**Q4. Analysis Results**

This section summarizes the analysis results for the Draft Plan, incorporating relevant findings from related Title VI and environmental justice analyses, which are summarized in Appendix Q5 and Q6. Additional details about the methodology and data sources used in the following analyses may be found in Appendix Q2.

The analyses presented in this section includes the following:

- Quantitative analysis of potential benefits and burdens of proposed land use and transportation policies and projects on disadvantaged communities compared to the balance of the region based on three performance measures, using outputs from the SJCOG Envision Tomorrow land use model;
- Quantitative analysis of the relative benefit received from roadway expenditures by disadvantaged communities using the SJCOG Travel Demand Model;
- Spatial analysis of transit access to low-income jobs by disadvantaged communities;
- Quantitative analysis to estimate health outcomes resulting from proposed changes to the built environment in disadvantaged communities compared to the balance of the region, applying the National Public Health Assessment Model (NPHAM); and
- Quantitative analysis of the share of potential benefits of proposed transportation investments that accrue to low-income and minority populations compared to non-low-income and non-minority populations, using available census data.

**Analysis of Land Use Performance Measures**

To conduct the analysis of benefits and burdens on disadvantaged communities, SJCOG identified three land use performance measures, which are a subset of performance measures for the Draft Plan. The performance measures examined in this section include indicators that impact transit accessibility, air pollution exposure, and housing choice. Using SJCOG’s Envision Tomorrow land use model, the performance measures are projected from the base year of 2015 to 2035 and controlled to 2042 numbers to compare the impact of a No Build alternative and the Draft Plan.

Table Q4-1 summarizes the modeled results for each of the land use performance measures, which was applied to EJ and non-EJ areas of San Joaquin County.
Table Q4-1. Summary of Results for Land Use Performance Measures

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Sub-Geography</th>
<th>Base Year¹</th>
<th>No Build²*</th>
<th>Draft Plan²*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent (and number of total households / employment located within ½ mile of high quality transit stops and centers)</td>
<td>EJ Areas</td>
<td>50% / 62% (36,642 / 52,423)</td>
<td>51% / 49% (50,042 / 62,266)</td>
<td>50% / 64% (56,199 / 77,568)</td>
</tr>
<tr>
<td></td>
<td>Non-EJ Areas</td>
<td>10% / 18% (24,741 / 43,025)</td>
<td>11% / 24% (25,617 / 45,512)</td>
<td>12% / 24% (26,826 / 47,394)</td>
</tr>
<tr>
<td>Percent (and number of total households within 500 feet of freeway)</td>
<td>EJ Areas</td>
<td>4.34% (3,208)</td>
<td>4.03% (3,921)</td>
<td>3.95% (4,408)</td>
</tr>
<tr>
<td></td>
<td>Non-EJ Areas</td>
<td>4.47% (6,673)</td>
<td>3.68% (8,563)</td>
<td>4.32% (9,432)</td>
</tr>
<tr>
<td>Percent (and number of total Housing Mix by Single Family / Multifamily Units)</td>
<td>EJ Areas</td>
<td>65% / 35% (53,561 / 28,224)</td>
<td>65% / 35% (71,948 / 38,255)</td>
<td>61% / 39% (72,269 / 47,152)</td>
</tr>
<tr>
<td></td>
<td>Non-EJ Areas</td>
<td>78% / 22% (124,558 / 35,334)</td>
<td>80% / 20% (188,307 / 48,090)</td>
<td>76% / 24% (171,666 / 55,513)</td>
</tr>
</tbody>
</table>

¹Base Year County total was 223,027 households and 234,969 jobs. Housing units total was 241,677.
²2042 County totals would be 330,095 households and 319,946 jobs. Housing units total would be 346,600.
*Results projected to year 2035 and controlled to 2042 numbers.

Transit Accessibility

High quality public transit is an important indicator for environmental justice communities, where car ownership rates are statistically lower and thus dependency on other modes of transportation are higher than the general population. Adding housing and jobs that are near high quality transit helps to improve the ability to get around without a car.
An analysis of the percent of total households and employment located within ½ mile of a high-quality transit stop and center provides an indication of the impact of Draft Plan investments on the conditions within EJ and non-EJ areas. Compared to a No Build alternative, the Draft Plan represents the greatest long term positive impact for EJ communities in terms of housing and jobs located near high quality transit stops and centers. Between the two sub-geographies, the Draft Plan would see a greater percent of total households (50%) and employment (64%) located near high quality transit in EJ areas compared to non-EJ areas (Table Q4-1). This would indicate an overall positive impact in EJ areas, with the benefit to EJ areas exceeding non-EJ areas. Additionally, in the Draft Plan alternative EJ households will make up 67.8% of total households within ½ mile of high-quality transit areas in the region. While making up 33.8% of total households in the region, this would indicate a significant benefit for EJ communities.

