Appendix A

Transportation Projects, Costs, and Phasing

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Revenue Constrained and Unconstrained Project Maps
Transportation Projects, Costs, and Phasing

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

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

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

No Build Projects
Table A.6 lists the projects included in the No Build Scenario.
## Table A.1
### Revenue Constrained Projects

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

#### Revenue Constrained Projects

**Transit Facilities (continued)**

<table>
<thead>
<tr>
<th>TransNet</th>
<th>Service</th>
<th>Route</th>
<th>Description</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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<tbody>
<tr>
<td>Rapid</td>
<td>41</td>
<td></td>
<td>Fashion Valley to UTC/UC San Diego via Linda Vista and Clairemont</td>
<td>$55</td>
<td>$96</td>
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<tr>
<td>Rapid</td>
<td>90</td>
<td></td>
<td>El Cajon Transit Center to San Diego International Airport ITC via SR 94, City College (peak only)</td>
<td>$20</td>
<td>$27</td>
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<tr>
<td>Rapid</td>
<td>103</td>
<td></td>
<td>Solana Beach to Sabre Springs Rapid station via Carmel Valley</td>
<td>$67</td>
<td>$135</td>
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<tr>
<td>Rapid</td>
<td>120</td>
<td></td>
<td>Kearny Mesa to Downtown San Diego via Mission Valley</td>
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<td>$104</td>
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<tr>
<td>Rapid</td>
<td>225</td>
<td></td>
<td>South Bay Rapid (Oat Mesa to Downtown San Diego) and Oat Mesa ITC (formerly Route 628)</td>
<td>$206</td>
<td>$206</td>
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<tr>
<td>Rapid</td>
<td>235</td>
<td></td>
<td>Temecula (peak only) Extension of Escondido to Downtown San Diego Rapid (formerly Route 610)</td>
<td>$98</td>
<td>$198</td>
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<tr>
<td>Rapid</td>
<td>440</td>
<td></td>
<td>Carlsbad to Escondido Transit Center via Palomar Airport Rd</td>
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<td>$104</td>
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<tr>
<td>Rapid</td>
<td>471</td>
<td></td>
<td>Downtown Escondido to East Escondido</td>
<td>$32</td>
<td>$80</td>
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<tr>
<td>Rapid</td>
<td>473</td>
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<td>UTC/UC San Diego to Oceanside via Hwy 101 Coastal Communities, Carmel Valley</td>
<td>$130</td>
<td>$242</td>
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<tr>
<td>Rapid</td>
<td>474</td>
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<td>Oceanside to Vista via Mission Ave/Santa Fe Rd Corridor</td>
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<td>$127</td>
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<td>Rapid</td>
<td>477</td>
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<td>Camp Pendleton to Carlsbad Village via College Blvd, Plaza Camino Real</td>
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<tr>
<td>Rapid</td>
<td>550</td>
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<td>SDSU to Palomar Station via East San Diego, Southeast San Diego, National City</td>
<td>$59</td>
<td>$78</td>
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<tr>
<td>Rapid</td>
<td>635</td>
<td></td>
<td>Eastlake to Palomar Trolley via Main St Corridor</td>
<td>$56</td>
<td>$98</td>
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<tr>
<td>Rapid</td>
<td>636</td>
<td></td>
<td>SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline</td>
<td>$39</td>
<td>$79</td>
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<tr>
<td>Rapid</td>
<td>637</td>
<td></td>
<td>North Park to 32nd St Trolley via Golden Hill</td>
<td>$33</td>
<td>$66</td>
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<tr>
<td>Rapid</td>
<td>638</td>
<td></td>
<td>Iris Trolley to Otay Mesa via Otay, Airway Dr, SR 905 Corridor</td>
<td>$38</td>
<td>$67</td>
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<tr>
<td>Rapid  640A/640B</td>
<td></td>
<td></td>
<td>Route 640A: I-5 - San Ysidro to Old Town Transit Center via City College Route 640B: I-5 Iris Trolley/Palomar to Kearny Mesa via Chula Vista, National City and City College</td>
<td>$153</td>
<td>$206</td>
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<tr>
<td>Rapid</td>
<td>650</td>
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<td>Chula Vista to Palomar Airport Rd Business Park via I-805/I-5 (peak only)</td>
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<td>$166</td>
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<tr>
<td>Rapid</td>
<td>653</td>
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<td>Mid-City to Palomar Airport Rd via Kearny Mesa/ I-805/I-5</td>
<td>$10</td>
<td>$21</td>
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### Table A.1 (continued)

**Revenue Constrained Projects**

#### Transit Facilities (continued)

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<tr>
<th>TransNet</th>
<th>Service</th>
<th>Route</th>
<th>Description</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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<tbody>
<tr>
<td>TransNet Rapid</td>
<td>688/689/690</td>
<td>Route 688: San Ysidro to Sorrento Mesa via I-805/ I-15/SR 52 Corridors (peak only); Route 689: Otay Mesa Port of Entry (POE) to UTC/Torrey Pines via Otay Ranch/ Millennia, I-805 Corridor (Peak Only); Route 690: Mid-City to Sorrento Mesa via I-805 Corridor (Peak Only)</td>
<td>$458</td>
<td>$653</td>
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<tr>
<td>Rapid</td>
<td>709</td>
<td>H St Trolley to Millennia via H St Corridor, Southwestern College</td>
<td>$37</td>
<td>$49</td>
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<tr>
<td>Rapid</td>
<td>870</td>
<td>El Cajon to UTC via Santee, SR 52, I-805</td>
<td>$7</td>
<td>$17</td>
<td></td>
</tr>
<tr>
<td>Rapid</td>
<td>890</td>
<td>El Cajon to Sorrento Mesa via SR 52, Kearny Mesa</td>
<td>$12</td>
<td>$29</td>
<td></td>
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<tr>
<td>Rapid</td>
<td>905</td>
<td>Extension of Iris Trolley Station to Otay Mesa Port of Entry (POE) route with new service to Otay Mesa East POE and Imperial Beach</td>
<td>$2</td>
<td>$2</td>
<td></td>
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<tr>
<td>Rapid</td>
<td>910</td>
<td>Coronado to Downtown via Coronado Bridge</td>
<td>$26</td>
<td>$39</td>
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<tr>
<td>Rapid SR163 DARs</td>
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<td>Kearny Mesa to Downtown San Diego via SR 163. Stations at Sharp/Children’s Hospital, University Ave, and Fashion Valley Transit Center</td>
<td>$150</td>
<td>$196</td>
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<tr>
<td>Shuttle</td>
<td>448/449</td>
<td>San Marcos Shuttle¹</td>
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<tr>
<td>Streetcar</td>
<td>553</td>
<td>Downtown San Diego: Little Italy to East Village²</td>
<td>$14</td>
<td>$21</td>
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<tr>
<td>Streetcar</td>
<td>554</td>
<td>Hillcrest/Balboa Park/Downtown San Diego Loop²</td>
<td>$29</td>
<td>$38</td>
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<tr>
<td>Streetcar</td>
<td>555</td>
<td>30th St to Downtown San Diego via North Park/ Golden Hill²</td>
<td>$26</td>
<td>$45</td>
<td></td>
</tr>
<tr>
<td>Streetcar</td>
<td>565</td>
<td>Mission Beach to La Jolla via Pacific Beach²</td>
<td>$25</td>
<td>$50</td>
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<tr>
<td>Airport Express</td>
<td>--</td>
<td>Airport Express Routes²</td>
<td>$52</td>
<td>$62</td>
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<tr>
<td>Intermodal Transit Center (ITC)</td>
<td>--</td>
<td>San Diego International Airport ITC and I-5 Direct Connector Ramps</td>
<td>$170</td>
<td>$223</td>
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<tr>
<td>ITC</td>
<td>--</td>
<td>San Ysidro ITC</td>
<td>$118</td>
<td>$189</td>
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</tr>
<tr>
<td>Transit Lanes</td>
<td>SR 15 from I-805 to I-8</td>
<td>Addition of two transit lanes for routes 235, 280/ 290, 653, and Airport Express Route to the cross-border facility in Otay Mesa</td>
<td>$56</td>
<td>$56</td>
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<td>Other</td>
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<td>Vehicles</td>
<td>$3,646</td>
<td>$6,608</td>
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<tr>
<td>Other</td>
<td>--</td>
<td>Transit System Rehabilitation</td>
<td>$1,250</td>
<td>$2,810</td>
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<td>Other</td>
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<td>Maintenance Facilities, Park and Ride, Transit Center Expansions</td>
<td>$1,220</td>
<td>$1,842</td>
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<td>Other</td>
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<td>ITS, Regulatory Compliance</td>
<td>$300</td>
<td>$502</td>
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</table>

**Subtotal** $22,854 $40,625
Table A.1 (continued)

**Revenue Constrained Projects**

<table>
<thead>
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<th>Managed Lanes/Toll Lanes Projects</th>
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<td><strong>TransNet</strong></td>
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<td>TransNet</td>
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<tr>
<td>TransNet</td>
</tr>
<tr>
<td>I-5</td>
</tr>
<tr>
<td>SR 11/Otay Mesa East POE</td>
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<tr>
<td>TransNet</td>
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<td>SR 241</td>
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Appendix A :: Transportation Projects, Costs, and Phasing
Table A.1 (continued)

**Revenue Constrained Projects**

*Managed Lanes/Toll Lanes Projects (continued)*

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

**Highway Projects**

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

**Operational Improvements**

<table>
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<tr>
<th>TransNet</th>
<th>Freeway</th>
<th>From</th>
<th>To</th>
<th>Existing</th>
<th>With Improvements</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TransNet</td>
<td>I-5</td>
<td>SR 15</td>
<td>I-8</td>
<td>8F</td>
<td>8F+Operational</td>
<td>$1,177</td>
<td>$2,919</td>
</tr>
<tr>
<td>TransNet</td>
<td>I-8</td>
<td>I-5</td>
<td>SR 125</td>
<td>8F/10F</td>
<td>8F/10F+Operational</td>
<td>$667</td>
<td>$1,654</td>
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<tr>
<td>TransNet</td>
<td>I-8</td>
<td>SR 125</td>
<td>2nd St</td>
<td>6F/8F</td>
<td>6F/8F+Operational</td>
<td>$167</td>
<td>$413</td>
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Table A.1 (continued)

### Revenue Constrained Projects

#### Operational Improvements

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<th>TransNet</th>
<th>Freeway</th>
<th>From</th>
<th>To</th>
<th>Existing</th>
<th>With Improvements</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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<tr>
<td>SR 76</td>
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<td>Couser Canyon</td>
<td>2C/4C</td>
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#### Managed Lanes Connectors

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<tr>
<th>TransNet</th>
<th>Freeway</th>
<th>Intersecting Freeway</th>
<th>Movement</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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<tbody>
<tr>
<td>I-5</td>
<td>I-805</td>
<td></td>
<td>North to North and South to South</td>
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<td>$66</td>
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<td>I-5</td>
<td>SR 78</td>
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<td>South to East and West to North, North to East and West to South</td>
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<td>$332</td>
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<tr>
<td>SR 15</td>
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<td>South to West and East to North</td>
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<td>North to North and South to South</td>
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<td>SR 52</td>
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<td>West to North and South to East</td>
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<tr>
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<td>SR 78</td>
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<td>East to South and North to West</td>
<td>$106</td>
<td>$139</td>
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<tr>
<td>I-805</td>
<td>SR 94</td>
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<td>North to West and East to South</td>
<td>$101</td>
<td>$133</td>
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<tr>
<td>I-805</td>
<td>SR 52</td>
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<td>West to North and South to East</td>
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#### Freeway Connectors

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<th>TransNet</th>
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<th>Movement</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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<tbody>
<tr>
<td>I-5</td>
<td>SR 56</td>
<td></td>
<td>West to North and South to East</td>
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<td>$411</td>
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<tr>
<td>I-5</td>
<td>SR 78</td>
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<td>South to East and West to South</td>
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<td>$358</td>
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<tr>
<td>SR 11/ SR 905</td>
<td>SR 125</td>
<td>EB SR 905 and WB SR 11 to NB SR 125 and NB SR 905 to NB SR 125</td>
<td>$26</td>
<td>$28</td>
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<tr>
<td>SR 11/ SR 905</td>
<td>SR 125</td>
<td>SB 125 to WB SR 905, SB SR 125 to EB SR 11, SB SR 125 to SB SR 905</td>
<td>$74</td>
<td>$90</td>
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<td>SR 56</td>
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<td>$265</td>
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<td>SR 94</td>
<td>SR 125</td>
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<td>South to East</td>
<td>$69</td>
<td>$88</td>
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<tr>
<td>SR 94</td>
<td>SR 125</td>
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<td>West to North</td>
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<td>$122</td>
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<td>Subtotal</td>
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## Table A.1 (continued)
### Revenue Constrained Projects

**Active Transportation Projects**

<table>
<thead>
<tr>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Capital Cost ($2014) millions</th>
<th>Capital Cost ($YOE) millions</th>
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</thead>
<tbody>
<tr>
<td>Uptown - Fashion Valley to Downtown San Diego</td>
<td>San Diego</td>
<td>$23.0</td>
<td>$27.2</td>
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<tr>
<td>Uptown - Old Town to Hillcrest</td>
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<td>Uptown - Hillcrest to Balboa Park</td>
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<td>North Park - Mid-City - Hillcrest to Kensington</td>
<td>San Diego</td>
<td>$6.0</td>
<td>$7.1</td>
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<tr>
<td>North Park - Mid-City - Hillcrest to City Heights (Hillcrest-El Cajon Corridor)</td>
<td>San Diego</td>
<td>$6.0</td>
<td>$7.1</td>
</tr>
<tr>
<td>North Park - Mid-City - City Heights</td>
<td>San Diego</td>
<td>$3.0</td>
<td>$3.5</td>
</tr>
<tr>
<td>North Park - Mid-City - Hillcrest to City Heights (City Heights - Old Town Corridor)</td>
<td>San Diego</td>
<td>$5.0</td>
<td>$5.9</td>
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<tr>
<td>North Park - Mid-City - City Heights to Rolando</td>
<td>San Diego</td>
<td>$4.0</td>
<td>$4.7</td>
</tr>
<tr>
<td>San Diego River Trail - Qualcomm Stadium</td>
<td>San Diego</td>
<td>$0.8</td>
<td>$0.9</td>
</tr>
<tr>
<td>Coastal Rail Trail San Diego - Rose Creek</td>
<td>San Diego</td>
<td>$21.0</td>
<td>$24.8</td>
</tr>
<tr>
<td>Bayshore Bikeway - Main St to Palomar</td>
<td>Chula Vista/Imperial Beach</td>
<td>$3.0</td>
<td>$3.5</td>
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<tr>
<td>Coastal Rail Trail Encinitas - Chesterfield to G St</td>
<td>Encinitas</td>
<td>$7.0</td>
<td>$8.3</td>
</tr>
<tr>
<td>Coastal Rail Trail Encinitas - Chesterfield to Solana Beach</td>
<td>Encinitas</td>
<td>$0.2</td>
<td>$0.3</td>
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<tr>
<td>Inland Rail Trail (combination of four projects)</td>
<td>San Marcos, Vista, Co. of San Diego</td>
<td>$33.0</td>
<td>$39.0</td>
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<td>Coastal Rail Trail Oceanside - Wisconsin to Oceanside Blvd</td>
<td>Oceanside</td>
<td>$0.2</td>
<td>$0.2</td>
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<tr>
<td>Plaza Bonita Bike Path</td>
<td>National City</td>
<td>$0.4</td>
<td>$0.5</td>
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<tr>
<td>Plaza Bonita Bike Path</td>
<td>National City</td>
<td>$0.4</td>
<td>$0.5</td>
</tr>
<tr>
<td>Plaza Bonita Bike Path</td>
<td>National City</td>
<td>$0.4</td>
<td>$0.5</td>
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<tr>
<td>Bayshore Bikeway - National City Marina to 32nd St</td>
<td>San Diego/National City</td>
<td>$2.0</td>
<td>$2.4</td>
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<tr>
<td>I-15 Mid-City - Adams Ave to Camino Del Rio S</td>
<td>San Diego</td>
<td>$9.0</td>
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<tr>
<td>Pershing and El Prado - North Park to Downtown San Diego</td>
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<td>$7.0</td>
<td>$8.3</td>
</tr>
<tr>
<td>Pershing and El Prado - North Park to Downtown San Diego</td>
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<td>$7.0</td>
<td>$8.3</td>
</tr>
<tr>
<td>Pershing and El Prado - Cross-Park</td>
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<td>$0.7</td>
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<tr>
<td>San Ysidro to Imperial Beach - Bayshore Bikeway Connection</td>
<td>Imperial Beach/San Diego</td>
<td>$8.9</td>
<td>$10.6</td>
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<tr>
<td>San Diego River Trail – I-805 to Fenton</td>
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<td>$2.4</td>
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<tr>
<td>Terrace Dr/Central Ave - Adams to Wightman</td>
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<td>$1.2</td>
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<tr>
<td>San Diego River Trail - Short gap connections</td>
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<td>$1.2</td>
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<td>Coastal Rail Trail Encinitas - Leucadia to G St</td>
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<td>$5.0</td>
<td>$5.9</td>
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<tr>
<td>Bayshore Bikeway - Barrio Logan</td>
<td>San Diego</td>
<td>$19.0</td>
<td>$34.0</td>
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</table>
### Table A.1 (continued)
#### Revenue Constrained Projects

