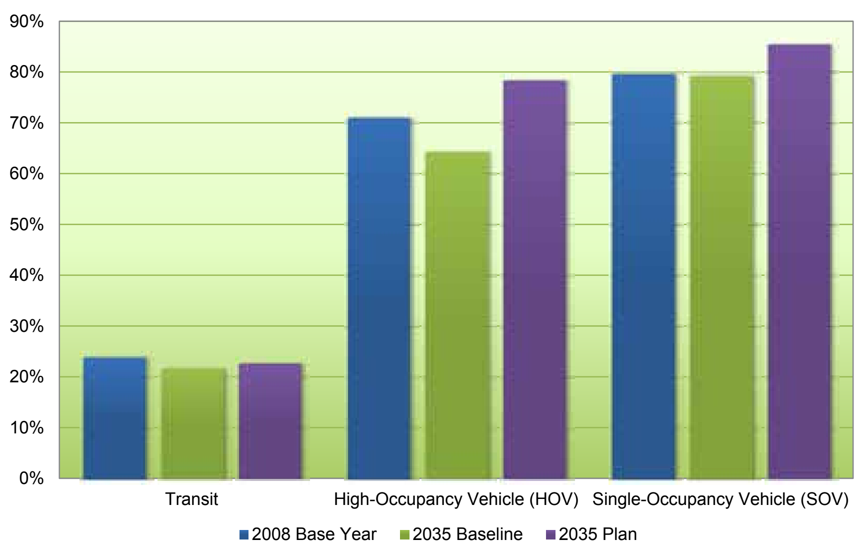
EXHIBIT 5.3 Plan 2035 Freeway Speed – PM Peak (3pm–7pm)

ACCESSIBILITY

Accessibility is used to capture how well the transportation system performs in providing people access to opportunities. Opportunities can include anything from jobs, education, medical care, recreation, shopping, or another activity that helps improve a person's life. For the 2012–2035 RTP/SCS, accessibility is simply defined as the distribution of trips by mode by travel time.

As with the 2008 RTP, accessibility is measured by taking afternoon or PM peak period travel demand model results for the base and forecast years and identifying the percentage of commute or home-based work trips that are completed within 45 minutes. **FIGURE 5.5** shows these results. In all cases, the 2035 Plan improves accessibility for home-based work trips over the baseline.

FIGURE 5.5 Percentage of PM Peak Period Home-Based Work Trips within 45 Minutes



The 2012–2035 RTP/SCS provides a more comprehensive measure of accessibility by including transit and HOV accessibility as well as non-work and work trips in the indicator. Results for the following were added to the 2012–2035 RTP/SCS based upon stakeholder input:

- Distributions of travel time (i.e., not just percentage completed within 45 minutes),
- High-occupancy vehicles (HOV) for each of the three modeled years,
- AM, midday, evening, and night accessibility for each of the three modeled years for all three modes (transit, SOV, and HOV), and
- Non-work trips for each of the three modeled years for all three modes (transit, SOV, and HOV) for all five time periods.

Productivity and Reliability

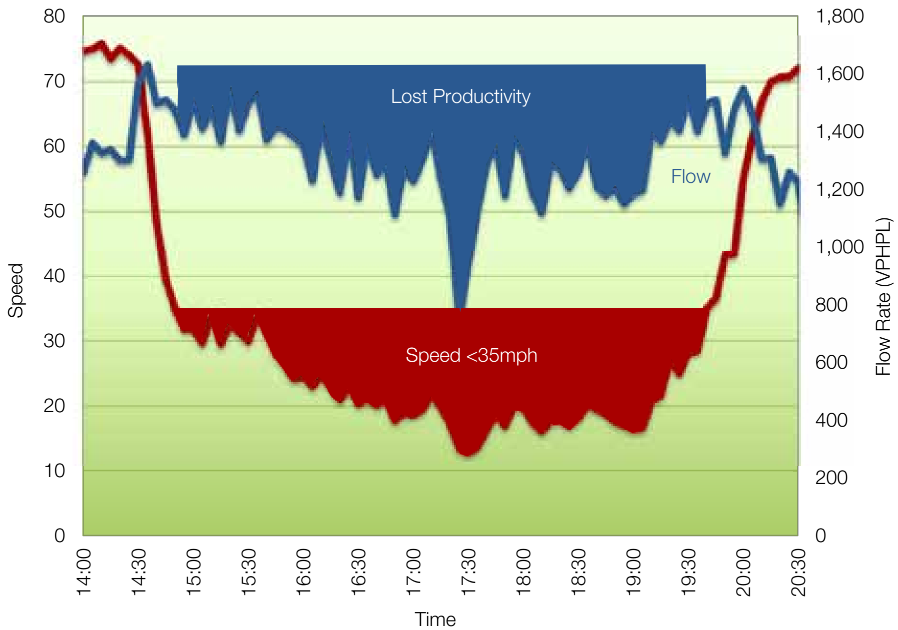
As with the non-recurrent congestion measure described in the previous section, the productivity and reliability outcomes cannot be readily forecasted and are not used for alternatives analysis in the 2012–2035 RTP/SCS. They do, however, provide some guidance on how much benefit can be obtained by regional investments in operational improvements. The productivity and reliability estimates presented here are based in part on Corridor System Management Plans (CSMPs) developed recently in the SCAG region. Productivity and reliability are critical since they reflect the improvements in efficiency and non-recurrent congestion, respectively. SCAG plans to monitor the progress achieved in improving productivity and reliability on a regular basis moving forward.

PRODUCTIVITY

The productivity outcome reflects the degree to which the transportation system performs during peak demand conditions. It is a system efficiency measure. The productivity indicator is defined as the percentage of utilization during peak demand conditions.

For highways, productivity is particularly important because when we need capacity the most, we often get the lowest "production" from our system. On some corridors throughput can decline as much as 50 percent during peak periods, and most congested urban corridors typically lose 25 percent of their capacity during rush hour. This loss of productivity is shown in **FIGURE 5.6**, which depicts how much vehicle throughput declines (i.e., productivity is lost) during rush hour.

FIGURE 5.6 Illustrative Highway Productivity Losses



Source: Caltrans Freeway Performance Measurement System (PeMS) for Los Angeles I-5 southbound; postmile 11.54, Washington Blvd; 10/19/2011; vehicle detector station 716924.

FIGURE 5.7 summarizes the current estimate for productivity losses on the region's freeway system and the expected improvements due to Plan investments. Maximizing the system's productivity is a critical goal of this RTP/SCS, and the overall system management approach aims to recapture lost productivity. The incremental investment of $6.2 billion to implement advanced operational strategies on our freeways and arterials is projected to recapture 20 percent of the lost productivity. These projections are based on recent studies indicating that investments in ramp metering, arterial signal coordination, traveler information, and incident management can achieve such improvements and more.

FIGURE 5.7 Highway System Productivity (Lost Lane-Miles)

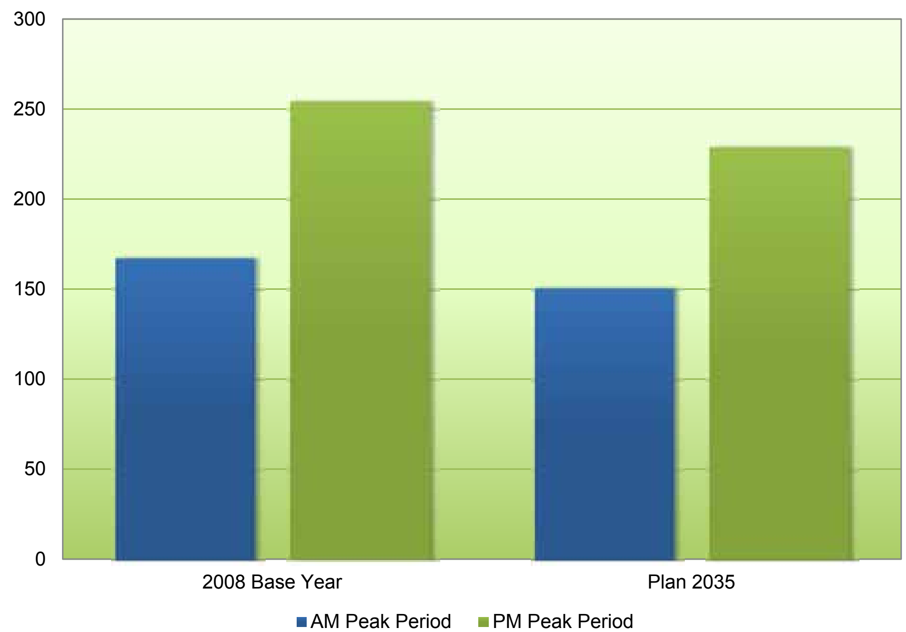
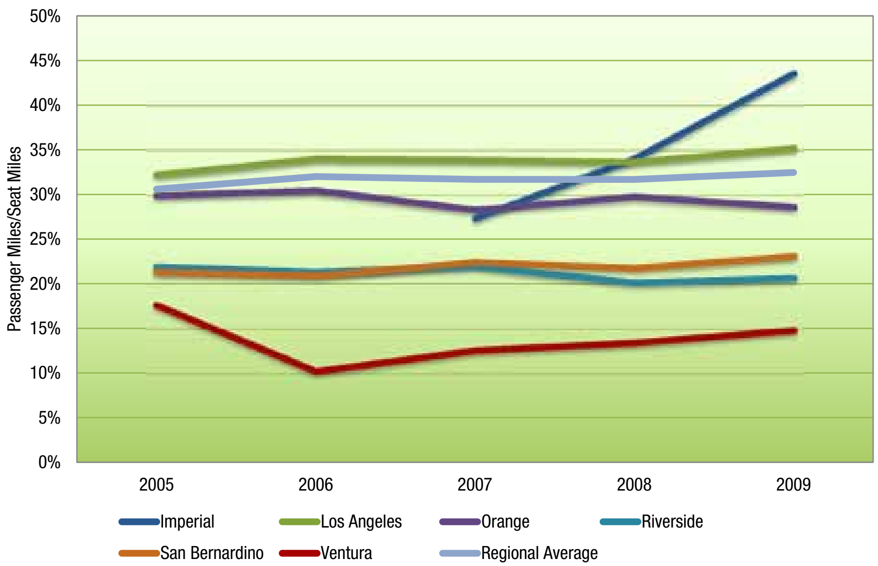


FIGURE 5.8 shows the percentage of transit passenger miles traveled compared to the total number of seat miles provided, a measure of transit productivity.

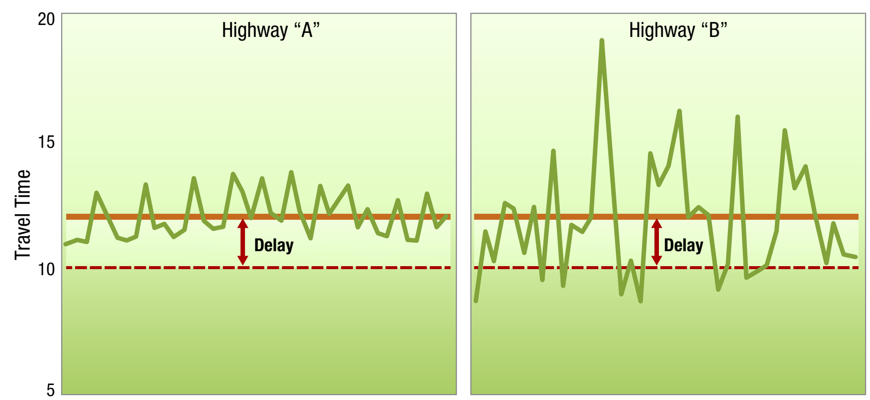
FIGURE 5.8 Ratio of Transit Passenger Miles/Seat Miles



RELIABILITY

Reliability captures the relative predictability of the public's travel time. Unlike mobility, which measures how fast the transportation system is moving people and goods, and accessibility, which addresses how much time people must spend traveling in total, reliability focuses on how much mobility and accessibility vary from day to day. This variability is illustrated in **FIGURE 5.9**, where Highway "A" and Highway "B" both have the same average travel time, meaning that they experience the same level of mobility. However, when each day's travel time is taken into account, one sees that Highway "A" has lower variability than Highway "B."

FIGURE 5.9 Difference between Reliability and Mobility



Same Mobility (same travel time and delay), but Highway "A" is much more reliable

Reliability is the level of variability in transportation service between the expected travel time and the actual travel time between origin-destination (OD) pairs. Reliability can be calculated by using statistical tools. The standard deviation is one such tool that provides an estimate of how much the travel time on any given day will "deviate" from the average travel time. It provides the probable range of time that a motorist will arrive within his or her scheduled time. Dividing the standard deviation by the average time spent traveling produces the percentage of variability for an OD pair.

Reliability can only be monitored and not forecasted. This is because travel demand models cannot evaluate variations in travel times, but can only estimate average travel times and delay (i.e., mobility). However, **TABLE 5.2** presents the estimated improvements in reliability for three different hours during the day. These improvements are expected as a result of the TSM investments, especially as they relate to incident management. These estimates are based in part on the recently completed Corridor System Management Plans (CSMPs) in the SCAG region.

TABLE 5.2 Estimated Improvements in Reliability

Hour	Average Travel Time (minutes)	Variability of Travel Time	Travel Time Based on Level of Confidence of Arriving on Time (minutes)		
			67%	95%	99%
8:00 AM	23	29%	30	37	43
Noon	20	16%	24	27	30
5:00 PM	27	38%	38	48	59

Safety and Health

The safety outcome for evaluating projects has been carried over from the 2008 RTP, but the 2012–2035 RTP/SCS effort also includes a new health outcome. Safety addresses how well the transportation system minimizes accidents and is measured in fatalities, injuries, and property damage accidents per million vehicle miles by mode.

Safety and health impacts of regional transportation improvements cannot be easily forecasted, but total accidents can show a reduction in future years if people shift from modes with higher accident risk to modes with lower accident risk. Total number of accidents is generally used as the performance measure and can be partially projected by using mode-specific accident rates (e.g., for highways, arterials, transit). This approach is used for the 2012–2035 RTP/SCS, but it is important to note that this approach does not take into account safety improvements for each mode. It just reflects the changes based on modal or facility shifts. It is not possible to forecast this measure by ethnicity or income group. Finally, for monitoring, this measure can be reported historically by time period month and by mode (including for non-motorized transportation), but it cannot be projected at this level of detail. The safety outcome results are discussed in further detail in the Performance Measures Appendix.

Health is a new outcome for the 2012–2035 RTP/SCS. There are health measures that will be used for ongoing monitoring for the region, but to evaluate alternatives, the health measure will be the tons of pollutants emitted, since these are highly correlated to health problems such as asthma. This measure supports both the Health outcome as well as the Environmental Quality outcome.

Environmental Quality

This outcome is measured in terms of criteria pollutant emissions. Emissions are estimated using the SCAG RTDM results, which are input to the ARB's Emission Factors (EMFAC) model. Pollutant emissions are reported in detail as part of the Transportation Conformity Appendix.

Economic Well-Being

Never before have the crucial linkages and interrelationships between the economy, the regional transportation system, and land use been as important as now. For the first time, the 2012–2035 RTP/SCS includes a significant consideration of the economic impacts and opportunities provided by the transportation infrastructure plan set forth in the RTP/SCS, considering not only the economic and job creation impacts of the direct investment in transportation infrastructure, but also the efficiency gains in terms of worker and business economic productivity and goods movement. The RTP/SCS outlines a transportation infrastructure investment strategy that will beneficially impact Southern California, the state, and the nation in terms of economic development, competitive advantage, and overall competitiveness in the global economy in terms of attracting and retaining employers in the Southern California region.

Implementation of SCAG's RTP/SCS will create or sustain jobs today to build transportation infrastructure projects for tomorrow. SCAG's RTP/SCS totaling more than $500 billion in transportation investments will put thousands of Southern Californians back to work in much-needed jobs, not only in construction, but in a broad cross-section of industry clusters. Over the twenty-three year period and six-county SCAG region, the plan will generate significant employment. An annual average of 174,500 new jobs will be generated by construction and operations expenditures that are specified in the RTP program (**TABLE 5.3**), and the indirect and induced jobs that flow from those expenditures. An additional 354,000 annual jobs will be created by the SCAG region's increased competitiveness and improved economic performance that will result from congestion reduction and improvements in regional amenities due to implementation of the 2012-2035 RTP/SCS. The rest of the state of California and nation will benefit from spillover impacts of additional accrued jobs.

TABLE 5.3 Employment Impact from Construction and Maintenance Expenditures (Per Year)

	2011–2015	2016–2020	2021–2025	2026–2030	2031–2035	Total
Los Angeles	112.2	89.1	90.1	93.4	76.4	92.2
Orange	36.1	34.0	35.5	37.8	32.3	35.1
Riverside	23.5	22.0	25.0	28.0	23.7	24.4
San Bernardino	18.0	15.5	18.5	21.4	18.0	18.3
Ventura	3.8	3.4	3.0	3.6	3.2	3.4
Imperial	0.7	0.7	1.1	1.6	0.9	1.0
	194.4	**164.7**	**173.2**	**185.7**	**154.4**	**174.5**

The goods movement, logistics & distribution, tourism, manufacturing, and many other transportation-reliant sectors are heavily dependent on efficient transportation infrastructure and are key Southern California job generators for all six SCAG-region counties. Without making the investments in Southern California's transportation system outlined in this plan, economic recovery and job creation will be markedly slower throughout the region. Longer term, failure to make sufficient regional transportation investments will cost Southern California economically and the region's business competitiveness will be at risk.

Investment Effectiveness

The cost-effectiveness outcome indicates the degree to which the Plan's expenditures generate benefits that transportation users can experience directly. This outcome is important to the public because it describes how the Plan's transportation investments make productive use of scarce funds.

The benefit/cost ratio is the indicator for the cost-effectiveness outcome, and it compares the incremental benefits to the incremental costs of the modal investments. The benefits are divided into several categories, including:

- Delay savings,
- Air quality improvements, and
- Reductions in vehicle operating costs.

For these categories, travel demand and air quality models are used to estimate the benefits of the Plan compared to the Baseline. Most of these benefits are a function of changes in vehicle miles traveled (VMT) and vehicle hours traveled (VHT). For example, a highway project that increases VMT would negatively impact air quality and vehicle operating costs, while a transit project that decreases VMT would have the opposite effect. Not all impacts are linear, so reductions in congestion can increase or decrease vehicle operating costs and emissions. Delay savings are reflected directly in the VHT statistics.

To estimate the benefit/cost ratio, the benefits in each category are converted into dollars and added together. These are divided by the total incremental costs of the Plan's transportation improvements to produce a ratio. **FIGURE 5.10** summarizes the results of this analysis.

The investments in the 2012–2035 RTP/SCS provide a return of $2.90 for every dollar invested. For this analysis, all benefits and costs are expressed in 2011 dollars. Benefits are estimated over the 25-year RTP/SCS planning period from 2011 to 2035. The user benefits are estimated using California's Cal-B/C benefit/cost framework and incorporate SCAG's RTDM outputs. The costs include the incremental public expenditures over the entire RTP/SCS planning period.

FIGURE 5.10 Results of Regional Benefit/Cost Analysis

System Sustainability

A transportation system is sustainable if it maintains its overall performance over time with the same costs for its users. Sustainability, therefore, reflects how our decisions today affect future generations. The indicator for sustainability is the total inflation-adjusted cost per capita to maintain overall system performance at current conditions.

The performance measures presented in this chapter show that the planned transportation system in 2035 will perform better compared to today. This RTP/SCS commits itself to maintaining a sustainable system by allocating $217 billion to maintaining the system in a state of good repair over the period of the plan. This is an average annual per capita investment of more than $400 per person for each year of the plan period.

RTP/SCS Performance for Co-Benefits

In addition to the transportation performance results discussed above, the RTP/SCS's more focused land pattern, increased investments in transit, and support for communities that foster walk and bike modes as serious transportation options leads to additional benefits in fiscal, economic, environmental, and other quality-of-life performance measures. These results compare the RTP/SCS with a future trend-based scenario that more closely follows the development trends of the past decades. Unlike the RTP/SCS, this trend-based future scenario relies more heavily on growth in undeveloped lands at the edges of cities and beyond and focuses more new housing toward single-family products in suburban patterns. Different from the modeling process used for the mobility-based performance measures, these performance results were derived using the single framework model described in the SCS Background Documentation Appendix.

Better Placemaking

The challenges of traffic congestion and long commutes make the value of including optioons for better places to live and work even more important. The RTP/SCS focuses over 50 percent of new housing and job growth for 2035 in areas served by high-quality transit, as well as other opportunity areas in existing main streets, downtowns, and along corridors where infrastructure already exists. This more compact land use pattern, combined with the identified transportation network improvements and strategies, results in improved pedestrian and bicycle access to community amenities, lowers average trip length, and reduces vehicle miles traveled. These outcomes not only reduce GHG emissions, but also support the development of more livable communities that provide more housing choices, conserve natural resources, offer transportation options, and promote a better quality of life.

Lower Cost to Taxpayers and Families

LOCAL INFRASTRUCTURE CAPITAL AND OPERATIONS AND MAINTENANCE COSTS

Increased land consumption can lead to higher costs for local and subregional infrastructure, as new development in "greenfield" lands (areas, including agricultural lands, not previously developed) requires significant capital investments to extend or build new local roads, water and sewer systems, and parks. Conversely, growth focused in urban areas often takes advantage of existing infrastructure and more efficient service to higher concentrations of jobs and housing. This cost difference increases when operations and maintenance (O&M) costs are taken into account. O&M costs include the ongoing city expenditures required to operate and maintain the infrastructure serving new residential growth. More dispersed development, which requires greater lengths of roads and sewer pipes, incurs higher O&M costs to local jurisdictions than more compact development, which capitalizes on shared infrastructure capacity.

The RTP/SCS shows that growth in urban and mixed-use developments in already developed areas can reduce costs significantly, as demonstrated by adding up capital infrastructure and ongoing O&M costs to 2035. If the development trend of the past decades continues, new growth would require $33.2 billion in capital infrastructure and O&M costs. By contrast, local jurisdictions following the land use pattern included in the RTP/SCS leads to $27.2 billion in costs, representing a savings of $6 billion.

LOCAL REVENUES

To determine the RTP/SCS's impact on local revenues, SCAG utilized estimates of potential revenues from property and property transfer taxes, sales taxes, and vehicle license fees generated by new households. By 2035, the RTP/SCS's more compact development generates $13,800 per acre in local revenues, which is approximately $4,000 per acre more than a land use pattern of more dispersed development.

HOUSEHOLD COSTS

If the land use patterns of the past decades persist, average household costs associated with driving and residential energy and water use will be up to $19,000 in 2035. By comparison, the RTP/SCS would cost each household $16,000. Over time, the differences in annual expenditures would amount to a significant sum for each household, which increases further if the effect of local infrastructure cost burdens, which are typically passed on to homeowners and renters in the form of taxes, fees, home prices, and assessments, is considered.

Benefits to Public Health and the Environment

LAND CONSUMPTION

New land consumption includes all land that will be newly urbanized, including residential and employment areas, roadways, open space, and public lands. Through infill, redevelopment, and more efficient use of new greenfield land to accommodate new growth, a land use pattern with a greater share of urban infill and compact development consumes less land overall. By contrast, a pattern that places a greater share of new growth in dispersed standard development patterns consumes more land. The development trend of the past decades would consume approximately 740 square miles of land, nearly twice as much as the RTP/SCS, which consumes approximately 330 square miles, to accommodate growth through 2035.

BUILDING ENERGY USE

Building energy use is determined by the mix of housing types and the proportion of development in temperate climate zones within the SCAG region. A land use pattern that contains more mixed-use/walkable and urban infill development accommodates a higher proportion of growth in more energy-efficient housing types like townhomes, apartments, and smaller single-family homes, as well as more compact commercial building types. By contrast, a large proportion of standard development leads to a higher proportion of larger single-family homes, which are typically less energy efficient. Location also comes into play—buildings in the warmer areas of the region and beyond use more energy each year, in part because they require more energy to cool during the summer months.

Differences in land use patterns lead to substantial differences in the amount of electricity and natural gas used. These differences will vary depending on policies regulating how efficient buildings become. Assuming the same efficiency standards, the RTP/SCS uses 8 percent less energy per year when compared to a land use pattern that more closely aligns with the past development trend. Additionally, the overall energy savings that come from developing more compactly translate to meaningful savings in residential energy bills. On average, the RTP/SCS saves approximately $950 million per year in total by 2035, or about $130 per household.

RESIDENTIAL WATER USE

Variations in land use patterns and their related building profiles also lead to substantial differences in residential water use and cost. Residential water use is a function of both indoor and outdoor water needs, with outdoor use (landscape irrigation) accounting for the majority of the difference among housing types. Because homes with larger yards require more water for landscape irrigation, lot size is generally interrelated with a household's overall water consumption. Thus, a land use pattern with a greater proportion of the standard development, which includes more large-lot single-family homes, requires more water than a land use pattern with a greater proportion of compact and urban infill development, which includes more attached and multifamily homes. And, as is the case for energy use, the location of new development has a significant bearing on water use—homes in warmer areas use more water to maintain lawns and other landscaping.

Water use will vary based on efficiency and conservation policies, which will be increasingly important as California faces future constraints to water supply. Assuming the same modest improvements, the RTP/SCS uses approximately 970 billion gallons of water (6 percent less than a land use pattern based on past development trends). Saving water also saves on costs, and the RTP/SCS saves approximately $245 million per year in total by 2035.

HEALTH INCIDENCES AND COSTS

Auto-related air pollution contributes to a spectrum of health incidences, including cases of chronic bronchitis; respiratory and cardiovascular hospitalizations; respiratory-related ER visits; acute bronchitis; work loss days; premature mortality; asthma exacerbation; and acute, lower, and upper respiratory symptoms. Using research-based rates and valuations produced by the American Lung Association, the RTP/SCS results in a 24 percent reduction in total health incidences and saves over $1.5 billion per year in total costs.

Greater Responsiveness to Demographics and the Changing Housing Market

There is little question that the demographic profile of Southern California is changing, resulting in different housing and transportation needs. The traditional suburban development pattern that characterizes most of the region is still appropriate for many residents and homeowners, but the increasing demand for small-lot and multifamily housing, walkable and bikeable environments, and shorter commutes calls for more varied housing options located in more compact developments.

The RTP/SCS responds to this emerging need through an overall land use pattern that focuses new housing growth in urban centers served by various transportation options, including high-quality transit and active transportation. Approximately 70 percent of this new housing will be multifamily products.

Environmental Justice

Title VI and Environmental Justice Overview

The concept of Environmental Justice is about equal and fair access to a healthy environment, with the goal of protecting underrepresented and poorer communities from incurring disproportionate negative environmental impacts. Consideration of Environmental Justice in the transportation planning process stems from Title VI of the Civil Rights Act of 1964 (Title VI). Title VI establishes the need for transportation agencies to disclose to the public the benefits and burdens of proposed projects on minority populations. The understanding of civil rights has expanded to include low-income communities, as further described below. Title VI states that "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Additionally, Title VI not only bars intentional discrimination, but also unjustified disparate impact discrimination. Disparate impacts result from policies and practices that are neutral on their face (i.e., there is no evidence of intentional discrimination), but have the effect of discrimination on protected groups.

A 1994 Presidential Order (Executive Order 12898) directed every federal agency to make Environmental Justice part of its mission by identifying and addressing the effects of all programs, policies, and activities on underrepresented groups and low-income populations. Reinforcing Title VI, this Presidential Order ensures that every federally funded project nationwide considers the human environment when undertaking the planning and decision-making process. The Presidential memorandum accompanying E.O. 12898 identified Title VI as one of several federal laws that should be applied "to prevent minority communities and low-income communities from being subject to disproportionately high and adverse environmental effects." Given the overlap in Title VI and Environmental Justice policies, this report will use the term "Environmental Justice" as an inclusive term to mean minority and low-income populations.[1]

In addition to federal requirements, SCAG must comply with California Government Code Section 11135, which states that "no person in the State of California shall, on the basis of race, national origin, ethnic group identification, religion, age, sex, sexual orientation, color, or disability, be unlawfully denied full and equal access to the benefits of, or be unlawfully subjected to discrimination under, any program or activity that is conducted, operated, or administered by the state or by any state agency, is funded directly by the state, or receives any financial assistance from the state."

The State of California also provides guidance for those involved in transportation decision-making to address Environmental Justice. In 2003, Caltrans published the *Desk Guide on Environmental Justice in Transportation Planning and Investments* to provide information and examples of ways to promote Environmental Justice. The *Desk Guide* identified requirements for public agencies, guidance on impact analyses, recommendations for public involvement, and mitigation.

1 See Title VI Legal Manual, U.S. Department of Justice Civil Rights Division (2001), page 59.

Major Environmental Justice Issues in the Region

The SCAG region is experiencing major challenges to quality of life and affordability. For example, the region's residents have a high cost burden, with 45 percent of owner-occupied households and 54 percent of renter-occupied households spending 30 percent or more of their incomes on housing. In the SCAG region, less than 55 percent of households own their homes, a 2 percentage point decline from 2007 and 11 percent below the national average for homeownership (66 percent). There were 8.1 million renters in the region in 2009.[2]

In general, housing is considered affordable if it costs 30 percent or less of a household's income. However, a more refined indicator called the Housing + Transportation Affordability Index was developed by the Center for Neighborhood Technology to better gauge the true cost of housing based on its location. Based on this index, 67 percent of households in the SCAG region spend 45 percent or more of their incomes on housing and transportation, among the highest percentages in the nation.[3]

The poverty rate in the SCAG region stands at 15 percent, with 2.6 million residents living in poverty. This is 3 percentage points higher than the national average. In 2009, per capita income was $42,784, which is about $17,000 less than that in the San Francisco Bay Area. Adding to the high poverty rate, real average wages (adjusted for inflation) have been stagnant for a decade. Further, for the past three years the SCAG region has experienced unemployment rates over 12 percent, about 3 percentage points higher than the national average. The lower income levels are associated in part with the educational attainment levels in the region. Only 25 percent of adults have a bachelor's degree or higher in the SCAG region, compared to almost 40 percent in the San Francisco Bay Area. In Riverside and San Bernardino Counties, 17 percent of adults have a bachelor's degree or higher. In Imperial County, only 12 percent of adults have a bachelor's degree or higher.[4]

Additional environmental concerns include exposure to toxic pollutants and obesity levels. Exposure to air pollutants is an Environmental Justice issue due to the disproportionate

2 U.S. Census. American Community Survey. 2009.
3 Center for Neighborhood Technology. Housing and Transportation Affordability Index. Last accessed October 15, 2011, from http://htaindex.cnt.org/.
4 U.S. Census. American Community Survey. 2009.

share of minority and low-income populations living in close proximity to heavily traveled corridors, particularly near port and logistics activity. This exposure to unhealthy air results in 5,000 premature deaths and 140,000 children with asthma and respiratory symptoms. More than half of Americans exposed to $PM_{2.5}$ pollution exceeding the national standard reside in the SCAG region.[5] Additionally, populations living in areas without access to parks, safe walking environments, and fresh food have a greater prevalence of obesity and associated ailments such as diabetes.[6] Although the SCAG region's level of obesity (24 percent) is lower than the national average of 33.8 percent, there are still disparities among racial groups, based on data from the CDC. For example, the prevalence of obesity among non-Hispanic White women is 33 percent, whereas the obesity rates among non-Hispanic Black women and Mexican American women is 49.6 percent and 45.1 percent, respectively.[7] This raises policy questions about the opportunities for physical activity, access to healthy foods, and safety.

SCAG's Title VI and Environmental Justice Policy & Program

As a government agency that receives federal funding, SCAG is required to conduct an Environmental Justice analysis for its RTP. SCAG's Environmental Justice program includes two main elements: technical analysis and public outreach. Specifically, it is SCAG's role to ensure that when transportation decisions are made, low-income and minority communities have ample opportunity to participate in the decision-making process and that they receive an equitable distribution of benefits and not a disproportionate share of burdens.

SCAG adheres to all directives on Environmental Justice. The Environmental Justice movement stems from Title VI of the Civil Rights Act of 1964. Title VI of the Civil Rights Act of 1964 provides one very significant means by which the public can seek greater accountability from transportation agencies. Title VI states that "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance."

Under federal policy, all federal agencies must make Environmental Justice part of their mission and adhere to three fundamental Title VI/Environmental Justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

In the 1990s, the federal executive branch issued orders on Environmental Justice that amplified Title VI, in part by providing protections on the basis of income as well as race. These included President Clinton's Executive Order 12898 (1994) and subsequent U.S. Department of Transportation (DOT) and Federal Highway Administration orders (1997 and 1998, respectively), along with a 1999 DOT guidance memorandum.

On August 4, 2011, seventeen federal agencies signed the "Memorandum of Understanding on Environmental Justice and Executive Order 12898." The signatories, including the U.S. Department of Transportation (DOT), agreed to develop Environmental Justice strategies to protect the health of people living in communities overburdened by pollution and provide the public with annual progress reports on their efforts. The MOU advances agency responsibilities outlined in 1994 Executive Order 12898 and directs each of the federal agencies to make Environmental Justice part of its mission and to work with other agencies on Environmental Justice issues as members of the Interagency Working Group on Environmental Justice.

In response to this MOU, the DOT revised its Environmental Justice Strategy. The revisions reinforce the DOT's programs and policies related to Environmental Justice and strengthen its efforts to outreach to minority and low-income populations. Further, on September 29, 2011, the Federal Transit Authority issued two proposed circulars on Title VI and Environmental Justice to clarify the requirements and offer guidance. FTA Circular 4702.1A, Title VI Requirements and Guidelines for Federal Transit Administration Recipients (Docket No. FTA-2011-0054), provides information required in the Title VI

5 California Air Resources Board, South Coast Air Quality Management District, and Southern California Association of Governments. Powering the Future. August 2011.

6 Sonia Caprio, MD, et.al. *Diabetes Care* November 2008 vol. 31 no. 11 2211–2221

7 Centers for Disease Control and Prevention: National Diabetes Surveillance System. Last accessed October 18, 2011, from http://apps.nccd.cdc.gov/DDTSTRS/default.aspx and Centers for Disease Control and Prevention. Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 through 2007–2008. June 2010.

Program, proposes changing the reporting requirement from every four years to every three years, and adds a requirement for mapping and charts to analyze the impacts of the distribution of state and federal public transportation funds. SCAG has reviewed the proposed Circulars as additional guidance for the development of the RTP/SCS. The FTA Circular 4703.1, Environmental Justice Policy Guidance for Federal Transit Administration Recipients (Docket number FTA-2011-0055), provides recommendations to MPOs (and other recipients of FTA funds) on how to fully engage Environmental Justice populations in the public transportation decision-making process; how to determine whether Environmental Justice populations would be subjected to disproportionately high and adverse human health or environmental effects as a result of a transportation plan, project, or activity; and how to avoid, minimize, or mitigate these effects. The proposed Environmental Justice Circular does not contain any new requirements, policies, or directives. Nonetheless, SCAG complies with the framework provided to integrate the principles of Environmental Justice into our decision-making processes.

Finally, under Senate Bill 375 (SB 375), SCAG is required to include a Sustainable Communities Strategy within the RTP/SCS. The RTP/SCS represents the collective vision of the six counties in the SCAG region and provides a framework for the future development of our regional transportation system. Through SB 375, the California Air Resources Board (ARB) established per capita targets for GHG reduction for cars and light trucks for the SCS. The targets for the SCAG region are 8 percent in 2020 and 13 percent in 2035, from 2005 levels. As part of the early target-setting process, the ARB appointed a Regional Target Advisory Committee (RTAC) to recommend factors to be considered and methodologies to be used for setting the targets. The RTAC report was finalized in September 2009 and included a recommendation on housing and social equity. The report recognized the impact policies to reduce Vehicle Miles Traveled (VMT) could have on social equity, specifically calling for appropriately located affordable housing match local wage levels. The RTAC further recommended that displacement and gentrification, as a result of changing land uses and increased housing costs, should be addressed and specifically avoided to the extent possible in the SCS. As a result of this recommendation and input from our Environmental Justice stakeholders, SCAG has updated its methodology to include new areas of analysis, including gentrification and displacement.

SCAG's Title VI and Environmental Justice Outreach

A key component of the RTP/SCS development process is seeking public participation. Public input from our Environmental Justice stakeholders helped SCAG prioritize and address needs in the region. As part of the Environmental Justice outreach effort, SCAG compiled a list of key stakeholders to be contacted regarding RTP/SCS programs and policies. This list is comprised of over 300 individuals and organizations involved with the 2008 RTP as well as additional stakeholders, such as the South Coast Air Quality Management District's (SCAQMD) Environmental Justice Working Group, which included new groups such as local community advocates, air quality interest groups, and unions. SCAG maintains this list regularly and allows interested persons to sign up online for the mailing list.

SCAG held two Environmental Justice workshops and convened focus groups on the Environmental Justice analysis to ensure that all members of the public have an opportunity to participate meaningfully in the planning process. All the workshops were properly noticed and advertised. A majority of the region's Environmental Justice organizations were represented at both workshops. In addition to the special Environmental Justice workshops, SCAG held a workshop for Resource Agencies during development of the RTP/SCS, where Environmental Justice was a primary focus. Furthermore, Environmental Justice stakeholders have been involved throughout the planning process. On June 24, 2010, SCAG held a workshop to review the planning process and familiarize the participants with the Environmental Justice analysis process. The workshop drew representatives of all major Environmental Justice groups from throughout the region, with video conferencing made available from SCAG's regional offices. Attendance totaled 37 participants.

The following is a summary of the main topics discussed at the workshop:

- SCAG was requested to conduct a presentation on SCAG's modeling process,
- The Environmental Justice analysis should include baseline data of major issues facing the region,
- Public health was identified as a topic that should be further analyzed,
- SCAG was requested to include the housing plus transportation affordability index in its analysis, and

- Gentrification needs to be addressed, particularly with SB 375's emphasis on transit-oriented development.

As a result of these workshops, SCAG determined that new analysis areas were necessary to capture the concerns raised by our stakeholders. These new areas are discussed in greater depth below, but include impacts from rail transportation, gentrification and displacement, pollution exposure along heavily traveled corridors, and impacts from revenue-generating mechanisms such as congestion pricing.

On June 30, 2011, SCAG held a follow-up workshop to discuss the proposed new analysis areas with our stakeholders and seek further input. In response to comments from the first workshop, SCAG also included a summary of the modeling process. This workshop drew 45 participants from all six regional offices.

The participants provided thoughtful comments and feedback on SCAG's proposed analysis and planning process, including:

- $PM_{2.5}$ should be analyzed in the Environmental Justice report,
- The Environmental Justice community should be included early in the decision-making processes and advisory committees,
- The report should identify communities of concern and compare those areas with the location of investments,
- SCAG should produce maps that show long-range trip projections compared to system capacity,
- Housing should be included in the performance measures, including housing/jobs fit (costs vs. wages), and
- The impacts of freight movement should be analyzed and mitigated.

In response to comments made at the workshop, SCAG followed up by organizing focused meetings to further discuss the methodology and ensure it addressed the concerns raised by Environmental Justice stakeholders. Also, participants were urged to attend subsequent public workshops. Many of those who attended the Environmental Justice workshops did attend the RTP/SCS workshops. Furthermore, to address the comments made during SCAG's workshops, the Environmental Justice analysis will be updated from prior cycles as follows:

- Focus more on non-motorized transportation,
- Identify and quantify the primary Environmental Justice challenges in transportation in the region, including the development of a baseline for key issues such as poverty, exposure to pollutants, and concentration of pollutants,
- Bring public health to the forefront—focus on pollutants and cancer concentration in communities of concern,
- Begin to analyze potential gentrification impacts from urban infill and transit-oriented development, and
- Provide an Environmental Justice mitigation toolbox with recommended mitigation measures for subsequent projects.

Technical Analysis

SCAG has been recognized for its technical approach to understanding the benefits and burdens in our regional plan. Each planning cycle presents new and emerging concerns for the region to address. For example, in the 2008 RTP, SCAG analyzed accessibility to public parks, including the distribution of parks by income and park accessibility by travel mode and income. In keeping with the trend of developing robust environmental analyses, the current RTP/SCS analyzes impacts from rail transport, exposure to pollutants along heavily traveled corridors, gentrification and displacement, and impacts from revenue-generating mechanisms such as a VMT fee. As with previous RTPs, the goal of the 2012–2035 RTP/SCS is to ensure that when transportation decisions are made, low-income and minority communities have ample opportunity to participate in the decision-making process and receive an equitable distribution of benefits and not a disproportionate share of burdens.

IDENTIFYING DEMOGRAPHIC GROUPS

Executive Order 12898 and the DOT and FHWA Orders on Environmental Justice define "minority" as persons belonging to any of the following groups, as well as "other" categories that are based on self-identification of individuals in the U.S. Census:[8] Black, Hispanic, Asian, and American Indian and Alaskan Native. SCAG bases its analysis on

[8] Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

the latest census data for ethnic/racial groups in the SCAG region by census tract and by transportation analysis zone (TAZ).

Identifying low-income and minority populations is necessary both for conducting effective public participation and for assessing the distribution of benefits and burdens of transportation plans and projects. For the purposes of this analysis, SCAG focused on all low-income groups and minority populations. The minority population in the SCAG region comprises 65 percent of the total population. The predominant minority groups are Hispanics and Asian/Pacific Islanders, which combine to account for over 50 percent of the total minority population within the SCAG region.

Poverty level is a federally established income guideline used to define persons who are economically disadvantaged as defined by the U.S. Department of Health & Human Services guidelines.[9] The poverty level applicable to the SCAG region is chosen on the basis of regional average household size for the census year. For example, for a regional mean of 2.98 persons—rounded to 3—per household, the threshold would consist of the sum of the value for the first person plus two additional people. The household counts in each income range are then used to determine the number and percentage of households in each census tract below the poverty level. In 2010, a family of three earning less than $17,374 was classified as living in poverty.[10]

In addition to complying with federal guidance, SCAG also conducts income equity analyses based on five income quintiles. A quintile, by definition, is a category into which 20 percent of the ranked population falls. For each new analysis, SCAG defines regional income quintiles based on the most recent census data on household income. Once the income quintiles are established, the incidence of benefits and costs can be estimated and compared across these income categories. **TABLE 5.4** lists the demographic categories used in SCAG's Environmental Justice analysis.

[9] Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

[10] Weighted average threshold. U.S. Census Bureau. Poverty Thresholds. Last accessed October 14, 2011 from http://www.census.gov/hhes/www/poverty/data/threshld/index.html.

TABLE 5.4 Demographic and Economic Categories

Ethnic/Racial/Other Categories (persons)	Income Categories (Households)
White (Non-Hispanic)	Below Poverty Level
African-American	Income Quintile 1 (lowest)
American Indian	Income Quintile 2
Asian/Pacific Islander	Income Quintile 3
Hispanic (Latino)	Income Quintile 4
Other Racial Categories	Income Quintile 5
Disabled/Mobility Limited	
Age 65 and Above	
Non-English speaking	
Individuals without High School Diploma	
Households without a car	
Foreign-Born Population	
Young Children 5 and Under (Provided in Additional Analysis/Data)	
Sensitive Receptors: Hospitals, Daycare Facilities, Schools, Senior Centers, Parks/Open Space	

Plan versus Baseline

As with the other performance outcomes presented in this chapter, the comparison of the Plan versus Baseline is the primary focus of the Environmental Justice analysis for the 2012–2035 RTP/SCS. The Plan represents the selected strategy to guide the region's transportation planning over the next few decades, while the Baseline represents "business as usual" and assumes current land use trends and the completion of projects programmed in the 2011 Federal Transportation Improvement Program (FTIP) that have received environmental clearance. The data for the analysis is based on the SCAG RTDM results.

PERFORMANCE MEASURES

In the development of this report, SCAG identified eleven performance measures to analyze existing social and environmental equity in the region and to address the impacts of the 2012–2035 RTP/SCS on various Environmental Justice population groups. Detailed analysis is presented for the following eleven performance measures:

1. 2012–2035 RTP/SCS Revenue Sources In Terms of Tax Burdens
2. Share of Transportation System Usage
3. 2012–2035 RTP/SCS Investments
4. Impacts of Proposed VMT Fees
5. Distribution of Travel Time and Travel Distance Savings
6. Jobs-Housing Imbalance or Jobs-Housing Mismatch
7. Accessibility to Employment and Services
8. Accessibility to Parks
9. Gentrification and Displacement
10. Environmental Impact Analyses (Air, Health, Noise)
    a. Air Quality and Health Impacts
        - Historic Performance At the Regional Level
        - Environmental Impacts along Freeways and Highly Traveled Corridors
        - Environmental impacts of Plan and Baseline Scenarios
    b. Noise impacts
        - Aviation
        - Roadway
11. Rail-Related Impacts

The following section summarizes the findings for each of the eleven performance measures analyzed as part of the Environmental Justice Report. The full results can be found in the Environmental Justice Appendix.

Performance Measure 1: 2012–2035 RTP/SCS Revenue Sources in Terms of Tax Burdens

Different funding sources (i.e., income taxes, property taxes, sales, fuel, etc.) can impose disproportionate burdens on lower-income and minority groups. Sales and gasoline taxes, which are the primary sources of funding for the region's transportation system, were evaluated for the purposes of this analysis. The amount of taxes paid was analyzed to demonstrate how tax burdens fall on various demographic groups. As in previous RTP Environmental Justice Reports, the 2012–2035 RTP/SCS Environmental Justice analysis examined in detail the incidence or distribution of, the burden of taxation.

The 2012–2035 RTP/SCS Environmental Justice analysis performed a comparative examination of the amount of taxes (sales, gasoline, and income) paid by the five respective income groups and by ethnicity. The analysis indicates that taxes paid as a percentage of each group's disposable income puts the heaviest burden on lower-income groups. This is the so-called "regressive" nature of the excise gasoline tax and retail sales tax levy on primarily consumer durable and non-durables that are necessities of daily living. The lower quintile groups (Quintile 1 and Quintile 2) are anticipated to pay 38.7 percent and 9.9 percent of their gross adjusted income on regional sales and gasoline taxes, respectively. By comparison, the higher quintile groups (Quintile 4 and 5) are anticipated to pay 6.6 percent and 3.0 percent of their income on all regional sales and gasoline taxes, respectively. Although the lower income quintile groups pay a larger percentage of their income on taxes than other quintiles, their contribution of the total share of sales and gasoline taxes is the smallest of the group at 8.4 percent for Quintile 1 and 12.8 percent for Quintile 2. Quintile 4 and Quintile 5, in contrast, pay 23.4 percent and 37.7 percent of the total sales and gasoline taxes in the region. Thus, those with limited financial means will not pay a disproportionate amount of overall taxes under the Plan compared with their usage of the transportation system and their shares of RTP/SCS investment.

The analysis indicates that tax burdens are expected to fall more heavily on non-minority groups, with non-Hispanic Whites paying 48.8 percent of the income taxes and 40.8 percent of the retail and gasoline tax.

Performance Measure 2: Share of Transportation System Usage

In order to determine the existing level of system usage, SCAG analyzed the 2010 National Household Travel Survey (NHTS). The NHTS is a household-based travel survey conducted periodically by the Federal Highway Administration (FHWA). The NHTS is the authoritative source of national data on the travel behavior of the American public.

SCAG then analyzed the transportation system usage by mode by race/ethnicity and income quintile. The data show that most bus and urban rail riders are lower-income quintile households—the lowest two income quintile households combined account for 84 percent of bus riders and 93 percent of urban rail riders. By ethnicity, Hispanics use disproportionately more bus, urban rail, and pedestrian facilities than their share of total households or population, while non-Hispanic Whites use disproportionately more auto and bike modes, similar to their mode usage for work trips.

Performance Measure 3: 2012–2035 RTP/SCS Investments

One of the most prominent Environmental Justice issues is the transportation investment strategy, which can impact the transportation choices of low-income and minority communities. A disproportionate allocation of resources for various transit investments can indicate a pattern of discrimination.

As a regional MPO, SCAG aims to identify and address Title VI of the Civil Rights Act and the Environmental Justice implications of its planning processes and investment decisions. This analysis intends to determine where the 2012–2035 RTP/SCS is putting its investments and will evaluate whether resources are being allocated equitably. The 2012–2035 RTP/SCS utilized a benefit assessment method that considered to what extent various socioeconomic groups were receiving value from existing and funded transportation investments. SCAG compared the total share of transportation funding borne by low-income households against other income groups. In this analysis, SCAG reported expenditure distribution in several ways. First, SCAG estimated the share of total RTP/SCS expenditures allocated to each category of household income. This was done by totaling expenditures on each type of mode (bus, HOV lanes, commuter/high-speed rail, highways/arterials, and light/heavy rail). These expenditures were then allocated to income categories based on each income group's use-share of these modes.

The results in the 2012–2035 RTP/SCS revealed that approximately 25 percent of Plan investments will be allocated to the lowest quintile group (compared with the group system usage of just under 17 percent), while 19 percent will be invested for the highest income category (Quintile 5), with total transportation system usage of almost 25 percent. In other words, transportation investments would go to modes likeliest to be used by lower-income households.

The current analysis for the 2012–2035 RTP/SCS further reveals that Plan investments will be distributed equitably on the basis of system usage by ethnic/racial groups. The full analysis is available in the Environmental Justice Appendix.

Performance Measure 4: Impacts of Proposed VMT Fees

This is a new analysis area based on the finance strategy in the 2012–2035 RTP/SCS, which recommends a vehicle mile traveled (VMT)–based user fee. This VMT user fee would be implemented to replace the gasoline tax and is estimated to cost about $0.05 (in 2011 dollars) per mile and indexed to maintain purchasing power starting in 2025. The implementation of this strategy requires actions of both the State Legislature and Congress.

This section discusses the land use impact from the "VMT fee" scenario. This is a cursory analysis using SCAG's PECAS land use model. To parameterize the VMT fee scenario for a model run, the following assumptions were applied:

- Current gasoline tax, $0.364 per gallon, would gradually increase until 2025 to $0.50 per gallon.
- After then, a $0.05 per mile of VMT fee would replace the gasoline tax at year 2026.
- Relative to the Production, Exchange, and Consumption Allocation System (PECAS) model's base year, 2007, the travel cost would be 10 percent higher at year 2025 than in 2007. Between 2008 and 2024, this cost increase is linear. At year 2026, the travel cost would be 20 percent higher than in 2007 and thereafter stabilized.

In general, the results suggest that with higher travel costs region-wide as reflected in the VMT-based user fees, people and households will tend to move to nearby local centers where accessibility to job opportunities is plentiful, so as to offset the impacts from an increase in travel costs. On the other hand, employers will relocate to key locations to better align themselves with the newly emerging concentration of workers and households.

Performance Measure 5: Distribution of Travel Time and Travel Distance Savings

SCAG assessed both the distribution of travel time and distance savings that are expected to result from the implementation of the 2012–2035 RTP/SCS by analyzing demographic data and the associated mode usage statistics for each Transportation Analysis Zone (TAZ) in the region. With this input, an estimate for the time savings for each income and ethnic group can be identified for trips involving transit (i.e., local bus and all transit) and automobiles.

The analysis resulted in the following observations:

- Share of travel times savings by income groups are generally consistent with the mode usage for each income group. Higher-income quintile groups captured more savings in person-hours traveled proportionally to their relative higher usage of auto mode. On the other hand, lower-income groups received more benefits from transit-related time savings for their higher usage in the transit mode.
- Similarly, person-mile travel changes are also in line with usage by income groups in terms of auto mode.
- The outcomes for share of travel time savings and person-mile benefits by ethnic groups are also very balanced and in line with each ethnic group's use of the transportation system.
- In terms of relative improvements by income/ethnicity group, lower-income quintile groups received greater improvements in person-mile travel reductions and local bus travel time savings than higher-income groups and about the same level of improvement in person-hour savings as higher-income households. Alternatively, higher-income households enjoyed a moderately better improvement in all transit mode time savings.
- The improvements in mobility and person-mile travel benefits are fairly similar and close for all ethnic groups.

Performance Measure 6: Jobs-Housing Imbalance or Job Housing Mismatch

In the practice of urban and transportation planning, the subject of job-housing imbalance and job-housing mismatch is considered a key contributor to traffic congestion and, some argue, an impediment to Environmental Justice. Among the arguments:

- Workers are priced out of the job rich areas, which makes long-distance travel and congestion inevitable for many
- Coastal counties have not built enough housing, forcing workers to move to inland counties where housing is affordable. This results in long distance commuting and traffic congestion

While this analysis is not expecting to allay all concerns of the jobs-housing imbalance and/or jobs-housing mismatch, the statistics are provided to investigate socioeconomic profiles of long-distance commuters—defined here as "intercounty commuters—such that stakeholders and policymakers can better understand the demographic composition of long-distance commuters.

From an economic point of view, transportation and driving are expensive; workers without a car or people with less income who cannot afford a vehicle have to either live close to their jobs where they can have access to transit or can walk or bike. Moreover, since long-distance commuting is expensive, people do not partake in it unless subsidies exist to own a dependable vehicle, access is available to relatively fast and cheap transit, or they have a good-paying job.

The statistics indicate that, almost without exception, all intercounty commuters command much higher wages than those commuters who work and live in the same county. Those commuters also command wages higher than workers who work and reside in their destination work counties. From an Environmental Justice perspective, this research does not provide definitive results. Rather, it raises additional questions that could be investigated to better understand how jobs, workers, housing, and associated income distribution could impact travel patterns of low income and minority populations.

Performance Measure 7: Accessibility to Employment and Services

Accessibility is a foundation for social and economic interactions. As an indicator, accessibility is measured by the spatial distribution of potential destinations; the ease of reaching each destination; and the magnitude, quality and character of the activities at the destination sites. Travel costs are central: The lower the costs of travel, in terms of time and money, the more places that can be reached within a certain budget and thus, the greater the accessibility. Destination choice is equally crucial: The more destinations and the more varied the destinations, the higher the level of accessibility.

Job and shopping accessibility calculations are presented in the Environmental Justice Appendix. Summary highlights from the analysis include the following:

- The elderly population showed only above average accessibility to job opportunity by auto; all other measures come out slightly below average for both job and shopping accessibility. As mentioned earlier, staff plan to research and further study residential location and land uses in the surrounding areas for this population group, in particular because the region is facing an aging population in the next 20–25 years.
- In general, lower-income quintile households and populations below poverty all showed higher job and shopping accessibility in Base Year 2008 under every transportation mode.
- As in the case of distance-based accessibility, non-Hispanic Native Americans and non-Hispanic other, similar to non-Hispanic White, are below average in both job and shopping accessibility.
- Nonetheless, through the implementation of recommended strategies in the 2012–2035 RTP/SCS, the elderly, non-Hispanic Native Americans, and non-Hispanic others will experience greater improvements than the average population in both employment and shopping opportunities.

Performance Measure 8: Accessibility to Parks

Similar to the method in measuring job accessibility, park accessibility is defined as the percentage of park acreage reachable within 45-minute travel time via 1) automobile; 2) local bus; and 3) all transit options. SCAG's existing typical weekday model was utilized for the analysis, as there is currently no weekend transportation model for the region.

The results of this park accessibility analysis by auto, local bus, and all transit modes for 45 minutes of travel are presented in the Environmental Justice Appendix. General conclusions from the table and figures include:

- Park accessibility statistics indicate that park accessibility by transit is much lower than that by automobile for all groups. This is true for all parks—national, state, or local parks. By transit, there is almost no access to national parks, and very limited access to state parks in all scenarios—Base Year 2008, Baseline, or under the Plan. This observation is consistent with the conclusions of the 2008 RTP Environmental Justice Report that there is a near complete lack of public transportation services into, in particular, the national forests.
- Income quintiles 4 and 5 will have moderately higher access to either state and/or local parks in the region via automobile. Population groups showing marginally lower accessibility to national parks by auto include non-Hispanic Black, income Quintile 1 and 5, and population below poverty. As to state park accessibility by auto, all population groups show slightly lower than average accessibility except for non-Hispanic White and the two higher-income quintile households. More Environmental Justice population groups, including Hispanics, non-Hispanic Asians, income Quintile 2, and the disabled population, show higher than average accessibility to local parks than the average population in the region.
- In addition to the elderly, non-Hispanic Native Americans, and non-Hispanic other, further analysis should also focus on non-Hispanic Blacks where their park accessibility by auto is below the average for all parks. However, the 2012–2035 RTP/SCS provides improvements for these population groups at a greater rate than the rest of the region's population groups.

Performance Measure 9: Gentrification and Displacement

The integration of transportation and land use has been recognized for its ability to reduce vehicle miles traveled, air pollution, and greenhouse gases, while increasing opportunities for physical activity. However, there are concerns associated with transit-oriented development (TOD). Specifically, there has been criticism of smart growth in relation to affordability. Some opponents have suggested that concentrating growth in cities and towns to avoid sprawl can lead to higher household costs, an effect completely opposite of what was intended. In some cases where transit service has spurred significant new TOD, the result can be that people with average incomes are unable to afford to buy homes in or near the new developments. This highlights the need for strategies that, at a minimum, set aside some portion of new development and surrounding households as affordable housing adjacent to transit and in surrounding households.[11]

In response to these concerns, SCAG developed a methodology to model and monitor the demographic trends in and around transit-oriented communities. With this methodology, SCAG has the ability to track demographic changes over time in those areas designated as key growth areas. The results will help SCAG and our partners better understand what demographic shifts occurred from the development of TOD along urban and commuter rail lines. It will also serve as Baseline data for comparison in future RTP cycles. More information on this methodology can be found in the Environmental Justice Appendix. Resources to address gentrification and displacement are provided for informational purposes only. Local agencies may consider them at their discretion.

Performance Measure 10: Environmental Impact Analyses (Air, Health, Noise)

HISTORICAL AIR QUALITY AND HEALTH IMPACTS

Emissions Impact on Environmental Justice Populations at the Regional Level

Exposure to air pollutants is an Environmental Justice issue due to the disproportionate share of minority and low-income populations living in close proximity to heavily traveled corridors, particularly near port and logistics activity. This exposure to unhealthy air results in 5,000 premature deaths and 140,000 children with asthma and respiratory symptoms. More than half of Americans exposed to $PM_{2.5}$ pollution exceeding the national standard reside in the SCAG region.[12]

[11] Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

[12] California Air Resources Board, South Coast Air Quality Management District, and Southern California Association of Governments. Powering the Future. August 2011.

New to the Title VI and Environmental Justice analysis for the 2012–2035 RTP/SCS, SCAG has mapped data for existing exposure to ozone, concentration of particulate matter emissions, cancer risks, and respiratory hazard risks. In order to assess the historical impacts of emissions on various demographic groups throughout the region, emissions information was summarized to the Environmental Justice communities. Further, additional analysis has been included in the final Environmental Justice Appendix that documents the health and emissions data for children age 5 or under. The analysis compares the performance of the Plan scenario with the Baseline scenario for children age 5 or under within 500 feet of freeways and highly traveled corridors and in areas affected by roadway noise, aviation noise, and near rail lines. It also includes historical air quality and health factors for areas that have a concentration of young children that is higher than the region at large. These findings are available in the Environmental Justice Appendix.

ENVIRONMENTAL IMPACTS ALONG FREEWAYS AND HIGHLY TRAVELED CORRIDORS

The concentration of air pollutants along heavily traveled corridors, particularly PM_{10} and $PM_{2.5}$, is a major concern in Southern California. SCAG identified major corridors defined as urban roads with 100,000 average daily trips and rural roads with 50,000 daily trips. Next, SCAG overlaid the income and racial and ethnic composition of those households within 500 feet of the corridor. This analysis allows SCAG to better understand the impacted populations and allow for greater outreach to those communities of concern. After the release of the Draft RTP/SCS, SCAG also prepared additional analysis to highlight the emissions exposure in buffer areas within 500 feet of freeways and high volume roads, and also added analysis of the areas within 1000 feet.

The analysis illustrated the distribution of Environmental Justice communities residing within 500 feet of a heavily traveled corridor. Low-income groups comprise 7 percent of the population living within 500 feet of a heavily traveled corridor, while 7.1 percent of minorities reside in these areas. This is higher than the regional level, which shows that 5.7 percent of the region's population lives within 500 feet of a heavily traveled corridor. These findings are available in the Environmental Justice Appendix.

ENVIRONMENTAL IMPACTS OF PLAN AND BASELINE SCENARIOS

SCAG's air pollutant emissions analysis was based on emission estimates for pollutants that have localized health effects: carbon monoxide (CO) and particulate matter (PM).

An analysis was also conducted for PM exhaust emissions from heavy-duty vehicles: an indicator for diesel toxic air contaminants. The results were calculated based on the estimated emissions at the TAZ level.

It is important to note that total emissions of all pollutants in the region will decrease compared to existing conditions with or without the Plan, due to the combination of measures being taken to meet air quality standards. Since the Plan must demonstrate conformity with regional air quality management plans that call for reductions in emissions of air pollutants, the Plan itself will likewise result in reductions of pollutant emissions. This is generally because the Plan investments will alleviate roadway congestion and provide a greater range of transportation alternatives. The analysis in the Appendix, however, is based on a comparison of Plan to Baseline conditions, rather than a comparison of Plan to current conditions.

Data and analysis included in the Environmental Justice Appendix does not account for Plan improvements in vehicle technology particularly for truck only corridors. These corridors in the Plan are exclusively for zero and/or near-zero emission vehicles. Furthermore, the Program Environmental Impact Report (PEIR) accompanying the 2012-2035 RTP/SCS includes mitigation measures that would reduce impacts associated with health risk within 500 feet of freeways and high-traffic volume roadways to less than significant. Analysis included in the Environmental Justice Appendix also does not account for emissions improvements through the implementation of these mitigation measures. As such, emissions and exposure analysis shown in the Appendix is abundantly conservative and demonstrates worst-case scenario outcomes. If these emissions improvements had been accounted for, we believe the analysis would show little or no areas with worsened emissions (“hot spots”) associated with the Plan. Moreover, the currently available data on emissions and on the distribution of households and population is imprecise such that the overlay with emissions and Environmental Justice populations will tend to overstate any potential impacts. Nevertheless, given on-going concerns and evolving information on health impacts, SCAG encourages project sponsors to be cognizant of any potential health risks in project design and delivery. Consistent with the mitigation identified and to be implemented as part of the proposed final PEIR, SCAG will assist in disseminating information and identifying effective strategies to reduce risk at the project level.

NOISE IMPACTS

Roadway Noise

The SCAG region has an extensive roadway system with nearly 21,000 centerline miles and 65,000 lane miles. It includes one of the country’s most extensive high-occupancy vehicle lane systems and a growing network of toll lanes, as well as high-occupancy toll (HOT) lanes. The region also has a vast network of arterials and other minor roadways. Roadway facilities noise may cause significant environmental concerns.

Noise associated with highway traffic depends on a number of factors that include traffic volumes, vehicle speed, vehicle fleet mix (cars, trucks), as well as the location of the highway with respect to sensitive receptors (i.e., schools, daycare facilities, parks, etc.). According to Federal Highway Administration (FHWA) guidance, noise impacts occur when noise levels increase substantially when compared to existing noise levels. For the purposes of this analysis (consistent with FHWA guidance), noise increases of 3 dB along highways where noise levels are currently, or would be in the future, above 66 dB are considered to be significant, regardless of adjacent land use.

Highways that would be expected to have an increase of 3 dB or more include those where any of the following would occur: (1) the total traffic volumes increase by 100 percent compared to existing conditions; (2) the medium/heavy truck traffic volumes increase by 130 percent compared to existing conditions; or (3) the medium/heavy truck traffic volumes increase by 100 percent and there is an increase in other traffic volumes by 50 percent. These highway segments were identified using the results of SCAG’s regional transportation model.

On some highways, there is no potential for noise levels to reach 66 dB. To eliminate these from the analysis, the following criteria were applied: (1) arterials where the FHWA’s Traffic Noise Model (TNM) indicated that the motor vehicle volume (and the percentage of medium/heavy trucks) would result in traffic noise levels less than 66 dB; (2) arterials where the calculated motor vehicle speed was less than 17 mph; or (3) freeways where the average volume-to-capacity ratio was equal to or greater than 1.0, which would result in vehicle speeds of less than 30 mph. If a highway met any one of these criteria, it was eliminated from further consideration.

For each highway segment where a significant increase in noise would occur, a 150-foot impact zone was determined on either side (see the Environmental Justice Appendix for roadway segments selected from the 2012–2035 RTP/SCS). Using GIS, the percentage of each affected TAZ's land area that fell within this zone was identified, and this percentage was applied to the demographic data forecast for this TAZ. This methodology was utilized in both the 2008 and 2004 RTP.

The results show that minority populations were primarily affected by highway noise impacts. As indicated by the distribution of households in highway noise areas by ethnic/racial category, minority populations, specifically Hispanics, would be disproportionately impacted by highway noise. Approximately 60 percent of Hispanics would be residing in highway noise areas by 2035. This is a 1 percent increase from the results of the 2008 RTP Environmental Justice analysis.

SCAG further investigated the impacts on areas and the number of people affected by improvement of roadway noise from the proposed 2012–2035 RTP/SCS as it compared with the 2035 Baseline conditions. As illustrated in the roadway segment maps where noise impacts are identified for both Baseline and for the proposed Plan, areas or number of segments under the proposed Plan are much smaller/fewer than those under the Baseline condition. Thus, it is projected that there will be 183,000 fewer people (13.9 percent reduction) and 63,000 fewer households (15.3 percent reduction) affected by roadway noise than those under the Baseline condition (1,321,600 people/426,700 households).

While the proposed 2012–2035 RTP/SCS improves the roadway noise conditions by reducing the areas, roadway segments, and the number of people affected by roadway noise, the benefits are not proportionally shared by each Environmental Justice category as observed in the roadway noise impacted areas or in the region as whole. SCAG's analysis found that the roadway noise reductions will disproportionately benefit non-Hispanic Whites and the two highest-income quintile groups. Several other Environmental Justice communities also receive greater benefits from roadway noise improvements, including non-Hispanic Asian, non-Hispanic other, elderly, and the disabled.

Aviation Noise

The SCAG region supports the nation's largest regional airport system in terms of number of airports and aircraft operations, operating in a very complex airspace environment. The system has six established air carrier airports including Los Angeles International (LAX), Bob Hope (formerly Burbank), John Wayne, Long Beach, Ontario, and Palm Springs. There are also four emerging air carrier airports in the Inland Empire and North Los Angeles County. These include San Bernardino International Airport (formerly Norton AFB), March Inland Port (joint use with March Air Reserve Base), Southern California Logistics Airport (formerly George AFB), and Palmdale Airport (joint use with Air Force Plant 42). The regional system also includes 45 general aviation airports and two commuter airports, for a total of 57 public use airports. Although the projected demand for airport capacity has decreased compared to the 2008 RTP, there is still moderate growth for the future. The challenge is striking a balance between the aviation capacity needs of Southern California with the local quality of life for the affected populations.

Projected noise impacts from aircraft operations at the region's airports in 2035 were modeled for inclusion in the Programmatic Environmental Impact Report for the RTP/SCS. For each airport, modeling produced a contour, or isoline, for the 65 dB Community Noise Equivalent Level (CNEL), a measure of noise that takes into account both the number and the timing of flights, as well as the mix of aircraft types. The Federal Aviation Administration (FAA) considers residences to be an "incompatible land use" with noise at or above 65 dB. To identify potentially impacted populations, the anticipated population within the 65 dB CNEL contour was calculated using the following steps:

1. Calculate the percentage of TAZs that would lie within a 65 dB CNEL contour.
2. Assign the SCAG projected population to the TAZ.
3. Apply the demographic breakdown of the TAZ as a whole to the population within the 65 dB CNEL contour.

It should be noted that after 9-11 and the Great Recession experienced since 2008, the global aviation industry remains in a depressed state. SCAG region air passenger demand and cargo forecasts have been revised downward repeatedly in 2004 RTP and 2008 RTP from the aviation scenario and forecasts adopted in the 2001 RTP. Currently for the 2012–2035 RTP/SCS, projections of aviation demand and air cargo remained significantly less than those projected and adopted in the 2001 RTP. Thus the downward revisions in projected demand at airports resulted in the reduction of airport noise areas and the corresponding communities that will be studied.

For the purposes of this study, aviation noise areas are defined as areas that are adversely affected by aircraft and airport noise. As part of the Environmental Justice analysis, special attention will be paid to income, disability, age, and race/ethnicity of affected populations.

The analysis indicates that the 2012–2035 RTP/SCS results in a disproportionate aviation noise impact to low-income and minority populations. Under the 2012–2035 RTP, the lowest-income group (Quintile 1) will represent 27 percent of the households impacted by noise above the 65 dB CNEL, while the highest-income group (Quintile 5) will represent only 13 percent of the households impacted by noise above the 65 dB CNEL.

Similarly, a disproportionate number of households below the poverty threshold will be affected by airport noise levels above the 65 dB CNEL. While 14 percent of the SCAG region households are projected to be living below the poverty level, 19 percent of those that live within the noise contour areas will be below the poverty line.

In terms of race/ethnicity, the aviation plan of the 2012–2035 RTP/SCS is projected to have a disproportionate aviation noise impact on minority groups, who make up 89 percent of population within the noise contours, compared with a regional average of 76 percent of minority population in 2035. Specifically, Hispanic and African-American populations are disproportionately affected. These two groups will make up 55 percent and 6 percent of the regional population in 2035, respectively, but represent 62 percent and 21 percent of those that will live within the impacted noise contour area. Consistent with mitigation identified in the proposed Final PEIR, SCAG will assist in disseminating information and identifying effective strategies to reduce impacts at the project level. Potential mitigation measures for noise impacts are included for reference in the Environmental Justice Mitigation Toolbox.

Performance Measure 11: Rail-Related Impacts

As described in the Goods Movement Technical Appendix (p 32), freight rail emissions are 5 percent and 4 percent of regional goods movement related NOx and PM emissions, respectively. When compared to all regional PM and NOx sources, the contribution of freight rail emissions is even lower. However, environmental pollution from locomotives, rail yards and other rail facilities must be considered as concentrations of rail activities can cause localized rail pollution. In response to input from our federal partners, SCAG developed a summary analysis to address potential environmental justice impacts in areas adjacent to railroads and rail facilities, although further discussion and analysis is recommended. This section includes an analysis of Environmental Justice communities adjacent to railroads and rail facilities, rail impacts to sensitive receptors, and a summary examination of potential environmental justice concerns that are alleviated by grade separation projects. The train traffic index and related analysis provided in the Environmental Justice Appendix includes data from both passenger and freight rail traffic.

ADDITIONAL SCAG STRATEGIES: ENVIRONMENTAL JUSTICE MITIGATION TOOLBOX

New to the 2012–2035 RTP/SCS, SCAG has developed a toolbox of potential mitigation measures to address potential impacts to Environmental Justice communities. The toolbox presents optional mitigation recommendations that may be effective in addressing project-specific Environmental Justice impacts after a comprehensive review of impacts and consultation with all stakeholders. These measures were identified through a review of the literature, the PEIR, and recent planning activities.[13] Measures incorporating or referring to compliance with existing regulations are for informational purposes only and do not supersede existing regulations.

Potential Mitigation for Noise Impacts

Project sponsors may voluntarily, to the extent feasible and applicable, and where their jurisdictional authority permits:

- As part of the appropriate environmental review of each project, conduct a project-specific noise evaluation and identify and implement applicable mitigation.
- Employ land use planning measures, such as zoning, restrictions on development, site design, and use of buffers, to ensure that future development is compatible with adjacent transportation facilities.

[13] The EJ Mitigation Toolbox draws from, among other sources, mitigation measures included in the Draft 2012–2035 RTP/SCS Program Environmental Impact Report (PEIR), particularly for air quality and noise impacts. As captured here, Environmental Justice mitigation is geared toward reducing impacts for Environmental Justice communities as defined in this appendix, whereas PEIR measures are more broadly geared to sensitive receptors as defined in the PEIR. Mitigation activities cited here (e.g., performing corridor-specific analysis) are consistent between this toolbox and the Final PEIR Appendix G.

- Maximize the distance between noise-sensitive land uses and new roadway lanes, roadways, rail lines, transit centers, park-and-ride lots, and other new noise-generating facilities.
- Construct sound-reducing barriers, where feasible and applicable, between noise sources and noise-sensitive land uses. Sound barriers can be in the form of earth berms or soundwalls. Constructing roadways as appropriate and feasible so that they are depressed below-grade of the existing sensitive land uses also creates an effective barrier between the roadway and sensitive receptors.
- Maximize distance of new route alignments from Environmental Justice communities.

Potential Mitigation for Air Quality Impacts along Heavily Traveled Corridors

Local air districts, local jurisdictions, and project sponsors may voluntarily implement measures adopted by ARB designed to attain federal air quality standards for $PM_{2.5}$ and eight-hour ozone. ARB's strategy includes the following elements:

- Set technology forcing new engine standards;
- Require clean fuels and reduce petroleum dependency;
- Work with US EPA to reduce emissions from federal and state sources;
- Pursue near-term advanced technology demonstration and deployment such as:
  - Zero- or near zero emissions heavy-duty trucks (2013 and beyond)[14]
  - Tier 4 marine engine repowers and replacements (2014 and beyond)
  - Tier 4 and zero-emissions railyard equipment (2015 and beyond)[15]
- Pursue long-term advanced technology measures;
- In addition, consider proposed new transportation-related SIP measures include:
  - Improvements and Enhancements to California's Smog Check Program
  - Expanded Passenger Vehicle Retirement
  - Modifications to Reformulated Gasoline Program
  - Cleaner In-Use Heavy-Duty Trucks
  - Ship Auxiliary Engine Cold Ironing and Other Clean Technology
  - Cleaner Ship Main Engines and Fuel
  - Port Truck Modernization
  - Clean Up Existing Commercial Harbor Craft
- Conduct corridor-level analysis for proposed projects in areas where air quality impacts may be concentrated among Environmental Justice communities
- Project sponsors should consider identifying the Environmental Justice impacts of each project. In consultation with the affected community, mitigation measures can be identified to best address the project's impacts.
- Participate in statewide and regional discussions seeking to balance multiple policy objectives affecting air quality and the siting of transit-oriented development.

Potential Mitigation for Rail-Related Impacts

- Construct sound-reducing barriers, where feasible and applicable, between noise sources and noise-sensitive land use

Potential Mitigation for Road Pricing Mechanisms

- Transit, vanpools, or other options as alternatives in locations not served by transit
- Upper limits on road pricing
- Exemptions or discounts for persons who are disadvantaged people such as those whose earnings are below a certain income level and people with disabilities
- Limits on the number of priced crossings in a period for cordon charges
- Allowances for unlimited use of priced facilities in certain periods, typically off-peak hours and holidays[16]
- Develop detailed program design including billing and collection technology, rate structure, enforcement, spillover guards, revenues and gas tax replacement strategy, and mitigation for perceived geographic inequity before communicating with public[17]

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14 Please see Chapter 2, Transportation Investments for more information regarding a heavy-duty truck demonstration project in partnership with SCAQMD.

15 For more information, see http://www.dieselnet.com/standards/us/marine.php and http://www.dieselnet.com/standards/us/loco.php.

16 Department of Transportation, Federal Highway Administration. Environmental Justice Emerging Trends and Best Practices Guidebook, Document Number: FHWA-HEP-11-024. August 2011.

17 National Cooperative Highway Research Program Report 686. Road Pricing: Public Perceptions and Program Development (2011).

- Develop an explicit benefit plan for increased revenues dovetailing with goals and mitigation concerns (e.g., enhanced transit, spillover protections, better enforcement)[18]
- Include Environmental Justice mitigation actions as part of the NEPA review[19]

Potential Mitigation for Environmental Justice Impacts

- Fund proactive measures to improve air quality in neighboring homes, schools, and other sensitive receptors
- Provide public education programs about environmental health impacts to better enable residents to make informed decisions about their health and community
- Engage in proactive measures to train and hire local residents for construction or operation of the project to improve their economic status and access to health care

Potential Resources Related to Gentrification and Displacement

Trends observed in areas with transit oriented developments (TODs) are inconclusive. However, the following resources are provided for informational purposes only. Local agencies may consider them at their discretion.

- California Department of Housing and Community Development, Inclusionary Housing Publications[20]
- PolicyLink, Equitable Development Toolkit[21]
- National Association of Realtors, Field Guide to Inclusionary Zoning[22]
- The Partnership for Working Families, Community Benefits Agreements[23]
- Los Angeles Alliance for a New Economy, LAX Community Benefit Agreement[24]

SB 375 Greenhouse Gas Emission Targets

California's Sustainable Communities and Climate Protection Act, or SB 375, requires SCAG to develop a Sustainable Communities Strategy to reduce per capita GHG emissions through integrated transportation, land use, housing and environmental planning. Pursuant to SB375, ARB set per capita GHG emission reduction targets from passenger vehicles for each of the state's 18 MPOs. For the SCAG region, the targets are set at eight percent below 2005 per capita emissions levels by 2020 and 13 percent below 2005 per capita emissions levels by 2035. The 2012–2035 RTP/SCS achieves per capita GHG emission reductions relative to 2005 of nine percent in 2020 and 16 percent in 2035.

Transportation Conformity

Transportation conformity is required under CAA section 176(c) to ensure that federally supported highway and transit project activities "conform to" the purpose of the SIP. Conformity currently applies to areas that are designated non-attainment, and those re-designated to attainment after 1990, maintenance areas, with plans developed for the specific transportation related criteria pollutants. Conformity for the purpose of the SIP means that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. The conformity tests and analyses are: regional emissions analysis, timely implementation of Transportation Control Measures, financial constraint analysis, and public involvement (see Transportation Conformity appendix for details). The Regional Council makes the conformity determination finding as part of the approval of the 2012–2035 RTP/SCS.

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18 Ibid.
19 Ibid.
20 Please see http://www.hcd.ca.gov/hpd/inclusionary.pdf
21 Please see http://www.policylink.org/site/c.lkIXLbMNJrE/b.5136575/k.39A1/Equitable_Development_Toolkit.htm
22 Please see http://www.realtor.org/library/library/fg806
23 Please see http://www.communitybenefits.org/section.php?id=155
24 Please see http://www.communitybenefits.org/section.php?id=155

06 PUBLIC PARTICIPATION

Introduction

SCAG values public participation in the development of its RTP/SCS. Public involvement is essential to ensure that stakeholders gain a clear understanding of SCAG, its role as a metropolitan planning organization (MPO), critical elements of the RTP/SCS, and its development process. Furthermore, public involvement helps SCAG policymakers and staff better understand the needs and concerns of stakeholders, leading to more meaningful planning efforts and activities.

In compliance with federal and state requirements and to guide effective public involvement, SCAG utilizes its Public Participation Plan. The Public Participation Plan provides the direction for public participation activities, outlining the processes and strategies SCAG uses to reach out to a broad range of stakeholders and gain their input. SCAG's Public Participation Plan was most recently amended to incorporate requirements of SB 375 for a Sustainable Communities Strategy and make appropriate revisions with respect to the 2012–2035 RTP/SCS. SCAG's Regional Council adopted Amendment No. 3 of the Public Participation Plan in January 2012. The full Public Participation Plan is included in the Public Participation and Consultation Appendix.

Activities

The 2012–2035 RTP/SCS was developed in consultation with interested parties from the private and public sectors, academia, and other stakeholders, including those listed in **TABLE 6.1**. SCAG values public participation in the development of its regional plans and programs and aims to ensure that the various stakeholders have a reasonable opportunity to comment on the contents of the RTP/SCS.

To ensure compliance with federal and state requirements, SCAG implements a public involvement process to provide information, timely public notice and full public access to key decisions, and to support early and continuing public involvement in developing its regional plans. Since its inception, SCAG has engaged in a public involvement process in developing its regional transportation plans and programs. As a result of changes in SAFETEA-LU in 2005, SCAG has broadened its current participation activities to engage a more extensive group of stakeholders in its planning and programming processes, as reflected in SCAG's current Public Participation Plan first adopted by the Regional Council in March 2007. In subsequent amendments, SCAG has continued to consult with a range of interested parties to refine the agency's public participation strategies, procedures, and techniques and solicit comments from a diverse number of stakeholders through mailings, email correspondence, workshops, presentations, meetings, telephone communications, and website postings.

TABLE 6.1 Participatory Non-Governmental Groups

Participatory Non-Governmental Groups
Bicycle users and advocates
Citizens
Educational institutions
Environmental groups
Ethnic and minority groups
Freight shippers
Freight transportation service providers
Non-profit organizations
Older and retired persons
Pedestrians
Private sector
Private transportation providers
Public transit users
Representatives of the disabled
Special-interest non-profit agencies
Transportation advocates
Urban and rural advocacy groups
Women's organizations

By using the Public Participation Plan, SCAG has continued to enhance the techniques and strategies for RTP/SCS outreach, including:

- Developing presentation materials for public outreach in a variety of formats to reach broad audiences, including interactive PowerPoint presentations, fact sheets, surveys, brochures, and maps,
- Enhancing website capabilities that allow SCAG to post all RTP/SCS-related information on its website to ensure that it is accessible and transparent to the public (the website is compliant with the 1990 Americans with Disabilities Act),
- Coordinating outreach efforts with other stakeholder organizations to maximize outreach opportunities,
- Developing an outreach schedule that notifies individuals and groups throughout the region of activities where SCAG will be presenting the RTP/SCS and encouraging attendance,
- Supporting multiple committees and task forces involving SCAG partners, stakeholders, and interested groups to develop the key components of the Plan,
- Holding multiple public workshops before the release of the Draft RTP/SCS to allow direct participation by interested parties,
- Reaching out to traditionally underrepresented and/or underserved audiences,
- Considering comments received in the deliberations regarding proposed plans and programs, and
- Evaluating public participation activities to continually improve the outreach process.

In addition to these targeted outreach efforts, all regular and special meetings of the RTP/SCS task forces, the Transportation Committee (TC), the Community, Economic and Human Development Committee (CEHD), the Energy and Environment Committee (EEC); the Legislative/Communications and Membership Committee; the Executive Administration Committee; and the SCAG Regional Council are publicly noticed and opportunities for public comment are provided. Federally required interagency consultation is done through the monthly meetings of the Transportation Conformity Working Group (TCWG). Specific public comments on the Draft RTP/SCS are being recorded and considered by SCAG in the development of the 2012–2035 RTP/SCS.

Across the region, hundreds of Southern Californians from all walks of life helped shape the Draft 2012–2035 RTP/SCS. From January through March 2011, SCAG conducted eleven Subregional Planning Sessions to receive input on projected population, household, and employment growth in the respective areas. From these policies, plans, and data, four planning scenarios were developed and presented in a series of 18 public workshops held during the summer of 2011. These Sustainable Community Strategy workshops were held throughout the SCAG region, with over 700 individuals in attendance. (Please see **FIGURES 6.1** and **6.2** for a sample of questions and responses from these workshops.)

Residents, elected officials, representatives of public agencies, and community organizations, as well as environmental, housing, and business stakeholders truly made this a "bottom up" process.

Participants were provided with a description of the four scenarios and how development location, neighborhood design, housing options and mix, and transportation investments within each scenario would impact greenhouse gas emissions, land use, fuel consumption, water consumption, and other costs in the region.

Following the presentations, the groups engaged in discussions of objectives and priorities for the 2012–2035 RTP/SCS, including mobility, environment, health, modes of travel, economy, safety, equity, and housing. Attendees were also surveyed on current transportation habits and access to public transportation, as well as priorities for their community. Results from the workshops can be found in the Public Participation and Consultation Appendix.

New Issues, New Strategies

From comments relating to the 2008 RTP, SCAG staff identified Environmental Justice as a key concern for further follow-up, and a special focus group was convened in June 2011. Approximately 60 participants, including residents and representatives of local community organizations, attended the meeting and provided valuable feedback on a variety of issues, such as gentrification and health impacts near transportation corridors. A summary of this workshop is available in the Public Participation and Consultation Appendix.

As illustrated in Chapter 2, a greater emphasis has been given in the 2012–2035 RTP/SCS to active transportation solutions to help address public health issues and reduce greenhouse gas emissions. To better address these issues, SCAG used innovative public participation strategies to develop the active transportation portion of the 2012–2035 RTP/SCS. Much of the active transportation plan was developed online using a Wiki—a managed website that allows for collaborative creation and editing. As of November 2011, the Wiki had over 1,000 registered users who represent various bicycle advocacy groups, county transportation officials, and other stakeholders. In addition, the Bike/Ped Twitter account actively engages over 500 followers, providing them with updates on the RTP/SCS and other planning items in the region.

Recognizing Diversity

To help inform the region's stakeholders of opportunities for public input on the 2012–2035 RTP/SCS, SCAG posted announcements and videos on its website, blog sites, and its social networking pages (e.g., Facebook, Twitter); prepared fact sheets and other outreach materials in English, Spanish, and Chinese; placed ads and public service announcements in newspapers, government access cable television stations, and e-newsletters; and sent announcements to the media, including the ethnic press.

SCAG has strived to ensure that the Native American voice is heard during the development of the RTP/SCS. There are 16 federally recognized tribes within the SCAG region. Seven are represented on the Regional Council and Policy Committees and have voting power. In addition to presentations made by staff to individual tribes, SCAG conducted a workshop for the regional, state, and federal resource agencies and tribal governments in November 2011 and has targeted additional outreach after the release of the Draft 2012–2035 RTP/SCS.

Raising the Bar

The 2012–2035 RTP/SCS is a grand vision with many components. SCAG understands that access to relevant information is necessary for greater awareness and understanding among stakeholders. Therefore, SCAG has put great effort into developing visual tools and utilizing new technologies to enhance public engagement in the planning process.

SCAG's website is the organization's most important tool in disseminating information and is its primary interface with the public. In 2010, SCAG began exploring ways to provide better access to the RTP/SCS, which was projected to exceed 200 pages in printed form. Rather than have visitors download PDF files individually, SCAG developed plans for a new website that would allow visitors to navigate easily through the various chapters and view all the ancillary maps, tables, and data visualizations without leaving the page they were reading. This new interactive RTP/SCS website allows users to navigate to various sections and also allow for custom PDF downloads of specific pages and sections of interest.

The use of video has helped create greater awareness and visibility for the RTP/SCS. An introductory video was produced and screened at the RTP/SCS workshops in the summer of 2011, included in subsequent staff presentations, and also made available on the SCAG website. In clear and simple terms, the video explained the need for a regional transportation plan, the role of SCAG, and the purpose of the workshop. The result was a more dynamic presentation that helped participants visualize and better understand the Plan, as well as engage in a high level of interaction between staff and workshop participants.

SCAG took this approach a step further and released a new RTP/SCS video to coincide with the release of the 2012 Draft RTP/SCS in December of 2011 and the beginning of the public comment period. This new RTP/SCS video discusses SCAG's role, the contents of the 2012 Draft RTP/SCS, and the benefits of implementing the Plan. As a highlight, it features interviews with key stakeholders, residents of the SCAG region, and community leaders. SCAG showcased this video at presentations throughout the region as well as continue to make it accessible on the SCAG website.

Looking Ahead

To ensure that as many people as possible are able to participate in the regional planning process going forward, SCAG is committed to increasing public participation opportunities and creating greater access.

SCAG's videoconferencing facilities (located at five regional offices and three videoconferencing sites across the Southern California region) have enabled more people to participate in the public outreach than in previous RTP cycles. SCAG will continue to utilize this technology to conduct public workshops, meetings, and other forms of public outreach, as well as expand the number of videoconferencing sites.

SCAG's new interactive RTP/SCS website called iRTP resulted in improved public feedback. The website allows visitors to submit comments on specific sections of the Draft from almost any page of the site. In designing the website, SCAG followed the three most prominent sources and standards for website accessibility guidelines:

- The Web Accessibility Initiative (WAI) of the World Wide Web Consortium (W3C),
- Section 508 of the Rehabilitation Act of 1973, and
- Legal guidelines in conformance with the US Americans with Disabilities Act (ADA).

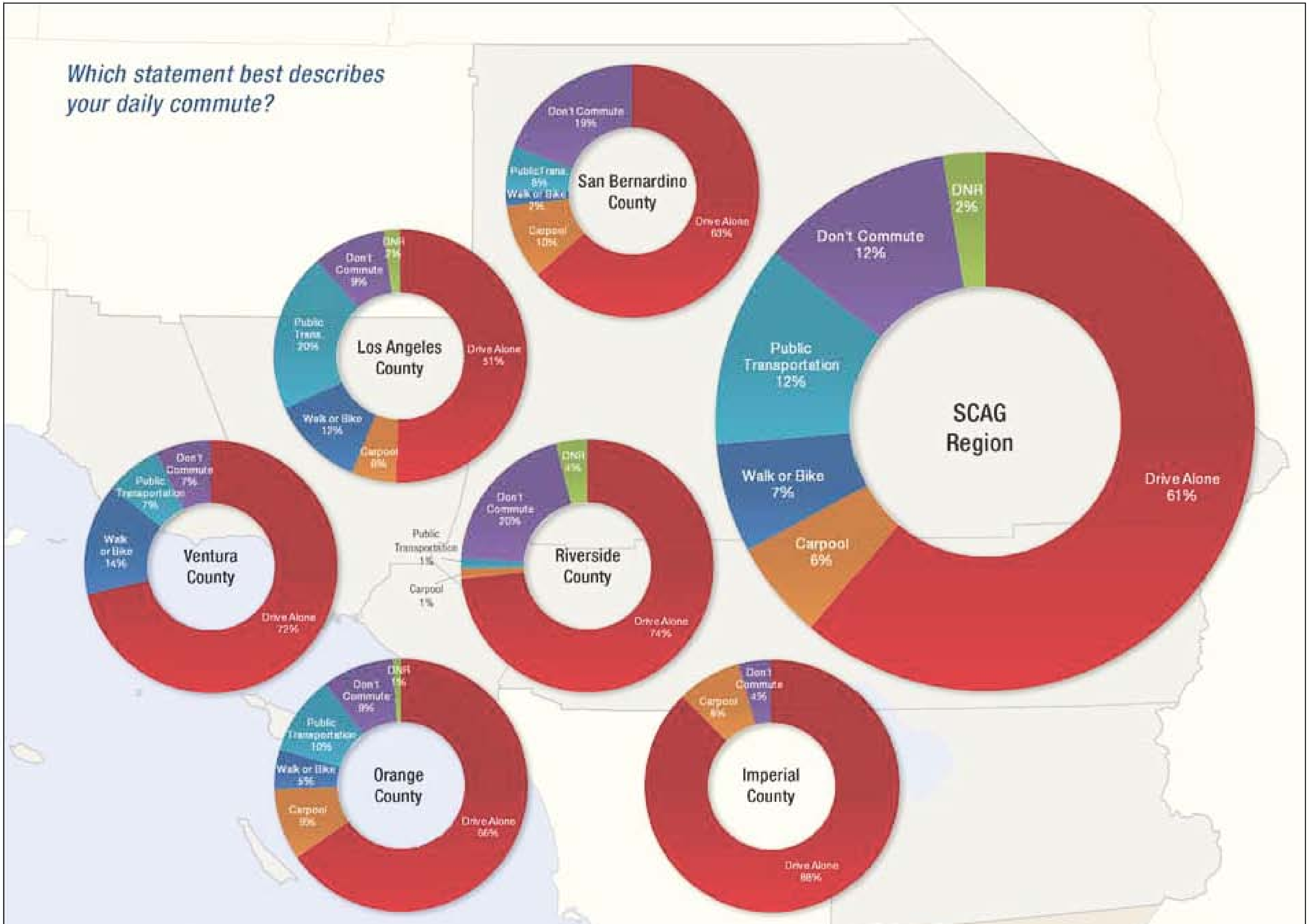
As part of its redesign of the main website, SCAG has ensured Americans with Disabilities Act compliance so that all Web content is accessible to all people regardless of disability.

Following the adoption of the RTP/SCS, the website will be updated to reflect any changes or amendments to the RTP/SCS, and continue to serve as an easy-to-navigate digital, searchable resource for the public.

While technology, including the utilization of social media, is important to public outreach, SCAG will continue to use traditional methods and techniques that have proven effective in ensuring wide participation. These include in-person, face-to-face engagement with residents, businesses, and community groups in urban and rural areas; representatives and advocacy groups for underrepresented and/or low-income communities; and direct work with ethnic media.

SCAG will conduct a survey to obtain feedback on the effectiveness of its outreach for continued improvement and enhancement of its outreach efforts. SCAG is committed to constantly evaluating its strategies and approaches to enhance public participation. As the nation's largest metropolitan planning organization, SCAG must address the broad range of interests, regional priorities, and needs of diverse populations within the Southern California region. Public engagement and participation have become an organization-wide value.

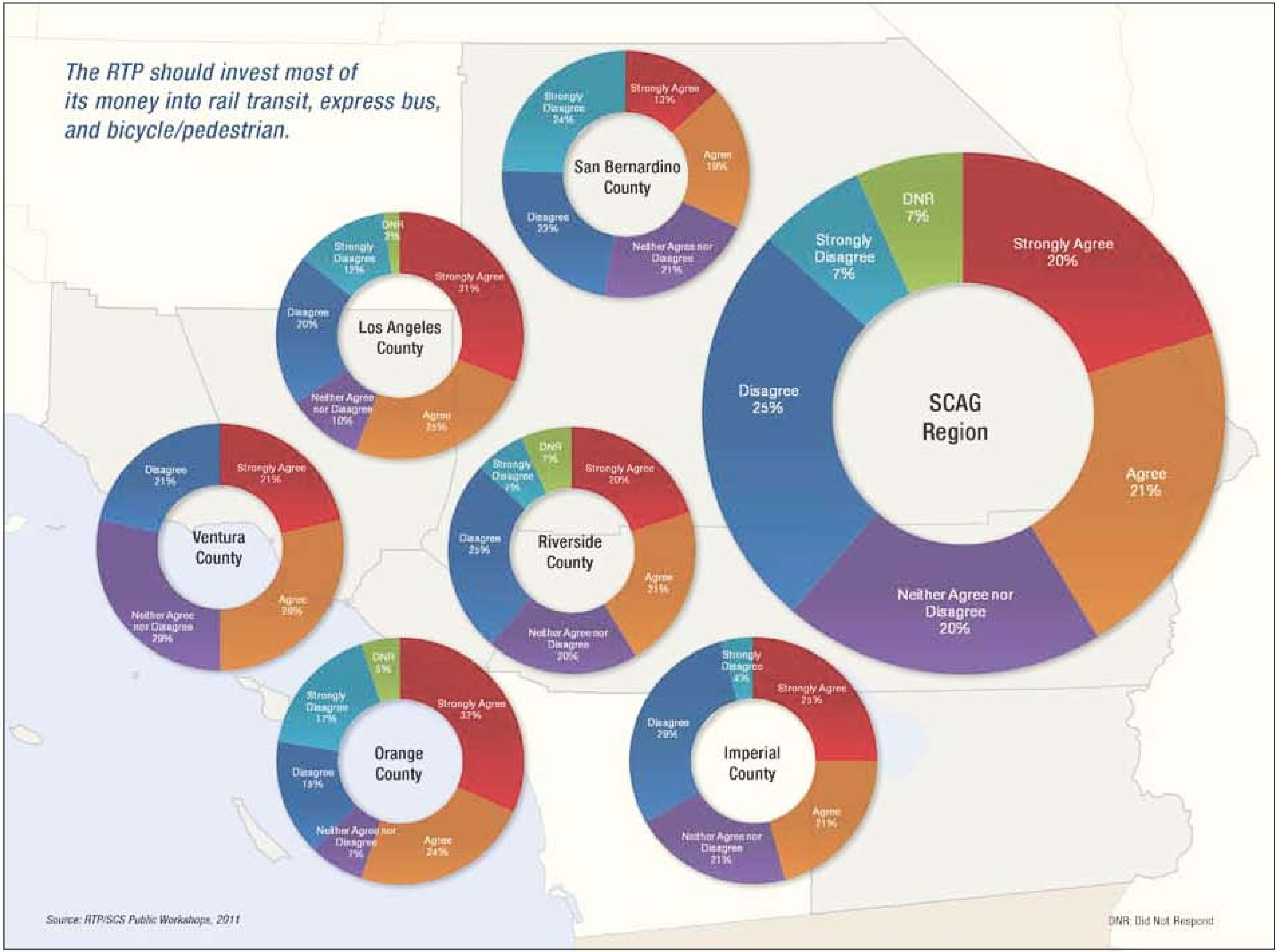
FIGURE 6.1 Sample of Question Used at RTP/SCS Public Workshops, Summer 2011



Source: RTP/SCS Public Workshops, 2011

DNR: Did Not Respond

FIGURE 6.2 Sample of Question Used at RTP/SCS Public Workshops, Summer 2011



07 STRATEGIC PLAN

Looking Ahead—Beyond the Horizon

The RTP/SCS strategies discussed in Chapter 2: Transportation Investments, represent the region's collective vision for addressing our transportation needs within the constraints of committed, available, or reasonably available revenue sources. Despite the substantial commitments of over $500 billion contained in the RTP/SCS and the associated benefits discussed in Chapter 5: Measuring Up, this level of investment does not meet the full needs identified through the RTP/SCS development process. If we truly want to address all the needs set forth in this RTP/SCS, we must look toward additional strategies and investments to get us there. Often this will entail controversial and difficult choices that will push the envelope and test the boundaries of what is politically acceptable. For now, these elements are contained in the Strategic Plan with the recognition that they merit further study and that, over time and with further consensus-building, these programs and policies may move forward into the constrained RTP/SCS.

The concept of a Strategic Plan was first incorporated into the 2008 RTP. It was envisioned that the 2012 and subsequent RTPs would draw from the projects contained in the Strategic Plan. This has, in fact, occurred. The 2012–2035 RTP/SCS investments discussed in Chapter 2 attest to the success of the 2008 Strategic Plan, since several of its projects and strategies have now moved to the constrained portion of the 2012–2035 RTP/SCS. These include:

- **Preservation Investments** – The 2008 Strategic Plan called for a higher level of investment to preserve the region's multimodal system. The 2012–2035 RTP/SCS includes $70 billion in additional preservation funding.
- **Operations Investments (TSM)** – The 2008 Strategic Plan recommended increasing funding to the cost-effective transportation system management strategies that increase the productivity of the existing system. The 2012–2035 RTP/SCS allocates $7.6 billion to TSM.
- **Dedicated Lanes for Clean-Technology Trucks on the East-West Corridor** – The 2008 Strategic Plan called for more detailed study of the different east-west corridors and recommending one for inclusion in the RTP/SCS. The 2012–2035 RTP/SCS includes the recommended East-West Freight Corridor and provides full funding for it.

- **Metrolink and LOSSAN Rail Improvements** – The 2008 Strategic Plan included unfunded improvements to the Metrolink and LOSSAN rail corridors. The 2012–2035 RTP/SCS fully funds these improvements, partially using newly available federal and state funds.
- **The Westside Purple Line Extension** – The 2008 Strategic Plan included the unfunded Purple Line Extension to Westwood. The 2012–2035 RTP/SCS now fully funds this extension, relying on the recently adopted Measure R in Los Angeles.

The 2008 Strategic Plan strongly influenced the 2012 Constrained Plan as originally intended. Moving forward, it is again envisioned that updates to the 2012–2035 RTP/SCS would draw from the projects contained in this Strategic Plan; exceptions would be handled on a case-by-case basis.

The remainder of this chapter provides a brief illustrative overview of the additional strategies and investments that the region would pursue if additional funding were to become available and after further consensus-building to solidify commitment around specific projects and policies.

Long-Term Emission-Reduction Strategies for Rail

Included in this strategic RTP/SCS is a recommendation to continue ongoing work with railroads, air quality management agencies, and other stakeholders to reach our goal of a zero-emissions rail system. Freight rail activity emits 5 percent and 4 percent of regional NOx and $PM_{2.5}$ goods movement-related emissions, respectively. Mitigation of rail emissions is currently underway with agreements to upgrade engines and reduce idling at certain railyards. More can be done to improve regional air quality, help meet federal requirements, and reduce health impacts for communities near rail activity. There are several options for a zero- and/or near-zero-emission rail system, including electrification, battery-hybrid systems, and fuel cells. Since 2008, SCAG has worked with representatives from major rail lines, the AQMD, and the ARB to carefully evaluate potential zero- and/or near-zero-emissions options for freight rail. In particular, three forms of electrification have been considered to date.

- **Electric Catenary Rail Systems** – These are perhaps the most technologically ready; however, construction of an electrified rail system in Southern California would be a major undertaking in terms of labor, timeline, and cost for the SCAG region and would require a large investment as well as cooperation and investment by the BNSF and UP railways.
- **Dual-Mode Locomotives** – These have been deployed for passenger rail applications, but would need development for freight applications. They have the ability to operate both on a catenary or with traditional diesel power. The ability to operate in both modes could potentially reduce operational difficulties associated with the need to remove the engine at the end of the electrified system. However, additional operational considerations remain to be addressed.
- **Linear Synchronous Motors** – This technology propels rail cars by creating an electromagnetic field from motors embedded in the railway. One advantage of LSM is that overhead electric lines would not be needed, allowing the electric rail system to extend further into ports and railyards. LSM technology is in its early stages and costs cannot be estimated, however demonstration projects are underway.

The 2012–2035 RTP/SCS specifies the need for further study of these technologies to resolve operational challenges and to better quantify the costs of implementation and potential savings or cost increases of eliminating diesel fuel. In addition, several other technologies such as hybrid diesel-electric locomotives and battery-electric tender cars will be considered. Such technologies have the potential to reduce or even eliminate the need for catenary wire infrastructure. Please see the Goods Movement Appendix and refer to the Environmental Strategy and Action Plan. The Action Plan identifies further study, prototype development and demonstration efforts, upon the availability of funds, to address issues such as technology readiness and operational application to freight systems.

Long-Term Emission-Reduction Strategies for Trucks

Equally important to SCAG's long-term vision of a zero-emission goods movement system is the reduction or elimination of emissions from heavy-duty trucking. Heavy-duty trucks comprise 75 percent of regional goods movement NOx emissions and 58 percent of goods movement-related $PM_{2.5}$ emissions. In the near term, the RTP/SCS proposes an aggressive program to bring more currently available clean fuel trucks and hybrid trucks into service. In the longer term, we suggest that our infrastructure serve as a catalyst for the development and deployment of zero-emission trucks such as those powered by hybrid, fuel-cell, or battery technologies.

The trucking market offers unique challenges due to heavy weights, operational performance requirements, and high incremental costs. However, several reduced-emissions trucks are currently commercially available and many zero- and near-zero-emission trucks are under development for future deployment. For instance, reduced-emission natural gas trucks have already been deployed at the ports, and several hundred hybrid electric trucks are on the road due to the ARB's Hybrid Truck and Bus Voucher Incentive Project (HVIP).

Other promising technologies include plug-in hybrid-electric trucks, which have batteries that are charged through an external power source, and battery-electric trucks, which can generate their own power or receive power from an outside source. Plans for zero- and/or near-zero-emission truck lanes on I-710 and the East-West Freight Corridor offer the opportunity to include wayside power systems that could extend the range of these trucks. The provision of zero- and/or near-zero emission corridors may also provide the certainty needed for original equipment manufacturers to more heavily invest in new technology. More research is needed to determine if wayside power is the right strategy for our region, but the RTP/SCS plans for flexible design of new infrastructure to allow for this use.

SCAG intends to work closely with our partners and continue existing collaborative efforts to facilitate development of these technologies. Stakeholder input will be critical to understand the performance needs of the technology and any operational concerns. As technologies are developed, appropriate funding support and other incentive mechanisms should be applied. Existing efforts are proposed to lead to the formation of a logistics working group to promote, evaluate, and secure funding for these technologies. For more information on steps toward development and deployment of these technologies, please see the Appendix.

Unfunded Operational Improvements

It has been shown around the state and the region that some well-targeted investments in physical operational improvements on roadway system (both highway and arterials) can significantly improve their productivity. These investments include interchange improvements, auxiliary lanes, ramp widening, and others. The recent Caltrans CSMP development process identified a number of these projects for a subset of the State Highway System. Between now and the 2016 RTP, SCAG will work with its stakeholders and partners to identify additional cost-effective investments and seek funding.

Unfunded Capital Improvements

Regionally significant major corridor improvements and strategies in the Strategic Plan are identified in **TABLE 7.1**. A more complete list is contained in the RTP/SCS Project List available at www.scag.ca.gov/rtp2012.

TABLE 7.1 Major Strategic Plan Projects

Strategic Plan Project Description
▪ Additional Transit Station Improvements to Irvine Station, Fullerton Transportation Center, and Santa Ana Regional Transportation Center
▪ Bus Rapid Transit on Beach, Edinger, La Palma, and Katella, and in South Orange County
▪ California High-Speed Train System Phase II
▪ California/Nevada Super-Speed Train Anaheim to Las Vegas
▪ Coachella Valley Daily Rail Service between Downtown Los Angeles and Indio
▪ Cordon Pricing Demonstration Projects (locations to be determined)
▪ DesertXpress High-Speed Rail between Palmdale-Victorville-Las Vegas
▪ Expanded Express/HOT Lane Network
▪ Express Bus Service throughout Orange County and between Orange County and Los Angeles and Riverside Counties
▪ Long-Term Goods Movement Emission-Reduction Strategies for Rail and Trucks
▪ Metro Gold Line Eastside Extension Beyond Phase II Terminus
▪ Metro Gold Line Extension to Ontario International Airport
▪ Metro Green Line Extension to San Pedro, Long Beach, and LA/Orange County Line
▪ Metro Purple Line Extension Further West
▪ Metrolink and LOSSAN Strategic Plans
▪ Mileage-Based User Fee Demonstration Projects and Implementation Strategy
▪ Orangeline High-Speed Transit (Union Station to Santa Clarita)
▪ San Bernardino Mountain-Valley Railway System between San Bernardino/Highland and Big Bear Lake
▪ Santa Paula Branch Line
▪ US-101 HOV Lanes from Route 23 to Topanga Canyon

Ultimate Vision for a High-Speed Rail System

Our ultimate vision for a true high-speed train system that would link major urban areas and activity centers within our region and beyond would be incomplete without Phase II of the proposed California High-Speed Train (HST) system. Phase II would link Los Angeles Union Station to San Diego via the Inland Empire in our region. The project is being planned in segments, which are all in different degrees of project readiness. This corridor is approximately 160 miles long, stretching from Union Station in downtown Los Angeles through San Bernardino and Riverside Counties, and terminating in San Diego County. With 20.8 million residents, these four counties make up approximately 56 percent of the state's current population and will grow significantly by 2050.

Phase II of the California HST project, by adding connections to the Inland Empire and San Diego County, completes the backbone of a true regional high-speed transport system. The LOSSAN, Metrolink system, and California HST Phase I investments discussed in previous chapters will provide high-speed travel alternatives in northern Los Angeles County, the San Fernando Valley, the Gateway Cities, and Orange County; Phase II will extend those alternatives to the San Gabriel Valley and the Inland Empire. Upon completion, Phase II will provide important access to planned and existing regional centers, including Ontario International Airport, the March Inland Port, and possibly San Bernardino International and Corona airports, helping to meet SCAG's long-term goal of regionalizing air travel in Southern California. Furthermore, Phase II may one day be the basis for further high-speed rail extensions into Nevada or Arizona.

The California HST system will provide excellent connectivity to our region by connecting with a robust network of intercity and commuter rail, subway and light-rail, and fixed-route transit systems. The proper planning and service levels of these connecting services will allow them and the California HST to feed and complement each other. While commuter, intercity, and interregional rail services are distinct travel markets, the proper coordination of their schedules will further increase the region's rail and transit ridership by attracting crossover passengers to these different markets. It will also significantly relieve capacity constraints of the existing air and highway transportation system as increases in intercity travel demand in California occur. By attracting a large number of trips from current auto and air travel markets, a significant decrease in GHG emissions will be achieved in our region. In addition, the HST project will provide a much cheaper alternative to building additional airport and highway capacity to serve intrastate aviation routes and auto trips.

In addition, several other high-speed rail transportation projects are part of the Strategic Plan that, if completed, would deliver a robust regional high-speed transport system. The DesertXpress project would link our region with Las Vegas, providing a high-speed alternative to the highly congested I-15 corridor and relieving traffic in our region's fifth-largest domestic air travel market. This project might eventually connect to the California HST system in the City of Palmdale, and work is progressing on this connection on behalf of the High Desert Corridor Joint Powers Authority. DesertXpress received a Federal Railroad Administration (FRA) Record of Decision (ROD) in July 2011 for its environmental review documents, and additional permits were obtained from the Surface Transportation Board, Bureau of Land Management, and FHWA in subsequent months.

Another proposal is a high-speed transport system connecting Anaheim with Las Vegas, with stations in Ontario, Victorville and Barstow in our region, linking important regional destinations. Similarly, daily Amtrak corridor service to the Coachella Valley would link an additional SCAG subregion to our regional rail network.

Greater Vision for Our Commuter Rail System

Metrolink provides our region's commuter rail service, operating 163 trips on seven lines carrying 42,000 passengers on weekdays. With the investments proposed within the Constrained and Strategic Plans, we expect to achieve more than double the ridership by 2035. But, we believe, the Metrolink system has even greater untapped potential for our region.

Our region boasts 4.32 commuter rail route miles per 100,000 residents, which is over 2.5 times the median for large metropolitan regions. However, in 2008, residents of the SCAG region took only 0.7 per capita trips on the commuter rail system, well below the national median of 0.82. Chicagoans, by contrast, took 8.28 trips per capita annually, on a network that provides 11.8 route miles for every 100,000 residents. Residents of Baltimore took 34 percent more commuter rail trips per capita on a network similar to that of the SCAG region.

The average speed for Metrolink is about 40 mph today. The average speeds vary by line, and while top speeds are 79 mph, the number of stops and physical capacity and geographic constraints result in this average system speed. This shows the need to fund capital projects in order to speed up the service and make Metrolink more attractive to the SOV commuter.

The recent release of the California High-Speed Rail Authority's draft 2011 Business Plan puts off the arrival of the California HST system in our region until 2033 and greatly escalates the official project cost. This confirms long-standing stakeholder concerns of the project's implementation timeline and viability and therefore confirms the need to spend HSR dollars on our region's current rail services. In fact, the new Business Plan calls for "blended" rail services whereby incremental operating segments of the California HST system will connect with existing rail services until the entire project gets built.

Our Strategic Plan vision for Metrolink speed and service improvements calls for an intensive investment in capital projects to further increase speed and service levels over and above the Constrained Plan. The Strategic Plan results in even more segments of the network operating at speeds of 110 mph or greater. These projects include additional double tracking, sidings, station improvements, grade separations, and grade crossings. Not only will this benefit commuter rail trips in our region, but it will benefit Amtrak intercity and California HST interregional trips also, as the three systems feed and complement each other. While these are three distinct travel markets, improving all three networks encourages cross-over rail travel market trips.

In addition to capital improvements, our strategic vision calls for:

- A doubling of system use by 2020 and possibly doubling again by 2035,
- Considerably more express trips,
- Regular special event services,
- A connection to Ontario International Airport,
- The implementation of new BRT services that directly connect with the Metrolink system,
- A robust growth of TOD around Metrolink stations, and
- The implementation of "first mile/last mile" policies for robust bicycle and pedestrian improvements around Metrolink stations.

Image courtesy of the California High-Speed Rail Authority

Our Vision for Active Transportation Beyond 2035

The 2012–2035 RTP/SCS Constrained Plan proposes investing over $6.7 billion toward active transportation, including the development of over 5,700 miles of bikeways and improvements to significant amount of sidewalks in our region. In addition to these projects, SCAG hopes to substantially increase bicycling and walking in the region by creating and maintaining an active transportation system that includes well-maintained bicycle and pedestrian facilities, easy access to transit facilities, and increased safety and security for all users. The active transportation vision for the strategic transportation system is one where bicycling or walking is simply the most logical and efficient choice for most short trips. To achieve that vision, SCAG and local jurisdictions must create the conditions by which active transportation is more attractive than driving for short trips (less than three miles for bicycles, one-half mile for walking). The goals are to develop and build a dense bicycle network so that all SCAG residents and visitors can easily find and access a route to their destination—incorporate Complete Streets policies in street design/redesign and Compass Blueprint strategies for land use—and ensure ADA compliance on all sidewalks.

BIKEWAYS

Further enhancements to the active transportation system should be considered to make bicycling and walking a more feasible and desirable transportation option. The strategic bikeway plan envisions a three-tiered system to achieve those goals: an expanded regional bikeway network, citywide bikeways in each city, and neighborhood bikeways.

- The Regional Bikeway Network is expanded over the constrained plan, developing a grid pattern where possible in urbanized areas. Each designated regional bikeway links to other regional bikeways and to city bikeways for commuters and recreational riders. Although not as free-flowing as freeways, the Regional Bicycle Network links the cities in the region in a similar manner. To the greatest extent possible, the regional bikeway network should be Class 1, Class 2 bikeways/cycle tracks, or even painted sharrows with appropriate signage and wayfinding.
- Citywide bikeways link neighborhood bikeways to regional bikeways and major city destinations, such as employment, retail, and entertainment centers. These will

often be on arterial and collector streets, which are already part of the grid system. Bikeways will likely need to be either Class 2 bikeways (painted or unpainted) or Cycle tracks. When going through large suburban areas, they can be designated bicycle boulevards. Citywide bikeways should be no farther than one-half mile apart.

- Neighborhood bikeways link neighborhoods to local amenities, such as schools, parks, grocery stores and local retail, eating, and entertainment. These facilities will be primarily on low-speed streets and be identified through sharrows, bicycle boulevards, and wayfinding signage. While every residential street should be considered a neighborhood bikeway, the focus should be on streets that connect across blocks and neighborhoods. In addition, neighborhood bikeways should link to other neighborhood bikeways, providing a low-speed, low-stress environment for families and youths to bicycle with minimal interaction with faster, busier streets.

Completion of this system will require coordination among cities as well as parallel improvements within each city and in unincorporated areas of counties. It will involve roughly a doubling of the bicycle network beyond the constrained plan to 24,000 miles, with a cost estimated at around $12 billion.

PEDESTRIANS

Pedestrian accessibility and mobility may be addressed through increased safety and security and land use. Integration of Safe Routes to School strategies, Safe Routes to Parks programs, incorporating active transportation in SCAG's Compass Blueprint Projects, and developing active transportation best practices around transit stations may further enhance the walking environment. In addition, local jurisdictions can integrate active transportation and Complete Streets concepts with their land use decisions. Inclusions of bulb-outs, median sanctuaries, and traffic calming can increase pedestrian safety by reducing collisions, particularly at intersections. Other strategies include more prominent deployment of left-turn signals and no-right-turn-on-red signals in high-pedestrian environments. In addition, SCAG encourages and is prepared to work with appropriate implementation agencies to map, develop, and implement recreational trails throughout the region, including the SCAG portion of the California Coastal Trail, river trails, urban, and wilderness hiking areas/trails.

The cost for completion of this element varies widely, depending upon the level of improvements and methodologies used, and ranges from $6 billion to $35 billion.

Strategic Finance

Following the adoption of the 2008 RTP, SCAG initiated a comprehensive study of congestion pricing strategies, which has come to be known as the Express Travel Choices Study. The emerging regional congestion pricing strategy is structured to help the region meet its transportation demand management and air quality goals while providing a reliable and dedicated revenue source. The pricing strategy could allow users of the transportation system to know the true cost of their travel, resulting in informed decision-making and more efficient use of the transportation system. Pricing strategies evaluated through the Express Travel Choices Study include a regional high-occupancy toll (HOT or Express) lane network and a mileage-based user fee, both of which are incorporated into the 2012–2035 RTP/SCS. Nevertheless, these strategies still face a number of significant hurdles before their full benefits can be realized. A second phase of the Express Travel Choices Study will continue beyond the adoption of the 2012–2035 RTP/SCS and establish an implementation plan for the regional congestion pricing strategy. SCAG will also participate in state and national efforts to address the long-term transition of excise fuel taxes to mileage-based user fees.

In addition to SCAG's regional congestion pricing initiative, a number of local efforts to establish additional transportation revenues are underway or may be in the near future. In 2004, the voters in Ventura County were asked to approve a local sales tax measure for transportation. While the voters did not approve the sales tax increase, it remains a popular option for the region's counties to generate a significant amount of revenues dedicated to transportation. All of the other counties in the SCAG region have a local sales tax measure dedicated to transportation.

The Los Angeles County Metropolitan Transportation Authority (MTA) is evaluating the feasibility of a Congestion Mitigation Fee as part of a proposed restructuring of its Congestion Management Program (CMP). If enacted, the fee would be imposed on new development and would generate new revenue to assist MTA in addressing congestion caused by growth.

America Fast Forward

Upon the passage of Measure R in 2008, MTA has also been looking for ways to accelerate the implementation of a 30-year transportation program over the next 10 years through innovative federal loan and bonding mechanisms. This program, if implemented, would be an alternative to traditional federal grant programs and provide an innovative way for the federal government to assist self-help counties that have adopted local funding mechanisms. This program, originally known as the 30/10 Initiative, gained broad attention from federal policymakers and is now known nationally as the America Fast Forward Initiative. America Fast Forward is being increasingly embraced by mayors and chambers of commerce around the nation as a program that should be enacted through the next federal surface transportation bill. Currently, over 120 mayors and over three dozen chambers of commerce, from red and blue states, have endorsed America Fast Forward.

Congressionally appointed national commissions, professional engineering organizations, academic think tanks, and national business groups have all documented the national imperative for a new era of federal investment in transportation infrastructure.

A new era of federal financing of critical transportation infrastructure must take place within the context of fiscal and budget realities confronting both the federal administration and Congress. These fiscal realities require smart, targeted, and innovative financing mechanisms that achieve two national priorities: minimize impacts on the federal budget and maximize the generation of new jobs, particularly in the small business sector. A new federal financing approach, leveraging transportation projects at the state and local levels, can achieve both of these priorities. This is the innovative thinking behind America Fast Forward.

America Fast Forward would support the creation of a 21st century national surface transportation system. It contains two federal innovative and proven investment methods: tax code incentives and credit assistance.

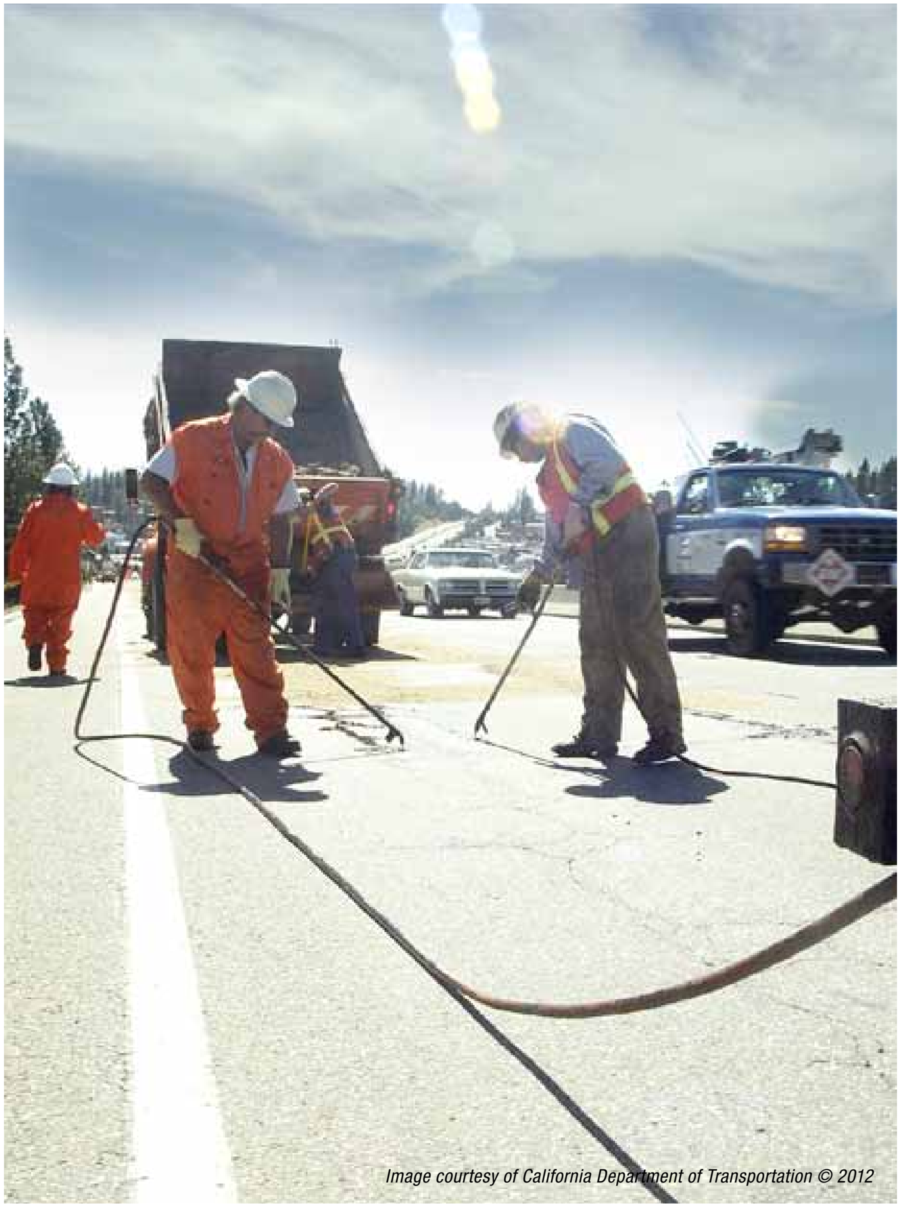
The specific legislative proposals are: (1) Qualified Transportation Improvement Bonds and (2) an Enhanced Transportation Infrastructure Finance and Innovation Act (TIFIA) Program.

America Fast Forward offers economic revitalization by stimulating infrastructure, investment to create jobs, and aggressively renewing the aging surface transportation system:

- Job Creation
- Cost Savings
- Project Acceleration
- Economic Development
- Infrastructure Improvements
- Resource Maximization

Enactment of America Fast Forward would be beneficial to the SCAG region and support many of the goals of the Regional Transportation Plan. In particular, by accelerating transportation projects, America Fast Forward will create an important new mechanism for job creation, not to mention attaining regional mobility and air quality goals earlier than anticipated. As a result, SCAG will actively advocate in support of the America Fast Forward plan as a component of the next federal surface transportation bill.

08 ECONOMIC AND JOB CREATION ANALYSIS



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Southern California's transportation infrastructure paves the way for economic recovery and job creation.

Executive Summary

Southern California faces its toughest economic climate in modern times. High unemployment, lack of job growth, waning competitiveness, aging infrastructure and environmental challenges have combined to present today's leaders with unparalleled challenges. Never before have the crucial linkages and interrelationships between the economy, the regional transportation system, and land use been as important as now. SCAG has thus chosen to view the 2012 RTP/SCS as an economic development strategy as well as a transportation, infrastructure and sustainability strategy.

For the first time, SCAG's RTP includes a significant consideration of the economic impacts and opportunities provided by the transportation infrastructure plan set forth in the 2012–2035 RTP/SCS. This analysis considers not only the economic and job creation impacts of the direct investment in transportation infrastructure, but also the efficiency gains in terms of worker and business economic productivity and goods movement. The 2012–2035 RTP/SCS outlines a transportation infrastructure investment strategy that will beneficially impact Southern California, the state, and the nation in terms of economic development, competitive advantage, and overall competitiveness in the global economy in terms of attracting and retaining employers in the Southern California region.

Implementation of SCAG's RTP/SCS will create or sustain jobs today to build transportation infrastructure projects for tomorrow. SCAG's 2012–2035 RTP/SCS, totaling more than $500 billion in transportation investments, will put thousands of Southern Californians back to work in much needed jobs, not only in construction, but in a broad cross-section of industries. To quantify the economic impact of the plan's implementation, SCAG used data and software from Regional Economic Models, Inc. (REMI) to produce county-level and statewide models depicting the economic and demographic activity of the region. All of the economic analysis of the plan was conducted using REMI models. The findings show that over the twenty-five year period and six-county SCAG region, the plan will generate significant employment. An annual average of 174,500 new jobs will be generated by construction and operations expenditures that are specified in the RTP program, and the indirect and induced jobs that flow from those expenditures. An additional 354,000 annual jobs will be created by the SCAG region's increased competitiveness and improved economic performance that will result from congestion reduction and improvements in regional amenities due to implementation of the 2012–2035 RTP/SCS. The rest of the state of California and nation will benefit from spillover impacts of additional accrued jobs.

- **Job growth from building the RTP infrastructure projects: average of 174,500 jobs per year**

  Over the 2012–2035 period, the RTP/SCS calls for the spending of over $500 billion on transportation improvement projects. The economic analysis shows this will create an average of 174,500 jobs per year across SCAG's six county region. The main beneficiaries will be construction workers, placing an employment floor under this volatile sector. However, job increases will also include workers in professional, supply and service firms that support the effort. Further, workers throughout the economy will feel the impact as construction-related workers and firms increase their spending in sectors like retailing and consumer services.

- **Increases in economic competitiveness and efficiency from completion of the projects: an average of 354,000 jobs per year**

  When investments are made in the transportation system, the economic benefits go far beyond the jobs created building it. Today's regional economy would be impossible if routes like Foothill Boulevard, rather than the Interstate system, were the only way to move people and goods within Southern California or to the rest of the U.S. In addition, unlike spending to satisfy current needs, infrastructure delivers benefits for decades. The increased long term efficiency of the system is thus a crucial result, delivering higher economic activity and job creation from three sets of activities:

  - **Reduced travel time.** Whether it is a commuter, a truck driver, a tourist or a firm awaiting crucial goods, lost time due to congestion is a cost to the economy. Reducing congestion thus adds economic activity and jobs.
  - **Increased labor access.** Southern California is a huge geographic area. The friction of distance means employers in one sub-area cannot easily access workers living in another. A more efficient transportation system, with increased mass transit systems, will create a more efficient and competitive labor market and add economic activity and jobs into the economy.
  - **Enhanced Transportation.** Supply chain managers favor Southern California because of the speed and reliability that goods can be moved around the region and from it to the rest of the U.S. As the economy expands, congestion robs the area of this competitive advantage. Increasing the efficiency of throughput would maintain and enhance these advantages and create extra economic activity and jobs.

- **Amenities and infrastructure system operations: an average of an additional 64,000 jobs per year**
  - **Amenities.** As the infrastructure system becomes increasingly completed, including its sustainable community provisions and pollution reductions, amenities such as lower health costs from improved air quality will add 46,000 jobs per year on average.
  - **Operations.** As investments are made in an enhanced Southern California transportation system, its operation will add an average of 18,000 jobs per year over the 2012–2035 period as transit systems come online and road maintenance and repair becomes necessary.

Looking forward, the socio-economic forecasts for the SCAG 2012–2035 RTP/SCS show that the region must not only recover from the devastation of the Great Recession, it must also prepare for the area's long term growth. Without making the investments in Southern California's transportation system outlined in this plan, economic recovery and job creation will be markedly slower throughout the region. The area would not enjoy the benefits of the long term competitiveness, efficiency and sustainability of modern infrastructure. In the longer term, failure to make sufficient regional transportation investments will cost Southern California economically and the region's business competitiveness will be at risk.

Introduction

Never before have the crucial linkages and interrelationships between the economy, regional transportation system, and land use been as apparent or important as now. For the first time, this RTP includes a significant consideration of the economic impacts and opportunities provided by the transportation infrastructure plan set forth in the 2012–2035 RTP/SCS, specifically considering not only the economic and job creation impacts of the direct investment in transportation infrastructure, but also the efficiency gains in terms of improved worker and business economic productivity and goods movement. The Goods Movement, Logistics & Distribution, Tourism, Manufacturing, and many other transportation reliant sectors are heavily dependent on efficient transportation infrastructure and are key Southern California job generators for all six SCAG-region counties. To illustrate this point, this chapter later drills down on the importance of goods movement to the SCAG regional economy. Also, the 2012–2035 RTP/SCS outlines a transportation infrastructure investment strategy that will beneficially impact Southern California, the state, and the nation in terms of economic development, competitive advantage, and overall competitiveness in the global economy in terms of attracting and retaining employers in the Southern California region.

During the 2007–2009 time period, the nation experienced the deepest and longest recession since the 1930's. Two years after the recession was officially determined to have ended, nearly 13 million Americans are still out of work, including more than 5.5 million who have been jobless for over six months. Job seekers outnumber available jobs by more than four-to-one. Most economists forecast that the nation will not generate enough jobs to return unemployment to 5 percent until the end of 2018, possibly 2020.

California has been hit even harder, enduring a jobs crisis not seen since the Great Depression. As the epicenter of the subprime mortgage industry and housing bubble, California entered the Great Recession earlier than most states, suffers from the second highest unemployment rate in the country (behind only Nevada), and is in the midst of one of the slowest economic and job recoveries in the nation. According to the state Employment Development Department (EDD), nearly 2 million Californians are officially unemployed, and the real number is likely much higher. California has 964,000 people who have been unemployed more than six months, with the majority of those (718,000) out of work a year or longer.

Southern California Economic Challenges

In Southern California, job losses have been devastating. In the 6-county SCAG region, over 1 million residents are officially unemployed. Although the real unemployment rates are probably much higher, as of January 2012, unemployment levels for the 6-county SCAG region are as follows:

Imperial County	26.4%
Los Angeles County	12.1%
Orange County	8.0%
Riverside County	12.5%
San Bernardino County	12.3%
Ventura County	9.7%

Source: California Employment Development Department

Several factors are responsible for Southern California's slower growth coming out of the 2007–2009 recession:

- Housing markets are not rebounding due to the overhang of foreclosures, "shadow inventory," and weak demand. UCLA economists recently predicted that Southern California home prices will not reach previous peaks until the 2017–2020 time period
- Rising oil prices
- End of federal stimulus programs
- The prospect of Government layoffs

Muted demand from Southern California consumers (consumer spending represents at least two-thirds of economic activity) who are still worried about their individual employment, home values, and financial situations.

The consequences of the Great Recession have battered the Southern California economy and impacted major economic sectors which traditionally have been key job generators throughout the SCAG region:

- Construction, finance and insurance, and management; and the professional and business services group performed much worse than the nation.
- Manufacturing and employment agencies had large absolute declines, but their percentage job losses were only a little larger than the nation.
- The large logistics sector lost a significant number of jobs, but that represented only a single digit percentage decrease.

Recovery has been slow and uneven throughout the SCAG region, resulting in Southern California facing both short and long term economic challenges.

- Significant job losses
- High unemployment rates
- Declining incomes
- Increased poverty

Most local and regional economic forecasts such as those produced by the Los Angeles County Economic Development Corporation, University of California Los Angeles Anderson School, California State University, Long Beach, California State University, Fullerton, and other leading institutions, do not project significant local/regional job growth until at least the 2014–2015 time period, and some particularly hard hit areas of Southern California will likely remain under economic pressure until the end of the decade.

Many Southern Californian's ask—when recovery finally takes hold, where will the region's job growth likely come from?

Implementation of SCAG's 2012–2035 RTP/SCS will create or sustain jobs today to build transportation infrastructure projects for tomorrow. The more than $500 billion in transportation investments of the 2012–2035 RTP/SCS will put thousands of Southern Californian's back to work in much needed jobs, not only in construction, but in a broad cross-section of industries highlighted later in this chapter. Without making these investments in Southern California's transportation system, economic recovery and job creation will be markedly slower throughout the region. In the longer term, failure to make sufficient regional transportation investments will cost Southern California economically and the region's business competitiveness will be at risk.

The SCAG region is home to approximately 18 million people, and supplies nearly 7.75 million jobs—making the SCAG region California's largest population and economic territory. Between now and 2035, SCAG forecasts project that job growth will increase nearly 1.2 percent a year, outpacing the rate of population growth over the same period. The SCAG region will grow to 22.1 million people by 2035, a 22.3 percent increase from 2010, or an average of 0.9 percent growth per year. Employment will grow to 9.4 million jobs by 2035, a 30.6 percent increase over 2010.

INFRASTRUCTURE INVESTMENT, ECONOMIC DEVELOPMENT, AND QUALITY OF LIFE

As indicated, SCAG has chosen to view the 2012–2035 RTP/SCS as an economic development strategy as well as a transportation, infrastructure and sustainability strategy. It has done so to deal with the profound challenges affecting the employment, prosperity, long term growth and air quality issues facing Southern California.

Fundamental to using the 2012–2035 RTP/SCS as an economic development strategy is an understanding of the relationship between infrastructure investment and the competitiveness, costs and efficiency of an economy. When a large region is knitted together by relatively uncongested freeway corridors and transit systems, economic life can be smoother and faster:

- Workers, otherwise in lengthy commutes, spend more leisure time with families and friends or more productive time at work.
- Companies have access to employees living throughout the region.
- Professionals and retailers can efficiently access clients in a wider geographic area.
- Importers, exporters, warehouses and producers see their supplies and products moving with the speed and reliability their schedules require.
- Amenities like concert halls, theaters, sports arenas or recreation areas are more easily accessed by residents from throughout the region and by tourists.
- Lower congestion means lower levels of pollution and the costs they impose on a society.

Whether measured in dollars, time or health, the benefits to workers, families and companies located in a region can be measured by investments in its transportation infrastructure. Given these additional economic benefits, more advanced economic models such as REMI are used to estimate the impacts on economic activity and job creation.

Often, Southern Californians are reminded of the importance of infrastructure to the cost and efficiency of their economy when one of the region's major arteries is shutdown. This occurred when the 1994 Northridge earthquake caused an overpass to collapse closing the Santa Monica freeway. The result was to slow down economic and personal life in the affected area. Infrastructure investment is unique in that it improves the lives of people and businesses from the moment it is available in addition to the activity generated by its construction and operations.

As a result of these considerations, in the analysis of measuring the economic impact of the over $500 billion infrastructure investment proposed for the 2012–2035 RTP/SCS, important attention is paid to several measurable impacts and the jobs it would create:

- Reduction of time lost to congestion
- Ability of employers to access a larger and deeper labor force
- Ability of goods to move with speed and reliability
- Reduction in costs related to air quality difficulties
- Enhanced quality of life

INFRASTRUCTURE INVESTMENT AND CONSTRUCTION RELATED IMPACTS

If the SCAG region invests over $500 billion on projects that can increase the efficiency of its transportation system, the most obvious economic impact will be the creation of construction jobs in the six county region. Here, standard regional economic modeling allows the determination of the full impact of such activity:

- Direct jobs are created with the companies that design and construct the facilities.
- Indirect jobs are created when those companies buy professional services, supplies, equipment and non-professional services from other firms to complete their work.
- Induced jobs are created when the firms and workers who directly build the project or indirectly supply goods and services to it, in turn, spend the money they receive in the general economy to support themselves and their families.

Each tier of this activity can be measured. The amounts of money going directly into construction activity are the beginning point. Economic impact models such as the sophisticated REMI model for this project can then determine the extent to which that direct spending will set off the rounds of indirect and induced spending and job creation. This work is explained below. A similar calculation was made for the funds that would flow to operate and maintain the transit and road systems once they have been created.

INFRASTRUCTURE INVESTMENT, COST, AND NET IMPACT

During the deliberations about the economic impact of SCAG's 2012–2035 RTP/SCS, a key issue was the extent to which additional local revenues, over those already flowing into the region's infrastructure investment, would be needed to finance the over $500 billion in projects. These were carefully assessed as to what measures would be used to raise these funds and during what time period. Because such added taxes or fees would tend to reduce local spending by businesses and/or consumers, estimates were then made of the job level reductions such measures would cause.

With the job losses from the added revenue measures estimated, they were deducted from the job creation from the construction and operation of the expanded transportation system plus the job creation due to the enhanced efficiency and quality of life created for the region's economy. The result was the net potential economic impact of SCAG's 2012–2035 RTP/SCS.

In the next section, the quantitative impact which the investments proposed in SCAG's Regional Transportation Plan will have on the region's economic performance, job creation, prosperity and quality of life are estimated and explained in detail.

Economic Impact of SCAG's Policies and Strategies

As implementation of the 2012–2035 RTP/SCS involves large financial investments in the region's transportation infrastructure, it has become increasingly important to understand both the short and long term economic impacts that the plan will have on the SCAG region. Fundamentally, the 2012–2035 RTP/SCS is designed to increase the efficiency and decrease the environmental impact of the region's transportation system.

GOODS MOVEMENT, THE ECONOMY, AND SOUTHERN CALIFORNIA'S TRANSPORTATION SYSTEM

Southern California's goods movement dependent sectors create considerable economic impact due to the wide variety of activities involved in moving goods within and through the region. According to analysis of EDD data, in 2011 these sectors directly employed 638,252 workers in the area. The facilities involved include the region's four ports (Los Angeles, Long Beach, Port Hueneme, San Diego), its numerous airports led by Los Angeles International Airport (LAX), its two long-haul (Burlington Northern Santa Fe Railway; Union Pacific Railroad) and four short-haul rail lines, several intermodal rail yards, hundreds of cross-docks and thousands of warehouses. The system is largely tied together by trucks that move most goods the "last mile" to retailers or consumers. Trucks also transfer cargo from the ports and airports to the intermodal yards, cross-docks and warehouses.

Challenges

While Southern California has the best logistics network in the United States, it does face two serious challenges. The first of these is the 2014 expansion of the Panama Canal. This doubling of capacity will allow ships carrying up to 13,000 TEUs versus the current 4,500 TEU's, to go directly from Asia to the East Coast rather than using West Coast ports. As a result, ports and corridors on the Gulf and East Coast are investing over $30 billion in their infrastructure to draw cargo directly to them, bypassing Los Angeles and Long Beach. The local response has been the "Beat the Canal" strategy to ensure that Southern California's competitive position is retained, if not enhanced. This has included:

- Serious efforts by the ports to reach out to their beneficial cargo owners to make sure they are being responsive to their needs, and that those companies understand the cost savings of using Southern California's ports.
- Continuation of the Clean Truck Program at the ports which has significantly lowered the adverse environmental impact they have had on the surrounding communities.
- Continued planning and investment in landside infrastructure to allow cargo to efficiently move through the region. Most recently, efforts have included release of the Draft Environmental Impact Report for the Southern California International Gateway (SCIG) near-dock rail project of BNSF Railway. Also, the ports have been deepening their channels, building on-dock rail facilities and are about to replace the Gerald Desmond Bridge. The region has also undertaken considerable work (EIR /EIS underway) to provide for the expansion of the I-710 freeway.

Meanwhile, a second major difficulty for the logistics sector is the fact that Southern California's transportation infrastructure frequently becomes clogged by traffic congestion. This is a crucial problem for supply chain managers since the speed and reliability with which they can move their cargo to the appropriate national markets is a critical determinant of where they choose to import, export and store their cargo.

Implementing solutions to improve the timeliness and efficiency of the region's goods movement throughput is a key economic development necessity.

Macro-Economic Impact

In the SCAG region, goods movement-dependent industries comprise 34 percent of the region's GDP, and 34 percent of regional jobs. Five industries comprise the vast majority of these benefits: manufacturing, construction, retail trade, wholesale trade, and transportation and warehousing. These five industries dominate the region in terms of contribution to GDP, employment, and prospects for growth.

Regional GDP Contribution

In terms of GDP, goods movement-dependent industries contribute a total of $253 billion to the region's economy. The top five goods movement-dependent industries in terms of GDP contribution are:

- Manufacturing ($84 billion);
- Retail trade ($54 billion);
- Wholesale trade ($53 billion);
- Construction ($27 billion); and
- Transportation and warehousing ($21 billion).

Employment Contribution

Goods movement-dependent industries contribute a total of 2.96 million jobs to the region's economy. The top five goods movement-dependent industries in terms of employment are:

- Retail trade (950,000 jobs);
- Manufacturing (744,000 jobs);
- Construction (431,000 jobs);
- Wholesale trade (429,000 jobs); and
- Transportation and warehousing (330,000 jobs).

Even when isolating the sectors that rely solely on the movement of goods, the impacts are significant. For the seven Southern California counties (Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura), the output of the sectors related to these industries totaled $130.1 billion out of the region's full output of $1.76 trillion in 2009.

Using the IMPLAN model to analyze the economic activity attributed to the $130.1 billion output associated with goods movement in Southern California, the model demonstrated the following results.

TABLE 8.1 Logistics Contribution to Southern California's Economy, 2009

Metric	Southern California	Logistics	Logistics Share
Gross Regional Product	$1,045,341,256,738	$146,699,940,876	14.0%
Total Employment	11,307,735	1,387,728	12.3%
Employee Compensation	$543,707,789,826	$86,753,281,440	16.0%
Proprietor Income	$92,433,783,666	$14,386,878,484	15.6%
Other Property Type Income	$330,967,058,325	$39,778,255,582	12.0%
Indirect Business Taxes	$78,232,624,920	$20,168,403,854	25.8%
Total Output	**$1,760,981,224,092**	**$238,503,892,404**	**13.5%**

Source: IMPLAN, analysis by Economics & Politics, Inc.

Project Expenditures – Mapping the RTP's Investment Plan

A mix of transportation projects are planned in each of the six counties over the twenty-five year span of the plan.

Of the total RTP expenditures exceeding $500 billion, more than half will be spent on projects in Los Angeles County.

Not all expenditures will have an economic impact. We have deducted expenditures estimated to be associated with debt service and right-of-way acquisition, which represent exchange of assets and are excluded from our analysis in **TABLE 8.2**.

ECONOMIC AND JOB IMPACTS

Net expenditures are categorized by function into three broad industries: construction, transit operations, and architectural and engineering services. Highway operations and maintenance expenditures are included with construction given their similarity. The total employment impact of the transportation plan is shown in **TABLE 8.3**.

Over the twenty-five year period, the plan will generate an annual average of 593,500 annual jobs in the six-county region. Almost 54 percent of these will fall in Los Angeles County, with 21 percent in Orange County and 12.5 percent in Riverside County.

In addition to the SCAG region, the rest of the state of California and U.S. will benefit from spillover impacts of additional jobs.

TABLE 8.2 Net Expenditures (in Millions of Nominal Dollars)

	FY2011–15	FY2016–20	FY2021–25	FY2026–30	FY2031–35	Total	% of SCAG Total
Total	$ 53,046,850	$ 63,210,971	$ 88,778,040	$ 120,811,690	$ 127,547,303	$ 453,394,855	100.0

TABLE 8.3 Employment Impact from Construction and Maintenance Expenditures (Per Year)

	2011–2015	2016–2020	2021–2025	2026–2030	2031–2035	Total
Los Angeles	112.2	89.1	90.1	93.4	76.4	92.2
Orange	36.1	34.0	35.5	37.8	32.3	35.1
Riverside	23.5	22.0	25.0	28.0	23.7	24.4
San Bernardino	18.0	15.5	18.5	21.4	18.0	18.3
Ventura	3.8	3.4	3.0	3.6	3.2	3.4
Imperial	0.7	0.7	1.1	1.6	0.9	1.0
	194.4	**164.7**	**173.2**	**185.7**	**154.4**	**174.5**

METHODS

Short Term impact

The most commonly used tool for conducting economic impact analysis is input-output modeling. Using detailed data on the distribution of sales and purchases between industries and households (available from the U.S. Census Bureau and the Bureau of Economic Analysis), the regional economy is mathematically represented as a series of flows of employees, goods and services, and capital between economic agents.

Using this model, the analyst can provide an initial increase in activity, such as a new transportation infrastructure investment, and trace the route that the project expenditures make through the supply chain, from the construction contractor to his employees (direct impacts), to his suppliers and to their employees and suppliers (indirect impacts), and so on; and from the employees to their household purchases (induced impacts). The original spending is thus multiplied by the additional activity it motivates.

Of course, not all needs in the supply chain can or should be filled locally. A construction company that purchases specialized equipment may order this from a manufacturer in another state or country. It may also choose to buy supplies from other areas if more competitive prices are offered elsewhere. The workers themselves may commute from outlying suburbs, representing an import of labor. Similarly, not all household spending occurs locally. Employees may purchase home insurance from Connecticut, table wine from France, and cigars from Cuba. Spending that occurs outside of the economic region is a leakage from the system and reduces the local economic impact.

To simplify analysis, regional models that have already been constructed by analysts or consultants are reduced to their multipliers, which are then more easily used by planners, engineers or policymakers to estimate the job impacts of their proposed projects.

Users of such multipliers should be cautioned that the underlying models depend on the economic region that is defined and the vintage of the data used to construct the model. For example, multipliers for the Southern California region are quite different from multipliers for the nation as a whole, and can be different from year to year, particularly during periods of technological or structural change. This leads to a confusion of job creation estimates, some of which range dramatically.

Rather than rely on externally-sourced multipliers, we use models constructed using data and software from Regional Economic Models, Inc. (REMI).

In our input-output analysis, we assume that the initial project spending occurs within the SCAG region, and allow the model to estimate the leakage from the region based on historical data and estimated trade flows among neighboring counties. In addition to the flows of goods and services, the model incorporates estimates of workers who commute from other regions—the household spending of these workers would in large part occur close to their residences as opposed to their place of employment.

Because supply chains differ across industries, the transportation project expenditure data is sorted by category, such as construction services, operations and maintenance for transit operations, and architectural and engineering services. The allocation of expenditures among these categories was estimated by knowledgeable transportation planners. Right-of-way acquisition costs are excluded since these represent a transfer of assets and are generally considered to have no economic impact. Each category of spending was modeled separately and their impacts summed. Employment estimates are measured on a job-count basis for wage-and-salary workers and for self-proprietors regardless of the number of hours worked, and are reported on an annual basis, i.e., the number of full and part time jobs generated in one year.

In our REMI analysis, we allocate the construction spending to counties in proportion to their relative output shares in the region. Expenditures for transit operations are expected to occur in the counties in which the projects are located.

Long-Term Impacts and Efficiency Improvements

Input-output analysis is useful for estimating the immediate economic impacts of a project. However, because this modeling is based upon fixed production relationships and does not incorporate behavioral decisions made by households or businesses to price signals, it is incapable of estimating dynamic responses such as businesses substituting towards capital in the face of rising labor costs, or labor migrating into the region as wage rates rise. To capture these full general equilibrium impacts a more complex methodology is needed.

In addition to these considerations, there are longer term impacts on the efficiency of the transportation system. The infrastructure, once built, can enhance the economic competitiveness of a region. Projects that reduce congestion may help firms produce at lower cost, or allow those firms to reach larger markets or hire more capable employees. An economy with a well-functioning transportation system can be a more attractive place for firms to do business, enhancing the economic competitiveness of the SCAG region. The RTP/SCS can boost employment in two ways—providing jobs for persons in highway and rail construction, operation, and maintenance, and boosting the economic competitiveness of the SCAG region by making it a more attractive place to do business. As an example, policies that could reduce congestion while creating no or minimal construction jobs can still increase the economic competitiveness of the region. Congestion pricing is one possible example.

Competitiveness and New Jobs: Results from REMI Model

SCAG's regional travel forecasting model was used to generate inputs for the REMI model. The forecasting model from REMI includes historical data from public, government sources like the Bureau of Economic Analysis (BEA), the Bureau of Labor Statistics (BLS), the Energy Information Administration (EIA), and the United States Census Bureau. The model relies on four different quantitative methodologies of regional analysis: input-output tabulation (which captures inter-industry relationships), econometrics (which estimates behavioral responses), computable general equilibrium (which will estimate long-term effects), and New Economic Geography (which relates economic growth to market areas as measured based on travel times and shipping or travel costs.) SCAG worked closely with REMI experts to run over 20 complex simulations of the region's economy with different elements of the RTP/SCS plan, compared to a "no build" or "no project" scenario. Using vehicle miles traveled (VMT), vehicle hours traveled (VHT), and number of trips from a travel demand model, REMI's TranSight module calculated how consumer, household, and business behavior responds to changes within a travel network. This allowed forecasts of future economic impacts. The model inputs were from SCAG's travel model and analysis. Inputs included reductions in commuting costs, accessibility costs, transportation costs, and operations costs and improvements in amenities or reductions in externalities. Each are defined below:

COMMUTING COSTS

REMI TranSight quantifies changes to commuting patterns from the travel demand data as a change in "commuting costs." The primary interaction is VHT/trips—that is, the average length of trip for personal automobiles. Shorter trips assume a greater ease of commute throughout the region and between different regions. From there, TranSight quantifies an increase in labor productivity as an increase in "labor pooling" and a better match between employees and employers. This leads to an expanded labor productivity throughout the SCAG regions, which initially reduces the amount of employment. Businesses will do "more with less"; however, in short order, lower labor costs creates a competitive advantage for the Southern California region, which leads to expanded market shares and increased output for local businesses. From there, employers continue to expand and hire more workers into the future, which forms a large bulk of the economic gains in the SCAG region.

ACCESSIBILITY COSTS

Accessibillity is the concept of the availability of intermediate inputs for businesses. That is, increased access means a better match for businesses in terms of their intermediate suppliers, which leads to increased productivity, larger market shares, and a greater clustering effect within a region. The travel demand interaction in this case is number of trips/VHT—again, this being the "average number of deliveries per hour" via truck. The model assumes that a faster rate of delivery means a greater ease of access in a region or between regions, which means better and cheaper access to the intermediate goods that businesses need.

TRANSPORTATION COSTS

Transportation costs are a similar concept to accessibility, but these quantify the expenses involved in the delivery of finished goods, rather than the movement of intermediate inputs amid different businesses and industries. The travel interaction is VMT/VHT, or the average system speed, for trucks, assuming that a higher system speed means a higher ease of transportation for sellers to buyers between regions. This builds on the gravity concepts of trade flows in the model, and also the concept of "relative delivered prices." That is, the model includes both a "relative cost of production" (RCP, which access lowers) and a "relative delivered price" (which is the RCP plus the cost of transporting a good to the shelf. The differences are transportation costs, which a higher speed for the system makes cheaper for the region inside of the TranSight model.

AMENITY/EXTERNALITY

Under normal circumstances, TranSight automatically quantifies the user- and agency-costs of transportation from travel demand data. However, in this case, as SCAG had an internal estimate of the same, REMI used the same information as the estimation of amenity benefits inside of the model. The variable in question, which is non-pecuniary amenity, goes into the model as an increase in the attractiveness of a region to migrants. For instance, people are willing to locate themselves in Florida for lower wages given the high overall attractiveness of the area's culture and climate. With this variable, we can enter a calculated number of externality benefits into specific regions. This will move migrants into the region, lower wages, and create a bigger cluster of labor for businesses to choose from. By extension, this is rather important to the industrial competitiveness of a region, as employers can charge less money for the same (or better) work from employees. SCAG's estimates included the cost of emissions, lost travel time due to congestion, and safety benefits. These all, in sum, add to the attractiveness of a region, which amenity quantifies in REMI.

OPERATIONS COSTS

Transportation improvements can have a big influence on business/household economies in terms of their fuel and vehicular repair purchases. TranSight normally quantifies this, but SCAG had an external estimate in provided data. To illustrate the influence of fuel savings on the economy, this goes into the model as reduced consumer or business spending on gasoline and oil. As an extension, saving an entity $50/year on fuel "frees up" $50 to spend on other priorities. For households, this means an increase in consumer spending and a decrease in the cost of living. For a business, this would mean increased competitiveness, as enterprises in SCAG counties no longer have to pay as much for fuel in the future. This allows them to expand their market shares and eventually have more output and hire more workers in the out years.

The results of the model effort yielded network benefits (flowing from reduced commuting, accessibility, and transport costs as defined above) and amenity and operations benefits (from the changes in amenities and the reductions in operations costs.) The network benefits summarize the bulk of the economic competitiveness impacts from improvements to the transportation system that result from the plan, while the amenity benefits are largely the impact of measurable quality of life changes or increased consumer spending power that results from lower transportation costs.

The REMI model results showed that the network benefits would result in an annual average of 512,000 jobs in the SCAG region during the 2011–2035 time period. Note that those jobs are in addition to construction jobs, and the jobs are economic opportunities available to SCAG region residents as a result of increased competitiveness that would flow from full implementation of the 2012–2035 RTP/SCS.

SCAG believes the REMI model results constitute a high end of the possible network benefits, as some behavioral responses, such as increases in telecommuting as an adaptation to high congestion levels, likely are not fully captured in the REMI model. SCAG validated the REMI results against a comparison with the literature and believes a better estimate of job gains from the network benefits of fully implementing the RTP are 354,000 jobs per year, on average. This is described in the last section of this chapter.

Full Results

The full economic results of the RTP/SCS investment are summarized below, with millions of new jobs (annual average) resulting from the plan in five year time periods and an annual average for 2011–2035 shown. The construction job gains (direct, indirect, and induced) effects are shown on the top row. The network benefits and amenity and construction benefits are also shown, and the full program economic impact—construction impacts and changes in the region's economic competitiveness, are shown on the bottom row.

TABLE 8.4 Total Employment Impact

	2011–2015	2016–2020	2021–2025	2026–2030	2031–2035	Annual Average
Construction	194	165	173	186	154	174.5
All Network Benefits	21	71	263	543	852	354
Amenity & Operations	17	40	65	88	108	64
Draft 2012–2035 RTP/SCS	232	276	501	819	1,114	593.5

Impact of Economic Gains Versus Revenue Required to Implement 2012–2035 RTP/SCS

593,500 jobs – 67,000 jobs = 526,500 net gain in jobs per year

Implementing the 2012–2035 RTP/SCS would create an average of 593,500 jobs a year over the 2012–2035 period. However, infrastructure investment is not free. It requires fees and taxes from within the region plus added state and federal revenue. Some, but not all, of these flows of funds exist. The modeling carefully traced them to determine the negative impact that increased local taxes and fees would have on the ability of Southern California's consumers and businesses to spend locally. The net cost from these taxes and fees is estimated to be a loss of 67,000 jobs on average per year. Implementation of the 2012–2035 RTP/SCS's net gain would thus average 526,500 jobs per year.

Should the 2012–2035 RTP/SCS not be implemented, the cost to Southern California would be immense. The area would forfeit long term competitiveness, efficiency and sustainability of modern infrastructure. It would face stiff penalties for being out of compliance with federal environmental law.

How Transportation Improves Economic Competitiveness

Transportation can improve economic competitiveness in several ways. Canvassing the literature and available economic models gives five possible paths through which transportation improvements can increase regional economic competitiveness.

1. **Improved Labor Market Matching:** Reducing travel time allows firms to hire from a larger geographic catchment area. This effectively increases the firm's labor market—particularly so in a large urban area like the SCAG region, where reductions in commuting time can yield possibly many more potential employees. Increasing the size of the labor pool allows the firm to hire better employees, as the firm can find a better match for its needs. By hiring employees who better suit their needs, the firm can produce more (employees are more productive) for the same cost, allowing the firm to capture a larger market share. That, in turn, can lead to increased hiring if the increase in market share countervails the fact that the firm can produce more with fewer employees due to the improved employer-employee job match. (See e.g., Kohlhase and Finney, 2008.)
2. **Firms Move into the SCAG Region in Response to Enhanced Economic Competitiveness:** This effect flows in part from the first effect. If the SCAG region's transportation system allows longer commutes and hence a larger labor market pool, and if that larger employee pool allows firms to hire better employees, eventually, firms will move into the region in response to those improved hiring prospects. Hence, the increases in firm productivity that initially result from improved labor market matching result in firms moving into the SCAG region from other locations over longer time horizons.
3. **Reduced Congestion Reduces Employees' Asking (or Reservation) Wage:** Employees have a reservation wage—a wage below which they will not work in a particular job. Congestion reductions can lower reservation wages in two ways. First, metropolitan areas compete for mobile labor, and metropolitan regions with lower traffic congestion will, all else equal, lure more migrants into the region due to the amenity value of lower traffic congestion. This increases the supply of available labor—an advantage for firms looking for to hire employees. Second, employees typically have to be compensated for undesirable characteristics of particular locations. In metropolitan areas with high traffic congestion, the labor pool will have to be compensated either in the form of higher wages, lower house prices, or both (e.g. Roback, 1982). These two effects are one and the same—the higher wages in high congestion metropolitan areas reflect the need to lure in a labor pool that otherwise might choose to locate in lower congestion locales. Reduced congestion can attract more workers to a region, allowing a firm to hire quality workers at lower reservation wages. Note that this does not mean that congestion reduction will lower wages paid. The effect of congestion on wages flows through multiple channels. As firms move into the SCAG region in response to the metropolitan area's enhanced competitiveness, that competition for labor will drive wages up. On net, employee wages may increase in the long run. Each of the paths described here are illustrations of isolated links from a complex economic system with multiple feedback loops, and the description here is intended to illustrate, in part, how advanced computer models can forecast the economic and job creation impacts of congestion reduction. Saying that employee reservation wages will be lower if their commute is less costly does not imply that, in the long run after the economy has fully adjusted, those employees are paid less. This information is provided as an explanation to the

results of economic impact modeling results and is not intended to be a policy statement on wages.

4. **Increased Market for Firms' Products:** Reductions in travel time can allow firms to supply a larger market area. If production exhibits constant returns to scale, this will not increase employment per se. Instead, local markets might be served by fewer, larger firms that can reach a larger customer base as congestion delays are reduced. The exception occurs when production exhibits increasing returns to scale, which means that larger firms can produce at lower cost. For many locally serving products—eating establishments, consumer products, services—production is likely to have constant returns to scale, and larger firms likely have no particular cost advantage over smaller firms. An important exception might be the shipping traffic through the Ports of Los Angeles and Long Beach. Larger ports can build infrastructure that may allow faster and hence lower cost processing of freight movements. Reductions in landside freight shipping times from the ports to points within and beyond the SCAG region may contribute to shipping volumes that could allow lower costs and hence lead to higher productivity, making the SCAG ports more cost effective than other points of entry.
5. **Learning:** Cities are engines of economic innovation. Virtually all economic advances—in consumer products, electronics, biotechnology, consumer services, entertainment, and fine arts—are created in metropolitan areas. A large and growing literature argues that much of the economic advantage of cities is the learning that is possible when persons and firms are in close proximity (e.g., Puga, 2010, Glaeser, 2011, Storper and Venables, 2004). The engineers in Silicon Valley interact regularly, within and across different firms, creating a hub of knowledge and innovation that is unrivaled in the computing industry. The movie industry in Los Angeles provides the same center for knowledge and learning. Such learning effects are central to many industries, including manufacturing processes and services that increasingly rely on innovations to remain competitive. Transportation investments that reduce traffic congestion can allow persons to interact more readily with a larger pool of like-minded experts, increasing the learning and innovation in a regional economy. That can allow local firms to innovate in ways that lowers costs, improves products, and leads to larger market share. Over time, improved innovation environment will attract mobile labor and capital (workers and firms) from other regions, further boosting economic activity.