**Exposure to Air Pollution**

Numerous studies point to the health risks associated with high exposure to air pollution including higher rates of asthma, heart attack, stroke, and lung cancer. Given that living near a major transportation facility can increase population exposure to emissions and particulate matter from vehicles, an equity analysis was performed to compare the number and percentage of countywide households relative to EJ households located within 500 feet of a major transportation facility. In this analysis, a major transportation facility is defined as any roadway within the County that carries more than 500,000 daily vehicle trips. The major transportation facilities include: Interstate 5, Interstate 580, Interstate 205, State Route 99, the Crosstown Freeway (State Route 4), and State Route 120. Figure Q3-3 includes the location of these major transportation facilities.

Table Q4-2 provides detailed analysis of EJ versus total countywide households located within 500 feet of the identified facilities. EJ households make up all households near the Crosstown Freeway (State Route 4), approximately 34.1% of the households near Interstate 5, and approximately 31.0% of households near State Route 99. EJ households make up 0% of households near State Route 120, Interstate 205, and Interstate 580 as these facilities are in outlying parts of the County.

Table Q4-1 shows the results of the analysis when conducted to compare EJ versus non-EJ areas. In base year conditions, 4.34% of households in EJ areas are located within 500 feet of any major transportation facility. In comparison, 4.47% of households in non-EJ areas are located within 500 feet of any major transportation facility in base year conditions. Overall, the Draft Plan represents the greatest long term positive impact for EJ areas in terms of exposure risks. Additionally, in the Draft Plan alternative EJ households will make up 31.8% of households within 500 feet of a freeway, while making up 33.8% of total households in the region, indicating a proportional share in the burden of exposure to air pollution.
<table>
<thead>
<tr>
<th>Area</th>
<th>Total Households</th>
<th>I-5</th>
<th>500'</th>
<th>500'</th>
<th>SR-99</th>
<th>500'</th>
<th>SR-120</th>
<th>500'</th>
<th>I-205</th>
<th>500'</th>
<th>I-580</th>
<th>500'</th>
<th>Any Freeway</th>
<th>500'</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Joaquin County</td>
<td>330,095</td>
<td></td>
<td>5,464</td>
<td>1.7%</td>
<td>3,508</td>
<td>1.1%</td>
<td>1,457</td>
<td>0.4%</td>
<td>1,054</td>
<td>0.3%</td>
<td>818</td>
<td>0.2%</td>
<td>1,541</td>
<td>0.5%</td>
</tr>
<tr>
<td>Escalon</td>
<td>3,157</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Lathrop</td>
<td>16,359</td>
<td>236</td>
<td>1.4%</td>
<td></td>
<td>1</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>237</td>
<td>1.4%</td>
</tr>
<tr>
<td>Lodi</td>
<td>32,194</td>
<td>507</td>
<td>1.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>507</td>
<td>1.6%</td>
</tr>
<tr>
<td>Manteca</td>
<td>35,990</td>
<td>1,101</td>
<td>3.1%</td>
<td>1,040</td>
<td>2.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2,141</td>
<td>5.9%</td>
</tr>
<tr>
<td>Ripon</td>
<td>7,985</td>
<td>220</td>
<td>2.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>220</td>
<td>2.8%</td>
</tr>
<tr>
<td>Stockton</td>
<td>138,182</td>
<td>5,101</td>
<td>3.7%</td>
<td>1,173</td>
<td>0.8%</td>
<td>1,457</td>
<td>1.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tracy</td>
<td>38,622</td>
<td>125</td>
<td>0.1%</td>
<td></td>
<td>506</td>
<td>0.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>797</td>
<td>2.1%</td>
</tr>
<tr>
<td>Unincorporated</td>
<td>96,228</td>
<td>125</td>
<td>0.1%</td>
<td></td>
<td>506</td>
<td>0.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>797</td>
<td>2.1%</td>
</tr>
<tr>
<td>San Joaquin County Environmental Justice Areas</td>
<td>111,578</td>
<td>1,863</td>
<td>1.7%</td>
<td>1,088</td>
<td>1.0%</td>
<td>1,457</td>
<td>1.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escalon</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>0.0%</td>
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</tr>
<tr>
<td>Lathrop</td>
<td>7,292</td>
<td>222</td>
<td>3.0%</td>
<td></td>
<td>1</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>223</td>
<td>3.1%</td>
</tr>
<tr>
<td>Lodi</td>
<td>3,542</td>
<td>23</td>
<td>0.6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23</td>
<td>0.6%</td>
</tr>
<tr>
<td>Manteca</td>
<td>306</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Ripon</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Stockton</td>
<td>86,722</td>
<td>1,633</td>
<td>1.9%</td>
<td>953</td>
<td>1.1%</td>
<td>1,457</td>
<td>1.7%</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Tracy</td>
<td>2,567</td>
<td>80</td>
<td>3.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>80</td>
<td>3.1%</td>
</tr>
<tr>
<td>Unincorporated</td>
<td>11,150</td>
<td>9</td>
<td>0.1%</td>
<td></td>
<td>112</td>
<td>1.0%</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>121</td>
<td>1.1%</td>
</tr>
<tr>
<td>EJ Households as a Percent of Total</td>
<td>33.8%</td>
<td>34.1%</td>
<td>31.0%</td>
<td>100%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>31.8%</td>
<td></td>
</tr>
</tbody>
</table>