**Active Transportation Projects (continued)**

<table>
<thead>
<tr>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Capital Cost ($2014) millions</th>
<th>Capital Cost ($YOE) millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Diego River Trail - Father Junipero Serra Trail to Santee</td>
<td>Santee</td>
<td>$10.0</td>
<td>$17.9</td>
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<tr>
<td>Downtown to Southeast connections</td>
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<tr>
<td>Coastal Rail Trail San Diego - UTC</td>
<td>San Diego</td>
<td>$3.8</td>
<td>$6.8</td>
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<tr>
<td>Coastal Rail Trail San Diego - Rose Canyon</td>
<td>San Diego</td>
<td>$12.0</td>
<td>$21.5</td>
</tr>
<tr>
<td>Coastal Rail Trail San Diego - Pac Hwy (W Washington St to Laurel St)</td>
<td>San Diego</td>
<td>$4.0</td>
<td>$7.2</td>
</tr>
<tr>
<td>Coastal Rail Trail San Diego - Pac Hwy (Laurel St to Santa Fe Depot)</td>
<td>San Diego</td>
<td>$8.0</td>
<td>$14.3</td>
</tr>
<tr>
<td>Coastal Rail Trail San Diego – Pac Hwy (Taylor St to W Washington St)</td>
<td>San Diego</td>
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<td>$7.2</td>
</tr>
<tr>
<td>Coastal Rail Trail San Diego – Pac Hwy (Fiesta Island Rd to Taylor St)</td>
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<td>$7.0</td>
<td>$12.5</td>
</tr>
<tr>
<td>City Heights /Encanto/Lemon Grove</td>
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<tr>
<td>City Heights/Fairmount Corridor</td>
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<td>$21.5</td>
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<td>Rolando to Grossmont/La Mesa</td>
<td>La Mesa/El Cajon/San Diego</td>
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<td>$3.6</td>
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<tr>
<td>La Mesa/Lemon Grove/El Cajon connections</td>
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<td>$10.7</td>
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<tr>
<td>San Diego River Trail - Qualcomm Stadium to Ward Rd</td>
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<td>Coastal Rail Trail San Diego - Rose Creek Mission Bay Connection</td>
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<tr>
<td>Coastal Rail Trail Carlsbad - Reach 4 Cannon to Palomar Airport Rd</td>
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<td>$8.9</td>
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<td>Coastal Rail Trail Carlsbad - Reach 5 Palomar Airport Rd to Poinsettia Station</td>
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<td>Coastal Rail Trail Encinitas - Carlsbad to Leucadia</td>
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<td>Coastal Rail Trail Del Mar</td>
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<tr>
<td>Coastal Rail Trail Carlsbad - Reach 4 Cannon to Palomar Airport Rd</td>
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<td>$8.9</td>
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<td>Coastal Rail Trail San Diego - Del Mar to Sorrento via Carmel Valley</td>
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<td>Coastal Rail Trail San Diego - Carmel Valley to Roselle via Sorrento</td>
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<td>Chula Vista/National City connections</td>
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<td>Capital Cost ($YOE) millions</td>
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<td>San Diego River Trail - Mast Park to Lakeside baseball park</td>
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<td>$17.9</td>
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<tr>
<td>I-8 Flyover - Camino del Rio S to Camino del Rio N</td>
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<td>Inland Rail Trail Oceanside</td>
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<td>Harbor Dr (Downtown to Ocean Beach)</td>
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<td>Coastal Rail Trail Oceanside - Alta Loma Marsh bridge</td>
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<td>Coastal Rail Trail San Diego - Mission Bay (Clairemont to Tecolote)</td>
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<tr>
<td>Bayshore Bikeway Coronado - Golf course adjacent</td>
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<td>San Luis Rey River Trail</td>
<td>Oceanside, Unincorporated</td>
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<td>Encinitas-San Marcos Corridor – Double Peak Dr to San Marcos Blvd</td>
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<td>Escondido Creek Bikeway – Quince St to Broadway</td>
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<td>Escondido Creek Bikeway – Escondido Creek to Washington Ave</td>
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<td>Escondido Creek Bikeway – 9th Ave to Escondido Creek</td>
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<td>Escondido Creek Bikeway – El Norte Pkwy to northern bikeway terminus</td>
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<td>Encinitas to San Marcos Corridor – Leucadia Blvd to El Camino Real</td>
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<td>I-15 Bikeway – Camino del Norte to Aguamiel Rd</td>
<td>San Diego</td>
<td>$13.0</td>
<td>$35.2</td>
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</table>
### Table A.1 (continued)

#### Revenue Constrained Projects

**Active Transportation Projects (continued)**

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<tr>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Capital Cost ($2014 millions)</th>
<th>Capital Cost ($YOE) millions</th>
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</thead>
<tbody>
<tr>
<td>I-15 Bikeway – Poway Rd interchange to Carmel Mountain Rd</td>
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<td>$5.4</td>
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<td>I-15 Bikeway – Murphy Canyon Rd to Affinity Ct</td>
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<tr>
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<td>$5.4</td>
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<td>SR 52 Bikeway – I-5 to Santo Rd</td>
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<td>$30.0</td>
<td>$81.2</td>
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<tr>
<td>SR 52 Bikeway – SR 52/Mast Dr to San Diego River Trail</td>
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<td>$2.0</td>
<td>$5.4</td>
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<tr>
<td>I-8 Corridor – San Diego River Trail to Riverside Dr</td>
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<td>$5.4</td>
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<td>I-805 Connector – Bonita Rd to Floyd Ave</td>
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<td>$16.2</td>
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<tr>
<td>SR 125 Connector – Bonita Rd to U.S.-Mexico Border</td>
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<td>SR 905 Connector – E Beyer Blvd to U.S.-Mexico Border</td>
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<td>$34.0</td>
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<tr>
<td>El Camino Real Bike Lanes – Douglas Dr to Mesa Dr</td>
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<td>$2.7</td>
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<tr>
<td>Vista Way Connector from Arcadia</td>
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<tr>
<td>El Camino Real Bike Lanes – Marron Rd to SR 78 offramp</td>
<td>Carlsbad</td>
<td>$0.3</td>
<td>$0.5</td>
</tr>
<tr>
<td>Carlsbad to San Marcos Corridor – Paseo del Norte to Avenida Encinas</td>
<td>Carlsbad</td>
<td>$0.4</td>
<td>$0.8</td>
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<tr>
<td>Encinitas to San Marcos Corridor – Kristen Ct to Ecke Ranch Rd</td>
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<tr>
<td>Encinitas to San Marcos Corridor – Encinitas Blvd/I-5 Interchange</td>
<td>Encinitas</td>
<td>$0.2</td>
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<tr>
<td>Mira Mesa Corridor – Reagan Rd to Parkdale Ave</td>
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<tr>
<td>Mira Mesa Corridor – Scranton Rd to I-805</td>
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<tr>
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<td>Mid-County Bikeway – I-5/Via de la Valle Interchange</td>
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<td>$0.3</td>
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<td>San Diego, Unincorporated</td>
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<td>El Camino Real Bike Lanes – Manchester Ave to Tennis Club Dr</td>
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<td>Central Coast Corridor – Van Nuys St to San Rafael Pl</td>
<td>San Diego</td>
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<tr>
<td>Clairemont – Centre-City Corridor – Coastal Rail Trail to Genesee Ave</td>
<td>San Diego</td>
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<td>SR 125 Corridor – Mission Gorge Rd to Glen Vista Way</td>
<td>Santee</td>
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<td>$0.5</td>
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<td>SR 125 Corridor – Prospect Ave to Weld Blvd</td>
<td>Santee, El Cajon</td>
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<td>$1.9</td>
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<td>I-8 Corridor – Lakeside Ave to SR 67</td>
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<td>I-8 Corridor – Willows Rd to SR 79</td>
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<td>El Cajon</td>
<td>$0.3</td>
<td>$0.8</td>
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<td>Project</td>
<td>Jurisdiction(s)</td>
<td>Capital Cost ($2014 millions)</td>
<td>Capital Cost ($YOE millions)</td>
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<td>E County Northern Loop – Washington Ave to Dewitt Ct</td>
<td>El Cajon</td>
<td>$1.0</td>
<td>$2.7</td>
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<td>E County Northern Loop – SR 94 onramp to Del Rio Rd</td>
<td>Unincorporated</td>
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<td>E County Southern Loop – Pointe Pkwy to Omega St</td>
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<td>SR 125 Corridor – SR 94 to S of Avocado St</td>
<td>Unincorporated</td>
<td>$1.1</td>
<td>$2.7</td>
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<td>Centre City – La Mesa Corridor – Gateside Rd to Campo Rd</td>
<td>La Mesa, Unincorporated</td>
<td>$0.4</td>
<td>$0.8</td>
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<td>Bay to Ranch Bikeway – River Ash Dr to Paseo Ranchero</td>
<td>Chula Vista</td>
<td>$0.5</td>
<td>$1.4</td>
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<tr>
<td>Mid-County Bikeway – San Elijo Ave to 101 Terminus</td>
<td>Encinitas</td>
<td>$1.0</td>
<td>$2.7</td>
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<td>Central Coast Corridor – Van Nuys St</td>
<td>San Diego</td>
<td>$0.2</td>
<td>$0.3</td>
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<td>E County Northern Loop – El Cajon Blvd to Washington Ave</td>
<td>El Cajon</td>
<td>$1.0</td>
<td>$2.7</td>
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<td>E County Northern Loop – Calavo Dr to Sweetwater Springs Blvd</td>
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<td>Central Coast Corridor – Torrey Pines Rd to Nautilus St</td>
<td>San Diego</td>
<td>$6.0</td>
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<td>Central Coast Corridor – Via Del Norte to Van Nuys St</td>
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<td>$13.5</td>
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<td>Kearny Mesa to Beaches Corridor – Ingraham St from Garnet Ave to Pacific Beach Dr</td>
<td>San Diego</td>
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<td>$5.4</td>
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<td>Kearny Mesa to Beaches Corridor – Clairemont Dr to Genesee Ave</td>
<td>San Diego</td>
<td>$10.0</td>
<td>$27.1</td>
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<tr>
<td>Kearny Mesa to Beaches Corridor – Genesee Ave to Linda Vista Dr</td>
<td>San Diego</td>
<td>$6.0</td>
<td>$16.2</td>
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<tr>
<td>Bay to Ranch Bikeway – E J St from 2nd Ave to Paseo Del Rey</td>
<td>Chula Vista</td>
<td>$12.0</td>
<td>$32.5</td>
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<tr>
<td>Chula Vista Greenbelt – Bay Blvd to Oleander Ave</td>
<td>Chula Vista</td>
<td>$17.0</td>
<td>$46.0</td>
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<tr>
<td>Safe Routes to Transit at new transit stations</td>
<td>Various</td>
<td>$1,025.0</td>
<td>$1,632.2</td>
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<td>Local Bike Projects</td>
<td>Various</td>
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<tr>
<td>Local pedestrian/safety/traffic calming projects</td>
<td>Various</td>
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<td>Regional Bicycle and Pedestrian Programs</td>
<td>Various</td>
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<td>$49</td>
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<tr>
<td>Regional Safe Routes to School Implementation</td>
<td>Various</td>
<td>$76.7</td>
<td>$122</td>
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Subtotal: $2,849 $4,901

TOTAL: $47,903 $87,453

1 Capital cost to be funded by the City of San Marcos.
2 Streetcar cost is representative of 10 percent of the total capital cost.
3 Implementation of these services is dependent upon funding from aviation and other private sources.
4 Figure A.9 includes Regional Bicycle Network segments built by others; such segments are not included in Table A.1.
## Table A.2
### Phased Revenue Constrained Projects