Overall, these five effects paint a rich picture of the regional economy—one in which firms can access larger labor and product markets as congestion is reduced, and those effects can translate in the short-run into higher productivity, lower costs, larger market share, and higher employment and, in the longer run new firms may move into the metropolitan region in response to that enhanced competitiveness. Beyond those "market size" effects, learning and innovation can be enhanced by policies that allow persons to interact more quickly and easily with a broad range of economic collaborators and competitors, reducing traffic congestion—the range of movement of workers and business owners—can enhance that learning environment. The nature of any one of these effects, and whether employment would increase or decrease in particular sectors or specific locations within the SCAG region, requires assessing complicated details of the magnitudes of each effect and the tradeoffs that ensue.

Quantified Estimates of Gains from Economic Competitiveness

To capture productivity effects, the results of SCAG's travel model were used in conjunction with REMI to estimate employment impacts that would result not from direct construction jobs and the multiplier effect of those jobs, but instead from the enhanced economic competitiveness of the SCAG region that results from the reductions in congestion delays and improvements in air quality that will be fostered by the plan. Estimating efficiency gains from transportation projects is a frontier topic in practice, and REMI is an advanced model that allows the sophisticated ability to measure some of the channels through which transportation improvements can lead to job growth from increased regional competitiveness. The list below compares how REMI can address each of the five economic competitiveness channels described in the previous section.

1. **Improved labor market matching:** REMI models how metropolitan labor markets expand when network travel times decrease. Changes in highway and transit travel times are both modeled. From increases in labor market catchment areas, REMI estimates improved employer-employee job matches and hence improved firm labor productivity and lower production costs. This channel is modeled well in REMI.
2. **Firms move into the SCAG region in response to enhanced economic competitiveness:** REMI's market share models allow it to estimate how changes in production costs affect firm market shares. That effectively addresses the question of firm in- or out-migration. REMI does not model the number of firms, but the key question

is the size of particular industry sectors, and REMI models market share effects that include changes in the location of production in response to changes in wages and the productivity of intermediate inputs.

3. **Reduced Congestion Reduces Employees' Asking (or Reservation) Wage:** REMI's approach captures some but possibly not all of this effect. When employees migrate into a metropolitan area in response to changes in employment opportunities, that expansion of labor supply and the resulting downward pressure on wages will be captured by REMI. A second effect is that employees are willing to work for lower wages when their commuting costs fall—a phenomenon predicted by economic theory. REMI's ability to capture that may be incomplete, as migration across metropolitan areas in the REMI model is more in response to wages and job opportunities in different metropolitan areas and migration for local amenities, including lower traffic congestion, is apparently not modeled in REMI. Recall that other competitiveness effects, including larger market areas and in-migration of firms into the SCAG region, will increase demand for labor. On net, wages may go up after all adjustments in the economy are accounted for. REMI has an ability to model some of those feedback channels, including the geographic market size for firm output and in-migration of firms due to the increased economic competitiveness of the SCAG region.
4. **Increase market size for firms' products:** The REMI model balances supply and demand within metropolitan areas, and in the broader economy, and so accounts for ways that transportation access changes firms' market size. As noted earlier, a key question for "market size" impacts is whether firms experience increasing returns to scale. Here the ability of the REMI model to capture productivity improvements due to market size is unclear, and particular issues of interest to the region, including the economically important ports, will require additional modeling and analysis in the future.
5. **Learning:** The REMI model has virtually no ability to capture learning improvements that lead to innovations in production processes or, in the extreme, to new products. Forecasting such effects at a regional level is difficult, yet such effects exist and are increasingly important in knowledge based economies.

The Literature

While there is a large academic literature that studies the effect of transportation infrastructure on economic productivity, only a few of those studies draw links to congestion reduction and economic gains. The bulk of the academic literature is focused on estimating relationships between a region's stock of highway or transportation infrastructure and economic productivity. That larger strand of the literature cannot illuminate how transportation infrastructure relates to productivity gains, and the effect of congestion reduction in particular is not modeled. Because congestion reduction is a key path through which transportation investment in the SCAG region could improve economic competitiveness, we focus on the relatively few studies that have drawn links from congestion to regional economic performance. Note that those studies typically aimed to test a hypothesis using retrospective data, often asking whether measures of economic performance are statistically related to traffic congestion. The goal in the academic literature, to date, has not been to forecast magnitudes of economic impacts from future congestion reduction, but instead to use retrospective data to test for a relationship.

Boarnet (1997) estimated labor productivity and output in the 58 counties in California with annual data from 1977 to 1988. He developed a congestion measure for each county based on peak hour measures of traffic volume relative to highway capacity. Boarnet found that congestion is negatively associated with county output (or gross county product.) Converting the regression estimates into elasticities, Boarnet found an effect only for the most congested counties in the state, typically the counties that comprised the San Francisco Bay Area and SCAG region. During the time period being studies, those were typically the only counties that had highway networks with meaningful levels of congestion. The elasticity of output with respect to a measure of congestion suggested that a 10 percent reduction in highway congestion was associated with county output increases in a range from 2 percent to 5 percent.

Hymel (2009) used data from the 85 largest U.S. metropolitan areas from 1982 through 2003. He used regression analysis to examine how employment growth is influenced by several factors, including congestion. Highway congestion measures were drawn from annual reports produced by the Texas Transportation Institute. Hymel found that congestion reduces employment growth, and the effect is non-linear. More congested metropolitan areas experienced larger employment penalties for increases in congestion. Hymel's estimates imply an elasticity of employment growth, from 1990 to 2003, with respect to congestion of -0.466 for the Los Angeles-Orange County metropolitan area, suggested that a 10 percent reduction in traffic congestion is associated with a 4.66 percent increase in employment growth during that 14-year period. Note that the Los Angeles-Orange County elasticity is almost twice the size of the elasticity for San Diego, which is -0.248. In San Diego, during this time period, a 10 percent reduction in traffic congestion is associated with a 2.48 percent increase in employment growth. This illustrates the non-linear nature of congestion's economic penalty. Mildly congested regions experience more moderate reductions in employment growth, but as congestion grows the reduction in employment, based on Hymel's estimates, grows faster than linearly.

Literature Comparison

Because this exercise—estimating economic benefits and competitiveness gains that result from transportation system improvements – is somewhat new, the SCAG economic team cross-checked the result with the academic literature. Hymel's (2009) paper, which uses regression analysis to estimate retrospectively the job gains that would result from congestion reduction, is the best comparison point in the literature. Hymel's results are based on the 1990 to 2003 time period—a shorter time period than the analysis here which focuses on 2011 to 2035. More importantly, Hymel's results suggest that the economic gains from congestion reduction grow larger as congestion increases, and so a simple application of Hymel's results from the less congested time period of the 1990s to the more congested circumstance in 2035 if the "no project" future were to occur (no RTP/SCS related transportation improvements) needs to account for the faster-than-linear growth of the economic gains from congestion reduction. SCAG used Hymel's results, adjusted to reflect the more congested network that would result if the RTP/SCS is not implemented, and estimated that Hymel's regression analysis implies that the RTP/SCS, if fully implemented, would generate 196,000 annual jobs from improved competitiveness.

SCAG considers the REMI estimate of 512,000 annual jobs a reasonable upper bound for network benefits and the Hymel method which estimates 196,000 annual jobs a reasonable lower bound for network benefits. Hymel's estimates, based on econometric analysis from 1990 to 2003, could easily understate the network benefits of the 2012–2035 RTP/SCS in 2035. The congestion levels in the 2011–2035 timeframe for the no project case will be outside of (and more congested than) anything Hymel observed in his 1990-2003 observations of U.S. metro areas. The REMI results, on the other hand, likely exclude some behavioral responses (e.g. increases in telecommuting) that would mitigate the impacts of increased traffic congestion. SCAG judges that a mid-point between the two estimates, 354,000 annual jobs from network benefits, is the most reasonable estimate.

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Glossary

AASHTO | American Association of State Highway and Transportation Officials – A non-profit, non-partisan association representing highway and transportation departments in the 50 states, the District of Columbia, and Puerto Rico.

AB 32 | Assembly Bill 32 – Signed into law on September 26, 2006, it requires that the state's global warming emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012. In order to effectively implement the cap, AB 32 directs the California Air Resources Board (CARB) to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels.

AB 169 | Assembly Bill 169 – Provides for the sixteen federally recognized tribes in the SCAG region to join the SCAG Joint Powers Authority (JPA) to participate in the Southern California Association of Governments by voting at the SCAG General Assembly.

ACE | Alameda Corridor East – A 35-mile corridor extending through the San Gabriel Valley between East Los Angeles and Pomona and connecting the Alameda Corridor to the transcontinental railroad network.

Active Transportation | A mode of transportation that includes walking, running, biking, skateboarding, and other self-propelled forms of transportation.

ADA | Americans with Disabilities Act of 1990 – Guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, state and local government services, and telecommunications. It prescribes federal transportation requirements for transportation providers.

AJR | Assembly Joint Resolution No. 40 – Introduced on August 23, 2007, the resolution calls upon the governor to declare a state of emergency in respect to the air quality health crisis in the South Coast Air Quality Basin related to emissions of $PM_{2.5}$, and to direct steps necessary to address the emergency.

ANCA | Federal Airport Noise and Capacity Act of 1990 – Establishes a national aviation noise policy that reviews airport noise and access restrictions on operations for Stage 2 and Stage 3 aircraft.

Antelope Valley AQMD | Antelope Valley Air Quality Management District – The air pollution control agency for the portion of Los Angeles County north of the San Gabriel Mountains.

AQMP | Air Quality Management Plan – Regional plan for air quality improvement in compliance with federal and state requirements.

ARB | Air Resources Board – Refer to CARB, California Air Resources Board.

ATIS | Advanced Traveler Information Systems – Technology used to provide travelers with information, both pre-trip and in-vehicle, so they can better utilize the transportation system.

ATMS | Advanced Transportation Management Systems – Technology used to improve the operations of the transportation network.

AVO | Average Vehicle Occupancy – Calculated by dividing the total number of travelers by the total number of vehicles.

Base Year | The year 2008, used in the RTP performance analysis as a reference point for current conditions.

Baseline | Future scenario which includes only those projects that are existing, undergoing right-of-way acquisition or construction, come from the first year of the previous RTP or RTIP, or have completed the NEPA process. The Baseline is based upon the adopted 2011 FTIP. The Baseline functions as the "No Project" alternative used in the RTP Program EIR.

BLS | Bureau of Labor Statistics – The principal fact-finding agency for the federal government in the broad field of labor economics and statistics.

BNSF | Burlington Northern and Santa Fe Railway Company

BRT | Bus Rapid Transit – Bus transit service that seeks to reduce travel time through measures such as traffic signal priority, automatic vehicle location, dedicated bus lanes, limited-stop service, and faster fare collection policies.

BTA | Bicycle Transportation Account – Provides state funds for city and county projects that improve safety and convenience for bicycle commuters.

CAA | Clean Air Act (CAA) – 1970 federal act that authorized EPA to establish air quality standards to limit levels of pollutants in the air. EPA has promulgated such standards (or NAAQS) for six criteria pollutants: sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone, lead, and particulate matter (PM_{10}). All areas of the United States must maintain ambient levels of these pollutants below the ceilings established by the NAAQS; any area that does not meet these standards is a "non-attainment" area. States must develop SIPs to explain how they will comply with the CAA. The act was amended in 1977 and again in 1990.

CAFR | Comprehensive Annual Financial Report – Official annual financial report that encompasses all funds and financial components associated with any given organization.

Cal B/C Model | California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C) – Was developed for the California Department of Transportation (Caltrans) as a tool for benefit-cost analysis of highway and transit projects. It is an Excel (spreadsheet) application structured to analyze several types of transportation improvement projects in a corridor where there already exists a highway facility or a transit service (the base case).

Caltrans | California Department of Transportation – State agency responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries.

CARB | California Air Resources Board – State agency responsible for attaining and maintaining healthy air quality through setting and enforcing emissions standards, conducting research, monitoring air quality, providing education and outreach, and overseeing/assisting local air quality districts.

Catalytic Demand | Additional aviation demand that is created by companies that locate in the proximity of expanding airports with developable land around them to reduce airport ground access time and costs for their employees and clients. Catalytic demand is greatest for large hub airports, particularly international airports.

CEHD | Community, Economic and Human Development Committee – A SCAG committee that studies the problems, programs, and other matters which pertain to the regional issues of community, economic and human development, and growth. This committee reviews projects, plans, and programs of regional significance for consistency and conformity with applicable regional plans.

CEQA | California Environmental Quality Act – State law providing certain environmental protections that apply to all transportation projects funded with state funds.

CETAP | Community Environmental and Transportation Acceptability Process – Part of the Riverside County Integrated Project that is examining where to locate possible major new multimodal transportation facilities to serve the current and future transportation needs of Western Riverside County, while minimizing impacts on communities and the environment.

CHSRA | California High-Speed Rail Authority – Agency responsible for planning, designing, constructing, and operating a state-of-the-art high-speed train system in California.

CIP | Capital Improvement Program – Long-range strategic plan that identifies capital projects; provides a planning schedule and financing options.

CMAQ | Congestion Mitigation and Air Quality Program – Federal program initiated by ISTEA to provide funding for surface transportation and other related projects that contribute to air quality improvements and reduce congestion.

CMIA | Corridor Mobility Improvement Account – These funds would be allocated by the California Transportation Commission to highly congested travel corridors in the state. Projects in this category must be a high priority; be able to start construction by 2012; improve mobility in a highly congested corridor by improving travel times and reducing vehicle hours of delay; connect the State Highway System; and improve access to jobs, housing, markets, and commerce.

CMP | Congestion Management Program – Established by Proposition 111 in 1990, requires each county to develop and adopt a CMP that includes highway and roadway system monitoring, multimodal system performance analysis, transportation demand management program, land-use analysis program, and local conformance.

CNSSTC | California-Nevada Super-Speed Train Commission – Public-private partnership developed to promote a high-speed link between California and Nevada.

CO | Carbon Monoxide – A colorless, odorless, poisonous gas formed when carbon in fuels is not burned completely. It is a byproduct of highway vehicle exhaust, which contributes about 60 percent of all CO emissions nationwide.

COG | Council of Governments – Under state law, a single or multi-county council created by a joint powers agreement.

COMPASS/Growth Visioning | A planning process guided by input from the public and initiated by SCAG to develop a regional strategy for addressing future growth in Southern California.

Congestion Management Process | Systematic approach required in transportation management areas (TMAs) that provides for effective management and operation, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under Title 23 U.S.C. and Title 49 U.S.C., through the use of operational management strategies.

Congestion Pricing | User fee imposed on vehicles during peak demand periods on congested roadways.

Constant Dollars | Dollars expended/received in a specific year adjusted for inflation/deflation relative to another time period.

Corridor | In planning, a broad geographical band that follows a general directional flow or connects major sources of trips. It may contain a number of streets and highways, as well as transit lines and routes.

CTC | California Transportation Commission – A nine-member board appointed by the governor to oversee and administer state and federal transportation funds and provide oversight on project delivery.

CTIPS | California Transportation Improvement Program System – A project programming database system used to efficiently and effectively develop and manage various transportation programming documents as required under state and federal law.

CTP | California Transportation Plan – A statewide, long-range transportation policy plan that provides for the movement of people, goods, services, and information. The CTP offers a blueprint to guide future transportation decisions and investments that will ensure California's ability to compete globally, provide safe and effective mobility for all persons, better link transportation and land-use decisions, improve air quality, and reduce petroleum energy consumption.

CVO | Commercial Vehicle Operations – Management of commercial vehicle activities through ITS.

Deficiency Plan | Set of provisions contained in a Congestion Management Plan to address congestion when unacceptable levels of congestion occur. Projects implemented through the Deficiency Plan must, by statute, have both mobility and air quality benefits.

DTIM | Direct Travel Impact Model – A vehicle emissions forecasting model.

EDF | Environmental Defense Fund – A national non-profit organization that seeks to protect the environmental rights of all people, including future generations.

EIR | Environmental Impact Report – An informational document, required under CEQA, which will inform public agency decision-makers and the public generally of the significant environmental effects of a project, possible ways to minimize significant effects, and reasonable alternatives to the project.

EIS | Environmental Impact Statement (federal) – National Environmental Policy Act (NEPA) requirement for assessing the environmental impacts of federal actions that may have a significant impact on the human environment.

EMFAC | Emission Factor – Model that estimates on-road motor vehicle emission rates for current year as well as backcasted and forecasted inventories.

EPA | Environmental Protection Agency – Federal agency established to develop and enforce regulations that implement environmental laws enacted by Congress to protect human health and safeguard the natural environment.

FAA | Federal Aviation Administration – Federal agency responsible for issuing and enforcing safety regulations and minimum standards, managing air space and air traffic, and building and maintaining air navigation facilities.

FHWA | Federal Highway Administration – Federal agency responsible for administering the Federal-Aid Highway Program, which provides federal financial assistance to the states to construct and improve the National Highway System, urban and rural roads, and bridges.

Financially Constrained | Expenditures are said to be financially constrained if they are within limits of anticipated revenues.

FRA | Federal Railroad Administration – Federal agency created to promulgate and enforce rail safety regulations, administer railroad assistance programs, conduct research and development in support of improved railroad safety and national rail transportation policy, and consolidate government support of rail transportation activities.

FTA | Federal Transit Administration – The federal agency responsible for administering federal transit funds and assisting in the planning and establishment of areawide urban mass transportation systems. As opposed to FHWA funding, most FTA funds are allocated directly to local agencies, rather than to Caltrans.

FTIP | Federal Transportation Improvement Program – A three-year list of all transportation projects proposed for federal transportation funding within the planning area of an MPO.

FY | Fiscal Year – The twelve-month period on which the budget is planned. The state fiscal year begins July 1 and ends June 30 of the following year. The federal fiscal year begins October 1 and ends September 30 of the following year.

GAO | Government Accountability Office – Congressional agency responsible for examining matters related to the receipt and payment of public funds.

Gentrification | Gentrification, while holding many definitions, is commonly understood as a change process in historically low-wealth communities that results in rising real estate values coupled with shifts in the economic, social, and cultural demographics and feel of the communities.

GHG | Greenhouse Gases – Components of the atmosphere that contribute to the greenhouse effect. The principal greenhouse gases that enter the atmosphere because of human activities are carbon dioxide, methane, nitrous oxide, and fluorinated gases.

GIS | Geographic Information System – Powerful mapping software that links information about where things are with information about what things are like. GIS allows users to examine relationships between features distributed unevenly over space, seeking patterns that may not be apparent without using advanced techniques of query, selection, analysis, and display.

GNP | Gross National Product – An estimate of the total value of goods and services produced in any specified country in a given year. GNP can be measured as a total amount or an amount per capita.

Grade Crossing | A crossing or intersection of highways, railroad tracks, other guideways, or pedestrian walks, or combinations of these at the same level or grade.

Greenfield | Also known as "raw land," land that is privately owned, lacks urban services, has not been previously developed, and is located at the fringe of existing urban areas.

HCP | Habitat Conservation Plan – Established under Section 10 of the Endangered Species Act to allow development to proceed while protecting endangered species.

HDT | Heavy-Duty Truck – Truck with a gross vehicle weight of 8,500 pounds or more.

HICOMP | Highway Congestion Monitoring Program (Caltrans) – A report that measures the congestion that occurs on urban area freeways in California.

Home-Based Work Trips | Trips that go between home and work, either directly or with an intermediate stop. Home-based work trips include telecommuting, working at home, and non-motorized transportation work trips.

HOT Lane | High-Occupancy Toll Lane – An HOV lane that single-occupant drivers can pay to drive in, also referred to as "Express Lanes."

HOV Lane | High-Occupancy Vehicle Lane – A lane restricted to vehicles with two (and in some cases three) or more occupants to encourage carpooling. Vehicles include automobiles, vans, buses, and taxis.

HPMS | Highway Performance Monitoring System – A federally mandated program designed by FHWA to assess the performance of the nation's highway system.

HSIPR | High-Speed Intercity Passenger Rail Program – A Federal Railroad Administration program created to invest in new high-speed rail corridors and existing rail corridors to improve speed and service.

HSR | High-Speed Rail – Intercity passenger rail service that is reasonably expected to reach speeds of at least 110 mile per hour.

HUD | U.S. Department of Housing and Urban Development – Federal agency charged with increasing homeownership, supporting community development, and increasing access to affordable housing free from discrimination.

ICAPCD | Imperial County Air Pollution Control District – Local air pollution control agency mandated by state and federal regulations to implement and enforce air pollution rules and regulations.

ICTC | Imperial County Transportation Commission – Agency responsible for planning and funding countywide transportation improvements and administering the county's transportation sales tax revenues.

IGR | Intergovernmental Review Process – The review of documents by several governmental agencies to ensure consistency of regionally significant local plans, projects, and programs with SCAG's adopted regional plans.

Infrastructure | The basic facilities, equipment, services, and installations needed for the growth and functioning of a community.

IOS | Initial Operating Segment

ISTEA | Intermodal Surface Transportation Efficiency Act – Signed into federal law on December 18, 1991, it provided authorization for highways, highway safety, and mass transportation for FYs 1991–1997 and served as the legislative vehicle for defining federal surface transportation policy.

ITIP | Interregional Transportation Improvement Program – The portion of the STIP that includes projects selected by Caltrans (25 percent of STIP funds).

ITS | Intelligent Transportation Systems – Systems that use modern detection, communications and computing technology to collect data on system operations and performance, communicate that information to system managers and users, and use that information to manage and adjust the transportation system to respond to changing operating conditions, congestion, or accidents. ITS technology can be applied to arterials, freeways, transit, trucks, and private vehicles. ITS include Advanced Traveler Information Systems (ATIS), Advanced Public Transit Systems (APTS), Advanced Traffic Management Systems (ATMS), Advanced Vehicle Control Systems (AVCS), and Commercial Vehicle Operations (CVO).

JPA | Joint Powers Authority – Two or more agencies that enter into a cooperative agreement to jointly wield powers that are common to them. JPAs are a vehicle for the cooperative use of existing governmental powers to finance and provide infrastructure and/or services in a cost-efficient manner.

LACMTA | Los Angeles County Metropolitan Transportation Authority, also referred to as "Metro" – Agency responsible for planning and funding countywide transportation improvements, administering the county's transportation sales tax revenues, and operating bus and rail transit service.

LAUPT | Los Angeles Union Passenger Terminal, also known as Union Station.

LAWA | Los Angeles World Airports – Aviation authority of the City of Los Angeles. LAWA owns and operates Los Angeles International (LAX), Ontario International, Van Nuys, and Palmdale Airports.

LCVs | Longer-Combination Vehicles – Includes tractor-trailer combinations with two or more trailers that weigh more than 80,000 pounds.

LEM | Location Efficient Mortgage – Allows people to qualify for larger loan amounts if they choose a home in a densely populated community that is well served by public transit and where destinations are located close together so that they can also walk and bike instead of driving everywhere.

Livable Communities | Any location in which people choose may be viewed as "livable." However, communities that contain a healthy mix of homes, shops, workplaces, schools, parks, and civic institutions coupled with a variety of transportation choices, give residents greater access to life's daily essentials and offer higher quality of life to a wider range of residents.

LRT | Light Rail Transit – A mode of transit that operates on steel rails and obtains its power from overhead electrical wires. LRT may operate in single or multiple cars on separate rights-of-way or in mixed traffic.

LTF | Local Transportation Fund – A fund which receives TDA revenues.

MAP | Million Annual Passengers – Used to quantify airport activity.

Market Incentives | Measures designed to encourage certain actions or behaviors. These include inducements for the use of carpools, buses, and other HOVs in place of single-occupant automobile travel. Examples include HOV lanes, preferential parking, and financial incentives.

MDAB | Mojave Desert Air Basin – Area defined by state law as comprising the desert portions of Los Angeles, Kern, Riverside, and San Bernardino Counties.

MDAQMD | Mojave Desert Air Quality Management District – Local air agency mandated by state and federal regulations to implement and enforce air pollution rules and regulations; encompasses the desert portion of San Bernardino County from the summit of the Cajon Pass north to the Inyo County line, as well as the Palo Verde Valley portion of Riverside County.

Measure A | Revenues generated from Riverside County's local half-cent sales tax.

Measure D | Revenues generated from Imperial County's local half-cent sales tax.

Measure I | Revenues generated from San Bernardino County's local half-cent sales tax.

Measure M | Revenues generated from Orange County's local half-cent sales tax.

Measure R | Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has two permanent local sales taxes (Propositions C and A) and one temporary local sales tax (Measure R).

Metrolink | Regional commuter rail system connecting Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties and operated by SCRRA.

MIS | Major Investment Study – The preliminary study, including preliminary environmental documentation, for choosing alternative transportation projects for federal transportation funding. An MIS is a requirement, which is conducted cooperatively by the study sponsor and the MPO.

Mixed Flow | Traffic movement having autos, trucks, buses, and motorcycles sharing traffic lanes.

Mode | A particular form of travel (e.g., walking, traveling by automobile, traveling by bus, or traveling by train).

Mode Split | The proportion of total person trips using various specified modes of transportation.

Model | A mathematical description of a real-life situation that uses data on past and present conditions to make a projection.

MPO | Metropolitan Planning Organization – A federally required planning body responsible for transportation planning and project selection in a region.

MTS | Metropolitan Transportation System – Regional network of roadways and transit corridors.

Multimodal | A mixture of the several modes of transportation, such as transit, highways, non-motorized, etc.

NAAQS | National Ambient Air Quality Standards – Targets established by the U.S. Environmental Protection Agency (EPA) for the maximum contribution of a specific pollutant in the air.

NAFTA | North American Free Trade Agreement – An agreement between the governments of Canada, Mexico, and the United States to eliminate barriers to trade and facilitate the cross-border movement of goods and services.

NCCP | Natural Communities Conservation Plan – Program under the Department of Fish and Game that uses a broad-based ecosystem approach toward planning for the protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity.

NEPA | National Environmental Protection Act – Federal environmental law that applies to all projects funded with federal funds or requiring review by a federal agency.

NIMS | National Incident Management System – Nationwide template that enables all government, private-sector, and non-governmental organizations to work together during a domestic incident.

Nominal Dollars | Actual dollars expended/received in a specific year without adjustments for inflation/deflation.

NOx | Nitrogen oxides – A group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. NOx are a major component of ozone and smog, and they are one of six principal air pollutants tracked by the EPA.

NTD | National Transit Database – The Federal Transit Administration's (FTA) national database for transit statistics.

O&M | Operations and Maintenance – The range of activities and services provided by the transportation system and for the upkeep and preservation of the existing system.

OCTA | Orange County Transportation Authority – Agency responsible for planning and funding countywide transportation improvements, administering the county's transportation sales tax revenues, and operating bus transit service.

OLDA | Orangeline Development Authority – Joint exercise of powers authority developed by the cities located along the Orangeline corridor.

OnTrac | Orange-North America Trade Rail Access Corridor – Formed in April of 2000 to build and support the Orangethorpe Avenue Grade Separation and Trade Corridor project, a 5-mile-long railroad-lowering project that will completely grade separate 11 rail crossings in the cities of Placentia and Anaheim.

Open Space | Generally understood as any area of land or water which, for whatever reason, is not developed for urbanized uses and which therefore enhances residents' quality of life. However, note that each county and city in California must adopt an open space element as part of its general plan. The element is a statement of local planning policies focusing on the use of unimproved land or water for: 1) the preservation or managed production of natural resources, 2) outdoor recreation, and 3) the promotion of public health and safety. Therefore, open space will be defined by each jurisdiction based on their own unique resources and environment.

OWP | Overall Work Program – SCAG develops an OWP annually, describing proposed transportation planning activities for the upcoming fiscal year, including those required by federal and state law.

Parking Cash-Out Program | An employer-funded program under which an employer offers to provide a cash allowance to an employee equivalent to the parking subsidy that the employer would otherwise pay to provide the employee with a parking space.

Parking Subsidy | The difference between the out-of-pocket amount paid by an employer on a regular basis in order to secure the availability of an employee parking space not owned by the employer and the price, if any, charged to an employee for use of that space.

PATH | Partners for Advanced Transit and Highways – Joint venture of Caltrans which includes the University of California and other public and private academic institutions and industries.

PEIR | Program Environmental Impact Report – Environmental review process used to evaluate the potential environmental effects of large-scale plans or programs.

PeMS | Freeway Performance Measurement System – A service provided by the University of California, Berkeley, to collect historical and real-time freeway data from freeways in the state of California in order to compute freeway performance measures.

Person Trip | A trip made by a person by any mode or combination of modes for any purpose.

PM_{10} | Particulate Matter – A mixture of solid particles and liquid droplets found in the air 10 micrometers or less in size (a micrometer is one-millionth of a meter). These coarse particles are generally emitted from sources such as vehicles traveling on unpaved roads, materials handling, and crushing and grinding operations, as well as windblown dust.

$PM_{2.5}$ | Particulate Matter – A mixture of solid particles and liquid droplets found in the air 2.5 micrometers or less in size (a micrometer is one-millionth of a meter). These fine particles result from fuel combustion from motor vehicles, power generation, and industrial facilities, as well as from residential fireplaces and wood stoves.

PMD | LA/Palmdale Regional Airport – Regional airport located in Palmdale.

PPP | Public-Private Partnership – Contractual agreements formed between a public agency and private-sector entity that allow for greater private-sector participation in the delivery of transportation projects.

PRC | Peer Review Committee – An "informal" committee of technical experts usually organized and invited to review and comment on various technical issues and processes used in the planning process.

Proposition 1A | Passed by voters in 2006, Proposition 1A protects transportation funding for traffic congestion relief projects, safety improvements, and local streets and roads. It also prohibits the state sales tax on motor vehicle fuels from being used for any purpose other than transportation improvements and authorizes loans of these funds only in the case of severe state fiscal hardship.

Proposition 1B | Highway Safety, Traffic Reduction, Air Quality, and Port Security State of California – Passed in November 2006, Proposition 1B provides $19.9 billion to fund state and local transportation improvement projects to relieve congestion, improve movement of goods, improve air quality, and enhance safety and security of the transportation system.

Proposition A | Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has two permanent local sales taxes (Propositions C and A) and one temporary local sales tax (Measure R).

Proposition C | Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has two permanent local sales taxes (Propositions C and A) and one temporary local sales tax (Measure R).

PSR | Project Study Report – Defines and justifies the project's scope, cost, and schedule. PSRs are prepared for state highway projects and PSR equivalents are prepared for projects not on the State Highway System. Under state law, a PSR or PSR equivalent is required for STIP programming.

PTA | Public Transportation Account – The major state transportation account for mass transportation purposes. Revenues include a portion of the sales tax on gasoline and diesel fuels.

PUC | Public Utilities Commission – Regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies.

Railroad Siding | A short stretch of railroad track used to store rolling stock or enable trains on the same line to pass; also called sidetrack.

RC | Regional Council – Conducts the affairs of SCAG; implements the General Assembly's policy decisions; acts upon policy recommendations from SCAG policy committees and external agencies; appoints committees to study specific problems; and amends, decreases or increases the proposed budget to be reported to the General Assembly.

RCP | Regional Comprehensive Plan (RCP) – Developed by SCAG, the RCP is a vision of how Southern California can balance resource conservation, economic vitality, and quality of life. It will serve as a blueprint to approach growth and infrastructure challenges in an integrated and comprehensive way.

RCTC | Riverside County Transportation Commission – Agency responsible for planning and funding countywide transportation improvements and administering the county's transportation sales tax revenues.

RHNA | Regional Housing Needs Assessment – Quantifies the need for housing within each jurisdiction of the SCAG region based on population growth projections. Communities then address this need through the process of completing the housing elements of their General Plans.

Robust Flight Portfolio | Providing a range of flight offerings in different haul length categories including short-haul, medium-haul, long-haul, and international flights.

ROG | Reactive Organic Gas – Organic compounds assumed to be reactive at urban/regional scales. Those organic compounds that are regulated because they lead to ozone formation.

RSTIS | Regionally Significant Transportation Investment Study – Involves identifying all reasonable transportation options, their costs, and their environmental impacts. RSTIS projects are generally highway or transit improvements that have a significant impact on the capacity, traffic flow, level of service, or mode share at the transportation corridor or sub-area level.

RSTP | Regional Surface Transportation Program – Established by California state statute utilizing federal Surface Transportation Program funds. Approximately 76 percent of the state's RSTP funds must be obligated on projects located within the 11 urbanized areas of California with populations of 200,000 or more.

RTMS | Regional Transportation Monitoring System – Internet-based transportation monitoring system. The RTMS will be the source for real-time and historical transportation data collected from local, regional, and private data sources.

RTP | Regional Transportation Plan (RTP) – Federally required 20-year plan prepared by metropolitan planning organizations and updated every four years. Includes projections of population growth and travel demand, along with a specific list of proposed projects to be funded.

RTSS | Regional Transit Security Strategy – Strategy for the region with specific goals and objectives related to the prevention, detection, response, and recovery of transit security issues.

SAFETEA-LU | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users – Signed into law by President Bush on August 10, 2005, it authorized the federal surface transportation programs for highways, highway safety, and transit for the 5-year period of 2005–2009.

SANBAG | San Bernardino Associated Governments – The council of governments and transportation planning agency for San Bernardino County. SANBAG is responsible for cooperative regional planning and developing an efficient multimodal transportation system countywide.

SANDAG | San Diego Association of Governments.

SB 45 | Senate Bill 45 (Chapter 622, Statutes of 1997, Kopp) – Established the current STIP process and shifted control of decision-making from the state to the regional level.

SB 375 | Senate Bill 375 (Chapter 728, Steinberg) – Established to implement the state's greenhouse gas (GHG) emission-reduction goals, as set forth by AB 32, in the sector of cars and light trucks. This mandate requires the California Air Resources Board to determine per capita GHG emission-reduction targets for each metropolitan planning organization (MPO) in the state at two points in the future—2020 and 2035. In turn, each MPO must prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its GHG reduction target through integrated land use, housing, and transportation planning.

SB 974 | Senate Bill 974 – Introduced by Senator Alan Lowenthal, SB 974 would impose a $30 fee on each shipping container processed at the Ports of Los Angeles, Long Beach, and Oakland for congestion management and air quality improvements related to ports.

SBD | San Bernardino International Airport – International airport located in San Bernardino.

SCAB | South Coast Air Basin – Comprises the non–Antelope Valley portion of Los Angeles County, Orange County, Riverside County, and the non-desert portion of San Bernardino County.

SCAG | Southern California Association of Governments – The metropolitan planning organization (MPO) for six counties including Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura.

SCAQMD | South Coast Air Quality Management District – The air pollution control agency for Orange County and major portions of Los Angeles, Riverside, and San Bernardino Counties in Southern California.

SCCAB | South Central Coast Air Basin – Comprises San Luis Obispo, Santa Barbara, and Ventura Counties.

SCRIFA | Southern California Railroad Infrastructure Financing Authority

Scrip | A form of fare payment transferrable among transportation providers, often issued by Dial-A-Ride transit service providers to be used on taxis.

SED | Socioeconomic Data – Population, employment, and housing forecast.

SHA | State Highway Account – The major state transportation account for highway purposes. Revenues include the state excise taxes on gasoline and diesel fuel and truck weight fees.

SHOPP | State Highway Operation and Protection Program – A four-year capital improvement program for rehabilitation, safety, and operational improvements on state highways.

SIP | State Implementation Plan – State air quality plan to ensure compliance with state and federal air quality standards. In order to be eligible for federal funding, projects must demonstrate conformity with the SIP.

Smart Growth Principles | The following principles developed by the Smart Growth Network, a partnership of government, business, and civic organizations created in 1996:

1. Mix land uses
2. Take advantage of compact building design
3. Create a range of housing opportunities and choices
4. Create walkable neighborhoods
5. Foster distinctive, attractive communities with a strong sense of place
6. Preserve open space, farmland, natural beauty, and critical environmental areas
7. Strengthen and direct development towards existing communities
8. Provide a variety of transportation choices
9. Make development decisions predictable, fair, and cost effective
10. Encourage community and stakeholder collaboration in development decisions

SOV | Single-Occupant Vehicle – Privately operated vehicle that contains only one driver or occupant.

SOx | Sulfur oxide – Any of several compounds of sulfur and oxygen, formed from burning fuels such as coal and oil.

SSAB | Salton Sea Air Basin – Comprises the Coachella Valley portion of Riverside County and all of Imperial County.

STA | State Transit Assistance – State funding program for mass transit operations and capital projects. Current law requires that STA receive 50 percent of PTA revenues.

STIP | State Transportation Improvement Program – A four-year capital outlay plan that includes the cost and schedule estimates for all transportation projects funded with any amount of state funds. The STIP is approved and adopted by the CTC and is the combined result of the ITIP and the RTIP.

STP | Surface Transportation Program – Provides flexible funding that may be used by states and localities for projects on any federal-aid highway, bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities. A portion of funds reserved for rural areas may be spent on rural minor collectors.

TAC | Technical Advisory Committee – A SCAG committee that provides ideas and feedback on the technical integrity of the Regional Transportation Plan.

TANN | Traveler Advisory News Network – Provides real-time traffic and transportation information content to communications service providers and consumer media channels both nationally and internationally.

TAZ | Traffic Analysis Zone – Zone system used in travel demand forecasting.

TC | Transportation Committee – Committee used to study problems, programs, and other matters which pertain to the regional issues of mobility, air quality, transportation control measures, and communications.

TCM | Transportation Control Measure – A project or program that is designed to reduce emissions or concentrations of air pollutants from transportation sources. TCMs are referenced in the State Implementation Plan (SIP) for the applicable air basin and have priority for programming and implementation ahead of non-TCMs.

TCWG | Transportation Conformity Working Group – Forum used to support interagency coordination to help improve air quality and maintain transportation conformity.

TDA | Transportation Development Act – State law enacted in 1971 that provided a 0.25 percent sales tax on all retail sales in each county for transit, bicycle, and pedestrian purposes. In non-urban areas, funds may be used for streets and roads under certain conditions.

TDM | Transportation Demand Management – Strategies that result in more efficient use of transportation resources, such as ridesharing, telecommuting, park-and-ride programs, pedestrian improvements, and alternative work schedules.

TEA-21 | Transportation Equity Act for the 21st Century – The predecessor to SAFETEA-LU, it was signed into federal law on June 9, 1998. TEA-21 authorized the federal surface transportation programs for highways, highway safety, and transit for the six-year period of 1998–2003. TEA-21 builds upon the initiatives established in ISTEA.

TEU | Twenty-Foot Equivalent Unit, a measure of shipping container capacity.

TIFIA | Transportation Infrastructure Finance and Innovation Act of 1998 – Established a new federal credit program under which the US DOT may provide three forms of credit assistance—secured (direct) loans, loan guarantees, and standby lines of credit—for surface transportation projects of national or regional significance. The program's fundamental goal is to leverage federal funds by attracting substantial private and other non-federal co-investment in critical improvements to the nation's surface transportation system. Sponsors may include state departments of transportation, transit operators, special authorities, local governments, and private entities.

TOD | Transit-Oriented Development – A planning strategy that explicitly links land-use and transportation by focusing mixed housing, employment, and commercial growth around bus and rail stations (usually within ½ mile). TODs can reduce the number and length of vehicle trips by encouraging more bicycle/pedestrian and transit use and can support transit investments by creating the density around stations to boost ridership.

TP&D | Transportation Planning and Development Account – A state transit trust fund that is the funding source for the STA program.

Trantrak | RTIP Database Management System

TSWG | Transportation Security Working Group – Advises the operating organizations on transportation safety matters associated with the transfer or shipment of hazardous materials.

TUMF | Transportation Uniform Mitigation Fee – Ordinance enacted by the Riverside County Board of Supervisors and cities to impose a fee on new development to fund related transportation improvements.

UP | Union Pacific Railroad

Urban Growth Boundary | A regional boundary that seeks to contain outward urban expansion by limiting development outside of the boundary, while focusing new growth within the boundary. Urban growth boundaries lead to the preservation of open space and agricultural lands, redevelopment and infill in existing communities, and optimization of existing infrastructure and transportation investments.

US DOT | U.S. Department of Transportation – Federal agency responsible for the development of transportation policies and programs that contribute to providing fast, safe, efficient, and convenient transportation at the lowest cost consistent with those and other national objectives, including the efficient use and conservation of the resources of the United States. US DOT is comprised of ten operating administrations, including FHWA, FTA, FAA, and FRA.

VCTC | Ventura County Transportation Commission – Agency responsible for planning and funding countywide transportation improvements.

Vehicle Hours of Delay | The travel time spent on the highway due to congestion. Delay is estimated as the difference between vehicle hours traveled at a specified free-flow speed and vehicle hours traveled at a congested speed.

VHDD | Vehicle Hours of Daily Delay – Hours of delay attributed to congestion for vehicles each day.

VMT | Vehicle Miles Traveled – On highways, a measurement of the total miles traveled by all vehicles in the area for a specified time period. It is calculated by the number of vehicles times the miles traveled in a given area or on a given highway during the time period. In transit, the number of vehicle miles operated on a given route or line or network during a specified time period.

VOC | Volatile Organic Compounds – Organic gases emitted from a variety of sources, including motor vehicles, chemical plants, refineries, factories, consumer, and commercial products, and other industrial sources. Ozone, the main component of smog, is formed from the reaction of VOCs and NOx in the presence of heat and sunlight.

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REGIONAL TRANSPORTATION PLAN
2012–2035
SUSTAINABLE COMMUNITIES STRATEGY
Towards a Sustainable Future
RTP

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EXHIBIT F

THE 2020–2045 REGIONAL TRANSPORTATION PLAN/
SUSTAINABLE COMMUNITIES STRATEGY OF THE
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

CONNECT SoCal

ADOPTED ON
SEPTEMBER 3, 2020

SCAG™
INNOVATING FOR A BETTER TOMORROW

U.S. Department of Transportation Federal Highway Administration

U.S. Department of Transportation Federal Transit Administration

CALIFORNIA DEPARTMENT OF TRANSPORTATION

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INNOVATING FOR A BETTER TOMORROW

OUR VISION

Southern California's
catalyst for a brighter future.

OUR MISSION

To foster innovative regional solutions that improve the lives of Southern Californians through inclusive **collaboration**, visionary **planning**, regional **advocacy**, information **sharing**, & promoting **best practices**.

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OUR CORE VALUES

- Be Open
- Lead By Example
- Make An Impact
- Be Courageous

RESOLUTION NO. 20-624-1

A RESOLUTION OF THE SOUTHERN CALIFORNIAASSOCIATION OF GOVERNMENTS (SCAG) ADOPTING THE 2020-2045 REGIONAL TRANSPORTATION PLAN/SUSTAINABLE COMMUNITIES STRATEGY (CONNECT SOCAL) PROGRAM ENVIRONMENTAL IMPACT REPORT (PEIR) ADDENDUM AND APPROVING CONNECT SOCAL IN ITS ENTIRETY

WHEREAS, the Southern California Association of Governments (SCAG) is a Joint Powers Agency established pursuant to California Government Code Section 6502 et seq.;

WHEREAS, SCAG is the designated Metropolitan Planning Organization (MPO) for the counties of Los Angeles, Riverside, San Bernardino, Ventura, Orange, and Imperial, pursuant to Title 23, United States Code Section 134(d);

WHEREAS, SCAG is responsible for maintaining a continuing, cooperative, and comprehensive transportation planning process which involves the preparation and update every four years of a Regional Transportation Plan (RTP) pursuant to Title 23, United States Code Section 134 et seq., Title 49, United States Code Section 5303 et seq., and Title 23, Code of Federal Regulations Section 450 et seq.;

WHEREAS, SCAG is the multi-county designated transportation planning agency under state law, and as such is responsible for preparing, adopting and updating every four years the RTP and Sustainable Communities Strategy (SCS) pursuant to Government Code Section 65080 et seq.;

WHEREAS, pursuant to Senate Bill 375 (Steinberg, 2008) as codified in Government Code Section 65080(b) et seq., SCAG prepared an SCS as a component of the RTP document that demonstrates how the region will meet its greenhouse gas (GHG) reduction targets as determined by the California Air Resources Board (ARB);

WHEREAS, ARB set the per capita GHG emission reduction targets from automobiles and light trucks for the SCAG region at 8% below 2005 per capita emissions levels by 2020 and 19% below 2005 per capita emissions levels by 2035;

WHEREAS, pursuant to Government Code Section 65080(b)(2)(B), the SCS must: (1) identify the general location of uses, residential densities, and building intensities within the region; (2) 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; (3) identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Government Code Section 65584; (4) identify a transportation network to service the transportation needs of the region; (5) 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; and (6) consider the state housing goals specified in Sections 65580 and 65581, (7) 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 GHG emissions from automobiles and light trucks to achieve the GHG reduction targets approved by the state board, and (8) allow the RTP to comply with air quality conformity requirements under the federal Clean Air Act;

WHEREAS, through the continuing, comprehensive and coordinated transportation planning process in conformance with all applicable federal and state requirement, SCAG developed and prepared the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy ("RTP/SCS," "Connect SoCal" or "Plan");

WHEREAS, Connect SoCal sets forth the long-range regional plan, policies and strategies for transportation improvements and regional growth throughout the SCAG region through the horizon year of 2045;

WHEREAS, Connect SoCal includes a regional growth forecast that was developed by working with local jurisdictions using the most recent land use plans and policies and planning assumptions;

WHEREAS, Connect SoCal includes a financial plan identifying the revenues committed, available or reasonably available to support the SCAG region's surface transportation investments. The financial plan was developed following basic principles including incorporation of county and local financial planning documents in the region where available, and utilization of published data sources to evaluate historical trends and augment local forecasts as needed;

WHEREAS, Connect SoCal includes a financially constrained plan and a strategic plan. The constrained plan includes transportation projects that have committed, available or reasonably available revenue sources, and thus are probable for implementation. The strategic plan is an illustrative list of additional transportation investments that the region would pursue if additional funding and regional commitment were secured; and such investments are potential candidates for inclusion in the constrained RTP/SCS through future amendments or updates. The strategic plan is provided for information purposes only and is not part of the financially constrained and conforming Connect SoCal;

WHEREAS, Connect SoCal includes a sustainable communities strategy which sets forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportations measures and policies, if implemented, will reduce the GHG emissions from automobiles and light trucks to achieve the regional GHG targets set by ARB for the SCAG region;

WHEREAS, Connect SoCal must comply with all applicable provisions of federal and state law including but not limited to:

(1) The Moving Ahead for Progress in the 21st Century Act (MAP-21, PL 112-141) and the metropolitan planning regulations at Title 23, United States Code Section 134 et seq., as was amended by the Fixing America's Surface Transportation Act (P.L. I 14-94, December 4, 2015);

(2) The metropolitan planning regulations at 23 C.F.R. Part 450, Subpart C;

(3) California Government Code Section 65080 et seq.; Public Utilities Code Section 130058 and 130059; and Public Utilities Code Section 44243.5;

(4) Sections 174 and 176(c) and (d) of the federal Clean Air Act [(42 U.S.C. §§7504 and 7506(c) and (d)] and U.S. Environmental Protection Agency (EPA) transportation conformity regulations, 40 C.F.R. Parts 51 and 93;

(5) Title VI of the 1964 Civil Rights Act and the Title VI assurance executed by the State pursuant to Title 23, United States Code Section 324;

(6) The Department of Transportation's Final Environmental Justice Strategy (60 Fed. Reg. 33896; June 29, 1995) enacted pursuant to Executive Order 12898, which seeks to avoid disproportionately high and adverse impacts on minority and low-income populations with respect to human health and the environment;

(7) Title II of the 1990 Americans with Disabilities Act (42 U.S.C. §§ 12101 et seq.) and its accompanying regulations (49 C.F.R. §§ 27, 37, and 38); and

(8) SB 375 (Steinberg, 2008) as codified in California Government Code §65080(b) et seq.;

WHEREAS, pursuant to the California Environmental Quality Act (CEQA) (Cal. Pub. Res. § 21000 et seq.) and CEQA Guidelines (Cal. Code Regs., Tit. 14, §15000 et seq.), SCAG, as the Lead Agency, prepared the Final Program Environmental Impact Report (PEIR) for Connect SoCal;

WHEREAS, SCAG has also prepared and adopted a Mitigation Monitoring and Reporting Program in compliance with Public Resources Code §21081.6 and CEQA Guidelines §15097;

WHEREAS, in non-attainment and maintenance areas for transportation-related criteria pollutants, the MPO, as well as the Federal Highways Administration (FHWA) and Federal Transit Administration (FTA), must make a transportation conformity determination on any updated or amended RTP in accordance with the federal Clean Air Act to ensure that federally supported highway and transit project activities conform to the purpose of the State Implementation Plan (SIP);

WHEREAS, transportation conformity is based upon a positive conformity finding with respect to the following tests: (1) regional emissions analysis, (2) timely implementation of Transportation Control Measures, (3) financial constraint, and (4) interagency consultation and public involvement;

WHEREAS, pursuant to Government Code §65080(b)(2)(F) and federal public participation requirements, including 23 C.F.R. §450.316(b)(l)(iv), SCAG must prepare the RTP/SCS by providing adequate public notice of public involvement activities and time for public review. On September 6, 2018, SCAG approved and adopted a Public Participation Plan, to serve as a guide for SCAG's public involvement process, including the public involvement process to be used for the Connect SoCal, and included an enhanced outreach program that incorporates the public participation requirements of SB 375 and adds strategies to better serve the underrepresented segments of the region;

WHEREAS, pursuant to Government Code §65080(b)(2)(F)(iii), during the summer 2019, SCAG held a series of RTP/SCS public workshops throughout the region, including residents, elected officials, representatives of public agencies, community organizations, and environmental, housing and business stakeholders;

WHEREAS, in accordance with the interagency consultation requirements, 40 C.F.R. §93.105, SCAG consulted with the respective transportation and air quality planning agencies, including but not limited to, extensive discussion of the Draft Connect SoCal Transportation Conformity Technical Report before the Transportation Conformity Working Group (a forum for implementing the interagency consultation requirements) throughout the RTP/SCS update process;

WHEREAS, the Transportation Conformity Technical Report contained in Connect SoCal makes a positive transportation conformity determination. Using the final motor vehicle emission budgets submitted by ARB and approved or found to be adequate by EPA, this conformity determination is based upon staff's analysis of the applicable transportation conformity tests;

WHEREAS, SCAG released the Draft Connect SoCal and the associated Draft Amendment No. 19-12 to the 2019 FTIP for a 60-day public review and comment period that began on November 14, 2019 and ended on January 24, 2020;

WHEREAS, SCAG followed the provisions of its adopted Public Participation Plan regarding public involvement activities for the Draft Connect SoCal and Draft PEIR. Public outreach efforts included publication of the Draft Connect SoCal and Draft PEIR on SCAG's website, distribution of public information materials, held three (3) duly-noticed public hearings (public hearings were video-conferenced to 5 regional offices in different counties), and 21 elected official briefings within the SCAG region to allow stakeholders, elected officials and the public to comment on the Draft Connect SoCal and the Draft PEIR;

WHEREAS, during the public review and comment period, SCAG received 107 verbal and written comment submissions on the Draft Connect SoCal;

WHEREAS, SCAG staff presented an overview of the comments received on the Draft Connect SoCal and Draft PEIR, and a proposed approach to the responses, to the Policy Committees and Regional Council on March 5, 2020;

WHEREAS, comment letters on the Draft Connect SoCal as well as staff responses were posted on the SCAG website on March 27, 2020, and included as part of the Final Connect SoCal, Public Participation and

Consultation Technical Report, Appendix 2-4. SCAG also notified all commenters of the availability of the comments and responses;

WHEREAS, on May 7, 2020, SCAG's three Policy Committees met and each recommended that the Regional Council approve Resolution No. 20-621-1 to certify the proposed Final PEIR and approve the proposed Final Connect SoCal for purposes of federal transportation conformity only;

WHEREAS, the Regional Council had the opportunity to review and consider the proposed Final Connect SoCal and its related technical reports in its entirety as well as the staff report related to the proposed Final Connect SoCal, as part of a public meeting held on May 7, 2020;

WHEREAS, on or about May 7, 2020, the Regional Council adopted Resolution No. 20-621-1 wherein it certified the Final PEIR and approved Connect SoCal for federal transportation conformity purposes only, and postponed for up to 120 days approval of Connect SoCal in its entirety and for all other purposes;

WHEREAS, on May 14, 2020, SCAG staff submitted Connect SoCal and 2019 FTIP Amendment No. 19-12 to FHWA and FTA for a final transportation conformity determination in accordance with the Federal Clean Air Act and EPA transportation conformity regulations, 40 C.F.R. Parts 51 and 93;

WHEREAS, on June 5, 2020, FHWA and FTA jointly determined that transportation conformity requirements have been met for Connect SoCal and 2019 FTIP Amendment No. 19-12;

WHEREAS, staff engaged with a diverse array of stakeholders to consider the impacts of COVID-19 on Connect SoCal;

WHEREAS, staff worked with local jurisdictions to restore entitlements and their phasing as conveyed by jurisdictions, and conducted technical analysis to quantify all differences within the SCS and locally-approved General Plans and quantify the increase (or decrease) in housing, jobs or population between Connect SoCal and each local General Plan;

WHEREAS, on July 2, 2020, staff presented to each of the three Policy Committees and the Regional Council, a progress report describing modifications to the SCS and associated modeling and analysis;

WHEREAS, SCAG has prepared an Addendum to the Connect SoCal PEIR (Addendum) to evaluate the technical refinements for Connect SoCal and address two comment letters from the Center of Biological Diversity (CBD) received on May 1, 2020 and May 6, 2020, wherein CBD requested expanded background information related to environmental setting, environmental impacts, and consideration of other mitigation measures;

WHEREAS, while SCAG is not obligated to respond to late comments (as the public review period occurred from December 9, 2019 to January 24, 2020), in the interest of providing as much information to the public as possible, SCAG has addressed CBD's comments and incorporated additional information;

WHEREAS, pursuant to CEQA Guidelines Section 15164(a), an Addendum may be prepared by the Lead Agency that prepared the original EIR if some changes or additions are necessary, but none of the conditions have occurred set forth under CEQA Guidelines Section 15162 requiring preparation of a Subsequent EIR;

WHEREAS, the Addendum reflects SCAG's clarification and addition of information requested by CBD and analysis of the technical refinements and concludes that the PEIR is sufficient for addressing the potential environmental impacts and mitigation measures for the Plan;

WHEREAS, based on CBD's comment letters, SCAG has refined the mitigation measures and has prepared a Revised Mitigation Monitoring and Reporting Program (MMRP);

WHEREAS, SCAG has prepared an Errata to the Final Connect SoCal PEIR and to the adopted Findings as the previously adopted Final PEIR incorrectly identified Growth Forecast Guiding Principles as Plan Principles;

WHEREAS, pursuant to SB 375, Connect SoCal includes the SCS which is required to meet GHG reduction targets from automobiles and light trucks for 2020 and 2035 as set by ARB;

WHEREAS, the SCS must identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Section 65080(b)(2)(B)(iii);

WHEREAS, the Regional Housing Needs Assessment (RHNA) is mandated by state housing law as part of the periodic process of updating local housing elements contained in General Plans. The RHNA quantifies the need for housing by income categories within each jurisdiction over a specified eight-year period and requires that local jurisdictions make available sufficient zoned capacity to accommodate this need;

WHEREAS, the state Legislature intended that housing planning be coordinated and integrated with the regional transportation plan and SCS. To achieve this goal, the RHNA allocation plan shall allocate housing units within the region consistent with the development pattern included in the SCS (Govt. Code § 65584.04(m));

WHEREAS, as a result of stakeholder outreach, SCAG staff received requests to clarify the limits of SCAG's authority with respect to the TAZ-level growth forecast data used for Connect SoCal regional modeling purposes, and the relationship of such data with local jurisdictions' implementation of their respective RHNA housing allocations; and

WHEREAS, all legal prerequisites to the adoption of this Resolution have occurred.

NOW THEREFORE, BE IT RESOLVED, the Regional Council hereby adopts the Addendum to the Connect SoCal PEIR and approves Connect SoCal in its entirety.

BE IT FURTHER RESOLVED by the Regional Council that:

1. The Addendum to the Connect SoCal PEIR has been completed in compliance with CEQA.

2. Based on substantial evidence provided in the Addendum, the Final PEIR and other materials in the record, SCAG determines that the impacts of

the Plan fall within the analyses in the Final PEIR as the Plan has no new significant environmental impacts; no substantial increase in the severity of previously identified significant effects; no mitigation measures or alternatives previously found infeasible are now feasible; and no mitigation measures or alternatives which are considerably different from those in the Final PEIR that would substantially reduce significant effects are declined to be adopted. Thus, a subsequent or supplemental EIR is not required.

3. Some changes or additions are necessary to the PEIR, making an Addendum the appropriate CEQA document for Connect SoCal refinements (CEQA Guidelines 15164).

4. Pursuant to Public Resources Code section 21081.6, the Regional Council hereby adopts the Revised Mitigation and Monitoring and Reporting Program (MMRP) attached to this Resolution as Exhibit A and the Errata to the Findings of Fact, attached to this Resolution as Exhibit B.

5. In consideration of the certified Connect SoCal PEIR and the Addendum to the PEIR, the Regional Council hereby approves Connect SoCal and finds as follows:

   a. Connect SoCal complies with all applicable federal and state requirements, including the metropolitan planning provisions as identified in the Code of Federal Regulations Title 23 Part 450 and Title 49, Part 613, and other state planning requirements as identified in California Government Code Section 65080. Specifically, Connect SoCal fully addresses the requirements relating to the development and content of metropolitan transportation plans as set forth in 23 C.F.R.§450.322 et seq., including issues relating to: identification of transportation facilities that function as an integrated metropolitan transportation system; operational and management strategies; safety and security; performance measures; environmental mitigation; the need for a financially constrained plan; consultation and public participation; and transportation conformity;

   b. The SCS prepared as part of Connect SoCal complies with the emission reduction targets established by ARB and meets the requirements of SB 375 (Steinberg, 2008) as codified in Government Code §65080(b) et seq. by achieving GHG emission reductions at 8% below 2005 per capita emissions levels by 2020 and 19% below 2005 per capita emissions levels by 2035;

   c. Connect SoCal's preferred land use scenario and corresponding forecast of population, household and employment growth is adopted at the jurisdictional level, and any corresponding sub-jurisdictional level data and/or maps are advisory only.

6. The Regional Council hereby directs staff to submit the SCS to ARB to review SCAG's determination that the SCS meets the regional GHG emission reduction targets;

7. The Regional Council hereby clarifies the limits of SCAG's authority with respect to the use of TAZ-level data and the relationship between the Connect SoCal growth forecast and local jurisdictions' implementation of their respective RHNA allocations as follows:

   a. Pursuant to state planning law (SB 375), SCAG's 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), known as "Connect SoCal," is required to meet greenhouse gas emissions (GHG) reduction targets from automobiles and light trucks for 2020 and 2035 as set by the California Air Resources Board (CARB). With regard to implementation of the sustainable communities strategy (SCS), SB 375 specifically provides that nothing in the SCS shall be interpreted as superseding the exercise of the land use authority of cities and counties within the region. Further, SB 375 may not be interpreted to authorize the abrogation of any vested right whether created by statute or by common law, and may not require a city's or county's land use policies and regulations, including its general plan, to be consistent with such plan. (Cal. Govt. Code § 65080(b)(2)(K)).

   b. The Regional Housing Needs Assessment (RHNA) is mandated by state housing law as part of the periodic process of updating local housing elements contained in General Plans. The RHNA quantifies the need for housing by income categories within each jurisdiction over a specified eight-year period and requires that local jurisdictions make available sufficient zoned capacity to accommodate this need.

   c. SCAG's legislative platform reflects its support of consistency within state law regarding the sometimes competing demands contained within SB 375 and the RHNA[1].

   d. The limits of SCAG's authority are reflected in the following Growth Forecast Guiding Principles contained in Connect SoCal, which are hereby clarified as follows (additions are in italics):

      i. Connect SoCal will be adopted at the jurisdictional-level, and directly reflects the population, household and employment growth projections that have been reviewed and refined with feedback from local jurisdictions through SCAG's Bottom-Up Local Input and Envisioning Process. The growth forecast maintains these locally informed projected jurisdictional growth totals, meaning future growth is not reallocated from one local jurisdiction to another.

      ii. Connect SoCal's growth forecast at the Transportation Analysis Zone (TAZ) level is controlled to not exceed the maximum density of local general plans as conveyed by jurisdictions, except in the case of existing entitlements and development agreements. TAZ-level growth projections are utilized by SCAG for regional modeling purposes and are not adopted as part of Connect SoCal nor included as part of the Forecasted

1 See SCAG 2020 Legislative Platform at: http://www.scag.ca.gov/programs/Documents/LegislativePriorities/SCAG-2020-legislative-platform-STATE.pdf

Regional Development Pattern. The Forecasted Regional Development Pattern for Connect SoCal reflects the policies and strategies of the Plan and includes existing entitlements and development agreements conveyed by jurisdictions, as depicted in the Connect SoCal Sustainable Communities Technical Report.

iii. For the purpose of determining consistency with Connect SoCal for California Environmental Quality Act (CEQA), grants or other opportunities, lead agencies such as local jurisdictions have the sole discretion in determining a local project's consistency; SCAG may also evaluate consistency for grants and other resource opportunities; consistency should be evaluated utilizing the goals and policies of Connect SoCal and its associated Program Environmental Impact Report (PEIR). However, TAZ-level growth projections for households, employment or population reflected in TAZ Maps may not be utilized to determine consistency or inconsistency with Connect SoCal2.

iv. TAZ-level data or any data at a geography smaller than the jurisdictional-level has been utilized to conduct required modeling analyses and is therefore advisory only and non-binding, given that sub-jurisdictional forecasts are not adopted as part of Connect SoCal. TAZ-level data may be used by jurisdictions in local planning as they deem appropriate, and Connect SoCal does not supersede or otherwise affect local jurisdiction authority or decisions on future development, including entitlements and development agreements. There is no obligation by a jurisdiction to change its land use policies, General Plan, or regulations to be consistent with Connect SoCal.

v. SCAG will maintain communication with agencies that use SCAG's subjurisdictional-level data to ensure that the "advisory and nonbinding" nature of the data is appropriately maintained.

e. TAZ-level growth forecast projections are used by SCAG staff for overall, regional-scale planning and modeling purposes in preparing Connect SoCal and to confirm data related to existing entitlements and development agreements. Given the scale at which their use is meaningful, these TAZ-level growth forecasts do not create any prescriptive or recommended cap or limit on the intra-jurisdictional locations of household/housing, employment or population within the boundaries of individual jurisdictions. SCAG is a regional planning organization and does not possess any land use authority, nor does it have enough information at the local level to constrain or otherwise affect individual projects and plans at an intra-jurisdictional scale.

f. The SCS was developed to comply with state greenhouse gas reduction requirements pursuant to SB 375, and is intended to serve as an advisory and elective planning vision for consideration by other stakeholders and implementing agencies, and local control of land use decision-making is not intended to be constrained or limited in any way by Connect SoCal.

g. In the event a project or plan located within a given TAZ boundary would exceed the projected growth as depicted within a TAZ Map utilized for overall, regional-scale modeling and forecasting, SCAG affirms that such TAZ Maps would not present a prescription, constraint or limit on household/housing, employment and population growth.

h. SCAG confirms that the Connect SoCal TAZ-level growth projections reflected in TAZ Maps do not constitute a prescriptive "pattern" of future development in Connect SoCal for General Plan or zoning code amendments (including intra-jurisdictional RHNA compliance and housing element updates), or for any individual project approval. The distribution and types of RHNA housing units allocated within each local jurisdiction continues to be fully and completely subject to local control and subject to other applicable laws, and not be constrained or affected by the TAZ-level growth projections.

i. SCAG recognizes that cities and counties will foreseeably update their housing elements as part of General Plans and amend zoning designations to accommodate the state-mandated RHNA sixth cycle allocation. For many cities and counties, the required RHNA General Plan and zoning changes may need to accommodate more housing units than reflected in the Connect SoCal's household and population growth projections for individual or combined TAZs within the jurisdiction ("Exceedances"). Given SCAG's use of TAZ-level growth projections for regional planning and modeling purposes, and the local jurisdictions' obligations to comply with state housing laws including RHNA, SCAG agrees that in the event of any Exceedances at the jurisdictional and/or intra-jurisdictional levels, such Exceedances may not be used to impede a local jurisdiction's compliance with the sixth cycle RHNA requirements, to assess impacts of a plan or project under CEQA, or affect eligibility for state funding.

j. Nothing in this Resolution creates any affirmative enforcement obligation by SCAG against any third party;

8. That the foregoing recitals are true and correct and incorporated herein by this reference; and

9. SCAG's Executive Director or his designee is authorized to make minor modifications, finalize and transmit the final Connect SoCal in its entirety, including but not limited to submittal to ARB.

2 "TAZ-level growth projections" refer to the disaggregation of the regional and jurisdictional population, household, employment growth forecasts developed as part of the final, adopted Connect SoCal, and is in contrast to other TAZ-level data such as locally envisioned growth projections (i.e., "local input") or the 2016 base-year TAZ-level data developed by SCAG. "TAZ Maps" refer to visualizations in a map format of the TAZ-level growth projections within a TAZ boundary, which may be created by SCAG, and such maps are not developed, included, contained, approved or adopted as part of Connect SoCal.

PASSED, APPROVED AND ADOPTED by the Regional Council of the Southern California Association of Governments at its regular meeting this 3rd day of September 2020.

Rex Richardson
President, SCAG
Council Member, City of Long Beach

Attested by:

Kome Ajise

Kome Ajise
Executive Director

Approved as to Form:

Justine Block
Acting Chief Counsel

WELCOME

MAKING CONNECTIONS

OUR REGION

Southern California is a region shaped by big dreams and big ideas. With an economy that continues to grow and thrive on the aspirations, courage and hard work of almost 19 million people, we are a region that retains and attracts people in search of opportunity and freedom. Our population is greater than all but four states. We are the 15th biggest economy in the world. Our geography spans more than 38,000 square miles, making us as large as the entire state of Indiana. The size and diversity of our region across a wide range of measures is extraordinary.

It is no surprise then that the infrastructure underlying the successful development of our region is huge. Our regional roadway network spans over 135,000 lane miles[1] — laid end-to-end, that is enough to circle the globe more than five times. We are home to the two largest container ports in the Western Hemisphere, the world's fourth busiest airport, and soon the world's longest light rail transit line, with the completion of the Regional Connector, which will connect transit lines from the Los Angeles Civic Center to the Financial District. Achieving this level of development has been a feat of engineering and ingenuity: tunneling under cities and across earthquake faults, scaling mountains and bridging rivers and canyons.

Our urban form also reflects extraordinary vision and leadership: the big ideas and persistence of community members seeking healthy and safe neighborhoods; civic leaders who through collaboration and compromise found a way to move initiatives forward; voters bold enough to tax themselves so that county transportation commissions—the region's implementing agencies—can fund and build critical transportation infrastructure projects. These collective efforts keep the region moving in an environmentally sustainable, economically efficient and socially equitable manner.

1 Caltrans Highway Performance Monitoring System (HPMS) Data (2017)

OUR PLAN

As the largest metropolitan planning organization in the country, the Southern California Association of Governments (SCAG) has worked collaboratively with transportation agencies across Southern California for the last fifty years to align and better connect transportation investments across the six-county region through the adoption of Regional Transportation Plans. The enactment of SB 375 in 2009 introduced a requirement to reduce greenhouse gas emissions, essentially codifying the integrated transportation and land use planning that our region had already initiated with the 2008 Regional Transportation Plan. Through our continuing efforts to better align transportation investments and land use decisions, we strive to improve mobility and reduce greenhouse gases not just by building new and bigger infrastructure, but also by bringing housing and jobs closer together, making commutes shorter and making it easier to get around without a car.

Guided by the leadership of the Regional Council, in 2012 SCAG adopted the region's first Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)—a plan we now call Connect SoCal. As might be expected, the vision for that plan was big: we would build more than 20 miles of light rail, creating a rail backbone to serve the entire region; we would accommodate 51 percent of all future housing near major transit stations and corridors; we would replace gas taxes with mileage-based user fees to ensure a long-term sustainable funding mechanism that isn't eroded by rising fuel efficiency and construction costs.

By many metrics, we've succeeded in meeting these ambitious objectives, advancing the Core Vision of our plan. Between 2009 and today, our region has constructed 61 miles of rail, a number that will continue to grow as projects embraced through voter-approved initiatives come to fruition. We collaborated with the state to implement California's Active Transportation Program, bringing nearly $500 million to local agencies to complete critical mobility and safety projects. Our persistence in advocating for increased transportation revenue was rewarded with passage of Senate Bill 1, a funding bill that generates $52 billion statewide over the next 10 years to maintain and preserve our transportation infrastructure.

However, despite our progress, we only narrowly achieve our 2020 target for greenhouse gas emission reductions, the core metric by which our region's sustainability is judged. Transit ridership is falling, despite billions of dollars in investment and increased development in station areas. Deaths from traffic collisions are rising. Housing costs are increasing, along with homelessness. We must do better.

OUR VISION

Connect SoCal was developed through a four-year planning process involving rigorous technical analysis, extensive stakeholder engagement and robust policy discussions with local elected leaders, who make up SCAG's policy committees and Regional Council. SCAG's leadership explored the challenges and barriers to the transformative change our region needs to address demographic and economic shifts, including an increasingly aging and economically inequitable society. Our analysis considered both the physical constraints and economic barriers of continuing to grow rapidly on the fringes of the region. Our policy committees reviewed and discussed emerging technologies and transportation innovations aimed at relieving congestion, while reducing emissions.

Through this extensive planning process, we discovered not just one technological advancement or signature transportation project to advance our goals and vision, but many. Reflecting the size and diversity of our region, Connect SoCal continues to aim toward transformative change by providing a clear vision for collective action. For example, the region has already committed significant resources to improve and expand the transit system. However, the solutions to transit ridership decline are not limited to what transit agencies can do. Rather, the solutions involve collective action regarding how we prioritize the use of streets and curb space, for people not cars; how our land use plans encourage more housing and jobs closer to each other and to transit; how we use technology to improve safety and provide meaningful choices to travelers; and how we price and manage use of the automobile.

We know that small changes can have a great impact. Taking the step of reforming how local jurisdictions permit accessory dwelling units, 2016's Senate Bill 1069 resulted in a dramatic statewide increase in construction permits for those units. Similarly, our 2018 transit ridership study with the University of California Los Angeles Institute of Transportation Studies found that if one out

WHY WE CALL IT CONNECT SOCAL

Connect SoCal charts a path toward a more mobile, sustainable and prosperous region by making connections between transportation networks, between planning strategies and between the people whose collaboration can improve the quality of life for Southern Californians

CORE VISION

Connect SoCal builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern

KEY CONNECTIONS

To augment the Core Vision of the plan, Connect SoCal includes new initiatives at the intersection of land use, tranportation and technology to close the gap and reach our greenhouse gas reduction goals

of every four people (who rarely ride transit) took transit just twice a month, it would more than make up for the region's lost ridership. It has also been proven that every dollar spent on early preventive maintenance can save five to 10 times as much on pavement rehabilitation or replacement costs for our vast roadway network.

The transformative change we seek does not require a radical shift in course. Our critical mission is to complete the Core Vision of our decades-long planning efforts and continue to build on past plans and successes. We must enhance and build out the transit network as the backbone of a mobility system that allows people to move freely without the personal, social and environmental cost of a car. We have to create complete streets across our communities such that people are prioritized over vehicles. And we must maintain the system we have and expand where necessary to ensure useful life and efficiency. We will adopt policies to encourage emerging technologies and mobility innovations that support rather than hamper regional goals. We will locate housing, jobs and transit closer together in priority growth areas while preserving natural lands and open spaces.

To complete the "last mile" towards our sustainability goals, Connect SoCal builds upon this Core Vision for Southern California with regional initiatives, or Key Connections, that link the built environment and transportation system with policies, projects and programs that strengthen and enhance each other beyond what each would accomplish in isolation. For example, we will foster housing construction in transit rich areas by deregulating parking, promoting housing supportive infrastructure, and supporting innovative self-help financing districts. We will encourage regional coordination to incentivize shared mobility, as mobility services and new technologies gain mode share. We will ensure the safe and fluid movement of goods while committing to the broad deployment of zero- and near-zero emission technologies.

Altogether, the multimodal transportation projects and strategies included in Connect SoCal represent an investment of over $638 billion over the next 25 years. In addition to meeting our greenhouse gas reduction target, Connect SoCal will deliver significant benefits to the region with respect to mobility, safety, health outcomes, travel time reliability, air quality, economic productivity, environmental justice, and transportation asset condition. Technology will be integral to the solutions we need. The way we work, shop and travel has been transformed by a device that fits in our pockets. These innovations point to the tremendous opportunity to shift travel behaviors through small changes: the potential to unlock the promise of our big sustainability vision with investments in access, connectivity and technology.

LET'S CONNECT SOCAL TOGETHER

The following pages of Connect SoCal provide further detail on the challenges facing our region, our shared goals and transportation and land use strategies, and how we intend to realize them. It is a compass, not a roadmap. It is a vision, not a guarantee. As has always been the case, the big dreams and big ideas that have shaped the landscape of Southern California will only be realized through hard work and collaboration. Let's Connect SoCal together!

Connect SoCal Plan Summary

CORE VISION	Connect SoCal builds upon and expands land use and transportation strategies established over several planning cycles to increase mobility options and achieve a more sustainable growth pattern. *Progress and next steps to advance the Core Vision can be found throughout Chapter 3*
KEY CONNECTIONS	To augment the Core Vision of the plan, Connect SoCal includes new initiatives at the intersection of land use, tranportation and technology to close the gap and reach our greenhouse gas reduction goals. *Key Connections can be found in Chapter 3*
FUNDING	$638.9 Billion
2035 GHG	19% Reduction Relative to 2005 Per Capita
ECONOMIC IMPACT	• 168,400 New Jobs Supported by Transportation Investments • 264,500 New Jobs Supported by Improved Competitiveness • $346 Million Saved Per Year in Healthcare Spending • $180 Million Saved Per Year on Air Pollution-Related Health Incidences • $1.00 Investment = $2.06 Benefit
PLAN BENEFITS	25.7% Decrease in time spent in traffic delay per capita 5.0% Decrease in daily miles driven per capita

CHAPTER 1

CHAPTER 1

ABOUT THE PLAN

WHAT IS CONNECT SOCAL?

As a metropolitan planning organization – the largest in the nation – SCAG is responsible for developing long-range transportation plans and a sustainability strategy for a vast and varied region. The centerpiece of that planning work is Connect SoCal, our 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). The plan charts a path toward a more mobile, sustainable and prosperous region by making key connections: between transportation networks, between planning strategies and between the people whose collaboration can make plans a reality.

SCAG is just one part of a large body of governments and public organizations that collectively plan, construct, operate and maintain the region's transportation system. SCAG's work helps facilitate implementation, but the agency does not directly implement or construct projects. The policies and strategies laid out in Connect SoCal materialize only in collaboration with local, county, state, federal and private partners.

Connect SoCal embodies a collective vision for the region's future, through the horizon year of 2045. It is developed with input from a wide range of constituents and stakeholders within the Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura, including public agencies, community organizations, elected officials, tribal governments, the business community and the general public.

Connect SoCal is an important planning document for the region, allowing public agencies who implement transportation projects to do so in a coordinated manner, while qualifying for federal and state funding. The plan includes robust financial analysis that considers operations and maintenance costs to ensure our existing transportation system's reliability, longevity, resilience and cost effectiveness. In addition, Connect SoCal is supported by a combination of transportation and land use strategies that outline how the region can achieve California's greenhouse gas emission reduction goals and federal Clean Air Act requirements. The plan also strives to achieve broader regional objectives, such as the preservation of natural lands, improvement of public health, increased roadway safety, support for the region's vital goods movement industries and more efficient use of resources.

LAWS THAT GUIDE THE PLAN

Key laws and requirements that drive Connect SoCal include:

- **Developing a Regional Transportation Plan (RTP) -** SCAG is required by federal law to prepare and update a long-range RTP (23 U.S.C. §134 et seq.). The RTP must include, among other things: the identification of transportation facilities such as major roadways, transit, intermodal facilities and connectors that function as an integrated metropolitan system over at least a 20 year forecast period; a financial plan demonstrating how the RTP can be implemented with "reasonably available" resources and additional financial approaches; strategies to improve existing facilities and relieve vehicular congestion and maximize the safety and mobility of people and goods; and environmental mitigation activities. (23 U.S.C. §134 (i)(2)).
- **Keeping up with Clean Air Act Requirements -** With respect to air quality, most areas within the SCAG region have been designated as nonattainment or maintenance areas for one or more transportation-related criteria pollutants. Pursuant to the federal Clean Air Act, SCAG's 2020 RTP/SCS is required to meet all federal transportation conformity requirements, including regional emissions analysis, financial constraint, timely implementation of transportation control measures, and interagency consultation and public involvement (42 U.S.C. §7401 et seq.).
- **Monitoring System Performance -** With the passage of the 'Moving Ahead for Progress in the 21st Century' (MAP-21) federal transportation authorization legislation in 2012, transportation system performance planning and monitoring also became a federal mandate. This commitment to a national performance management and reporting system was further solidified with the passage of the subsequent federal transportation authorization package (the 'FAST Act') in 2015. SCAG has been a pioneer in the development and use of performance metrics to evaluate progress toward achieving regional goals before MAP-21/FAST Act became law, a practice that has only gained momentum in recent years. Starting with the 1998 RTP, SCAG has been using quantitative performance measures to evaluate how well the RTP may achieve the regional goals established in the plan.

- **Developing a Sustainable Communities Strategy -** California State law also imposes additional requirements. For example, state law specifies that, "The plan shall be action-oriented and pragmatic, considering both the short-term and long-term future" (Government Code §65080(a)). California Senate Bill 375, codified in 2008 in Government Code §65080 (b)(2)(B), also requires that the RTP include a sustainable communities strategy or "SCS", which outlines growth strategies for land use and transportation and help reduce the state's greenhouse gas emissions from cars and light duty trucks.
- **Hitting Specific Targets for Greenhouse Gas Reduction -** For the SCAG region, the California Air Resources Board (ARB) has set greenhouse gas reduction targets at eight percent below 2005 per capita emissions levels by 2020, and 19 percent below 2005 per capita emissions levels by 2035. As we will be discussed further in Chapter 3, the plan lays out a strategy for the region to meet these targets.

SCAG is committed to not only meeting its statutory requirements but also ensuring that Connect SoCal, as with the agency's prior RTPs, remains a living document that is rooted in strong analysis and evolves as the region's demographics, priorities and economy change.

GOALS & GUIDING PRINCIPLES

The goals of Connect SoCal fall into four core categories: economy, mobility, environment and healthy/complete communities. The plan explicitly lays out goals related to housing, transportation technologies, equity and resilience in order to adequately reflect the increasing importance of these topics in the region, and where possible the goals have been developed to link to potential performance measures and targets. The plan's guiding policies take these goals and focus them, creating a specific direction for plan investments.

Federal policy also requires that SCAG sets performance measures and targets in Connect SoCal. As required under MAP-21/FAST Act, in 2016 and 2017 the Federal Highway Administration (FHWA) issued national performance measures and guidelines for use in the setting of statewide and regional performance targets. The FHWA rule-making process established a four-year performance target setting and reporting cycle, with a two-year mid-term progress evaluation point. SCAG coordinated closely with State of California Department of

Connect SoCal Goals

1. Encourage regional economic prosperity and global competitiveness
2. Improve mobility, accessibility, reliability, and travel safety for people and goods
3. Enhance the preservation, security, and resilience of the regional transportation system
4. Increase person and goods movement and travel choices within the transportation system
5. Reduce greenhouse gas emissions and improve air quality
6. Support healthy and equitable communities
7. Adapt to a changing climate and support an integrated regional development pattern and transportation network
8. Leverage new transportation technologies and data-driven solutions that result in more efficient travel
9. Encourage development of diverse housing types in areas that are supported by multiple transportation options
10. Promote conservation of natural and agricultural lands and restoration of habitats

Connect SoCal Guiding Principles

1. Base transportation investments on adopted regional performance indicators and MAP-21/FAST Act regional targets
2. Place high priority for transportation funding in the region on projects and programs that improve mobility, accessibility, reliability and safety, and that preserve the existing transportation system
3. Assure that land use and growth strategies recognize local input, promote sustainable transportation options, and support equitable and adaptable communities
4. Encourage RTP/SCS investments and strategies that collectively result in reduced non-recurrent congestion and demand for single occupancy vehicle use, by leveraging new transportation technologies and expanding travel choices
5. Encourage transportation investments that will result in improved air quality and public health, and reduced greenhouse gas emissions
6. Monitor progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies
7. Regionally, transportation investments should reflect best-known science regarding climate change vulnerability, in order to design for long term resilience

Transportation (Caltrans) in the establishment of specific performance targets for the state and for our region in the various transportation performance areas established under MAP-21/FAST Act. These targets provide quantifiable objectives to achieve each measure during the performance period.

HOW THE PLAN WAS DEVELOPED

In preparing Connect SoCal, SCAG engaged with local, state and federal agency partners from the very beginning. Through many collaborative initiatives SCAG was able to better understand existing conditions in the region, building a foundation for planning how to accommodate growth and direct future transportation investments.

SCAG sought regular input from the Regional Council and Policy Committees while creating Connect SoCal. These groups of elected officials consist of representatives from county transportation commissions, tribal governments, as well as towns, cities and counties throughout the region.

The development process also involved working closely with local governments throughout the region to collect and compile data on land use and growth trends. This *"Bottom-Up Local Input and Envisioning Process,"* helped us get a clear picture of what's going on at the local level – and formed the basis for projections and strategies in Connect SoCal. Through this collaborative initiative, SCAG staff held one-on-one meetings with all of the region's 197 towns, cities and counties. In addition to seeking feedback on regional forecasts of population, household and employment growth, SCAG gathered data on land use, protected natural lands, farmland, flood areas and coastal inundation, regional bikeways, regional truck routes, planned major transit stops, high quality transit corridors, future transit priority areas and other local data. In addition to the jurisdictions themselves, the data came from county assessors' offices, county transportation commissions, and state and federal partners.

This local input process gave jurisdictions the opportunity to ask questions, understand data elements and seek technical support, as well as provide feedback on local data. The process was guided by the Connect SoCal Guidelines and Schedule that were adopted by the Regional Council in October 2017. Overall, 90 percent of jurisdictions provided feedback on one or more data elements requested for local review. Collectively, these towns, cities and counties represent an estimated 94 percent of the region's residents.

SCAG staff also regularly convened a series of technical advisory groups that engaged local, state and federal agencies in the transportation and sustainable communities planning process. To more accurately understand future growth, SCAG engaged with expert demographers and economists to peer-review projections of population, households, and employment at the regional and county levels.

SCAG worked closely with each of the six county transportation commissions throughout 2018 to update the list of regionally significant transportation projects that was established in Connect SoCal's predecessor, the 2016 RTP/SCS. Each county transportation commission in turn worked with their partner transportation agencies (including applicable transit providers, rail operators, marine port and airport authorities and Caltrans District offices) to finalize a list of county-priority projects to submit to SCAG. This effort culminated in a comprehensive update to the list of programs and projects, which numbers in the thousands. SCAG worked collaboratively with key stakeholders to identify additional regional initiatives that go beyond county-level commitments and are intended to address challenges that are regional in nature.

To better coordinate with the State, Connect SoCal was developed to align with the California State Rail Plan, California Transportation Plan (CTP 2040), California Freight Mobility Plan (CFMP), California Aviation System Plan (CASP), and State Bicycle and Pedestrian Plan. SCAG is also actively participating in the update of the California Transportation Plan, CTP 2050, to coordinate and better align regional and statewide planning. The CTP is a long-range statewide level transportation plan that combines regional transportation and land-use plans to produce a unified multimodal strategy to achieve our collective vision of a lasting and well-integrated transportation system that benefits both people and goods over the next 25 years.

Throughout this process, SCAG staff has regularly convened technical advisory committees and topic-specific working groups, which bring together regional stakeholders to discuss the plan's development and provide technical expertise. There were seven formal Regional Planning Working Groups, including: Active Transportation, Environmental Justice, Mobility Innovations, Natural and Farm Land Conservation, Public Health, Sustainable Communities and Transportation Safety. These allow interested parties from across industries and sub-regions to have a direct pipeline into SCAG's planning process, and helped develop a vision for the future that promotes regional goals and sustainability while respecting local control. Some takeaways include: the importance of identifying common barriers to sustainable development, such as funding and 'NIMBYism'; the need for a balance of jobs and households in communities; the need for coordination and support on emerging transportation technologies; support for sustainable development solutions for existing suburban communities and the challenge of providing sufficient affordable housing.

To ensure that underrepresented voices were involved in the planning process, we also implemented a new grassroots outreach initiative to engage diverse constituencies across Southern California. SCAG partnered with 18 community-based organizations, or CBOs, from across the region. These organizations assisted with workshop and survey outreach as well as hosting local gatherings for community members to provide input on Connect SoCal. Using this strategy, we successfully broadened our outreach to traditionally underserved and underrepresented communities including:

- Children and youth
- Individuals with access and functional needs
- Low-income communities of color
- Older adults or retired people
- Populations with limited English proficiency
- Women and female-headed households

SCAG's 18 CBO partners represented constituents from Long Beach to Coachella Valley, Santa Clara River Valley to Orange County. Though their missions and areas of focus vary, each of these groups has a common commitment to creating a more equitable, sustainable, accessible and affordable Southern California.

Feedback received through our CBO partners was used to identify areas where the plan could be refined to meaningfully reflect the priorities and concerns of these traditionally underserved groups, particularly because they have historically been disproportionately burdened by the negative outcomes associated with existing and changing land use patterns and transportation policies. Highlights of what we heard from them include:

- Concerns about housing availability and affordability, limited alternative transportation options, displacement and access to destinations, the effects of increased greenhouse gas emissions, and the risks associated with climate change

- A push for Connect SoCal to take into account the degree to which transportation and housing options vary between communities, and that having a limited range of travel options often increases residents' reliance on vehicles
- Pronounced support for strategies that create affordable housing, improve the existing transportation network, and expand mobility options that reduce the harmful impacts of displacement to historically marginalized neighborhoods

Overall, the communities surveyed agreed with the themes, policies and interventions proposed by Connect SoCal.

In developing a vision of future growth for Connect SoCal, SCAG also sought feedback from residents throughout the region through public engagement initiatives that featured 28 public workshops, an extensive advertisement campaign, a telephone town hall meeting and a widely distributed online survey. Public workshop attendees were asked to review four potential growth scenarios, each with a unique set of strategies. These included enhancing job centers, prioritizing connecting people to more transportation options, protecting natural lands and farmland areas and planning for our region's future resiliency from natural disasters. Local plans and policies, as conveyed through the local input process, were integrated into each of these scenarios, ensuring that they reflected an attainable future. The input we received included support for locating more growth near transit and job centers, desire to prioritize infill and redevelopment within existing cities to accommodate future growth and promote affordable housing, and concerns about overcrowding or gentrification within existing communities. Taken together, the feedback pointed to a need for Connect SoCal to envision a sustainable development pattern that respects and enhances the quality of life within local communities.

SCAG considered input gathered through the CBO engagement and public workshops to ensure Connect SoCal addresses challenges faced by our region's residents. Strategies, therefore, emphasize growth in areas rich with destinations and mobility options, promote diverse housing choices, leverage technology innovations, support implementation of sustainability policies and promote a green region. This more compact development pattern, combined with the identified transportation network improvements and strategies, results in improved pedestrian and bicycle access to community amenities, lowers average trip length and reduces Vehicle miles traveled. These outcomes not only reduce greenhouse gas emissions, but also support the development of more livable communities that provide lower-cost housing choices, conserve natural resources, offer transportation options and promote a better quality of life.

Connect SoCal will help residents thrive, providing better access to jobs, housing, schools, healthcare, recreation and everything in between. In our region's history, we've seen that small actions can build to extraordinary outcomes. With investments to improve our roadways, expand our transit system, multiply walking and bicycling amenities, protect natural lands and integrate new initiatives like road pricing — Connect SoCal works to address residents' challenges by promoting job accessibility, enabling shorter commutes, making communities safer and encouraging lower-cost housing developments.

The various components of Connect SoCal were reviewed by SCAG's Regional Council and Policy Committees in a series of meetings. At their Nov. 7, 2019 meeting the Regional Council authorized the release of Connect SoCal and its accompanying Technical Reports for public review and comment. This final version of Connect SoCal, which incorporates adjustments based on feedback received during the public review process, was presented to the Regional Council on May 7, 2020 and approved for federal transportation conformity purposes only. On September 3, the Regional Council adopted Connect SoCal in full after an additional 120-day outreach and technical refinement period.

HOW TO USE THIS PLAN

SCAG collaborated closely with a wide range of partners to develop Connect SoCal. It is our goal that Connect SoCal be used by the same constituents and stakeholders that worked with us to create it, as a trusted reference and guiding document for prioritizing transportation projects, encouraging behavior change and furthering regional strategies that can shape Southern California's transportation and land use development for years to come.

Use the Connect SoCal plan to:

- Understand the biggest trends and challenges in the region (Chapter 2)
- Review a comprehensive set of policies, strategies and tools to improve mobility and sustainability (Chapter 3)
- Evaluate the sources and structures of funding that will support executing the plan (Chapter 4)
- Refer to performance measures and ways of tracking our success in becoming a more mobile and sustainable region (Chapter 5)
- Identify new challenges that remain on our horizon (Chapter 6)

Connect SoCal is also supported by 20 technical reports that provide additional data and material on all topics and concepts covered in this plan. All citations used throughout the main book and technical reports conform to AP style.

Connect SoCal Technical Reports

Active Transportation
Aviation & Airport Ground Access
Congestion Management
Demographics & Growth Forecast
Economic & Job Creation Analysis
Emerging Technology
Environmental Justice
Goods Movement
Highways & Arterials
Natural & Farm Lands Conservation
Passenger Rail
Performance Measures
Project List
Public Health
Public Participation & Consultation
Sustainable Communities Strategy
Transit
Transportation Conformity Analysis
Transportation Finance
Transportation Safety & Security

CHAPTER 2

CHAPTER 2

SOCAL TODAY

MAJOR TRENDS, EXISTING CONDITIONS & CHALLENGES

MAJOR TRENDS

With more than 19 million people, 6 million households, and 8 million jobs, the SCAG region is among the most dynamic metropolitan areas in the world. It encompasses a uniquely diverse mix of industries, urban forms, transportation connectivity, agricultural resources and risks for natural disasters.

In order to plan for 2045 and identify how to best prepare for the uncertainty of the future, we must first understand how our region and its 197 local jurisdictions are changing, what challenges are currently in place and which are emerging.

DEMOGRAPHIC & POPULATION CHANGES

Southern California's most precious resource is our people. In order to understand how changes will impact them, Connect SoCal projects growth in employment, population, and households at the region, county, city, town and neighborhood levels. These projections take into account economic and demographic trends at the global and regional levels, as well as feedback reflecting on-the-ground conditions from SCAG's local partners, stakeholders and working groups. Overall, our population forecast reveals that we are embarking on a new era for Southern California, and in the wake of our recovery from the Great Recession, new and unprecedented demographic trends are beginning.

On a national level, population growth has slowed, with the US Census Bureau projecting a decrease in national annual growth rate from about 0.75 percent in 2016 to approximately 0.40 percent by the 2040s. In the SCAG region, annual growth is similarly slowing down, from about 0.85 percent in 2020 to about 0.45 percent by 2045. These changes are driven by declines in fertility, as women are having fewer children and are doing so later in life. This is exacerbated by high housing costs in economically vibrant mega-regions like Southern California.

While we are growing slower, we are also growing older. From 2000 to 2016, the region's median age increased from 32.3 to 35.8. By 2045, this number is expected to reach 39.7. Meanwhile, the youngest members of the Baby Boomer generation turned 55 in 2019. This will substantially change the ratio of working-age population to seniors in the future, placing stresses on social services such as healthcare, social security and pensions. As Baby Boomers enter their eighties and beyond, the region and nation are likely to experience a population decline, meaning that in order to create any future population growth, we will need to rely on migration. As such, many demographers have stressed the mutual dependence between the retirees and young immigrants who, together, will characterize a large portion of the region's future population. Future economic success will require effectively integrating new residents into the social and economic structures of Southern California. Similarly, education and workforce development will be even more important for younger generations since their labor will need to support a larger retiree population.

While net foreign immigration to the region has decreased from its highs in the early 1990s, Southern California is historically one of the country's most important immigrant gateways. Today, Southern California ranks behind only the Miami and San Jose regions in its share of foreign-born population. While roughly half of the region's foreign-born population is originally from Latin American countries, an increasing share of newly-arrived immigrants – now nearly 60 percent – are from Asian countries. Compared to the total population, immigrants are generally young or working age, which increases their importance to the regional economy. There are also clear-cut implications for transportation: new immigrants are more likely than their native-born counterparts to take transit, ride in carpools and utilize alternative modes of transportation.

Another "mega-trend" impacting the SCAG region is domestic migration. For most of the last thirty years, the SCAG region has lost more people to other states and regions than it has gained—in each year since 2014, an average of 91,000 more people have left the region for other parts of the country than the number of those who have arrived. While employment growth brings people to the region, high housing costs are often cited as a reason for leaving.

Hidden behind this trend is an exchange that has been referred to as California's "Brain Gain" – meaning that new residents moving to the region who come from other parts of the country ("domestic in-migrants") tend to have a higher education level than those who leave ("domestic out-migrants"). In 2017, 47 percent of the region's 321,000 domestic in-migrants had at least a four-year degree, compared to 39 percent of the region's 429,000 domestic out-migrants (see the Demographics and Growth Forecast Technical Report). This is a trend which many regional economists believe is part of what it means to be a booming mega-region today. Many U.S. regions expend tremendous effort attracting the highly educated workforce that is moving to our region of its own accord. While this can be a great boost to the region's economy, it is also indicative of some of the challenges faced by middle-class families native to Southern California.

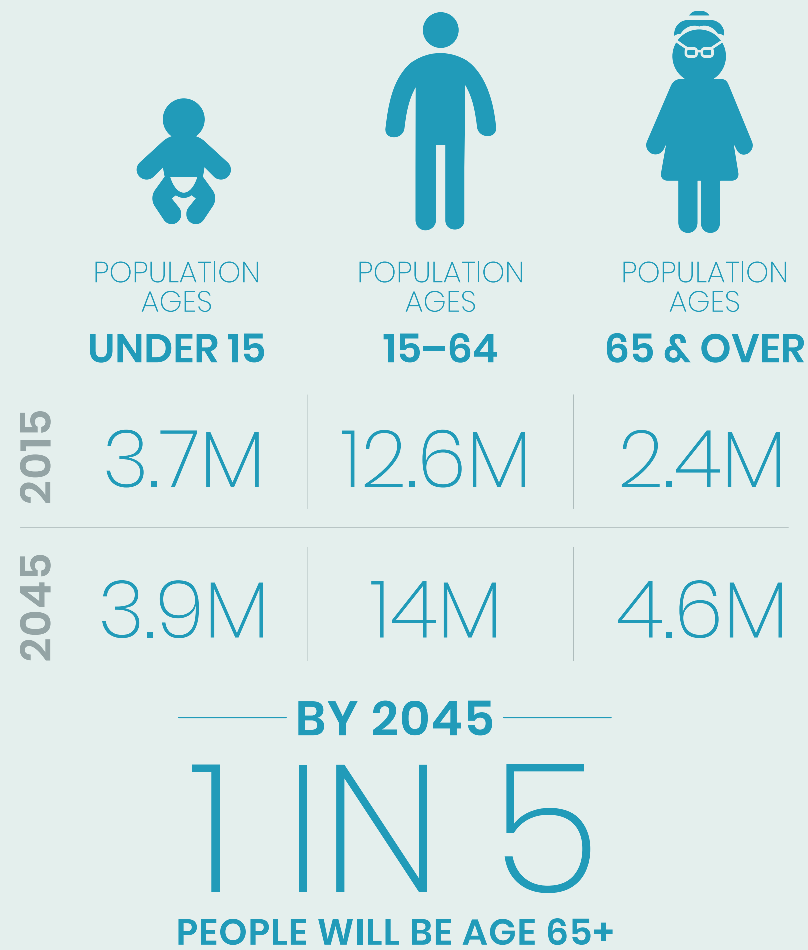
In addition to the region's aging and migration, Connect SoCal is heavily informed by trends surrounding the large cohort of Millennials — the generation born between years 1981 and 1996. Since most Millennials entered adulthood during the recession, difficulties in securing stable employment have caused many of them to lag behind previous generations in building lifetime wealth. During this time, Millennials were less likely than previous generations to form a family, move out of their parents' homes to form a household, or purchase their own homes. This has had the effect of increased demand and higher prices in the rental housing market, since many would-be homeowners lacked the income to buy. Since the Great Recession, the popular perception has been that Millennials prefer urban renting rather than suburban homeownership. This also accompanied a decline in vehicle miles traveled (VMT) during the same period. However, more recent travel survey data and economic research has shown that a large portion of this shift can be explained by the lower incomes Millennials had during the recession rather than a fundamental change in preferences. Thus, as the economy improves and Millennials age, we must be aware that their demonstrated preferences may have been a temporary delay rather than a lasting characteristic[1].

STRUCTURAL ECONOMIC CHANGES

The distribution of income and wealth in Southern California has been changing gradually; but in the long term, future impacts may be profound. Median incomes have increased in the SCAG region since the depths of the Great Recession, but when adjusted for inflation, the median household income in the SCAG region is below what it was in 1989 — validating some

1 Kurz, Christopher, Geng Li, and Daniel J. Vine (2018). "Are Millennials Different?," Finance and Economics Discussion Series 2018-080. Washington: Board of Governors of the Federal Reserve System

Changing Age Demographics in the Region

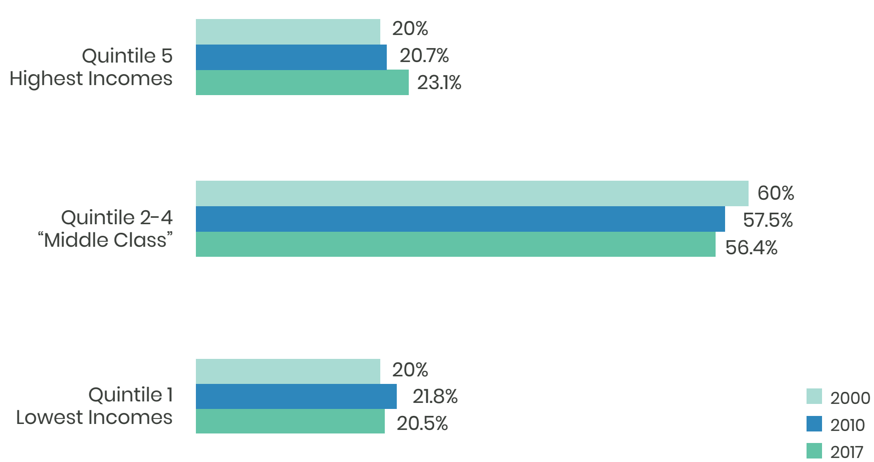


claims that recovery has been uneven. Indeed, the middle class is measurably shrinking in Southern California. Since 2000, households in the middle income brackets have been declining - first as the recession turned some middle-class households into lower-income households, then as the recovery moved other middle-class households into the highest income group (see **FIGURE 2.1**). Using the "middle 60 percent" of the income distribution in the year 2000 to define the middle class, only 56.4 percent of households would fit that definition today. While the distribution of income remains a challenge, the region has experienced tremendous job growth since 2010, gaining 1.3 million jobs and cresting the pre-recession high of 8.1 million jobs reached in 2007. Meanwhile unemployment has dropped to lows not seen in several decades, from a high of 12.4 percent in 2010 to 4.3 percent in 2018.

Technological changes are also poised to make big impacts on our local economy, both by presenting new challenges and by creating new, previously infeasible solutions. While leaps in technology have always disrupted the established ways of getting things done, they are generally accompanied by increases in utility and productivity. New approaches to work have, for some, fostered a shift in the nature of employment away from full-time, long-term, stable jobs. Income sources like ridesourcing, short-term home rentals, and craft production enabled by new technology platforms can have the benefit of more efficiently matching consumers with products and services. But they can also remove important employment benefits and protections, as many of these positions are part-time or filled by independent contractors. Indeed, disruption by some technological platforms has caused serious concerns over displacing workers from stable, full-time jobs or from work altogether—a concern that is heightened when productivity gains are concentrated into smaller shares of the population. While workplace automation has already displaced some manufacturing jobs, services and knowledge-based employment are also increasingly being automated. An estimate of the potential impacts of automation on regional employment by 2045 suggests that construction, repair, transportation, food preparation, sales, social services and office support occupations show some of the highest likelihood of automation. Today these industries together employ over 3 million workers regionwide. **FIGURE 2.2** displays anticipated growth in these sectors, along with the projected number of jobs that will be automated based on three estimates – Brookings, Frey Osborne and Nesta. Looking at the logistics industry alone, changing trade paradigms and the emergence of new market-driven strategies and technologies (e.g., smaller urban fulfillment centers, increased competition for skilled labor, automation, etc.) will challenge the regional workforce. Trade-related jobs once offered few barriers to entry as well as upward career mobility to low- and semi-skilled workers, often allowing them to achieve security and middle-class incomes.

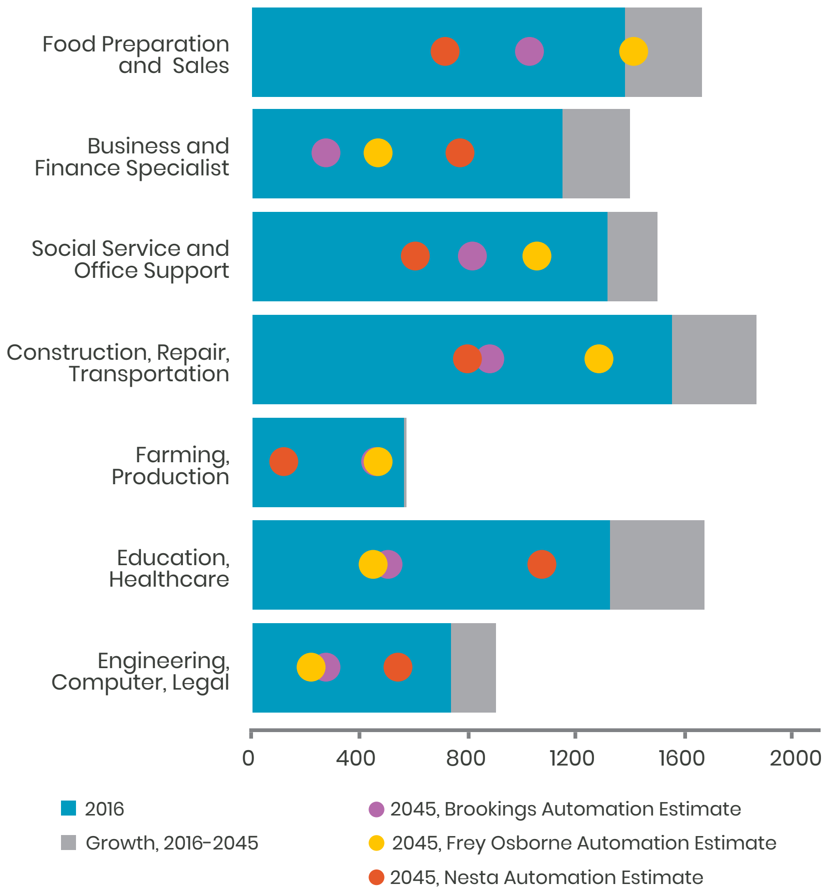
In the years ahead, the region may face significant challenges from technology disruption by reducing opportunities for many regional workers who will not be able to close the skills gap to adequately compete for future jobs in that sphere. This has spurred increasingly popular policy discussions of universal basic income (UBI) as a potential solution to offset the negative impacts of job losses due to technology. Since employment is becoming less necessary for gains in overall economic productivity, UBI models have proposed redistributing the revenues from taxes on businesses utilizing these new platforms to area residents to ensure a minimum living standard without impacting the incentive to work.

FIGURE 2.1 **Income by Quintile**



Source: United States Census Bureau and American Community Survey

FIGURE 2.2 **Job Growth (in Thousands) and Automation Potential by Occupation, SCAG Region, 2016-2045**



** Figure shows Connect SoCal's anticipated regional jobs and job growth alongside independent estimates of automation potential by occupation. Occupations are aggregations of 2-digit occupation codes covering 95% of regional jobs*
Source: SCAG, Muro, Maxim, and Whiton (2019, Brookings), Frey and Osborne (2017), and Bakhski et al. (2017, Nesta)

Another major economic shift is occurring among consumers, who are now spending less on products and goods than they are on services. Some of this can be correlated with the aging of the population, since older people are less likely to fill a home with goods and more likely to spend on healthcare. As services are generally not subject to local sales tax, this could be problematic for local city and county revenue streams - a major source of funding for public amenities as well as existing and future transportation infrastructure in Southern California.

GLOBALIZATION

As a global crossroads for the movement of people and things, Southern California depends heavily on transportation services for the health of our economy. As a crucial node in global supply chains with a massive volume of trade, as well as an enormous consumer market with extensive transportation infrastructure, it is highly important that SCAG's strategies for the region accommodate growing freight movement. Combined, the region's major trade hubs – including the Ports of Los Angeles and Long Beach, Los Angeles International Airport, and Calexico East – Mexicali II – handled more than $500 billion of goods in 2018. International containerized trade between the U.S. and Pacific Rim countries and bilateral trade with Mexico have been key factors that helped to drive the region's economy for decades. This has a direct impact on the region, as growth in international containerized trade continues to outpace growth in gross domestic product (GDP) nationally and globally (**FIGURE 2.3**).

In part due to Southern California's global connectivity - specifically its linkages with Asian countries – the growth of the global middle class also impacts the job and housing markets in the region. The growth rate in the global middle class internationally is at an all-time high, with 140 million new middle-class people annually[2]. In the future, 88 percent of new middle-class residents expected between 2015 and 2030 will live in the Asia Pacific region. This is an approximately 250 percent increase in middle class residents in Asia compared to a modest increase of about six percent in North America. Sharp declines in manufacturing employment in the U.S. and the region indicate that traditional middle-class occupations are being filled by middle-class workers

2 Kharas, Homi. (2017) The unprecedented expansion of the global middle class: An update. Brookings, Global Economy & Development Working Paper 100. (February)

in other countries. One impact from both the growth in the middle class in Asia as well as rapid GDP increases in Asian countries, particularly China, is the relationship with the Southern California real estate market. While data on foreign investment in residential real estate are weak, the California Association of Realtors estimates between 5 and 10 percent of California's single-family housing stock is owned by foreign buyers, and 71 percent of foreign buyers in 2017 were from Asia[3]. An influx of foreign capital in Southern California real estate has the potential to exacerbate regional housing shortages, especially if investment properties are left unoccupied.

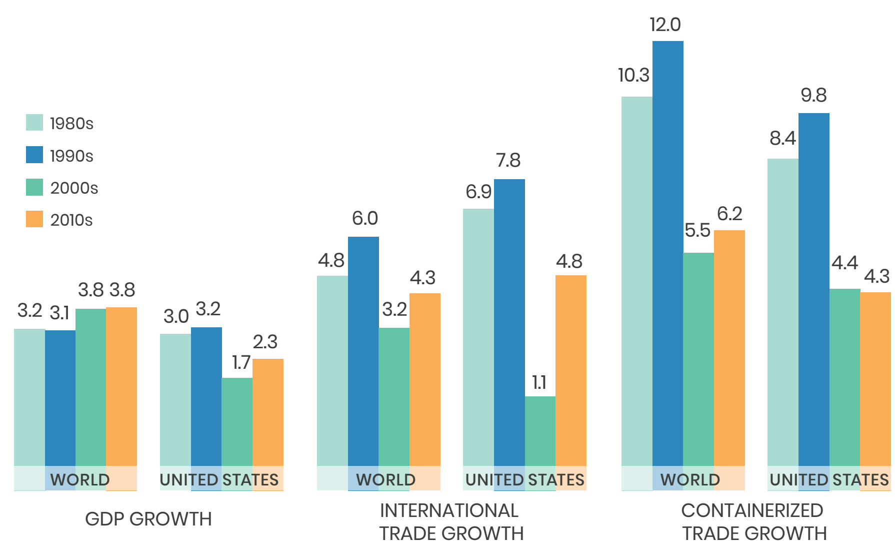
REGIONAL GROWTH

As our regional population and economy continue to grow, the physical footprint of development in our region is growing too. Though Southern California is seen by many as the embodiment of urban sprawl, the region has always challenged the notion of a crisp delineation between "urban" and "suburban." U.S. Census data have indicated that Los Angeles is the densest urbanized area in the United States. This may seem counterintuitive since much of Southern California's land use is characterized by fairly small-lot single-family homes that are spread across many square miles of the region. By contrast, urban areas that seem more compact like New York or Chicago have very dense cores but a lower level of development across their regions, since suburban and exurban land is often far more spread out in these locales. In Southern California, decades of lower-density development (particularly housing) has occurred farther from employment-rich areas, increasing congestion, automobile dependency, leapfrog development and air pollution, and limiting the effectiveness of public transit.

Recent growth trends show a push-and-pull between new single-family development in traditionally suburban or formerly rural areas and multi-family residential development in higher-density communities. Overall, it is clear that when new residents join our region, existing towns, cities and counties adapt to accommodate and attract growth. From 2006 to 2016, an additional 930,000 people called Southern California home. Riverside County had the largest share of population growth among the six counties in the SCAG region during this period, adding an additional 360,000 new residents (nearly 40 percent of the region's increase in population). Los Angeles County followed with the next largest share and experienced an increase of 190,000 residents (or 20 percent of the growth).

In meeting these new residents' demand for housing, the region also added about 400,000 units from 2006 to 2016 – 54 percent of which were multi-family units. Comparing to current conditions in 2016, 39 percent of the region's housing units are multi-family and 61 percent are single-family units. Looking at the distribution of these new housing units throughout the region, Riverside County and Los Angeles County again took the highest shares, together comprising two-thirds (66 percent) of Southern California's housing growth from 2006 to 2016. Riverside County added just under 100,000 new units, and Los Angeles County added an additional 164,000 housing units - with 90 percent

FIGURE 2.3 World & US Growth Rates of GDP, International Trade & Containerized Trade



Source: SCAG staff review and process international trade statistics from: U.S. Department of Transportation, Maritime Administration, U.S. Waterborne Foreign Container Trade by U.S. Customs Ports (1997 - 2017), World Development Indicators, World Bank. Update 08/28/2018, Bureau of Economic Analysis

3 Levin, Matt. (2018) "Data dig: Are foreign investors driving up real estate in your California neighborhood?" CalMatters. (March 7)

representing multi-family developments, largely occurring in denser areas that are well served by transit.

Part of Riverside County's expansion is due to new communities that began to emerge during the housing boom. Four additional cities have incorporated since 2006 (Wildomar, Menifee, Eastvale and Jurupa Valley), increasing the total number of local jurisdictions in the SCAG region to 197. Much of this new territory was previously vacant, very low density residential, or used for agricultural purposes. Many areas in Riverside and San Bernardino Counties were appealing for development due to the availability of lower priced land, which attracted new residents looking for larger or lower priced housing. Jobs, however, did not follow in proportion to housing unit growth in these communities. As a result, residents of the Inland Empire had to travel longer distances on average than other Southern Californians to reach their jobs. As wages are often higher in coastal counties than in inland counties, even for the same occupation, many residents also opted for a longer commute due to their preference for homes that were larger or lower-priced. Examining median commute distances for residents of these areas before and after the housing boom shows a sharp uptick from 2002 to 2012, followed by leveling off from 2012 to 2016 (as displayed in the Environmental Justice Technical Report).

From a regional perspective, incorporation of jurisdictions is often driven by an increase in housing density and the associated needs of residents for increased water, sewer, police, and other municipal services. Therefore, the acreage of incorporated towns and cities in our region provides a good indicator of overall regional development trends, as well as the expansion of growth into rural and agricultural areas. From 2006 to 2016, the amount of land within incorporated jurisdictions increased by over 144,000 acres—a 6 percent change during the 10-year period.

Moving towards the future, new housing production has accelerated since the recession with over 40,000 new units permitted each year from 2015 to 2018. While this is above the 15,000 annual permits in 2009 – a historic low for the region during the Great Recession – it is still below the average of 80,000 new units permitted annually during the housing boom from 2002 to 2006.

While the acceleration in new units since the Great Recession has been characterized by a higher share of multi-family units, there is concern that this trend may reverse absent policy intervention, as Millennials seek affordable ownership opportunities which are scarcer in the urban core and in the multi-family market. For example, 51 percent of all new housing unit permits issued in California for 2018 were for single-family dwellings, making 2018 the first year since 2011 that single-family housing permitting outpaced multi-family homes. The SCAG region's multi-family share of permits have begun to decline from their peak in 2015 (**FIGURE 2.4**). Connect SoCal projects a higher share in multi-family growth and seeks to provide more housing choices in both type and location, while being aware of the transportation, fiscal and environmental benefits of some aspects of denser living.

As our communities continue to expand, vital habitat lands face severe development pressure. The diverse natural and agricultural landscapes of Southern California are a valuable asset to the region and its residents. These lands support a robust economy, provide clean drinking water, protect the air and host countless recreation activities. The region's desert, mountain and coastal habitats have some of the highest concentrations of native plant and animal species on the planet. Southern California is part of the California Floristic Province, one of the planet's top twenty-five biodiversity hotspots[4]. Much of the SCAG region has a rich agricultural history, and crop sales continue to bring billions of dollars into our local economy.

LINKING FUTURE GROWTH WITH MORE TRANSPORTATION CHOICES

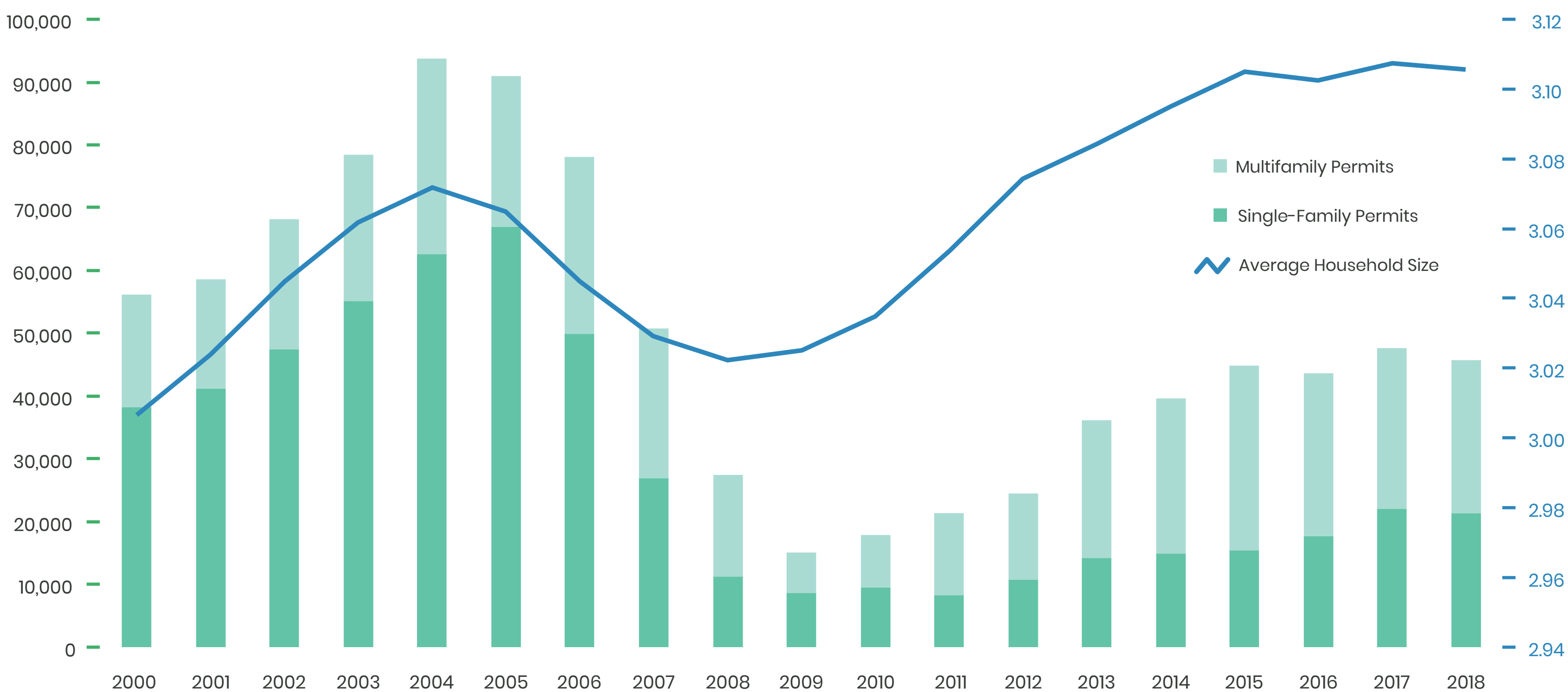
Planning for more housing and jobs near transit was a strategy incorporated in SCAG's first Regional Transportation Plan/Sustainable Community Strategy (RTP/SCS) in 2012 and carried forward in the 2016 RTP/SCS with a focus on areas that are well served by transit. Efforts to implement the previous SCSs have been evident both in recently adopted local plans, which increasingly reflect more SCS strategies such as infill development, as well as in the observed data on recent growth. Between 2008 and 2016, over 58 percent of household growth and 45 percent of employment growth occurred within future high quality transit areas (i.e. places within a half mile of a rail or bus rapid transit stops or bus stops/corridors that will have peak headways of 15 minutes or less) (**TABLE 2.1**).

4 Myers, N., Mittermeier, R. A., Mittermeier, C. G., Da Fonseca, G. A., & Kent, J. (2000). Biodiversity hotspots for conservation priorities. Nature, 403(6772), 853.

Previous RTP/SCS plans also identified increasingly sophisticated strategies to ensure the preservation of natural lands and farmland. As of 2016, over 70 local jurisdictions have conservation strategies in place, such as development impact fees. Between 2008 and 2016, 11 percent of household growth and 5 percent of employment growth occurred in constrained areas (**TABLE 2.1**). SCAG continues to support jurisdictions in implementing the SCS through the Sustainable Communities Program which provides resources for local planning efforts.

Since 2008, there has been a substantial concentration and share of growth in high quality transit areas (HQTAs), Transit Priority Areas (TPAs), Specific Plan Areas, job centers, Neighborhood Mobility Areas (NMAs) and Livable Corridors. These areas account for just under four percent of the region's land area but accommodate the lion's share of regional growth (**TABLE 2.1**). While these recent trends are largely the result of existing local policy, demographic trends and market demand, they underscore that in many ways the region is gradually moving towards a more sustainable development pattern. This new growth is supported by the completion of major transportation projects across the region as well as several major urban rail projects under construction such

FIGURE 2.4 Building Permit Activity & Household Size, SCAG Region, 2000-2018



**Population aged 25 and over*
Source: CA DOF and Construction Industry Research Board (CIRB). Single-family permits listed here utilize the CIRB definition, which includes attached duplexes and accessory dwelling units.

TABLE 2.1 Recent Growth Trends in SCAG Growth Priority Areas, 2008-2016

	Land Area		Share of Total Growth (2008-2016)		Annual Growth Rate (2008-2016)	
	Acres	Percent	Households	Employment	Households	Employment
SCAG Region Total	**24,717,287**				**0.42%**	**1.01%**
Priority Growth Areas Total	**975,234**	**3.9%**	**70.7%**	**74.6%**	**0.50%**	**1.07%**
High Quality Transit Areas (HQTA)[1]	592,286	2.4%	58.2%	45.2%	0.54%	0.85%
Transit Priority Areas (TPA)[2]	218,411	0.9%	33.9%	20.9%	0.65%	0.72%
Job Centers[3]	202,186	0.8%	24.2%	33.4%	0.90%	1.21%
Neighborhood Mobility Areas[4]	248,916	1.0%	37.4%	27.6%	0.54%	0.96%
Livable Corridors[5]	548,451	2.2%	49.6%	53.8%	0.50%	1.13%
Sphere of Influence[6]	146,017	0.6%	3.0%	2.6%	0.36%	1.31%
Absolute Constrained Areas[7]	**20,487,984**	**82.9%**	**11.4%**	**5.0%**	**0.50%**	**0.66%**
Variable Constrained Areas[8]	**17,924,688**	**72.5%**	**52.9%**	**44.9%**	**0.48%**	**1.26%**

Source: SCAG
Note: Priority Growth and Constrained areas extracted from 2045 plan year data of the final Connect SoCal, 2020-2045 RTP/SCS

1. *Generally a walkable transit village or corridor, consistent with the adopted RTP/SCS, and within 1/2-mile of a transit stop or a transit corridor with 15-minute or less service frequency during peak commute hours, excluding freeway transit corridors with no bus stops on the freeway alignment. Additional information is included in the Connect SoCal Sustainable Communities Strategy Technical Report.*
2. *An area within 1/2-mile of a major transit stop that is existing or planned including an existing rail transit station or bus rapid transit station or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during AM and PM peak commute periods.*
3. *Areas with significantly higher employment density than surrounding areas which capture density peaks and locally significant job centers throughout all six counties in the region.*
4. *Areas with high intersection density (generally >= 50 intersections/sqmi.), low to moderate traffic speeds, and robust residential retail connections that can support the use of Neighborhood Electric Vehicles or active transportation modes for short trips.*
5. *An arterial network subset of HQTAs based on level of transit service and land use planning efforts. Some additional arterials identified through corridor planning studies funded through the Sustainability Planning Grant program.*
6. *Spheres of Influence (outside of absolute and variable constrained areas) - Existing or planned service areas and within the planning boundary outside of an agency's legal boundary; data accessed by SCAG from each county's Local Agency Formation Commission (LAFCO) in 2016.*
7. *Including tribal lands, military, open space, conserved lands, sea level rise areas (2 feet) and farmlands in unincorporated areas*
8. *Including Wildland Urban Interface (WUI), grazing lands, farmlands in incorporated jurisdictions, 500 year flood plains, CalFire Very High Severity Fire Risk (state and local), and Natural Lands and Habitat Corridors (connectivity, habitat quality, habitat type layers).*

HOW WE TRAVEL TODAY (2016)

	ALL TRIPS	TO/FROM: WORK	TO/FROM: SCHOOL	OTHER
SINGLE OCCUPANCY VEHICLE	36.0%	70.7%	12.8%	31.2%
HIGH OCCUPANCY VEHICLE	51.7%	23.5%	61.8%	58.2%
TRANSIT	3.2%	2.7%	9.0%	1.6%
BIKE	1.3%	0.7%	2.5%	1.1%
WALK	7.8%	2.4%	13.8%	7.8%

Source: SCAG Activity Based Model

as the OC Streetcar, Metro Rail Regional Connector and Arrow/Redlands Rail. However, there is some very recent data that show increasing rates of single-family housing and vehicle travel, which suggests that in an improving economy the region may require stronger policy intervention and community-building in priority areas to ensure that sustainable trends continue. See Chapter 3's "Core Vision" and "Key Connections" for more highlights of recent progress and potential solutions for addressing the region's challenges.

TRANSPORTATION SYSTEM

The SCAG region is a place in motion with more ships, planes, trains, trucks, and automobiles carrying people and goods in, out, and around than anywhere else in the United States. It is also infamous for congestion, network gaps, and lack of adequate maintenance and preservation. By understanding how the current system is utilized, we can implement policies that help address these challenges while preserving and maintaining the system's longevity.

Our current transportation network is comprised of more than 9,000 miles of public transit (**EXHIBIT 2.1**), 5,000 miles of bikeways (**EXHIBIT 2.2**), over 135,000 lane miles of roadways and 94 miles of express lanes. The Port of Los Angeles and Port of Long Beach, which comprise the largest container complex in the U.S., is one of the many regional gateways that contribute to our expansive regional goods movement system (**EXHIBIT 2.4**). Our aviation system is one of the busiest in the world in terms of air passenger and cargo demand, with more than 110.2 million annual passengers and 3.14 million tons of cargo in 2017. All components of the system are providing economic stimulus throughout the region, while simultaneously connecting our homes to opportunities, including leisure.

Understanding the current infrastructure presents the question of how do Southern Californians utilize the transportation system. **PAGE 28** identifies the current mode choice for trip purposes throughout the SCAG region. Key takeaways include:

- According to SCAG's activity-based travel demand model (ABM), more than 71 million total unlinked daily trips are made throughout the region, and nearly one third of all trips are work related
- Of those 20 million daily work unlinked trips, nearly 40 percent are greater than 10 miles in distance and over 70 percent are completed by individuals driving alone in their vehicles. After that, carpooling is the second most popular option, followed distantly by walking, taking transit and bicycling
- Over two-thirds of all regional trips are non-work related; for these purposes, carpooling is the most popular means for residents to reach their destinations, including school, shopping, among many others
- Looking at school trips specifically, nearly 14 percent are made by walking and 9 percent of trips are made by transit

While the system supports a multitude of options for people and cargo to navigate the region, it is not immune to challenges of preservation, maintenance and accessibility. To ensure a more connected 2045, Southern California will need to address many of these obstacles.

PRESENT & FUTURE CHALLENGES

The region is experiencing a range of challenges and anticipating more, including the aging population, income inequality, traffic congestion and the high cost of housing. This section highlights several key land use and transportation challenges which are directly addressed in this plan; additional discussion is also available in the Technical Reports for Connect SoCal.

AFFORDABLE HOUSING

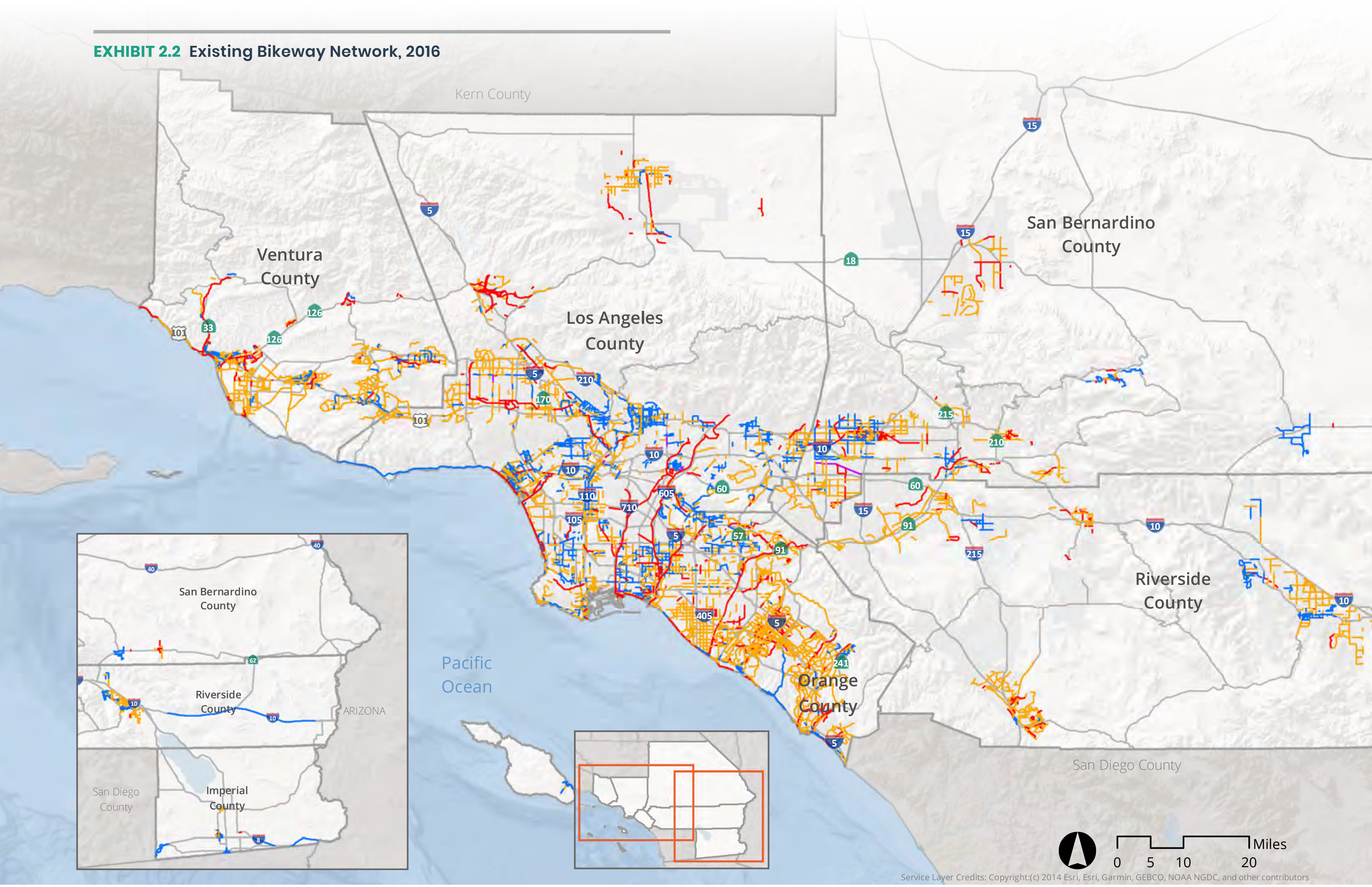
California is in the midst of a long-term structural housing shortage and affordability crisis. As of 2018, California ranks 49th of 50 states in the number of housing units per resident. With many strong indications, high demand for housing and short supply drives up rental and home prices throughout the state. Indeed, seven of the 10 most expensive housing markets in the United States are in California.

SCAG published a housing report in 2016, Mission Impossible: Meeting California's Housing Challenge, to review the causes and consequences of the housing crisis throughout the state and for the SCAG region. The housing crisis is a two-part problem – a shortage of housing and a lack of affordability. The shortage of housing is a lack of supply since there is not enough housing to meet population needs. Housing supply has not kept up with population growth. In comparison to the last few decades, housing building has significantly decreased.

EXHIBIT 2.1 Existing Transit Network, 2016

Source: SCAG, 2019

EXHIBIT 2.2 **Existing Bikeway Network, 2016**

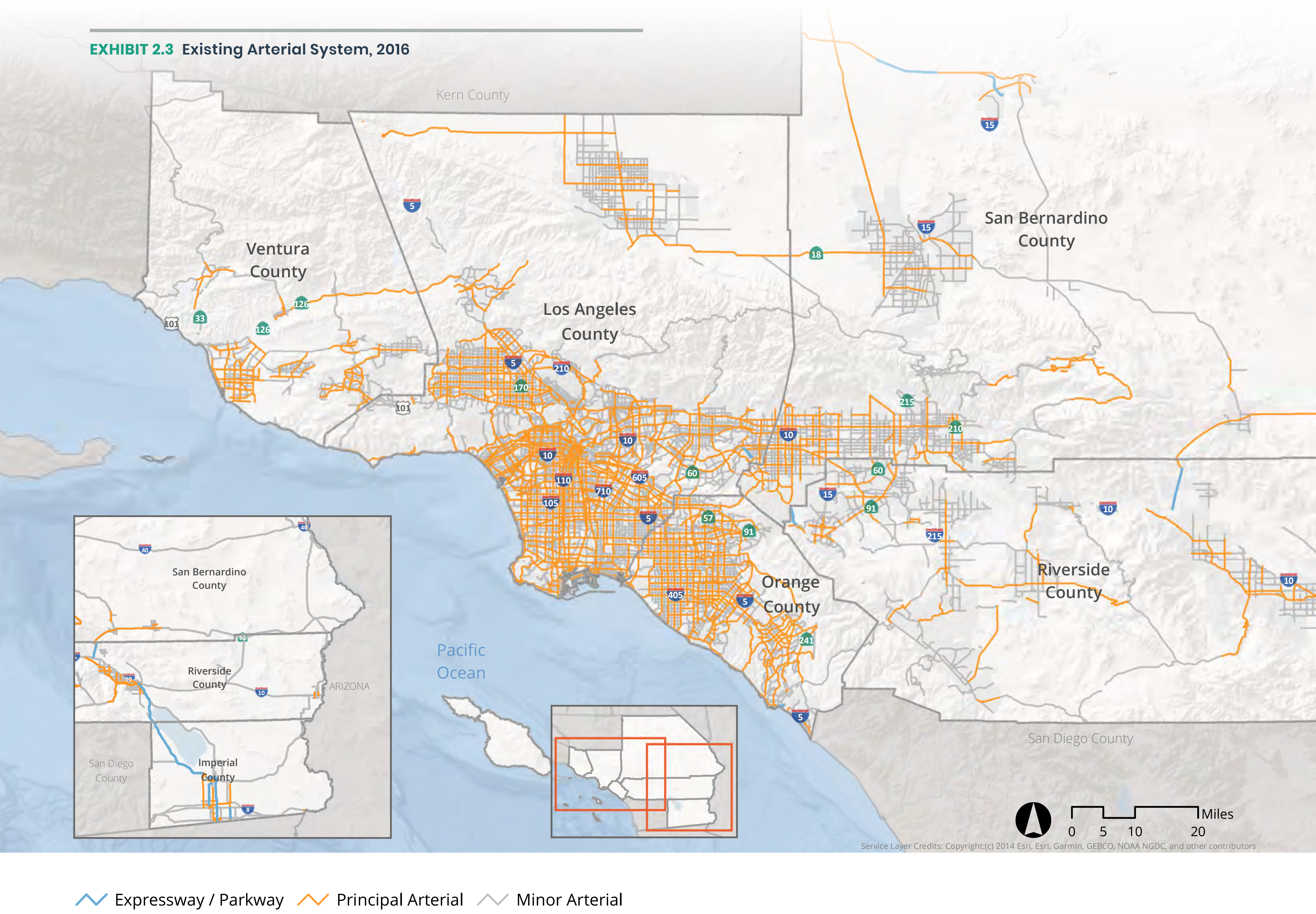


County Boundaries
City Boundaries
Freeway

Existing Bikeways
Class I
Class II
Class III
Class IV

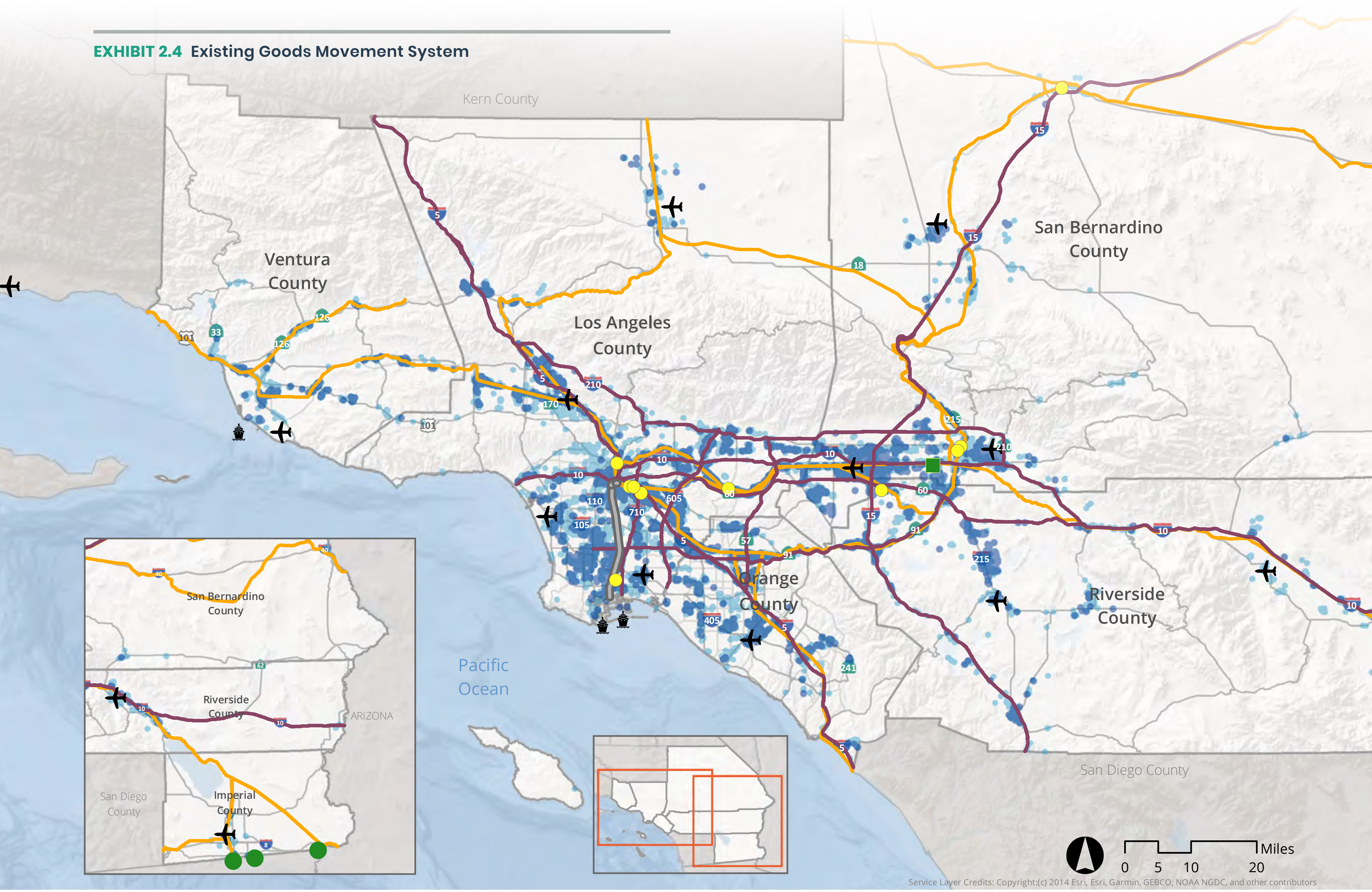
Source: SCAG, 2019

EXHIBIT 2.3 **Existing Arterial System, 2016**



Source: SCAG, 2019

EXHIBIT 2.4 Existing Goods Movement System



Airport
Ports
Ports of Entry
Intermodal Facilities
Classification Facilities
Major Freight Highway Corridors
Main Line Rail
Alameda Corridor
Warehouses
>= 50,000 sq ft
< 50,000 sq ft

Source: SCAG 2019, CoStar Realty Information Inc.

FOCUS

REGIONAL AVIATION

AIRPORTS

7 COMMERCIAL AIRPORTS

7 GOVERNMENT/ MILITARY AIR FIELDS

30+ RELIEVER AND GENERAL AVIATION AIRPORTS

STATS

110.2 MILLION ANNUAL PASSENGERS IN 2017

200 Destinations, 50 Countries, 40 States

3.1 MILLION TONS OF AIR CARGO IN 2017

114 Destinations, 20+ Countries, 30+ States

TRENDS

GENERAL AVIATION GREW AT AN ANNUAL GROWTH RATE OF **0.12%***

AIR CARGO GREW AT AN ANNUAL GROWTH RATE OF **4.6%***

*From 2012 to 2017

HOW WE GET TO THE AIRPORTS IN THE REGION

*Transportation Network Companies, such as Uber and Lyft

FOCUS

GOODS MOVEMENT

THE SCAG REGION HAD APPROXIMATELY

5,177 MILES of principal arterial roadway, including interstate, other freeway & expressway in 2018

2 CLASS 1 RAILROADS

6 INTERMODAL RAIL YARDS*

* Not including carload and automobile terminals

IN 2018, THE VALUE OF INTERNATIONAL TRADE THAT MOVED THROUGH THE SCAG REGION WAS OVER

$562 BILLION including total maritime and cross-border trade and air freight

$1.6 BILLION** cost of congestion to the trucking industry in the Los Angeles metropolitan region in 2016

**Source: ATRI

#1 SOUTHERN CALIFORNIA HAS THE LARGEST CONTAINER PORT COMPLEX IN THE UNITED STATES

9th largest container port complex in the world in 2018

NEARLY **1.2** BILLION sq. ft. of warehousing & distribution space

AND CLOSE TO **750** MILLION facilities >50k sq. ft. in size

Goods Movement dependent industries generated **2.9** MILLION JOBS

REGIONAL AIRPORTS HANDLED NEARLY **$122** BILLION in international air cargo in 2018

OVER **300%** GROWTH in VEHICLE HOURS OF DELAY per day at rail-highway grade crossings across the region by 2045

From 2010 to 2018, one unit was built for every 3.32 persons in the SCAG region which is a 47.5 percent decrease compared to the 1.74 persons per unit in 1970 to 1980. There are also many other contributors to the overall housing crisis including barriers caused by land use zoning that prevent new housing development and increasing building and other costs resulting from time delays, environmental litigation, lack of sufficient local funding mechanisms and community resistance to new housing, especially medium and high-density projects. The second problem, lack of affordability, is the mismatch of household incomes to the prices of housing that is available. **EXHIBIT 2.5** highlights SCAG's existing land use as of 2016. One underlying challenge is that middle income job growth has been severely deficient despite an otherwise strong recovery from the Great Recession.

Additionally, population and employment growth in metropolitan areas in California has slowed in recent years because wages cannot compensate for the high cost of housing. From 2000 to 2017, median gross rent and median home price have increased 25.5 percent and 55.7 percent, respectively, while median household income only increased by 2 percent. High housing costs often force residents to live further away from their workplace as affordable options are sparse near their place of work. In surveying the needs and concerns of residents in Southern California, affordable housing and homelessness were the top concerns. The California Legislative Analyst's Office found that for every 10 percent increase in a metropolitan area's median rent, there was a 4.5 percent increase in an individual's commute time[5]. High housing prices contribute to sprawl, add time to regular commutes, make food and healthcare less attainable by constraining household resources, and exacerbate the growing homelessness crisis.

The cumulative impacts of the housing shortage on individuals' everyday lives add up to a significant economic loss for our region. This is in spite of the fact that every dollar spent on new housing construction, including infill development, generates more than an additional dollar ($1.10) in total economic activity, and each job created through residential construction supports 1.4 additional jobs[6]. These challenges also present an opportunity, however: Increasing the supply of affordable housing would reduce poverty and homelessness, increase residents' economic mobility and educational attainment and improve health outcomes in vulnerable populations. Several studies that have analyzed the economic relationship between affordable housing and surrounding properties have found that affordable housing development has little to no impact on surrounding property values, and in some cases, surrounding property values have increased.

NATURAL LANDS

A range of local conservation plans, habitat conservation agencies and state/federal park designated areas provide protection for a significant amount of natural and farmland in the SCAG region. Many of these protected lands are in remote desert areas far from incorporated areas (**EXHIBIT 2.6**), leaving a substantial amount of land on the urban and suburban fringe susceptible to development. Protected areas tend to not be distributed evenly across habitat types, leaving some habitat types largely unprotected. Many of the high-biodiversity habitats that play a key role in the region's ecosystem are adjacent to urban and suburban communities and do not have protected status. Furthermore, many habitats, both protected and unprotected, are in need of restoration efforts such as non-native species removal, re-introduction of native species, erosion control and re-connecting fragmented areas.

FARM LAND LOST & AT-RISK

Like natural habitat lands, farm and grazing lands are at risk. According to the California Department of Conservation's most recent data, the SCAG region lost 21 percent of its farmland between 1984 (the year the farmland tracking began) and 2016. Major losses were seen in Los Angeles, San Bernardino and Orange counties, which respectively lost 55, 71 and 78 percent of their farmland (**TABLE 2.2**). This decline of agricultural land has implications for the economy and the environment, especially in the context of climate change. While many farming practices contribute to greenhouse gas (GHG) emissions, emissions from farmlands are far less than those from urban environments. Farm and grazing lands can also provide co-benefits such as wildlife habitats, flood control and groundwater recharge. Productive farm and range lands bring billions of dollars into Southern California's economy, creating jobs and providing food security. Converting these lands to urban development weakens this vital industry and the region's position in the U.S. economy.

5 Taylor, Mac. (2015). California's High Housing Costs: Causes and Consequences. California Legislative Analysts' Office. 17 March
6 Center for Strategic Economic Research. (2014). The Economic Benefits of Housing in California. September.

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AFFORDABLE HOUSING

California is in the midst of a long-term structural housing shortage and affordability crisis. In 2016, SCAG published the report, *Mission Impossible: Meeting California's Housing Challenge*, to review the causes and consequences of the housing crisis throughout the state and for the SCAG region. It found that the lack of supply of housing is due to the fact that housing construction has not kept up with population growth. There are also many other contributors to the overall housing crisis including barriers caused by land use zoning that prevent new housing development and increasing building and other costs resulting from time delays, environmental litigation, lack of sufficient local funding mechanisms, and community resistance to new housing especially medium and high-density projects.

HOME BUILDING HAS NOT KEPT UP WITH POPULATION GROWTH

1970–1980	1 NEW UNIT	PER	1.74 PERSONS ADDED
A DROP IN HOME BUILDING 1990–2000	1 NEW UNIT	PER	4.52 PERSONS ADDED
2010–2018	1 NEW UNIT	PER	3.32 PERSONS ADDED

FROM 2000 TO 2017

FOR RENT

MEDIAN RENT 26%

MEDIAN HOME PRICE 55.7%

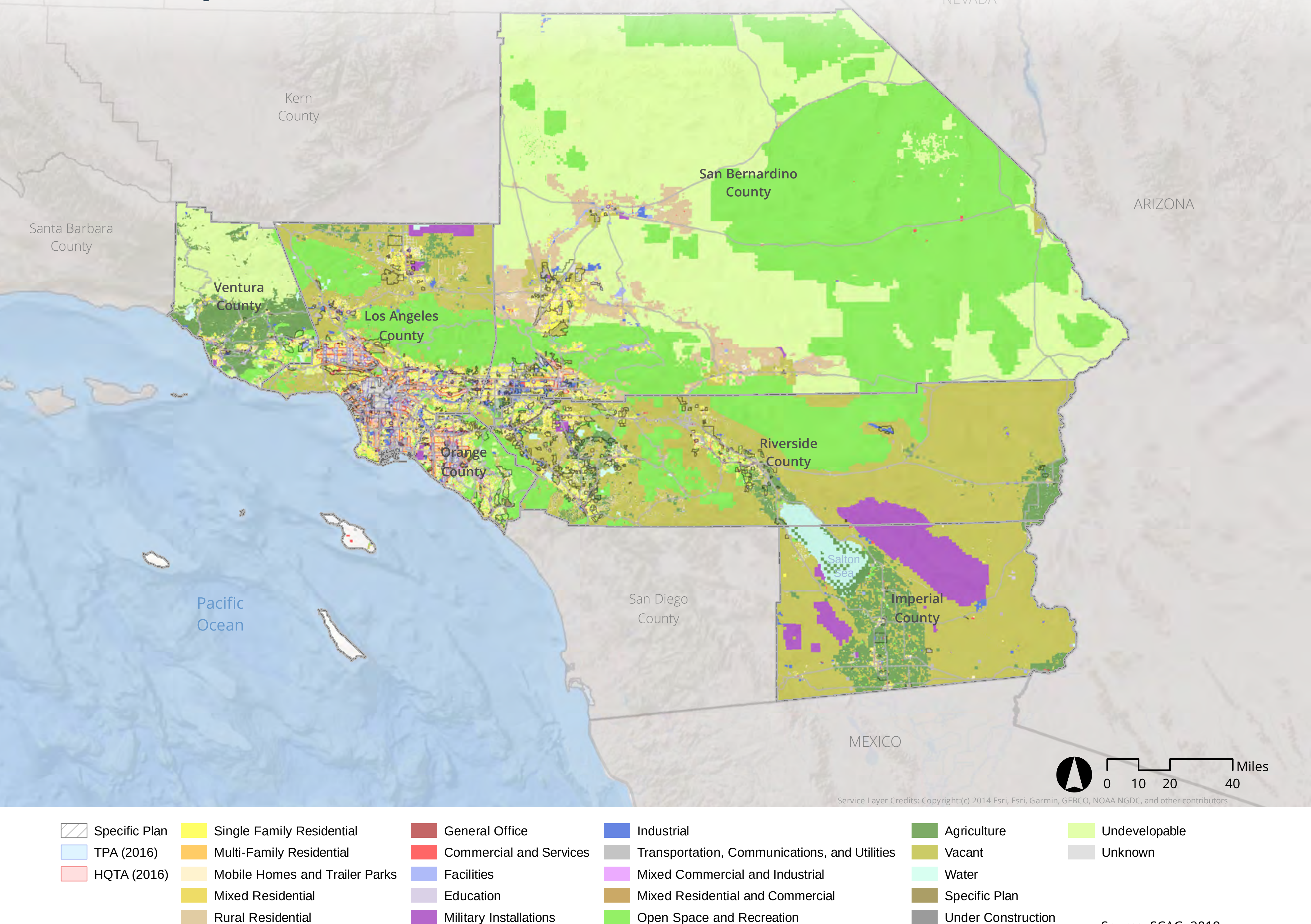
in SCAG Region $532,175

VS.

MEDIAN HOUSEHOLD INCOME 2%

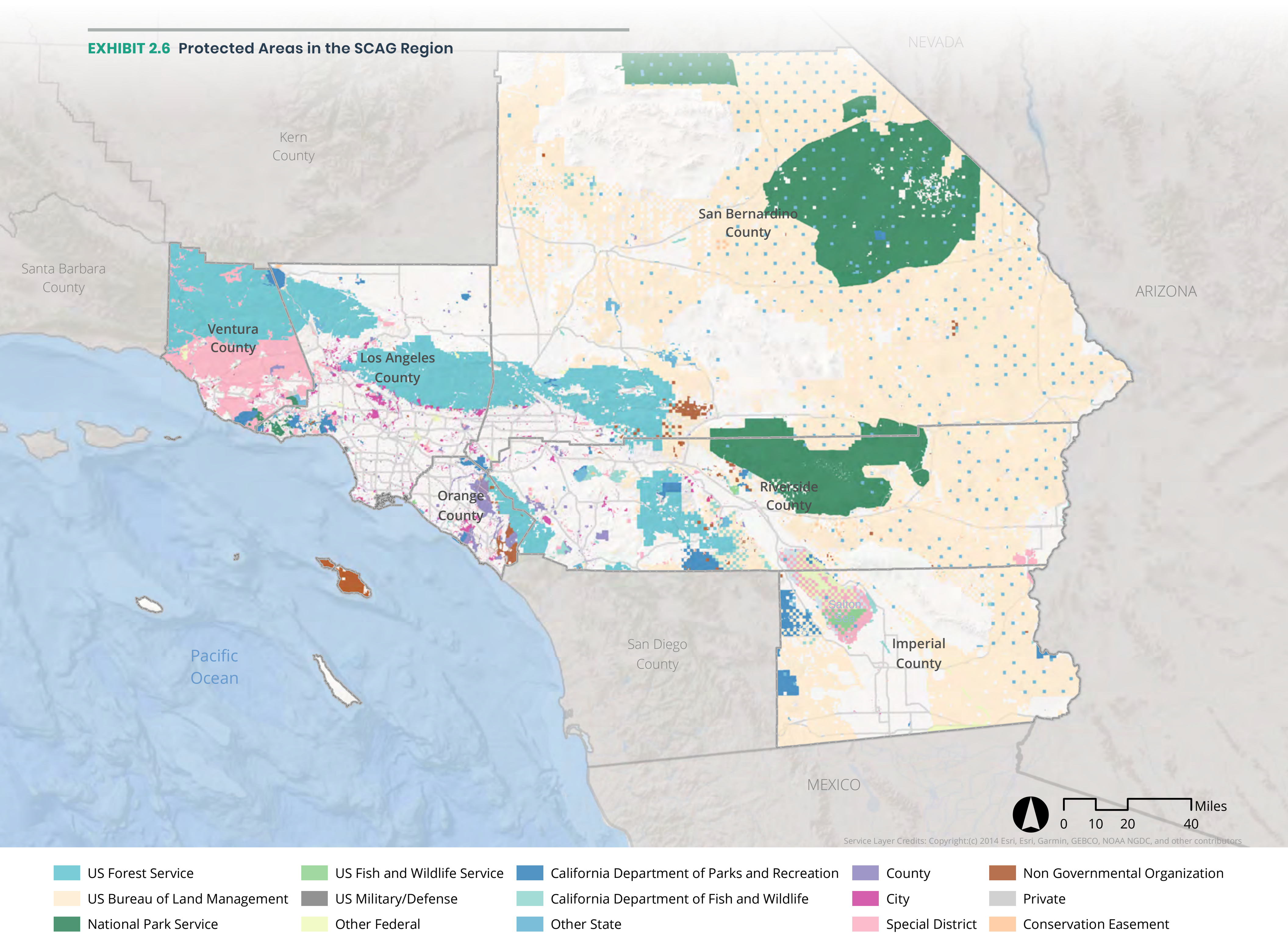
Source: U.S. Census Bureau; Census 2000 Summary File 1, 2017 American Community Survey 1-Year Estimates, and SCAG's 2016 Mission Impossible? Meeting California's Housing Challenge Report.

EXHIBIT 2.5 Regional Land Use, 2016



Source: SCAG, 2019

EXHIBIT 2.6 Protected Areas in the SCAG Region



Source: SCAG, California Protected Areas Database, 2017; California Conservation Easement Database, 2016

As population continues to grow, vital habitat and farmlands face severe development pressure. In addition to their respective roles in biodiversity and food production, both natural areas and farmlands help reduce the impacts of climate change by capturing GHGs in the soil, plants, and trees instead of allowing them to concentrate in the atmosphere. Urban, suburban and even rural development on previously undeveloped land results in increased GHG emissions. The conservation of natural area and farmlands on the edges of urban and suburban development is an integral aspect of Connect SoCal as it incentivizes infill development and the concentration of different land uses. This makes it easier to travel shorter distances which reduces GHG emissions. Many counties, cities and conservation groups in Southern California have excelled in their work to protect these vulnerable lands, but few plans or policies have been enacted to preserve habitat and farmlands on a regional scale. With regional population increases, conservation decisions made now can safeguard the endurance of these lands, protecting threatened wildlife and the local agricultural economy, and reducing carbon emissions, while also contributing to a high quality of life for future generations.

TABLE 2.2 **Farmland Loss by County in Acres, 1984-2016**

County	1984	2016	Percent Change
Imperial	562,132	528,471	-6%
Los Angeles	60,877	27,390	-55%
Orange	26,535	5,715	-78%
Riverside	561,542	419,835	-25%
San Bernardino	69,575	20,293	-71%
Ventura	132,388	118,508	-10%
SCAG Region	**1,413,049**	**1,120,212**	**-21%**

Source: California Department of Conservation Farmland Mapping & Monitoring Program

TRANSPORTATION SAFETY

Traffic-related fatalities and serious injuries are a critical and preventable public health and equity issue in the region. Approximately 1,500 people die, more than 5,200 are severely injured, and 136,000 are injured on roadways throughout the SCAG region every year. Collisions are happening in every community in the region, from El Centro in Imperial County to Malibu in Los Angeles County. They are happening to people from all walks of life, to those who drive and to people who walk and bike. Approximately 90 percent of collisions are occurring in urban areas, with most taking place on local roads, not highways. Regionally, 65 percent of fatalities and serious injuries are occurring on less than 1.5 percent of the roadway network. Of particular concern are vulnerable groups such as children, older adults, and users of personal mobility devices such as e-scooters. These roadway users do not have the protections included in automobiles, and collisions involving them have higher fatality rates. Pedestrian and bicycle-related collisions have been steadily increasing since 2012, underscoring the importance of implementing infrastructure improvements that safely accommodate all modes, or reducing speed limits in some areas to reduce the likelihood or severity of higher speed collisions. Unsafe speed is the primary collision factor in the SCAG region, accounting for about 30 percent of collisions. At 50 miles per hour, a pedestrian has only 25 percent chance of survival if struck. In contrast, at about 25 miles per hour, if struck, a pedestrian has a 90 percent chance of survival.

Traffic-related fatalities and serious injuries have significant impacts on the lives of families, friends and community members. They also have economic and environmental impacts. Traffic collisions impact congestion, leading to emergency management costs and additional GHG emissions from bottlenecking. Increasing safety for pedestrians and bicyclists can make transit and active transportation more desirable, thereby motivating mode shifts and reducing GHG emissions. Policies, infrastructure and mode choice impact the safety of everyone who travels throughout the region. Providing a safe transportation network is essential for meeting SCAG's economic, housing, environmental, equity and public health goals, and will require optimizing the existing system to strategically incorporate complete streets while supporting a range of other safety strategies.

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TRANSPORTATION SAFETY

#1
REASON FOR ALL COLLISIONS
UNSAFE SPEED

Fatal and Serious Injury collisions have increased in the region since 2012, underscoring the importance of re-evaluating our street designs and speed limits. Approximately 90 percent of collisions occur in urban areas, with most taking place on local roads, not highways. Unsafe speed is the primary collision factor in the SCAG region. About 30 percent of collisions are due to unsafe speed. At 50 miles per hour, a pedestrian has only 25 percent chance of survival if struck. In contrast, at about 25 miles per hour, if struck, a pedestrian has a 90 percent chance of survival.

65% OF FATALITIES & SERIOUS INJURIES ANNUALLY
OCCUR IN LESS THAN **1.5%** OF THE REGION'S ROADWAY NETWORK

ON ROADWAYS IN THE SCAG REGION

136,000 INJURED ANNUALLY

5,200 SEVERELY INJURED ANNUALLY

1,500 PEOPLE DIE ANNUALLY

Source: Statewide Integrated Traffic Records System (SWITRS), 2016

TRANSPORTATION SECURITY

Catastrophic events like earthquakes, floods, fires, hazardous material incidents, dam failures, civil unrest, transportation accidents, tsunamis and terrorism can occur at any given moment in the SCAG region. The state of California has experienced 323 state proclaimed emergencies and 267 federally proclaimed disasters since the year 1950. While the threat of disasters cannot be eliminated, effective planning can help minimize the impacts from disasters. Disaster incidents in the state were highest between 2000 and 2009 where 59 people died, and 885 people were injured. Despite a tripling of population between 1950 and 2017, the number of deaths resulting from disasters has remained within a relatively narrow range. The two most frequent disasters in the SCAG region are floods (160 incidents since 1950) and fires (138 incidents since 1950).

PUBLIC HEALTH

Across the SCAG region, transportation and land use decisions are shaping neighborhoods, while also influencing the health outcomes of residents. The way a community is designed impacts the likelihood that a person will bike or walk to school, work, or local shops; have access to healthy food or parks; and breathe air that is free of pollutants. Conditions in the places where people are born, live, learn, work and play affect a wide range of health risks and outcomes. These conditions are known as the Social Determinants of Health (SDOH) and they help explain why health outcomes (e.g., rates of asthma or diabetes) vary widely across the region. Depending on where you live in the region, your life expectancy could be as low as 68 years or as high as 93 years. To improve health outcomes and to reduce these inequities, it is critical for public health to be integrated into land use and transportation planning.