Source: SJCOG Envision Tomorrow Land Use Model, Scenario 2A
**Housing Choice**

Housing mix by type is an important performance measure in EJ communities, where housing affordability weighs heavily on a household’s ability to pay for other necessities, such as health care, food, clothing, and transportation. A more diverse housing mix, which includes multifamily housing, as well as single-family housing, can help to assure that individuals and families at all income levels have a safe place to stay. An equity analysis of the housing mix was conducted to understand the Draft Plan’s impact on housing choice throughout San Joaquin County.

Table Q4-1 shows the results of the analysis conducted on the mix of single-family and multifamily housing types available in the Base Year and 2042 for both No Build and Draft Plan alternatives. The Draft Plan will improve housing choice in both EJ and non-EJ areas of the region by increasing the mix of multifamily housing units. In comparison, the No Build alternative would yield less than desirable results for housing choice, resulting in no change in the housing mix from the Base Year in EJ areas (35% multifamily units) and a poorer outcome in non-EJ areas (20% multifamily units). As a result, the Draft Plan may represent the greatest long term positive impact for EJ areas in terms of housing choice with 54% of new units categorized as multifamily housing types, compared to 32% in non-EJ areas.¹¹ EJ areas will thus see a higher total mix of multifamily housing unit types (39%) compared to non-EJ areas (24%) in the Draft Plan. While these outcomes are optimistic, there is also a growing body of research that indicates providing multifamily and subsidized housing options in all neighborhoods increases household access to opportunity by ensuring residents of all income levels are able to access high-quality schools, jobs and services. While the Draft Plan improves housing choice across the region, SJCOG acknowledges the potential for unintended consequences resulting in worsening conditions of concentrated poverty and segregation in identified EJ communities. Therefore, to promote federal and state fair housing goals, SJCOG will continue to work with local jurisdictions, which directly shape land use and zoning policy, to improve access to opportunity for all residents of San Joaquin County.

**Roadway Expenditure Benefits**

To gauge to the extent EJ communities proportionately benefit from roadway expenditures compared to the general population, an equity analysis of the relative benefit received from roadway improvement expenditures was performed. Using the SJCOG travel demand model, a select link analysis was performed on regionally significant roadways identified for capacity improvements in the Draft Plan. The analysis yields the percentage of vehicle demand whose origin is an EJ community (i.e., TAZ) versus non-EJ community (TAZ).

To determine the environmental justice area’s share of the use of the improved facilities, a representative list of improved regionally significant roadway facilities was first identified.