<table>
<thead>
<tr>
<th>Year Built By</th>
<th>Service</th>
<th>Route</th>
<th>Description</th>
<th>Capital Cost ($2014; millions)</th>
<th>Capital Cost ($YOE; millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>COASTER</td>
<td>398</td>
<td>Double tracking (20-minute peak frequencies and 120-minute off-peak frequencies)</td>
<td>$445</td>
<td>$445</td>
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<tr>
<td>2020</td>
<td>Trolley</td>
<td>510</td>
<td>Mid-Coast Trolley Extension</td>
<td>$1,753</td>
<td>$1,753</td>
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<tr>
<td>2020</td>
<td>Rapid</td>
<td>225</td>
<td>South Bay Rapid (Otay Mesa to Downtown) and Otay Mesa ITC (formerly Route 628)</td>
<td>$206</td>
<td>$206</td>
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<tr>
<td>2020</td>
<td>Rapid</td>
<td>905</td>
<td>Extension of Iris Trolley Station to Otay Mesa Port of Entry (POE) route with new service to Otay Mesa East POE and Imperial Beach</td>
<td>$2</td>
<td>$2</td>
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<tr>
<td>2020</td>
<td>Shuttle</td>
<td>448/449</td>
<td>San Marcos Shuttle¹</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>2020</td>
<td>Airport Express</td>
<td>--</td>
<td>Airport Express Routes²</td>
<td>$52</td>
<td>$62</td>
</tr>
<tr>
<td>2020</td>
<td>Transit Lanes</td>
<td>SR 15 from I-805 to I-8</td>
<td>Addition of two Transit Lanes for routes 235, 280/290, 653, and Airport Express Route to the cross border facility in Otay Mesa</td>
<td>$56</td>
<td>$56</td>
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<tr>
<td>2020</td>
<td>Other</td>
<td>--</td>
<td>Other Improvements (Vehicles, transit system rehabilitation, maintenance facilities, ITS, regulatory compliance, Park and Ride, transit center expansions)</td>
<td>$632</td>
<td>$680</td>
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<tr>
<td>2020</td>
<td>--</td>
<td>--</td>
<td>Local Bus Routes - 15 minutes in key corridors</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2035</td>
<td>COASTER</td>
<td>398</td>
<td>Double tracking (20-minute peak frequencies and 60-minute off-peak frequencies, grade separations at Leucadia Blvd, stations/platforms at Convention Center/Gaslamp Quarter and Del Mar Fairgrounds, and extension to Camp Pendleton)</td>
<td>$900</td>
<td>$1,357</td>
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<tr>
<td>2035</td>
<td>SPRINTER</td>
<td>399</td>
<td>SPRINTER efficiency improvements (20-minute frequencies by 2025); double tracking Oceanside to Escondido for 10-minute frequencies and six rail grade separations at El Camino Real, Melrose Dr, Vista Village Dr/Main St, North Dr, Civic Center, Auto Pkwy and Mission Ave</td>
<td>$946</td>
<td>$1,339</td>
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<tr>
<td>2035</td>
<td>Trolley</td>
<td>510</td>
<td>Phase I - Blue Line Frequency Enhancements and rail grade separations at 28th St, 32nd St, E St, H St, Palomar St, and Blue/Orange Track Connection at 12th/Imperial</td>
<td>$205</td>
<td>$292</td>
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<tr>
<td>2035</td>
<td>Trolley</td>
<td>520</td>
<td>Orange Line Frequency Enhancements and four rail grade separations at Euclid Ave, Broadway/Lemon Grove Ave, Allison Ave/University Ave, Severin Dr</td>
<td>$267</td>
<td>$402</td>
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<td>2035</td>
<td>Trolley</td>
<td>561</td>
<td>UTC to COASTER Connection (extension of Route 510)</td>
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<td>$602</td>
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<tr>
<td>2035</td>
<td>Trolley</td>
<td>562</td>
<td>Phase I - San Ysidro to Kearny Mesa via Chula Vista via Highland Ave/4th Ave, National City, Southeast San Diego, Mid-City, and Mission Valley</td>
<td>$2,333</td>
<td>$4,028</td>
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<tr>
<td>2035</td>
<td>Rapid</td>
<td>2</td>
<td>North Park to Downtown San Diego via 30th St, Golden Hill</td>
<td>$39</td>
<td>$52</td>
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<tr>
<td>2035</td>
<td>Rapid</td>
<td>10</td>
<td>La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town</td>
<td>$87</td>
<td>$117</td>
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<td>2035</td>
<td>Rapid</td>
<td>11</td>
<td>Spring Valley to SDSU via Southeast San Diego, Downtown, Hillcrest, Mid-City</td>
<td>$113</td>
<td>$173</td>
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<tr>
<td>Year Built By</td>
<td>Service</td>
<td>Route</td>
<td>Description</td>
<td>Capital Cost ($2014); millions</td>
<td>Capital Cost ($YOE); millions</td>
</tr>
<tr>
<td>--------------</td>
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<tr>
<td>2035</td>
<td>Rapid</td>
<td>28</td>
<td>Point Loma to Kearny Mesa via Old Town, Linda Vista</td>
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<td>$76</td>
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<tr>
<td>2035</td>
<td>Rapid</td>
<td>30</td>
<td>Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC</td>
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<td>$161</td>
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<tr>
<td>2035</td>
<td>Rapid</td>
<td>41</td>
<td>Fashion Valley to UTC/UC San Diego via Linda Vista and Clairemont</td>
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<td>$96</td>
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<tr>
<td>2035</td>
<td>Rapid</td>
<td>90</td>
<td>El Cajon Transit Center to San Diego International Airport ITC via SR 94, City College (peak only)</td>
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<td>$27</td>
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<tr>
<td>2035</td>
<td>Rapid</td>
<td>120</td>
<td>Kearny Mesa to Downtown via Mission Valley</td>
<td>$78</td>
<td>$104</td>
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<tr>
<td>2035</td>
<td>Rapid</td>
<td>473</td>
<td>Phase I - Solana Beach to UTC/UC San Diego via Hwy 101 Coastal Communities, Carmel Valley</td>
<td>$43</td>
<td>$66</td>
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<tr>
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<td>Rapid</td>
<td>550</td>
<td>SDSU to Palomar Station via East San Diego, Southeast San Diego, National City</td>
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<td>$78</td>
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<td>2035</td>
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<td>635</td>
<td>Eastlake to Palomar Trolley via Main St Corridor</td>
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<td>$98</td>
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<td>Rapid</td>
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<td>Iris Trolley Station to Otay Mesa via Otay, Airway Dr, SR 905 Corridor</td>
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<td>640A/ 640B</td>
<td>Route 640A: I-5 - San Ysidro to Old Town Transit Center via City College; 640B: I-5 Iris Trolley/Palomar to Kearny Mesa via Chula Vista, National City and City College</td>
<td>$153</td>
<td>$206</td>
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<td>688/ 689/ 690</td>
<td>Route 688: San Ysidro to Sorrento Mesa via I-805/I-15/SR 52 Corridors (Peak Only); Route 689:Otay Mesa Port of Entry (POE) to TTC/Torrey Pines via Otay Ranch/Millennia, I-805 Corridor (Peak Only); Route 690: Mid-City to Sorrento Mesa via I-805 Corridor (Peak Only)</td>
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<td>Coronado to Downtown via Coronado Bridge</td>
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<td>Kearny Mesa to Downtown via SR 163. Stations at Sharp/Children’s Hospital, University Ave, and Fashion Valley Transit Center</td>
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<td>Downtown San Diego: Little Italy to East Village³</td>
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<td>554</td>
<td>Hillcrest/Balboa Park/Downtown San Diego Loop³</td>
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<td>$38</td>
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<tr>
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<td>30th St to Downtown San Diego via North Park/ Golden Hill³</td>
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<td>San Diego International Airport ITC and I-5 Direct Connector Ramps</td>
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<td>Phase I - San Ysidro ITC</td>
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<td>Year</td>
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<td>Capital Cost ($YOE); millions</td>
</tr>
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<td>-----------------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>2035</td>
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<td>--</td>
<td>Local Bus Routes - 10 minutes in key corridors</td>
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<td>--</td>
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<tr>
<td>2050</td>
<td>COASTER</td>
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<td>Double tracking (completes double tracking; includes Del Mar Tunnel) plus 2 grade separations</td>
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<td>$3,372</td>
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<td>Branch Extension to Westfield North County</td>
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<td>SPRINTER Express</td>
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<td>Trolley</td>
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<td>Trolley</td>
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<td>Green Line Frequency Enhancements</td>
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<tr>
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<td>Trolley</td>
<td>560</td>
<td>SDSU to Downtown via El Cajon Blvd/Mid-City (transition of Mid-City Rapid to Trolley)</td>
<td>$2,390</td>
<td>$5,005</td>
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<tr>
<td>2050</td>
<td>Trolley</td>
<td>562</td>
<td>Phase II - Kearny Mesa to Carmel Valley</td>
<td>$633</td>
<td>$1,443</td>
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<tr>
<td>2050</td>
<td>Trolley</td>
<td>563</td>
<td>Pacific Beach to El Cajon Transit Center</td>
<td>$1,299</td>
<td>$2,937</td>
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<tr>
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<td>Rapid</td>
<td>103</td>
<td>Solana Beach to Sabre Springs Rapid station via Carmel Valley</td>
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<td>$135</td>
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<td>2050</td>
<td>Rapid</td>
<td>440</td>
<td>Carlsbad to Escondido Transit Center via Palomar Airport Rd</td>
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<td>$104</td>
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<tr>
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<td>Rapid</td>
<td>471</td>
<td>Downtown Escondido to East Escondido</td>
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<td>$80</td>
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<tr>
<td>2050</td>
<td>Rapid</td>
<td>473</td>
<td>Phase II - Oceanside to Solana Beach via Hwy 101 Coastal Communities</td>
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<td>$176</td>
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<tr>
<td>2050</td>
<td>Rapid</td>
<td>474</td>
<td>Oceanside to Vista via Mission Ave/Santa Fe Rd Corridor</td>
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<td>$127</td>
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<tr>
<td>2050</td>
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<td>477</td>
<td>Camp Pendleton to Carlsbad Village via College Blvd, Plaza Camino Real</td>
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<td>$161</td>
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<tr>
<td>2050</td>
<td>Rapid</td>
<td>235</td>
<td>Temecula (peak only) Extension of Escondido to Downtown Rapid (formerly Route 610)</td>
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<td>$198</td>
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<tr>
<td>2050</td>
<td>Rapid</td>
<td>636</td>
<td>SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline</td>
<td>$39</td>
<td>$79</td>
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<tr>
<td>2050</td>
<td>Rapid</td>
<td>637</td>
<td>North Park to 32nd St Trolley Station via Golden Hill</td>
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Subtotal $22,854 $40,625
### Table A.2 (continued)
**Phased Revenue Constrained Projects**

**Managed Lanes/Toll Lanes**

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<th>Year</th>
<th>Built By</th>
<th>Freeway</th>
<th>From</th>
<th>To</th>
<th>Existing*</th>
<th>With Improvements</th>
<th>Transit Route</th>
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<th>Capital Cost ($YOE); millions</th>
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<td>SR 78</td>
<td>8F</td>
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<td>Capital Cost ($YOE); millions</td>
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**Subtotal $16,231 $29,699**

**Highway Projects**

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<th>To</th>
<th>Existing*</th>
<th>With Improvements</th>
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<th>Capital Cost ($YOE); millions</th>
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<td>4C</td>
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### Table A.2 (continued)

#### Phased Revenue Constrained Projects

#### Highway Projects (continued)

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<th>To</th>
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<th>With Improvements</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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**Subtotal** $2,046 $4,214

#### Operational Improvements

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<th>With Improvements</th>
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<th>Capital Cost ($YOE); millions</th>
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**Subtotal** $2,142 $5,247

#### Managed Lanes Connectors

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**Subtotal** $884 $1,405

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San Diego Forward: The Regional Plan
### Table A.2 (continued)

#### Phased Revenue Constrained Projects

##### Freeway Connectors

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<th>Movement</th>
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**Subtotal** $897 $1,362

##### Active Transportation Projects

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<tr>
<th>Year Built By</th>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Project Phase</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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<td>Uptown - Fashion Valley to Downtown San Diego</td>
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### Table A.2 (continued)
#### Phased Revenue Constrained Projects

#### Active Transportation Projects (continued)

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<th>Jurisdiction(s)</th>
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## Phased Revenue Constrained Projects

### Active Transportation Projects (continued)

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<tr>
<th>Year Built By</th>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Project Phase</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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**Phased Revenue Constrained Projects**

### Active Transportation Projects (continued)

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<th>Built By</th>
<th>Project Description</th>
<th>Jurisdiction(s)</th>
<th>Project Phase</th>
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<td>2050</td>
<td>San Diego</td>
<td>I-15 Bikeway – Poway Rd interchange to Carmel Mountain Rd</td>
<td>San Diego</td>
<td>Const.</td>
<td>$17.0</td>
<td>$46.0</td>
</tr>
<tr>
<td>2050</td>
<td>San Diego</td>
<td>SR 56 Bikeway – Azuaga St to Rancho Penasquitos Blvd</td>
<td>San Diego</td>
<td>Const.</td>
<td>$2.0</td>
<td>$5.4</td>
</tr>
<tr>
<td>2050</td>
<td>San Diego</td>
<td>I-15 Bikeway – Murphy Canyon Rd to Affinity Ct</td>
<td>San Diego</td>
<td>Const.</td>
<td>$40.0</td>
<td>$108.3</td>
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<tr>
<td>2050</td>
<td>San Diego</td>
<td>SR 56 Bikeway – El Camino Real to Caminito Pointe</td>
<td>San Diego</td>
<td>Const.</td>
<td>$2.0</td>
<td>$5.4</td>
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<tr>
<td>2050</td>
<td>San Diego</td>
<td>SR 52 Bikeway – I-5 to Santo Rd</td>
<td>San Diego</td>
<td>Const.</td>
<td>$30.0</td>
<td>$81.2</td>
</tr>
<tr>
<td>2050</td>
<td>San Diego</td>
<td>SR 52 Bikeway – SR 52/Mast Dr to San Diego River Trail</td>
<td>San Diego</td>
<td>Const.</td>
<td>$2.0</td>
<td>$5.4</td>
</tr>
<tr>
<td>2050</td>
<td>Unincorporated</td>
<td>I-8 Corridor – San Diego River Trail to Riverside Dr</td>
<td>Unincorporated</td>
<td>Const.</td>
<td>$2.0</td>
<td>$5.4</td>
</tr>
<tr>
<td>Year</td>
<td>Project</td>
<td>Jurisdiction(s)</td>
<td>Phase</td>
<td>Capital Cost ($2014); millions</td>
<td>Capital Cost ($YOE); millions</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------------</td>
<td>--------------------------------------</td>
<td>-------</td>
<td>-------------------------------</td>
<td>-------------------------------</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>I-805 Connector – Bonita Rd to Floyd Ave</td>
<td>Chula Vista, Unincorporated</td>
<td>Const.</td>
<td>$6.0</td>
<td>$16.2</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>SR 125 Connector – Bonita Rd to U.S.-Mexico Border</td>
<td>Chula Vista, San Diego</td>
<td>Const.</td>
<td>$39.0</td>
<td>$105.6</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>SR 905 Connector – E Beyer Blvd to U.S.-Mexico Border</td>
<td>San Diego, Unincorporated</td>
<td>Const.</td>
<td>$34.0</td>
<td>$92.1</td>
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<tr>
<td>2050</td>
<td>El Camino Real Bike Lanes – Douglas Dr to Mesa Dr</td>
<td>Oceanside</td>
<td>Const.</td>
<td>$1.0</td>
<td>$2.7</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>Vista Way Connector from Arcadia</td>
<td>Vista, Unincorporated</td>
<td>Const.</td>
<td>$2.1</td>
<td>$5.4</td>
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</tr>
<tr>
<td>2050</td>
<td>I-15 Bikeway – W Country Club Ln to Nutmeg St</td>
<td>Escondido</td>
<td>Const.</td>
<td>$0.6</td>
<td>$1.4</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>El Camino Real Bike Lanes – Marron Rd to SR 78 off ramp</td>
<td>Carlsbad</td>
<td>Const.</td>
<td>$0.3</td>
<td>$0.5</td>
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</tr>
<tr>
<td>2050</td>
<td>Carlsbad to San Marcos Corridor – Paseo del Norte to Avenida Encinas</td>
<td>Carlsbad</td>
<td>Const.</td>
<td>$0.4</td>
<td>$0.8</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>Encinitas to San Marcos Corridor – Kristen Ct to Ecke Ranch Rd</td>
<td>Encinitas</td>
<td>Const.</td>
<td>$0.4</td>
<td>$0.8</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>Encinitas to San Marcos Corridor – Encinitas Blvd/ I-5 Interchange</td>
<td>Encinitas</td>
<td>Const.</td>
<td>$0.2</td>
<td>$0.3</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>Mira Mesa Corridor – Reagan Rd to Parkdale Ave</td>
<td>San Diego</td>
<td>Const.</td>
<td>$0.4</td>
<td>$0.8</td>
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</tr>
<tr>
<td>2050</td>
<td>Mira Mesa Corridor – Scranton Rd to I-805</td>
<td>San Diego</td>
<td>Const.</td>
<td>$0.4</td>
<td>$0.8</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>Mira Mesa Corridor – Sorrento Valley Rd to Sorrento Valley Blvd</td>
<td>San Diego</td>
<td>Const.</td>
<td>$0.8</td>
<td>$1.9</td>
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</tr>
<tr>
<td>2050</td>
<td>Mid-County Bikeway – I-5/Via de la Valle Interchange</td>
<td>San Diego</td>
<td>Const.</td>
<td>$0.3</td>
<td>$0.5</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>Mid-County Bikeway – Rancho Santa Fe segment</td>
<td>San Diego, Unincorporated</td>
<td>Const.</td>
<td>$3.0</td>
<td>$8.1</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>El Camino Real Bike Lanes – Manchester Ave to Tennis Club Dr</td>
<td>Encinitas</td>
<td>Const.</td>
<td>$0.5</td>
<td>$1.1</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>Mid-County Bikeway – Manchester Ave/I-5 Interchange to San Elijo Ave</td>
<td>Encinitas</td>
<td>Const.</td>
<td>$0.8</td>
<td>$1.9</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>Central Coast Corridor – Van Nuys St to San Rafael Pl</td>
<td>San Diego</td>
<td>Const.</td>
<td>$1.0</td>
<td>$2.7</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>Clairemont – Centre-City Corridor – Coastal Rail Trail to Genesee Ave</td>
<td>San Diego</td>
<td>Const.</td>
<td>$2.0</td>
<td>$5.4</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>SR 125 Corridor – Mission Gorge Rd to Glen Vista Way</td>
<td>Santee</td>
<td>Const.</td>
<td>$0.3</td>
<td>$0.5</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>SR 125 Corridor – Prospect Ave to Weld Blvd</td>
<td>Santee, El Cajon</td>
<td>Const.</td>
<td>$0.8</td>
<td>$1.9</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>I-8 Corridor – Lakeside Ave to SR 67</td>
<td>Unincorporated</td>
<td>Const.</td>
<td>$0.5</td>
<td>$1.1</td>
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</tr>
<tr>
<td>2050</td>
<td>I-8 Corridor – Willows Rd to SR 79</td>
<td>Unincorporated</td>
<td>Const.</td>
<td>$5.0</td>
<td>$13.5</td>
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<tr>
<td>2050</td>
<td>E County Northern Loop – N Marshall Ave to El Cajon Blvd</td>
<td>El Cajon</td>
<td>Const.</td>
<td>$0.3</td>
<td>$0.8</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>E County Northern Loop – Washington Ave to Dewitt Ct</td>
<td>El Cajon</td>
<td>Const.</td>
<td>$1.0</td>
<td>$2.7</td>
<td></td>
</tr>
<tr>
<td>2050</td>
<td>E County Northern Loop – SR 94 onramp to Del Rio Rd</td>
<td>Unincorporated</td>
<td>Const.</td>
<td>$0.2</td>
<td>$0.3</td>
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</tr>
</tbody>
</table>
### Table A.2 (continued)