Public health outcomes in the 4-year period from 2012 to 2016, the base years of the 2016 RTP/SCS and Connect SoCal, have largely worsened or remained constant across the SCAG region, including asthma (13.8 percent), diabetes (8.9 percent), pre-diabetes (13.7 percent), high blood pressure (27.9 percent), heart disease (5.8 percent) and obesity (29.6 percent). The main chronic diseases accounting for deaths in the region are coronary heart disease, cerebrovascular disease (stroke), chronic lower respiratory disease and diabetes. Chronic diseases carry significant direct treatment-related costs and indirect costs. Healthcare expenditures continue to be a large burden on the regional economy, with $18.8 billion spent annually at the base year on just three chronic diseases: type 2 diabetes, high blood pressure, and heart disease. Reducing the prevalence of chronic disease through strategic transportation investments and land use strategies would benefit the region's health and the economy.

The aging of the region's population will also pose new public health challenges. Most senior citizens prefer to age in place rather than move into a smaller dwelling unit or group housing. With an aging population comes greater risks of health complications, and an increased need to plan for walkable and compact urban environments to support older adults choosing to age in place. Through the implementation of Connect SoCal, public health outcomes through transportation investments and land use strategies are expected to improve across each of SCAG's public health focus areas.

SYSTEM PRESERVATION & RESILIENCE

Maintaining the operational efficiency of our transportation system is crucial. Unfortunately, demand on the system has increased over the decades without significant maintenance reinvestment. This has greatly influenced the number of roadways and bridges that have fallen into an unacceptable state of disrepair. Indeed, many residents have expressed concern. One particular resident commented that "Southern California's roads are in horrible condition. There's no infrastructure to support planned development." Part of the challenge is to ensure that life cycle costs such as maintenance and preservation expenses, are considered and planned in the development of infrastructure projects. Until the passage of Senate Bill 1 (SB1) (2017), funding for preservation and improvement of our system was on a dramatic decline. SB 1 provides a much needed funding supplement for system preservation, but we must continue to weigh our options carefully in allocating and investing resources to maximize the productivity of our transportation system. **FIGURE 2.5** displays the conditions of distressed lane miles on the State Highway System. **FIGURE 2.6** reflects bridge conditions in the SCAG region.

ACCESS & MOBILITY

Reaching destinations in a timely manner is a top concern of Southern California residents. In 2016, average trip length to work was over 19 miles and

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PUBLIC HEALTH

Conditions in the places where people are born, live, learn, work, and play affect a wide range of health risks and outcomes. If a person lives in housing adjacent to a freeway or high traffic road, they may be more likely to develop asthma. If a person lives in a community with an abundance of bikeways, they may be more inclined to bike to work or school. These types of community conditions are known as the Social Determinants of Health (SDOH) and they help explain why health outcomes (e.g., rates of asthma or diabetes, lifespans, etc.) vary widely across the region. Social Determinants of Health are often the result of past transportation and land use planning and policy decisions, and they, along with economic opportunities, play a role in shaping these circumstances and influencing health outcomes.

Since the last plan was adopted, overall public health trends have continued to worsen or stay the same. SCAG analyzes health outcomes affected by the SDOH which include: accessibility to essential services; air quality; affordable housing; climate change; economic opportunity; safety; and physical activity.

$16.7 BILLION

ANNUAL COST OF TREATING CHRONIC DISEASES:

Heart disease, high blood pressure and diabetes.

CHRONIC DISEASES & INJURIES MAKE UP OVER 69% OF ALL CAUSES OF DEATH IN THE REGION:

14% (**+2%** increase since **2012**)
ASTHMA

13% (**+4%** increase since **2012**)
PRE-DIABETES

9% (existing rate **2016**)
DIABETES

29% (**+10%** increase since **2001**)
OBESITY

28% (**2016**)
HIGH BLOOD PRESSURE

6% (**2016**)
HEART DISEASE

Source: California Health Interview Survey (CHIS), 2012, 2016, California Public Health Assessment Model (C-PHAM) for the $16.7 billion figure

14 miles by auto and transit respectively. Yet it took over twice as long by transit (69 min) to make the same trip compared to auto (31 min).

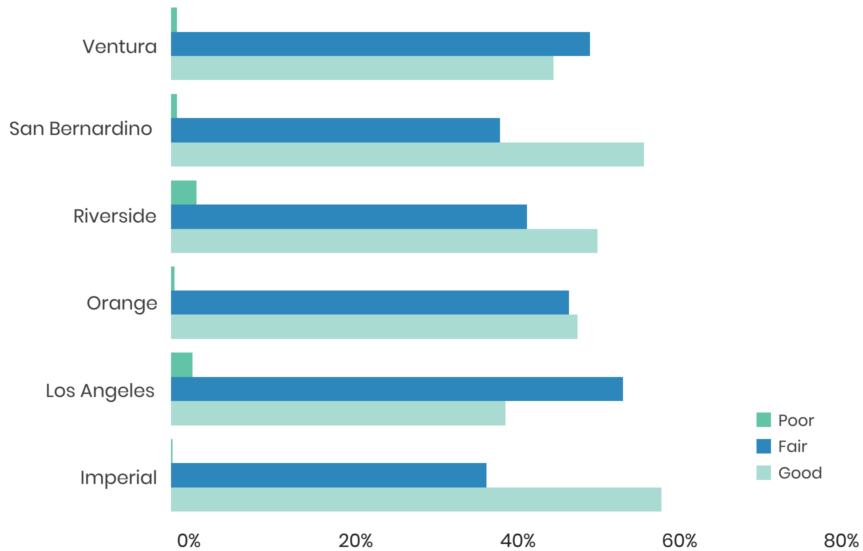
Examining Southern California's transportation system, it is clear that there are many causes of congestion and challenges for improving accessibility. Paramount among them is a dependence on personal vehicles in our region, which often shapes our built environment to be more suited to cars than people – reducing the attractiveness and viability of transit as an alternative means of getting around. Residents see a lack of transit options as a significant challenge and many express a desire, as one survey respondent put it, for more "...reliable transit outside of the Los Angeles downtown core."

An imbalance between jobs and housing in many areas presents challenges to access and mobility in Southern California due to the geography and urban sprawl of our region. Many residents continue to move farther and farther inland to reach lower priced housing. Additional factors impacting congestion on roadways and transit accessibility are natural impediments such as mountains and waterways and other challenges.

Another cause of congestion is gaps in the road network and bottlenecks where capacity is reduced at pinch points. SCAG identified the top 100 bottleneck locations in 2016 by annual hours of vehicle delay. Most bottlenecks are active in the morning and/or afternoon peak periods, and all are active at midday. The most active time for bottlenecks is the afternoon peak period. The top three ranked bottlenecks in the SCAG region are all located on the I-405. The top ranked bottleneck, where National Blvd. meets the Santa Monica Freeway (I-10) in Los Angeles, results in over 1.7 million annual hours of vehicle delay. Most bottlenecks are located in Los Angeles County, with 19 in Orange County, three in Riverside County and two in San Bernardino County. More discussion on bottlenecks is included in the Congestion Management Technical Report.

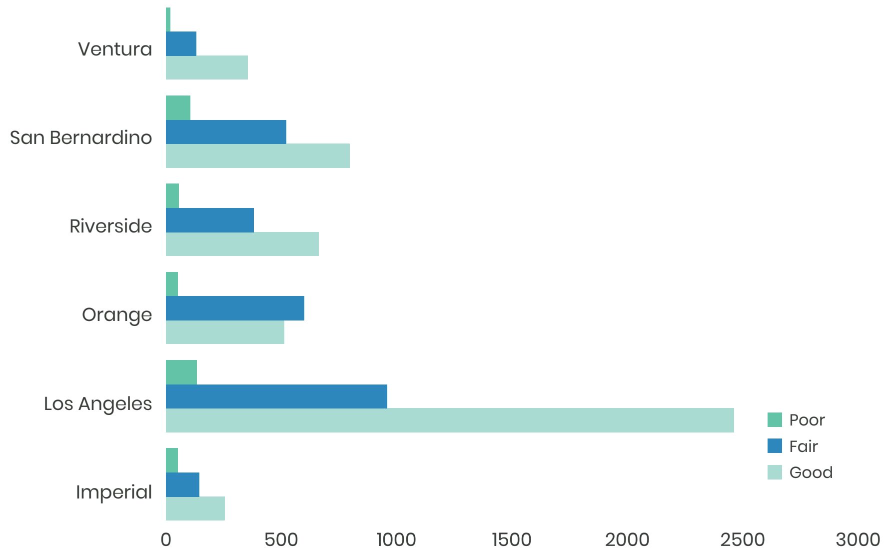
Access to opportunities such as jobs, schools and healthcare is critical to the well-being of all segments of our society. Equitable access to such opportunities still remain a challenges. Minority and low-income populations tend to live in areas that have relatively fewer opportunities and services. At the same time, they tend to be more dependent on public transportation, and/or walking or bicycling due to lower rates of auto ownership, which results in limiting their

FIGURE 2.5 Pavement Condition of State Highway System



Source: Caltrans Automated Pavement Condition Survey 2015-2016

FIGURE 2.6 Bridge Conditions in the SCAG Region, 2015



Source: FHWA Bridge Inventory

access to opportunities, thus putting them at a disadvantage relative to the general population.

FUNDING THE TRANSPORTATION SYSTEM

The cost of a multimodal transportation system that will serve the region's projected growth in population, employment, and demand for travel surpasses the projected revenues expected from existing sources including the gas tax, our historic source of transportation funding. The purchasing power of our gas tax revenues is decreasing and will continue a downward trajectory while transportation costs escalate, fuel efficiency improves, and the number of alternative-fuel vehicles continues to grow.

Despite the recent increase in state revenue through a state gas tax increase and other transportation fees with the passage of SB 1, state sources comprise a small share of total transportation revenues. Additionally, federal sources continue to dwindle as federal fuel tax rates have not been adjusted since 1993. To backfill limited state and federal gas tax revenues, our region has continued to rely on local revenues to meet transportation needs. In fact, 60 percent of the region's core revenues are from local sources. Eight sales tax measures have been adopted throughout the region since the 1980s; the burden of raising tax dollars has shifted significantly to local agencies.

Simultaneously, we need to explore innovative local programs that help meet the challenge of financing and maintaining the transportation system while reflecting the unique needs of the region. Efforts are underway to explore how we can transition from our current system based on fuel taxes to a more direct system based on user fees. In addition to generating revenues, user fees are among the most impactful VMT and GHG reduction strategies for the transportation sector. Yet perceptions about the fairness of user fees often raise public acceptability concerns. A sensible system of user fees can be designed with policies that address equity concerns.

PLANNING FOR DISRUPTION

Emerging technology has the potential to expand transportation choices and equity throughout the region. By providing more options for local and regional trips, emerging technologies may shift trips to less environmentally damaging modes, minimize negative environmental impacts associated with current vehicle use, increase system efficiency, improve safety, and reduce auto-related collisions and fatalities. However, realizing the potential benefits (and potential negative impacts) is dependent on the rate of technology development and adoption of a wide range of public and private sector innovations. Emerging transportation technologies pose numerous challenges and opportunities for the SCAG region, including:

- An uncertain pace of development and deployment
- Challenges obtaining data from the private sector
- The impact of Transportation Network Companies (TNCs) on transit and active transportation usage
- A lack of permanence in public/private service agreements
- High likelihood of new technology actually increasing VMT
- Finding a balance between regulation and innovation
- Avoiding inequities in accessing new transportation technologies

Emerging technologies vary widely when it comes to their effect on VMT, and therefore GHG emissions. Some of these technologies, such as alternative fuel vehicles, micro-mobility, bikesharing and microtransit, have a mitigating influence on GHG emissions. Others, such as ride-hailing and automated vehicles, will increase VMT and GHG emissions if their business models do not adapt[7] to eliminate or reduce single-passenger rides and "deadheading," where drivers drive with zero passengers. Therefore, it is vitally important to adopt strategies and policies that ensure pooled or shared rides.

MEETING FEDERAL AIR QUALITY STANDARDS

Although air quality has improved significantly over the past decades, the SCAG region still experiences among the worst air quality in the country. Almost the entire SCAG region fails to meet the health-based federal air quality standards for one or more transportation-related air pollutants. In addition to public health impacts from unhealthy air quality, the challenge of meeting health-based federal air quality standards has serious implications for the RTP/SCS, the Federal Transportation Improvement Program (FTIP) and transportation projects in the SCAG region.

7 San Francisco County Transportation Authority, TNCs and Congestion Final Report, October 2018.

A particularly pressing challenge is for the South Coast Region to meet the 2023 statutory deadline of attaining the 1997 ozone standard. Pursuant to the federal Clean Air Act (CAA), a Contingency Measure Plan was recently developed jointly by the South Coast Air Quality Management District (SCAQMD) and the California Air Resources Board (ARB) and subsequently submitted to the U.S. Environmental Protection Agency (EPA). The Contingency Measure Plan highlights the critical need for federal regulatory actions and/or funding to address emission sources under federal jurisdiction including aircraft, ships, trains and out-of-state trucks in order to meet the air quality standard. This is in addition to regulatory actions, programs and incentive funding SCAQMD and ARB have developed to achieve emission reductions.

If the U.S. EPA disapproves the air plan, a federal sanctions clock will be triggered which will lead to federal highway sanctions if the underlying deficiency cannot be resolved within 24 months. Highway sanctions restrict federal funding to transportation projects that expand highway capacity, nonexempt project development activities and any other projects that do not explicitly meet exemption criteria. If imposed, highway sanctions have the potential to impact billions of dollars of federal funding and tens of billions of dollars of important transportation projects in the SCAG region.

Transportation, especially the goods movement sectors, contributes to the overwhelming majority of air pollutant emissions causing ozone pollution. A comprehensive and coordinated regional solution including aggressive regulations, advancements in clean technologies, innovative solutions, and integrated land use and transportation planning from all levels of governments and all stakeholders will be required to achieve the needed emission reductions from the goods movement sectors.

Finally, the emission of air pollutants come from a wide range of sources and may be transported upwind. Therefore, a mitigation strategy should be in place to assist impacted communities, even if the emissions are not being locally produced.

MOVING TOWARDS SOLUTIONS

As this region continues to grow in age and population, and in an environment already experiencing significant challenges, it is crucial that land use and transportation strategies are integrated to achieve regional goals. Connect SoCal identifies a number of land use and transportation strategies that will provide residents more choices in how they can reach their destinations reliably and reduce congestion on roadways in our region through 2045 and beyond.

In the following chapter, Connect SoCal showcases an array of investments across all transportation modes and incorporates a range of best practices for increasing transportation choices, reducing dependence on personal automobiles, encouraging growth in walkable/mixed-use communities with ready access to transit infrastructure and employment opportunities, and improving air quality. More and varied housing types and employment opportunities are envisioned within and near job centers, transit stations, and walkable neighborhoods where goods and services are easily accessible via shorter trips.

Strategies in Connect SoCal also recognize the transformative potential of emerging technologies and mobility innovations to provide increased mobility, reduce harmful emissions, generate new revenue streams for regional reinvestment, and opportunities to affect land use to improve quality of life. While no one technology or innovation is likely to solve our regional challenges alone, the combination of and judicious application of their benefits for the region can positively change the way we live, work and travel in Southern California.

CHAPTER 3

CHAPTER 3

A PATH TO GREATER ACCESS, MOBILITY & SUSTAINABILITY

CORE VISION

Rooted in the 2008 and 2012 RTP/SCS plans, Connect SoCal's "Core Vision" centers on maintaining and better managing the transportation network we have for moving people and goods, while expanding mobility choices by locating housing, jobs and transit closer together and increasing investment in transit and complete streets. Examples of SCAG's Core Vision are embedded throughout this chapter in blue highlight boxes, and include progress made since the 2016 RTP/SCS. These highlights are presented alongside the narrative, which provides a more comprehensive overview of strategies planned to advance the region's core vision for mobility and sustainability. The Core Vision includes:

- SUSTAINABLE DEVELOPMENT
- SYSTEM PRESERVATION & RESILIENCE
- DEMAND & SYSTEM MANAGEMENT
- TRANSIT BACKBONE
- COMPLETE STREETS
- GOODS MOVEMENT

There is no one-size-fits-all solution for regional challenges. Instead, we must explore an integrated web of creative strategies to achieve the goals of Connect SoCal. In this chapter we will lay out clear policy guidance, action-oriented strategies and pragmatic tools that can be utilized to achieve a coordinated and balanced regional transportation system. This chapter also describes strategies to integrate the region's Forecasted Development Pattern with the transportation network to demonstrate reductions in greenhouse gas (GHG) emissions.

OUR VISION FOR A CONNECTED REGION

As the region's population increases, ages and diversifies, it is crucial that land use decisions and transportation investments made at the federal, state, regional and local levels are coordinated to be able to achieve Connect SoCal's regional goals. Developing compact centers with a robust mix of land uses, a range of building types and connected public spaces can strengthen the fabric of communities. Targeting rideshare and transportation demand management strategies near employment centers can reduce travel costs and improve air quality. Thoughtfully locating freight delivery facilities and logistics centers can reduce truck travel and the impact of goods movement on communities. While coordinating land-use and transportation strategies makes sense and can yield beneficial outcomes, implementation is difficult in a region where authority is divided among myriad agencies. This plan is not designed to dictate or supersede local actions and policies, but rather to lay out a path to achieving regional goals set by the Regional Council.

Our vision for the region incorporates a range of best practices for increasing transportation choices, reducing dependence on personal automobiles, further improving air quality and encouraging growth in walkable, mixed-use communities with ready access to transit infrastructure and employment. More and varied housing types and employment opportunities would be located in and near job centers, transit stations and walkable neighborhoods where goods and services are easily accessible via shorter trips. To support shorter trips, people would have the choice of using neighborhood bike networks, car share or micro-mobility services like shared bicycles or scooters. For longer commutes, people would have expanded regional transit services and more employer incentives to carpool or vanpool. Other longer trips would be supported by on-demand services such as microtransit, carshare and citywide partnerships with ride hailing services. For those that choose to drive, hotspots of congestion would be less difficult to navigate due to cordon pricing, and using an electric vehicle will be easier thanks to an expanded regional charging network.

There are certainly inherent constraints to expansive regional growth, and areas that are susceptible to natural hazards and a changing climate must be recognized. Connect SoCal therefore emphasizes options that conserve important farmland, resource areas and habitat corridors, and de-prioritizes growth on lands that are vulnerable to wildfire, flooding and near term sea-level rise.

OUR APPROACH

Connect SoCal addresses regional challenges in several ways. A key, formative step is to develop a Regional Growth Forecast in collaboration with local jurisdictions, which helps SCAG identify opportunities and barriers to development. The plan forecasts the number of people, households and jobs (at the jurisdictional level) expected throughout SCAG's 191 cities and in unincorporated areas by 2045. This forecast helps the region understand in a very general sense where we expect growth and allows us to focus attention on areas experiencing change and increases in transportation needs. For additional details on growth forecast methodology, refer to the Demographics and Growth Forecast Technical Report.

The Regional Growth Forecast is then complemented by a set of strategies to guide integrated land use development decisions and transportation investments to achieve regional goals, called the Connect SoCal Growth Vision. The resulting Forecasted Development Pattern includes strategies to prioritize areas for new development, like near destinations and mobility options, and places enhanced conservation value on resource areas, key farm lands and areas vulnerable to natural hazards. However, Connect SoCal does not dictate or supersede local policies, actions or strategies – applying the Forecasted Development Pattern at the local level is the authority and responsibility of towns, cities and counties. The regional Forecasted Development Pattern identifies areas sufficient to house the region's population, including all economic segments of the population, through 2045. It takes into account

KEY CONNECTIONS

In this chapter, we also describe Connect SoCal's "Key Connections" in yellow highlight boxes. Key Connections augment the Core Vision of the plan to address trends and emerging challenges while "closing the gap" between what can be accomplished through intensification of core planning strategies alone, and what must be done to meet increasingly aggressive greenhouse gas reduction goals. These Key Connections lie at the intersection of land use, transportation and innovation, aiming to coalesce policy discussions and advance promising strategies for leveraging new technologies and partnerships to accelerate progress on regional planning goals. The Key Connections include:

- SMART CITIES & JOB CENTERS
- HOUSING SUPPORTIVE INFRASTRUCTURE
- GO ZONES
- ACCELERATED ELECTRIFICATION
- SHARED MOBILITY & MOBILITY AS A SERVICE

CORE VISION
SUSTAINABLE DEVELOPMENT

Through our continuing efforts to better align transportation investments and land use decisions, we strive to improve mobility and reduce greenhouse gases by bringing housing, jobs and transit closer together.

PROGRESS SINCE 2016

From 2008 to 2016, 71 percent of the region's household growth and 75 percent of the region's job growth occurred in Connect SoCal's priority growth areas. During this same period, only 11 percent of the region's household growth and 5 percent of the job growth occurred on constrained areas like prime farmland, and in areas vulnerable to rising seas.

PLANNING FOR 2045

From 2016 to 2045, 64 percent of new households and 74 percent of new jobs will occur in priority growth areas. During this same period, roughly 10 percent of new households and 9 percent of new jobs will occur in constrained areas.

SCAG's Sustainable Communities Program supports planning in local jurisdictions to advance the regional Growth Vision. In addition, new regional data tools, like the Regional Data Platform, will help local jurisdictions identify areas well suited for infill and redevelopment as well as natural and farm lands to be preserved. Studies and partnerships will also be pursued to establish a Regional Advanced Mitigation Program (RAMP), a strategic habitat and agricultural land conservation-planning program that identifies mitigation solutions for infrastructure projects early in the planning process.

net migration into the region, population growth, household formation and employment growth. Moreover, Connect SoCal identifies areas within the region sufficient to house near-term and long-term growth and support a diverse economy and workforce. For additional details on the Growth Vision and Forecasted Development Pattern, see the Sustainable Communities Strategy Technical Report.

Key investments are coupled with our Forecasted Development Pattern to optimize the regional transportation system and accommodate the increased service and infrastructure demands posed by land-use changes. Connect SoCal's transportation investments are financially constrained to reflect core and reasonably available revenues and are progressively integrated with projected land use patterns and coordinated across transportation modes to advance plan goals.

By integrating the Forecasted Development Pattern with a suite of financially constrained transportation investments, Connect SoCal can reach the regional target of reducing greenhouse gases, or GHGs, from autos and light-duty trucks by 8 percent per capita by 2020, and 19 percent by 2035 (compared to 2005 levels). Moreover, this integration can yield tangible outcomes that make our everyday travel needs easier when compared to a future without the plan — for example, the combined work trips made by carpooling, active transportation, and public transit increases by 3 percent and travel delay reduces by 26 percent per capita.

SUSTAINABLE COMMUNITIES STRATEGY

As part of the state's mandate to reduce per-capita GHG emissions from automobiles and light trucks, Connect SoCal presents strategies and tools that are consistent with local jurisdictions' land use policies and incorporate best practices for achieving the state-mandated reductions in GHG emissions at the regional level through reduced per-capita vehicle miles traveled (VMT).

These strategies identify how the SCAG region can implement Connect SoCal and achieve related GHG reductions. It is important to note that SCAG does not have a direct role in implementing the Sustainable Communities Strategy

—neither through decisions about what type of development goes where, nor what transportation projects are ultimately built. However, SCAG works to support local jurisdictions and partnerships by identifying ways to implement the Sustainable Communities Strategy (SCS) in a way that fits the vision and needs of each local community. Additionally, SCAG serves as a leader as well as a hub to convene stakeholders and to find ways to collaborate on broader regional initiatives. See the Sustainable Communities Strategy Technical Report for more details on GHG reduction and implementation of the SCS.

The following strategies are intended to be supportive of implementing the regional Sustainable Communities Strategy. Several are directly tied to supporting related GHG reductions while others support the broader goals of Connect SoCal:

Focus Growth Near Destinations & Mobility Options

- Emphasize land use patterns that facilitate multimodal access to work, educational and other destinations
- Focus on a regional jobs/housing balance to reduce commute times and distances and expand job opportunities near transit and along center-focused main streets
- Plan for growth near transit investments and support implementation of first/last mile strategies
- Promote the redevelopment of underperforming retail developments and other outmoded nonresidential uses
- Prioritize infill and redevelopment of underutilized land to accommodate new growth, increase amenities and connectivity in existing neighborhoods
- Encourage design and transportation options that reduce the reliance on and number of solo car trips (this could include mixed uses or locating and orienting close to existing destinations)
- Identify ways to “right size” parking requirements and promote alternative parking strategies (e.g. shared parking or smart parking)

Promote Diverse Housing Choices

- Preserve and rehabilitate affordable housing and prevent displacement
- Identify funding opportunities for new workforce and affordable housing development
- Create incentives and reduce regulatory barriers for building context-sensitive accessory dwelling units to increase housing supply
- Provide support to local jurisdictions to streamline and lessen barriers to housing development that supports reduction of greenhouse gas emissions

Leverage Technology Innovations

- Promote low emission technologies such as neighborhood electric vehicles, shared rides hailing, car sharing, bike sharing and scooters by providing supportive and safe infrastructure such as dedicated lanes, charging and parking/drop-off space
- Improve access to services through technology—such as telework and telemedicine as well as other incentives such as a “mobility wallet,” an app-based system for storing transit and other multi-modal payments
- Identify ways to incorporate “micro-power grids” in communities, for example solar energy, hydrogen fuel cell power storage and power generation

Support Implementation of Sustainability Policies

- Pursue funding opportunities to support local sustainable development implementation projects that reduce greenhouse gas emissions
- Support statewide legislation that reduces barriers to new construction and that incentivizes development near transit corridors and stations
- Support local jurisdictions in the establishment of Enhanced Infrastructure Financing Districts (EIFDs), Community Revitalization and Investment Authorities (CRIAs), or other tax increment or value capture tools to finance sustainable infrastructure and development projects, including parks and open space
- Work with local jurisdictions/communities to identify opportunities and assess barriers to implement sustainability strategies
- Enhance partnerships with other planning organizations to promote resources and best practices in the SCAG region
- Continue to support long range planning efforts by local jurisdictions
- Provide educational opportunities to local decisions makers and staff on new tools, best practices and policies related to implementing the Sustainable Communities Strategy

Promote a Green Region

- Support development of local climate adaptation and hazard mitigation plans, as well as project implementation that improves community resiliency to climate change and natural hazards
- Support local policies for renewable energy production, reduction of urban heat islands and carbon sequestration
- Integrate local food production into the regional landscape
- Promote more resource efficient development focused on conservation, recycling and reclamation
- Preserve, enhance and restore regional wildlife connectivity
- Reduce consumption of resource areas, including agricultural land
- Identify ways to improve access to public park space

LAND USE TOOLS

CENTER FOCUSED PLACEMAKING

Creating dynamic, connected built environments that support multimodal mobility, reduced reliance on single-occupancy vehicles, and reduced GHG emissions is critical throughout the region. Center focused placemaking is an approach that supports attractive and functional places for Southern California residents to live, work and play, in urban, suburban and rural settings. Although center focused placemaking can be applied in a wide range of settings, priority must be placed, however, on urban and suburban infill, in existing/planned service areas and, for unincorporated county growth, within the planning boundary known as "Spheres of Influence" (SOI) where applicable and feasible.

Successful centers are typically human-scale, compact and pedestrian-oriented with a variety of housing types and ranges of affordability. For example, transit-oriented development (TOD) in Transit Priority Areas (TPAs) and high quality transit areas (HQTAs) within centers and nodes along corridors can play a pivotal role in supporting compact development that is less reliant on single-occupancy vehicles. Elements of center-focused placemaking can be implemented when transit service is neither existing nor planned. Center-focused placemaking includes smart locations and linkages, neighborhood patterns and design and green infrastructure and buildings. Some key elements are specified the Sustainable Communities Strategy Technical Report.

PRIORITY GROWTH AREAS

Priority Growth Areas (PGAs) follow the principles of center focused placemaking and are locations where many Connect SoCal strategies can be fully realized. Connect SoCal's PGAs—Job Centers, TPAs, HQTAs, Neighborhood Mobility Areas (NMAs), Livable Corridors and Spheres of Influence (SOIs)—account for only 4 percent of region's total land area, but implementation of SCAG's recommended growth strategies will help these areas accommodate 64 percent of forecasted household growth and 74 percent of forecasted employment growth between 2016 and 2045. This more compact form of regional development, if fully realized, can reduce travel distances, increase mobility options, improve access to workplaces, and conserve the region's resource areas.

Jurisdictions should continue to be sensitive to the possibility of gentrification and employ strategies to mitigate negative community impacts – particularly in PGAs. Although the region will see benefits from infill development, communities are encouraged to actively acknowledge and plan for potential impacts including displacement. Production and preservation of permanent affordable housing to complement infill strategies is essential to achieving equitable outcomes.

Exhibits for priority growth areas and growth constraints, spheres of influence, job centers, transit priority areas, high quality transit areas, and neighborhood mobility areas can be found at the end of this chapter (**EXHIBIT 3.4-3.10**). Following is a description of Connect SoCal's PGAs and their associated strategies.

JOB CENTERS

Job Centers are where regional strategies that support economic prosperity can be deployed in catalytic ways. Job Centers have been identified in all six counties in the SCAG region and represent areas that have a significantly higher employment density than surrounding areas. Employment growth and residential growth are prioritized in existing Job Centers in order to leverage existing density and infrastructure. However, it is recognized that capacity for infrastructure or services may need to be evaluated before residential or employment population is increased in a given area. By encouraging regional growth and employing transportation strategies in the 70+ Job Centers throughout the region, Connect SoCal seeks to reinforce regional economic prosperity. SCAG's methodology to identify Job Centers is not all-inclusive and additional potential centers can be identified.

Job Centers represent areas with local employment peaks rather than simply places with the most jobs. Identified Job Centers are present in over 60 percent of the region's cities and contain about one-third of Southern California's jobs – but only cover less than 1 percent of the region's land area. These Job Centers range in size from over 250,000 jobs in the region's most urbanized areas, to roughly 1,500 jobs in rural areas – all with employment densities far higher than neighboring areas. When growth is concentrated in Job Centers, the length of vehicle trips for residents can be reduced.

TRANSIT PRIORITY AREAS

Transit Priority Areas (TPAs) are Priority Growth Areas that are within one half mile of existing or planned 'major' transit stops in the region. A 'major' transit stop is defined as a site containing an existing or planned rail or bus rapid transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods. TPAs are where TOD can be realized – where people can live, work and play in higher density, compact communities with ready access to a multitude of safe and convenient transportation alternatives.

Focusing regional growth in areas with planned or existing transit stops is key to achieving equity, economic, and environmental goals. Infill within TPAs can reinforce the assets of existing communities, efficiently leveraging existing infrastructure and potentially lessening impacts on natural and working lands. Growth within TPAs supports Connect SoCal's strategies for preserving natural lands and farmlands and alleviates development pressure in sensitive resource areas by promoting compact, focused infill development in established communities with access to high-quality transportation. Although TPAs comprise less than 1 percent of Southern California's land area, around 30 percent of new households are projected to occur within these transit rich areas.

HIGH QUALITY TRANSIT AREAS

High Quality Transit Areas (HQTAs) are corridor-focused Priority Growth Areas within one half mile of an existing or planned fixed guideway transit stop or a bus transit corridor where buses pick up passengers at a frequency of every 15 minutes (or less) during peak commuting hours. Freeway transit corridors with no bus stops on the freeway alignment do not have a directly associated HQTA. Like Transit Priority Areas, HQTAs are places where vibrant TOD can be realized and are a cornerstone of land use planning best practice in the SCAG region.

HQTAs represent under 3 percent of the region's acreage but are projected to be home to over 51 percent of new households between 2016 and 2045. Infrastructure investments that support walkable, compact communities that integrate land use and transportation planning for a better functioning built environment are essential within HQTAs. Active transportation and new developments should be context-sensitive, responding to the existing physical conditions of the surrounding area. Sensitively designed TODs can preserve existing development patterns and neighborhood character while providing a balance of modal and housing choices.

NEIGHBORHOOD MOBILITY AREAS

Neighborhood mobility area (NMAs) focus on creating, improving, restoring and enhancing safe and convenient connections to schools, shopping, services, places of worship, parks, greenways and other destinations. NMAs are Priority Growth Areas with robust residential to non-residential land use connections, high roadway intersection densities and low-to-moderate traffic speeds. NMAs can encourage safer, multimodal, short trips in existing and planned neighborhoods and reduce reliance on single occupancy vehicles. NMAs support the principles of center focused placemaking. Fundamental to neighborhood scale mobility in urban, suburban and rural settings is encouraging "walkability," active transportation and short, shared vehicular trips on a connected network through increased density, mixed land uses, neighborhood design, enhanced destination accessibility and reduced distance to transit.

From 2016 to 2045, nearly 29 percent of new households are projected to be located in NMAs. Although 38 percent of all trips made in the SCAG region are three miles or less, more than 78 percent of these short trips are made by driving. Improving public health and reducing per-capita VMT, and GHG reductions relies on our region's ability to support safe and convenient short trips at the neighborhood scale—by foot, bicycle, micro-mobility devices and slow speed electric vehicles such as e-bikes, scooters, and neighborhood electric vehicles. Adopting and implementing Complete Streets policies supports safer neighborhood mobility and connected, economically dynamic communities. Targeting future growth in these areas has inherent benefits to Southern California residents – providing access to "walkable" and destination-rich neighborhoods to more people in the future.

LIVABLE CORRIDORS

The Livable Corridor strategy encourages local jurisdictions to plan and zone for increased density at nodes along key corridors, and to "redevelop" single-story under-performing retail with well-designed, higher density housing and employment centers. Growth at strategic nodes along key corridors, many of which are within HQTAs, will make transit a more convenient and viable option. The Livable Corridors strategy is comprised of three components that will encourage context sensitive density, improve retail performance, combat disinvestment, and improve fiscal outcomes for local communities:

- **Transit improvements:** Some corridors have been identified as candidates for on-street, dedicated lane Bus Rapid Transit (BRT) or semi-dedicated "BRT-lite" transit. Other corridors have the potential to support features that improve the user experience and bus performance, including enhanced bus shelters, real-time travel information, off-bus ticketing, all-door boarding and longer distances between stops to increase speeds.
- **Active transportation improvements:** Increased investments in Complete Streets within Livable Corridors and intersecting arterials are essential to support safe bicycling and walking. Investments should include protected lanes to encourage safe bicycling and lower speed mobility, improved pedestrian access and bicycle and micro-mobility parking.
- **Land use policies:** Mixed-use retail centers at key nodes along Livable Corridors are essential, as is increasing neighborhood-oriented retail at intersections, and flexible zoning that allows for the replacement of under-performing auto-oriented retail.

SPHERES OF INFLUENCE

Local Agency Formation Commissions, or LAFCos, are given the authority to determine SOIs for all local governmental agencies, and each county in the SCAG region has an associated LAFCo. An SOI is a planning boundary outside of a local agency's legal boundary (such as the city limit line) that designates the agency's probable future boundary and service area. The intent of an SOI is to promote the efficient, effective and equitable delivery of local and regional services for existing and future residents and to encourage a collaborative process between agencies. A city will periodically annex parcels in an SOI into the city limits to include new developments or areas with infrastructure needs. Some factors considered in an SOI designation focus on current and future land uses and the need and capacity for services.

Decisions made by LAFCos in the SCAG region can support the implementation of Connect SoCal goals related to infill development, GHG emissions reductions, and climate change resilience. Connect SoCal encourages future unincorporated county growth be prioritized within existing SOIs to discourage urban sprawl and the premature conversion of agricultural and natural lands, support alignment of policies across jurisdictions, and rehabilitate and utilize existing infrastructure. This strategy promotes growth in an efficient manner that limits sprawl and "leapfrog" development and minimizes costs to taxpayers. As a result, 4 percent of the region's future household growth will be located in SOIs outside of incorporated city boundaries from 2016 to 2045.

GREEN REGION

A sustainable, "green" region requires that the built environment and natural resource areas coexist in a well-balanced land use pattern that encourages mutual co-benefits. The quality and range of conservation, natural and agricultural areas present in the region can be reinforced and enhanced by a range of regional and local tools.

Paired with PGAs, Connect SoCal's conservation strategies consider the economic and ecological benefits of preserving natural areas and farmlands, while also maximizing their potential for GHG reduction. New housing and employment development is emphasized in PGAs such as Job Centers, TPAs, HQTAs and NMAs, and away from natural and farm lands on the edges of urban and suburban areas, to incentivize infill development and the concentration of varied land uses. This emphasis on concentrated, compact growth makes it easier to travel shorter distances, which reduces per-capita greenhouse gas emissions. In addition, natural areas and farmlands have the capacity to absorb and store atmospheric carbon dioxide, preventing additional contributions of GHG emissions. Finally, natural lands conservation is imperative to protect communities from major hazards caused or exacerbated by climate change, such as wildfires and flooding.

Connect SoCal's land use strategies deemphasize development on agricultural lands in unincorporated counties, and in areas subject to future two-foot sea level rise. To further prioritize natural habitat areas and avoid impacts to the environment, Connect SoCal seeks to avoid growth in wetlands, wildlife corridors, biodiverse areas, wildfire prone areas and floodplains. These strategies were identified with guidance from stakeholders in SCAG's Natural and Farm LandsConservation Working Group as high priorities for conservation based on climate change vulnerability, water quality impacts, and decline of native species. In acknowledgement of this need for conservation and to address climate change's impacts, local and regional agencies throughout the region have worked to establish and/or implement a diverse set of policies, projects and plans to protect threatened natural areas and farmlands. See the Natural and Farm Lands Conservation Technical Report for successful examples and see the Sustainable Communities Strategy Technical Report for more detail on the use of these as land use strategies.

TRANSFER OF DEVELOPMENT RIGHTS

Transfer of Development Rights (TDR) is a market-based planning tool to support growth in locally identified "receiving districts" in lieu of growth in identified "sending districts." Receiving districts typically exhibit future infrastructure capacity to absorb development impacts, whereas sending districts often contain fragile habitats, productive agricultural lands, or other unique community features that a jurisdiction may seek to preserve. TDR can be an effective tool to achieve regional growth outcomes and conservation objectives by augmenting and leveraging available public funds and programs, providing permanent protections for important resources, and focusing development in areas that already have infrastructure capacity.

URBAN GREENING

Urban Greening is a multi-benefit land use strategy that improves the relationship between the built and natural environment. Greening can support reduction in GHG emissions by sequestering carbon and reduce VMT by making the environment more appealing for people who are bicycling and walking. Benefits within urban, suburban and rural settings include:

- Improved traffic calming and safety
- Increased active transportation
- Cooler street surfaces and communities
- Increased trail and greenway connectivity
- Improved water quality, groundwater recharge and watershed health
- Reduced urban runoff
- Reduced energy consumption and costs
- Expanded urban forest
- Provision of wildlife habitat and increased biodiversity
- Expanded recreation opportunities and beautification

Urban greening improvements are critical components of Complete Streets and offer a sustainable approach to transportation infrastructure implementation. Ultimately, urban greening can be applied at both the project and programmatic scale to achieve broader community benefits, and can help transform the built environment into enjoyable, healthy and connected places.

GREENBELTS & COMMUNITY SEPARATORS

Greenbelts and community separators can serve as contiguous areas between jurisdictions that support projected regional growth, promote land conservation, and avert unchecked urbanization. These areas can include farmland, floodplains, unique habitats, scenic corridors, viewsheds, or other resources considered valuable to communities. Incorporating greenbelts and community separators into planning initiatives can achieve regional benefits, such as reducing VMT, preserving contiguous spaces for active transportation, restoring severed wildlife corridors, preserving agrarian economies, and reducing costs for infrastructure maintenance. The use of TDR can also help identify and prioritize candidate areas for greenbelts and community separators.

KEY CONNECTIONS

HOUSING SUPPORTIVE INFRASTRUCTURE

BUILDING FOUNDATIONS FOR NEW HOUSING

The extraordinary cost of producing housing is a significant barrier to growth throughout Southern California, but also specifically, to achieving the level of infill and transit-oriented development anticipated in Connect SoCal. The Regional Housing Supportive Infrastructure strategy will help make it quicker for local jurisdictions to produce critically-needed housing. The costs of building parking, and sewer/water infrastructure through Development Fees can range from 10% to nearly 25% of construction costs. By implementing tax-increment finance districts, jurisdictions can plan and implement housing supportive infrastructure. With the increase in use of ridesourcing, right-sizing parking strategies, enabled by technology, can reduce the overall cost of housing construction in Connect SoCal's Priority Growth Areas.

PROMISING PRACTICES

Affordable Housing Sustainable Communities Program
Projects across Southern California's cities have successfully competed for funding offered through the Strategic Growth Council for construction of affordable housing and supporting infrastructure in areas that are well served by transit and offer promising opportunities for neighborhood scale mobility.

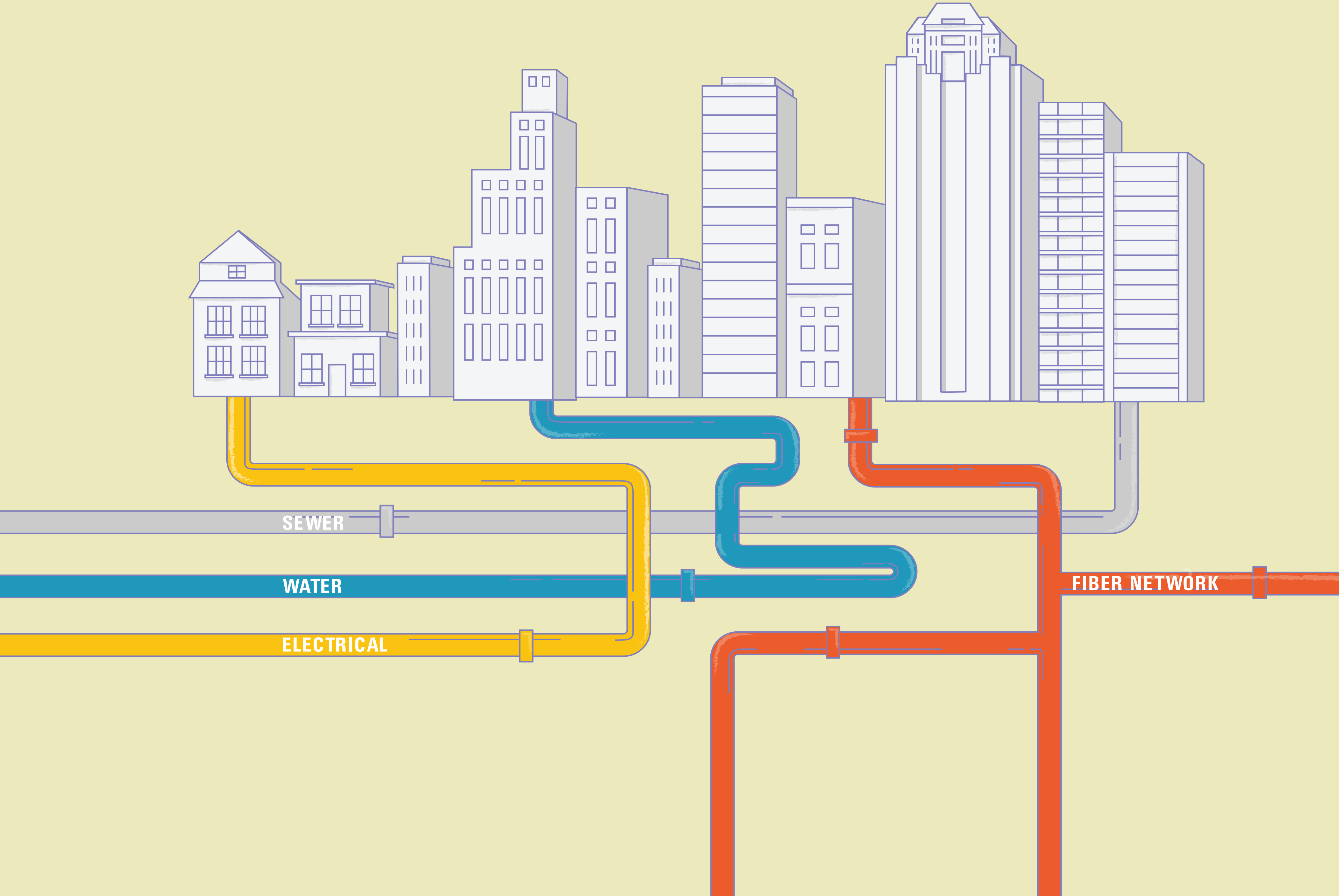
Metro Joint Development Program
LA Metro collaborates with developers to build affordable, transit-oriented housing on Metro-owned properties.

Placentia Enhanced Infrastructure Financing District (EIFD)
Placentia's EIFD will support the neighborhoods surrounding an upcoming Metrolink station by implementing streetscape, sewer and water infrastructure improvements through value capture – paving the way for economic development and reducing the cost of housing construction in this transit oriented locale.

PLANNING FOR 2045

Through legislative and planning efforts, SCAG will advance the vision for accelerated development within transit-oriented communities. Opportunities to be explored and advanced to realize this outcome include:

- **Local Financing Planning Support** – Expand activities to support local agencies in establishing self-help tax-increment financing districts.
- **Parking Requirements Reform** – Support local planning efforts to reduce or eliminate parking requirement to realize potential construction costs savings ranging from $20,000 for surface parking, $50,000 for garages and structures, and $80,000 per space for underground spaces.
- **Local Government Planning Support Grants Program** – Leverage resources allocated to SCAG through AB 101 to support local activities that stimulate development near transit and in priority growth areas.


SEWER
WATER
ELECTRICAL
FIBER NETWORK

REGIONAL ADVANCE MITIGATION

To promote the conservation of natural and agricultural lands and restoration of habitats, Connect SoCal includes a new Regional Advance Mitigation Program (RAMP) initiative that will establish or supplement regional conservation and mitigation banks and other approaches to more effectively address impacts for projects that support reduction of per-capita vehicle miles traveled. The initiative will also support long term management and stewardship of mitigated properties.

Transportation, land use and other development projects and programs are often required to reduce their impacts on the environment through mitigation measures. Habitat preservation and restoration is a leading mitigation method, especially for significant transportation projects. Implementing agencies can directly preserve land through acquisitions or they can pay into "mitigation banks" (for wetlands) or "conservation banks" (for listed species) where a qualified land trust, joint powers authority, or governmental agency acquires and manages lands for conservation and restoration. Advance mitigation uses a science-based approach to anticipate and identify mitigation needs for multiple development projects, early in the planning process. By avoiding piecemeal mitigation for individual projects, and by doing so in advance of impacts, this method prioritizes sites with the highest ecological benefits and provide mitigation efficiencies to transportation, land use and other development projects. Advance mitigation can reduce project cost escalations and delays.

Regional advance mitigation planning takes this concept further and establishes inventories of anticipated impacts from transportation projects across the region and an assessment of the region's sensitive habitats and the conservation actions needed to protect them. As ecological habitats and other conservation elements do not routinely line up with jurisdictional borders, designation of conservation sites can span multiple jurisdictions. In 2017, the California Department of Fish and Wildlife created the Regional Conservation Investment Strategy (RCIS) program to encourage regional approaches for advance mitigation and conservation. The program is a voluntary, non-regulatory conservation assessment and strategy to benefit species and habitats of concern and to provide a more efficient and effective approaches to mitigation and conservation. An RCIS can be used as the basis for advance mitigation and have the benefit of streamlining.

CLIMATE ADAPTATION & MITIGATION

Embedded in Connect SoCal's growth and conservation strategies is an understanding that climate adaptation and mitigation is critical to supporting an integrated regional development pattern and transportation network. Climate change mitigation means reducing or sequestering GHGs, whereas adaptation is preparing for the known impacts of climate change. The greater the mitigation effort is in the near-term, the less adaptation will be needed in the long-term.

Climate change adaptation planning has become more pressing with each passing year, as the region experiences extreme climate-related events more frequently, such as the destruction of homes and infrastructure, travel congestion, air quality degradation from wildfires, inland flooding, mudslides from torrential rainstorms, coastal flooding from sea level rise, and urban heat island effects from unusually high temperatures. These events have become persistent reminders to local governments, residents, workers and businesses that systematic adaptation and resiliency planning must become a high priority. Since climate stressors also do not follow jurisdictional boundaries, effective management of and adaptation to risks posed by climate change will require cross-jurisdictional coordination and collaboration.

TRANSPORTATION STRATEGIES

The strategies for land use are integrated with transportation strategies to achieve Connect SoCal's regional goals. Similar to the Growth Vision and Land Use Tools, the transportation strategies build on the Core Vision established during previous planning cycles and are augmented by Key Connection strategies. Progress made in accomplishing the Core Vision and work that lies ahead in realizing Key Connections are highlighted throughout this section. In addition, this section also describes the broader set of transportation strategies being pursued across the region to achieve a coordinated and balanced transportation system, highlighting areas where we've made significant progress and opportunities to expand activities to yield an even greater benefit.

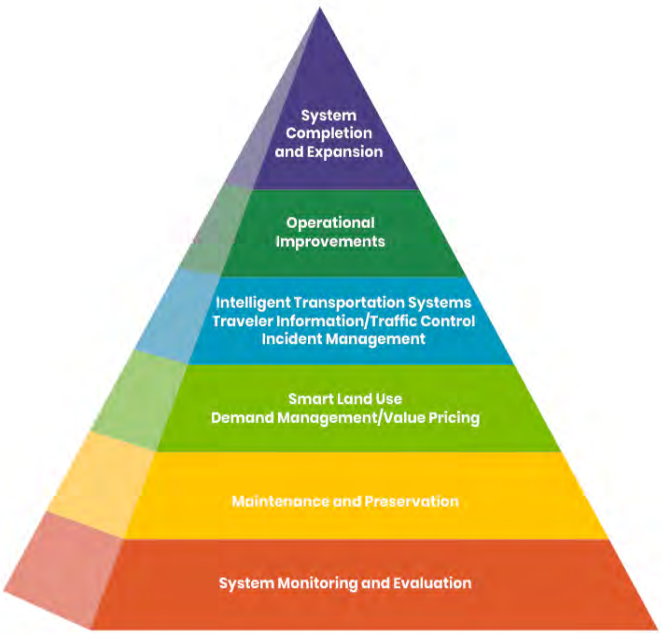
The transportation strategies described in this section are divided into two broad categories: Preserving and Optimizing our current and future system and Capital Improvements by mode for Completing Our System.

In all, Connect SoCal includes $638.9 billion in transportation system investments through 2045.

PRESERVE & OPTIMIZE OUR CURRENT SYSTEM

Millions of residents rely on our regional transportation system every day. Preserving and maintaining our existing, aging infrastructure assets is fundamental to mitigate growing pressures on the overburdened transportation infrastructure. Consistent with the overarching guiding principles of the System Management Pyramid as depicted in **FIGURE 3.1**, a top priority is to maintain and preserve the transportation infrastructure through a "Fix it First" principle. Funding provided by Senate Bill 1 offers an opportunity to strategically reinvest in the transportation network to realize an improvement in the conditions of the existing system.

FIGURE 3.1 System Management Pyramid



Source: Caltrans

CORE VISION

SYSTEM PRESERVATION & RESILIENCE

"Fix it First" has been a guiding principle for prioritizing transportation funding in the RTP for the last decade. The cost of rebuilding roadways is eight times more than preventative maintenance. Preservation of the transportation system can extend the pavement life in a cost effective manner and can also improve safety.

PROGRESS SINCE 2016

Passage of Senate Bill 1 (SB 1) in California in 2017 provides much needed infusion of funding to address these challenges. More specifically, SB 1 is expected to generate over $52 billion statewide over the next 10 years dedicated primarily to Road Maintenance and Rehabilitation. Most of the new sources that make up SB 1 are indexed to California Consumer Price Index so that the funds keep pace with inflation moving forward. Many roadway improvement/rehabilitation projects, including bridge improvement have been programmed.

PLANNING FOR 2045

Given the magnitude of our need and to enhance resilience in light of climate change, Connect SoCal continues to prioritize funding for system preservation. The plan includes $68 billion towards preservation, operation and resiliency needs of the state highway system, and $47.5 billion towards preservation, operation and resiliency needs of the regionally significant local streets and roads.

SCAG will continue to collaborate with federal, state and local partners to monitor the conditions of transportation assets and pursue new research and partnerships to ensure plan resources are deployed to address the region's greatest vulnerabilities.

A key strategy for system preservation is to include preventative maintenance of roadways as part of project costs and work plans. According to Caltrans' Automated Pavement Condition Survey Report, this strategy of prioritizing routine preventative maintenance to address surface damage on the system is significantly cheaper and more effective compared to major rehabilitation or reconstruction of a majorly damaged road. The timeframe to perform preventative maintenance can be days, while construction of a new roadway can take years, causing more increased inconvenience and congestion on the network as residents use alternate routes not built for such demand. Connect SoCal allocates approximately $68 billion towards state highway over the plan period to ensure a well maintained and resilient system for generations to come.

MANAGE CONGESTION

Connect SoCal also seeks to optimize the existing transportation system to meet increased demand levels through the use of innovative strategies that leverage the existing transportation infrastructure. The following section discusses transportation strategies to help support preservation and optimization of infrastructure. Physical solutions can include reversible lanes and policy solutions can include congestion pricing concept along with other solutions.

CONGESTION MANAGEMENT PROCESS

The Congestion Management Process (CMP) aims to provide effective management of the regional transportation system through monitoring and maintenance, demand reduction, analysis of local land use decisions, operational management strategies and strategic capacity enhancements. Federal regulations require the development, establishment and implementation of a CMP. Consistent with federal requirements, SCAG implements, monitors and evaluates these actions as part of Connect SoCal. These eight actions are as follows:

- Develop Regional Objectives for Congestion Management
- Define CMP Network
- Develop Multimodal Performance
- Collect Data/Monitor System Performance
- Analyze Congestion Problems and Needs
- Identify and Assess Strategies
- Program and Implement Strategies
- Evaluate Strategy Effectiveness

The CMP requires that roadway projects that significantly increase the capacity for single-occupancy Vehicles (SOVs) be addressed through a CMP. It should provide appropriate analysis of reasonable, multimodal travel demand reduction and operational management strategies for the corridor. If alternative strategies are neither practical nor feasible, appropriate management strategies must be considered for roadway capacity improvement projects that would increase SOV capacity. For more details of this process are included in the 2019 FTIP.

CONGESTION PRICING

Consistent with the mobility pyramid, SCAG's planning efforts have focused on integrating pricing strategies to optimize operation, improve travel time reliability and offer travelers greater choices.

In 2013, SCAG conducted the Express Travel Choices Study, which reviewed a variety of congestion pricing options and their potential applicability to the SCAG region based on mobility, economic and equity impacts. Three promising strategies were identified as noted below, two of which were incorporated into the 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS).

1. Develop a network of express lanes, that connects to existing express lanes in order to accommodate growing inter-county travel
2. Establish a mileage-based user fee to generate a funding source for aging infrastructure and construction of other travel options
3. Develop Cordon/Area Pricing which involves charging a variable or fixed fee to drive into or within a highly congested area

A cordon/area pricing strategy required additional analysis to identify the most promising geographic area and system design for initial testing. Accordingly, SCAG has been engaged in detailed analyses of this concept since the 2016 RTP/SCS.

SCAG examined the potential application of cordon/area pricing in Southern California through its Mobility Go Zone and Pricing Feasibility Study. The study showed that a Westside Go Zone would reduce VMT by 21 percent and vehicle hours traveled (VHT) by 24 percent during peak travel times, saving $4 million annually in reduced GHG emissions and generating a net average of $69.2 million annually in revenues, which would go directly toward transportation improvements, pedestrian amenities and economic development.

SCAG also estimated a 22 percent reduction in single-occupancy vehicles entering the area and an increase in transit trips and bike/walk trips by nine and seven percent, respectively during peak periods. SCAG urged the creation of a pilot project to more deeply test the potential of Mobility Go Zones in reducing congestion and improving air quality.

Bolstered by recent decisions in New York City to move forward with implementing a congestion pricing program by 2021, further studies of cordon/area pricing along with other forms of congestion pricing, are being evaluated by major metropolitan areas throughout the country. Los Angeles is no exception with recent announcements by Metro to evaluate congestion pricing and other user fee strategies.

Connect SoCal assumes the implementation of a local road charge program in the form of mileage-based user fees regionally, which can be adjusted by time-of-day at major activity centers. For analysis, SCAG assumes congestion pricing (peak period charges) in parts of Los Angeles, along with increases in parking pricing at major job centers as a part of the regional job centers strategy.

Overall, the implementation of user-fees and pricing strategies can be structured to increase equity and mobility, and preserve the transportation system, while reducing environmental impacts. Additionally, California's and other states' road charge pilots to date have had high levels of participant satisfaction- even on the issue of user privacy, and surveys show that support for such fees has been steadily increasing.

Because mileage-based user fees are directly linked to system usage, they can more easily address the actual cost of driving and direct funding towards repair and maintenance of the system in accordance with usage, regardless of fuel purchases. Using differential pricing, fees can be balanced to compensate for the lost revenue from alternative fuel penetration and increasing fuel efficiency, while still providing incentives that encourage the adoption of cleaner vehicles,

CORE VISION
DEMAND & SYSTEM MANAGEMENT

Better managing the existing transportation system through demand management strategies and Intelligent Transportation Systems (ITS) yields significant mobility benefits in a cost-effective manner.

PROGRESS SINCE 2016

The I-210 Integrated Corridor Management Pilot, a first of its kind in Southern California, integrates management and operation of the freeway with nearby arterials and local transit using real-time monitoring of travel conditions, and improved corridor-wide collaboration to re-direct vehicles during congestion causing incidents.

The California Road Charge Pilot Program is a statewide effort to test the functionality, complexity and feasibility of a road charge system for transportation funding. The pilot demonstrated the feasibility for a variety of technologies to facilitate mileage reporting methods and data collection. Coupled with carefully designed incentives, a road charge is a powerful tool for reducing congestion and supporting our sustainability goals.

In 2018, the Metro board signaled a major change in direction for the former I-710 North capacity project by approving an alternative that focuses on TDM/TSM strategies in this corridor.

PLANNING FOR 2045

Connect SoCal increases investment and strengthens policy levers to optimize system performance while realizing greenhouse gas reduction, quickly and efficiently.

New strategies resulting from SCAG's TDM Strategic Plan provide an objectives-driven, performance-based process to identify and promote TDM strategies and programs across the region. SCAG will pursue implementation of these strategies in coordination with regional and local partners.

SCAG will pursue research and planning as autonomous vehicles emerge in the market, transforming system management opportunities.

KEY CONNECTIONS
GO ZONES

CLAIMING BACK TIME FROM YOUR COMMUTE

Go Zones are geographic areas where a suite of mobility service options are provided together with incentives to reduce dependency on personal automobiles. This expanded mobility ecosystem can include increased transit, bike share, enhanced active transportation infrastructure and incentives—such as a fee on solo driving during peak traffic periods. Incentives would encourage the use of shared modes or shift less time sensitive trips to off-peak times. Revenues collected from the fee would be used to fund local transportation improvements and support sustainability goals by contributing to reductions in GHG emissions. Go Zones can be designed with policies and discounts that address equity concerns and promote mobility options for commuters of various income levels.

PROMISING PRACTICES

100 Hours
Public engagement campaign to turn traffic hot spots into models of mobility

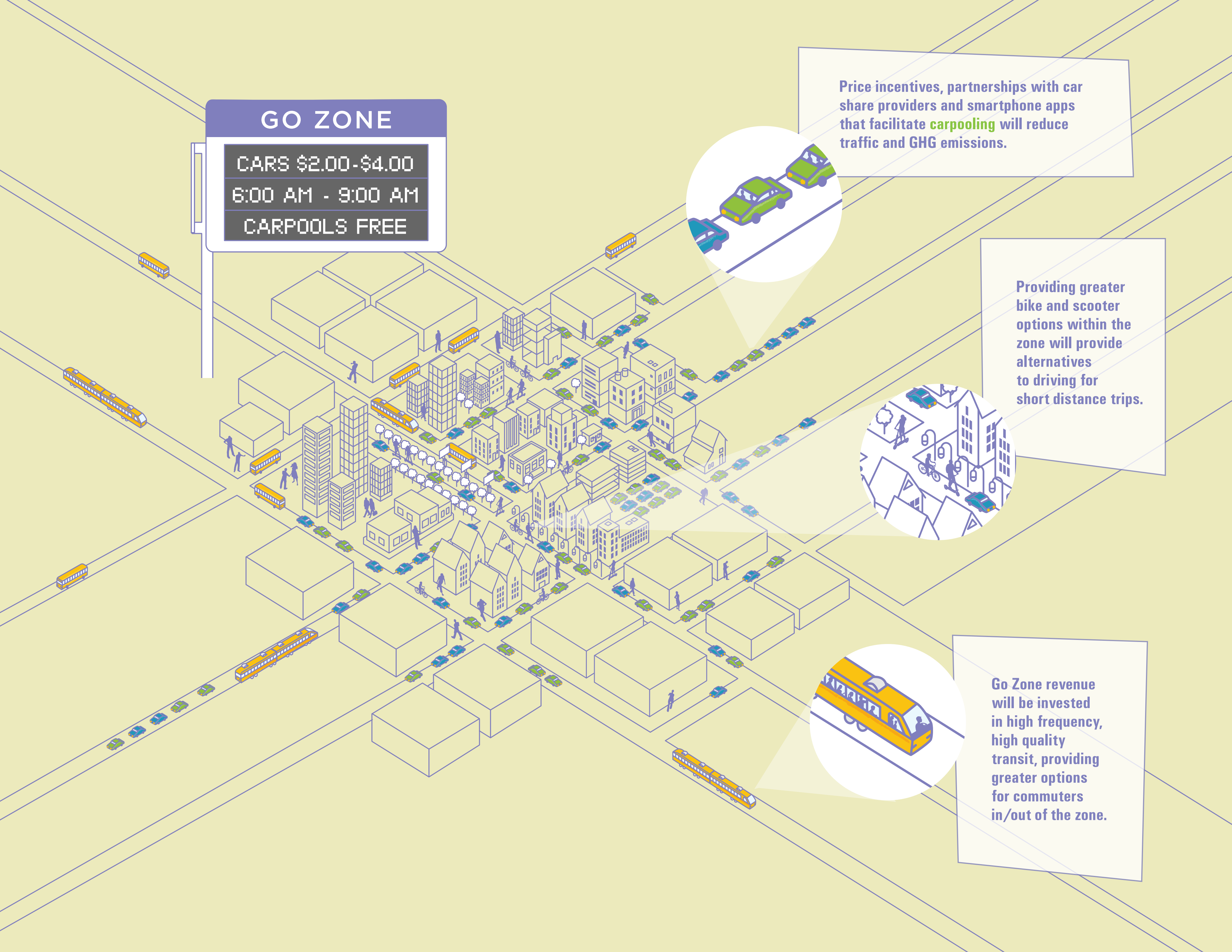
SCAG Mobility Go Zone & Pricing Feasibility Study
The Mobility Go Zone & Pricing Feasibility Study evaluates congestion pricing and the range of impacts on traffic volumes, transit ridership, air quality and availability of funds for transportation programs.

Evaluating parts of the Cities of Los Angeles and Santa Monica, the study estimates a 21% to 22% decrease in VMT and 24% decrease in VHT within the study area during peak periods. Transit usage and bicycling/walking trips increase by 9% and 7%, respectively. Annual average net revenue of $69.2 million would be generated to offer additional resources for local reinvestment.

PLANNING FOR 2045

To foster adoption of Go Zones envisioned by Connect SoCal, SCAG will pursue research and partnerships, including:

- **SCAG Mobility Innovations & Incentives Pilot Program** – design and conduct pilot tests to further assess equity impacts and likely changes in travel behavior
- **Joint MPO Road Usage Charge & Incentive Program Pilot Tests** – develop and test a common core road usage charge and incentive pilot
- **Metro Traffic Reduction Study** – SCAG will partner with Metro to analyze and identify a place or places where congestion pricing can be tested along with a package of mobility improvements


GO ZONE
CARS $2.00-$4.00
6:00 AM - 9:00 AM
CARPOOLS FREE
Price incentives, partnerships with car share providers and smartphone apps that facilitate carpooling will reduce traffic and GHG emissions.
Providing greater bike and scooter options within the zone will provide alternatives to driving for short distance trips.
Go Zone revenue will be invested in high frequency, high quality transit, providing greater options for commuters in/out of the zone.

and protecting user privacy. Additionally, differential pricing can be structured to encourage the use of more sustainable modes of transportation.

A mileage-based system can also assuage environmental justice concerns inherent in the regressive gas tax. Environmental justice was a focus of the California Road Charge Pilot Program, and 73 percent of participants reported that they thought user fees were fairer than a gas tax. Looking forward, alternative fuel technologies are likely to remain expensive compared to conventional vehicles, and it is likely that low-income residents will be paying a higher proportion of transportation taxes through continued purchase of gasoline. Linking fees more directly with system usage would reduce the burden on disadvantaged residents and could even be structured to enhance overall mobility.

TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a set of strategies that aims to reduce the demand for roadway travel, particularly from SOVs. TDM investments can reduce congestion and shift trips from SOVs to other modes in ways that often cost significantly less than roadway or transit capital expansion projects. TDM strategies add transportation choices that improve sustainability, public health and the quality of life by reducing congestion, air pollution and GHG emissions. When transit ridership, carpooling, bicycling and walking increase, the efficiency of the entire transportation system improves, bringing many benefits to the region. These benefits can justify relatively modest public expenditures on effectively implemented TDM programs. Connect SoCal allocates $7.3 billion through 2045 to implement TDM strategies throughout the region. There are three primary goals of this program:

- Reduce the number of SOV trips and per capita VMT through ridesharing (which includes carpooling and vanpooling) and providing first/last mile services to and from transit
- Redistribute or eliminate vehicle trips during peak demand periods by supporting telecommuting and alternative work schedules
- Reduce the number of SOV trips through use of other modes such as transit, rail, bicycling, and walking, or other micro-mobility modes

In 2018, SCAG initiated a study to develop a TDM Strategic Plan to identify ways in which SCAG and its regional partners can expand the effectiveness and use of TDM strategies to achieve regional goals. The resulting recommendations address knowledge sharing, policy and regulation, partnership, and TDM programming and performance measurement, and are included in more detail in the Congestion Management Technical Report and the TDM Strategic Plan.

TRANSPORTATION SYSTEMS MANAGEMENT

Transportation Systems Management (TSM) employs a series of techniques designed to maximize the capacity and efficiency of the existing transportation system. Effective TSM strategies reduce traffic congestion, improve air quality and reduce or eliminate the need to construct new and expensive transportation infrastructure. Many TSM strategies seek to optimize the operation of the existing transportation system through use of Intelligent Transportation Systems (ITS). For example, advanced technologies can anticipate changing traffic conditions and inform drivers about driving conditions on a real-time basis so that drivers can make more informed decisions. SCAG recently updated the Regional ITS Architecture which identifies a significant number of planned ITS projects, including those related to connected vehicle applications, transit signal priority, emergency response, express lanes and goods movement.

Examples of TSM strategies include Corridor System Management Plans (CSMPs) and system management initiatives (e.g., variable speed limits, signal synchronization, ramp metering, etc.), High Occupancy Toll (HOT) lanes, collision avoidance systems, universal transit fare cards and improved data collection.

COMPLETING OUR SYSTEM

Strategies for improving and expanding the many modes of transportation that make up the regional network must be integrated closely with our strategies for how we use land. The success of transit, passenger rail, walking, bicycling and other forms of active transportation, our highways and arterials, the efficient movement of goods and our regional airport system all depend on a close relationship with how our region uses land and how we grow. This is particularly true when it comes to improving and building a transit system that can best serve people in communities throughout our region. It is the first transportation category for which numerous strategies are reviewed.

TRANSIT

The Southern California vision for transportation and transit was developed via a cooperative, comprehensive and continuing process where local agencies work with their county transportation commission and with SCAG to identify a program of projects that will deliver a local vision of increased mobility and accessibility, and support Connect SoCal goals including congestion reduction and sustainability. Transit serves as both a key component of local, regional and state efforts to combat climate change and reduce congestion, and as a critical social service. It is a way of providing mobility for individuals who cannot provide it for themselves, especially those who do not have access to automobiles, are very poor, recent immigrants, and the elderly and disabled. It also can provide an alternative to SOVs and could serve as the backbone of a multimodal transportation system with an integrated trip planning and payment system, as part of the MaaS concept.

Since 1991, the region has spent over $77 billion on transit (in 2016 dollars). This trend is expected to continue, as the combined costs for transit capital projects and operations and maintenance (O&M) total nearly half of the investments in Connect SoCal. The plan includes significant investment across all transit modes, with $66.8 billion toward transit capital projects and $173.9 billion for transit O&M. **TABLE 3.1** displays selected major transit capital projects included in Connect SoCal, while the map in **EXHIBIT 3.1** displays the 2045 plan transit network.

When these planned transit projects are completed, the region will have a greatly expanded urban rail network, including multiple Metro Rail extensions and the first urban rail services in Orange County (OC Streetcar) and San Bernardino County (Redlands Rail/Arrow). New bus rapid transit and rapid bus routes will be implemented across Los Angeles, Orange, Riverside and San Bernardino Counties. Riverside County will extend Metrolink to San Jacinto/Hemet and San Bernardino County will connect via Metrolink to Ontario International Airport.

Other ongoing regional efforts may result in changes to the transit investments in Connect SoCal. SCAG will monitor these efforts and adjust Connect SoCal accordingly through a future amendment, if needed. These efforts include Metro's Twenty-Eight by '28 Initiative, which seeks to complete 28 major projects approved by the Metro Board by the 2028 Summer Olympic and Paralympic

CORE VISION
TRANSIT BACKBONE

Expanding the transit network and fostering development in transit-oriented communities is central to the region's plan for meeting mobility and sustainability goals while continuing to grow the regional economy.

PROGRESS SINCE 2016

Major urban rail projects under construction:

- Metro Rail Regional Connector and Crenshaw/LAX lines
- OC Streetcar
- Arrow / Redlands Rail

Metrolink achieved record ridership levels in fiscal year 2018-2019, almost 12 million annual boardings.

Regional agencies have committed to major bus system redesigns including OC Bus 360 and the Metro NextGen Bus Study.

Microtransit pilots and partnerships with Transportation Network Companies are being implemented to provide additional options connecting to fixed route transit and rail.

PLANNING FOR 2045

Connect SoCal builds upon extensive local investment in the transit and rail network by increasing resources for frequent and reliable bus service and closing gaps in the fixed guideway system.

Regional collaboration to implement Metrolink's Southern California Optimized Rail Expansion (SCORE) and complete the Link Union Station (LinkUS) to transform Los Angeles Union Station from a "stub-end" station, to a "run-through" will reduce rail travel times across the system and allow one-seat rides to many more destinations.

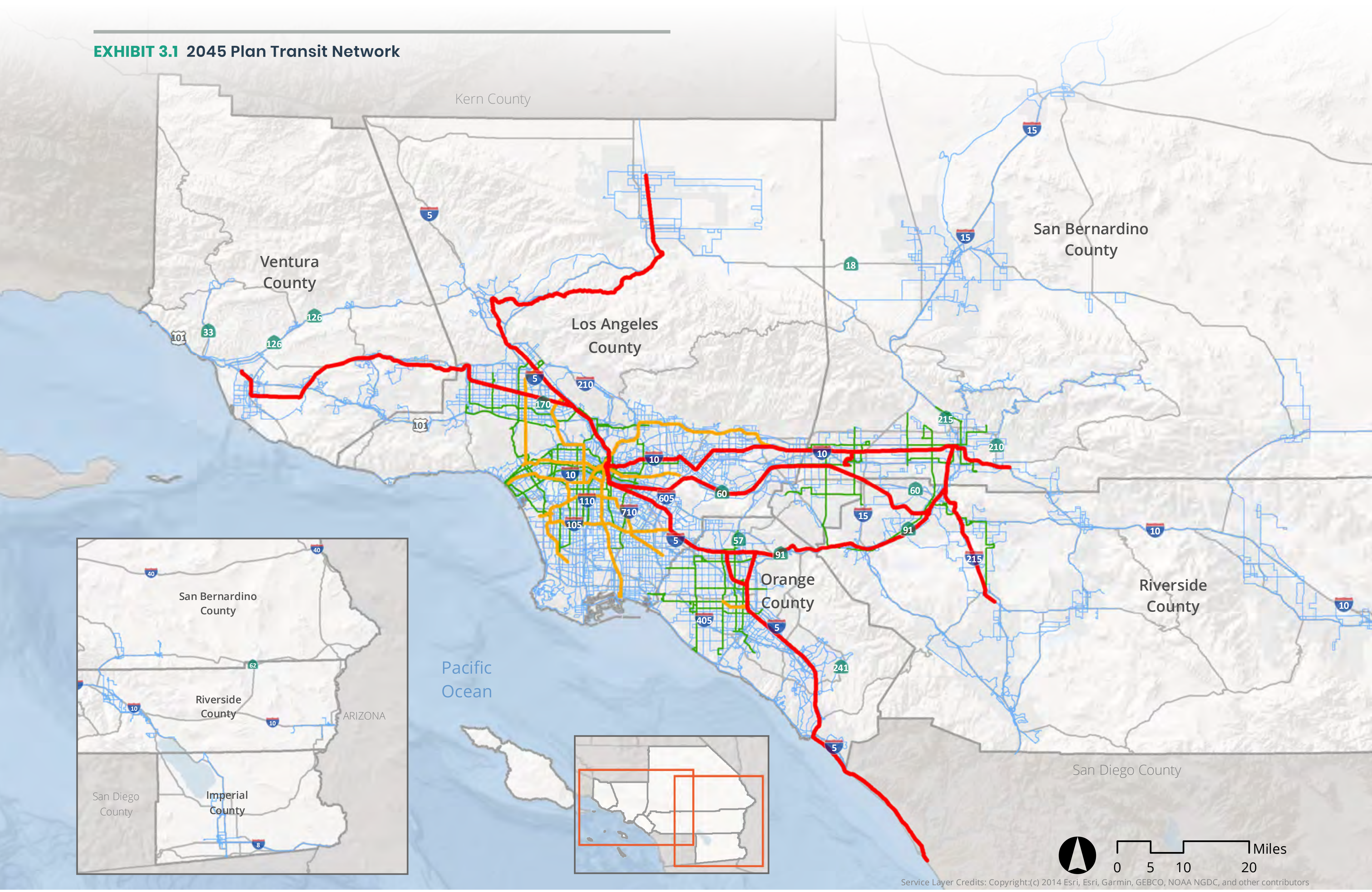
SCAG-supported plans and pilot projects to address first-last mile challenges will be essential to improving the transit experience and expanding access to jobs and destinations.

TABLE 3.1 Selected Transit Capital Projects

County	Project
Los Angeles	Airport Metro Connector
Los Angeles	BRT Connector – Orange/Red Line to Gold Line
Los Angeles	Crenshaw/LAX Transit Corridor
Los Angeles	Historic Los Angeles Streetcar
Los Angeles	East San Fernando Valley Transit Corridor
Los Angeles	Gold Line Eastside Extension Phase 2 to South El Monte
Los Angeles	Gold Line Foothill Extension – Azusa to Claremont
Los Angeles	Green Line Extension to Torrance
Los Angeles	LAX Automated People Mover
Los Angeles	North San Fernando Valley Transit Corridor
Los Angeles	Orange Line BRT Improvements
Los Angeles	Purple Line Westside Subway Extension to La Cienega, Century City, Westwood
Los Angeles	Regional Connector
Los Angeles	Sepulveda Pass Transit Corridor (Phase 2)
Los Angeles	Vermont Transit Corridor
Los Angeles	West Santa Ana Branch Transit Corridor
Los Angeles	Green Line Extension to Norwalk/Santa Fe Springs Metrolink Station
Los Angeles	Red Line Extension to Hollywood Burbank Airport
Los Angeles	Slauson Light Rail – Crenshaw/LAX Transit Corridor to Blue Line
Orange	OC Streetcar
Orange	OC Transit Vision
Riverside	Coachella Valley Quick Bus
Riverside	Rapid Commuter Corridor from Perris to San Jacinto
Riverside	RapidLink Service – Riverside, Moreno Valley, Perris
San Bernardino	Redlands Passenger Rail
San Bernardino	West Valley Connector Phase 1
San Bernardino	Gold Line Extension to Montclair
San Bernardino	Passenger Rail Service from San Bernardino Metrolink Line to Ontario Airport

Source: SCAG

EXHIBIT 3.1 2045 Plan Transit Network



Metrolink (2045) Urban Rail (2045) Rapid Bus and Bus Rapid Transit (2045) Bus Routes (2045)

Note: Planned project alignments shown on this map are not intended to represent preferred alternatives where local planning and environmental processes are still ongoing. Maps provided in future updates to Connect SoCal will reflect locally preferred alternatives, once they are formally adopted by the local lead agency.

Source: SCAG, 2019

Games. Additionally, Metro's NextGen Bus Study seeks to redesign the bus network to be more relevant and attractive to the residents of Los Angeles County. Finally, the California Air Resources Board (ARB) Innovative Clean Transit Rule requires that transit agencies convert to Zero Emissions Bus Fleets with bus rollout plans due from larger transit operators in June 2020.

Transit agencies are also piloting improvements using emerging technologies and innovations. Metro is in the process of upgrading its TAP card program regional system and unified payment across multi-modal programs. Metro's TAP system now integrates transit and bike share, with the potential for future integration of Express Lanes and electric vehicle car share, forming the foundation for a regional MaaS system. The system also allows for providing incentives and cross-program discounts. At the state level, the California State Transportation Agency is leading an initiative called the California Integrated Travel Project (Cal-ITP) to facilitate multimodal trip planning and payment to support state goals of increasing transit ridership, reaching environmental targets, lowering costs, creating efficiencies, improving customer experience and promoting equity. Current efforts focus on incentivizing statewide trip planning and fare payment standards and other integrated travel improvements over time. A future phase will involve a multi-agency pilot of integrated travel planning and fare payment.

In the SCAG region, several operators are piloting microtransit services, which typically involve smaller vehicles, flexible routing, on-demand dispatch and public-private partnerships. Research has shown that microtransit services are not very productive, carrying on average three to five passenger trips per vehicle per hour. Microtransit therefore may be best suited to serve lower-demand areas, acting as part of an array of services that include fixed route transit, TNCs, and other shared mobility services. Agencies conducting microtransit pilots in the SCAG region include OCTA (OC Flex), the City of Los Angeles Department of Transportation (LANow), LA Metro (Mobility on Demand pilot with Via), and Anaheim Transit Network (Free Ride Around the Neighborhood). Data and results from these pilot projects will inform future planning for microtransit in the region.

Over the last 10 years, one of the leading new mobility practices has been ridesourcing. This practice marries the taxi model with mobile and GPS applications to provide on-demand point-to-point service. Use of these TNC services, particularly those offered by Uber and Lyft, has grown exponentially and as the TNC business model evolves, the impacts will be felt across Southern California. One of the ways that transit providers or local jurisdictions are responding to that growth is by partnering with Uber, Lyft, and other companies to provide first/last mile services or replace low performing bus routes. Examples within the SCAG region include Go Monrovia, a partnership between the City of Monrovia and Lyft that provides subsidized rides including discounted rides to/from the Foothill Gold Line station, and a partnership between the City of San Clemente and Lyft in South Orange County in an area where OCTA discontinued two bus routes.

With respect to connected and automated vehicle applications, a new generation of transit navigation aids is emerging. Many private and public sector parties are currently testing automated passenger vehicles and trucks, and the capabilities range from driver assist to fully automated operations. Automated transit systems are still in the research phase and are supported by the FTA's Office of Research, Demonstration and Innovation and a five-year Strategic Transit Automation Research Plan. Automated services may be tested in closed environments such as university and hospital campuses through the horizon of Connect SoCal and may enter into service in open environments before 2045. SCAG's recently updated Regional ITS Architecture identifies planned projects such as connected vehicle applications, integrated corridor management and transit signal priority expansion.

PASSENGER RAIL

The 2020 Connect SoCal vision for passenger rail in the SCAG region consists of four main elements:

Grow Ridership: Although ridership on commuter and intercity rail services has steadily grown over the last two decades, there is still tremendous potential to significantly increase ridership in the region.

Provide More Frequent and New Services: Providing more frequent rail service will attract new riders to passenger rail. Currently, commuter rail service in Southern California is much less frequent than commuter rail services elsewhere in the nation. There are also several unserved passenger rail markets that would greatly benefit from the establishment of new rail service.

Improve Connectivity: While progress has been made in connecting passenger rail services to other existing transit in our region, more needs to be done to coordinate schedules and connections. Also, more progress must be made in first/last mile connections to rail stations, and station area planning and transit oriented development.

Secure Funding: New funding opportunities have been created since the 2016 Connect SoCal, such as the first dedicated source for rail operations at the state level. However, passenger rail funding in the region is still incremental in nature and to grow ridership via increased service levels, more long-term state and federal financing needs to be identified.

Several strategies in Connect SoCal are designed to increase rail ridership in our region by making rail travel more attractive as an alternative to commuting alone by car. These strategies address three distinct rail markets and the carriers can serve multiple travel markets:

- Metrolink – Commuter Rail
- Amtrak – Intercity Rail
- California High-Speed Rail and Southern California to Las Vegas – Interregional Rail

First, the Metrolink Southern California Optimized Rail Expansion (SCORE) program expands the capacity of the commuter rail system to ensure more regular and frequent service throughout the entire day. Capital investments for SCORE include construction of:

- Construction of additional tracks (e.g., sidings, double track, triple track and quadruple track segments)
- Improved signaling
- Expanded and lower emissions fleets
- Upgraded and enlarged maintenance facilities
- Grade crossing treatments and separations
- Fencing and safety features
- Features to support readiness for quiet zones
- Required asset rehabilitation to sustain capacity

SCORE includes the Link Union Station (Link US) project, which will transform the region's largest multi-modal transportation hub at Los Angeles Union Station by extending rail tracks over the US–101 freeway. With Link US, SCORE will greatly improve regional rail by providing through service at Union Station, reducing rail travel times in our region and allowing "one-seat ride" opportunities to many more destinations.

Second, the Los Angeles-San Diego-San Luis Obispo (LOSSAN) Rail Corridor Strategic Implementation Plan lays out a long-range vision for customer and capital improvements that increase the speed and quality of service. The latest LOSSAN Rail Corridor Agency Business Plan (FY 2018–19 to FY 2019–20) highlights several significant strategies for improvement such as train monitoring, train and connecting bus schedule adjustments, improved connectivity with local transit services, equipment and crew utilization, response to service disruptions and service planning. The LOSSAN plan calls for improvements along the corridor to provide more service, including 13 daily round trips between Los Angeles and San Diego, six round trips between Goleta and Los Angeles and three round trips between San Luis Obispo and Los Angeles.

Third, voters approved in 2008 the Proposition 1A bond measure providing $9.95 billion for the California High-Speed Rail project. Phase 1 will connect San Francisco to Los Angeles and Anaheim at speeds of up to 220 miles per hour, completing the trip within two hours and forty minutes. Segments in the SCAG region connect the Central Valley to Palmdale, Hollywood Burbank Airport, Los Angeles Union Station, and Anaheim. As described in the 2018 Business Plan and 2020 Draft Business Plan, Phase 1 will begin service in 2033.

In 2012, the Regional Council entered into a memorandum of understanding (MOU) with the California High-Speed Rail Authority (CHSRA), Metrolink, San Diego Association of Governments (SANDAG), Metro, Riverside County Transportation Commission (RCTC), and the City of Anaheim to include Phase 1 in the 2012 RTP/SCS and commit $500 million in Prop. 1A funds to early investments in Southern California's existing passenger rail system. The funding agreement for the Rosecrans/Marquardt grade separation project to receive $76.7 million in Prop. 1A funds was executed in 2018. In September 2019, the CHSRA, Metro and the California State Transportation Agency (CalSTA) executed an MOU which established a commitment for these agencies to work together cooperatively to execute a full funding agreement for the remaining $423.3 million for the LINK US project.

Finally, the Southern California to Las Vegas high-speed rail project was environmentally cleared under XpressWest and the Federal Railroad Administration (FRA) issued a record of decision on July 8, 2011. XpressWest is now in the process of planning, constructing and operating this service, which is expected to be privately financed.

ACTIVE TRANSPORTATION

With its temperate climate and wide array of stunning natural and built environments, the SCAG region holds great potential for active transportation initiatives. Walking (inclusive of people using personal mobility devices) and bicycling are accessible forms of transportation for people of all ages, abilities and socioeconomic backgrounds. Communities that are built to support walking and bicycling trips tend to be healthier and are safer for people using all modes of transportation. Likewise, the implementation of infrastructure and development of plans and programs increases the number of people walking and bicycling and decreases the number of people driving. This will improve health outcomes and reduce GHG emissions in the region.

Connect SoCal is expected to increase the number of daily active transportation trips by more than two million, increasing the mode share from 7.8 percent in 2016 to 10 percent by 2045. In order to achieve these outcomes, planned future investments are nearly doubled from $12.9 billion in the 2016 RTP/SCS to $22.5 billion in Connect SoCal. The active transportation investments in Connect SoCal are allocated across a range of active transportation strategies that address planning, policy making and implementation for both short and regional trips. Additionally, they are designed to improve environmental justice outcomes and enhance the safety and comfort of people walking and bicycling.

Since the adoption of the 2016 RTP/SCS planning efforts throughout the region have expanded significantly. Nearly 80 percent of the cities in the SCAG region now have completed some sort of active transportation plan, bringing the regional total to more than 300 pedestrian, bicycle and safe routes to schools plans. This is a 40 percent increase from 2016. Likewise, every county in the SCAG region now has a county-wide pedestrian, bicycle and/or active transportation plan (ATP) or is in the process of completing one. Some of these include the Imperial County Active Transportation Plan (2019) and Pedestrian Master Plan currently in progress, the Los Angeles County Active Transportation Strategic Plan (2016), Orange County's OC Active (2018), the Western Riverside Council of Governments Active Transportation Plan, the San Bernardino Non-Motorized Transportation Plan (2018) and the Ventura County Regional Bikeway Wayfinding Plan (2017). Through Connect SoCal, SCAG's Sustainable Communities Program and other statewide funding sources, additional planning funding will be available to continue this progress and to plan for more active communities across the region.

In addition to development of a robust set of plans, the region has seen significant positive changes to our built environment as active transportation projects have been implemented. Almost 500 bikeway miles have been built in the region since the 2016 RTP/SCS. These efforts are dispersed across the region, with a focus on projects that improve active transportation mode share and safety for disadvantaged communities. SCAG has worked closely with impacted communities and partnered with community-based organizations to ensure that plans and projects are designed to best address the issues that people walking and bicycling in each community face. Some noteworthy active transportation projects initiated or implemented since 2016 include:

Coachella Valley Link: A multi-use trail in the Coachella Valley which is expected to facilitate more than 3 million active transportation trips per year by 2035.

El Centro 8th Street ATP Project: The El Centro 8th Street ATP-funded project is significant in part due to the positive impact of a Go Human demonstration project. The partnership allowed the City to showcase potential improvements and solicit community feedback and support, which helped see the project to implementation.

Venice Boulevard Great Streets: Mar Vista's Venice Boulevard Great Streets project enhanced pedestrian and bicycle safety, and promoted place-making through community art installations. The one-year evaluation report highlights how infrastructure investments, such as new signalized crossing locations and protected bike lanes, resulted in an 11 percent increase of active transportation users, a 75 percent reduction of collisions at its busiest intersection and a decrease in bicyclist injuries, all while supporting the same traffic volumes and promoting a vibrant downtown core.

Connect SoCal includes a wide variety of infrastructure projects that will support short and regional active transportation trips. These strategies will reduce automobile vehicle miles traveled by increasing the number of trips accomplished by walking, bicycling and the use of micro-mobility devices. These strategies include building physical infrastructure such as local and regional bikeways, sidewalk and safe routes to schools pedestrian improvements, regional greenways and first-last mile connections to transit. In addition to reducing vehicle miles traveled, these strategies will improve air quality and public health by reducing emissions and increasing levels of physical activity. Finally, they will have a positive economic impact on the region by reducing transportation and healthcare costs.

Since the 2016 RTP/SCS there has been a significant change in technology and the way that it influences travel behavior. The growth in popularity of micro-mobility in the past few years necessitated the inclusion of strategies in Connect SoCal to address shared mobility infrastructure and regulation frameworks to ensure that new technologies can be used safely and responsibly. These strategies range from incentives for the purchase of e-bikes, to the distribution of private micro-mobility devices that help ensure access for low-income communities. While it is expected that many of these devices will be provided through the private sector, they will still use public streets and will likely increase demand for separated facilities that are safe for all ages and abilities. Local jurisdictions will likely be tasked with the regulation of these devices and will need to manage the locations where they will be stored and where they can be ridden.

New technology also has the potential to provide local partners with more and better travel behavior data. SCAG and member jurisdictions should support the procurement and development of new data sources for active transportation. This will include the collection of pedestrian, bicycle and micro-mobility volume data, as well as the integration of large data sets. Local cities, county agencies, public health departments and other stakeholders will all benefit from better data sets that provide information on traffic stress, accurate collision rates and information on the types of people using these modes. In addition, zoning codes and general plan elements should be updated when appropriate to support short trips and end-of-trip facilities such as bicycle parking.

Recent developments regarding micro-mobility and personal e-bikes and scooters have shown that new shared mobility benefits from the same programmatic and infrastructure improvements as traditional active transportation. Complete streets, which are planned, designed, operated and

CORE VISION
COMPLETE STREETS

Creating "complete streets" that are safe and inviting to all roadway users is critical to increasing mobility choices, reducing traffic fatalities and serious injuries and meeting greenhouse gas reduction targets.

PROGRESS SINCE 2016

In December 2018, the City of Santa Ana opened its first protected bikeway, or cycletrack. The project, funded by OC Go (Orange County Measure M), features a 6-foot wide bikeway protected from vehicle traffic by a landscaped median. About 55 percent of the surrounding community doesn't have access to a car. Santa Ana has been awarded about $45 million in grant funding for projects like this one that improve safety for people walking and biking.

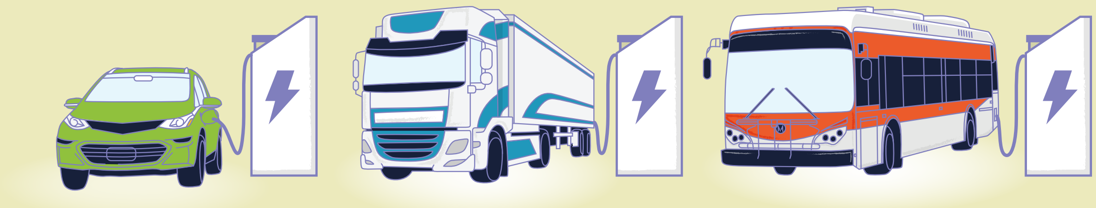
In the City of Los Angeles, the Mobility Plan 2035 advances the complete streets concept beyond a single project by prioritizing multi-modal networks including a Bicycle Enhanced Network, Transit Enhanced Network, Vehicle Enhanced Network and Pedestrian Enhanced Districts.

PLANNING FOR 2045

Connect SoCal invests in local streets and arterials and anticipates continued success in securing grant funds for regionally significant projects through programs like the California Active Transportation Program (ATP).

By expanding complete streets concepts to accommodate and optimize new technologies and micro-mobility devices, first-last mile connections to transit and curbside management strategies, the region will achieve even greater mode shift and reductions in VMT. SCAG champions Complete Streets policy implementation throughout the region with the Go Human campaign and a range of planning resources, including the Regional High Injury Network. Specific strategies and actions related to Complete Streets are detailed in the Active Transportation Technical Report.

KEY CONNECTIONS
ACCELERATED ELECTRIFICATION



CLEAN VEHICLES, CLEANER AIR

The Accelerated Electrification strategy offers a holistic and coordinated approach to de-carbonizing or electrifying passenger vehicles, transit and goods movement vehicles. Through greater coordination and deeper collaboration, this strategy aims to go beyond benefits achieved through state mandates alone. In the light-duty sector, Connect SoCal plans for greater incentives to increase sales of electric vehicles and strategies to increase the availability of charging infrastructure. Electric vehicles (EVs) currently make up only seven percent of new car sales, but the growth is healthy: In 2013 EVs made up just 2.4 percent of all new car sales statewide. For transit, in 2018 the California Air Resources Board voted to mandate purchases of electric buses. We can facilitate that process by working with transit agencies to ensure adequate charging stations and electricity rates. In the goods movement sector, the goal is to achieve a zero-emissions system, fostering early adoption of near-zero-emissions technologies.

PROMISING PRACTICES

LACI- Los Angeles Cleantech Incubator
Public private partnership among local, regional, and state stakeholders to accelerate transportation electrification and zero emissions goods movement in SCAG region.

SCAG PEV Atlas & Clean Cities Coalition Outreach
Five Department of Energy certified coalitions advance alternative fuels and fuel technologies in the region by building partnerships, creating tools and disseminating resources from the National Laboratories. Successful coalition initiatives across the region include SCAG's Plug-in Electric Vehicle Atlas, the AltCar Expo, and the deployment of thousands of municipal alternative fuel vehicles.

Regional Transit Agency Electric Buses
Sunline Transit, Foothill Transit pioneered the purchase of hydrogen and battery electric busses

PLANNING FOR 2045

Connect SoCal aims to align and catalyze investments to decarbonize the transportation system. Opportunities to be explored and advanced through studies and regional planning include:

- **Regional EV Charging Station & Vehicle Rebate Programs**
  Provides financial incentives for local communities to install charging stations & for individuals to purchase EVs
- **EV Charging Station Streamlining**
  Working with member agencies to streamline the process of permitting and installing new charging stations.
- **Innovative Clean Transit Rule**
  Facilitating the transition of transit fleets in the region to 100 percent electric vehicles.

maintained for safe, convenient, and comfortable travel and access for users of all ages and abilities, will support people who are walking, bicycling, and using micro-mobility devices. A variety of engagement strategies will need to be implemented alongside infrastructure components to support active transportation, in whatever form it takes. This engagement can take the form of Safe Routes to School programs designed to encourage students to walk and bicycle to school, SCAG's Go Human advertising campaigns to encourage the public to walk and bicycle more, or the demonstration of possible new infrastructure to get communities excited about changing their streets.

TRANSPORTATION SAFETY

Connect SoCal prioritizes the safety and mobility of the region's residents, including drivers and passengers, transit riders, pedestrians, and bicyclists. To adhere to MAP-21/FAST Act performance measures requirement, SCAG adopted its annual regional safety targets in February 2020. For the year 2020, SCAG is aiming to reduce fatalities by a minimum of 3.03 percent and serious injuries by a minimum of 1.5 percent. To enhance safety in the region, SCAG anticipates providing cities with resources to develop safety plans and help achieve the safety targets.

SCAG's safety strategies are largely grounded in the State's Strategic Highway Safety Plan (SHSP), which helps member agencies interested in pursuing safety initiatives and strategies at the local level. SCAG outlines detailed strategies and actions that local jurisdictions and county transportation commissions can undertake to enhance safety in our region in the Transportation Safety and Security Report. The strategies are supportive of the Strategic Highway Safety Plan and include:

1. Reduce Aggressive Driving and Speeding
2. Improve Safety for Aging Populations:
3. Improve Bicyclist Safety
4. Improve Commercial Vehicles Safety
5. Ensure Drivers are Licensed
6. Improve Emergency Response Services
7. Leverage Emerging Technologies
8. Reduce Impaired Driving Fatalities
9. Reduce Distracted Driving
10. Improve Safety at Intersections
11. Reduce the Occurrence of Lane Departure Fatalities
12. Improve Motorcycle Safety
13. Improve Occupant Protection by Increased Use of Seat Belts and Child Safety Seats
14. Improve Pedestrian Safety
15. Improve Work Zone Safety
16. Improve Safety for Young Drivers

To achieve regional safety targets SCAG will:

- Develop and maintain a High Injury Network (HIN) mapping tool to support planning efforts related to transportation safety by our local partners
- Work with local jurisdictions to provide active transportation safety education opportunities through its Go Human campaign
- Continue to represent Southern California on the California SHSP Steering Committee, the California Walk Bike Technical Advisory Committee, the Active Transportation Program Technical Advisory Committee and active transportation emphasis areas
- Support regional safety efforts including the development of Vision Zero policies and plans
- Support bicycle and pedestrian safety as part of SCAG's Sustainable Communities Program
- Analyze shared use of sidewalks between different modes (bicyclists, pedestrian's e-scooters) and the impacts on personal safety (e.g. dockless devices blocking foot traffic or other conflicts when riding near pedestrians)
- Advocate for funding strategies that reflect unique local needs

HIGHWAY & ARTERIAL NETWORK

Southern California's highway and arterial system functions as the backbone of the larger transportation network. Most trips in our region are still made on our highways and arterials. The network provides access to employment, health, social and educational services among others. Yet, expansion of our highways and arterials has slowed down over the past decade. Building new roads is no longer accepted as the only solution to our congestion challenges, partly due to lack of funding and challenging environmental and community concerns. However, given that critical gaps and congestion choke points still exist in the system, improvements beyond those that are operational in nature still need to be considered. Connect SoCal includes capital improvements that will address the choke points and gaps in the system, to ensure the system is operating optimally and provides adequate and equitable access to opportunities.

SCAG works with partner implementing agencies to prioritize projects that preserve and optimize the existing highway and arterial network. A sample of major committed projects included in Connect SoCal are highlighted in **EXHIBIT 3.2** and **TABLE 3.2**. Projects include interchange improvements, auxiliary lanes, general purpose lanes, carpool lanes, toll lanes and Express/HOT lanes. The complete list of projects can be found in the Project List Technical Report. In addition to the financially constrained list (projects for which funds are identified in the plan) of projects, the Project List Technical Report also contains an unconstrained list of projects, also known as strategic projects, for illustrative purpose. Strategic projects are those projects that the region believes merits future consideration for inclusion in the financially constrained plan as the funding becomes available and the consensus for the projects are further developed through future studies.

Our region boasts one of the most comprehensive High Occupancy Vehicle (HOV) Lane systems in the nation. However, there are still gaps in the system that we must continue to close. As part of Connect SoCal, strategic HOV gap closures, direct highway-to-highway HOV connectors, and HOV direct access ramps need to be built to complete the system.

Our region's arterials and local road system accounts for more than 80 percent of the total road network and they carry a majority of overall traffic. A number of arterials run parallel to major highways and can provide alternatives to them. Beyond motor vehicles, our arterials serve transit and active transportation. As part of Complete Streets initiatives, improvements such as bicycle lanes, sidewalks, lighting, landscaping, and ADA compliant measures are shifting focus on arterials towards considering multiple users – while also providing a greater sense of place.

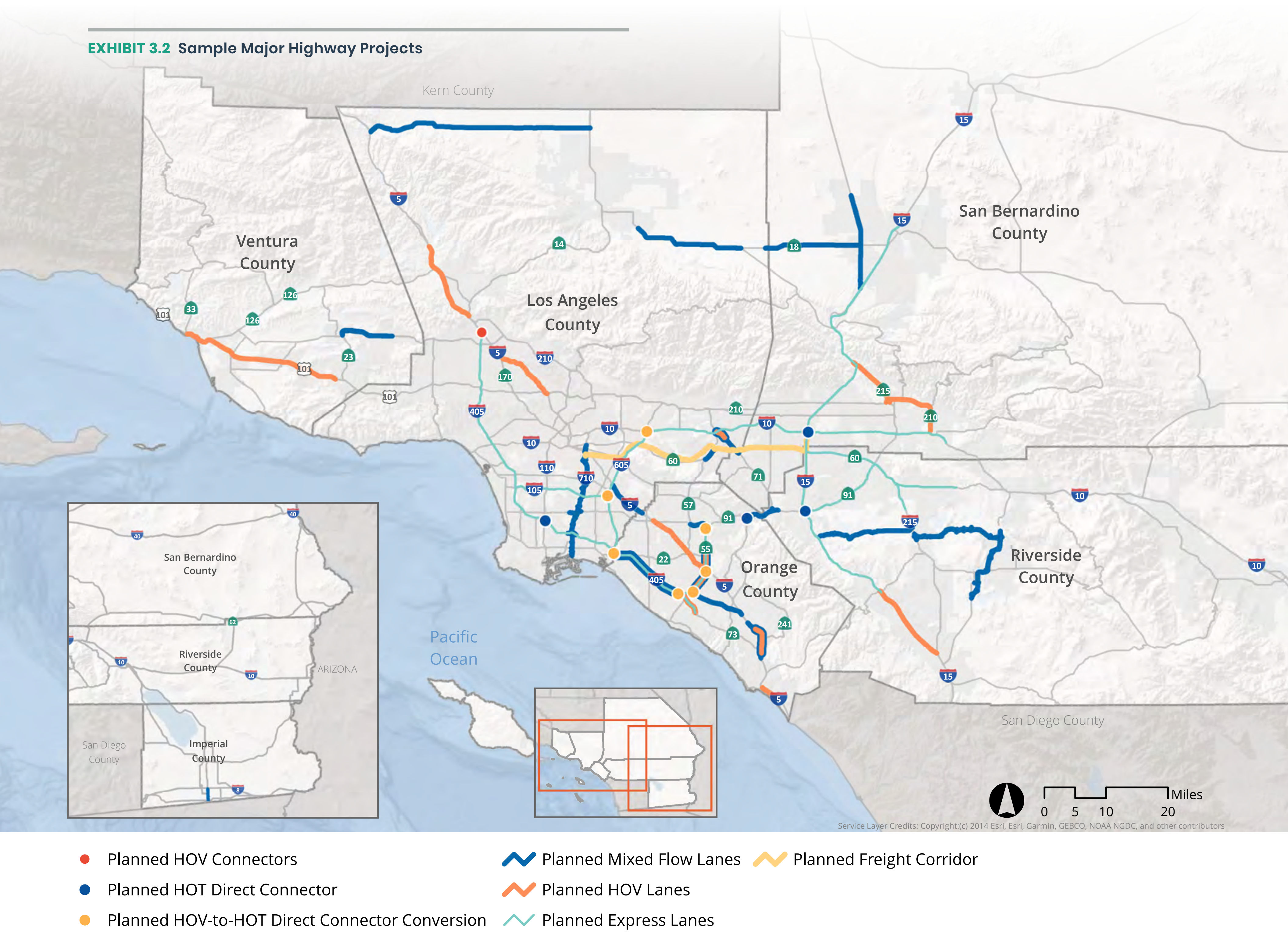
The Highway and Arterial improvements in Connect SoCal are guided by the following framework and guiding principles:

- Protect and preserve what we have first, supporting 'Fix it First' principle, including the consideration of life cycle costs beyond construction
- Support continued system preservation funding and augment as necessary
- Focus on achieving maximum productivity through strategic investments in system management and demand management
- Focus on adding capacity primarily (but not exclusively) to:
  - Close gaps in the system
  - Improve access where needed
- Support policies and system improvements that will encourage the seamless operation of our roadway network from a user perspective
- Consider safety in all roadway improvement projects
- Assure that any new roadway capacity project is developed with consideration and incorporation of congestion management strategies, including demand management measures, operational improvements, transit and ITS.
- Focus on addressing non-recurring congestion with new technology
- Implement Complete Streets consistent with California's Complete Streets Act

REGIONAL EXPRESS LANE NETWORK

Consistent with the system management pyramid, the regional express lane network integrates congestion pricing to optimize existing capacity on freeways and offer users greater travel time reliability and choices. Express lanes when appropriately priced to reflect demand can outperform non-priced lanes in terms of throughput, especially during congested periods. Express lanes operate on the principle of congestion pricing – when more vehicles are using those lanes, the price increases accordingly to manage congestion in the lanes. Express lanes and toll roads generate revenues that fund construction and operation of the facilities, and can relieve air pollution and GHG emissions associated with congestion.

EXHIBIT 3.2 **Sample Major Highway Projects**



Source: SCAG, 2019

TABLE 3.2 Sample Highway Projects

	County	Route	Description	Completion Year	Project Cost ($1,000's)
MIXED-FLOW LANES	Imperial	SR-111	Widen and improve to six-lane freeway with interchanges at Heber, McCabe, and Jasper and overpass at Chick Rd.	2030	$999,136
	Los Angeles	SR-57/SR-60	Route 57/60 Confluence Chokepoint Relief Program.	2026	$300,000
	Los Angeles	I-710	Add one mixed-flow lane in each direction between Shoreline Dr and SR-91 and between I-105 and SR-60, plus add 2 truck lanes between Willow St and Del Amo Blvd.	2035	$5,941,000
	Orange	SR-55	Add one mixed-flow lane in each direction and fix chokepoints from I-405 to I-5 and add one auxiliary lane in each direction between select on/off ramps and operational improvements through project limits.	2025	$410,907
	Orange	SR-91	Add eastbound mixed-flow lane from SR-57 to SR-55, add one westbound mixed-flow lane from Kraemer to State College, improve interchanges and merging from Lakeview to Raymond, and auxiliary lanes in certain segments.	2030	$456,190
	Orange	I-405	Add one mixed-flow lane in each direction from I-5 to SR-55 and southbound auxiliary lane from SR-133 to Irvine Center Drive.	2034	$323,600
	Orange	I-405	Add one mixed-flow lane in each direction, convert existing HOV lane to HOT lane, add one additional HOT lane in each direction from SR-73 to I-605.	2026	$1,900,000
	Ventura	SR-118	Add one lane each direction from RT-23 to Tapo Canyon Rd.	2031	$216,463

TABLE 3.2 **Sample Highway Projects - Continued**

	County	Route	Description	Completion Year	Project Cost ($1,000's)
EXPRESS LANES	Los Angeles	I-405	Add I-405 Express Lanes from I-105 to I-110.	2028	$71,560
	Los Angeles	I-405	Add I-405 Express Lanes from I-110 to LA/Orange County Line.	2028	$110,390
	Los Angeles	I-105	Add I-105 Express Lane from I-405 to Studebaker.	2027	$520,900
	Los Angeles	I-405	Sepulveda Pass (Ph 1) ExpressLanes.	2027	$260,000
	Los Angeles	I-10	Add I-10 Express Lanes from I-605 to LA/San Bernardino County Line.	2028	$196,840
	Los Angeles	I-405	Add I-405 Express Lanes from I-10 to I-105.	2028	$70,880
	Los Angeles	I-605	I-605 Express Lanes from I-105 to Orange County Line.	2031	$100,850
	RIVERSIDE	I-15	Add two Express Lanes in each direction from Cajalco Rd to SR-74.	2027	$544,000
	San Bernardino	I-15	Add two Express Lanes in each direction from I-215 to US-395	2040	$687,994
	San Bernardino	I-15	Add one Express Lane in each direction from US-395 to High Desert Corridor (Segment 5)	2045	$194,662
	San Bernardino	I-10	Implement 2 Express Lanes from I-10/I-15 interchange to California St. and 1 Express Lane from California St. to Ford St.	2024	$1,214,607
	Los Angeles	SR-71	Add one HOV lane and one mixed-flow lane from Rt-10 to SB County Line.	2028	$326,392
	Riverside	I-15	Add one HOV lane in each direction from SR-74 to I-15/I-215 interchange.	2039	$375,664
	San Bernardino	I-215	Add one HOV lane in each direction from SR-210 to I-15.	2035	$249,151
	Ventura	US-101	Add one HOV lane in each direction from LA/VEN County Line to SR-33.	2040	$700,000

The regional express lane network included in Connect SoCal builds on the successful implementation of the I-10 and I-110 Express Lanes in Los Angeles County and the recent extension of the SR-91 Express Lanes between Orange and Riverside Counties. Additional efforts underway include planned express lanes on the I-105 in Los Angeles County, the I-15 in Riverside County, the I-15 and the I-10 in San Bernardino County and the I-405 in Orange County and Los Angeles County. **EXHIBIT 3.3** displays the segments in the proposed regional express lane network.

GOODS MOVEMENT

Global supply chains are interconnected, and changes in one area have subsequent and far-reaching ripple effects on transportation networks. This is especially true in the SCAG region, which serves as the premier trade gateway for the U.S.

Since the 2016 RTP/SCS, several new paradigms have emerged that are reshaping the way the region addresses goods movement issues. E-commerce has been a core driver affecting all aspects of regional goods movement by facilitating increased cargo volumes, fostering both the development and turnover of industrial establishments, changing consumer habits, causing shifts in labor forces, and paving the way for new technologies in logistics. The region is also positioning itself to address the challenges that will be brought by new technologies like automation and its corollary impacts on the regional goods movement workforce. Balancing traditional goods movement concerns and opportunities with emerging challenges, SCAG has developed key strategies to realize a regional vison that maintains regional economic competitiveness, promotes job creation and retention, increases freight mobility and safety, and mitigates environmental impacts. Specific details of goods movement challenges and strategies can be found in the Goods Movement Technical Report.

Infrastructure Investments to Improve Freight Mobility

Capturing the benefits that accompany goods movement means ensuring that regional businesses have access to and increased mobility on key goods movement corridors and networks. Improving efficiency on the transportation system will help contain the rising costs of goods and services that may be passed on to consumers. Connect SoCal identifies a significant number of infrastructure investments to assure that the region continues to be the leading trade gateway in the U.S. It does this by supporting physical improvements in the marine terminals, highways, intermodal terminals, railroad mainlines, access routes, airports and international land border crossings that make up the goods movement network.

Last-Mile Freight

Last-mile delivery represents the final leg for goods to reach customers. These deliveries happen in complex environments, including high-density regional locations, involve sophisticated interactions among physical infrastructure and often compete for limited public space with other modes. Ensuring that freight is properly included in policy considerations and street design necessitates tailored and nuanced strategies involving multidisciplinary approaches as identified in Connect SoCal.

Workforce Development

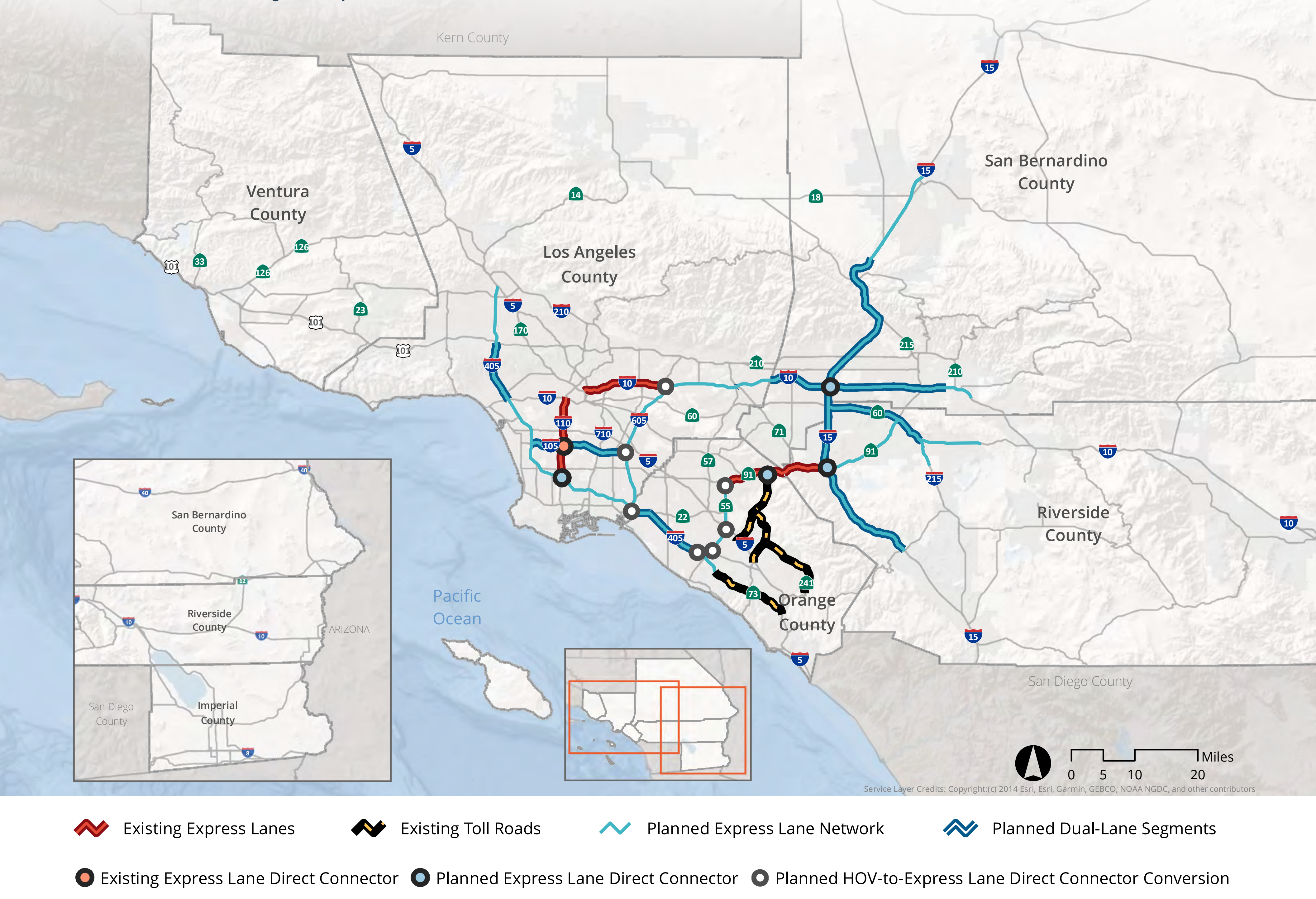
Changing supply chains, automation and new technologies, and increasingly competitive wages from other sectors, will place growing pressure on goods movement related businesses to find qualified workers without raising costs and ensure the availability of jobs that have traditionally provided well-paying jobs to lower-skilled workers. Connect SoCal supports regional programs that raise awareness of the issue, reposition the image of goods movement jobs to accurately reflect career mobility for goods movement jobs, promote increased participation by younger workers and improve access for workers.

Truck Bottleneck Relief Strategy

In 2016, California had the third-highest cost of truck congestion behind Texas and Florida at nearly $5.1 billion and five of the top 100 truck bottlenecks in the nation. With driver wages and fuel costs representing more than 50 percent of total motor carrier costs, truck congestion has major impacts on the bottom line of the trucking industry. Truck bottlenecks are also emission “hot spots” that generally have significantly degraded localized air quality because of increased idling. Connect SoCal identifies 48 truck bottlenecks in the region and allocates an estimated $5 billion toward strategies that relieve them, such as:

- Ramp metering
- Extending merging lanes
- Improving ramps and interchanges
- Adding auxiliary lanes

EXHIBIT 3.3 Planned Regional Express Lane Network



Source: SCAG, 2019

CORE VISION
GOODS MOVEMENT

The efficient movement of goods is critical to a strong economy and improves quality of life in the SCAG region by providing jobs and access to markets through trade. However, increased volumes of goods moving across the transportation system contribute to greater congestion, safety concerns and harmful emissions. It is critical to integrate land use decisions and technological advancements to minimize environmental and health impacts while fostering continued growth in trade and commerce.

PROGRESS SINCE 2016

Adoption of the Clean Air Action Plan Update in 2017. Since inception in 2006, the Ports have reduced air pollution from harbor trucks alone by more than 90 percent.

Selection of a Locally Preferred Alternative for the I-710 South Recirculated Draft EIR/Supplemental Draft EIS.

Twenty-five regional grade separations have been completed and opened to traffic, reducing delays and emissions from idling vehicles, and addressing noise and safety concerns.

Near completion of the Gerald Desmond Bridge (completion 2020).

Expansion of the international POE in Calexico.

PLANNING FOR 2045

Connect SoCal includes expanded railyards, additional mainline railroad tracks, grade separations, improved port terminals and truck bottleneck relief projects, including dedicated truck lanes.

Connect SoCal addresses drivers of change such as e-commerce, new technologies, shifts in trade policies, last-mile delivery and the move to a near-zero and zero-emissions system.

Industrial Warehouse & Distribution Centers

Southern California is home to the largest industrial warehouse cluster in the nation, with well over 1.2 billion square feet of industrial space. SCAG will continue efforts to provide the most updated data on industrial warehouse building square footage and conduct further analyses to better reflect changes in industrial land uses, truck industry service types, and equipment usage for truck terminals due to e-commerce. This includes consideration of new area sub-category classifications such as seaport and air cargo terminals, and rail intermodal and classification yards. By further understanding industrial facilities, SCAG will be more equipped to explore strategies that support the effective integration between goods movement needs and regional land use patterns.

Goods Movement Environmental Strategy

Much of the SCAG region (and nearly all of the urbanized area in the region) does not meet federal ozone and fine particulate air quality standards, and goods movement is a major source of greenhouse gas emissions. With growing demand to quickly deliver goods to consumers, the region will need to aggressively pursue the reduction of freight emissions that contributes to regional air pollution problems and localized “hot spots” that have adverse health impacts. Connect SoCal proposes an environmental strategy to address the air quality impacts of goods movement, while also allowing for the efficient and safe movement of goods throughout the region. A critical component of this strategy is the integration of advanced technologies that have benefits such as air quality improvements, energy security and economic growth opportunities. Connect SoCal articulates a process to accelerate the development and deployment of effective technologies, along with key action steps, to help the region reduce dangerous pollutants as much as possible. While this plan focuses on getting cleaner vehicles on the road quickly, this must be done with full life-cycle consideration of production, use and disposal impacts. This plan reaffirms zero and near-zero emission technologies as a priority, describes progress to date, and outlines a framework and key action steps to reach that goal. The process, framework, and action steps can be found in the Goods Movement Technical Report.

AVIATION

SCAG, by definition, is primarily a regional surface transportation planning agency. Therefore, SCAG is focused on air passenger and cargo activity from the perspective of how the traffic coming and going from the airports affects the region's roads, highways, and transit systems, and how to improve ground transportation access to the airports. On a basic level, SCAG maintains an updated list of airport ground access improvements. However, SCAG has and will continue to play a role in terms of aviation systems research, planning and analysis, as well as encouraging collaboration and communication amongst the region's aviation stakeholders.

In order to best plan for and assess the impacts of air passenger and cargo activity on the region's surface transportation system, SCAG takes a comprehensive, collaborative and empirical analytical approach to regional transportation planning. **TABLE 3.3** summarizes passenger and air cargo demand in 2045 at each of the current and future commercial airports within the SCAG region. These forecasts were developed through a collaborative process working with each of the airports individually as well as collectively through the Aviation Technical Advisory committee (ATAC). The estimated future demand at each of the airports informs the transportation improvement needs.

Work with Airports & Transportation Agencies on Airport Ground Access Projects

The airports in the SCAG region are currently working with federal, state, and local transportation agencies, and private partners, to improve airport ground access and infrastructure. SCAG maintains an updated list of the various airport ground access improvement projects and works with the airports to assist with data collection and assist with agency coordination.

Currently, Los Angeles World Airports (LAWA) is completing the Landside Access Modernization Program (LAMP) project and is in the planning and environmental phases for the Airfield and Terminal Modernization (ATM) program. Both the LAMP and ATM projects address ground access and airport modernization at LAX. The LAMP project will include the Automated People Mover, two Intermodal Transportation Facilities, a Consolidated Rental Car Facility and a series of comprehensive roadway improvements designed to alleviate traffic congestion in and around the airport.

Hollywood Burbank Airport has recently completed transit and rail infrastructure projects to improve ground access, including the Regional Intermodal Transit Center (RITC), and is currently in the planning process for a new airport terminal. While Burbank is currently the only airport with direct rail access to the airport, the City of Ontario and the San Bernardino County Transportation Authority have formally initiated the planning process for new Metrolink connections to the Ontario International Airport.

TABLE 3.3 SCAG Region Airport Passenger Forecast for 2020–2045

Major SCAG Region Airports	2017 (Base Year) Actual Activity (in millions)	2045 (Horizon Year) Projection (in millions)
Total SCAG Region	110.17	197.14
Burbank	4.74	9
Imperial	0.012	0.3
Los Angeles	84.56	127
Long Beach	3.783	5.5
Ontario	4.552	33
Oxnard	0	0.3
Palmdale	0	1.82
Palm Springs	2.1	5
Riverside	0	0.61
San Bernardino	0	1.81
Orange County	10.423	12.5
So Cal Logistics	0	0.3

Source: The airport activity numbers for 2017 and the airport forecast numbers for 2045 were obtained from the airports.

Effective Analysis & Planning

Rigorous data collection, research and analysis is critical for effective regional planning, including planning for ground access to and from the region's airports. The ongoing development of the SCAG region's surface transportation system, especially as it relates to the airports in the face of growing air passenger and cargo demand, will require that all key partners maintain and have access to quality data on aviation passenger and cargo trends.

Much of that research and analysis will continue to be provided by the aviation and transportation stakeholders in the region in the form of data, activity reports, passenger surveys and other agency-initiated reports, studies and working groups. However, in addition to the agency-led efforts, the SCAG Aviation Program will begin designing and initiating studies (e.g. air passenger surveys, airline airport choice studies) that will help inform airport and transportation planners in the region. To this end, in order to ensure that there is not unnecessarily overlap and that the research represents the interests and goals of the aviation stakeholders, SCAG will continue a comprehensive and collaborative planning approach by working with the airports, transportation commissions and agencies, state agencies, federal agencies and other aviation and transportation stakeholders.

The data collection and analysis for the different research projects will be open, transparent and collaborative processes. At the core of the SCAG Aviation Program's efforts will be to continue to facilitate effective research, analysis, and planning through information sharing and open communication.

Ongoing Communication & Collaboration Between Airports, Transportation Agencies & Government

The SCAG Aviation Program will act as a facilitator of working relationships and discourse between aviation and transportation planning agencies and officials in the region. Although SCAG has no regulatory, planning, or operational authority over the airports, as a metropolitan planning organization, SCAG is encouraged by federal statute to consult and collaborate with transportation stakeholders, including airport officials. In an effort to encourage effective planning for the coming growth in air passenger and cargo demand, the SCAG Aviation Program has provided and will continue to provide a critical collaborative planning function. Whether it is through the ATAC, attendance at conferences and working group meetings, and meeting with airports and government agencies, the SCAG Aviation Program will continue to play a critical role in building bridges and partnerships across the region.

TECHNOLOGICAL INNOVATIONS & EMERGING TECHNOLOGY

Emerging technologies in transportation and mobility are primarily developed and advanced by the private sector, and it is important that public agencies monitor the development of such innovations. Emerging technology in transportation and mobility are themes threaded throughout Connect SoCal. SCAG has completed wide-ranging analysis of recent and emerging technologies principally associated with light-duty vehicles that could potentially impact travel behavior and location choices in the region over the next 25 years. However, these new technologies will have diverse impacts, affecting everything from goods movement to transit.

Connect SoCal recognizes that many of these new technologies provide consumer solutions and have been embraced by the public as evidenced by the proliferation of smartphones, mobile banking, navigational apps and social networking. Emerging technology such as ride-hailing, carshare, e-bike and e-scooters provide more choices, including a range of affordable mobility options for travelers. Some niche ride-hailing companies also serve special markets such as children, healthcare transportation and concierge service for elderly customers. Improvements in regional mobility will therefore likely be derived from how technology is used, rather than from any individual technological development.

By providing more options for local and regional trips, emerging technologies may shift trips to less environmentally damaging modes, minimize negative environmental externalities associated with current vehicle use, increase system efficiency, improve safety, and reduce auto-related collisions and fatalities. Moreover, strategies to harness the benefits of emerging technologies to advance Connect SoCal goals are viewed through the lens of improving health, safety, and equity and mobility outcomes for all the region's residents.

To stay informed on emerging technologies as they develop, SCAG regularly communicates with institutions of higher learning, metropolitan planning organizations from around the country, county transportation commissions, local jurisdictions, economic development entities and chambers of commerce.

SCAG has prepared a set of recommended policies that are included in the Connect SoCal Emerging Technology Technical Report. Those policies represent examples that SCAG could help local jurisdictions to adopt. The policies would need to be studied and customized to fit local context. In addition to recommended policies, Connect SoCal proposes programs that encourage the deployment of selected technologies to improve mobility and reduce GHGs. These programs support the Key Connections strategies 'Accelerated Electrification' and 'Shared Mobility and Mobility as a Service (MaaS)'.

PROTECTING THE ENVIRONMENT

Integrating the many transportation and land use strategies discussed in this chapter will help protect the region's natural environment—in numerous ways. SCAG has been committed to this integration, as well as protecting the environment, for years. However, environmental protection is now a major requirement of Moving Ahead for Progress in the 21st Century Act (MAP-21/FAST Act). Pursuant to Section 23 U.S. Code Section 134, "a long-range transportation plan shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan." Connect SoCal also considers and is consistent with the provisions of the Fixing America's Surface Transportation Act (FAST Act). As part of the planning process, MPOs "shall consult, as appropriate, with State and local agencies responsible for land use management, natural resources, environmental protection, conservation and historic preservation concerning the development of the transportation plan." They also must consider, if available, "state conservation plans or maps" and "inventories of natural or historic resources."

ENVIRONMENTAL MITIGATION PROGRAM

Connect SoCal includes an environmental mitigation program that links transportation planning to the environment. Building on its strong commitment to the environment as demonstrated in the previously conducted 2016 RTP/SCS, SCAG's mitigation program is intended to function as a resource for lead agencies to consider in identifying mitigation measures to reduce impacts anticipated to result from future projects as deemed applicable and feasible by such agencies. This mitigation discussion also utilizes documents created by federal, state and local agencies to guide environmental planning for transportation projects.

Connect SoCal in some aspects acts as a "self-mitigating" plan in certain impact areas, in that its policies and strategies lead to improved environmental outcomes for air quality, GHG emissions, public health, congestion and other indicators, while accommodating existing and projected population growth, among other key environmental indicators compared to the No Project Alternative (Trend Scenario). Nevertheless, the implementation of plan programs, policies and strategies may lead to additional environmental impacts compared to existing conditions.

As a public agency in California, SCAG also fulfills mitigation requirements by preparing a Program Environmental Impact Report (PEIR), pursuant to the California Environmental Quality Act (CEQA). The PEIR evaluates potential environmental impacts of Connect SoCal when compared with existing conditions and proposes measures at the program level to mitigate impacts to the maximum extent feasible for those resource areas that would be affected by the plan.

MITIGATION MEASURES

SCAG is responsible for developing a plan to monitor mitigation activities to track progress on implementation of these measures at the regional level. SCAG's mitigation is consistent with the general role played by a metropolitan planning organization, including developing and sharing information, collaborating with partners and developing regional policies.

Senate Bill 375 states that nothing in a SCS supersedes the land use authority of cities and counties and that cities and counties are not required to change their land use policies and regulations, including their general plans, to be consistent with the SCS or an alternative planning strategy (Government Code Section 65080(b)(2)(K)). Cities and counties have plenary authority to regulate land use through their police powers granted by the California Constitution, art. XI, §7, and under several statutes, including the local planning law (Government Code Sections 65100-65763), the zoning law (Government Code Sections 65800-65912), and the Subdivision Map Act (Government Code Sections 66410-66499.37). SCAG has no concurrent authority/jurisdiction to implement mitigation related to land use plans and projects.

KEY CONNECTIONS

SMART CITIES & JOB CENTERS

BIG DATA & VIRTUAL INFRASTRUCTURE

Smart Cities connect people, vehicles and infrastructure, allowing them to communicate in "real-time" through regional telecommunications networks. The Smart Cities and Job Centers strategy aims to catalyze investments across sectors to make "virtual access" a cost-effective and reliable option for all types of trips, expanding the air quality, congestion and VMT reduction benefits the region already realizes through teleworking. While Smart Cities strategies can be deployed universally, virtual access is particularly beneficial in rural communities where destinations are far apart.

Connect SoCal specifically envisions intensified deployment in sub-regional job centers to encourage more growth of both jobs and housing in areas with already high employment density. The Smart Cities and Job Centers strategy enables this by using integrated information and communication technologies to improve the efficiency and performance of the transportation system. It incorporates transit demand management (TDM) measures that encourage carpooling and transit, and parking strategies that reduce the cost to build new employment facilities within job centers. Also, this strategy builds upon promising trends in "co-working" to promote alternatives for long-distance commuters who prefer not to telecommute. Strengthening these locally significant employment centers allows the region to capitalize on the economic and mobility benefits of compact development, where housing and jobs are closer together.

PROMISING PRACTICES

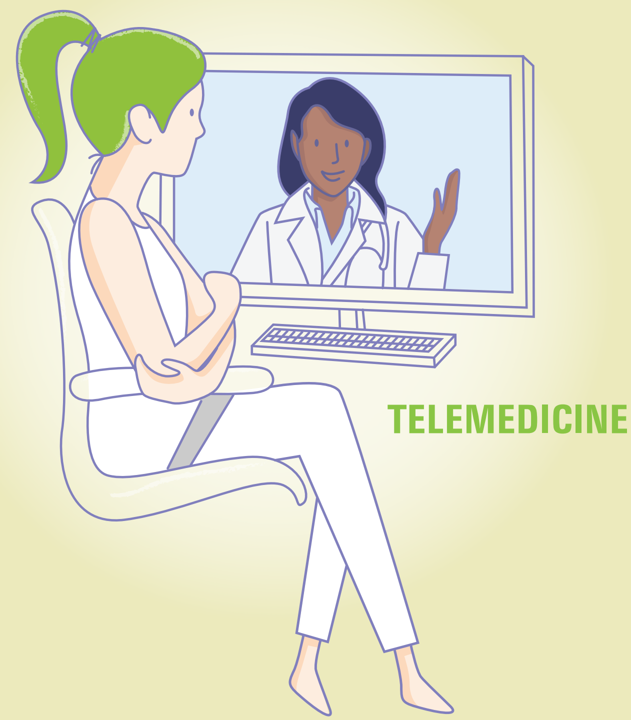
South Bay Fiber Network
Development of a regional broadband fiber-optic network to support improved management of transportation systems and transportation demand management.

SCAG Future Communities Pilot Program
Partnership with the Mobile Source Air Pollution Reduction Review Committee to provide local technical assistance grants supporting data and technology solutions to reduce VMT through enhanced city services and mobility programs.

PLANNING FOR 2045

To replace vehicle trips with virtual access and realize greenhouse gas reductions savings through the deployment of "smart" technologies, SCAG will continue to research and advance Smart Cities strategies including by:

- Seeking funding and partners to continue to the Future Communities Pilot Program.
- Expanding research on the Future of Work to increase understanding and advance strategies where technology can substitute for physical trips (via strategies like telecommuting, telemedicine, online learning, e-commerce, and e-government).
- Collaborating with the Inland Empire Regional Broadband Consortium, California Emerging Technology Fund, and others on a Transportation Broadband Strategies Study to help reduce VMT and greenhouse gas emissions.



TECHNOLOGY IS CHANGING THE FUTURE OF WORK (AND HELPING REDUCE VEHICLE TRIPS)

KEY CONNECTIONS

SHARED MOBILITY & MOBILITY AS A SERVICE

THE RIGHT TOOL FOR THE JOB

The future of transportation, like so many aspects of living in our region, will be shaped by technology and the ability to customize our choices. The rise of shared mobility and mobility as a service will allow residents to choose how to travel, depending on the time, distance or goal of their trip. "Shared mobility" refers to a broad range of transportation options, such as rental e-scooters and e-bikes, ridesourcing services like Uber and Lyft, and on-demand app-based transit connections provided by vans and shuttles. "Mobility as a service," or MaaS, allows travelers to research and compare different transportation options from one screen and plan their trip accordingly. MaaS will also allow the traveler to book and pay for different segments of a multi-modal trip with one click. This will make it increasingly critical that dense urban areas manage their curb space smartly, in order to ensure safe access for low-speed modes, ridesourcing providers, parking and local deliveries.

PROMISING PRACTICES

TAP Card Integration
You can pay fares on 25 different regional transit systems with just one "Transit Access Pass" (TAP) card

Metro Bike Share / TAP Card Integration
Your TAP card gives you to access 1,500 bikes at over 150 stations across LA County

LA Metro Carsharing Integration
Dedicated carsharing spaces are available at 25 Metro stations in LA County

PLANNING FOR 2045

Through regional planning and collaboration, SCAG will advance the vision of shared and seamless travel through MaaS as an alternative to driving alone. Programs to be explored and advanced to realize this outcome through partnership and collaboration could include:

- **GoMonrovia** – City-subsidized ridesharing trips take residents to city's downtown and Metro Gold Line station
- **California Integrated Travel Project (Cal-ITP)** – facilitate multi-modal trip planning and payment to support state goals of increasing transit ridership, reaching environmental targets, lowering costs, creating efficiencies, improving customer experience and promoting equity.
- **Micro-Mobility Pilot Programs** – Developing local regulations helps ensure safety, accessibility, access to data and accountability for new modes of travel
- **Regional Microtransit Pilot Projects** – Testing on-demand transit across the region: OCTA - OC Flex, LADOT - LANow, Anaheim Transit Network - Free Rides Around the Neighborhood, and Metro – Via.


WHICH OPTION WOULD WORK BEST FOR ME TODAY?
Shared Mobility Apps

With respect to the transportation projects in Connect SoCal, these projects are to be implemented by Caltrans, county transportation commissions, local transit agencies, and local governments (i.e., cities and counties), and not SCAG. Transportation project implementation and land use development decisions are subject to their own environmental review process and are expected to implement project-specific mitigation measures to minimize environmental impacts, as SCAG has no authority/jurisdiction to require these agencies to implement projects nor their mitigation measures.

For the Connect SoCal PEIR, SCAG has taken a performance standards-based mitigation approach that includes:

- SCAG's program level mitigation measures
- Project-level mitigation measures which are within responsibility, authority, and/or jurisdiction of project-implementing agency or other public agency serving as lead agency under CEQA in subsequent project- and site- specific design, CEQA review, and decision-making processes, to meet the performance standards for each of the CEQA resource categories.

Program level mitigation measures have been identified and will be undertaken by SCAG, to offset any identified potentially significant adverse programmatic-level environmental effects. Such measures include public awareness and outreach, agency coordination and feasibility studies.

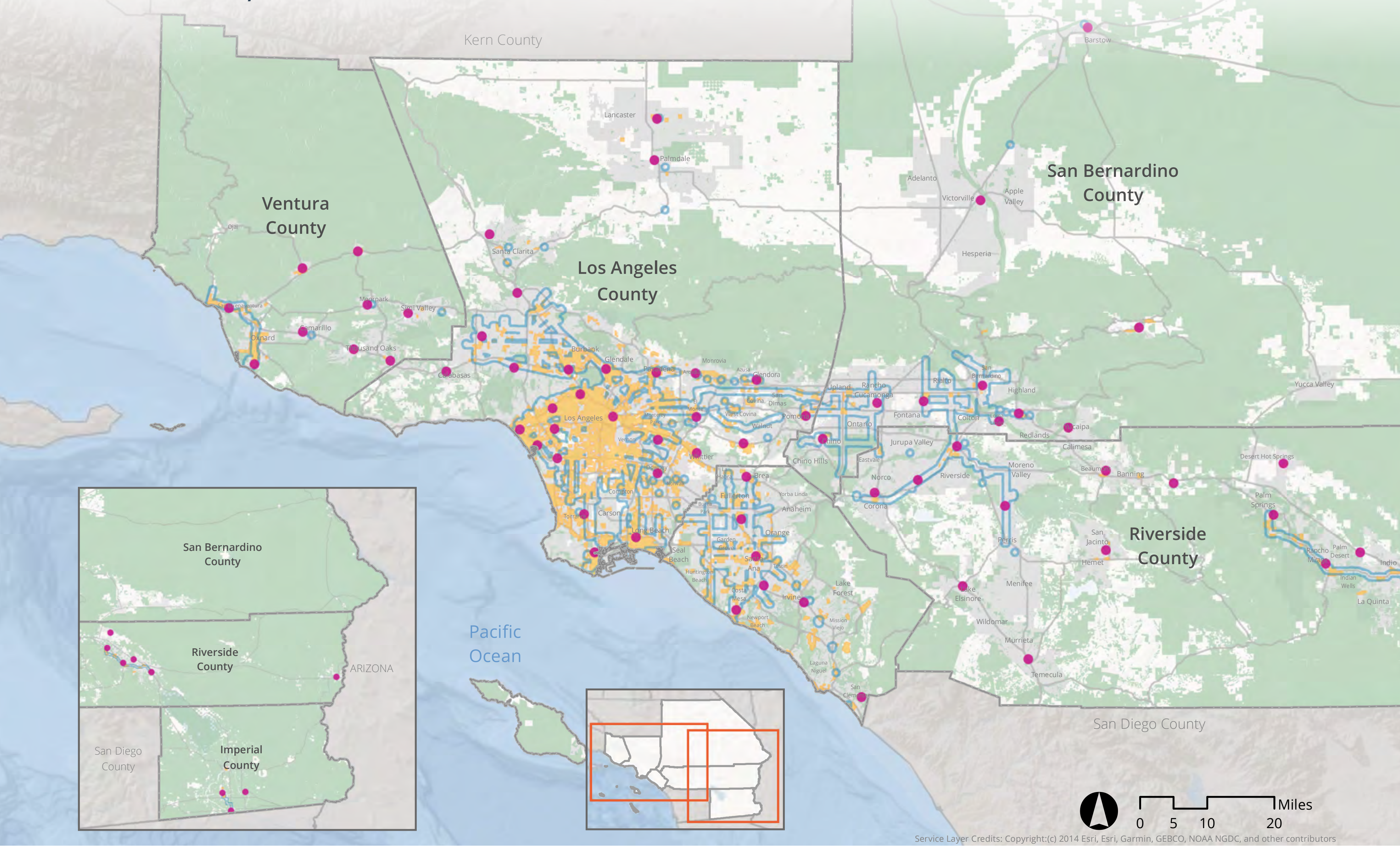
Project level mitigation measures have been identified that "can and should where applicable and feasible" be undertaken by lead agencies that implement transportation projects or projects influenced by land use development patterns. Such measures may include: local safety measures, transportation demand management system, compliance with air management district regulations and others.

The Connect SoCal PEIR identifies program and project-level mitigation measures for the following resource categories:

- Aesthetics
- Agriculture and forestry resources
- Air quality; Biological resources
- Cultural resources
- Energy
- Geology and soils
- Greenhouse gas emissions and climate change
- Hazards and hazardous materials
- Hydrology and water quality
- Land use and planning
- Mineral resources
- Noise
- Population, housing and employment
- Public services
- Recreation
- Transportation, traffic and safety
- Tribal cultural resources
- Utilities and service systems
- Wildfire

For a complete list of mitigation measures and its approach, refer to the Connect SoCal PEIR located at the Connect SoCal website.

EXHIBIT 3.4 Priority Growth Areas & Growth Constraints



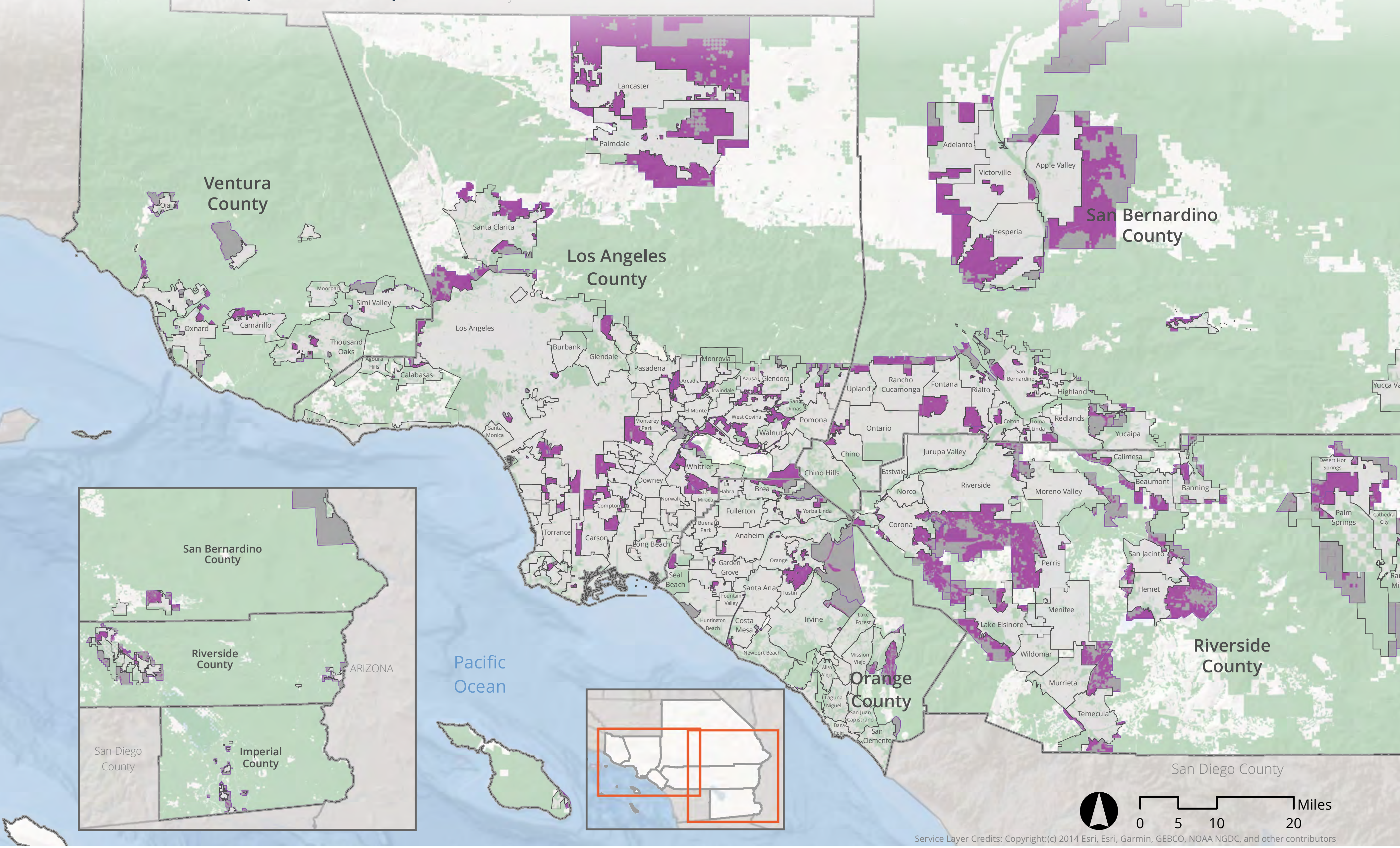
Priority Growth Areas vs. Regional Growth Constraints

- Job Center
- High Quality Transit Area
- Neighborhood Mobility Areas
- Regional Growth Constraints

Note: SCAG used locally informed data elements to determine Regional Growth Constraints including the absolute constraint areas shown in the map such as Tribal lands, Conserved Land and others. See the Sustainable Communities Strategy Technical Report for more details on these and the variable constraints used in plan development.

Source: CalBRACE, California Department of Conservation, CPAD, CCED, County Transportation Commissions, NOAA Coastal Services Center, SCAG, 2019

EXHIBIT 3.5 **Priority Growth Area - Spheres of Influence**

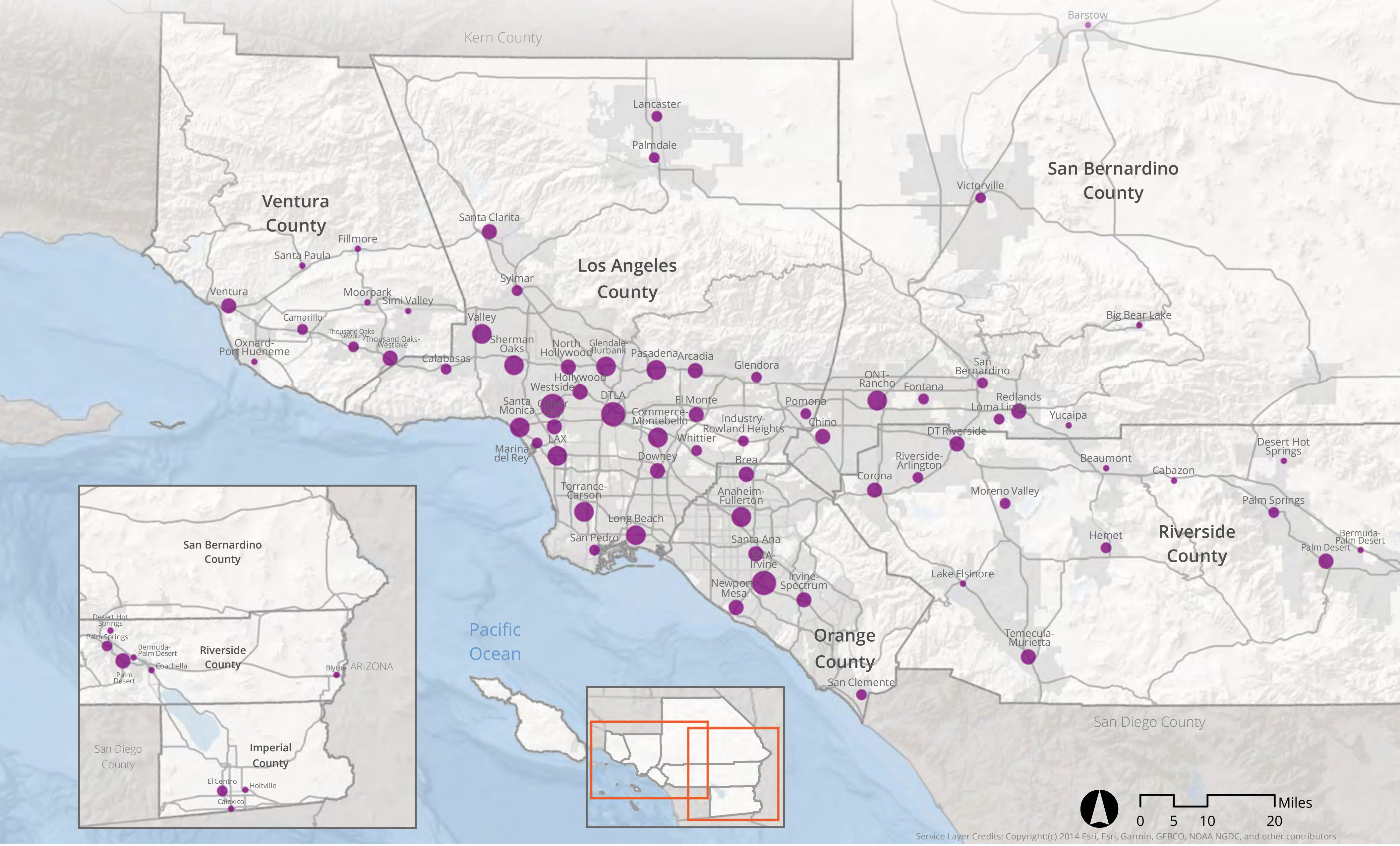


County Boundaries
Sphere of Influence
City Boundaries
Regional Growth Constraints

Note: SCAG used locally informed data elements to determine Regional Growth Constraints including the absolute constraint areas shown in the map such as Tribal lands, Conserved Land and others. See the Sustainable Communities Strategy Technical Report for more details on these and the variable constraints used in plan development.

Source: Counties and local jurisdictions LAFCO in SCAG region, 2018

EXHIBIT 3.6 **Priority Growth Area - Job Centers**



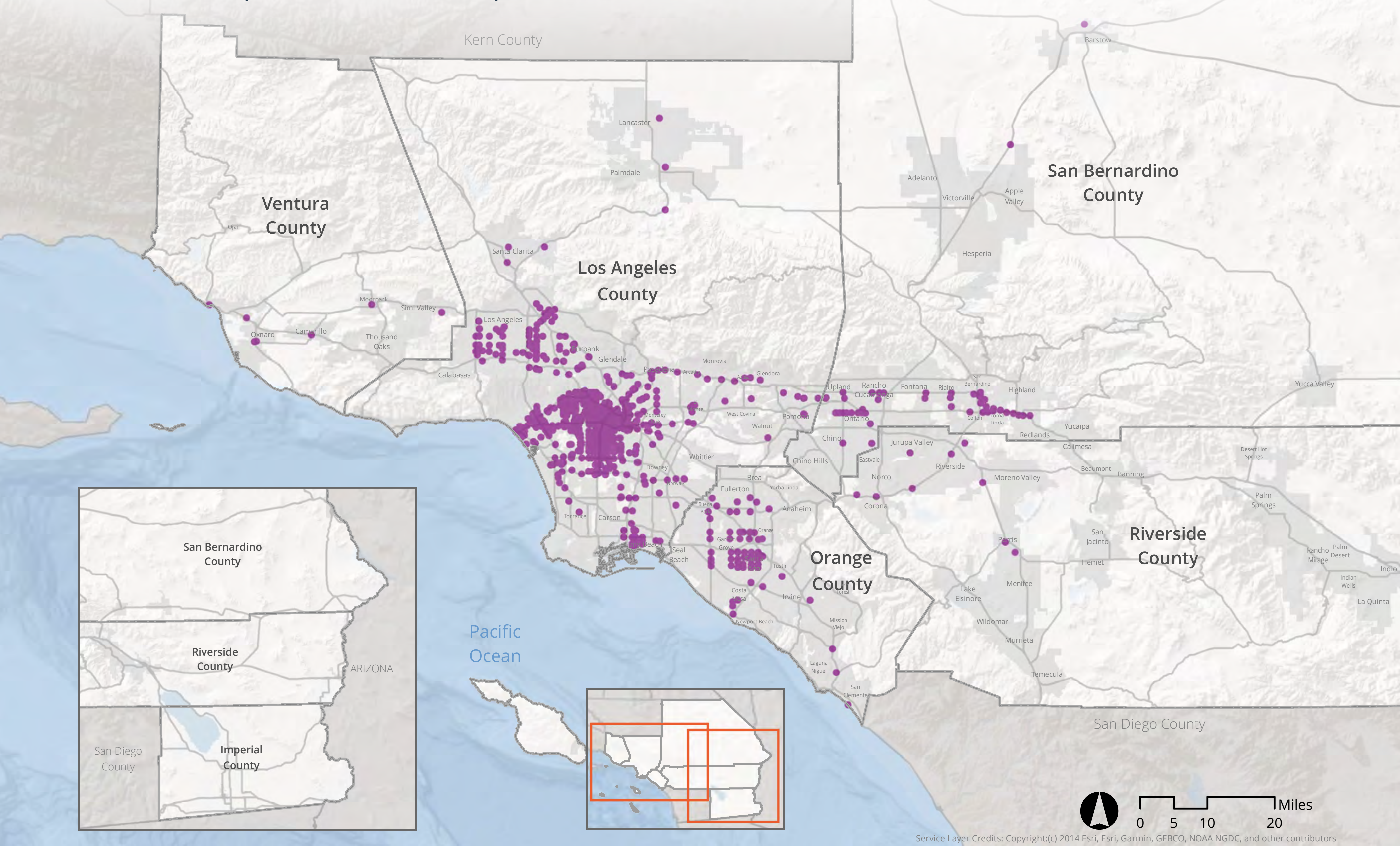
SCAG Region Proposed 2020 RTP/SCS Job Centers (Total Employment)

- Less than 10,001 (17)
- 10,001 - 25,000 (22)
- 25,001 - 50,000 (19)
- 50,001 - 150,000 (11)
- More than 150,000 (3)

Source: SCAG, 2019

Notes:
(1) Centers are areas with denser employment than their surroundings.
(2) Dots represent the total employment in each center, not center boundaries.
(3) Names are intended to be illustrative and may not reflect all the jurisdictions in which a center fully lies.

EXHIBIT 3.7 Priority Growth Area - Transit Priority Areas



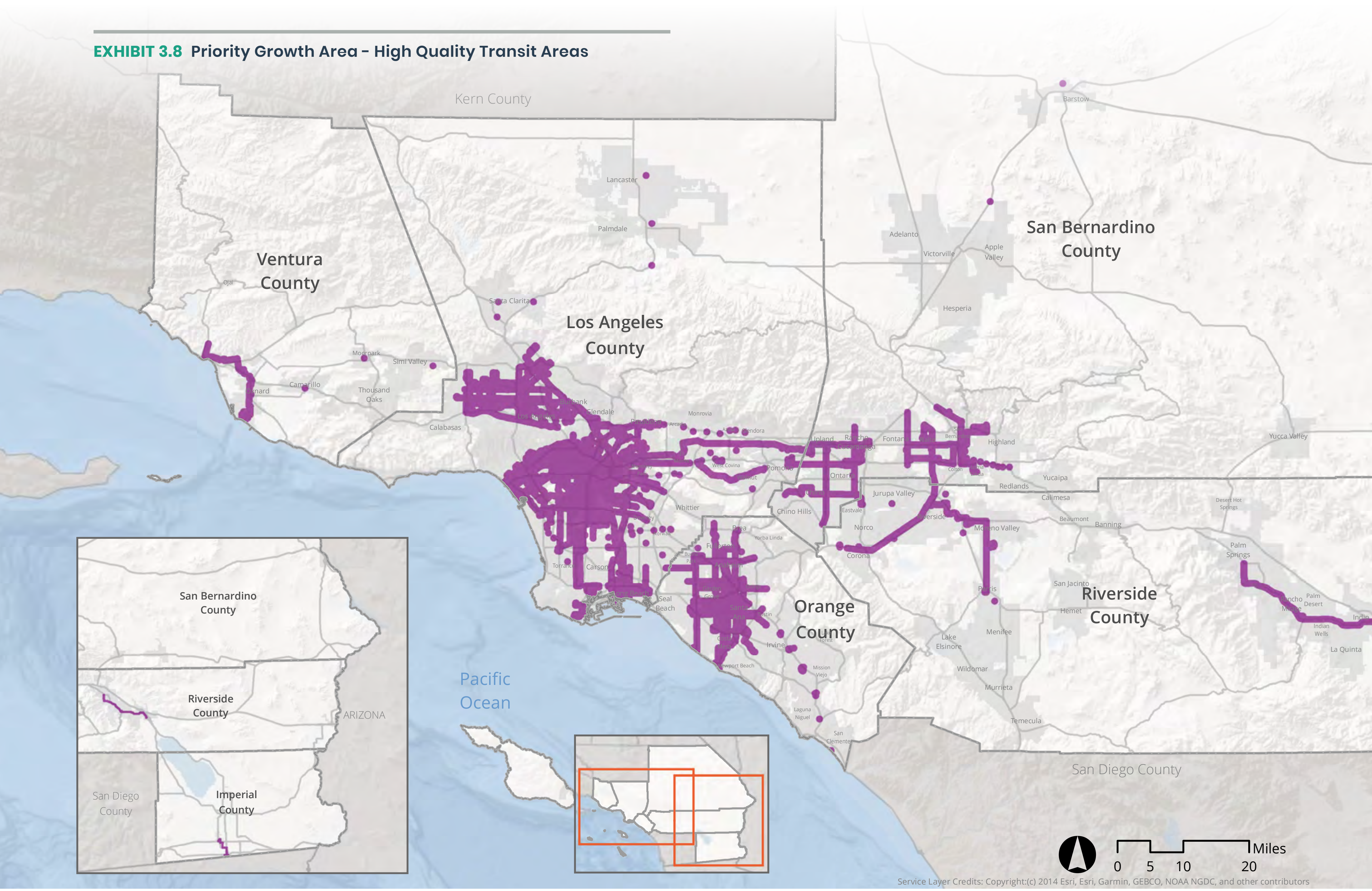
Transit Priority Areas (2045)

TPA

Note: Transit priority area (TPA) refers to an area within one-half mile of a major transit stop that is existing or planned. SCAG identifies major transit stops and transit priority areas using the methodology described in the Transit Technical Report. Major transit stops are extracted from 2045 plan year data of Connect SoCal.

Source: County Transportation Commissions, SCAG, 2019

EXHIBIT 3.8 Priority Growth Area - High Quality Transit Areas



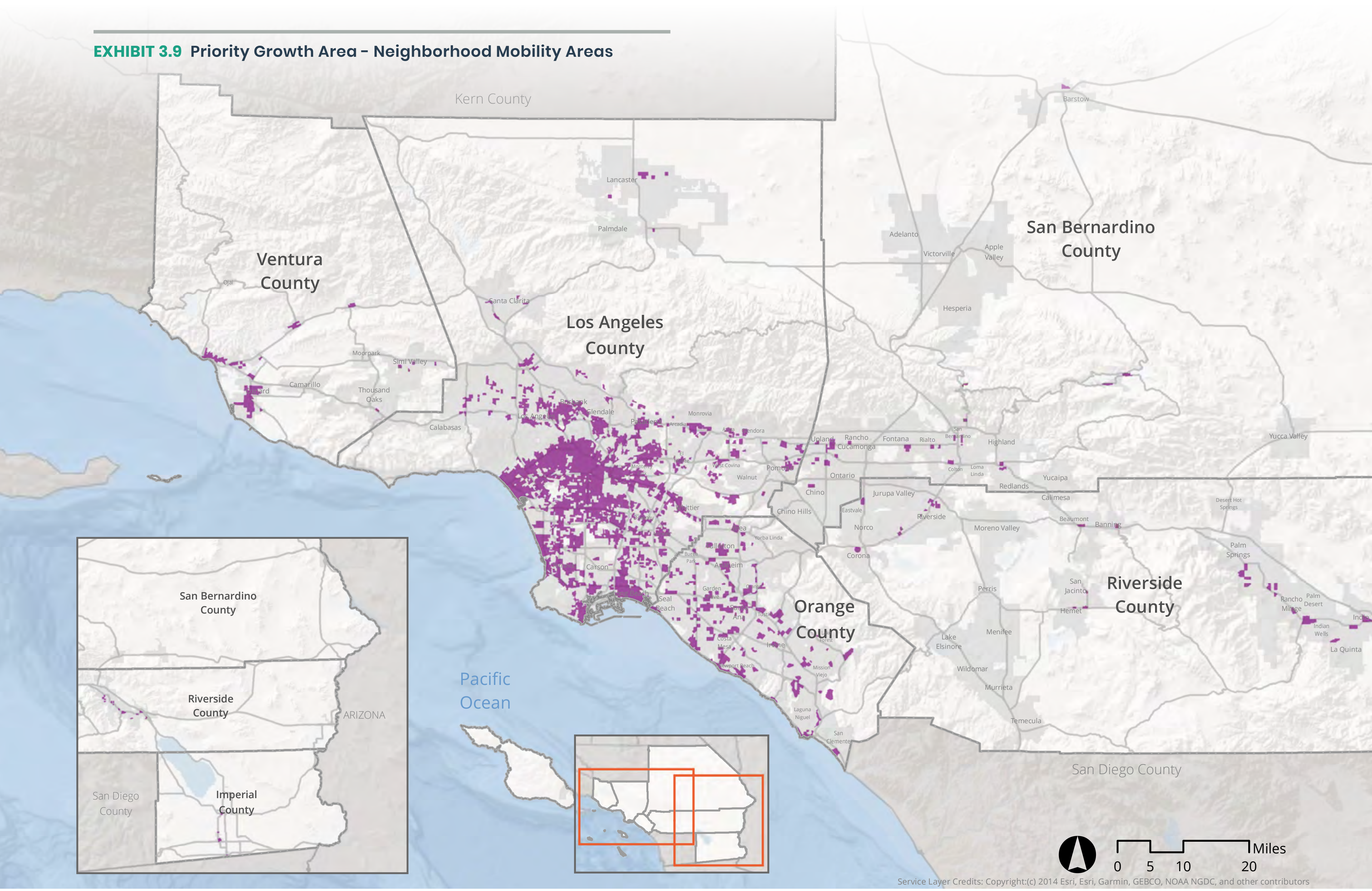
High Quality Transit Areas (2045)

HQTA

Note: SCAG's High Quality Transit Area (HQTA) is within one-half mile from major transit stops and high quality transit corridors (HQTC). SCAG identifies major transit stops and HQTCs using the methodology described in the Transit Technical Report. Major transit stops and HQTCs are extracted from 2045 plan year data of Connect SoCal.