¹¹ 2018 RTP/SCS. Chapter 5: Performance of the Sustainable Communities Strategy.
These facilities are corridor-type facilities with regional significance (e.g., they are expected to carry over 20,000 ADT by 2035 according to the travel demand model) that are also programmed for improvements by 2035 according to the RTP project list. These roadways include:

- 11th Street
- Airport Way
- Arch/Sperry Road
- Byron Road
- Corral Hollow
- Eight Mile Road
- Grant Line Road
- Hammer Lane
- Lathrop Road
- Lower Sacramento Road
- Mountain House/International Parkway
- Thornton Road
- I-205
- SR 120
- SR 99

In the travel demand model, the links within the project-limits of these roadway segments were specified by their A nodes and B nodes. Upon running the model with this set of selected links, a select link network file was generated in the model output. From this file, trips generated by EJ areas that also traverse these selected links were traced and the percentage share of these EJ trips in relationship to the total forecasted traffic that uses these facilities was calculated.

Results indicate that approximately 31.5% of daily vehicle trips utilizing these improved roadways originate from EJ communities. This indicates that a significant proportion of EJ communities will benefit from future roadway investments resulting from the Draft Plan. While this share is slightly less than the countywide percentage of total EJ households (33.8%) the difference is relatively small.

The difficulty in definitively concluding disproportionate benefit in the analysis for roadway improvements in the RTP/SCS is a result of the difficulty in assessing proximity benefits from operation and maintenance improvements for EJ communities versus the general population as well as the limitation that available data covers only modal difference for work trips. Absent a definitive locational analysis, one might argue that projects in the maintenance category would exhibit an inverse relationship to the regional roadway expansion projects as roads are not slated to be otherwise improved would make up the bulk of the maintenance expenditures. Of additional import to the equity discussion is that while workers in low-income households make up approximately 23% of total work trips by automobile, nearly 90% of low-income households either drove alone or carpooled for their primary means of getting to work. In addition, investments in roadway improvements also benefit transit riders in the County given that transit within San Joaquin County is primarily bus transit.
High Quality Transit Access to Low-Income Employment

As an additional measure of transit accessibility for environmental justice areas, a spatial analysis was conducted by overlaying Longitudinal Employer-Household Dynamics (LEHD) data for San Joaquin County on a half-mile walk shed from high quality transit (HQT). High quality transit includes any bus transit line that operates with 15-minute frequency during peak commute time, as well as any rail transit stations. LEHD data provides information to analyze the location of jobs by income, identifying total employment in three income categories: Low, Medium, and High. For this analysis, low-income jobs were targeted, which LEHD defines as jobs with earnings that total $1,250 per month or less. A spatial analysis was performed to locate LEHD census block data into Transportation Analysis Zones (TAZs). The comparison, between LEHD low-income jobs and the total jobs within a TAZ, was applied to the projected 2042 employment.

As can be seen in Table Q4-3, the highest number of accessible low-income jobs within the region in 2042 will be located primarily within the urban core of San Joaquin County, within the City of Stockton (31,218). Approximately 70% of those jobs are located within Stockton’s EJ areas. Some moderate concentrations of low-income employment will also occur in the more outlying areas of the region (Figure Q4-1). For instance, outside of Stockton the next highest number of low-income jobs near high quality transit is projected in the City of Lodi (4,835), where approximately 38% of these jobs will be in EJ areas.

The results of the analysis show that of the total low-income jobs in San Joaquin County, at least 51% of them in 2042 will be located near high quality transit. Additionally, of the low-income jobs near high quality transit, approximately 59% will be located within the region’s EJ areas. Except for rail stations scattered throughout San Joaquin County, existing and future high-quality transit lines are found primarily serving the urban core. Because it is challenging to predict the location of low-income jobs in the future, this layer was held constant for the analysis. The existing and future high-quality transit lines and stations were then overlaid on the map, inferring improved access to low-income jobs resulting from planned investments in the Draft Plan. While high quality transit may be improving access to jobs within the urban core, access to jobs outside of the urban core will be limited to train station areas and non-high-quality transit service in outlying areas of the County in the future.
Table Q4-3. High Quality Transit (HQT) Access to Low Income (LI) Jobs for San Joaquin County and Environmental Justice Areas