#### Phased Revenue Constrained Projects

**Active Transportation Projects (continued)**

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

**Subtotal** | **$2,849** | **$4,901** |

**TOTAL** | **$47,903** | **$87,453** |

---

* Based on facility configuration at time of project construction.
1 Capital cost to be funded by the City of San Marcos.
2 Implementation of these services is dependent upon funding from aviation and other private sources.
3 Streetcar cost is representative of 10 percent of the total capital cost.
4 Figure A.9 includes Regional Bicycle Network segments built by others; such segments are not included in Table A.2.
5 Includes Safe Routes to Transit projects at new transit station areas, local bike projects, local pedestrian/safety/traffic calming projects, regional bicycle and pedestrian programs and Regional Safe Routes to School implementation.
Table A.3
Phased Revenue Constrained Arterial Projects

<table>
<thead>
<tr>
<th>Year Built By</th>
<th>SANDAG ID</th>
<th>Lead Agency</th>
<th>Project Title</th>
<th>Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>CB04A</td>
<td>Carlsbad</td>
<td>El Camino Real Widening - Tamarack Ave to Chestnut Ave</td>
<td>Widen El Camino Real to prime arterial standards with three travel lanes, bike lanes, and sidewalks in each direction including intersection improvements at Tamarack Ave and Chestnut Ave</td>
</tr>
<tr>
<td>2020</td>
<td>CB04B</td>
<td>Carlsbad</td>
<td>El Camino Real and Cannon Rd</td>
<td>Along the eastside of El Camino Real just south of Cannon Rd, widen to prime arterial standards with three through lanes, a right turn lane, and a sidewalk approaching the intersection</td>
</tr>
<tr>
<td>2020</td>
<td>CB04C</td>
<td>Carlsbad</td>
<td>El Camino Real - Lisa St to Crestview Dr</td>
<td>Along the west side of El Camino Real, roadway widening to provide three southbound through lanes, curb, gutter, and sidewalk per prime arterial standards</td>
</tr>
<tr>
<td>2020</td>
<td>CB12</td>
<td>Carlsbad</td>
<td>College Blvd Reach A - Badger Ln to Cannon Rd</td>
<td>From Badger Ln to Cannon Rd, construct a new segment of College Blvd to provide 4-lane roadway with raised median, bike lanes, and sidewalks/trails in accordance with major arterial standards</td>
</tr>
<tr>
<td>2020</td>
<td>CB13</td>
<td>Carlsbad</td>
<td>Poinsettia Ln Reach E - Cassia Dr to Skimmer Ct</td>
<td>From Cassia Dr to Skimmer Ct, construct a new 4-lane roadway with median, bike lanes, and sidewalks/trails to major arterial standards</td>
</tr>
<tr>
<td>2020</td>
<td>CB22</td>
<td>Carlsbad</td>
<td>Avenida Encinas, widen from Palomar Airport Rd to Encinas Water Pollution Control Facility</td>
<td>Avenida Encinas from Palomar Airport Rd southerly to existing improvements adjacent to the Embarcadero Lane, roadway widening to secondary arterial standards</td>
</tr>
<tr>
<td>2020</td>
<td>CB30</td>
<td>Carlsbad</td>
<td>El Camino Real – El Camino Real to Tamarack Ave</td>
<td>At the intersection of El Camino Real and Tamarack Ave, construct a second left turn lane from El Camino Real to westbound Tamarack</td>
</tr>
<tr>
<td>2020</td>
<td>CB31</td>
<td>Carlsbad</td>
<td>El Camino Real – La Costa Ave to Arenal Rd</td>
<td>Along El Camino Real from 700 feet north of La Costa Ave to Arenal Rd, widening along the southbound side of the roadway to provide three travel lanes and a bike lane in accordance with prime arterial standards</td>
</tr>
<tr>
<td>2020</td>
<td>CB32</td>
<td>Carlsbad</td>
<td>El Camino Real Widening - Cassia to Camino Vida Roble</td>
<td>Widen El Camino Real from 900 feet north of Cassia Rd to Camino Vida Roble, along the northbound side of the roadway to provide three travel lanes and a bike lane in accordance with prime arterial standards</td>
</tr>
<tr>
<td>2020</td>
<td>CB35</td>
<td>Carlsbad</td>
<td>Palomar Airport Rd - Palomar Airport Rd to Paseo Del Norte</td>
<td>Lengthen the left turn pocket along eastbound Palomar Airport Rd to northbound Paseo Del Norte</td>
</tr>
<tr>
<td>2020</td>
<td>CB38</td>
<td>Carlsbad</td>
<td>El Camino Real – Cannon Rd to Tamarack Ave</td>
<td>El Camino Real from Cannon Rd to Tamarack, widen along both sides of El Camino Real from Cannon Rd to Tamarack Ave excluding the limits of project CB04C, to provide a raised median, three travel lanes, bike lane, curb, gutter, and walkway along both sides per prime arterial standards, and a new traffic signal at Lisa St</td>
</tr>
<tr>
<td>2020</td>
<td>CHV08</td>
<td>Chula Vista</td>
<td>Willow St Bridge Project - Bonita Rd to Sweetwater Rd</td>
<td>Replace 2-lane bridge with 4-lane bridge (Phase I and II)</td>
</tr>
<tr>
<td>Year</td>
<td>Built By</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>-----------</td>
<td>---------------------</td>
<td>-------------------------------------------------------</td>
</tr>
<tr>
<td>2020</td>
<td>CHV69</td>
<td></td>
<td>Chula Vista</td>
<td>Heritage Rd Bridge</td>
</tr>
<tr>
<td>2020</td>
<td>CNTY14</td>
<td>San Diego County</td>
<td>South Santa Fe Ave North - Montgomery Dr to South of Woodland Dr</td>
<td>Vista City limits to 700 feet south of Woodland, reconstruct and widen from 2 to 4 lanes including bicycle lane; more detail in 2014 RTIP Project List</td>
</tr>
<tr>
<td>2020</td>
<td>CNTY14A</td>
<td>San Diego County</td>
<td>South Santa Fe Ave South</td>
<td>South Santa Fe from 700 feet south of Woodland Dr to Smilax Rd, widening of South Santa Fe Ave to a 5-lane major road with a center left turn lane, curb, gutter, sidewalk, bike lanes, and drainage improvements.</td>
</tr>
<tr>
<td>2020</td>
<td>CNTY21</td>
<td>San Diego County</td>
<td>Bradley Ave Overpass at SR 67</td>
<td>Widen Bradley Ave from Magnolia Ave to Mollison Ave; widen from 2 lanes to 4 lanes plus sidewalks. Replace 2-lane bridge over SR 67 with a 6-lane bridge, which accommodates turn pockets.</td>
</tr>
<tr>
<td>2020</td>
<td>CNTY24</td>
<td>San Diego County</td>
<td>Cole Grade Rd</td>
<td>Cole Grade Rd from north of Horse Creek Trail to south of Pauma Heights Rd, widen to accommodate 14-foot traffic lane in both directions, 12-foot center 2-way left turn, 6-foot bike lane and 10-foot pathway</td>
</tr>
<tr>
<td>2020</td>
<td>CNTY36</td>
<td>San Diego County</td>
<td>San Vicente Rd Improvements</td>
<td>From Warnock Dr to Wildcat Canyon Rd - in Ramona, design and reconstruct road improvements, including 2-lane community collector road with intermittent turn lanes, bike lanes, asphalt concrete dike, and pathway/walkway</td>
</tr>
<tr>
<td>2020</td>
<td>CNTY39</td>
<td>San Diego County</td>
<td>Bear Valley Pkwy North</td>
<td>From San Pasqual Valley Rd to Boyle Ave - widen from 2 to 4 lanes, with a center median, a bike lane and shoulder in each direction of travel</td>
</tr>
<tr>
<td>2020</td>
<td>CNTY82</td>
<td>San Diego County</td>
<td>Alpine Blvd Streetscape Improvements</td>
<td>From Tavern Rd to South Grade Rd – in unincorporated community of Alpine, widen from 2-lane to 3-lane roadway including a median turn-lane with bicycle, parking, and pedestrian improvements</td>
</tr>
<tr>
<td>2020</td>
<td>CNTY83</td>
<td>San Diego County</td>
<td>SR 67/ Highland/Dye Intersection</td>
<td>From SR 67 to 1,000 feet SE of SR 67 – in Ramona, intersection widening (double left turn lanes on Dye/Highland and double through lanes with dedicated right turn lanes on SR 67), signal modification with bicycle and pedestrian improvements, and associated improvements</td>
</tr>
<tr>
<td>2020</td>
<td>ESC02A</td>
<td>Escondido</td>
<td>East Valley/Valley Center</td>
<td>Widen roadway from 4 to 6 lanes with raised medians and left turn pockets; modify signal at Lake Wohlford and Valley Center Rd; widen bridge over Escondido Creek</td>
</tr>
<tr>
<td>2020</td>
<td>ESC04</td>
<td>Escondido</td>
<td>Citracado Parkway II</td>
<td>West Valley to Harmony Grove, widen from 2 to 4 lanes with raised medians; construct bridge over Escondido Creek</td>
</tr>
<tr>
<td>Year Built By</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
<td>Project Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
<td>-------------</td>
<td>---------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>2020</td>
<td>ESC06</td>
<td>Escondido</td>
<td>El Norte Pkwy Bridge at Escondido Creek - Kaile Ln to Key Lime Way</td>
<td>Construct missing 2-lane bridge at Escondido Creek</td>
</tr>
<tr>
<td>2020</td>
<td>ESC08</td>
<td>Escondido</td>
<td>Felicita Ave/Juniper St - from Escondido Blvd to Juniper St and from Juniper St to Chestnut St</td>
<td>Widen from 2 to 4 lanes with left turn pockets, raised medians on Felicita; new traffic signals at Juniper and Chestnut, Juniper and 13th Ave, Juniper and 15th Ave; modify traffic signal at Juniper and Felicita</td>
</tr>
<tr>
<td>2020</td>
<td>ESC09</td>
<td>Escondido</td>
<td>Ninth Ave – La Terraza Blvd to Spruce St</td>
<td>Widen from 2 to 4 lanes with raised median and modify traffic signals at Ninth Ave and Tulip St - design phase</td>
</tr>
<tr>
<td>2020</td>
<td>ESC24</td>
<td>Escondido</td>
<td>Centre City Pkwy</td>
<td>Mission Rd to SR 78, widen 4 lanes to 6 lanes with intersection improvements</td>
</tr>
<tr>
<td>2020</td>
<td>LG13</td>
<td>Lemon Grove</td>
<td>Lemon Grove Ave Realignment Project</td>
<td>Lemon Grove Ave at SR 94 - a key project in the redevelopment of the city’s downtown Village Specific Plan, this project will realign Lemon Grove Ave at SR 94 adding traffic lanes and improving access to and from SR 94, reducing motorist delays and emissions</td>
</tr>
<tr>
<td>2020</td>
<td>NC01</td>
<td>National City</td>
<td>Plaza Blvd Widening</td>
<td>Plaza Blvd from Highland Ave to Euclid Ave, widen from 2 to 3 lanes including a new traffic lane in each direction, new sidewalks, sidewalk widening, traffic signal upgrades, and interconnection at Plaza Blvd</td>
</tr>
<tr>
<td>2020</td>
<td>O06</td>
<td>Oceanside</td>
<td>Melrose Dr Extension</td>
<td>Melrose Dr from North Santa Fe Ave to Spur Ave - in Oceanside, future construction of Melrose Dr; 4-lane arterial highway with medians, sidewalks, and bike lanes between North Santa Fe Ave and Spur Ave</td>
</tr>
<tr>
<td>2020</td>
<td>O22</td>
<td>Oceanside</td>
<td>College Blvd - Vista Way to Old Grove Rd</td>
<td>Widen from the existing 4 lanes to 6 lanes with bike lanes and raised median</td>
</tr>
<tr>
<td>2020</td>
<td>SD32</td>
<td>San Diego</td>
<td>Carroll Canyon Rd</td>
<td>Carroll Canyon Rd from Scranton Rd to I-805: extend Carroll Canyon under I-805 including improvements to on/off ramps</td>
</tr>
<tr>
<td>2020</td>
<td>SD34</td>
<td>San Diego</td>
<td>El Camino Real</td>
<td>In San Diego on El Camino Real from San Dieguito Rd to Via de la Valle, reconstruct and widen from 2 to 4 lanes and extend transition lane and additional grading to avoid biological impacts (CIP 52-479.0)</td>
</tr>
<tr>
<td>2020</td>
<td>SD70</td>
<td>San Diego</td>
<td>West Mission Bay Dr Bridge</td>
<td>In San Diego, replace bridge and increase from 4- to 6-lane bridge including Class II bike lane (CIP 52-643.0/S00871)</td>
</tr>
<tr>
<td>Year Built By</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
<td>Project Description</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------</td>
<td>-------------</td>
<td>---------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>2020</td>
<td>SD83</td>
<td>San Diego</td>
<td>SR 163/Friars Rd Interchange</td>
<td>Friars Rd from Avenida de las Tiendas to Mission Center Rd, widen and improve Friars Rd and overcrossing; reconstruct interchange including improvements to ramp intersections (Phase I). Construct new connector roadways and structures (Phase II). Construct auxiliary lanes along northbound and southbound SR 163 (Phase III).</td>
</tr>
<tr>
<td>2020</td>
<td>SD90</td>
<td>San Diego</td>
<td>SR 163/Clairemont Mesa Blvd Interchange</td>
<td>From Kearny Villa Rd to Kearny Mesa - in San Diego, widen from 4- to 6-lane prime arterial; Phase II of the project - west ramps</td>
</tr>
<tr>
<td>2020</td>
<td>SD102A</td>
<td>San Diego</td>
<td>Otay Truck Route Widening</td>
<td>On Otay Truck Route in San Diego from Drucker Ln to La Media, add one lane (total 3 lanes) for trucks; from Britannia to La Media, add one lane for trucks and one lane for emergency vehicles (border patrol/fire department access); along Britannia from Britannia Court to the Otay Truck Route - add one lane for trucks</td>
</tr>
<tr>
<td>2020</td>
<td>SD103</td>
<td>San Diego</td>
<td>I-5/Genesee Ave Interchange</td>
<td>Replace Genesee Ave over-crossing from 4-lane bridge with 6-lane bridge; construct auxiliary lanes and replace Voigt Dr bridge; add additional lane at on/off ramp to Sorrento Valley Rd; add one carpool lane and one general purpose lane to on-ramp from Sorrento Valley Rd to southbound I-5; install ramp meters at on-ramp and construct a southbound auxiliary lane between Sorrento Valley Rd and Genesee Ave</td>
</tr>
<tr>
<td>2020</td>
<td>SD189</td>
<td>San Diego</td>
<td>Sea World Dr Widening and I-5 Interchange Improvements</td>
<td>Replace existing 4-lane bridge with an 8-lane bridge with new on/off ramps; widen approach-ways to add right turn lanes to improve access to I-5 (CIP 52-706.0)</td>
</tr>
<tr>
<td>2020</td>
<td>SD190</td>
<td>San Diego</td>
<td>Palm Ave/I-805 Interchange</td>
<td>Improvements to the Palm Avenue Bridge over I-805; repairs to the bridge approaches; a new Project Study Report (PSR) and Preliminary Environmental Assessment Report (PEAR). Phase II will include widening of the bridge, realignment of existing ramps, possible addition of northbound looping entrance ramp, restripping of traffic lanes, and signal modifications.</td>
</tr>
<tr>
<td>2020</td>
<td>SM19</td>
<td>San Marcos</td>
<td>Grand Ave Bridge and Street Improvements</td>
<td>From Discovery St to San Marcos Blvd, construct 4-lane arterial bridge and a 6-lane arterial street from Craven to Grand Ave</td>
</tr>
<tr>
<td>2020</td>
<td>SM22</td>
<td>San Marcos</td>
<td>South Santa Fe - Bosstick to Smilax</td>
<td>From Bosstick to Smilax, realign and signalize the South Santa Fe/Smilax intersection (Phase I)</td>
</tr>
<tr>
<td>2020</td>
<td>SM24</td>
<td>San Marcos</td>
<td>Woodland Pkwy Interchange Improvements</td>
<td>From La Moree Rd to Rancheros Dr, modify existing ramps at Woodland Pkwy and Barham Dr; widen and realign SR 78 undercrossing and associated work</td>
</tr>
<tr>
<td>Year</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
<td>Project Description</td>
</tr>
<tr>
<td>------</td>
<td>------------</td>
<td>-------------</td>
<td>---------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>2020</td>
<td>SM31</td>
<td>San Marcos</td>
<td>Discovery St Improvements</td>
<td>From Via Vera Cruz to Bent Ave/Craven Rd, widen roadway to 4-lane secondary arterial</td>
</tr>
<tr>
<td>2020</td>
<td>SM32</td>
<td>San Marcos</td>
<td>Via Vera Cruz Bridge and Street Improvements</td>
<td>From San Marcos Blvd to Discovery St, widen to 4-lane secondary arterial and construct a bridge at San Marcos Creek</td>
</tr>
<tr>
<td>2020</td>
<td>SM42</td>
<td>San Marcos</td>
<td>Street Improvements: Discovery St - Craven Rd to West of Twin Oaks Valley Rd</td>
<td>In the City of San Marcos, on Discovery St from Craven Rd to west of Twin Oaks Valley Rd, construct approximately 5,100 lineal feet of a new 6-lane roadway</td>
</tr>
<tr>
<td>2020</td>
<td>SM43</td>
<td>San Marcos</td>
<td>Street Improvements and Widening on Barham Dr</td>
<td>Twin Oaks Valley Rd to La Moree Rd in the City of San Marcos, on Barham Dr between Twin Oaks Valley Rd and La Moree Rd, widen and reconstruct the north side of Barham Dr to a 6-lane prime arterial and associated work</td>
</tr>
<tr>
<td>2020</td>
<td>SM48</td>
<td>San Marcos</td>
<td>Creekside Dr</td>
<td>Construct approximately 3,000 feet of a 2-lane collector road from Via Vera Cruz to Grand Ave in the City of San Marcos. The road will include two 12-foot lanes, diagonal parking on the north side, and parallel parking on the south side. In addition, the project also will include a 10-foot bike trail meandering along the south side.</td>
</tr>
<tr>
<td>2020</td>
<td>SM55</td>
<td>San Marcos</td>
<td>Borden Rd Widening and Improvements</td>
<td>Borden Rd from Vineyard to Richland, widening of Borden Rd will add an additional roadway capacity to accommodate increase in traffic volumes</td>
</tr>
<tr>
<td>2035</td>
<td>CB34</td>
<td>Carlsbad</td>
<td>Palomar Airport Rd - Palomar Airport Rd to Paseo Del Norte</td>
<td>Widening along eastbound Palomar Airport Rd to provide a dedicated right turn lane to southbound Paseo Del Norte</td>
</tr>
<tr>
<td>2035</td>
<td>CNTY34</td>
<td>San Diego County</td>
<td>Dye Rd Extension</td>
<td>Dye Rd to San Vicente Rd - in Ramona, study, design, and construct a 2-lane community collector road with intermittent turn lanes, bike lanes, curb, gutter, and pathway/walkway</td>
</tr>
<tr>
<td>2035</td>
<td>CNTY35</td>
<td>San Diego County</td>
<td>Ramona St Extension</td>
<td>From Boundary Ave to Warnock Dr - in the community of Ramona, construct new road extension, 2 lanes with intermittent turn lanes, bike lanes, and walkway/pathway</td>
</tr>
<tr>
<td>2035</td>
<td>CNTY88</td>
<td></td>
<td>Ashwood Street Corridor Improvements – Mapleview to Willow</td>
<td>Ashwood Street/Wildcat Canyon Road from Mapleview Street to 1100 feet north of Willow Road in Lakeside- traffic signal improvements at Mapleview and Ashwood; traffic signal installation at Willow and Ashwood/Wildcat Canyon; and the addition of turn lanes, addition of a passing lane in a non-urbanized area, bike lanes, and pedestrian facilities.</td>
</tr>
</tbody>
</table>
### Table A.3 (continued)
#### Phased Revenue Constrained Arterial Projects