Source: County Transportation Commissions, SCAG, 2019

EXHIBIT 3.9 Priority Growth Area - Neighborhood Mobility Areas



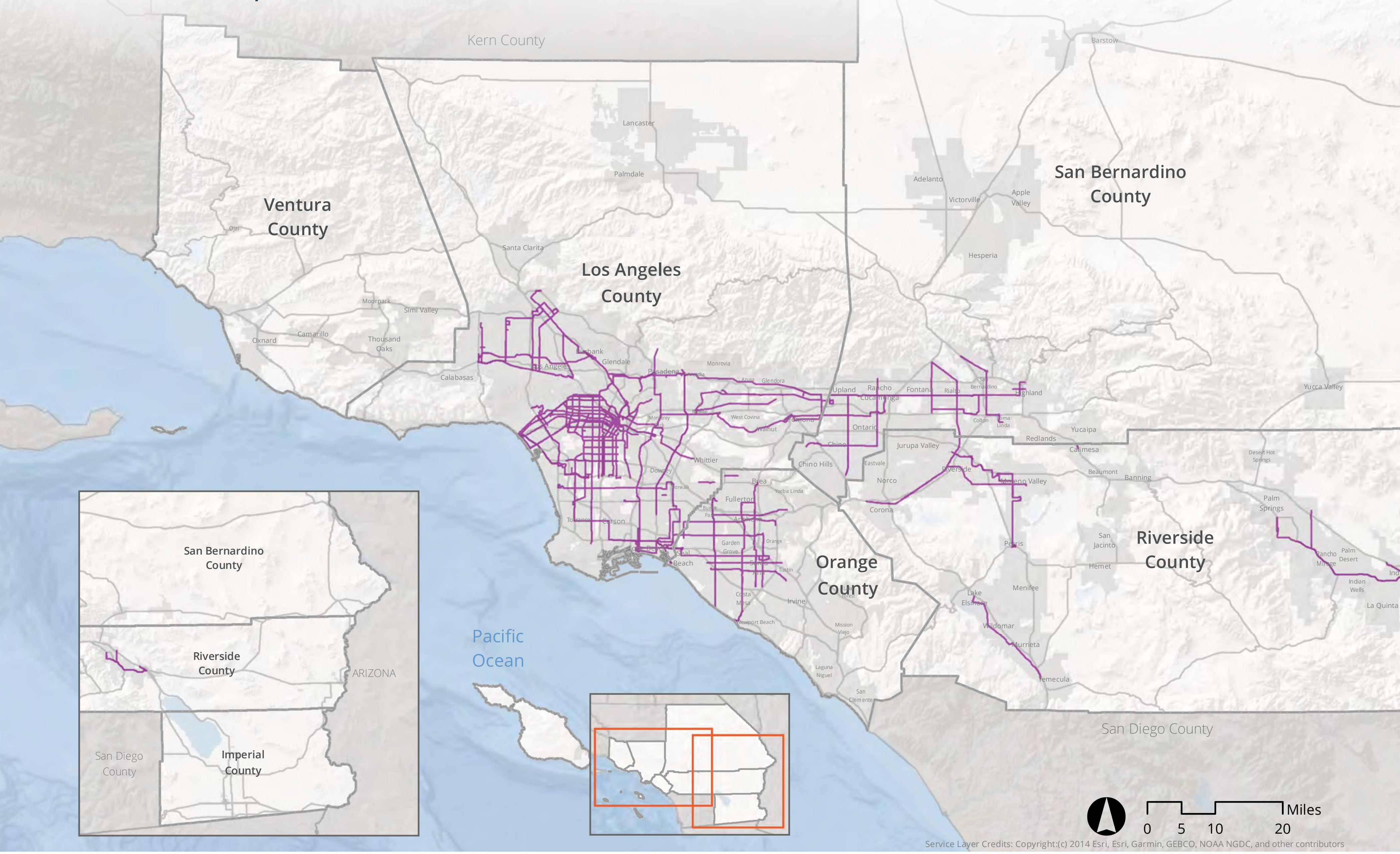
Neighborhood Mobility Areas (NMA)

NMA

Note: Neighborhood Mobility Areas (NMA) were identified by analyzing and assigning z-scores four measures at the Tier 2 TAZ level, and subsequently summing the z-scores. TAZs that scored at the 80th percentile or higher for the composite score were considered NMAs.

Source: SCAG, 2019

EXHIBIT 3.10 **Priority Growth Area - Livable Corridors**



Livable Corridors

Livable Corridors

Source: SCAG, 2019

CHAPTER 4

CHAPTER 4

PAYING OUR WAY FORWARD

In accordance with federal fiscal constraint requirements (23 U.S.C. § 134(i)(2)(E)), this chapter and a more detailed Transportation Finance Technical Report identify how much money SCAG reasonably expects will be available to support our region's surface transportation investments, ensuring that there is sufficient revenue available to support expenditures identified in Connect SoCal. SCAG has secured the necessary resources to support transportation investments detailed in past Plans, and our current financial plan will continue to meet the necessary milestones to implement Connect SoCal.

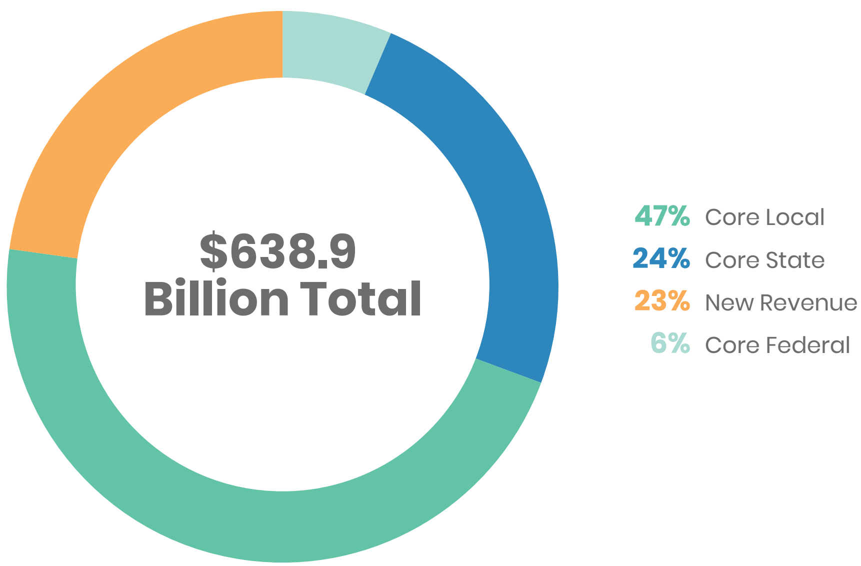
The financially constrained Connect SoCal includes both a "traditional" core revenue forecast comprised of existing local, state, and federal sources and more innovative but reasonably available sources of revenue to implement a program of improvements that keeps people and goods moving. The financial plan further documents progress made since past RTPs and describes steps we can take to obtain needed revenues to implement the region's transportation vision.

The SCAG region's financially constrained Connect SoCal plan includes revenues from both core and reasonably available revenue sources, which together total $638.9 billion from FY2020-21 through FY2044-45, as illustrated in **FIGURE 4.1**. For core sources, the Plan is funded 60 percent by local sources, 32 percent by state sources and 8 percent by federal sources.

As shown in **FIGURE 4.2**, capital projects total $287.3 billion in nominal dollars. Operating and maintenance (O&M) costs total $316 billion, while debt service obligations total $35.6 billion. Transit-related costs comprise the largest share of O&M costs for the region, totaling $173.9 billion.

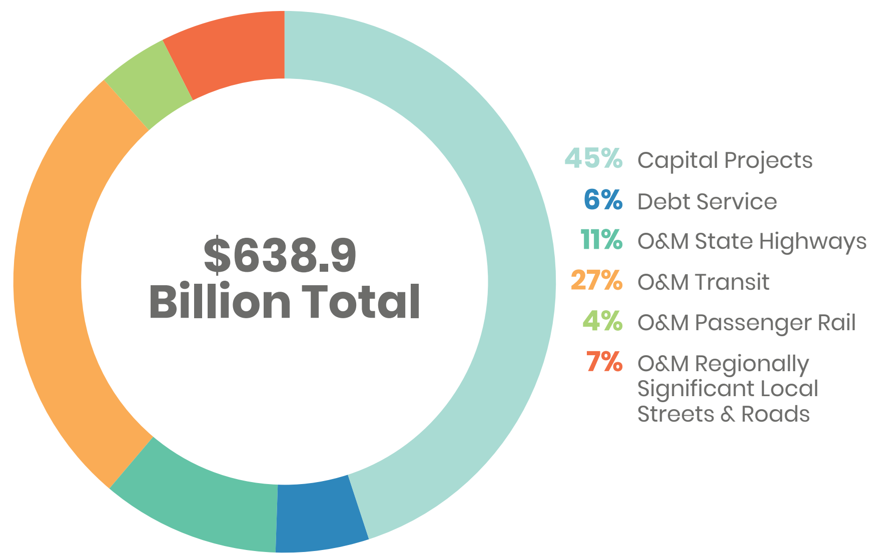
The financial plan highlights the importance of finding new and pioneering ways to pay for transportation, including an ever-expanding backlog of projects necessary to preserve our existing transportation system. Nationally, we continue to face an insolvency crisis with the Federal Highway Trust Fund (HTF), which is funded by excise taxes on fuel. The federal gas tax remains unchanged since 1993, and fuel tax receipts have declined precipitously as fuel efficiency

FIGURE 4.1 **FY2021–FY2045 RTP/SCS Revenues, in Nominal Dollars**



Note: Numbers may not sum to total due to rounding; Source: SCAG Revenue Model 2020

FIGURE 4.2 **FY2021–FY2045 RTP/SCS Expenditures, in Nominal Dollars**



Note: Numbers may not sum to total due to rounding; Source: SCAG Revenue Model 2020

has increased. California's passage of the Road Repair and Accountability Act of 2017 (Senate Bill 1) provides a significant influx of new state revenue through a state gas tax increase and other transportation fees, yet only a fraction of our needs is funded through state sources.

Our region continues to rely heavily on local sources of tax revenue. Eight sales tax measures in the region are the key reason that local sources generate 60 percent of core revenues for transportation improvements. Ventura County is the only county in the SCAG region without a sales tax. Our region's success in providing local sources of transportation funding also increases our ability to secure federal and state funding that requires local contribution.

It is vital that we find new ways to make transportation funding more sustainable in the long-term, and efforts are underway to explore how we can transition from our current system, based on fuel taxes, to a more direct system of user fees linked to how people travel. User fees can support our infrastructure needs and promote a more balanced transportation system by encouraging residents and visitors to consider their travel choices. User fees can be structured and implemented to advance environmental, economic and equity goals, including reducing congestion and vehicle miles traveled (VMT), while encouraging active transportation and transit ridership.

In our region, numerous policy and technical studies have been conducted on the subject, and more work is planned to examine and demonstrate the viability of user fee systems, including toll networks, mileage-based user fees to replace fuel taxes, and congestion pricing zones that levy fees based on time-of-day and congestion levels. Connect SoCal includes these user fee based financial strategies to support system management, preservation and resilience, and to contribute to the region's greenhouse gas reduction goals. SCAG further considers the potential equity concerns that accompany pricing policies and assumes mitigation measures such as the establishment of a mobility equity fund to provide resources that can increase access for environmental justice communities.

ECONOMIC OUTLOOK & KEY FINANCIAL ASSUMPTIONS

SCAG's financial model reflects historical growth trends and reasonable future expectations for key revenue sources, which are described below. These include:

- Inflation
- Construction cost increases
- Retail sales growth
- Fuel consumption
- Status of the Federal Highway Trust Fund
- Status of the State Highway Account
- Local sales tax measures
- Transit operating and maintenance (O&M) costs
- Multimodal system preservation and maintenance

INFLATION

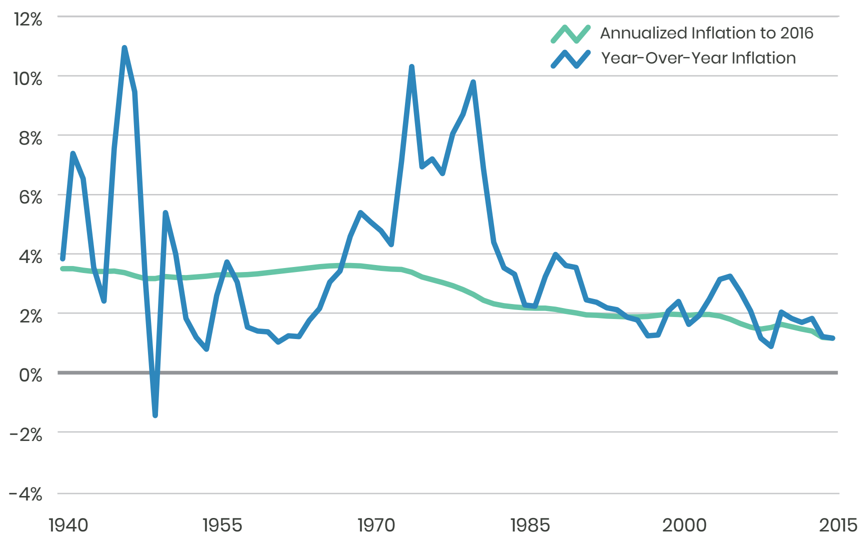
Inflation can have a profound impact over the long-term time horizon of the Plan. SCAG's revenue model accounts for historical inflation trends, as measured by the Gross Domestic Product (GDP) Price Deflator.

FIGURE 4.3 shows the trends in inflation by the GDP Price Deflator. Although inflation rates have varied considerably over time, they have generally trended between two and 4 percent. Accordingly, a 2.2 percent inflation rate is used to adjust constant dollar (revenue) forecasts into nominal (or year-of-expenditure) dollars.

CONSTRUCTION COST INCREASES

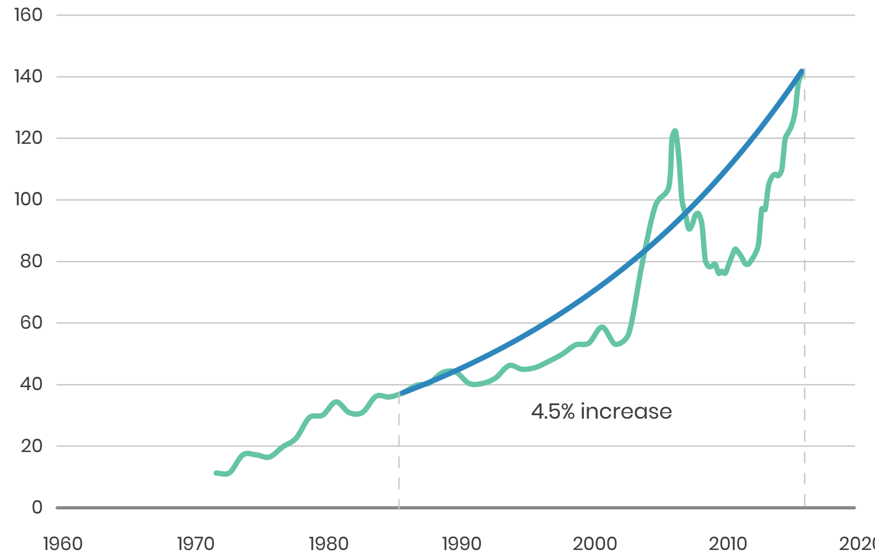
The rise in construction costs can further erode the purchasing power of transportation revenues. **FIGURE 4.4** shows the increase and decline in California highway construction costs since the early 1970s, which is well above general inflation. The financial plan uses a 4.5 percent annual inflation factor to estimate future and nominal (or year-of-expenditure) costs.

FIGURE 4.3 **Historical Inflation Trends, Annual Inflation**



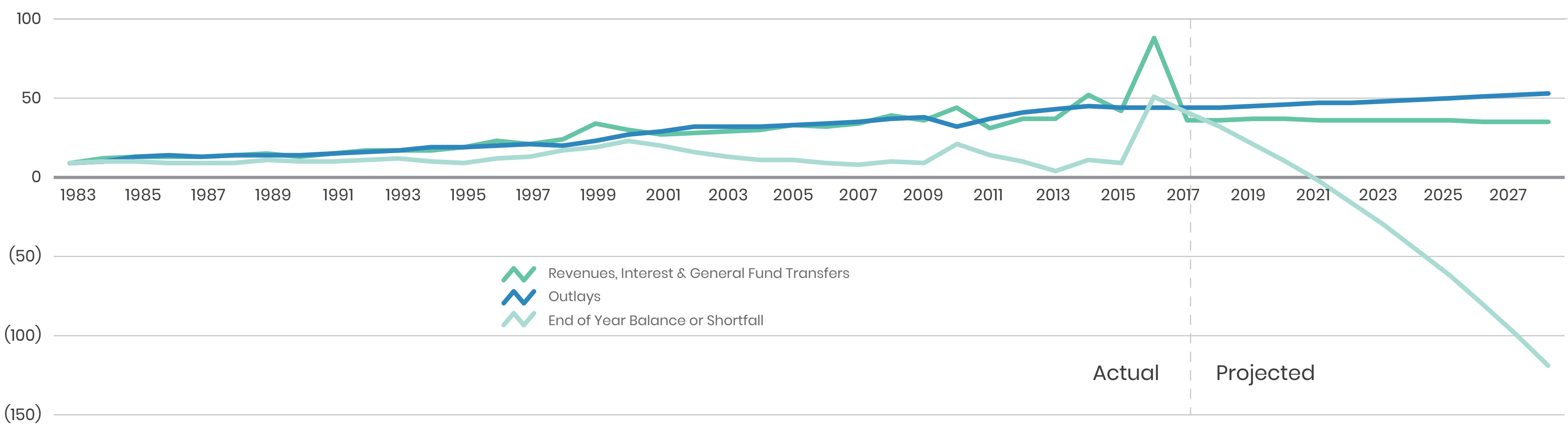
Source: Office of Management and Budget, Budget of the United States Government, Fiscal Year 2019 Budget (FY2019)

FIGURE 4.4 **Growth in Highway Capital Costs, Index Value**



Source: California Department of Transportation

FIGURE 4.5 **Status of the Federal Highway Trust Fund, $ Billions**



Source: Congressional Budget Office and Federal Highway Administration

RETAIL SALES GROWTH

Changes in personal consumption patterns and overall population are the main contributors to the growth in retail sales. Over the 30-year period from FY1985-86 to FY2015-16, statewide retail sales grew by 1.5 percent in real terms (when the effects of inflation are eliminated). The financial plan assumes retail sales growth in the SCAG region ranging from -0.1 percent to 3.2 percent in real terms consistent with historical trends.

FUEL CONSUMPTION

Excise taxes on gasoline and diesel fuels are the basis of most federal and state transportation funding sources. Since these taxes are based on cents-per-gallon purchased, they depend on fuel consumption. Though changes in regional vehicle miles traveled will continue to play a role during the Plan period, increases in conventional fuel efficiency and the adoption of alternative fuel vehicles will reduce overall fuel consumption. The financial plan assumes that increases in vehicle fuel efficiency will reduce fuel consumption by 1 percent per year during the Plan period. Recently passed state legislation, Senate Bill 1, increased state fuel tax rates and will index these taxes to inflation in future years using the California Consumer Price Index (CPI). The combination of assumptions about declining fuel consumption and increasing excise tax rates leads to modest growth in the revenue sources funded by state fuel taxes in real terms.

STATUS OF THE FEDERAL HIGHWAY TRUST FUND

The Federal Highway Trust Fund (HTF) provides federal highway and transit funding from a nationally imposed 18.3 cent-per-gallon gasoline excise tax. Since 2008, the HTF has failed to meet its obligations and has required the United States Congress to make transfers from the General Fund to keep it solvent. The negative balances shown on **FIGURE 4.5** illustrate the projected inability of the HTF to pay its obligations into the highway account.

At the time of the Connect SoCal plan, nearly a decade has passed without substantive Congressional agreement on a long-term solution to provide adequate funding for the HTF and address the present, long-term structural deficiency that exists in funding the HTF. Although the financial plan assumes that Congress will reach agreement on reauthorizing federal spending for transportation programs over the plan horizon, the core revenues available from the HTF are expected to decline due to increasing fuel efficiency and other factors.

STATUS OF THE STATE HIGHWAY ACCOUNT

The passage of California's Senate Bill 1 (SB 1) created a significant source of ongoing state transportation funding described in **TABLE 4.1**. SB 1 increased the gas excise tax from 18 cents per gallon to 47.3 cents per gallon (as of July 1, 2019), and further indexed the gas tax to inflation going forward. Prior to passage of SB 1, the effective state gas excise tax rate of 18 cents per gallon remained unadjusted for more than 20 years. SB 1 additionally instituted per vehicle fees pegged to vehicle value to raise revenue for various transportation system improvements. It also enacted an annual fee on zero-emission vehicles (ZEVs). Most of these fees are indexed to the CPI. However, these fees do not completely address the erosion of purchasing power as construction costs are rising faster than the general inflation rate.

Gas tax revenues remain the primary source of funding for the State Highway Operation and Protection Program (SHOPP), which funds projects to maintain the state highway system. As shown in **FIGURE 4.6**, previous levels of funding have been considerably less than actual needs. Statewide, the 2018 Ten-Year SHOPP Plan identifies $85.8 billion in statewide needs, while available funding is only $44.9 billion. While SB 1 provides a key down payment, rising construction costs could undermine efforts to bring our highway assets back to a state of good repair.

LOCAL SALES TAX MEASURES

The SCAG region continues to rely heavily on local sales tax measures for the timely delivery of transportation projects. While most counties impose a 0.5 percent sales tax to fund transportation projects, Los Angeles County effectively imposes a permanent 2 percent sales tax (a combination of four 0.5 percent sales taxes—Proposition A, Proposition C, Measure R, and Measure M) as Measure M increases from 0.5 to 1 percent upon the expiration of Measure R.

Riverside County's Measure A also expires in 2039. Measure I in San Bernardino County expires in 2040, followed by Orange County's Measure M in 2041. Measure D in Imperial County expires in 2050. Ventura County is the only county in the region without a dedicated sales tax for transportation.

TRANSIT OPERATING & MAINTENANCE COSTS

Future transit O&M costs depend on a variety of factors, such as future revenue-miles of service, labor contracts and the age of rolling stock. Over the last decade, these O&M costs grew by up to 5 percent annually, depending on the transit operator.

For Connect SoCal, transit O&M costs are estimated based upon historical increases. The regional average increase (3.3 percent) is used for most operators. For Los Angeles County, the financial plan relies on detailed forecasts from the county transportation commission. These forecasts are consistent with historical data.

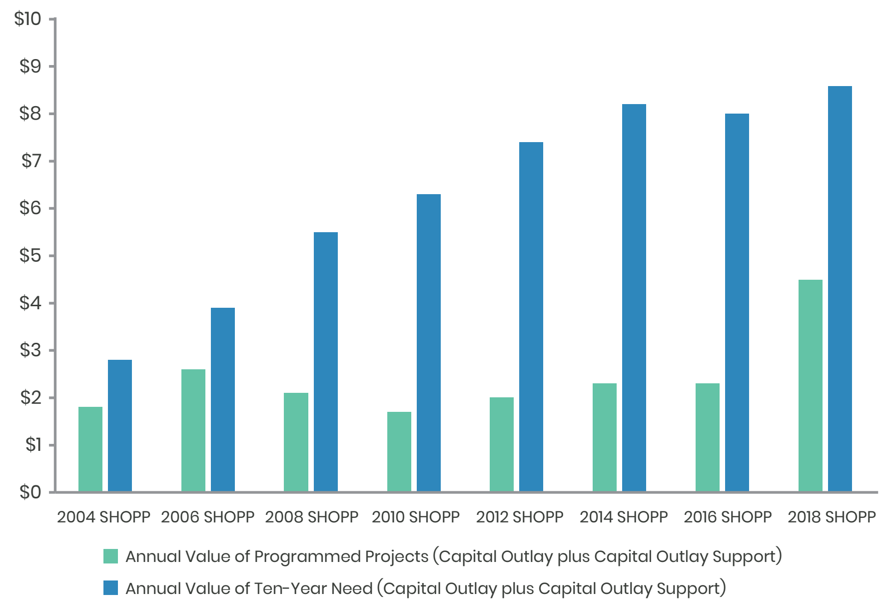
MULTIMODAL SYSTEM PRESERVATION & MAINTENANCE

TABLE 4.2 summarizes the total system preservation and maintenance needs assumed in Connect SoCal to bring transit, regionally significant local streets and roads, and the State Highway System to a state of good repair.

TABLE 4.1 California SB 1 Fees & Funding Programs

Fee	Description	Amount	Uses
Gas Tax	A per gallon excise tax on gasoline purchases	47.3 cents, indexed to the California CPI	Road Maintenance and Rehabilitation
Diesel Tax	A per gallon excise tax on diesel purchases	41.75 cents, indexed to the California CPI	Trade Corridor Enhancement Road Maintenance and Rehabilitation
Diesel Sales Tax	Percentage sales tax on diesel purchases	5.75%	Transit Improvements
Transportation Improvement Fee	An annual per-vehicle fee that varies according to the vehicle value	$25-$175 per vehicle, per year. Not adjusted for inflation	Road Maintenance and Rehabilitation Congested Corridors Program Transit Improvements
Zero Emissions Vehicle (ZEV) Registration Fee	An annual per-vehicle fee on all ZEVs	$100 per year, indexed to the California CPI	Road Maintenance and Rehabilitation

FIGURE 4.6 Status of the State Highway Operation & Protection Program (SHOPP), Billions



Source: California Department of Transportation

REVENUE & EXPENDITURE CATEGORIES

CORE & REASONABLY AVAILABLE REVENUES

The Connect SoCal financial plan includes two types of revenue forecasts. Both are included in the financially constrained plan:

- Core revenues
- Reasonably available revenues

The core revenues identified are existing transportation funding sources projected to FY2044-45. The core revenue forecast does not include any future increases in state or federal gas excise tax rates (other than those described previously related to SB 1 or adoptions of new tax measures). These revenues provide a benchmark from which additional funding can be identified.

Federal guidelines additionally permit the inclusion in the financial plan of revenues that are reasonably available. Further, the Plan includes strategies for ensuring the availability of these sources. The region's reasonably available revenues include new sources of transportation funding likely to materialize within the Connect SoCal timeframe. These sources include:

- Adjustments to the existing federal gas tax rate
- Replacement of existing state and federal gas excise taxes with more direct mileage-based user fees
- Federal credit assistance and bond proceeds
- Private investment participation
- A local road charge program
- Value capture strategies
- A per-mile charge for Transportation Network Companies (e.g. Uber and Lyft)

TABLE 4.2 **Multimodal System Preservation & Maintenance Needs, in Nominal Dollars, Billions**

System	State of Good Repair Needs Included in Estimate	Estimated State of Good Repair Cost
Transit	O&M Existing Service; O&M Service Expansion; O&M Major New Service; Preservation	$173.9
Passenger Rail	O&M Existing Service; O&M Service Expansion; O&M Major New Service; Preservation	$26.6
Regionally Significant Local Streets and Roads*	Pavement; Essential Components; Bridges; Goods Movement Corridors; Active Transportation Safety Improvements	$47.5
State Highways	Bridges, Pavement, Roadside; Mobility, Collision Reduction; Mandates, Facilities; Emergency Response	$68.0
	Total	**$316.0**

Note: Numbers may not sum to total due to rounding
** Includes $4.8 billion for active transportation & $5 billion GM arterial*

EXPENDITURE CATEGORIES

Transportation expenditures in the SCAG region are summarized into three main categories:

- Capital costs for transit, state highways, and local streets and roads (including regionally significant arterials). This category includes programmatic investments in transportation demand management (TDM), transportation system management, etc.
- Operating and maintenance costs for transit, state highways and local streets and roads (including regionally significant arterials)
- Debt service payments (for current and anticipated bond issuances)

CORE REVENUES

SCAG's regional core revenue model forecasts transportation revenues over the entire Connect SoCal time horizon. The revenue model is comprehensive and provides data by county and funding source. The revenue forecast was developed using the following framework:

- Incorporate financial planning documents developed by local county transportation commissions and transit operators in the region, where available
- Ensure consistency with both local and state planning documents
- Utilize published data sources to evaluate historical trends
- Conduct sensitivity testing of assumptions to augment local forecasts, as needed

The region's revenue forecast horizon for the financial plan is FY2020-21 through FY2044-45. **TABLE 4.3** shows these core revenues in five-year increments by county.

TABLE 4.3 **Core Revenue Forecast FY2021–FY2045, in Nominal Dollars, Billions**

County	FY2021–FY2025	FY2026–FY2030	FY2031–FY2035	FY2036–FY2040	FY2041–FY2045	Total
Imperial	$0.4	$0.5	$0.6	$0.7	$0.9	$3.1
Los Angeles	$47.3	$53.8	$63.9	$73.7	$83.6	$322.1
Orange	$11.4	$13.2	$15.9	$19.3	$20.4	$80.3
Riverside	$5.9	$6.4	$7.4	$8.2	$8.4	$36.3
San Bernardino	$5.6	$6.5	$7.5	$8.7	$8.4	$36.8
Ventura	$2.1	$2.4	$2.8	$3.3	$3.9	$14.5
Total	**$72.6**	**$82.9**	**$98.1**	**$114.0**	**$125.5**	**$493.1**

Note: Numbers may not sum to total due to rounding

As shown in **FIGURE 4.7**, the majority of revenues in the SCAG region come from local sources (60 percent). The share of state sources has increased since the last RTP from 11 percent share of core revenues to 32 percent as a result of the passage of SB 1.

FIGURE 4.8 shows the breakdown of revenues by county. With four local sales tax measures, Los Angeles County accounts for 65 percent of the funding available in the SCAG region. This includes revenues from the passage of Measure M since the adoption of the 2016 Connect SoCal.

Local sales taxes provide the largest single source of local funding, as shown in **FIGURE 4.9**. These taxes account for more than half (57 percent) of local sources in the plan.

As shown in **FIGURE 4.10**, the State Highway Operations and Protection Program (SHOPP), the Highway User Tax Account (HUTA), the Road Maintenance and Rehabilitation Account (RMRA), and the State Transit Assistance fund (STA) account for the bulk of the state funding available.

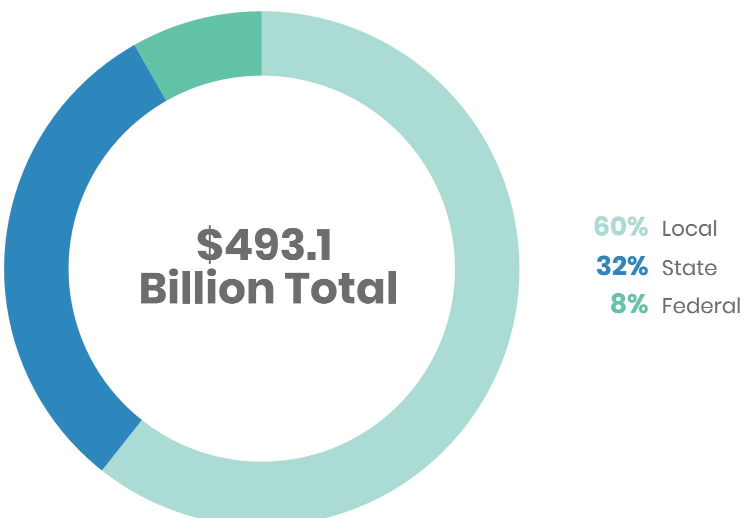
As shown in **FIGURE 4.11**, federal sources are expected to comprise a small portion of overall transportation funds ($41.1 billion or eight percent share of core revenues). This is consistent with past RTPs. Federal Transit Administration (FTA) funds account for 61 percent of federal funding in the SCAG region. The financial plan also assumes that Congestion Mitigation and Air Quality funding will decline over the life of the Plan due to the region achieving attainment for a number of criteria pollutants and reducing the severity level of others.

REASONABLY AVAILABLE REVENUES

There are several new funding sources that are reasonably expected to be available for Connect SoCal. The following guiding principles were used for identifying reasonably available revenues:

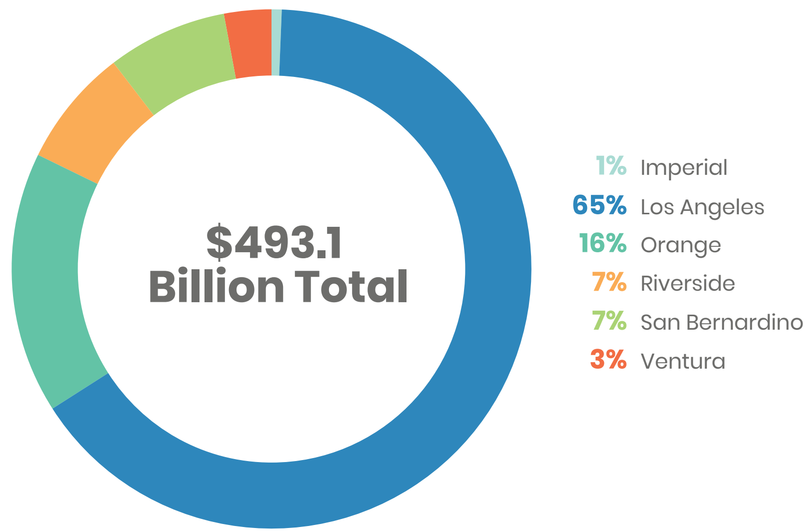
- Establish a user fee-based system that better reflects the true cost of transportation, provides firewall protection for transportation funds and ensures an equitable distribution of costs and benefits
- Promote national and state programs that include return-to-source

FIGURE 4.7 **Core Revenues, in Nominal Dollars**



Note: Numbers may not sum to total due to rounding; Source: SCAG Revenue Model 2020

FIGURE 4.8 **Core Revenues by County, in Nominal Dollars**



Note: Numbers may not sum to total due to rounding; Source: SCAG Revenue Model 2020

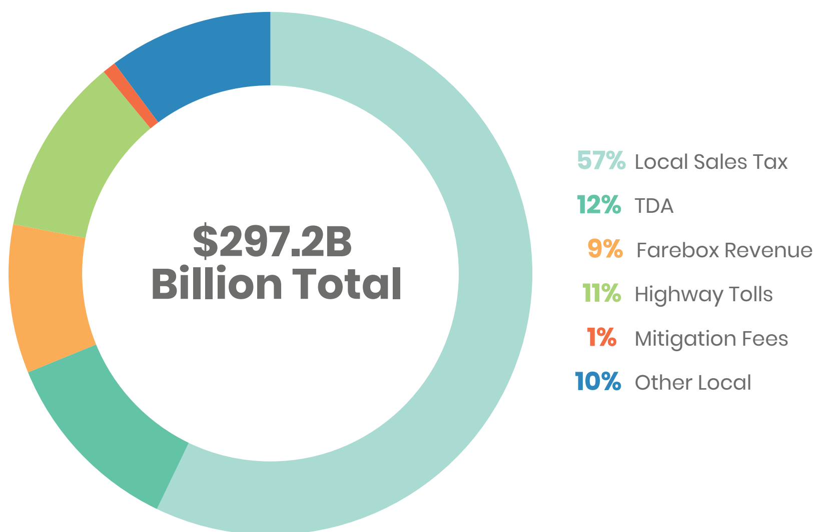
guarantees, while maintaining flexibility to reward regions that continue to commit substantial local resources

- Leverage locally available funding with innovative financing tools (e.g., tax credits and expansion of the Transportation Infrastructure Finance and Innovation Act [TIFIA]) to attract private capital and accelerate project delivery
- Promote local funding strategies that maximize the value of public assets while improving mobility, sustainability, and resilience

TABLE 4.4 identifies seven categories of funding sources that are reasonably available and are included in the financially constrained plan. These sources were identified because of their potential for revenue generation, historical precedence, and the likelihood of their implementation within the time frame of Connect SoCal. For each funding source, SCAG has examined the policy and legal context of implementation and has prepared an estimate of the potential revenues generated.

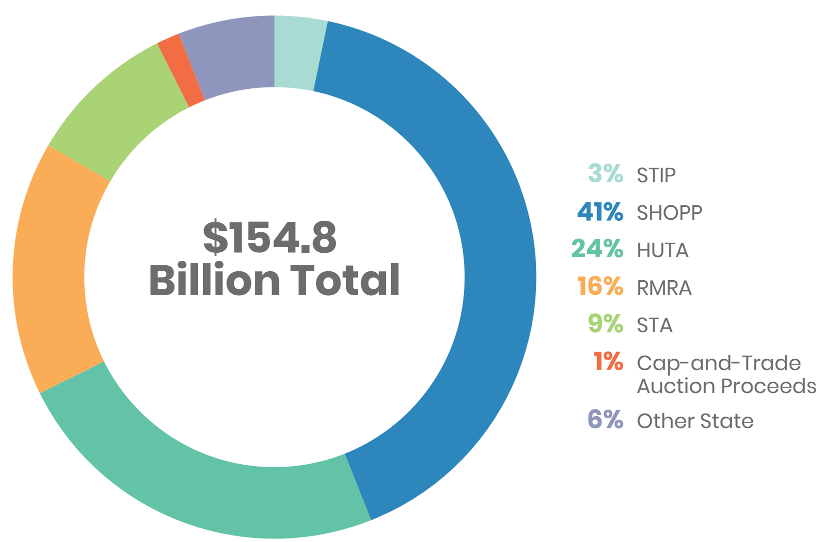
The implementation of road user charges, in particular, will require further collaboration with the California State Transportation Agency, the California Transportation Commission, Caltrans, business, and other key parties on the California Road Charge Pilot Program to address key implementation factors such as: technology and associated privacy issues, cost of implementation and administrative methods for fee collection/revenue allocation, and potential equity concerns. Equity concerns can be addressed through enhanced transportation alternatives for transit dependent populations, and discounts for impacted low-income populations. Connect SoCal assumes the establishment of a Mobility Equity Fund to cover the cost of rebates, credits, or discounts for general mobility expenses including user fees/tolls, parking charges, transit fares and new mobility options. Additional documentation of funding sources included in the financial plan are provided in the Transportation Finance Technical Report.

FIGURE 4.9 Core Revenues, Local Sources, in Nominal Dollars



Note: Numbers may not sum to total due to rounding; Source: SCAG Revenue Model 2020

FIGURE 4.10 Core Revenues, State Sources, in Nominal Dollars



Note: Numbers may not sum to total due to rounding; Source: SCAG Revenue Model 2020

ASSUMPTIONS BY REVENUE SOURCE

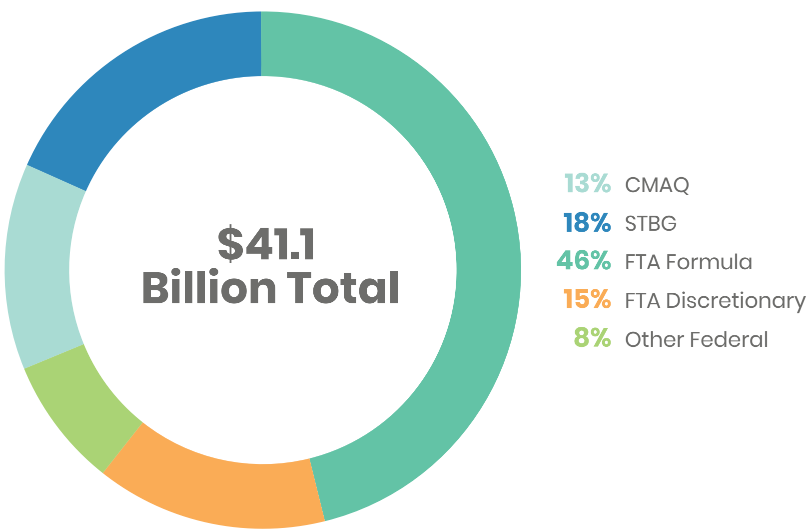
TABLE 4.5 describes the specific revenue assumptions used for the financially constrained 2020 Connect SoCal. A more detailed discussion of revenue sources is included in the Transportation Finance Technical Report.

SUMMARY OF REVENUE SOURCES & EXPENDITURES

TABLE 4.6.1 presents the SCAG region's revenue forecast by source in five-year increments, from FY2020-21 through FY2044-45.

This is followed by **TABLE 4.6.2**, which provides details of the region's expenditures by category in five-year increments.

FIGURE 4.11 **Core Revenues, Federal Sources, in Nominal Dollars**



Note: Numbers may not sum to total due to rounding; Source: SCAG Revenue Model 2020

TABLE 4.4 New Revenue Sources & Innovative Financing Strategies, in Nominal Dollars, Billions

Revenue Source	Description	Amount	Actions to Ensure Availability	Responsible Party(ies)
Federal Gas Excise Tax Adjustment to Maintain Historical Purchasing Power	Additional $0.10 per gallon gasoline tax imposed at the federal level starting in 2025 to 2029—indexed to maintain purchasing power.	$2.7	Requires action of Congress. Strategy is consistent with recommendations from two national commissions to move immediately with augmenting fuel tax resources through conventional Highway Trust Fund mechanisms.	Congress
Mileage-Based User Fee (Replacement)	Mileage-based user fees would be implemented to replace gas taxes—estimated at about $0.025 (in 2019 dollars) per mile starting in 2030 and indexed to maintain purchasing power.	$42.7 (est. increment only)	Requires state enabling legislation and action of Congress. In 2017, California successfuly conducted a legislatively-mandated pilot program to study the feasibility of a road charge as a replacement to the gas tax, and is currently pursuing next-step studies. The FAST Act establishes the Surface Transportation System Funding Alternatives program, which provides grants to states to demonstrate alternative user-based revenue mechanisms that could maintain the long-term solvency of the Trust Fund.	State Legislature, Congress
Federal Credit Assistance; Other Bond Proceeds	TIFIA/RRIF credit assistance and other bond financing , pledging new local funding (e.g., mileage-based road charge program funding) to help finance specific initiaitives including SCORE.	$2.2	Issuance of debt and TIFIA/RRIF credit agreement terms subject to County Transportation Commissions' respective board policies, and potentially the Southern California Regional Rail Authority (SCRRA).	County Transportation Commissions and USDOT Build America Bureau; other potential parties include SCRRA.
Private Investment	XpressWest, to construct and operate high-speed rail service from the Victor Valley to Las Vegas along the I-15 corridor. Revenue estimate would cover construction costs for the San Bernardino County portion only. This category of funding also assumes private funding for SCAG-region portion of California High-Speed Rail Phase 1; various freight related initiatives.	$12.7	Contingent upon financing efforts by XpressWest and necessary approvals. Similarly, contingent upon private financing for California High-Speed Rail. For freight investments, contigent upon private entities in the region, including freight railroads.	XpressWest; private partners; freight railroads as may be applicable.

TABLE 4.4 **New Revenue Sources & Innovative Financing Strategies, in Nominal Dollars, Billions - Continued**

Revenue Source	Description	Amount	Actions to Ensure Availability	Responsible Party(ies)
Local Road Charge Program	Local road charge program assumes a $0.015 (in 2019 dollars) per mile charge throughout the region that can be implemented on a county basis. This can be adjusted by time-of-day and location with congestion pricing and/or parking pricing at major activity centers. For analysis, also assumed congestion pricing (peak period charges) in parts of Los Angeles County, along with increases in parking pricing at major job centers as a part of the regional job centers strategy.	$77.8	Requires state enabling legislation for at least two components--mileage-based user fees and congestion pricing. Parking pricing would be subject to local policies.	MPO, CTCs, Caltrans, and FHWA as may be applicable; local jurisdictions.
Value Capture Strategies	Assumed the use of EIFDs and tax increment financing (TIF) to support investment in transit supportive housing infrastructure needs.	$3.0	Pursue necessary approvals for district formation and TIF.	Local jurisdictions
Transportation Network Company (TNC) Mileage-Based Fee	User fees on TNC mileage —estimated at about $0.05 (in 2019 dollars) per mile starting in 2021.	$4.7	Requires state enabling legislation to implement at local level. Currently being explored by LA Metro and a similar measure was approved by voters in San Francisco in 2019.	MPO, CTCs, California Public Utilities Commission, State Legislature

TABLE 4.5 Summary of Revenue Sources

4.5.1 Core & Reasonably Available Revenue Projections—Local Core Revenue Sources, in Nominal Dollars, Billions		
Revenue Source	**Revenue Projection Assumptions**	**Revenue Estimate**
Local Option Sales Tax Measures	**Description:** Locally imposed ½ percent sales tax in four counties (Imperial, Orange, Riverside, and San Bernardino). Permanent 2 percent sales tax in Los Angeles County (combination of two permanent ½ percent sales taxes, Measure R through 2039, and Measure M, which will increase from 1/2 percent to 1 percent upon the expiration of Measure R). Measure D in Imperial County expires in 2050; Measure M in Orange County expires in 2041; Measure A in Riverside County expires in 2039; and Measure D in San Bernardino County expires in 2040. **Assumptions:** Sales taxes grow consistent with county transportation commission forecasts and historical trends.	$169.8
Transportation Development Act (TDA)—Local Transportation Fund	**Description:** The Local Transportation Fund (LTF) is derived from a ¼ cent sales tax on retail sales statewide. Funds are returned to the county of generation and used mostly for transit operations and transit capital expenses. **Assumptions:** Same sales tax growth rate as used for local option sales tax measures.	$34.7
Transit Farebox Revenue	**Description:** Transit fares collected by transit operators in the SCAG region. **Assumptions:** Farebox revenues increase consistent with historic trends, planned system expansions, and operator forecasts.	$27.3
Highway Tolls	**Description:** Revenues generated from toll roads operated by the Transportation Corridor Agencies (TCA), from the SR-91 Express Lanes operated by the Orange County Transportation Authority (OCTA) and Riverside County Transportation Commission (RCTC), and from the MetroExpress Lanes along I-10 and I-110 in Los Angeles County. **Assumptions:** Toll revenues grow consistent with county transportation commission forecasts and historical trends.	$32.7
Mitigation Fees	**Description:** Revenues generated from development impact fees. The revenue forecast includes fees from the Transportation Corridor Agencies (TCA) development impact fee program, San Bernardino County's development impact fee program and Riverside County's Transportation Uniform Mitigation Fee (TUMF) for both the Coachella Valley and Western Riverside County. **Assumptions:** The financial forecast is consistent with revenue forecasts from TCA, Coachella Valley Council of Governments, Western Riverside Council of Governments, and the San Bernardino County Transportation Commission (SBCTA).	$2.5
Other Local Sources	**Description:** Includes local revenue sources such as general funds, transit advertising and auxiliary revenues, lease revenues and interest and investment earnings from reserve funds. For Los Angeles County, interest income from Propositions A and C and Measure R are included under this source. Income from financing is also included, while principal and interest payments are included as part of debt service. **Assumptions:** Revenues are based on financial data from transit operators and local county transportation commissions.	$30.2
	Local Subtotal	**$297.2**

Note: Numbers may not sum to total due to rounding

TABLE 4.5 Summary of Revenue Sources - Continued

4.5.2 Core & Reasonably Available Revenue Projections—State Revenue Sources, in Nominal Dollars, Billions		
Revenue Source	**Revenue Projection Assumptions**	**Revenue Estimate**
State Transportation Improvement Program (STIP)	**Description:** The STIP is a five-year capital improvement program that provides funding from the State Highway Account (SHA) for projects that increase the capacity of the transportation system. The SHA is funded through a combination of state gas excise tax, the Federal Highway Trust Fund, and truck weight fees. The STIP may include projects on state highways, local roads, intercity rail, or public transit systems. The Regional Transportation Planning Agencies (RTPAs) propose 75 percent of STIP funding for regional transportation projects in Regional Transportation Improvement Programs (RTIPs). Caltrans proposes 25 percent of STIP funding for interregional transportation projects in the Interregional Transportation Improvement Program (ITIP). **Assumptions:** Funds are based upon the 2020 STIP Fund Estimate, 2020 STIP Commission Staff Recommendations, February 28, 2020. Fuel consumption declines in real terms by 1 percent due to increasing fuel efficiency.	$5.1
State Highway Operation and Protection Plan (SHOPP)	**Description:** Funds state highway maintenance and operations projects. **Assumptions:** Short-term revenues are based on overlapping 2016 and 2018 SHOPP programs. Long-term forecasts are consistent with STIP forecasts and assume decline in fuel consumption. As with the HUTA and STA, a portion of SHOPP revenues are indexed due to passage of SB 1, which offsets the effect of the increase in fuel efficiency.	$63.0
Highway Users Tax Account (HUTA)	**Description:** Gas tax revenue apportionments distributed via the HUTA to counties and cities in the region. **Assumptions:** The forecast is based on current funding levels reported by the State Controller. Future funding declines with fuel consumption using assumptions consistent with other sources.	$36.7
Road Maintenance and Rehabilitation Account (RMRA)	**Description:** The RMRA was established by SB 1 and is funded by new diesel and gas excise taxes, a transportation improvement fee, and electric vehicle fee. Although the RMRA also provides SHOPP funding, for purposes of the 2020 RTP/SCS financial plan, it only reflects the portion directed to counties and cities. **Assumptions:** SB 1 indexes the sources for RMRA, offsetting the decline due to fuel efficiency.	$24.3
State Transit Assistance Fund (STA)	**Description:** The STA is funded by diesel sales taxes and the transportation improvement fee established under SB 1. SB 1 also created a State of Good Repair Program associated with the STA, which for purposes of this financial plan are included in the STA figures. **Assumptions:** The forecast is based on current funding levels reported by the State Controller. Future funding declines with fuel consumption but is offset by SB 1 indexing using assumptions consistent with other sources.	$14.2
Cap-and-Trade Auction Proceeds	**Description:** The Global Warming Solutions Act of 2006 (AB 32) established the goal of reducing greenhouse gas (GHG) emissions statewide to 1990 levels by 2020. In order to help achieve this goal, the California Air Resources Board (ARB) adopted a regulation to establish a cap-and-trade program that places a "cap" on the aggregate GHG emissions from entities responsible for roughly 85 percent of the state's GHG emissions. As part of the cap-and-trade program, ARB conducts quarterly auctions where it sells emission allowances. Revenues from the sale of these allowances fund projects that support the goals of AB 32, including transit and rail investments. Funds associated with non-transportation and High-Speed Rail are not included in this amount. **Assumptions:** The forecast is based on current funding levels reported by the State Controller for the Low Carbon Transit Operations Program and award lists as reported by Caltrans. Given the uncertainty about future allowance prices, annual growth is assumed to be flat and is assumed to end after 2030.	$2.2
Other State Sources	**Description:** Other state sources include remaining SB 1 competitive program awards; the Active Transportation Program (ATP); and other miscellaneous state grant apportionments for the SCAG region. **Assumptions:** Short-term revenues are based on actual apportionments. Future Active Transportation Program funding declines with fuel consumption using assumptions consistent with other sources.	$9.2
	State Subtotal	**$154.8**

Note: Numbers may not sum to total due to rounding

TABLE 4.5 Summary of Revenue Sources - Continued

4.5.3 Core & Reasonably Available Revenue Projections—Federal Core Revenue Sources, in Nominal Dollars, Billions		
Revenue Source	**Revenue Projection Assumptions**	**Revenue Estimate**
FHWA Non-Discretionary Congestion Mitigation and Air Quality (CMAQ) Program	**Description:** Program to reduce traffic congestion and improve air quality in non-attainment areas. **Assumptions:** Short-term revenues are based upon the Caltrans apportionment estimates. Long-term revenues assume that fuel consumption declines by 1 percent (in real terms) annually. CMAQ funding is assumed to be reduced by 25 percent in 2027, an additional 25 percent in 2032, and an additional 25 percent in 2037 due to improved air quality.	$5.3
FHWA Non-Discretionary Surface Transportation Block Grant (STBG)	**Description:** Projects eligible for STBG funds include rehabilitation and new construction on any highways included in the National Highway System (NHS) and Interstate Highways (including bridges). Also, transit capital projects, as well as intracity and intercity bus terminals and facilities, are eligible. **Assumptions:** Short-term revenues are based upon the Caltrans apportionment estimates. Long-term revenues assume that fuel consumption declines by 1 percent (in real terms) annually.	$7.5
FTA Formula Programs 5307 Urbanized Area Formula, 5310 Enhanced Mobility of Seniors and Individuals with Disabilities Formula, 5311 Rural Formula, 5337 State of Good Repair Formula, and 5339 Bus and Bus Facilities Formula	**Description:** This includes a number of FTA programs distributed by formula. 5307 is distributed to state urbanized areas with a formula based upon population, population density, number of low-income individuals, and transit revenue and passenger miles of service. Program funds capital projects, planning, job access and reverse commute projects, and operations costs under certain circumstances. 5310 funds are allocated by formula to states for projects providing enhanced mobility to seniors and persons with disabilities. 5311 provides capital, planning, and operating assistance to states to support public transportation in rural areas with populations less than 50,000. 5337 is distributed based on revenue and route miles and provides funds for repairing and upgrading rail transit systems, high-intensity bus systems that use High-Occupancy Vehicle (HOV) lanes, including bus rapid transit (BRT). 5339 provides capital funding to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities. **Assumptions:** Formula funds are assumed to decline in proportion with the Federal Highway Trust Fund. As with the FHWA sources, fuel consumption declines by 1 percent (in real terms) annually.	$19.0
FTA Non-Formula Program 5309 Fixed Guideway Capital Investment Grants ("New Starts")	**Description:** Provides grants for new fixed-guideways or extensions to fixed guideways (projects that operate on a separate right-of-way exclusively for public transportation, or that include a rail or a catenary system), bus rapid transit projects operating in mixed traffic that represent a substantial investment in the corridor, and projects that improve capacity on an existing fixed-guideway system. **Assumptions:** Operators are assumed to receive FTA discretionary funds in rough proportion to what they have received historically. As with the FHWA sources, fuel consumption declines by 1 percent (in real terms) annually.	$6.0
Other Federal Sources	**Description:** Includes other federal programs, such as Transportation Investment Generating Economic Recovery (TIGER) competitive grant program, Highway Safety Improvement Program, Federal Safe Routes to School, Highway Bridge Program, and earmarks. **Assumptions:** Short-term revenues are based on actual apportionments. Long-term revenues assumes a 1 percent (in real terms) annual decline in fuel consumption as used for other federal funding sources.	$3.3
	Federal Subtotal	**$41.1**

Note: Numbers may not sum to total due to rounding

TABLE 4.5 Summary of Revenue Sources - Continued

4.5.4 Core & Reasonably Available Revenue Projections—Innovative Financing and New Revenue Sources, in Nominal Dollars, Billions		
Revenue Source	**Revenue Projection Assumptions**	**Revenue Estimate**
Federal Gas Excise Tax Adjustment	**Description:** Additional 10-cents-per-gallon gasoline tax imposed by the federal government starting in 2025 through 2029. **Assumptions:** Forecast consistent with historical tax rate adjustments for federal gas taxes.	$2.7
Mileage-Based User Fee (Replacement)	**Description:** Mileage-based user fees would be implemented to replace existing gas taxes (state and federal) by 2030. **Assumptions:** It is assumed that a national mileage-based user fee system would be established during the latter years of the RTP/SCS. An estimated $0.025 per mile (in 2019 dollars) is assumed starting in 2030 to replace existing gas tax revenues, indexed to maintain purchasing power.	$42.7 (est. increment only)
Federal Credit Assistance; Other Bond Proceeds	**Description:** Credit assistance/debt financing is assumed to facilitate construction of regional initiatives, pledging new regional/local funding via road charge program. **Assumptions:** It is assumed that some credit assistance in the form of TIFIA/RRIF will be needed to facilitate implementation of key regional initiatives. Assumed aggregate level debt service using an interest rate of 2.2 percent over 35 years.	$2.2
Private Investment	**Description:** XpressWest, to construct and operate high-speed rail service from Victor Valley to Las Vegas along the I-15 corridor; assumes private sector investment contribution for California High-Speed Rail Phase 1; also includes freight initiatives. **Assumptions:** Revenue estimate reflects only the San Bernardino County segment costs for XpressWest; SCAG-region segment for California-High Speed Rail Phase 1.	$12.7
Local Road Charge Program	**Description:** Local road charge program assumes a per mile charge across the region that can be implemented on a county basis. This can be adjusted by time-of-day and location with congestion pricing and parking pricing at major activity centers. For analysis, also assumed congestion pricing in parts of Los Angeles County, along with increases in parking pricing at major job centers throughout the region as a part of the regional job centers strategy. **Assumptions:** Assumes a charge of $0.015 per mile (in 2019 dollars) starting in 2030; peak period congestion charges in parts of Los Angeles County; some increases in parking costs assumed starting in 2025 at regional job centers.	$77.8
Value Capture Strategies	**Description:** Formation of EIFDs and use of tax increment financing for transit supportive housing related infrastructure. **Assumptions:** Based on recent EIFD/tax increment financing studies to fund improved water and sewer infrastructure in Transit Priority Areas	$3.0
Transportation Network Company (TNC) Mileage-Based Fee	**Description:** User fees on TNC mileage **Assumptions:** Estimated at about $0.05 (in 2019 dollars) per mile starting in 2021	$4.7
	New Revenue Source Subtotal	**$145.7**

Note: Numbers may not sum to total due to rounding

TABLE 4.6.1 FY2021–FY2045 RTP/SCS Revenues, in Nominal Dollars, Billions

	Revenue Sources	FY2021 – FY2025	FY2026 – FY2030	FY2031 – FY2035	FY2036 – FY2040	FY2041 – FY2045	Total
Local	Sales Tax	$28.4	$34.3	$41.4	$48.9	$51.5	$204.5
	– Local Option Sales Tax Measures	$23.6	$28.7	$34.7	$40.9	$42.0	$169.8
	– Transportation Development Act (TDA)—Local Transportation Fund	$4.8	$5.7	$6.7	$8.0	$9.5	$34.7
	Transit Farebox Revenue	$3.5	$4.4	$5.2	$6.4	$7.8	$27.3
	Highway Tolls (in core revenue forecast)	$3.4	$4.5	$6.0	$8.0	$10.7	$32.7
	Mitigation Fees	$0.4	$0.4	$0.5	$0.5	$0.6	$2.5
	Other Local Sources	$6.5	$5.4	$7.3	$6.6	$4.3	$30.2
	Local Total	$42.2	$49.1	$60.5	$70.6	$74.9	$297.2
State	State Transportation Improvement Program (STIP)	$1.3	$0.7	$0.9	$1.0	$1.2	$5.1
	– Regional Transportation Improvement Program (RTIP)	$1.1	$0.5	$0.6	$0.7	$0.9	$3.8
	– Interregional Transportation Improvement Program (ITIP)	$0.1	$0.2	$0.2	$0.3	$0.3	$1.2
	State Highway Operation and Protection Plan (SHOPP)	$8.5	$10.2	$12.2	$14.6	$17.5	$63.0
	Highway Users Tax Account (HUTA)	$5.1	$6.0	$7.1	$8.4	$10.0	$36.7
	Road Maintenance and Rehabilitation Account (RMRA)	$3.1	$3.8	$4.7	$5.7	$7.0	$24.3
	State Transit Assistance Fund (STA)	$1.9	$2.3	$2.8	$3.3	$3.9	$14.2
	Cap-and-Trade Auction Proceeds	$1.1	$1.1	$0.0	$0.0	$0.0	$2.2
	Other State Sources	$1.6	$1.6	$1.8	$2.0	$2.2	$9.2
	State Total	$22.6	$25.8	$29.5	$35.1	$41.9	$154.8

Note: Numbers may not sum to total due to rounding

TABLE 4.6.1 **FY2021–FY2045 RTP/SCS Revenues, in Nominal Dollars, Billions - Continued**

Revenue Sources		FY2021 – FY2025	FY2026 – FY2030	FY2031 – FY2035	FY2036 – FY2040	FY2041 – FY2045	Total
Federal	Federal Transit	$4.4	$4.7	$5.0	$5.3	$5.6	$25.0
	– Federal Transit Formula	$3.4	$3.6	$3.8	$4.0	$4.2	$19.0
	– Federal Transit Non-Formula	$1.1	$1.1	$1.2	$1.3	$1.3	$6.0
	Federal Highway & Other	$3.4	$3.3	$3.2	$3.1	$3.2	$16.1
	– Congestion Mitigation and Air Quality (CMAQ)	$1.5	$1.3	$1.0	$0.8	$0.8	$5.3
	– Surface Transportation Block Grant (STBG)	$1.3	$1.4	$1.5	$1.6	$1.7	$7.5
	– Other Federal Sources	$0.5	$0.6	$0.7	$0.7	$0.8	$3.3
	Federal Total	$7.8	$8.0	$8.1	$8.4	$8.8	$41.1
New	Federal Gas Excise Tax Adjustment	$0.6	$2.1	$0.0	$0.0	$0.0	$2.7
	Mileage-Based User Fee (Replacement)	$0.0	$1.6	$10.4	$13.7	$16.9	$42.7
	Federal Credit Assistance; Other Bond Proceeds	$0.0	$2.2	$0.0	$0.0	$0.0	$2.2
	Private Equity Participation	$3.2	$0.0	$2.1	$4.2	$3.2	$12.7
	Local Road Charge Program	$0.2	$5.8	$21.0	$23.8	$26.9	$77.8
	Enhanced Infrastructure Financing District	$0.0	$0.8	$0.8	$0.8	$0.8	$3.0
	TNC Fee	$0.7	$0.8	$0.9	$1.1	$1.2	$4.7
	New Revenue Total	$4.7	$13.3	$35.1	$43.5	$49.1	$145.7
	Revenue Total	**$77.3**	**$96.2**	**$133.2**	**$157.6**	**$174.6**	**$638.9**

Note: Numbers may not sum to total due to rounding

TABLE 4.6.2 **FY2021–FY2045 RTP/SCS Expenditures, in Nominal Dollars, Billions**

RTP Costs	FY2021 – FY2025	FY2026 – FY2030	FY2031 – FY2035	FY2036 – FY2040	FY2041 – FY2045	Total
Capital Projects and Other Programs	$36.2	$44.6	$68.0	$70.9	$67.6	$287.3
Arterials	$7.1	$4.7	$4.2	$4.1	$0.7	$20.7
Goods Movement (including Grade Separations)	$4.8	$9.3	$9.6	$22.7	$19.6	$66.0
High-Occupancy Vehicle/Express Lanes	$0.9	$3.2	$3.3	$3.4	$2.6	$13.4
Mixed-Flow and Interchange Improvements	$2.7	$1.7	$1.7	$1.4	$2.8	$10.3
Transportation System Management (including ITS)	$1.4	$1.4	$3.3	$3.9	$3.7	$13.7
Transit	$10.9	$13.9	$20.4	$13.5	$8.1	$66.8
Passenger Rail	$4.6	$6.5	$14.5	$9.3	$18.4	$53.3
Active Transportation	$1.6	$2.3	$4.2	$4.9	$4.6	$17.7
Transportation Demand Management	$0.7	$0.2	$2.4	$2.4	$1.7	$7.3
Other**	$1.5	$1.5	$4.3	$5.4	$5.4	$18.1
Operations and Maintenance	$35.9	$44.9	$57.4	$77.8	$100.0	$316.0
State Highways	$8.5	$10.2	$12.2	$17.1	$20.0	$68.0
Transit	$20.5	$24.9	$31.8	$41.2	$55.4	$173.9
Passenger Rail	$2.0	$2.7	$4.3	$7.5	$10.1	$26.6
Regionally Significant Local Streets and Roads*	$4.8	$7.1	$9.1	$12.0	$14.4	$47.5
Debt Service	$5.2	$6.6	$7.8	$8.9	$7.0	$35.6
Cost Total	**$77.3**	**$96.2**	**$133.2**	**$157.6**	**$174.6**	**$638.9**

Note: Numbers may not sum to total due to rounding
** Includes $4.8 billion for active transportation in addition to capital project investment level of $17.7 billion for a total of $22.5 billion for active transportation improvements*
*** Includes Safety, Pooled Incentives, Mobility Equity Fund, Regional PEV Charger Program, and Others*

CHAPTER 5

CHAPTER 5

MEASURING OUR PROGRESS

CONNECT SOCAL & PERFORMANCE-BASED PLANNING

SCAG has been incorporating performance measures into its Regional Transportation Plan (RTP) evaluation process since development of the 1998 Plan. For the 2004 RTP, SCAG developed a set of measurable outcomes that were based upon the principle of sustainability, which includes environmental preservation, linking transportation and land use and focusing on how the region meets its critical system preservation needs. Connect SoCal builds upon the sustainability goals established in previous RTP cycles, reflecting the ever-evolving needs and priorities of our region. The performance measures developed in support of Connect SoCal are focused on a set of outcomes that aim to continue to strengthen land-use and transportation connections, enhance the health of our region's residents, reduce greenhouse gas (GHG) emissions, and ameliorate the consequential effects of climate change.

Implementation of the strategies, programs and projects identified in Connect SoCal will help to secure a safe, efficient, sustainable and prosperous future for our region. To demonstrate the effectiveness of Connect SoCal toward achieving our regional goals and desired outcomes, SCAG conducted a 'Plan' vs 'No Plan' (or 'Baseline') analysis, which compares how the region would perform with and without implementation of the Plan. The conclusions of that analysis are the focus of this chapter. More details on the Connect SoCal performance analysis and its results may be found in the Performance Measures Technical Report.

Implementation of the Plan would result in a regional transportation system that provides improved travel conditions and better air quality, while also ensuring an equitable distribution of benefits among the various communities that comprise the SCAG region. With Connect SoCal, trips to work, schools and other key destinations would be faster and more efficient. Connect SoCal improves the integration of multiple transportation modes, leading to an increase in carpooling, demand for transit and use of active transportation (bicycle and pedestrian) modes for work trips and for other trips made throughout the day.

Analysis conducted by SCAG found that, in comparison to the 2045 Baseline, Connect SoCal will:

- Increase the combined percentage of work trips made by carpooling, active transportation, and public transit by 3 percent, with a commensurate reduction in the number of commuters traveling by single-occupancy vehicle
- Reduce vehicle miles traveled per capita by 5 percent and vehicle hours traveled per capita by 9 percent (for automobiles and light/medium-duty trucks) as a result of more efficient land use strategies and improved regional transit service
- Increase transit use for work trips by 2 percent, as a result of improved transit service and more transit-oriented, mixed-use development
- Reduce travel delay per capita by 26 percent
- Reduce heavy-duty truck delay by 24 percent
- Create more than 264,500 new jobs annually, due to an increased level of economic competitiveness throughout the region, and improved regional economic performance. This more competitive economic environment would be the result of an improved regional transportation system and reduced levels of congestion
- Reduce greenfield development by 29 percent. Conservation of open space, agricultural lands, and other rural land uses may be achieved by focusing new residential and commercial development in higher density areas that are already equipped with the requisite urban infrastructure.

Note, the above transportation performance results do not include off-model adjustments and are therefore considered to be conservative estimates of Connect SoCal performance.

Connect SoCal also focuses on improving public health outcomes in the SCAG region. Some key performance results include a reduction in our regional obesity rate and a reduction in the share of our population that suffers from pathologies related to lack of regular physical activity, such as hypertension and type 2 diabetes. The total annual healthcare costs for respiratory disease will be reduced under the Plan by more than 5 percent compared to the Baseline. Implementation of Connect SoCal would provide more than $346 million in healthcare cost savings per year as a result of reductions in several chronic diseases and would bring significant benefits for the regional economy. When looking specifically at air-pollution related health incidences, the region is expected to save over $180 million in healthcare expenditures annually. These public health improvements are the result of Connect SoCal investments in active transportation, more walkable and bikeable communities and improved regional air quality.

PERFORMANCE GOALS & REQUIREMENTS

The Connect SoCal performance measurement process provides a means for determining how well the program of investments included in the Plan correspond to the overall goals and desired vision for the future of the SCAG region. As part of the development of Connect SoCal, a set of 10 high level goals for the Plan were adopted. The goals are intentionally general in nature, and the Connect SoCal performance measures are not intended to correspond specifically to each of the Plan goals. However, they are complementary, with most of the performance measures supporting multiple goals. While the Connect SoCal goals are visionary in nature, the performance outcomes provide a more specific framework to guide the region toward achievement of the higher level goals. Performance measures, in turn, are the quantitatively defined variables used to assess progress within each of the outcome categories.

Performance measures are also used to ensure that the Plan meets all federal and state mandates. These requirements will be discussed in detail in a subsequent section of this chapter.

PERFORMANCE OUTCOMES & MEASURES

Senate Bill 375 (SB 375) provided a strong regulatory foundation for addressing the daunting challenges presented by climate change. The ambitious GHG reduction goals and associated sustainability planning requirements mandated by SB 375 served to further fortify SCAG's already firm commitment to the monitoring of regional GHG emissions reductions and achievement of regional sustainability objectives, as well as promoting the integration of transportation and land use planning.

The Connect SoCal performance measures are focused on specific outcomes that will serve to strengthen the land-use transportation connections in the SCAG region and enhance the physical health of our region's residents, while also facilitating attainment of GHG emissions reduction goals and ameliorating the consequential impacts of climate change. The set of outcomes and performance measures used to evaluate various scenarios for Connect SoCal are presented in the Performance Measures Technical Report.

USES OF PERFORMANCE MEASURES

The Connect SoCal performance measures serve to gauge progress toward meeting the goals and objectives for our region as outlined in the Plan, as well to ensure that the region meets state requirements for reducing GHG emissions and planning for a more sustainable future. The results of SCAG's performance analysis and assessment process allow us to conclude that implementation of the integrated program of projects, strategies and policy recommendations of Connect SoCal will result in significant benefits to our region, not only in respect to the transportation-related objectives of improved mobility and accessibility; but also for better air quality, stimulated regional economic activity and job creation, community and environmental sustainability, social equity, and environmental justice.

Performance monitoring is an invaluable tool to facilitate linkage of the regional goals and desired outcomes identified in Connect SoCal with actual performance at the implementation level. The monitoring of local and regional progress is key to understanding which projects, programs, and strategies are proving successful in meeting our regional goals and which ones may require modification or reconsideration. Ultimately, progress toward our regional objectives is made through implementation at the local level.

Ongoing performance monitoring serves to guide future planning efforts and support local and regional transportation system investment decision-making. The assessment of regional performance over time allows us to set meaningful performance targets and milestones so that progress and setbacks may be effectively evaluated and addressed in a timely manner. On-going performance monitoring also helps to identify emerging trends in the region that may need to be accounted for in our interim planning activities, as well as to inform development of the next RTP/Sustainable Communities Strategy (SCS).

CONNECT SOCAL PERFORMANCE OUTCOMES

This section summarizes how well the Connect SoCal program of transportation improvement projects, land use strategies and sustainable communities policy recommendations are expected to perform when fully implemented. The performance of the Plan is assessed through the modeling of several discretely defined outcome scenarios. The modeling outputs are then compared, using standardized performance measures, to quantify differences in the model results between various scenarios.

Three planning scenarios are referenced in Connect SoCal: Base Year, Baseline and Plan.

- **Base Year** represents existing conditions in the SCAG region as of 2016. This includes our regional transportation system, land use patterns and socio-economic characteristics (households and employment). The year 2016 was selected as the 'Base Year' for this analysis because it is the year of the most recent available data for all variables related to Connect SoCal performance outcomes.
- **Baseline** represents the future regional transportation system that will result from the continuation of current programs, including projects currently under construction or undergoing right-of-way acquisition, those transportation plans and projects programmed and committed to in the 2019 Federal Transportation Improvement Program (FTIP), and/or transportation projects that have already received environmental clearance.
- **Plan** represents future conditions in 2045 wherein the transportation investments, policy recommendations and strategies identified in Connect SoCal are fully implemented.

The Base Year, Baseline and Plan scenarios discussed in this chapter were developed to help evaluate the performance of the strategies, programs and projects presented in Connect SoCal and to meet various state and federal requirements.

TABLE 5.1 presents the Connect SoCal performance outcomes and the associated measures used to forecast Plan performance. The table also includes specific performance results for both the Baseline and the Plan.

PERFORMANCE OUTCOME CATEGORIES

The Connect SoCal performance monitoring program is based upon performance goals, outcomes and measures. As discussed previously, the goals refer to high level regional objectives for the Plan. The performance goals correlate to how we envision the future of the SCAG region and what planning priorities need to be emphasized through the Plan to achieve that vision. Connect SoCal includes 10 overall performance goals as presented in the Performance Measures Technical Report.

For Connect SoCal, eight outcome categories have been designated, each representing a primary performance focus area for the Plan. These performance outcome categories include:

1. Location Efficiency
2. Mobility and Accessibility
3. Safety and Public Health
4. Environmental Quality
5. Economic Opportunity
6. Investment Effectiveness
7. Transportation System Sustainability
8. Environmental Justice

An additional set of performance measures to be used for SCAG's on-going regional monitoring effort are described and discussed in the Connect SoCal Performance Measures Technical Report. The next section of this chapter defines these categories and introduces the specific measures used to evaluate the performance of Connect SoCal.

CONNECT SOCAL
PERFORMANCE PROFILE

LOCATION EFFICIENCY

High Quality Transit Area Household Growth Share

45.2% Baseline

51.2% Plan

6.0% ↑

High Quality Transit Area Employment Growth Share

44.8% Baseline

59.7% Plan

14.9% ↑

Rural Land Consumption

100 sq. miles Baseline

71 sq. miles Plan

29.2% ↓

LESS TIME SPENT DRIVING

Daily Miles Driven per capita

21.8 mi Baseline

20.7 mi Plan

5.0% ↓

Daily Traffic Delay per capita

11.3 mins Baseline

8.4 mins Plan

25.7% ↓

Heavy Duty Truck Delay Highway

186,276 hrs Baseline

144,744 hrs Plan

22.3% ↓

Heavy Duty Truck Delay Arterial

32,027 hrs Baseline

23,492 hrs Plan

26.6% ↓

IMPROVED AIR QUALITY

Reactive Organic Gas Emissions

46.5 tons Baseline

44.1 tons Plan

5.3% ↓

Carbon Monoxide Emissions

325.8 tons Baseline

307.3 tons Plan

5.7% ↓

$PM_{2.5}$ Emissions

12.9 tons Baseline

12.4 tons Plan

4.1% ↓

GHG Reductions

YEAR	TARGET	PLAN
2020	8%	8%
2035	19%	19%

ECONOMIC OPPORTUNITY

Benefit/Cost Ratio

$1.00 INVESTMENT = $2.06 BENEFIT

$346 Million

Saved in Annual Healthcare Expenditure

264,500

Annual New Jobs Supported By Improved Competitiveness

168,400

Annual New Jobs Supported By Transportation Investments

CONNECT SOCAL
PERFORMANCE RESULTS

Daily Vehicle Miles Traveled (VMT)*
per capita

2016 BASE YEAR	2045 BASELINE	2045 PLAN
23.2 MILES	21.8 MILES	20.7 MILES

Baseline to Plan Comparison: **-5.0%**

Base Year to Plan Comparison: **-10.8%**

Daily Minutes of Person Delay
per capita

2016 BASE YEAR	2045 BASELINE	2045 PLAN
10.5 MINUTES	11.3 MINUTES	8.4 MINUTES

Baseline to Plan Comparison: **-25.7%**

Base Year to Plan Comparison: **-20.0%**

County	Measure	2016 BASE YEAR	2045 BASELINE	2045 PLAN
IMPERIAL COUNTY	DAILY VMT *per capita*	30.7 MILES	32.6 MILES	32.4 MILES
IMPERIAL COUNTY	DAILY DELAY *per capita*	3.3 MINUTES	12.1 MINUTES	8.1 MINUTES
LOS ANGELES COUNTY	DAILY VMT *per capita*	22.2 MILES	20.4 MILES	19.2 MILES
LOS ANGELES COUNTY	DAILY DELAY *per capita*	13.4 MINUTES	13.4 MINUTES	10.5 MINUTES
ORANGE COUNTY	DAILY VMT *per capita*	24.1 MILES	22.9 MILES	22.3 MILES
ORANGE COUNTY	DAILY DELAY *per capita*	10.0 MINUTES	11.0 MINUTES	8.0 MINUTES
RIVERSIDE COUNTY	DAILY VMT *per capita*	23.0 MILES	21.6 MILES	20.6 MILES
RIVERSIDE COUNTY	DAILY DELAY *per capita*	5.6 MINUTES	8.4 MINUTES	5.4 MINUTES
SAN BERNARDINO COUNTY	DAILY VMT *per capita*	26.1 MILES	25.6 MILES	24.5 MILES
SAN BERNARDINO COUNTY	DAILY DELAY *per capita*	5.4 MINUTES	8.3 MINUTES	5.2 MINUTES
VENTURA COUNTY	DAILY VMT *per capita*	22.3 MILES	21.0 MILES	19.6 MILES
VENTURA COUNTY	DAILY DELAY *per capita*	5.6 MINUTES	6.1 MINUTES	3.4 MINUTES

Note: Base Year: 2016 Existing Conditions, Baseline: Continuation of current trends without Plan, Plan: Full implementation of Connect SoCal

*VMT per capita refers to automobiles & light trucks only

TABLE 5.1 **Connect SoCal Performance Measures & Results**

Outcome Group	Performance Measure	Definition	Objective	Category	2045 Performance Results		
					Baseline	Connect SoCal	Trend
Location Efficiency	Share of regional household growth occurring in HQTAs	Percent of the region's total household growth occurring within HQTAs	Improvement (increase) over Baseline	Percent of households located in HQTAs	45.2%	51.2%	↑
	Share of regional employment growth occurring in HQTAs	Percent of the region's total employment growth occurring within HQTAs	Improvement (increase) over Baseline	Percent of jobs located in HQTAs	44.8%	59.7%	↑
	Land consumption	Total acreage of greenfield or otherwise rural land uses converted to urban use	Improvement (decrease) over Baseline	Greenfield land consumed	100 sq miles	71 sq miles	↓
	VMT per capita	Daily vehicle miles driven per person	Improvement (decrease) over Baseline	Automobiles and light-duty trucks	21.8 miles	20.7 miles	↓
	Average distance traveled	Average daily distance traveled for work and non-work trips (in miles)	Improvement (decrease) over Baseline	Work Trips	17.9 miles	17.7 miles	↓
				Non-Work Trips	5.8 miles	5.7 miles	↓
	Percent of trips less than 3 miles	Percentage of work and non-work trips which are less than 3 miles in length	Improvement (increase) over Baseline	Work Trips	14.0%	14.3%	↑
				Non-Work Trips	40.5%	41.4%	↑
	Work trip length distribution	Statistical distribution of work trip length	Improvement (increase in share of short trip lengths) over Baseline	Trip Length: 10 miles or less	42.3%	42.4%	↑
				Trip Length: 25 miles or less	76.6%	76.6%	↔

TABLE 5.1 Connect SoCal Performance Measures & Results - Continued

Outcome Group	Performance Measure	Definition	Objective	Category	2045 Performance Results: Baseline	2045 Performance Results: Connect SoCal	2045 Performance Results: Trend
Mobility & Accessibility	Person delay per capita	Average minutes of delay experienced per capita due to traffic congestion	Improvement (decrease) over Baseline	Daily minutes of delay per capita	11.3 mins	8.4 mins	↓
	Person hours of delay by facility type	Excess travel time resulting from the difference between a reference speed and actual speed	Improvement (decrease) over Baseline	Highway	1,648,575 hrs	1,224,572 hrs	↓
				HOV	127,650 hrs	31,740 hrs	↓
				Arterial	2,006,711 hrs	1,523,701 hrs	↓
	Truck delay by facility type	Excess travel time for heavy duty trucks resulting from the difference between a reference speed and actual speed	Improvement (decrease) over Baseline	Highway	186,276 hrs	144,744 hrs	↓
				Arterial	32,027 hrs	23,492 hrs	↓
	Travel time distribution by mode	Percentage of PM peak period trips completed within 45 minutes by travel mode	Improvement (increase) over Baseline	Transit Trips	46.70%	47.20%	↑
				HOV Trips	78.30%	83.90%	↑
				SOV Trips	80.10%	85.40%	↑
	Transit mode share	Percentage of trips that use transit (work and all trips)	Improvement (increase) over Baseline	All Trips	3.60%	4.90%	↑
				Work Trips	4.00%	6.10%	↑
	Mean commute time	Average travel time to work (all modes)	Improvement (decrease) over Baseline	Average commute time (minutes)	32.1	30.2	↓

TABLE 5.1 Connect SoCal Performance Measures & Results - Continued

Outcome Group	Performance Measure	Definition	Objective	Category	2045 Performance Results		
					Baseline	Connect SoCal	Trend
Safety & Public Health	Vehicle collision rate by severity	Collision rate per 100 million vehicle miles traveled	Improvement (decrease)	Fatality rate	N/A	0.12	N/A
				Serious injury rate	N/A	1.97	N/A
	Air pollution-related health measures	Annual air pollution-related respiratory disease incidence and cost	Improvement (decrease) over Baseline	Pollution-related respiratory health incidences	192,400	182,200	↓
				Pollution-related respiratory health costs	$3.34 billion	$3.16 billion	↓
	Physical activity-related health measures	Health incidences and costs related to lack of physical activity and/or obesity	Improvement (decrease) over Baseline	Daily per capita walking	5.8 mins	6.7 mins	↑
				Daily per capita biking	0.5 mins	0.7 mins	↑
				Daily per capita driving	48.4 mins	43.2 mins	↓
				Obesity rate	30.30%	30.10%	↓
				Hypertension rate	26.40%	26.30%	↓
				Cardiovascular disease rate	4.37%	4.36%	↓
				Diabetes (type 2) rate	8.10%	7.90%	↓
	Active transportation mode share*	Percentage of trips using either walking or biking (by trip type)	Improvement (increase) over Baseline	Walk share (work trips)	2.70%	3.00%	↑
				Bike share (work trips)	1.00%	1.20%	↑
				Walk share (non-work trips)	9.10%	10.10%	↑
				Bike share (non-work trips)	1.80%	2.30%	↑
				Walk share (all trips)	7.80%	8.70%	↑
				Bike share (all trips)	1.70%	2.10%	↑

**Values do not include off-model adjustment factors, see "Active Transportation Mode Share" section for additional details.*

TABLE 5.1 **Connect SoCal Performance Measures & Results - Continued**

Outcome Group	Performance Measure	Definition	Objective	Category	2045 Performance Results		
					Baseline	Connect SoCal	Trend
Environmental Quality	Greenhouse gas (GHG) emissions reduction	Percent reduction in per capita GHG emissions (from 2005 levels)	Meet state and regional GHG reduction targets	2020	N/A	8%	N/A
				2035	N/A	19%	N/A
	Criteria pollutant emissions	ROG, CO, NOx, PM10, and PM2.5 emissions (tons per day)	Meet federal air quality conformity requirements	Reactive organic gases (ROG)	46.5 tons	44.1 tons	↓
				Carbon monoxide (CO)	325.8 tons	307.3 tons	↓
				Oxides of nitrogen (NOx)	82.9 tons	79.5 tons	↓
				Particulate matter (PM10)	31.7 tons	30.4 tons	↓
				Particulate matter (PM2.5)	12.9 tons	12.4 tons	↓
	Non-SOV mode share	Percentage of trips using a travel mode other than single occupancy vehicle (SOV)	Improvement (increase) over Baseline	All Trips	62.8%	64.9%	↑
				Work Trips	30.9%	33.3%	↑
Economic Opportunity	New jobs supported by improved economic competitiveness	Number of new jobs supported by improved regional economic competitiveness	Improvement (increase) over Baseline	Annual number of new jobs generated by Connect SoCal	N/A	264,500	N/A
	New jobs supported by transportation system investments	Number of new jobs supported by Connect SoCal transportation system investments	Improvement (increase) over Baseline	Annual number of new jobs generated by Connect SoCal	N/A	168,400	N/A

** Comparative figures shown for Criteria Pollutant Emissions are for the 2016 Base Year*

TABLE 5.1 Connect SoCal Performance Measures & Results - Continued

Outcome Group	Performance Measure	Definition	Objective	Category	2045 Performance Results		
					Baseline	Connect SoCal	Trend
Investment Effectiveness	Transportation system investment benefit/cost ratio	Ratio of monetized user and social benefits relative to transportation system investment expenditures	Benefit/cost ratio greater than 1.0	Benefit ratio per $1 investment	N/A	2.06	N/A
Transportation System Sustainability	Cost per capita to preserve the regional multimodal transportation system in current state of good repair	Annual cost per capita required to preserve the regional multimodal transportation system to current conditions	Improvement (decrease) over Baseline	Cost per capita (per year)	N/A	$562	N/A
Environmental Justice	See Table 5.5: Connect SoCal Environmental Justice Performance Measures		Meet federal Environmental Justice requirements: No unaddressed disproportinately high and adverse effects on low income or minority communities				

Source: SCAG

CONNECT SOCAL PERFORMANCE OUTCOMES

OUTCOME 1: LOCATION EFFICIENCY

The 'Location Efficiency' performance outcome reflects how improved coordination of land use and transportation planning affects the movement of people and goods throughout the SCAG region. This outcome has seven associated performance measures to assess progress provided by Connect SoCal toward achieving our Location Efficiency objectives:

- Share of Household Growth in High Quality Transit Areas
- Share of Employment Growth in High Quality Transit Areas
- Land Consumption
- Vehicle Miles Traveled per Capita
- Average Distance Traveled
- Percent of Trips Less than Three Miles
- Work Trip Length Distribution

The following is a summary of the Location Efficiency performance measures:

SHARE OF HOUSEHOLD GROWTH IN HIGH QUALITY TRANSIT AREAS

By 2045, the share of new households located within designated High Quality Transit Areas (HQTAs) is projected to increase by 6 percent between the Baseline (45.2 percent) and Connect SoCal (51.2 percent).

SHARE OF EMPLOYMENT GROWTH IN HIGH QUALITY TRANSIT AREAS

Growth in the share of new regional employment located within HQTAs is projected to increase by 15.3 percent between the Baseline (44.8 percent) and Connect SoCal (60.1 percent) by 2045.

LAND CONSUMPTION

The land consumption metric is used to assess the amount of previously agricultural or otherwise undeveloped land that has changed from rural to more intensive development. 'Greenfield' land consumption refers to new urban development occurring on land that has not previously been developed, or otherwise impacted by, urbanized use, including agricultural lands, forests, deserts and other open spaces. Rural land consumption under Connect SoCal would be substantially less (71 square miles) than under the Baseline (100 square miles).

VEHICLE MILES TRAVELED PER CAPITA

Vehicle miles traveled (VMT) per capita is an essential metric used for monitoring the impact of population and economic growth on our regional transportation system. VMT measures the total number of miles traveled by motor vehicles within the SCAG region. Increases in VMT may impact traffic congestion, air quality and the overall quality of life in our region. As a region with an ever-growing population and a vibrant economy, it is expected that more people will be making use of our regional transportation system to get to their places of employment and to engage in other daily economic, service, and entertainment activities. The challenge is to identify effective solutions to balance our regional mobility needs with the imperative to address the consequential impacts of climate change.

The monitoring of VMT per capita (for automobiles and light trucks) became even more important with the passage of SB 375, which led to state-mandated reduction targets for regional GHG emissions. According to the U.S. Environmental Protection Agency (U.S. EPA), the transportation sector produces about 30 percent of all GHG emissions, with automobiles contributing approximately 60 percent of transportation sector emissions.

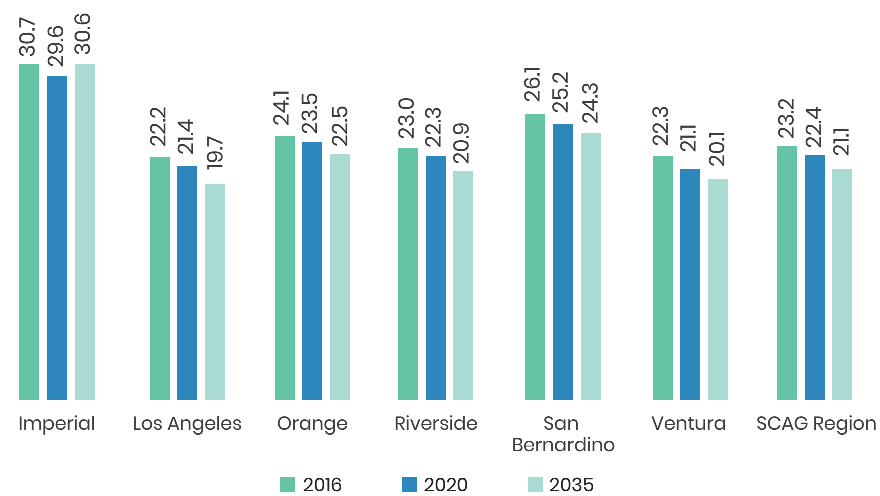
SB 375 engendered the passage of several subsequent legislative measures for purposes of implementing its GHG reduction mandate. SB 743, passed in 2013, directed the Governor's Office of Planning and Research (OPR) to identify a new metric for assessing California Environmental Quality Act (CEQA) transportation impacts that would serve to promote achievement of statewide GHG reduction goals. Ultimately, VMT was selected as the most viable of several alternatives evaluated to replace the previously used 'Level of Service' (LOS) methodology, which focused exclusively on vehicle delay. Replacing the LOS methodology with a VMT-based assessment metric satisfies the SB 743 objectives of reducing GHG emissions, promoting mixed-use and infill development, and encouraging the provision of active transportation infrastructure. The new VMT-based CEQA transportation impact assessment requirement will take effect statewide on July 1, 2020, further elevating the importance of monitoring VMT at the regional and local levels. Connect SoCal has not taken any credits in regard to potential per capita VMT reduction through SB 743 implementation. By monitoring progress in reducing per capita VMT through implementation of the various transportation investments and land use strategies outlined in Connect SoCal, we are better able to accurately gauge progress toward achieving our regional GHG emissions reduction goals.

Daily per capita VMT in the SCAG region is projected to decrease in 2045 from 21.8 miles under the Baseline to 20.7 miles with Connect SoCal. **FIGURE 5.1** shows per capita VMT by county.

AVERAGE DISTANCE TRAVELED

In 2045, the average distance traveled one-way for work trips in the SCAG region is projected to decrease slightly from 17.9 miles under the Baseline to 17.7 miles with Connect SoCal. The average distance traveled one-way for non-work trips in 2045 is also projected to decrease, from 5.8 miles to 5.7 miles.

FIGURE 5.1 Daily Vehicle Miles Traveled (VMT) per Capita by County



Source: SCAG Regional Travel Demand Model

PERCENT OF TRIPS LESS THAN THREE MILES

The majority of trips in Southern California are made by people driving alone in their vehicles. As trip lengths become shorter, particularly to within a few miles, people become more amenable to the use of transit, bicycling, walking or using other travel modes instead of driving alone. By 2045, the share of work trips less than three miles in length is projected to increase from 14 percent to 14.3 percent; and from 40.5 percent to 41.4 percent for non-work trips. Land use strategies that emphasize location efficiency, investments in active transportation, and transit system enhancements contribute to achieving these results.

WORK TRIP LENGTH DISTRIBUTION

A primary objective of Connect SoCal is the reduction of commuting distances in the SCAG region. The share of work trips under 25 miles one-way is projected to remain unchanged at 76.6 percent. However, a subset of this group, the share of work trips less than 10 miles in length one-way, is expected to increase slightly from 42.3 percent to 42.4 percent.

OUTCOME 2: MOBILITY & ACCESSIBILITY

The 'Mobility and Accessibility' outcome is defined as the ability to reach desired destinations with relative ease and within a reasonable time, using available transportation choices. This section discusses the mobility and accessibility performance measures for Connect SoCal.

MOBILITY

Mobility performance measures are based on the metric of travel delay. Delay is defined as the difference between an actual travel time and the expected travel time at a reference speed for a specified mode. Travel delay is measured in vehicle-hours of delay, from which person-hours of delay is derived. The measures used to evaluate alternatives for the mobility outcome include:

- Person Delay per Capita
- Person Hours of Delay by Facility Type

- Truck Delay by Facility Type

PERSON DELAY PER CAPITA

FIGURE 5.2 shows daily minutes of delay experienced per capita for each of the six counties, and for the entire SCAG region. Normalizing delay by the number of people living in an area provides insight as to how well the region is mitigating traffic congestion within the context of increasing population growth. Daily minutes of delay per capita would be expected to increase by 2045 in all six counties of the region under Baseline conditions. However, implementation of Connect SoCal would reduce delay substantially, to about 20 percent below 2016 levels and about 26 percent below the Baseline.

PERSON-HOURS OF DELAY BY FACILITY TYPE

Travel delay is also assessed by comparing the number of person-hours of delay experienced on different facility types. The person-hours of delay by facility type metric differentiates the amount of delay experienced by commuters traveling on mixed flow lanes, carpools using high-occupancy vehicle (HOV) lanes, and on our arterial roadways. As shown in **FIGURE 5.3**, person delay experienced on the mixed flow lanes of our highways would improve upon Baseline conditions with Connect SoCal by approximately 26 percent, while delay on HOV facilities will be reduced even more significantly, by more than 75 percent. Delay on arterial roadways in the SCAG region would be reduced by about 24 percent between the Baseline and the Plan.

TRUCK DELAY BY FACILITY TYPE

The Truck Delay by Facility Type performance measure estimates average daily delay experienced by heavy-duty trucks on freeways and arterials in the SCAG region. Connect SoCal includes significant investments in transportation system improvements to facilitate goods movement. **FIGURE 5.4** summarizes heavy duty truck delay projections for freeways and on major arterials in the SCAG region for the Base Year, Baseline, and Connect SoCal.

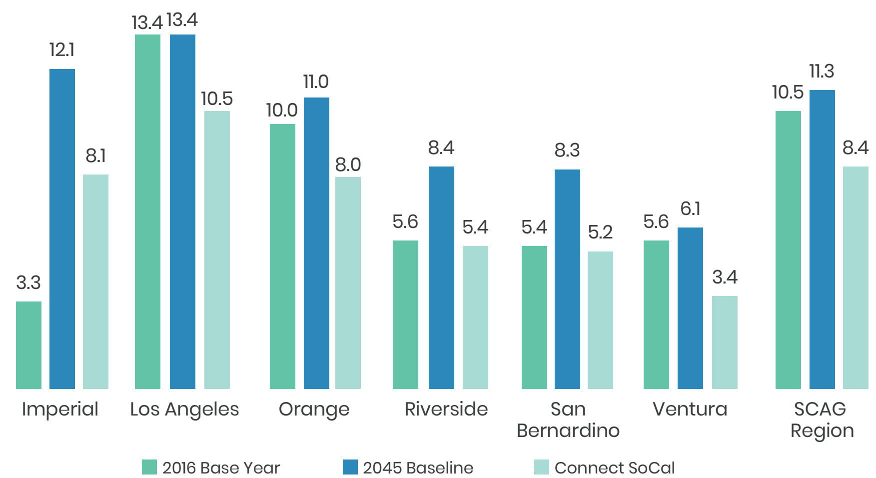
Connect SoCal will reduce heavy-duty truck delay on both our regional freeways and arterial highways as compared to 2045 Baseline projections by 22 percent and 27 percent, respectively. However, truck delay under the Plan will still be expected to be above 2016 levels due to projected growth in regional economic activity and the associated increased demand for freight movement by truck.

HIGHWAY NON-RECURRENT DELAY

Another measure for delay that is useful for ongoing performance monitoring, but is not readily modeled, is non-recurrent delay. Recurrent delay is the expected daily traffic congestion that occurs as a result of there being too many vehicles being on the road at the same time. Non-recurrent delay refers to unexpected conditions of excessive traffic congestion caused by vehicle collisions, adverse weather, special events or other atypical incidents.

Non-recurrent delay may be mitigated or reduced by improving incident response times, implementation of traveler information systems, and deployment of other intelligent transportation technologies, such as traffic signal coordination and highway ramp metering systems. Dynamic travel information technologies providing real-time information about unexpected delays allow travelers to make better-informed decisions regarding the availability of transportation alternatives, including transit. Non-recurrent delay as an ongoing regional monitoring measure is discussed in greater detail in the Connect SoCal Performance Measures Technical Report.

FIGURE 5.2 **Daily Person Delay per Capita by County, Minutes**



Source: SCAG Regional Travel Demand Model

FIGURE 5.5 shows the relative proportion of freeway congestion experienced in each county that is caused by non-recurrent events. Please note that data for Imperial County is not currently available for this metric.

ACCESSIBILITY

The 'Accessibility' outcome is used to evaluate how well the regional transportation system performs in providing access to various types of opportunities. Opportunities may include jobs, education, medical care, recreation, shopping, or any other activities that may help enhance a person's quality of life. For Connect SoCal, accessibility is assessed by the distribution of trips by mode and by travel time.

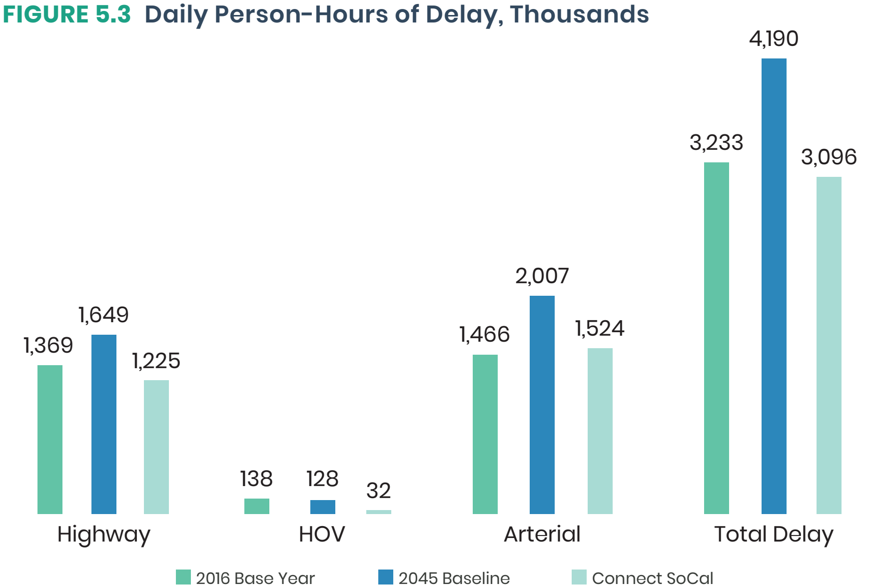
A useful metric for evaluating accessibility is to determine the percentage of peak period work trips that are completed within 45 minutes in comparison with the 2045 Baseline and the 2016 Base Year scenarios. Peak commute periods are those times during the weekday when travel demand on regional roadways reaches its highest levels. Peak periods typically occur twice daily, first during the morning commute when people are traveling to their workplaces, and again in the late afternoon when people are returning home from work.

FIGURE 5.6 shows the results of the accessibility analysis conducted for the afternoon (PM) peak period. In all cases, Connect SoCal improves performance for the share of work trips in the SCAG region completed within 45 minutes. In support of the accessibility performance analysis for Connect SoCal, travel time distribution tables are prepared for transit, single-occupant vehicle (SOV) and HOV travel modes, for both work and non-work trips. The results of these mode specific accessibility analyses may be found in the Connect SoCal Performance Measures Technical Report.

TRANSIT MODE SHARE

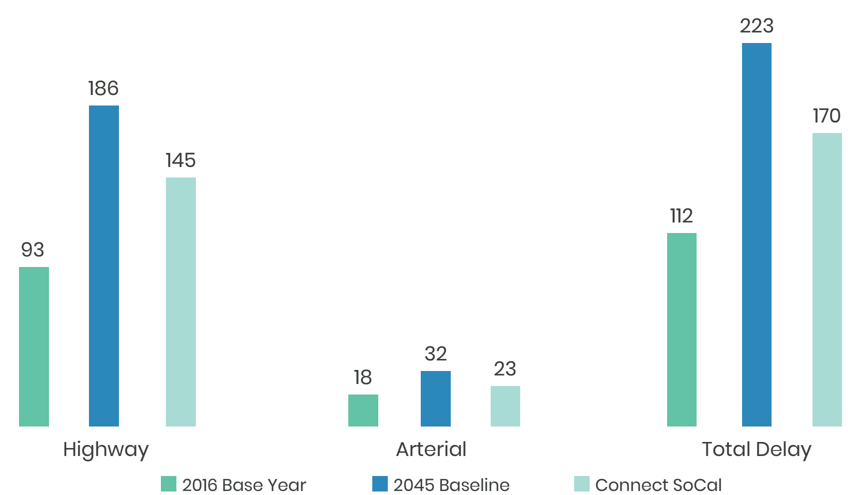
The Transit Mode Share performance measure reports the share of work trips, and all trips that use transit. This metric helps identify how effectively the transit improvements and strategies proposed in Connect SoCal work toward providing better and more diverse commuting options for the travelers. Ideally, with better and more reliable transit service, more commuters will

FIGURE 5.3 Daily Person-Hours of Delay, Thousands



Source: SCAG Regional Travel Demand Model

FIGURE 5.4 Daily Heavy-Duty Truck Hours of Delay by Facility Type, Thousands



Source: SCAG Regional Travel Demand Model

choose transit over driving alone, facilitating reduction of VMT and regional GHG emissions. **TABLE 5.2** shows transit mode shares by county. These 2045 projections are for work trips and for all trips under Connect SoCal.

ACTIVE TRANSPORTATION MODE SHARE

The Active Transportation Mode Share performance measure reports the share of work trips, and all trips that use active transportation (walking, bicycling, and other human-powered transportation) using the SCAG Activity-Based Model (ABM). Due to the general lack of data collected regarding active transportation infrastructure, SCAG conducted an additional "off-model" analysis for Connect SoCal. This analysis takes into account Safe Routes to School safety enhancements, first-last mile improvements, pedestrian infrastructure improvements, and bike share and micro-mobility. While the ABM shows active transportation mode share of 8.7 percent for walking (all trips) and 2.1 percent for bicycling (all trips), the most accurate Connect SoCal mode share estimate includes an addition of 1.3 percent for walking (all trips) and 0.4 percent for bicycling (all trips) for a total of 10 percent walking mode share (all trips) and 2.5 percent bicycling mode share (all trips). Additional details on the active transportation off-model analysis can be found in the Active Transportation Technical Report.

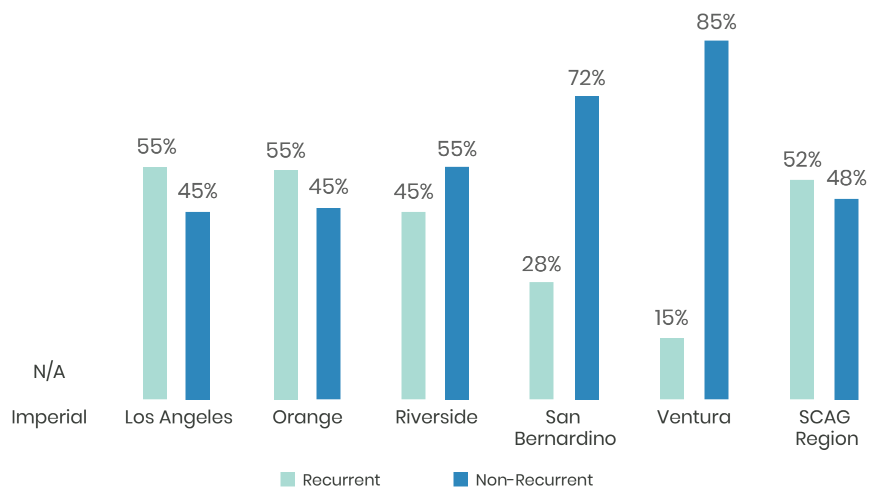
MEAN COMMUTE TIME

Mean commute time is a new performance metric introduced for Connect SoCal. This measure reports the average time it takes for a commuter in the SCAG region to get to work by various travel modes. In 2045, the mean commute time by automobile in the region will improve from 30.6 minutes under the Baseline to 27.8 minutes with Connect SoCal. For transit, the average commute time will decrease from about 71 minutes under the Baseline to 70 minutes under the Plan.

OUTCOME 3: SAFETY & PUBLIC HEALTH

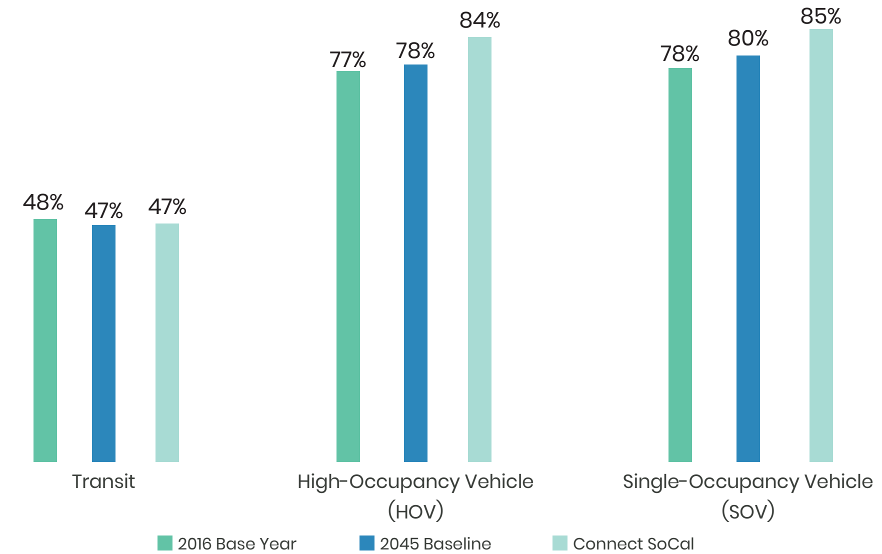
Connect SoCal includes several performance measures to evaluate the 'Safety and Public Health' outcome. The totality of impacts of regional transportation improvements on safety and public health are not easily modeled. However, the assessment of the number and severity of collisions occurring on our roadways

FIGURE 5.5 Non-Recurrent Congestion Share by County



Source: SCAG Regional Travel Demand Model

FIGURE 5.6 Work Trips Completed within 45 Minutes, PM Peak Period



Source: SCAG Regional Travel Demand Model

provides a useful means for monitoring the relative safety of the regional transportation system. The total number and rate of fatalities and of serious injuries resulting from collisions are the primary performance measures used to assess safety. It should be noted, however, that this methodology does not account for safety improvements specific to individual transportation modes. For purposes of ongoing regional performance monitoring, this measure is reported over time and by mode (including for active transportation modes). Please see the Connect SoCal Transportation Safety and Security Technical Report for more detailed analysis on regional safety performance and trends.

Connect SoCal seeks to improve the integration of transportation and land use planning with the recognition that our regional multimodal transportation system generates a wide range of impacts that significantly affect public health and quality of life. To assess public health outcomes of the Plan, SCAG consolidated several health-related performance measures. Please see the Public Health Technical Report for an analysis on Plan performance related to health outcomes. SCAG models several specific health-related metrics to evaluate how the Plan affects the public health outcome. These measures include:

- Incidences of air pollution-related respiratory illness
- Healthcare expenditures related to air pollution-related illnesses
- Mode share walking and bicycling
- Reduced rates of chronic disease and obesity due to improvements in physical activity
- Healthcare expenditures related to hypertension, heart disease, and type 2 diabetes for adults ages 18-65

Air quality significantly impacts public health in the SCAG region, as the amount of air pollutants released into the atmosphere is highly correlated to respiratory health issues, including asthma. There are four common criteria air pollutants that are monitored in the SCAG region in accordance with federal air quality regulations. These air pollutants include ozone, particulate matter (PM10 and PM2.5), carbon monoxide (CO), and nitrogen dioxide (NO2). These pollutants require careful monitoring because of their known adverse effects on human health. While children, older citizens and persons with existing respiratory illnesses are most vulnerable to the effects of air pollutants, the health impacts of long-term exposure are a concern for everyone in the region.

Airborne particulate matter comes in all sizes, however particles smaller than 10 micrometers in diameter are considered the most dangerous to human health because they are small enough to be absorbed into the lungs. High levels of carbon monoxide are also considered a health hazard, especially for people with compromised respiratory or coronary function, as CO is known to reduce the flow of oxygen through the human body. Long-term exposure to high levels of nitrogen dioxide, which is produced primarily through the burning of fossil fuels, may cause a narrowing of the bronchial airways, resulting in chronic wheezing or aggravation of asthma symptoms. For more detailed information regarding the performance of the criteria pollutant measures, please see the Connect SoCal Performance Measures Technical Report.

Improved opportunities for daily physical activity and adoption of healthy lifestyle choices are also quite relevant to the discussion of public health in the SCAG region. Connect SoCal improves physical activity-related public health outcomes through the promotion of more efficient and better coordinated land use and transportation planning. By increasing the share of shorter trips, more

TABLE 5.2 Transit Mode Share: 2045, Connect SoCal

County	Work Trips	All Trips
Imperial County	0.7%	1.4%
Los Angeles County	9.8%	7.0%
Orange County	2.2%	2.6%
Riverside County	1.2%	2.1%
San Bernardino County	1.7%	2.4%
Ventura County	2.0%	2.1%
SCAG Region	6.1%	4.9%

Source: SCAG Regional Travel Demand Model

opportunities are provided for use of active transportation. With development of an enhanced active transportation network, first/last mile improvements, Safe Routes to School projects and improved regional bikeway infrastructure, opportunities for healthy lifestyle choices are increased. Connect SoCal also improves access to natural lands, open space and parks, thereby increasing opportunities for physical activity and adoption of healthy lifestyle choices.

The linkage between obesity and chronic disease has been well documented. Providing the appropriate community design and infrastructure to support a more active lifestyle is an important first step toward promoting healthy communities in the SCAG region. Implementation of Connect SoCal is expected to contribute to a 15 percent increase in daily minutes walking per person and an increase in daily minutes of bicycling per capita of about 40 percent. This increase in daily physical activity would improve health outcomes related to obesity, hypertension, heart disease and type 2 diabetes. For a more detailed discussion of the Plan's public health implications, please see the Connect SoCal Public Health Technical Report.

As the health benefits associated with an active lifestyle have become increasingly recognized over recent years, there has been growing support for improving the walkability and bikeability of the communities where we live and work. To promote active lifestyle choices, the Plan evaluates mode share for both walking and bicycling. Connect SoCal increases the mode share for walking from 7.8 percent under the Baseline to 8.7 percent. For bicycling, the share increases from 1.7 percent under the Baseline to 2.1 percent with Connect SoCal.

OUTCOME 4: ENVIRONMENTAL QUALITY

The 'Environmental Quality' performance outcome is assessed in terms of criteria air pollutant and GHG emissions. Based on the modeling results of SCAG's activity-based Regional Transportation Demand Model (RTDM), emissions are estimated using the California Air Resources Board (ARB) Emission Factors (EMFAC) model. Criteria air pollutant emissions are reported in detail as part of the Connect SoCal Transportation Conformity Analysis Technical Report. The impact of air quality on public health is discussed in the Safety and Public Health section of this chapter and monitoring of regional GHG emissions is further discussed in the Connect SoCal Performance Measures Technical Report. A new 'Environmental Quality' outcome performance measure introduced for Connect SoCal is mode share for travel other than driving alone in a motor vehicle (non-SOV mode share). This metric is also supportive of federal MAP-21/FAST Act performance management and reporting requirements.

OUTCOME 5: ECONOMIC OPPORTUNITY

Performance measures used to quantify the 'Economic Opportunity' outcome include the number of new jobs created due to an improved level of economic competitiveness in the SCAG region occurring as a result of Connect SoCal regional transportation system investments. This improved regional economic climate would result in the creation of approximately 264,500 new jobs generated annually over a wide range of employment sectors. In addition, an average of 168,400 new jobs would be generated each year directly through Connect SoCal transportation system construction and operations expenditures. Through implementation of the strategic investments contained in Connect SoCal, the SCAG region will save over $346 million each year in healthcare expenditures associated with high blood pressure, heart disease and type 2 diabetes. These health cost savings may result in new economic activity due to increased disposable income.

The continued strength of the Southern California economy depends on a modern, well maintained regional multimodal transportation system. Goods movement, freight logistics and distribution, tourism, manufacturing and other primary employment sectors are key job generators for all six counties in the SCAG region, and each is very much dependent upon the availability of efficient, high quality transportation infrastructure. The robust investments in our regional transportation system provided through Connect SoCal will serve not only to improve mobility for people and goods throughout our region, but will also ensure the sustained health and vigor of our regional economy, fortifying Southern California's pivotal position within the state, national and global economies for generations to come. Additional economic co-benefits derived through Connect SoCal are referenced in the Economic and Job Creation Analysis Technical Report.

OUTCOME 6: INVESTMENT EFFECTIVENESS

The 'Investment Effectiveness' performance outcome evaluates the degree to which the Plan's transportation system expenditures generate direct benefits to residents of the SCAG region in relation to the amount invested.

The benefit/cost ratio is the quantitative measure used to assess the 'Investment Effectiveness' outcome, as it compares the incremental benefits generated by Connect SoCal expenditures with the incremental costs of regional transportation system capital investments. The benefits are categorized into several categories, including:

- Travel time savings resulting from reduced travel delay
- Air quality improvements
- Safety improvements
- Reductions in vehicle operating costs

For these categories, travel delay and air quality models are used to estimate the benefits generated by Connect SoCal as compared with the Baseline. Many of these benefits are a function of reductions in travel distance (vehicle miles traveled) and in travel time (vehicle hours traveled).

To estimate the Connect SoCal benefit/cost ratio, the benefits generated for each category are converted into dollars and added together. These monetized benefits are then divided by the total incremental costs of the Plan's regional transportation system investments to produce a ratio.

The investments provided in Connect SoCal would provide a return of $2.06 for every dollar invested. For this analysis, all benefits and costs are expressed in 2016 dollars. Benefits are estimated over the Connect SoCal planning period from 2020 through 2045. The user benefits are estimated using the California Benefit/Cost (Cal-B/C) framework and incorporate SCAG Regional Transportation Demand Model (RTDM) outputs. The costs include incremental capital expenditures over the entire 25-year Connect SoCal planning horizon.

OUTCOME 7: TRANSPORTATION SYSTEM SUSTAINABILITY

A regional transportation system may be considered 'sustainable' if it maintains its overall performance over time in an equitable manner with minimal impact to the environment, while not compromising future transportation needs. Essentially, sustainability refers to how decisions made today impact future generations. One of the performance measures used to evaluate transportation system sustainability is the total inflation-adjusted cost per capita to maintain our existing regional multimodal transportation system in a state of good repair. Connect SoCal provides two additional measures to support preservation of our existing transportation system infrastructure: state highway system pavement condition and local roadways pavement condition.

Connect SoCal is committed to maintaining a sustainable transportation system by allocating a total of more than $316 billion toward maintaining and operating the system in a state of good repair. This amounts to an average annual per capita investment of about $562 per person for each year of the Plan. More details on the 'Transportation System Sustainability' performance measures and analysis results are presented in the Connect SoCal Chapter 4 (Paying our Way Forward) and the Performance Measures Technical Report.

OUTCOME 8: ENVIRONMENTAL JUSTICE

Environmental Justice (EJ) is a federal and state requirement designed to ensure the fair treatment and meaningful involvement of all people and communities in the regional planning process regardless of race, color, national origin, or income. SCAG conducted a comprehensive EJ community outreach process and prepared a wide-ranging analysis during the development of Connect SoCal. A separate set of performance measures were developed for use in the EJ analysis and these measures are described later in this chapter.

The results of SCAG's comprehensive EJ analysis and community outreach process are presented in detail in the Connect SoCal Environmental Justice Technical Report.

CONNECT SOCAL CO-BENEFITS

Connect SoCal provides substantial regional benefits and cost savings that extend beyond the performance variables used to evaluate the Plan. The more focused and compact land use patterns promoted by Connect SoCal serve to reduce the need for significant capital investments. Since most new development would be directed into areas where urban infrastructure already exists, there will not be as much need to extend or build new local roads, water and sewer systems and parks, although existing infrastructure may require enhancement. There will also be savings in operations and maintenance (O&M) costs. O&M costs include the on-going municipal expenditures required to operate and maintain the urban infrastructure needed to serve new residential growth.

The Connect SoCal land use strategies also reduce average household costs associated with driving and residential energy and water use. A land use configuration that features more mixed-use/walkable and urban infill development accommodates a higher proportion of growth in more energy-efficient housing types such as townhomes, apartments and smaller single-family homes, as well as more compact and energy efficient commercial buildings.

As California continues to experience constraints on water supplies due to periodic drought conditions throughout the state, which are likely to become more prevalent as we continue to encounter the challenges presented by climate change, there is a need to do what is possible to reduce residential water use. Residential water use is a function of both indoor and outdoor water needs, with outdoor use (landscape irrigation) accounting for much of the difference among housing types. Because homes with larger yards require more water for landscape irrigation, lot size is generally highly correlated with a household's overall water consumption. Therefore, a prevailing land use configuration with a greater proportion of large lot single-family homes will typically consume more water than one that features compact and urban infill development, which includes attached and multi-family homes.

TABLE 5.3 presents some of the supplemental co-benefits provided by Connect SoCal.

MEETING STATE & FEDERAL PLANNING REQUIREMENTS

In addition to meeting the ambitious regional goals and performance outcomes discussed in previous sections of this chapter, Connect SoCal prioritizes the attainment of all applicable federal and state performance requirements. As presented in depth in the Transportation Conformity Analysis Technical Report, Connect SoCal meets all federal provisions for transportation conformity as defined under the federal Clean Air Act (CAA). Cleaner fuels and emergent vehicle technologies will help to significantly reduce many of the pollutants that contribute to smog and other airborne contaminants that impact public health in the SCAG region.

TRANSPORTATION CONFORMITY

Pursuant to the CAA, the U.S. EPA establishes and regularly updates the National Ambient Air Quality Standards (NAAQS), along with a set of planning and reporting requirements for designated criteria air pollutants. To comply with CAA requirements for achieving NAAQS, the ARB periodically prepares a State Implementation Plan (SIP) for each federally designated 'non-attainment' area (an area that does not meet NAAQS for one or more criteria pollutants), and 'maintenance' area (a previously designated non-attainment area that now meets NAAQS) within the State of California. The SIP provides a comprehensive plan of action for how an area will work toward achieving attainment and maintenance of NAAQS. Development of the SIP requires the collaboration of all applicable local air agencies and the ARB, working cooperatively with federal, state, and local agencies, including MPOs.

Demonstration of transportation conformity is required under the CAA to ensure that federally supported highway and transit project activities conform to, or are consistent with, the purpose of the applicable SIP. Conformity for the purpose of the SIP means that transportation activities including regional transportation plans, transportation improvement programs and transportation projects will not cause new air quality violations, worsen existing air quality violations, or delay timely attainment of the relevant NAAQS. Air quality conformity regulations apply to areas designated by the U.S. EPA as being in non-attainment or maintenance for the following transportation

TABLE 5.3 **Connect SoCal Co-Benefits**

Benefit Category	Comparative Benefit Performance			
	2045 Baseline	Connect SoCal	Savings	% Savings
Local Infrastructure and Services Costs: Capital, operations, and maintenance costs to support new growth: 2016-2045	$40.3 billion	$36.4 billion	$3.9 billion	9.7%
Household Costs: Annual transportation and home energy/water use: 2045	$13,953	$13,272	$681	4.9%
Land Consumption: New (greenfield) land consumed to accommodate new growth: 2016-2045	100 square miles	71 square miles	29 square miles	29.2%
Building Energy Use: Residential and commercial buildings: Cumulative 2016-2045 (British Thermal Units)	15,546 trillion	15,396 trillion	150 trillion	0.9%
Building Energy Costs: Residential and commercial buildings: Cumulative 2016-2045	$671.4 billion	$666.4 billion	$5.0 billion	0.7%
Building Water Use: Residential and commercial buildings: Cumulative 2016-2045 (Acre Feet)	89.7 million	88.1 million	1.6 million	1.8%
Building Water Costs: Residential and commercial buildings: Cumulative 2016-2045	$122.5 billion	$120.4 billion	$2.2 billion	1.8%
Total Annual Vehicle Miles Traveled (VMT): 2045	483.5 million	459.1 million	24.4 million	5.0%

Source: SCAG Scenario Planning Model

related criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO2), ozone, and particulate matter (PM2.5 and PM10).

Under the U.S. Department of Transportation Metropolitan Planning Regulations and the U.S. EPA's Transportation Conformity Regulations, Connect SoCal is required to pass the following four conformity tests in order to demonstrate transportation conformity:

- Regional Emissions Analysis
- Timely Implementation of Transportation Control Measures
- Financial Constraint
- Interagency Consultation and Public Involvement

The Regional Council adopts the initial Connect SoCal transportation conformity determination, while the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) approve the final transportation conformity determination.

CONFORMITY ANALYSIS & FINDINGS

As documented in the Transportation Conformity Analysis Technical Report, Connect SoCal meets all federal transportation conformity requirements and therefore demonstrates transportation conformity. The findings associated with the conformity tests are described in detail in the Connect SoCal Transportation Conformity Analysis Technical Report.

GREENHOUSE GAS EMISSIONS REDUCTION

Although transportation conformity is a federal requirement and the reduction of GHG emissions is a state mandate, both requirements are highly interrelated. First, each of the Connect SoCal policies, strategies, programs and projects that contribute to meeting federal transportation conformity requirements are the same policies, strategies, programs and projects that support achievement of state GHG emissions reduction targets. Secondly, although transportation conformity addresses emissions of federally designated criteria pollutants and their precursors, these pollutants originate from the same source as GHG emissions: the combustion of fossil fuels in motor vehicles.

Plans and strategies that result in the reduction or elimination of the use of fossil fuels in motor vehicles serve to help Connect SoCal meet both federal transportation conformity requirements and state GHG emission reduction targets. In addition, the regional emissions analysis conducted to ensure transportation conformity and the analysis employed for evaluating GHG emissions reduction performance use the same regional transportation model and the same ARB EMFAC model. There is now greater awareness of the need for more concerted efforts at the federal, state and local levels to integrate the SIP development process with planning activities to address climate change. As a result, transportation conformity and GHG emissions reduction efforts will become even more interconnected and more mutually supportive.

As discussed throughout Connect SoCal, SB 375 requires SCAG to incorporate into its RTP a Sustainable Communities Strategy (SCS) to reduce per capita GHG emissions through integrated transportation, land use, housing and environmental planning.

SB 375 required the ARB to set per capita GHG emission reduction targets from passenger vehicles for each of the state's 18 MPOs. These regional targets were updated by the ARB in 2018 to ensure consistency with the more stringent statewide reduction goals subsequently introduced by the California legislature and the Governor's office. For the SCAG region, the updated targets are 8 percent below 2005 per capita emissions levels by 2020 (this value is unchanged from the previous 2020 ARB target), and 19 percent below 2005 per capita emissions levels by 2035. This revised 2035 target is significantly higher than the previous ARB target of 13 percent for the SCAG region.

Analysis of SCAG's ability to meet SB 375 targets relies on data outputs from SCAG's activity based model as well as supplemental off-model analysis. **TABLE 5.4** provides a simplified calculation overview of the performance of the plan related to GHG emissions reductions.

The Connect SoCal SCS has been found to meet state targets for reducing GHG emissions from cars and light trucks. Connect SoCal achieves per capita GHG emission reductions relative to 2005 levels of 8 percent in 2020, and 19 percent in 2035, thereby meeting the GHG reduction targets established by the ARB for the SCAG region. For the 2020 target, this achievement is based on modeled results as observed data is not yet available to confirm achievement. For more detailed information and analysis on the performance of Connect SoCal in regard to criteria air pollutant emissions and GHG reduction targets in the SCAG region, please see the Transportation Conformity Analysis Technical Report and the Sustainable Communities Strategy Technical Report.

FEDERAL PERFORMANCE MANAGEMENT REQUIREMENTS

In July 2012, the 'Moving Ahead for Progress in the 21st Century' (MAP-21) federal transportation authorization legislation was signed into law. MAP-21 was widely considered to be a groundbreaking achievement in that it provided a legislative foundation for the establishment of a national performance-based transportation planning program, which was continued with the subsequent federal authorization program, the 'Fixing America's Surface Transportation' (FAST) Act, in December 2015.

MAP-21/FAST Act requires states and MPOs to establish performance targets focused on outcomes supportive of seven key national transportation goals related to transportation investment efficiency. These national performance goals include: 1) transportation system safety, 2) transportation infrastructure condition, 3) congestion reduction, 4) system reliability, 5) freight movement and economic vitality, 6) environmental sustainability and 7) reduced project delivery delay.

To provide a quantitative basis for evaluating progress toward achieving these seven national performance goals, MAP-21/FAST Act also tasked FHWA with the development of a corresponding set of performance measures and targets. The performance measures provide a standardized quantitative metric for monitoring progress toward meeting each of the national goals. Performance targets establish quantitative thresholds by which the measures may be interpreted as having made acceptable progress toward achieving a specific performance goal.

As required by MAP-21/FAST Act, FHWA established national performance measures and guidelines for the setting of statewide and regional performance targets. As provided for in the federal rulemaking, SCAG coordinated closely with Caltrans in the establishment of specific performance targets for the state and for our region in the various transportation performance areas established under MAP-21/FAST Act.

GHG Reduction Targets for the SCAG Region

	2020	2035
ARB Target	8%	19%
Connect SoCal	8%*	19%
% Difference	0%	0%

Percent Reduction Relative to 2005 Levels (per capita)

**Observed data is not yet available. Achievement is based on modeled results and does not include off-model adjustment factors.*

FHWA established rules for implementing transportation system performance management planning at a national level. Rulemaking in support of MAP-21/FAST Act has provided performance management and target-setting guidance through three performance management (PM) packages:

- Transportation System Safety
- Pavement and Bridge Condition (National Highway System)
- National Highway System, Freight Movement, and CMAQ Program Performance

In addition to the three performance management packages, federal performance measures and reporting requirements were established for Transit Asset Management (TAM) and Transit Safety. Performance metrics for TAM focus on the maintenance of our regional transit system in a state of good repair. Transit assets to be monitored under this provision include:

1. Non-revenue support equipment and maintenance vehicles
2. Transit vehicles (rolling stock)
3. Rail infrastructure including tracks, signals, and guidance systems
4. Transit facilities including stations, parking structures and administrative offices

Transit safety performance monitoring is focused on assessment of the number of transit incidents resulting in fatalities or serious injuries, and on transit system reliability.

Each of the federal Performance Management packages features a corresponding set of specific performance measures for which statewide and regional performance targets must be set and reported to FHWA. A comprehensive MAP-21/FAST Act System Performance Report is included in the Connect SoCal Performance Measures Technical Report. The System Performance Report provides details regarding MAP-21/FAST Act performance measures and the associated statewide and regional targets for each of the federal performance management packages.

ENVIRONMENTAL JUSTICE

Environmental Justice (EJ) is a federal and state mandate designed to help ensure social equity in the transportation planning and decision-making process, with the goal of protecting minority and low-income communities from incurring a disproportionate share of adverse impacts produced by regional transportation projects and plans. SCAG's EJ program includes two essential elements: public outreach and technical analysis. Specifically, it is SCAG's role to ensure that when transportation system investment decisions are being

TABLE 5.4 **2035 Greenhouse Gas Emission Reduction Calculation**

Modeled Greenhouse Gas Emissions	
This calculation reflects transportation investments, pricing strategies, transportation demand management strategies and land use strategies.	-14.89%
Baseline Adjustment	
Tele-Medicine and E-Commerce	-0.35%
Off-Model Greenhouse Gas Emissions	
Induced Demand	0.56%
Electric Vehicle Strategies	-1.76%
Emerging Technology (e.g. carshare and bikeshare)	-0.78%
Job Center and Commute Strategies (e.g. co-working)	-1.21%
Multimodal Strategies (e.g. Safe Routes to School)	-0.70%
TOTAL GREENHOUSE GAS EMISSIONS	-19.12%

made, low-income and minority communities have adequate opportunity to participate in the decision-making process and receive an equitable distribution of benefits, while not bearing a disproportionate share of burdens.

As such, SCAG adheres to all federal and state EJ directives. All public agencies that use federal funding must make EJ part of their mission and adhere to three fundamental EJ principles:

- To avoid, minimize or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- To prevent the denial of, reduction in or significant delay in the receipt of benefits by minority and low-income populations

Public outreach to EJ stakeholders and the EJ technical analysis conducted in support of Connect SoCal is described in detail in the Environmental Justice Technical Report. The Technical Report also provides a review of federal and state legislation pertaining to EJ, SCAG policies related to EJ, outreach efforts in communities throughout the region, SCAG's efforts to identify affected communities and an 'EJ Toolbox" which provides recommended practices and approaches that local jurisdictions and community organizations may use to guide further discussion on the identification of EJ solutions and mitigations.

In the development of the EJ analysis, SCAG identified 18 performance measures to analyze existing EJ parameters in the region and to address any potential adverse impacts that Connect SoCal may impose upon the various EJ communities throughout the region. SCAG also examined potential impacts at various geographic levels, and specifically employed a community-based approach for Connect SoCal based on guidance received from community stakeholders. A brief description of the EJ performance measures is provided in this section.

TABLE 5.5 (at the end of this section) presents the Connect SoCal Environmental Justice performance measures.

ENVIRONMENTAL JUSTICE PERFORMANCE MEASURES

A critical element in the development of Connect SoCal is the completion of a comprehensive EJ analysis. SCAG also conducted an extensive EJ outreach program with regional EJ stakeholders to maximize participation of all communities that may be affected by the development and implementation of Connect SoCal. SCAG established a separate set of performance measures to evaluate Connect SoCal impacts on designated EJ communities throughout the region.

The Connect SoCal EJ analysis includes a set of topical areas of inquiry designed to evaluate various social equity concerns. Each of the Connect SoCal EJ performance measures are described below. The 18 EJ performance measures are categorized into four EJ-focused questions as requested by stakeholders to make the performance areas more relatable. These four relatable questions are: 1) How will this impact quality of life; 2) how will this impact health and safety; 3) how will this impact the commute; and 4) how will this impact transportation costs? For more information regarding the SCAG EJ program and the detailed results of the Connect SoCal EJ analysis, please see the Environmental Justice Technical Report.

HOW WILL THIS IMPACT QUALITY OF LIFE?

1. **Jobs-Housing Balance:** An imbalance between employment and housing in a community is a key contributor to local traffic congestion. These types of origin/destination disparities may also be considered impediments to EJ. From an economic standpoint, transportation and driving are expensive; workers without a car or cannot afford a vehicle have to live close to their jobs where they have access to transit or are able to walk or bike to their jobs. This metric seeks to identify any significant differences in commute distances, job-to-work ratios, and jobs-housing ratios among various income levels, between coastal counties and inland counties, and over time.
2. **Neighborhood Change & Displacement:** The integration and coordination of transportation and land use planning is recognized as a key strategy for reducing VMT, air pollution and GHG emissions, while also increasing opportunities for physical activity. However, there

are some equity concerns regarding some 'smart growth' strategies as they relate to housing affordability, specifically in as it relates to Transit-Oriented Development (TOD). The concentration of new growth in central cities and towns to limit sprawl may lead to higher household costs. In some cases where improved transit service has spurred significant new TOD, the result has been that people with low and average incomes are no longer able to afford to buy or rent homes in or near the new developments. In response to these concerns, SCAG developed a methodology to model and monitor demographic trends occurring in and around new transit-oriented communities. This measure examines historical demographic and housing trends for areas surrounding rail and transit stations. With this methodology, demographic changes may be tracked over time in key growth areas. The results will help SCAG and our regional partners better understand demographic shifts that have occurred due to development of TOD along transit lines.

3. **Accessibility to Employment & Services:** Accessibility to key destinations is vital for social and economic interactions. As a performance metric, accessibility is evaluated by the spatial distribution of potential destinations, the ease of reaching each destination by various transportation modes and the magnitude, quality and character of the activities at the destination sites. Travel costs are central: the lower the costs of travel, in terms of time and money, the more places may be reached within a specific budget – that is, the greater the accessibility. The number of destination choices that people have is equally crucial: the more destinations and the more varied the destinations, the higher the level of accessibility. This metric analyzes the share of employment and shopping destinations reachable within 30 minutes by automobile or 45 minutes by transit during evening peak periods to determine the accessibility of services in EJ communities
4. **Accessibility to Parks & Schools:** Accessibility to parks is defined as the percentage of park acreage that may be reached within 30 minutes of travel time by automobile or 45 minutes by transit. In support of the Connect SoCal EJ assessment, analysis was conducted to evaluate accessibility to the San Gabriel National Monument. SCAG's accessibility analysis seeks to determine how the Plan improves residents' ability to access parks within a designated travel time and distance. This analysis is discussed in greater detail in the Connect SoCal Environmental Justice Technical Report.

HOW WILL THIS IMPACT HEALTH & SAFETY?

5. **Active Transportation Hazards:** Encouraging a healthier, more active lifestyle in all our communities is one of the featured goals of Connect SoCal. Making walking and bicycling safer and more convenient transportation options is key to attracting more people to choose these healthy alternatives. Bicycling or walking along roadways near motor vehicles is often perceived as dangerous and reducing hazards in the pedestrian and cycling environment is a primary strategy toward achieving our goal of promoting healthier, more active communities. The 'Active Transportation Hazards' performance measure evaluates incidences of motor vehicle collisions involving bicyclists and pedestrians in our communities, with the goal of promoting an improved environment for active transportation users and encouraging more residents to make the choice to walk or bicycle in their communities. As with other EJ performance measures, this indicator will be used to identify patterns of active transportation hazards and potential risk disparities among the various communities in the SCAG region. For more information on active transportation safety, please see the Active Transportation Technical Report.
6. **Climate Vulnerability:** The 'Climate Vulnerability' performance measure seeks to identify disparities in vulnerability to the impacts of climate change among the various communities in the SCAG region. Of specific interest for this analysis is relative risk for sea level rise and wildfires. It is understood that climate change will impact different regions in different ways. In Southern California, we may expect a general trend toward warmer temperatures, less precipitation and higher sea levels along our coasts. This combination of climatic changes will likely result in increased wildfire danger, particularly in the foothill areas, where our cities adjoin our local mountains. Due to rapidly melting polar ice caps, a steady rise in global sea levels is expected. This may impact the coastal regions of Southern California. This measure will allow SCAG to obtain a better understanding of how these anticipated changes in our local climate may impact our more

vulnerable communities.

7. **Public Health Impacts:** The 'Public Health Impacts' metric seeks to assess the potential disparity among communities in the SCAG region of public health issues that may be associated with local exposure to toxic substances and to transportation infrastructure. Like the Active Transportation Hazards measure, inclusion of this analysis is intended to advance the regional goal of fostering healthier lifestyle choices in our communities. It is a priority of Connect SoCal to provide for more and better opportunities for healthy lifestyle choices throughout the region. For more information on public health, please see the Public Health Technical Report.
8. **Aviation Noise Impacts:** The SCAG region supports the nation's largest regional airport system, in terms of the number of airports and overall aircraft operating within a complex airspace environment. The aviation system includes seven airports with commercial passenger service: Los Angeles International (LAX), Hollywood/Burbank, John Wayne (Orange County), Long Beach, Ontario, Palm Springs, and Imperial. In addition, there are four large reliever airports located in the Inland Empire and in North Los Angeles County, including San Bernardino International Airport, March Inland Port, Southern California Logistics Airport, and Palmdale Airport.
   The regional aviation system also includes more than 30 general aviation and reliever airports, several private-use and government airports, and 14 public use airports not included in the national airport system – for a total of more than 60 airports in the region. The primary aviation planning challenge in the SCAG region is striking a balance between the aviation capacity needs of Southern California and maintaining the quality of life for people living near airports. This performance measure provides a descriptive analysis of aviation noise in terms of trends in passenger demand and aircraft operations.
9. **Roadway Noise Impacts:** The SCAG region has an extensive roadway system, with nearly 24,000 centerline miles or over 73,000 lane miles of regionally significant roadways. It also includes one of the country's most extensive HOV systems and a growing network of high-occupancy toll (HOT) lanes. The region also has a vast network of arterials and other local roadways, and the noise generated by these facilities may cause significant environmental concerns. Noise associated with highway traffic depends on multiple factors including traffic volumes, vehicle speed, vehicle fleet mix (cars, trucks) and the location of the highway relative to schools, daycare facilities, parks and other sensitive receptors. This performance measure assesses transportation-related noise impacts by examining how the program of projects included in Connect SoCal may affect roadway noise levels, and by determining the population groups that may potentially be most impacted by increased levels of roadway noise.
10. **Emissions Impact Analysis:** The EJ emissions impact analysis seeks to identify areas in the region that generate a disproportionate share of air pollutant emissions as a result of Connect SoCal. This analysis also includes a breakdown of demographics for those affected areas.
11. **Impacts Along Freeways & High-Traffic Roadways:** Exposure to air pollutants is an EJ issue due to the disproportionate share of minority and low-income populations living near heavily traveled corridors, particularly freeways and port and logistics activities. Exposure to unhealthy air is estimated to result in approximately 5,000 premature deaths annually in the SCAG region, as well as 140,000 incidents of asthma and symptoms of respiratory distress. More than half of all Americans exposed to PM2.5 levels that exceed the national standard live in the SCAG region. This performance metric examines the potential impact of Connect SoCal on the generation of particulate matter and ozone emissions in areas near freeways and other highly traveled corridors.

HOW WILL THIS IMPACT THE COMMUTE?

12. **Travel Time Savings & Travel Distance Savings:** SCAG assessed the distribution of both travel time and travel distance savings that result from the implementation of Connect SoCal, through the analysis of demographic and mode share data for each Transportation Analysis Zone (TAZ) in the region. With this input, travel time and distance savings estimates were developed for various income and ethnic groups for transit trips (bus and rail) and for automobile trips.
13. **Rail-Related Impacts:** Freight rail emissions are estimated to account for 5 percent of all NOx emissions and 4 percent of all particulate matter emissions generated by regional goods movement activities. When compared with all regional particulate matter and NOx sources, the contributions by freight rail emissions is even lower. However,

environmental pollution from locomotives, rail yards and other rail facilities must be considered, as concentrations of rail activities may contribute to localized air pollution. In support of this outcome, SCAG conducted an extensive analysis of potential impacts to EJ communities adjacent to railroads and rail facilities and of rail-related impacts to designated sensitive receptors. For more detailed information regarding the SCAG regional rail system, please see the Goods Movement Technical Report.

HOW WILL THIS IMPACT TRANSPORTATION COSTS?

14. **Share of Transportation System Usage:** SCAG analyzed the use of various transportation modes by race/ethnicity and by income group, with the objective of identifying transportation mode share consistencies among various ethnicity groups and income levels in the SCAG region.
15. **Connect SoCal Revenue Sources & Tax Burdens:** Various types of transportation improvement revenue sources (taxes on income, property, sales and fuel) may impose disproportionate burdens on low-income and minority populations. Sales and gasoline taxes, which are currently the primary sources of funding for the region's transportation system, were evaluated for the purposes of this analysis. The amount of taxes paid was broken down to demonstrate how tax burdens fall on various demographic and income groups. As with previous RTP EJ assessments, the Connect SoCal EJ analysis examined in detail the incidence, distribution and relative burden of taxation.
16. **Connect SoCal Investments:** The strategies that public agencies pursue to invest in transportation systems present potential impacts on EJ. Transportation investment strategies and policies determine the number and quality of transportation choices that are available to low-income and minority communities. An investment analysis that reveals a disproportionate allocation of resources for high quality transit projects, for example, may indicate a pattern of discrimination.
17. **Geographic Distribution of Transportation Investments:** This metric examines where Connect SoCal transportation investments are planned throughout the region. Building upon the community-based approach used in SCAG's overall EJ process, a summary of investments for areas with high concentrations of minority and/or low-income populations is compiled for Connect SoCal highway, transit and active transportation investments.
18. **Mileage-Based User Fee Impacts:** This analysis is based on a potential transportation improvement financing strategy which would implement a user fee based on VMT. If implemented, the VMT user fee would replace the current gasoline tax and is estimated to cost about 2.5 cents (2019 value) per mile and would be indexed to maintain its purchasing power starting in 2030. Implementation of this financing strategy would require action by both the California State Legislature and the U.S. Congress. This performance measure evaluates the potential land use impacts that may result from implementation of such a fee.

SUMMARY OF PLAN PERFORMANCE

The comprehensive program of transportation system improvement projects, regional sustainability strategies and land use-transportation coordination policies proposed by Connect SoCal serve to advance the regional goals. Performance outcomes and performance measures are the tools used by SCAG to evaluate how well the Plan performs toward achieving those objectives.

Common elements among the various Connect SoCal outcomes and performance metrics are a unified commitment to the strengthening of the transportation-land use connection, the promotion of sustainable land use policies throughout the region, and the reduction of GHG emissions that contribute to climate change. Connect SoCal strengthens the transportation-land use connection through its focus on orienting new housing and job growth in areas served by high quality transit, and into other infill areas where urban infrastructure already exists. This more compact and sustainable land use pattern, combined with the transportation network improvements and strategies identified in Connect SoCal, will result in an improved pedestrian and bicycle environment, access to more community amenities, shorter average trip lengths, reduced VMT and better regional air quality.

The Connect SoCal performance outcomes and measures also support the development of more livable communities that provide housing choices for all income levels, encourage conservation of our natural resources, offer more and better transportation options and promote an improved quality of life for residents of the SCAG region.

The overall objective of Connect SoCal is to provide a means to transform the SCAG region in accordance with the vision provided by our constituent communities and jurisdictions. Among the performance outcome areas where Connect SoCal demonstrates significant transformative capacity is in Location Efficiency. As discussed earlier in this chapter, Location Efficiency refers to improvements in the coordination of land use and transportation planning and decision-making to promote development of more sustainable communities throughout the region that are less dependent on SOV travel and reduce regional VMT and GHG emissions. Focusing new residential and commercial development in HQTAs serves this outcome by situating employment centers and new housing closer to reliable transit options, thereby providing viable alternatives to driving alone to the workplace and to other destinations. HQTAs also foster the mixing of both employment and housing, further enhancing opportunities to reduce commute times and distances.

Under the 2045 Baseline scenario, just over 45.2 percent of new households would be located in HQTAs. With Connect SoCal, the share of new households in HQTAs increases by six percent to 51.2 percent. The share of employment in HQTAs, increases even more dramatically going from 44.8 percent under the Baseline to nearly 60 percent with the Plan, an increase of more than 15 percent. With more people living and working within locations proximal to efficient and convenient transit options, traffic congestion on our freeways and arterial roadways will be reduced accordingly. Another substantial Location Efficiency improvement provided by Connect SoCal is in the reduction of urban sprawl into the rural periphery of our region. Under the Baseline, urbanization would consume 100 square miles of previously rural areas. Connect SoCal reduces this expansion to only 71 square miles, a reduction of 29 percent. The preservation of rural and agricultural lands on the periphery of our region will allow future generations to enjoy the grandeur of our deserts and the rich harvests of our local farmlands.

VMT per capita is another performance area where Connect SoCal excels. Under the Baseline, SCAG region residents would drive an average of 21.8 miles per day. Connect SoCal would reduce this figure to 20.7 miles per day. While one mile per day doesn't seem like very much, when considering the SCAG region is expected to be home to 22.5 million people by 2045, that decrease of one mile in per capita VMT becomes quite meaningful.

Another area where Connect SoCal demonstrates significant strength is in the reduction of travel delay. Person hours of delay experienced on the mixed flow lanes of our highways is expected to decrease by 26 percent in comparison to the 2045 Baseline projection, while delay on our arterial roadways will decrease by 24 percent. Traffic congestion is a significant quality of life issue in the SCAG region and these reductions in travel delay on our roadways will result in less time spent stuck in traffic, more time available to use for more satisfying activities, and therefore less stress for residents of the SCAG region.

TABLE 5.5 Environmental Justice Performance Measures

Performance Measure	Definition	Performance Target	Summary of Impacts
Jobs/housing balance	Comparison of median earnings for intra-county vs inter-county commuters for each county; analysis of relative housing affordability and jobs throughout the region	Establish existing conditions to evaluate future performance (not a Connect SoCal performance measure)	Higher wage workers tend to commute longer distances than lower wage workers. Coastal counties have a substantial concentration of low-wage jobs, but lack an adequate number of affordable rental units, while inland counties have a substantial concentration of affordable rental units and workers relative to the number of low-wage jobs. Connect SoCal will improve jobs/housing balance throughout the region, particularly in inland counties.
Neighborhood change and displacement	Examination of historical and projected demographic and housing trends for areas surrounding rail transit stations	Establish existing conditions to evaluate future performance (not a Connect SoCal performance metric)	New light rail stations may increase neighborhood outflow rates by up to ten percent. However, most observed moves were for middle and upper income groups. Project-based analysis provides a better understanding of local neighborhood dynamics and helps ensure equitable access to the benefits of improved infrastructure. Regional neighborhood analysis identified several communities that have experienced persistent change over recent decades, however, they are not disproportionately located in EJ communities.
Accessibility to employment and services	Share of employment and shopping destinations reachable within 30 minutes by automobile or 45 minutes by transit during evening peak period	No unaddressed disproportionately high adverse effects for low income or minority communities	Connect SoCal will improve the number of accessible destinations within 45 minutes of travel and within short distances for low income and minority communities both by auto and transit.
Accessibility to parks and educational facilities	Share of park acreage reachable within 30 minutes by automobile or 45 minutes by transit during evening peak period	No unaddressed disproportionately high adverse effects for low income or minority communities	Connect SoCal will improve the number of destinations accessible within 45 minutes of travel and short distances for low income and minority communities both by auto and transit.
Active transportation hazards	Analysis of population by demographic group for areas that experience highest rates of bicycle and pedestrian collisions	Establish existing conditions to evaluate future performance	Analysis indicates that low-income and minority communities tend to incur a higher rate of bicycle and pedestrian risk. Improvements in active transportation infrastructure and complete streets measures, such as those proposed in Connect SoCal, have been shown to reduce hazards to cyclists and pedestrians.

TABLE 5.5 **Environmental Justice Performance Measures - Continued**

Performance Measure	Definition	Performance Target	Summary of Impacts
Climate vulnerability	Population analysis by demographic group for areas potentially impacted by substandard housing, sea level rise, wildfire risk, or extreme heat effects related to climate change	Establish existing conditions to evaluate future performance (not a Connect SoCal performance metric)	Minority and low-income populations are at greater risk for experiencing negative impacts of climate change, including extreme heat and flooding. These communities have fewer resources to ameliorate climate consequences.
Public health analysis	Summary of historical emissions and health data for areas with high concentrations of minority and low income population	Establish existing conditions to evaluate future performance (not a Connect SoCal performance metric)	Air quality is generally improving throughout the SCAG region, however some areas not showing improvement feature higher proportions of minority and low income population. When examining regional public health performance, areas with the highest concentrations of minority and low-income population often incur some of the highest risks.
Aviation noise impacts	Descriptive analysis of aviation noise in terms of trends in passenger demand and aircraft operations	Establish existing conditions to evaluate future performance	Airport noise impacts affecting adjacent communities have been reduced through enhanced FAA noise certification standards, improved technology implemented by aircraft and engine manufacturers, investments by U.S. airlines in newer, quieter aircraft, and mandates by the FAA and the U.S. Congress to retire older, noisier aircraft. However, aviation noise levels and impacts willl continue to be monitored for minority and low-income communities located near airports.
Roadway noise impacts	Comparison of Plan and Baseline scenarios, identification of areas that are low performing due to Connect SoCal investments; breakdown of population for impacted areas by ethnicity and income	No unaddressed disproportionately high adverse effects for low income or minority communities	Connect SoCal will reduce roadway noise impacts at the regional level, but does not specifically improve impacts for disadvantaged communities.
Emissions impact analysis	Comparison of Plan and Baseline scenarios; identification of areas that are lower performing as a result of the Plan, including a breakdown of demographics for those areas	No unaddressed disproportionately high adverse effects for low income or minority communities	Connect SoCal will result in reductions in vehicle carbon monoxide and particulate matter emissions, providing air quality benefits to minority and low-income households and to communities with a high concentration of minority and low income population.

TABLE 5.5 **Environmental Justice Performance Measures - Continued**

Performance Measure	Definition	Performance Target	Summary of Impacts
Impacts along freeways and highly traveled corridors	Comparison of Plan and Baseline scenarios and demographic analysis of communities in close proximity to freeways and highly traveled corridors	No unaddressed disproportionately high adverse effects for low income or minority communities	Connect SoCal will result in an overall reduction in emissions in areas located near highly traveled roadways, which tend to have a higher concentration of minority and low-income groups than the region as a whole.
Travel time and travel distance savings	Assessment of comparative benefits received as a result of Connect SoCal investments by demographic group in terms of travel time and travel distance savings	No unaddressed disproportionately high adverse effects for low income or minority communities	Connect SoCal travel time and distance savings for low-income households and minority communities are proportionate to each group's usage of the transportation system.
Rail-related impacts	Breakdown of population by demographic group for areas in close proximity to rail corridors and planned grade separations	No unaddressed disproportionately high adverse effects for low income or minority communities	Minority and low income communities in areas adjacent to railroad grade separation projects do not demonstrate improvement.
Share of transportation system usage	Comparison of transportation system usage by mode for low income and minority households relative to each group's regional population share	No unaddressed disproportionately high adverse effects for low income or minority communities	Low-income and minority groups show a higher usage of transit and active transportation modes and positions these communities to benefit from the investments in Connect SoCal.
Connect SoCal revenue sources in terms of tax burdens	Proportion of Connect SoCal revenue sources (taxable sales, income, and gasoline taxes) generated from low income and minority populations	No unaddressed disproportionately high adverse effects for low income or minority communities	Households in poverty would not contribute disproportionately to the overall funding of Connect SoCal. Minority households would not pay a higher proportion of taxes to fund the Plan than their relative representation in the SCAG region as a whole.
Connect SoCal investments	Analysis of Connect SoCal investments by mode (bus, HOV lanes, commuter/high speed rail, highways/arterials, and light/heavy rail transit)	No unaddressed disproportionately high adverse effects for low income or minority communities	The share of Connect SoCal transportation investments serving low-income and minority communities outpaces the relative share of financial burden on those groups.

TABLE 5.5 Environmental Justice Performance Measures - Continued

Performance Measure	Definition	Performance Target	Summary of Impacts
Geographic distribution of Connect SoCal transportation investments	Evaluation of Connect SoCal transit, roadway, and active transportation infrastructure investments in various communities throughout the region	No unaddressed disproportionately high adverse effects for low income or minority communities	Connect SoCal transportation infrastructure investments are distributed throughout the region in proportion to population density.
Mileage-Based User Fee impacts	Examination of potential impacts from implementation of a mileage-based user fee on low income households in the region	No unaddressed disproportionately high adverse effects for low income or minority communities	No disproportionate impact is found. Analysis indicates that a mileage-based user fee would be less regressive and more equitable to low-income residents than the current gasoline tax. Low income households currently pay more per mile in gasoline tax than their higher earning counterparts due to lower adoption rates of new (more fuel efficient) vehicles. With a mileage-based user fee system, all households will pay in proportion to their usage of the transportation system.

Source: SCAG

CHAPTER 6

CHAPTER 6

LOOKING AHEAD

LOOKING AHEAD

Connect SoCal has presented a suite of valuable regional strategies and catalytic transportation investments reflecting our aspirations for a healthier, safer, more resilient and economically vibrant region. In particular, Connect SoCal introduces the Key Connections which are packages of strategies that lie at the intersection of land use, transportation and innovation. These strategies depend on broad inter-agency partnerships, and will position the region to deliver sustained performance in meeting the plan's objectives. Our air can be cleaner to breathe, our streets can be safer to navigate, and our resources can be preserved and restored when we directly confront our challenges and take decisive action. Real progress can be made towards sustainable results over the next 25 years if cities and counties are equipped with sufficient resources and practical tools. SCAG will help forge partnerships beyond jurisdictional boundaries for over 20 million people so we can achieve our regional goals.

There is always more to accomplish in Southern California – much more than what a single regional transportation plan can articulate. Although Connect SoCal helps our region advance towards a more sustainable future, additional needs remain, and this Chapter seeks to illuminate new challenges that are on our horizon.

A REGIONAL RESILIENCE FRAMEWORK

The challenges our region will face in meeting ambitious goals over the next 25 years and beyond are increasingly difficult to predict, as the recent COVID-19 pandemic has proven. Disruptions to the region from our changing climate, natural hazards, technology, the global economy and other external forces will be significant in the near- and long-term. These disruptions may be acute shocks that are sudden such as earthquakes, or chronic stresses such as high unemployment or housing insecurity. It is critical that we recognize the likelihood of disruption and strengthen our collective resolve to become an even more resilient and prepared region. Disruptions will impact to varying degrees our region's public health, vulnerable populations, economy, natural resources, built environment, transportation system, housing and water supplies, utility infrastructure and emergency services.

To better anticipate a wide range of potential futures and strengthen the resilience and preparedness of the region, a collaborative exploratory scenario planning process will be initiated to augment the traditional Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) planning process. This process will not be focused on achieving predetermined outcomes or targets. Rather, it will explore pressing issues and potential near- and long-term disruptions to Southern California, such as earthquakes, extreme weather, drought, wildfires, pandemics and economic shocks. This exploration will be expansive and help identify pathways for developing future regional and local plans, including those addressing resilience, emergency preparedness and health equity.

A framework and approach will help define "regional resilience" and identify specific strategies to reduce vulnerabilities, thus allowing the region to further adapt, withstand and respond to disruption. Specifically, the approach will consider the potential degree of disruption to the region that could result from land based, atmospheric, public health and geologic natural hazards. Opportunities for being better prepared for climate change and public health impacts may be prioritized, and implementation tools will be established.

Connect SoCal recognizes that a resilient and prepared region requires that the transportation system, built environment and natural resource areas coexist in a well-balanced land use pattern. Further, it recognizes that when well-coordinated, these components can result in multiple benefits, including greenhouse gas (GHG) emissions reductions, improved health, equity and conservation. Accordingly, the framework will be developed to maximize the implementation of Connect SoCal's regional strategies and investments that support resilience.

SCAG recognizes that disruptions and their impacts may be borne differently by people depending on demographics and location. Crafting a regional resilience framework and approach therefore requires the meaningful engagement of diverse stakeholders from throughout the region. To better reach and engage a broader cross section of residents – particularly when physical distancing may make traditional outreach more challenging – SCAG intends to develop, expand and deepen partnerships with Community Based Organizations (CBOs). Partnering with CBOs can support equitable and resilient regional outcomes.

IDENTIFYING & FULFILLING HOUSING NEEDS

Connect SoCal's strategies and investments seek to support expanded housing choices for all income levels in areas with a range of transportation choices and economic opportunities. For instance, land use strategies such as prioritizing growth in Job Centers are intended to reduce commute distances and times, and regional initiatives focused on supportive infrastructure for housing in these areas seek to incentivize infill housing production. However, as prices have soared in areas closest to employment centers, high housing costs have lengthened commutes and growth has been pushed to distant locales that often have important natural resources meriting conservation.

Moreover, since 1990, new home construction in the region has on average been at much lower levels than the decades before and vacancy rates have declined. The cost of building housing has been increasing and the risk of displacement has amplified. Production of affordable housing in particular has also remained well below the region's needs during a critical time. Overcrowded households and the burdens of housing costs have increased as a result of low supply and increased demand.

Cost-burdened households with limited transit options who reside further from Connect SoCal's Priority Growth Areas (PGAs) such as Jobs Centers, Transit Priority Areas (TPAs) and High Quality Transit Areas (HQTAs) are more likely to acquire an automobile, drive longer distances, and drive more often. Accordingly, a comprehensive approach is needed to expedite the production of housing in and near PGAs and in other areas with multiple mobility options. Investigating opportunities and barriers to producing units of all types for households of all ages, sizes and income levels is critical.

A Regional Housing Strategy Framework should be developed that places enhanced value on infill opportunities within Connect SoCal's identified and potential future PGAs such as Job Centers, TPAs, HQTAs, Neighborhood Mobility Areas and Livable Corridors. Strategies to preserve existing affordable housing and avert displacement will be essential. This effort should balance housing production strategies well supported by multiple transportation options with the conservation of natural and agricultural lands and restoration of habitats. The "Housing Supportive Infrastructure" Key Connections strategy, discussed in Chapter 3, will be a starting point to coordinate policies and investments across different agencies involving innovations in technology, planning and financial tools.

Finally, it is important to note that recent legislation has increased funding to support local planning for housing. Specifically, under Assembly Bill 101 (AB 101) (2019) legislation, SCAG is eligible for approximately $47 million from the California Department of Housing and Community Development (HCD). These funds will be used to develop a Regional Housing Strategy Framework and provide planning resources, grants and services to jurisdictions to implement their 6th cycle Regional Housing Needs Assessment (RHNA) allocation, which is supportive of Connect SoCal goals and policies. In addition, depending on their population size, local jurisdictions are eligible to receive between $65,000 and $1.5 million individually through AB 101 funding to develop and implement their 6th cycle housing element. Collectively, SCAG jurisdictions are eligible for up to $50 million based on this direct funding resource. SCAG is promoting coordination among these funding opportunities to accelerate housing production throughout the region.

PLANNING FOR TECHNOLOGY & MOBILITY SERVICES

Given existing land use patterns and our maturing transportation system, expanding transportation capacity and infrastructure to serve exurban areas is ever more expensive to build and maintain. Accordingly, it is essential to ensure we are getting the most productivity out of our existing built areas and transportation system through system optimization strategies. These strategies can be facilitated by new technology and mobility innovations that are fundamentally transforming the way people travel.

Connect SoCal provides a number of policies and recommendations to support and facilitate the three revolutions of transportation — electrification, sharing and automation — and ensure that these transformative innovations support, rather than hinder, our regional goals. For example, research suggests that Transportation Network Companies (TNCs) contribute to increased congestion, vehicle miles traveled (VMT) and therefore GHG emissions. Various studies report that between 43 percent and 61 percent of TNC trips substitute for transit, walk or bike travel, or would not have been made at all. The University of Kentucky found that Uber and Lyft decrease rail ridership by 1.3 percent per year and bus ridership by 1.7 percent per year. These impacts could be dwarfed by the increased VMT that may occur in a future where privately owned automated vehicles are the primary means of travel. More discussion is provided in the Emerging Technology Technical Report.