<table>
<thead>
<tr>
<th></th>
<th>1/2 Mile of HQT LI Jobs in EJ Areas</th>
<th>% of LI Jobs near HQT in EJ Areas</th>
<th>Total LI Jobs near HQT in County</th>
<th>% of Total LI Jobs near HQT</th>
<th>Total LI Jobs in County</th>
<th>% of LI jobs County Total</th>
<th>Total Jobs in County</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>San Joaquin County</strong></td>
<td>17,418</td>
<td>8,220</td>
<td>25,638</td>
<td>59%</td>
<td>43,747</td>
<td>51%</td>
<td>85,561</td>
</tr>
<tr>
<td>Escalon</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0%</td>
<td>-</td>
<td>0%</td>
<td>1,033</td>
</tr>
<tr>
<td>Lathrop</td>
<td>9</td>
<td>358</td>
<td>367</td>
<td>27%</td>
<td>1,363</td>
<td>49%</td>
<td>2,777</td>
</tr>
<tr>
<td>Lodi</td>
<td>-</td>
<td>1,866</td>
<td>1,866</td>
<td>38%</td>
<td>4,853</td>
<td>65%</td>
<td>7,465</td>
</tr>
<tr>
<td>Manteca</td>
<td>221</td>
<td>416</td>
<td>637</td>
<td>24%</td>
<td>2,633</td>
<td>37%</td>
<td>7,194</td>
</tr>
<tr>
<td>Ripon</td>
<td>-</td>
<td>165</td>
<td>165</td>
<td>19%</td>
<td>891</td>
<td>62%</td>
<td>1,439</td>
</tr>
<tr>
<td>Stockton</td>
<td>17,087</td>
<td>4,819</td>
<td>21,906</td>
<td>70%</td>
<td>31,218</td>
<td>70%</td>
<td>44,809</td>
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<tr>
<td>Tracy</td>
<td>101</td>
<td>559</td>
<td>660</td>
<td>25%</td>
<td>2,609</td>
<td>37%</td>
<td>7,073</td>
</tr>
<tr>
<td>Unincorporated</td>
<td>0</td>
<td>37</td>
<td>37</td>
<td>21%</td>
<td>180</td>
<td>1%</td>
<td>13,769</td>
</tr>
</tbody>
</table>

37
Figure Q4-1. High Quality Transit Access to Low-Income Jobs, Existing and Future

San Joaquin County Low Income Jobs per TAZ

Legend
Number of Low Income Jobs
- Below 100
- 100-249
- 250-449
- 550-549
- 560-669
- 670+

- Existing BRT Corridors
- Future BRT Corridors
- Existing Train Stations
- Future Train Stations
- Environmental Justice Zones
- County Limit

Miles
0 1.5 3 6 9 12
Health Equity Analysis

An additional analysis was conducted to consider the health equity impacts of the land use and transportation policies and projects included in the RTP. SJCOG piloted the use of public health performance metrics during the 2018 RTP/SCS cycle and applied these to conduct a spatially-based equity analysis. The results of this analysis are summarized in this section, however the full health indicators report can be found in Appendix N.

The health equity analysis relies on the comparison of communities of concern that include the defined EJ areas, as well as the SB535 Disadvantaged Communities identified by CalEnviroScreen. For more detail, please see Appendix Q2. The analysis looks at the differential effects from current conditions in 2015 to a future scenario based on Scenario 2a in 2035 for the public health performance metrics found in Table Q4-4.

Table Q4-4. Difference in Weighted Means Between Scenario (2035) and Baseline (2015) for Scenario 2a by Area of Concern*

<table>
<thead>
<tr>
<th></th>
<th>CalEnviroScreen</th>
<th>Minority</th>
<th>Poverty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Balance of Region</td>
<td>Area of Concern</td>
<td>Balance of Region</td>
</tr>
<tr>
<td>Weekly transport walking minutes per person</td>
<td>0.085</td>
<td>0.083</td>
<td>0.042</td>
</tr>
<tr>
<td>Weekly leisure walking minutes per person</td>
<td>0.055</td>
<td><strong>0.115</strong></td>
<td>0.215</td>
</tr>
<tr>
<td>Weekly total walking minutes per person</td>
<td>0.140</td>
<td>0.198</td>
<td>0.257</td>
</tr>
<tr>
<td>Daily total recreational PA minutes per person</td>
<td>-0.075</td>
<td><strong>0.028</strong></td>
<td>0.019</td>
</tr>
<tr>
<td>Average body mass index (BMI)</td>
<td>-0.065</td>
<td>-0.124</td>
<td>-0.102</td>
</tr>
<tr>
<td>Percent of population with poor general health</td>
<td>0.001%</td>
<td><strong>0.285%</strong></td>
<td>0.138%</td>
</tr>
</tbody>
</table>

Green = Improved Health  Red = Worse Health  Bold/shade = Area of Concern Performs Better

*Detailed NPHAM methodology and results found in Appendix N.