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

1. The arterials listed in this table reflect locally initiated projects that were submitted by local jurisdictions in the 2014 Regional Transportation Improvement Program.
### Table A.4
**Revenue Constrained Freight and Goods Movement Projects**

#### Rail Facilities (Shared Use Freight and Passengers)

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

**Subtotal**  
$4,598  
$8,148

#### Managed Lanes / Toll Lanes

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

<table>
<thead>
<tr>
<th>Freeway</th>
<th>From</th>
<th>To</th>
<th>Existing</th>
<th>With Improvements</th>
<th>Transit Route</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-15</td>
<td>SR 78</td>
<td>Riverside County</td>
<td>8F</td>
<td>8F + 4T</td>
<td>610</td>
<td>$1,029</td>
<td>$2,555</td>
</tr>
<tr>
<td>SR 52</td>
<td>I-805</td>
<td>I-15</td>
<td>6F</td>
<td>6F + 2ML</td>
<td>653, 870, 890</td>
<td>$91</td>
<td>$181</td>
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<tr>
<td>SR 52</td>
<td>I-15</td>
<td>SR 125</td>
<td>4F/6F</td>
<td>4F/6F + 2ML(R)</td>
<td>870, 890</td>
<td>$298</td>
<td>$662</td>
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<tr>
<td>SR 54</td>
<td>I-5</td>
<td>SR 125</td>
<td>6F</td>
<td>6F + 2ML</td>
<td></td>
<td>$111</td>
<td>$276</td>
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<tr>
<td>SR 78</td>
<td>I-5</td>
<td>I-15</td>
<td>6F</td>
<td>6F + 2ML</td>
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<td>$1,192</td>
<td>$1,720</td>
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<tr>
<td>SR 94</td>
<td>I-5</td>
<td>SR 125</td>
<td>8F</td>
<td>8F + 2ML</td>
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<td>$1,478</td>
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<tr>
<td>SR 125</td>
<td>SR 54</td>
<td>SR 94</td>
<td>6F</td>
<td>6F + 2ML</td>
<td></td>
<td>$76</td>
<td>$188</td>
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<tr>
<td>SR 125</td>
<td>SR 94</td>
<td>I-8</td>
<td>8F</td>
<td>10F + 2ML</td>
<td>90</td>
<td>$293</td>
<td>$694</td>
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<tr>
<td>I-805</td>
<td>SR 905</td>
<td>Palomar St</td>
<td>8F</td>
<td>8F + 2ML</td>
<td>688</td>
<td>$343</td>
<td>$595</td>
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<td>I-805</td>
<td>SR 54</td>
<td>SR 94</td>
<td>8F + 2ML</td>
<td>8F + 4ML</td>
<td>225, 650, 688, 689</td>
<td>$704</td>
<td>$1,096</td>
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<tr>
<td>I-805</td>
<td>SR 94</td>
<td>Carroll Canyon Rd</td>
<td>8F</td>
<td>8F + 4ML</td>
<td>30, 225, 650, 653, 688, 690, 690, 870, 890</td>
<td>$2,585</td>
<td>$4,411</td>
</tr>
</tbody>
</table>

**Subtotal** $15,752 $29,101

### Highway Projects

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

**Subtotal** $994 $2,215
### Table A.4 (continued)

#### Revenue Constrained Freight and Goods Movement Projects

#### Operational Improvements

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

#### Freeway Connectors

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

#### Goods Movement

<table>
<thead>
<tr>
<th>Year Built By</th>
<th>Air Cargo System Improvement</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>SDIA Interior Northside Roadway</td>
<td>$4</td>
<td>$4</td>
</tr>
<tr>
<td>2020</td>
<td>SDIA Air Cargo Facility Improvements for cargo storage and handling</td>
<td>$20</td>
<td>$20</td>
</tr>
<tr>
<td></td>
<td><strong>Subtotal</strong></td>
<td>$24</td>
<td>$24</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>$24,276</strong></td>
<td><strong>$45,836</strong></td>
</tr>
</tbody>
</table>
## Table A.5
### Revenue Constrained and Unconstrained Projects

<table>
<thead>
<tr>
<th>Service (Route)</th>
<th>Description</th>
<th>Revenue Constrained Peak/Off-Peak (minutes)</th>
<th>Constrained Capital Cost ($2014); millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSR 598</td>
<td>Commuter Rail Overlay (Temecula to Airport ITC)</td>
<td>NA 15/15</td>
<td>$340</td>
</tr>
<tr>
<td>HSR --</td>
<td>Extension from Airport ITC to San Ysidro/Otay Mesa</td>
<td>NA 15/60</td>
<td>$2,734</td>
</tr>
<tr>
<td>COASTER 398</td>
<td>Double tracking, grade separation at Leucadia Blvd and two other locations, stations/platforms at Convention Center/Gaslamp Quarter and Del Mar Fairgrounds, extension to Convention Center/Gaslamp Quarter and Camp Pendleton, and Del Mar and UTC Tunnels¹</td>
<td>20/60 15/15</td>
<td>$5,786</td>
</tr>
<tr>
<td>COASTER 398</td>
<td>COASTER extension to National City</td>
<td>NA 15/15</td>
<td>$900</td>
</tr>
<tr>
<td>SPRINTER 399</td>
<td>SPRINTER efficiency improvements; double tracking Oceanside to Escondido; includes six rail grade separations at El Camino Real, Melrose Dr, Vista Village Dr/Main St, North Dr, Civic Center, Auto Pkwy and Mission Ave and a Branch Extension to Westfield North County¹</td>
<td>10/10 7.5/7.5</td>
<td>$1,122</td>
</tr>
<tr>
<td>SPRINTER 588</td>
<td>SPRINTER Express</td>
<td>10/15 10/15</td>
<td>$244</td>
</tr>
<tr>
<td>Trolley 510</td>
<td>Mid-Coast Trolley Extension</td>
<td>7.5/7.5 7.5/7.5</td>
<td>$1,753</td>
</tr>
<tr>
<td>Trolley 510</td>
<td>Blue Line/Mid-Coast Frequency Enhancements and rail grade separations at 28th St, 32nd St, E St, H St, Palomar St, Taylor and Ash St, and Blue/Orange Track Connection at 12th/Imperial</td>
<td>7.5/7.5 7.5/7.5</td>
<td>$431</td>
</tr>
<tr>
<td>Trolley 520</td>
<td>Orange Line Frequency Enhancements and four rail grade separations at Euclid Ave, Broadway/Lemon Grove Ave, Allison Ave/University Ave, Severin Dr</td>
<td>7.5/7.5 7.5/7.5</td>
<td>$267</td>
</tr>
<tr>
<td>Trolley 530</td>
<td>Green Line Frequency Enhancements</td>
<td>7.5/7.5 7.5/7.5</td>
<td>$0</td>
</tr>
<tr>
<td>Trolley 522</td>
<td>Orange Line Express - El Cajon to San Diego International Airport ITC (ITC)</td>
<td>NA 10/10</td>
<td>$198</td>
</tr>
<tr>
<td>Trolley 540</td>
<td>Blue Line Express - Santa Fe Depot to San Ysidro via Downtown</td>
<td>NA 10/10</td>
<td>$391</td>
</tr>
<tr>
<td>Trolley 550</td>
<td>SDSU to Palomar Station via East San Diego, Southeast San Diego, National City</td>
<td>NA 7.5/7.5</td>
<td>$1,582</td>
</tr>
<tr>
<td>Trolley 560</td>
<td>SDSU to Downtown San Diego via El Cajon Blvd/Mid-City (transition of Mid-City Rapid to Trolley)</td>
<td>7.5/7.5 7.5/7.5</td>
<td>$2,390</td>
</tr>
<tr>
<td>Trolley 561</td>
<td>UTC COASTER Connection</td>
<td>7.5/7.5 7.5/7.5</td>
<td>$343</td>
</tr>
<tr>
<td>Trolley 561</td>
<td>COASTER Connection to Mira Mesa/Carroll Canyon (extension of Route 510)</td>
<td>NA 7.5/7.5</td>
<td>$824</td>
</tr>
<tr>
<td>Trolley 562</td>
<td>San Ysidro to Carmel Valley via Chula Vista, National City, Southeast San Diego, Mid-City, Mission Valley, and Kearny Mesa</td>
<td>7.5/10 7.5/7.5</td>
<td>$2,967</td>
</tr>
<tr>
<td>Service</td>
<td>Route</td>
<td>Description</td>
<td>Revenue Constrained Peak/Off-Peak (minutes)</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>-------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>Trolley</td>
<td>563</td>
<td>Pacific Beach to El Cajon Transit Center via Balboa and Kearny Mesa</td>
<td>7.5/10</td>
</tr>
<tr>
<td>Trolley</td>
<td>564</td>
<td>Otay Mesa East Border Crossing to Western Chula Vista via Otay Ranch/Millennia</td>
<td>NA</td>
</tr>
<tr>
<td>Trolley</td>
<td>566</td>
<td>Palomar St Trolley Station to Carmel Valley via Mid-City, Kearny Mesa (Route 562 Express)</td>
<td>NA</td>
</tr>
<tr>
<td>Trolley</td>
<td>510, 520, 540, 522 and 560</td>
<td>Downtown Trolley Tunnel</td>
<td>NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>2</td>
<td>North Park to Downtown San Diego via 30th St, Golden Hill</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>10</td>
<td>La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>11</td>
<td>Spring Valley to SDSU via Southeast San Diego, Downtown, Hillcrest, Mid-City</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>28</td>
<td>Point Loma to Kearny Mesa via Old Town, Linda Vista</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>30</td>
<td>Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>41</td>
<td>Fashion Valley to UTC/UC San Diego via Linda Vista and Clairemont</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>90</td>
<td>El Cajon Transit Center to San Diego International Airport ITC via SR 94, City College (peak only)</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>103</td>
<td>Solana Beach to Sabre Springs Rapid station via Carmel Valley</td>
<td>15/15</td>
</tr>
<tr>
<td>Rapid</td>
<td>120</td>
<td>Kearny Mesa to Downtown via Mission Valley</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>225</td>
<td>South Bay Rapid (Otay Mesa to Downtown) and Otay Mesa ITC</td>
<td>15/30</td>
</tr>
<tr>
<td>Rapid</td>
<td>235</td>
<td>Temecula (peak only) Extension of Escondido to Downtown Rapid (formerly Route 610)</td>
<td>10/NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>430</td>
<td>Oceanside to Escondido (peak only)</td>
<td>NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>440</td>
<td>Carlsbad to Escondido Transit Center via Palomar Airport Rd</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>471</td>
<td>Downtown Escondido to East Escondido</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>473</td>
<td>UTC/UC San Diego to Oceanside via Hwy 101 Coastal Communities, Carmel Valley</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>474</td>
<td>Oceanside to Vista via Mission Ave/Santa Fe Road Corridor</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>477</td>
<td>Camp Pendleton to Carlsbad Village via College Blvd, Plaza Camino Real</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>550</td>
<td>SDSU to Palomar Station via East San Diego, Southeast San Diego, National City</td>
<td>10/10</td>
</tr>
<tr>
<td>Service</td>
<td>Route</td>
<td>Description</td>
<td>Revenue Constrained Peak/Off-Peak (minutes)</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>-------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>Rapid</td>
<td>635</td>
<td>Eastlake to Palomar Trolley via Main St Corridor</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>636</td>
<td>SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>637</td>
<td>North Park to 32nd St Trolley via Golden Hill</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>638</td>
<td>Iris Trolley to Otay Mesa via Otay, Airway Dr, SR 905 Corridor</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>639</td>
<td>Iris Trolley Station to North Island via Imperial Beach and Silver Strand, Coronado</td>
<td>NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>640A/640B</td>
<td>Route 640A: I-5 - San Ysidro to Old Town Transit Center via City College 640B: I-5 Iris Trolley/Palomar to Kearny Mesa via Chula Vista, National City and City College</td>
<td>10/15</td>
</tr>
<tr>
<td>Rapid</td>
<td>650</td>
<td>Chula Vista to Palomar Airport Rd Business Park via I-805/I-5 (peak only)</td>
<td>15/NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>652</td>
<td>Downtown to UTC via Kearny Mesa Guideway/ I-805</td>
<td>NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>653</td>
<td>Mid-City to Palomar Airport Rd via Kearny Mesa/ I-805/I-5</td>
<td>15/NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>688/689/690</td>
<td>San Ysidro to Sorrento Mesa via I-805/I-15/SR 52 Corridors; Otay Mesa Port of Entry (POE) to UTC/Torrey Pines via Otay Ranch/Millennia, I-805 Corridor; Mid City to Sorrento Mesa via I-805 Corridor. All Peak Only</td>
<td>15/NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>692</td>
<td>Grossmont Center to Otay Town Center/Millennia via Southwest College, SR125, Spring Valley</td>
<td>NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>709</td>
<td>H St Trolley to Millennia via H St Corridor, Southwestern College</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>870</td>
<td>El Cajon to UTC via Santee, SR 52, I-805</td>
<td>10/NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>890</td>
<td>El Cajon to Sorrento Mesa via SR 52, Kearny Mesa</td>
<td>10/NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>905</td>
<td>Extension of Iris Trolley Station to Otay Mesa Port of Entry (POE) with new service to Otay Mesa East POE and Imperial Beach</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>910</td>
<td>Coronado to Downtown via Coronado Bridge</td>
<td>10/10</td>
</tr>
<tr>
<td>Rapid</td>
<td>940</td>
<td>Oceanside to Sorrento Mesa via I-5, Carlsbad, Encinitas (peak only)</td>
<td>NA</td>
</tr>
<tr>
<td>Rapid</td>
<td>SR 163 DARs</td>
<td>Kearny Mesa to Downtown via SR 163. Stations at Sharp/Children’s Hospital, University Ave, and Fashion Valley Transit Center</td>
<td>✓</td>
</tr>
</tbody>
</table>
### Table A.5 (continued)