Through additional policy discussions and planning efforts, SCAG will build upon Connect SoCal recommendations and develop a regional framework for technology and mobility services to ensure that the power of technology and innovation is harnessed to improve mobility, accessibility and sustainability in Southern California. This framework should be built on a foundation of guiding principles, data and analysis, to provide a blueprint for integrated policies, practices and programs. SCAG will develop work plans in partnership with various jurisdictions to implement innovative strategies aligned with the "Smart Cities and Job Centers," "Go Zones," "Accelerated Electrification" and "Shared Mobility and Mobility as a Service" Key Connections described in Chapter 3.

Through its Emerging Technologies Committee, SCAG will develop a set of guiding principles to inform decision-making processes related to new technologies in transportation. Guiding principles provide for the objective evaluation of technology to ensure outcomes are consistent with shared priorities, including congestion reduction, efficient use of land and public rights-of-way, equity, open data, labor, seamless connectivity and safety. Additionally, in order to enhance SCAG's understanding of emerging technology, staff will build on its Future Mobility Research Program in collaboration with the other large metropolitan planning organizations in California.

SCAG will also continue research efforts to understand travel behavior in response to incentives including pricing and other transportation demand management strategies. SCAG will engage with regional stakeholders to ensure local components of the Regional Intelligent Transportation Systems (ITS) Architecture are updated with the latest national standards, implement planned ITS investments, and to identify key actions for local jurisdictions to prepare for a connected and automated future. Through its ongoing Future Communities Initiative, SCAG will continue to ensure that public agencies in Southern California lead the nation with respect to efficiency, innovation and transparency through improvements in data collection, analysis and technology.

GLOSSARY

A

AASHTO American Association of State Highway and Transportation Officials – A nonprofit, non-partisan association representing highway and transportation departments in the 50 states, the District of Columbia and Puerto Rico.

AB 32 Assembly Bill 32 – Signed into law on September 26, 2006, it requires that the state's global warming emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012 in addition to other measures. In order to effectively implement the cap, AB 32 directs the California Air Resources Board (ARB) to develop appropriate regulations and establish a mandatory reporting system to track and monitor global warming emissions levels. Please also see "ARB – California Air Resource Board."

AB 169 Assembly Bill 169 – Provides for the sixteen federally recognized tribes in the SCAG region to join the SCAG Joint Powers Authority (JPA) to participate in the Southern California Association of Governments by voting at the SCAG General Assembly.

AB 398 Assembly Bill 398 – In 2017, California Governor Jerry Brown signed Assembly Bill 398 (Eduardo Garcia, Chapter 135, Statutes of 2017) to extend the state's cap-and-trade program to 2030. Cap and trade is a key part of California's plan to reduce greenhouse gas emissions 40 percent below 1990 levels by 2030. The enacted bill makes design changes to the post-2020 carbon market, such as including a price ceiling, price containment points, additional limits to the number and location of offset credits, limits on who can set greenhouse gas emission requirements, and specifics on industry assistance factors.

AB 617 Assembly Bill 617 – In 2017, California Governor Jerry Brown signed Assembly Bill 617 (C. Garcia, Chapter 136, Statutes of 2017) to develop a new community focused program to more effectively reduce exposure to air pollution and preserve public health. AB 617 is a companion bill to AB 398 that extends California's cap-and-trade program for greenhouse gas emissions. The most significant criteria and toxics air quality legislation passed in California in the last three decades, AB 617 directs the California Air Resources Board (ARB) and all local air districts throughout California to take measures to protect communities disproportionally impacted by air pollution.

There are five central components to the AB 617 mandate:

- Community-level air monitoring
- A state strategy and community specific emission reduction plans
- Accelerated review of retrofit pollution control technologies on industrial facilities subject to Cap-and-Trade
- Enhanced emission reporting requirements
- Increased penalty provisions for polluters

Additionally, ARB may direct additional grant funding to communities determined to have the highest air pollution burden.

AB 744 Assembly Bill 744 – Allows a developer that is requesting a density bonus and including 100% affordable rental units in the development to also request that the city or county reduce the minimum parking requirements for the development. To qualify, the development would have to be either within half a mile of a major transit stop, a seniors-only development with access to transit, or a development that serves special-needs individuals and has access to transit. For mixed-income developments within a half mile of a major transit stop that include the maximum number of very low- or low-income units under Density Bonus Law, the parking requirement cannot exceed 0.5 per bedroom.

ABM Activity-Based Model is based on the principle that travel demand is derived from people's daily activity patterns. ABMs predict when and where activities are conducted, for how long, and the travel choices made to complete them.

Absolute Constrained Areas Include tribal lands, military, open space, conserved lands, sea level rise areas (2 feet) and farmlands in unincorporated areas. These areas were identified during the scenario development process to be used during the modeling process to redirect jurisdictional growth into other areas. These are intended to be regional guidelines and do not supersede existing regulations or protections or local land use policy.

ACE Alameda Corridor East is a 35-mile corridor extending through the San Gabriel Valley between East Los Angeles and Pomona and connecting the Alameda Corridor to the transcontinental railroad network.

Active Transportation A mode of transportation that includes human powered transportation and low-speed electronic assist devices. Examples include but are not limited to: walking (includes any person walking, skateboarding and using a wheelchair or other personal mobility device), use of a bicycle, electric bicycle (e-bike), tricycle, scooter, skates, push scooter, trailer and hand cart.

ADA Americans with Disabilities Act of 1990 – Guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, state and local government services, and telecommunications. It prescribes federal transportation requirements for transportation providers.

ADU Accessory Dwelling Units – A room or set of rooms in a single-family home (and in a single-family zone) that has been designated or configured to be used as a separate dwelling unit, and has been established by a permit.

Advance Mitigation A science-based approach to identify mitigation opportunities early in the planning process prior to project design and permitting phases to support regional conservation priorities.

Affordable Housing Units Housing that is affordable to households earning 80% or less of the county median income.

Agricultural Lands Land designated for farming; specifically the production of crops and rearing of animals to provide food and other products.

AHSC Affordable Housing and Sustainable Communities – A state grant program from the Greenhouse Gas Reduction Fund that addresses land-use, housing, transportation, and land preservation projects to support infill and compact development to reduce greenhouse gas emissions.

AJR 40 Assembly Joint Resolution No. 40 – Introduced on August 23, 2007, the resolution calls upon the governor to declare a state of emergency in respect to the air quality health crisis in the South Coast Air Quality Basin related to emissions of PM2.5, and to direct steps necessary to address the emergency.

Antelope Valley AQMD Antelope Valley Air Quality Management District – The air pollution control agency with the primary responsibility for the control of non-vehicular sources of air pollution throughout the Antelope Valley within the northern part of Los Angeles County.. The District boundaries start on the south just outside of Acton, north to the Kern County line, east to the San Bernardino County line, and west to the Quail Lake area. The AVAQMD is located within the Mojave Desert air basin.

AQMP Air Quality Management Plan – Regional plan for air quality improvement in compliance with federal and state air quality planning requirements including attaining applicable federal and state ambient air quality standards.

ARB California Air Resources Board – California state agency responsible for attaining and maintaining healthy air quality through setting and enforcing emissions standards, conducting research, monitoring air quality, providing education and outreach, and overseeing/assisting local air quality districts within California. The ARB is also responsible for implementing AB 32 and establishing regional greenhouse gas emission reduction targets for automobile and light trucks under SB 375. ARB is a part of the California Environmental Protection Agency, an organization which reports directly to the Governor's Office in the Executive Branch of California State Government.

ATIS Advanced Traveler Information Systems – Technology used to provide travelers with information, both pre-trip and in-vehicle, so they can better utilize the transportation system.

ATMS Advanced Transportation Management Systems – Technology used to improve the operations of the transportation network.

ATP Active Transportation Program – The ATP was created by Senate Bill 99 and Assembly Bill 101, and expanded by Senate Bill 1 to encourage increased use of active modes of transportation. The ATP is a program designed for cities, counties and regional government organizations to apply for funding to further active transportation planning and implementation in the State.

Automated Vehicle U.S. Department of Transportation's National Highway Traffic Safety Administration (NHTSA) has defined five increasing levels of vehicle automation at five levels:

- Level 0. No-Automation: The driver is in complete and sole control and performs all driving tasks.
- Level 1. Driver Assistance: Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.
- Level 2. Partial Automation: Vehicle has combined automated functions,

- like acceleration and steering, but the driver must remain engaged with the driving task and monitor the operating environment at all times.
- Level 3. Conditional Automation: Driver is a necessity, but is able to cede the performance of driving tasks to the vehicle. However the driver must be ready to take control of the vehicle at all times when noticed.
- Level 4. High Automation: The vehicle is capable of performing all driving functions under certain conditions, and within certain operating environments. The driver may or not have the ability to control the vehicle.
- Level 5. Full Automation: The vehicle is capable of performing all driving functions under all conditions. The driver may or may not have the ability to control the vehicle.

Autonomous Vehicle Vehicles in which operation of the vehicle occurs without direct driver input to control the steering, acceleration and braking and are designed so that the driver is not expected to constantly the roadway while operating in automated- driving mode.

B

Baseline Defined in the US EPA's Transportation Conformity Regulations, the Baseline is the future transportation system that will result from current programs, including the following (except that exempt projects listed in §93.126 and projects exempt from regional emissions analysis as listed in §93.127 need not be explicitly considered):

- All in-place regionally significant highway and transit facilities, services and activities
- All ongoing travel demand management or transportation system management activities
- Completion of all regionally significant projects, regardless of funding source, which are currently under construction or are undergoing right-of-way acquisition (except for hardship acquisition and protective buying); come from the first year of the previously conforming transportation plan and/or TIP; or have completed the NEPA process

For Connect SoCal, the Baseline is based upon the adopted 2019 FTIP.

Base Year The year that is used in the RTP/SCS performance analysis as a reference point for current conditions. For Connect SoCal, the base year is 2016.

BEV Battery Electric Vehicle – An electric drive vehicle powertrain that is powered by an on-board battery. A BEV is a sub-class of Plug-in Electric Vehicle (PEV).

Bike Share A service that provides users with on-demand access to bicycles at a variety of pick-up and drop-off locations for one-way (point-to-point) or roundtrip travel. Bike sharing fleets are commonly deployed in a network within a metropolitan region, city, neighborhood, employment center and/or university campus.

Bikeway Common term for any designated bicycle facility, such as a bicycle path, bicycle lane, bicycle route, sharrow, bicycle boulevard or cycle-track.

BNSF Burlington Northern and Santa Fe Railway Company

BRT Bus Rapid Transit – Bus transit service that seeks to reduce travel time through measures such as traffic signal priority, automatic vehicle location, dedicated bus lanes, limited-stop service and faster fare collection policies

Bus A transit mode comprised of rubber-tired passenger vehicles operating on fixed routes and schedules over roadways.

C

CAA Federal Clean Air Act – The federal law that authorized the United States Environmental Protection Agency (EPA) to establish national ambient air quality standards (NAAQS) to limit levels of pollutants in the air. EPA has promulgated such standards for six criteria pollutants: sulfur dioxide ($SO2$), nitrogen dioxide ($NO2$), carbon monoxide (CO), ozone, lead, and particulate matter ($PM10$). All areas of the United States must maintain ambient levels of these pollutants below the ceilings established by the NAAQS; any area that does not meet these standards is a "nonattainment" area. States must develop State Implementation Plans (SIPs) to explain how they will comply with the CAA.

The last major change in the law, the Clean Air Act Amendments of 1990, was enacted by Congress in 1990. Legislation passed since then has made several minor changes. The Clean Air Act, like other laws enacted by Congress, was incorporated into the United States Code as Title 42, Chapter 85. The House of

Representatives maintains a current version of the U.S. Code, which includes Clean Air Act changes enacted since 1990.

Cal B/C Model California Life-Cycle Benefit/Cost Analysis Model (Cal-B/C) – Was developed for the California Department of Transportation (Caltrans) as a tool for benefit-cost analysis of highway and transit projects. It is an Excel (spreadsheet) application structured to analyze several types of transportation improvement projects in a corridor where there already exists a highway facility or a transit service (the base case).

CalBRACE CalBRACE is a project of the California Department of Public Health (CDPH) to enhance CDPH's capability to plan for and reduce health risks associated with climate change. CalBRACE provides local health departments and its partners with tools (e.g. climate change and health indicator narratives and data) to better understand the people and places in their jurisdictions that are more susceptible to adverse health impacts associated with climate change, specifically extreme heat, wildfire, sea level rise, drought, and poor air quality. The assessment data can be used to screen and prioritize where to focus deeper analysis and plan for public health actions to increase resilience.

Caltrans California Department of Transportation – State agency responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries.

Cap-and-Trade is a market based regulation that is designed to reduce greenhouse gases (GHGs) from multiple sources. Cap-and-trade sets a firm limit or cap on GHGs and minimize the compliance costs of achieving California's AB 32 goals. The cap will decline approximately 3 percent each year beginning in 2013. Trading creates incentives to reduce GHGs below allowable levels through investments in clean technologies. With a carbon market, a price on carbon is established for GHGs. Market forces spur technological innovation and investments in clean energy.

Carbon Sequestration The ability for natural elements such as forests, soils and oceans to store carbon instead of releasing it into the atmosphere, preventing GHG Emissions.

Car Share An integrated network of passenger vehicles available for short-term rental in heavily urbanized areas. Car share can take the form of return systems in which a vehicle must be returned to the parking space from which it was rented. Alternatively, it can take the form of point-to-point systems in which the car can be returned to another space, or left anywhere within a pre-determined geographic zone. Peer-to-peer car sharing is an app based system that allows people to rent out their own private vehicles, and is return based.

CB Commuter Bus – Fixed-route bus systems that are primarily connecting outlying areas with a central city through bus service that operates with at least five miles of continuous closed-door service. This service typically operates using motorcoaches (aka over-the-road buses), and usually features peak scheduling, multiple-trip tickets, and multiple stops in outlying areas with limited stops in the central city.

CBO Community Based Organization – Public or private non-profit group that work at a local-level to address community needs.

CEHD Community, Economic and Human Development Committee – A SCAG committee that studies the problems, programs, and other matters which pertain to the regional issues of community, economic and human development, and growth. This committee reviews projects, plans, and programs of regional significance for consistency and conformity with applicable regional plans.

CEQA California Environmental Quality Act – State law providing certain environmental protections that apply to all state-funded transportation projects.

CHSRA California High-Speed Rail Authority – Agency responsible for planning, designing, constructing, and operating a state-of-the-art high-speed train system in California.

CIP Capital Improvement Program – Long-range strategic plan that identifies capital projects; provides a planning schedule and financing options.

Class I Railroad Rail carrier with operating revenues equal to or above $447,621,226.

Climate Change Adaptation The Process of adjusting to actual or expected climate change and its effects, in order to moderate or avoid harm. Adaptation addresses the impacts but not the causes of climate change.

Climate Change Mitigation Consists of actions to limit the magnitude of climate change and its related effects. Mitigation addresses the cause of climate change.

CMAQ Congestion Mitigation and Air Quality Program – Federal program initiated by the Intermodal Surface Transportation Efficiency Act of 1991 to provide funding for surface transportation and other related projects that contribute to air quality improvements and reduce congestion.

CMP Congestion Management Program – Established by Proposition 111 in 1990, each county is required to develop and adopt a CMP that includes highway and roadway system monitoring, multimodal system performance analysis, transportation demand management program, land-use analysis program, and local conformance.

CO Carbon Monoxide – A colorless, odorless, poisonous gas formed when carbon in fuels is not burned completely and can be harmful when inhaled in large amounts. The greatest sources of CO to outdoor air are cars, trucks and other vehicles or machinery that burn fossil fuels. A variety of items in your home such as unvented kerosene and gas space heaters, leaking chimneys and furnaces, and gas stoves also release CO and can affect air quality indoors. CO is one of six "criteria air pollutants" for which the U.S. EPA set national standards pursuant to CAA.

COG Council of Governments – Under state law, a single or multi-county council created by a joint powers agreement.

Complete Communities Suburban communities that provide a mix of land uses in strategic growth areas, wherein most daily needs can be met within a short distance of home. Complete communities provide residents with the opportunity to support their local area and run daily errands by walking or bicycling rather than traveling by automobile.

Complete Streets Streets designed and operated to enable safe access for all roadway users of all ages and abilities, including pedestrians, bicyclists, motorists and transit riders. Complete Streets strategies can include traffic calming, bicycle priority streets (bicycle boulevards) and pedestrian connectivity to increase physical activity, improve connectivity to the regional bikeway/greenway networks, local businesses and parks.

Community Separator A parcel of undeveloped land, sometimes in the form of open space, separating two or more urban areas under different municipal jurisdictions, which has been designated to provide a permanent low-density area preserving the communal integrity of the two municipalities.

Congestion (Cordon Area) Pricing A system of surcharging users/drivers a fee to operate in designated areas, roads or highway corridors as part of a demand management strategy to relieve traffic congestion within that area.

Connected/Automated Vehicles Refers to the interrelated nature of connectivity and automation in new vehicle technology. Connected vehicles are vehicles that use any of a number of different communication technologies to communicate with the driver, other cars on the road (vehicle-to-vehicle [V2V]), roadside infrastructure (vehicle-to- infrastructure [V2I]) and the "Cloud" to improved safety, user experience and collision avoidance. Please also see "automated vehicles."

Conservation Easement A voluntary agreement landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values.

Constant Dollars Dollars expended/received in a specific year adjusted for inflation/deflation relative to another time period.

Constrained Projects Constrained are projects that have funding whether committed or reasonably available.

Corridor In planning, a broad geographical band that follows a general directional flow or connects major sources of trips. It may contain a number of streets and highways, as well as transit lines and routes.

CR Commuter Rail – A transit mode that is an electric or diesel propelled railway for urban passenger train service consisting of local short distance travel operating between a central city and adjacent suburbs. Service must be operated on a regular basis by or under contract with a transit operator for the purpose of transporting passengers within urbanized areas (UZAs), or between urbanized areas and outlying areas. Such rail service, using either locomotive hauled or self-propelled railroad passenger cars, is generally characterized by multi-trip tickets, specific station to station fares, railroad employment practices, and usually only one or two stations in a central business district. Commuter Rail does not include heavy rail rapid transit, or light rail /streetcar transit service, or intercity rail service.

CRIA Community Revitalization and Investment Authorities - Community Revitalization and Investment Authorities (CRIA) were enacted into law by Assembly Bill 2, which authorized the revitalization of disadvantaged communities through planning and financing infrastructure improvements and upgrades; economic development activities; and affordable housing via tax increment financing.

CSMP Corridor System Management Plans.

CTC California Transportation Commission – eleven voting members and two non- voting ex-officio members. Nine of the members are appointed by the Governor, one is appointed by the Senate Rules Committee, and one is appointed by the Speaker of the Assembly, to oversee and administer state and federal transportation funds and provide oversight on project delivery.

CTIPS California Transportation Improvement Program System – A project programming database system used to efficiently and effectively develop and manage various transportation programming documents as required under state and federal law.

CTP California Transportation Plan – A statewide, long-range transportation policy plan that provides for the movement of people, goods, services, and information. The CTP offers a blueprint to guide future transportation decisions and investments.

CVO Commercial Vehicle Operations – Management of commercial vehicle activities through ITS.

D

Demand Response A transit mode comprised of non-fixed route or fixed-schedule automobiles, vans or small buses that operate in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up and transport passengers to their destinations.

Development Impact Fee A fee imposed by a local government on a new or proposed development project, to pay for the costs of providing public services to the new development.

Displacement The process that occurs when the increasing property values brought about through gentrification drive out the existing residents and business operators, and attract a new and different demographic population to an area. Please also see Gentrification.

E

EIFD Enhanced Infrastructure Financing District – Senate Bill 628 authorizes the creation of a governmental entity known as an EIFD. One or more of these districts may be created within a city or county to finance the construction or rehabilitation of a wide variety of public infrastructure and private facilities by using property tax increment of consenting taxing agencies (cities, counties, special districts, but not schools).

EIR Environmental Impact Report – An informational document, required under CEQA, which will inform public agency decision-makers and the public generally of the significant environmental effects of a project, possible ways to minimize significant effects, and reasonable alternatives to the project.

EIS Environmental Impact Statement (federal) – National Environmental Policy Act (NEPA) requirement for assessing the environmental impacts of federal actions that may have a significant impact on the human environment.

EJ Environmental Justice – The concept of Environmental Justice is about equal and fair access to a healthy environment, with the goal of protecting minority and low-income communities from incurring disproportionate negative environmental impacts.

EJA Environmental Justice Area – The area is created using SCAG's transportation analysis zones (TAZ), which are similar to census block groups that have a higher concentration of minority population or low-income households than is seen in the region as a whole.

EMFAC Model The Emission Factors model is a computer model developed by the ARB for estimating emission rates and emissions for on-road mobile sources operating in California. Upon approved by the U.S. Environmental Protection Agency, EMFAC model is required to be used for regional transportation conformity determination in California.

EPA The United States Environmental Protection Agency – Federal agency established to develop and enforce regulations that implement environmental laws enacted by Congress to protect human health and safeguard the natural environment.

E-scooter An e-scooter is an electric powered two-wheeled device that has handlebars, a floorboard designed to be stood upon when riding, and is sized to accommodate most adults. The e-scooter travel on level ground up to about 15mph.

EV Electric Vehicle – A vehicle fully or partially powered by an electric engine. In common use it is synonymous with Plug-In Electric Vehicle (PEV), however hydrogen fuel cell vehicles are also electric vehicles.

EV Charging Station A location where a vehicle can be parked and the electric storage or battery can be recharged. EV charging stations can be private or publicly accessible and can be free to the user or used for a fee

Executive Order B-30-15 Signed by Governor Brown on April 29, 2015, which establishes a California Greenhouse Gas (GHG) reduction target of 40 percent below 1990 levels by 2030.

Express Lane A High-Occupancy Vehicle lane that single-occupant drivers can pay to drive in, also referred to as "High Occupancy Toll Lanes."

F

FAA Federal Aviation Administration – Federal agency responsible for issuing and enforcing safety regulations and minimum standards, managing air space and air traffic, and building and maintaining air navigation facilities.

FAST Act Fixing America's Surface Transportation Act (H.R. 22) – Signed into law by President Obama on December 4, 2016. FAST Act funds surface transportation programs at over $305 billion for five years through 2020.

FCV Fuel Cell Vehicle – Electric vehicles that are powered by hydrogen fuel cells.

FHWA Federal Highway Administration – Federal agency responsible for administering the Federal-Aid Highway Program, which provides federal financial assistance to the states to construct and improve the National Highway System, urban and rural roads, and bridges.

First-Last Mile Strategies designed to increase transit usage by making it more convenient and safe to walk or bicycle to and from transit stations. Strategies include wayfinding, bikeways, station amenities, new crosswalks, sidewalk improvements, shared mobility services and bike share.

Form Based Code A means of regulating land development to achieve a specific urban form. Form based codes foster predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle, with a lesser focus on land use through municipal regulations.

FRA Federal Railroad Administration – Federal agency created to promulgate and enforce rail safety regulations, administer railroad assistance programs, conduct research and development in support of improved railroad safety and national rail transportation policy, and consolidate government support of rail transportation activities.

FTA Federal Transit Administration – The federal agency responsible for administering federal transit funds and assisting in the planning and establishment of area wide urban mass transportation systems. As opposed to FHWA funding, most FTA funds are allocated directly to local agencies, rather than to Caltrans.

FTIP Federal Transportation Improvement Program – A six-year comprehensive listing of transportation projects proposed for federal funding, that require a federal action, or are regionally significant, and are within the planning area of an MPO, the last two years are for informational purposes only.

FTZ Foreign Trade Zones.

FY Fiscal Year – The twelve-month period on which the budget is planned. The state fiscal year begins July 1 and ends June 30 of the following year. The federal fiscal year begins October 1 and ends September 30 of the following year.

G

Gentrification while holding many definitions, is commonly understood as a change process in historically low-income communities that results in rising real estate values coupled with shifts in the economic, social, and cultural demographics and feel of the communities. Please also see Displacement.

GGRF Greenhouse Gas Reduction Funds – administered by state and local agencies for a variety of greenhouse gas (GHG) emission reductions programs, including energy efficiency, public transit, low-carbon transportation and affordable housing.

GHG Greenhouse Gases – Components of the atmosphere that contribute to the greenhouse effect. The principal greenhouse gases that enter the atmosphere because of human activities are carbon dioxide, methane, nitrous oxide, and fluorinated gases.

GIS Geographic Information System – Mapping software that links information about where things are with information about what things are like. GIS allows users to examine relationships between features distributed unevenly over space, seeking patterns that may not be apparent without using advanced techniques of query, selection, analysis, and display.

GNP Gross National Product – An estimate of the total value of goods and services produced in any specified country in a given year. GNP can be measured as a total amount or an amount per capita.

Grade Crossing A crossing or intersection of highways, railroad tracks, other guideways, or pedestrian walks, or combinations of these at the same level or grade.

Greenbelt Land surrounding or neighboring areas that is designated as largely undeveloped, wild or agricultural.

Greenfield Also known as “raw land,” land that is privately owned, lacks urban services, has not been previously developed, and is located at the fringe of existing urban areas.

GRP Gross Regional Product.

H

Habitat Connectivity The degree to which the landscape facilitates animal movement and other ecological flows.

HCP Habitat Conservation Plan – Established under Section 10 of the federal Endangered Species Act to allow development to proceed while protecting endangered species. A federal Habitat Conservation Plan is typically accompanied by a state Natural Communities Conservation Plan or NCCP.

HDT Heavy-Duty Truck – Truck with a gross vehicle weight of 8,500 pounds or more.

Health Equity SCAG has adopted the California Department of Public Health, Office of Health Equity (OHE) definition to define health equity as “efforts to ensure that all people have full and equal access to opportunities that enable them to lead healthy lives.” Determinants of equity are, “social, economic, geographic, political, and physical environmental conditions that lead to the creation of a fair and just society.”

Healthy Cities A movement that promotes comprehensive, systematic policy and planning for health by addressing the social, economic and environmental determinants of health. Healthy Cities emphasizes the need to address inequality in health, urban poverty and participatory governance.

Heavy Rail A transit mode that is an electric railway with the capacity for a heavy volume of traffic. It is characterized by high speed and rapid acceleration passenger rail cars operating singly or in multi-car trains on fixed rails, separate rights-of-way (ROW) from which all other vehicular and foot traffic are excluded, sophisticated signaling, and raised platform loading.

HIA Health Impact Assessment – A tool that can help communities, decision makers, and practitioners make choices that improve public health through community design.

HiAP Health in All Policies – HiAP is a collaborative strategy that aims to improve public health outcomes by including health considerations in the decision-making process across sectors and policy areas. HiAP addresses the social determinants of health by encouraging transportation practitioners to work with nontraditional partners who have expertise related to public health outcomes, such as city and county public health departments.

HIN High Injury Network – A High Injury Network include stretches of roadways where the highest concentrations of collisions occur on the transportation network.

Home-Based Work Trips Trips that go between home and work, either directly or with an intermediate stop. Home-based work trips include telecommuting, working at home, and non-motorized transportation work trips.

HOT Lane High-Occupancy Toll Lane – An HOV lane that single-occupant drivers can pay to drive in, also referred to as "Express Lanes."

Household A household consists of all the people who occupy a housing unit. A household includes the related family members and all the unrelated people, if any, such as lodgers, foster children, wards, or employees who share the housing unit. A person living alone in a housing unit, or a group of unrelated people sharing a housing unit such as partners or roomers, is also counted as a household.

HOV Lane High-Occupancy Vehicle Lane – A lane restricted to vehicles with two (and in some cases three) or more occupants to encourage carpooling. Vehicles include automobiles, vans, buses, and taxis.

HQTA High Quality Transit Areas – Generally a walkable transit village or corridor, consistent with the adopted RTP/SCS, and is within one half-mile of a well- serviced transit stop or a transit corridor with 15-minute or less service frequency during peak commute hours. Freeway transit corridors with no bus stops on the freeway alignment do not have a directly associated HQTA. The definition that SCAG has been using for the HQTA is based on the language in SB375 which defines:

- Major Transit Stop: A site containing an existing rail or bus rapid transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods (CA Public Resource Code Section 21064.3). SCAG's methodology for identifying major transit stops is included as an appendix to the Transit Technical Report.
- High-Quality Transit Corridor (HQTC): A corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours (CA Public Resource Code Section 21155(b)). SCAG's methodology for identifying HQTCs is included as an appendix to the Transit Technical Report.

HSIP Highway Safety Improvement Program – A core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land.

HSR High-Speed Rail – Intercity passenger rail service that is reasonably expected to reach speeds of at least 110 mile per hour.

HTF Highway Trust Fund – The Federal HTF is a transportation fund in the United States that received money from a federal fuel tax of 18.4 cents per gallon on gasoline and 24.4 cents per gallon from diesel fuel and related excise taxes.

HUD U.S. Department of Housing and Urban Development – Federal agency charged with increasing homeownership, supporting community development, and increasing access to affordable housing free from discrimination.

HUTA Highway Users Tax Account – Formerly known as the California Highway Users Tax Fund, HUTA is a trust fund comprised of revenues collected from taxes imposed by California on motor vehicle fuels for use in motor vehicles upon public streets and highways. The HUTA is dedicated to fund transportation improvements.

I

ICE Internal Combustion Engine – Refers traditional vehicle engines that are powered by the burning of fuel sources, including gasoline, diesel, and natural gas.

ICTC Imperial County Transportation Commission – Agency responsible for planning and funding countywide transportation improvements and administering the county's transportation sales tax revenues.

IGR Intergovernmental Review Process – The review of documents by several governmental agencies to ensure consistency of regionally significant local plans, projects, and programs with SCAG's adopted regional plans.

Inclusionary Zoning Municipal or county planning ordinances that require a given share of new construction to be affordable by people with low to moderate incomes.

Infill New development on vacant, underutilized or undeveloped land within an existing community that is enclosed by other types of development.

Infrastructure The basic facilities, equipment, services, and installations needed for the growth and functioning of a community. This may refer to transportation infrastructure such as rail stations or roadways, as well as other civic infrastructure such as electrical and water systems.

In-Lieu Fee (Environment) An in-lieu fee is one type of mitigation that can be used to compensate for unavoidable environmental impacts that would affect open space, culturally significant land, agricultural and forestry land, wetlands or other environmentally sensitive areas. Such fees are typically pooled and distributed to build off-site mitigation areas.

In-Lieu Fee (Housing) A fee typically applied when affordable housing cannot be provided "on-site" of a new development. These fees are typically paid into a housing trust fund and used (often along with other local funding sources) to finance affordable housing to be developed "off-site".

ITIP Interregional Transportation Improvement Program – The portion of the STIP that includes projects selected by Caltrans (25 percent of STIP funds).

ITS Intelligent Transportation Systems – Systems that use modern detection, communications and computing technology to collect data on system operations and performance, communicate that information to system managers and users, and use that information to manage and adjust the transportation system to respond to changing operating conditions, congestion, or accidents. ITS technology can be applied to arterials, freeways, transit, trucks, and private vehicles. ITS include Advanced Traveler Information Systems (ATIS), Advanced Public Transit Systems (APTS), Advanced Traffic Management Systems (ATMS), Advanced Vehicle Control Systems (AVCS), and Commercial Vehicle Operations (CVO).

J

JPA Joint Powers Authority – Two or more agencies that enter into a cooperative agreement to jointly wield powers that are common to them. JPAs are a vehicle for the cooperative use of existing governmental powers to finance and provide infrastructure and/or services in a cost-efficient manner.

L

LACMTA Los Angeles County Metropolitan Transportation Authority, also referred to as "Metro" – Agency responsible for planning and funding countywide transportation improvements, administering the county's transportation sales tax revenues, and operating bus and rail transit service.

LAFCo Local Agency Formation Commission - Regional service planning agencies of the State of California that exercise regulatory and planning powers. LAFCos regulatory powers are outlined in California Government Code Sections 56375 and 56133.

LAWA or LAX Los Angeles World Airports – Aviation authority of the City of Los Angeles. LAWA owns and operates Los Angeles International (LAX), Ontario International, Van Nuys, and Palmdale Airports.

LCVs Longer-Combination Vehicles – Includes tractor-trailer combinations with two or more trailers that weigh more than 80,000 pounds.

LID Low Impact Development – A land planning and engineering design approach to manage storm water runoff as part of green infrastructure.

LID emphasizes conservation and use of on-site natural features to protect water quality.

LIHTC Low Income Housing Credit – A federal program created under the Tax Reform Act of 1986, which gives incentives for the utilization of private equity in the development of affordable housing.

Livable Communities Any location in which people choose to live may be viewed as "livable." However, communities that contain a healthy mix of homes, shops, workplaces, schools, parks, and civic institutions coupled with a variety of transportation choices, give residents greater access to life's daily essentials and offer higher quality of life to a wider range of residents.

Livable Corridors Arterial roadways where local jurisdictions may plan for a combination of the following elements: high-quality bus frequency; higher density residential and employment at key intersections; and increased active transportation through dedicated bikeways. Most, but not all Livable Corridors would be located within HQTAs. Livable Corridor land-use strategies include development of mixed use retail centers at key nodes along corridors, increasing neighborhood-oriented retail at more intersections, applying a "Complete Streets" approach to roadway improvements and zoning that allows for the replacement of underperforming auto- oriented strip retail between nodes with higher density residential and employment.

LTF Local Transportation Fund – A fund which receives TDA revenues.

M

MaaS Mobility as a Service – Please see "Shared Mobility Services."

MAP Million Annual Passengers – Used to quantify airport activity.

MAP-21 Moving Ahead for Progress in the 21st Century – Signed into law by President Obama on July 6, 2012. Funding surface transportation programs at over $105 billion for fiscal years (FY) 2013 and 2014, MAP-21 was the first long-term highway authorization enacted since 2005. To allow more time for development and consideration of a long-term reauthorization of surface transportation programs, Congress has enacted short term extensions of the expiring law, MAP-21.

Market Incentives Measures designed to encourage certain actions or behaviors. These include inducements for the use of carpools, buses, and other HOVs in place of single-occupant automobile travel. Examples include HOV lanes, preferential parking, and financial incentives.

MDAB Mojave Desert Air Basin – Area defined by state law as comprising the desert portions of Los Angeles, Kern, Riverside, and San Bernardino Counties.

MDAQMD Mojave Desert Air Quality Management District – Stretched out over almost 20,000 square miles of California's vast desert expanse, the Mojave Desert Air Quality Management District is geographically the second largest of the state's 35 air districts. As the air pollution control agency for San Bernardino County's High Desert and Riverside County's Palo Verde Valley, the District has primary responsibility for regulating stationary sources of air pollution located within its jurisdictional boundaries. The District implements air quality programs required by state and federal mandates, enforces rules and regulations based on air pollution laws and educates businesses and residents about their role in protecting air quality and the risks of air pollution.

Measure A Revenues generated from Riverside County's local half-cent sales tax.

Measure D Revenues generated from Imperial County's local half-cent sales tax.

Measure I Revenues generated from San Bernardino County's local half-cent sales tax.

Measure M Revenues generated from Orange County's local half-cent sales tax. Also refers to Los Angeles County's local half cent sales tax which was authorized in 2018.

Measure R Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has three permanent local sales taxes (Proposition A, Proposition C, and Measure M) and one temporary local sales tax (Measure R).

Metrolink Regional commuter rail system connecting Los Angeles, Orange, Riverside, San Bernardino, and Ventura Counties and operated by SCRRA.

Micro-mobility Personal vehicles which typically are designed to carry one passenger. Devices include but are not limited to bicycles, electronic bicycles (e-bikes) and electronic scooters (e-scooters). Micro-mobility is often linked to bike and scooter sharing.

Mills Act A state law allowing cities to enter into contracts with the owners of historic structures. Such contracts require a reduction of property taxes in exchange for the continued preservation of the property.

Mitigation Measure A measure designed to minimize a project's significant environmental impacts.

Mixed Flow Traffic movement having autos, trucks, buses, and motorcycles sharing traffic lanes.

Mixed Use Development A type of urban development that blends residential, commercial, cultural, institutional or industrial uses, where those functions are physically and functionally integrated, and that provides pedestrian connections.

Mode Split The proportion of total person trips using various specified modes of transportation.

Mode A particular form of travel (e.g., walking, traveling by automobile, traveling by bus, or traveling by train).

Model A mathematical description of a real-life situation that uses data on past and present conditions to make a projection.

MPO Metropolitan Planning Organization – A federally required planning body responsible for transportation planning and project selection in a region.

MSHCP Multiple Species Habitat Conservation Plans – A comprehensive, multi-jurisdictional Habitat Conservation Plan (HCP) designed to preserve a network of habitat and open space, protecting biodiversity and enhancing the region's quality of life. MSHCPs are often implemented with the assistance of federal and state wildlife agencies.

MTS Metropolitan Transportation System – Regional network of roadways and transit corridors.

Multi-Family Residential Multi-family units are attached residences, apartments, condominiums, and townhouses. Multi-family residences are usually served by all utilities, are on paved streets, and are provided with or have access to all urban facilities such as schools, parks, police and fire stations. Senior citizen apartment buildings are included in these classes. Also included are off-campus university owned housing and off-campus fraternity/sorority houses.

Multimodal A mixture of the several modes of transportation, such as transit, highways, non-motorized, etc.

N

NAAQS National Ambient Air Quality Standards – The federal Clean Air Act requires US EPA to set National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants. These common air pollutants can harm human health and the environment, and cause property damage. Please see "CAA-Federal Clean Air Act" for more information on NAAQS.

Natural Lands Biologically diverse landscapes such as forested and mountainous areas, shrub lands, deserts and other ecosystems which contain habitat that supports wildlife and vegetation.

NCCP Natural Community Conservation Plan – A program that takes a broad-based ecosystem approach to planning for the protection and perpetuation of biological diversity. It is broader in its orientation and objectives than the California and Federal Endangered Species Acts, as these laws are designed to identify and protect individual species that have already declined in number significantly.

NEPA National Environmental Protection Act – Federal environmental law that applies to all projects funded with federal funds or requiring review by a federal agency.

New Markets Tax Credit The New Markets Tax Credit (NMTC) Program incentivizes business and real estate investment in low-income communities via a federal tax credit.

New Mobility The integration of various forms of transportation services into a single service accessible on demand. Please also see "Shared Mobility Services."

NGV Natural Gas Vehicle – Vehicles that are powered by internal combustion engines that burn compressed or liquid natural gas.

NIMBY Not in My Backyard – The phenomenon where people oppose the location of a development perceived as undesirable (e.g. landfill, freeway expansion) in their own neighborhood, but raise no objections of similar developments elsewhere.

NIMS National Incident Management System – Nationwide template that enables all government, private-sector, and non-governmental organizations to work together during a domestic incident.

NMAs Neighborhood Mobility Areas Areas with a high number of intersections, low observed travel speed, high mix of uses and high accessibility to "everyday" destinations. These are areas where complete streets and sustainability policies support and encourage replacing or reducing single and multi-occupant automobile use with walking, bicycling, skateboarding and slow speed electric vehicles (such as e-bikes, scooters, senior mobility devices and neighborhood electric vehicles). Please also see "Complete Streets."

Nominal Dollars Actual dollars expended/received in a specific year without adjustments for inflation/deflation.

Non-Reportable TCM The following de minimis committed TCMs are defined in the Final 2019 FTIP Guidelines as non-reportable TCMs for the purpose of TCM timely implementation reporting:

- Bus/shuttle/paratransit fleet expansion projects with fewer than 5 vehicles
- Bus stop improvement projects
- Bicycle facility less than 1 mile and pedestrian facility less than 1/4 mile
- Intelligent transportation systems/control system computerization projects with fewer than 3 traffic signals
- Changeable message sign projects with fewer than 5 signs
- Bike parking facilities, new or expansion, with nine or fewer bike lockers/slots
- Expansion of bus station/shelter/transfer facilities with nine or fewer bike lockers/slots
- Rail station expansion with addition of nine or fewer bike lockers/slots.

NOx Nitrogen oxides – A group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. NOx is a major component of ozone and smog. NOx also can be a major component of particle air pollution.

NTD National Transit Database – The Federal Transit Administration's (FTA) national database for transit statistics.

O

O&M Operations and Maintenance – The range of activities and services provided by the transportation system and for the upkeep and preservation of the existing system.

OCS Overhead Catenary System - A type of wayside power where vehicles may connect to and draw power from overhead wires.

OCTA Orange County Transportation Authority – Agency responsible for planning and funding countywide transportation improvements, administering the county's transportation sales tax revenues, and operating bus transit service.

OEM Original Equipment Manufacturer

OHE Office of Health Equity - OHE is a program within the CDPH focused on providing a leadership role to reduce health and mental health disparities to vulnerable communities. OHE has moved forward with the implementation of Portrait of Promise: The California Statewide Plan to Promote Health and Mental Health Equity. Example action items include advancing climate change and health equity research, supporting the Cal BRACE Framework through additional research, and publishing new reports such as Safeguarding California: Implementation Action Plan – Public Health Sector Plan.

Open Space Generally understood as any area of land or water which, for whatever reason, is not developed for urbanized uses and which therefore enhances residents' quality of life. Each county and city in California must adopt an open space element as part of its general plan. The element is a statement of local planning policies focusing on the use of unimproved land or water for: 1) the preservation or managed production of natural resources, 2) outdoor recreation, and 3) the promotion of public health and safety. Therefore, open space will be defined by each jurisdiction based on their own unique resources and environment.

OWP Overall Work Program – SCAG develops an OWP annually, describing proposed transportation planning activities for the upcoming fiscal year, including those required by federal and state law.

P

Parking Subsidy The difference between the out-of-pocket amount paid by an employer on a regular basis in order to secure the availability of an employee parking space not owned by the employer and the price, if any, charged to an employee for use of that space.

PCI Pavement Condition Index – A numerical index between 0 and 100 which is used to indicate the general condition of a pavement.

PEIR Program Environmental Impact Report – An information document that analyzes and discloses potential environmental effects of large-scale plans or programs in accordance with provisions of the California Environmental Quality Act (CEQA).

PeMS Freeway Performance Measurement System – A service provided by the University of California, Berkeley, to collect historical and real-time freeway data from freeways in the state of California in order to compute freeway performance measures.

Person Trip A trip made by a person by any mode or combination of modes for any purpose.

PEV Plug-in Electric Vehicle – Refers to all vehicles that can be plugged into an external source of electricity in order to recharge an on-board battery which will provide some or all power to an electric engine.

PGA Priority Growth Area – Designated areas prioritized for new development based on established criteria (e.g. infrastructure, location, market).

PHEV Plug-in Hybrid Electric Vehicle – A vehicle powertrain that combines an electric engine with a traditional internal combustion engine. The two engines can operate in parallel with the electric engine operating at certain speeds, or the engines can operate sequentially, with all power being provided by the electric engine until the battery power is exhausted.

PM2.5 Particulate matter with diameters that are generally 2.5 micrometers and smaller – A mixture of fine inhalable solid particles and liquid droplets found in the air 2.5 micrometers or less in size (A micrometer is one-millionth of a meter. The average human hair is about 70 micrometers in diameter). These fine particles result from fuel combustion from motor vehicles, power generation, and industrial facilities, as well as from residential fireplaces and wood stoves.

PM10 Particulate matter with diameters that are generally 10 micrometers and smaller – A mixture of inhalable solid particles and liquid droplets found in the air 10 micrometers or less in size (A micrometer is one-millionth of a meter. The average human hair is about 70 micrometers in diameter). These coarse particles are generally emitted from sources such as vehicles traveling on unpaved roads, materials handling, and crushing and grinding operations, as well as windblown dust.

PMD LA/Palmdale Regional Airport – Regional airport located in Palmdale.

PMT Passenger Miles Traveled – The cumulative sum of the distances ridden by each public transportation passenger.

POE Port of Entry.

POLA Port of Los Angeles.

POLB Port of Long Beach.

PPP Public-Private Partnership – Contractual agreements formed between a public agency and private-sector entity that allow for greater private-sector participation in the delivery of transportation projects.

PRC Peer Review Committee – An “informal” committee of technical experts usually organized and invited to review and comment on various technical issues and processes used in the planning process.

Proposition 1A Passed by voters in 2006, Proposition 1A protects transportation funding for traffic congestion relief projects, safety improvements, and local streets and roads. It also prohibits the state sales tax on motor vehicle fuels from being used for any purpose other than transportation improvements and authorizes loans of these funds only in the case of severe state fiscal hardship.

Proposition 1B Highway Safety, Traffic Reduction, Air Quality, and Port Security State of California – Passed in November 2006, Proposition 1B provides $19.9 billion to fund state and local transportation improvement projects to relieve congestion, improve movement of goods, improve air quality, and enhance safety and security of the transportation system.

Proposition A Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has three permanent local sales taxes (Propositions A and C; and Measure M) and one temporary local sales tax (Measure R).

Proposition C Revenues generated from Los Angeles County's local half-cent sales tax. Los Angeles County has three permanent local sales taxes (Propositions A and C; and Measure M) and one temporary local sales tax (Measure R).

PTA Public Transportation Account – The major state transportation account for mass transportation purposes. Revenues include a portion of the sales tax on gasoline and diesel fuels.

Public Transportation As defined in the Federal Transit Act, "Transportation by a conveyance that provides regular and continuing general or special transportation to the public, but does not include school bus, charter, or intercity bus transportation or intercity passenger rail transportation provided by the entity described in chapter 243 (Amtrak or a successor to such entity)."

PUC Public Utilities Commission – Regulates privately owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies.

R

RAMP Regional Advance Mitigation Program – Advance mitigation is a science-based approach to identify mitigation opportunities to support regional conservation priorities. By considering mitigation development early in the regional planning process prior to design and permitting phases, proponents can identify higher-quality mitigation opportunities.

Rapid Bus A bus rapid transit (BRT) type service operated by Metro with vehicles branded as "Rapid" and painted red, operating in mixed traffic environments, serving fewer stops than local bus service, and with transit signal priority where available. Other transit operators, including Culver CityBus, Santa Monica's Big Blue Bus and Torrance Transit, also operate Rapid lines.

RBN Regional Bikeway Network – A system of regionally interconnected bikeways linking cities and counties in the SCAG region.

RC Regional Council – Conducts the affairs of SCAG; implements the General Assembly's policy decisions; acts upon policy recommendations from SCAG policy committees and external agencies; appoints committees to study specific problems; and amends, decreases or increases the proposed budget to be reported to the General Assembly.

RCIS Regional Conservation Investment Strategy – A voluntary, non-regulatory, and non-binding conservation assessment that includes information and analyses and establishes biological goals and objectives that may be used as a basis to provide advance mitigation through the development of credits or to inform other conservation investments.

RCP Regional Comprehensive Plan (RCP) – Developed by SCAG, the RCP is a vision of how Southern California can balance resource conservation, economic vitality, and quality of life. It will serve as a blueprint to approach growth and infrastructure challenges in an integrated and comprehensive way.

RCTC Riverside County Transportation Commission – Agency responsible for planning and funding countywide transportation improvements and administering the county's transportation sales tax revenues.

Rent Stabilization A practice which allows landlords a reasonable rate of return on their investments while setting maximum rates for annual rent increases to protect tenants.

Resilience The capacity of infrastructure, communities and their related systems to mitigate, adapt or positively respond to chronic and acute stresses, transforming in ways that restore, maintain and even improve their essential functions.

RGN Regional Greenway Network – A regional system of bikeways physically separate from traffic. It makes use of riverbeds and under-utilized utility corridors. It is part of the Regional Bikeway Network (RBN).

RHNA Regional Housing Needs Assessment – Quantifies and allocates the determination of housing need during specified planning periods at various income categories for each city and county in the region, in accordance with state housing law. Cities and counties then address this need through the process of updating the housing elements of local General Plans.

Ride-hailing A generic term to describe booking rides and paying for car service through a smartphone app with a transportation network company (TNC) such as Uber or Lyft. The term "ridesharing" has been used to describe TNCs, but it has been widely argued to be inaccurate, and hence the ride-hailing term was introduced.

Rideshare Please see "Ride-hailing."

RMRA Road Maintenance and Rehabilitation Account – Funds related to the Road Maintenance and Rehabilitation Program, collected via fuel taxes and vehicle fees established by SB 1, are deposited in the RMRA. Cities and counties receiving RMRA funds must comply with relevant federal and state laws, regulations, policies and procedures. RMRA funds are also referred to as "SB 1 funds". Please also see "SB 1."

ROG Reactive Organic Gas – Organic gases emitted from a variety of sources, including motor vehicles, chemical plants, refineries, factories, consumer, commercial products, and other industrial sources. Ozone, the main component of smog, is formed from the reaction of VOCs and NOx in the presence of heat and sunlight.

RSTIS Regionally Significant Transportation Investment Study – Involves identifying all reasonable transportation options, their costs, and their environmental impacts. RSTIS projects are generally highway or transit improvements that have a significant impact on the capacity, traffic flow, level of service, or mode share at the transportation corridor or sub-area level.

RTMS Regional Transportation Monitoring System – Internet-based transportation monitoring system. The RTMS will be the source for real-time and historical transportation data collected from local, regional, and private data sources.

RTP Regional Transportation Plan (RTP) – Federally required 20-year plan prepared by metropolitan planning organizations and updated every four years. Includes projections of population growth and travel demand, along with a specific list of proposed projects to be funded.

RTSS Regional Transit Security Strategy – Strategy for the region with specific goals and objectives related to the prevention, detection, response, and recovery of transit security issues.

S

Safe Routes to School Part of a nationwide/region-wide program to increase students walking or biking to school. Includes engineering, educational and enforcement activities. Funded through the State Active Transportation Program (ATP).

SANDAG San Diego Association of Governments.

SB 1 Senate Bill 1 – Known as the Road Repair and Accountability Act of 2017, SB 1 established fuel taxes and vehicle fees that will generate new funding for roadways, including up to $1.5 billion per year allocated directly to counties and cities for local road maintenance, safety improvements and complete streets improvements (e.g. bicycle and pedestrian facilities).

SB 45 Senate Bill 45 (Chapter 622, Statutes of 1997, Kopp) – Established the current STIP process and shifted control of decision-making from the state to the regional level.

SB 226 (Simitian) Implements changes to the California Environmental Quality Act (CEQA) by authorizing limited CEQA review for urban infill projects, creating a new statutory exemption for rooftop and parking lot solar energy projects and establishing that greenhouse gas emissions at a project or cumulative level do not disqualify the use of categorical exemptions if the project complies with certain regulations and requirements.

SB 375 Senate Bill 375 (Chapter 728, Steinberg) – Established to implement the state's greenhouse gas (GHG) emission-reduction goals, as set forth by AB 32, in the sector of cars and light trucks. This mandate requires the California Air Resources Board to determine per capita GHG emission-reduction targets for each metropolitan planning organization (MPO) in the state at two points in the future—2020 and 2035. In turn, each MPO must prepare a Sustainable Communities Strategy (SCS) that demonstrates how the region will meet its GHG reduction target through integrated land use, housing, and transportation planning.

SB 535 Senate Bill 535 (Chapter 830, De León) – Established that a quarter of the proceeds from the Greenhouse Gas Reduction Fund must also go to projects that provide a benefit to disadvantaged communities. A minimum of 10 percent of the funds must be for projects located within those communities. The legislation gives the California Environmental Protection Agency responsibility for identifying those communities.

SB 743 (Steinberg, 2013) Made several changes to the California Environmental Quality Act (CEQA) for projects located in areas served by transit. SB 743 proposes to eliminate auto delay, level of services, and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts. It also creates a new exemption for certain projects that are consistent with a Specific Plan, and eliminates the need to evaluate aesthetic and parking impacts of a project in some circumstances.

SBCTA San Bernardino County Transportation Authority − The council of governments and transportation planning agency for San Bernardino County. SBCTA is responsible for cooperative regional planning and developing an efficient multimodal transportation system countywide.

SBD San Bernardino International Airport – International airport located in San Bernardino.

SCAB South Coast Air Basin – Comprises the non–Antelope Valley portion of Los Angeles County, Orange County, western Riverside County, and the non-desert portion of San Bernardino County.

SCAG Southern California Association of Governments – The metropolitan planning organization (MPO) for six counties including Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura.

SCAQMD South Coast Air Quality Management District – The air pollution control agency for all of Orange County and the urbanized portions of Los Angeles, Riverside, and San Bernardino Counties in Southern California. This area of 10,743 square miles is home to over 16.8 million people–about half the population of the whole state of California. It is the second most populated urban area in the United States and one of the smoggiest. South Coast AQMD is responsible for controlling emissions primarily from stationary sources of air pollution within its jurisdiction. These can include anything from large power plants and refineries to the corner gas station.

SCCAB South Central Coast Air Basin – Comprises San Luis Obispo, Santa Barbara, and Ventura Counties.

SCS Sustainable Communities Strategy – As part of SB 375, which was established to implement the state's greenhouse gas (GHG) emission-reduction goals, as set forth by AB 32, each California metropolitan planning organization (MPO) is required to prepare a SCS as part of their regional transportation plan. The mandate requires the California Air Resources Board to determine per capita GHG emission-reduction targets for each MPO in the state at two points in the future – 2020 and 2035. In turn, each MPO must prepare a SCS that demonstrates how the region will meet its GHG through integrated land use, housing and transportation planning.

Scooter Share Scooter sharing allows individuals access to scooters by joining an organization that maintains a fleet of scooters at various locations. Scooter sharing models can include a variety of motorized and non-motorized scooter types. The scooter service provider typically provides gasoline or charge (in the case of motorized scooters), maintenance, and may include parking as part of the service. Users typically pay a fee each time they use a scooter. Trips can be roundtrip or one way.

SDOH Social Determinants of Health – Includes the circumstances in which people are born, grow up, live, work, play, and age. Economic opportunities, government policies, and the built environment all play a role in shaping these circumstances and influencing public health outcomes.

SED Socioeconomic Data – Population, employment and housing forecast.

SGC The Strategic Growth Council is a state agency tasked with encouraging the development of sustainable communities.

SHA State Highway Account – The major state transportation account for highway purposes. Revenues include the state excise taxes on gasoline and diesel fuel and truck weight fees.

Shared Mobility Services Refers to a wide variety of new mobility services and encompasses bike share, scooters, car share, app-based transit services, and ride-hailing. This term refers to the way in which these modes are offered as services brokered by a mobile application, and each vehicle is shared amongst multiple users. Another common term used to describe this type of transportation service is Mobility as a Service (MaaS).

Shared Parking A tool in parking management which allows different land uses with different periods of parking demand to share a common parking facility and thereby limit the need to provide additional parking. Shared parking policies do not treat the parking supply as individual units specific to particular businesses or uses, but rather emphasize the efficient use of the parking supply by including as many spaces as possible in a common pool of shared, publicly available spaces.

SHOPP State Highway Operation and Protection Program – A four-year capital improvement program for rehabilitation, safety, and operational improvements on state highways.

SHSP Strategic Highway Safety Plan – A statewide, coordinated safety plan that provides a comprehensive framework for reducing fatalities and severe injuries to motorists, pedestrians, and bicyclists on all public roads. SHSP goals and objectives are data-driven and results are measured. Actions designed to achieve the objectives are developed by hundreds of safety stakeholders from the five E's of highway safety: engineering, education, enforcement and emergency medical services and equipment. In California, Caltrans coordinates the effort to develop the plan.

Single-Family Residential These residential areas are typically made up of detached dwellings, where each structure houses a single family, located in an urban or suburban setting. These single family residences are usually served by all utilities, are on paved streets, and are provided with or have access to all urban facilities such as schools, parks, police, and fire stations. Single family residential neighborhoods are normally large contiguous areas of residential lots. Some areas have subdivisions or tracts of homes with similar size or architectural design. In these areas the roofs may be similar in shape or color when viewed on the aerial photo. Typically, single family lots contain landscaped front and back yards, one driveway, and one walkway either to the sidewalk or to the driveway. Some lots may have swimming pools in the back yards. High or low density is determined by the size of the lot on which the residence is located. If an area is under construction, and the residential lots or pads are easily identifiable, then the area can be properly mapped.

SIP State Implementation Plan – Comprehensive state plan that describes how an area will attain national ambient air quality standards. Transportation conformity requires that transportation activities including regional transportation plans, programs, and projects are consistent with the goals and objectives of the applicable SIP.

Small-Lot Development A practice that allows for the subdivision of lots located within existing multifamily and commercial zones to develop fee simple housing. Typically small lot developments are not required to be part of a homeowner's association, thus reducing the cost for home buyers.

Smart City A designation given to a city that incorporates information and communication technologies to enhance the quality and performance of public services, consumption, waste and overall costs.

Smart Growth Principles The following principles developed by the Smart Growth Network, a partnership of government, business, and civic organizations created in 1996:

- Mix land uses
- Take advantage of compact building design
- Create a range of housing opportunities and choices
- Create walkable neighborhoods
- Foster distinctive, attractive communities with a strong sense of place
- Preserve open space, farmland, natural beauty, and

critical environmental areas

- Strengthen and direct development towards existing communities
- Provide a variety of transportation choices
- Make development decisions predictable, fair, and cost effective
- Encourage community and stakeholder collaboration in development decisions

Smart Parking Smart parking management techniques include real-time identification of open parking spaces, active wayfinding, adaptive pricing, and consumer facing apps for information and payment of parking. These management techniques pertain to on-street as well as public off-street parking.

Social Equity Equal opportunity in a safe and healthy environment.

SOI Sphere of Influence – A planning boundary outside of an agency's legal boundary (e.g. city limit) that designates the agency's probable future boundary and service area.

SOV Single-Occupant Vehicle – Privately operated vehicle that contains only one driver or occupant.

SOx Sulfur oxide – Any of several compounds of sulfur and oxygen, formed from burning fuels such as coal and oil.

SPA Specific Plan Areas – An SPA is created for an established area when the countywide zoning regulations do not adequately address local concerns. The SPA allows uses, regulations and standards that would not be allowed under countywide regulations.

SPB Ports San Pedro Bay Ports.

SRTS Safe Routes to School – Part of a nationwide/region-wide program to increase students walking or biking to school. Includes engineering, educational and enforcement activities. Funded through the State Active Transportation Program (ATP).

SSAB Salton Sea Air Basin – Comprises the Coachella Valley portion of Riverside County and all of Imperial County.

STA State Transit Assistance – State funding program for mass transit operations and capital projects. Current law requires that STA receive 50 percent of PTA revenues.

STBG Surface Transportation Block Grant – Established by California state statute utilizing federal Surface Transportation Program funds. Approximately 76 percent of the state's STBG funds must be obligated on projects located within the 11 urbanized areas of California with populations of 200,000 or more.

STIP State Transportation Improvement Program – A five-year capital outlay plan that includes the cost and schedule estimates for all transportation projects funded with any amount of state funds. The STIP is approved and adopted by the CTC and is the combined result of the ITIP and the RTIP.

STP Surface Transportation Program – Provides flexible funding that may be used by states and localities for projects on any federal-aid highway, bridge projects on any public road, transit capital projects, and intracity and intercity bus terminals and facilities. A portion of funds reserved for rural areas may be spent on rural minor collectors.

Strategic Projects/Plan Strategic projects are unfunded projects that are showcased in case future funding is available.

Sustainability The practice of analyzing and accounting for the impact of decisions, policies, strategies and development projects on the Economy, the Environment and Social Equity (commonly referred to as the three E's). In the 2017 Agency Strategic Plan, SCAG adopted the following objective: "Cultivate dynamic knowledge of the major challenges and opportunities relevant to sustainability and quality of life in the region."

SWITRS Statewide Integrated Traffic Records System - A database that serves as a means to collect and process data gathered from a collision scene.

T

TAP Transit Access Pass – A form of electronic ticketing payment method used in most public transit services within Los Angeles County.

TAM Transit Asset Management – A business model that prioritizes funding based on the actual condition of transit assets in order to achieve or maintain transit networks in a state of good repair.

TAZ Traffic Analysis Zone – Zone system used in travel demand forecasting.

TC Transportation Committee – Committee used to study problems, programs, and other matters which pertain to the regional issues of mobility, air quality, transportation control measures, and communications.

TCM Transportation Control Measure – Defined in the US EPA's Transportation Conformity Regulations, TCM is any measure that is specifically identified and committed to in the applicable SIP, including a substitute or additional TCM that is incorporated into the applicable SIP through the process established in CAA section 176(c)(8), that is either one of the types listed in CAA section 108, or any other measure for the purpose of reducing emissions or concentrations of air pollutants from transportation sources by reducing vehicle use or changing traffic flow or congestion conditions. Vehicle technology-based, fuel-based, and maintenance-based measures which control the emissions from vehicles under fixed traffic conditions are not TCMs.

TCWG Transportation Conformity Working Group – A forum to support federally mandated interagency consultation to help improve air quality and maintain transportation conformity in the SCAG region. Membership of the TCWG includes federal (US EPA, FHWA, FTA), state (ARB, Caltrans), regional (Air Quality Management Districts, SCAG), and sub-regional (County Transportation Commissions) agencies and other stakeholders.

TDA Transportation Development Act – State law enacted in 1971 that provided a 0.25 percent sales tax on all retail sales in each county for transit, bicycle, and pedestrian purposes. In non-urban areas, funds may be used for streets and roads under certain conditions.

TDM Transportation Demand Management – Strategies that result in more efficient use of transportation resources, such as ridesharing, telecommuting, park-and-ride programs, pedestrian improvements, and alternative work schedules.

TDR Transfer of Development Rights – A market-based planning tool to support growth in locally identified “receiving districts” in lieu of growth in identified “sending districts”.

TEU Twenty-Foot Equivalent Unit, a measure of shipping container capacity.

TIFIA Transportation Infrastructure Finance and Innovation Act of 1998 – Established a new federal credit program under which the US DOT may provide three forms of credit assistance—secured (direct) loans, loan guarantees, and standby lines of credit—for surface transportation projects of national or regional significance. The program's fundamental goal is to leverage federal funds by attracting substantial private and other non-federal co-investment in critical improvements to the nation's surface transportation system. Sponsors may include state departments of transportation, transit operators, special authorities, local governments, and private entities.

TMA Transportation Management Area – An area designated by the Secretary of Transportation, having an urbanized area population of over 200,000, or upon special request from the Governor and the MPO designated for the area.

TNC Transportation Network Companies – This is the technical term for ride-hailing companies used by the California Public Utilities Commission in order to create a new class of mobility provider distinguished from taxi companies and limousines.

TOD Transit-Oriented Development – A planning strategy that explicitly links land- use and transportation by focusing mixed housing, employment, and commercial growth around bus and rail stations (usually within ½ mile). TODs can reduce the number and length of vehicle trips by encouraging more bicycle/pedestrian and transit use and can support transit investments by creating the density around stations to boost ridership.

TP&D Transportation Planning and Development Account – A state transit trust fund that is the funding source for the STA program.

TPA Transit Priority Areas - An area within half a mile of a major transit stop that is existing or planned.

TSM Transportation Systems Management – A set of techniques used to increase the capacity of a segment of transportation infrastructure without increasing its physical size. Most often, these techniques are used in the context of roadways, and techniques include coordinated traffic signals and ramp meters.

TSP Transit Signal Priority – A set of operational improvements that use technology to facilitate the movement of transit vehicles and reduce their dwell time at traffic signals by holding green lights longer or shortening red lights. TSP may be implemented at individual intersections or across corridors or entire street systems. Objectives of TSP include improved schedule adherence and improved transit travel time efficiency while minimizing impacts to normal traffic operations.

TSWG Transportation Safety Working Group – Advises the operating organizations on transportation safety matters associated with the transfer or shipment of hazardous materials.

TUMF Transportation Uniform Mitigation Fee – Ordinance enacted by the Riverside County Board of Supervisors and cities to impose a fee on new development to fund related transportation improvements.

U

Unconstrained Plan Same as Strategic Projects/Plan.

Union Station Los Angeles Union Station is the main railway station in Los Angeles.

UP Union Pacific Railroad.

UPT Unlinked Passenger Trips - The number of passengers who board public transportation vehicles. Passengers are counted each time they board vehicles no matter how many vehicles they use to travel from their origin to their destination.

Urban Areas Urban Areas in the SCAG region represent densely developed territory, and encompass residential, commercial and other non-residential urban land uses where population is concentrated over 2,500 people in a given locale.

Urban Greening Grant Program A grant program that competitively distributes grants statewide to projects that make the built environment more sustainable and effective in creating healthy and vibrant communities. The program funds establishing and enhancing parks and open space, using natural solutions to improving air and water quality and reducing energy consumption, and creating more walkable and bikeable trails.

Urban Growth Boundary A regional boundary that seeks to contain outward urban expansion by limiting development outside of the boundary, while focusing new growth within the boundary. Urban growth boundaries lead to the preservation of natural and agricultural lands, redevelopment and infill in existing communities, and optimization of existing infrastructure and transportation investments.

Urban Heat Island/ Heat Island Effect An urban or metropolitan area that is significantly warmer than surrounding rural areas due to human activities. Its main cause is the modification of land surfaces.

US DOT U.S. Department of Transportation – Federal agency responsible for the development of transportation policies and programs that contribute to providing fast, safe, efficient, and convenient transportation at the lowest cost consistent with those and other national objectives, including the efficient use and conservation of the resources of the United States. US DOT is comprised of ten operating administrations, including FHWA, FTA, FAA and FRA.

V

Variable Constrained Areas Include Wildland Urban Interface (WUI), grazing lands, farmlands in incorporated jurisdictions, 500 year flood plains, CalFire Very High Severity Fire Risk (state and local), and Natural Lands Conservation Areas (connectivity, habitat quality, habitat type layers). These areas were identified during the scenario development process to be used during the modeling process to redirect jurisdictional growth into other areas when feasible. These are intended to be regional guidelines and do not supersede existing regulations or protections or local land use policy.

VCAPCD Ventura County Air Pollution Control District – The air pollution control agency with the primary responsibility for the control of non-vehicular sources of air pollution in Ventura County. The District provides a full range of air pollution control activities, including permitting, facility inspection, air quality attainment planning, rulemaking, air quality monitoring, and incentive programs. The District shares responsibility with the California Air Resources Board for ensuring that all state and federal air quality standards are achieved and maintained within Ventura County. The VCAPCD is located within the South Central Coast Air Basin.

VCTC Ventura County Transportation Commission – Agency responsible for planning and funding countywide transportation improvements.

Vehicle Hours of Delay The travel time spent on the highway due to congestion. Delay is estimated as the difference between vehicle hours traveled at a specified free- flow speed and vehicle hours traveled at a congested speed.

Vehicle Revenue Hours The hours that a public transportation vehicle actually travels while in revenue service. Vehicle revenue hours include layover/recovery time, but exclude deadheading, operator training, vehicle maintenance testing, and school bus and charter services.

VHDD Vehicle Hours of Daily Delay – Hours of delay attributed to congestion for vehicles each day.

Vision Zero Policy A multi-national road traffic safety project that aims to achieve a highway system with no fatalities or serious injuries in road traffic. The policy was started in Sweden and was approved by their parliament in 1997. Since then, various countries (including the United States) have adopted the policy.

VMT Vehicle Miles Traveled – On roadways, a measurement of the total miles traveled by all vehicles in the area for a specified time period. It is calculated by the number of vehicles times the miles traveled in a given area or on a given roadway during the time period. In transit, the number of vehicle miles operated on a given route or line or network during a specified time period.

VRM Vehicle Revenue Miles – The miles that a public transportation vehicle actually travels while in revenue service. Vehicle revenue miles include layover/recovery time, but exclude deadheading, operator training, vehicle maintenance testing, and school bus and charter services.

Z

ZEV Zero Emissions Vehicles – Vehicles that produce no tailpipe emissions of criteria pollutants. Generally, ZEVs feature electric powertrains. Technically, ZEVs are still responsible for some greenhouse gas emissions, as the GHG content from the electricity generation must be accounted for. ZEVs include battery electric vehicles (BEV), plug-in electric hybrids (PHEV) when powered by the electric engine, and hydrogen fuel cell vehicles (FCV).

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EXHIBIT G

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April 23, 2021

Greg Sonstein, Esq.
Mitchell M. Tsai, Attorney at Law
155 South El Molino Avenue Suite 104
Pasadena, CA 91101

Subject: Comments on 1111 Sunset Project (SCH No. 2018051043)

Dear Mr. Sonstein,

We have reviewed the March 2021 Draft Environmental Impact Report ("DEIR") for the 1111 Sunset Project ("Project") located in the City of Los Angeles ("City"). The Project proposes two development scenarios: the Mixed Use Development Scenario and the No-Hotel Development Scenario. The Mixed Use Development Scenario proposes to construct up to 737 residential units, 180 hotel rooms, 48,000-SF of office space, and 95,000-SF of commercial space, as well as 1,101 parking spaces, on the 6.27-acre site. The No Hotel Development Scenario proposes to construct up to 827 residential units, 48,000-SF of office space, and 95,000-SF of commercial space, as well as 1,075 parking spaces, on the 6.27-acre site.

Our review concludes that the DEIR fails to adequately evaluate the Project's hazards and hazardous material, air quality, health risk, and greenhouse gas impacts. As a result, emissions and health risk impacts associated with construction and operation of the proposed Project are underestimated and inadequately addressed. An updated EIR should be prepared to adequately assess and mitigate the potential hazards and hazardous materials, air quality, health risk, and greenhouse gas impacts that the project may have on the surrounding environment.

Hazards and Hazardous Materials

The DEIR and the accompanying Phase I ESA describe a site that has at least six abandoned oil wells, abandoned before modern standards were published (p. IV.F-37). There is also contaminated soil onsite from oilfield operations with impacts to soil and soil vapor. Methane is also present.

The DEIR provides only for deferred mitigation. Mitigation Measure HAZ-MM-1 calls for all wells to be properly abandoned in accordance with current California Geologic Energy Management Division;

however, this will not be done until prior to the issuance of the building permit. Instead, the investigation of the location of the wells, their condition and a description of what will be required to meet modern abandonment standards should be included in a revised DEIR. This is necessary to ensure full disclosure of impacts associated with the project, including construction air emissions associate with the abandonment of the wells (which requires drilling, casing removal, grouting and the transportation of materials and waste). Without disclosure of these impacts, the full impact of the project's constriction air emissions and health impacts is not known.

Additionally, Mitigation Measure HAZ-MM-3 calls for a soil and site management plan to guide removal of on-site contaminated soil. This mitigation measure is also deferred. Instead, a revised DEIR should be prepared to include the results of a full site characterization of the degree of contamination on the Project site and an evaluation of the potential health risks to construction workers and future occupants and workers. If the site characterization indicates the need for contaminated soil removal, the revised DEIR should also estimate impacts to air quality and human health during the removal of the contaminated soils and the transportation of those soils for proper disposal. The site characterization should be performed prior to construction, with cleanup certified by the California Department of Toxics Substances Control under a voluntary agreement.

Air Quality

Unsubstantiated Input Parameters Used to Estimate Project Emissions

The DEIR's air quality analysis relies on emissions calculated with CalEEMod.2016.3.2 (p. IV.A-34).[1] CalEEMod provides recommended default values based on site-specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act ("CEQA") requires that such changes be justified by substantial evidence. Once all of the values are inputted into the model, the Project's construction and operational emissions are calculated, and "output files" are generated. These output files disclose to the reader what parameters are utilized in calculating the Project's air pollutant emissions and make known which default values are changed as well as provide justification for the values selected.

When reviewing the Project's CalEEMod output files, provided in the Air Quality and Greenhouse Gas Emissions ("AQ & GHG Analysis") as Appendix C to the DEIR, we found that several model inputs were not consistent with information disclosed in the DEIR. As a result, the Project's construction and operational emissions may be underestimated.

Unsubstantiated Reduction to Default CO_2 Intensity Factor

Review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout with PDFs," "1111 Sunset Buildout - Mixed Use Option (with PDFs)," "1111 Sunset Buildout - No Hotel Option (with PDFs)" "1111 Sunset Buildout - Mixed Use Option (Without PDFs, TDM, LADOT MXD Methodology)," and "1111

[1] CAPCOA (November 2017) CalEEMod User's Guide, http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4.

Sunset Buildout - No Hotel Option (without PDFs)" models include a manual reduction to the default CO_2 intensity factor (see excerpt below) (Appendix C, pp. 77, 85, 104, 125, 136, 147, 158).

Table Name	Column Name	Default Value	New Value
tblProjectCharacteristics	CO2IntensityFactor	1227.89	524

As you can see in the excerpt above, the CO_2 intensity factor was reduced by approximately 57%, from the default value of 1,227.89- to 525-pounds per megawatt hour ("lbs/MWh"). As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.[2] According to the "User Entered Comments and Non-Default Data" table, the justification provided for this change is: "LADWP 2028 Carbon Intensity (SB 100 RPS)" (Appendix C, pp. 76, 84, 103, 124, 135, 146, 157). Furthermore, regarding the CO_2 intensity factor, the DEIR states:

> "The CalEEMod default carbon intensity for electricity generated by LADWP (pounds of CO_2e per MWh) is based on a year 2007 renewables portfolio of 8 percent and was therefore updated within CalEEMod to reflect the year 2028 renewables portfolio. Please note that under recently passed SB 100, LADWP is required to generate electricity that would increase renewable energy resources to 50 percent by 2026 and, 60 percent by 2030, and 100 percent by 2045. The Project complies with these percentage renewable requirements inasmuch as the Project is served by LADWP, which is committed to achieving the increase in renewable energy resources by the required dates" (p. IV.E-48).

However, this change remains unsupported for three reasons. First, simply because the ***State*** has renewable energy ***goals*** does not ensure that these goals will be achieved locally on the Project site or by the Project's specific utility company. Second, the DEIR cannot simply interpolate its own CO_2 intensity factor based on ***estimates*** of future increases in renewable energy use. Third, the DEIR fails to provide a source for the revised CO_2 intensity factor. As a result, we cannot verify this change.

This unsubstantiated reduction presents an issue, as CalEEMod uses the CO_2 intensity factor to calculate the Project's greenhouse gas ("GHG") emissions associated with electricity use.[3] Thus, by including an unsubstantiated reduction to the default CO_2 intensity factor, the models may underestimate the Project's GHG emissions and should not be relied upon to determine Project significance.

Unsubstantiated Changes to Individual Construction Phase Lengths

Review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout Construction-Regional," "1111 Sunset Buildout with PDFs (Construction On-Site)" and "1111 Sunset Buildout with PDFs" models include several changes to the default individual construction phase lengths (see excerpt below) (Appendix C, pp. 28-29, 50-51, 103).

[2] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 2, 9

[3] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.caleemod.com/, p. 17.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	50.00	60.00
tblConstructionPhase	NumDays	75.00	72.00
tblConstructionPhase	NumDays	75.00	24.00
tblConstructionPhase	NumDays	75.00	60.00
tblConstructionPhase	NumDays	740.00	35.00
tblConstructionPhase	NumDays	740.00	225.00
tblConstructionPhase	NumDays	740.00	424.00
tblConstructionPhase	NumDays	55.00	248.00
tblConstructionPhase	NumDays	55.00	79.00

As a result, the models include a construction schedule as follows (see excerpt below) (Appendix C, pp. 31, 53, 106):

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days
1	Utility Work and Demolition	Demolition	1/6/2021	3/27/2021	5	60
2	Demolition and Excavation	Grading	3/28/2021	6/19/2021	6	72
3	Grading and Excavation	Grading	6/20/2021	7/17/2021	6	24
4	Concrete and Grading/Excavation	Grading	7/18/2021	9/25/2021	6	60
5	Concrete and Mat Foundation	Building Construction	9/28/2021	11/15/2021	5	35
6	Building Construction (Phase 0 and 1/2)	Building Construction	11/16/2021	9/24/2022	5	225
7	Building Construction (Phase 1/2)	Building Construction	9/28/2022	5/12/2024	5	424
8	Architectural Coating	Architectural Coating	6/1/2023	5/12/2024	5	248
9	Paving	Paving	5/13/2024	8/31/2024	5	79

As you can see in the excerpts above, the demolition phase was increased by approximately 20%, from the default value of 50 to 60 days; the grading phases were decreased by approximately 31%, from the cumulative default value of 225 to 156 days; the building construction phases were decreased by approximately 69%; from the cumulative default value of 2,220 to 684 days; the architectural coating phase was increased by approximately 351%, from the default value of 55 to 248 days; and the paving phase was increased by approximately 44%, from the default value of 55 to 79 days. As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.[4] According to the "User Entered Comments and Non-Default Data" table, the justification provided for these changes is: "see assumptions" (Appendix C, pp. 27, 49, 101). Furthermore, regarding the Project's anticipated construction schedule, the DEIR states:

> "Under either development scenario, the construction schedule would be the same. Construction of the Project would commence with demolition of the existing buildings. This phase would be followed by grading and excavation for the subterranean parking. Building

[4] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 2, 9

foundations would then be laid, followed by building construction, paving/concrete installation, and landscape installation. Project construction is anticipated to be completed in 2028" (p. II-22).

Furthermore, the AQ & GHG Analysis provides the following construction assumptions (see excerpt below) (Appendix C, pp. 23):

Construction Details	Start Date	End Date	Days
Project	1/6/2021	8/31/2024	952
Utility Work (Phase 0) and Demolition (Phase 1)	1/6/2021	3/30/2021	60
Demolition (Phase 0) and Excavation (Phase 1)	4/1/2021	6/23/2021	72
Grading/Excavation (Phases 0 and 1)	6/24/2021	7/21/2021	24
Concrete (Phase 0) and Grading/Excavation (Phase 1)	7/22/2021	9/29/2021	60
Concrete (Phase 0 and Phase 1/2) Mat	9/30/2021	11/17/2021	35
Building Construction (Phase 0 and Phase 1/2)	11/18/2021	9/28/2022	225
Building Construction (Phase 1/2)	9/29/2022	5/14/2024	424
Bungalows/Paving/Landscape	5/13/2023	8/31/2024	340

Finally, regarding the construction schedule inputted into the models, the AQ & GHG Analysis states:

> "[T]he Project also assumes a 44-month construction duration. This construction schedule assumes overlapping phases which would identify the worst-case daily emissions. However, if the Project construction schedule were to be extended to take place over a longer duration (Year 2028 buildout), construction activities would be less intense on a daily basis as most phases would occur sequentially (non-overlapping)" (Appendix C, pp. 25).

However, these changes remain unsupported for three reasons.

First, while the DEIR indicates that construction will end by 2028, the DEIR fails to provide the ***individual construction phase lengths***. As such, we cannot verify the changes.

Second, the construction assumptions fail to provide a source or explain how the revised phase lengths were derived. This is incorrect, as simply providing the individual construction phase lengths *assumed* to estimate the Project's emissions does not justify the revised phase lengths inputted into the model. Rather, according to the CalEEMod User's Guide:

> "CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, *provided that the information is supported by substantial evidence as required by CEQA*." [5]

Here, as the AQ & GHG Analysis fail to provide substantial evidence to support the revised individual construction phase lengths, we cannot verify the changes.

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[5] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 12.

Third, while the AQ & GHG Analysis claims that the modeled construction schedule represents the worst-case scenario, the AQ & GHG Analysis again cannot simply *assume* a 44-month construction period. Furthermore, while a 44-month overall construction duration may be a conservative analysis compared to a 2028 buildout year, the AQ & GHG Analysis fails to mention or justify why the individual construction phase lengths were *disproportionately* altered. As such, we cannot verify the revised individual construction phase lengths.

These unsubstantiated changes present an issue, as they disproportionately spread out construction emissions over a longer period of time for some phases, but not others. According to the CalEEMod User's Guide, each construction phase is associated with different emissions activities (see excerpt below).[6]

> *Demolition* involves removing buildings or structures.
>
> *Site Preparation* involves clearing vegetation (grubbing and tree/stump removal) and removing stones and other unwanted material or debris prior to grading.
>
> *Grading* involves the cut and fill of land to ensure that the proper base and slope is created for the foundation.
>
> *Building Construction* involves the construction of the foundation, structures and buildings.
>
> *Architectural Coating* involves the application of coatings to both the interior and exterior of buildings or structures, the painting of parking lot or parking garage striping, associated signage and curbs, and the painting of the walls or other components such as stair railings inside parking structures.
>
> *Paving* involves the laying of concrete or asphalt such as in parking lots, roads, driveways, or sidewalks.

As such, by disproportionately altering individual construction phase lengths without proper justification, the models' calculations are altered and emissions are distorted, and possibly underestimated. Thus, by including unsubstantiated increases to the default individual construction phase lengths, the models may underestimate the Project's construction-related emissions and should not be relied upon to determine Project significance.

Unsubstantiated Changes to Number of Construction Days Per Week

Review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout Construction-Regional," "1111 Sunset Buildout with PDFs (Construction On-Site)" and "1111 Sunset Buildout with PDFs" models include several changes to the default number of construction days per week (see excerpt below) (Appendix C, pp. 28-29, 50-51, 103).

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

[6] "CalEEMod User's Guide." CAPCOA, November 2017, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 31.

As you can see in the excerpt above, the models assume that construction activities would occur 6 days per week, rather than the default of 5 days per week. As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.[7] According to the "User Entered Comments and Non-Default Data" table, the justification provided for this change is: "see assumptions" (Appendix C, pp. 27, 49, 101). However, review of the AQ & GHG Analysis demonstrates that the construction assumptions fail to mention or justify the number of construction days per week (Appendix C, pp. 23). Furthermore, the DEIR fails to mention or justify these changes whatsoever. As such, we cannot verify the revised number of construction days per week.

These unsubstantiated changes present an issue, as increasing the number of construction days per week spreads out construction emissions over a longer period of time than is anticipated for the Project. Thus, by including an unsubstantiated increase to the default number of construction days per week, the models may underestimate the Project's construction-related emissions and should not be relied upon to determine Project significance.

Unsubstantiated Changes to Off-Road Construction Equipment Unit Amounts

Review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout Construction-Regional," "1111 Sunset Buildout with PDFs (Construction On-Site)" and "1111 Sunset Buildout with PDFs" models include several changes to the default off-road construction equipment unit amounts (see excerpt below) (Appendix C, pp. 29-30, 51-52, 103-104).

[7] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 2, 9

Table Name	Column Name	Default Value	New Value
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	7.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00

As you can see in the excerpt above, the off-road construction equipment unit amounts were altered in the models. As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.[8] According to the "User Entered Comments and Non-Default Data" table, the justifications provided for these changes are: "Site Specific" and "see assumptions" (Appendix C, pp. 27, 49, 101). Furthermore, the AQ & GHG Analysis provides the following construction assumptions (see excerpt below) (Appendix C, pp. 23):

[8] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 2, 9

Equipment (Worst Case Day)								
	Utility Work (Phase 0) and Demo (Phase 1)	Demolition (Phase 0) and Excavation (Phase 1)	Grading/ Excavation (Phases 0 and 1)	Concrete (Phase 0) and Grading/ Excavation (Phase 1)	Concrete (Phase 0 and Phase 1/2) Matt	Building Construction (Phase 0 and Phase 1/2)	Building Construction (Phase 1/2)	Bungalows/Paving /Landscape
Air Compressor	1	1	-	2	2	8	6	
Aerial Lift	-	-	-	-	-	12	10	
Bore/Drill Rig	-	3	3		-	-	-	-
Cement and Mortar Mixers	-	2	2	4			4	2
Concrete/Industrial Saws	1	1	-	-	-	-	-	1
Cranes (Tower) Electric	-			1	2	4	3	-
Cranes (Mobile)	-	-	-	1	2	2	2	1
Crawler Tractors	-	-	-	-	-	-	-	-
Crushing/Proc. Equipment	-	-	-	-	-	-	-	-
Excavators	2	4	4	3	-	-	-	1
Forklifts	-	-	-	-	2	7	5	2
Generator Sets	-	1	1	1	-	-	-	-
Graders	-			-	-	-	-	
Off-Highway Tractors	-	-	-	-	-	-	-	-
Pavers	-	-	-	-	-	-	-	2
Paving Equipment	-	-	-	-	-	-	-	2
Concrete Pumps	-	-	-	3	3	3	2	
Plate Compactors	-	-	-	-	-	-	-	-
Compactors	-	2	2	2	4	-	-	2
Rough Terrain Forklifts	1	1	1	1	1	2	1	1
Rubber Tired Dozers	-	-	-	-	-	-	-	-
Rubber Tired Loaders	-	4	4	3	-	-	-	1
Scrapers	-	-	-	-	-	-	-	-
Signal Boards	-	-	-	-	-	-	-	-
Skid Steer Loaders	2	2	2	2			2	2
Surfacing Equipment	-	-	-	-	-	-	-	-
Tractors/Loaders/Backhoes	2	2	2	2	2	2	1	2
Trenchers	2	-	-	-	-	-	-	1
Welders	-	3	3	3	2	3	2	1
Total Pieces	**11**	**26**	**24**	**28**	**20**	**43**	**38**	**21**

However, these changes remain unsupported for two reasons.

First, the DEIR fails to mention or justify the changes to the off-road construction equipment unit amounts whatsoever.

Second, the construction assumptions fail to provide a source or explain how the revised off-road construction equipment unit amounts were derived. As previously discussed, this is incorrect, as simply providing the number of equipment pieces _assumed_ to estimate the Project's emissions does not justify the revised unit amounts inputted into the model. Rather, according to the CalEEMod User's Guide:

> "CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, _provided that the information is supported by substantial evidence as required by CEQA_." [9]

Here, as the DEIR and AQ & GHG Analysis fail to provide substantial evidence to support the revised off-road construction equipment unit amounts, we cannot verify the changes.

By including unsubstantiated changes to the default off-road construction equipment unit amounts, the models may underestimate the Project's construction-related emissions and should not be relied upon to determine Project significance.

[9] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 12.

Unsubstantiated Changes to Hauling, Vendor, and Worker Trip Lengths and Numbers

Review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout with PDFs (Construction On-Site)" model includes several changes to the default hauling, vendor, and worker trip lengths and numbers (see excerpt below) (Appendix C, pp. 30, 52, 104-105).

Table Name	Column Name	Default Value	New Value
tblTripsAndVMT	HaulingTripLength	20.00	876.00
tblTripsAndVMT	HaulingTripLength	20.00	3,672.00
tblTripsAndVMT	HaulingTripLength	20.00	1,334.40
tblTripsAndVMT	HaulingTripLength	20.00	2,623.00
tblTripsAndVMT	HaulingTripNumber	4,084.00	1.00
tblTripsAndVMT	HaulingTripNumber	27,090.00	1.00
tblTripsAndVMT	HaulingTripNumber	9,030.00	1.00
tblTripsAndVMT	HaulingTripNumber	22,951.00	1.00
tblTripsAndVMT	VendorTripLength	6.90	0.10
tblTripsAndVMT	VendorTripLength	6.90	0.10
tblTripsAndVMT	VendorTripLength	6.90	0.10
tblTripsAndVMT	VendorTripLength	6.90	17.00
tblTripsAndVMT	VendorTripLength	6.90	140.00
tblTripsAndVMT	VendorTripLength	6.90	19.00
tblTripsAndVMT	VendorTripLength	6.90	19.00
tblTripsAndVMT	VendorTripLength	6.90	0.10
tblTripsAndVMT	VendorTripLength	6.90	10.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	VendorTripNumber	0.00	60.00
tblTripsAndVMT	VendorTripNumber	0.00	60.00
tblTripsAndVMT	VendorTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	235.00	1.00
tblTripsAndVMT	VendorTripNumber	235.00	1.00
tblTripsAndVMT	VendorTripNumber	235.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	1.00

Table Name	Column Name	Default Value	New Value
tblTripsAndVMT	WorkerTripLength	14.70	0.10
tblTripsAndVMT	WorkerTripLength	14.70	0.10
tblTripsAndVMT	WorkerTripLength	14.70	0.10
tblTripsAndVMT	WorkerTripLength	14.70	0.10
tblTripsAndVMT	WorkerTripLength	14.70	0.10
tblTripsAndVMT	WorkerTripLength	14.70	0.10
tblTripsAndVMT	WorkerTripLength	14.70	0.10
tblTripsAndVMT	WorkerTripLength	14.70	0.10
tblTripsAndVMT	WorkerTripLength	14.70	0.10
tblTripsAndVMT	WorkerTripNumber	28.00	136.00
tblTripsAndVMT	WorkerTripNumber	65.00	206.00
tblTripsAndVMT	WorkerTripNumber	60.00	200.00
tblTripsAndVMT	WorkerTripNumber	68.00	256.00
tblTripsAndVMT	WorkerTripNumber	964.00	150.00
tblTripsAndVMT	WorkerTripNumber	964.00	550.00
tblTripsAndVMT	WorkerTripNumber	964.00	550.00
tblTripsAndVMT	WorkerTripNumber	193.00	0.00
tblTripsAndVMT	WorkerTripNumber	50.00	168.00

As you can see in the excerpt above, the default hauling, vendor, and worker trip lengths and numbers were significantly and randomly altered within the model. For example, the default hauling trip numbers were each reduced to 1 trip, while the default hauling trip lengths were increased; all of the vendor and some of the worker trip lengths were reduced to 0.10-miles; and some of the vendor trip numbers were reduced to 1 trip, among other changes. As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.[10] According to the "User Entered Comments and Non-Default Data" table, the justification provided for these changes is: "Soil Export – 25 miles to Irvindale (one-way) Concrete – 6.5 miles to Catalina Pacific (one-way)" (Appendix C, pp. 49). Furthermore, the AQ & GHG Analysis provides the following construction assumptions for hauling and vendor truck trips (see excerpt below) (Appendix C, pp. 71):

Hauling and Vendor Truck Trips[1]

Year	PhaseName	VendorTripNumber	HaulingTripNumber	VendorTripLength	HaulingTripLength	NumDays	Haul Trips per Day
2021	Utility Work and Demolition	20	8760	6.9	25	60	146
	Demolition and Excavation	60	36720	6.9	25	72	510
	Grading and Excavation	60	13344	6.9	25	24	556
	Concrete and Grading/Excavation	170	26230	6.9	25	60	437
	Concrete and Mat Foundation	1400	0	6.5	20	35	0
	Building Construction (Phase 0 and 1/2)	190	0	6.9	20	225	0

However, these changes remain unsupported for four reasons.

First, the construction assumptions fail to mention or justify *worker* trip numbers or lengths.

Second, the DEIR fails to mention or justify any of these changes whatsoever.

[10] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 2, 9

Third, the construction assumptions fail to provide calculations or explain how the vendor and hauling trip lengths and numbers were derived. As previously discussed, this is incorrect, as simply providing the number of equipment pieces *assumed* to estimate the Project's emissions does not justify the revised unit amounts inputted into the model. Rather, according to the CalEEMod User's Guide:

> "CalEEMod was also designed to allow the user to change the defaults to reflect site- or project-specific information, when available, *provided that the information is supported by substantial evidence as required by CEQA*." [11]

Here, as the DEIR and AQ & GHG Analysis fail to provide substantial evidence to support the revised vendor and hauling trip lengths and numbers, we cannot verify the changes.

Fourth, regardless of whether the assumptions are substantiated, the changes to the default vendor and hauling trip lengths and numbers are inconsistent with the values provided by the construction assumptions.

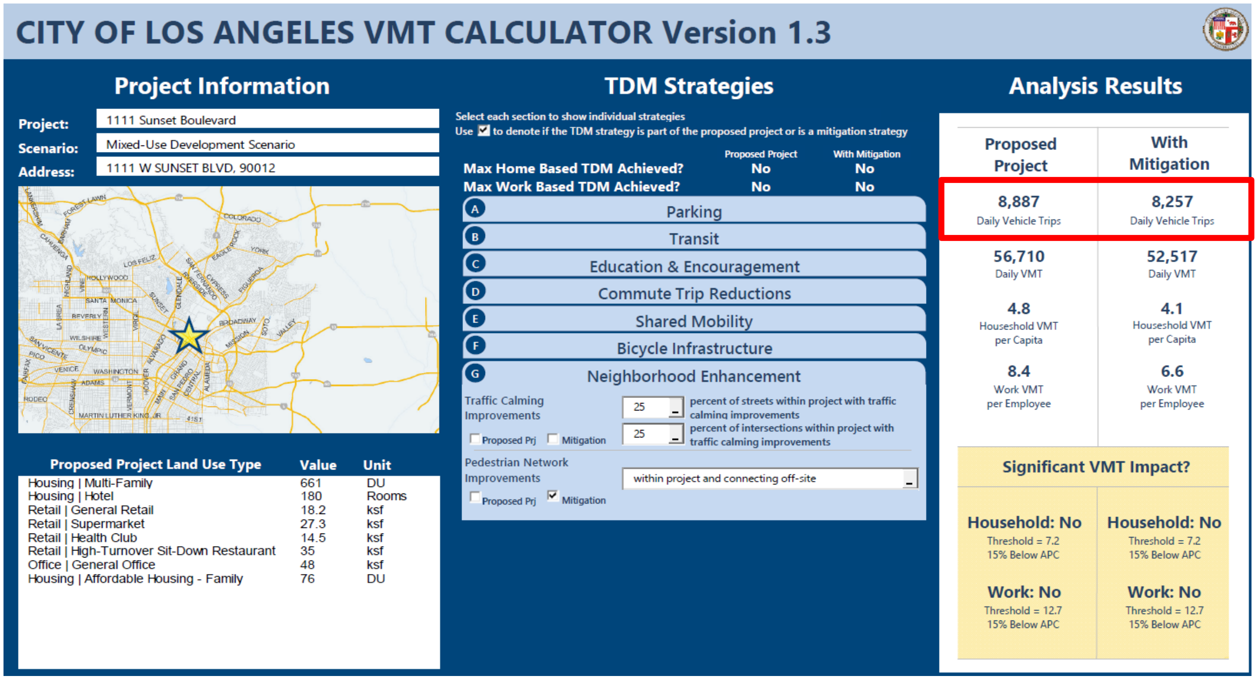
These unsubstantiated changes present an issue, as CalEEMod uses the hauling, vendor, and worker trip lengths and numbers to estimate the construction-related emissions associated with on-road vehicles.[12] Thus, by including unsubstantiated changes to the default hauling, vendor, and worker trip lengths and numbers, the model may underestimate the Project's mobile-source construction-related emissions and should not be relied upon to determine Project significance.

Unsubstantiated Operational Vehicle Trip Rates

According to the City's LADOT VMT Calculator, the Mixed Use Scenario is expected to generate approximately 8,887- and 8,304-daily vehicle trips without and with mitigation, respectively (see excerpt below) (Appendix C, pp. 170).

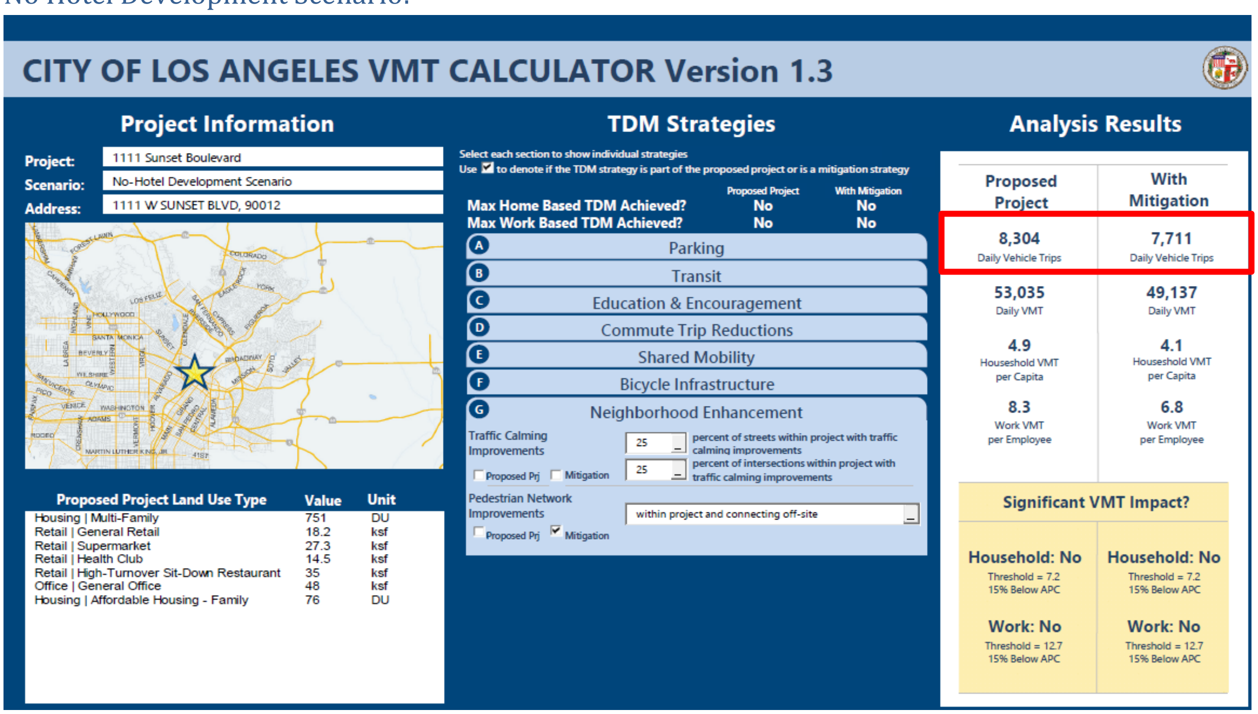
[11] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 12.
[12] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 34.

Mixed Use Development Scenario:



Furthermore, the No Hotel Development Scenario is expected to generate approximately 8,257- and 7,711-daily vehicle trips without and with mitigation, respectively (see excerpt below) (Appendix C, pp. 180).

No Hotel Development Scenario:



As the DEIR does not include any mitigation measures that would reduce the Project's vehicle miles traveled ("VMT"), the models associated with the Mixed Use and No Hotel Development Scenarios should have included the ***unmitigated*** average daily vehicle trip estimates of 8,887- and 8,304-trips, respectively. However, review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout - Mixed Use Option (with PDFs)" model includes only 8,257, 8,810.22, and 8,810.22 weekday, Saturday, and Sunday vehicle trips, respectively (see excerpt below) (Appendix C, pp. 79).

Land Use	Average Daily Trip Rate		
	Weekday	Saturday	Sunday
Condo/Townhouse High Rise	0.00	0.00	0.00
Enclosed Parking with Elevator	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00
Health Club	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00
Hotel	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00
Supermarket	0.00	0.00	0.00
Unenclosed Parking with Elevator	0.00	0.00	0.00
User Defined Commercial	8,257.00	8,810.22	8810.22
Total	8,257.00	8,810.22	8,810.22

As you can see in the excerpt above, the weekday, Saturday, and Sunday trip numbers associated with the Mixed Use Development Scenario are underestimated by approximately 630-, 77-, and 77-trips, respectively.

Furthermore, review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout – No Hotel Option (with PDFs)" model includes only 7,711 weekday average daily vehicle trips (see excerpt below) (Appendix C, pp. 87).

Land Use	Average Daily Trip Rate		
	Weekday	Saturday	Sunday
Condo/Townhouse High Rise	0.00	0.00	0.00
Enclosed Parking with Elevator	0.00	0.00	0.00
General Office Building	0.00	0.00	0.00
Health Club	0.00	0.00	0.00
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00
Strip Mall	0.00	0.00	0.00
Supermarket	0.00	0.00	0.00
Unenclosed Parking with Elevator	0.00	0.00	0.00
User Defined Commercial	7,711.00	8,358.72	8358.72
Total	7,711.00	8,358.72	8,358.72

As you can see in the excerpt above, the number of weekday trips associated with the No Hotel Development Scenario is underestimated by approximately 593 trips. As such, the trip rates inputted into the proposed land use models are underestimated and inconsistent with the information provided by the AQ & GHG Analysis.

These inconsistencies present an issue, as CalEEMod uses the operational vehicle trip rates to calculate the emissions associated with the Project's operational on-road vehicles.[13] Thus, by including underestimated operational vehicle trip rates, the models underestimate the Project's mobile-source operational emissions and should not be relied upon to determine Project significance.

Unsubstantiated Reduction to Energy Use Value

Review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout - Mixed Use Option (with PDFs)," "1111 Sunset Buildout - No Hotel Option (with PDFs)" "1111 Sunset Buildout - Mixed Use Option (Without PDFs, TDM, LADOT MXD Methodology)," and "1111 Sunset Buildout - No Hotel Option (without PDFs)" models include a manual reduction to the default Title 24 energy use value (see excerpt below) (Appendix C, pp. 77, 85, 125, 136, 147, 158).

Table Name	Column Name	Default Value	New Value
tblEnergyUse	T24E	3.92	0.46

As you can see in the excerpt above, the Title 24 electricity energy intensity ("T24E") was reduced by approximately 88%, from the default value of 3.92- to 0.45-kilowatt hours ("kWh"). As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.[14] According to the "User Entered Comments and Non-Default Data" table, the justification provided for this change is: "Adjustment for Parking Structure Energy Usage (See assumptions). Existing Uses usage rate increased by 10 percent as PDF would not apply to those uses" (Appendix C, pp. 77, 85, 125, 136, 147, 158). Furthermore, regarding the Project's energy-source emissions, the DEIR states:

> "Energy source emissions are based on CalEEMod default electricity and natural gas usage rates and reduction in GHG emissions account for compliance with 2019 Title 24 standard" (p. IV.E-67).

However, these justifications are insufficient for two reasons.

First, review of the assumptions demonstrates that these changes were not mentioned or justified.

Second, simply because the 2019 Title 24 standards *expect* a reduction in building energy consumption does not *guarantee* that these reductions would be implemented locally on the Project site. Absent additional information demonstrating that these reductions would be achieved through the implementation, monitoring, and enforcement of energy-related mitigation measures, we are unable to verify the revised energy use values inputted into the model.

This unsubstantiated reduction presents an issue, as CalEEMod uses energy use values to calculate the Project's emissions associated with building electricity and non-hearth natural gas usage.[15] By including an unsubstantiated change to the default Title 24 energy use value, the models may underestimate the

[13] "CalEEMod User Guide." CAPCOA, November 2017, *available at:* http://www.caleemod.com/, p. 35.
[14] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 2, 9
[15] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 43

Project's energy-source operational emissions and should not be relied upon to determine Project significance.

Unsubstantiated Changes to Stationary Generator Emission Factors

Review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout - Mixed Use Option (with PDFs)," "1111 Sunset Buildout - No Hotel Option (with PDFs)" "1111 Sunset Buildout - Mixed Use Option (Without PDFs, TDM, LADOT MXD Methodology)," and "1111 Sunset Buildout - No Hotel Option (without PDFs)" models include several changes to the default stationary source emission factors (see excerpt below) (Appendix C, pp. 77, 85, 125, 136, 147, 158).

Table Name	Column Name	Default Value	New Value
tblStationaryGeneratorsPumpsEF	NOX_EF	2.85	0.50
tblStationaryGeneratorsPumpsEF	PM10_EF	0.15	0.02
tblStationaryGeneratorsPumpsEF	PM2_5_EF	0.15	0.02
tblStationaryGeneratorsPumpsEF	ROG_EF	2.2480e-003	3.1000e-004
tblStationaryGeneratorsPumpsEF	TOG_EF	2.4700e-003	2.4700e-004

As you can see in the excerpt above, the default NO_X, PM_{10}, $PM_{2.5}$, ROG, and TOG emission factors for the proposed emergency generator were each manually reduced. As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.[16] According to the "User Entered Comments and Non-Default Data" table, the justification provided for these changes is: "AQMD BACT" (Appendix C, pp. 77, 85, 102, 125, 136, 147, 158). Furthermore, regarding the use of best available control technology ("BACT"), the DEIR states:

> "SCAQMD Regulation XIII, New Source Review, requires new on-site facility nitrogen oxide emissions to be minimized through the use of emission control measures (e.g., use of best available control technology for new combustion sources such as boilers, emergency generators, and water heaters)" (p. IV.A-11).

However, these changes remain unsupported for two reasons. First, as demonstrated in the excerpt above, the DEIR indicates that SCAQMD Regulation XIII only requires the minimization of ***nitrogen oxide*** emissions. Second, the DEIR and associated documents fail to provide a source or explanation of how the revised stationary generator emission factors were calculated. As such, we cannot verify the changes.

These unsubstantiated reductions present an issue, as CalEEMod uses the emergency generator emission factors to calculate the Project's stationary-source emissions.[17] By including unsubstantiated reductions to the default stationary generator emission factors, the models may underestimate the Project's stationary-source operational emissions and should not be relied upon to determine Project significance.

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[16] CalEEMod User Guide, *available at:* http://www.caleemod.com/, p. 2, 9

[17] "Appendix A Calculation Details for CalEEMod." *available at:* http://www.caleemod.com/, p. 53.

Incorrect Application of Tier 4 Final Mitigation for Construction, Coating, and Paving Phases

The DEIR implements Mitigation Measure ("MM") AIR-MM-1, which states:

> "All off-road diesel-powered equipment greater than 50 hp used *during Project demolition, grading/excavation, and concrete foundation* activities shall meet USEPA Tier4 final emissions standards" (emphasis added) (p. I-19).

As such, the model should have only included Tier 4 Final mitigation for off-road construction equipment used during the demolition, grading/excavation, and concrete foundation phases of construction, resulting in the mitigation of only 106 pieces of off-road construction equipment (see excerpt below) (Appendix C, pp. 34, 56, 109).

Phase Name	Offroad Equipment Count
Utility Work and Demolition	11
Demolition and Excavation	26
Grading and Excavation	24
Concrete and Grading/Excavation	27
Concrete and Mat Foundation	18
Building Construction (Phase 0 and 1/2)	39
Building Construction (Phase 1/2)	35
Architectural Coating	0
Paving	20

However, review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout Construction-Regional," "1111 Sunset Buildout with PDFs (Construction On-Site)" and "1111 Sunset Buildout with PDFs" models assume that 200 pieces of off-road construction equipment would meet Tier 4 Final emissions standards (see excerpt below) (Appendix C, pp. 28, 50, 102-103).

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	22.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	20.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	8.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	14.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	16.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	11.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	12.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	17.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
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tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

As you can see in the excerpt above, the models assume that 200 pieces of off-road construction equipment would meet Tier 4 Final emission standards. Thus, the model assumes that the off-road equipment used for all phases of Project construction would meet Tier 4 Final standards. By incorrectly assuming that the off-road construction equipment used for the *construction, coating, and paving phases* would also meet Tier 4 Final emission standards, the models are inconsistent with AIR-MM-1 and should not be relied upon to determine Project significance.

Incorrect Application of Operational Mitigation Measures

Review of the CalEEMod output files demonstrates that the "1111 Sunset Buildout - Mixed Use Option (with PDFs)" and "1111 Sunset Buildout - No Hotel Option (with PDFs)" models include the following energy-, water-, and waste-related operational mitigation measures (see excerpts below) (Appendix C, pp. 80, 82, 88, 90):

Energy-Related Mitigation Measures

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Water-Related Mitigation Measures

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Waste-Related Mitigation Measures

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

As previously mentioned, the CalEEMod User's Guide requires any changes to model defaults be justified.[18] According to the "User Entered Comments and Non-Default Data" table, the justification provided for the inclusion of the waste-related measure is: "City of LA Waste Diversion Rate (2013)" (Appendix C, pp. 77, 85). Furthermore, regarding greenhouse gas ("GHG") emissions reductions, the DEIR states:

> "The 2008 Climate Change Scoping Plan identified a number of specific issues relevant to the Project, including:

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[18] CalEEMod User Guide, *available at:* http://www.aqmd.gov/docs/default-source/caleemod/01_user-39-s-guide2016-3-2_15november2017.pdf?sfvrsn=4, p. 2, 9.

- The potential of using the green building framework as a mechanism, which could enable GHG emissions reductions in other sectors (i.e., electricity, natural gas), noting that:

> *A Green Building strategy will produce greenhouse gas savings through buildings that exceed minimum energy efficiency standards, decrease consumption of potable water, reduce solid waste during construction and operation, and incorporate sustainable materials. Combined, these measures can also contribute to healthy indoor air quality, protect human health, and minimize impacts to the environment*" (p. IV.E-12 – IV.E-13).

However, the inclusion of the above-mentioned operational mitigation measures remains unsupported for three reasons.

First, the "User Entered Comments and Non-Default Data" table fail to provide justifications for the inclusion of the energy- or water-related measures.

Second, the inclusion of these operational mitigation measures, based on the Project's vague compliance with a Green Building strategy, is unsupported. According to the Association of Environmental Professionals ("AEP") *CEQA Portal Topic Paper* on mitigation measures:

> "By definition, *mitigation measures are not part of the original project design*. Rather, mitigation measures are actions taken by the lead agency to reduce impacts to the environment resulting from the original project design. Mitigation measures are identified by the lead agency after the project has undergone environmental review and are *above-and-beyond existing laws, regulations, and requirements* that would reduce environmental impacts" (emphasis added).[19]

As you can see in the excerpt above, mitigation measures "are not part of the original project design" and are intended to go "above-and-beyond" existing regulatory requirements. As such, the inclusion of these measures, based solely on the 2008 Climate Change Scoping Plan, is unsubstantiated.

Third, AEP guidance states:

> "While not "mitigation", a good practice is *to include those project design feature(s) that address environmental impacts in the mitigation monitoring and reporting program (MMRP)*. Often the MMRP is all that accompanies building and construction plans through the permit process. If the design features are not listed as important to addressing an environmental impact, *it is easy for someone not involved in the original environmental process to approve a change to the project that could eliminate one or more of the design features without understanding the resulting environmental impact*" (emphasis added).[20]

[19] "CEQA Portal Topic Paper Mitigation Measures." AEP, February 2020, *available at:* https://ceqaportal.org/tp/CEQA%20Mitigation%202020.pdf, p. 5.
[20] "CEQA Portal Topic Paper Mitigation Measures." AEP, February 2020, *available at:* https://ceqaportal.org/tp/CEQA%20Mitigation%202020.pdf, p. 6.

As you can see in the excerpts above, design features that are not formally included as mitigation measures may be eliminated from the Project's design altogether. Thus, as the above-mentioned energy-, water-, and waste-related operational measures are not formally included as mitigation measures, we cannot guarantee that they would be implemented, monitored, and enforced on the Project site. As a result, the inclusion of the above-mentioned operational mitigation measures in the models is incorrect. By including several operational mitigation measures without properly committing to their implementation, the models may underestimate the Project's operational emissions and should not be relied upon to determine Project significance.

Updated Analysis Indicates a Potentially Significant Air Quality Impact

In an effort to more accurately estimate Project's construction-related and operational emissions, we prepared updated CalEEMod models, using the Project-specific information provided by the DEIR. In our updated models, we omitted the unsubstantiated changes to the CO_2 intensity factor, number of construction days per week, off-road construction equipment unit amounts, construction trip numbers and lengths, energy use values, and stationary generator emission factors; proportionally decreased the individual construction phase lengths to reflect the buildout year indicated by the DEIR; corrected the operational vehicle trip rates; and excluded the unsubstantiated construction-related and operational mitigation measures.

Our updated analysis estimates that the Project's construction-related VOC and NO_X exceed the applicable SCAQMD thresholds of 75- and 100-pounds per day ("lbs/day"), respectively (see table below).[21]

Model	VOC	NO_X
DEIR Construction	33.14	18.77
SWAPE Construction	207.75	141.49
% Increase	527%	654%
SCAQMD Regional Threshold (lbs/day)	**75**	**100**
Threshold Exceeded?	***Yes***	***Yes***

As you can see in the excerpt above, the Project's construction-related VOC and NO_X emissions, as estimated by SWAPE, increase by approximately 527% and 654%, respectively, and exceed the applicable SCAQMD significance thresholds. Thus, our model demonstrates that the Project would result in a potentially significant air quality impact that was not previously identified or addressed in the DEIR. As a result, an updated EIR should be prepared to adequately assess and mitigate the potential air quality impacts that the Project may have on the surrounding environment.

Diesel Particulate Matter Health Risk Emissions Inadequately Evaluated

The DEIR concludes that the proposed Project would have a less-than-significant health risk impact, without conducting a quantified construction or operational health risk analysis ("HRA") (p. IV.A-59 -

[21] "South Coast AQMD Air Quality Significance Thresholds." SCAQMD, April 2019, *available at*: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.

IV.A-60, IV.A-62 - IV.A-64). Specifically, regarding potential health risk impacts associated with Project construction, the DEIR states:

> "Given the short-term construction schedule of approximately four years, the Project would not result in a long-term (i.e., 70-year) source of TAC emissions. Additionally, the SCAQMD CEQA guidance does not require a health risk assessment (HRA) for short-term construction emissions. It is, therefore, not necessary to evaluate long-term cancer impacts from construction activities which occur over a relatively short duration. The Project construction activities, including generation of TACs, would not expose sensitive receptors to substantial pollutant concentrations. Therefore, Project-related TAC impacts during construction would be less than significant" (p. IV.A-59 - IV.A-60).

As demonstrated above, the DEIR concludes that the Project would result in a less-than-significant construction-related health risk impact because construction is short-term and would not result in a long-term source of toxic air contaminant ("TAC") emissions. Furthermore, regarding potential health risk impacts associated with Project operation, the DEIR states:

> "As the Project would not contain substantial TAC sources and is consistent with the CARB and SCAQMD guidelines, the Project would not result in the exposure of off-site sensitive receptors to carcinogenic or toxic air contaminants that exceed the maximum incremental cancer risk of 10 in one million or an acute or chronic hazard index of 1.0, and potential TAC impacts would be less than significant" (p. IV.A-63 – IV.A-64).

As demonstrated above, the DEIR concludes that the Project would result in a less-than-significant operational health risk impact because the land uses associated with the Project are not considered to generate substantial TACs. Finally, regarding the health risk impacts posed by existing sources to people that would be housed on the Project site, the DEIR states:

> "CARB has published and adopted the Air Quality and Land Use Handbook: A Community Health Perspective, which provides recommendations regarding the siting of new sensitive land uses near potential sources of air toxic emissions (e.g., freeways, distribution centers, rail yards, ports, refineries, chrome plating facilities, dry cleaners, and gasoline dispensing facilities).76 The SCAQMD adopted similar recommendations in its Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. Together, the CARB and SCAQMD guidelines recommend siting distances for both the development of sensitive land uses in proximity to TAC sources and the addition of new TAC sources in proximity to existing sensitive land uses. The Project would be consistent with this siting guidance because the Project would not include any major sources of TACs or place sensitive uses near TACs consistent with CARB and SCAQMD guidelines" (p. IV.A-62 - IV.A-63).

As demonstrated above, the DEIR claims the Project would not place new sensitive land uses near potential sources of TACs, such as roadways. However, the DEIR's evaluation of the Project's potential health risk impacts, as well as the subsequent less-than-significant impact conclusion, is incorrect for four reasons.

First, the DEIR fails to quantitatively evaluate the Project's construction-related and operational TAC emissions or make a reasonable effort to connect these emissions to potential health risk impacts posed to nearby existing sensitive receptors. Despite the DEIR's qualitative claims that construction-related TAC emissions would be less-than-significant, construction of the proposed Project would produce diesel particulate matter ("DPM") emissions through the exhaust stacks of construction equipment over a potential construction period lasting through 2028 (p. II-22). Furthermore, despite the DEIR's qualitative claim that the proposed land uses would not generate TACs, the AQ & GHG Analysis indicates that the Mixed Use and No Hotel Development scenarios are expected to generate approximately 8,887- and 8,304-average daily vehicle trips, respectively, which would generate additional exhaust emissions and continue to expose nearby sensitive receptors to DPM emissions (Appendix C, pp. 170, 180). However, the DEIR's vague discussion of potential Project-generated TACs fails to indicate the concentrations at which such pollutants would trigger adverse health effects. Thus, without making a reasonable effort to connect the Project's construction-related and operational TAC emissions to the potential health risks posed to nearby receptors, the DEIR is inconsistent with CEQA's requirement to correlate the increase in emissions generated by the Project with the potential adverse impacts on human health.

Second, the Office of Environmental Health Hazard Assessment ("OEHHA"), the organization responsible for providing guidance on conducting HRAs in California, released its most recent *Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments* in February 2015, as referenced by the Air Quality and Health Effects ("AQ & Health Risk Analysis"), provided as Appendix E to the DEIR (Appendix E, pp. 113).[22] This guidance document describes the types of projects that warrant the preparation of an HRA. The OEHHA document recommends that all short-term projects lasting at least two months be evaluated for cancer risks to nearby sensitive receptors. As the Project's construction duration vastly exceeds the 2-month requirement set forth by OEHHA, it is clear that the Project meets the threshold warranting a quantified HRA under OEHHA guidance. Furthermore, the OEHHA document recommends that exposure from projects lasting more than 6 months be evaluated for the duration of the project and recommends that an exposure duration of 30 years be used to estimate individual cancer risk for the maximally exposed individual resident ("MEIR"). Even though we were not provided with the expected lifetime of the Project, we can reasonably assume that the Project will operate for at least 30 years, if not more. Therefore, we recommend that health risk impacts from Project operation also be evaluated, as a 30-year exposure duration vastly exceeds the 6-month requirement set forth by OEHHA. These recommendations reflect the most recent state health risk policies, and as such, we recommend that an analysis of health risk impacts posed to nearby sensitive receptors from Project-generated DPM emissions be included in an updated EIR for the Project.

Third, by claiming a less than significant impact without conducting a quantified construction or operational HRA for nearby, existing sensitive receptors, the DEIR fails to compare the excess health risk impact to the applicable SCAQMD threshold of 10 in one million and lacks evidence to support its

[22] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

conclusion that the health risk would be under the threshold.[23] Thus, pursuant to CEQA, an analysis of the health risk posed to nearby, existing receptors from Project construction and operation should have been conducted.

Fourth, despite the DEIR's claim that the Project would not place new sensitive land uses near potential sources of TACs, the DEIR fails to address the ***non-cancer health risks*** posed to future, on-site receptors as a result of proximity to State Route 110 ("SR-110") and the Hollywood Freeway ("US-101"). Additional impacts related to non-cancer health risks have been documented for people living near congested roadways. Key findings from a 2005 California Air Resources Board ("CARB") report[24] on health risk impacts from nearby freeways include:

- Reduced lung function in children was associated with traffic density, especially trucks, within 1,000 feet and the association was strongest within 300 feet.
- Increased asthma hospitalizations were associated with living within 650 feet of heavy traffic and heavy truck volume (Lin, 2000).
- Asthma symptoms increased with proximity to roadways and the risk was greatest within 300 feet (Venn, 2001).
- A San Diego study found increased medical visits in children living within 550 feet of heavy traffic (English, 1999).

People housed by the proposed Project will be located directly north of the Four Level Interchange, which connects the SR-110 and US-101 Freeways. Therefore, many of the Project's residents will be subjected to additional non-cancer health risks as a result of close proximity to the SR-110 and US-101 Freeways. Regarding risks posed to people living nearby busy roadways, CARB concludes:

> "The combination of the children's health studies and the distance related findings suggests that it is important to avoid exposing children to elevated air pollution levels immediately downwind of freeways and high traffic roadways. These studies suggest a substantial benefit to a 500-foot separation."[25]

As a result, CARB recommends that projects:

> "[a]void siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day."[26]

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[23] "South Coast AQMD Air Quality Significance Thresholds." SCAQMD, April 2019, *available at:* http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.
[24] "Air Quality and Land Use Handbook: A Community Health Perspective." CARB, April 2005, *available at:* https://ww3.arb.ca.gov/ch/handbook.pdf.
[25] "Air Quality and Land Use Handbook: A Community Health Perspective." CARB, April 2005, *available at:* https://ww3.arb.ca.gov/ch/handbook.pdf, p. 10.
[26] "Air Quality and Land Use Handbook: A Community Health Perspective." CARB, April 2005, *available at:* https://ww3.arb.ca.gov/ch/handbook.pdf, p. 15.

Despite this recommendation, asthma and other non-cancer, freeway-related health risks are not mentioned or assessed by the DEIR. As such, an updated EIR should be prepared to include an assessment of all risks faced by residents at the Project not only cancer, especially to sensitive groups, such as newborns and the elderly. Because of the proximity to the SR-110 and US-101 Freeways, all feasible mitigation should be considered in the updated EIR to reduce health impacts to people living at the project. Feasible mitigation, implemented at other Southern California projects adjacent to freeways include:

- Disclose to residents the potential health impacts from living in proximity to the SR-110 and US-101 Freeways;
- Installation, use, and maintenance of filtration systems with at least a Minimum Efficiency Reporting Value (MERV) 15;
- Lead Agency verification and certification of the implementation the filtration systems;
- Lead Agency verification of maintenance to include manufacturer's recommended filter replacement schedule; and
- Disclosure to residents that opening windows will reduce the health-protectiveness of the filter systems.

Screening-Level Analysis Indicates a Potentially Significant Health Risk Impact

In order to conduct our screening-level risk analysis we relied upon AERSCREEN, which is a screening level air quality dispersion model.[27] The model replaced SCREEN3, and AERSCREEN is included in the OEHHA[28] and the California Air Pollution Control Officers Associated ("CAPCOA")[29] guidance as the appropriate air dispersion model for Level 2 health risk screening analyses ("HRSAs"). A Level 2 HRSA utilizes a limited amount of site-specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is determined to be possible using AERSCREEN, a more refined modeling approach is required prior to approval of the Project.

In order to estimate the health risk impacts posed to residential sensitive receptors as a result of the Project's construction-related and operational TAC emissions, we prepared a preliminary HRA using the annual PM_{10} exhaust estimates from SWAPE's updated CalEEMod output files. Consistent with recommendations set forth by OEHHA, we assumed residential exposure begins during the third trimester stage of life. SWAPE's updated CalEEMod model indicates that construction activities will generate approximately 910 pounds of DPM over the 2,548-day construction period. The AERSCREEN model relies on a continuous average emission rate to simulate maximum downward concentrations from point, area, and volume emission sources. To account for the variability in equipment usage and

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[27] U.S. EPA (April 2011) AERSCREEN Released as the EPA Recommended Screening Model, http://www.epa.gov/ttn/scram/guidance/clarification/20110411_AERSCREEN_Release_Memo.pdf

[28] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf

[29] CAPCOA (July 2009) Health Risk Assessments for Proposed Land Use Projects, http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf.

truck trips over Project construction, we calculated an average DPM emission rate by the following equation:

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{910.11\ lbs}{2{,}548\ days} \times \frac{453.6\ grams}{lbs} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.00188\ g/s}$$

Using this equation, we estimated a construction emission rate of 0.00188 grams per second ("g/s"). Subtracting the 2,548-day construction period from the total residential duration of 30 years, we assumed that after Project construction, the sensitive receptor would be exposed to the Project's operational DPM for an additional 23.02 years, approximately. SWAPE's operational CalEEMod emissions indicate that operational activities will generate approximately 344 pounds of DPM per year throughout operation under the Mixed Use Development Scenario. Applying the same equation used to estimate the construction DPM rate, we estimated the following emission rate for operation of the Mixed Use Development Scenario:

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{344.0\ lbs}{365\ days} \times \frac{453.6\ grams}{lbs} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.00495\ g/s}$$

Using this equation, we estimated an operational emission rate of 0.00495 g/s for the Mixed Use Development Scenario. Furthermore, SWAPE's operational CalEEMod emissions indicate that operational activities will generate approximately 336 pounds of DPM per year throughout operation under the No Hotel Development Scenario. Applying the same equation used to estimate operation of the Mixed Use Development Scenario, we estimated the following emission rate for operation of the No Hotel Development Scenario:

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{335.8\ lbs}{365\ days} \times \frac{453.6\ grams}{lbs} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.00483\ g/s}$$

Using this equation, we estimated an operational emission rate of 0.00483 g/s for the No Hotel Development Scenario. Construction and operational activity were simulated as a 6.27-acre rectangular area source in AERSCREEN with dimensions of 254 by 100 meters. A release height of three meters was selected to represent the height of exhaust stacks on operational equipment and other heavy-duty vehicles, and an initial vertical dimension of one and a half meters was used to simulate instantaneous plume dispersion upon release. An urban meteorological setting was selected with model-default inputs for wind speed and direction distribution.

The AERSCREEN model generates maximum reasonable estimates of single-hour DPM concentrations from the Project site. EPA guidance suggests that in screening procedures, the annualized average concentration of an air pollutant be estimated by multiplying the single-hour concentration by 10%.[30] According to the DEIR, the nearest sensitive receptors are located directly north and east of the Project

[30] "Screening Procedures for Estimating the Air Quality Impact of Stationary Sources Revised." EPA, 1992, *available at*: http://www.epa.gov/ttn/scram/guidance/guide/EPA-454R-92-019_OCR.pdf; *see also* "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf p. 4-36.

Site (p. IV.A-25, Figure IV.A-4). However, review of the AERSCREEN output files demonstrates that the *maximally exposed* individual resident ("MEIR") is located approximately 125 meters from the Project site. Thus, the single-hour concentration estimated by AERSCREEN for Project construction is approximately 2.317 $\mu g/m^3$ DPM at approximately 125 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.2317 $\mu g/m^3$ for Project construction at the MEIR. For operation of the Mixed Use Development Scenario, the single-hour concentration estimated by AERSCREEN is 6.097 $\mu g/m^3$ DPM at approximately 125 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.6097 $\mu g/m^3$ for operation of the Mixed Use Development Scenario at the MEIR. Furthermore, for operation of the No Hotel Development Scenario, the single-hour concentration estimated by AERSCREEN is 5.953 $\mu g/m^3$ DPM at approximately 125 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 0.5953 $\mu g/m^3$ for operation of the No Hotel Development Scenario at the MEIR.

We calculated the excess cancer risk to the MEIR using applicable HRA methodologies prescribed by OEHHA. Consistent with the 2,548-day construction schedule, the annualized average concentration for Project construction was used for the entire third trimester of pregnancy (0.25 years), infantile stage of life (0 – 2 years), and the first 4.73 years of the child stage of life (2 – 16 years); and the annualized averaged concentration for operation was used for the remainder of the child stage of life and the entire the adult stage of life (16 – 30 years).

Consistent with OEHHA guidance and recommended by the SCAQMD, BAAQMD, and SJVAPCD guidance, we used Age Sensitivity Factors ("ASF") to account for the heightened susceptibility of young children to the carcinogenic toxicity of air pollution.[31, 32, 33] According to this guidance, the quantified cancer risk should be multiplied by a factor of ten during the third trimester of pregnancy and during the first two years of life (infant), as well as multiplied by a factor of three during the child stage of life (2 – 16 years). We also included the quantified cancer risk without adjusting for the heightened susceptibility of young children to the carcinogenic toxicity of air pollution in accordance with older OEHHA guidance from 2003. This guidance utilizes a less health protective scenario than what is currently recommended by SCAQMD, the air quality district with jurisdiction over the City, and several other air districts in the state. Furthermore, in accordance with the guidance set forth by OEHHA, we used the 95th percentile

[31] "Draft Environmental Impact Report (DEIR) for the Proposed The Exchange (SCH No. 2018071058)." SCAQMD, March 2019, *available at:* http://www.aqmd.gov/docs/default-source/ceqa/comment-letters/2019/march/RVC190115-03.pdf?sfvrsn=8, p. 4.
[32] "California Environmental Quality Act Air Quality Guidelines." BAAQMD, May 2017, *available at:* http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en, p. 56; see also "Recommended Methods for Screening and Modeling Local Risks and Hazards." BAAQMD, May 2011, *available at:* http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20Modeling%20Approach.ashx, p. 65, 86.
[33] "Update to District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document." SJVAPCD, May 2015, *available at:* https://www.valleyair.org/busind/pto/staff-report-5-28-15.pdf, p. 8, 20, 24.

breathing rates for infants.[34] Finally, according to SCAQMD guidance, we used a Fraction of Time At Home ("FAH") Value of 1 for the 3rd trimester and infant receptors.[35] We used a cancer potency factor of 1.1 (mg/kg-day)$^{-1}$ and an averaging time of 25,550 days. The results of our calculations are shown below.

Mixed Use Development Scenario						
The Maximum Exposed Individual at an Existing Residential Receptor (MEIR)						
Activity	**Duration (years)**	**Concentration (ug/m3)**	**Breathing Rate (L/kg-day)**	**Cancer Risk without ASFs***	**ASF**	**Cancer Risk with ASFs***
Construction	0.25	0.2317	361	3.2E-07	10	3.2E-06
3rd Trimester Duration	***0.25***			***3.2E-07***	***3rd Trimester Exposure***	***3.2E-06***
Construction	2.00	0.2317	1090	7.6E-06	10	7.6E-05
Infant Exposure Duration	***2.00***			***7.6E-06***	***Infant Exposure***	***7.6E-05***
Construction	4.73	0.2317	572	9.4E-06	3	2.8E-05
Operation	9.27	0.6097	572	4.9E-05	3	1.5E-04
Child Exposure Duration	***14.00***			***4.9E-05***	***Child Exposure***	***1.5E-04***
Operation	14.00	0.6097	261	2.5E-05	1	2.5E-05
Adult Exposure Duration	***14.00***			***2.5E-05***	***Adult Exposure***	***2.5E-05***
Lifetime Exposure Duration	**30.00**			**8.1E-05**	**Lifetime Exposure**	**2.5E-04**

* We, along with CARB and SCAQMD, recommend using the more updated and health protective 2015 OEHHA guidance, which includes ASFs.

[34] "Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics 'Hot Spots' Information and Assessment Act," July 2018, *available at:* http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab2588supplementalguidelines.pdf, p. 16.
"Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf
[35] "Risk Assessment Procedures for Rules 1401, 1401.1, and 212." SCAQMD, August 2017, *available at:* http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1401/riskassessmentprocedures_2017_080717.pdf, p. 7.

<u>No Hotel Development Scenario</u>
The Maximum Exposed Individual at an Existing Residential Receptor (MEIR)

Activity	Duration (years)	Concentration (ug/m3)	Breathing Rate (L/kg-day)	Cancer Risk without ASFs*	ASF	Cancer Risk with ASFs*
Construction	0.25	0.2317	361	3.2E-07	10	3.2E-06
3rd Trimester Duration	***0.25***			***3.2E-07***	***3rd Trimester Exposure***	***3.2E-06***
Construction	2.00	0.2317	1090	7.6E-06	10	7.6E-05
Infant Exposure Duration	***2.00***			***7.6E-06***	***Infant Exposure***	***7.6E-05***
Construction	4.73	0.2317	572	9.4E-06	3	2.8E-05
Operation	9.27	0.5953	572	4.8E-05	3	1.4E-04
Child Exposure Duration	***14.00***			***4.8E-05***	***Child Exposure***	***1.4E-04***
Operation	14.00	0.5953	261	2.4E-05	1	2.4E-05
Adult Exposure Duration	***14.00***			***2.4E-05***	***Adult Exposure***	***2.4E-05***
Lifetime Exposure Duration	**30.00**			**7.9E-05**	**Lifetime Exposure**	**2.5E-04**

* We, along with CARB and SCAQMD, recommend using the more updated and health protective 2015 OEHHA guidance, which includes ASFs.

As demonstrated in the first table above, the excess cancer risks associated with the Mixed Use Development Scenario to adults, children, infants, and during the 3rd trimester of pregnancy at the MEIR located approximately 125 meters away, over the course of Project construction and operation, utilizing ASFs, are approximately 25, 150, 76, and 3.2 in one million, respectively. The excess cancer risk associated with the Mixed Use Development Scenario over the course of a residential lifetime (30 years), utilizing ASFs, is approximately 250 in one million. Furthermore, as demonstrated in the second table above, the excess cancer risks associated with the No Hotel Development Scenario to adults, children, infants, and during the 3rd trimester of pregnancy at the MEIR located approximately 125 meters away, over the course of Project construction and operation, utilizing ASFs, are approximately 24, 140, 76, and 3.2 in one million, respectively. The excess cancer risk associated with the No Hotel Development Scenario over the course of a residential lifetime, utilizing ASFs, is also approximately 250 in one million. The infant, child, adult, and lifetime cancer risks associated with both the Mixed Use and No Hotel Development Scenarios exceed the SCAQMD threshold of 10 in one million, thus resulting in a potentially significant impact not previously addressed or identified by the DEIR.

Utilizing ASFs is the most conservative, health-protective analysis according to the most recent guidance by OEHHA and reflects recommendations from the air district. Results without ASFs are presented in the table above, although we **do not** recommend utilizing these values for health risk analysis. Regardless, the excess cancer risks associated with the Mixed Use Development Scenario to adults, children, infants, and during the 3rd trimester of pregnancy at the MEIR located approximately 125 meters away, over the course of Project construction and operation, without ASFs, are approximately 25, 49, 7.6, and 0.32 in one million, respectively. The excess cancer risk associated with the Mixed Use Development Scenario over the course of a residential lifetime, without ASFs, is approximately 81 in one million. Furthermore, the excess cancer risks associated with the No Hotel Development Scenario to adults, children, infants, and during the 3rd trimester of pregnancy at the MEIR located approximately 125 meters away, over the course of Project construction and operation, without ASFs, are approximately 24, 48, 7.6, and 0.32 in one million, respectively. The excess cancer risk associated with the No Hotel Development Scenario over the course of a residential lifetime, without ASFs, is approximately 79 in one million. The child, adult, and lifetime cancer risks associated with both the Mixed Use and No Hotel Development Scenarios, without ASFs, exceed the SCAQMD threshold of 10 in one million, thus resulting in a potentially significant impact not previously addressed or identified by the DEIR. While we recommend the use of ASFs, the Project's cancer risk without ASFs, as estimated by SWAPE, exceeds the SCAQMD threshold regardless.

An agency must include an analysis of health risks that connects the Project's air emissions with the health risk posed by those emissions. Our analysis represents a screening-level HRA, which is known to be conservative and tends to err on the side of health protection. [36] The purpose of the screening-level construction and operational HRA shown above is to demonstrate the link between the proposed Project's emissions and the potential health risk. Our screening-level HRA demonstrates that construction and operation of the Project could result in a potentially significant health risk impact, when correct exposure assumptions and up-to-date, applicable guidance are used. Therefore, since our screening-level HRA indicates a potentially significant impact, the City should prepare an updated EIR with an HRA which makes a reasonable effort to connect the Project's air quality emissions and the potential health risks posed to nearby receptors. Thus, the City should prepare an updated, quantified air pollution model as well as an updated, quantified refined health risk analysis which adequately and accurately evaluates health risk impacts associated with both Project construction and operation.

Greenhouse Gas

Failure to Adequately Evaluate Greenhouse Gas Emissions

The DEIR estimates that the Mixed-Use and No Hotel Development Scenarios would generate net annual greenhouse gas ("GHG") emissions of 10,968- and 10,419-metric tons of carbon dioxide equivalents per year ("MT CO_2e/year"), respectively, including reduction measures (see excerpt below) (p. IV.E-67, Table IV.E-9).

[36] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf, p. 1-5

Table IV.E-9
Annual GHG Emissions Summary (Buildout)
(metric tons of carbon dioxide equivalent [$MTCO_2e$])[a]

Scope	Project Without Reduction Features	Project with Reduction Features	Percent Reduction from Measures[b]
Mixed Use Development Scenario			
Area[c]	173	40	–77%
Energy[d]	3,213	3,041	–5%
Mobile	11,415	7,061	–38%
EV Chargers[e]	—	(76)	—
Stationary[f]	2	2	0%
Solid Waste[g]	581	137	–76%
Water/Wastewater[h]	447	357	–20%
Construction	406	406	0%
Total Emissions	**16,236**	**10,968**	**–32%**
No-Hotel Development Scenario			
Area[c]	184	14	–92%
Energy[d]	3,114	2,947	–5%
Mobile	10,678	6,637	–38%
EV Chargers[e]	—	(86)	—
Stationary[f]	2	2	0%
Solid Waste[g]	552	130	–76%
Water/Wastewater[h]	461	369	–20%
Construction	406	406	0%
Total Emissions	**15,396**	**10,419**	**–32%**

However, the DEIR elects not to apply a quantitative GHG threshold, stating:

> "The City has not adopted a numerical significance threshold for assessing impacts related to GHG emissions. Nor have the SCAQMD, OPR, CARB, CAPCOA, or any other state or regional agency adopted a numerical significance threshold for assessing GHG emissions that is applicable to the Project. Since there is no applicable adopted or accepted numerical threshold of significance for GHG emissions, the methodology for evaluating the Project's impacts related to GHG emissions focuses on its consistency with statewide, regional, and local plans adopted for the purpose of reducing and/or mitigating GHG emissions consistent with CEQA Guidelines section 15064.4" (p. IV.E-38).

Instead, the DEIR relies upon the Project's consistency with CARB's 2017 *Climate Change Scoping Plan*, SCAG's 2016-2040 *RTP/SCS*, and the Sustainable City pLAn/L.A.'s Green New Deal in order to conclude that the Project would result in a less-than-significant GHG impact (p. IV.E-73). However, the DEIR's GHG analysis, as well as the subsequent less-than-significant impact conclusion, is incorrect for four reasons.

(1) The DEIR's quantitative GHG analysis relies upon an incorrect and unsubstantiated air model;
(2) The DEIR incorrectly relies upon unsubstantiated GHG reduction measures;
(3) The DEIR's unsubstantiated air model indicates a potentially significant impact; and
(4) The DEIR incorrectly relies upon SCAG's outdated *RTP/SCS*.

1) Incorrect and Unsubstantiated Quantitative Analysis of Emissions

As previously stated, DEIR estimates that the Mixed-Use and No Hotel Development Scenarios would generate net annual GHG emissions of 10,968- and 10,419-MT CO_2e/year, respectively, including reduction measures (p. IV.E-67, Table IV.E-9). However, the DEIR's quantitative GHG analysis is unsubstantiated. As previously discussed, when we reviewed the Project's CalEEMod output files, provided in the AQ & GHG Analysis as Appendix C to the DEIR, we found that several of the values inputted into the model are not consistent with information disclosed in the DEIR. As a result, the model underestimates the Project's emissions, and the DEIR's quantitative GHG analysis should not be relied upon to determine Project significance. An updated EIR should be prepared that adequately assesses the potential GHG impacts that construction and operation of the proposed Project may have on the surrounding environment.

2) Incorrect Reliance on GHG Reduction Measures

As previously stated, DEIR estimates that the Mixed-Use and No Hotel Development Scenarios would generate net annual GHG emissions of 10,968- and 10,419-MT CO_2e/year, respectively, including GHG reduction measures (p. IV.E-67, Table IV.E-9). Specifically, the DEIR estimates that the area-, energy-, mobile-, waste-, and water-related measures would result in GHG emissions reductions of 77%, 5%, 38%, 76% and 20%, respectively, in the Mixed-Use Development Scenario. Furthermore, the DEIR estimates that the area-, energy-, mobile-, waste-, and water-related measures would result in GHG emissions reductions of 92%, 5%, 38%, 76% and 20%, respectively, in the No Hotel Development Scenario (see excerpt below) (p. IV.E-67, Table IV.E-9).

Table IV.E-9
Annual GHG Emissions Summary (Buildout)
(metric tons of carbon dioxide equivalent [$MTCO_2e$])[a]

Scope	Project Without Reduction Features	Project with Reduction Features	Percent Reduction from Measures[b]
Mixed Use Development Scenario			
Area[c]	173	40	−77%
Energy[d]	3,213	3,041	−5%
Mobile	11,415	7,061	−38%
EV Chargers[e]	—	(76)	—
Stationary[f]	2	2	0%
Solid Waste[g]	581	137	−76%
Water/Wastewater[h]	447	357	−20%
Construction	406	406	0%
Total Emissions	**16,236**	**10,968**	**−32%**
No-Hotel Development Scenario			
Area[c]	184	14	−92%
Energy[d]	3,114	2,947	−5%
Mobile	10,678	6,637	−38%
EV Chargers[e]	—	(86)	—
Stationary[f]	2	2	0%
Solid Waste[g]	552	130	−76%
Water/Wastewater[h]	461	369	−20%
Construction	406	406	0%
Total Emissions	**15,396**	**10,419**	**−32%**

Furthermore, regarding the implementation of GHG emission reduction measures, the DEIR states:

> "In view of the above considerations, this EIR quantifies the Project's total annual GHG emissions for informational purposes, taking into account the GHG emission reduction features that would be incorporated into the Project's design.
>
> The EIR quantifies the Project's annual GHG emissions and compares them to a Project without Reduction Features scenario, as defined by CARB's most updated projections for AB/SB 32. This comparison is included herein for informational purposes only, including in order to disclose the relative carbon efficiency of the Project and to determine if there would be a reduction in the Project's incremental contribution of GHG emissions as a result of compliance with regulations and requirements adopted to implement plans for the reduction or mitigation of GHG emissions" (p. IV.E-39 – IV.E-40).

However, as discussed above, the Project's compliance with various regulations, plans and policies does not justify the Project's reliance on these measures. As these reduction measures are not formally included as mitigation measures, we cannot verify that they would be implemented, monitored, and enforced on the Project site.

Furthermore, regarding the use of mitigation measures, the DEIR states:

"Project-level impacts related to GHG emissions would be less than significant. Therefore, no mitigation measures are required" (p. IV.E-73).

As you the excerpt above demonstrates, the DEIR claims that ***no*** mitigation measures would be required. As such, the DEIR should not rely on reduction measures to artificially decrease the Project's estimated GHG emissions. Rather, in order to claim that the Project would result in a less-than-significant GHG impact, the DEIR should demonstrate that the Project's GHG emissions are less-than-significant ***without*** the inclusion of reduction measures.

3) Failure to Identify a Potentially Significant GHG Impact

The DEIR's incorrect and unsubstantiated air model indicates a potentially significant GHG impact when applying the California Association of Environmental Professionals' ("AEP's") "2030 Land Use Efficiency Threshold" of 2.6 MT CO_2e/SP/year. In support of this threshold for projects with a horizon year beyond 2020, AEP's guidance *states*:

> "Once the state has a full plan for 2030 (which is expected in 2017), and then *a project with a horizon between 2021 and 2030 should be evaluated based on a threshold using the 2030 target*. A more conservative approach would be to apply a 2030 threshold *based on SB 32* for any project with a horizon between 2021 and 2030 regardless of the status of the Scoping Plan Update" (emphasis added).[37]

As the California Air Resources Board ("CARB") adopted *California's 2017 Climate Change Scoping Plan* in November of 2017, the proposed Project "should be evaluated based on a threshold using the 2030 target," according to the relevant guidance referenced above. Thus, in an effort to evaluate the Project's GHG emissions quantitatively, we compared the Project's GHG emissions, as estimated by the DEIR, to the AEP's "2030 Land Use Efficiency Threshold" of 2.6 MT CO_2e/SP/year.

As previously stated, the DEIR estimates that the Mixed-Use and No Hotel Development Scenarios would generate net annual GHG emissions of 10,968- and 10,419-MT CO_2e/year, respectively, including GHG reduction measures (p. IV.E-67, Table IV.E-9). Furthermore, according to CAPCOA's *CEQA & Climate Change* report, service population is defined as "the sum of the number of residents and the number of jobs supported by the project."[38] The DEIR estimates that the Mixed-Use and No Hotel Development Scenarios would have service populations of approximately 2,310- and 2,423-people (p. IV.E-58, Table IV.E-6).[39] When dividing the Project's GHG emissions associated with the Mixed-Use Development Scenario, as estimated by the DEIR, by a service population of 2,310 people, we find that the Mixed-Use Development Scenario would emit approximately 4.7 MT CO_2e/SP/year.[40] Furthermore, when dividing the Project's GHG emissions associated with the No Hotel Development Scenario, as estimated by the

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[37] "Beyond Newhall and 2020: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California." Association of Environmental Professionals (AEP), October 2016, *available at:* https://califaep.org/docs/AEP-2016_Final_White_Paper.pdf, p. 40.

[38] CAPCOA *(*Jan. 2008) CEQA & Climate Change, p. 71-72, http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf.

[39] Calculated: 801 residents + 319 employees = 1,120 service population.

[40] Calculated: (3,384 MT CO_2e/year) / (1,120 service population) = (3.0 MT CO_2e/SP/year).

DEIR, by a service population of 2,423 people, we find that the No Hotel Development Scenario would emit approximately 4.3 MT CO_2e/SP/year (see table below).[41]

DEIR Service Population Efficiency		
Project Phase	**Mixed Use Development Scenario (MT CO_2e/year)**	**No Hotel Development Scenario (MT CO_2e/year)**
Total	**10,968**	**10,419**
Service Population	2,310	2,423
Service Population Efficiency	**4.7**	**4.3**
Threshold	2.6	2.6
Exceed?	***Yes***	***Yes***

As demonstrated above, when we compare the Mixed-Use and No Hotel Development Scenarios per service population GHG emissions to the AEP's "2030 Land Use Efficiency Threshold" of 2.6 MT CO_2e/SP/year, we find that both scenarios would result in a potentially significant GHG impact not previously identified or addressed by the DEIR. Therefore, an updated EIR should be prepared and recirculated for the Project, and mitigation should be implemented where necessary.

4) Incorrect Reliance Upon SCAG's Outdated RTP/SCS

As previously discussed, the DEIR concludes that the Project would be consistent with SCAG's 2016-2040 *RTP/SCS* (p. IV.E-73). However, in September 2020 SCAG adopted the more recent 2020-2045 *RTP/SCS*.[42] Thus, the DEIR should have relied upon the current 2020-2045 *RTP/SCS*, and the DEIR's less-than-significant impact conclusion regarding the outdated 2016-2040 *RTP/SCS* should not be relied upon.

Design Features Should Be Included As Mitigation Measures

Our analysis demonstrates that the Project would result in potentially significant air quality, health risk, and GHG impacts that should be mitigated further. We recommend that the DEIR implement all Project Design Features ("PDFs") as formal mitigation measures. As a result, we could guarantee that these measures would be implemented, monitored, and enforced on the Project site. Including formal mitigation measures by properly committing to their implementation would result in verifiable emissions reductions that may help reduce emissions to less-than-significant levels.

Disclaimer

SWAPE has received limited discovery regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing

[41] Calculated: (3,384 MT CO_2e/year) / (1,120 service population) = (3.0 MT CO_2e/SP/year).

[42] "ADOPTED FINAL CONNECT SOCAL." SCAG, *available at:* https://scag.ca.gov/read-plan-adopted-final-plan.

results, and findings presented. This report reflects efforts which were limited to information that was reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

Sincerely,

M Hagemann

Matt Hagemann, P.G., C.Hg.

Paul Rosenfeld

Paul E. Rosenfeld, Ph.D.

Attachment A:	SWAPE Health Risk Calculations
Attachment B:	SWAPE Project CalEEMod Modeling
Attachment C:	SWAPE Project AERSCREEN Modeling
Attachment D:	Paul Rosenfeld CV
Attachment E:	Matt Hagemann CV

Attachment A

Construction

2021	
Annual Emissions (tons/year)	0.0672
Daily Emissions (lbs/day)	0.368219178
Construction Duration (days)	360
Total DPM (lbs)	132.5589041
Total DPM (g)	60128.7189
Start Date	1/6/2021
End Date	1/1/2022
Construction Days	360
2022	
Annual Emissions (tons/year)	0.0864
Daily Emissions (lbs/day)	0.473424658
Construction Duration (days)	365
Total DPM (lbs)	172.8
Total DPM (g)	78382.08
Start Date	1/1/2022
End Date	1/1/2023
Construction Days	365
2023	
Annual Emissions (tons/year)	0.0726
Daily Emissions (lbs/day)	0.397808219
Construction Duration (days)	365
Total DPM (lbs)	145.2
Total DPM (g)	65862.72
Start Date	1/1/2023
End Date	1/1/2024
Construction Days	365
2024	
Annual Emissions (tons/year)	0.0652
Daily Emissions (lbs/day)	0.357260274
Construction Duration (days)	366
Total DPM (lbs)	130.7572603
Total DPM (g)	59311.49326
Start Date	1/1/2024
End Date	1/1/2025
Construction Days	366
2025	
Annual Emissions (tons/year)	0.058
Daily Emissions (lbs/day)	0.317808219
Construction Duration (days)	365
Total DPM (lbs)	116
Total DPM (g)	52617.6
Start Date	1/1/2025
End Date	1/1/2026
Construction Days	365
2026	
Annual Emissions (tons/year)	0.0576
Daily Emissions (lbs/day)	0.315616438
Construction Duration (days)	365
Total DPM (lbs)	115.2
Total DPM (g)	52254.72
Start Date	1/1/2026
End Date	1/1/2027
Construction Days	365
2027	
Annual Emissions (tons/year)	0.0492
Daily Emissions (lbs/day)	0.269589041
Construction Duration (days)	362
Total DPM (lbs)	97.59123288
Total DPM (g)	44267.38323
Start Date	1/1/2027
End Date	12/29/2027
Construction Days	362

Total		
Total DPM (lbs)		910.1073973
Total DPM (g)		412824.7154
Total Construction Days		2548
Emission Rate (g/s)		0.00188
Release Height (meters)		3
Initial Vertical Dimension (meters)		1.5
Max Horizontal (meters)		254.0
Min Horizontal (meters)		100.0
Total Acreage		6.276471141
Setting	Urban	
Population		3,967,000
Start Date		1/6/2021
End Date		12/29/2027
Total Construction Days		2548
Total Years of Operation		23.02

Mixed Use Operation

Emission Rate		
Annual Emissions (tons/year)		0.172
Daily Emissions (lbs/day)		0.942465753
Emission Rate (g/s)		0.004947945
Release Height (meters)		3
Initial Vertical Dimension (meters)		1.5
Max Horizontal (meters)		254.0
Min Horizontal (meters)		100.0
Total Acreage		6.276471141
Setting	Urban	
Population		3,967,000
Annual Pounds of DPM		
Total DPM (lbs)		344.0

No Hotel Operation

Emission Rate		
Annual Emissions (tons/year)		0.1679
Daily Emissions (lbs/day)		0.92
Emission Rate (g/s)		0.00483
Release Height (meters)		3
Initial Vertical Dimension (meters)		1.5
Max Horizontal (meters)		254.0
Min Horizontal (meters)		100.0
Total Acreage		6.276471141
Setting	Urban	
Population		3,967,000
Annual Pounds of DPM		
Total DPM (lbs)		335.8

Mixed Use Development Scenario

The Maximum Exposed Individual at an Existing Residential Receptor (MEIR)

Activity	Duration (years)	Concentration (ug/m3)	Breathing Rate (L/kg-day)	Cancer Risk without ASFs*	ASF	Cancer Risk with ASFs*
Construction	0.25	0.2317	361	3.2E-07	10	3.2E-06
3rd Trimester Duration	***0.25***			***3.2E-07***	***3rd Trimester Exposure***	***3.2E-06***
Construction	2.00	0.2317	1090	7.6E-06	10	7.6E-05
Infant Exposure Duration	***2.00***			***7.6E-06***	***Infant Exposure***	***7.6E-05***
Construction	4.73	0.2317	572	9.4E-06	3	2.8E-05
Operation	9.27	0.6097	572	4.9E-05	3	1.5E-04
Child Exposure Duration	***14.00***			***4.9E-05***	***Child Exposure***	***1.5E-04***
Operation	14.00	0.6097	261	2.5E-05	1	2.5E-05
Adult Exposure Duration	***14.00***			***2.5E-05***	***Adult Exposure***	***2.5E-05***
Lifetime Exposure Duration	**30.00**			**8.1E-05**	**Lifetime Exposure**	**2.5E-04**

* We, along with CARB and SCAQMD, recommend using the more updated and health protective 2015 OEHHA guidance, which includes ASFs.

No Hotel Development Scenario

The Maximum Exposed Individual at an Existing Residential Receptor (MEIR)

Activity	Duration (years)	Concentration (ug/m3)	Breathing Rate (L/kg-day)	Cancer Risk without ASFs*	ASF	Cancer Risk with ASFs*
Construction	0.25	0.2317	361	3.2E-07	10	3.2E-06
3rd Trimester Duration	***0.25***			***3.2E-07***	***3rd Trimester Exposure***	***3.2E-06***
Construction	2.00	0.2317	1090	7.6E-06	10	7.6E-05
Infant Exposure Duration	***2.00***			***7.6E-06***	***Infant Exposure***	***7.6E-05***
Construction	4.73	0.2317	572	9.4E-06	3	2.8E-05
Operation	9.27	0.5953	572	4.8E-05	3	1.4E-04
Child Exposure Duration	***14.00***			***4.8E-05***	***Child Exposure***	***1.4E-04***
Operation	14.00	0.5953	261	2.4E-05	1	2.4E-05
Adult Exposure Duration	***14.00***			***2.4E-05***	***Adult Exposure***	***2.4E-05***
Lifetime Exposure Duration	**30.00**			**7.9E-05**	**Lifetime Exposure**	**2.5E-04**

* We, along with CARB and SCAQMD, recommend using the more updated and health protective 2015 OEHHA guidance, which includes ASFs.

1111 Sunset Buildout with PDFs (Construction On-site)

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	48.00	1000sqft	1.10	48,000.00	0
Enclosed Parking with Elevator	485.00	Space	4.36	194,000.00	0
Unenclosed Parking Structure	1,168.00	Space	10.51	467,200.00	0
Health Club	14.50	1000sqft	0.33	14,500.00	0
High Turnover (Sit Down Restaurant)	35.00	1000sqft	0.80	35,000.00	0
Hotel	180.00	Room	6.00	85,000.00	0
Apartments Mid Rise	96.00	Dwelling Unit	2.53	110,336.00	275
Condo/Townhouse High Rise	737.00	Dwelling Unit	11.52	766,982.00	2108
Strip Mall	18.20	1000sqft	0.42	18,200.00	0
Supermarket	27.30	1000sqft	0.63	27,300.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2028
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Consistent with the DEIR's model

Land Use - Consistent with the DEIR's model.

Construction Phase - See SWAPE comment regarding construction schedule. Proportionally decreased default values to end by the start of 2028.

Off-road Equipment - See SWAPE comment regarding unit amounts. Usage hours consistent with DEIR's model.

Off-road Equipment - See SWAPE comment regarding unit amounts. Usage hours consistent with the DEIR's model.

Off-road Equipment - See SWAPE comment regarding unit amounts. Usage hours consistent with the DEIR's model.

Grading - Consistent with the DEIR's model.

Demolition - Consistent with the DEIR's model.

Trips and VMT - See SWAPE comment regarding worker, vendor, and hauling trip numbers and lengths.