Highlights of the health equity results attributed to Scenario 2a are as follows:

- **Walking for Transportation**: All areas are gaining transportation walking minutes; areas of concentrated minority and concentrated poverty gain more minutes than the balance of the region. This is in addition to starting out in 2015 with higher levels of transportation walking.
- **Walking for Leisure**: Results are mixed for this indicator. Minorities are losing minutes of leisure walking; areas of concentrated poverty are slightly gaining and CalEnviroScreen are gaining enough to outperform non-CalEnviroScreen areas.
• **Total Walking**: This indicator is reflective of the sum of transportation and leisure walking minutes. All areas gain more minutes. CalEnviroScreen and areas of concentrated poverty both perform better than the balance of the region.

• **Recreational Physical Activity**: This indicator is less sensitive to built environment changes and the results are mixed. The CalEnviroScreen areas gain minutes and perform better than the non-equity counterpart. Areas of concentrated minorities and poverty both lose minutes even as their counterparts gain minutes.

• **Body Mass Index**: All areas improve under this scenario with reduced BMI. CalEnviroScreen areas improve more than the non-equity counterpart.

• **Percent Poor Health**: All areas show additional population reporting poor health under this scenario with areas of concern performing worse than their counterparts.

In general, it was found that CalEnviroScreen areas perform better than the balance of the region for 4 out of 6 outcomes: leisure walking, total walking, recreational physical activity, and body mass index. Because the concentrated minority and concentrated poverty areas do not perform as well as the balance of the region, this suggests that areas that have slightly less concentrated poverty or minorities (i.e. 20-30% of households in poverty or 50-75% of the population non-white) are performing the best. This tentative finding would require additional analysis to confirm.

**Transportation Investment Analysis**

This section summarizes the results from an analysis of Draft Plan investments for their relative benefit on minority and low-income populations, compared to non-minority and non-low-income populations. The methodology for conducting the transportation investment analysis is described in more detail in Appendix Q2. The legal context for the analysis is provided in Appendix Q1.

The transportation investment analysis includes the following components:

• The transportation investment analysis is a population-based analysis, which quantifies the benefits of the region’s transportation investments, and assigns these benefits to low-income and minority populations based on their share of system usage. This share of benefits is then compared to the overall share of minority and low-income populations in the region.

• A public transit investment analysis, which satisfies Title VI requirements.

**Population-Based Analysis**

This analysis illustrates the distribution of the investments relative to different population subgroups in the region by comparing the estimated share of investments that benefit low-
income and minority populations to the share of their respective use of the transportation system. This evaluation centers on populations of concern, low-income and minorities, to estimate the average distribution of benefits across the region.

To conduct the analysis, the Draft Plan investments were divided into categories matching available data on means of transportation to work. Draft Plan investments were divided into five categories: Regional Roadways and Highways, Roadway Operations and Maintenance, Bus Transit, Rail Transit, and Bicycle and Pedestrian. Overall, the Draft Plan investment strategy is a balanced approach to support the development of a multi-modal transportation system. Table Q4-5 displays the funding amounts made available by modal category in the Draft Plan.

**Table Q4-5. Draft Plan Funding by Modal Category**

<table>
<thead>
<tr>
<th>Modal Category</th>
<th>Funding (in millions)</th>
<th>Percent of Total Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Roadways &amp; Highways</td>
<td>$3,121</td>
<td>27.1%</td>
</tr>
<tr>
<td>Roadway Operations &amp; Maintenance</td>
<td>$4,448</td>
<td>38.7%</td>
</tr>
<tr>
<td>Bus Transit</td>
<td>$2,393</td>
<td>20.8%</td>
</tr>
<tr>
<td>Rail Transit</td>
<td>$1,219</td>
<td>10.6%</td>
</tr>
<tr>
<td>Bicycle &amp; Pedestrian</td>
<td>$320</td>
<td>2.8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$11,502</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

For the population-based analysis, as a first step, share of transportation system usage by income and minority status was determined using the most recent data available from the Census Transportation Planning Package. Alongside demographic information, the CTPP data includes detailed estimates of means of transportation to work. Using this data, the share of transportation system usage was determined by calculating the percent of work trips by means of transportation by income and minority status and summarized in Table Q4-6.

For this analysis, low-income workers were defined using the Regional Housing Needs Assessment (RHNA) income guidelines, which include extremely low, very low, and low-income households.\(^{12}\) Using this definition, households with income below $43,011 were designated as low-income households for the transportation investment analysis. To match this income limit with available data, workers from households with income below $45,000 were used for the analysis.