#### Revenue Constrained and Unconstrained Projects

**Transit Facilities (continued)**

<table>
<thead>
<tr>
<th>Service</th>
<th>Route</th>
<th>Description</th>
<th>Revenue Constrained Peak/Off-Peak (minutes)</th>
<th>Unconstrained Peak/Off-Peak (minutes)</th>
<th>Unconstrained Capital Cost ($2014); millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shuttle</td>
<td>448/449</td>
<td>San Marcos Shuttle[^3]</td>
<td>10/10</td>
<td>10/10</td>
<td>$0</td>
</tr>
<tr>
<td>Streetcar</td>
<td>552</td>
<td>National City Downtown[^4]</td>
<td>NA</td>
<td>10/10</td>
<td>$41</td>
</tr>
<tr>
<td>Streetcar</td>
<td>553</td>
<td>Downtown San Diego: Little Italy to East Village[^6]</td>
<td>10/10</td>
<td>10/10</td>
<td>$14</td>
</tr>
<tr>
<td>Streetcar</td>
<td>554</td>
<td>Hillcrest/Balboa Park/Downtown San Diego Loop[^4]</td>
<td>10/10</td>
<td>10/10</td>
<td>$29</td>
</tr>
<tr>
<td>Streetcar</td>
<td>555</td>
<td>30th St to Downtown San Diego via North Park/Golden Hill[^4]</td>
<td>10/10</td>
<td>10/10</td>
<td>$26</td>
</tr>
<tr>
<td>Streetcar</td>
<td>558</td>
<td>Escondido Downtown[^4]</td>
<td>NA</td>
<td>10/10</td>
<td>$51</td>
</tr>
<tr>
<td>Streetcar</td>
<td>559</td>
<td>Oceanside Downtown[^4]</td>
<td>NA</td>
<td>10/10</td>
<td>$46</td>
</tr>
<tr>
<td>Streetcar</td>
<td>565</td>
<td>Mission Beach to La Jolla via Pacific Beach[^4]</td>
<td>10/10</td>
<td>10/10</td>
<td>$25</td>
</tr>
<tr>
<td>Airport Express</td>
<td>-</td>
<td>Airport Express Routes[^5]</td>
<td>30/30</td>
<td>30/30</td>
<td>$52</td>
</tr>
<tr>
<td>Local</td>
<td>-</td>
<td>Local Bus Routes - 15 minutes in key corridors</td>
<td>15/15</td>
<td>15/15</td>
<td>NA</td>
</tr>
<tr>
<td>Local</td>
<td>-</td>
<td>Local Bus Routes - 10 minutes in key corridors</td>
<td>10/10</td>
<td>10/10</td>
<td>NA</td>
</tr>
<tr>
<td>ITC</td>
<td>-</td>
<td>San Diego International Airport ITC and I-5 Direct Connector Ramps</td>
<td>✔</td>
<td>✔</td>
<td>$170</td>
</tr>
<tr>
<td>ITC</td>
<td>-</td>
<td>San Ysidro ITC</td>
<td>✔</td>
<td>✔</td>
<td>$118</td>
</tr>
<tr>
<td>ITC</td>
<td>-</td>
<td>Otay Mesa East ITC</td>
<td>NA</td>
<td>✔</td>
<td>$0</td>
</tr>
<tr>
<td>Transit Lanes</td>
<td>SR 15 from I-805 to I-8</td>
<td>Addition of two transit lanes for routes 235, 280/290, 653, and Airport Express Route to the cross-border facility in Otay Mesa</td>
<td>✔</td>
<td>✔</td>
<td>$56</td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>Other Improvements (Vehicles, transit system rehabilitation, maintenance facilities, ITS, regulatory compliance, park and ride, and transit center expansions)</td>
<td>✔</td>
<td>✔</td>
<td>$7,696</td>
</tr>
</tbody>
</table>

Subtotal: $38,690

**Managed Lanes / Toll Lanes / Highway Projects / Operational Improvements**

<table>
<thead>
<tr>
<th>Freeway</th>
<th>From</th>
<th>To</th>
<th>Existing or Planned Phase</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Cost ($2014); millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-5</td>
<td>SR 905</td>
<td>SR 54</td>
<td>8F</td>
<td>8F+2ML</td>
<td>8F+2ML</td>
<td>$308</td>
</tr>
<tr>
<td>I-5</td>
<td>SR 54</td>
<td>SR 15</td>
<td>8F</td>
<td>10F+2ML</td>
<td>10F+2ML</td>
<td>$343</td>
</tr>
</tbody>
</table>
### Table A.5 (continued)

#### Revenue Constrained and Unconstrained Projects

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

<table>
<thead>
<tr>
<th>Freeway</th>
<th>From</th>
<th>To</th>
<th>Existing or Planned Phase</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Cost ($2014) millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-5</td>
<td>I-15</td>
<td>I-8</td>
<td>8F</td>
<td>8F+Operational</td>
<td>8F+Operational</td>
<td>$1,177</td>
</tr>
<tr>
<td>I-5</td>
<td>I-8</td>
<td>La Jolla Village Dr</td>
<td>8F/10F</td>
<td>8F/10F+2ML</td>
<td>8F/10F+2ML</td>
<td>$556</td>
</tr>
<tr>
<td>I-5</td>
<td>La Jolla Village Dr</td>
<td>I-5/805 Merge</td>
<td>8F/14F</td>
<td>8F/14F+2ML</td>
<td>8F/14F+2ML</td>
<td>$206</td>
</tr>
<tr>
<td>I-5</td>
<td>I-5/I-805 Merge</td>
<td>SR 56</td>
<td>8F/14F +2ML</td>
<td>8F/14F+4ML</td>
<td>8F/14F+4ML</td>
<td>$91</td>
</tr>
<tr>
<td>I-5</td>
<td>SR 56</td>
<td>Manchester Ave</td>
<td>8F+2ML</td>
<td>8F+4ML</td>
<td>8F+4ML</td>
<td>$455</td>
</tr>
<tr>
<td>I-5</td>
<td>Manchester Ave</td>
<td>Vandegrift Blvd</td>
<td>8F</td>
<td>8F+4ML</td>
<td>8F+4ML</td>
<td>$2,458</td>
</tr>
<tr>
<td>I-5</td>
<td>Vandegrift Blvd</td>
<td>Orange County</td>
<td>8F</td>
<td>8F+4T</td>
<td>8F+4T</td>
<td>$1,813</td>
</tr>
<tr>
<td>I-8</td>
<td>I-5</td>
<td>SR 125</td>
<td>8F/10F</td>
<td>8F/10F+Operational</td>
<td>8F/10F+Operational</td>
<td>$667</td>
</tr>
<tr>
<td>I-8</td>
<td>SR 125</td>
<td>2nd St</td>
<td>6F/8F</td>
<td>6F/8F+Operational</td>
<td>6F/8F+Operational</td>
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<tr>
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<td>I-8</td>
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<tr>
<td>SR 11/ Oty</td>
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<td>Mexico</td>
<td>--</td>
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<td>4T + POE</td>
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<tr>
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<td>SR 94</td>
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<td>6F+2ML</td>
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<tr>
<td>I-15</td>
<td>Viaduct</td>
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<td>I-15</td>
<td>I-8</td>
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<td>8F+2ML</td>
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<tr>
<td>I-15</td>
<td>Centre City Pkwy</td>
<td>SR 78</td>
<td>8F/10F+4ML</td>
<td>8F/10F+4ML</td>
<td>10F+4ML</td>
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</tr>
<tr>
<td>I-15</td>
<td>SR 78</td>
<td>Riverside County</td>
<td>8F</td>
<td>8F+4T</td>
<td>8F+4T</td>
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<td>I-805</td>
<td>4F</td>
<td>6F</td>
<td>6F</td>
<td>$111</td>
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<tr>
<td>SR 52</td>
<td>I-805</td>
<td>I-15</td>
<td>6F</td>
<td>6F+2ML</td>
<td>6F+2ML</td>
<td>$91</td>
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<tr>
<td>SR 52</td>
<td>I-15</td>
<td>SR 125⁶</td>
<td>6F</td>
<td>6F+2ML(R)</td>
<td>6F+3ML(R)</td>
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<tr>
<td>SR 52</td>
<td>Mast Blvd</td>
<td>SR 125</td>
<td>4F</td>
<td>6F</td>
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<td>$76</td>
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<tr>
<td>SR 52</td>
<td>SR 125</td>
<td>SR 67⁶</td>
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<td>4F</td>
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<td>SR 54</td>
<td>I-5</td>
<td>SR 125⁶</td>
<td>6F</td>
<td>6F+2ML</td>
<td>6F/8F+2ML</td>
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<td>SR 56</td>
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<td>I-15</td>
<td>4F</td>
<td>6F</td>
<td>6F +2ML</td>
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<td>Mapleview St⁶</td>
<td>4F/6F</td>
<td>4F/6F</td>
<td>6F/8F</td>
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<tr>
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<td>2C/4C</td>
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<td>4C</td>
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<td>SR 76</td>
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<td>2C</td>
<td>4C</td>
<td>4C</td>
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<tr>
<td>SR 76</td>
<td>I-15</td>
<td>Couser Canyon</td>
<td>2C/4C</td>
<td>4C/6C+ Operational</td>
<td>4C/6C+ Operational</td>
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Table A.5 (continued)
Revenue Constrained and Unconstrained Projects

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

<table>
<thead>
<tr>
<th>Freeway From</th>
<th>To</th>
<th>Existing or Planned Phase</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Cost ($2014) millions</th>
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<tbody>
<tr>
<td>SR 76 Couser Canyon</td>
<td>SR 79</td>
<td>2C</td>
<td>2C</td>
<td>2C+Operational</td>
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<tr>
<td>SR 78 I-5</td>
<td>I-15</td>
<td>6F</td>
<td>6F+2ML+Operational</td>
<td>6F+2ML+Operational</td>
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<tr>
<td>SR 94 I-5</td>
<td>I-805</td>
<td>8F</td>
<td>8F+2ML</td>
<td>8F+2ML</td>
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<tr>
<td>SR 94 I-805</td>
<td>College Ave</td>
<td>8F</td>
<td>8F+2ML</td>
<td>8F/10F+2ML</td>
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<td>SR 94 College Ave</td>
<td>SR 125</td>
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<td>8F+2ML</td>
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</tr>
<tr>
<td>SR 94 SR 125</td>
<td>Avocado Blvd</td>
<td>4F</td>
<td>6F</td>
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<tr>
<td>SR 94 Avocado Blvd</td>
<td>Jamacha</td>
<td>4C</td>
<td>6C</td>
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<tr>
<td>SR 94 Jamacha</td>
<td>Steele Canyon Rd</td>
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<tr>
<td>SR 125 SR 905</td>
<td>San Miguel Rd</td>
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<td>8F</td>
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<td>4F</td>
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<td>SR 125 SR 94</td>
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<td>10F+2ML</td>
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<td>SR 52</td>
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<tr>
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<td>6F</td>
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</table>

Subtotal $24,222

Managed Lanes Connectors

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<thead>
<tr>
<th>Freeway</th>
<th>Intersecting Freeway</th>
<th>Movement</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Cost ($2014) millions</th>
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</thead>
<tbody>
<tr>
<td>I-5</td>
<td>SR 15</td>
<td>North to North and South to South</td>
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<td>$121</td>
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<td>SR 54</td>
<td>South to East and West to North</td>
<td>✓</td>
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<td>$121</td>
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<td>$177</td>
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<tr>
<td>I-5</td>
<td>SR 56</td>
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<td>✓</td>
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Appendix A :: Transportation Projects, Costs, and Phasing 39
### Table A.5 (continued)
#### Revenue Constrained and Unconstrained Projects

**Managed Lanes Connectors (continued)**

<table>
<thead>
<tr>
<th>Freeway</th>
<th>Intersecting Freeway</th>
<th>Movement</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Cost ($2014) millions</th>
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</thead>
<tbody>
<tr>
<td>I-15</td>
<td>SR 52</td>
<td>West to South and North to East</td>
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<tr>
<td>I-15</td>
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<td>$172</td>
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<td>☑️</td>
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<td>☑️</td>
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<td>SR 125</td>
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<td>☑️</td>
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<tr>
<td>SR 94</td>
<td>SR 125</td>
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<td>☑️</td>
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<td>☑️</td>
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<td>☑️</td>
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<td>☑️</td>
<td>$212</td>
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<table>
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<td>I-5</td>
</tr>
<tr>
<td>I-5</td>
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<tr>
<td>I-5</td>
</tr>
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<tr>
<td>SR 11/</td>
</tr>
<tr>
<td>SR 11/</td>
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</table>
### Table A.5 (continued)

#### Revenue Constrained and Unconstrained Projects

**Goods Movement**

<table>
<thead>
<tr>
<th>Maritime System Improvements</th>
<th>Revenue Constrained</th>
<th>Unconstrained Capital Costs ($2014) millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenth Ave Marine Terminal (TAMT) Marine Cargo Staging and Handling Projects, including but not limited to: enhanced open storage, shed demolition, cargo handling infrastructure improvements, wharf reinforcements, additional crane, on-dock shorepower, improvements to facilitate &quot;marine highway&quot; cargo, and front gate technology enhancements.⁸</td>
<td>✓</td>
<td>$88</td>
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<tr>
<td>TAMT Freight Rail Improvements, including but not limited to: track upgrades and increased staging area for rail cargo and loading⁸</td>
<td>✓</td>
<td>$28</td>
</tr>
<tr>
<td>National City Marine Terminal (NCMT) Marine Cargo Staging and Handling Projects, including but not limited to: construct garages for additional roll-on/roll-off cargo storage, wharf extension to create two new berths, and improvements to facilitate &quot;marine highway&quot; cargo.⁸</td>
<td>✓</td>
<td>$95</td>
</tr>
<tr>
<td>NCMT Freight Rail Improvements, including but not limited to: additional rail storage facilities in the vicinity of the balloon track.⁸</td>
<td>✓</td>
<td>$3</td>
</tr>
<tr>
<td>Harbor Dr Multimodal Corridor Improvements, including but not limited to: improvements at 32nd St and Vesta St; pedestrian crossings and bridges; various truck improvements; bikeway accommodations; streetscape, safety, and parking improvements.⁸</td>
<td>✓</td>
<td>$273</td>
</tr>
</tbody>
</table>

**Rail Mainline Capacity**

| Desert Line Basic Service, Rehabilitation⁹ | ✓                   | $182                                        |

**Rail Intermodal System Improvements**

| Logistics Center Mid County⁸ | ✓                   | $2,130                                      |
| Logistics Center North County⁸ | ✓                   | $166                                        |

**Rail Safety, Tunnels**

| LOSSAN Grade Separations (locations TBD) | ✓                   | $260                                        |

**Pipeline**

| I-15 Access to Kinder Morgan (KM) MV Terminal⁸ | ✓                   | NA                                          |
| KM, New Miramar Junction/Terminal/Tanks⁹ | ✓                   | NA                                          |
| KM Expand to 16 Pipe/Extend to Mexico⁹ | ✓                   | NA                                          |