Construction Off-road Equipment Mitigation - See SWAPE comment regarding Tier 4 mitigation.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	55.00	38.00
tblConstructionPhase	NumDays	740.00	518.00
tblConstructionPhase	NumDays	50.00	35.00
tblConstructionPhase	NumDays	75.00	52.00
tblConstructionPhase	NumDays	55.00	38.00
tblConstructionPhase	NumDays	75.00	52.00
tblConstructionPhase	NumDays	75.00	52.00
tblConstructionPhase	NumDays	740.00	518.00
tblConstructionPhase	NumDays	740.00	518.00
tblConstructionPhase	PhaseEndDate	12/31/2030	12/29/2027
tblConstructionPhase	PhaseEndDate	11/26/2024	9/25/2023
tblConstructionPhase	PhaseEndDate	3/16/2021	2/23/2021
tblConstructionPhase	PhaseEndDate	6/29/2021	5/6/2021
tblConstructionPhase	PhaseEndDate	10/15/2030	11/5/2027
tblConstructionPhase	PhaseEndDate	10/12/2021	7/19/2021
tblConstructionPhase	PhaseEndDate	1/25/2022	9/29/2021
tblConstructionPhase	PhaseEndDate	9/28/2027	9/18/2025
tblConstructionPhase	PhaseEndDate	7/30/2030	9/14/2027
tblConstructionPhase	PhaseStartDate	10/16/2030	11/6/2027
tblConstructionPhase	PhaseStartDate	1/26/2022	9/30/2021
tblConstructionPhase	PhaseStartDate	3/17/2021	2/24/2021
tblConstructionPhase	PhaseStartDate	7/31/2030	9/15/2027

tblConstructionPhase	PhaseStartDate	6/30/2021	5/7/2021
tblConstructionPhase	PhaseStartDate	10/13/2021	7/20/2021
tblConstructionPhase	PhaseStartDate	11/27/2024	9/26/2023
tblConstructionPhase	PhaseStartDate	9/29/2027	9/19/2025
tblGrading	MaterialExported	0.00	216,720.00
tblGrading	MaterialExported	0.00	72,240.00
tblGrading	MaterialExported	0.00	183,610.00
tblLandUse	LandUseSquareFeet	261,360.00	85,000.00
tblLandUse	LandUseSquareFeet	96,000.00	110,336.00
tblLandUse	LandUseSquareFeet	737,000.00	766,982.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	HHDT

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.8637	14.5442	6.6542	0.0367	2.4082	0.2473	2.6554	0.7368	0.2294	0.9662	0.0000	3,517.0985	3,517.0985	0.3775	0.0000	3,526.5361
2022	0.8326	6.9008	7.1642	0.0264	1.5565	0.1305	1.6870	0.4150	0.1226	0.5376	0.0000	2,450.1932	2,450.1932	0.1949	0.0000	2,455.0648
2023	0.7471	5.2046	6.7052	0.0249	1.5594	0.1103	1.6697	0.4165	0.1035	0.5200	0.0000	2,308.3625	2,308.3625	0.1717	0.0000	2,312.6553
2024	0.7053	4.3061	6.3792	0.0231	1.5795	0.0982	1.6777	0.4239	0.0921	0.5160	0.0000	2,125.2824	2,125.2824	0.1435	0.0000	2,128.8690
2025	0.6652	4.1080	6.0788	0.0225	1.5735	0.0856	1.6591	0.4223	0.0803	0.5026	0.0000	2,070.8428	2,070.8428	0.1398	0.0000	2,074.3369
2026	0.6453	4.0669	5.8549	0.0221	1.5735	0.0852	1.6587	0.4223	0.0799	0.5023	0.0000	2,030.3170	2,030.3170	0.1373	0.0000	2,033.7497
2027	4.3650	3.0165	4.3664	0.0160	1.1466	0.0686	1.2152	0.3076	0.0642	0.3719	0.0000	1,471.7603	1,471.7603	0.1078	0.0000	1,474.4560
Maximum	**4.3650**	**14.5442**	**7.1642**	**0.0367**	**2.4082**	**0.2473**	**2.6554**	**0.7368**	**0.2294**	**0.9662**	**0.0000**	**3,517.0985**	**3,517.0985**	**0.3775**	**0.0000**	**3,526.5361**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.5357	10.5468	6.8577	0.0367	2.4082	0.0672	2.4753	0.7368	0.0640	0.8008	0.0000	3,517.0978	3,517.0978	0.3775	0.0000	3,526.5354
2022	0.7565	6.1225	7.2277	0.0264	1.5565	0.0864	1.6428	0.4150	0.0814	0.4964	0.0000	2,450.1928	2,450.1928	0.1949	0.0000	2,455.0644
2023	0.6785	4.4981	6.7749	0.0249	1.5594	0.0726	1.6320	0.4165	0.0684	0.4849	0.0000	2,308.3621	2,308.3621	0.1717	0.0000	2,312.6549
2024	0.6415	3.6472	6.4526	0.0231	1.5795	0.0652	1.6447	0.4239	0.0614	0.4853	0.0000	2,125.2820	2,125.2820	0.1435	0.0000	2,128.8686
2025	0.6076	3.5092	6.1564	0.0225	1.5735	0.0580	1.6315	0.4223	0.0546	0.4769	0.0000	2,070.8424	2,070.8424	0.1398	0.0000	2,074.3365
2026	0.5878	3.4681	5.9325	0.0221	1.5735	0.0576	1.6311	0.4223	0.0543	0.4766	0.0000	2,030.3166	2,030.3166	0.1373	0.0000	2,033.7493
2027	4.3247	2.5967	4.4208	0.0160	1.1466	0.0492	1.1958	0.3076	0.0462	0.3539	0.0000	1,471.7599	1,471.7599	0.1078	0.0000	1,474.4557
Maximum	**4.3247**	**10.5468**	**7.2277**	**0.0367**	**2.4082**	**0.0864**	**2.4753**	**0.7368**	**0.0814**	**0.8008**	**0.0000**	**3,517.0978**	**3,517.0978**	**0.3775**	**0.0000**	**3,526.5354**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**7.84**	**18.41**	**-1.43**	**0.00**	**0.00**	**44.75**	**3.02**	**0.00**	**44.26**	**8.72**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-6-2021**	**4-5-2021**	7.3131	5.3035
2	**4-6-2021**	**7-5-2021**	4.1811	2.7178
3	**7-6-2021**	**10-5-2021**	4.9557	3.5568
4	**10-6-2021**	**1-5-2022**	2.0938	1.8493

5	**1-6-2022**	**4-5-2022**	1.9016	1.6903
6	**4-6-2022**	**7-5-2022**	1.9109	1.6973
7	**7-6-2022**	**10-5-2022**	1.9326	1.7166
8	**10-6-2022**	**1-5-2023**	1.9243	1.7094
9	**1-6-2023**	**4-5-2023**	1.5374	1.3457
10	**4-6-2023**	**7-5-2023**	1.5439	1.3501
11	**7-6-2023**	**10-5-2023**	1.5329	1.3369
12	**10-6-2023**	**1-5-2024**	1.3091	1.1140
13	**1-6-2024**	**4-5-2024**	1.2455	1.0662
14	**4-6-2024**	**7-5-2024**	1.2299	1.0506
15	**7-6-2024**	**10-5-2024**	1.2443	1.0631
16	**10-6-2024**	**1-5-2025**	1.2571	1.0767
17	**1-6-2025**	**4-5-2025**	1.1778	1.0161
18	**4-6-2025**	**7-5-2025**	1.1760	1.0126
19	**7-6-2025**	**10-5-2025**	1.1898	1.0246
20	**10-6-2025**	**1-5-2026**	1.2040	1.0387
21	**1-6-2026**	**4-5-2026**	1.1627	1.0011
22	**4-6-2026**	**7-5-2026**	1.1615	0.9980
23	**7-6-2026**	**10-5-2026**	1.1751	1.0098
24	**10-6-2026**	**1-5-2027**	1.1886	1.0234
25	**1-6-2027**	**4-5-2027**	1.1485	0.9868
26	**4-6-2027**	**7-5-2027**	1.1477	0.9843
27	**7-6-2027**	**9-30-2027**	0.9501	0.8226
		Highest	7.3131	5.3035

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	7.4146	0.3151	13.9028	0.0140		0.8431	0.8431		0.8431	0.8431	88.4805	184.1105	272.5910	0.2774	6.0100e-003	281.3164
Energy	0.1114	0.9856	0.6532	6.0700e-003		0.0770	0.0770		0.0770	0.0770	0.0000	6,538.6680	6,538.6680	0.1495	0.0468	6,556.3440
Mobile	2.5097	13.0751	27.7197	0.1187	11.4523	0.0818	11.5341	3.0675	0.0759	3.1434	0.0000	11,033.3544	11,033.3544	0.4842	0.0000	11,045.4592
Waste						0.0000	0.0000		0.0000	0.0000	243.3050	0.0000	243.3050	14.3789	0.0000	602.7778
Water						0.0000	0.0000		0.0000	0.0000	26.5114	866.4523	892.9636	2.7434	0.0685	981.9712
Total	**10.0357**	**14.3758**	**42.2757**	**0.1387**	**11.4523**	**1.0018**	**12.4541**	**3.0675**	**0.9960**	**4.0634**	**358.2968**	**18,622.5851**	**18,980.8819**	**18.0335**	**0.1213**	**19,467.8685**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	7.4146	0.3151	13.9028	0.0140		0.8431	0.8431		0.8431	0.8431	88.4805	184.1105	272.5910	0.2774	6.0100e-003	281.3164
Energy	0.1114	0.9856	0.6532	6.0700e-003		0.0770	0.0770		0.0770	0.0770	0.0000	6,538.6680	6,538.6680	0.1495	0.0468	6,556.3440
Mobile	2.5097	13.0751	27.7197	0.1187	11.4523	0.0818	11.5341	3.0675	0.0759	3.1434	0.0000	11,033.3544	11,033.3544	0.4842	0.0000	11,045.4592
Waste						0.0000	0.0000		0.0000	0.0000	243.3050	0.0000	243.3050	14.3789	0.0000	602.7778
Water						0.0000	0.0000		0.0000	0.0000	26.5114	866.4523	892.9636	2.7434	0.0685	981.9712
Total	**10.0357**	**14.3758**	**42.2757**	**0.1387**	**11.4523**	**1.0018**	**12.4541**	**3.0675**	**0.9960**	**4.0634**	**358.2968**	**18,622.5851**	**18,980.8819**	**18.0335**	**0.1213**	**19,467.8685**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/6/2021	2/23/2021	5	35	
2	Demolition and Excavation	Grading	2/24/2021	5/6/2021	5	52	
3	Grading and Excavation	Grading	5/7/2021	7/19/2021	5	52	
4	Concrete and Grading/Excavation	Grading	7/20/2021	9/29/2021	5	52	
5	Concrete and Mat Foundation	Building Construction	9/30/2021	9/25/2023	5	518	
6	Building Construction (Phase 0 and 1/2)	Building Construction	9/26/2023	9/18/2025	5	518	
7	Building Construction (Phase 1/2)	Building Construction	9/19/2025	9/14/2027	5	518	
8	Paving	Paving	9/15/2027	11/5/2027	5	38	
9	Architectural Coating	Architectural Coating	11/6/2027	12/29/2027	5	38	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 14.87

Residential Indoor: 1,776,569; Residential Outdoor: 592,190; Non-Residential Indoor: 342,000; Non-Residential Outdoor: 114,000; Striped Parking Area: 39,672 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition and Excavation	Excavators	2	8.00	158	0.38
Concrete and Mat Foundation	Cranes	1	8.00	231	0.29
Concrete and Mat Foundation	Forklifts	3	8.00	89	0.20
Concrete and Mat Foundation	Generator Sets	1	8.00	84	0.74

Paving	Pavers		2	8.00	130	0.42
Paving	Rollers		2	8.00	80	0.38
Demolition	Rubber Tired Dozers		2	8.00	247	0.40
Demolition and Excavation	Rubber Tired Dozers		1	8.00	247	0.40
Concrete and Mat Foundation	Tractors/Loaders/Backhoes		3	8.00	97	0.37
Demolition and Excavation	Graders		1	8.00	187	0.41
Demolition and Excavation	Tractors/Loaders/Backhoes		2	8.00	97	0.37
Paving	Paving Equipment		2	8.00	132	0.36
Building Construction (Phase 0 and 1/2)	Cranes		1	8.00	231	0.29
Building Construction (Phase 1/2)	Cranes		1	8.00	231	0.29
Demolition and Excavation	Scrapers		2	8.00	367	0.48
Concrete and Mat Foundation	Welders		1	8.00	46	0.45
Grading and Excavation	Excavators		2	8.00	158	0.38
Concrete and Grading/Excavation	Excavators		2	8.00	158	0.38
Building Construction (Phase 0 and 1/2)	Forklifts		3	8.00	89	0.20
Building Construction (Phase 1/2)	Forklifts		3	8.00	89	0.20
Building Construction (Phase 0 and 1/2)	Generator Sets		1	8.00	84	0.74
Building Construction (Phase 1/2)	Generator Sets		1	8.00	84	0.74
Grading and Excavation	Graders		1	8.00	187	0.41
Concrete and Grading/Excavation	Graders		1	8.00	187	0.41
Grading and Excavation	Rubber Tired Dozers		1	8.00	247	0.40
Concrete and Grading/Excavation	Rubber Tired Dozers		1	8.00	247	0.40
Grading and Excavation	Scrapers		2	8.00	367	0.48
Concrete and Grading/Excavation	Scrapers		2	8.00	367	0.48
Building Construction (Phase 0 and 1/2)	Tractors/Loaders/Backhoes		3	8.00	97	0.37
Building Construction (Phase 1/2)	Tractors/Loaders/Backhoes		3	8.00	97	0.37
Grading and Excavation	Tractors/Loaders/Backhoes		2	8.00	97	0.37

Concrete and Grading/Excavation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction (Phase 0 and 1/2)	Welders	1	8.00	46	0.45
Building Construction (Phase 1/2)	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	4,084.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction (Phase 0 and 1/2)	9	964.00	235.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition and Excavation	8	20.00	0.00	27,090.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete and Mat Foundation	9	964.00	235.00	0.00	14.70	6.90	20.00	LD_Mix	HHDT	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	193.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction (Phase 1/2)	9	964.00	235.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading and Excavation	8	20.00	0.00	9,030.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete and Grading/Excavation	8	20.00	0.00	22,951.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4419	0.0000	0.4419	0.0669	0.0000	0.0669	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0554	0.5502	0.3774	6.8000e-004		0.0272	0.0272		0.0252	0.0252	0.0000	59.5014	59.5014	0.0168	0.0000	59.9201
Total	**0.0554**	**0.5502**	**0.3774**	**6.8000e-004**	**0.4419**	**0.0272**	**0.4691**	**0.0669**	**0.0252**	**0.0921**	**0.0000**	**59.5014**	**59.5014**	**0.0168**	**0.0000**	**59.9201**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0157	0.5461	0.1203	1.5500e-003	0.0351	1.6600e-003	0.0368	9.6300e-003	1.5900e-003	0.0112	0.0000	153.2465	153.2465	0.0111	0.0000	153.5229
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0900e-003	8.1000e-004	9.1600e-003	3.0000e-005	2.8800e-003	2.0000e-005	2.9000e-003	7.6000e-004	2.0000e-005	7.8000e-004	0.0000	2.5112	2.5112	7.0000e-005	0.0000	2.5129
Total	**0.0168**	**0.5470**	**0.1295**	**1.5800e-003**	**0.0380**	**1.6800e-003**	**0.0397**	**0.0104**	**1.6100e-003**	**0.0120**	**0.0000**	**155.7577**	**155.7577**	**0.0111**	**0.0000**	**156.0358**

3.2 Demolition - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4419	0.0000	0.4419	0.0669	0.0000	0.0669	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.0900e-003	0.0351	0.4074	6.8000e-004		1.0800e-003	1.0800e-003		1.0800e-003	1.0800e-003	0.0000	59.5013	59.5013	0.0168	0.0000	59.9200
Total	**8.0900e-003**	**0.0351**	**0.4074**	**6.8000e-004**	**0.4419**	**1.0800e-003**	**0.4430**	**0.0669**	**1.0800e-003**	**0.0680**	**0.0000**	**59.5013**	**59.5013**	**0.0168**	**0.0000**	**59.9200**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0157	0.5461	0.1203	1.5500e-003	0.0351	1.6600e-003	0.0368	9.6300e-003	1.5900e-003	0.0112	0.0000	153.2465	153.2465	0.0111	0.0000	153.5229
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0900e-003	8.1000e-004	9.1600e-003	3.0000e-005	2.8800e-003	2.0000e-005	2.9000e-003	7.6000e-004	2.0000e-005	7.8000e-004	0.0000	2.5112	2.5112	7.0000e-005	0.0000	2.5129
Total	**0.0168**	**0.5470**	**0.1295**	**1.5800e-003**	**0.0380**	**1.6800e-003**	**0.0397**	**0.0104**	**1.6100e-003**	**0.0120**	**0.0000**	**155.7577**	**155.7577**	**0.0111**	**0.0000**	**156.0358**

3.3 Demolition and Excavation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3375	0.0000	0.3375	0.1367	0.0000	0.1367	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1090	1.2064	0.8028	1.6100e-003		0.0516	0.0516		0.0475	0.0475	0.0000	141.6870	141.6870	0.0458	0.0000	142.8326
Total	**0.1090**	**1.2064**	**0.8028**	**1.6100e-003**	**0.3375**	**0.0516**	**0.3891**	**0.1367**	**0.0475**	**0.1842**	**0.0000**	**141.6870**	**141.6870**	**0.0458**	**0.0000**	**142.8326**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1041	3.6226	0.7980	0.0103	0.2328	0.0110	0.2438	0.0639	0.0105	0.0744	0.0000	1,016.5153	1,016.5153	0.0733	0.0000	1,018.3487
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	1.6000e-003	0.0182	6.0000e-005	5.7100e-003	4.0000e-005	5.7500e-003	1.5200e-003	4.0000e-005	1.5500e-003	0.0000	4.9746	4.9746	1.3000e-004	0.0000	4.9779
Total	**0.1062**	**3.6242**	**0.8162**	**0.0104**	**0.2385**	**0.0111**	**0.2495**	**0.0654**	**0.0106**	**0.0760**	**0.0000**	**1,021.4899**	**1,021.4899**	**0.0735**	**0.0000**	**1,023.3267**

3.3 Demolition and Excavation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3375	0.0000	0.3375	0.1367	0.0000	0.1367	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0229	0.1218	0.8563	1.6100e-003		4.8600e-003	4.8600e-003		4.6700e-003	4.6700e-003	0.0000	141.6868	141.6868	0.0458	0.0000	142.8324
Total	**0.0229**	**0.1218**	**0.8563**	**1.6100e-003**	**0.3375**	**4.8600e-003**	**0.3424**	**0.1367**	**4.6700e-003**	**0.1414**	**0.0000**	**141.6868**	**141.6868**	**0.0458**	**0.0000**	**142.8324**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1041	3.6226	0.7980	0.0103	0.2328	0.0110	0.2438	0.0639	0.0105	0.0744	0.0000	1,016.5153	1,016.5153	0.0733	0.0000	1,018.3487
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	1.6000e-003	0.0182	6.0000e-005	5.7100e-003	4.0000e-005	5.7500e-003	1.5200e-003	4.0000e-005	1.5500e-003	0.0000	4.9746	4.9746	1.3000e-004	0.0000	4.9779
Total	**0.1062**	**3.6242**	**0.8162**	**0.0104**	**0.2385**	**0.0111**	**0.2495**	**0.0654**	**0.0106**	**0.0760**	**0.0000**	**1,021.4899**	**1,021.4899**	**0.0735**	**0.0000**	**1,023.3267**

3.4 Grading and Excavation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3293	0.0000	0.3293	0.1355	0.0000	0.1355	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1090	1.2064	0.8028	1.6100e-003		0.0516	0.0516		0.0475	0.0475	0.0000	141.6870	141.6870	0.0458	0.0000	142.8326
Total	**0.1090**	**1.2064**	**0.8028**	**1.6100e-003**	**0.3293**	**0.0516**	**0.3810**	**0.1355**	**0.0475**	**0.1830**	**0.0000**	**141.6870**	**141.6870**	**0.0458**	**0.0000**	**142.8326**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0347	1.2076	0.2660	3.4400e-003	0.0776	3.6700e-003	0.0813	0.0213	3.5100e-003	0.0248	0.0000	338.8384	338.8384	0.0245	0.0000	339.4496
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	1.6000e-003	0.0182	6.0000e-005	5.7100e-003	4.0000e-005	5.7500e-003	1.5200e-003	4.0000e-005	1.5500e-003	0.0000	4.9746	4.9746	1.3000e-004	0.0000	4.9779
Total	**0.0369**	**1.2092**	**0.2842**	**3.5000e-003**	**0.0833**	**3.7100e-003**	**0.0870**	**0.0228**	**3.5500e-003**	**0.0264**	**0.0000**	**343.8130**	**343.8130**	**0.0246**	**0.0000**	**344.4275**

3.4 Grading and Excavation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3293	0.0000	0.3293	0.1355	0.0000	0.1355	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0229	0.1218	0.8563	1.6100e-003		4.8600e-003	4.8600e-003		4.6700e-003	4.6700e-003	0.0000	141.6868	141.6868	0.0458	0.0000	142.8324
Total	**0.0229**	**0.1218**	**0.8563**	**1.6100e-003**	**0.3293**	**4.8600e-003**	**0.3342**	**0.1355**	**4.6700e-003**	**0.1402**	**0.0000**	**141.6868**	**141.6868**	**0.0458**	**0.0000**	**142.8324**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0347	1.2076	0.2660	3.4400e-003	0.0776	3.6700e-003	0.0813	0.0213	3.5100e-003	0.0248	0.0000	338.8384	338.8384	0.0245	0.0000	339.4496
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	1.6000e-003	0.0182	6.0000e-005	5.7100e-003	4.0000e-005	5.7500e-003	1.5200e-003	4.0000e-005	1.5500e-003	0.0000	4.9746	4.9746	1.3000e-004	0.0000	4.9779
Total	**0.0369**	**1.2092**	**0.2842**	**3.5000e-003**	**0.0833**	**3.7100e-003**	**0.0870**	**0.0228**	**3.5500e-003**	**0.0264**	**0.0000**	**343.8130**	**343.8130**	**0.0246**	**0.0000**	**344.4275**

3.5 Concrete and Grading/Excavation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3356	0.0000	0.3356	0.1364	0.0000	0.1364	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1090	1.2064	0.8028	1.6100e-003		0.0516	0.0516		0.0475	0.0475	0.0000	141.6870	141.6870	0.0458	0.0000	142.8326
Total	**0.1090**	**1.2064**	**0.8028**	**1.6100e-003**	**0.3356**	**0.0516**	**0.3873**	**0.1364**	**0.0475**	**0.1839**	**0.0000**	**141.6870**	**141.6870**	**0.0458**	**0.0000**	**142.8326**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0882	3.0692	0.6761	8.7400e-003	0.1972	9.3300e-003	0.2065	0.0541	8.9300e-003	0.0631	0.0000	861.2050	861.2050	0.0621	0.0000	862.7583
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	1.6000e-003	0.0182	6.0000e-005	5.7100e-003	4.0000e-005	5.7500e-003	1.5200e-003	4.0000e-005	1.5500e-003	0.0000	4.9746	4.9746	1.3000e-004	0.0000	4.9779
Total	**0.0903**	**3.0708**	**0.6943**	**8.8000e-003**	**0.2029**	**9.3700e-003**	**0.2123**	**0.0557**	**8.9700e-003**	**0.0646**	**0.0000**	**866.1796**	**866.1796**	**0.0623**	**0.0000**	**867.7362**

3.5 Concrete and Grading/Excavation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3356	0.0000	0.3356	0.1364	0.0000	0.1364	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0229	0.1218	0.8563	1.6100e-003		4.8600e-003	4.8600e-003		4.6700e-003	4.6700e-003	0.0000	141.6868	141.6868	0.0458	0.0000	142.8324
Total	**0.0229**	**0.1218**	**0.8563**	**1.6100e-003**	**0.3356**	**4.8600e-003**	**0.3405**	**0.1364**	**4.6700e-003**	**0.1411**	**0.0000**	**141.6868**	**141.6868**	**0.0458**	**0.0000**	**142.8324**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0882	3.0692	0.6761	8.7400e-003	0.1972	9.3300e-003	0.2065	0.0541	8.9300e-003	0.0631	0.0000	861.2050	861.2050	0.0621	0.0000	862.7583
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1600e-003	1.6000e-003	0.0182	6.0000e-005	5.7100e-003	4.0000e-005	5.7500e-003	1.5200e-003	4.0000e-005	1.5500e-003	0.0000	4.9746	4.9746	1.3000e-004	0.0000	4.9779
Total	**0.0903**	**3.0708**	**0.6943**	**8.8000e-003**	**0.2029**	**9.3700e-003**	**0.2123**	**0.0557**	**8.9700e-003**	**0.0646**	**0.0000**	**866.1796**	**866.1796**	**0.0623**	**0.0000**	**867.7362**

3.6 Concrete and Mat Foundation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0678	0.6281	0.5920	9.7000e-004		0.0343	0.0343		0.0322	0.0322	0.0000	83.1503	83.1503	0.0205	0.0000	83.6632
Total	**0.0678**	**0.6281**	**0.5920**	**9.7000e-004**		**0.0343**	**0.0343**		**0.0322**	**0.0322**	**0.0000**	**83.1503**	**83.1503**	**0.0205**	**0.0000**	**83.6632**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0292	1.1960	0.2252	2.5700e-003	0.0468	2.4100e-003	0.0492	0.0129	2.3100e-003	0.0152	0.0000	253.2046	253.2046	0.0230	0.0000	253.7799
Worker	0.1342	0.0996	1.1270	3.4200e-003	0.3543	2.6700e-003	0.3570	0.0941	2.4600e-003	0.0966	0.0000	308.9412	308.9412	8.3100e-003	0.0000	309.1491
Total	**0.1635**	**1.2956**	**1.3523**	**5.9900e-003**	**0.4011**	**5.0800e-003**	**0.4062**	**0.1070**	**4.7700e-003**	**0.1117**	**0.0000**	**562.1458**	**562.1458**	**0.0313**	**0.0000**	**562.9289**

3.6 Concrete and Mat Foundation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0452	0.3997	0.6052	9.7000e-004		0.0206	0.0206		0.0194	0.0194	0.0000	83.1502	83.1502	0.0205	0.0000	83.6631
Total	**0.0452**	**0.3997**	**0.6052**	**9.7000e-004**		**0.0206**	**0.0206**		**0.0194**	**0.0194**	**0.0000**	**83.1502**	**83.1502**	**0.0205**	**0.0000**	**83.6631**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0292	1.1960	0.2252	2.5700e-003	0.0468	2.4100e-003	0.0492	0.0129	2.3100e-003	0.0152	0.0000	253.2046	253.2046	0.0230	0.0000	253.7799
Worker	0.1342	0.0996	1.1270	3.4200e-003	0.3543	2.6700e-003	0.3570	0.0941	2.4600e-003	0.0966	0.0000	308.9412	308.9412	8.3100e-003	0.0000	309.1491
Total	**0.1635**	**1.2956**	**1.3523**	**5.9900e-003**	**0.4011**	**5.0800e-003**	**0.4062**	**0.1070**	**4.7700e-003**	**0.1117**	**0.0000**	**562.1458**	**562.1458**	**0.0313**	**0.0000**	**562.9289**

3.6 Concrete and Mat Foundation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2359	2.1797	2.2671	3.7500e-003		0.1124	0.1124		0.1056	0.1056	0.0000	322.8033	322.8033	0.0791	0.0000	324.7819
Total	**0.2359**	**2.1797**	**2.2671**	**3.7500e-003**		**0.1124**	**0.1124**		**0.1056**	**0.1056**	**0.0000**	**322.8033**	**322.8033**	**0.0791**	**0.0000**	**324.7819**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1076	4.3719	0.8584	9.8500e-003	0.1816	8.0700e-003	0.1896	0.0499	7.7200e-003	0.0576	0.0000	971.4548	971.4548	0.0866	0.0000	973.6193
Worker	0.4891	0.3492	4.0387	0.0128	1.3749	0.0101	1.3850	0.3652	9.2700e-003	0.3744	0.0000	1,155.9351	1,155.9351	0.0291	0.0000	1,156.6637
Total	**0.5967**	**4.7211**	**4.8971**	**0.0226**	**1.5565**	**0.0181**	**1.5746**	**0.4150**	**0.0170**	**0.4320**	**0.0000**	**2,127.3899**	**2,127.3899**	**0.1157**	**0.0000**	**2,130.2829**

3.6 Concrete and Mat Foundation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1598	1.4015	2.3306	3.7500e-003		0.0682	0.0682		0.0644	0.0644	0.0000	322.8029	322.8029	0.0791	0.0000	324.7815
Total	**0.1598**	**1.4015**	**2.3306**	**3.7500e-003**		**0.0682**	**0.0682**		**0.0644**	**0.0644**	**0.0000**	**322.8029**	**322.8029**	**0.0791**	**0.0000**	**324.7815**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.1076	4.3719	0.8584	9.8500e-003	0.1816	8.0700e-003	0.1896	0.0499	7.7200e-003	0.0576	0.0000	971.4548	971.4548	0.0866	0.0000	973.6193
Worker	0.4891	0.3492	4.0387	0.0128	1.3749	0.0101	1.3850	0.3652	9.2700e-003	0.3744	0.0000	1,155.9351	1,155.9351	0.0291	0.0000	1,156.6637
Total	**0.5967**	**4.7211**	**4.8971**	**0.0226**	**1.5565**	**0.0181**	**1.5746**	**0.4150**	**0.0170**	**0.4320**	**0.0000**	**2,127.3899**	**2,127.3899**	**0.1157**	**0.0000**	**2,130.2829**

3.6 Concrete and Mat Foundation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1598	1.4743	1.6531	2.7500e-003		0.0714	0.0714		0.0671	0.0671	0.0000	237.2231	237.2231	0.0578	0.0000	238.6677
Total	**0.1598**	**1.4743**	**1.6531**	**2.7500e-003**		**0.0714**	**0.0714**		**0.0671**	**0.0671**	**0.0000**	**237.2231**	**237.2231**	**0.0578**	**0.0000**	**238.6677**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0528	2.3204	0.5620	6.9100e-003	0.1334	2.5800e-003	0.1360	0.0366	2.4700e-003	0.0391	0.0000	683.4848	683.4848	0.0560	0.0000	684.8845
Worker	0.3383	0.2321	2.7356	9.0400e-003	1.0100	7.2100e-003	1.0173	0.2682	6.6300e-003	0.2749	0.0000	817.5269	817.5269	0.0193	0.0000	818.0092
Total	**0.3911**	**2.5524**	**3.2975**	**0.0160**	**1.1434**	**9.7900e-003**	**1.1532**	**0.3049**	**9.1000e-003**	**0.3140**	**0.0000**	**1,501.0116**	**1,501.0116**	**0.0753**	**0.0000**	**1,502.8937**

3.6 Concrete and Mat Foundation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1094	0.9553	1.7043	2.7500e-003		0.0438	0.0438		0.0414	0.0414	0.0000	237.2228	237.2228	0.0578	0.0000	238.6675
Total	**0.1094**	**0.9553**	**1.7043**	**2.7500e-003**		**0.0438**	**0.0438**		**0.0414**	**0.0414**	**0.0000**	**237.2228**	**237.2228**	**0.0578**	**0.0000**	**238.6675**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0528	2.3204	0.5620	6.9100e-003	0.1334	2.5800e-003	0.1360	0.0366	2.4700e-003	0.0391	0.0000	683.4848	683.4848	0.0560	0.0000	684.8845
Worker	0.3383	0.2321	2.7356	9.0400e-003	1.0100	7.2100e-003	1.0173	0.2682	6.6300e-003	0.2749	0.0000	817.5269	817.5269	0.0193	0.0000	818.0092
Total	**0.3911**	**2.5524**	**3.2975**	**0.0160**	**1.1434**	**9.7900e-003**	**1.1532**	**0.3049**	**9.1000e-003**	**0.3140**	**0.0000**	**1,501.0116**	**1,501.0116**	**0.0753**	**0.0000**	**1,502.8937**

3.7 Building Construction (Phase 0 and 1/2) - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0577	0.5326	0.5972	9.9000e-004		0.0258	0.0258		0.0243	0.0243	0.0000	85.6984	85.6984	0.0209	0.0000	86.2203
Total	**0.0577**	**0.5326**	**0.5972**	**9.9000e-004**		**0.0258**	**0.0258**		**0.0243**	**0.0243**	**0.0000**	**85.6984**	**85.6984**	**0.0209**	**0.0000**	**86.2203**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.5614	0.1691	1.9400e-003	0.0511	6.5000e-004	0.0517	0.0147	6.2000e-004	0.0154	0.0000	189.0926	189.0926	0.0108	0.0000	189.3625
Worker	0.1222	0.0838	0.9882	3.2700e-003	0.3649	2.6000e-003	0.3675	0.0969	2.4000e-003	0.0993	0.0000	295.3369	295.3369	6.9700e-003	0.0000	295.5112
Total	**0.1384**	**0.6453**	**1.1573**	**5.2100e-003**	**0.4160**	**3.2500e-003**	**0.4192**	**0.1116**	**3.0200e-003**	**0.1147**	**0.0000**	**484.4295**	**484.4295**	**0.0178**	**0.0000**	**484.8736**

3.7 Building Construction (Phase 0 and 1/2) - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0395	0.3451	0.6157	9.9000e-004		0.0158	0.0158		0.0149	0.0149	0.0000	85.6983	85.6983	0.0209	0.0000	86.2202
Total	**0.0395**	**0.3451**	**0.6157**	**9.9000e-004**		**0.0158**	**0.0158**		**0.0149**	**0.0149**	**0.0000**	**85.6983**	**85.6983**	**0.0209**	**0.0000**	**86.2202**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.5614	0.1691	1.9400e-003	0.0511	6.5000e-004	0.0517	0.0147	6.2000e-004	0.0154	0.0000	189.0926	189.0926	0.0108	0.0000	189.3625
Worker	0.1222	0.0838	0.9882	3.2700e-003	0.3649	2.6000e-003	0.3675	0.0969	2.4000e-003	0.0993	0.0000	295.3369	295.3369	6.9700e-003	0.0000	295.5112
Total	**0.1384**	**0.6453**	**1.1573**	**5.2100e-003**	**0.4160**	**3.2500e-003**	**0.4192**	**0.1116**	**3.0200e-003**	**0.1147**	**0.0000**	**484.4295**	**484.4295**	**0.0178**	**0.0000**	**484.8736**

3.7 Building Construction (Phase 0 and 1/2) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2053	1.8897	2.2567	3.7800e-003		0.0860	0.0860		0.0808	0.0808	0.0000	325.4719	325.4719	0.0789	0.0000	327.4433
Total	**0.2053**	**1.8897**	**2.2567**	**3.7800e-003**		**0.0860**	**0.0860**		**0.0808**	**0.0808**	**0.0000**	**325.4719**	**325.4719**	**0.0789**	**0.0000**	**327.4433**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0603	2.1264	0.6236	7.3500e-003	0.1940	2.4400e-003	0.1964	0.0560	2.3300e-003	0.0583	0.0000	715.4293	715.4293	0.0404	0.0000	716.4388
Worker	0.4398	0.2901	3.4988	0.0120	1.3855	9.7500e-003	1.3953	0.3680	8.9700e-003	0.3769	0.0000	1,084.3812	1,084.3812	0.0242	0.0000	1,084.9869
Total	**0.5000**	**2.4164**	**4.1225**	**0.0193**	**1.5795**	**0.0122**	**1.5917**	**0.4239**	**0.0113**	**0.4352**	**0.0000**	**1,799.8105**	**1,799.8105**	**0.0646**	**0.0000**	**1,801.4257**

3.7 Building Construction (Phase 0 and 1/2) - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1415	1.2308	2.3301	3.7800e-003		0.0530	0.0530		0.0501	0.0501	0.0000	325.4715	325.4715	0.0789	0.0000	327.4429
Total	**0.1415**	**1.2308**	**2.3301**	**3.7800e-003**		**0.0530**	**0.0530**		**0.0501**	**0.0501**	**0.0000**	**325.4715**	**325.4715**	**0.0789**	**0.0000**	**327.4429**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0603	2.1264	0.6236	7.3500e-003	0.1940	2.4400e-003	0.1964	0.0560	2.3300e-003	0.0583	0.0000	715.4293	715.4293	0.0404	0.0000	716.4388
Worker	0.4398	0.2901	3.4988	0.0120	1.3855	9.7500e-003	1.3953	0.3680	8.9700e-003	0.3769	0.0000	1,084.381 2	1,084.381 2	0.0242	0.0000	1,084.986 9
Total	**0.5000**	**2.4164**	**4.1225**	**0.0193**	**1.5795**	**0.0122**	**1.5917**	**0.4239**	**0.0113**	**0.4352**	**0.0000**	**1,799.810 5**	**1,799.810 5**	**0.0646**	**0.0000**	**1,801.425 7**

3.7 Building Construction (Phase 0 and 1/2) - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1361	1.2498	1.6024	2.7000e-003		0.0528	0.0528		0.0496	0.0496	0.0000	232.3776	232.3776	0.0560	0.0000	233.7775
Total	**0.1361**	**1.2498**	**1.6024**	**2.7000e-003**		**0.0528**	**0.0528**		**0.0496**	**0.0496**	**0.0000**	**232.3776**	**232.3776**	**0.0560**	**0.0000**	**233.7775**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0419	1.5042	0.4337	5.2100e-003	0.1385	1.7100e-003	0.1402	0.0400	1.6300e-003	0.0416	0.0000	507.8267	507.8267	0.0284	0.0000	508.5363
Worker	0.2985	0.1893	2.3193	8.2200e-003	0.9889	6.8300e-003	0.9957	0.2626	6.2800e-003	0.2689	0.0000	743.5030	743.5030	0.0158	0.0000	743.8969
Total	**0.3404**	**1.6935**	**2.7529**	**0.0134**	**1.1274**	**8.5400e-003**	**1.1359**	**0.3026**	**7.9100e-003**	**0.3105**	**0.0000**	**1,251.3297**	**1,251.3297**	**0.0441**	**0.0000**	**1,252.4332**

3.7 Building Construction (Phase 0 and 1/2) - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0949	0.8207	1.6580	2.7000e-003		0.0330	0.0330		0.0312	0.0312	0.0000	232.3773	232.3773	0.0560	0.0000	233.7773
Total	**0.0949**	**0.8207**	**1.6580**	**2.7000e-003**		**0.0330**	**0.0330**		**0.0312**	**0.0312**	**0.0000**	**232.3773**	**232.3773**	**0.0560**	**0.0000**	**233.7773**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0419	1.5042	0.4337	5.2100e-003	0.1385	1.7100e-003	0.1402	0.0400	1.6300e-003	0.0416	0.0000	507.8267	507.8267	0.0284	0.0000	508.5363
Worker	0.2985	0.1893	2.3193	8.2200e-003	0.9889	6.8300e-003	0.9957	0.2626	6.2800e-003	0.2689	0.0000	743.5030	743.5030	0.0158	0.0000	743.8969
Total	**0.3404**	**1.6935**	**2.7529**	**0.0134**	**1.1274**	**8.5400e-003**	**1.1359**	**0.3026**	**7.9100e-003**	**0.3105**	**0.0000**	**1,251.3297**	**1,251.3297**	**0.0441**	**0.0000**	**1,252.4332**

3.8 Building Construction (Phase 1/2) - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0539	0.4946	0.6341	1.0700e-003		0.0209	0.0209		0.0196	0.0196	0.0000	91.9569	91.9569	0.0222	0.0000	92.5109
Total	**0.0539**	**0.4946**	**0.6341**	**1.0700e-003**		**0.0209**	**0.0209**		**0.0196**	**0.0196**	**0.0000**	**91.9569**	**91.9569**	**0.0222**	**0.0000**	**92.5109**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0166	0.5953	0.1716	2.0600e-003	0.0548	6.8000e-004	0.0555	0.0158	6.5000e-004	0.0165	0.0000	200.9582	200.9582	0.0112	0.0000	201.2390
Worker	0.1181	0.0749	0.9178	3.2500e-003	0.3913	2.7000e-003	0.3940	0.1039	2.4900e-003	0.1064	0.0000	294.2204	294.2204	6.2400e-003	0.0000	294.3763
Total	**0.1347**	**0.6702**	**1.0894**	**5.3100e-003**	**0.4461**	**3.3800e-003**	**0.4495**	**0.1197**	**3.1400e-003**	**0.1229**	**0.0000**	**495.1786**	**495.1786**	**0.0175**	**0.0000**	**495.6153**

3.8 Building Construction (Phase 1/2) - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0376	0.3248	0.6561	1.0700e-003		0.0131	0.0131		0.0123	0.0123	0.0000	91.9568	91.9568	0.0222	0.0000	92.5108
Total	**0.0376**	**0.3248**	**0.6561**	**1.0700e-003**		**0.0131**	**0.0131**		**0.0123**	**0.0123**	**0.0000**	**91.9568**	**91.9568**	**0.0222**	**0.0000**	**92.5108**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0166	0.5953	0.1716	2.0600e-003	0.0548	6.8000e-004	0.0555	0.0158	6.5000e-004	0.0165	0.0000	200.9582	200.9582	0.0112	0.0000	201.2390
Worker	0.1181	0.0749	0.9178	3.2500e-003	0.3913	2.7000e-003	0.3940	0.1039	2.4900e-003	0.1064	0.0000	294.2204	294.2204	6.2400e-003	0.0000	294.3763
Total	**0.1347**	**0.6702**	**1.0894**	**5.3100e-003**	**0.4461**	**3.3800e-003**	**0.4495**	**0.1197**	**3.1400e-003**	**0.1229**	**0.0000**	**495.1786**	**495.1786**	**0.0175**	**0.0000**	**495.6153**

3.8 Building Construction (Phase 1/2) - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1900	1.7443	2.2365	3.7700e-003		0.0737	0.0737		0.0692	0.0692	0.0000	324.3345	324.3345	0.0782	0.0000	326.2884
Total	**0.1900**	**1.7443**	**2.2365**	**3.7700e-003**		**0.0737**	**0.0737**		**0.0692**	**0.0692**	**0.0000**	**324.3345**	**324.3345**	**0.0782**	**0.0000**	**326.2884**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0572	2.0793	0.5930	7.2300e-003	0.1933	2.3400e-003	0.1956	0.0558	2.2400e-003	0.0580	0.0000	705.0157	705.0157	0.0390	0.0000	705.9909
Worker	0.3981	0.2433	3.0254	0.0111	1.3802	9.2100e-003	1.3894	0.3666	8.4800e-003	0.3750	0.0000	1,000.9668	1,000.9668	0.0201	0.0000	1,001.4704
Total	**0.4553**	**2.3226**	**3.6184**	**0.0183**	**1.5735**	**0.0116**	**1.5850**	**0.4223**	**0.0107**	**0.4330**	**0.0000**	**1,705.9825**	**1,705.9825**	**0.0592**	**0.0000**	**1,707.4613**

3.8 Building Construction (Phase 1/2) - 2026

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1325	1.1455	2.3141	3.7700e-003		0.0461	0.0461		0.0435	0.0435	0.0000	324.3341	324.3341	0.0782	0.0000	326.2881
Total	**0.1325**	**1.1455**	**2.3141**	**3.7700e-003**		**0.0461**	**0.0461**		**0.0435**	**0.0435**	**0.0000**	**324.3341**	**324.3341**	**0.0782**	**0.0000**	**326.2881**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0572	2.0793	0.5930	7.2300e-003	0.1933	2.3400e-003	0.1956	0.0558	2.2400e-003	0.0580	0.0000	705.0157	705.0157	0.0390	0.0000	705.9909
Worker	0.3981	0.2433	3.0254	0.0111	1.3802	9.2100e-003	1.3894	0.3666	8.4800e-003	0.3750	0.0000	1,000.966 8	1,000.966 8	0.0201	0.0000	1,001.470 4
Total	**0.4553**	**2.3226**	**3.6184**	**0.0183**	**1.5735**	**0.0116**	**1.5850**	**0.4223**	**0.0107**	**0.4330**	**0.0000**	**1,705.982 5**	**1,705.982 5**	**0.0592**	**0.0000**	**1,707.461 3**

3.8 Building Construction (Phase 1/2) - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1332	1.2230	1.5681	2.6400e-003		0.0517	0.0517		0.0485	0.0485	0.0000	227.4070	227.4070	0.0548	0.0000	228.7770
Total	**0.1332**	**1.2230**	**1.5681**	**2.6400e-003**		**0.0517**	**0.0517**		**0.0485**	**0.0485**	**0.0000**	**227.4070**	**227.4070**	**0.0548**	**0.0000**	**228.7770**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0393	1.4443	0.4088	5.0400e-003	0.1355	1.6100e-003	0.1371	0.0391	1.5400e-003	0.0406	0.0000	491.9437	491.9437	0.0269	0.0000	492.6168
Worker	0.2664	0.1574	1.9890	7.5000e-003	0.9677	6.1100e-003	0.9738	0.2570	5.6200e-003	0.2626	0.0000	679.0955	679.0955	0.0130	0.0000	679.4195
Total	**0.3057**	**1.6016**	**2.3978**	**0.0125**	**1.1033**	**7.7200e-003**	**1.1110**	**0.2961**	**7.1600e-003**	**0.3033**	**0.0000**	**1,171.0392**	**1,171.0392**	**0.0399**	**0.0000**	**1,172.0363**

3.8 Building Construction (Phase 1/2) - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0929	0.8032	1.6225	2.6400e-003		0.0323	0.0323		0.0305	0.0305	0.0000	227.4067	227.4067	0.0548	0.0000	228.7767
Total	**0.0929**	**0.8032**	**1.6225**	**2.6400e-003**		**0.0323**	**0.0323**		**0.0305**	**0.0305**	**0.0000**	**227.4067**	**227.4067**	**0.0548**	**0.0000**	**228.7767**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0393	1.4443	0.4088	5.0400e-003	0.1355	1.6100e-003	0.1371	0.0391	1.5400e-003	0.0406	0.0000	491.9437	491.9437	0.0269	0.0000	492.6168
Worker	0.2664	0.1574	1.9890	7.5000e-003	0.9677	6.1100e-003	0.9738	0.2570	5.6200e-003	0.2626	0.0000	679.0955	679.0955	0.0130	0.0000	679.4195
Total	**0.3057**	**1.6016**	**2.3978**	**0.0125**	**1.1033**	**7.7200e-003**	**1.1110**	**0.2961**	**7.1600e-003**	**0.3033**	**0.0000**	**1,171.0392**	**1,171.0392**	**0.0399**	**0.0000**	**1,172.0363**

3.9 Paving - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0174	0.1631	0.2770	4.3000e-004		7.9500e-003	7.9500e-003		7.3200e-003	7.3200e-003	0.0000	38.0366	38.0366	0.0123	0.0000	38.3441
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0174**	**0.1631**	**0.2770**	**4.3000e-004**		**7.9500e-003**	**7.9500e-003**		**7.3200e-003**	**7.3200e-003**	**0.0000**	**38.0366**	**38.0366**	**0.0123**	**0.0000**	**38.3441**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.6000e-004	5.1000e-004	6.4300e-003	2.0000e-005	3.1300e-003	2.0000e-005	3.1500e-003	8.3000e-004	2.0000e-005	8.5000e-004	0.0000	2.1942	2.1942	4.0000e-005	0.0000	2.1953
Total	**8.6000e-004**	**5.1000e-004**	**6.4300e-003**	**2.0000e-005**	**3.1300e-003**	**2.0000e-005**	**3.1500e-003**	**8.3000e-004**	**2.0000e-005**	**8.5000e-004**	**0.0000**	**2.1942**	**2.1942**	**4.0000e-005**	**0.0000**	**2.1953**

3.9 Paving - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0174	0.1631	0.2770	4.3000e-004		7.9500e-003	7.9500e-003		7.3200e-003	7.3200e-003	0.0000	38.0365	38.0365	0.0123	0.0000	38.3441
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0174**	**0.1631**	**0.2770**	**4.3000e-004**		**7.9500e-003**	**7.9500e-003**		**7.3200e-003**	**7.3200e-003**	**0.0000**	**38.0365**	**38.0365**	**0.0123**	**0.0000**	**38.3441**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.6000e-004	5.1000e-004	6.4300e-003	2.0000e-005	3.1300e-003	2.0000e-005	3.1500e-003	8.3000e-004	2.0000e-005	8.5000e-004	0.0000	2.1942	2.1942	4.0000e-005	0.0000	2.1953
Total	**8.6000e-004**	**5.1000e-004**	**6.4300e-003**	**2.0000e-005**	**3.1300e-003**	**2.0000e-005**	**3.1500e-003**	**8.3000e-004**	**2.0000e-005**	**8.5000e-004**	**0.0000**	**2.1942**	**2.1942**	**4.0000e-005**	**0.0000**	**2.1953**

3.10 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.8935					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.2500e-003	0.0218	0.0344	6.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	4.8512	4.8512	2.6000e-004	0.0000	4.8578
Total	**3.8968**	**0.0218**	**0.0344**	**6.0000e-005**		**9.8000e-004**	**9.8000e-004**		**9.8000e-004**	**9.8000e-004**	**0.0000**	**4.8512**	**4.8512**	**2.6000e-004**	**0.0000**	**4.8578**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0111	6.5400e-003	0.0827	3.1000e-004	0.0402	2.5000e-004	0.0405	0.0107	2.3000e-004	0.0109	0.0000	28.2321	28.2321	5.4000e-004	0.0000	28.2456
Total	**0.0111**	**6.5400e-003**	**0.0827**	**3.1000e-004**	**0.0402**	**2.5000e-004**	**0.0405**	**0.0107**	**2.3000e-004**	**0.0109**	**0.0000**	**28.2321**	**28.2321**	**5.4000e-004**	**0.0000**	**28.2456**

3.10 Architectural Coating - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.8935					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.2500e-003	0.0218	0.0344	6.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	4.8512	4.8512	2.6000e-004	0.0000	4.8578
Total	**3.8968**	**0.0218**	**0.0344**	**6.0000e-005**		**9.8000e-004**	**9.8000e-004**		**9.8000e-004**	**9.8000e-004**	**0.0000**	**4.8512**	**4.8512**	**2.6000e-004**	**0.0000**	**4.8578**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0111	6.5400e-003	0.0827	3.1000e-004	0.0402	2.5000e-004	0.0405	0.0107	2.3000e-004	0.0109	0.0000	28.2321	28.2321	5.4000e-004	0.0000	28.2456
Total	**0.0111**	**6.5400e-003**	**0.0827**	**3.1000e-004**	**0.0402**	**2.5000e-004**	**0.0405**	**0.0107**	**2.3000e-004**	**0.0109**	**0.0000**	**28.2321**	**28.2321**	**5.4000e-004**	**0.0000**	**28.2456**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.5097	13.0751	27.7197	0.1187	11.4523	0.0818	11.5341	3.0675	0.0759	3.1434	0.0000	11,033.3544	11,033.3544	0.4842	0.0000	11,045.4592
Unmitigated	2.5097	13.0751	27.7197	0.1187	11.4523	0.0818	11.5341	3.0675	0.0759	3.1434	0.0000	11,033.3544	11,033.3544	0.4842	0.0000	11,045.4592

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	638.40	613.44	562.56	2,132,303	2,132,303
Condo/Townhouse High Rise	3,080.66	3,176.47	2527.91	10,304,021	10,304,021
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	529.44	118.08	50.40	1,295,800	1,295,800
Health Club	477.49	302.62	387.59	940,334	940,334
High Turnover (Sit Down Restaurant)	4,450.25	5,542.95	4614.40	6,309,633	6,309,633
Hotel	1,470.60	1,474.20	1071.00	3,374,114	3,374,114
Strip Mall	806.62	765.13	371.83	1,405,223	1,405,223
Supermarket	2,791.15	4,848.21	4543.81	4,400,959	4,400,959
Unenclosed Parking Structure	0.00	0.00	0.00		
Total	14,244.61	16,841.09	14,129.49	30,162,387	30,162,387

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15
Supermarket	16.60	8.40	6.90	6.50	74.50	19.00	34	30	36
Unenclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Condo/Townhouse High Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Enclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
General Office Building	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Health Club	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
High Turnover (Sit Down Restaurant)	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Hotel	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Strip Mall	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Supermarket	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Unenclosed Parking Structure	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	5,436.480 5	5,436.480 5	0.1284	0.0266	5,447.606 8
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	5,436.480 5	5,436.480 5	0.1284	0.0266	5,447.606 8
NaturalGas Mitigated	0.1114	0.9856	0.6532	6.0700e-003		0.0770	0.0770		0.0770	0.0770	0.0000	1,102.187 5	1,102.187 5	0.0211	0.0202	1,108.737 2
NaturalGas Unmitigated	0.1114	0.9856	0.6532	6.0700e-003		0.0770	0.0770		0.0770	0.0770	0.0000	1,102.187 5	1,102.187 5	0.0211	0.0202	1,108.737 2

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	1.05391e+006	5.6800e-003	0.0486	0.0207	3.1000e-004		3.9300e-003	3.9300e-003		3.9300e-003	3.9300e-003	0.0000	56.2404	56.2404	1.0800e-003	1.0300e-003	56.5746
Condo/Townhouse High Rise	8.09092e+006	0.0436	0.3728	0.1587	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	431.7622	431.7622	8.2800e-003	7.9200e-003	434.3280
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	499680	2.6900e-003	0.0245	0.0206	1.5000e-004		1.8600e-003	1.8600e-003		1.8600e-003	1.8600e-003	0.0000	26.6648	26.6648	5.1000e-004	4.9000e-004	26.8233
Health Club	262450	1.4200e-003	0.0129	0.0108	8.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	14.0053	14.0053	2.7000e-004	2.6000e-004	14.0886
High Turnover (Sit Down Restaurant)	8.0766e+006	0.0436	0.3959	0.3326	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	430.9981	430.9981	8.2600e-003	7.9000e-003	433.5593
Hotel	2.0383e+006	0.0110	0.0999	0.0839	6.0000e-004		7.5900e-003	7.5900e-003		7.5900e-003	7.5900e-003	0.0000	108.7715	108.7715	2.0800e-003	1.9900e-003	109.4178
Strip Mall	29848	1.6000e-004	1.4600e-003	1.2300e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5928	1.5928	3.0000e-005	3.0000e-005	1.6023
Supermarket	602511	3.2500e-003	0.0295	0.0248	1.8000e-004		2.2400e-003	2.2400e-003		2.2400e-003	2.2400e-003	0.0000	32.1523	32.1523	6.2000e-004	5.9000e-004	32.3434
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1114**	**0.9856**	**0.6532**	**6.0900e-003**		**0.0769**	**0.0769**		**0.0769**	**0.0769**	**0.0000**	**1,102.1875**	**1,102.1875**	**0.0211**	**0.0202**	**1,108.7372**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Mid Rise	1.05391e+006	5.6800e-003	0.0486	0.0207	3.1000e-004		3.9300e-003	3.9300e-003		3.9300e-003	3.9300e-003	0.0000	56.2404	56.2404	1.0800e-003	1.0300e-003	56.5746
Condo/Townhouse High Rise	8.09092e+006	0.0436	0.3728	0.1587	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	431.7622	431.7622	8.2800e-003	7.9200e-003	434.3280
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	499680	2.6900e-003	0.0245	0.0206	1.5000e-004		1.8600e-003	1.8600e-003		1.8600e-003	1.8600e-003	0.0000	26.6648	26.6648	5.1000e-004	4.9000e-004	26.8233
Health Club	262450	1.4200e-003	0.0129	0.0108	8.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	14.0053	14.0053	2.7000e-004	2.6000e-004	14.0886
High Turnover (Sit Down Restaurant)	8.0766e+006	0.0436	0.3959	0.3326	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	430.9981	430.9981	8.2600e-003	7.9000e-003	433.5593
Hotel	2.0383e+006	0.0110	0.0999	0.0839	6.0000e-004		7.5900e-003	7.5900e-003		7.5900e-003	7.5900e-003	0.0000	108.7715	108.7715	2.0800e-003	1.9900e-003	109.4178
Strip Mall	29848	1.6000e-004	1.4600e-003	1.2300e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5928	1.5928	3.0000e-005	3.0000e-005	1.6023
Supermarket	602511	3.2500e-003	0.0295	0.0248	1.8000e-004		2.2400e-003	2.2400e-003		2.2400e-003	2.2400e-003	0.0000	32.1523	32.1523	6.2000e-004	5.9000e-004	32.3434
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1114**	**0.9856**	**0.6532**	**6.0900e-003**		**0.0769**	**0.0769**		**0.0769**	**0.0769**	**0.0000**	**1,102.1875**	**1,102.1875**	**0.0211**	**0.0202**	**1,108.7372**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	389148	216.7407	5.1200e-003	1.0600e-003	217.1843
Condo/Townhouse High Rise	3.17889e+006	1,770.5221	0.0418	8.6500e-003	1,774.1456
Enclosed Parking with Elevator	1.13684e+006	633.1762	0.0150	3.0900e-003	634.4720
General Office Building	623520	347.2767	8.2000e-003	1.7000e-003	347.9874
Health Club	160950	89.6430	2.1200e-003	4.4000e-004	89.8264
High Turnover (Sit Down Restaurant)	1.5449e+006	860.4499	0.0203	4.2000e-003	862.2109
Hotel	644300	358.8503	8.4800e-003	1.7500e-003	359.5847
Strip Mall	245700	136.8455	3.2300e-003	6.7000e-004	137.1255
Supermarket	1.01911e+006	567.6045	0.0134	2.7700e-003	568.7662
Unenclosed Parking Structure	817600	455.3718	0.0108	2.2300e-003	456.3037
Total		**5,436.4805**	**0.1284**	**0.0266**	**5,447.6068**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	389148	216.7407	5.1200e-003	1.0600e-003	217.1843
Condo/Townhouse High Rise	3.17889e+006	1,770.5221	0.0418	8.6500e-003	1,774.1456
Enclosed Parking with Elevator	1.13684e+006	633.1762	0.0150	3.0900e-003	634.4720
General Office Building	623520	347.2767	8.2000e-003	1.7000e-003	347.9874
Health Club	160950	89.6430	2.1200e-003	4.4000e-004	89.8264
High Turnover (Sit Down Restaurant)	1.5449e+006	860.4499	0.0203	4.2000e-003	862.2109
Hotel	644300	358.8503	8.4800e-003	1.7500e-003	359.5847
Strip Mall	245700	136.8455	3.2300e-003	6.7000e-004	137.1255
Supermarket	1.01911e+006	567.6045	0.0134	2.7700e-003	568.7662
Unenclosed Parking Structure	817600	455.3718	0.0108	2.2300e-003	456.3037
Total		**5,436.4805**	**0.1284**	**0.0266**	**5,447.6068**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	7.4146	0.3151	13.9028	0.0140		0.8431	0.8431		0.8431	0.8431	88.4805	184.1105	272.5910	0.2774	6.0100e-003	281.3164
Unmitigated	7.4146	0.3151	13.9028	0.0140		0.8431	0.8431		0.8431	0.8431	88.4805	184.1105	272.5910	0.2774	6.0100e-003	281.3164

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3894					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.0368					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.7285	0.2160	5.2953	0.0135		0.7954	0.7954		0.7954	0.7954	88.4805	170.0291	258.5096	0.2639	6.0100e-003	266.8959
Landscaping	0.2600	0.0991	8.6075	4.6000e-004		0.0477	0.0477		0.0477	0.0477	0.0000	14.0814	14.0814	0.0136	0.0000	14.4205
Total	**7.4146**	**0.3151**	**13.9028**	**0.0140**		**0.8431**	**0.8431**		**0.8431**	**0.8431**	**88.4805**	**184.1105**	**272.5910**	**0.2774**	**6.0100e-003**	**281.3164**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3894					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.0368					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.7285	0.2160	5.2953	0.0135		0.7954	0.7954		0.7954	0.7954	88.4805	170.0291	258.5096	0.2639	6.0100e-003	266.8959
Landscaping	0.2600	0.0991	8.6075	4.6000e-004		0.0477	0.0477		0.0477	0.0477	0.0000	14.0814	14.0814	0.0136	0.0000	14.4205
Total	**7.4146**	**0.3151**	**13.9028**	**0.0140**		**0.8431**	**0.8431**		**0.8431**	**0.8431**	**88.4805**	**184.1105**	**272.5910**	**0.2774**	**6.0100e-003**	**281.3164**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	892.9636	2.7434	0.0685	981.9712
Unmitigated	892.9636	2.7434	0.0685	981.9712

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	6.25479 / 3.94323	71.7454	0.2055	5.1500e-003	78.4176
Condo/Townhouse High Rise	48.0185 / 30.2725	550.7955	1.5773	0.0396	602.0185
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	8.53122 / 5.22881	96.9317	0.2802	7.0200e-003	106.0304
Health Club	0.857576 / 0.525611	9.7438	0.0282	7.1000e-004	10.6584
High Turnover (Sit Down Restaurant)	10.6237 / 0.678107	84.6114	0.3481	8.5700e-003	95.8678
Hotel	4.56602 / 0.507335	37.7016	0.1496	3.6900e-003	42.5423
Strip Mall	1.34812 / 0.826267	15.3173	0.0443	1.1100e-003	16.7551
Supermarket	3.36522 / 0.104079	26.1169	0.1103	2.7100e-003	29.6812
Unenclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**892.9636**	**2.7434**	**0.0685**	**981.9712**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	6.25479 / 3.94323	71.7454	0.2055	5.1500e-003	78.4176
Condo/Townhouse High Rise	48.0185 / 30.2725	550.7955	1.5773	0.0396	602.0185
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	8.53122 / 5.22881	96.9317	0.2802	7.0200e-003	106.0304
Health Club	0.857576 / 0.525611	9.7438	0.0282	7.1000e-004	10.6584
High Turnover (Sit Down Restaurant)	10.6237 / 0.678107	84.6114	0.3481	8.5700e-003	95.8678
Hotel	4.56602 / 0.507335	37.7016	0.1496	3.6900e-003	42.5423
Strip Mall	1.34812 / 0.826267	15.3173	0.0443	1.1100e-003	16.7551
Supermarket	3.36522 / 0.104079	26.1169	0.1103	2.7100e-003	29.6812
Unenclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**892.9636**	**2.7434**	**0.0685**	**981.9712**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	243.3050	14.3789	0.0000	602.7778
Unmitigated	243.3050	14.3789	0.0000	602.7778

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	44.16	8.9641	0.5298	0.0000	22.2081
Condo/Townhouse High Rise	339.02	68.8180	4.0670	0.0000	170.4937
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	44.64	9.0615	0.5355	0.0000	22.4495
Health Club	82.65	16.7772	0.9915	0.0000	41.5648
High Turnover (Sit Down Restaurant)	416.5	84.5457	4.9965	0.0000	209.4585
Hotel	98.55	20.0048	1.1823	0.0000	49.5609
Strip Mall	19.11	3.8792	0.2293	0.0000	9.6105
Supermarket	153.97	31.2545	1.8471	0.0000	77.4318
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
Total		**243.3050**	**14.3789**	**0.0000**	**602.7778**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	44.16	8.9641	0.5298	0.0000	22.2081
Condo/Townhouse High Rise	339.02	68.8180	4.0670	0.0000	170.4937
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	44.64	9.0615	0.5355	0.0000	22.4495
Health Club	82.65	16.7772	0.9915	0.0000	41.5648
High Turnover (Sit Down Restaurant)	416.5	84.5457	4.9965	0.0000	209.4585
Hotel	98.55	20.0048	1.1823	0.0000	49.5609
Strip Mall	19.11	3.8792	0.2293	0.0000	9.6105
Supermarket	153.97	31.2545	1.8471	0.0000	77.4318
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
Total		**243.3050**	**14.3789**	**0.0000**	**602.7778**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

1111 Sunset Buildout with PDFs (Construction On-site)

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	48.00	1000sqft	1.10	48,000.00	0
Enclosed Parking with Elevator	485.00	Space	4.36	194,000.00	0
Unenclosed Parking Structure	1,168.00	Space	10.51	467,200.00	0
Health Club	14.50	1000sqft	0.33	14,500.00	0
High Turnover (Sit Down Restaurant)	35.00	1000sqft	0.80	35,000.00	0
Hotel	180.00	Room	6.00	85,000.00	0
Apartments Mid Rise	96.00	Dwelling Unit	2.53	110,336.00	275
Condo/Townhouse High Rise	737.00	Dwelling Unit	11.52	766,982.00	2108
Strip Mall	18.20	1000sqft	0.42	18,200.00	0
Supermarket	27.30	1000sqft	0.63	27,300.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2028
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

1111 Sunset Buildout with PDFs (Construction On-site) - South Coast Air Basin, Summer

Project Characteristics - Consistent with the DEIR's model

Land Use - Consistent with the DEIR's model.

Construction Phase - See SWAPE comment regarding construction schedule. Proportionally decreased default values to end by the start of 2028.

Off-road Equipment - See SWAPE comment regarding unit amounts. Usage hours consistent with DEIR's model.

Off-road Equipment - See SWAPE comment regarding unit amounts. Usage hours consistent with the DEIR's model.

Off-road Equipment - See SWAPE comment regarding unit amounts. Usage hours consistent with the DEIR's model.

Grading - Consistent with the DEIR's model.

Demolition - Consistent with the DEIR's model.

Trips and VMT - See SWAPE comment regarding worker, vendor, and hauling trip numbers and lengths.

Construction Off-road Equipment Mitigation - See SWAPE comment regarding Tier 4 mitigation.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	55.00	38.00
tblConstructionPhase	NumDays	740.00	518.00
tblConstructionPhase	NumDays	50.00	35.00
tblConstructionPhase	NumDays	75.00	52.00
tblConstructionPhase	NumDays	55.00	38.00
tblConstructionPhase	NumDays	75.00	52.00
tblConstructionPhase	NumDays	75.00	52.00
tblConstructionPhase	NumDays	740.00	518.00
tblConstructionPhase	NumDays	740.00	518.00
tblConstructionPhase	PhaseEndDate	12/31/2030	12/29/2027
tblConstructionPhase	PhaseEndDate	11/26/2024	9/25/2023
tblConstructionPhase	PhaseEndDate	3/16/2021	2/23/2021
tblConstructionPhase	PhaseEndDate	6/29/2021	5/6/2021
tblConstructionPhase	PhaseEndDate	10/15/2030	11/5/2027
tblConstructionPhase	PhaseEndDate	10/12/2021	7/19/2021
tblConstructionPhase	PhaseEndDate	1/25/2022	9/29/2021
tblConstructionPhase	PhaseEndDate	9/28/2027	9/18/2025
tblConstructionPhase	PhaseEndDate	7/30/2030	9/14/2027
tblConstructionPhase	PhaseStartDate	10/16/2030	11/6/2027
tblConstructionPhase	PhaseStartDate	1/26/2022	9/30/2021
tblConstructionPhase	PhaseStartDate	3/17/2021	2/24/2021
tblConstructionPhase	PhaseStartDate	7/31/2030	9/15/2027

tblConstructionPhase	PhaseStartDate	6/30/2021	5/7/2021
tblConstructionPhase	PhaseStartDate	10/13/2021	7/20/2021
tblConstructionPhase	PhaseStartDate	11/27/2024	9/26/2023
tblConstructionPhase	PhaseStartDate	9/29/2027	9/19/2025
tblGrading	MaterialExported	0.00	216,720.00
tblGrading	MaterialExported	0.00	72,240.00
tblGrading	MaterialExported	0.00	183,610.00
tblLandUse	LandUseSquareFeet	261,360.00	85,000.00
tblLandUse	LandUseSquareFeet	96,000.00	110,336.00
tblLandUse	LandUseSquareFeet	737,000.00	766,982.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	HHDT

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	8.2342	181.5302	61.4667	0.4638	27.4586	2.4081	29.1055	7.8112	2.2309	10.0421	0.0000	49,638.2496	49,638.2496	5.0081	0.0000	49,763.4524
2022	6.4078	52.3891	57.1098	0.2091	12.1946	1.0030	13.1976	3.2468	0.9419	4.1888	0.0000	21,403.5640	21,403.5640	1.6436	0.0000	21,444.6541
2023	5.7726	41.7322	53.8170	0.2018	12.2790	0.8498	13.1209	3.2905	0.7975	4.0805	0.0000	20,666.5458	20,666.5458	1.5308	0.0000	20,704.8157
2024	5.3855	32.4578	50.6257	0.1816	12.2790	0.7491	13.0281	3.2905	0.7026	3.9931	0.0000	18,405.9993	18,405.9993	1.2095	0.0000	18,436.2357
2025	5.0943	31.0916	48.3862	0.1775	12.2790	0.6557	12.9346	3.2905	0.6148	3.9053	0.0000	17,996.1708	17,996.1708	1.1823	0.0000	18,025.7272
2026	4.9382	30.7998	46.5645	0.1739	12.2790	0.6529	12.9319	3.2905	0.6122	3.9028	0.0000	17,637.9459	17,637.9459	1.1610	0.0000	17,666.9718
2027	205.6756	30.5274	44.9476	0.1707	12.2790	0.6488	12.9278	3.2905	0.6084	3.8989	0.0000	17,321.7046	17,321.7046	1.1415	0.0000	17,350.2415
Maximum	**205.6756**	**181.5302**	**61.4667**	**0.4638**	**27.4586**	**2.4081**	**29.1055**	**7.8112**	**2.2309**	**10.0421**	**0.0000**	**49,638.2496**	**49,638.2496**	**5.0081**	**0.0000**	**49,763.4524**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.2374	139.8153	63.5219	0.4638	27.4586	0.7655	27.6158	7.8112	0.7214	8.3953	0.0000	49,638.2496	49,638.2496	5.0081	0.0000	49,763.4524
2022	5.8221	46.4025	57.5982	0.2091	12.1946	0.6633	12.8579	3.2468	0.6253	3.8722	0.0000	21,403.5640	21,403.5640	1.6436	0.0000	21,444.6541
2023	5.2443	36.2976	54.3533	0.2018	12.2790	0.5601	12.8312	3.2905	0.5276	3.8107	0.0000	20,666.5458	20,666.5458	1.5308	0.0000	20,704.8157
2024	4.8984	27.4283	51.1859	0.1816	12.2790	0.4973	12.7762	3.2905	0.4681	3.7587	0.0000	18,405.9993	18,405.9993	1.2095	0.0000	18,436.2357
2025	4.6534	26.5031	48.9807	0.1775	12.2790	0.4441	12.7230	3.2905	0.4180	3.7085	0.0000	17,996.1708	17,996.1708	1.1823	0.0000	18,025.7272
2026	4.4972	26.2113	47.1590	0.1739	12.2790	0.4413	12.7203	3.2905	0.4155	3.7060	0.0000	17,637.9459	17,637.9459	1.1610	0.0000	17,666.9718
2027	205.6756	25.9389	45.5421	0.1707	12.2790	0.4372	12.7162	3.2905	0.4116	3.7022	0.0000	17,321.7046	17,321.7046	1.1415	0.0000	17,350.2415
Maximum	**205.6756**	**139.8153**	**63.5219**	**0.4638**	**27.4586**	**0.7655**	**27.6158**	**7.8112**	**0.7214**	**8.3953**	**0.0000**	**49,638.2496**	**49,638.2496**	**5.0081**	**0.0000**	**49,763.4524**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**1.85**	**17.96**	**-1.49**	**0.00**	**0.00**	**45.33**	**2.80**	**0.00**	**44.88**	**8.99**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	244.6089	18.0760	492.4834	1.0843		64.0132	64.0132		64.0132	64.0132	7,802.6430	15,118.1765	22,920.8196	23.3886	0.5296	23,663.3521
Energy	0.6103	5.4004	3.5793	0.0333		0.4216	0.4216		0.4216	0.4216		6,657.2806	6,657.2806	0.1276	0.1221	6,696.8415
Mobile	17.7034	83.1789	183.0120	0.7839	73.8699	0.5207	74.3905	19.7559	0.4832	20.2392		80,273.9815	80,273.9815	3.4051		80,359.1087
Total	**262.9226**	**106.6553**	**679.0747**	**1.9015**	**73.8699**	**64.9555**	**138.8253**	**19.7559**	**64.9180**	**84.6739**	**7,802.6430**	**102,049.4386**	**109,852.0816**	**26.9213**	**0.6516**	**110,719.3023**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	244.6089	18.0760	492.4834	1.0843		64.0132	64.0132		64.0132	64.0132	7,802.6430	15,118.1765	22,920.8196	23.3886	0.5296	23,663.3521
Energy	0.6103	5.4004	3.5793	0.0333		0.4216	0.4216		0.4216	0.4216		6,657.2806	6,657.2806	0.1276	0.1221	6,696.8415
Mobile	17.7034	83.1789	183.0120	0.7839	73.8699	0.5207	74.3905	19.7559	0.4832	20.2392		80,273.9815	80,273.9815	3.4051		80,359.1087
Total	**262.9226**	**106.6553**	**679.0747**	**1.9015**	**73.8699**	**64.9555**	**138.8253**	**19.7559**	**64.9180**	**84.6739**	**7,802.6430**	**102,049.4386**	**109,852.0816**	**26.9213**	**0.6516**	**110,719.3023**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/6/2021	2/23/2021	5	35	
2	Demolition and Excavation	Grading	2/24/2021	5/6/2021	5	52	
3	Grading and Excavation	Grading	5/7/2021	7/19/2021	5	52	
4	Concrete and Grading/Excavation	Grading	7/20/2021	9/29/2021	5	52	
5	Concrete and Mat Foundation	Building Construction	9/30/2021	9/25/2023	5	518	
6	Building Construction (Phase 0 and 1/2)	Building Construction	9/26/2023	9/18/2025	5	518	
7	Building Construction (Phase 1/2)	Building Construction	9/19/2025	9/14/2027	5	518	
8	Paving	Paving	9/15/2027	11/5/2027	5	38	
9	Architectural Coating	Architectural Coating	11/6/2027	12/29/2027	5	38	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 14.87

Residential Indoor: 1,776,569; Residential Outdoor: 592,190; Non-Residential Indoor: 342,000; Non-Residential Outdoor: 114,000; Striped Parking Area: 39,672 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48

Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition and Excavation	Excavators	2	8.00	158	0.38
Concrete and Mat Foundation	Cranes	1	8.00	231	0.29
Concrete and Mat Foundation	Forklifts	3	8.00	89	0.20
Concrete and Mat Foundation	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Demolition and Excavation	Rubber Tired Dozers	1	8.00	247	0.40
Concrete and Mat Foundation	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Demolition and Excavation	Graders	1	8.00	187	0.41
Demolition and Excavation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Building Construction (Phase 0 and 1/2)	Cranes	1	8.00	231	0.29
Building Construction (Phase 1/2)	Cranes	1	8.00	231	0.29
Demolition and Excavation	Scrapers	2	8.00	367	0.48
Concrete and Mat Foundation	Welders	1	8.00	46	0.45
Grading and Excavation	Excavators	2	8.00	158	0.38
Concrete and Grading/Excavation	Excavators	2	8.00	158	0.38
Building Construction (Phase 0 and 1/2)	Forklifts	3	8.00	89	0.20
Building Construction (Phase 1/2)	Forklifts	3	8.00	89	0.20
Building Construction (Phase 0 and 1/2)	Generator Sets	1	8.00	84	0.74
Building Construction (Phase 1/2)	Generator Sets	1	8.00	84	0.74
Grading and Excavation	Graders	1	8.00	187	0.41
Concrete and Grading/Excavation	Graders	1	8.00	187	0.41
Grading and Excavation	Rubber Tired Dozers	1	8.00	247	0.40

Concrete and Grading/Excavation	Rubber Tired Dozers	1	8.00	247	0.40
Grading and Excavation	Scrapers	2	8.00	367	0.48
Concrete and Grading/Excavation	Scrapers	2	8.00	367	0.48
Building Construction (Phase 0 and 1/2)	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction (Phase 1/2)	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading and Excavation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Concrete and Grading/Excavation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction (Phase 0 and 1/2)	Welders	1	8.00	46	0.45
Building Construction (Phase 1/2)	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	4,084.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction (Phase 0 and 1/2)	9	964.00	235.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition and Excavation	8	20.00	0.00	27,090.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete and Mat Foundation	9	964.00	235.00	0.00	14.70	6.90	20.00	LD_Mix	HHDT	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	193.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction (Phase 1/2)	9	964.00	235.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading and Excavation	8	20.00	0.00	9,030.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete and Grading/Excavation	8	20.00	0.00	22,951.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					25.2529	0.0000	25.2529	3.8235	0.0000	3.8235			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**25.2529**	**1.5513**	**26.8042**	**3.8235**	**1.4411**	**5.2646**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.8868	30.2545	6.6830	0.0895	2.0380	0.0943	2.1324	0.5585	0.0902	0.6487		9,722.9953	9,722.9953	0.6852		9,740.1263
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.9496**	**30.2954**	**7.2462**	**0.0912**	**2.2057**	**0.0956**	**2.3013**	**0.6029**	**0.0914**	**0.6943**		**9,889.0301**	**9,889.0301**	**0.6897**		**9,906.2729**

3.2 Demolition - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					25.2529	0.0000	25.2529	3.8235	0.0000	3.8235			0.0000			0.0000
Off-Road	0.4623	2.0032	23.2798	0.0388		0.0616	0.0616		0.0616	0.0616	0.0000	3,747.944 9	3,747.944 9	1.0549		3,774.317 4
Total	**0.4623**	**2.0032**	**23.2798**	**0.0388**	**25.2529**	**0.0616**	**25.3145**	**3.8235**	**0.0616**	**3.8852**	**0.0000**	**3,747.944 9**	**3,747.944 9**	**1.0549**		**3,774.317 4**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.8868	30.2545	6.6830	0.0895	2.0380	0.0943	2.1324	0.5585	0.0902	0.6487		9,722.995 3	9,722.995 3	0.6852		9,740.126 3
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.9496**	**30.2954**	**7.2462**	**0.0912**	**2.2057**	**0.0956**	**2.3013**	**0.6029**	**0.0914**	**0.6943**		**9,889.030 1**	**9,889.030 1**	**0.6897**		**9,906.272 9**

3.3 Demolition and Excavation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.9809	0.0000	12.9809	5.2586	0.0000	5.2586			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**12.9809**	**1.9853**	**14.9663**	**5.2586**	**1.8265**	**7.0851**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.9593	135.0757	29.8373	0.3996	9.0991	0.4211	9.5202	2.4933	0.4029	2.8961		43,409.8265	43,409.8265	3.0594		43,486.3102
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**4.0430**	**135.1303**	**30.5883**	**0.4018**	**9.3227**	**0.4227**	**9.7454**	**2.5526**	**0.4044**	**2.9569**		**43,631.2062**	**43,631.2062**	**3.0653**		**43,707.8390**

3.3 Demolition and Excavation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Fugitive Dust					12.9809	0.0000	12.9809	5.2586	0.0000	5.2586			0.0000			0.0000
Off-Road	0.8810	4.6850	32.9337	0.0620		0.1869	0.1869		0.1798	0.1798	0.0000	6,007.043 4	6,007.043 4	1.9428		6,055.613 4
Total	**0.8810**	**4.6850**	**32.9337**	**0.0620**	**12.9809**	**0.1869**	**13.1679**	**5.2586**	**0.1798**	**5.4384**	**0.0000**	**6,007.043 4**	**6,007.043 4**	**1.9428**		**6,055.613 4**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Hauling	3.9593	135.0757	29.8373	0.3996	9.0991	0.4211	9.5202	2.4933	0.4029	2.8961		43,409.82 65	43,409.82 65	3.0594		43,486.31 02
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**4.0430**	**135.1303**	**30.5883**	**0.4018**	**9.3227**	**0.4227**	**9.7454**	**2.5526**	**0.4044**	**2.9569**		**43,631.20 62**	**43,631.20 62**	**3.0653**		**43,707.83 90**

3.4 Grading and Excavation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.6667	0.0000	12.6667	5.2111	0.0000	5.2111			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**12.6667**	**1.9853**	**14.6521**	**5.2111**	**1.8265**	**7.0376**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3198	45.0252	9.9458	0.1332	3.0330	0.1404	3.1734	0.8311	0.1343	0.9654		14,469.9422	14,469.9422	1.0198		14,495.4367
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**1.4035**	**45.0798**	**10.6967**	**0.1354**	**3.2566**	**0.1420**	**3.3986**	**0.8904**	**0.1358**	**1.0262**		**14,691.3218**	**14,691.3218**	**1.0258**		**14,716.9656**

3.4 Grading and Excavation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.6667	0.0000	12.6667	5.2111	0.0000	5.2111			0.0000			0.0000
Off-Road	0.8810	4.6850	32.9337	0.0620		0.1869	0.1869		0.1798	0.1798	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**0.8810**	**4.6850**	**32.9337**	**0.0620**	**12.6667**	**0.1869**	**12.8536**	**5.2111**	**0.1798**	**5.3908**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3198	45.0252	9.9458	0.1332	3.0330	0.1404	3.1734	0.8311	0.1343	0.9654		14,469.9422	14,469.9422	1.0198		14,495.4367
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**1.4035**	**45.0798**	**10.6967**	**0.1354**	**3.2566**	**0.1420**	**3.3986**	**0.8904**	**0.1358**	**1.0262**		**14,691.3218**	**14,691.3218**	**1.0258**		**14,716.9656**

3.5 Concrete and Grading/Excavation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.9089	0.0000	12.9089	5.2477	0.0000	5.2477			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**12.9089**	**1.9853**	**14.8943**	**5.2477**	**1.8265**	**7.0742**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.3544	114.4379	25.2786	0.3385	7.7089	0.3568	8.0656	2.1123	0.3413	2.4536		36,777.3691	36,777.3691	2.5919		36,842.1670
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**3.4381**	**114.4925**	**26.0295**	**0.3408**	**7.9324**	**0.3584**	**8.2909**	**2.1716**	**0.3428**	**2.5145**		**36,998.7487**	**36,998.7487**	**2.5979**		**37,063.6958**

3.5 Concrete and Grading/Excavation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.9089	0.0000	12.9089	5.2477	0.0000	5.2477			0.0000			0.0000
Off-Road	0.8810	4.6850	32.9337	0.0620		0.1869	0.1869		0.1798	0.1798	0.0000	6,007.043 4	6,007.043 4	1.9428		6,055.613 4
Total	**0.8810**	**4.6850**	**32.9337**	**0.0620**	**12.9089**	**0.1869**	**13.0959**	**5.2477**	**0.1798**	**5.4275**	**0.0000**	**6,007.043 4**	**6,007.043 4**	**1.9428**		**6,055.613 4**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.3544	114.4379	25.2786	0.3385	7.7089	0.3568	8.0656	2.1123	0.3413	2.4536		36,777.36 91	36,777.36 91	2.5919		36,842.16 70
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**3.4381**	**114.4925**	**26.0295**	**0.3408**	**7.9324**	**0.3584**	**8.2909**	**2.1716**	**0.3428**	**2.5145**		**36,998.74 87**	**36,998.74 87**	**2.5979**		**37,063.69 58**

3.6 Concrete and Mat Foundation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0228	18.7492	17.6706	0.0288		1.0251	1.0251		0.9625	0.9625		2,736.0438	2,736.0438	0.6751		2,752.9212
Total	**2.0228**	**18.7492**	**17.6706**	**0.0288**		**1.0251**	**1.0251**		**0.9625**	**0.9625**		**2,736.0438**	**2,736.0438**	**0.6751**		**2,752.9212**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8528	35.2574	6.3009	0.0780	1.4193	0.0709	1.4902	0.3892	0.0678	0.4570		8,472.8596	8,472.8596	0.7345		8,491.2226
Worker	4.0344	2.6315	36.1952	0.1071	10.7753	0.0798	10.8550	2.8577	0.0734	2.9311		10,670.4995	10,670.4995	0.2876		10,677.6894
Total	**4.8872**	**37.8888**	**42.4961**	**0.1851**	**12.1946**	**0.1506**	**12.3452**	**3.2469**	**0.1413**	**3.3881**		**19,143.3590**	**19,143.3590**	**1.0221**		**19,168.9120**

3.6 Concrete and Mat Foundation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3501	11.9302	18.0646	0.0288		0.6149	0.6149		0.5802	0.5802	0.0000	2,736.0438	2,736.0438	0.6751		2,752.9212
Total	**1.3501**	**11.9302**	**18.0646**	**0.0288**		**0.6149**	**0.6149**		**0.5802**	**0.5802**	**0.0000**	**2,736.0438**	**2,736.0438**	**0.6751**		**2,752.9212**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8528	35.2574	6.3009	0.0780	1.4193	0.0709	1.4902	0.3892	0.0678	0.4570		8,472.8596	8,472.8596	0.7345		8,491.2226
Worker	4.0344	2.6315	36.1952	0.1071	10.7753	0.0798	10.8550	2.8577	0.0734	2.9311		10,670.4995	10,670.4995	0.2876		10,677.6894
Total	**4.8872**	**37.8888**	**42.4961**	**0.1851**	**12.1946**	**0.1506**	**12.3452**	**3.2469**	**0.1413**	**3.3881**		**19,143.3590**	**19,143.3590**	**1.0221**		**19,168.9120**

3.6 Concrete and Mat Foundation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8146	16.7670	17.4392	0.0288		0.8645	0.8645		0.8122	0.8122		2,737.1520	2,737.1520	0.6711		2,753.9288
Total	**1.8146**	**16.7670**	**17.4392**	**0.0288**		**0.8645**	**0.8645**		**0.8122**	**0.8122**		**2,737.1520**	**2,737.1520**	**0.6711**		**2,753.9288**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8083	33.2448	6.1989	0.0771	1.4193	0.0610	1.4803	0.3892	0.0584	0.4476		8,377.9953	8,377.9953	0.7125		8,395.8087
Worker	3.7848	2.3773	33.4717	0.1032	10.7753	0.0775	10.8527	2.8577	0.0713	2.9290		10,288.4167	10,288.4167	0.2600		10,294.9166
Total	**4.5931**	**35.6221**	**39.6707**	**0.1803**	**12.1946**	**0.1385**	**12.3330**	**3.2468**	**0.1297**	**3.3766**		**18,666.4120**	**18,666.4120**	**0.9725**		**18,690.7253**

3.6 Concrete and Mat Foundation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2290	10.7805	17.9275	0.0288		0.5248	0.5248		0.4956	0.4956	0.0000	2,737.1520	2,737.1520	0.6711		2,753.9288
Total	**1.2290**	**10.7805**	**17.9275**	**0.0288**		**0.5248**	**0.5248**		**0.4956**	**0.4956**	**0.0000**	**2,737.1520**	**2,737.1520**	**0.6711**		**2,753.9288**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8083	33.2448	6.1989	0.0771	1.4193	0.0610	1.4803	0.3892	0.0584	0.4476		8,377.9953	8,377.9953	0.7125		8,395.8087
Worker	3.7848	2.3773	33.4717	0.1032	10.7753	0.0775	10.8527	2.8577	0.0713	2.9290		10,288.4167	10,288.4167	0.2600		10,294.9166
Total	**4.5931**	**35.6221**	**39.6707**	**0.1803**	**12.1946**	**0.1385**	**12.3330**	**3.2468**	**0.1297**	**3.3766**		**18,666.4120**	**18,666.4120**	**0.9725**		**18,690.7253**

3.6 Concrete and Mat Foundation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6735	15.4377	17.3101	0.0288		0.7481	0.7481		0.7029	0.7029		2,738.1535	2,738.1535	0.6670		2,754.8288
Total	**1.6735**	**15.4377**	**17.3101**	**0.0288**		**0.7481**	**0.7481**		**0.7029**	**0.7029**		**2,738.1535**	**2,738.1535**	**0.6670**		**2,754.8288**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5402	24.1433	5.5971	0.0736	1.4193	0.0263	1.4456	0.3892	0.0251	0.4143		8,023.1966	8,023.1966	0.6293		8,038.9278
Worker	3.5589	2.1512	30.9098	0.0994	10.7753	0.0755	10.8507	2.8577	0.0695	2.9271		9,905.1957	9,905.1957	0.2345		9,911.0590
Total	**4.0991**	**26.2945**	**36.5069**	**0.1730**	**12.1946**	**0.1017**	**12.2963**	**3.2468**	**0.0946**	**3.3414**		**17,928.3923**	**17,928.3923**	**0.8638**		**17,949.9868**

3.6 Concrete and Mat Foundation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1452	10.0032	17.8464	0.0288		0.4584	0.4584		0.4330	0.4330	0.0000	2,738.1535	2,738.1535	0.6670		2,754.8288
Total	**1.1452**	**10.0032**	**17.8464**	**0.0288**		**0.4584**	**0.4584**		**0.4330**	**0.4330**	**0.0000**	**2,738.1535**	**2,738.1535**	**0.6670**		**2,754.8288**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5402	24.1433	5.5971	0.0736	1.4193	0.0263	1.4456	0.3892	0.0251	0.4143		8,023.1966	8,023.1966	0.6293		8,038.9278
Worker	3.5589	2.1512	30.9098	0.0994	10.7753	0.0755	10.8507	2.8577	0.0695	2.9271		9,905.1957	9,905.1957	0.2345		9,911.0590
Total	**4.0991**	**26.2945**	**36.5069**	**0.1730**	**12.1946**	**0.1017**	**12.2963**	**3.2468**	**0.0946**	**3.3414**		**17,928.3923**	**17,928.3923**	**0.8638**		**17,949.9868**

3.7 Building Construction (Phase 0 and 1/2) - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6735	15.4377	17.3101	0.0288		0.7481	0.7481		0.7029	0.7029		2,738.1535	2,738.1535	0.6670		2,754.8288
Total	**1.6735**	**15.4377**	**17.3101**	**0.0288**		**0.7481**	**0.7481**		**0.7029**	**0.7029**		**2,738.1535**	**2,738.1535**	**0.6670**		**2,754.8288**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4602	16.1151	4.6704	0.0570	1.5037	0.0185	1.5222	0.4329	0.0176	0.4505		6,110.8569	6,110.8569	0.3359		6,119.2532
Worker	3.5589	2.1512	30.9098	0.0994	10.7753	0.0755	10.8507	2.8577	0.0695	2.9271		9,905.1957	9,905.1957	0.2345		9,911.0590
Total	**4.0191**	**18.2663**	**35.5802**	**0.1563**	**12.2790**	**0.0939**	**12.3729**	**3.2905**	**0.0871**	**3.3776**		**16,016.0526**	**16,016.0526**	**0.5704**		**16,030.3122**

3.7 Building Construction (Phase 0 and 1/2) - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1452	10.0032	17.8464	0.0288		0.4584	0.4584		0.4330	0.4330	0.0000	2,738.1535	2,738.1535	0.6670		2,754.8288
Total	**1.1452**	**10.0032**	**17.8464**	**0.0288**		**0.4584**	**0.4584**		**0.4330**	**0.4330**	**0.0000**	**2,738.1535**	**2,738.1535**	**0.6670**		**2,754.8288**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4602	16.1151	4.6704	0.0570	1.5037	0.0185	1.5222	0.4329	0.0176	0.4505		6,110.8569	6,110.8569	0.3359		6,119.2532
Worker	3.5589	2.1512	30.9098	0.0994	10.7753	0.0755	10.8507	2.8577	0.0695	2.9271		9,905.1957	9,905.1957	0.2345		9,911.0590
Total	**4.0191**	**18.2663**	**35.5802**	**0.1563**	**12.2790**	**0.0939**	**12.3729**	**3.2905**	**0.0871**	**3.3776**		**16,016.0526**	**16,016.0526**	**0.5704**		**16,030.3122**

3.7 Building Construction (Phase 0 and 1/2) - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Off-Road	1.5670	14.4249	17.2270	0.0288		0.6565	0.6565		0.6166	0.6166		2,738.7124	2,738.7124	0.6635		2,755.3009
Total	**1.5670**	**14.4249**	**17.2270**	**0.0288**		**0.6565**	**0.6565**		**0.6166**	**0.6166**		**2,738.7124**	**2,738.7124**	**0.6635**		**2,755.3009**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4502	16.0725	4.5378	0.0567	1.5037	0.0183	1.5220	0.4329	0.0175	0.4503		6,088.4518	6,088.4518	0.3310		6,096.7258
Worker	3.3683	1.9604	28.8609	0.0961	10.7753	0.0744	10.8497	2.8577	0.0685	2.9262		9,578.8352	9,578.8352	0.2150		9,584.2090
Total	**3.8185**	**18.0329**	**33.3987**	**0.1528**	**12.2790**	**0.0927**	**12.3716**	**3.2905**	**0.0860**	**3.3765**		**15,667.2870**	**15,667.2870**	**0.5459**		**15,680.9348**

3.7 Building Construction (Phase 0 and 1/2) - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0799	9.3954	17.7873	0.0288		0.4046	0.4046		0.3822	0.3822	0.0000	2,738.7123	2,738.7123	0.6635		2,755.3009
Total	**1.0799**	**9.3954**	**17.7873**	**0.0288**		**0.4046**	**0.4046**		**0.3822**	**0.3822**	**0.0000**	**2,738.7123**	**2,738.7123**	**0.6635**		**2,755.3009**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4502	16.0725	4.5378	0.0567	1.5037	0.0183	1.5220	0.4329	0.0175	0.4503		6,088.4518	6,088.4518	0.3310		6,096.7258
Worker	3.3683	1.9604	28.8609	0.0961	10.7753	0.0744	10.8497	2.8577	0.0685	2.9262		9,578.8352	9,578.8352	0.2150		9,584.2090
Total	**3.8185**	**18.0329**	**33.3987**	**0.1528**	**12.2790**	**0.0927**	**12.3716**	**3.2905**	**0.0860**	**3.3765**		**15,667.2870**	**15,667.2870**	**0.5459**		**15,680.9348**

3.7 Building Construction (Phase 0 and 1/2) - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4560	13.3663	17.1378	0.0289		0.5647	0.5647		0.5304	0.5304		2,739.5986	2,739.5986	0.6602		2,756.1030
Total	**1.4560**	**13.3663**	**17.1378**	**0.0289**		**0.5647**	**0.5647**		**0.5304**	**0.5304**		**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1030**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4388	15.9324	4.4221	0.0564	1.5037	0.0180	1.5217	0.4329	0.0172	0.4501		6,054.6378	6,054.6378	0.3261		6,062.7906
Worker	3.1994	1.7929	26.8262	0.0923	10.7753	0.0730	10.8483	2.8577	0.0672	2.9248		9,201.9344	9,201.9344	0.1960		9,206.8337
Total	**3.6383**	**17.7253**	**31.2483**	**0.1486**	**12.2790**	**0.0910**	**12.3699**	**3.2905**	**0.0844**	**3.3749**		**15,256.5722**	**15,256.5722**	**0.5221**		**15,269.6243**

3.7 Building Construction (Phase 0 and 1/2) - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0151	8.7778	17.7323	0.0289		0.3531	0.3531		0.3336	0.3336	0.0000	2,739.598 6	2,739.598 6	0.6602		2,756.102 9
Total	**1.0151**	**8.7778**	**17.7323**	**0.0289**		**0.3531**	**0.3531**		**0.3336**	**0.3336**	**0.0000**	**2,739.598 6**	**2,739.598 6**	**0.6602**		**2,756.102 9**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4388	15.9324	4.4221	0.0564	1.5037	0.0180	1.5217	0.4329	0.0172	0.4501		6,054.637 8	6,054.637 8	0.3261		6,062.790 6
Worker	3.1994	1.7929	26.8262	0.0923	10.7753	0.0730	10.8483	2.8577	0.0672	2.9248		9,201.934 4	9,201.934 4	0.1960		9,206.833 7
Total	**3.6383**	**17.7253**	**31.2483**	**0.1486**	**12.2790**	**0.0910**	**12.3699**	**3.2905**	**0.0844**	**3.3749**		**15,256.57 22**	**15,256.57 22**	**0.5221**		**15,269.62 43**

3.8 Building Construction (Phase 1/2) - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4560	13.3663	17.1378	0.0289		0.5647	0.5647		0.5304	0.5304		2,739.598 6	2,739.598 6	0.6602		2,756.103 0
Total	**1.4560**	**13.3663**	**17.1378**	**0.0289**		**0.5647**	**0.5647**		**0.5304**	**0.5304**		**2,739.598 6**	**2,739.598 6**	**0.6602**		**2,756.103 0**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4388	15.9324	4.4221	0.0564	1.5037	0.0180	1.5217	0.4329	0.0172	0.4501		6,054.637 8	6,054.637 8	0.3261		6,062.790 6
Worker	3.1994	1.7929	26.8262	0.0923	10.7753	0.0730	10.8483	2.8577	0.0672	2.9248		9,201.934 4	9,201.934 4	0.1960		9,206.833 7
Total	**3.6383**	**17.7253**	**31.2483**	**0.1486**	**12.2790**	**0.0910**	**12.3699**	**3.2905**	**0.0844**	**3.3749**		**15,256.57 22**	**15,256.57 22**	**0.5221**		**15,269.62 43**

3.8 Building Construction (Phase 1/2) - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0151	8.7778	17.7323	0.0289		0.3531	0.3531		0.3336	0.3336	0.0000	2,739.598 6	2,739.598 6	0.6602		2,756.102 9
Total	**1.0151**	**8.7778**	**17.7323**	**0.0289**		**0.3531**	**0.3531**		**0.3336**	**0.3336**	**0.0000**	**2,739.598 6**	**2,739.598 6**	**0.6602**		**2,756.102 9**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4388	15.9324	4.4221	0.0564	1.5037	0.0180	1.5217	0.4329	0.0172	0.4501		6,054.637 8	6,054.637 8	0.3261		6,062.790 6
Worker	3.1994	1.7929	26.8262	0.0923	10.7753	0.0730	10.8483	2.8577	0.0672	2.9248		9,201.934 4	9,201.934 4	0.1960		9,206.833 7
Total	**3.6383**	**17.7253**	**31.2483**	**0.1486**	**12.2790**	**0.0910**	**12.3699**	**3.2905**	**0.0844**	**3.3749**		**15,256.57 22**	**15,256.57 22**	**0.5221**		**15,269.62 43**

3.8 Building Construction (Phase 1/2) - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4560	13.3663	17.1378	0.0289		0.5647	0.5647		0.5304	0.5304		2,739.5986	2,739.5986	0.6602		2,756.1030
Total	**1.4560**	**13.3663**	**17.1378**	**0.0289**		**0.5647**	**0.5647**		**0.5304**	**0.5304**		**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1030**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4289	15.7827	4.3333	0.0560	1.5037	0.0177	1.5214	0.4329	0.0169	0.4498		6,022.0615	6,022.0615	0.3213		6,030.0928
Worker	3.0533	1.6508	25.0934	0.0890	10.7753	0.0706	10.8458	2.8577	0.0650	2.9226		8,876.2858	8,876.2858	0.1796		8,880.7760
Total	**3.4821**	**17.4335**	**29.4266**	**0.1450**	**12.2790**	**0.0882**	**12.3672**	**3.2905**	**0.0818**	**3.3724**		**14,898.3473**	**14,898.3473**	**0.5009**		**14,910.8688**

3.8 Building Construction (Phase 1/2) - 2026

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0151	8.7778	17.7323	0.0289		0.3531	0.3531		0.3336	0.3336	0.0000	2,739.598 6	2,739.598 6	0.6602		2,756.102 9
Total	**1.0151**	**8.7778**	**17.7323**	**0.0289**		**0.3531**	**0.3531**		**0.3336**	**0.3336**	**0.0000**	**2,739.598 6**	**2,739.598 6**	**0.6602**		**2,756.102 9**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4289	15.7827	4.3333	0.0560	1.5037	0.0177	1.5214	0.4329	0.0169	0.4498		6,022.061 5	6,022.061 5	0.3213		6,030.092 8
Worker	3.0533	1.6508	25.0934	0.0890	10.7753	0.0706	10.8458	2.8577	0.0650	2.9226		8,876.285 8	8,876.285 8	0.1796		8,880.776 0
Total	**3.4821**	**17.4335**	**29.4266**	**0.1450**	**12.2790**	**0.0882**	**12.3672**	**3.2905**	**0.0818**	**3.3724**		**14,898.34 73**	**14,898.34 73**	**0.5009**		**14,910.86 88**

3.8 Building Construction (Phase 1/2) - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4560	13.3663	17.1378	0.0289		0.5647	0.5647		0.5304	0.5304		2,739.5986	2,739.5986	0.6602		2,756.1030
Total	**1.4560**	**13.3663**	**17.1378**	**0.0289**		**0.5647**	**0.5647**		**0.5304**	**0.5304**		**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1030**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4205	15.6382	4.2615	0.0557	1.5037	0.0173	1.5211	0.4329	0.0166	0.4495		5,992.8141	5,992.8141	0.3164		6,000.7248
Worker	2.9104	1.5230	23.5483	0.0861	10.7753	0.0667	10.8420	2.8577	0.0614	2.9191		8,589.2920	8,589.2920	0.1649		8,593.4137
Total	**3.3309**	**17.1611**	**27.8098**	**0.1418**	**12.2790**	**0.0841**	**12.3631**	**3.2905**	**0.0780**	**3.3685**		**14,582.1061**	**14,582.1061**	**0.4813**		**14,594.1385**

3.8 Building Construction (Phase 1/2) - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0151	8.7778	17.7323	0.0289		0.3531	0.3531		0.3336	0.3336	0.0000	2,739.5986	2,739.5986	0.6602		2,756.1029
Total	**1.0151**	**8.7778**	**17.7323**	**0.0289**		**0.3531**	**0.3531**		**0.3336**	**0.3336**	**0.0000**	**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1029**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4205	15.6382	4.2615	0.0557	1.5037	0.0173	1.5211	0.4329	0.0166	0.4495		5,992.8141	5,992.8141	0.3164		6,000.7248
Worker	2.9104	1.5230	23.5483	0.0861	10.7753	0.0667	10.8420	2.8577	0.0614	2.9191		8,589.2920	8,589.2920	0.1649		8,593.4137
Total	**3.3309**	**17.1611**	**27.8098**	**0.1418**	**12.2790**	**0.0841**	**12.3631**	**3.2905**	**0.0780**	**3.3685**		**14,582.1061**	**14,582.1061**	**0.4813**		**14,594.1385**

3.9 Paving - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0453	0.0237	0.3664	1.3400e-003	0.1677	1.0400e-003	0.1687	0.0445	9.6000e-004	0.0454		133.6508	133.6508	2.5700e-003		133.7149
Total	**0.0453**	**0.0237**	**0.3664**	**1.3400e-003**	**0.1677**	**1.0400e-003**	**0.1687**	**0.0445**	**9.6000e-004**	**0.0454**		**133.6508**	**133.6508**	**2.5700e-003**		**133.7149**

3.9 Paving - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0453	0.0237	0.3664	1.3400e-003	0.1677	1.0400e-003	0.1687	0.0445	9.6000e-004	0.0454		133.6508	133.6508	2.5700e-003		133.7149
Total	**0.0453**	**0.0237**	**0.3664**	**1.3400e-003**	**0.1677**	**1.0400e-003**	**0.1687**	**0.0445**	**9.6000e-004**	**0.0454**		**133.6508**	**133.6508**	**2.5700e-003**		**133.7149**

3.10 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	204.9221					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**205.0929**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5827	0.3049	4.7145	0.0172	2.1573	0.0134	2.1707	0.5721	0.0123	0.5844		1,719.6404	1,719.6404	0.0330		1,720.4656
Total	**0.5827**	**0.3049**	**4.7145**	**0.0172**	**2.1573**	**0.0134**	**2.1707**	**0.5721**	**0.0123**	**0.5844**		**1,719.6404**	**1,719.6404**	**0.0330**		**1,720.4656**

3.10 Architectural Coating - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	204.9221					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**205.0929**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5827	0.3049	4.7145	0.0172	2.1573	0.0134	2.1707	0.5721	0.0123	0.5844		1,719.6404	1,719.6404	0.0330		1,720.4656
Total	**0.5827**	**0.3049**	**4.7145**	**0.0172**	**2.1573**	**0.0134**	**2.1707**	**0.5721**	**0.0123**	**0.5844**		**1,719.6404**	**1,719.6404**	**0.0330**		**1,720.4656**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	17.7034	83.1789	183.0120	0.7839	73.8699	0.5207	74.3905	19.7559	0.4832	20.2392		80,273.9815	80,273.9815	3.4051		80,359.1087
Unmitigated	17.7034	83.1789	183.0120	0.7839	73.8699	0.5207	74.3905	19.7559	0.4832	20.2392		80,273.9815	80,273.9815	3.4051		80,359.1087

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	638.40	613.44	562.56	2,132,303	2,132,303
Condo/Townhouse High Rise	3,080.66	3,176.47	2527.91	10,304,021	10,304,021
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	529.44	118.08	50.40	1,295,800	1,295,800
Health Club	477.49	302.62	387.59	940,334	940,334
High Turnover (Sit Down Restaurant)	4,450.25	5,542.95	4614.40	6,309,633	6,309,633
Hotel	1,470.60	1,474.20	1071.00	3,374,114	3,374,114
Strip Mall	806.62	765.13	371.83	1,405,223	1,405,223
Supermarket	2,791.15	4,848.21	4543.81	4,400,959	4,400,959
Unenclosed Parking Structure	0.00	0.00	0.00		
Total	14,244.61	16,841.09	14,129.49	30,162,387	30,162,387

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15
Supermarket	16.60	8.40	6.90	6.50	74.50	19.00	34	30	36
Unenclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Condo/Townhouse High Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Enclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
General Office Building	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Health Club	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
High Turnover (Sit Down Restaurant)	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Hotel	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Strip Mall	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Supermarket	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Unenclosed Parking Structure	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.6103	5.4004	3.5793	0.0333		0.4216	0.4216		0.4216	0.4216		6,657.2806	6,657.2806	0.1276	0.1221	6,696.8415
NaturalGas Unmitigated	0.6103	5.4004	3.5793	0.0333		0.4216	0.4216		0.4216	0.4216		6,657.2806	6,657.2806	0.1276	0.1221	6,696.8415

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	2887.41	0.0311	0.2661	0.1132	1.7000e-003		0.0215	0.0215		0.0215	0.0215		339.6955	339.6955	6.5100e-003	6.2300e-003	341.7141
Condo/Townhouse High Rise	22166.9	0.2391	2.0428	0.8693	0.0130		0.1652	0.1652		0.1652	0.1652		2,607.8706	2,607.8706	0.0500	0.0478	2,623.3679
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1368.99	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	719.041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22127.7	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Hotel	5584.38	0.0602	0.5475	0.4599	3.2800e-003		0.0416	0.0416		0.0416	0.0416		656.9863	656.9863	0.0126	0.0120	660.8904
Strip Mall	81.7753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1650.72	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.6102**	**5.4003**	**3.5793**	**0.0333**		**0.4216**	**0.4216**		**0.4216**	**0.4216**		**6,657.2806**	**6,657.2806**	**0.1276**	**0.1221**	**6,696.8414**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	2.88741	0.0311	0.2661	0.1132	1.7000e-003		0.0215	0.0215		0.0215	0.0215		339.6955	339.6955	6.5100e-003	6.2300e-003	341.7141
Condo/Townhouse High Rise	22.1669	0.2391	2.0428	0.8693	0.0130		0.1652	0.1652		0.1652	0.1652		2,607.8706	2,607.8706	0.0500	0.0478	2,623.3679
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1.36899	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	0.719041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22.1277	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Hotel	5.58438	0.0602	0.5475	0.4599	3.2800e-003		0.0416	0.0416		0.0416	0.0416		656.9863	656.9863	0.0126	0.0120	660.8904
Strip Mall	0.0817753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1.65072	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.6102**	**5.4003**	**3.5793**	**0.0333**		**0.4216**	**0.4216**		**0.4216**	**0.4216**		**6,657.2806**	**6,657.2806**	**0.1276**	**0.1221**	**6,696.8414**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	244.6089	18.0760	492.4834	1.0843		64.0132	64.0132		64.0132	64.0132	7,802.6430	15,118.1765	22,920.8196	23.3886	0.5296	23,663.3521
Unmitigated	244.6089	18.0760	492.4834	1.0843		64.0132	64.0132		64.0132	64.0132	7,802.6430	15,118.1765	22,920.8196	23.3886	0.5296	23,663.3521

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.1334					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	22.1195					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	218.2760	17.2834	423.6237	1.0807		63.6315	63.6315		63.6315	63.6315	7,802.6430	14,994.0000	22,796.6430	23.2690	0.5296	23,536.1850
Landscaping	2.0800	0.7927	68.8597	3.6400e-003		0.3817	0.3817		0.3817	0.3817		124.1765	124.1765	0.1196		127.1671
Total	**244.6089**	**18.0760**	**492.4834**	**1.0843**		**64.0132**	**64.0132**		**64.0132**	**64.0132**	**7,802.6430**	**15,118.1765**	**22,920.8196**	**23.3886**	**0.5296**	**23,663.3521**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.1334					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	22.1195					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	218.2760	17.2834	423.6237	1.0807		63.6315	63.6315		63.6315	63.6315	7,802.6430	14,994.0000	22,796.6430	23.2690	0.5296	23,536.1850
Landscaping	2.0800	0.7927	68.8597	3.6400e-003		0.3817	0.3817		0.3817	0.3817		124.1765	124.1765	0.1196		127.1671
Total	**244.6089**	**18.0760**	**492.4834**	**1.0843**		**64.0132**	**64.0132**		**64.0132**	**64.0132**	**7,802.6430**	**15,118.1765**	**22,920.8196**	**23.3886**	**0.5296**	**23,663.3521**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

1111 Sunset Buildout with PDFs (Construction On-site)

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	48.00	1000sqft	1.10	48,000.00	0
Enclosed Parking with Elevator	485.00	Space	4.36	194,000.00	0
Unenclosed Parking Structure	1,168.00	Space	10.51	467,200.00	0
Health Club	14.50	1000sqft	0.33	14,500.00	0
High Turnover (Sit Down Restaurant)	35.00	1000sqft	0.80	35,000.00	0
Hotel	180.00	Room	6.00	85,000.00	0
Apartments Mid Rise	96.00	Dwelling Unit	2.53	110,336.00	275
Condo/Townhouse High Rise	737.00	Dwelling Unit	11.52	766,982.00	2108
Strip Mall	18.20	1000sqft	0.42	18,200.00	0
Supermarket	27.30	1000sqft	0.63	27,300.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2028
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Consistent with the DEIR's model

Land Use - Consistent with the DEIR's model.

Construction Phase - See SWAPE comment regarding construction schedule. Proportionally decreased default values to end by the start of 2028.

Off-road Equipment - See SWAPE comment regarding unit amounts. Usage hours consistent with DEIR's model.

Off-road Equipment - See SWAPE comment regarding unit amounts. Usage hours consistent with the DEIR's model.

Off-road Equipment - See SWAPE comment regarding unit amounts. Usage hours consistent with the DEIR's model.

Grading - Consistent with the DEIR's model.

Demolition - Consistent with the DEIR's model.

Trips and VMT - See SWAPE comment regarding worker, vendor, and hauling trip numbers and lengths.

Construction Off-road Equipment Mitigation - See SWAPE comment regarding Tier 4 mitigation.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final

tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	55.00	38.00
tblConstructionPhase	NumDays	740.00	518.00
tblConstructionPhase	NumDays	50.00	35.00
tblConstructionPhase	NumDays	75.00	52.00
tblConstructionPhase	NumDays	55.00	38.00
tblConstructionPhase	NumDays	75.00	52.00
tblConstructionPhase	NumDays	75.00	52.00
tblConstructionPhase	NumDays	740.00	518.00
tblConstructionPhase	NumDays	740.00	518.00
tblConstructionPhase	PhaseEndDate	12/31/2030	12/29/2027
tblConstructionPhase	PhaseEndDate	11/26/2024	9/25/2023
tblConstructionPhase	PhaseEndDate	3/16/2021	2/23/2021
tblConstructionPhase	PhaseEndDate	6/29/2021	5/6/2021
tblConstructionPhase	PhaseEndDate	10/15/2030	11/5/2027
tblConstructionPhase	PhaseEndDate	10/12/2021	7/19/2021
tblConstructionPhase	PhaseEndDate	1/25/2022	9/29/2021
tblConstructionPhase	PhaseEndDate	9/28/2027	9/18/2025
tblConstructionPhase	PhaseEndDate	7/30/2030	9/14/2027
tblConstructionPhase	PhaseStartDate	10/16/2030	11/6/2027
tblConstructionPhase	PhaseStartDate	1/26/2022	9/30/2021
tblConstructionPhase	PhaseStartDate	3/17/2021	2/24/2021
tblConstructionPhase	PhaseStartDate	7/31/2030	9/15/2027

tblConstructionPhase	PhaseStartDate	6/30/2021	5/7/2021
tblConstructionPhase	PhaseStartDate	10/13/2021	7/20/2021
tblConstructionPhase	PhaseStartDate	11/27/2024	9/26/2023
tblConstructionPhase	PhaseStartDate	9/29/2027	9/19/2025
tblGrading	MaterialExported	0.00	216,720.00
tblGrading	MaterialExported	0.00	72,240.00
tblGrading	MaterialExported	0.00	183,610.00
tblLandUse	LandUseSquareFeet	261,360.00	85,000.00
tblLandUse	LandUseSquareFeet	96,000.00	110,336.00
tblLandUse	LandUseSquareFeet	737,000.00	766,982.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	HHDT

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	8.3448	183.2007	63.3469	0.4568	27.4586	2.4144	29.1069	7.8112	2.2369	10.0481	0.0000	48,879.1573	48,879.1573	5.1222	0.0000	49,007.2124
2022	6.8485	52.3326	54.7654	0.1996	12.1946	1.0055	13.2001	3.2468	0.9444	4.1912	0.0000	20,429.5328	20,429.5328	1.6762	0.0000	20,471.4378
2023	6.1874	41.6604	51.3879	0.1927	12.2790	0.8516	13.1219	3.2905	0.7993	4.0814	0.0000	19,732.1669	19,732.1669	1.5540	0.0000	19,771.0181
2024	5.7837	32.5665	48.1682	0.1742	12.2790	0.7500	13.0289	3.2905	0.7034	3.9939	0.0000	17,647.2478	17,647.2478	1.2148	0.0000	17,677.6175
2025	5.4835	31.1845	46.0965	0.1703	12.2790	0.6564	12.9354	3.2905	0.6155	3.9060	0.0000	17,262.6543	17,262.6543	1.1881	0.0000	17,292.3566
2026	5.3205	30.8791	44.4172	0.1669	12.2790	0.6536	12.9326	3.2905	0.6129	3.9034	0.0000	16,926.2247	16,926.2247	1.1673	0.0000	16,955.4061
2027	205.7462	30.5936	42.9277	0.1639	12.2790	0.6493	12.9283	3.2905	0.6089	3.8995	0.0000	16,628.7917	16,628.7917	1.1480	0.0000	16,657.4916
Maximum	**205.7462**	**183.2007**	**63.3469**	**0.4568**	**27.4586**	**2.4144**	**29.1069**	**7.8112**	**2.2369**	**10.0481**	**0.0000**	**48,879.1573**	**48,879.1573**	**5.1222**	**0.0000**	**49,007.2124**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.6950	141.4859	65.4022	0.4568	27.4586	0.7684	27.6172	7.8112	0.7241	8.4013	0.0000	48,879.1573	48,879.1573	5.1222	0.0000	49,007.2124
2022	6.2629	46.3460	55.2538	0.1996	12.1946	0.6658	12.8604	3.2468	0.6278	3.8746	0.0000	20,429.5328	20,429.5328	1.6762	0.0000	20,471.4378
2023	5.6591	36.2258	51.9242	0.1927	12.2790	0.5619	12.8322	3.2905	0.5294	3.8116	0.0000	19,732.1669	19,732.1669	1.5540	0.0000	19,771.0181
2024	5.2966	27.5370	48.7284	0.1742	12.2790	0.4981	12.7770	3.2905	0.4689	3.7595	0.0000	17,647.2478	17,647.2478	1.2148	0.0000	17,677.6175
2025	5.0425	26.5960	46.6910	0.1703	12.2790	0.4448	12.7238	3.2905	0.4187	3.7093	0.0000	17,262.6543	17,262.6543	1.1881	0.0000	17,292.3565
2026	4.8795	26.2905	45.0117	0.1669	12.2790	0.4420	12.7210	3.2905	0.4161	3.7066	0.0000	16,926.2247	16,926.2247	1.1673	0.0000	16,955.4060
2027	205.7462	26.0051	43.5222	0.1639	12.2790	0.4378	12.7168	3.2905	0.4122	3.7027	0.0000	16,628.7917	16,628.7917	1.1480	0.0000	16,657.4916
Maximum	**205.7462**	**141.4859**	**65.4022**	**0.4568**	**27.4586**	**0.7684**	**27.6172**	**7.8112**	**0.7241**	**8.4013**	**0.0000**	**48,879.1573**	**48,879.1573**	**5.1222**	**0.0000**	**49,007.2124**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.70**	**17.87**	**-1.54**	**0.00**	**0.00**	**45.30**	**2.80**	**0.00**	**44.84**	**8.99**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	244.6089	18.0760	492.4834	1.0843		64.0132	64.0132		64.0132	64.0132	7,802.6430	15,118.1765	22,920.8196	23.3886	0.5296	23,663.3521
Energy	0.6103	5.4004	3.5793	0.0333		0.4216	0.4216		0.4216	0.4216		6,657.2806	6,657.2806	0.1276	0.1221	6,696.8415
Mobile	16.8445	83.6597	175.5737	0.7435	73.8699	0.5234	74.3932	19.7559	0.4858	20.2417		76,168.9679	76,168.9679	3.4558		76,255.3622
Total	**262.0636**	**107.1361**	**671.6364**	**1.8611**	**73.8699**	**64.9582**	**138.8280**	**19.7559**	**64.9206**	**84.6765**	**7,802.6430**	**97,944.4250**	**105,747.0681**	**26.9720**	**0.6516**	**106,615.5558**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	244.6089	18.0760	492.4834	1.0843		64.0132	64.0132		64.0132	64.0132	7,802.6430	15,118.1765	22,920.8196	23.3886	0.5296	23,663.3521
Energy	0.6103	5.4004	3.5793	0.0333		0.4216	0.4216		0.4216	0.4216		6,657.2806	6,657.2806	0.1276	0.1221	6,696.8415
Mobile	16.8445	83.6597	175.5737	0.7435	73.8699	0.5234	74.3932	19.7559	0.4858	20.2417		76,168.9679	76,168.9679	3.4558		76,255.3622
Total	**262.0636**	**107.1361**	**671.6364**	**1.8611**	**73.8699**	**64.9582**	**138.8280**	**19.7559**	**64.9206**	**84.6765**	**7,802.6430**	**97,944.4250**	**105,747.0681**	**26.9720**	**0.6516**	**106,615.5558**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/6/2021	2/23/2021	5	35	
2	Demolition and Excavation	Grading	2/24/2021	5/6/2021	5	52	
3	Grading and Excavation	Grading	5/7/2021	7/19/2021	5	52	
4	Concrete and Grading/Excavation	Grading	7/20/2021	9/29/2021	5	52	
5	Concrete and Mat Foundation	Building Construction	9/30/2021	9/25/2023	5	518	
6	Building Construction (Phase 0 and 1/2)	Building Construction	9/26/2023	9/18/2025	5	518	
7	Building Construction (Phase 1/2)	Building Construction	9/19/2025	9/14/2027	5	518	
8	Paving	Paving	9/15/2027	11/5/2027	5	38	
9	Architectural Coating	Architectural Coating	11/6/2027	12/29/2027	5	38	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 14.87

Residential Indoor: 1,776,569; Residential Outdoor: 592,190; Non-Residential Indoor: 342,000; Non-Residential Outdoor: 114,000; Striped Parking Area: 39,672 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48

Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition and Excavation	Excavators	2	8.00	158	0.38
Concrete and Mat Foundation	Cranes	1	8.00	231	0.29
Concrete and Mat Foundation	Forklifts	3	8.00	89	0.20
Concrete and Mat Foundation	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Demolition and Excavation	Rubber Tired Dozers	1	8.00	247	0.40
Concrete and Mat Foundation	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Demolition and Excavation	Graders	1	8.00	187	0.41
Demolition and Excavation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Building Construction (Phase 0 and 1/2)	Cranes	1	8.00	231	0.29
Building Construction (Phase 1/2)	Cranes	1	8.00	231	0.29
Demolition and Excavation	Scrapers	2	8.00	367	0.48
Concrete and Mat Foundation	Welders	1	8.00	46	0.45
Grading and Excavation	Excavators	2	8.00	158	0.38
Concrete and Grading/Excavation	Excavators	2	8.00	158	0.38
Building Construction (Phase 0 and 1/2)	Forklifts	3	8.00	89	0.20
Building Construction (Phase 1/2)	Forklifts	3	8.00	89	0.20
Building Construction (Phase 0 and 1/2)	Generator Sets	1	8.00	84	0.74
Building Construction (Phase 1/2)	Generator Sets	1	8.00	84	0.74
Grading and Excavation	Graders	1	8.00	187	0.41
Concrete and Grading/Excavation	Graders	1	8.00	187	0.41
Grading and Excavation	Rubber Tired Dozers	1	8.00	247	0.40

Concrete and Grading/Excavation	Rubber Tired Dozers	1	8.00	247	0.40
Grading and Excavation	Scrapers	2	8.00	367	0.48
Concrete and Grading/Excavation	Scrapers	2	8.00	367	0.48
Building Construction (Phase 0 and 1/2)	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction (Phase 1/2)	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading and Excavation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Concrete and Grading/Excavation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction (Phase 0 and 1/2)	Welders	1	8.00	46	0.45
Building Construction (Phase 1/2)	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	4,084.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction (Phase 0 and 1/2)	9	964.00	235.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Demolition and Excavation	8	20.00	0.00	27,090.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete and Mat Foundation	9	964.00	235.00	0.00	14.70	6.90	20.00	LD_Mix	HHDT	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	193.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction (Phase 1/2)	9	964.00	235.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading and Excavation	8	20.00	0.00	9,030.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Concrete and Grading/Excavation	8	20.00	0.00	22,951.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					25.2529	0.0000	25.2529	3.8235	0.0000	3.8235			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**25.2529**	**1.5513**	**26.8042**	**3.8235**	**1.4411**	**5.2646**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.9097	30.6274	7.1201	0.0880	2.0380	0.0957	2.1338	0.5585	0.0916	0.6500		9,556.0524	9,556.0524	0.7109		9,573.8243
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.9789**	**30.6724**	**7.6299**	**0.0895**	**2.2057**	**0.0970**	**2.3027**	**0.6029**	**0.0927**	**0.6956**		**9,711.7750**	**9,711.7750**	**0.7151**		**9,729.6517**

3.2 Demolition - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					25.2529	0.0000	25.2529	3.8235	0.0000	3.8235			0.0000			0.0000
Off-Road	0.4623	2.0032	23.2798	0.0388		0.0616	0.0616		0.0616	0.0616	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**0.4623**	**2.0032**	**23.2798**	**0.0388**	**25.2529**	**0.0616**	**25.3145**	**3.8235**	**0.0616**	**3.8852**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.9097	30.6274	7.1201	0.0880	2.0380	0.0957	2.1338	0.5585	0.0916	0.6500		9,556.0524	9,556.0524	0.7109		9,573.8243
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.9789**	**30.6724**	**7.6299**	**0.0895**	**2.2057**	**0.0970**	**2.3027**	**0.6029**	**0.0927**	**0.6956**		**9,711.7750**	**9,711.7750**	**0.7151**		**9,729.6517**

3.3 Demolition and Excavation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.9809	0.0000	12.9809	5.2586	0.0000	5.2586			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**12.9809**	**1.9853**	**14.9663**	**5.2586**	**1.8265**	**7.0851**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.0614	136.7409	31.7887	0.3927	9.0991	0.4274	9.5265	2.4933	0.4089	2.9022		42,664.4836	42,664.4836	3.1738		42,743.8292
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**4.1537**	**136.8008**	**32.4685**	**0.3948**	**9.3227**	**0.4290**	**9.7517**	**2.5526**	**0.4104**	**2.9630**		**42,872.1138**	**42,872.1138**	**3.1794**		**42,951.5990**

3.3 Demolition and Excavation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.9809	0.0000	12.9809	5.2586	0.0000	5.2586			0.0000			0.0000
Off-Road	0.8810	4.6850	32.9337	0.0620		0.1869	0.1869		0.1798	0.1798	0.0000	6,007.043 4	6,007.043 4	1.9428		6,055.613 4
Total	**0.8810**	**4.6850**	**32.9337**	**0.0620**	**12.9809**	**0.1869**	**13.1679**	**5.2586**	**0.1798**	**5.4384**	**0.0000**	**6,007.043 4**	**6,007.043 4**	**1.9428**		**6,055.613 4**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.0614	136.7409	31.7887	0.3927	9.0991	0.4274	9.5265	2.4933	0.4089	2.9022		42,664.48 36	42,664.48 36	3.1738		42,743.82 92
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**4.1537**	**136.8008**	**32.4685**	**0.3948**	**9.3227**	**0.4290**	**9.7517**	**2.5526**	**0.4104**	**2.9630**		**42,872.11 38**	**42,872.11 38**	**3.1794**		**42,951.59 90**

3.4 Grading and Excavation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.6667	0.0000	12.6667	5.2111	0.0000	5.2111			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**12.6667**	**1.9853**	**14.6521**	**5.2111**	**1.8265**	**7.0376**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3538	45.5803	10.5963	0.1309	3.0330	0.1425	3.1755	0.8311	0.1363	0.9674		14,221.4945	14,221.4945	1.0579		14,247.9431
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**1.4460**	**45.6403**	**11.2760**	**0.1330**	**3.2566**	**0.1441**	**3.4007**	**0.8904**	**0.1378**	**1.0282**		**14,429.1248**	**14,429.1248**	**1.0635**		**14,455.7129**

3.4 Grading and Excavation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.6667	0.0000	12.6667	5.2111	0.0000	5.2111			0.0000			0.0000
Off-Road	0.8810	4.6850	32.9337	0.0620		0.1869	0.1869		0.1798	0.1798	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**0.8810**	**4.6850**	**32.9337**	**0.0620**	**12.6667**	**0.1869**	**12.8536**	**5.2111**	**0.1798**	**5.3908**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3538	45.5803	10.5963	0.1309	3.0330	0.1425	3.1755	0.8311	0.1363	0.9674		14,221.4945	14,221.4945	1.0579		14,247.9431
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**1.4460**	**45.6403**	**11.2760**	**0.1330**	**3.2566**	**0.1441**	**3.4007**	**0.8904**	**0.1378**	**1.0282**		**14,429.1248**	**14,429.1248**	**1.0635**		**14,455.7129**

3.5 Concrete and Grading/Excavation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.9089	0.0000	12.9089	5.2477	0.0000	5.2477			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**12.9089**	**1.9853**	**14.8943**	**5.2477**	**1.8265**	**7.0742**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.4409	115.8486	26.9318	0.3327	7.7089	0.3621	8.0710	2.1123	0.3464	2.4587		36,145.9049	36,145.9049	2.6889		36,213.1275
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**3.5331**	**115.9086**	**27.6116**	**0.3348**	**7.9324**	**0.3637**	**8.2962**	**2.1716**	**0.3479**	**2.5196**		**36,353.5351**	**36,353.5351**	**2.6945**		**36,420.8973**

3.5 Concrete and Grading/Excavation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Fugitive Dust					12.9089	0.0000	12.9089	5.2477	0.0000	5.2477			0.0000			0.0000
Off-Road	0.8810	4.6850	32.9337	0.0620		0.1869	0.1869		0.1798	0.1798	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**0.8810**	**4.6850**	**32.9337**	**0.0620**	**12.9089**	**0.1869**	**13.0959**	**5.2477**	**0.1798**	**5.4275**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day							lb/day			
Hauling	3.4409	115.8486	26.9318	0.3327	7.7089	0.3621	8.0710	2.1123	0.3464	2.4587		36,145.9049	36,145.9049	2.6889		36,213.1275
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**3.5331**	**115.9086**	**27.6116**	**0.3348**	**7.9324**	**0.3637**	**8.2962**	**2.1716**	**0.3479**	**2.5196**		**36,353.5351**	**36,353.5351**	**2.6945**		**36,420.8973**

3.6 Concrete and Mat Foundation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0228	18.7492	17.6706	0.0288		1.0251	1.0251		0.9625	0.9625		2,736.0438	2,736.0438	0.6751		2,752.9212
Total	**2.0228**	**18.7492**	**17.6706**	**0.0288**		**1.0251**	**1.0251**		**0.9625**	**0.9625**		**2,736.0438**	**2,736.0438**	**0.6751**		**2,752.9212**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8992	34.9779	7.2259	0.0749	1.4193	0.0737	1.4930	0.3892	0.0705	0.4597		8,136.6436	8,136.6436	0.7864		8,156.3040
Worker	4.4457	2.8899	32.7631	0.1004	10.7753	0.0798	10.8550	2.8577	0.0734	2.9311		10,007.7771	10,007.7771	0.2692		10,014.5062
Total	**5.3449**	**37.8677**	**39.9890**	**0.1754**	**12.1946**	**0.1535**	**12.3480**	**3.2469**	**0.1440**	**3.3908**		**18,144.4207**	**18,144.4207**	**1.0556**		**18,170.8102**

3.6 Concrete and Mat Foundation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3501	11.9302	18.0646	0.0288		0.6149	0.6149		0.5802	0.5802	0.0000	2,736.0438	2,736.0438	0.6751		2,752.9212
Total	**1.3501**	**11.9302**	**18.0646**	**0.0288**		**0.6149**	**0.6149**		**0.5802**	**0.5802**	**0.0000**	**2,736.0438**	**2,736.0438**	**0.6751**		**2,752.9212**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8992	34.9779	7.2259	0.0749	1.4193	0.0737	1.4930	0.3892	0.0705	0.4597		8,136.6436	8,136.6436	0.7864		8,156.3040
Worker	4.4457	2.8899	32.7631	0.1004	10.7753	0.0798	10.8550	2.8577	0.0734	2.9311		10,007.7771	10,007.7771	0.2692		10,014.5062
Total	**5.3449**	**37.8677**	**39.9890**	**0.1754**	**12.1946**	**0.1535**	**12.3480**	**3.2469**	**0.1440**	**3.3908**		**18,144.4207**	**18,144.4207**	**1.0556**		**18,170.8102**

3.6 Concrete and Mat Foundation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8146	16.7670	17.4392	0.0288		0.8645	0.8645		0.8122	0.8122		2,737.152 0	2,737.152 0	0.6711		2,753.928 8
Total	**1.8146**	**16.7670**	**17.4392**	**0.0288**		**0.8645**	**0.8645**		**0.8122**	**0.8122**		**2,737.152 0**	**2,737.152 0**	**0.6711**		**2,753.928 8**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8526	32.9555	7.0819	0.0740	1.4193	0.0636	1.4829	0.3892	0.0608	0.4500		8,042.944 8	8,042.944 8	0.7620		8,061.995 2
Worker	4.1813	2.6101	30.2444	0.0968	10.7753	0.0775	10.8527	2.8577	0.0713	2.9290		9,649.436 0	9,649.436 0	0.2431		9,655.513 8
Total	**5.0339**	**35.5656**	**37.3263**	**0.1708**	**12.1946**	**0.1410**	**12.3356**	**3.2468**	**0.1321**	**3.3790**		**17,692.38 08**	**17,692.38 08**	**1.0051**		**17,717.50 90**

3.6 Concrete and Mat Foundation - 2022

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2290	10.7805	17.9275	0.0288		0.5248	0.5248		0.4956	0.4956	0.0000	2,737.152 0	2,737.152 0	0.6711		2,753.928 8
Total	**1.2290**	**10.7805**	**17.9275**	**0.0288**		**0.5248**	**0.5248**		**0.4956**	**0.4956**	**0.0000**	**2,737.152 0**	**2,737.152 0**	**0.6711**		**2,753.928 8**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.8526	32.9555	7.0819	0.0740	1.4193	0.0636	1.4829	0.3892	0.0608	0.4500		8,042.944 8	8,042.944 8	0.7620		8,061.995 2
Worker	4.1813	2.6101	30.2444	0.0968	10.7753	0.0775	10.8527	2.8577	0.0713	2.9290		9,649.436 0	9,649.436 0	0.2431		9,655.513 8
Total	**5.0339**	**35.5656**	**37.3263**	**0.1708**	**12.1946**	**0.1410**	**12.3356**	**3.2468**	**0.1321**	**3.3790**		**17,692.38 08**	**17,692.38 08**	**1.0051**		**17,717.50 90**

3.6 Concrete and Mat Foundation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6735	15.4377	17.3101	0.0288		0.7481	0.7481		0.7029	0.7029		2,738.1535	2,738.1535	0.6670		2,754.8288
Total	**1.6735**	**15.4377**	**17.3101**	**0.0288**		**0.7481**	**0.7481**		**0.7029**	**0.7029**		**2,738.1535**	**2,738.1535**	**0.6670**		**2,754.8288**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5703	23.8616	6.2014	0.0707	1.4193	0.0281	1.4474	0.3892	0.0269	0.4161		7,704.0169	7,704.0169	0.6680		7,720.7162
Worker	3.9437	2.3610	27.8764	0.0932	10.7753	0.0755	10.8507	2.8577	0.0695	2.9271		9,289.9965	9,289.9965	0.2191		9,295.4731
Total	**4.5139**	**26.2226**	**34.0779**	**0.1639**	**12.1946**	**0.1036**	**12.2981**	**3.2468**	**0.0964**	**3.3432**		**16,994.0134**	**16,994.0134**	**0.8870**		**17,016.1892**

3.6 Concrete and Mat Foundation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1452	10.0032	17.8464	0.0288		0.4584	0.4584		0.4330	0.4330	0.0000	2,738.1535	2,738.1535	0.6670		2,754.8288
Total	**1.1452**	**10.0032**	**17.8464**	**0.0288**		**0.4584**	**0.4584**		**0.4330**	**0.4330**	**0.0000**	**2,738.1535**	**2,738.1535**	**0.6670**		**2,754.8288**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5703	23.8616	6.2014	0.0707	1.4193	0.0281	1.4474	0.3892	0.0269	0.4161		7,704.0169	7,704.0169	0.6680		7,720.7162
Worker	3.9437	2.3610	27.8764	0.0932	10.7753	0.0755	10.8507	2.8577	0.0695	2.9271		9,289.9965	9,289.9965	0.2191		9,295.4731
Total	**4.5139**	**26.2226**	**34.0779**	**0.1639**	**12.1946**	**0.1036**	**12.2981**	**3.2468**	**0.0964**	**3.3432**		**16,994.0134**	**16,994.0134**	**0.8870**		**17,016.1892**

3.7 Building Construction (Phase 0 and 1/2) - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6735	15.4377	17.3101	0.0288		0.7481	0.7481		0.7029	0.7029		2,738.1535	2,738.1535	0.6670		2,754.8288
Total	**1.6735**	**15.4377**	**17.3101**	**0.0288**		**0.7481**	**0.7481**		**0.7029**	**0.7029**		**2,738.1535**	**2,738.1535**	**0.6670**		**2,754.8288**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4840	16.0282	5.1022	0.0555	1.5037	0.0194	1.5231	0.4329	0.0185	0.4514		5,946.2077	5,946.2077	0.3562		5,955.1138
Worker	3.9437	2.3610	27.8764	0.0932	10.7753	0.0755	10.8507	2.8577	0.0695	2.9271		9,289.9965	9,289.9965	0.2191		9,295.4731
Total	**4.4277**	**18.3892**	**32.9786**	**0.1486**	**12.2790**	**0.0948**	**12.3738**	**3.2905**	**0.0880**	**3.3785**		**15,236.2042**	**15,236.2042**	**0.5753**		**15,250.5869**

3.7 Building Construction (Phase 0 and 1/2) - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1452	10.0032	17.8464	0.0288		0.4584	0.4584		0.4330	0.4330	0.0000	2,738.153 5	2,738.153 5	0.6670		2,754.828 8
Total	**1.1452**	**10.0032**	**17.8464**	**0.0288**		**0.4584**	**0.4584**		**0.4330**	**0.4330**	**0.0000**	**2,738.153 5**	**2,738.153 5**	**0.6670**		**2,754.828 8**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4840	16.0282	5.1022	0.0555	1.5037	0.0194	1.5231	0.4329	0.0185	0.4514		5,946.207 7	5,946.207 7	0.3562		5,955.113 8
Worker	3.9437	2.3610	27.8764	0.0932	10.7753	0.0755	10.8507	2.8577	0.0695	2.9271		9,289.996 5	9,289.996 5	0.2191		9,295.473 1
Total	**4.4277**	**18.3892**	**32.9786**	**0.1486**	**12.2790**	**0.0948**	**12.3738**	**3.2905**	**0.0880**	**3.3785**		**15,236.20 42**	**15,236.20 42**	**0.5753**		**15,250.58 69**

3.7 Building Construction (Phase 0 and 1/2) - 2024

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Off-Road	1.5670	14.4249	17.2270	0.0288		0.6565	0.6565		0.6166	0.6166		2,738.7124	2,738.7124	0.6635		2,755.3009
Total	**1.5670**	**14.4249**	**17.2270**	**0.0288**		**0.6565**	**0.6565**		**0.6166**	**0.6166**		**2,738.7124**	**2,738.7124**	**0.6635**		**2,755.3009**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4732	15.9907	4.9570	0.0552	1.5037	0.0191	1.5228	0.4329	0.0183	0.4511		5,925.5736	5,925.5736	0.3507		5,934.3417
Worker	3.7435	2.1509	25.9841	0.0901	10.7753	0.0744	10.8497	2.8577	0.0685	2.9262		8,982.9618	8,982.9618	0.2005		8,987.9749
Total	**4.2167**	**18.1416**	**30.9411**	**0.1453**	**12.2790**	**0.0935**	**12.3725**	**3.2905**	**0.0868**	**3.3773**		**14,908.5355**	**14,908.5355**	**0.5512**		**14,922.3166**

3.7 Building Construction (Phase 0 and 1/2) - 2024

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0799	9.3954	17.7873	0.0288		0.4046	0.4046		0.3822	0.3822	0.0000	2,738.7123	2,738.7123	0.6635		2,755.3009
Total	**1.0799**	**9.3954**	**17.7873**	**0.0288**		**0.4046**	**0.4046**		**0.3822**	**0.3822**	**0.0000**	**2,738.7123**	**2,738.7123**	**0.6635**		**2,755.3009**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4732	15.9907	4.9570	0.0552	1.5037	0.0191	1.5228	0.4329	0.0183	0.4511		5,925.5736	5,925.5736	0.3507		5,934.3417
Worker	3.7435	2.1509	25.9841	0.0901	10.7753	0.0744	10.8497	2.8577	0.0685	2.9262		8,982.9618	8,982.9618	0.2005		8,987.9749
Total	**4.2167**	**18.1416**	**30.9411**	**0.1453**	**12.2790**	**0.0935**	**12.3725**	**3.2905**	**0.0868**	**3.3773**		**14,908.5355**	**14,908.5355**	**0.5512**		**14,922.3166**

3.7 Building Construction (Phase 0 and 1/2) - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4560	13.3663	17.1378	0.0289		0.5647	0.5647		0.5304	0.5304		2,739.5986	2,739.5986	0.6602		2,756.1030
Total	**1.4560**	**13.3663**	**17.1378**	**0.0289**		**0.5647**	**0.5647**		**0.5304**	**0.5304**		**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1030**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4611	15.8516	4.8311	0.0549	1.5037	0.0187	1.5224	0.4329	0.0179	0.4508		5,893.5571	5,893.5571	0.3452		5,902.1880
Worker	3.5663	1.9666	24.1275	0.0865	10.7753	0.0730	10.8483	2.8577	0.0672	2.9248		8,629.4986	8,629.4986	0.1827		8,634.0657
Total	**4.0274**	**17.8182**	**28.9587**	**0.1414**	**12.2790**	**0.0917**	**12.3707**	**3.2905**	**0.0851**	**3.3756**		**14,523.0557**	**14,523.0557**	**0.5279**		**14,536.2536**

3.7 Building Construction (Phase 0 and 1/2) - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0151	8.7778	17.7323	0.0289		0.3531	0.3531		0.3336	0.3336	0.0000	2,739.5986	2,739.5986	0.6602		2,756.1029
Total	**1.0151**	**8.7778**	**17.7323**	**0.0289**		**0.3531**	**0.3531**		**0.3336**	**0.3336**	**0.0000**	**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1029**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4611	15.8516	4.8311	0.0549	1.5037	0.0187	1.5224	0.4329	0.0179	0.4508		5,893.5571	5,893.5571	0.3452		5,902.1880
Worker	3.5663	1.9666	24.1275	0.0865	10.7753	0.0730	10.8483	2.8577	0.0672	2.9248		8,629.4986	8,629.4986	0.1827		8,634.0657
Total	**4.0274**	**17.8182**	**28.9587**	**0.1414**	**12.2790**	**0.0917**	**12.3707**	**3.2905**	**0.0851**	**3.3756**		**14,523.0557**	**14,523.0557**	**0.5279**		**14,536.2536**

3.8 Building Construction (Phase 1/2) - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4560	13.3663	17.1378	0.0289		0.5647	0.5647		0.5304	0.5304		2,739.5986	2,739.5986	0.6602		2,756.1030
Total	**1.4560**	**13.3663**	**17.1378**	**0.0289**		**0.5647**	**0.5647**		**0.5304**	**0.5304**		**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1030**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4611	15.8516	4.8311	0.0549	1.5037	0.0187	1.5224	0.4329	0.0179	0.4508		5,893.5571	5,893.5571	0.3452		5,902.1880
Worker	3.5663	1.9666	24.1275	0.0865	10.7753	0.0730	10.8483	2.8577	0.0672	2.9248		8,629.4986	8,629.4986	0.1827		8,634.0657
Total	**4.0274**	**17.8182**	**28.9587**	**0.1414**	**12.2790**	**0.0917**	**12.3707**	**3.2905**	**0.0851**	**3.3756**		**14,523.0557**	**14,523.0557**	**0.5279**		**14,536.2536**

3.8 Building Construction (Phase 1/2) - 2025

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0151	8.7778	17.7323	0.0289		0.3531	0.3531		0.3336	0.3336	0.0000	2,739.5986	2,739.5986	0.6602		2,756.1029
Total	**1.0151**	**8.7778**	**17.7323**	**0.0289**		**0.3531**	**0.3531**		**0.3336**	**0.3336**	**0.0000**	**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1029**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4611	15.8516	4.8311	0.0549	1.5037	0.0187	1.5224	0.4329	0.0179	0.4508		5,893.5571	5,893.5571	0.3452		5,902.1880
Worker	3.5663	1.9666	24.1275	0.0865	10.7753	0.0730	10.8483	2.8577	0.0672	2.9248		8,629.4986	8,629.4986	0.1827		8,634.0657
Total	**4.0274**	**17.8182**	**28.9587**	**0.1414**	**12.2790**	**0.0917**	**12.3707**	**3.2905**	**0.0851**	**3.3756**		**14,523.0557**	**14,523.0557**	**0.5279**		**14,536.2536**

3.8 Building Construction (Phase 1/2) - 2026

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4560	13.3663	17.1378	0.0289		0.5647	0.5647		0.5304	0.5304		2,739.598 6	2,739.598 6	0.6602		2,756.103 0
Total	**1.4560**	**13.3663**	**17.1378**	**0.0289**		**0.5647**	**0.5647**		**0.5304**	**0.5304**		**2,739.598 6**	**2,739.598 6**	**0.6602**		**2,756.103 0**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4505	15.7023	4.7336	0.0546	1.5037	0.0183	1.5220	0.4329	0.0175	0.4504		5,862.739 4	5,862.739 4	0.3398		5,871.233 5
Worker	3.4139	1.8104	22.5457	0.0834	10.7753	0.0706	10.8458	2.8577	0.0650	2.9226		8,323.886 7	8,323.886 7	0.1673		8,328.069 6
Total	**3.8644**	**17.5127**	**27.2794**	**0.1380**	**12.2790**	**0.0889**	**12.3679**	**3.2905**	**0.0825**	**3.3730**		**14,186.62 61**	**14,186.62 61**	**0.5071**		**14,199.30 31**

3.8 Building Construction (Phase 1/2) - 2026

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0151	8.7778	17.7323	0.0289		0.3531	0.3531		0.3336	0.3336	0.0000	2,739.5986	2,739.5986	0.6602		2,756.1029
Total	**1.0151**	**8.7778**	**17.7323**	**0.0289**		**0.3531**	**0.3531**		**0.3336**	**0.3336**	**0.0000**	**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1029**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4505	15.7023	4.7336	0.0546	1.5037	0.0183	1.5220	0.4329	0.0175	0.4504		5,862.7394	5,862.7394	0.3398		5,871.2335
Worker	3.4139	1.8104	22.5457	0.0834	10.7753	0.0706	10.8458	2.8577	0.0650	2.9226		8,323.8867	8,323.8867	0.1673		8,328.0696
Total	**3.8644**	**17.5127**	**27.2794**	**0.1380**	**12.2790**	**0.0889**	**12.3679**	**3.2905**	**0.0825**	**3.3730**		**14,186.6261**	**14,186.6261**	**0.5071**		**14,199.3031**

3.8 Building Construction (Phase 1/2) - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4560	13.3663	17.1378	0.0289		0.5647	0.5647		0.5304	0.5304		2,739.5986	2,739.5986	0.6602		2,756.1030
Total	**1.4560**	**13.3663**	**17.1378**	**0.0289**		**0.5647**	**0.5647**		**0.5304**	**0.5304**		**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1030**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4416	15.5575	4.6550	0.0543	1.5037	0.0179	1.5217	0.4329	0.0171	0.4500		5,834.9278	5,834.9278	0.3343		5,843.2863
Worker	3.2631	1.6698	21.1348	0.0807	10.7753	0.0667	10.8420	2.8577	0.0614	2.9191		8,054.2653	8,054.2653	0.1535		8,058.1024
Total	**3.7047**	**17.2273**	**25.7898**	**0.1350**	**12.2790**	**0.0847**	**12.3637**	**3.2905**	**0.0785**	**3.3691**		**13,889.1931**	**13,889.1931**	**0.4878**		**13,901.3887**

3.8 Building Construction (Phase 1/2) - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0151	8.7778	17.7323	0.0289		0.3531	0.3531		0.3336	0.3336	0.0000	2,739.5986	2,739.5986	0.6602		2,756.1029
Total	**1.0151**	**8.7778**	**17.7323**	**0.0289**		**0.3531**	**0.3531**		**0.3336**	**0.3336**	**0.0000**	**2,739.5986**	**2,739.5986**	**0.6602**		**2,756.1029**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4416	15.5575	4.6550	0.0543	1.5037	0.0179	1.5217	0.4329	0.0171	0.4500		5,834.9278	5,834.9278	0.3343		5,843.2863
Worker	3.2631	1.6698	21.1348	0.0807	10.7753	0.0667	10.8420	2.8577	0.0614	2.9191		8,054.2653	8,054.2653	0.1535		8,058.1024
Total	**3.7047**	**17.2273**	**25.7898**	**0.1350**	**12.2790**	**0.0847**	**12.3637**	**3.2905**	**0.0785**	**3.3691**		**13,889.1931**	**13,889.1931**	**0.4878**		**13,901.3887**

3.9 Paving - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850		2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**		**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0508	0.0260	0.3289	1.2600e-003	0.1677	1.0400e-003	0.1687	0.0445	9.6000e-004	0.0454		125.3257	125.3257	2.3900e-003		125.3854
Total	**0.0508**	**0.0260**	**0.3289**	**1.2600e-003**	**0.1677**	**1.0400e-003**	**0.1687**	**0.0445**	**9.6000e-004**	**0.0454**		**125.3257**	**125.3257**	**2.3900e-003**		**125.3854**

3.9 Paving - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9152	8.5816	14.5780	0.0228		0.4185	0.4185		0.3850	0.3850	0.0000	2,206.7452	2,206.7452	0.7137		2,224.5878
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9152**	**8.5816**	**14.5780**	**0.0228**		**0.4185**	**0.4185**		**0.3850**	**0.3850**	**0.0000**	**2,206.7452**	**2,206.7452**	**0.7137**		**2,224.5878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0508	0.0260	0.3289	1.2600e-003	0.1677	1.0400e-003	0.1687	0.0445	9.6000e-004	0.0454		125.3257	125.3257	2.3900e-003		125.3854
Total	**0.0508**	**0.0260**	**0.3289**	**1.2600e-003**	**0.1677**	**1.0400e-003**	**0.1687**	**0.0445**	**9.6000e-004**	**0.0454**		**125.3257**	**125.3257**	**2.3900e-003**		**125.3854**

3.10 Architectural Coating - 2027

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	204.9221					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**205.0929**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6533	0.3343	4.2314	0.0162	2.1573	0.0134	2.1707	0.5721	0.0123	0.5844		1,612.5241	1,612.5241	0.0307		1,613.2923
Total	**0.6533**	**0.3343**	**4.2314**	**0.0162**	**2.1573**	**0.0134**	**2.1707**	**0.5721**	**0.0123**	**0.5844**		**1,612.5241**	**1,612.5241**	**0.0307**		**1,613.2923**

3.10 Architectural Coating - 2027

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	204.9221					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**205.0929**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6533	0.3343	4.2314	0.0162	2.1573	0.0134	2.1707	0.5721	0.0123	0.5844		1,612.524 1	1,612.524 1	0.0307		1,613.292 3
Total	**0.6533**	**0.3343**	**4.2314**	**0.0162**	**2.1573**	**0.0134**	**2.1707**	**0.5721**	**0.0123**	**0.5844**		**1,612.524 1**	**1,612.524 1**	**0.0307**		**1,613.292 3**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.8445	83.6597	175.5737	0.7435	73.8699	0.5234	74.3932	19.7559	0.4858	20.2417		76,168.9679	76,168.9679	3.4558		76,255.3622
Unmitigated	16.8445	83.6597	175.5737	0.7435	73.8699	0.5234	74.3932	19.7559	0.4858	20.2417		76,168.9679	76,168.9679	3.4558		76,255.3622

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	638.40	613.44	562.56	2,132,303	2,132,303
Condo/Townhouse High Rise	3,080.66	3,176.47	2527.91	10,304,021	10,304,021
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	529.44	118.08	50.40	1,295,800	1,295,800
Health Club	477.49	302.62	387.59	940,334	940,334
High Turnover (Sit Down Restaurant)	4,450.25	5,542.95	4614.40	6,309,633	6,309,633
Hotel	1,470.60	1,474.20	1071.00	3,374,114	3,374,114
Strip Mall	806.62	765.13	371.83	1,405,223	1,405,223
Supermarket	2,791.15	4,848.21	4543.81	4,400,959	4,400,959
Unenclosed Parking Structure	0.00	0.00	0.00		
Total	14,244.61	16,841.09	14,129.49	30,162,387	30,162,387

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15
Supermarket	16.60	8.40	6.90	6.50	74.50	19.00	34	30	36
Unenclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Mid Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Condo/Townhouse High Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Enclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
General Office Building	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Health Club	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
High Turnover (Sit Down Restaurant)	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Hotel	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Strip Mall	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Supermarket	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Unenclosed Parking Structure	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.6103	5.4004	3.5793	0.0333		0.4216	0.4216		0.4216	0.4216		6,657.2806	6,657.2806	0.1276	0.1221	6,696.8415
NaturalGas Unmitigated	0.6103	5.4004	3.5793	0.0333		0.4216	0.4216		0.4216	0.4216		6,657.2806	6,657.2806	0.1276	0.1221	6,696.8415

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	2887.41	0.0311	0.2661	0.1132	1.7000e-003		0.0215	0.0215		0.0215	0.0215		339.6955	339.6955	6.5100e-003	6.2300e-003	341.7141
Condo/Townhouse High Rise	22166.9	0.2391	2.0428	0.8693	0.0130		0.1652	0.1652		0.1652	0.1652		2,607.8706	2,607.8706	0.0500	0.0478	2,623.3679
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1368.99	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	719.041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22127.7	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Hotel	5584.38	0.0602	0.5475	0.4599	3.2800e-003		0.0416	0.0416		0.0416	0.0416		656.9863	656.9863	0.0126	0.0120	660.8904
Strip Mall	81.7753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1650.72	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.6102**	**5.4003**	**3.5793**	**0.0333**		**0.4216**	**0.4216**		**0.4216**	**0.4216**		**6,657.2806**	**6,657.2806**	**0.1276**	**0.1221**	**6,696.8414**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Mid Rise	2.88741	0.0311	0.2661	0.1132	1.7000e-003		0.0215	0.0215		0.0215	0.0215		339.6955	339.6955	6.5100e-003	6.2300e-003	341.7141
Condo/Townhouse High Rise	22.1669	0.2391	2.0428	0.8693	0.0130		0.1652	0.1652		0.1652	0.1652		2,607.8706	2,607.8706	0.0500	0.0478	2,623.3679
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1.36899	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	0.719041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22.1277	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Hotel	5.58438	0.0602	0.5475	0.4599	3.2800e-003		0.0416	0.0416		0.0416	0.0416		656.9863	656.9863	0.0126	0.0120	660.8904
Strip Mall	0.0817753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1.65072	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.6102**	**5.4003**	**3.5793**	**0.0333**		**0.4216**	**0.4216**		**0.4216**	**0.4216**		**6,657.2806**	**6,657.2806**	**0.1276**	**0.1221**	**6,696.8414**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	244.6089	18.0760	492.4834	1.0843		64.0132	64.0132		64.0132	64.0132	7,802.6430	15,118.1765	22,920.8196	23.3886	0.5296	23,663.3521
Unmitigated	244.6089	18.0760	492.4834	1.0843		64.0132	64.0132		64.0132	64.0132	7,802.6430	15,118.1765	22,920.8196	23.3886	0.5296	23,663.3521

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.1334					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	22.1195					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	218.2760	17.2834	423.6237	1.0807		63.6315	63.6315		63.6315	63.6315	7,802.6430	14,994.0000	22,796.6430	23.2690	0.5296	23,536.1850
Landscaping	2.0800	0.7927	68.8597	3.6400e-003		0.3817	0.3817		0.3817	0.3817		124.1765	124.1765	0.1196		127.1671
Total	**244.6089**	**18.0760**	**492.4834**	**1.0843**		**64.0132**	**64.0132**		**64.0132**	**64.0132**	**7,802.6430**	**15,118.1765**	**22,920.8196**	**23.3886**	**0.5296**	**23,663.3521**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	2.1334					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	22.1195					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	218.2760	17.2834	423.6237	1.0807		63.6315	63.6315		63.6315	63.6315	7,802.6430	14,994.0000	22,796.6430	23.2690	0.5296	23,536.1850
Landscaping	2.0800	0.7927	68.8597	3.6400e-003		0.3817	0.3817		0.3817	0.3817		124.1765	124.1765	0.1196		127.1671
Total	**244.6089**	**18.0760**	**492.4834**	**1.0843**		**64.0132**	**64.0132**		**64.0132**	**64.0132**	**7,802.6430**	**15,118.1765**	**22,920.8196**	**23.3886**	**0.5296**	**23,663.3521**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

1111 Sunset - Mixed Use Options (With PDFs)

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	48.00	1000sqft	1.10	48,000.00	0
User Defined Commercial	1.00	User Defined Unit	0.00	0.00	0
Enclosed Parking with Elevator	485.00	Space	4.36	194,000.00	0
Unenclosed Parking with Elevator	1,168.00	Space	10.51	467,200.00	0
Health Club	14.50	1000sqft	0.33	14,500.00	0
High Turnover (Sit Down Restaurant)	35.00	1000sqft	0.80	35,000.00	0
Hotel	180.00	Room	6.00	85,000.00	0
Condo/Townhouse High Rise	737.00	Dwelling Unit	11.52	766,982.00	2108
Strip Mall	18.20	1000sqft	0.42	18,200.00	0
Supermarket	27.30	1000sqft	0.63	27,300.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2028
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See SWAPE comment regarding CO2 intensity factor.

Land Use - Consistent with the DEIR's model.

Construction Phase - Operation only.

Off-road Equipment - Operation only.

Trips and VMT - Operation only. Changes to hauling trips unnecessary.

Vehicle Trips - See SWAPE comment regarding operational vehicle trip rate.

Woodstoves - Consistent with the DEIR's model.

Energy Use -

Area Mitigation -

Energy Mitigation - See SWAPE comment regarding operational mitigation measures.