Table Q4-6. Share of Transportation System Usage by Income and Minority Status

<table>
<thead>
<tr>
<th>Means of Transportation to Work</th>
<th>Income Status</th>
<th>Minority Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low-Income</td>
<td>All Other</td>
</tr>
<tr>
<td>Drove Alone or Carpool</td>
<td>22.7%</td>
<td>77.3%</td>
</tr>
<tr>
<td>Bus</td>
<td>37.1%</td>
<td>62.9%</td>
</tr>
<tr>
<td>Rail</td>
<td>13.0%</td>
<td>87.8%</td>
</tr>
<tr>
<td>Bicycle or Pedestrian</td>
<td>48.4%</td>
<td>51.9%</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, American Community Survey 2006-2010. Special Tabulation: Census Transportation Planning Package

To determine relative benefits by income status, transportation investments from the Draft Plan were assigned to either low-income households or all other households. Following in Table Q4-7, expenditure by modal category was determined by allocating expenditures by the respective share of transportation system usage by low-income population. The share of benefit for all other workers was then calculated by subtracting the calculated share for low-income workers from all expenditures for each modal category of funding. Overall, project investment totaled to $2.9 billion for low-income households, while investment totaled $8.6 billion for all other households. Compared to their share of total population in the region (23.4%), low-income households receive 25.4% of total benefit from Draft Plan investments based on their share of usage of the transportation system.

Table Q4-7. Funding Expenditure by Mode and Income Status

<table>
<thead>
<tr>
<th>Modal Category</th>
<th>All Expenditures</th>
<th>Low-Income Households</th>
<th>All Other Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of Total Population</td>
<td>23.4%</td>
<td>76.6%</td>
<td></td>
</tr>
<tr>
<td>Regional Roadways &amp; Highways</td>
<td>$3,121,215,385</td>
<td>$707,751,876</td>
<td>$2,413,463,509</td>
</tr>
<tr>
<td>Roadway Operations and Maintenance</td>
<td>$4,448,287,873</td>
<td>$1,008,672,487</td>
<td>$3,439,615,386</td>
</tr>
<tr>
<td>Bus Transit</td>
<td>$2,393,417,693</td>
<td>$888,613,073</td>
<td>$1,504,804,620</td>
</tr>
<tr>
<td>Rail Transit</td>
<td>$1,218,986,203</td>
<td>$159,062,834</td>
<td>$1,059,923,369</td>
</tr>
<tr>
<td>Bicycle and Pedestrian</td>
<td>$319,855,156</td>
<td>$154,711,648</td>
<td>$165,143,508</td>
</tr>
<tr>
<td>Total</td>
<td>$11,501,762,310</td>
<td>$2,918,811,918</td>
<td>$8,582,950,392</td>
</tr>
</tbody>
</table>

Share of Total Benefit

25.4%                74.6%

Source: U.S. Census Bureau, American Community Survey 2006-2010. Special Tabulation: Census Transportation Planning Package
Table Q4-8 summarizes the calculated benefit by minority status. Overall, Draft Plan investment benefit totaled $7 billion for minority populations, while for non-minority populations the benefit totaled $4.5 billion. Compared to their share of total population in the region (58.0%), minority populations receive 61.1% of total benefit of Draft Plan investments based on their share of usage of the transportation system.

**Table Q4-8. Funding Expenditure by Mode and Minority Status**

<table>
<thead>
<tr>
<th>Funding Type</th>
<th>All Expenditures</th>
<th>Minority</th>
<th>Non-Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of Total Population</td>
<td>58.0%</td>
<td>42.0%</td>
<td></td>
</tr>
<tr>
<td>Regional Roadways &amp; Highways</td>
<td>$3, 121,215,385</td>
<td>$1,822,773,573</td>
<td>$1,298,441,812</td>
</tr>
<tr>
<td>Roadway Operations and Maintenance</td>
<td>$4,448,287,873</td>
<td>$2,597,777,013</td>
<td>$1,850,510,860</td>
</tr>
<tr>
<td>Bus Transit</td>
<td>$2,393,417,693</td>
<td>$1,752,526,225</td>
<td>$640,891,468</td>
</tr>
<tr>
<td>Rail Transit</td>
<td>$1,218,986,203</td>
<td>$687,537,950</td>
<td>$531,448,253</td>
</tr>
<tr>
<td>Bicycle and Pedestrian</td>
<td>$319,855,156</td>
<td>$162,310,605</td>
<td>$157,544,551</td>
</tr>
<tr>
<td>Total</td>
<td>$11,501,762,310</td>
<td>$7,022,925,366</td>
<td>$4,478,836,944</td>
</tr>
</tbody>
</table>

| Share of Total Benefit              | 61.1%            | 38.9%          |                |