**Border System Improvements**

| Otay Mesa Southbound Truck Route Improvements⁹ | ✓                   | $35                                         |
| Jacumba Port of Entry (POE)⁹ | ✓                   | NA                                          |
| Otay Mesa Port of Entry Modernization Project⁹ | ✓                   | $63                                         |
### Table A.5 (continued)

#### Revenue Constrained and Unconstrained Projects

**Truck Rest Stop**

<table>
<thead>
<tr>
<th>Maritime System Improvements</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Costs ($2014) millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truck parking at SR 76/I-15&lt;sup&gt;8&lt;/sup&gt;</td>
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<td></td>
<td>$14</td>
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<tr>
<td>Truck staging at border&lt;sup&gt;8&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
<td>$30</td>
</tr>
<tr>
<td>Truck rest stop with restrooms, location TBD&lt;sup&gt;8&lt;/sup&gt;</td>
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<td></td>
<td>NA</td>
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</table>

**Mexican Freight Projects**

<table>
<thead>
<tr>
<th>Project</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Costs ($2014) millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesa de Otay II Port of Entry and Related Roads&lt;sup&gt;8&lt;/sup&gt;</td>
<td>✓</td>
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<td>NA</td>
</tr>
<tr>
<td>Tijuana Intermodal Terminal/Distribution Center&lt;sup&gt;9&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Ensenada Port Expansion&lt;sup&gt;9&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Mexican Rail Yard Bicentennial Multi-modal Center in Tijuana&lt;sup&gt;9&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
<td>NA</td>
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<tr>
<td>Jacumé Port of Entry (POE)&lt;sup&gt;9&lt;/sup&gt;</td>
<td>✓</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Expansion of Tecate Port of Entry Cargo Inspection Facility&lt;sup&gt;9&lt;/sup&gt;</td>
<td>✓</td>
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<tr>
<td>Tijuana-Tecate Rail Line Improvements&lt;sup&gt;9&lt;/sup&gt;</td>
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**Subtotal** $3,387

**Active Transportation Projects**<sup>10</sup>

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<th>Jurisdiction(s)</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Cost ($2014) millions</th>
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</thead>
<tbody>
<tr>
<td>Uptown - Fashion Valley to Downtown San Diego</td>
<td>San Diego</td>
<td>✓</td>
<td>✓</td>
<td>$23.0</td>
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<tr>
<td>Uptown - Old Town to Hillcrest</td>
<td>San Diego</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Uptown - Hillcrest to Balboa Park</td>
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<td>✓</td>
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<tr>
<td>North Park - Mid-City - Hillcrest to Kensington</td>
<td>San Diego</td>
<td>✓</td>
<td>✓</td>
<td>$6.0</td>
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<tr>
<td>North Park - Mid-City - Hillcrest to City Heights (Hillcrest-EI Cajon Corridor)</td>
<td>San Diego</td>
<td>✓</td>
<td>✓</td>
<td>$6.0</td>
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<tr>
<td>North Park - Mid-City - City Heights</td>
<td>San Diego</td>
<td>✓</td>
<td>✓</td>
<td>$3.0</td>
</tr>
<tr>
<td>North Park - Mid-City - Hillcrest to City Heights (City Heights - Old Town Corridor)</td>
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<td>✓</td>
<td>✓</td>
<td>$5.0</td>
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<tr>
<td>North Park - Mid-City - City Heights to Rolando</td>
<td>San Diego</td>
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<td>✓</td>
<td>$4.0</td>
</tr>
<tr>
<td>San Diego River Trail - Qualcomm Stadium</td>
<td>San Diego</td>
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<td>✓</td>
<td>$0.8</td>
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<tr>
<td>Coastal Rail Trail San Diego - Rose Creek</td>
<td>San Diego</td>
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<td>✓</td>
<td>$21.0</td>
</tr>
<tr>
<td>Bayshore Bikeway - Main St to Palomar</td>
<td>Chula Vista/Imperial Beach</td>
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<td>✓</td>
<td>$3.0</td>
</tr>
<tr>
<td>Coastal Rail Trail Encinitas - Chesterfield to G St</td>
<td>Encinitas</td>
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<td>Coastal Rail Trail Encinitas - Chesterfield to Solana Beach</td>
<td>Encinitas</td>
<td>✓</td>
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<td>$0.2</td>
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</table>
### Table A.5 (continued)

**Revenue Constrained and Unconstrained Projects**

#### Active Transportation Projects (continued)

<table>
<thead>
<tr>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Cost ($2014) millions</th>
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<tr>
<td>Inland Rail Trail (combination of four projects)</td>
<td>San Marcos, Vista, Co. of San Diego</td>
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<td>National City</td>
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<td>✓</td>
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<td>Bayshore Bikeway - National City Marina to 32nd St</td>
<td>San Diego/National City</td>
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<td>✓</td>
<td>$2.0</td>
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<td>I-15 Mid-City - Adams Ave to Camino Del Rio S</td>
<td>San Diego</td>
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<td>✓</td>
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</tr>
<tr>
<td>Pershing and El Prado - North Park to Downtown San Diego</td>
<td>San Diego</td>
<td>✓</td>
<td>✓</td>
<td>$7.0</td>
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<tr>
<td>Pershing and El Prado - Cross-Park</td>
<td>San Diego</td>
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<td>✓</td>
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<td>San Ysidro to Imperial Beach - Bayshore Bikeway Connection</td>
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<td>Terrace Dr/Central Ave - Adams to Wightman</td>
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<td>San Diego River Trail – I-805 to Fenton</td>
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<td>San Diego River Trail - Short gap connections</td>
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<td>Bayshore Bikeway - Barrio Logan</td>
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<td>✓</td>
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<td>San Diego River Trail - Father Junipero Serra Trail to Santee</td>
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<td>$10.0</td>
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<td>Downtown to Southeast connections</td>
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<tr>
<td>Coastal Rail Trail San Diego - Rose Canyon</td>
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<td>Coastal Rail Trail San Diego - Pac Hwy (W Washington St to Laurel St)</td>
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<td>Coastal Rail Trail San Diego - Pac Hwy (Laurel St to Santa Fe Depot)</td>
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<tr>
<td>Coastal Rail Trail San Diego – Pac Hwy (Taylor St to W Washington St)</td>
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<td>Coastal Rail Trail San Diego- Pac Hwy (Fiesta Island Rd to Taylor St)</td>
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<td>City Heights /Encanto/Lemon Grove</td>
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<td>City Heights/Fairmount Corridor</td>
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<td>Rolando to Grossmont/La Mesa</td>
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<td>Project</td>
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<td>Revenue Constrained</td>
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<td>Unconstrained Capital Cost ($2014) millions</td>
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<td>------------------------------------------------------------------------</td>
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<td>San Diego River Trail - Qualcomm Stadium to Ward Rd</td>
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<tr>
<td>San Diego River Trail - Rancho Mission Rd to Camino Del Rio North</td>
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<tr>
<td>Coastal Rail Trail San Diego - Rose Creek Mission Bay Connection</td>
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<td>✓</td>
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<td>Coastal Rail Trail Carlsbad - Reach 5 Palomar Airport Rd to Poinsettia Station</td>
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<td>Coastal Rail Trail Del Mar</td>
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<td>✓</td>
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<tr>
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<td>✓</td>
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<td>Coastal Rail Trail San Diego - Roselle Canyon</td>
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<td>Pacific Beach to Mission Beach</td>
<td>San Diego</td>
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<td>Ocean Beach to Mission Bay</td>
<td>San Diego</td>
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<td>✓</td>
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<td>✓</td>
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<tr>
<td>I-8 Flyover - Camino del Rio S to Camino del Rio N</td>
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<td>Coastal Rail Trail Oceanside - Broadway to Eaton</td>
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<td>El Cajon - Santee connections</td>
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<td>✓</td>
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<tr>
<td>San Diego River Trail - Father Junipero Serra Trail to West Hills Parkway</td>
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<td>✓</td>
<td>$3.0</td>
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<td>Inland Rail Trail Oceanside</td>
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<td>✓</td>
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<td>Coastal Rail Trail Carlsbad - Reach 3 Tamarack to Cannon</td>
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<td>Clairemont Dr (Mission Bay to Burgener)</td>
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<td>✓</td>
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<tr>
<td>Harbor Dr (Downtown to Ocean Beach)</td>
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<tr>
<td>Mira Mesa Bike Blvd</td>
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<td>✓</td>
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</table>
Table A.5 (continued)
Revenue Constrained and Unconstrained Projects

Active Transportation Projects (continued)

<table>
<thead>
<tr>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Cost ($2014) millions</th>
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<tr>
<td>Sweetwater River Bikeway Ramps</td>
<td>National City</td>
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<td>✓</td>
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<tr>
<td>Coastal Rail Trail Oceanside - Alta Loma Marsh bridge</td>
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<td>Coastal Rail Trail San Diego - Mission Bay (Clairemont to Tecolote)</td>
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<td>✓</td>
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<td>Bayshore Bikeway Coronado - Golf course adjacent</td>
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<td>✓</td>
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<tr>
<td>San Luis Rey River Trail</td>
<td>Oceanside, Unincorporated</td>
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<tr>
<td>Encinitas-San Marcos Corridor – Double Peak Dr to San Marcos Blvd</td>
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<td>✓</td>
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<tr>
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<td>✓</td>
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<tr>
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<td>Escondido Creek Bikeway – El Norte Pkwy to northern bikeway terminus</td>
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<tr>
<td>Encinitas to San Marcos Corridor – Leucadia Blvd to El Camino Real</td>
<td>Carlsbad, Encinitas</td>
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<td>✓</td>
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<tr>
<td>I-15 Bikeway – Via Rancho Pkwy to Lost Oak Ln</td>
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<td>✓</td>
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<td>I-15 Bikeway – Rancho Bernardo Community Park to Lake Hodges Bridge</td>
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<td>✓</td>
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<tr>
<td>I-15 Bikeway – Camino del Norte to Aguamiel Rd</td>
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<td>✓</td>
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<tr>
<td>I-15 Bikeway – Poway Rd interchange to Carmel Mountain Rd</td>
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<td>✓</td>
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<tr>
<td>SR 56 Bikeway – Azuaga St to Rancho Penasquitos Blvd</td>
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<td>I-15 Bikeway – Murphy Canyon Rd to Affinity Ct</td>
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<td>SR 52 Bikeway – I-5 to Santo Rd</td>
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<td>✓</td>
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<td>SR 52 Bikeway – SR 52/Mast Dr to San Diego River Trail</td>
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<td>✓</td>
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<tr>
<td>I-8 Corridor – San Diego River Trail to Riverside Dr</td>
<td>Unincorporated</td>
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<td>✓</td>
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<tr>
<td>I-805 Connector – Bonita Rd to Floyd Ave</td>
<td>Chula Vista, Unincorporated</td>
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<td>✓</td>
<td>$6.0</td>
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<tr>
<td>SR 125 Connector – Bonita Rd to U.S.-Mexico Border</td>
<td>Chula Vista, San Diego</td>
<td>✓</td>
<td>✓</td>
<td>$39.0</td>
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<tr>
<td>SR 905 Connector – E Beyer Blvd to U.S.-Mexico Border</td>
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<td>El Camino Real Bike Lanes – Douglas Dr to Mesa Dr</td>
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<tr>
<td>Vista Way Connector from Arcadia</td>
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<td>Project</td>
<td>Jurisdiction(s)</td>
<td>Revenue Constrained</td>
<td>Unconstrained</td>
<td>Unconstrained Capital Cost ($2014) millions</td>
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<tr>
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<tr>
<td>El Camino Real Bike Lanes – Marron Rd to SR 78 offramp</td>
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<td>✓</td>
<td>✓</td>
<td>$0.3</td>
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<tr>
<td>Carlsbad to San Marcos Corridor – Paseo del Norte to Avenida Encinas</td>
<td>Carlsbad</td>
<td>✓</td>
<td>✓</td>
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<td>Encinitas to San Marcos Corridor – Kristen Ct to Ecke Ranch Rd</td>
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<td>Encinitas to San Marcos Corridor – Encinitas Blvd/I-5 Interchange</td>
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<td>✓</td>
<td>$0.2</td>
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<tr>
<td>Mira Mesa Corridor – Reagan Rd to Parkdale Ave</td>
<td>San Diego</td>
<td>✓</td>
<td>✓</td>
<td>$0.4</td>
</tr>
<tr>
<td>Mira Mesa Corridor – Scranton Rd to I-805</td>
<td>San Diego</td>
<td>✓</td>
<td>✓</td>
<td>$0.4</td>
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<tr>
<td>Mira Mesa Corridor – Sorrento Valley Rd to Sorrento Valley Blvd</td>
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<td>✓</td>
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<td>Mid-County Bikeway – I-5/Via de la Valle Interchange</td>
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<td>✓</td>
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<td>Mid-County Bikeway – Manchester Ave/I-5 Interchange to San Elijo Ave</td>
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<td>✓</td>
<td>$2.0</td>
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<td>Clairemont – Centre-City Corridor – Coastal Rail Trail to Genesee Ave</td>
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<td>✓</td>
<td>$2.0</td>
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<td>$0.3</td>
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<td>SR 125 Corridor – Prospect Ave to Weld Blvd</td>
<td>Santee, El Cajon</td>
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<td>✓</td>
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<td>I-8 Corridor – Lakeside Ave to SR 67</td>
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<td>E County Northern Loop – N Marshall Ave to El Cajon Blvd</td>
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<td>✓</td>
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<td>E County Southern Loop – Pointe Pkwy To Omega St</td>
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### Table A.5 (continued)

#### Revenue Constrained and Unconstrained Projects

##### Active Transportation Projects (continued)

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<tr>
<th>Project</th>
<th>Jurisdiction(s)</th>
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<th>Unconstrained Capital Cost ($2014) millions</th>
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<tr>
<td>Mid-County Bikeway – San Elijo Ave to 101 Terminus</td>
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<td>Bay to Ranch Bikeway – E J St from 2nd Ave to Paseo Del Rey</td>
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##### Active Transportation Retrofits - Safe Routes to Transit at Existing Stations

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<th>Jurisdiction(s)</th>
<th>Revenue Constrained</th>
<th>Unconstrained Capital Cost ($2014) millions</th>
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<td>El Camino Real at Cannon/College</td>
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<td>Carlsbad Village COASTER Station</td>
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<tr>
<td>E St Trolley Station</td>
<td>Chula Vista</td>
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<tr>
<td>Old Highway 80 between El Cajon and Alpine</td>
<td>County - Fallbrook</td>
<td>✓</td>
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<tr>
<td>Fallbrook High School</td>
<td>County - Fallbrook</td>
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### Table A.5 (continued)

#### Revenue Constrained and Unconstrained Projects

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

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<thead>
<tr>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Revenue Constrained</th>
<th>Unconstrained Capital Cost (2014) millions</th>
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<td>Jamacha Blvd at Lamplighter Village Dr</td>
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<td>SB Sweetwater Rd at Troy St</td>
<td>County - Spring Valley</td>
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<td>Sweetwater Rd between Jamacha Blvd and Broadway</td>
<td>County - Spring Valley</td>
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<td>Buena Creek SPRINTER Station</td>
<td>County of San Diego</td>
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<td>Encinitas COASTER Station</td>
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<td>Del Lago Transit Station</td>
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<td>Amaya Trolley Station</td>
<td>La Mesa</td>
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<td>70th St Trolley Station</td>
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<td>National City Blvd and E 32nd St/W 33rd St</td>
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<td>El Camino Real SPRINTER Station</td>
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<tr>
<td>Rancho Del Oro SPRINTER Station</td>
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<td>College Blvd SPRINTER Station</td>
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<td>Oceanside High School</td>
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<td>San Luis Rey Transit Center</td>
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<td>32nd and Commercial Trolley Station</td>
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<td>Alvarado Trolley Station</td>
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<td>70th St between El Cajon Blvd and Alvarado Rd</td>
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<td>12th and Imperial Transit Center</td>
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<td>Harbor Dr Pedestrian Bridge</td>
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<td>Project</td>
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<td>Revenue Constrained</td>
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<tr>
<td>Pacific Fleet Trolley Station</td>
<td>San Diego - Harborside</td>
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<td>Washington St at Hancock St/I-5 Overcrossing</td>
<td>San Diego - Mission Hills</td>
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<td>WB Hotel Circle S. at Bachman Pl</td>
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<td>Fenton Parkway Trolley Station</td>
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<td>Grantville Trolley Station</td>
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<td>Morena/Linda Vista Trolley Station</td>
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<td>54th St between Euclid Ave and Chollas Pkwy</td>
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<td>EB Airway Rd at Dublin Dr</td>
<td>San Diego - Otay Mesa</td>
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<tr>
<td>EB Airway Rd at Excellante St (Southwestern College)</td>
<td>San Diego - Otay Mesa</td>
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<tr>
<td>La Media Rd at Airway Rd</td>
<td>San Diego - Otay Mesa</td>
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<tr>
<td>WB Siempre Vida Rd at La Media Rd</td>
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<td>NB S. Vista Ave at Beyer Blvd Trolley Station</td>
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<td>Calle Primera between Willow Rd and Via de San Ysidro</td>
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<td>Sorrento Valley COASTER Station</td>
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<td>SB Gilman Dr at Villa La Jolla Dr</td>
<td>San Diego - University City</td>
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<td>EB Eastgate Mall between I-805 and Miramar Rd</td>
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<td>San Marcos Civic Center SPRINTER Station</td>
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<td>Cal State San Marcos SPRINTER Station</td>
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<td>Rancheros Dr/State Department of Rehabilitation</td>
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### Table A.5 (continued)