Table Name	Column Name	Default Value	New Value
tblFireplaces	FireplaceDayYear	25.00	100.00
tblFireplaces	FireplaceHourDay	3.00	6.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	626.45	14.00
tblFireplaces	NumberNoFireplace	73.70	0.00
tblFireplaces	NumberWood	36.85	0.00
tblLandUse	LandUseSquareFeet	261,360.00	85,000.00
tblLandUse	LandUseSquareFeet	737,000.00	766,982.00
tblVehicleTrips	CC_TL	8.40	6.36
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	4.31	0.00
tblVehicleTrips	ST_TR	2.46	0.00

tblVehicleTrips	ST_TR	20.87	0.00
tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	8.19	0.00
tblVehicleTrips	ST_TR	42.04	0.00
tblVehicleTrips	ST_TR	177.59	0.00
tblVehicleTrips	ST_TR	0.00	8,887.00
tblVehicleTrips	SU_TR	3.43	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	5.95	0.00
tblVehicleTrips	SU_TR	20.43	0.00
tblVehicleTrips	SU_TR	166.44	0.00
tblVehicleTrips	SU_TR	0.00	8,887.00
tblVehicleTrips	WD_TR	4.18	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	32.93	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	8.17	0.00
tblVehicleTrips	WD_TR	44.32	0.00
tblVehicleTrips	WD_TR	102.24	0.00
tblVehicleTrips	WD_TR	0.00	8,887.00
tblWoodstoves	NumberCatalytic	36.85	0.00
tblWoodstoves	NumberNoncatalytic	36.85	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.3850	3.7058	2.7832	6.4200e-003	0.7633	0.1586	0.9218	0.3286	0.1465	0.4751	0.0000	573.4680	573.4680	0.1220	0.0000	576.5182
2022	0.7549	5.0539	6.5577	0.0226	1.4608	0.1196	1.5804	0.3922	0.1124	0.5046	0.0000	2,078.3752	2,078.3752	0.1434	0.0000	2,081.9606
2023	0.6906	4.1888	6.1791	0.0219	1.4608	0.1024	1.5633	0.3922	0.0962	0.4884	0.0000	2,016.7573	2,016.7573	0.1350	0.0000	2,020.1328
2024	1.4227	3.2697	4.8539	0.0168	1.1027	0.0810	1.1837	0.2960	0.0759	0.3718	0.0000	1,541.1089	1,541.1089	0.1162	0.0000	1,544.0137
2025	2.6608	0.0312	0.1315	4.0000e-004	0.0403	1.3300e-003	0.0416	0.0107	1.3100e-003	0.0120	0.0000	35.5034	35.5034	9.3000e-004	0.0000	35.5266
Maximum	**2.6608**	**5.0539**	**6.5577**	**0.0226**	**1.4608**	**0.1586**	**1.5804**	**0.3922**	**0.1465**	**0.5046**	**0.0000**	**2,078.3752**	**2,078.3752**	**0.1434**	**0.0000**	**2,081.9606**

2.1 Overall Construction

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.3850	3.7058	2.7832	6.4200e-003	0.7633	0.1586	0.9218	0.3286	0.1465	0.4751	0.0000	573.4676	573.4676	0.1220	0.0000	576.5177
2022	0.7549	5.0539	6.5577	0.0226	1.4608	0.1196	1.5804	0.3922	0.1124	0.5046	0.0000	2,078.3748	2,078.3748	0.1434	0.0000	2,081.9603
2023	0.6906	4.1888	6.1791	0.0219	1.4608	0.1024	1.5633	0.3922	0.0962	0.4884	0.0000	2,016.7569	2,016.7569	0.1350	0.0000	2,020.1325
2024	1.4227	3.2697	4.8539	0.0168	1.1027	0.0810	1.1837	0.2960	0.0759	0.3718	0.0000	1,541.1086	1,541.1086	0.1162	0.0000	1,544.0133
2025	2.6608	0.0312	0.1315	4.0000e-004	0.0403	1.3300e-003	0.0416	0.0107	1.3100e-003	0.0120	0.0000	35.5034	35.5034	9.3000e-004	0.0000	35.5265
Maximum	**2.6608**	**5.0539**	**6.5577**	**0.0226**	**1.4608**	**0.1586**	**1.5804**	**0.3922**	**0.1465**	**0.5046**	**0.0000**	**2,078.3748**	**2,078.3748**	**0.1434**	**0.0000**	**2,081.9603**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-22-2021**	**7-21-2021**	1.2016	1.2016
2	**7-22-2021**	**10-21-2021**	1.6203	1.6203
3	**10-22-2021**	**1-21-2022**	1.5894	1.5894
4	**1-22-2022**	**4-21-2022**	1.4312	1.4312
5	**4-22-2022**	**7-21-2022**	1.4334	1.4334
6	**7-22-2022**	**10-21-2022**	1.4533	1.4533

7	**10-22-2022**	**1-21-2023**	1.4145	1.4145
8	**1-22-2023**	**4-21-2023**	1.2055	1.2055
9	**4-22-2023**	**7-21-2023**	1.2067	1.2067
10	**7-22-2023**	**10-21-2023**	1.2236	1.2236
11	**10-22-2023**	**1-21-2024**	1.2251	1.2251
12	**1-22-2024**	**4-21-2024**	1.1714	1.1714
13	**4-22-2024**	**7-21-2024**	1.1597	1.1597
14	**7-22-2024**	**10-21-2024**	0.9395	0.9395
15	**10-22-2024**	**1-21-2025**	2.1179	2.1179
16	**1-22-2025**	**4-21-2025**	1.6891	1.6891
		Highest	2.1179	2.1179

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.2260	0.1109	7.6283	5.5000e-004		0.0441	0.0441		0.0441	0.0441	0.0000	39.3596	39.3596	0.0125	4.9000e-004	39.8198
Energy	0.1057	0.9370	0.6326	5.7600e-003		0.0730	0.0730		0.0730	0.0730	0.0000	6,315.1272	6,315.1272	0.1445	0.0449	6,332.1266
Mobile	1.5906	8.2971	18.4151	0.0802	7.8116	0.0549	7.8664	2.0923	0.0509	2.1432	0.0000	7,448.8341	7,448.8341	0.3213	0.0000	7,456.8658
Waste						0.0000	0.0000		0.0000	0.0000	234.3409	0.0000	234.3409	13.8492	0.0000	580.5696
Water						0.0000	0.0000		0.0000	0.0000	24.5270	796.6912	821.2182	2.5380	0.0634	903.5536
Total	**5.9223**	**9.3451**	**26.6759**	**0.0865**	**7.8116**	**0.1720**	**7.9836**	**2.0923**	**0.1680**	**2.2604**	**258.8679**	**14,600.0120**	**14,858.8799**	**16.8654**	**0.1088**	**15,312.9355**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.2260	0.1109	7.6283	5.5000e-004		0.0441	0.0441		0.0441	0.0441	0.0000	39.3596	39.3596	0.0125	4.9000e-004	39.8198
Energy	0.1057	0.9370	0.6326	5.7600e-003		0.0730	0.0730		0.0730	0.0730	0.0000	6,315.1272	6,315.1272	0.1445	0.0449	6,332.1266
Mobile	1.5906	8.2971	18.4151	0.0802	7.8116	0.0549	7.8664	2.0923	0.0509	2.1432	0.0000	7,448.8341	7,448.8341	0.3213	0.0000	7,456.8658
Waste						0.0000	0.0000		0.0000	0.0000	234.3409	0.0000	234.3409	13.8492	0.0000	580.5696
Water						0.0000	0.0000		0.0000	0.0000	24.5270	796.6912	821.2182	2.5380	0.0634	903.5536
Total	**5.9223**	**9.3451**	**26.6759**	**0.0865**	**7.8116**	**0.1720**	**7.9836**	**2.0923**	**0.1680**	**2.2604**	**258.8679**	**14,600.0120**	**14,858.8799**	**16.8654**	**0.1088**	**15,312.9355**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/22/2021	6/30/2021	5	50	
2	Site Preparation	Site Preparation	7/1/2021	8/11/2021	5	30	
3	Grading	Grading	8/12/2021	11/24/2021	5	75	
4	Building Construction	Building Construction	11/25/2021	9/25/2024	5	740	
5	Paving	Paving	9/26/2024	12/11/2024	5	55	
6	Architectural Coating	Architectural Coating	12/12/2024	2/26/2025	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 14.87

Residential Indoor: 1,553,139; Residential Outdoor: 517,713; Non-Residential Indoor: 342,000; Non-Residential Outdoor: 114,000; Striped Parking Area: 39,672 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	895.00	225.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	179.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0791	0.7860	0.5391	9.7000e-004		0.0388	0.0388		0.0360	0.0360	0.0000	85.0020	85.0020	0.0239	0.0000	85.6001
Total	**0.0791**	**0.7860**	**0.5391**	**9.7000e-004**		**0.0388**	**0.0388**		**0.0360**	**0.0360**	**0.0000**	**85.0020**	**85.0020**	**0.0239**	**0.0000**	**85.6001**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5600e-003	1.1600e-003	0.0131	4.0000e-005	4.1100e-003	3.0000e-005	4.1500e-003	1.0900e-003	3.0000e-005	1.1200e-003	0.0000	3.5875	3.5875	1.0000e-004	0.0000	3.5899
Total	**1.5600e-003**	**1.1600e-003**	**0.0131**	**4.0000e-005**	**4.1100e-003**	**3.0000e-005**	**4.1500e-003**	**1.0900e-003**	**3.0000e-005**	**1.1200e-003**	**0.0000**	**3.5875**	**3.5875**	**1.0000e-004**	**0.0000**	**3.5899**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0791	0.7860	0.5391	9.7000e-004		0.0388	0.0388		0.0360	0.0360	0.0000	85.0019	85.0019	0.0239	0.0000	85.6000
Total	**0.0791**	**0.7860**	**0.5391**	**9.7000e-004**		**0.0388**	**0.0388**		**0.0360**	**0.0360**	**0.0000**	**85.0019**	**85.0019**	**0.0239**	**0.0000**	**85.6000**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5600e-003	1.1600e-003	0.0131	4.0000e-005	4.1100e-003	3.0000e-005	4.1500e-003	1.0900e-003	3.0000e-005	1.1200e-003	0.0000	3.5875	3.5875	1.0000e-004	0.0000	3.5899
Total	**1.5600e-003**	**1.1600e-003**	**0.0131**	**4.0000e-005**	**4.1100e-003**	**3.0000e-005**	**4.1500e-003**	**1.0900e-003**	**3.0000e-005**	**1.1200e-003**	**0.0000**	**3.5875**	**3.5875**	**1.0000e-004**	**0.0000**	**3.5899**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0583	0.6075	0.3173	5.7000e-004		0.0307	0.0307		0.0282	0.0282	0.0000	50.1536	50.1536	0.0162	0.0000	50.5591
Total	**0.0583**	**0.6075**	**0.3173**	**5.7000e-004**	**0.2710**	**0.0307**	**0.3017**	**0.1490**	**0.0282**	**0.1772**	**0.0000**	**50.1536**	**50.1536**	**0.0162**	**0.0000**	**50.5591**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1200e-003	8.3000e-004	9.4200e-003	3.0000e-005	2.9600e-003	2.0000e-005	2.9800e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.5830	2.5830	7.0000e-005	0.0000	2.5847
Total	**1.1200e-003**	**8.3000e-004**	**9.4200e-003**	**3.0000e-005**	**2.9600e-003**	**2.0000e-005**	**2.9800e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.5830**	**2.5830**	**7.0000e-005**	**0.0000**	**2.5847**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2710	0.0000	0.2710	0.1490	0.0000	0.1490	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0583	0.6075	0.3173	5.7000e-004		0.0307	0.0307		0.0282	0.0282	0.0000	50.1535	50.1535	0.0162	0.0000	50.5590
Total	**0.0583**	**0.6075**	**0.3173**	**5.7000e-004**	**0.2710**	**0.0307**	**0.3017**	**0.1490**	**0.0282**	**0.1772**	**0.0000**	**50.1535**	**50.1535**	**0.0162**	**0.0000**	**50.5590**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1200e-003	8.3000e-004	9.4200e-003	3.0000e-005	2.9600e-003	2.0000e-005	2.9800e-003	7.9000e-004	2.0000e-005	8.1000e-004	0.0000	2.5830	2.5830	7.0000e-005	0.0000	2.5847
Total	**1.1200e-003**	**8.3000e-004**	**9.4200e-003**	**3.0000e-005**	**2.9600e-003**	**2.0000e-005**	**2.9800e-003**	**7.9000e-004**	**2.0000e-005**	**8.1000e-004**	**0.0000**	**2.5830**	**2.5830**	**7.0000e-005**	**0.0000**	**2.5847**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3253	0.0000	0.3253	0.1349	0.0000	0.1349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1572	1.7400	1.1579	2.3300e-003		0.0745	0.0745		0.0685	0.0685	0.0000	204.3562	204.3562	0.0661	0.0000	206.0085
Total	**0.1572**	**1.7400**	**1.1579**	**2.3300e-003**	**0.3253**	**0.0745**	**0.3997**	**0.1349**	**0.0685**	**0.2034**	**0.0000**	**204.3562**	**204.3562**	**0.0661**	**0.0000**	**206.0085**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1200e-003	2.3100e-003	0.0262	8.0000e-005	8.2300e-003	6.0000e-005	8.2900e-003	2.1900e-003	6.0000e-005	2.2400e-003	0.0000	7.1749	7.1749	1.9000e-004	0.0000	7.1797
Total	**3.1200e-003**	**2.3100e-003**	**0.0262**	**8.0000e-005**	**8.2300e-003**	**6.0000e-005**	**8.2900e-003**	**2.1900e-003**	**6.0000e-005**	**2.2400e-003**	**0.0000**	**7.1749**	**7.1749**	**1.9000e-004**	**0.0000**	**7.1797**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3253	0.0000	0.3253	0.1349	0.0000	0.1349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1572	1.7400	1.1579	2.3300e-003		0.0745	0.0745		0.0685	0.0685	0.0000	204.3559	204.3559	0.0661	0.0000	206.0083
Total	**0.1572**	**1.7400**	**1.1579**	**2.3300e-003**	**0.3253**	**0.0745**	**0.3997**	**0.1349**	**0.0685**	**0.2034**	**0.0000**	**204.3559**	**204.3559**	**0.0661**	**0.0000**	**206.0083**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.1200e-003	2.3100e-003	0.0262	8.0000e-005	8.2300e-003	6.0000e-005	8.2900e-003	2.1900e-003	6.0000e-005	2.2400e-003	0.0000	7.1749	7.1749	1.9000e-004	0.0000	7.1797
Total	**3.1200e-003**	**2.3100e-003**	**0.0262**	**8.0000e-005**	**8.2300e-003**	**6.0000e-005**	**8.2900e-003**	**2.1900e-003**	**6.0000e-005**	**2.2400e-003**	**0.0000**	**7.1749**	**7.1749**	**1.9000e-004**	**0.0000**	**7.1797**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0257	0.2353	0.2238	3.6000e-004		0.0129	0.0129		0.0122	0.0122	0.0000	31.2710	31.2710	7.5400e-003	0.0000	31.4596
Total	**0.0257**	**0.2353**	**0.2238**	**3.6000e-004**		**0.0129**	**0.0129**		**0.0122**	**0.0122**	**0.0000**	**31.2710**	**31.2710**	**7.5400e-003**	**0.0000**	**31.4596**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.7300e-003	0.2955	0.0747	7.6000e-004	0.0191	6.0000e-004	0.0197	5.5200e-003	5.8000e-004	6.1000e-003	0.0000	73.7525	73.7525	4.7500e-003	0.0000	73.8714
Worker	0.0502	0.0373	0.4217	1.2800e-003	0.1326	1.0000e-003	0.1336	0.0352	9.2000e-004	0.0361	0.0000	115.5875	115.5875	3.1100e-003	0.0000	115.6652
Total	**0.0590**	**0.3327**	**0.4963**	**2.0400e-003**	**0.1517**	**1.6000e-003**	**0.1533**	**0.0407**	**1.5000e-003**	**0.0422**	**0.0000**	**189.3400**	**189.3400**	**7.8600e-003**	**0.0000**	**189.5366**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0257	0.2353	0.2238	3.6000e-004		0.0129	0.0129		0.0122	0.0122	0.0000	31.2710	31.2710	7.5400e-003	0.0000	31.4596
Total	**0.0257**	**0.2353**	**0.2238**	**3.6000e-004**		**0.0129**	**0.0129**		**0.0122**	**0.0122**	**0.0000**	**31.2710**	**31.2710**	**7.5400e-003**	**0.0000**	**31.4596**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.7300e-003	0.2955	0.0747	7.6000e-004	0.0191	6.0000e-004	0.0197	5.5200e-003	5.8000e-004	6.1000e-003	0.0000	73.7525	73.7525	4.7500e-003	0.0000	73.8714
Worker	0.0502	0.0373	0.4217	1.2800e-003	0.1326	1.0000e-003	0.1336	0.0352	9.2000e-004	0.0361	0.0000	115.5875	115.5875	3.1100e-003	0.0000	115.6652
Total	**0.0590**	**0.3327**	**0.4963**	**2.0400e-003**	**0.1517**	**1.6000e-003**	**0.1533**	**0.0407**	**1.5000e-003**	**0.0422**	**0.0000**	**189.3400**	**189.3400**	**7.8600e-003**	**0.0000**	**189.5366**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0789	2.6996	0.6808	7.2500e-003	0.1843	5.0400e-003	0.1894	0.0532	4.8200e-003	0.0580	0.0000	703.9354	703.9354	0.0442	0.0000	705.0402
Worker	0.4541	0.3242	3.7496	0.0119	1.2765	9.3500e-003	1.2859	0.3390	8.6100e-003	0.3476	0.0000	1,073.1970	1,073.1970	0.0271	0.0000	1,073.8734
Total	**0.5331**	**3.0238**	**4.4304**	**0.0191**	**1.4608**	**0.0144**	**1.4752**	**0.3922**	**0.0134**	**0.4056**	**0.0000**	**1,777.1324**	**1,777.1324**	**0.0713**	**0.0000**	**1,778.9136**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0789	2.6996	0.6808	7.2500e-003	0.1843	5.0400e-003	0.1894	0.0532	4.8200e-003	0.0580	0.0000	703.9354	703.9354	0.0442	0.0000	705.0402
Worker	0.4541	0.3242	3.7496	0.0119	1.2765	9.3500e-003	1.2859	0.3390	8.6100e-003	0.3476	0.0000	1,073.1970	1,073.1970	0.0271	0.0000	1,073.8734
Total	**0.5331**	**3.0238**	**4.4304**	**0.0191**	**1.4608**	**0.0144**	**1.4752**	**0.3922**	**0.0134**	**0.4056**	**0.0000**	**1,777.1324**	**1,777.1324**	**0.0713**	**0.0000**	**1,778.9136**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3462	301.3462	0.0717	0.0000	303.1383
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3462**	**301.3462**	**0.0717**	**0.0000**	**303.1383**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0586	2.0254	0.6101	7.0100e-003	0.1843	2.3500e-003	0.1867	0.0532	2.2400e-003	0.0554	0.0000	682.2025	682.2025	0.0390	0.0000	683.1764
Worker	0.4276	0.2933	3.4573	0.0114	1.2765	9.1100e-003	1.2856	0.3390	8.3800e-003	0.3474	0.0000	1,033.2086	1,033.2086	0.0244	0.0000	1,033.8182
Total	**0.4861**	**2.3187**	**4.0674**	**0.0184**	**1.4608**	**0.0115**	**1.4723**	**0.3922**	**0.0106**	**0.4028**	**0.0000**	**1,715.4111**	**1,715.4111**	**0.0633**	**0.0000**	**1,716.9945**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2045	1.8700	2.1117	3.5000e-003		0.0910	0.0910		0.0856	0.0856	0.0000	301.3458	301.3458	0.0717	0.0000	303.1380
Total	**0.2045**	**1.8700**	**2.1117**	**3.5000e-003**		**0.0910**	**0.0910**		**0.0856**	**0.0856**	**0.0000**	**301.3458**	**301.3458**	**0.0717**	**0.0000**	**303.1380**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0586	2.0254	0.6101	7.0100e-003	0.1843	2.3500e-003	0.1867	0.0532	2.2400e-003	0.0554	0.0000	682.2025	682.2025	0.0390	0.0000	683.1764
Worker	0.4276	0.2933	3.4573	0.0114	1.2765	9.1100e-003	1.2856	0.3390	8.3800e-003	0.3474	0.0000	1,033.2086	1,033.2086	0.0244	0.0000	1,033.8182
Total	**0.4861**	**2.3187**	**4.0674**	**0.0184**	**1.4608**	**0.0115**	**1.4723**	**0.3922**	**0.0106**	**0.4028**	**0.0000**	**1,715.4111**	**1,715.4111**	**0.0633**	**0.0000**	**1,716.9945**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1420	1.2973	1.5601	2.6000e-003		0.0592	0.0592		0.0557	0.0557	0.0000	223.7344	223.7344	0.0529	0.0000	225.0571
Total	**0.1420**	**1.2973**	**1.5601**	**2.6000e-003**		**0.0592**	**0.0592**		**0.0557**	**0.0557**	**0.0000**	**223.7344**	**223.7344**	**0.0529**	**0.0000**	**225.0571**

3.5 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0425	1.4997	0.4398	5.1800e-003	0.1368	1.7200e-003	0.1386	0.0395	1.6400e-003	0.0411	0.0000	504.5886	504.5886	0.0285	0.0000	505.3006
Worker	0.3008	0.1984	2.3929	8.2000e-003	0.9476	6.6700e-003	0.9542	0.2517	6.1400e-003	0.2578	0.0000	741.6244	741.6244	0.0166	0.0000	742.0386
Total	**0.3433**	**1.6981**	**2.8328**	**0.0134**	**1.0844**	**8.3900e-003**	**1.0928**	**0.2911**	**7.7800e-003**	**0.2989**	**0.0000**	**1,246.2129**	**1,246.2129**	**0.0451**	**0.0000**	**1,247.3392**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1420	1.2973	1.5601	2.6000e-003		0.0592	0.0592		0.0557	0.0557	0.0000	223.7341	223.7341	0.0529	0.0000	225.0568
Total	**0.1420**	**1.2973**	**1.5601**	**2.6000e-003**		**0.0592**	**0.0592**		**0.0557**	**0.0557**	**0.0000**	**223.7341**	**223.7341**	**0.0529**	**0.0000**	**225.0568**

3.5 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0425	1.4997	0.4398	5.1800e-003	0.1368	1.7200e-003	0.1386	0.0395	1.6400e-003	0.0411	0.0000	504.5886	504.5886	0.0285	0.0000	505.3006
Worker	0.3008	0.1984	2.3929	8.2000e-003	0.9476	6.6700e-003	0.9542	0.2517	6.1400e-003	0.2578	0.0000	741.6244	741.6244	0.0166	0.0000	742.0386
Total	**0.3433**	**1.6981**	**2.8328**	**0.0134**	**1.0844**	**8.3900e-003**	**1.0928**	**0.2911**	**7.7800e-003**	**0.2989**	**0.0000**	**1,246.2129**	**1,246.2129**	**0.0451**	**0.0000**	**1,247.3392**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0272	0.2619	0.4022	6.3000e-004		0.0129	0.0129		0.0119	0.0119	0.0000	55.0730	55.0730	0.0178	0.0000	55.5183
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0272**	**0.2619**	**0.4022**	**6.3000e-004**		**0.0129**	**0.0129**		**0.0119**	**0.0119**	**0.0000**	**55.0730**	**55.0730**	**0.0178**	**0.0000**	**55.5183**

3.6 Paving - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4400e-003	9.5000e-004	0.0114	4.0000e-005	4.5300e-003	3.0000e-005	4.5600e-003	1.2000e-003	3.0000e-005	1.2300e-003	0.0000	3.5421	3.5421	8.0000e-005	0.0000	3.5441
Total	**1.4400e-003**	**9.5000e-004**	**0.0114**	**4.0000e-005**	**4.5300e-003**	**3.0000e-005**	**4.5600e-003**	**1.2000e-003**	**3.0000e-005**	**1.2300e-003**	**0.0000**	**3.5421**	**3.5421**	**8.0000e-005**	**0.0000**	**3.5441**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0272	0.2619	0.4022	6.3000e-004		0.0129	0.0129		0.0119	0.0119	0.0000	55.0729	55.0729	0.0178	0.0000	55.5182
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0272**	**0.2619**	**0.4022**	**6.3000e-004**		**0.0129**	**0.0129**		**0.0119**	**0.0119**	**0.0000**	**55.0729**	**55.0729**	**0.0178**	**0.0000**	**55.5182**

3.6 Paving - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4400e-003	9.5000e-004	0.0114	4.0000e-005	4.5300e-003	3.0000e-005	4.5600e-003	1.2000e-003	3.0000e-005	1.2300e-003	0.0000	3.5421	3.5421	8.0000e-005	0.0000	3.5441
Total	**1.4400e-003**	**9.5000e-004**	**0.0114**	**4.0000e-005**	**4.5300e-003**	**3.0000e-005**	**4.5600e-003**	**1.2000e-003**	**3.0000e-005**	**1.2300e-003**	**0.0000**	**3.5421**	**3.5421**	**8.0000e-005**	**0.0000**	**3.5441**

3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.9032					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2700e-003	8.5300e-003	0.0127	2.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	1.7873	1.7873	1.0000e-004	0.0000	1.7898
Total	**0.9045**	**8.5300e-003**	**0.0127**	**2.0000e-005**		**4.3000e-004**	**4.3000e-004**		**4.3000e-004**	**4.3000e-004**	**0.0000**	**1.7873**	**1.7873**	**1.0000e-004**	**0.0000**	**1.7898**

3.7 Architectural Coating - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3600e-003	2.8800e-003	0.0347	1.2000e-004	0.0138	1.0000e-004	0.0138	3.6500e-003	9.0000e-005	3.7400e-003	0.0000	10.7593	10.7593	2.4000e-004	0.0000	10.7653
Total	**4.3600e-003**	**2.8800e-003**	**0.0347**	**1.2000e-004**	**0.0138**	**1.0000e-004**	**0.0138**	**3.6500e-003**	**9.0000e-005**	**3.7400e-003**	**0.0000**	**10.7593**	**10.7593**	**2.4000e-004**	**0.0000**	**10.7653**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.9032					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2700e-003	8.5300e-003	0.0127	2.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	1.7873	1.7873	1.0000e-004	0.0000	1.7898
Total	**0.9045**	**8.5300e-003**	**0.0127**	**2.0000e-005**		**4.3000e-004**	**4.3000e-004**		**4.3000e-004**	**4.3000e-004**	**0.0000**	**1.7873**	**1.7873**	**1.0000e-004**	**0.0000**	**1.7898**

3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.3600e-003	2.8800e-003	0.0347	1.2000e-004	0.0138	1.0000e-004	0.0138	3.6500e-003	9.0000e-005	3.7400e-003	0.0000	10.7593	10.7593	2.4000e-004	0.0000	10.7653
Total	**4.3600e-003**	**2.8800e-003**	**0.0347**	**1.2000e-004**	**0.0138**	**1.0000e-004**	**0.0138**	**3.6500e-003**	**9.0000e-005**	**3.7400e-003**	**0.0000**	**10.7593**	**10.7593**	**2.4000e-004**	**0.0000**	**10.7653**

3.7 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.6451					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5000e-003	0.0235	0.0371	6.0000e-005		1.0600e-003	1.0600e-003		1.0600e-003	1.0600e-003	0.0000	5.2342	5.2342	2.9000e-004	0.0000	5.2413
Total	**2.6486**	**0.0235**	**0.0371**	**6.0000e-005**		**1.0600e-003**	**1.0600e-003**		**1.0600e-003**	**1.0600e-003**	**0.0000**	**5.2342**	**5.2342**	**2.9000e-004**	**0.0000**	**5.2413**

3.7 Architectural Coating - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0122	7.7100e-003	0.0944	3.3000e-004	0.0403	2.8000e-004	0.0405	0.0107	2.6000e-004	0.0110	0.0000	30.2692	30.2692	6.4000e-004	0.0000	30.2852
Total	**0.0122**	**7.7100e-003**	**0.0944**	**3.3000e-004**	**0.0403**	**2.8000e-004**	**0.0405**	**0.0107**	**2.6000e-004**	**0.0110**	**0.0000**	**30.2692**	**30.2692**	**6.4000e-004**	**0.0000**	**30.2852**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.6451					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.5000e-003	0.0235	0.0371	6.0000e-005		1.0600e-003	1.0600e-003		1.0600e-003	1.0600e-003	0.0000	5.2342	5.2342	2.9000e-004	0.0000	5.2413
Total	**2.6486**	**0.0235**	**0.0371**	**6.0000e-005**		**1.0600e-003**	**1.0600e-003**		**1.0600e-003**	**1.0600e-003**	**0.0000**	**5.2342**	**5.2342**	**2.9000e-004**	**0.0000**	**5.2413**

3.7 Architectural Coating - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0122	7.7100e-003	0.0944	3.3000e-004	0.0403	2.8000e-004	0.0405	0.0107	2.6000e-004	0.0110	0.0000	30.2692	30.2692	6.4000e-004	0.0000	30.2852
Total	**0.0122**	**7.7100e-003**	**0.0944**	**3.3000e-004**	**0.0403**	**2.8000e-004**	**0.0405**	**0.0107**	**2.6000e-004**	**0.0110**	**0.0000**	**30.2692**	**30.2692**	**6.4000e-004**	**0.0000**	**30.2852**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.5906	8.2971	18.4151	0.0802	7.8116	0.0549	7.8664	2.0923	0.0509	2.1432	0.0000	7,448.8341	7,448.8341	0.3213	0.0000	7,456.8658
Unmitigated	1.5906	8.2971	18.4151	0.0802	7.8116	0.0549	7.8664	2.0923	0.0509	2.1432	0.0000	7,448.8341	7,448.8341	0.3213	0.0000	7,456.8658

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse High Rise	0.00	0.00	0.00		
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Health Club	0.00	0.00	0.00		
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Hotel	0.00	0.00	0.00		
Strip Mall	0.00	0.00	0.00		
Supermarket	0.00	0.00	0.00		
Unenclosed Parking with Elevator	0.00	0.00	0.00		
User Defined Commercial	8,887.00	8,887.00	8887.00	20,573,760	20,573,760
Total	8,887.00	8,887.00	8,887.00	20,573,760	20,573,760

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15
Supermarket	16.60	8.40	6.90	6.50	74.50	19.00	34	30	36
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
User Defined Commercial	0.00	6.36	0.00	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse High Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Enclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
General Office Building	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Health Club	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
High Turnover (Sit Down Restaurant)	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Hotel	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Strip Mall	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Supermarket	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Unenclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
User Defined Commercial	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	5,269.1801	5,269.1801	0.1245	0.0258	5,279.9640
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	5,269.1801	5,269.1801	0.1245	0.0258	5,279.9640
NaturalGas Mitigated	0.1057	0.9370	0.6326	5.7600e-003		0.0730	0.0730		0.0730	0.0730	0.0000	1,045.9471	1,045.9471	0.0201	0.0192	1,052.1626
NaturalGas Unmitigated	0.1057	0.9370	0.6326	5.7600e-003		0.0730	0.0730		0.0730	0.0730	0.0000	1,045.9471	1,045.9471	0.0201	0.0192	1,052.1626

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Condo/Townhouse High Rise	8.09092e+006	0.0436	0.3728	0.1587	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	431.7622	431.7622	8.2800e-003	7.9200e-003	434.3280
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	499680	2.6900e-003	0.0245	0.0206	1.5000e-004		1.8600e-003	1.8600e-003		1.8600e-003	1.8600e-003	0.0000	26.6648	26.6648	5.1000e-004	4.9000e-004	26.8233
Health Club	262450	1.4200e-003	0.0129	0.0108	8.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	14.0053	14.0053	2.7000e-004	2.6000e-004	14.0886
High Turnover (Sit Down Restaurant)	8.0766e+006	0.0436	0.3959	0.3326	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	430.9981	430.9981	8.2600e-003	7.9000e-003	433.5593
Hotel	2.0383e+006	0.0110	0.0999	0.0839	6.0000e-004		7.5900e-003	7.5900e-003		7.5900e-003	7.5900e-003	0.0000	108.7715	108.7715	2.0800e-003	1.9900e-003	109.4178
Strip Mall	29848	1.6000e-004	1.4600e-003	1.2300e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5928	1.5928	3.0000e-005	3.0000e-005	1.6023
Supermarket	602511	3.2500e-003	0.0295	0.0248	1.8000e-004		2.2400e-003	2.2400e-003		2.2400e-003	2.2400e-003	0.0000	32.1523	32.1523	6.2000e-004	5.9000e-004	32.3434
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1057**	**0.9370**	**0.6326**	**5.7800e-003**		**0.0730**	**0.0730**		**0.0730**	**0.0730**	**0.0000**	**1,045.9471**	**1,045.9471**	**0.0201**	**0.0192**	**1,052.1626**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Condo/Townhouse High Rise	8.09092e+006	0.0436	0.3728	0.1587	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	431.7622	431.7622	8.2800e-003	7.9200e-003	434.3280
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	499680	2.6900e-003	0.0245	0.0206	1.5000e-004		1.8600e-003	1.8600e-003		1.8600e-003	1.8600e-003	0.0000	26.6648	26.6648	5.1000e-004	4.9000e-004	26.8233
Health Club	262450	1.4200e-003	0.0129	0.0108	8.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	14.0053	14.0053	2.7000e-004	2.6000e-004	14.0886
High Turnover (Sit Down Restaurant)	8.0766e+006	0.0436	0.3959	0.3326	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	430.9981	430.9981	8.2600e-003	7.9000e-003	433.5593
Hotel	2.0383e+006	0.0110	0.0999	0.0839	6.0000e-004		7.5900e-003	7.5900e-003		7.5900e-003	7.5900e-003	0.0000	108.7715	108.7715	2.0800e-003	1.9900e-003	109.4178
Strip Mall	29848	1.6000e-004	1.4600e-003	1.2300e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5928	1.5928	3.0000e-005	3.0000e-005	1.6023
Supermarket	602511	3.2500e-003	0.0295	0.0248	1.8000e-004		2.2400e-003	2.2400e-003		2.2400e-003	2.2400e-003	0.0000	32.1523	32.1523	6.2000e-004	5.9000e-004	32.3434
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1057**	**0.9370**	**0.6326**	**5.7800e-003**		**0.0730**	**0.0730**		**0.0730**	**0.0730**	**0.0000**	**1,045.9471**	**1,045.9471**	**0.0201**	**0.0192**	**1,052.1626**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse High Rise	3.17889e+006	1,770.5221	0.0418	8.6500e-003	1,774.1456
Enclosed Parking with Elevator	1.13684e+006	633.1762	0.0150	3.0900e-003	634.4720
General Office Building	623520	347.2767	8.2000e-003	1.7000e-003	347.9874
Health Club	160950	89.6430	2.1200e-003	4.4000e-004	89.8264
High Turnover (Sit Down Restaurant)	1.5449e+006	860.4499	0.0203	4.2000e-003	862.2109
Hotel	644300	358.8503	8.4800e-003	1.7500e-003	359.5847
Strip Mall	245700	136.8455	3.2300e-003	6.7000e-004	137.1255
Supermarket	1.01911e+006	567.6045	0.0134	2.7700e-003	568.7662
Unenclosed Parking with Elevator	906368	504.8121	0.0119	2.4700e-003	505.8453
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000
Total		**5,269.1801**	**0.1245**	**0.0257**	**5,279.9640**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse High Rise	3.17889e+006	1,770.5221	0.0418	8.6500e-003	1,774.1456
Enclosed Parking with Elevator	1.13684e+006	633.1762	0.0150	3.0900e-003	634.4720
General Office Building	623520	347.2767	8.2000e-003	1.7000e-003	347.9874
Health Club	160950	89.6430	2.1200e-003	4.4000e-004	89.8264
High Turnover (Sit Down Restaurant)	1.5449e+006	860.4499	0.0203	4.2000e-003	862.2109
Hotel	644300	358.8503	8.4800e-003	1.7500e-003	359.5847
Strip Mall	245700	136.8455	3.2300e-003	6.7000e-004	137.1255
Supermarket	1.01911e+006	567.6045	0.0134	2.7700e-003	568.7662
Unenclosed Parking with Elevator	906368	504.8121	0.0119	2.4700e-003	505.8453
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000
Total		**5,269.1801**	**0.1245**	**0.0257**	**5,279.9640**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	4.2260	0.1109	7.6283	5.5000e-004		0.0441	0.0441		0.0441	0.0441	0.0000	39.3596	39.3596	0.0125	4.9000e-004	39.8198
Unmitigated	4.2260	0.1109	7.6283	5.5000e-004		0.0441	0.0441		0.0441	0.0441	0.0000	39.3596	39.3596	0.0125	4.9000e-004	39.8198

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3548					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.6381					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.7200e-003	0.0232	9.8800e-003	1.5000e-004		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003	0.0000	26.8954	26.8954	5.2000e-004	4.9000e-004	27.0552
Landscaping	0.2303	0.0877	7.6184	4.0000e-004		0.0422	0.0422		0.0422	0.0422	0.0000	12.4642	12.4642	0.0120	0.0000	12.7647
Total	**4.2260**	**0.1109**	**7.6283**	**5.5000e-004**		**0.0441**	**0.0441**		**0.0441**	**0.0441**	**0.0000**	**39.3596**	**39.3596**	**0.0125**	**4.9000e-004**	**39.8198**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3548					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.6381					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.7200e-003	0.0232	9.8800e-003	1.5000e-004		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003	0.0000	26.8954	26.8954	5.2000e-004	4.9000e-004	27.0552
Landscaping	0.2303	0.0877	7.6184	4.0000e-004		0.0422	0.0422		0.0422	0.0422	0.0000	12.4642	12.4642	0.0120	0.0000	12.7647
Total	**4.2260**	**0.1109**	**7.6283**	**5.5000e-004**		**0.0441**	**0.0441**		**0.0441**	**0.0441**	**0.0000**	**39.3596**	**39.3596**	**0.0125**	**4.9000e-004**	**39.8198**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	821.2182	2.5380	0.0634	903.5536
Unmitigated	821.2182	2.5380	0.0634	903.5536

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse High Rise	48.0185 / 30.2725	550.7955	1.5773	0.0396	602.0185
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	8.53122 / 5.22881	96.9317	0.2802	7.0200e-003	106.0304
Health Club	0.857576 / 0.525611	9.7438	0.0282	7.1000e-004	10.6584
High Turnover (Sit Down Restaurant)	10.6237 / 0.678107	84.6114	0.3481	8.5700e-003	95.8678
Hotel	4.56602 / 0.507335	37.7016	0.1496	3.6900e-003	42.5423
Strip Mall	1.34812 / 0.826267	15.3173	0.0443	1.1100e-003	16.7551
Supermarket	3.36522 / 0.104079	26.1169	0.1103	2.7100e-003	29.6812
Unenclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**821.2182**	**2.5380**	**0.0634**	**903.5536**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse High Rise	48.0185 / 30.2725	550.7955	1.5773	0.0396	602.0185
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	8.53122 / 5.22881	96.9317	0.2802	7.0200e-003	106.0304
Health Club	0.857576 / 0.525611	9.7438	0.0282	7.1000e-004	10.6584
High Turnover (Sit Down Restaurant)	10.6237 / 0.678107	84.6114	0.3481	8.5700e-003	95.8678
Hotel	4.56602 / 0.507335	37.7016	0.1496	3.6900e-003	42.5423
Strip Mall	1.34812 / 0.826267	15.3173	0.0443	1.1100e-003	16.7551
Supermarket	3.36522 / 0.104079	26.1169	0.1103	2.7100e-003	29.6812
Unenclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**821.2182**	**2.5380**	**0.0634**	**903.5536**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	234.3409	13.8492	0.0000	580.5696
Unmitigated	234.3409	13.8492	0.0000	580.5696

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse High Rise	339.02	68.8180	4.0670	0.0000	170.4937
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	44.64	9.0615	0.5355	0.0000	22.4495
Health Club	82.65	16.7772	0.9915	0.0000	41.5648
High Turnover (Sit Down Restaurant)	416.5	84.5457	4.9965	0.0000	209.4585
Hotel	98.55	20.0048	1.1823	0.0000	49.5609
Strip Mall	19.11	3.8792	0.2293	0.0000	9.6105
Supermarket	153.97	31.2545	1.8471	0.0000	77.4318
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000
Total		**234.3409**	**13.8492**	**0.0000**	**580.5696**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse High Rise	339.02	68.8180	4.0670	0.0000	170.4937
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	44.64	9.0615	0.5355	0.0000	22.4495
Health Club	82.65	16.7772	0.9915	0.0000	41.5648
High Turnover (Sit Down Restaurant)	416.5	84.5457	4.9965	0.0000	209.4585
Hotel	98.55	20.0048	1.1823	0.0000	49.5609
Strip Mall	19.11	3.8792	0.2293	0.0000	9.6105
Supermarket	153.97	31.2545	1.8471	0.0000	77.4318
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000
Total		**234.3409**	**13.8492**	**0.0000**	**580.5696**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

1111 Sunset - Mixed Use Options (With PDFs)

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	48.00	1000sqft	1.10	48,000.00	0
User Defined Commercial	1.00	User Defined Unit	0.00	0.00	0
Enclosed Parking with Elevator	485.00	Space	4.36	194,000.00	0
Unenclosed Parking with Elevator	1,168.00	Space	10.51	467,200.00	0
Health Club	14.50	1000sqft	0.33	14,500.00	0
High Turnover (Sit Down Restaurant)	35.00	1000sqft	0.80	35,000.00	0
Hotel	180.00	Room	6.00	85,000.00	0
Condo/Townhouse High Rise	737.00	Dwelling Unit	11.52	766,982.00	2108
Strip Mall	18.20	1000sqft	0.42	18,200.00	0
Supermarket	27.30	1000sqft	0.63	27,300.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2028
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See SWAPE comment regarding CO2 intensity factor.

Land Use - Consistent with the DEIR's model.

Construction Phase - Operation only.

Off-road Equipment - Operation only.

Trips and VMT - Operation only. Changes to hauling trips unnecessary.

Vehicle Trips - See SWAPE comment regarding operational vehicle trip rate.

Woodstoves - Consistent with the DEIR's model.

Energy Use -

Area Mitigation -

Energy Mitigation - See SWAPE comment regarding operational mitigation measures.

Table Name	Column Name	Default Value	New Value
tblFireplaces	FireplaceDayYear	25.00	100.00
tblFireplaces	FireplaceHourDay	3.00	6.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	626.45	14.00
tblFireplaces	NumberNoFireplace	73.70	0.00
tblFireplaces	NumberWood	36.85	0.00
tblLandUse	LandUseSquareFeet	261,360.00	85,000.00
tblLandUse	LandUseSquareFeet	737,000.00	766,982.00
tblVehicleTrips	CC_TL	8.40	6.36
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	4.31	0.00
tblVehicleTrips	ST_TR	2.46	0.00

tblVehicleTrips	ST_TR	20.87	0.00
tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	8.19	0.00
tblVehicleTrips	ST_TR	42.04	0.00
tblVehicleTrips	ST_TR	177.59	0.00
tblVehicleTrips	ST_TR	0.00	8,887.00
tblVehicleTrips	SU_TR	3.43	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	5.95	0.00
tblVehicleTrips	SU_TR	20.43	0.00
tblVehicleTrips	SU_TR	166.44	0.00
tblVehicleTrips	SU_TR	0.00	8,887.00
tblVehicleTrips	WD_TR	4.18	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	32.93	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	8.17	0.00
tblVehicleTrips	WD_TR	44.32	0.00
tblVehicleTrips	WD_TR	102.24	0.00
tblVehicleTrips	WD_TR	0.00	8,887.00
tblWoodstoves	NumberCatalytic	36.85	0.00
tblWoodstoves	NumberNoncatalytic	36.85	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.2796	46.4544	55.4117	0.1833	18.2675	2.0460	20.3134	9.9840	1.8823	11.8663	0.0000	18,551.8378	18,551.8378	1.9488	0.0000	18,583.3310
2022	5.8142	38.2895	52.3932	0.1791	11.4437	0.9192	12.3629	3.0676	0.8640	3.9316	0.0000	18,144.6689	18,144.6689	1.2171	0.0000	18,175.0960
2023	5.3175	31.8114	49.4131	0.1737	11.4437	0.7875	12.2312	3.0676	0.7398	3.8074	0.0000	17,602.2442	17,602.2442	1.1472	0.0000	17,630.9230
2024	129.8360	30.6524	47.3066	0.1705	11.4437	0.6999	12.1436	3.0676	0.6572	3.7248	0.0000	17,278.2808	17,278.2808	1.1208	0.0000	17,306.3007
2025	129.7947	1.4784	6.7904	0.0201	2.0008	0.0651	2.0659	0.5306	0.0640	0.5946	0.0000	1,990.1060	1,990.1060	0.0517	0.0000	1,991.3995
Maximum	**129.8360**	**46.4544**	**55.4117**	**0.1833**	**18.2675**	**2.0460**	**20.3134**	**9.9840**	**1.8823**	**11.8663**	**0.0000**	**18,551.8378**	**18,551.8378**	**1.9488**	**0.0000**	**18,583.3310**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.2796	46.4544	55.4117	0.1833	18.2675	2.0460	20.3134	9.9840	1.8823	11.8663	0.0000	18,551.8378	18,551.8378	1.9488	0.0000	18,583.3310
2022	5.8142	38.2895	52.3932	0.1791	11.4437	0.9192	12.3629	3.0676	0.8640	3.9316	0.0000	18,144.6689	18,144.6689	1.2171	0.0000	18,175.0960
2023	5.3175	31.8114	49.4131	0.1737	11.4437	0.7875	12.2312	3.0676	0.7398	3.8074	0.0000	17,602.2442	17,602.2442	1.1472	0.0000	17,630.9230
2024	129.8360	30.6524	47.3066	0.1705	11.4437	0.6999	12.1436	3.0676	0.6572	3.7248	0.0000	17,278.2808	17,278.2808	1.1208	0.0000	17,306.3007
2025	129.7947	1.4784	6.7904	0.0201	2.0008	0.0651	2.0659	0.5306	0.0640	0.5946	0.0000	1,990.1060	1,990.1060	0.0517	0.0000	1,991.3995
Maximum	**129.8360**	**46.4544**	**55.4117**	**0.1833**	**18.2675**	**2.0460**	**20.3134**	**9.9840**	**1.8823**	**11.8663**	**0.0000**	**18,551.8378**	**18,551.8378**	**1.9488**	**0.0000**	**18,583.3310**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	23.7759	1.1660	61.1448	6.1900e-003		0.3753	0.3753		0.3753	0.3753	0.0000	702.8569	702.8569	0.1173	0.0109	709.0297
Energy	0.5791	5.1343	3.4661	0.0316		0.4001	0.4001		0.4001	0.4001		6,317.5851	6,317.5851	0.1211	0.1158	6,355.1273
Mobile	9.4546	44.5160	105.0660	0.4576	43.7142	0.3012	44.0153	11.6910	0.2795	11.9706		46,837.2855	46,837.2855	1.9451		46,885.9126
Total	**33.8096**	**50.8163**	**169.6769**	**0.4954**	**43.7142**	**1.0766**	**44.7908**	**11.6910**	**1.0550**	**12.7460**	**0.0000**	**53,857.7274**	**53,857.7274**	**2.1835**	**0.1267**	**53,950.0696**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	23.7759	1.1660	61.1448	6.1900e-003		0.3753	0.3753		0.3753	0.3753	0.0000	702.8569	702.8569	0.1173	0.0109	709.0297
Energy	0.5791	5.1343	3.4661	0.0316		0.4001	0.4001		0.4001	0.4001		6,317.5851	6,317.5851	0.1211	0.1158	6,355.1273
Mobile	9.4546	44.5160	105.0660	0.4576	43.7142	0.3012	44.0153	11.6910	0.2795	11.9706		46,837.2855	46,837.2855	1.9451		46,885.9126
Total	**33.8096**	**50.8163**	**169.6769**	**0.4954**	**43.7142**	**1.0766**	**44.7908**	**11.6910**	**1.0550**	**12.7460**	**0.0000**	**53,857.7274**	**53,857.7274**	**2.1835**	**0.1267**	**53,950.0696**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/22/2021	6/30/2021	5	50	
2	Site Preparation	Site Preparation	7/1/2021	8/11/2021	5	30	
3	Grading	Grading	8/12/2021	11/24/2021	5	75	
4	Building Construction	Building Construction	11/25/2021	9/25/2024	5	740	
5	Paving	Paving	9/26/2024	12/11/2024	5	55	
6	Architectural Coating	Architectural Coating	12/12/2024	2/26/2025	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 14.87

Residential Indoor: 1,553,139; Residential Outdoor: 517,713; Non-Residential Indoor: 342,000; Non-Residential Outdoor: 114,000; Striped Parking Area: 39,672 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	895.00	225.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	179.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**		**1.5513**	**1.5513**		**1.4411**	**1.4411**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.0628**	**0.0410**	**0.5632**	**1.6700e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**166.0347**	**166.0347**	**4.4800e-003**		**166.1466**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**		**1.5513**	**1.5513**		**1.4411**	**1.4411**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.0628**	**0.0410**	**0.5632**	**1.6700e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**166.0347**	**166.0347**	**4.4800e-003**		**166.1466**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0753	0.0491	0.6758	2.0000e-003	0.2012	1.4900e-003	0.2027	0.0534	1.3700e-003	0.0547		199.2417	199.2417	5.3700e-003		199.3759
Total	**0.0753**	**0.0491**	**0.6758**	**2.0000e-003**	**0.2012**	**1.4900e-003**	**0.2027**	**0.0534**	**1.3700e-003**	**0.0547**		**199.2417**	**199.2417**	**5.3700e-003**		**199.3759**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0753	0.0491	0.6758	2.0000e-003	0.2012	1.4900e-003	0.2027	0.0534	1.3700e-003	0.0547		199.2417	199.2417	5.3700e-003		199.3759
Total	**0.0753**	**0.0491**	**0.6758**	**2.0000e-003**	**0.2012**	**1.4900e-003**	**0.2027**	**0.0534**	**1.3700e-003**	**0.0547**		**199.2417**	**199.2417**	**5.3700e-003**		**199.3759**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**0.0837**	**0.0546**	**0.7509**	**2.2200e-003**	**0.2236**	**1.6500e-003**	**0.2252**	**0.0593**	**1.5200e-003**	**0.0608**		**221.3797**	**221.3797**	**5.9700e-003**		**221.5288**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**0.0837**	**0.0546**	**0.7509**	**2.2200e-003**	**0.2236**	**1.6500e-003**	**0.2252**	**0.0593**	**1.5200e-003**	**0.0608**		**221.3797**	**221.3797**	**5.9700e-003**		**221.5288**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6330	21.5477	5.2321	0.0569	1.4397	0.0440	1.4837	0.4145	0.0421	0.4565		6,091.734 3	6,091.734 3	0.3767		6,101.151 8
Worker	3.7457	2.4431	33.6045	0.0994	10.0040	0.0740	10.0780	2.6531	0.0682	2.7213		9,906.739 6	9,906.739 6	0.2670		9,913.414 9
Total	**4.3787**	**23.9908**	**38.8365**	**0.1564**	**11.4437**	**0.1180**	**11.5618**	**3.0676**	**0.1103**	**3.1778**		**15,998.47 39**	**15,998.47 39**	**0.6437**		**16,014.56 67**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.363 9	2,553.363 9	0.6160		2,568.764 3
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.363 9**	**2,553.363 9**	**0.6160**		**2,568.764 3**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6330	21.5477	5.2321	0.0569	1.4397	0.0440	1.4837	0.4145	0.0421	0.4565		6,091.7343	6,091.7343	0.3767		6,101.1518
Worker	3.7457	2.4431	33.6045	0.0994	10.0040	0.0740	10.0780	2.6531	0.0682	2.7213		9,906.7396	9,906.7396	0.2670		9,913.4149
Total	**4.3787**	**23.9908**	**38.8365**	**0.1564**	**11.4437**	**0.1180**	**11.5618**	**3.0676**	**0.1103**	**3.1778**		**15,998.4739**	**15,998.4739**	**0.6437**		**16,014.5667**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5940	20.4668	4.9539	0.0564	1.4397	0.0383	1.4780	0.4145	0.0366	0.4511		6,038.330 1	6,038.330 1	0.3638		6,047.424 1
Worker	3.5139	2.2071	31.0759	0.0958	10.0040	0.0719	10.0759	2.6531	0.0662	2.7193		9,552.005 2	9,552.005 2	0.2414		9,558.039 8
Total	**4.1079**	**22.6739**	**36.0298**	**0.1522**	**11.4437**	**0.1102**	**11.5539**	**3.0676**	**0.1028**	**3.1704**		**15,590.33 53**	**15,590.33 53**	**0.6051**		**15,605.46 38**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.333 6	2,554.333 6	0.6120		2,569.632 2
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.333 6**	**2,554.333 6**	**0.6120**		**2,569.632 2**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5940	20.4668	4.9539	0.0564	1.4397	0.0383	1.4780	0.4145	0.0366	0.4511		6,038.330 1	6,038.330 1	0.3638		6,047.424 1
Worker	3.5139	2.2071	31.0759	0.0958	10.0040	0.0719	10.0759	2.6531	0.0662	2.7193		9,552.005 2	9,552.005 2	0.2414		9,558.039 8
Total	**4.1079**	**22.6739**	**36.0298**	**0.1522**	**11.4437**	**0.1102**	**11.5539**	**3.0676**	**0.1028**	**3.1704**		**15,590.33 53**	**15,590.33 53**	**0.6051**		**15,605.46 38**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.209 9	2,555.209 9	0.6079		2,570.406 1
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.209 9**	**2,555.209 9**	**0.6079**		**2,570.406 1**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4406	15.4294	4.4717	0.0545	1.4397	0.0177	1.4574	0.4145	0.0169	0.4314		5,850.820 5	5,850.820 5	0.3216		5,858.859 5
Worker	3.3041	1.9972	28.6974	0.0923	10.0040	0.0701	10.0740	2.6531	0.0645	2.7176		9,196.213 9	9,196.213 9	0.2177		9,201.657 5
Total	**3.7448**	**17.4266**	**33.1691**	**0.1468**	**11.4437**	**0.0877**	**11.5314**	**3.0676**	**0.0814**	**3.1490**		**15,047.03 43**	**15,047.03 43**	**0.5393**		**15,060.51 69**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.209 9	2,555.209 9	0.6079		2,570.406 1
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.209 9**	**2,555.209 9**	**0.6079**		**2,570.406 1**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4406	15.4294	4.4717	0.0545	1.4397	0.0177	1.4574	0.4145	0.0169	0.4314		5,850.8205	5,850.8205	0.3216		5,858.8595
Worker	3.3041	1.9972	28.6974	0.0923	10.0040	0.0701	10.0740	2.6531	0.0645	2.7176		9,196.2139	9,196.2139	0.2177		9,201.6575
Total	**3.7448**	**17.4266**	**33.1691**	**0.1468**	**11.4437**	**0.0877**	**11.5314**	**3.0676**	**0.0814**	**3.1490**		**15,047.0343**	**15,047.0343**	**0.5393**		**15,060.5169**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

3.5 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4311	15.3886	4.3447	0.0543	1.4397	0.0175	1.4572	0.4145	0.0167	0.4312		5,829.368 7	5,829.368 7	0.3169		5,837.290 7
Worker	3.1272	1.8200	26.7951	0.0892	10.0040	0.0691	10.0731	2.6531	0.0636	2.7167		8,893.213 2	8,893.213 2	0.1996		8,898.202 3
Total	**3.5583**	**17.2086**	**31.1398**	**0.1435**	**11.4437**	**0.0866**	**11.5303**	**3.0676**	**0.0803**	**3.1479**		**14,722.58 19**	**14,722.58 19**	**0.5164**		**14,735.49 30**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.698 9	2,555.698 9	0.6044		2,570.807 7
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.698 9**	**2,555.698 9**	**0.6044**		**2,570.807 7**

3.5 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4311	15.3886	4.3447	0.0543	1.4397	0.0175	1.4572	0.4145	0.0167	0.4312		5,829.368 7	5,829.368 7	0.3169		5,837.290 7
Worker	3.1272	1.8200	26.7951	0.0892	10.0040	0.0691	10.0731	2.6531	0.0636	2.7167		8,893.213 2	8,893.213 2	0.1996		8,898.202 3
Total	**3.5583**	**17.2086**	**31.1398**	**0.1435**	**11.4437**	**0.0866**	**11.5303**	**3.0676**	**0.0803**	**3.1479**		**14,722.58 19**	**14,722.58 19**	**0.5164**		**14,735.49 30**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.547 2	2,207.547 2	0.7140		2,225.396 3
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.547 2**	**2,207.547 2**	**0.7140**		**2,225.396 3**

3.6 Paving - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0524	0.0305	0.4491	1.4900e-003	0.1677	1.1600e-003	0.1688	0.0445	1.0700e-003	0.0455		149.0483	149.0483	3.3400e-003		149.1319
Total	**0.0524**	**0.0305**	**0.4491**	**1.4900e-003**	**0.1677**	**1.1600e-003**	**0.1688**	**0.0445**	**1.0700e-003**	**0.0455**		**149.0483**	**149.0483**	**3.3400e-003**		**149.1319**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310	0.0000	2,207.547 2	2,207.547 2	0.7140		2,225.396 3
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**	**0.0000**	**2,207.547 2**	**2,207.547 2**	**0.7140**		**2,225.396 3**

3.6 Paving - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0524	0.0305	0.4491	1.4900e-003	0.1677	1.1600e-003	0.1688	0.0445	1.0700e-003	0.0455		149.0483	149.0483	3.3400e-003		149.1319
Total	**0.0524**	**0.0305**	**0.4491**	**1.4900e-003**	**0.1677**	**1.1600e-003**	**0.1688**	**0.0445**	**1.0700e-003**	**0.0455**		**149.0483**	**149.0483**	**3.3400e-003**		**149.1319**

3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	129.0298					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**129.2106**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.7 Architectural Coating - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6254	0.3640	5.3590	0.0178	2.0008	0.0138	2.0146	0.5306	0.0127	0.5433		1,778.642 6	1,778.642 6	0.0399		1,779.640 5
Total	**0.6254**	**0.3640**	**5.3590**	**0.0178**	**2.0008**	**0.0138**	**2.0146**	**0.5306**	**0.0127**	**0.5433**		**1,778.642 6**	**1,778.642 6**	**0.0399**		**1,779.640 5**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	129.0298					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**129.2106**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6254	0.3640	5.3590	0.0178	2.0008	0.0138	2.0146	0.5306	0.0127	0.5433		1,778.642 6	1,778.642 6	0.0399		1,779.640 5
Total	**0.6254**	**0.3640**	**5.3590**	**0.0178**	**2.0008**	**0.0138**	**2.0146**	**0.5306**	**0.0127**	**0.5433**		**1,778.642 6**	**1,778.642 6**	**0.0399**		**1,779.640 5**

3.7 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	129.0298					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**129.2007**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

3.7 Architectural Coating - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5941	0.3329	4.9812	0.0171	2.0008	0.0136	2.0144	0.5306	0.0125	0.5431		1,708.658 0	1,708.658 0	0.0364		1,709.567 7
Total	**0.5941**	**0.3329**	**4.9812**	**0.0171**	**2.0008**	**0.0136**	**2.0144**	**0.5306**	**0.0125**	**0.5431**		**1,708.658 0**	**1,708.658 0**	**0.0364**		**1,709.567 7**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	129.0298					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**129.2007**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

3.7 Architectural Coating - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5941	0.3329	4.9812	0.0171	2.0008	0.0136	2.0144	0.5306	0.0125	0.5431		1,708.6580	1,708.6580	0.0364		1,709.5677
Total	**0.5941**	**0.3329**	**4.9812**	**0.0171**	**2.0008**	**0.0136**	**2.0144**	**0.5306**	**0.0125**	**0.5431**		**1,708.6580**	**1,708.6580**	**0.0364**		**1,709.5677**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	9.4546	44.5160	105.0660	0.4576	43.7142	0.3012	44.0153	11.6910	0.2795	11.9706		46,837.28 55	46,837.28 55	1.9451		46,885.91 26
Unmitigated	9.4546	44.5160	105.0660	0.4576	43.7142	0.3012	44.0153	11.6910	0.2795	11.9706		46,837.28 55	46,837.28 55	1.9451		46,885.91 26

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse High Rise	0.00	0.00	0.00		
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Health Club	0.00	0.00	0.00		
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Hotel	0.00	0.00	0.00		
Strip Mall	0.00	0.00	0.00		
Supermarket	0.00	0.00	0.00		
Unenclosed Parking with Elevator	0.00	0.00	0.00		
User Defined Commercial	8,887.00	8,887.00	8887.00	20,573,760	20,573,760
Total	8,887.00	8,887.00	8,887.00	20,573,760	20,573,760

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15
Supermarket	16.60	8.40	6.90	6.50	74.50	19.00	34	30	36
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
User Defined Commercial	0.00	6.36	0.00	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse High Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Enclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
General Office Building	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Health Club	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
High Turnover (Sit Down Restaurant)	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Hotel	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Strip Mall	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Supermarket	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Unenclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
User Defined Commercial	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.5791	5.1343	3.4661	0.0316		0.4001	0.4001		0.4001	0.4001		6,317.585 1	6,317.585 1	0.1211	0.1158	6,355.127 3
NaturalGas Unmitigated	0.5791	5.1343	3.4661	0.0316		0.4001	0.4001		0.4001	0.4001		6,317.585 1	6,317.585 1	0.1211	0.1158	6,355.127 3

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse High Rise	22166.9	0.2391	2.0428	0.8693	0.0130		0.1652	0.1652		0.1652	0.1652		2,607.8706	2,607.8706	0.0500	0.0478	2,623.3679
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1368.99	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	719.041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22127.7	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Hotel	5584.38	0.0602	0.5475	0.4599	3.2800e-003		0.0416	0.0416		0.0416	0.0416		656.9863	656.9863	0.0126	0.0120	660.8904
Strip Mall	81.7753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1650.72	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.5791**	**5.1343**	**3.4661**	**0.0316**		**0.4001**	**0.4001**		**0.4001**	**0.4001**		**6,317.5851**	**6,317.5851**	**0.1211**	**0.1158**	**6,355.1273**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse High Rise	22.1669	0.2391	2.0428	0.8693	0.0130		0.1652	0.1652		0.1652	0.1652		2,607.8706	2,607.8706	0.0500	0.0478	2,623.3679
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1.36899	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	0.719041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22.1277	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Hotel	5.58438	0.0602	0.5475	0.4599	3.2800e-003		0.0416	0.0416		0.0416	0.0416		656.9863	656.9863	0.0126	0.0120	660.8904
Strip Mall	0.0817753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1.65072	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.5791**	**5.1343**	**3.4661**	**0.0316**		**0.4001**	**0.4001**		**0.4001**	**0.4001**		**6,317.5851**	**6,317.5851**	**0.1211**	**0.1158**	**6,355.1273**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	23.7759	1.1660	61.1448	6.1900e-003		0.3753	0.3753		0.3753	0.3753	0.0000	702.8569	702.8569	0.1173	0.0109	709.0297
Unmitigated	23.7759	1.1660	61.1448	6.1900e-003		0.3753	0.3753		0.3753	0.3753	0.0000	702.8569	702.8569	0.1173	0.0109	709.0297

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.9443					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	19.9348					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0544	0.4645	0.1977	2.9600e-003		0.0376	0.0376		0.0376	0.0376	0.0000	592.9412	592.9412	0.0114	0.0109	596.4647
Landscaping	1.8424	0.7015	60.9472	3.2300e-003		0.3378	0.3378		0.3378	0.3378		109.9157	109.9157	0.1060		112.5649
Total	**23.7759**	**1.1660**	**61.1448**	**6.1900e-003**		**0.3753**	**0.3753**		**0.3753**	**0.3753**	**0.0000**	**702.8569**	**702.8569**	**0.1173**	**0.0109**	**709.0297**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.9443					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	19.9348					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0544	0.4645	0.1977	2.9600e-003		0.0376	0.0376		0.0376	0.0376	0.0000	592.9412	592.9412	0.0114	0.0109	596.4647
Landscaping	1.8424	0.7015	60.9472	3.2300e-003		0.3378	0.3378		0.3378	0.3378		109.9157	109.9157	0.1060		112.5649
Total	**23.7759**	**1.1660**	**61.1448**	**6.1900e-003**		**0.3753**	**0.3753**		**0.3753**	**0.3753**	**0.0000**	**702.8569**	**702.8569**	**0.1173**	**0.0109**	**709.0297**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

1111 Sunset - Mixed Use Options (With PDFs)

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	48.00	1000sqft	1.10	48,000.00	0
User Defined Commercial	1.00	User Defined Unit	0.00	0.00	0
Enclosed Parking with Elevator	485.00	Space	4.36	194,000.00	0
Unenclosed Parking with Elevator	1,168.00	Space	10.51	467,200.00	0
Health Club	14.50	1000sqft	0.33	14,500.00	0
High Turnover (Sit Down Restaurant)	35.00	1000sqft	0.80	35,000.00	0
Hotel	180.00	Room	6.00	85,000.00	0
Condo/Townhouse High Rise	737.00	Dwelling Unit	11.52	766,982.00	2108
Strip Mall	18.20	1000sqft	0.42	18,200.00	0
Supermarket	27.30	1000sqft	0.63	27,300.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 31

Climate Zone 12 **Operational Year** 2028

Utility Company Los Angeles Department of Water & Power

CO2 Intensity (lb/MWhr) 1227.89 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See SWAPE comment regarding CO2 intensity factor.

Land Use - Consistent with the DEIR's model.

Construction Phase - Operation only.

Off-road Equipment - Operation only.

Trips and VMT - Operation only. Changes to hauling trips unnecessary.

Vehicle Trips - See SWAPE comment regarding operational vehicle trip rate.

Woodstoves - Consistent with the DEIR's model.

Energy Use -

Area Mitigation -

Energy Mitigation - See SWAPE comment regarding operational mitigation measures.

Table Name	Column Name	Default Value	New Value
tblFireplaces	FireplaceDayYear	25.00	100.00
tblFireplaces	FireplaceHourDay	3.00	6.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	626.45	14.00
tblFireplaces	NumberNoFireplace	73.70	0.00
tblFireplaces	NumberWood	36.85	0.00
tblLandUse	LandUseSquareFeet	261,360.00	85,000.00
tblLandUse	LandUseSquareFeet	737,000.00	766,982.00
tblVehicleTrips	CC_TL	8.40	6.36
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	4.31	0.00
tblVehicleTrips	ST_TR	2.46	0.00

tblVehicleTrips	ST_TR	20.87	0.00
tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	8.19	0.00
tblVehicleTrips	ST_TR	42.04	0.00
tblVehicleTrips	ST_TR	177.59	0.00
tblVehicleTrips	ST_TR	0.00	8,887.00
tblVehicleTrips	SU_TR	3.43	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	5.95	0.00
tblVehicleTrips	SU_TR	20.43	0.00
tblVehicleTrips	SU_TR	166.44	0.00
tblVehicleTrips	SU_TR	0.00	8,887.00
tblVehicleTrips	WD_TR	4.18	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	32.93	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	8.17	0.00
tblVehicleTrips	WD_TR	44.32	0.00
tblVehicleTrips	WD_TR	102.24	0.00
tblVehicleTrips	WD_TR	0.00	8,887.00
tblWoodstoves	NumberCatalytic	36.85	0.00
tblWoodstoves	NumberNoncatalytic	36.85	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.6934	46.4598	52.8092	0.1755	18.2675	2.0460	20.3134	9.9840	1.8823	11.8663	0.0000	17,770.7268	17,770.7268	1.9484	0.0000	17,802.4392
2022	6.2125	38.4428	49.9515	0.1717	11.4437	0.9205	12.3642	3.0676	0.8652	3.9328	0.0000	17,386.0916	17,386.0916	1.2261	0.0000	17,416.7444
2023	5.6976	31.9231	47.0102	0.1665	11.4437	0.7884	12.2321	3.0676	0.7407	3.8082	0.0000	16,873.4361	16,873.4361	1.1523	0.0000	16,902.2439
2024	129.9057	30.7510	45.0372	0.1635	11.4437	0.7007	12.1444	3.0676	0.6580	3.7255	0.0000	16,569.1110	16,569.1110	1.1263	0.0000	16,597.2689
2025	129.8629	1.5107	6.2893	0.0190	2.0008	0.0651	2.0659	0.5306	0.0640	0.5946	0.0000	1,883.8135	1,883.8135	0.0493	0.0000	1,885.0453
Maximum	**129.9057**	**46.4598**	**52.8092**	**0.1755**	**18.2675**	**2.0460**	**20.3134**	**9.9840**	**1.8823**	**11.8663**	**0.0000**	**17,770.7268**	**17,770.7268**	**1.9484**	**0.0000**	**17,802.4392**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.6934	46.4598	52.8092	0.1755	18.2675	2.0460	20.3134	9.9840	1.8823	11.8663	0.0000	17,770.7268	17,770.7268	1.9484	0.0000	17,802.4392
2022	6.2125	38.4428	49.9515	0.1717	11.4437	0.9205	12.3642	3.0676	0.8652	3.9328	0.0000	17,386.0916	17,386.0916	1.2261	0.0000	17,416.7444
2023	5.6976	31.9231	47.0102	0.1665	11.4437	0.7884	12.2321	3.0676	0.7407	3.8082	0.0000	16,873.4361	16,873.4361	1.1523	0.0000	16,902.2439
2024	129.9057	30.7510	45.0372	0.1635	11.4437	0.7007	12.1444	3.0676	0.6580	3.7255	0.0000	16,569.1110	16,569.1110	1.1263	0.0000	16,597.2689
2025	129.8629	1.5107	6.2893	0.0190	2.0008	0.0651	2.0659	0.5306	0.0640	0.5946	0.0000	1,883.8135	1,883.8135	0.0493	0.0000	1,885.0453
Maximum	**129.9057**	**46.4598**	**52.8092**	**0.1755**	**18.2675**	**2.0460**	**20.3134**	**9.9840**	**1.8823**	**11.8663**	**0.0000**	**17,770.7268**	**17,770.7268**	**1.9484**	**0.0000**	**17,802.4392**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	23.7759	1.1660	61.1448	6.1900e-003		0.3753	0.3753		0.3753	0.3753	0.0000	702.8569	702.8569	0.1173	0.0109	709.0297
Energy	0.5791	5.1343	3.4661	0.0316		0.4001	0.4001		0.4001	0.4001		6,317.5851	6,317.5851	0.1211	0.1158	6,355.1273
Mobile	9.0088	44.8918	100.0526	0.4343	43.7142	0.3025	44.0167	11.6910	0.2808	11.9719		44,474.0256	44,474.0256	1.9661		44,523.1780
Total	**33.3637**	**51.1921**	**164.6635**	**0.4720**	**43.7142**	**1.0780**	**44.7921**	**11.6910**	**1.0563**	**12.7473**	**0.0000**	**51,494.4676**	**51,494.4676**	**2.2045**	**0.1267**	**51,587.3350**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	23.7759	1.1660	61.1448	6.1900e-003		0.3753	0.3753		0.3753	0.3753	0.0000	702.8569	702.8569	0.1173	0.0109	709.0297
Energy	0.5791	5.1343	3.4661	0.0316		0.4001	0.4001		0.4001	0.4001		6,317.5851	6,317.5851	0.1211	0.1158	6,355.1273
Mobile	9.0088	44.8918	100.0526	0.4343	43.7142	0.3025	44.0167	11.6910	0.2808	11.9719		44,474.0256	44,474.0256	1.9661		44,523.1780
Total	**33.3637**	**51.1921**	**164.6635**	**0.4720**	**43.7142**	**1.0780**	**44.7921**	**11.6910**	**1.0563**	**12.7473**	**0.0000**	**51,494.4676**	**51,494.4676**	**2.2045**	**0.1267**	**51,587.3350**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/22/2021	6/30/2021	5	50	
2	Site Preparation	Site Preparation	7/1/2021	8/11/2021	5	30	
3	Grading	Grading	8/12/2021	11/24/2021	5	75	
4	Building Construction	Building Construction	11/25/2021	9/25/2024	5	740	
5	Paving	Paving	9/26/2024	12/11/2024	5	55	
6	Architectural Coating	Architectural Coating	12/12/2024	2/26/2025	5	55	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 187.5

Acres of Paving: 14.87

Residential Indoor: 1,553,139; Residential Outdoor: 517,713; Non-Residential Indoor: 342,000; Non-Residential Outdoor: 114,000; Striped Parking Area: 39,672 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	895.00	225.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	179.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.944 9	3,747.944 9	1.0549		3,774.317 4
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**		**1.5513**	**1.5513**		**1.4411**	**1.4411**		**3,747.944 9**	**3,747.944 9**	**1.0549**		**3,774.317 4**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.0692**	**0.0450**	**0.5098**	**1.5600e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**155.7227**	**155.7227**	**4.1900e-003**		**155.8274**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**		**1.5513**	**1.5513**		**1.4411**	**1.4411**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.0692**	**0.0450**	**0.5098**	**1.5600e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**155.7227**	**155.7227**	**4.1900e-003**		**155.8274**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0830	0.0540	0.6118	1.8800e-003	0.2012	1.4900e-003	0.2027	0.0534	1.3700e-003	0.0547		186.8672	186.8672	5.0300e-003		186.9929
Total	**0.0830**	**0.0540**	**0.6118**	**1.8800e-003**	**0.2012**	**1.4900e-003**	**0.2027**	**0.0534**	**1.3700e-003**	**0.0547**		**186.8672**	**186.8672**	**5.0300e-003**		**186.9929**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0830	0.0540	0.6118	1.8800e-003	0.2012	1.4900e-003	0.2027	0.0534	1.3700e-003	0.0547		186.8672	186.8672	5.0300e-003		186.9929
Total	**0.0830**	**0.0540**	**0.6118**	**1.8800e-003**	**0.2012**	**1.4900e-003**	**0.2027**	**0.0534**	**1.3700e-003**	**0.0547**		**186.8672**	**186.8672**	**5.0300e-003**		**186.9929**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**0.0922**	**0.0600**	**0.6797**	**2.0800e-003**	**0.2236**	**1.6500e-003**	**0.2252**	**0.0593**	**1.5200e-003**	**0.0608**		**207.6302**	**207.6302**	**5.5800e-003**		**207.7698**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**0.0922**	**0.0600**	**0.6797**	**2.0800e-003**	**0.2236**	**1.6500e-003**	**0.2252**	**0.0593**	**1.5200e-003**	**0.0608**		**207.6302**	**207.6302**	**5.5800e-003**		**207.7698**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6651	21.4969	5.8160	0.0554	1.4397	0.0454	1.4851	0.4145	0.0434	0.4579		5,925.910 1	5,925.910 1	0.4026		5,935.974 6
Worker	4.1275	2.6830	30.4181	0.0932	10.0040	0.0740	10.0780	2.6531	0.0682	2.7213		9,291.452 8	9,291.452 8	0.2499		9,297.700 3
Total	**4.7925**	**24.1799**	**36.2340**	**0.1486**	**11.4437**	**0.1194**	**11.5631**	**3.0676**	**0.1116**	**3.1792**		**15,217.36 29**	**15,217.36 29**	**0.6525**		**15,233.67 49**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.363 9	2,553.363 9	0.6160		2,568.764 3
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.363 9**	**2,553.363 9**	**0.6160**		**2,568.764 3**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6651	21.4969	5.8160	0.0554	1.4397	0.0454	1.4851	0.4145	0.0434	0.4579		5,925.910 1	5,925.910 1	0.4026		5,935.974 6
Worker	4.1275	2.6830	30.4181	0.0932	10.0040	0.0740	10.0780	2.6531	0.0682	2.7213		9,291.452 8	9,291.452 8	0.2499		9,297.700 3
Total	**4.7925**	**24.1799**	**36.2340**	**0.1486**	**11.4437**	**0.1194**	**11.5631**	**3.0676**	**0.1116**	**3.1792**		**15,217.36 29**	**15,217.36 29**	**0.6525**		**15,233.67 49**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.333 6	2,554.333 6	0.6120		2,569.632 2
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.333 6**	**2,554.333 6**	**0.6120**		**2,569.632 2**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6243	20.4039	5.5085	0.0549	1.4397	0.0395	1.4792	0.4145	0.0378	0.4523		5,872.997 5	5,872.997 5	0.3885		5,882.708 8
Worker	3.8820	2.4233	28.0796	0.0899	10.0040	0.0719	10.0759	2.6531	0.0662	2.7193		8,958.760 6	8,958.760 6	0.2257		8,964.403 4
Total	**4.5063**	**22.8272**	**33.5881**	**0.1447**	**11.4437**	**0.1115**	**11.5552**	**3.0676**	**0.1040**	**3.1716**		**14,831.75 81**	**14,831.75 81**	**0.6142**		**14,847.11 22**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.333 6	2,554.333 6	0.6120		2,569.632 2
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.333 6**	**2,554.333 6**	**0.6120**		**2,569.632 2**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6243	20.4039	5.5085	0.0549	1.4397	0.0395	1.4792	0.4145	0.0378	0.4523		5,872.997 5	5,872.997 5	0.3885		5,882.708 8
Worker	3.8820	2.4233	28.0796	0.0899	10.0040	0.0719	10.0759	2.6531	0.0662	2.7193		8,958.760 6	8,958.760 6	0.2257		8,964.403 4
Total	**4.5063**	**22.8272**	**33.5881**	**0.1447**	**11.4437**	**0.1115**	**11.5552**	**3.0676**	**0.1040**	**3.1716**		**14,831.75 81**	**14,831.75 81**	**0.6142**		**14,847.11 22**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.209 9	2,555.209 9	0.6079		2,570.406 1
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.209 9**	**2,555.209 9**	**0.6079**		**2,570.406 1**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4634	15.3462	4.8851	0.0531	1.4397	0.0186	1.4583	0.4145	0.0178	0.4322		5,693.177 6	5,693.177 6	0.3411		5,701.704 7
Worker	3.6614	2.1920	25.8811	0.0865	10.0040	0.0701	10.0740	2.6531	0.0645	2.7176		8,625.048 6	8,625.048 6	0.2034		8,630.133 2
Total	**4.1248**	**17.5382**	**30.7662**	**0.1396**	**11.4437**	**0.0886**	**11.5323**	**3.0676**	**0.0823**	**3.1498**		**14,318.22 62**	**14,318.22 62**	**0.5445**		**14,331.83 79**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.209 9	2,555.209 9	0.6079		2,570.406 1
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.209 9**	**2,555.209 9**	**0.6079**		**2,570.406 1**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4634	15.3462	4.8851	0.0531	1.4397	0.0186	1.4583	0.4145	0.0178	0.4322		5,693.177 6	5,693.177 6	0.3411		5,701.704 7
Worker	3.6614	2.1920	25.8811	0.0865	10.0040	0.0701	10.0740	2.6531	0.0645	2.7176		8,625.048 6	8,625.048 6	0.2034		8,630.133 2
Total	**4.1248**	**17.5382**	**30.7662**	**0.1396**	**11.4437**	**0.0886**	**11.5323**	**3.0676**	**0.0823**	**3.1498**		**14,318.22 62**	**14,318.22 62**	**0.5445**		**14,331.83 79**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769		2,555.698 9	2,555.698 9	0.6044		2,570.807 7
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**		**2,555.698 9**	**2,555.698 9**	**0.6044**		**2,570.807 7**

3.5 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4531	15.3103	4.7461	0.0529	1.4397	0.0183	1.4580	0.4145	0.0175	0.4319		5,673.4216	5,673.4216	0.3358		5,681.8165
Worker	3.4756	1.9969	24.1243	0.0836	10.0040	0.0691	10.0731	2.6531	0.0636	2.7167		8,339.9905	8,339.9905	0.1862		8,344.6447
Total	**3.9286**	**17.3072**	**28.8704**	**0.1365**	**11.4437**	**0.0874**	**11.5311**	**3.0676**	**0.0811**	**3.1486**		**14,013.4121**	**14,013.4121**	**0.5220**		**14,026.4613**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4716	13.4438	16.1668	0.0270		0.6133	0.6133		0.5769	0.5769	0.0000	2,555.6989	2,555.6989	0.6044		2,570.8077
Total	**1.4716**	**13.4438**	**16.1668**	**0.0270**		**0.6133**	**0.6133**		**0.5769**	**0.5769**	**0.0000**	**2,555.6989**	**2,555.6989**	**0.6044**		**2,570.8077**

3.5 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4531	15.3103	4.7461	0.0529	1.4397	0.0183	1.4580	0.4145	0.0175	0.4319		5,673.4216	5,673.4216	0.3358		5,681.8165
Worker	3.4756	1.9969	24.1243	0.0836	10.0040	0.0691	10.0731	2.6531	0.0636	2.7167		8,339.9905	8,339.9905	0.1862		8,344.6447
Total	**3.9286**	**17.3072**	**28.8704**	**0.1365**	**11.4437**	**0.0874**	**11.5311**	**3.0676**	**0.0811**	**3.1486**		**14,013.4121**	**14,013.4121**	**0.5220**		**14,026.4613**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310		2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**		**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

3.6 Paving - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0583	0.0335	0.4043	1.4000e-003	0.1677	1.1600e-003	0.1688	0.0445	1.0700e-003	0.0455		139.7764	139.7764	3.1200e-003		139.8544
Total	**0.0583**	**0.0335**	**0.4043**	**1.4000e-003**	**0.1677**	**1.1600e-003**	**0.1688**	**0.0445**	**1.0700e-003**	**0.0455**		**139.7764**	**139.7764**	**3.1200e-003**		**139.8544**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9882	9.5246	14.6258	0.0228		0.4685	0.4685		0.4310	0.4310	0.0000	2,207.5472	2,207.5472	0.7140		2,225.3963
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9882**	**9.5246**	**14.6258**	**0.0228**		**0.4685**	**0.4685**		**0.4310**	**0.4310**	**0.0000**	**2,207.5472**	**2,207.5472**	**0.7140**		**2,225.3963**

3.6 Paving - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0583	0.0335	0.4043	1.4000e-003	0.1677	1.1600e-003	0.1688	0.0445	1.0700e-003	0.0455		139.7764	139.7764	3.1200e-003		139.8544
Total	**0.0583**	**0.0335**	**0.4043**	**1.4000e-003**	**0.1677**	**1.1600e-003**	**0.1688**	**0.0445**	**1.0700e-003**	**0.0455**		**139.7764**	**139.7764**	**3.1200e-003**		**139.8544**

3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	129.0298					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**129.2106**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.7 Architectural Coating - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6951	0.3994	4.8249	0.0167	2.0008	0.0138	2.0146	0.5306	0.0127	0.5433		1,667.998 1	1,667.998 1	0.0372		1,668.929 0
Total	**0.6951**	**0.3994**	**4.8249**	**0.0167**	**2.0008**	**0.0138**	**2.0146**	**0.5306**	**0.0127**	**0.5433**		**1,667.998 1**	**1,667.998 1**	**0.0372**		**1,668.929 0**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	129.0298					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**129.2106**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6951	0.3994	4.8249	0.0167	2.0008	0.0138	2.0146	0.5306	0.0127	0.5433		1,667.998 1	1,667.998 1	0.0372		1,668.929 0
Total	**0.6951**	**0.3994**	**4.8249**	**0.0167**	**2.0008**	**0.0138**	**2.0146**	**0.5306**	**0.0127**	**0.5433**		**1,667.998 1**	**1,667.998 1**	**0.0372**		**1,668.929 0**

3.7 Architectural Coating - 2025

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	129.0298					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515		281.4481	281.4481	0.0154		281.8319
Total	**129.2007**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**		**281.4481**	**281.4481**	**0.0154**		**281.8319**

3.7 Architectural Coating - 2025

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6622	0.3652	4.4801	0.0161	2.0008	0.0136	2.0144	0.5306	0.0125	0.5431		1,602.365 4	1,602.365 4	0.0339		1,603.213 4
Total	**0.6622**	**0.3652**	**4.4801**	**0.0161**	**2.0008**	**0.0136**	**2.0144**	**0.5306**	**0.0125**	**0.5431**		**1,602.365 4**	**1,602.365 4**	**0.0339**		**1,603.213 4**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	129.0298					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1709	1.1455	1.8091	2.9700e-003		0.0515	0.0515		0.0515	0.0515	0.0000	281.4481	281.4481	0.0154		281.8319
Total	**129.2007**	**1.1455**	**1.8091**	**2.9700e-003**		**0.0515**	**0.0515**		**0.0515**	**0.0515**	**0.0000**	**281.4481**	**281.4481**	**0.0154**		**281.8319**

3.7 Architectural Coating - 2025

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6622	0.3652	4.4801	0.0161	2.0008	0.0136	2.0144	0.5306	0.0125	0.5431		1,602.365 4	1,602.365 4	0.0339		1,603.213 4
Total	**0.6622**	**0.3652**	**4.4801**	**0.0161**	**2.0008**	**0.0136**	**2.0144**	**0.5306**	**0.0125**	**0.5431**		**1,602.365 4**	**1,602.365 4**	**0.0339**		**1,603.213 4**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	9.0088	44.8918	100.0526	0.4343	43.7142	0.3025	44.0167	11.6910	0.2808	11.9719		44,474.0256	44,474.0256	1.9661		44,523.1780
Unmitigated	9.0088	44.8918	100.0526	0.4343	43.7142	0.3025	44.0167	11.6910	0.2808	11.9719		44,474.0256	44,474.0256	1.9661		44,523.1780

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse High Rise	0.00	0.00	0.00		
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Health Club	0.00	0.00	0.00		
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Hotel	0.00	0.00	0.00		
Strip Mall	0.00	0.00	0.00		
Supermarket	0.00	0.00	0.00		
Unenclosed Parking with Elevator	0.00	0.00	0.00		
User Defined Commercial	8,887.00	8,887.00	8887.00	20,573,760	20,573,760
Total	8,887.00	8,887.00	8,887.00	20,573,760	20,573,760

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Hotel	16.60	8.40	6.90	19.40	61.60	19.00	58	38	4
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15
Supermarket	16.60	8.40	6.90	6.50	74.50	19.00	34	30	36
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
User Defined Commercial	0.00	6.36	0.00	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse High Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Enclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
General Office Building	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Health Club	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
High Turnover (Sit Down Restaurant)	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Hotel	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Strip Mall	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Supermarket	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Unenclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
User Defined Commercial	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.5791	5.1343	3.4661	0.0316		0.4001	0.4001		0.4001	0.4001		6,317.585 1	6,317.585 1	0.1211	0.1158	6,355.127 3
NaturalGas Unmitigated	0.5791	5.1343	3.4661	0.0316		0.4001	0.4001		0.4001	0.4001		6,317.585 1	6,317.585 1	0.1211	0.1158	6,355.127 3

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse High Rise	22166.9	0.2391	2.0428	0.8693	0.0130		0.1652	0.1652		0.1652	0.1652		2,607.8706	2,607.8706	0.0500	0.0478	2,623.3679
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1368.99	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	719.041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22127.7	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Hotel	5584.38	0.0602	0.5475	0.4599	3.2800e-003		0.0416	0.0416		0.0416	0.0416		656.9863	656.9863	0.0126	0.0120	660.8904
Strip Mall	81.7753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1650.72	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.5791**	**5.1343**	**3.4661**	**0.0316**		**0.4001**	**0.4001**		**0.4001**	**0.4001**		**6,317.5851**	**6,317.5851**	**0.1211**	**0.1158**	**6,355.1273**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse High Rise	22.1669	0.2391	2.0428	0.8693	0.0130		0.1652	0.1652		0.1652	0.1652		2,607.8706	2,607.8706	0.0500	0.0478	2,623.3679
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1.36899	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	0.719041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22.1277	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Hotel	5.58438	0.0602	0.5475	0.4599	3.2800e-003		0.0416	0.0416		0.0416	0.0416		656.9863	656.9863	0.0126	0.0120	660.8904
Strip Mall	0.0817753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1.65072	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.5791**	**5.1343**	**3.4661**	**0.0316**		**0.4001**	**0.4001**		**0.4001**	**0.4001**		**6,317.5851**	**6,317.5851**	**0.1211**	**0.1158**	**6,355.1273**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	23.7759	1.1660	61.1448	6.1900e-003		0.3753	0.3753		0.3753	0.3753	0.0000	702.8569	702.8569	0.1173	0.0109	709.0297
Unmitigated	23.7759	1.1660	61.1448	6.1900e-003		0.3753	0.3753		0.3753	0.3753	0.0000	702.8569	702.8569	0.1173	0.0109	709.0297

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.9443					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	19.9348					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0544	0.4645	0.1977	2.9600e-003		0.0376	0.0376		0.0376	0.0376	0.0000	592.9412	592.9412	0.0114	0.0109	596.4647
Landscaping	1.8424	0.7015	60.9472	3.2300e-003		0.3378	0.3378		0.3378	0.3378		109.9157	109.9157	0.1060		112.5649
Total	**23.7759**	**1.1660**	**61.1448**	**6.1900e-003**		**0.3753**	**0.3753**		**0.3753**	**0.3753**	**0.0000**	**702.8569**	**702.8569**	**0.1173**	**0.0109**	**709.0297**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.9443					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	19.9348					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0544	0.4645	0.1977	2.9600e-003		0.0376	0.0376		0.0376	0.0376	0.0000	592.9412	592.9412	0.0114	0.0109	596.4647
Landscaping	1.8424	0.7015	60.9472	3.2300e-003		0.3378	0.3378		0.3378	0.3378		109.9157	109.9157	0.1060		112.5649
Total	**23.7759**	**1.1660**	**61.1448**	**6.1900e-003**		**0.3753**	**0.3753**		**0.3753**	**0.3753**	**0.0000**	**702.8569**	**702.8569**	**0.1173**	**0.0109**	**709.0297**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

1111 Sunset Buildout - No Hotel Option (with PDFs)

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	48.00	1000sqft	1.10	48,000.00	0
User Defined Commercial	1.00	User Defined Unit	0.00	0.00	0
Enclosed Parking with Elevator	485.00	Space	4.36	194,000.00	0
Unenclosed Parking with Elevator	1,210.00	Space	10.89	484,000.00	0
Health Club	14.50	1000sqft	0.33	14,500.00	0
High Turnover (Sit Down Restaurant)	35.00	1000sqft	0.80	35,000.00	0
Condo/Townhouse High Rise	827.00	Dwelling Unit	12.92	851,982.00	1931
Strip Mall	18.20	1000sqft	0.42	18,200.00	0
Supermarket	27.30	1000sqft	0.63	27,300.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2028
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See SWAPE comment regarding the CO2 intensity factor.

Land Use - Consistent with the DEIR's model.

Construction Phase - Operation only.

Off-road Equipment - Operation only.

Trips and VMT - Operation only. Changes to hauling trips unnecessary.

Vehicle Trips - See SWAPE comment regarding weekday operational vehicle trip rates.

Woodstoves - Consistent with the DEIR's model.

Area Mitigation - Consistent with the DEIR's model.

Energy Mitigation - See SWAPE comment regarding operational mitigation measures.

Table Name	Column Name	Default Value	New Value
tblFireplaces	FireplaceDayYear	25.00	100.00
tblFireplaces	FireplaceHourDay	3.00	6.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	702.95	14.00
tblFireplaces	NumberNoFireplace	82.70	0.00
tblFireplaces	NumberWood	41.35	0.00
tblLandUse	LandUseSquareFeet	827,000.00	851,982.00
tblLandUse	Population	2,365.00	1,931.00
tblVehicleTrips	CC_TL	8.40	6.37
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	4.31	0.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	20.87	0.00

tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	42.04	0.00
tblVehicleTrips	ST_TR	177.59	0.00
tblVehicleTrips	ST_TR	0.00	8,358.74
tblVehicleTrips	SU_TR	3.43	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	20.43	0.00
tblVehicleTrips	SU_TR	166.44	0.00
tblVehicleTrips	SU_TR	0.00	8,358.72
tblVehicleTrips	WD_TR	4.18	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	32.93	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	44.32	0.00
tblVehicleTrips	WD_TR	102.24	0.00
tblVehicleTrips	WD_TR	0.00	8,304.00
tblWoodstoves	NumberCatalytic	41.35	0.00
tblWoodstoves	NumberNoncatalytic	41.35	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.4631	3.7500	3.6325	0.0103	0.8907	0.1354	1.0261	0.3184	0.1257	0.4441	0.0000	938.9564	938.9564	0.1150	0.0000	941.8305
2022	0.7724	5.0429	6.7024	0.0230	1.5106	0.1199	1.6305	0.4054	0.1127	0.5181	0.0000	2,115.2857	2,115.2857	0.1441	0.0000	2,118.8885
2023	3.8732	2.6713	4.1062	0.0139	0.9275	0.0709	0.9984	0.2488	0.0665	0.3153	0.0000	1,278.4229	1,278.4229	0.0922	0.0000	1,280.7271
Maximum	**3.8732**	**5.0429**	**6.7024**	**0.0230**	**1.5106**	**0.1354**	**1.6305**	**0.4054**	**0.1257**	**0.5181**	**0.0000**	**2,115.2857**	**2,115.2857**	**0.1441**	**0.0000**	**2,118.8885**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.4631	3.7500	3.6325	0.0103	0.8907	0.1354	1.0261	0.3184	0.1257	0.4441	0.0000	938.9561	938.9561	0.1150	0.0000	941.8302
2022	0.7724	5.0429	6.7024	0.0230	1.5106	0.1199	1.6305	0.4054	0.1127	0.5181	0.0000	2,115.2853	2,115.2853	0.1441	0.0000	2,118.8882
2023	3.8732	2.6713	4.1062	0.0139	0.9275	0.0709	0.9984	0.2488	0.0665	0.3153	0.0000	1,278.4226	1,278.4226	0.0922	0.0000	1,280.7268
Maximum	**3.8732**	**5.0429**	**6.7024**	**0.0230**	**1.5106**	**0.1354**	**1.6305**	**0.4054**	**0.1257**	**0.5181**	**0.0000**	**2,115.2853**	**2,115.2853**	**0.1441**	**0.0000**	**2,118.8882**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	4-22-2021	7-21-2021	1.3462	1.3462
2	7-22-2021	10-21-2021	1.6184	1.6184
3	10-22-2021	1-21-2022	1.5623	1.5623
4	1-22-2022	4-21-2022	1.4332	1.4332
5	4-22-2022	7-21-2022	1.4348	1.4348
6	7-22-2022	10-21-2022	1.4548	1.4548
7	10-22-2022	1-21-2023	1.4169	1.4169
8	1-22-2023	4-21-2023	1.2084	1.2084
9	4-22-2023	7-21-2023	1.2090	1.2090
10	7-22-2023	9-30-2023	1.0652	1.0652
		Highest	1.6184	1.6184

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.2422	0.1216	8.5538	6.0000e-004		0.0492	0.0492		0.0492	0.0492	0.0000	40.8723	40.8723	0.0140	4.9000e-004	41.3686
Energy	0.1000	0.8826	0.5680	5.4600e-003		0.0691	0.0691		0.0691	0.0691	0.0000	6,134.5936	6,134.5936	0.1405	0.0433	6,151.0052
Mobile	1.4899	7.7721	17.2605	0.0752	7.3244	0.0514	7.3758	1.9618	0.0477	2.0096	0.0000	6,983.3101	6,983.3101	0.3011	0.0000	6,990.8382
Waste						0.0000	0.0000		0.0000	0.0000	222.7400	0.0000	222.7400	13.1636	0.0000	551.8288
Water						0.0000	0.0000		0.0000	0.0000	24.9388	825.8392	850.7780	2.5810	0.0645	934.5278
Total	**5.8321**	**8.7762**	**26.3823**	**0.0812**	**7.3244**	**0.1698**	**7.4942**	**1.9618**	**0.1661**	**2.1279**	**247.6787**	**13,984.6152**	**14,232.2939**	**16.2001**	**0.1083**	**14,669.5686**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	4.2394	0.0984	8.5439	4.5000e-004		0.0474	0.0474		0.0474	0.0474	0.0000	13.9769	13.9769	0.0135	0.0000	14.3134
Energy	0.1000	0.8826	0.5680	5.4600e-003		0.0691	0.0691		0.0691	0.0691	0.0000	6,134.5936	6,134.5936	0.1405	0.0433	6,151.0052
Mobile	1.4899	7.7721	17.2605	0.0752	7.3244	0.0514	7.3758	1.9618	0.0477	2.0096	0.0000	6,983.3101	6,983.3101	0.3011	0.0000	6,990.8382
Waste						0.0000	0.0000		0.0000	0.0000	222.7400	0.0000	222.7400	13.1636	0.0000	551.8288
Water						0.0000	0.0000		0.0000	0.0000	24.9388	825.8392	850.7780	2.5810	0.0645	934.5278
Total	**5.8294**	**8.7530**	**26.3724**	**0.0811**	**7.3244**	**0.1679**	**7.4923**	**1.9618**	**0.1642**	**2.1260**	**247.6787**	**13,957.7198**	**14,205.3985**	**16.1996**	**0.1078**	**14,642.5134**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.05**	**0.26**	**0.04**	**0.18**	**0.00**	**1.11**	**0.03**	**0.00**	**1.13**	**0.09**	**0.00**	**0.19**	**0.19**	**0.00**	**0.45**	**0.18**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/22/2021	6/2/2021	5	30	
2	Site Preparation	Site Preparation	6/3/2021	6/30/2021	5	20	
3	Grading	Grading	7/1/2021	9/1/2021	5	45	
4	Building Construction	Building Construction	9/2/2021	8/2/2023	5	500	
5	Paving	Paving	8/3/2023	9/20/2023	5	35	
6	Architectural Coating	Architectural Coating	9/21/2023	11/8/2023	5	35	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 15.25

Residential Indoor: 1,725,264; Residential Outdoor: 575,088; Non-Residential Indoor: 214,500; Non-Residential Outdoor: 71,500; Striped Parking Area: 40,680 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	931.00	223.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	186.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0475	0.4716	0.3235	5.8000e-004		0.0233	0.0233		0.0216	0.0216	0.0000	51.0012	51.0012	0.0144	0.0000	51.3601
Total	**0.0475**	**0.4716**	**0.3235**	**5.8000e-004**		**0.0233**	**0.0233**		**0.0216**	**0.0216**	**0.0000**	**51.0012**	**51.0012**	**0.0144**	**0.0000**	**51.3601**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.4000e-004	6.9000e-004	7.8500e-003	2.0000e-005	2.4700e-003	2.0000e-005	2.4900e-003	6.6000e-004	2.0000e-005	6.7000e-004	0.0000	2.1525	2.1525	6.0000e-005	0.0000	2.1539
Total	**9.4000e-004**	**6.9000e-004**	**7.8500e-003**	**2.0000e-005**	**2.4700e-003**	**2.0000e-005**	**2.4900e-003**	**6.6000e-004**	**2.0000e-005**	**6.7000e-004**	**0.0000**	**2.1525**	**2.1525**	**6.0000e-005**	**0.0000**	**2.1539**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0475	0.4716	0.3235	5.8000e-004		0.0233	0.0233		0.0216	0.0216	0.0000	51.0011	51.0011	0.0144	0.0000	51.3600
Total	**0.0475**	**0.4716**	**0.3235**	**5.8000e-004**		**0.0233**	**0.0233**		**0.0216**	**0.0216**	**0.0000**	**51.0011**	**51.0011**	**0.0144**	**0.0000**	**51.3600**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.4000e-004	6.9000e-004	7.8500e-003	2.0000e-005	2.4700e-003	2.0000e-005	2.4900e-003	6.6000e-004	2.0000e-005	6.7000e-004	0.0000	2.1525	2.1525	6.0000e-005	0.0000	2.1539
Total	**9.4000e-004**	**6.9000e-004**	**7.8500e-003**	**2.0000e-005**	**2.4700e-003**	**2.0000e-005**	**2.4900e-003**	**6.6000e-004**	**2.0000e-005**	**6.7000e-004**	**0.0000**	**2.1525**	**2.1525**	**6.0000e-005**	**0.0000**	**2.1539**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1807	0.0000	0.1807	0.0993	0.0000	0.0993	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0389	0.4050	0.2115	3.8000e-004		0.0204	0.0204		0.0188	0.0188	0.0000	33.4357	33.4357	0.0108	0.0000	33.7061
Total	**0.0389**	**0.4050**	**0.2115**	**3.8000e-004**	**0.1807**	**0.0204**	**0.2011**	**0.0993**	**0.0188**	**0.1181**	**0.0000**	**33.4357**	**33.4357**	**0.0108**	**0.0000**	**33.7061**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5000e-004	5.6000e-004	6.2800e-003	2.0000e-005	1.9700e-003	1.0000e-005	1.9900e-003	5.2000e-004	1.0000e-005	5.4000e-004	0.0000	1.7220	1.7220	5.0000e-005	0.0000	1.7231
Total	**7.5000e-004**	**5.6000e-004**	**6.2800e-003**	**2.0000e-005**	**1.9700e-003**	**1.0000e-005**	**1.9900e-003**	**5.2000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.7220**	**1.7220**	**5.0000e-005**	**0.0000**	**1.7231**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1807	0.0000	0.1807	0.0993	0.0000	0.0993	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0389	0.4050	0.2115	3.8000e-004		0.0204	0.0204		0.0188	0.0188	0.0000	33.4357	33.4357	0.0108	0.0000	33.7060
Total	**0.0389**	**0.4050**	**0.2115**	**3.8000e-004**	**0.1807**	**0.0204**	**0.2011**	**0.0993**	**0.0188**	**0.1181**	**0.0000**	**33.4357**	**33.4357**	**0.0108**	**0.0000**	**33.7060**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.5000e-004	5.6000e-004	6.2800e-003	2.0000e-005	1.9700e-003	1.0000e-005	1.9900e-003	5.2000e-004	1.0000e-005	5.4000e-004	0.0000	1.7220	1.7220	5.0000e-005	0.0000	1.7231
Total	**7.5000e-004**	**5.6000e-004**	**6.2800e-003**	**2.0000e-005**	**1.9700e-003**	**1.0000e-005**	**1.9900e-003**	**5.2000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.7220**	**1.7220**	**5.0000e-005**	**0.0000**	**1.7231**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1952	0.0000	0.1952	0.0809	0.0000	0.0809	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0943	1.0440	0.6948	1.4000e-003		0.0447	0.0447		0.0411	0.0411	0.0000	122.6137	122.6137	0.0397	0.0000	123.6051
Total	**0.0943**	**1.0440**	**0.6948**	**1.4000e-003**	**0.1952**	**0.0447**	**0.2398**	**0.0809**	**0.0411**	**0.1220**	**0.0000**	**122.6137**	**122.6137**	**0.0397**	**0.0000**	**123.6051**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8700e-003	1.3900e-003	0.0157	5.0000e-005	4.9400e-003	4.0000e-005	4.9700e-003	1.3100e-003	3.0000e-005	1.3500e-003	0.0000	4.3049	4.3049	1.2000e-004	0.0000	4.3078
Total	**1.8700e-003**	**1.3900e-003**	**0.0157**	**5.0000e-005**	**4.9400e-003**	**4.0000e-005**	**4.9700e-003**	**1.3100e-003**	**3.0000e-005**	**1.3500e-003**	**0.0000**	**4.3049**	**4.3049**	**1.2000e-004**	**0.0000**	**4.3078**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1952	0.0000	0.1952	0.0809	0.0000	0.0809	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0943	1.0440	0.6948	1.4000e-003		0.0447	0.0447		0.0411	0.0411	0.0000	122.6136	122.6136	0.0397	0.0000	123.6050
Total	**0.0943**	**1.0440**	**0.6948**	**1.4000e-003**	**0.1952**	**0.0447**	**0.2398**	**0.0809**	**0.0411**	**0.1220**	**0.0000**	**122.6136**	**122.6136**	**0.0397**	**0.0000**	**123.6050**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.8700e-003	1.3900e-003	0.0157	5.0000e-005	4.9400e-003	4.0000e-005	4.9700e-003	1.3100e-003	3.0000e-005	1.3500e-003	0.0000	4.3049	4.3049	1.2000e-004	0.0000	4.3078
Total	**1.8700e-003**	**1.3900e-003**	**0.0157**	**5.0000e-005**	**4.9400e-003**	**4.0000e-005**	**4.9700e-003**	**1.3100e-003**	**3.0000e-005**	**1.3500e-003**	**0.0000**	**4.3049**	**4.3049**	**1.2000e-004**	**0.0000**	**4.3078**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0827	0.7583	0.7210	1.1700e-003		0.0417	0.0417		0.0392	0.0392	0.0000	100.7622	100.7622	0.0243	0.0000	101.3700
Total	**0.0827**	**0.7583**	**0.7210**	**1.1700e-003**		**0.0417**	**0.0417**		**0.0392**	**0.0392**	**0.0000**	**100.7622**	**100.7622**	**0.0243**	**0.0000**	**101.3700**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0279	0.9436	0.2385	2.4300e-003	0.0611	1.9200e-003	0.0631	0.0176	1.8400e-003	0.0195	0.0000	235.5345	235.5345	0.0152	0.0000	235.9141
Worker	0.1683	0.1249	1.4134	4.2900e-003	0.4443	3.3500e-003	0.4477	0.1180	3.0900e-003	0.1211	0.0000	387.4297	387.4297	0.0104	0.0000	387.6904
Total	**0.1962**	**1.0685**	**1.6518**	**6.7200e-003**	**0.5055**	**5.2700e-003**	**0.5107**	**0.1356**	**4.9300e-003**	**0.1406**	**0.0000**	**622.9642**	**622.9642**	**0.0256**	**0.0000**	**623.6045**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0827	0.7583	0.7210	1.1700e-003		0.0417	0.0417		0.0392	0.0392	0.0000	100.7621	100.7621	0.0243	0.0000	101.3698
Total	**0.0827**	**0.7583**	**0.7210**	**1.1700e-003**		**0.0417**	**0.0417**		**0.0392**	**0.0392**	**0.0000**	**100.7621**	**100.7621**	**0.0243**	**0.0000**	**101.3698**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0279	0.9436	0.2385	2.4300e-003	0.0611	1.9200e-003	0.0631	0.0176	1.8400e-003	0.0195	0.0000	235.5345	235.5345	0.0152	0.0000	235.9141
Worker	0.1683	0.1249	1.4134	4.2900e-003	0.4443	3.3500e-003	0.4477	0.1180	3.0900e-003	0.1211	0.0000	387.4297	387.4297	0.0104	0.0000	387.6904
Total	**0.1962**	**1.0685**	**1.6518**	**6.7200e-003**	**0.5055**	**5.2700e-003**	**0.5107**	**0.1356**	**4.9300e-003**	**0.1406**	**0.0000**	**622.9642**	**622.9642**	**0.0256**	**0.0000**	**623.6045**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2428	301.2428	0.0722	0.0000	303.0471
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2428**	**301.2428**	**0.0722**	**0.0000**	**303.0471**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0782	2.6756	0.6747	7.1800e-003	0.1827	5.0000e-003	0.1877	0.0527	4.7800e-003	0.0575	0.0000	697.6782	697.6782	0.0438	0.0000	698.7732
Worker	0.4724	0.3372	3.9005	0.0124	1.3279	9.7300e-003	1.3376	0.3527	8.9600e-003	0.3616	0.0000	1,116.3647	1,116.3647	0.0282	0.0000	1,117.0683
Total	**0.5506**	**3.0129**	**4.5752**	**0.0195**	**1.5106**	**0.0147**	**1.5253**	**0.4054**	**0.0137**	**0.4191**	**0.0000**	**1,814.0429**	**1,814.0429**	**0.0720**	**0.0000**	**1,815.8415**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2218	2.0300	2.1272	3.5000e-003		0.1052	0.1052		0.0990	0.0990	0.0000	301.2425	301.2425	0.0722	0.0000	303.0467
Total	**0.2218**	**2.0300**	**2.1272**	**3.5000e-003**		**0.1052**	**0.1052**		**0.0990**	**0.0990**	**0.0000**	**301.2425**	**301.2425**	**0.0722**	**0.0000**	**303.0467**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0782	2.6756	0.6747	7.1800e-003	0.1827	5.0000e-003	0.1877	0.0527	4.7800e-003	0.0575	0.0000	697.6782	697.6782	0.0438	0.0000	698.7732
Worker	0.4724	0.3372	3.9005	0.0124	1.3279	9.7300e-003	1.3376	0.3527	8.9600e-003	0.3616	0.0000	1,116.364 7	1,116.364 7	0.0282	0.0000	1,117.068 3
Total	**0.5506**	**3.0129**	**4.5752**	**0.0195**	**1.5106**	**0.0147**	**1.5253**	**0.4054**	**0.0137**	**0.4191**	**0.0000**	**1,814.042 9**	**1,814.042 9**	**0.0720**	**0.0000**	**1,815.841 5**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1203	1.1004	1.2427	2.0600e-003		0.0535	0.0535		0.0504	0.0504	0.0000	177.3306	177.3306	0.0422	0.0000	178.3852
Total	**0.1203**	**1.1004**	**1.2427**	**2.0600e-003**		**0.0535**	**0.0535**		**0.0504**	**0.0504**	**0.0000**	**177.3306**	**177.3306**	**0.0422**	**0.0000**	**178.3852**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0342	1.1813	0.3558	4.0900e-003	0.1075	1.3700e-003	0.1089	0.0310	1.3100e-003	0.0323	0.0000	397.8815	397.8815	0.0227	0.0000	398.4495
Worker	0.2617	0.1795	2.1163	6.9900e-003	0.7814	5.5700e-003	0.7870	0.2075	5.1300e-003	0.2127	0.0000	632.4595	632.4595	0.0149	0.0000	632.8327
Total	**0.2959**	**1.3608**	**2.4721**	**0.0111**	**0.8889**	**6.9400e-003**	**0.8959**	**0.2385**	**6.4400e-003**	**0.2450**	**0.0000**	**1,030.3410**	**1,030.3410**	**0.0377**	**0.0000**	**1,031.2821**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1203	1.1004	1.2427	2.0600e-003		0.0535	0.0535		0.0504	0.0504	0.0000	177.3304	177.3304	0.0422	0.0000	178.3850
Total	**0.1203**	**1.1004**	**1.2427**	**2.0600e-003**		**0.0535**	**0.0535**		**0.0504**	**0.0504**	**0.0000**	**177.3304**	**177.3304**	**0.0422**	**0.0000**	**178.3850**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0342	1.1813	0.3558	4.0900e-003	0.1075	1.3700e-003	0.1089	0.0310	1.3100e-003	0.0323	0.0000	397.8815	397.8815	0.0227	0.0000	398.4495
Worker	0.2617	0.1795	2.1163	6.9900e-003	0.7814	5.5700e-003	0.7870	0.2075	5.1300e-003	0.2127	0.0000	632.4595	632.4595	0.0149	0.0000	632.8327
Total	**0.2959**	**1.3608**	**2.4721**	**0.0111**	**0.8889**	**6.9400e-003**	**0.8959**	**0.2385**	**6.4400e-003**	**0.2450**	**0.0000**	**1,030.3410**	**1,030.3410**	**0.0377**	**0.0000**	**1,031.2821**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0181	0.1784	0.2552	4.0000e-004		8.9300e-003	8.9300e-003		8.2100e-003	8.2100e-003	0.0000	35.0470	35.0470	0.0113	0.0000	35.3304
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0181**	**0.1784**	**0.2552**	**4.0000e-004**		**8.9300e-003**	**8.9300e-003**		**8.2100e-003**	**8.2100e-003**	**0.0000**	**35.0470**	**35.0470**	**0.0113**	**0.0000**	**35.3304**

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.6000e-004	6.6000e-004	7.8000e-003	3.0000e-005	2.8800e-003	2.0000e-005	2.9000e-003	7.6000e-004	2.0000e-005	7.8000e-004	0.0000	2.3311	2.3311	6.0000e-005	0.0000	2.3324
Total	**9.6000e-004**	**6.6000e-004**	**7.8000e-003**	**3.0000e-005**	**2.8800e-003**	**2.0000e-005**	**2.9000e-003**	**7.6000e-004**	**2.0000e-005**	**7.8000e-004**	**0.0000**	**2.3311**	**2.3311**	**6.0000e-005**	**0.0000**	**2.3324**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0181	0.1784	0.2552	4.0000e-004		8.9300e-003	8.9300e-003		8.2100e-003	8.2100e-003	0.0000	35.0470	35.0470	0.0113	0.0000	35.3304
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0181**	**0.1784**	**0.2552**	**4.0000e-004**		**8.9300e-003**	**8.9300e-003**		**8.2100e-003**	**8.2100e-003**	**0.0000**	**35.0470**	**35.0470**	**0.0113**	**0.0000**	**35.3304**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.6000e-004	6.6000e-004	7.8000e-003	3.0000e-005	2.8800e-003	2.0000e-005	2.9000e-003	7.6000e-004	2.0000e-005	7.8000e-004	0.0000	2.3311	2.3311	6.0000e-005	0.0000	2.3324
Total	**9.6000e-004**	**6.6000e-004**	**7.8000e-003**	**3.0000e-005**	**2.8800e-003**	**2.0000e-005**	**2.9000e-003**	**7.6000e-004**	**2.0000e-005**	**7.8000e-004**	**0.0000**	**2.3311**	**2.3311**	**6.0000e-005**	**0.0000**	**2.3324**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.4226					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3500e-003	0.0228	0.0317	5.0000e-005		1.2400e-003	1.2400e-003		1.2400e-003	1.2400e-003	0.0000	4.4682	4.4682	2.7000e-004	0.0000	4.4749
Total	**3.4260**	**0.0228**	**0.0317**	**5.0000e-005**		**1.2400e-003**	**1.2400e-003**		**1.2400e-003**	**1.2400e-003**	**0.0000**	**4.4682**	**4.4682**	**2.7000e-004**	**0.0000**	**4.4749**

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0120	8.2100e-003	0.0967	3.2000e-004	0.0357	2.5000e-004	0.0360	9.4800e-003	2.3000e-004	9.7200e-003	0.0000	28.9050	28.9050	6.8000e-004	0.0000	28.9220
Total	**0.0120**	**8.2100e-003**	**0.0967**	**3.2000e-004**	**0.0357**	**2.5000e-004**	**0.0360**	**9.4800e-003**	**2.3000e-004**	**9.7200e-003**	**0.0000**	**28.9050**	**28.9050**	**6.8000e-004**	**0.0000**	**28.9220**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.4226					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3500e-003	0.0228	0.0317	5.0000e-005		1.2400e-003	1.2400e-003		1.2400e-003	1.2400e-003	0.0000	4.4682	4.4682	2.7000e-004	0.0000	4.4749
Total	**3.4260**	**0.0228**	**0.0317**	**5.0000e-005**		**1.2400e-003**	**1.2400e-003**		**1.2400e-003**	**1.2400e-003**	**0.0000**	**4.4682**	**4.4682**	**2.7000e-004**	**0.0000**	**4.4749**

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0120	8.2100e-003	0.0967	3.2000e-004	0.0357	2.5000e-004	0.0360	9.4800e-003	2.3000e-004	9.7200e-003	0.0000	28.9050	28.9050	6.8000e-004	0.0000	28.9220
Total	**0.0120**	**8.2100e-003**	**0.0967**	**3.2000e-004**	**0.0357**	**2.5000e-004**	**0.0360**	**9.4800e-003**	**2.3000e-004**	**9.7200e-003**	**0.0000**	**28.9050**	**28.9050**	**6.8000e-004**	**0.0000**	**28.9220**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.4899	7.7721	17.2605	0.0752	7.3244	0.0514	7.3758	1.9618	0.0477	2.0096	0.0000	6,983.3101	6,983.3101	0.3011	0.0000	6,990.8382
Unmitigated	1.4899	7.7721	17.2605	0.0752	7.3244	0.0514	7.3758	1.9618	0.0477	2.0096	0.0000	6,983.3101	6,983.3101	0.3011	0.0000	6,990.8382

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse High Rise	0.00	0.00	0.00		
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Health Club	0.00	0.00	0.00		
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Strip Mall	0.00	0.00	0.00		
Supermarket	0.00	0.00	0.00		
Unenclosed Parking with Elevator	0.00	0.00	0.00		
User Defined Commercial	8,304.00	8,358.74	8358.72	19,290,576	19,290,576
Total	8,304.00	8,358.74	8,358.72	19,290,576	19,290,576

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15
Supermarket	16.60	8.40	6.90	6.50	74.50	19.00	34	30	36
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
User Defined Commercial	0.00	6.37	0.00	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse High Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Enclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
General Office Building	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Health Club	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
High Turnover (Sit Down Restaurant)	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Strip Mall	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Supermarket	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Unenclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
User Defined Commercial	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	5,144.692 6	5,144.692 6	0.1215	0.0251	5,155.221 7
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	5,144.692 6	5,144.692 6	0.1215	0.0251	5,155.221 7
NaturalGas Mitigated	0.1000	0.8826	0.5680	5.4600e-003		0.0691	0.0691		0.0691	0.0691	0.0000	989.9010	989.9010	0.0190	0.0182	995.7835
NaturalGas Unmitigated	0.1000	0.8826	0.5680	5.4600e-003		0.0691	0.0691		0.0691	0.0691	0.0000	989.9010	989.9010	0.0190	0.0182	995.7835

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Condo/Townhouse High Rise	9.07895e +006	0.0490	0.4183	0.1780	2.6700e-003		0.0338	0.0338		0.0338	0.0338	0.0000	484.4876	484.4876	9.2900e-003	8.8800e-003	487.3667
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	499680	2.6900e-003	0.0245	0.0206	1.5000e-004		1.8600e-003	1.8600e-003		1.8600e-003	1.8600e-003	0.0000	26.6648	26.6648	5.1000e-004	4.9000e-004	26.8233
Health Club	262450	1.4200e-003	0.0129	0.0108	8.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	14.0053	14.0053	2.7000e-004	2.6000e-004	14.0886
High Turnover (Sit Down Restaurant)	8.0766e +006	0.0436	0.3959	0.3326	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	430.9981	430.9981	8.2600e-003	7.9000e-003	433.5593
Strip Mall	29848	1.6000e-004	1.4600e-003	1.2300e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5928	1.5928	3.0000e-005	3.0000e-005	1.6023
Supermarket	602511	3.2500e-003	0.0295	0.0248	1.8000e-004		2.2400e-003	2.2400e-003		2.2400e-003	2.2400e-003	0.0000	32.1523	32.1523	6.2000e-004	5.9000e-004	32.3434
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1000**	**0.8826**	**0.5680**	**5.4700e-003**		**0.0691**	**0.0691**		**0.0691**	**0.0691**	**0.0000**	**989.9010**	**989.9010**	**0.0190**	**0.0182**	**995.7835**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Condo/Townhouse High Rise	9.07895e+006	0.0490	0.4183	0.1780	2.6700e-003		0.0338	0.0338		0.0338	0.0338	0.0000	484.4876	484.4876	9.2900e-003	8.8800e-003	487.3667
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	499680	2.6900e-003	0.0245	0.0206	1.5000e-004		1.8600e-003	1.8600e-003		1.8600e-003	1.8600e-003	0.0000	26.6648	26.6648	5.1000e-004	4.9000e-004	26.8233
Health Club	262450	1.4200e-003	0.0129	0.0108	8.0000e-005		9.8000e-004	9.8000e-004		9.8000e-004	9.8000e-004	0.0000	14.0053	14.0053	2.7000e-004	2.6000e-004	14.0886
High Turnover (Sit Down Restaurant)	8.0766e+006	0.0436	0.3959	0.3326	2.3800e-003		0.0301	0.0301		0.0301	0.0301	0.0000	430.9981	430.9981	8.2600e-003	7.9000e-003	433.5593
Strip Mall	29848	1.6000e-004	1.4600e-003	1.2300e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5928	1.5928	3.0000e-005	3.0000e-005	1.6023
Supermarket	602511	3.2500e-003	0.0295	0.0248	1.8000e-004		2.2400e-003	2.2400e-003		2.2400e-003	2.2400e-003	0.0000	32.1523	32.1523	6.2000e-004	5.9000e-004	32.3434
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.1000**	**0.8826**	**0.5680**	**5.4700e-003**		**0.0691**	**0.0691**		**0.0691**	**0.0691**	**0.0000**	**989.9010**	**989.9010**	**0.0190**	**0.0182**	**995.7835**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse High Rise	3.56709e+006	1,986.7324	0.0469	9.7100e-003	1,990.7984
Enclosed Parking with Elevator	1.13684e+006	633.1762	0.0150	3.0900e-003	634.4720
General Office Building	623520	347.2767	8.2000e-003	1.7000e-003	347.9874
Health Club	160950	89.6430	2.1200e-003	4.4000e-004	89.8264
High Turnover (Sit Down Restaurant)	1.5449e+006	860.4499	0.0203	4.2000e-003	862.2109
Strip Mall	245700	136.8455	3.2300e-003	6.7000e-004	137.1255
Supermarket	1.01911e+006	567.6045	0.0134	2.7700e-003	568.7662
Unenclosed Parking with Elevator	938960	522.9646	0.0124	2.5600e-003	524.0349
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000
Total		**5,144.6926**	**0.1215**	**0.0251**	**5,155.2217**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Condo/Townhouse High Rise	3.56709e+006	1,986.7324	0.0469	9.7100e-003	1,990.7984
Enclosed Parking with Elevator	1.13684e+006	633.1762	0.0150	3.0900e-003	634.4720
General Office Building	623520	347.2767	8.2000e-003	1.7000e-003	347.9874
Health Club	160950	89.6430	2.1200e-003	4.4000e-004	89.8264
High Turnover (Sit Down Restaurant)	1.5449e+006	860.4499	0.0203	4.2000e-003	862.2109
Strip Mall	245700	136.8455	3.2300e-003	6.7000e-004	137.1255
Supermarket	1.01911e+006	567.6045	0.0134	2.7700e-003	568.7662
Unenclosed Parking with Elevator	938960	522.9646	0.0124	2.5600e-003	524.0349
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000
Total		**5,144.6926**	**0.1215**	**0.0251**	**5,155.2217**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	4.2394	0.0984	8.5439	4.5000e-004		0.0474	0.0474		0.0474	0.0474	0.0000	13.9769	13.9769	0.0135	0.0000	14.3134
Unmitigated	4.2422	0.1216	8.5538	6.0000e-004		0.0492	0.0492		0.0492	0.0492	0.0000	40.8723	40.8723	0.0140	4.9000e-004	41.3686

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3423					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.6392					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	2.7200e-003	0.0232	9.8800e-003	1.5000e-004		1.8800e-003	1.8800e-003		1.8800e-003	1.8800e-003	0.0000	26.8954	26.8954	5.2000e-004	4.9000e-004	27.0552
Landscaping	0.2580	0.0984	8.5439	4.5000e-004		0.0474	0.0474		0.0474	0.0474	0.0000	13.9769	13.9769	0.0135	0.0000	14.3134
Total	**4.2422**	**0.1216**	**8.5538**	**6.0000e-004**		**0.0492**	**0.0492**		**0.0492**	**0.0492**	**0.0000**	**40.8723**	**40.8723**	**0.0140**	**4.9000e-004**	**41.3686**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3423					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.6392					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.2580	0.0984	8.5439	4.5000e-004		0.0474	0.0474		0.0474	0.0474	0.0000	13.9769	13.9769	0.0135	0.0000	14.3134
Total	**4.2394**	**0.0984**	**8.5439**	**4.5000e-004**		**0.0474**	**0.0474**		**0.0474**	**0.0474**	**0.0000**	**13.9769**	**13.9769**	**0.0135**	**0.0000**	**14.3134**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	850.7780	2.5810	0.0645	934.5278
Unmitigated	850.7780	2.5810	0.0645	934.5278

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse High Rise	53.8824 / 33.9693	618.0568	1.7700	0.0444	675.5350
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	8.53122 / 5.22881	96.9317	0.2802	7.0200e-003	106.0304
Health Club	0.857576 / 0.525611	9.7438	0.0282	7.1000e-004	10.6584
High Turnover (Sit Down Restaurant)	10.6237 / 0.678107	84.6114	0.3481	8.5700e-003	95.8678
Strip Mall	1.34812 / 0.826267	15.3173	0.0443	1.1100e-003	16.7551
Supermarket	3.36522 / 0.104079	26.1169	0.1103	2.7100e-003	29.6812
Unenclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**850.7780**	**2.5810**	**0.0645**	**934.5278**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Condo/Townhouse High Rise	53.8824 / 33.9693	618.0568	1.7700	0.0444	675.5350
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
General Office Building	8.53122 / 5.22881	96.9317	0.2802	7.0200e-003	106.0304
Health Club	0.857576 / 0.525611	9.7438	0.0282	7.1000e-004	10.6584
High Turnover (Sit Down Restaurant)	10.6237 / 0.678107	84.6114	0.3481	8.5700e-003	95.8678
Strip Mall	1.34812 / 0.826267	15.3173	0.0443	1.1100e-003	16.7551
Supermarket	3.36522 / 0.104079	26.1169	0.1103	2.7100e-003	29.6812
Unenclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**850.7780**	**2.5810**	**0.0645**	**934.5278**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	222.7400	13.1636	0.0000	551.8288
Unmitigated	222.7400	13.1636	0.0000	551.8288

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse High Rise	380.42	77.2218	4.5637	0.0000	191.3138
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	44.64	9.0615	0.5355	0.0000	22.4495
Health Club	82.65	16.7772	0.9915	0.0000	41.5648
High Turnover (Sit Down Restaurant)	416.5	84.5457	4.9965	0.0000	209.4585
Strip Mall	19.11	3.8792	0.2293	0.0000	9.6105
Supermarket	153.97	31.2545	1.8471	0.0000	77.4318
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000
Total		**222.7400**	**13.1636**	**0.0000**	**551.8288**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Condo/Townhouse High Rise	380.42	77.2218	4.5637	0.0000	191.3138
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
General Office Building	44.64	9.0615	0.5355	0.0000	22.4495
Health Club	82.65	16.7772	0.9915	0.0000	41.5648
High Turnover (Sit Down Restaurant)	416.5	84.5457	4.9965	0.0000	209.4585
Strip Mall	19.11	3.8792	0.2293	0.0000	9.6105
Supermarket	153.97	31.2545	1.8471	0.0000	77.4318
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000
Total		**222.7400**	**13.1636**	**0.0000**	**551.8288**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

1111 Sunset Buildout - No Hotel Option (with PDFs)

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	48.00	1000sqft	1.10	48,000.00	0
User Defined Commercial	1.00	User Defined Unit	0.00	0.00	0
Enclosed Parking with Elevator	485.00	Space	4.36	194,000.00	0
Unenclosed Parking with Elevator	1,210.00	Space	10.89	484,000.00	0
Health Club	14.50	1000sqft	0.33	14,500.00	0
High Turnover (Sit Down Restaurant)	35.00	1000sqft	0.80	35,000.00	0
Condo/Townhouse High Rise	827.00	Dwelling Unit	12.92	851,982.00	1931
Strip Mall	18.20	1000sqft	0.42	18,200.00	0
Supermarket	27.30	1000sqft	0.63	27,300.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2028
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See SWAPE comment regarding the CO2 intensity factor.

Land Use - Consistent with the DEIR's model.

Construction Phase - Operation only.

Off-road Equipment - Operation only.

Trips and VMT - Operation only. Changes to hauling trips unnecessary.

Vehicle Trips - See SWAPE comment regarding weekday operational vehicle trip rates.

Woodstoves - Consistent with the DEIR's model.

Area Mitigation - Consistent with the DEIR's model.

Energy Mitigation - See SWAPE comment regarding operational mitigation measures.

Table Name	Column Name	Default Value	New Value
tblFireplaces	FireplaceDayYear	25.00	100.00
tblFireplaces	FireplaceHourDay	3.00	6.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	702.95	14.00
tblFireplaces	NumberNoFireplace	82.70	0.00
tblFireplaces	NumberWood	41.35	0.00
tblLandUse	LandUseSquareFeet	827,000.00	851,982.00
tblLandUse	Population	2,365.00	1,931.00
tblVehicleTrips	CC_TL	8.40	6.37
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	4.31	0.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	20.87	0.00

tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	42.04	0.00
tblVehicleTrips	ST_TR	177.59	0.00
tblVehicleTrips	ST_TR	0.00	8,358.74
tblVehicleTrips	SU_TR	3.43	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	20.43	0.00
tblVehicleTrips	SU_TR	166.44	0.00
tblVehicleTrips	SU_TR	0.00	8,358.72
tblVehicleTrips	WD_TR	4.18	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	32.93	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	44.32	0.00
tblVehicleTrips	WD_TR	102.24	0.00
tblVehicleTrips	WD_TR	0.00	8,304.00
tblWoodstoves	NumberCatalytic	41.35	0.00
tblWoodstoves	NumberNoncatalytic	41.35	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.4247	46.4544	56.7169	0.1868	18.2675	2.0460	20.3134	9.9840	1.8823	11.8663	0.0000	18,896.1725	18,896.1725	1.9488	0.0000	18,927.8504
2022	5.9502	38.1964	53.5991	0.1825	11.8333	0.9218	12.7551	3.1706	0.8663	4.0369	0.0000	18,475.2095	18,475.2095	1.2236	0.0000	18,505.7986
2023	196.4563	31.7546	50.5276	0.1770	11.8333	0.7901	12.6234	3.1706	0.7423	3.9129	0.0000	17,920.1405	17,920.1405	1.1531	0.0000	17,948.9668
Maximum	**196.4563**	**46.4544**	**56.7169**	**0.1868**	**18.2675**	**2.0460**	**20.3134**	**9.9840**	**1.8823**	**11.8663**	**0.0000**	**18,896.1725**	**18,896.1725**	**1.9488**	**0.0000**	**18,927.8504**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.4247	46.4544	56.7169	0.1868	18.2675	2.0460	20.3134	9.9840	1.8823	11.8663	0.0000	18,896.1725	18,896.1725	1.9488	0.0000	18,927.8504
2022	5.9502	38.1964	53.5991	0.1825	11.8333	0.9218	12.7551	3.1706	0.8663	4.0369	0.0000	18,475.2095	18,475.2095	1.2236	0.0000	18,505.7986
2023	196.4563	31.7546	50.5276	0.1770	11.8333	0.7901	12.6234	3.1706	0.7423	3.9129	0.0000	17,920.1405	17,920.1405	1.1531	0.0000	17,948.9668
Maximum	**196.4563**	**46.4544**	**56.7169**	**0.1868**	**18.2675**	**2.0460**	**20.3134**	**9.9840**	**1.8823**	**11.8663**	**0.0000**	**18,896.1725**	**18,896.1725**	**1.9488**	**0.0000**	**18,927.8504**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	23.9344	1.2513	68.5488	6.5800e-003		0.4164	0.4164		0.4164	0.4164	0.0000	716.1964	716.1964	0.1301	0.0109	722.6873
Energy	0.5481	4.8362	3.1124	0.0299		0.3787	0.3787		0.3787	0.3787		5,979.0633	5,979.0633	0.1146	0.1096	6,014.5939
Mobile	8.8974	41.8935	98.9471	0.4310	41.1804	0.2836	41.4640	11.0134	0.2633	11.2766		44,116.4759	44,116.4759	1.8317		44,162.2688
Total	**33.3799**	**47.9811**	**170.6082**	**0.4675**	**41.1804**	**1.0787**	**42.2591**	**11.0134**	**1.0584**	**12.0718**	**0.0000**	**50,811.7356**	**50,811.7356**	**2.0764**	**0.1205**	**50,899.5499**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	23.8800	0.7869	68.3512	3.6200e-003		0.3789	0.3789		0.3789	0.3789	0.0000	123.2552	123.2552	0.1187	0.0000	126.2225
Energy	0.5481	4.8362	3.1124	0.0299		0.3787	0.3787		0.3787	0.3787		5,979.0633	5,979.0633	0.1146	0.1096	6,014.5939
Mobile	8.8974	41.8935	98.9471	0.4310	41.1804	0.2836	41.4640	11.0134	0.2633	11.2766		44,116.4759	44,116.4759	1.8317		44,162.2688
Total	**33.3255**	**47.5166**	**170.4106**	**0.4645**	**41.1804**	**1.0412**	**42.2216**	**11.0134**	**1.0208**	**12.0342**	**0.0000**	**50,218.7944**	**50,218.7944**	**2.0650**	**0.1096**	**50,303.0852**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.16	0.97	0.12	0.63	0.00	3.48	0.09	0.00	3.55	0.31	0.00	1.17	1.17	0.55	9.02	1.17

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/22/2021	6/2/2021	5	30	
2	Site Preparation	Site Preparation	6/3/2021	6/30/2021	5	20	
3	Grading	Grading	7/1/2021	9/1/2021	5	45	
4	Building Construction	Building Construction	9/2/2021	8/2/2023	5	500	
5	Paving	Paving	8/3/2023	9/20/2023	5	35	
6	Architectural Coating	Architectural Coating	9/21/2023	11/8/2023	5	35	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 15.25

Residential Indoor: 1,725,264; Residential Outdoor: 575,088; Non-Residential Indoor: 214,500; Non-Residential Outdoor: 71,500; Striped Parking Area: 40,680 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	931.00	223.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	186.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**		**1.5513**	**1.5513**		**1.4411**	**1.4411**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.0628**	**0.0410**	**0.5632**	**1.6700e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**166.0347**	**166.0347**	**4.4800e-003**		**166.1466**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**		**1.5513**	**1.5513**		**1.4411**	**1.4411**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0628	0.0410	0.5632	1.6700e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		166.0347	166.0347	4.4800e-003		166.1466
Total	**0.0628**	**0.0410**	**0.5632**	**1.6700e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**166.0347**	**166.0347**	**4.4800e-003**		**166.1466**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0753	0.0491	0.6758	2.0000e-003	0.2012	1.4900e-003	0.2027	0.0534	1.3700e-003	0.0547		199.2417	199.2417	5.3700e-003		199.3759
Total	**0.0753**	**0.0491**	**0.6758**	**2.0000e-003**	**0.2012**	**1.4900e-003**	**0.2027**	**0.0534**	**1.3700e-003**	**0.0547**		**199.2417**	**199.2417**	**5.3700e-003**		**199.3759**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0753	0.0491	0.6758	2.0000e-003	0.2012	1.4900e-003	0.2027	0.0534	1.3700e-003	0.0547		199.2417	199.2417	5.3700e-003		199.3759
Total	**0.0753**	**0.0491**	**0.6758**	**2.0000e-003**	**0.2012**	**1.4900e-003**	**0.2027**	**0.0534**	**1.3700e-003**	**0.0547**		**199.2417**	**199.2417**	**5.3700e-003**		**199.3759**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**0.0837**	**0.0546**	**0.7509**	**2.2200e-003**	**0.2236**	**1.6500e-003**	**0.2252**	**0.0593**	**1.5200e-003**	**0.0608**		**221.3797**	**221.3797**	**5.9700e-003**		**221.5288**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0837	0.0546	0.7509	2.2200e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		221.3797	221.3797	5.9700e-003		221.5288
Total	**0.0837**	**0.0546**	**0.7509**	**2.2200e-003**	**0.2236**	**1.6500e-003**	**0.2252**	**0.0593**	**1.5200e-003**	**0.0608**		**221.3797**	**221.3797**	**5.9700e-003**		**221.5288**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6274	21.3561	5.1856	0.0564	1.4269	0.0436	1.4705	0.4108	0.0417	0.4525		6,037.585 6	6,037.585 6	0.3734		6,046.919 3
Worker	3.8963	2.5414	34.9562	0.1034	10.4064	0.0770	10.4834	2.7598	0.0709	2.8308		10,305.22 30	10,305.22 30	0.2778		10,312.16 68
Total	**4.5237**	**23.8975**	**40.1417**	**0.1598**	**11.8333**	**0.1206**	**11.9539**	**3.1706**	**0.1126**	**3.2832**		**16,342.80 86**	**16,342.80 86**	**0.6511**		**16,359.08 61**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.363 9	2,553.363 9	0.6160		2,568.764 3
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.363 9**	**2,553.363 9**	**0.6160**		**2,568.764 3**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6274	21.3561	5.1856	0.0564	1.4269	0.0436	1.4705	0.4108	0.0417	0.4525		6,037.585 6	6,037.585 6	0.3734		6,046.919 3
Worker	3.8963	2.5414	34.9562	0.1034	10.4064	0.0770	10.4834	2.7598	0.0709	2.8308		10,305.22 30	10,305.22 30	0.2778		10,312.16 68
Total	**4.5237**	**23.8975**	**40.1417**	**0.1598**	**11.8333**	**0.1206**	**11.9539**	**3.1706**	**0.1126**	**3.2832**		**16,342.80 86**	**16,342.80 86**	**0.6511**		**16,359.08 61**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.333 6	2,554.333 6	0.6120		2,569.632 2
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.333 6**	**2,554.333 6**	**0.6120**		**2,569.632 2**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5888	20.2849	4.9098	0.0559	1.4269	0.0379	1.4649	0.4108	0.0363	0.4471		5,984.656 1	5,984.656 1	0.3605		5,993.669 2
Worker	3.6552	2.2959	32.3259	0.0997	10.4064	0.0748	10.4812	2.7598	0.0689	2.8287		9,936.219 9	9,936.219 9	0.2511		9,942.497 2
Total	**4.2440**	**22.5808**	**37.2357**	**0.1556**	**11.8333**	**0.1128**	**11.9461**	**3.1706**	**0.1052**	**3.2758**		**15,920.87 60**	**15,920.87 60**	**0.6116**		**15,936.16 64**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.333 6	2,554.333 6	0.6120		2,569.632 2
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.333 6**	**2,554.333 6**	**0.6120**		**2,569.632 2**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5888	20.2849	4.9098	0.0559	1.4269	0.0379	1.4649	0.4108	0.0363	0.4471		5,984.6561	5,984.6561	0.3605		5,993.6692
Worker	3.6552	2.2959	32.3259	0.0997	10.4064	0.0748	10.4812	2.7598	0.0689	2.8287		9,936.2199	9,936.2199	0.2511		9,942.4972
Total	**4.2440**	**22.5808**	**37.2357**	**0.1556**	**11.8333**	**0.1128**	**11.9461**	**3.1706**	**0.1052**	**3.2758**		**15,920.8760**	**15,920.8760**	**0.6116**		**15,936.1664**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.2099	2,555.2099	0.6079		2,570.4061
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.2099**	**2,555.2099**	**0.6079**		**2,570.4061**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4367	15.2922	4.4319	0.0541	1.4269	0.0175	1.4444	0.4108	0.0167	0.4275		5,798.813 2	5,798.813 2	0.3187		5,806.780 7
Worker	3.4371	2.0775	29.8517	0.0960	10.4064	0.0729	10.4793	2.7598	0.0671	2.8269		9,566.117 4	9,566.117 4	0.2265		9,571.780 0
Total	**3.8738**	**17.3697**	**34.2836**	**0.1500**	**11.8333**	**0.0904**	**11.9237**	**3.1706**	**0.0838**	**3.2544**		**15,364.93 06**	**15,364.93 06**	**0.5452**		**15,378.56 07**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.209 9	2,555.209 9	0.6079		2,570.406 1
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.209 9**	**2,555.209 9**	**0.6079**		**2,570.406 1**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4367	15.2922	4.4319	0.0541	1.4269	0.0175	1.4444	0.4108	0.0167	0.4275		5,798.813 2	5,798.813 2	0.3187		5,806.780 7
Worker	3.4371	2.0775	29.8517	0.0960	10.4064	0.0729	10.4793	2.7598	0.0671	2.8269		9,566.117 4	9,566.117 4	0.2265		9,571.780 0
Total	**3.8738**	**17.3697**	**34.2836**	**0.1500**	**11.8333**	**0.0904**	**11.9237**	**3.1706**	**0.0838**	**3.2544**		**15,364.93 06**	**15,364.93 06**	**0.5452**		**15,378.56 07**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.584 1	2,207.584 1	0.7140		2,225.433 6
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.584 1**	**2,207.584 1**	**0.7140**		**2,225.433 6**

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0554	0.0335	0.4810	1.5500e-003	0.1677	1.1700e-003	0.1688	0.0445	1.0800e-003	0.0456		154.1265	154.1265	3.6500e-003		154.2177
Total	**0.0554**	**0.0335**	**0.4810**	**1.5500e-003**	**0.1677**	**1.1700e-003**	**0.1688**	**0.0445**	**1.0800e-003**	**0.0456**		**154.1265**	**154.1265**	**3.6500e-003**		**154.2177**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.584 1	2,207.584 1	0.7140		2,225.433 6
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.584 1**	**2,207.584 1**	**0.7140**		**2,225.433 6**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0554	0.0335	0.4810	1.5500e-003	0.1677	1.1700e-003	0.1688	0.0445	1.0800e-003	0.0456		154.1265	154.1265	3.6500e-003		154.2177
Total	**0.0554**	**0.0335**	**0.4810**	**1.5500e-003**	**0.1677**	**1.1700e-003**	**0.1688**	**0.0445**	**1.0800e-003**	**0.0456**		**154.1265**	**154.1265**	**3.6500e-003**		**154.2177**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	195.5779					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**195.7696**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6867	0.4151	5.9639	0.0192	2.0790	0.0146	2.0936	0.5514	0.0134	0.5648		1,911.1685	1,911.1685	0.0453		1,912.2998
Total	**0.6867**	**0.4151**	**5.9639**	**0.0192**	**2.0790**	**0.0146**	**2.0936**	**0.5514**	**0.0134**	**0.5648**		**1,911.1685**	**1,911.1685**	**0.0453**		**1,912.2998**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	195.5779					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**195.7696**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6867	0.4151	5.9639	0.0192	2.0790	0.0146	2.0936	0.5514	0.0134	0.5648		1,911.168 5	1,911.168 5	0.0453		1,912.299 8
Total	**0.6867**	**0.4151**	**5.9639**	**0.0192**	**2.0790**	**0.0146**	**2.0936**	**0.5514**	**0.0134**	**0.5648**		**1,911.168 5**	**1,911.168 5**	**0.0453**		**1,912.299 8**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	8.8974	41.8935	98.9471	0.4310	41.1804	0.2836	41.4640	11.0134	0.2633	11.2766		44,116.4759	44,116.4759	1.8317		44,162.2688
Unmitigated	8.8974	41.8935	98.9471	0.4310	41.1804	0.2836	41.4640	11.0134	0.2633	11.2766		44,116.4759	44,116.4759	1.8317		44,162.2688

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse High Rise	0.00	0.00	0.00		
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Health Club	0.00	0.00	0.00		
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Strip Mall	0.00	0.00	0.00		
Supermarket	0.00	0.00	0.00		
Unenclosed Parking with Elevator	0.00	0.00	0.00		
User Defined Commercial	8,304.00	8,358.74	8358.72	19,290,576	19,290,576
Total	8,304.00	8,358.74	8,358.72	19,290,576	19,290,576

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15
Supermarket	16.60	8.40	6.90	6.50	74.50	19.00	34	30	36
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
User Defined Commercial	0.00	6.37	0.00	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse High Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Enclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
General Office Building	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Health Club	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
High Turnover (Sit Down Restaurant)	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Strip Mall	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Supermarket	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Unenclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
User Defined Commercial	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.5481	4.8362	3.1124	0.0299		0.3787	0.3787		0.3787	0.3787		5,979.063 3	5,979.063 3	0.1146	0.1096	6,014.593 9
NaturalGas Unmitigated	0.5481	4.8362	3.1124	0.0299		0.3787	0.3787		0.3787	0.3787		5,979.063 3	5,979.063 3	0.1146	0.1096	6,014.593 9

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse High Rise	24873.8	0.2683	2.2923	0.9755	0.0146		0.1853	0.1853		0.1853	0.1853		2,926.3352	2,926.3352	0.0561	0.0537	2,943.7249
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1368.99	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	719.041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22127.7	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Strip Mall	81.7753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1650.72	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.5481**	**4.8362**	**3.1124**	**0.0299**		**0.3787**	**0.3787**		**0.3787**	**0.3787**		**5,979.0633**	**5,979.0633**	**0.1146**	**0.1096**	**6,014.5939**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse High Rise	24.8738	0.2683	2.2923	0.9755	0.0146		0.1853	0.1853		0.1853	0.1853		2,926.3352	2,926.3352	0.0561	0.0537	2,943.7249
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1.36899	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	0.719041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22.1277	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Strip Mall	0.0817753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1.65072	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.5481**	**4.8362**	**3.1124**	**0.0299**		**0.3787**	**0.3787**		**0.3787**	**0.3787**		**5,979.0633**	**5,979.0633**	**0.1146**	**0.1096**	**6,014.5939**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	23.8800	0.7869	68.3512	3.6200e-003		0.3789	0.3789		0.3789	0.3789	0.0000	123.2552	123.2552	0.1187	0.0000	126.2225
Unmitigated	23.9344	1.2513	68.5488	6.5800e-003		0.4164	0.4164		0.4164	0.4164	0.0000	716.1964	716.1964	0.1301	0.0109	722.6873

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8754					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	19.9408					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0544	0.4645	0.1977	2.9600e-003		0.0376	0.0376		0.0376	0.0376	0.0000	592.9412	592.9412	0.0114	0.0109	596.4647
Landscaping	2.0638	0.7869	68.3512	3.6200e-003		0.3789	0.3789		0.3789	0.3789		123.2552	123.2552	0.1187		126.2225
Total	**23.9344**	**1.2513**	**68.5488**	**6.5800e-003**		**0.4164**	**0.4164**		**0.4164**	**0.4164**	**0.0000**	**716.1964**	**716.1964**	**0.1301**	**0.0109**	**722.6873**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8754					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	19.9408					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0638	0.7869	68.3512	3.6200e-003		0.3789	0.3789		0.3789	0.3789		123.2552	123.2552	0.1187		126.2225
Total	**23.8800**	**0.7869**	**68.3512**	**3.6200e-003**		**0.3789**	**0.3789**		**0.3789**	**0.3789**	**0.0000**	**123.2552**	**123.2552**	**0.1187**	**0.0000**	**126.2225**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

1111 Sunset Buildout - No Hotel Option (with PDFs)

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Office Building	48.00	1000sqft	1.10	48,000.00	0
User Defined Commercial	1.00	User Defined Unit	0.00	0.00	0
Enclosed Parking with Elevator	485.00	Space	4.36	194,000.00	0
Unenclosed Parking with Elevator	1,210.00	Space	10.89	484,000.00	0
Health Club	14.50	1000sqft	0.33	14,500.00	0
High Turnover (Sit Down Restaurant)	35.00	1000sqft	0.80	35,000.00	0
Condo/Townhouse High Rise	827.00	Dwelling Unit	12.92	851,982.00	1931
Strip Mall	18.20	1000sqft	0.42	18,200.00	0
Supermarket	27.30	1000sqft	0.63	27,300.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	12			**Operational Year**	2028

Utility Company Los Angeles Department of Water & Power

CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See SWAPE comment regarding the CO2 intensity factor.

Land Use - Consistent with the DEIR's model.

Construction Phase - Operation only.

Off-road Equipment - Operation only.

Trips and VMT - Operation only. Changes to hauling trips unnecessary.

Vehicle Trips - See SWAPE comment regarding weekday operational vehicle trip rates.

Woodstoves - Consistent with the DEIR's model.

Area Mitigation - Consistent with the DEIR's model.

Energy Mitigation - See SWAPE comment regarding operational mitigation measures.