Source: U.S. Census Bureau, American Community Survey 2006-2010. Special Tabulation: Census Transportation Planning Package

In addition to calculating total benefit to low-income and minority populations based on transportation system usage, a comparison of funding expenditures per household was conducted. To calculate relative benefits for low-income households, the total benefit for each modal category in Table Q4-7 was divided by the total estimate of low-income households. Per household expenditures by modal category are summarized in Table Q4-9. Using similar methods for the minority population, per capita expenditures by modal category are summarized in Table Q4-10.

On a per household basis, the result of the analysis indicates a disproportionate share of Draft Plan expenditures accruing to non-low-income households (Table Q4-9). Modal category expenditures benefitting low-income households are less when compared to all other households. There are disparities in all funding categories, except for bicycle and pedestrian. The disparity is most pronounced in the roadway and rail categories.

On a per capita basis, the result of the analysis indicates a disproportionate share of Draft Plan expenditures accruing to non-minority populations (Table Q4-10). Modal category expenditures benefitting minority populations are slightly less when compared to non-minority populations. There are disparities in all funding categories, except for bus transit.
Table Q4-9. Funding Expenditures per Household by Income Status

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Low Income Households</th>
<th>All Other Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Households</td>
<td>219,073</td>
<td>93,315</td>
<td>125,073</td>
</tr>
<tr>
<td>Regional Roadways &amp; Highways</td>
<td>$14,247</td>
<td>$7,585</td>
<td>$19,191</td>
</tr>
<tr>
<td>Roadway Operations and Maintenance</td>
<td>$20,305</td>
<td>$10,809</td>
<td>$27,351</td>
</tr>
<tr>
<td>Bus Transit</td>
<td>$10,925</td>
<td>$9,523</td>
<td>$11,966</td>
</tr>
<tr>
<td>Rail Transit</td>
<td>$5,564</td>
<td>$1,705</td>
<td>$8,428</td>
</tr>
<tr>
<td>Bicycle and Pedestrian</td>
<td>$1,460</td>
<td>$1,658</td>
<td>$1,313</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$52,502</strong></td>
<td><strong>$31,279</strong></td>
<td><strong>$68,250</strong></td>
</tr>
</tbody>
</table>

Source: 2011-2015 ACS 5-Year Estimates

Table Q4-10. Funding Expenditures per Capita by Minority Status

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Minority</th>
<th>Non-Minority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>708,554</td>
<td>465,468</td>
<td>243,086</td>
</tr>
<tr>
<td>Regional Roadways &amp; Highways</td>
<td>$4,405</td>
<td>$3,916</td>
<td>$5,341</td>
</tr>
<tr>
<td>Roadway Operations and Maintenance</td>
<td>$6,278</td>
<td>$5,581</td>
<td>$7,613</td>
</tr>
<tr>
<td>Bus Transit</td>
<td>$3,378</td>
<td>$3,765</td>
<td>$2,636</td>
</tr>
<tr>
<td>Rail Transit</td>
<td>$1,720</td>
<td>$1,477</td>
<td>$2,186</td>
</tr>
<tr>
<td>Bicycle and Pedestrian</td>
<td>$451</td>
<td>$349</td>
<td>$648</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$16,233</strong></td>
<td><strong>$15,088</strong></td>
<td><strong>$18,425</strong></td>
</tr>
</tbody>
</table>

Source: 2011-2015 ACS 5-Year Estimates

An important limitation to this analysis is that it relies on data regarding means of transportation to work, thus only capturing a specific trip purpose. Therefore, the calculated share of transportation system usage may not represent a comprehensive picture of actual system usage by the region’s population.

To provide further understanding of benefits to environmental justice communities, additional analyses are included to assess equity impacts of roadway (see Roadway Expenditure Benefits) and transit projects (see High Quality Transit Access to Low-Income Employment) included in the Draft Plan. For further discussion and analysis of public transit investment, please refer to Appendix Q5 for the Title VI Report.