Table Name	Column Name	Default Value	New Value
tblFireplaces	FireplaceDayYear	25.00	100.00
tblFireplaces	FireplaceHourDay	3.00	6.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	702.95	14.00
tblFireplaces	NumberNoFireplace	82.70	0.00
tblFireplaces	NumberWood	41.35	0.00
tblLandUse	LandUseSquareFeet	827,000.00	851,982.00
tblLandUse	Population	2,365.00	1,931.00
tblVehicleTrips	CC_TL	8.40	6.37
tblVehicleTrips	CC_TTP	0.00	100.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CW_TL	16.60	0.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	4.31	0.00
tblVehicleTrips	ST_TR	2.46	0.00
tblVehicleTrips	ST_TR	20.87	0.00

tblVehicleTrips	ST_TR	158.37	0.00
tblVehicleTrips	ST_TR	42.04	0.00
tblVehicleTrips	ST_TR	177.59	0.00
tblVehicleTrips	ST_TR	0.00	8,358.74
tblVehicleTrips	SU_TR	3.43	0.00
tblVehicleTrips	SU_TR	1.05	0.00
tblVehicleTrips	SU_TR	26.73	0.00
tblVehicleTrips	SU_TR	131.84	0.00
tblVehicleTrips	SU_TR	20.43	0.00
tblVehicleTrips	SU_TR	166.44	0.00
tblVehicleTrips	SU_TR	0.00	8,358.72
tblVehicleTrips	WD_TR	4.18	0.00
tblVehicleTrips	WD_TR	11.03	0.00
tblVehicleTrips	WD_TR	32.93	0.00
tblVehicleTrips	WD_TR	127.15	0.00
tblVehicleTrips	WD_TR	44.32	0.00
tblVehicleTrips	WD_TR	102.24	0.00
tblVehicleTrips	WD_TR	0.00	8,304.00
tblWoodstoves	NumberCatalytic	41.35	0.00
tblWoodstoves	NumberNoncatalytic	41.35	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.8535	46.4598	53.9810	0.1788	18.2675	2.0460	20.3134	9.9840	1.8823	11.8663	0.0000	18,091.7865	18,091.7865	1.9484	0.0000	18,123.6607
2022	6.3631	38.3589	51.0320	0.1748	11.8333	0.9230	12.7563	3.1706	0.8675	4.0381	0.0000	17,694.2396	17,694.2396	1.2317	0.0000	17,725.0330
2023	196.5305	31.8749	48.0078	0.1695	11.8333	0.7910	12.6243	3.1706	0.7431	3.9137	0.0000	17,169.7594	17,169.7594	1.1575	0.0000	17,198.6960
Maximum	**196.5305**	**46.4598**	**53.9810**	**0.1788**	**18.2675**	**2.0460**	**20.3134**	**9.9840**	**1.8823**	**11.8663**	**0.0000**	**18,091.7865**	**18,091.7865**	**1.9484**	**0.0000**	**18,123.6607**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	6.8535	46.4598	53.9810	0.1788	18.2675	2.0460	20.3134	9.9840	1.8823	11.8663	0.0000	18,091.7865	18,091.7865	1.9484	0.0000	18,123.6607
2022	6.3631	38.3589	51.0320	0.1748	11.8333	0.9230	12.7563	3.1706	0.8675	4.0381	0.0000	17,694.2396	17,694.2396	1.2317	0.0000	17,725.0330
2023	196.5305	31.8749	48.0078	0.1695	11.8333	0.7910	12.6243	3.1706	0.7431	3.9137	0.0000	17,169.7594	17,169.7594	1.1575	0.0000	17,198.6960
Maximum	**196.5305**	**46.4598**	**53.9810**	**0.1788**	**18.2675**	**2.0460**	**20.3134**	**9.9840**	**1.8823**	**11.8663**	**0.0000**	**18,091.7865**	**18,091.7865**	**1.9484**	**0.0000**	**18,123.6607**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	23.9344	1.2513	68.5488	6.5800e-003		0.4164	0.4164		0.4164	0.4164	0.0000	716.1964	716.1964	0.1301	0.0109	722.6873
Energy	0.5481	4.8362	3.1124	0.0299		0.3787	0.3787		0.3787	0.3787		5,979.0633	5,979.0633	0.1146	0.1096	6,014.5939
Mobile	8.4780	42.2484	94.2188	0.4090	41.1804	0.2849	41.4653	11.0134	0.2645	11.2779		41,890.7895	41,890.7895	1.8514		41,937.0751
Total	**32.9604**	**48.3359**	**165.8799**	**0.4455**	**41.1804**	**1.0800**	**42.2604**	**11.0134**	**1.0596**	**12.0730**	**0.0000**	**48,586.0492**	**48,586.0492**	**2.0961**	**0.1205**	**48,674.3563**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	23.8800	0.7869	68.3512	3.6200e-003		0.3789	0.3789		0.3789	0.3789	0.0000	123.2552	123.2552	0.1187	0.0000	126.2225
Energy	0.5481	4.8362	3.1124	0.0299		0.3787	0.3787		0.3787	0.3787		5,979.0633	5,979.0633	0.1146	0.1096	6,014.5939
Mobile	8.4780	42.2484	94.2188	0.4090	41.1804	0.2849	41.4653	11.0134	0.2645	11.2779		41,890.7895	41,890.7895	1.8514		41,937.0751
Total	**32.9061**	**47.8715**	**165.6823**	**0.4426**	**41.1804**	**1.0425**	**42.2228**	**11.0134**	**1.0221**	**12.0354**	**0.0000**	**47,993.1080**	**47,993.1080**	**2.0847**	**0.1096**	**48,077.8915**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.16	0.96	0.12	0.66	0.00	3.48	0.09	0.00	3.54	0.31	0.00	1.22	1.22	0.54	9.02	1.23

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/22/2021	6/2/2021	5	30	
2	Site Preparation	Site Preparation	6/3/2021	6/30/2021	5	20	
3	Grading	Grading	7/1/2021	9/1/2021	5	45	
4	Building Construction	Building Construction	9/2/2021	8/2/2023	5	500	
5	Paving	Paving	8/3/2023	9/20/2023	5	35	
6	Architectural Coating	Architectural Coating	9/21/2023	11/8/2023	5	35	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 15.25

Residential Indoor: 1,725,264; Residential Outdoor: 575,088; Non-Residential Indoor: 214,500; Non-Residential Outdoor: 71,500; Striped Parking Area: 40,680 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	931.00	223.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	186.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**		**1.5513**	**1.5513**		**1.4411**	**1.4411**		**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.0692**	**0.0450**	**0.5098**	**1.5600e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**155.7227**	**155.7227**	**4.1900e-003**		**155.8274**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**		**1.5513**	**1.5513**		**1.4411**	**1.4411**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5098	1.5600e-003	0.1677	1.2400e-003	0.1689	0.0445	1.1400e-003	0.0456		155.7227	155.7227	4.1900e-003		155.8274
Total	**0.0692**	**0.0450**	**0.5098**	**1.5600e-003**	**0.1677**	**1.2400e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**155.7227**	**155.7227**	**4.1900e-003**		**155.8274**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0830	0.0540	0.6118	1.8800e-003	0.2012	1.4900e-003	0.2027	0.0534	1.3700e-003	0.0547		186.8672	186.8672	5.0300e-003		186.9929
Total	**0.0830**	**0.0540**	**0.6118**	**1.8800e-003**	**0.2012**	**1.4900e-003**	**0.2027**	**0.0534**	**1.3700e-003**	**0.0547**		**186.8672**	**186.8672**	**5.0300e-003**		**186.9929**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**18.0663**	**2.0445**	**20.1107**	**9.9307**	**1.8809**	**11.8116**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0830	0.0540	0.6118	1.8800e-003	0.2012	1.4900e-003	0.2027	0.0534	1.3700e-003	0.0547		186.8672	186.8672	5.0300e-003		186.9929
Total	**0.0830**	**0.0540**	**0.6118**	**1.8800e-003**	**0.2012**	**1.4900e-003**	**0.2027**	**0.0534**	**1.3700e-003**	**0.0547**		**186.8672**	**186.8672**	**5.0300e-003**		**186.9929**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265		6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**		**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**0.0922**	**0.0600**	**0.6797**	**2.0800e-003**	**0.2236**	**1.6500e-003**	**0.2252**	**0.0593**	**1.5200e-003**	**0.0608**		**207.6302**	**207.6302**	**5.5800e-003**		**207.7698**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.6733	0.0000	8.6733	3.5965	0.0000	3.5965			0.0000			0.0000
Off-Road	4.1912	46.3998	30.8785	0.0620		1.9853	1.9853		1.8265	1.8265	0.0000	6,007.0434	6,007.0434	1.9428		6,055.6134
Total	**4.1912**	**46.3998**	**30.8785**	**0.0620**	**8.6733**	**1.9853**	**10.6587**	**3.5965**	**1.8265**	**5.4230**	**0.0000**	**6,007.0434**	**6,007.0434**	**1.9428**		**6,055.6134**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0922	0.0600	0.6797	2.0800e-003	0.2236	1.6500e-003	0.2252	0.0593	1.5200e-003	0.0608		207.6302	207.6302	5.5800e-003		207.7698
Total	**0.0922**	**0.0600**	**0.6797**	**2.0800e-003**	**0.2236**	**1.6500e-003**	**0.2252**	**0.0593**	**1.5200e-003**	**0.0608**		**207.6302**	**207.6302**	**5.5800e-003**		**207.7698**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013		2,553.3639	2,553.3639	0.6160		2,568.7643
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**		**2,553.3639**	**2,553.3639**	**0.6160**		**2,568.7643**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6591	21.3058	5.7643	0.0549	1.4269	0.0450	1.4719	0.4108	0.0430	0.4538		5,873.235 3	5,873.235 3	0.3990		5,883.210 4
Worker	4.2935	2.7909	31.6416	0.0970	10.4064	0.0770	10.4834	2.7598	0.0709	2.8308		9,665.187 3	9,665.187 3	0.2600		9,671.686 0
Total	**4.9526**	**24.0967**	**37.4058**	**0.1519**	**11.8333**	**0.1220**	**11.9553**	**3.1706**	**0.1139**	**3.2845**		**15,538.42 26**	**15,538.42 26**	**0.6590**		**15,554.89 64**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9009	17.4321	16.5752	0.0269		0.9586	0.9586		0.9013	0.9013	0.0000	2,553.363 9	2,553.363 9	0.6160		2,568.764 3
Total	**1.9009**	**17.4321**	**16.5752**	**0.0269**		**0.9586**	**0.9586**		**0.9013**	**0.9013**	**0.0000**	**2,553.363 9**	**2,553.363 9**	**0.6160**		**2,568.764 3**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6591	21.3058	5.7643	0.0549	1.4269	0.0450	1.4719	0.4108	0.0430	0.4538		5,873.235 3	5,873.235 3	0.3990		5,883.210 4
Worker	4.2935	2.7909	31.6416	0.0970	10.4064	0.0770	10.4834	2.7598	0.0709	2.8308		9,665.187 3	9,665.187 3	0.2600		9,671.686 0
Total	**4.9526**	**24.0967**	**37.4058**	**0.1519**	**11.8333**	**0.1220**	**11.9553**	**3.1706**	**0.1139**	**3.2845**		**15,538.42 26**	**15,538.42 26**	**0.6590**		**15,554.89 64**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612		2,554.333 6	2,554.333 6	0.6120		2,569.632 2
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**		**2,554.333 6**	**2,554.333 6**	**0.6120**		**2,569.632 2**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6187	20.2226	5.4595	0.0544	1.4269	0.0392	1.4661	0.4108	0.0375	0.4482		5,820.7931	5,820.7931	0.3850		5,830.4180
Worker	4.0382	2.5207	29.2090	0.0935	10.4064	0.0748	10.4812	2.7598	0.0689	2.8287		9,319.1130	9,319.1130	0.2348		9,324.9828
Total	**4.6569**	**22.7433**	**34.6686**	**0.1479**	**11.8333**	**0.1140**	**11.9473**	**3.1706**	**0.1064**	**3.2770**		**15,139.9060**	**15,139.9060**	**0.6198**		**15,155.4008**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7062	15.6156	16.3634	0.0269		0.8090	0.8090		0.7612	0.7612	0.0000	2,554.3336	2,554.3336	0.6120		2,569.6322
Total	**1.7062**	**15.6156**	**16.3634**	**0.0269**		**0.8090**	**0.8090**		**0.7612**	**0.7612**	**0.0000**	**2,554.3336**	**2,554.3336**	**0.6120**		**2,569.6322**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6187	20.2226	5.4595	0.0544	1.4269	0.0392	1.4661	0.4108	0.0375	0.4482		5,820.793 1	5,820.793 1	0.3850		5,830.418 0
Worker	4.0382	2.5207	29.2090	0.0935	10.4064	0.0748	10.4812	2.7598	0.0689	2.8287		9,319.113 0	9,319.113 0	0.2348		9,324.982 8
Total	**4.6569**	**22.7433**	**34.6686**	**0.1479**	**11.8333**	**0.1140**	**11.9473**	**3.1706**	**0.1064**	**3.2770**		**15,139.90 60**	**15,139.90 60**	**0.6198**		**15,155.40 08**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584		2,555.209 9	2,555.209 9	0.6079		2,570.406 1
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**		**2,555.209 9**	**2,555.209 9**	**0.6079**		**2,570.406 1**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4593	15.2098	4.8416	0.0526	1.4269	0.0184	1.4453	0.4108	0.0176	0.4284		5,642.571 6	5,642.571 6	0.3381		5,651.022 9
Worker	3.8087	2.2802	26.9221	0.0900	10.4064	0.0729	10.4793	2.7598	0.0671	2.8269		8,971.977 9	8,971.977 9	0.2116		8,977.267 1
Total	**4.2680**	**17.4900**	**31.7638**	**0.1426**	**11.8333**	**0.0913**	**11.9246**	**3.1706**	**0.0847**	**3.2553**		**14,614.54 95**	**14,614.54 95**	**0.5496**		**14,628.28 99**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5728	14.3849	16.2440	0.0269		0.6997	0.6997		0.6584	0.6584	0.0000	2,555.209 9	2,555.209 9	0.6079		2,570.406 1
Total	**1.5728**	**14.3849**	**16.2440**	**0.0269**		**0.6997**	**0.6997**		**0.6584**	**0.6584**	**0.0000**	**2,555.209 9**	**2,555.209 9**	**0.6079**		**2,570.406 1**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.4593	15.2098	4.8416	0.0526	1.4269	0.0184	1.4453	0.4108	0.0176	0.4284		5,642.5716	5,642.5716	0.3381		5,651.0229
Worker	3.8087	2.2802	26.9221	0.0900	10.4064	0.0729	10.4793	2.7598	0.0671	2.8269		8,971.9779	8,971.9779	0.2116		8,977.2671
Total	**4.2680**	**17.4900**	**31.7638**	**0.1426**	**11.8333**	**0.0913**	**11.9246**	**3.1706**	**0.0847**	**3.2553**		**14,614.5495**	**14,614.5495**	**0.5496**		**14,628.2899**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694		2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**		**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0614	0.0367	0.4338	1.4500e-003	0.1677	1.1700e-003	0.1688	0.0445	1.0800e-003	0.0456		144.5539	144.5539	3.4100e-003		144.6391
Total	**0.0614**	**0.0367**	**0.4338**	**1.4500e-003**	**0.1677**	**1.1700e-003**	**0.1688**	**0.0445**	**1.0800e-003**	**0.0456**		**144.5539**	**144.5539**	**3.4100e-003**		**144.6391**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0327	10.1917	14.5842	0.0228		0.5102	0.5102		0.4694	0.4694	0.0000	2,207.5841	2,207.5841	0.7140		2,225.4336
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0327**	**10.1917**	**14.5842**	**0.0228**		**0.5102**	**0.5102**		**0.4694**	**0.4694**	**0.0000**	**2,207.5841**	**2,207.5841**	**0.7140**		**2,225.4336**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0614	0.0367	0.4338	1.4500e-003	0.1677	1.1700e-003	0.1688	0.0445	1.0800e-003	0.0456		144.5539	144.5539	3.4100e-003		144.6391
Total	**0.0614**	**0.0367**	**0.4338**	**1.4500e-003**	**0.1677**	**1.1700e-003**	**0.1688**	**0.0445**	**1.0800e-003**	**0.0456**		**144.5539**	**144.5539**	**3.4100e-003**		**144.6391**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	195.5779					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**195.7696**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.7609	0.4556	5.3787	0.0180	2.0790	0.0146	2.0936	0.5514	0.0134	0.5648		1,792.468 2	1,792.468 2	0.0423		1,793.524 9
Total	**0.7609**	**0.4556**	**5.3787**	**0.0180**	**2.0790**	**0.0146**	**2.0936**	**0.5514**	**0.0134**	**0.5648**		**1,792.468 2**	**1,792.468 2**	**0.0423**		**1,793.524 9**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	195.5779					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**195.7696**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.7609	0.4556	5.3787	0.0180	2.0790	0.0146	2.0936	0.5514	0.0134	0.5648		1,792.468 2	1,792.468 2	0.0423		1,793.524 9
Total	**0.7609**	**0.4556**	**5.3787**	**0.0180**	**2.0790**	**0.0146**	**2.0936**	**0.5514**	**0.0134**	**0.5648**		**1,792.468 2**	**1,792.468 2**	**0.0423**		**1,793.524 9**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	8.4780	42.2484	94.2188	0.4090	41.1804	0.2849	41.4653	11.0134	0.2645	11.2779		41,890.7895	41,890.7895	1.8514		41,937.0751
Unmitigated	8.4780	42.2484	94.2188	0.4090	41.1804	0.2849	41.4653	11.0134	0.2645	11.2779		41,890.7895	41,890.7895	1.8514		41,937.0751

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Condo/Townhouse High Rise	0.00	0.00	0.00		
Enclosed Parking with Elevator	0.00	0.00	0.00		
General Office Building	0.00	0.00	0.00		
Health Club	0.00	0.00	0.00		
High Turnover (Sit Down Restaurant)	0.00	0.00	0.00		
Strip Mall	0.00	0.00	0.00		
Supermarket	0.00	0.00	0.00		
Unenclosed Parking with Elevator	0.00	0.00	0.00		
User Defined Commercial	8,304.00	8,358.74	8358.72	19,290,576	19,290,576
Total	8,304.00	8,358.74	8,358.72	19,290,576	19,290,576

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Enclosed Parking with Elevator	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
General Office Building	16.60	8.40	6.90	33.00	48.00	19.00	77	19	4
Health Club	16.60	8.40	6.90	16.90	64.10	19.00	52	39	9
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15
Supermarket	16.60	8.40	6.90	6.50	74.50	19.00	34	30	36
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
User Defined Commercial	0.00	6.37	0.00	0.00	100.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Condo/Townhouse High Rise	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Enclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
General Office Building	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Health Club	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
High Turnover (Sit Down Restaurant)	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Strip Mall	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Supermarket	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
Unenclosed Parking with Elevator	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782
User Defined Commercial	0.554500	0.041901	0.206158	0.112158	0.013256	0.005781	0.022151	0.034039	0.002155	0.001547	0.004857	0.000717	0.000782

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.5481	4.8362	3.1124	0.0299		0.3787	0.3787		0.3787	0.3787		5,979.0633	5,979.0633	0.1146	0.1096	6,014.5939
NaturalGas Unmitigated	0.5481	4.8362	3.1124	0.0299		0.3787	0.3787		0.3787	0.3787		5,979.0633	5,979.0633	0.1146	0.1096	6,014.5939

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse High Rise	24873.8	0.2683	2.2923	0.9755	0.0146		0.1853	0.1853		0.1853	0.1853		2,926.3352	2,926.3352	0.0561	0.0537	2,943.7249
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1368.99	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	719.041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22127.7	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Strip Mall	81.7753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1650.72	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.5481**	**4.8362**	**3.1124**	**0.0299**		**0.3787**	**0.3787**		**0.3787**	**0.3787**		**5,979.0633**	**5,979.0633**	**0.1146**	**0.1096**	**6,014.5939**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Condo/Townhouse High Rise	24.8738	0.2683	2.2923	0.9755	0.0146		0.1853	0.1853		0.1853	0.1853		2,926.3352	2,926.3352	0.0561	0.0537	2,943.7249
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
General Office Building	1.36899	0.0148	0.1342	0.1127	8.1000e-004		0.0102	0.0102		0.0102	0.0102		161.0572	161.0572	3.0900e-003	2.9500e-003	162.0143
Health Club	0.719041	7.7500e-003	0.0705	0.0592	4.2000e-004		5.3600e-003	5.3600e-003		5.3600e-003	5.3600e-003		84.5931	84.5931	1.6200e-003	1.5500e-003	85.0958
High Turnover (Sit Down Restaurant)	22.1277	0.2386	2.1694	1.8223	0.0130		0.1649	0.1649		0.1649	0.1649		2,603.2554	2,603.2554	0.0499	0.0477	2,618.7253
Strip Mall	0.0817753	8.8000e-004	8.0200e-003	6.7300e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004		9.6206	9.6206	1.8000e-004	1.8000e-004	9.6778
Supermarket	1.65072	0.0178	0.1618	0.1359	9.7000e-004		0.0123	0.0123		0.0123	0.0123		194.2018	194.2018	3.7200e-003	3.5600e-003	195.3558
Unenclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Commercial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.5481**	**4.8362**	**3.1124**	**0.0299**		**0.3787**	**0.3787**		**0.3787**	**0.3787**		**5,979.0633**	**5,979.0633**	**0.1146**	**0.1096**	**6,014.5939**

6.0 Area Detail

6.1 Mitigation Measures Area

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	23.8800	0.7869	68.3512	3.6200e-003		0.3789	0.3789		0.3789	0.3789	0.0000	123.2552	123.2552	0.1187	0.0000	126.2225
Unmitigated	23.9344	1.2513	68.5488	6.5800e-003		0.4164	0.4164		0.4164	0.4164	0.0000	716.1964	716.1964	0.1301	0.0109	722.6873

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8754					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	19.9408					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0544	0.4645	0.1977	2.9600e-003		0.0376	0.0376		0.0376	0.0376	0.0000	592.9412	592.9412	0.0114	0.0109	596.4647
Landscaping	2.0638	0.7869	68.3512	3.6200e-003		0.3789	0.3789		0.3789	0.3789		123.2552	123.2552	0.1187		126.2225
Total	**23.9344**	**1.2513**	**68.5488**	**6.5800e-003**		**0.4164**	**0.4164**		**0.4164**	**0.4164**	**0.0000**	**716.1964**	**716.1964**	**0.1301**	**0.0109**	**722.6873**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8754					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	19.9408					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0638	0.7869	68.3512	3.6200e-003		0.3789	0.3789		0.3789	0.3789		123.2552	123.2552	0.1187		126.2225
Total	**23.8800**	**0.7869**	**68.3512**	**3.6200e-003**		**0.3789**	**0.3789**		**0.3789**	**0.3789**	**0.0000**	**123.2552**	**123.2552**	**0.1187**	**0.0000**	**126.2225**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Attachment C

Start date and time 04/23/21 15:26:11

AERSCREEN 16216

1111 Sunset Construction

1111 Sunset Construction

----------------- DATA ENTRY VALIDATION -----------------

	METRIC	ENGLISH
** AREADATA **	---------------	----------------
Emission Rate:	0.188E-02 g/s	0.149E-01 lb/hr
Area Height:	3.00 meters	9.84 feet
Area Source Length:	254.00 meters	833.33 feet
Area Source Width:	100.00 meters	328.08 feet
Vertical Dimension:	1.50 meters	4.92 feet
Model Mode:	URBAN	
Population:	3967000	
Dist to Ambient Air:	1.0 meters	3. feet

** BUILDING DATA **

No Building Downwash Parameters

** TERRAIN DATA **

No Terrain Elevations

Source Base Elevation: 0.0 meters 0.0 feet

Probe distance: 5000. meters 16404. feet

No flagpole receptors

No discrete receptors used

** FUMIGATION DATA **

No fumigation requested

** METEOROLOGY DATA **

Min/Max Temperature: 250.0 / 310.0 K -9.7 / 98.3 Deg F

Minimum Wind Speed: 0.5 m/s

Anemometer Height: 10.000 meters

Dominant Surface Profile: Urban

Dominant Climate Type: Average Moisture

Surface friction velocity (u*): not adjusted

DEBUG OPTION ON

AERSCREEN output file:

2021.04.23_1111Sunset_Construction.out

*** AERSCREEN Run is Ready to Begin

No terrain used, AERMAP will not be run

****

SURFACE CHARACTERISTICS & MAKEMET

Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture

Season	Albedo	Bo	zo
Winter	0.35	1.50	1.000
Spring	0.14	1.00	1.000
Summer	0.16	2.00	1.000
Autumn	0.18	2.00	1.000

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR started 04/23/21 15:27:03

****

Running AERMOD

Processing Winter

Processing surface roughness sector 1

```
**************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
*****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ********************************************
```

```
  Running AERMOD

 Processing Spring


Processing surface roughness sector  1


****************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ********************************************


  Running AERMOD
 Processing Summer


Processing surface roughness sector  1


*****************************************************
Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0


    ********   WARNING MESSAGES   ********
               ***  NONE  ***


*****************************************************
Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5


    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
**************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
```

```
Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25


    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ********************************************


  Running AERMOD
 Processing Autumn


Processing surface roughness sector  1


*****************************************************
Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0


    ********   WARNING MESSAGES   ********
               ***  NONE  ***


*****************************************************
Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  20
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

FLOWSECTOR   ended 04/23/21 15:27:17

REFINE       started 04/23/21 15:27:17

 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

REFINE       ended 04/23/21 15:27:19

 **********************************************
 AERSCREEN Finished Successfully
 With no errors or warnings
```

Check log file for details

****

Ending date and time 04/23/21 15:27:21

```
 Concentration     Distance Elevation  Diag  Season/Month   Zo sector       Date
 H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS     HT
REF TA     HT
   0.18744E+01         1.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19966E+01        25.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20965E+01        50.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21808E+01        75.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22531E+01       100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23168E+01       125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
*  0.23238E+01       128.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16409E+01       150.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12203E+01       175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.95019E+00       200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.79150E+00       225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.67469E+00       250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58488E+00       275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51450E+00       300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45799E+00       325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41155E+00       350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.37273E+00       375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34014E+00       400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31195E+00       425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28777E+00       450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26680E+00       475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24841E+00       500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23191E+00       525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21727E+00       550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20420E+00       575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19248E+00       600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18191E+00       625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17233E+00       650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16352E+00       675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15547E+00       700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14809E+00       725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14131E+00       750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13507E+00       775.00      0.00   0.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12929E+00       800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12392E+00       825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11892E+00       850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11427E+00       875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10993E+00       900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10587E+00       925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10207E+00       950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.98475E-01       975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.95097E-01      1000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.91918E-01      1025.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.88920E-01      1050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.86089E-01      1075.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.83417E-01      1100.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.80883E-01      1125.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.78482E-01      1150.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.76202E-01      1175.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.74036E-01      1200.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.71972E-01      1225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.70010E-01      1250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.68140E-01      1275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.66355E-01      1300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.64651E-01      1325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.63022E-01      1350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.61464E-01      1375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59972E-01      1400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58542E-01      1425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57171E-01      1450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55856E-01      1475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.54587E-01      1500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53367E-01      1525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52193E-01      1550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51064E-01      1575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.49976E-01      1600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.48929E-01      1625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.47913E-01      1650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.46933E-01      1675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45987E-01      1700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45074E-01      1725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.44192E-01      1750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43339E-01      1775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42515E-01      1800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41717E-01      1825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40945E-01      1850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40198E-01      1875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39474E-01      1900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38772E-01      1925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38214E-01      1950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37552E-01      1975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36911E-01      2000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36288E-01      2025.00      0.00   0.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35683E-01      2050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35095E-01      2075.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34524E-01      2100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33969E-01      2125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33429E-01      2150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32904E-01      2175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32393E-01      2200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31896E-01      2225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31412E-01      2250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30940E-01      2275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30481E-01      2300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30033E-01      2325.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29597E-01      2350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29171E-01      2375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28756E-01      2400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28352E-01      2425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.27957E-01      2450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27571E-01      2475.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27194E-01      2500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26826E-01      2525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26466E-01      2550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26115E-01      2575.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25772E-01      2600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25436E-01      2625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25108E-01      2650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24787E-01      2675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24474E-01      2700.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24167E-01      2725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23866E-01      2750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23572E-01      2775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23285E-01      2800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23003E-01      2825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22727E-01      2850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.22457E-01      2875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22193E-01      2900.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21933E-01      2925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21679E-01      2950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21430E-01      2975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21186E-01      3000.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20947E-01      3025.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20712E-01      3050.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20482E-01      3075.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20256E-01      3100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20034E-01      3125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19817E-01      3150.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19604E-01      3174.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19395E-01      3200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19189E-01      3225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18987E-01      3250.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18789E-01      3275.00      0.00   0.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18595E-01      3300.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18404E-01      3325.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18216E-01      3350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18031E-01      3375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17850E-01      3400.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17672E-01      3425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17497E-01      3450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17325E-01      3475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17156E-01      3500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16989E-01      3525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16826E-01      3550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16665E-01      3575.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16507E-01      3600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16351E-01      3625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16198E-01      3650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16048E-01      3675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.15899E-01      3700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15754E-01      3725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15610E-01      3750.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15469E-01      3775.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15330E-01      3800.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15193E-01      3825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15058E-01      3850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14925E-01      3875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14794E-01      3900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14665E-01      3925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14539E-01      3950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14414E-01      3975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14290E-01      4000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14169E-01      4025.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14050E-01      4050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13932E-01      4075.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13816E-01      4100.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.13701E-01      4125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13588E-01      4150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13477E-01      4175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13368E-01      4200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13259E-01      4225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13153E-01      4250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13048E-01      4275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12944E-01      4300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12842E-01      4325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12741E-01      4350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12641E-01      4375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12543E-01      4400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12446E-01      4425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12351E-01      4450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12257E-01      4475.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12163E-01      4500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12071E-01      4525.00      0.00   0.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11981E-01      4550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11891E-01      4575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11803E-01      4600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11716E-01      4625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11630E-01      4650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11545E-01      4675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11461E-01      4700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11378E-01      4725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11296E-01      4750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11215E-01      4775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11135E-01      4800.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11057E-01      4825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10979E-01      4850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10902E-01      4875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10826E-01      4900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10751E-01      4925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
```

```
   0.10676E-01      4950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10603E-01      4975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10531E-01      5000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
```

Start date and time 04/23/21 13:03:55

AERSCREEN 16216

1111 Sunset Mixed Use Operation

1111 Sunset Mixed Use Operation

----------------- DATA ENTRY VALIDATION -----------------

	METRIC	ENGLISH
** AREADATA **	---------------	----------------
Emission Rate:	0.495E-02 g/s	0.393E-01 lb/hr
Area Height:	3.00 meters	9.84 feet
Area Source Length:	254.00 meters	833.33 feet
Area Source Width:	100.00 meters	328.08 feet
Vertical Dimension:	1.50 meters	4.92 feet
Model Mode:	URBAN	
Population:	3967000	
Dist to Ambient Air:	1.0 meters	3. feet

** BUILDING DATA **

No Building Downwash Parameters

** TERRAIN DATA **

No Terrain Elevations

Source Base Elevation: 0.0 meters   0.0 feet

Probe distance: 5000. meters   16404. feet

No flagpole receptors

No discrete receptors used

** FUMIGATION DATA **

No fumigation requested

** METEOROLOGY DATA **

Min/Max Temperature: 250.0 / 310.0 K   -9.7 / 98.3 Deg F

Minimum Wind Speed: 0.5 m/s

Anemometer Height: 10.000 meters

Dominant Surface Profile: Urban

Dominant Climate Type: Average Moisture

Surface friction velocity (u*): not adjusted

DEBUG OPTION ON

AERSCREEN output file:

2021.04.23_1111Sunset_MixedUseOperation.out

*** AERSCREEN Run is Ready to Begin

No terrain used, AERMAP will not be run

****

SURFACE CHARACTERISTICS & MAKEMET

Obtaining surface characteristics...

```
Using AERMET seasonal surface characteristics for Urban with Average Moisture

Season             Albedo     Bo       zo

Winter              0.35     1.50     1.000

Spring              0.14     1.00     1.000

Summer              0.16     2.00     1.000

Autumn              0.18     2.00     1.000


Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl


Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl


Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl


Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl


Buildings and/or terrain present or rectangular area source, skipping probe


FLOWSECTOR   started 04/23/21 13:05:37
 ********************************************


  Running AERMOD
 Processing Winter


Processing surface roughness sector  1
```

```
*****************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


*****************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


*****************************************************

Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10


    ********   WARNING MESSAGES   ********

               ***  NONE  ***
```

```
*****************************************************
Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15


    ********   WARNING MESSAGES   ********
               ***  NONE  ***


*****************************************************
Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20


    ********   WARNING MESSAGES   ********
               ***  NONE  ***


*****************************************************
Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25


    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ********************************************
```

```
  Running AERMOD

 Processing Spring


Processing surface roughness sector  1


*****************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


*****************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


*****************************************************

Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ******************************************

  Running AERMOD
 Processing Summer

Processing surface roughness sector  1

**************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

**************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
*****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
```

```
Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25


    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ********************************************


  Running AERMOD
 Processing Autumn


Processing surface roughness sector  1


*****************************************************
Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0


    ********   WARNING MESSAGES   ********
               ***  NONE  ***


*****************************************************
Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  20
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************

Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

FLOWSECTOR   ended 04/23/21 13:05:48

REFINE       started 04/23/21 13:05:48

 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

REFINE       ended 04/23/21 13:05:50

 **********************************************

 AERSCREEN Finished Successfully

 With no errors or warnings
```

Check log file for details

****

Ending date and time 04/23/21 13:05:52

```
 Concentration     Distance Elevation  Diag  Season/Month   Zo sector       Date
 H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS     HT
REF TA     HT
   0.49329E+01         1.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52545E+01        25.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55175E+01        50.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57392E+01        75.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59297E+01       100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.60972E+01       125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
*  0.61156E+01       128.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43185E+01       150.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32115E+01       175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25006E+01       200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20830E+01       225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17756E+01       250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15392E+01       275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13540E+01       300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12053E+01       325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10831E+01       350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
```

```
310.0    2.0
   0.98091E+00       375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.89515E+00       400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.82097E+00       425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.75732E+00       450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.70215E+00       475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.65373E+00       500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.61033E+00       525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57178E+00       550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53740E+00       575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.50655E+00       600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.47873E+00       625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45354E+00       650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43033E+00       675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40914E+00       700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38973E+00       725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37190E+00       750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35546E+00       775.00      0.00   0.0        Winter       0-360   10011001
```

```
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34026E+00       800.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32611E+00       825.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31297E+00       850.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30073E+00       875.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28931E+00       900.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27863E+00       925.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26862E+00       950.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25916E+00       975.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25027E+00      1000.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24190E+00      1025.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23401E+00      1050.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22656E+00      1075.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21953E+00      1100.00      0.00   5.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21286E+00      1125.00      0.00   5.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20654E+00      1150.00      0.00   5.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20054E+00      1175.00      0.00   5.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
```

```
   0.19484E+00      1200.00      0.00   5.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18941E+00      1225.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18425E+00      1250.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17932E+00      1275.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17463E+00      1300.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17014E+00      1325.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16586E+00      1350.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16176E+00      1375.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15783E+00      1400.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15407E+00      1425.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15046E+00      1450.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14700E+00      1475.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14366E+00      1500.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14045E+00      1525.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13736E+00      1550.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13439E+00      1575.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13152E+00      1600.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.12877E+00      1625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12609E+00      1650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12352E+00      1675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12103E+00      1700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11862E+00      1725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11630E+00      1750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11406E+00      1775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11189E+00      1800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10979E+00      1825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10776E+00      1850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10579E+00      1875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10388E+00      1900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10204E+00      1925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10057E+00      1950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.98828E-01      1975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.97139E-01      2000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.95500E-01      2025.00      0.00   0.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.93908E-01      2050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.92361E-01      2075.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.90858E-01      2100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.89397E-01      2125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.87977E-01      2150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.86595E-01      2175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.85250E-01      2200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.83941E-01      2225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.82667E-01      2250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.81426E-01      2275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.80217E-01      2300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.79039E-01      2325.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.77891E-01      2350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.76771E-01      2375.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.75679E-01      2400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.74614E-01      2425.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.73574E-01      2450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.72558E-01      2475.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.71566E-01      2500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.70598E-01      2525.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.69651E-01      2550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.68727E-01      2575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.67824E-01      2600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.66941E-01      2625.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.66077E-01      2650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.65233E-01      2675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.64408E-01      2700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.63600E-01      2725.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.62809E-01      2750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.62036E-01      2775.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.61279E-01      2800.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.60538E-01      2825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59812E-01      2850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.59101E-01      2875.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58404E-01      2900.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57722E-01      2925.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57053E-01      2950.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.56398E-01      2975.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55756E-01      3000.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55126E-01      3025.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.54508E-01      3050.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53902E-01      3075.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53308E-01      3100.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52725E-01      3125.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52153E-01      3150.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51592E-01      3174.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51041E-01      3199.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.50500E-01      3225.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.49969E-01      3250.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.49448E-01      3275.00      0.00   0.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.48936E-01      3300.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.48433E-01      3325.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.47939E-01      3350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.47453E-01      3375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.46976E-01      3400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.46508E-01      3425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.46047E-01      3450.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45594E-01      3475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45149E-01      3500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.44711E-01      3525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.44281E-01      3550.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43858E-01      3575.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43442E-01      3600.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43032E-01      3625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42629E-01      3650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42233E-01      3675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
```

```
   0.41843E-01      3700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41459E-01      3725.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41081E-01      3750.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40709E-01      3775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40343E-01      3800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39983E-01      3825.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39628E-01      3849.99      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39278E-01      3875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38934E-01      3900.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38595E-01      3925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38261E-01      3950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37933E-01      3975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37609E-01      4000.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37289E-01      4025.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36975E-01      4050.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36665E-01      4075.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36359E-01      4100.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
```

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310.0    2.0
   0.36058E-01      4125.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35761E-01      4150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35468E-01      4175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35180E-01      4200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34895E-01      4225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34615E-01      4250.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34338E-01      4275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34065E-01      4300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33796E-01      4325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33530E-01      4350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33269E-01      4375.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33010E-01      4400.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32755E-01      4425.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32504E-01      4449.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32256E-01      4475.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.32011E-01      4500.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31769E-01      4525.00      0.00   0.0        Winter       0-360   10011001
```

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-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31530E-01      4550.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31295E-01      4575.00      0.00  20.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31062E-01      4600.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30833E-01      4625.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30606E-01      4650.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30383E-01      4675.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30162E-01      4700.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29944E-01      4725.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29728E-01      4750.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29515E-01      4775.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29305E-01      4800.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29098E-01      4825.00      0.00  15.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28893E-01      4850.00      0.00   5.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28690E-01      4875.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28490E-01      4900.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28293E-01      4925.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
```

```
   0.28097E-01      4950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27904E-01      4975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27714E-01      5000.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
```

```
Start date and time  04/23/21 13:06:46

                             AERSCREEN 16216


1111 Sunset No Hotel Operation


            1111 Sunset No Hotel Operation



         -----------------  DATA ENTRY VALIDATION  -----------------
                        METRIC              ENGLISH
 ** AREADATA **  ---------------     ----------------


 Emission Rate:    0.483E-02 g/s         0.383E-01 lb/hr
 Area Height:           3.00 meters           9.84 feet
 Area Source Length:  254.00 meters         833.33 feet
 Area Source Width:   100.00 meters         328.08 feet
 Vertical Dimension:    1.50 meters           4.92 feet
 Model Mode:           URBAN
 Population:         3967000
 Dist to Ambient Air:           1.0 meters             3. feet



 ** BUILDING DATA **
```

No Building Downwash Parameters

** TERRAIN DATA **

No Terrain Elevations

Source Base Elevation: 0.0 meters   0.0 feet

Probe distance: 5000. meters   16404. feet

No flagpole receptors

No discrete receptors used

** FUMIGATION DATA **

No fumigation requested

** METEOROLOGY DATA **

Min/Max Temperature: 250.0 / 310.0 K   -9.7 / 98.3 Deg F

Minimum Wind Speed: 0.5 m/s

Anemometer Height: 10.000 meters

Dominant Surface Profile: Urban

Dominant Climate Type: Average Moisture

Surface friction velocity (u*): not adjusted

DEBUG OPTION ON

AERSCREEN output file:

2021.04.23_1111Sunset_NoHotelOperation.out

*** AERSCREEN Run is Ready to Begin

No terrain used, AERMAP will not be run

****

SURFACE CHARACTERISTICS & MAKEMET

Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture

Season	Albedo	Bo	zo
Winter	0.35	1.50	1.000
Spring	0.14	1.00	1.000
Summer	0.16	2.00	1.000
Autumn	0.18	2.00	1.000

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR started 04/23/21 13:08:17

****

Running AERMOD

Processing Winter

Processing surface roughness sector 1

```
**************************************************
Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0


    ********   WARNING MESSAGES   ********
               ***  NONE  ***


**************************************************
Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5


    ********   WARNING MESSAGES   ********
               ***  NONE  ***


**************************************************
Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10


    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
*****************************************************

Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


*****************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


*****************************************************

Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25


    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 ********************************************
```

```
  Running AERMOD

 Processing Spring


Processing surface roughness sector  1


*****************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


*****************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


*****************************************************

Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***


*****************************************************
Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15


    ********   WARNING MESSAGES   ********
               ***  NONE  ***


*****************************************************
Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20


    ********   WARNING MESSAGES   ********
               ***  NONE  ***


*****************************************************
Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25
```

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***
 ********************************************

  Running AERMOD
 Processing Summer

Processing surface roughness sector  1

*****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

*****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
**************************************************

Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


**************************************************
```

```
Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25


    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 *********************************************


  Running AERMOD

 Processing Autumn


Processing surface roughness sector  1


******************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


******************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5
```

******** WARNING MESSAGES ********

*** NONE ***

****

Processing wind flow sector 3

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 10

******** WARNING MESSAGES ********

*** NONE ***

****

Processing wind flow sector 4

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 15

******** WARNING MESSAGES ********

*** NONE ***

****

Processing wind flow sector 5

AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector 20

```
    ********   WARNING MESSAGES   ********
               ***  NONE  ***

********************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

FLOWSECTOR   ended 04/23/21 13:08:28

REFINE       started 04/23/21 13:08:28

 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

REFINE       ended 04/23/21 13:08:30

 **********************************************
 AERSCREEN Finished Successfully
 With no errors or warnings
```

Check log file for details

****

Ending date and time 04/23/21 13:08:31

```
 Concentration     Distance Elevation  Diag  Season/Month   Zo sector       Date
 H0     U*     W*  DT/DZ ZICNV ZIMCH  M-O LEN    Z0  BOWEN ALBEDO  REF WS     HT
REF TA     HT
   0.48164E+01         1.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51305E+01        25.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53872E+01        50.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.56037E+01        75.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57896E+01       100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59533E+01       125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
*  0.59712E+01       128.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42165E+01       150.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31356E+01       175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24416E+01       200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20338E+01       225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17337E+01       250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15029E+01       275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13221E+01       300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11768E+01       325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10575E+01       350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.95775E+00       375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.87401E+00       400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.80158E+00       425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.73944E+00       450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.68557E+00       475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.63830E+00       500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59592E+00       525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55828E+00       550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52470E+00       575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.49458E+00       600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.46743E+00       625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.44283E+00       650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42017E+00       675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39948E+00       700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38053E+00       725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36312E+00       750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.34707E+00       775.00      0.00   0.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.33223E+00       800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.31841E+00       825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30558E+00       850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29362E+00       875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28247E+00       900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27205E+00       925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.26227E+00       950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.25304E+00       975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.24436E+00      1000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.23619E+00      1025.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22849E+00      1050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.22121E+00      1075.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.21435E+00      1100.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20784E+00      1125.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.20166E+00      1150.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.19581E+00      1175.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.19024E+00      1200.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.18494E+00      1225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17989E+00      1250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17509E+00      1275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.17051E+00      1300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16613E+00      1325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.16194E+00      1350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15794E+00      1375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15410E+00      1400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.15043E+00      1425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14691E+00      1450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14353E+00      1475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.14027E+00      1500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13713E+00      1525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13411E+00      1550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.13121E+00      1575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12842E+00      1600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.       6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.12573E+00      1625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12312E+00      1650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.12060E+00      1675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11817E+00      1700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11582E+00      1725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11355E+00      1750.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.11136E+00      1775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10925E+00      1800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10719E+00      1825.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10521E+00      1850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10329E+00      1875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.10143E+00      1900.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.99628E-01      1924.99      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.98193E-01      1950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.96494E-01      1975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.94845E-01      2000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.93244E-01      2025.00      0.00   0.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.91690E-01      2050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.90180E-01      2075.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.88713E-01      2100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.87286E-01      2125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.85899E-01      2150.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.84550E-01      2175.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.83237E-01      2200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.81959E-01      2225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.80715E-01      2250.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.79503E-01      2275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.78323E-01      2300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.77173E-01      2325.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.76051E-01      2350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.74958E-01      2375.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.73892E-01      2400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.72852E-01      2425.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.71837E-01      2450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.70845E-01      2475.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.69876E-01      2500.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.68930E-01      2525.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.68007E-01      2550.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.67104E-01      2575.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.66222E-01      2600.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.65360E-01      2625.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.64517E-01      2650.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.63693E-01      2675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.62887E-01      2700.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.62098E-01      2725.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.61326E-01      2750.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.60571E-01      2775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59832E-01      2800.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.59108E-01      2825.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.58399E-01      2850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.57705E-01      2875.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.57025E-01      2900.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.56359E-01      2925.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55706E-01      2950.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.55066E-01      2975.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.54439E-01      3000.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53824E-01      3025.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.53221E-01      3050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52630E-01      3075.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.52049E-01      3100.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.51480E-01      3125.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.50922E-01      3150.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.50374E-01      3174.99      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.49836E-01      3200.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.49308E-01      3225.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.48789E-01      3250.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.48280E-01      3275.00      0.00  20.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.47780E-01      3300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.47289E-01      3325.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.46807E-01      3350.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.46333E-01      3375.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45867E-01      3400.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.45409E-01      3425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.44960E-01      3450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.44518E-01      3475.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.44083E-01      3500.00      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43656E-01      3525.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.43235E-01      3550.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42822E-01      3575.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42416E-01      3600.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.42016E-01      3625.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41623E-01      3650.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.41235E-01      3675.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.40855E-01      3700.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40480E-01      3725.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.40111E-01      3750.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39748E-01      3775.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39390E-01      3800.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.39039E-01      3825.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38692E-01      3850.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38351E-01      3875.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.38015E-01      3900.00      0.00  15.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37684E-01      3925.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37358E-01      3950.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.37037E-01      3975.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36720E-01      4000.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36409E-01      4025.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.36101E-01      4050.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35799E-01      4075.00      0.00  25.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.35500E-01      4100.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
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310.0    2.0
   0.35206E-01      4125.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.34917E-01      4149.99      0.00  20.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.34631E-01      4175.00      0.00   5.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.34349E-01      4200.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.34071E-01      4225.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.33797E-01      4250.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.33527E-01      4275.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.33261E-01      4300.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.32998E-01      4325.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.32739E-01      4350.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.32483E-01      4375.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.32231E-01      4400.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.31982E-01      4425.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.31736E-01      4450.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.31494E-01      4475.00      0.00   0.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.31255E-01      4500.00      0.00  10.0        Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35   0.50   10.0
310.0    2.0
   0.31019E-01      4525.00      0.00  10.0        Winter       0-360   10011001
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-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30786E-01      4550.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30556E-01      4575.00      0.00  20.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30329E-01      4600.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.30105E-01      4625.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29884E-01      4650.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29665E-01      4675.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29450E-01      4700.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29237E-01      4725.00      0.00  25.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.29026E-01      4750.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28818E-01      4775.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28613E-01      4800.00      0.00   5.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28411E-01      4825.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28211E-01      4850.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.28013E-01      4875.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27818E-01      4900.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27625E-01      4925.00      0.00   0.0        Winter      0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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   0.27434E-01      4950.00      0.00   0.0         Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27245E-01      4975.00      0.00   0.0         Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
   0.27059E-01      5000.00      0.00   0.0         Winter       0-360   10011001
-1.30  0.043 -9.000  0.020 -999.   21.      6.0 1.000   1.50   0.35    0.50   10.0
310.0    2.0
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SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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Paul Rosenfeld, Ph.D.

Chemical Fate and Transport & Air Dispersion Modeling

Principal Environmental Chemist

Risk Assessment & Remediation Specialist

Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Thesis on wastewater treatment.

Professional Experience

Dr. Rosenfeld has over 25 years' experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from unconventional oil drilling operations, oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, and many other industrial and agricultural sources. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at dozens of sites and has testified as an expert witness on more than ten cases involving exposure to air contaminants from industrial sources.

Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex H_2O Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

Publications:

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P**., (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

Rosenfeld, P.E. & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health*. 73(6), 34-46.

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Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution,* 123 (17), 319-327.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

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Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

Rosenfeld, P.E., J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

Rosenfeld, P. E., M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities.* Boston Massachusetts: Elsevier Publishing

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

Rosenfeld P. E., J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004.* New Orleans, October 2-6, 2004.

Rosenfeld, P.E., and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49(9), 171-178.

Rosenfeld, P. E., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

Rosenfeld, P.E., Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

Rosenfeld, P.E., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

Rosenfeld, P.E., and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality.* 29, 1662-1668.

Rosenfeld, P.E., C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

Rosenfeld, P.E., and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

Rosenfeld, P.E., and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

Chollack, T. and **P. Rosenfeld. (**1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

Rosenfeld, P. E. (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

Rosenfeld, P. E. (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

Rosenfeld, P. E. (1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

Rosenfeld, P. E. (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

Rosenfeld, P. E. (1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

Presentations:

Rosenfeld, P.E., Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society.* Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

Rosenfeld, P.E. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

Rosenfeld, P.E. (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

Rosenfeld, P. E. (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant*. The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld P. E. (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

Rosenfeld P. E. (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting.* Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition.* Lecture conducted from Boston Massachusetts.

Paul Rosenfeld Ph.D. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference.* Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

Paul Rosenfeld Ph.D. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

Paul Rosenfeld Ph.D. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference.* Lecture conducted from Hilton Hotel in Irvine, California.

Paul Rosenfeld Ph.D. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference.* Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

Paul Rosenfeld Ph.D. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference.* Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

Paul Rosenfeld, Ph.D. (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

Paul Rosenfeld, Ph.D. (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

Rosenfeld, P. E., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

Paul Rosenfeld, Ph.D. (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

Paul Rosenfeld, Ph.D. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

Rosenfeld, P.E. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conferenc*e. Lecture conducted from Indianapolis, Maryland.

Rosenfeld. P.E. (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

Rosenfeld. P.E. (October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

Rosenfeld, P.E. (2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

Rosenfeld, P.E., C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

Rosenfeld, P.E, C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

Deposition and/or Trial Testimony:

In the United States District Court For The Southern District of Illinois
Duarte et al, *Plaintiffs,* vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 3:19-cv-00302-SMY-GCS
Rosenfeld Deposition. 2-19-2020

In the Circuit Court of Jackson County, Missouri
Karen Cornwell, *Plaintiff,* vs. Marathon Petroleum, LP, *Defendant.*
Case No.: 1716-CV10006
Rosenfeld Deposition. 8-30-2019

In the United States District Court For The District of New Jersey
Duarte et al, *Plaintiffs,* vs. United States Metals Refining Company et. al. *Defendant.*
Case No.: 2:17-cv-01624-ES-SCM
Rosenfeld Deposition. 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk, *Plaintiffs,* vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" *Defendant.*
Case No.: 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition. 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No.: No. BC615636
Rosenfeld Deposition, 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No.: No. BC646857
Rosenfeld Deposition, 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiff vs. The 3M Company et al., Defendants
Case: No 1:16-cv-02531-RBJ
Rosenfeld Deposition, 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No 1923
Rosenfeld Deposition, 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintiffs vs. Chevron Corporation, et al., Defendants
Cause No C12-01481
Rosenfeld Deposition, 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition, 8-23-2017

In United States District Court For The Southern District of Mississippi
Guy Manuel vs. The BP Exploration et al., Defendants
Case: No 1:19-cv-00315-RHW
Rosenfeld Deposition, 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No.: LC102019 (c/w BC582154)
Rosenfeld Deposition, 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., *Plaintiffs,* vs. Meritor Inc., et al., *Defendants*
Case Number: 4:16-cv-52-DMB-JVM
Rosenfeld Deposition: July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No.: No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial, March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No.: RG14711115
Rosenfeld Deposition, September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No.: LALA002187
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Jerry Dovico, et al., Plaintiffs vs. Valley View Sine LLC, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Iowa District Court For Wapello County
Doug Pauls, et al.,, et al., Plaintiffs vs. Richard Warren, et al., Defendants
Law No,: LALA105144 - Division A
Rosenfeld Deposition, August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action N0. 14-C-30000
Rosenfeld Deposition, June 2015

In The Third Judicial District County of Dona Ana, New Mexico
Betty Gonzalez, et al. Plaintiffs vs. Del Oro Dairy, Del Oro Real Estate LLC, Jerry Settles and Deward DeRuyter, Defendants
Rosenfeld Deposition: July 2015

In The Iowa District Court For Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No 4980
Rosenfeld Deposition: May 2015

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

2656 29th Street, Suite 201
Santa Monica, CA 90405

Matt Hagemann, P.G, C.Hg.
(949) 887-9013
mhagemann@swape.com

Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

Geologic and Hydrogeologic Characterization
Investigation and Remediation Strategies
Litigation Support and Testifying Expert
Industrial Stormwater Compliance
CEQA Review

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certifications:

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, Matt has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2104, 2017;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

<u>Senior Regulatory and Litigation Support Analyst:</u>

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 300 environmental impact reports and negative declarations since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at more than 150 industrial facilities.
- Expert witness on numerous cases including, for example, perfluorooctanoic acid (PFOA) contamination of groundwater, MTBE litigation, air toxins at hazards at a school, CERCLA compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted

public hearings, and responded to public comments from residents who were very concerned about the impact of designation.
- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:
- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:
- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9.

Activities included the following:
- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific

principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt is currently a part time geology instructor at Golden West College in Huntington Beach, California where he taught from 2010 to 2014 and in 2017.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.

Kathleen King <kathleen.king@lacity.org>

RE: 1111 Sunset Project (ENV-2018-177-EIR) DEIR Comments

3 messages

jordan@gideonlaw.net <jordan@gideonlaw.net> Mon, Apr 26, 2021 at 4:18 PM
To: kathleen.king@lacity.org

Ms. King—apologies sent wrong version. Please use the correct version attached.

-JRS

From: jordan@gideonlaw.net <jordan@gideonlaw.net>
Sent: Monday, April 26, 2021 3:59 PM
To: 'kathleen.king@lacity.org' <kathleen.king@lacity.org>
Subject: 1111 Sunset Project (ENV-2018-177-EIR) DEIR Comments

Ms. King:

On behalf of UNITE HERE Local 11, please see attached DEIR comment letter regarding the above-referenced project. Do not hesitate to contact me if you have any questions. Lastly, please confirm receipt of this message—many thanks.

-JRS

Jordan R. Sisson, Attorney

Law Office of Gideon Kracov

801 S. Grand Ave., 11th Floor

Los Angeles, CA 90017

Cell: 818-324-9752

Office: 213-629-2071 ext. 1102

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jordan@gideonlaw.net

www.gideonlaw.net

2021.04.26_CEQA Comments.final.v2.pdf
822K

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 4:21 PM
To: jordan@gideonlaw.net

Mr. Sisson,

Thank you for your comment regarding the 1111 Sunset Project Draft EIR. Your comment emailed at 4:18 PM on April 26, 2021 is received and included in the project file.

Thank you again,

LOS ANGELES CITY PLANNING

Kathleen King
Pronouns: She/Hers/Her
City Planner
Los Angeles City Planning
221 N. Figueroa Street, Suite 1350
Los Angeles, CA 90012
Planning4LA.org
T: (213) 847-3624
E-NEWS

[Quoted text hidden]
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LOS ANGELES CITY PLANNING

Kathleen King
Pronouns: She/Hers/Her
City Planner
Los Angeles City Planning
221 N. Figueroa Street, Suite 1350
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E-NEWS

Jordan R. Sisson <jordan@gideonlaw.net> Mon, Apr 26, 2021 at 4:24 PM
To: Kathleen King <kathleen.king@lacity.org>

Thank you

-Jordan

(Dictated from mobile device, please excuse any typos)

On Apr 26, 2021, at 4:21 PM, Kathleen King <kathleen.king@lacity.org> wrote:

GIDEON KRACOV
Attorney at Law
801 South Grand Avenue
11th Floor
Los Angeles, California 90017

(213) 629-2071
Fax: (213) 623-7755

gk@gideonlaw.net
www.gideonlaw.net

April 26, 2020

VIA EMAIL:

Kathleen King, City Planning
City of Los Angeles
6262 Van Nuys Boulevard, Room 430
Van Nuys, CA 91401
kathleen.king@lacity.org

RE: DEIR Comments on 1111 Sunset Project (1115 W. Sunset Blvd., 90012); DCP Case Nos. ENV-2018-177-EIR

Dear Mr. King:

On behalf of UNITE HERE Local 11 ("**Local 11**"), this Office respectfully provides the following comments[1] to the City of Los Angeles ("**City**") Department of City Planning ("**DCP**") regarding the Draft Environmental Impact Report ("**DEIR**")[2] for a proposed two-tower, 994,982 square feet ("**SF**") mixed-use development at the above-referenced 6.27-acre location ("**Site**") that can be either: (i) 737 residential units (76 of which affordable), 180-room hotel, 48,000-SF office; 95,0000-SF commercial ("**Mixed-Use Scenario**"); or (ii) the same development but replacing the 180-room hotel with 90 more residential units (totaling 827 units/ 76 still affordable) ("**No Hotel Scenario**") (collectively "**Project**").

The Project contemplates various land use approvals pursuant to the Los Angeles Municipal Code ("**LAMC**" or "**Code**"), including: (i) Major Development Conditional Use approval for a development project that creates more than 100,000 SF of non-residential floor area and potentially 180 guest rooms; (ii) removal of a variable width building line in conjunction with a subdivision; (iii) Density Bonus request with various incentives requested; (iv) Vesting Conditional Use Permit to locate a hotel use within 500 feet of an A or R zone; (v) Master Conditional Use Permit for sale of alcohol; (vi) Director of Planning approval of a landscape plan with 262 trees planted on-site instead of the tree planting requirements defined by the Code; (vii) Vesting Tentative Airspace Tract Map; and (viii) Site Plan Review to allow the development of 50 or more net new guest rooms (collectively "**Entitlements**"). Additionally, pursuant to the California Environmental Quality Act, Pub. Res. Code § 21000 *et seq.,* ("**CEQA**"),[3] the Project seeks approval of an EIR.

As discussed below, Local 11 is concerned about the Project's compliance with CEQA. In short, the DEIR fails to adequately assess the Project's vehicle miles traveled ("**VMT**") and greenhouse gas ("**GHG**") impacts—though the DEIR admits less VMT per employee and GHG

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[1] Page citations contained herein are to the page's stated pagination (referenced herein as "**p. #**"), or to the page's location in the referenced PDF document (referenced herein as "**PDF p. #**").
[2] Inclusive of all Draft EIR documents retrieved from City website on the Project. See https://planning.lacity.org/development-services/eir/1111-sunset-project-0.
[3] Including "**CEQA Guidelines**" codified at 14 Cal. Code. Regs. § 15000 *et seq*.

emissions under the No Hotel Scenario. Failure to identify these impacts infects the DEIR's project alternative analysis. Before the City considers approving the DEIR or the Project, the City should factor the Project's ability to create good-paying jobs and maximize housing opportunities and whether those factors outweigh the admitted significant air quality and noise impacts of this Project, as well as the unidentified VMT and GHG impacts alleged herein.

Until the issues discussed herein are resolved, Local 11 respectfully urges the City to stay any actions on the Entitlements and DEIR (collectively "**Project Approvals**").

I. LOCAL 11'S STANDING

Local 11 represents more than 25,000 workers employed in hotels, restaurants, airports, sports arenas, and convention centers throughout Southern California and Phoenix—including *thousands of members* who live and/or work in the City. The union has a First Amendment right to lobby public officials in connection with matters of public concern, like compliance with applicable zoning rules and CEQA, just as developers, other community organizations, and individual residents do. Protecting its members' interest in the environment and the availability of housing is part of Local 11's core function. Recognizing unions' interest in these issues, California courts have consistently upheld unions' standing to litigate land use and environmental claims. (See *Bakersfield Citizens v. Bakersfield* (2004) 124 Cal.App.4th 1184, 1198.) Furthermore, Local 11 has public interest standing given the adoption/amendment of the STR Ordinance relates to the City's public duty to comply with applicable zoning and CEQA laws, and where Local 11 seeks to have that duty enforced. (See e.g., *Rialto Citizens for Responsible Growth v. City of Rialto* (2012) 208 Cal.App.4th 899, 914-916, n6; *La Mirada Avenue Neighborhood Assn. of Hollywood v. City of Los Angeles* (2018) 22 Cal.App.5th 1149, 1158-1159; *Weiss v. City of Los Angeles* (2016) 2 Cal.App.5th 194, 205-206; *Save the Plastic Bag Coalition v. City of Manhattan Beach* (2011) 52 Cal.4th 155, 166, 169–170.)

II. DEIR MASKS VMT IMPACTS

Here, while the Mixed-Use Scenario would generate 4.8 VMT per capita (i.e., household production) and 8.4 VMT per employee (work attraction), and the No Hotel Scenario would generate 4.9 VMT per capita (i.e., household production) and 8.3 VMT per employee (work attraction). (DEIR, pp. IV.L-39 - 40.) The DEIR concludes that these VMTs levels are less than significant because they are below applicable thresholds. (Id.) However, the DEIR only analyzed 13,195 of the 56,710 VMTs generated by the Mixed-Use Scenario (i.e., 23.6 percent) and only analyzed 13,508 of the 53,035 VMTs generated by the No Hotel Scenario (i.e., 25.4 percent). (DEIR, APP-Q, PDF pp. 181, 192; see also figure following page [highlighted for your convenience]). This VMT analysis is incorrect for at least three reasons.

/ / /

CITY OF LOS ANGELES VMT CALCULATOR
Report 4: MXD Methodology

Date: October 1, 2020
Project Name: 1111 Sunset Boulevard
Project Scenario: Mixed-Use Development Scenario
Project Address: 1111 W SUNSET BLVD, 90012

Version 1.3

MXD Methodology - Project Without TDM

	Unadjusted Trips	MXD Adjustment	MXD Trips	Average Trip Length	Unadjusted VMT	MXD VMT
Home Based Work Production	657	-29.4%	464	7.5	4,928	3,480
Home Based Other Production	1,819	-40.4%	1,085	5.6	10,186	6,076
Non-Home Based Other Production	2,582	-4.1%	2,477	6.8	17,558	16,844
Home-Based Work Attraction	844	-21.7%	661	8.5	7,174	5,619
Home-Based Other Attraction	5,590	-34.1%	3,682	5.9	32,981	21,724
Non-Home Based Other Attraction	1,939	-4.5%	1,851	6.2	12,022	11,476

MXD Methodology with TDM Measures

	Proposed Project			*Project with Mitigation Measures*		
	TDM Adjustment	Project Trips	Project VMT	TDM Adjustment	Mitigated Trips	Mitigated VMT
Home Based Work Production	-13.0%	403	3,026	-13.0%	403	3,026
Home Based Other Production	-13.0%	943	5,283	-13.0%	943	5,283
Non-Home Based Other Production	-13.0%	2,154	14,646	-13.0%	2,154	14,646
Home-Based Work Attraction	-13.0%	575	4,886	-13.0%	575	4,886
Home-Based Other Attraction	-13.0%	3,202	18,890	-13.0%	3,202	18,890
Non-Home Based Other Attraction	-13.0%	1,610	9,979	-13.0%	1,610	9,979

MXD VMT Methodology Per Capita & Per Employee

Total Population: 1,728
Total Employees: 582
APC: East Los Angeles

	Proposed Project	*Project with Mitigation Measures*
Total Home Based Production VMT	8,309	8,309
Total Home Based Work Attraction VMT	4,886	4,886
Total Home Based VMT Per Capita	4.8	4.8
Total Work Based VMT Per Employee	8.4	8.4

CITY OF LOS ANGELES VMT CALCULATOR
Report 4: MXD Methodology

Date: October 1, 2020
Project Name: 1111 Sunset Boulevard
Project Scenario: No-Hotel Development Scenario
Project Address: 1111 W SUNSET BLVD, 90012

Version 1.3

MXD Methodology - Project Without TDM

	Unadjusted Trips	MXD Adjustment	MXD Trips	Average Trip Length	Unadjusted VMT	MXD VMT
Home Based Work Production	737	-28.4%	528	7.5	5,528	3,960
Home Based Other Production	2,042	-40.0%	1,226	5.6	11,435	6,866
Non-Home Based Other Production	2,552	-4.0%	2,450	6.8	17,354	16,660
Home-Based Work Attraction	714	-22.4%	554	8.5	6,069	4,709
Home-Based Other Attraction	4,624	-34.2%	3,044	5.9	27,282	17,960
Non-Home Based Other Attraction	1,830	-4.5%	1,748	6.2	11,346	10,838

MXD Methodology with TDM Measures

	Proposed Project			*Project with Mitigation Measures*		
	TDM Adjustment	Project Trips	Project VMT	TDM Adjustment	Mitigated Trips	Mitigated VMT
Home Based Work Production	-13.0%	459	3,443	-13.0%	459	3,443
Home Based Other Production	-13.0%	1,066	5,970	-13.0%	1,066	5,970
Non-Home Based Other Production	-13.0%	2,130	14,486	-13.0%	2,130	14,486
Home-Based Work Attraction	-13.0%	482	4,095	-13.0%	482	4,095
Home-Based Other Attraction	-13.0%	2,647	15,617	-13.0%	2,647	15,617
Non-Home Based Other Attraction	-13.0%	1,520	9,424	-13.0%	1,520	9,424

MXD VMT Methodology Per Capita & Per Employee

Total Population: 1,931
Total Employees: 492
APC: East Los Angeles

	Proposed Project	*Project with Mitigation Measures*
Total Home Based Production VMT	9,413	9,413
Total Home Based Work Attraction VMT	4,095	4,095
Total Home Based VMT Per Capita	4.9	4.9
Total Work Based VMT Per Employee	8.3	8.3

/ / /

First, *the City's VMT Calculator ignores hotel/retail patron VMTs*. The DEIR fails to apply any threshold to the 43,515 and 39,527 VMTs generated by the Mixed Project and No Hotel Scenarios (respectively), roughly 75 percent of the total VMTs generated by the Project. Notably missing is any application of a threshold to the hotel/retail patron VMTs. This amounts to omitting roughly 70% of the average daily trips ("**ADT(s)**") generated by the non-office and non-housing uses proposed. (DEIR, APP-Q, PDF pp. 140 - 141.)[4] Unlike office and housing projects where the vast majority of trips/VMTs are generated by employees and residents (respectively), the vast majority of trips/VMTs generated by hotel/retail projects are from patrons and, in this respect, are more akin to retail, entertainment, and/or regional serving projects. Under the City's approach, unlimited VMTs from hotel/retail patrons could be generated and found to be less than significant merely because the City has refused to apply any threshold. While the City has the discretion in selecting thresholds, supported by substantial evidence, it does not enjoy the discretion to ignore impacts by refusing to apply any threshold completely.

Second, *the DEIR ignores the significant portions of retail/regional serving uses in the Project*. The DEIR fails to acknowledge that the Project's 95,000-SF of retail/restaurant uses exceeds the 50,000-SF threshold applicable to the Project under local VMT guidelines.[5] Under the DEIR's logic every hotel/retail/restaurant project—regardless of size and VMTs generated—could be found less than significant VMT impact merely because the development includes a residential/office or other use component. This would lead to absurd results of allowing extensive VMTs to be ignored. Additionally, as discussed above, hotels are more akin to regional retail whereby they generate a majority of non-residential/employee VMTs. The City admits that the area is a marquee destination of regional tourist significance.[6] As such, the hotel and retail/restaurant components do function as a regional-serving use that must be considered in the VMT analysis. Moreover, with numerous hotels in the area,[7] it does not appear that the area is underserved by hotels or locally-serving uses that would normally indicate a reduction in VMTs from the Project.[8]

Third, *additional mitigation measures are required for the Project's hotel/retail component*. The DEIR has failed to calculate VMT by hiding behind speculation and ignoring the vast majority of the Project's VMTs by refusing to apply any threshold. Neither the DEIR nor the City can categorically ignore the significant VMTs generated by the Project's hotel/retail patrons. Mitigation measures are required to reduce these daily trips as Conditions of Approval.[9]

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[4] Sum of ADTs from Hotel, Hotel Retail, Hotel Restaurant, Retail, Health Club, Grocery, Restaurant; subtracted trip credits. Admittedly some of these ADTs are from employees captured by the VMT calculator, but provides context of how substantial these uses are for the Project.
[5] See LADOT (Jul. 2020) Transportation Assessment Guidelines ("**TAG**"), p. 2-6 – 2-8 (fnn. 14 & 20) (retail projects "under 50,000 square feet" are considered local serving. For larger projects to be considered local serving, applicant must provide documentation that "most of the vehicle trips will be originating from the project area."), pp. 2-8 – 2-9 (suggesting several analysis and model types to demonstrate retail component is locally serving and/or reducing VMTs), https://ladot.lacity.org/sites/default/files/documents/2020-transportation-assessment-guidelines_final_2020.07.27_0.pdf.
[6] See also Central City Community Plan, pp. I-17, III-3 – III-5, https://planning.lacity.org/odocument/2ddbdde0-a8fb-46e3-a151-f52fd09cc084/Central_City_Community_Plan.pdf.
[7] See Google Maps, https://www.google.com/maps/search/hotel/@34.0666555,-118.3187832,12z/data=!4m7!2m6!3m5!1shotel!2s34.0661,+-118.2485!4m2!1d-118.2484869!2d34.0660841.
[8] See LADOT, supra fn. 5.
[9] Numerous VMT mitigation measures are available, such as those recommended by the California Air Pollution Control Officers Association ("CAPCOA") and Southern California Association of Governments ("SCAG"). (See e.g., CAPCOA (Aug. 2010) Quantifying Greenhouse Gas Mitigation Measures, pp. 155-331, http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf; SCAG

III. GHG IMPACTS ARE IGNORED

Here, citing CEQA Guidelines § 15064(h)(3), the DEIR's qualitative GHG analysis relies on the Project's consistency with CARB's 2017 Scoping Plan, SCAG's RTP/SCS, and the City's Green New Deal to determine less than significant GHG impacts. (DEIR, p. IV.E-37, 39.) This is incorrect for several reasons.

First, the *DEIR fails to recognize that plans must include specific, binding, and enforceable measures specific to local land-use projects* to be applicable under the CEQA Guidelines. Under subdivision (h)(3), lead agencies can find projects not cumulatively considerable for GHG when a project complies with an approved plan or mitigation program that "provides *specific requirements* that will avoided or substantially lessen the cumulative problems *within the geographic area* in which the project is located … [and] the lead agency should *explain* how implementing the particular requirements in the plan, regulation or program ensure that the *project's incremental contribution* to the cumulative effect is not cumulatively considerable." (Emphasis added). When adopted, the Resources Agency explained that this subsection provides a "rebuttable presumption" for "certain" plans, such as local Climate Action Plans ("**CAP(s)**").[10] As further explained, "consistency with plans that are *purely aspirational* (i.e., those that include *only unenforceable goals without mandatory reduction measures*), and *provide no assurance that emissions within the area governed by the plan will actually address the cumulative problem*, may not achieve the level of protection necessary to give rise to this subdivision's presumption."[11] (Emphasis added.) Hence, lead agencies must "*draw a link* between the project and the *specific provisions of a binding plan or regulation*," before subdivision (h)(3) rebuttable presumption is to take effect.[12] Here, the DEIR fails to draw that link.

Second, the *DEIR's Scoping Plan consistency analysis is lacking*. Here, the DEIR claims the Project is consistent with CARB's Scoping Plan by referencing "mandatory regulatory compliance measures" and compliance with Title 24 and meeting various building codes. (DEIR, Tbls. IV.E-4 & 5.) However, these measures are not specific to the City land-use projects and focus instead on other agencies' efforts at the state and regional levels (e.g., Cap-and-Trade, Renewables Portfolio Standard, Low Carbon Fuel Standards, etc.). CARB has stated it would be "misguided" to suggest Cap-and-Trade or other state regulations covers mobile emissions from local land-use projects, and made it abundantly clear that its Scoping Plans are "non-binding" on local governments.[13]

Third, the *DEIR's RTP/SCS and SB 375 consistency analysis is similarly lacking*. SCAG has also made it clear that the RTP/SCS is "non-binding" on local governments.[14] Here, the DEIR claims the Project is generally consistent with the RTP/SCS because it is mixed-use, infill development. (DEIR, p. IV-E-58.) However, more must be done beyond merely being an infill development near transit

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(Sep. 2020) 2020 RTP/SCS Connect SoCal Addendum, pp. 4.0-18 – 4.0-25, https://scag.ca.gov/sites/main/files/file-attachments/fpeir_connectsocal_addendum_4_mitigationmeasures.pdf?1606004420.

[10] Resources Agency (Dec. 2009) Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines, pp. 14-15, http://resources.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf.

[11] Ibid., pp. 16, 65.

[12] Ibid., p. 16.

[13] See e.g., CARB (12/5/18) RE Centennial Specific Plan Final EIR, p. 3-4, 6-7, 10-11, https://ww3.arb.ca.gov/toxics/ttdceqalist/centennialfeir.pdf.

[14] See e.g., SCAG (Apr. 2016) 2016 RTP/SCS, PDF p. 70, http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf; SCAG (Apr. 2016) 2016 RTP/SCS Program EIR Response to Comments, PDF p. 85, http://scagrtpscs.net/Documents/2016/peir/final/Final_RTC032816.pdf.

and relying on existing regulatory measures. According to CARB, the Sustainable Communities Strategy (like SCAG's RTP/SCS) is not enough, and California "*is not on track*" to meet GHG reductions expected under SB 375.[15] As warned by CARB, "with emissions from the transportation sector continuing to rise despite increases in fuel efficiency and decreases in the carbon content of fuel, *California will not achieve the necessary [GHG] emissions reductions to meet mandates for 2030* and beyond …" (emphasis added).[16] Here, the Project is failing to do its part to reduce mobile emissions, which is necessary if the State is going to reach its long-term GHG reduction goals.

Fourth, the *DEIR's reliance on the Project's VMT analysis is equally flawed given it ignores roughly 75 percent of the VMTs generated by the project* (discussed supra).

Fifth, *the DEIR fails to compare the Project against RTP/SCS performance goals*. While the DEIR notes RTP/SCS's GHG per capita reductions from auto/light-truck emissions (i.e., SB 375's goal) (DEIR, pp. IV.E-29 – 30, 54, 72), it does not show the Project is coming close to this figure. This goal is reflected in SCAG's 2016 RTP/SCS Program EIR ("**PEIR**")[17] that determined the per capita emissions were 23.8 pounds per day ("**lbs/day**") in 2005, and that SCAG's 2016 RTP/SCS plan would achieve per capita emissions of 21.4 lbs/day in 2020 and 19.5 lbs/day in 2035 (see table excerpted directly below).[18] These performance goals identified in the table below have been updated pursuant to SCAG's adoption of the 2020 RTP/SCS.[19] Here, however, the DEIR fails to conduct any analysis to show that the Project would come close to the per capita auto/light-truck GHG emissions levels under the 2016 RTP/SCS (i.e., 21.4 and 19.5 lbs/day/capita goal for 2020 and 2035 [respectively]) or the 2020 RTP/SCS (i.e., 21.3 and 18.8 lbs/day/capita goal for 2020 and 2035 [respectively]).[20] This analysis must be done to show that the Project is genuinely consistent with SCAG's RTP/SCS and SB 375 by meeting these specific performance goals.

TABLE 3.8.4-3
SB 375 ANALYSIS

	2005 (Baseline)	2020 (Plan)	2035 (Plan)	2040 (Plan)
Resident population (per 1,000)	17,161	19,060	21,475	22,116
CO_2 emissions (per 1,000 tons)	204.0*	203.6**	206.0**	203.0**
Per capita emissions (pounds/day)	23.8	21.4	19.5	18.7
% difference from Plan (2020) to Baseline (2005)				−8%*
% difference from Plan (2035) to Baseline (2005)				−18%***
% difference from Plan (2040) to Baseline (2005)				−22%***

NOTE:
* Based on EMFAC2007
** Based on EMFAC2014
***Included off-model adjustments for 2035 and 2040
SOURCE:
SCAG modeling, 2015
Southern California Association of Governments. 5 November 2015. *Item No. 1 Staff Report: 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) – Proposed Major Components*. Available at: http://www.scag.ca.gov/committees/CommitteeDocLibrary/jointRCPC110515fullagn.pdf

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15 CARB (Nov. 2018) 2018 Progress Report, p. 4-7 (emphasis added), https://ww2.arb.ca.gov/sites/default/files/2018-11/Final2018Report_SB150_112618_02_Report.pdf.
16 Ibid.
17 SCAG (Apr. 2016) 2016 RTP/SCS, p. 8, 15, 153, 166, http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf.
18 SCAG (11/24/15) 2016 RTP/SCS Draft PEIR, p. 3.8-37 – 3.8-38, http://scagrtpscs.net/Documents/2016/peir/draft/2016dPEIR_Complete.pdf.
19 See e.g., SCAG (11/7/19) Draft 2020 RTP/SCS, p. 9, 48, 138, https://www.connectsocal.org/Documents/Draft/dConnectSoCal_Draft-Plan.pdf; SCAG (Nov. 2019) 2020 RTP/SCS Draft PEIR, p. 3.8-73 – 3.8-74, https://www.connectsocal.org/Documents/PEIR/draft/dPEIR_ConnectSoCal_Complete.pdf.
20 Ibid., 2020 RTP/SCS Draft PEIR, Tbl. 3.8-10.

Sixth, the ***City's Green New Deal is not a CEQA-compliant CAP***. Here, the Green New Deal is merely a "mayoral initiative" and not a qualified CAP. (DEIR, pp. IV.E-30 – 31.) However, like its consistency analysis of CARB's Scoping Plan (discussed supra), the DEIR routinely cites mandatory compliance with Title 24 and other building codes. (Id., at Tbl. IV.E-7.) Additionally, the Green New Deal has none of the hallmarks of a qualified CAP that ensures GHG reductions, such as: i) inventorying existing and future GHG emissions within the City; ii) establishing a numeric limit of total GHG emission for the City; iii) identifying specific mitigation measures with performance standards that can be implemented on a project-by-project basis that would achieve the City limit; iv) creating a monitoring program to ensure the CAP's efficacy for the City to reach its limit; and v) subject to CEQA review. (See CEQA Guidelines § 15183.5(b)(1).)

Seventh, the ***DEIR ignores SCAQMD thresholds routinely used by the City***. Here, the Mixed-Use Scenario and No Hotel Scenario would generate 10,562 and 10,013 MTCO2e/yr in GHG emissions, respectively. (DEIR, p. IV.E-71.) This exceeds all South Coast Air Quality Management District's ("**SCAQMD**") Tier 3 interim numeric thresholds.[21] Additionally, based on its GHG emissions and purported service population (DEIR, Tbl. IV.E-6), the Mixed-Use Scenario and No Hotel Scenario would achieve an efficiency level of approximately 4.57 and 4.13 MTCO2e/yr/sp (respectively), which exceeds SCAQMD's Tier 4 target of 3.0 MTCO2e/yr/sp in year 2035.[22] This is substantial evidence of a significant GHG impact, particularly given the City has routinely used SCAQMD's Tier 3 and Tier 4 thresholds in the past—notwithstanding contrary arguments.[23] Additionally, similar

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[21] SCAQMD interim thresholds for various projects include: 10,000 (industrial); 3,500 (residential), 3,000 (mixed-use or non-industrial); 1,400 (commercial) MTCO2e/yr. See SCAQMD (9/28/10) Minutes for the GHG CEQA Significance Working Group # 15, p. 2, http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf); see also SCAQMD (12/5/08) Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans, p. 5, 6, http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2; SCAQMD (Oct. 2008) Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold, http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf.

[22] Ibid.

[23] See e.g., Venice Blvd. Self-Storage project (DCP Case No. ENV-2017-3855) MND, PDF pp. 49-50 (applying 1,400 MTCO2e/yr threshold for commercial project), https://planning.lacity.org/staffrpt/mnd/Pub_101818/ENV-2017-3855.pdf; 5950 Jefferson Boulevard project (DCP Case No. ENV-2017-4170) MND, PDF pp. 112-114 (noting SCAQMD's 3,000 MTCO2e/yr threshold is "appropriate" and remains supported by SCAQMD's technical analysis as a useful indicator of significance), https://planning.lacity.org/staffrpt/mnd/Pub_122018/ENV-2017-4170.pdf; 333 La Cienega Blvd. project (DCP Case No. ENV-2015-897-EIR) Initial Study, PDF pp. 89-90 (applying the 3,000 MTCO2e/yr threshold for mixed-use project), http://planning.lacity.org/eir/nops/333LaCienega/is.pdf; 3063 W. Pico Blvd. project (DCP Case No. ENV-2016-1604) MND, PDF pp. 86-87 (referencing 3,000 MTCO2e/yr threshold for mixed-use projects), http://cityplanning.lacity.org/staffrpt/mnd/Pub_033017/ENV-2016-1604.pdf; 16966 Sunset Blvd. project (DCP Case No. ENV-2017-3896) MND, PDF pp. 41 (utilizing 3,000 MTCO2e/yr threshold), https://planning.lacity.org/staffrpt/mnd/Pub_122718/ENV-2017-3896.pdf; 756 N. Edinburgh Avenue project (DCP Case No. ENV-2016-1367-EIR) IS, PDF pp. 87-88 (applying 3,000 MTCO2e/yr threshold), http://planning.lacity.org/eir/EdinburghAve/DEIR/Appendix%20A%20-%20NOP%20IS%20and%20Comment%20Letters.pdf; 1209 6th Avenue project (DCP Case No. ENV-2014-1988-EIR) Initial Study, PDF pp. 85-86 (applying the 3,500 MTCO2e/yr threshold for residential project), https://planning.lacity.org/eir/nops/1209_6thAvenueInitialStudy/1209_InitialStudySigned_100716.pdf; 15116 S. Vermont Avenue Staff Report (DCP Case No. ENV-2017-1015-MND) PDF pp. 182, 220 (containing MND applying the 10,000 MTCO2e/yr threshold for industrial project), http://planning.lacity.org/StaffRpt/InitialRpts/CPC-2017-1014.PDF; Woodley Avenue Self-Storage project (DCP Case No. ENV-2018-4247) MND, PDF pp. 89-91 (utilizing 10,000 MTCO2e/yr threshold for industrial project), https://planning.lacity.org/staffrpt/mnd/Pub_012419/ENV-2018-4247.pdf; 7720 Lankershim Blvd. project (DCP

numeric/efficiency thresholds have been adopted by numerous other air districts, such as Sacramento Metropolitan Air Quality Management District ("**SMAQMD**"),[24] Bay Area Air Quality Management District ("**BAAQMD**"),[25] Placer County Air Pollution Control District ("**PCAPCD**"),[26] and San Luis Obispo Air Pollution Control District ("**SLOAPCD**").[27] So too, the Project efficiency

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Case No. ENV-2016-2384) MND, p. IV-33 – IV-35 (utilizing 3,000 Tier 3 threshold for non-industrial project), http://clkrep.lacity.org/onlinedocs/2018/18-0827_misc_1_08-28-2018.0001.pdf; Lafayette Park Place Bridge Housing Facility project (3/13/19) CE, PDF p. 578, http://clkrep.lacity.org/onlinedocs/2018/18-0392_rpt_BOE_03-13-2019.pdf; 5750 Hollywood Blvd. project (DCP Case No. ENV-2014-4288) DEIR, PDF p. 31-32, http://planning.lacity.org/eir/5750HollywoodBlvd/DEIR/4.C_Greenhouse_Gas_Emissions.pdf; Providence Tarzana Medical Center project (DCP Case No. ENV-2016-1662) DEIR, PDF p. 50, https://planning.lacity.org/eir/ProvidenceTarzanaMedicalCtr/FEIR/files/D_IVD.pdf; Bermuda Apartments (DCP Case No. ENV-2017-628) MND, PDF p. 72-73, https://planning.lacity.org/odocument/64056bf9-e4b7-4085-b33f-89ced0b9dac5/ENV-2017-628.pdf; Bending the River Back into the City Project (Jan. 2014) IS/MND, PDF p. 34 (applying 900 MTCO2e/yr threshold for City project), http://clkrep.lacity.org/onlinedocs/2014/14-0254_misc_a_2-24-14.pdf; City (10/27/11) Inter-Departmental Correspondence, PDF p. 34 (applying 10,000 MTCO2e/yr threshold), http://clkrep.lacity.org/onlinedocs/2014/14-0106_misc_w_5-7-15.pdf; LAX Terminals 2 and 3 Modernization project (Feb. 2017) DEIR, PDF pp. 141 (applying 10,000 MTCO2e/yr threshold), http://clkrep.lacity.org/onlinedocs/2017/17-0836_misc_11_07-26-2017.pdf; Van Nuys Airport Propeller Park Development (Feb. 2011) Final Negative Declaration, PDF p. 87 (applying 10,000 MTCO2e/yr threshold), http://clkrep.lacity.org/onlinedocs/2011/11-1518_rpt_bac_8-30-2011.pdf; LAX Terminal 1.5 project (Nov. 2016) IS/MND, PDF p. 72 (applying 10,000 MTCO2e/yr threshold), http://clkrep.lacity.org/onlinedocs/2017/17-0017_misc_5_01-13-2017.pdf; Mariondale Avenue and Lillyvale Avenue Vacation District project (2/22/18) IS, PDF p. 18, http://clkrep.lacity.org/onlinedocs/2017/17-0504_misc_2_03-27-2018.pdf; 15116-15216 South Vermont Avenue project (11/22/17) IS, PDF p. 81, http://clkrep.lacity.org/onlinedocs/2018/18-0279_misc_5_04-04-2018.pdf; North Valley Fire Station No. 7 project (10/17/11) IS, PDF p. 31, http://clkrep.lacity.org/onlinedocs/2012/12-0114_misc.pdf; Burbank Blvd. Widening project (Jul. 2009) IS, PDF p. 45, http://clkrep.lacity.org/onlinedocs/2009/09-2458_misc_4-1-16.pdf.

[24] SMAQMD (May 2018) Guide to Air Quality Assessment in Sacramento County, pp. 6:1-3, 6:10-12 ("(GHG) emissions adversely affect the environment through contributing, on a cumulative basis, to global climate change … *the District recommends that lead agencies address the impacts of climate change on a proposed project and its ability to adapt to these changes in CEQA documents* … [thus urging] evaluating whether the GHG emissions associated with a proposed project will be responsible for making a cumulatively considerable contribution to global climate change."[emphasis original]), http://www.airquality.org/LandUseTransportation/Documents/Ch6GHGFinal5-2018.pdf; *see also* SMAQMD Thresholds of Significance Table, http://www.airquality.org/LandUseTransportation/Documents/CH2ThresholdsTable5-2015.pdf.

[25] BAAQMD (May 2017) CEQA Air Quality Guidelines, p. 2:1-4 ("No single project could generate enough GHG emissions to noticeably change the global average temperature [but rather] [t]he combination of GHG emissions from past, present, and future projects contribute substantially to the phenomenon of global climate change and its associated environmental impacts."), http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en.

[26] PCAPCD (Oct. 2016) CEQA thresholds of Significance Justification Report, pp. E-2, 2, 17-22 ("CEQA requires that the lead agency review not only a project's direct effects on the environment, but also the cumulative impacts of a project and other projects causing related impacts. When the incremental effect of a project is cumulatively considerable, the lead agency must discuss the cumulative impacts in an EIR. [citing CEQA Guidelines § 15064]"), https://www.placer.ca.gov/DocumentCenter/View/2061/Threshold-Justification-Report-PDF; *see also* PCAPCD (11/21/17) CEQA Thresholds And Review Principles, http://www.placerair.org/landuseandceqa/ceqathresholdsandreviewprinciples.

[27] SLOAPCD (Mar. 28, 2012) GHG Threshold and Supporting Evidence, p. 5, 25-30, 42 ("No single land use project could generate enough GHG emissions to noticeably change the global average temperature. Cumulative GHG emissions, however, contribute to global climate change and its significant adverse environmental impacts. Thus, the primary goal in adopting GHG significance thresholds, analytical

threshold exceeds the 2.6 MTCO2e/yr/sp threshold advanced by the Association of Environmental Professionals ("**AEP**") for projects with a horizon between 2021 and 2030.[28] In sum, the DEIR provides no explanation why the City has routinely used those thresholds in the recent past, but refuses to do so now. Nor does the DEIR explain how not using a numeric threshold comports with evolving science and trends, given numerous air districts have adopted them. To avoid ad hoc rationalization and threshold-shopping, the DEIR must explain with substantial evidence why these thresholds are no longer applicable when the evidence suggests otherwise.

IV. THE DEIR FAILS TO PROVIDE AN ADEQUATE ALTERNATIVE ANALYSIS

Under CEQA, the discussion of mitigation and alternatives is "the core of an EIR," requiring a lead agency to select a reasonable range of alternatives for evaluation guided by a clearly written statement of objectives. (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564-65; see also CEQA Guidelines § 15124(b).) It is the lead agency's affirmative duty to approve a project only after "meaningful consideration of alternatives and mitigation measures." (*Mountain Lion Foundation v. Fish & Game Com.* (1997) 16 Cal.4th 105, 134.) This duty cannot be defeated by defining objectives too narrowly or too broadly or artificially limiting the agencies' ability to implement reasonable alternatives by prior contractual commitments. (See e.g. *City of Santee v. County of San Diego* (1989) 214 Cal.App.3d 1438, 1447; *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 736.) Instead, a "reasonable range of alternatives" should be:

- "capable of being accomplished in a successful manner" (Pub. Res. Code § 21061.1);
- "attain most of the basic objectives of the project" (*Sierra Club v. County of Napa* (2004) 121 Cal.App.4th 1490, 1509 [citing CEQA Guidelines § 15126.6(a) and (f)]); and
- achieve the project's "underlying fundamental purpose" *(In re Bay-Delta* (2008) 43 Cal.4th 1143, 1164-1165 [citing CEQA Guidelines § 15124(b)]).

While alternatives must implement the most basic project objectives, they need not implement all of them. (See *California Native Plant Soc'y v. City of Santa Cruz (*2009) 177 Cal.App.4th 957, 991; see also *Mira Mar Mobile Community v. City of Oceanside* (2004) 119 Cal.App.4th 477, 488-489.) The discussion must "focus on alternatives capable of eliminating any significant adverse environmental effects or reducing them to a level of insignificance, even if these alternatives would impede to some degree the attainment of the project objectives, or would be costlier." (*Friends of the Eel River v. Sonoma County Water Agency* (2003) 108 Cal.App.4th 859, 873; see also CEQA Guidelines § 15126.6(a); *Cleveland National Forest Foundation v. San Diego Assn. of Governments* (2017) 17 Cal.App.5th 413, 436 [EIR discussion deficient where no alternative was considered that significantly reduced total vehicle miles traveled and where the alternatives labeled 'transit emphasis' was a "misnomer" given they only advanced certain rapid bus projects, left rail/trolley projects largely unchanged, and provided no increased transit projects/services].)

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methodologies, and mitigation measures is to ensure new land use development provides its fair share of the GHG reductions needed to address cumulative environmental impacts from those emissions.), https://storage.googleapis.com/slocleanair-org/images/cms/upload/files/Greenhouse%20Gas%20Thresholds%20and%20Supporting%20Evidence%204-2-2012.pdf.

[28] AEP (Oct. 2016) Beyond Newhall and 2020: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California, p. 40 ("Once the state has a full plan for 2030 (which is expected in 2017), and then a project with a horizon between 2021 and 2030 should be evaluated based on a threshold using the 2030 target. A more conservative approach would be to apply a 2030 threshold based on SB 32 for any project with a horizon between 2021 and 2030 regardless of the status of the Scoping Plan Update."), https://califaep.org/docs/AEP-2016_Final_White_Paper.pdf.

Here, as discussed above, the DEIR fails to adequately assess Project impacts relating to VMTs and GHG impacts. As a result, the DEIR's project alternative analysis is inadequate because it does not give due consideration to these impacts. Nevertheless, it is worth noting that the No Hotel Scenario, which serves all of the Project's base objectives consistent with CEQA,[29] would have fewer VMTs per employee and less GHG emissions than the Mixed-Use Scenario (discussed supra). So too, it would produce more housing, which is a rare opportunity to put an enormous dent into the City's desperately need affordable housing goals. According to the City's 2019 Annual Element Progress Report, the City was approximately 78 percent short of the total 46,590 very-low, low-, and moderate-income units allocated under the City's then Regional Housing Assessment Allocation ("**RHNA**").[30] Under the draft updated RHNA allocation, that need has increased by a factor of more than five—to 259,206.[31] Failing to place as much housing as possible at the Site would be a missed opportunity.

Moreover, failing to recognize these significant Project VMT/GHG impacts, the DEIR's alternative analysis fails to (i) include alternatives that address these specific impacts or (ii) provide a fair comparison of the comparative advantages of the alternatives to the Project.

V. STATEMENT OF OVERRIDING CONSIDERATIONS SHOULD FACTOR GOOD PAYING JOBS AND AFFORDABLE HOUSING AT A PREMIUM

The DEIR admits, at a minimum, that the Project will have significant, unmitigated regional air emission and construction noise impacts. (DEIR, pp. I-13 - 14.) So too, Local 11 is concerned about potentially significant VMT and GHG impacts discussed herein. Here, the Project fails to impose all feasible mitigation measures or identify a CEQA-compliant statement of overriding considerations. (See *Lawler v. City of Redding* (1992) 7 Cal.App.4th 778 [vacating city's approval of a sports facility on city-owned land in an unincorporated area until adopting measures to sufficient mitigate noise impacts].)

When approving a project that will have significant environmental impacts not fully mitigated, a lead agency must adopt a "statement of overriding considerations" finding that the project's benefits outweigh its environmental harm. (See CEQA Guidelines § 15043; *see also* Pub. Res. Code § 21081(b); *Sierra Club v. Contra Costa County* (1992) 10 Cal.App.4th 1212, 1222.) An overriding statement expresses the "larger, more general reasons for approving the project, such as the need to create new jobs, provide housing, generate taxes and the like." (*Concerned Citizens of S. Central LA v. Los Angeles Unif. Sch. Dist*. (1994) 24 Cal.App.4th 826, 847.) It must fully inform and disclose the specific benefits expected to outweigh environmental impacts, supported by substantial evidence. (See CEQA Guidelines §§ 15043(b), 15093(b); *see also Sierra Club*, 10 Cal.App.4th at 1223.) Furthermore, an agency may adopt a statement of overriding considerations ***only after*** it has imposed all feasible mitigation measures to reduce a project's impact to less than significant levels. (See CEQA Guidelines §§ 15091 & 15126.4.) Hence, decisionmakers may not

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[29] See e.g., *California Native Plant Soc'y v. City of Santa Cruz* (2009) 177 Cal.App.4th 957, 991; *Mira Mar Mobile Community v. City of Oceanside* (2004) 119 Cal.App.4th 477, 488-489; *Friends of the Eel River v. Sonoma County Water Agency* (2003) 108 Cal.App.4th 859, 873; *Cleveland National Forest Foundation v. San Diego Assn. of Governments* (2017) 17 Cal.App.5th 413, 436; CEQA Guidelines § 15126.6(a).
[30] City (Jan. 2020) Annual Progress Report, PDF p. 2, https://planning.lacity.org/odocument/8204713d-6574-46b6-b41c-6f6311c247f6/LosAngeles2019_Summary.pdf.
[31] City (Jan. 2021) Citywide Housing Element Initial Study, PDF p. 15 (Tbl. 1), https://planning.lacity.org/odocument/1a4e2cf4-7365-4fef-a45e-7f4631f2c132/Initial_Study.pdf.

approve a project when feasible mitigation measures can substantially lessen or avoid such impacts. (See Pub. Res. Code § 21002; see also CEQA Guidelines § 15092(b)(2).)

Moreover, in addition to imposing all feasible mitigation, to the extent that overriding considerations are needed, key among the findings that the lead agency must make is that:

> Specific economic, legal, social, technological, or other considerations, including the provision of ***employment opportunities for highly trained workers***, make infeasible the mitigation measures or alternatives identified in the environmental impact report … [and that those] benefits of the project outweigh the significant effects on the environment. (Pub. Res. Code § 21081(a)(3) & (b), emphasis added.)

Here, the DEIR fails to identify significant impacts and/or incorporate feasible mitigation measures. Nor does the DEIR identify any overriding considerations. To the extent the City considers approving the Project with significant environmental impacts, the City should consider the number of construction/operational jobs that will be for "highly trained workers," and what the likely salary and wage ranges of these jobs will be. The City should also consider the number of affordable housing units (for sale or rental) feasible for the Site. These factors are critical for the City to consider whether the Project's purported benefits of the Project truly outweigh its environmental impacts.

VI. CONCLUSION

In sum, Local 11 is seriously concerned with the DEIR's failure to adequately assess the Project's impact on VMTs and GHGs. These flaws must be cured through a recirculated EIR, with adequate mitigation measures and project alternatives considered. Until these issues are addressed, Local 11 respectfully urges the City to stay any action on the Project Approvals.

Finally, on behalf of Local 11, this Office requests, to the extent not already on the notice list, all notices of CEQA actions and any approvals, Project CEQA determinations, or public hearings to be held on the Project under state or local law requiring local agencies to mail such notices to any person who has filed a written request for them. (Pub. Res. Code §§, 21092.2, 21167(f) and Gov. Code § 65092 and Los Angeles Municipal Code § 197.01.F.) Please send notice by electronic and regular mail to Jordan R. Sisson, Esq., P.O. Box 569, Riverside, CA 92502 (jordan@jrsissonlaw.com).

Thank you for consideration of these comments. We ask that this letter is placed in the administrative record for the Project.

Sincerely,

Jordan R. Sisson
Attorney for Local 11

Kathleen King <kathleen.king@lacity.org>

1111 Sunset Blvd. Proposed development Letter of NO SUPPORT

1 message

coni acos <coni.epnc@gmail.com> Mon, Apr 26, 2021 at 4:32 PM
To: kathleen.king@lacity.org

I'm submitting this letter of no support for the reasons stated in the attached document. Please add it to the Planning file for consideration.

Thank you,
Connie Acosta,
Former EPNC Planning and Land Use Committee Chair
Echo Park NC Board member
Letter is my personal statement

RE- 1111 Sunset blvd. (Letter of no support).pdf
63K

STAKEHOLDER LETTER OF **NO SUPPORT**
For 1111 Sunset Boulevard

RE: Environmental Case No. ENV-2018-177-EIR 1111 Sunset Blvd.

To: Kathleen King City of Los Angeles, Department of City Planning 221 N. Figueroa Street, Suite 1350 L.A., CA 90012
From: Connie Acosta, Echo Park NC Board member, personal Statement
Date April 26, 2021

Though the 1111 Sunset project is very beautiful, I find that the City of Los Angeles Planning Department has been shaping the City's land use with a clear vision as reflected in ZIMAS and the Commercial Citywide Design Guidelines. I find that the subject project does not support the City's vision per their existing plans and renderings shown to the community at the Historical Neighborhood Council meeting of April 15, 2021.

According to ZIMAS.LACity.org, the subject project violates the following vital provisions in land use and zoning among other hazardous factors. The Baseline Hillside Ordinance applicable to the Elysian Hills may also apply in this case.

- 1111 W. Sunset Blvd., Land Use is labeled Commercial General Use with corresponding zones: C1.5; C2; C4; RAS3 and RAS4
- Floor Area Ratio (FAR) is 3:1
- Residential is Medium to Medium-high corresponding to R4
- Methane Hazard Zone (see ZIMAS description)
- Nonresidential market area—Medium
- Hillside based on latest Grid Map is a Special Grading Area
- There exist three (3) buried oil wells left from the 1910's oil field industry in that area with numbers: 0403725954; 0403725955; 0403725959
- According to the ZIMAS's diagram there seems be 4 additional wells (red dots) on Beaudry Street from Sunset to 800 N. Beaudry Street.

In addition, according to the 10 principles of Urban Design, the project fails short in the following 4 items:
They are:

(3) Nurture neighborhood character
(4) Bridge the past and the future
(7) Stimulate sustainability and innovation in our city.

(10) Ensure connections. There is no evidence that the building of this project will create connections with Angelino Heights HPOZ.

According to the LADCP Citywide Design Guidelines: "Relationship to adjacent buildings," P. 17. Does ***not recommend,*** "high rise buildings adjacent to multi-family housing, insensitive to height transition and creates negative shade/shadow impacts."

Kathleen King <kathleen.king@lacity.org>

Case No. ENV-2018-177-EIR, 1111 Sunset, Draft EIR Comment

3 messages

Phyllis Ling <pling@yahoo.com> Mon, Apr 26, 2021 at 3:50 PM
To: kathleen.king@lacity.org

Hi Kathleen,

Attached is a comment letter regarding the 1111 Sunset EIR from Mr. Bill Chin, resident and property owner in Victor Heights. He asked me to submit it for him because he doesn't have email.

Thanks,

Phyllis Ling

1111 Sunset EIR Comment-BillChin.pdf
1225K

Phyllis Ling <pling@yahoo.com> Mon, Apr 26, 2021 at 4:00 PM
To: kathleen.king@lacity.org

Bill Chin also wanted to add that the S-shaped curve in Beaudry coming off of Sunset causes a bottleneck that needs to be mitigated.

Begin forwarded message:
[Quoted text hidden]

1111 Sunset EIR Comment-BillChin.pdf
1225K

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 4:18 PM
To: Phyllis Ling <pling@yahoo.com>

Ms Ling,

The 1111 Sunset Draft EIR initial comment letter and follow-up comment regarding the S-shaped curve at Beaudry, both submitted on behalf of Bill Chin are received and included in the project file.

Thank you,

LOS ANGELES CITY PLANNING

Kathleen King
Pronouns: She/Hers/Her
City Planner
Los Angeles City Planning
221 N. Figueroa Street, Suite 1350
Los Angeles, CA 90012
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T: (213) 847-3624
E-NEWS

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LOS ANGELES CITY PLANNING

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Case Number: ENV-2018-177-EIR

Project Location: 1111 and 1115 West Sunset Boulevard, Los Angeles, CA 90012

To:

Kathleen King

City of Los Angeles, Department of City Planning

221 N. Figueroa Street, Suite 1350

Los Angeles, CA 90012

kathleen.king@lacity.org

Here are my comments regarding the project and requested mitigation:

Scale and Compatibility

The project is wildly out of scale to its surrounding Victor Heights hillside neighborhood. LA City Planning has an Urban Design Studio to study the compatibility of new development with existing neighborhoods. This project clearly does not follow the city's own Urban Design Studio dictates. Once built, the 49-story tower will be among the 12 tallest buildings in LA. Neither the Historic Cultural North Neighborhood Council (HCNNC) board nor HCNNC's Planning and Land Use Committee voted to support this project.

Tower B at 30 levels/29 residential levels is the widest and deepest of all three towers. (Dimensions are 132' x 108' square). It is the largest footprint and is less than 70' from existing residences on Alpine. This larger footprint will block a significant amount of sun and shade on surrounding blocks. Urban planning articulates scaling and compatibility with the neighborhood. Tower B has neither.

Tower A at 572' high plus 382' above sea level would rise as high as the 12 tallest buildings in downtown Los Angeles. Once built, it will exceed the top of Victor Heights and Figureoa Terrace hill by more than 300'. Again, urban scaling and compatibility is ignored. The tower height should be reduced.

Just because the lot is zoned C2, doesn't mean that it is appropriate to put downtown skyscrapers in a residential setting, so close to residential zoning. Victor Heights is a low-scale residential neighborhood, not the urban core of Downtown LA.

Traffic Circulation

The driveway off of Alpine is currently used to feed less than 142 parking spaces for The Elysian. Under the proposal, the same driveway will provide all vehicular access for Tower A, Tower B, commercial, courtyard, and main loading dock. It would feed 900 parking spaces, six times the number of current parking spaces. It would also be the ingress/egress point for trucks to access the 255' long loading bays. All of this would happen 24/7, adjacent to the existing lower scale, residential neighborhood, and 500 feet away from Sunset Blvd.

It is completely inappropriate and disruptive to existing residents to direct this huge volume of residential AND commercial traffic into the residential neighborhood. The garage access should not be across the street from the residential zoning. There are current residents who use the local streets – Alpine, Beaudry, and White Knoll – to go to laundromats and to access public transportation. To share these streets with huge new influx of commercial and residential vehicles that are coming to the 1111 Sunset project is not appropriate because Beaudry is not a secondary highway. Alpine is not a secondary highway. Sunset Boulevard, however, is a secondary highway, which is meant for commercial vehicles to travel on, and for access to the property to load and offload merchandise.

The pattern of commercial traffic should be reconfigured to increase ingress/egress along Sunset Boulevard rather than directing all traffic to Alpine and the existing neighborhood. A 10 ft highway dedication is needed on Sunset, so that commercial vehicles can enter the loading dock from Sunset. The current proposal uses Alpine for their main access to a 255' long loading bay, and it is in a residential neighborhood. The optional loading area is only 8'2" high. The trucks entering from Alpine will need to back out and cause a lot of noise and obstruction as they back up into the street.

North of Sunset, Beaudry is currently one lane (plus one lane for parking) in each direction. Per the Central City West Specific Plan, Beaudry would have six lanes, which Beaudry does have south of Temple St to First St. To plan ahead, Sunset Boulevard should have an extra lane at the intersection of Beaudry, continuing to White Knoll Drive, to handle the increased traffic due to street parking. 1111 Sunset should dedicate an additional 10' on Sunset for additional drop off for commercial and hotel accessibility.

The Sunset Building abuts Sunset with no setbacks resulting in a wall of concrete up from the Beaudry corner. Again, a 10' setback should be mandated to promote traffic flow and ease of ingress/egress along Sunset.

Public Property for Private Use

1111 Sunset's proposed property line includes an annexation of the Beaudry Triangle (4,549 sqft) and an extension of the development's property line along the Beaudry frontage into the public right of way, for an additional 5,925 square feet of public property. Will the city be re-numerated for this annexation? Will citizens have access to the property? At the very least, the annexed Beaudry Triangle should be landscaped to serve as a public pocket park.

Land Use

The Sunset Building, which is the proposed hotel building, is less than 500' from residences, a clear violation of the municipal code. Sec. 3. Paragraph (d) of Subdivision 1 of Subsection A of Section 12.12.2 of the Los Angeles Municipal Code is amended to read as follows: Hotels (including motels), apartment hotels or hostels when no portion of a structure proposed to be used as a hotel (including a motel), apartment hotel or hostel is located within 500 ft from any A or R zone.

The top level of the Sunset Building is designated for hotel food and beverage. The City needs to add conditional use and limit hours of operation (no later than 10pm) to reduce sound impacts to the surrounding neighborhoods once the bar/restaurant opens. There shall be no live entertainment or amplified music permitted on the rooftop deck.

If the project will have liquor and wine licenses for over 20 venues including beer and wine bars, I would like to know if the development would also include laundromats where people can wash their clothes. If there will be mom and pop owned Chinese restaurants, tamale, taco, and soup restaurants. I would also like to know if there will be a public library drop off and annex in the neighborhood. I want to know that this will not be franchises coming in that will be corporate, when so many mom and pop businesses have suffered hardship during the pandemic and were forced to close down.

And also, I want to know if Palisades will offer an air right parcel to the city of la housing to build affordable apartments on this site since they are building the site into multiple, over a dozen, air right parcels. And if they believe in affordable housing, why not offer one of the parcels to someone who believes in affordable housing to develop affordable housing, instead of offering only 10 percent according to TOC?

Oil Wells

There are six oil wells located at the 1111 Sunset property. Well number 3 (API # 03725954) at the edge of the property near the intersection of Beaudry and Alpine may not be properly capped off. Two nearby wells at the 800 N Beaudry (API # 0403706425 and # 0403706476) were high production wells, and have been properly abandonned.

It is essential that all of the oil wells at the 1111 Sunset property are properly plugged prior to any excavation or earthmoving work, or work that causes ground vibration. Methane is colorless and odorless, but highly flammable. Hydrosulfide is colorless, but highly toxic. If construction work compromises any one of these wells and causes a leak, it will be too late to mitigate for the damage, because there aren't funds in the U.S. for superfund or brownfield cleanup in case of emergency.

History of Open Space

The site of the proposed 1111 Sunset development has a long history as an open space and a place for the public good and public health. In the 1800's Victor Beaudry deliberately made the site into a public park. Out of the goodness of his heart, he sold the property to the Sisters of Charity in 1883 for $10,000, so that they could build a TB hospital (https://www.kcet.org/shows/lost-la/bellevue-terrace-and-beaudry-park-l-a-s-two-lost-hilltop-gardens). The sisters placed their new infirmary there, but also repurposed Beaudry's fruit trees and cypresses into a soothing backdrop for their patients. The land that was originally intended for open space by Victor Beaudry has changed hands over the years, including through possible eminent domain prior to the building of the MWD campus in 1963. The open space that is proposed by the current owner is a small fraction of the open space, and does little to pay tribute to the history of this site. Alpine Gardens and The Hill, which make up the bulk of the open space are mostly fire access roads and parking access. The canery pine trees were planted by MWD; they should be replanted.

The grade from Sunset Boulevard has an elevation gain from 18' to 51'. The elevator is a climb up toward the center of the property. How will the public easily access the property? An elevator open to the public at the Sunset Blvd side of the property will increase promised access to the project's open spaces. The proposed elevators, which are toward the center of Tower B for the convenience of the tenants coming up from the multiple subterranean parking levels, are insufficient.

Bellevue Avenue is wider than Beaudry Avenue. This intersection needs to be well planned for future use.

Shadows

The buildings are too high. As a group, Towers A and Towers B and the Sunset building will cast shadows on a wide area of the neighborhood. At any given time there will be over 350 linear feet of shadow from these 3 buildings, casting shadow over Angelino Heights in the morning from the sun rising in the east, and on Alpine Hill (Victor Heights) in the afternoon as the sun sets to the west. During the day, Victor Heights and Figueroa Terrace will be in the shadow a majority of the time with over 350 linear feet of shadow from these 3 buildings. This will limit the ability of residents to use solar panels and grow vegetable gardens, fruit tress, and flower gardens. The buildings are simply too high, and these impacts need to be mitigated with reductions in height. In addition, the shadow studies only show what will happen at the equinox. Longer shadows will be cast during other times of year.

There have been many meetings, but half of the time those meetings have been spent on the presentation, instead of the needed time on Q and A. There is not enough understanding because the maps and plans do not show the direction on the top of the pages.

Sincerely,

BILL CHIN

Bill Chin

836 N. Beaudry
213-250-4826

Connect Create Collaborate

Kathleen King <kathleen.king@lacity.org>

Inquiry re Environmental Case No. ENV-2018-177-EIR

2 messages

Matthew French <matt@mattfrench.com> Wed, Apr 21, 2021 at 10:28 AM
To: kathleen.king@lacity.org

Ms. King,

I see that the public comment period for this EIR closes on Monday, April 26th. Can you help me to understand the significance of this deadline? For example, should I have certain concerns or opposition to aspects of the planned development, would they have to be submitted via public comment before that date to be considered by the City in its approval/permitting processes or would there be other opportunities or ways to engage in an interactive process after that date?

Thank you,

Matthew French

Kathleen King <kathleen.king@lacity.org> Wed, Apr 21, 2021 at 10:44 AM
To: Matthew French <matt@mattfrench.com>

Hi Mathew,

The April 26th deadline relates to the Draft Environmental Impact Report (EIR) comment period closing for the 1111 Sunset Project. If you would like to submit a comment regarding the Project's Draft EIR, the comment will need to be submitted by the April 26th deadline. A public hearing for this Project will not be scheduled until the Project's environmental review is complete. Individuals will have an opportunity at the public hearing to provide testimony/comments.

Thanks- Kathleen

[Quoted text hidden]

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LOS ANGELES CITY PLANNING

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E-NEWS

Connect Create Collaborate

Kathleen King <kathleen.king@lacity.org>

Public Comment for Environmental Case No. ENV-2018-177-EIR

4 messages

Scott Hitchins <scotthitchins@gmail.com> Mon, Apr 26, 2021 at 3:51 PM
To: kathleen.king@lacity.org

Dear Ms. King,

This email is in response to the notice of Public Comments deadline by 4pm today for case number ENV-2018-177-EIR. A hard copy of this email was dropped off at your office and left with Susan earlier this afternoon, but it was not dated. I have also also attached a PDF to this email.

I am a resident of The Elysian at 1115 W. Sunset Blvd. Our building is the immediate/adjacent neighbor of the subject site/proposed development at 1111 W. Sunset Blvd.

In the draft EIR, Appendix A (Initial Study), Attachment B (Environmental Checklist), Section VIII (Hazards and Hazardous Materials), potentially significant impacts are indicated, related to the presence and release of asbestos, PCB's, and lead based paint from the existing subject site into the environment.

In response, the applicant/development team stated on page B-43 of the draft EIR that additional evaluation and analysis of hazards and hazardous materials would be included in the EIR. During a community Zoom meeting last week (Tuesday 04/20) hosted by the applicant, I asked about the status/results of that evaluation and analysis. They could not fully answer, despite the question having been submitted in advance. They did respond that asbestos had already been removed from the buildings sometime within the last decade. But, continuing on, they also stated that there may still be asbestos present in existing building materials such as flooring. When further questioned about what other hazardous materials beyond asbestos had been evaluated, tested for, etc., they said they did not have that information and would get back to us. A written request the next day (Wed. 4/21) via The Elysian management for that promised follow up has not yet (as of this writing) received a response.

The Elysian is physically connected to one of the original 1961 structures to be demolished. While living here, I have observed red-tailed hawks and other birds gliding on the updraft created by wind encountering the vertical plane of our building. It is clear that any release of the aforementioned hazardous substances (if they are present) into the air would be carried upward, into occupied public and dwelling spaces of The Elysian, via any opening in the exterior envelope because of its proximity to the demolition site.

It is understood CalOSHA, SoCal AQMD, and CEQA all play a role in how these situations are managed. Out of an abundance of caution, I submit this comment to emphasize how much we and the neighboring community will depend on vigorous oversight at the City, Regional, and/or State level to ensure that the removal of all hazardous substances is conducted properly and thoroughly. This issue goes beyond the usual nuisances and inconveniences attendant to large scale developments. It is a serious public health and safety concern.

I am generally supportive of the development. It offers an opportunity revitalize a segment of the neighborhood and Sunset corridor that suffers from neglect and blight. It has the potential to increase economic activity. While it will increase density, it will also provide sorely needed housing.

Thank you for the opportunity to be heard regarding the proposed development, and for your consideration of our neighborhood public health and safety.

Sincerely,

Scott Hitchins
1115 W. Sunset Blvd. #710
Los Angeles CA 90012

Public comments ENV 2018 177 EIR.pdf

215K

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 3:53 PM
To: Scott Hitchins <scotthitchins@gmail.com>

Mr. Hitchins,

Thank you for your comment regarding the 1111 Sunset Project Draft EIR. Susan did send me a copy of your letter and date stamped it. Your letter is received and in the case file.

Thank you again,

LOS ANGELES CITY PLANNING

Kathleen King
Pronouns: She/Hers/Her
City Planner
Los Angeles City Planning
221 N. Figueroa Street, Suite 1350
Los Angeles, CA 90012
Planning4LA.org
T: (213) 847-3624

E-NEWS

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LOS ANGELES CITY PLANNING

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E-NEWS

Scott Hitchins <scotthitchins@gmail.com> Tue, Apr 27, 2021 at 12:01 PM
To: Kathleen King <kathleen.king@lacity.org>

Ms. King,

Thank you for confirmation of receipt. I need to correct/clarify an assertion I made in my statement:

The question that I submitted regarding hazardous materials to The Elysian management to forward in advance of our meeting was *not* provided to the developer's team prior to the Zoom call. Posing the question to them during that call was the first time they heard it (from me).

I did not know this until management reached out to me yesterday to inform me of their error. At that point, I had already submitted the comment, after waiting as long as possible for someone to reply to me before the deadline.
While this doesn't change any fact at the heart of the issue or my appeal for the need of adequate oversight, I thought it important to let you know this detail so it does not color your or anyone else's assessment of either party's credibility.

Thanks again
Scott Hitchins
[Quoted text hidden]

Kathleen King <kathleen.king@lacity.org>
To: Scott Hitchins <scotthitchins@gmail.com>
Tue, Apr 27, 2021 at 5:33 PM

Mr. Hitchins,

Thank you for the clarification. This follow-up email is received and included in the case file.

Thank you again,
Kathleen
[Quoted text hidden]

Kathleen King <kathleen.king@lacity.org>

Environmental Case No. ENV-2018-177-EIR1111 Sunset Blvd.

2 messages

GT MANAGEMENT <gtmgmt817@gmail.com> Mon, Apr 26, 2021 at 9:20 AM
To: kathleen.king@lacity.org

Environmental Case No. ENV-2018-177-EIR1111 Sunset Blvd.

Kathleen King City of Los Angeles, Department of City Planning 221 N. Figueroa Street, Suite 1350 Los Angeles, CA 90012 kathleen.king@lacity.org

Dear Ms. King:

I am a stakeholder and property owner in Angelino Heights. Please add my comments to the project file. The proposed 1111 Sunset Blvd. project is completely out of scale to its surrounding Victor Heights hillside neighborhood and does not follow the city's own urban planning design guide. The HCNC planning and land use committee (or the HCNC board) did not vote to support the project. Here are my comments regarding the project and requested accommodations:

Tower B at 30 levels/29 residential levels is the highest, widest and deepest of all three towers. (dimensions are 132'x108' square). It is the largest building and is closest to residences and is less than 70' from residences on Alpine. This larger footprint will block more sun and shade surrounding blocks. Urban planning articulates scaling and compatibility with the neighborhood. Tower B has neither.

Tower A at 572' high (and set 382' above Sunset) is among the top 10 tallest buildings in downtown Los Angeles. Once built it will exceed the top of the Victor Heights hill by more than 300'. Again, urban scaling and compatibility is ignored. The tower height should be reduced.

Loading and service. The driveway off Alpine is currently used to feed less than 150 parking spaces for the Elysian. Under the proposal, the same driveway will provide all vehicular access for Tower A, Tower B main loading dock and feed 900 parking spaces, six times the number of current parking spaces, 24/7. It will feed all residential parking and some commercial as well as 255' long loading bays. The pattern of commercial traffic should be reconfigured to increase ingress/egress along Sunset rather than direct all traffic to Alpine. Trash collection should be directed to enter off Sunset rather than Alpine.

Palisades Development has not accounted for employee parking in the proposed 900+ parking spaces. Where is the designated employee parking?

Beaudry is currently two lanes (with one lane for parking); per the Beaudry Central City West plan, Beaudry would have six lanes. To plan ahead, Sunset should have an extra lane at the intersection of Beaudry continuing from Beaudry to White Knoll Dr. to handle the increased traffic due to 1111 Sunset. The project should dedicate 10' from Sunset for additional drop off for commercial, hotel and accessibility.

Per the EIR, The Site is located within the L.A. City Oil Field. Six to eight former oil and gas production wells are located onsite, with five along the Beaudry frontage and elevated methane concentrations in soil vapor, per the EIR appendix. Current best practices indicate that there NEVER should be construction above or upon capped wells. Currently the wells are located beneath unimproved dirt hillside; the current plan calls for TOWER A to be built on three of these wells.

1111 Sunset's proposed property line includes an annexation of the Beaudry Triangle. (at 4,549') and an extension of the development's property line along the Beaudry frontage into the public right of way for an additional 5,925 square feet of public property. Will the city be re-numerated for this annexation? Will citizens have access to the property? At the very least, the annexed Beaudry Triangle should be landscaped to serve as a public pocket park. Dozens of jacaranda trees along the public way will be removed. Applicant should replace these trees.

The grade from Sunset has an elevation gain from 18' to 51'. The only elevator is at the rear of the property. How will the public easily access the property? An elevator open to the public at the Sunset Blvd. facing side of the property will increase promised access to the project's open spaces. There's not even one public restroom in the proposal! Currently the applicant's proposal is a walled-off city on a hill.

The Sunset Building, which is the proposed hotel building, is less than 500' from residences, a clear violation of the municipal code. Sec. 3. Paragraph (d) of Subdivision 1 of Subsection A of Section 12.12.2 of the Los Angeles Municipal Code is amended to read as follows: Hotels (including motels), Apartment hotels or hostels when no portion of a structure proposed to be used as a hotel (including a motel), apartment hotel or hostel is located within 500 feet from any A or R zone.

The top level is designated for hotel F&B—city needs to add conditional use and hours of operation imposed (no later than 10 pm) to reduce sound impacts once the bar/restaurant opens. There shall be no live entertainment or amplified music permitted on the rooftop deck. No digital signage should be permitted.

The Sunset Building abuts Sunset with no setbacks resulting in a wall of concrete up from the Beaudry corner. Again a 10' setback should be mandated to promote traffic flow and ease of ingress/egress along Sunset.

The landscaping currently includes 50-year old Canary Island Pines. The pines should be preserved and re-used rather than replaced with low shrubbery.

Currently there are more than two-dozen street parking spaces for residents along the Beaudry frontage. The developers should not be allowed to reduce street parking.The corner of Sunset Blvd and Beaudry is a bottleneck with an S-curve and elevation. DOT should study the S-curve and elevation gain and implement mitigation measures so emergency vehicles can access.

Jeff Kirshbaum
--
GT MANAGEMENT
gtmgmt817@gmail.com

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 1:26 PM
To: GT MANAGEMENT <gtmgmt817@gmail.com>

Mr. Kirshbaum,

The 1111 Sunset Project Draft EIR comment letter has been received and included in the project file.

Thank you,

Kathleen King
Pronouns: She/Hers/Her
City Planner
Los Angeles City Planning

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Connect Create Collaborate

Kathleen King <kathleen.king@lacity.org>

Case No. ENV-2018-177-EIR, 1111 Sunset, Draft EIR Comment

2 messages

Phyllis Ling <pling@yahoo.com> Mon, Apr 26, 2021 at 3:59 PM
To: kathleen.king@lacity.org

Case Number: ENV-2018-177-EIR

Project Location: 1111 and 1115 West Sunset Boulevard, Los Angeles, CA 90012

To:

Kathleen King

City of Los Angeles, Department of City Planning

221 N. Figueroa Street, Suite 1350

Los Angeles, CA 90012

kathleen.king@lacity.org

The following are my comments for the draft EIR for the proposed project at 1111 Sunset:

1. Impact of vibration to foundations of old historic homes and apartment buildings. Many of the nearby apartment buildings in Victor Heights are owned by mom and pop landlords who have been in the neighborhood for generations. They own older 2 to 3 story apartment buildings, sometimes referred to as "naturally occurring" affordable housing. Will the developer or the city be liable for damage caused to these surrounding properties? What measures will be in place to receive and investigate complaints? What metrics will be used to stop or pause construction on the project if damage occurs? Has a survey been conducted on the properties? I was hoping the EIR would provide more answers to these questions. The city needs to protect existing affordable housing.

2. The displacement of seniors and families. No one can say if COVID-19 pandemic is truly over. The pandemic certainly rages on in other parts of the world, and other states in the U.S. With many children continuing to receive schooling at home, the issue of the vibration and noise from construction needs even more attention. What are impacts to children's education if they have to deal with noise and vibration during the school day? Likewise, what about seniors who need to nap during the day? These are significant educational, physical, and mental health impacts that are not given enough attention in the EIR. Although mitigation may be difficult, the degree of impact is proportional to the size and scale of this project. Reducing the height of the buildings should reduce the duration of these noise impacts by reducing the amount of excavation required. This project is completely out of scale with the neighborhood as it is, and really only belongs in an urban core area, such as the center of Downtown LA or South Park.

3. This project may add 70 affordable units, but end up driving out many more families and seniors who cannot cope with the health impacts of this project, especially during construction, but also afterwards, due to the round-the-clock vehicular traffic with the garage access at Alpine. Many of the buildings in the neighborhood are older apartment buildings without effective sound-proofing. Will tractor trailers need to turn on their rear backup beeping when they exit the garage at night? The location of the garage access at Alpine for the loading bays needs to be reconsidered because of the heavy impacts this would cause to the existing residents.

4. If long-time residents are forced to leave, they lose their affordable housing and this brings units into market rate prices. But they don't get relocation fees. Will the developer mitigate for this and pay for relocation fees for those who need to relocate due to the severe health impacts. Will there be assistance to help people find new housing?

5. This project is completely out of scale with the neighborhood. The shadow studies demonstrate the magnitude of the difference, with the immense shadows it would cast over Angelino Heights and Victor Heights. These shadows would prevent residents from being able to ever use solar panels and grow vegetables gardens. Not enough mitigation has been proposed to compensate or deal with these impacts.

6. The noise from the construction of this project is concerning also because of the topography. The neighborhood is very similar to an amphitheater or a lecture hall, with 1111 Sunset at the base, and the hillside of Victor Heights on rising above, like the audience. Because of the upward slope of Victor Heights to the north of this project, the noise from the construction of this project, as well as any outdoor roof decks, may be felt even more by hillside residents.

7. A great deal of the “open space” that is proposed for this project are actually fire access roads and parking access, particularly at “The Hill” and “Alpine Gardens.” This is a shame considering the history of the site, having been set aside as a garden by Victor Beaudry, then sold to Sisters of Charity for their hospital. Even when the hospital was there, the sisters managed to maintain a lot of the existing gardens and trees. The proposed project does not offer much of any nod to that history.

The Annex fire, 22 January 1927.

Courtesy St. Vincent Medical Center Historical Conservancy, Los Angeles

https://via.library.depaul.edu/cgi/viewcontent.cgi?article=1045&context=vincentian_ebooks

(ca. 1890s)* - View of Sisters Hospital (aka St. Vincent's Hospital) as seen from behind a cluster of banana trees located on the grounds; a nun can be seen standing in the foreground. More trees hide the rest of the grand hospital, which boasts of numerous windows, dormers, an irregular roof, a cupola or tower, and several chimneys.

https://waterandpower.org/museum/Early_LA_Buildings%20(1800s)_3_of_6.html

Sincerely,

Phyllis Ling

451 Savoy St

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 4:24 PM
To: Phyllis Ling <pling@yahoo.com>

Ms. Ling,

Thank you for your comment regarding the 1111 Sunset Project Draft EIR. Your comment is received and included in the project file.

Thank you again,

LOS ANGELES CITY PLANNING

Kathleen King
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Kathleen King <kathleen.king@lacity.org>

Re: 1111 Sunset Blvd. @ Marion/ Proposed three-tower development/ Composite rendering
2 messages

Ofer Lion <oferlion@hotmail.com> Mon, Apr 26, 2021 at 11:11 AM
To: "kathleen.king@lacity.org" <kathleen.king@lacity.org>
Cc: Ofer Lion <oferlion@hotmail.com>

Hello Kathleen,

I got this email as a former Angeleno Heights homeowner (lived there 14 years). I'm now in Los Feliz. Just wanted to let you know that I fully SUPPORT this project. It's on a major thoroughfare with bus lines and bike lanes. It adds a good number of affordable units. It is not in a historic district.

Perhaps more importantly, these days we just need many, many more units overall throughout the city. While trickle-down economics is a joke, trickle-down housing isn't. Those many market-rate units are needed to increase supply and, ipso facto, begin to lower the cost not of these units, but of other older housing in the area. Demand is sky high. Prices are sky high. This is a smart, sharp way to increase supply.

Thanks,
Ofer Lion

From: GT Management <gtmgmt817@gmail.com>
Sent: Monday, April 26, 2021 9:38 AM
To: Kathy McDonad <gtmgmt817@gmail.com>
Subject: 1111 Sunset Blvd. @ Marion/ Proposed three-tower development/ Composite rendering

1111 Sunset Blvd. @ Marion/ Proposed three-tower development/

Comments regarding the EIR are due today!

Environmental Case No. ENV-2018-177-EIR1111 Sunset Blvd.

Kathleen King City of Los Angeles, Department of City Planning 221 N. Figueroa Street, Suite 1350 Los Angeles, CA 90012 kathleen.king@lacity.org

The Future of Angelino Heights. 1111 Sunset project will bring **994,982 square feet** of multi-use development to the hillside lot at Sunset Blvd. and Marion. The lot includes The Elysian and is located at the Forgotten Edge, bordering Echo Park across Sunset Blvd. from Angelino Heights. Demolition of the historic William Pereira low-rise building is a given. The scope of the project is under review but currently it's a proposed, mixed use development of 737 up to 827 units, hotel and commercial/retail space.

The project is broken out as follows: Three towers at 49-, 30- and 17-stories holding 406 residential units, 246 units and 180-hotel rooms respectively plus 26-low rise buildings surrounding the tower bases. Application includes 20 on-site and off-site alcohol establishments. Here is a link to proposal:

https://www.som.com/projects/1111_sunset_boulevard The neighborhood council did not vote to support the project. Expect construction to last 44-64 months per the developer with grading, drilling and below grade excavation of the hill followed by construction that includes a 49-story skyscraper and 30-story tower plus several 23 smaller residential buildings, commercial spaces and 900 parking spaces. To exceed allowed zoning, the project includes 76 affordable housing units. There are six to eight capped oil wells on the site.

Please consider that 1111 Sunset is wildly out of scale to the surrounding historic hillside neighborhoods
and will forever change the historic character of our neighborhood, not to mention the impact of major hillside construction, environmental impacts (as noted in the EIR) and future traffic as 800 + new residents, hotel and restaurant guests drive in-and-out
onto the surrounding narrow streets.

Please contact me for a detailed EIR comment letter if you are interested.

GT MANAGEMENT
gtmgmt817@gmail.com

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 1:28 PM
To: Ofer Lion <oferlion@hotmail.com>
Cc: Ofer Lion <oferlion@hotmail.com>

Ofer,

The 1111 Sunset Project Draft EIR comment letter has been received and included in the project file.

Thank you,

LOS ANGELES CITY PLANNING
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Kathleen King <kathleen.king@lacity.org>

Environmental Case No. ENV-2018-177-EIR 1111 Sunset Blvd.

2 messages

Kathy A. McDonald <writerkathymcd@gmail.com> Fri, Apr 23, 2021 at 5:13 PM
To: kathleen.king@lacity.org

Environmental Case No. ENV-2018-177-EIR1111 Sunset Blvd.

Kathleen King City of Los Angeles, Department of City Planning 221 N. Figueroa Street, Suite 1350 Los Angeles, CA 90012 kathleen.king@lacity.org

The proposed 1111 Sunset Blvd. proposed project is completely out of scale to its surrounding Victor Heights hillside neighborhood and does not follow the city's own urban planning dictates. Once built, the 49-story tower will be among the 10 tallest buildings in downtown LA due to its location 382' above Sunset. The HCNC planning and land use committee (or the HCNC board) did not vote to support the project. Community input was limited during webinars. Commentators were preselected and community members could not comment on the impacts of traffic and parking. There are zero accommodations for the community and the construction is deemed significant per EIR. Here are my comments regarding the project and requested accommodations:

Tower B at 30 levels/29 residential levels is the highest, widest and deepest of all three towers. (dimensions are 132'x108' square). It is the largest building and is closest to residences and is less than 70' from residences on Alpine. This larger footprint will block more sun and shade surrounding blocks. Urban planning articulates scaling and compatibility with the neighborhood. Tower B has neither.

Tower A at 572' high (and set 382' above Sunset) is among the top 10 tallest buildings in downtown Los Angeles. Once built it will exceed the top of the Victor Heights hill by more than 300'. Again, urban scaling and compatibility is ignored. The tower height should be reduced. Additionally the proposed tower heights will shade solar panels on housing in Victor Heights and Figueroa Terrace.

Loading and service. The driveway off Alpine is currently used to feed less than 150 parking spaces for the Elysian. Under the proposal, the same driveway will provide all vehicular access for Tower A, Tower B main loading dock and feed

900 parking spaces, six times the number of current parking spaces, 24/7. It will feed all residential parking and some commercial as well as 255’ long loading bays. The pattern of commercial traffic should be reconfigured to increase ingress/egress along Sunset rather than direct all traffic to Alpine. Trash collection should be directed to enter off Sunset rather than Alpine.

Palisades Development has not accounted for employee parking in the proposed 900+ parking spaces. Where is the designated employee parking?

Beaudry is currently two lanes (with one lane for parking); per the Beaudry Central City West plan, Beaudry would have six lanes. To plan ahead, Sunset should have an extra lane at the intersection of Beaudry continuing from Beaudry to White Knoll Dr. to handle the increased traffic due to 1111 Sunset. The project should dedicate 10’ from Sunset for additional drop off for commercial, hotel and accessibility.

Per the EIR, The Site is located within the L.A. City Oil Field. Six to eight former oil and gas production wells are located onsite, with five along the Beaudry frontage and elevated methane concentrations in soil vapor, per the EIR appendix. Current best practices indicate that there NEVER should be construction above or upon capped wells. Currently the wells are located beneath unimproved dirt hillside; the current plan calls for TOWER A to be built on three of these wells.

1111 Sunset’s proposed property line includes an annexation of the Beaudry Triangle. (at 4,549’) and an extension of the development’s property line along the Beaudry frontage into the public right of way for an additional 5,925 square feet of public property. Will the city be re-numerated for this annexation? Will citizens have access to the property? At the very least, the annexed Beaudry Triangle should be landscaped to serve as a public pocket park. Dozens of jacaranda trees along the public way will be removed. Applicant should replace these trees.

The grade from Sunset has an elevation gain from 18’ to 51’. The only elevator is at the rear of the property. How will the public easily access the property? An elevator open to the public at the Sunset Blvd. facing side of the property will increase promised access to the project’s open spaces. There’s not even one public restroom in the proposal! Currently the applicant’s proposal is a walled-off city on a hill.

The Sunset Building, which is the proposed hotel building, is less than 500’ from residences, a clear violation of the municipal code. Sec. 3. Paragraph (d) of Subdivision 1 of Subsection A of Section 12.12.2 of the Los Angeles Municipal

Code is amended to read as follows: Hotels (including motels), Apartment hotels or hostels when no portion of a structure proposed to be used as a hotel (including a motel), apartment hotel or hostel is located within 500 feet from any A or R zone.

The top level is designated for hotel F&B—city needs to add conditional use and hours of operation imposed (no later than 10 pm) to reduce sound impacts once the bar/restaurant opens. There shall be no live entertainment or amplified music permitted on the rooftop deck.

The Sunset Building abuts Sunset with no setbacks resulting in a wall of concrete up from the Beaudry corner. Again a 10’ setback should be mandated to promote traffic flow and ease of ingress/egress along Sunset. Planning also needs to take into consideration and coordinate the construction timeline of the future projects planned on this corridor including the Do-It Center project (224 units) + two additional developments along Sunset Blvd. + a future project at the Bahia Nightclub site.

The landscaping currently includes 50-year old Canary Island Pines. The pines should be preserved and re-used rather than replaces with low shrubbery.

Currently there are more than two-dozen street parking spaces for residents along the Beaudry frontage. The developers should not be allowed to reduce street parking.

The corner of Sunset Blvd and Beaudry is a bottleneck with an S-curve and elevation. The bureau of engineering should study the S-curve and elevation gain and implement mitigation measures so emergency vehicles can access.

Other considerations: **Aesthetics (Light).** Outdoor lighting shall be designed and installed with shielding, such that the light sources cannot be seen from adjacent residential properties, and adjacent hillsides. No digital billboards should be permitted.

Aesthetics (Glare). The exterior of the proposed structures shall be constructed of materials such as, but not limited to, high- performance and/or non-reflective tinted glass (no mirror-like tints or films) and pre-cast concrete or fabricated wall surfaces to minimize glare and reflected heat.

Kathy A. McDonald
writerkathymcd@gmail.com
213-221-7707
I

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 7:42 AM
To: "Kathy A. McDonald" <writerkathymcd@gmail.com>

Ms. McDonald,

Thank you for your comment regarding the 1111 Sunset Project Draft EIR. Your comment is received and included in the project file.

Thank you again,

LOS ANGELES
CITY PLANNING

Kathleen King
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Kathleen King <kathleen.king@lacity.org>

1111 Sunset, ENV-2018-177-EIR, Project is 4x too big, wrong for Echo Park

1 message

michele mck <michelemck99@gmail.com> Mon, Apr 26, 2021 at 3:20 PM
To: kathleen.king@lacity.org, board@hcnnc.org

Dear Ms. King,

I am a homeowner within 2 blocks of this planned complex of skyscrapers in Echo Park at 1111 Sunset Blvd. I live on Boylston Street. Most of the residents in Angelino Heights, my neighbors, are shocked at the size, height and scale of this property. 49 stories (and 30 and 17 stories) is outrageous in this historic residential neighborhood of Echo Park. Most of the residential houses in this neighborhood are 100 years old and have brick foundations. There will be many houses getting cracks in their foundations from the rattling of the neighborhood during years of demolition and construction. i would guess this will bring lawsuits.

Please don't approve this design - it is 4x too tall, too large, too congested for Echo Park. Any building built there should not be any taller than the Elysian apartment building. (10 stories I believe) These proposed buildings do not serve this residential neighborhood at all with 737 luxury units, expensive not needed luxury hotel, and hundreds of office space rentals, when there is already a glut of office space downtown not rented. There is also a glut of luxury apt towers downtown that sit vacant as well.

The traffic is already very difficult on Sunset Blvd., Traffic is insane during Dodger games and events. This part of Echo Park is not very walkable, most consider it not safe at night to walk, crime is rampant and homeless and mentally ill people roam at all hours. These new residents or workers of these new skyscrapers will drive everywhere, not walk. This area is not a good choice for this size project, please require it to be smaller, much smaller. Also recent news articles reported Los Angeles has had a .01 population decrease since 2019. Housing that is needed is not luxury apartments, and more office space is not needed, neither is hotel space.

I have been in these new apartment buildings (link below) recently near Staples Center, most apartments remain ready but vacant for the last 2 years.

https://circala.com/?modalWidget=sg&utm_source=imps.conversionlogix.com&utm_medium=GMB-sg&utm_content=Google_appt&utm_campaign=TCC

Please serve us residents, taxpayers, ...stakeholders, and don't allow a huge wasteful massive multi skyscraper complex to be built in this historic residential neighborhood.

Please don't force this monstrosity on our beloved Echo Park neighborhood. If this project is approved at all, it should be reduced to 1/4 its height and square footage.

Thank you,
Michele McKinley

Connect Create Collaborate

Kathleen King <kathleen.king@lacity.org>

Environmental Case No. ENV-2018-177-EIR

2 messages

Reseda Mickey <resedamickey@sbcglobal.net> Mon, Apr 26, 2021 at 5:23 PM
Reply-To: Reseda Mickey <resedamickey@sbcglobal.net>
To: "kathleen.king@lacity.org" <kathleen.king@lacity.org>

Yes I know it's past the deadline, but I just read the discussion of this on nextdoor.com.
There were pros and cons, but the comment below was particularly concerining. I've lived here 20+ years, and have always wondered about that part of Sunset.
Thought you should see these comments in case you can't log in:
https://nextdoor.com/news_feed/?post=183506152&comment=575001047&ct=_StAOrbzRJEVcjln8fM8XfjMn2cH6einoFZpZ3oH0pVciKkgvV1qj1W4yO4HafGg&ec=OsTQaK5EfsnyavzwbSdG6xCsaFBVDChIdtlFdebAXMw%3D&lc=127

The 1111 Sunset buildings are only empty because the City cited the previous owner (The Korean Church) with never-ending "Orders To Comply" and then stonewalled the Church's good-faith efforts to Comply with these City of Los Angeles BAD-FAITH ORDERS; it's THE CITY's SUBJECTIVE AND UNEQUAL ENFORCEMENT ACTIONS ON THE PROPERTY - ENFORCEMENT ACTIONS THAT ARE SUPPOSE TO BE ENFORCED EQUALLY ON ANY OWNER - BUT HAVEN'T BEEN - THAT caused the property to be sold at a substantially reduced rate - according to the City's intent to cause a change of ownership and to use the property as it wanted - not as the Church Owners wanted ......The City has forced it's vision onto the property, for it to be an INTERNATIONALLY ARCHITECTURALLY CELEBRATED 49 STORY, 38 STORY AND 17 STORY SKYSCRAPER CLUSTER WITH A WHOPPING ONE MILLION SQUARE FOOT OF TAX-GENERATING SPACE (COMPARED TO EFFECTIVELY ZERO TAX INCOME FROM THE CHURCH!) AND A JEWEL OF A DEVELOPMENT TO SHOW THE WORLD AT THE 2028 SUMMER OLYMPICS HERE.

The new owner of the jewel of a site has been allowed to let the property disintegrate; They haven't been held by the city to the standard of structural integrity nor maintenance the city aggressively held the korean church to.

The city planning department has been awaiting the extensive preliminary documentation/plans for this mega- development and has allowed the parcel structures to be vacant and to deteriorate - unlike the church who were present and used the historic structures but were compelled by city of I.A. Department of building and safety to do unending, unnecessary work.

The current developer-owners

aren't present/the buildings are vacant and the city planning department are allowing the historic buildings to decay fabricating your narrative of decay, jason. This wasn't a foregone conclusion
but rather a government regulatory outcome!

the city has allowed the campus to sit vacant and even allowed damage (work?) to occur on the pereira buildings without permits - nor issuing orders to comply to reverse the destruction at the hands of current ownership of the historically designated and supposedly protected existing buildings.

The city therefore bears responsibility for current vacant status of the site and for deterioration - that's occurred while the city has awaited the new owners/developers' international architectural teams to present their overzoned designs to: City politicos,
to planning department employees and department of building and safety employees -
for official approval of the extensively over-zoned mega-development.

On-site damage of the campus by known vacancy and neglect of the new owner was predictable and allowed by the city.

Maybe the proposed scale of this development could be appropriate?, but not according to established planning guidelines for the site.

The city should follow it's own zoning and long-term plans without different treatment to separate owners, period and especially two successive owners of the same parcel should not have different treatment from the city.

Further it's not appropriate for the city to even accept proposed projects that are substantially over-zoned - according to the city's own plan for a parcel.

Of note this site is a block away from I.A.'S first "Historic preservation overlay zone" (hpoz) - where every detail of construction and renovation - even exterior paint color changes - has to be approved by the hpoz board.

Presumably approving the 1111 development three skyscrapers all to reach hundreds of feet height - each - where a block away owners are restricted to board approval in addition to building and safety permits to alter their investment buildings and are limited to approx 40 feet typical height per planning for their area's an unfair system that serves the interests of the existing developer robber barons of the area including the mccourt family, the dodger organization as well as the 1111 sunset developers plus the city's tax base and agenda to be "A world class city" while having substantial negative impacts on the neighborhood surrounding the 1111 site and most residents.

If the city eventually permits the 1111 mega-development option proposed, then it also should be planning simultaneously for providing the permanent public housing that'll be needed for the many current residents that will predictably be displaced by this unfair process if it results in approving the 1111 mega-gigantic skyscraper cluster.

Elysian was retrofitted for solar power; I think that's a point to raise and ask if this project will have solar power. (I know they mention lo-flow plumbing in the 767+ units). They are also cutting down all the mature palms and pines on the site; doubt this project helps lessen climate change in any way.

at least 80:1 Floor Area Ratio density comprised of luxury residential units, luxury hotel rooms and high end office/commercial space INCLUDING MORE THAN TWENTY LIQUOR ESTABLISHMENTS!

The proposal offers 900 parking spaces for 767 units + 180 hotel rooms and whatever retail/restaurant/office spaces are built + employees for said businesses. I believe the 900 spaces also includes a new parking garage + roof deck for The Elysian residents. I don't think that adds up.

Please send comments to: If you wish to submit comments following review of the Draft EIR, please reference the Environmental Case No. ENV-2018-177-EIR, and submit them in writing by Monday, April 26, 2021, no later than 4:00 P.M.Please direct your comments to:Kathleen KingCity of Los Angeles, Department of City Planning
221 N. Figueroa Street, Suite 1350
Los Angeles, CA 90012
Email:kathleen.king@lacity.org

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 5:34 PM
To: Reseda Mickey <resedamickey@sbcglobal.net>

Reseda,

Thank you for your comment regarding the 1111 Sunset Project Draft EIR. Your comment is received and included in the project file.

Thank you again,

LOS ANGELES
CITY PLANNING

Kathleen King
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**Kathleen King <kathleen.king@lacity.org>

Attachments in included in email. Video and second email.

COMMENT ON ENV-2018-177-EIR (1111 SUNSET)

2 messages

Olivia Robinson <robinson@backgroundintelligence.com>
To: kathleen.king@lacity.org

Wed, Apr 7, 2021 at 12:54 PM

Dear Ms. King:

I have been a resident at 1115 Sunset Boulevard for approximately 6-years. This means that my home is adjacent to the proposed project. Last night a number of us attended a Zoom Community meeting, sponsored by the project proponents. I hope that you were able to participate. I was really touched by the thoughtful comments made by community members. This was a really good forum.

I am ***extremely*** concerned about TRAFFIC.

Since I have lived here:

- I've had an accident with a motorcycle, as I was pulling into my parking area behind the iron gates (when the motorcycle shot out of an alley way and hit my car).
- I have called 911 at least two dozen times to report street racing (attached #7155).
- I have developed a quasi "street racing" consortium of local community leaders (CVS, Jack-in-the-Box, Elysian residents, and designated police).
- I have had near-misses with cars as they streak in and out of streets/alley without looking in the multi-block area around the Elysian.
- Commercial delivery vehicles (FedEx, couriers, USPS) double and triple park in front of the Elysian, which means that cars have a limited path and virtually no visibility.
- People trying to cross the street anywhere along the frontage to the Elysian do so at their own peril.

Of all places on the planet that I would not want to add additional traffic…the Alpine/White Knoll loop north of Sunset would top my list. Second would be the Beaudry/Sunset intersection…and from that point, heading west for two blocks.

Ms. King: we have an existing hugely dangerous traffic situation. Any potential additional development will only exacerbate this.

Certainly, the response to my traffic concerns during the Community Meeting last night only heightened my anxiety. I suggested to the "traffic expert" that he actually spend some time here. I'm willing to show him around, if that would help.

As proposed…this is a traffic disaster, and people will be killed.

Olivia Robinson

BACKGROUND INTELLIGENCE, INC.

Fraud and White Collar Crime Investigations

213/243-0707

213/703-5632 Cell

www.backgroundintelligence.com

---------- Forwarded message ----------
From: Travis Swords <travis@swordsgroup.com>
To: "Olivia G. Robinson - Neighbor 705" <robinson@backgroundintelligence.com>
Cc:
Bcc:
Date: Tue, 6 Apr 2021 15:17:10 -0700
Subject: Fwd: 1111 Sunset Bl Project - Virtual Community Meeting - Tuesday, April 6th at 5PM

Sent from my iPhone

Begin forwarded message:

> **From:** Tony Torres <tonytorres1214@gmail.com>
> **Date:** March 31, 2021 at 4:43:09 PM PDT
> **To:** Travis Swords <travis@swordsgroup.com>

Subject: 1111 Sunset Bl Project - Virtual Community Meeting - Tuesday, April 6th at 5PM

Please join us for a virtual community meeting on Tuesday April 6th at 5PM for the 1111 Sunset Blvd Project:

1111 Sunset Blvd. Community Meeting
April 6, 2021 5 p.m. - 6 p.m.
Meeting Information:
Join our Zoom meeting from your computer, tablet or smartphone.
Link to join: https://us02web.zoom.us/j/82234587272?pwd=akcyeWR4WHpYbEsrWFh0OXFaaTVudz09
Passcode: sunset

You may also dial in to the meeting using your phone:
Number: (669) 900-6833
Webinar ID: 822 3458 7272
Password: 823253

[image.png]
[image.png]

Tony Torres
323-804-5696

---

2 attachments

Fwd: 1111 Sunset Bl Project - Virtual Community Meeting - Tuesday, April 6th at 5PM.eml
427K

IMG_7155.mov
12878K

Kathleen King <kathleen.king@lacity.org> Thu, Apr 8, 2021 at 7:58 AM
To: Olivia Robinson <robinson@backgroundintelligence.com>

Ms. Robinson,

Thank you for your comment regarding the 1111 Sunset Draft EIR. Your comment has been added to the project file and will be responded to in the Final EIR.

Thank you again,

LOS ANGELES CITY PLANNING
Kathleen King
Pronouns: She/Hers/Her
City Planner
Los Angeles City Planning
221 N. Figueroa Street, Suite 1350
Los Angeles, CA 90012
Planning4LA.org
T: (213) 847-3624
E-NEWS

[Quoted text hidden]
--

Kathleen King

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City Planner
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Los Angeles, CA 90012
Planning4LA.org
T: (213) 847-3624

E-NEWS

Kathleen King <kathleen.king@lacity.org>

1111 Sunset Blvd Development

2 messages

Karen Stasevich <karenstasevich@gmail.com> Mon, Apr 26, 2021 at 3:50 PM
To: kathleen.king@lacity.org
Cc: board@hcnnc.org

Hi, I'm writing to give comments about the planned development at 1111 Sunset Blvd, Environmental Case No. ENV-2018-177-EIR

I've reviewed this presentation that was brought to the neighborhood council and would like to give a short list of my thoughts given the information presented. I'm largely in favor of this development, however as a member of the community I have some suggestions that I think would aid in gaining community support and ensure the long term success of the development.

I would like to see:
-double the amount of affordable housing
-no hotel
-public restrooms
-a public composting station (given the proposed housing and retail, this could be well-used green infrastructure)
-DASH bus to the Red and Gold line Metro stations (traffic from this development has been a major cause for concern related to this development)
-micro transit (bike, scooter, walking, etc) infrastructure
-prioritize leases in the retail/business spaces to small local businesses (unique business are what makes our neighborhood such an up and coming place to be, however increased development has resulted in pushing out longtime residents and businesses alike)
--not much shown in those slides about the landscaping (although James Corner is well-known), but we need to demand that it's sustainable and improves local ecology -- more big shade trees (not palms), native and pollinator friendly shrubs, less turf.

I'm looking forward to seeing more of these plans and community engagement about this site. Thanks for your time.

Karen
--
Karen Stasevich
Open Session
Policy Analyst / Client Accounts Manager
269-744-7940
kstasevich@opensession.com

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 3:57 PM
To: Karen Stasevich <karenstasevich@gmail.com>
Cc: board@hcnnc.org

Ms. Stasevich,

Thank you for your comment regarding the 1111 Sunset Project Draft EIR. Your comment is received and included in the project file.

Thank you again,

LOS ANGELES CITY PLANNING
Kathleen King
Pronouns: She/Hers/Her
City Planner
Los Angeles City Planning
221 N. Figueroa Street, Suite 1350
Los Angeles, CA 90012

1111 Sunset Blvd.

Location


1111
Sunset
Blvd.
Stadium Way
Figueroa St.
110
Sunset Blvd.
101
Downtown
Community Plan

The Proposed Project: Two Options

Option 1

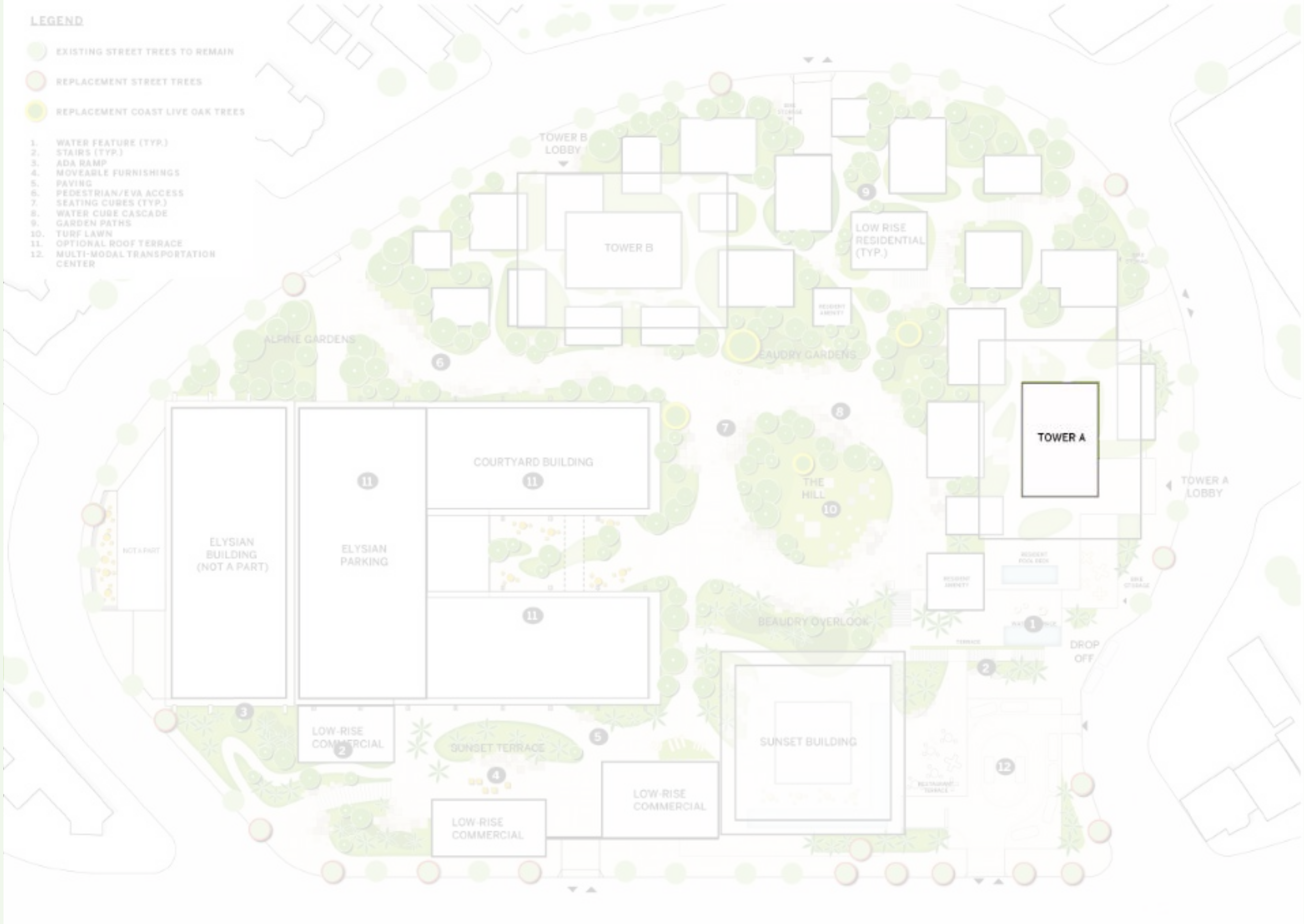
- 737 residential units
  (76 for “very low income” residents)
- 180 hotel rooms
- 48,000 sf of office space
- Up to 95,000 sf of retail
- Built atop parking podium

The Proposed Project: Two Options

OPTION 2 (No Hotel)

- 827 residential units
  (76 for "very low income" residents)
- 48,000 sf of office space
- 95,000 sf of retail space
- Built atop parking podium

Site Plan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2. STAIRS (TYP.)
3. ADA RAMP
4. MOVEABLE FURNISHINGS
5. PAVING
6. PEDESTRIAN/EVA ACCESS
7. SEATING CUBES (TYP.)
8. WATER CUBE CASCADE
9. GARDEN PATHS
10. TURF LAWN
11. OPTIONAL ROOF TERRACE
12. MULTI-MODAL TRANSPORTATION CENTER
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BEAUDRY GARDENS
TOWER A
TOWER A LOBBY
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ELYSIAN BUILDING (NOT A PART)
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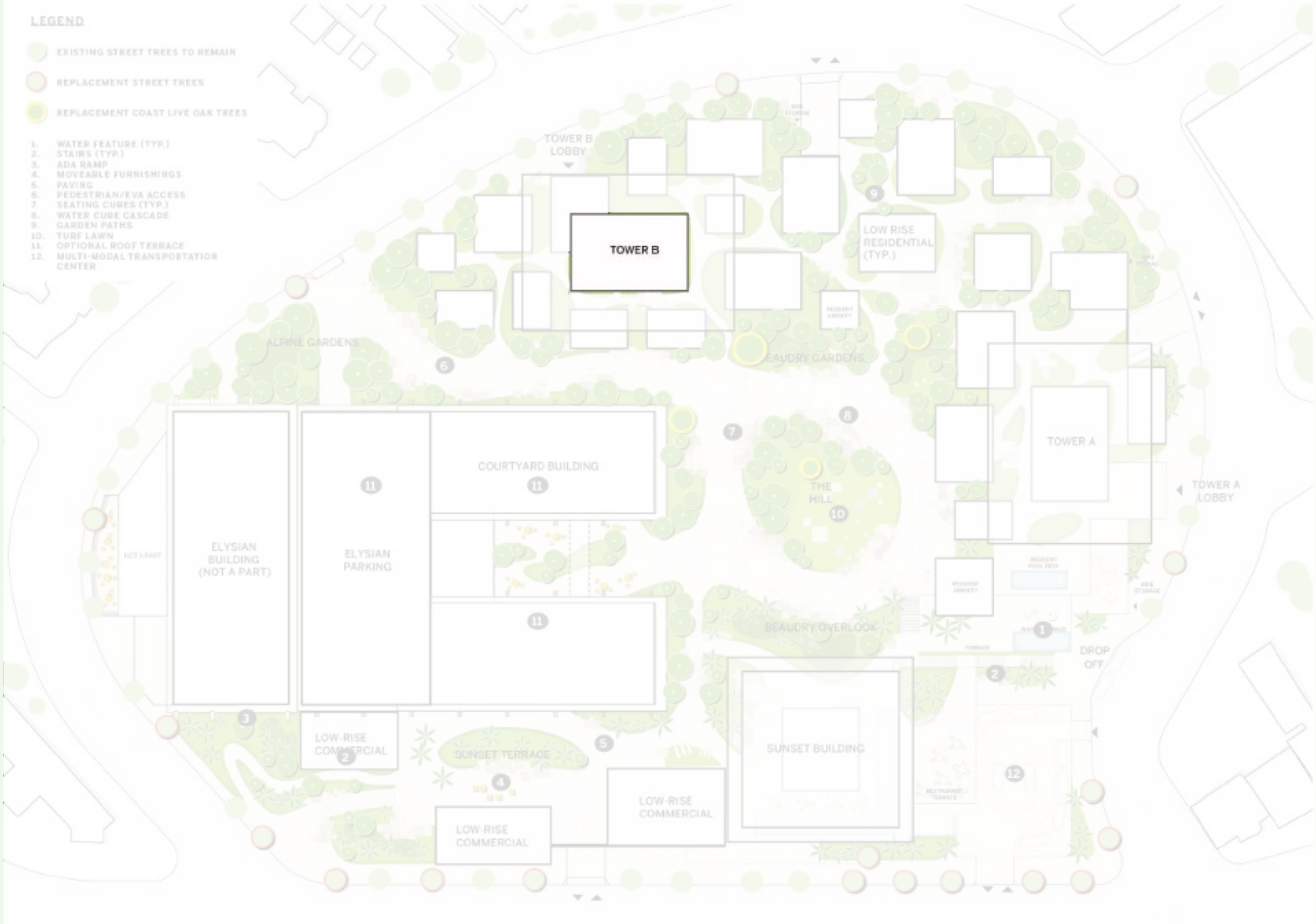
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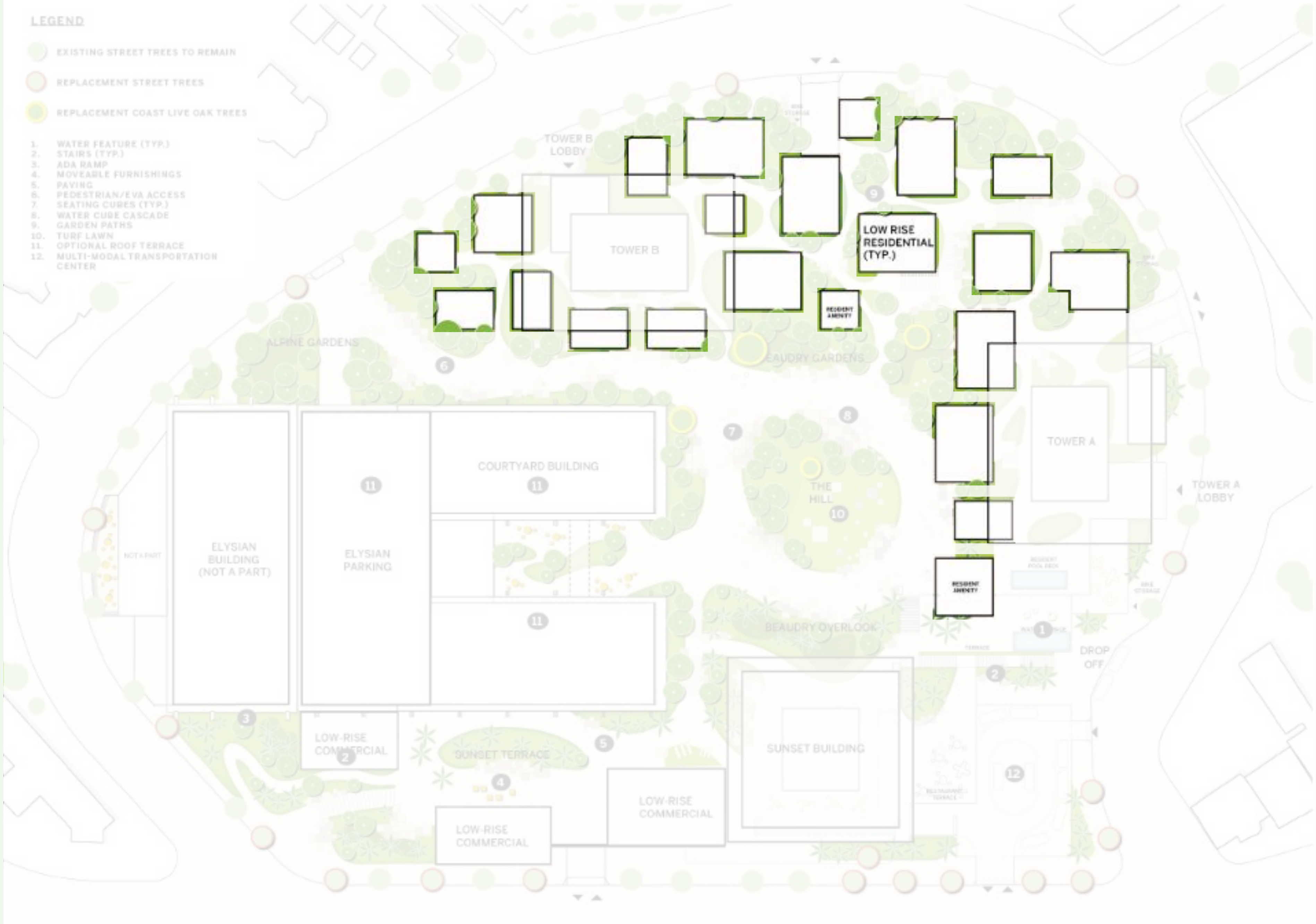

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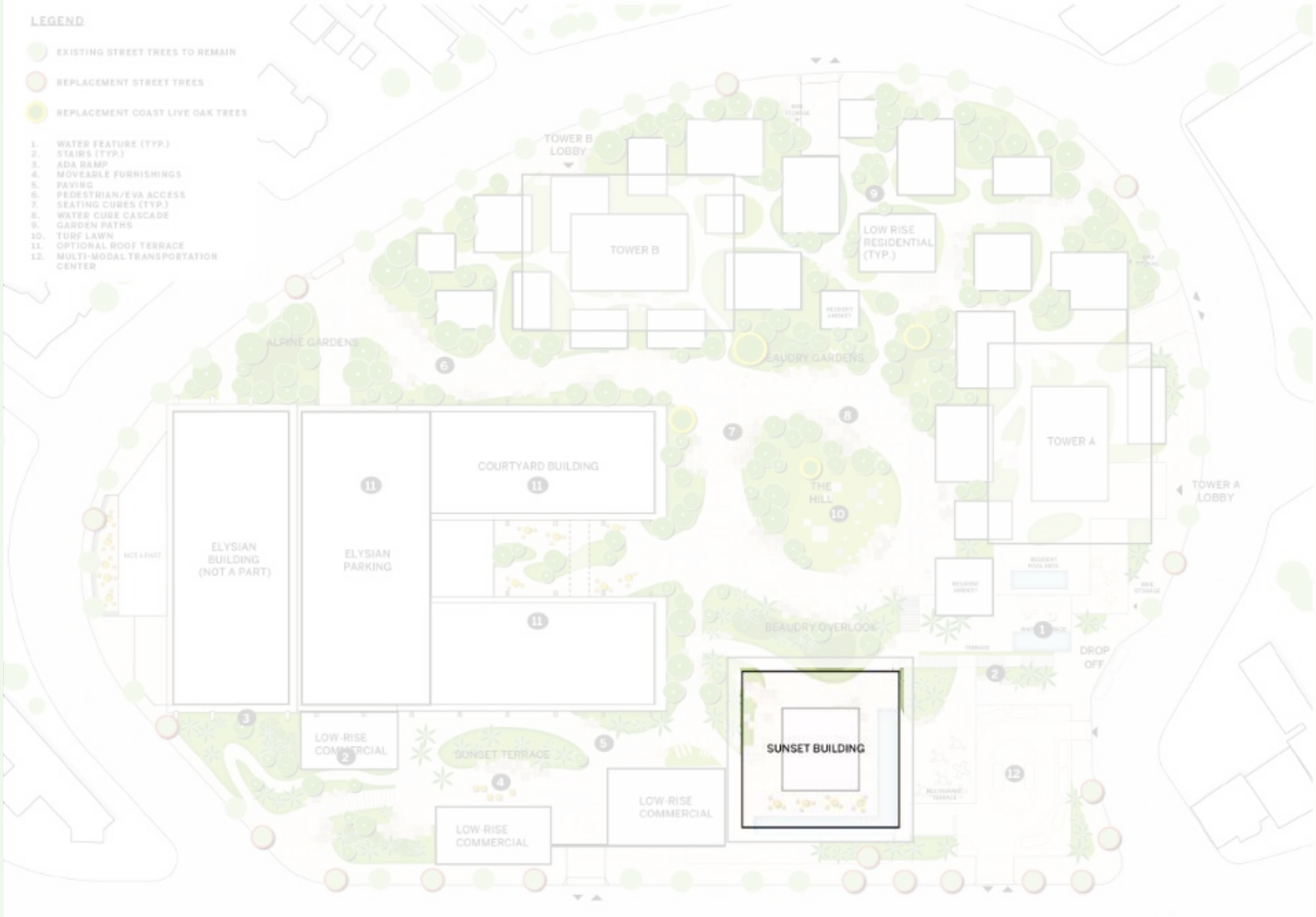
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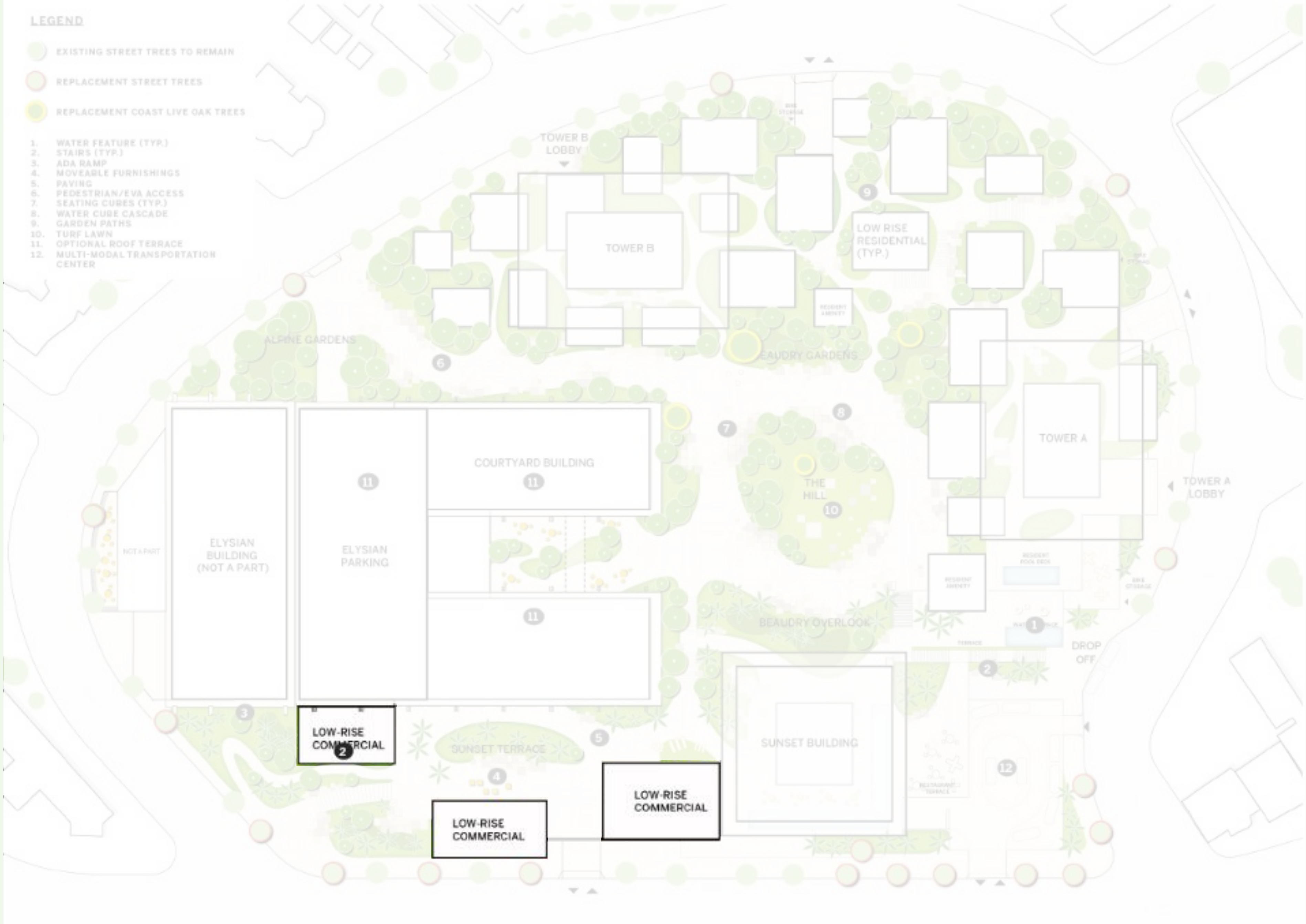
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Design Strategy and Features

- Sunset Blvd. arrival area
- Pathways through project create connectivity to Sunset and to public gathering spaces
- Neighborhood retail options provide convenience for local residents

Design Strategy and Features

- Height delivers large open space for community's use

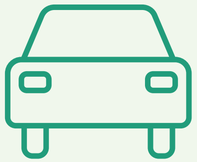
Design Strategy and Features

- Public gathering spaces for community use
- Extensive landscaping designed by James Corner Field Operations

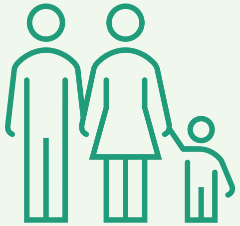
Design Strategy and Features

- Residential focus better integrates redevelopment with surrounding areas which are predominantly residential in character

Additional Design Features



900+ onsite parking spaces



Unit counts enable affordable housing for very low-income residents

Approval Process

May 2018
Scoping meeting

March 2021
DEIR released by City

Fall 2021
Final EIR and City hearings expected

Draft Environmental Impact Report

Comprehensive Analysis

- Areas analyzed include air quality, noise, public services, cultural resources, transportation/traffic, recreation, utilities, greenhouse gas emissions, and more.
- Overall Findings: besides temporary construction impacts (air quality and noise), the project has no significant and unavoidable impacts that cannot be mitigated to a level of insignificance.
- A construction traffic management plan will be employed.

Thank You

Connect Create Collaborate

Kathleen King <kathleen.king@lacity.org>

Case No. ENV-2018-177-EIR, 1111 Sunset, Draft EIR Comment

2 messages

chris wabich <nocheeto@yahoo.com> Mon, Apr 26, 2021 at 8:00 AM
To: kathleen.king@lacity.org
Cc: gtmgmt817@gmail.com

Hi Kathleen

Please include my comment in the report

I'm Chris Wabich, a 22 year resident of Angeleno Heights and board member of the Angeleno Heights HPOZ.
The first takeaway from the proposed project is the mass and scaling are out of balance with the surrounding neighborhood. I'm confused as to how such zoning would even be allowed given that every adjacent property is R1, R2.

The main concern is that allowance of this project also allows more of Sunset Blvd to be developed similarly throughout Echo Park, Silverlake, ChinaTown and Hollywood. It would completely destroy the character of Los Angeles.

The gridlock and density of the Sunset corridor has already been reached. It's a cluttered, dangerous mess of constant cars. Will there be a DOT study in parallel with this project? It is
appropriate given that additional gridlock would make normal activity and dodger Stadium related events impossible.

This kind of structure would further stress services that barely exist. There is no reliable mass transit and ample adjacent parking. Just a few blocks down Sunset, is a property that has remained a series of short lived restaurant and retail failures, including a Walmart. Nearly all of Orsini's retail space remains empty after decades of being available. Even further down Sunset, s similar development in ChinaTown has the same vacancy issue. That is the reality of this projects' fate. Empty, vandalized units. There is nothing about this description that would warrant a project of this density nor result in a coexistence for business or residential compatibility.

I am reachable via this email should any items need clarification.

With thanks,
Chris Wabich

Sent from my iPhone

Kathleen King <kathleen.king@lacity.org> Mon, Apr 26, 2021 at 8:10 AM
To: chris wabich <nocheeto@yahoo.com>
Cc: gtmgmt817@gmail.com

Mr. Wabich,

Thank you for your comment regarding the 1111 Sunset Project Draft EIR. Your comment is received and included in the project file.

Thank you again,

LOS ANGELES CITY PLANNING

Kathleen King
Pronouns: She/Hers/Her
City Planner
Los Angeles City Planning
221 N. Figueroa Street, Suite 1350
Los Angeles, CA 90012
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E-NEWS

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LOS ANGELES CITY PLANNING

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T: (213) 847-3624

E-NEWS

May 18, 2021

To Kathleen King,

We reach out and respond with this public comment on behalf of Chinatown Community for Equitable Development (CCED), which builds grassroots power by organizing, educating, and mutual help.

Specifically, we are responding to the CEQA scoping period for 1111 Sunset Drive. Noting that the EIR will entail analysis on the aesthetics, cultural and historic resources, land use and planning, and population and housing, CCED has a number of concerns related to these themes.

With regard to the technical elements of the project, we wanted to name these specific issues we take with the project.

Most specifically, we take grave issue with only 10% of the units being made affordable housing. Already, large developments like College Station threaten to enter Chinatown with 0 or the absolute minimum of affordable housing units. The median income of the 6 Census Tracts making up Chinatown is only $41,000, while the HCD state income limits designate median income in Los Angeles County as $80,000. This means that, by HCD's standards, a 1-person low income household should be making $66,250, which is almost a $20,000 difference between the two. This indicates that even if there will be affordable housing added to this project, these units will still not be affordable to many of the residents who currently live in Chinatown and will only further the process of gentrification and displacement.

We believe that multiple qualities of this development will make life extremely difficult for current residents: the quality of life for existing community members could be greatly decreased because it will put parts of the neighborhood in shadows for at least four hours a day. With so many seniors and families living in Chinatown, having a loss of sunlight during the day would greatly influence much of their ability to stay physically and mentally healthy.

In addition, the EIR has already made mention of the impacts of the project's construction to regional air quality; and on-site and off-site noise sources during construction and vibrations.

Caltrans has submitted public comment asking to reduce the parking as this is a low income neighborhood and rates of car ownership and Vehicle Miles Traveled (VMT) is significantly lower for low-income households than for high-income households.

With all of the points considered above, CCED has grave concerns about the 1111 Sunset project, both with how it affects the community and contributes to historic disinvestment, and in its technical implementation. We will continue to be engaged in this process.

Chinatown Community for Equitable Development