#### Revenue Constrained and Unconstrained Projects

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<thead>
<tr>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Revenue Constrained</th>
<th>Unconstrained</th>
<th>Unconstrained Capital Cost ($2014) millions</th>
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<tr>
<td>Civic Center-Vista SPRINTER Station</td>
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<td>✓</td>
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<tr>
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<td><strong>Subtotal</strong></td>
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#### Active Transportation Retrofits - Bicycle/Pedestrian Improvements at Freeway Interchanges

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<th>Unconstrained Capital Cost ($2014) millions</th>
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<td>West Mission Bay Dr at I-8</td>
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### Table A.5 (continued)

#### Revenue Constrained and Unconstrained Projects

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

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<tr>
<th>Project</th>
<th>Jurisdiction(s)</th>
<th>Revenue Constrained</th>
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<th>Unconstrained Capital Cost ($2014) millions</th>
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<td>Winter Gardens Blvd at SR 67</td>
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<td>Riverford Rd at SR 67</td>
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<td>Bradley Ave at SR 67</td>
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<tr>
<td>Tavern Rd at I-8</td>
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<td>Willows Rd at I-8</td>
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<tr>
<td>Japatul Valley Rd at I-8</td>
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<td>Sunrise Highway at I-8</td>
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<td>Pine Valley Rd at I-8</td>
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<td>Buckman Springs Rd at I-8</td>
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<td></td>
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<tr>
<td>Prospect Ave at SR 67</td>
<td>Santee</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

**Subtotal** $56,121

**TOTAL** $74,217

---

1. Unconstrained rail facilities (shared use freight and passengers)
2. Rapid Route 550 appeared only as a Trolley route in the Unconstrained Network
3. Capital cost to be funded by the City of San Marcos
4. Streetcar cost is representative of 10 percent of the total capital cost
5. Implementation of these services is dependent upon funding from aviation and other private sources
6. Unconstrained Managed Lanes/Highway improvements (shared use freight and passengers)
7. Unconstrained Freeway Connectors improvements (shared use freight and passengers)
8. Projects that require innovative financing strategies which require development with multiple parties
9. Projects of interest to SANDAG; to be financed by other parties
10. Figure A.9 includes Regional Bicycle Network segments built by others; such segments are not included in Table A.5.
11. The subtotal reflects estimated Safe Routes to Transit Retrofit project costs ranging from $186,000 to $7.5 million per stop area or station area
12. The subtotal reflects estimated Freeway Interchange Retrofit project costs ranging from $500,000 to $3 million per interchange
### Table A.6
**No-Build Projects**

#### Transit Services

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

#### Managed Lanes / Highway Projects

<table>
<thead>
<tr>
<th>Segment</th>
<th>From</th>
<th>To</th>
<th>Improvement</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-805</td>
<td>SR 52</td>
<td>Carroll Canyon Rd</td>
<td>+2ML</td>
<td>Under construction</td>
</tr>
<tr>
<td>SR 11 (Phase I)</td>
<td>SR 125</td>
<td>Enrico Fermi Dr</td>
<td>+4T</td>
<td>Under construction</td>
</tr>
<tr>
<td>SR 15</td>
<td>I-805</td>
<td>I-8</td>
<td>+2TL</td>
<td>Under construction</td>
</tr>
<tr>
<td>SR 76</td>
<td>Mission Rd</td>
<td>I-15</td>
<td>+2C</td>
<td>Under construction</td>
</tr>
</tbody>
</table>

#### Tables A.1 – A.6 Legend

- **BNSF** = Burlington Northern Santa Fe Railway
- **POE** = Port of Entry
- **Const.** = Construction
- **R** = Reversible
- **C** = Conventional Highway
- **ROW** = Right-of-Way
- **DAR** = Direct Access Ramp
- **SDIV** = San Diego and Imperial Valley Railroad
- **Eng.** = Engineering
- **T** = Toll Lanes
- **F** = Freeway Lanes
- **TL** = Transit Lanes
- **ML** = Managed Lanes
Figure A.1
2020 Revenue Constrained Transit Network
October 2015

- COASTER/AMTRAK/Metrolink
- Trolley/SPRINTER
- Rapid Transit
- Shuttle
- Airport Express
- Local Bus
- San Diego-Coronado Ferry
- Intermodal Transit Center
- Safe Routes to Transit
Figure A.2
2035 Revenue Constrained Transit Network
October 2015

- COASTER/AMTRAK/Metrolink
- Trolley/SPRINTER
- Rapid Transit
- Streetcar/Shuttle
- Airport Express
- Local Bus
- San Diego-Coronado Ferry
- Intermodal Transit Center
- Safe Routes to Transit

MILES
KILOMETERS
Figure A.3
2050 Revenue Constrained Transit Network
October 2015

- High Speed Rail
- COASTER/AMTRAK/Metrolink
- Trolley/SPRINTER
- SPRINT Express
- Rapid Transit
- Streetcar/Shuttle
- Airport Express
- Local Bus
- San Diego-Coronado Ferry

Intermodal Transit Center
Safe Routes to Transit

Map Area
San Diego Region

Appendix A :: Transportation Projects, Costs, and Phasing
Figure A.4
2020 Revenue Constrained Managed Lanes and Highway Network
October 2015

- Existing Managed Lanes
- Managed Lanes
- General Purpose Lanes
- Toll Lanes
- Existing Facility
- Bicycle/Pedestrian Improvements at Freeway Interchanges

C = Conventional Highway
F = Freeway
ML = Managed Lanes
T = Toll Lanes

MILES 0 1 2 3 4 5 6
KILOMETERS 0 1 2 3 4 5 6

SANDAG

San Diego Forward: The Regional Plan
Figure A.5

2035 Revenue Constrained Managed Lanes and Highway Network
October 2015

- Existing Managed Lanes
- Managed Lanes
- General Purpose Lanes
- Toll Lanes
- Existing Facility
- Bicycle/Pedestrian Improvements at Freeway Interchanges

- Freeway Connectors
- Managed Lanes Connectors
- Freeway & Managed Lanes Connectors

C = Conventional Highway
F = Freeway
ML = Managed Lanes
T = Toll Road

MILES
0 1 2 3 4 5 6
KILOMETERS

APPENDIX A :: Transportation Projects, Costs, and Phasing
Figure A.6
2050 Revenue Constrained Managed Lanes and Highway Network
October 2015

- Existing Managed Lanes
- Managed Lanes
- General Purpose Lanes
- Toll Lanes
- Operational Improvements
- Existing Facility
  - Freeway Connectors
  - ML Connectors
  - Freeway & ML Connectors
  - Bicycle/Pedestrian Improvements at Freeway Interchanges

C = Conventional Highway
F = Freeway
ML = Managed Lanes
T = Toll Road
R = Reversible Lanes
OPS = Operational Improvements

MILES
KILOMETERS

San Diego Forward: The Regional Plan
Figure A.7
2020 Revenue Constrained Regional Bike Network
October 2015

- Class I - Bike Path
- Cycle Track
- Bike Boulevard
- Enhanced Class II - Bike Lane
- Enhanced Class III - Bike Route
- Freeways and Highways
- Regional Arterials

Appendix A: Transportation Projects, Costs, and Phasing
Figure A.8
2035
Revenue Constrained Regional Bike Network
October 2015

- Class I - Bike Path
- Cycle Track
- Bike Boulevard
- Enhanced Class II - Bike Lane
- Enhanced Class III - Bike Route
- Freeways and Highways
- Regional Arterials

MILES

KILOMETERS

SANDAG

San Diego Forward: The Regional Plan
Figure A.10
Planned California High-Speed Train Overview
October 2015

Source: California High-Speed Rail Authority

Two alignment options are currently under consideration by the California High Speed Rail Authority: University City/LOSSAN and SR 163

San Diego International Airport Terminus Station Option

Escondido I-15 Station Option

Above-Grade Structure
At-Grade
Below-Grade Option
High-Speed Rail Stations
High-Speed Rail Station Options

Source: California High-Speed Rail Authority
Figure A.11
2020 and 2035 High Frequency Local Bus Routes
October 2015

High Frequency Local Bus
by 2020: 15 minutes (peak period)
by 2035: 10 minutes (peak period)

Regional and Corridor Routes

Urban Area Transit Strategy
Figure A.13
2012 Managed Lanes and Highway Network
October 2015

Existing Managed Lanes

Appendix A :: Transportation Projects, Costs, and Phasing
Figure A.14
2012 Regional Bike Network
October 2015

Bike Network
Freeways and Highways
Regional Arterials

MILES
0 3 6
0 4 8

KILOMETERS
Figure A.15
Regional Arterial System
October 2015

- Freeways and Highways
- Regional Arterials
Figure A.16
California Coastal Trail and County of San Diego Community Trails
October 2015

Sources:
California Coastal Trail: Completing the Coastal Trail, Coastal Conservancy.
County of San Diego Community Trails: Community Trails Master Plan
Figure A.17
2050 Unconstrained Transit Network
October 2015

High Speed Rail
COASTER/AMTRAK/Metrolink
Trolley/SPRINTER
Trolley/SPRINTER Express
Rapid Transit
Streetcar/Shuttle
Airport Express
Local Bus
San Diego-Coronado Ferry

Intermodal Transit Center
Safe Routes to Transit including retrofits

Appendix A: Transportation Projects, Costs, and Phasing
Figure A.18
2050 Unconstrained Managed Lanes and Highway Network
October 2015

Legend:
- Existing Managed Lanes
- Managed Lanes
- General Purpose Lanes
- Toll Lanes
- Operational Improvements
- Existing Facility
- Freeway Connectors
- ML Connectors
- Freeway & ML Connectors
- Bicycle/Pedestrian Improvements at Freeway Interchanges

- C = Conventional Highway
- F = Freeway
- ML = Managed Lanes
- T = Toll Road
- R = Reversible Lanes
- OPS = Operational Improvements
- E = Expressway

MILES 0 1 2 3 4 5 6
KILOMETERS

San Diego Forward: The Regional Plan
Figure A.19
2050 Unconstrained Regional Bike Network
October 2015

- Class I - Bike Path
- Cycle Track
- Bike Boulevard
- Enhanced Class II - Bike Lane
- Enhanced Class III - Bike Route
- Freeways and Highways
- Regional Arterials

Appendix A :: Transportation Projects, Costs, and Phasing
Figure A.20
Unconstrained Goods Movement Strategy
October 2015

Key Project Locations

Air Cargo
1. San Diego International Airport Access Improvements

Border
2. Southbound Truck Route Improvements
3. SR 11/Future Otay Mesa East Border Truck Crossing
4. SR 125

Maritime
5. Port Terminal and Access Improvements Harbor Drive

Rail
6. LOSSAN/SPRINTER Burlington Northern Santa Fe Railroad (BNSF)
7. Baja California Railroad, Inc. (BJRR) in Mexico/Desert Line in USA

Freeway/Highway
8. I-5
9. I-15
10. I-805
11. SR 94/125, I-8
12. SR 52/54/56/94
13. SR 78
Appendix B
Air Quality Planning and Transportation Conformity

Appendix Contents
Background
Transportation Conformity: Modeling Procedures
Motor Vehicle Emissions Modeling
Exempt Projects
Implementation of Transportation Control Measures (TCMs)
Interagency Consultation Process and Public Input
Revenue Constrained Scenario Project Tables
Air Quality Planning and Transportation Conformity

Background

The federal Clean Air Act (CAA) (42 U.S.C. §7401, et seq.), which was last amended in 1990, requires the United States Environmental Protection Agency (U.S. EPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. Pursuant to California Health & Safety Code §39606, California has adopted state air quality standards that are more stringent than the NAAQS. Areas with levels that violate the standard for specified pollutants are designated as non-attainment areas.

The U.S. EPA requires that each state containing non-attainment areas develop plans to attain the NAAQS by a specified attainment deadline. The attainment plan is called the State Implementation Plan (SIP). The San Diego County Air Pollution Control District (APCD) prepares the San Diego portion of the California SIP. Once the standards are attained, further plans – called Maintenance Plans – are required to demonstrate continued maintenance of the NAAQS.

Pursuant to Section 176(c) of the federal CAA (42 USC §7506(c)), the San Diego Association of Governments (SANDAG) and the United States Department of Transportation (U.S. DOT) must make a determination that the Regional Transportation Plan (RTP) and the Regional Transportation Improvement Program (RTIP) conform to the SIP for air quality. Conformity to the SIP means that transportation activities will not create new air quality violations, worsen existing violations, or delay the attainment of the NAAQS. Regulations regarding conformity to the SIP are specific to the NAAQS. The RTP's impacts on California Ambient Air Quality Standards (CAAQS) are discussed and analyzed in the San Diego Forward: The Regional Plan environmental impact report, Section 4.3.

On April 15, 2004, the U.S. EPA designated the San Diego air basin as non-attainment for the 1997 Eight-Hour Ozone Standard. This designation took effect on June 15, 2004. However, several areas that are tribal lands in eastern San Diego County were excluded from the non-attainment designation.

The air basin initially was classified as a basic non-attainment area under Subpart 1 of the CAA, and the attainment date for the 1997 Eight-Hour Ozone Standard was set as June 15, 2009. In cooperation with SANDAG, the San Diego APCD developed an Eight-Hour Ozone Attainment Plan for the 1997 standard, which was submitted to the U.S. EPA on June 15, 2007. (The Regional Plan may be found at: sdapcd.org/planning/8-Hour-O3-Attain-Plan.pdf.) Emissions budgets set an upper limit which on-road mobile sources are permitted to emit. The budgets in the Eight-Hour Ozone Attainment Plan for San Diego County were found adequate for transportation conformity purposes by the U.S. EPA, effective June 9, 2008.

However, on April 27, 2012, in response to a court decision (South Coast Air Quality Management District, et al., v. EPA, 472 F.3d 882 (D.C. Cir. 2006) reh’g denied 489 F.3d 1245), the U.S. EPA ruled that the San Diego basic non-attainment area be reclassified as a Subpart 2, moderate non-attainment area, with an attainment deadline of June 15, 2010. This reclassification became effective on June 13, 2012. Air quality data for 2009, 2010, and 2011 demonstrated that the San Diego air basin attained the 1997 ozone standard; APCD prepared a Maintenance Plan, with a request for redesignation to attainment/maintenance. (The Maintenance Plan may be found at: sdapcd.org/planning/8_Hour_O3_Maint-Plan.pdf.) On December 6, 2012, the California Air Resources Board (ARB) approved the Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County for submittal to the U.S. EPA as a SIP revision. Effective July 5, 2013, the U.S. EPA approved California’s
request to redesignate the San Diego County ozone non-attainment area to attainment for the 1997 Eight-Hour Ozone Standard and the Maintenance Plan for continuing to attain this standard for ten years beyond redesignation.

On May 21, 2012, the U.S. EPA designated the San Diego air basin as a non-attainment area for the new 2008 Eight-Hour Ozone Standard and classified it as a marginal area with an attainment date of December 31, 2015. This designation became effective on July 20, 2012. SANDAG determined conformity to the new standard on May 24, 2013, using the model approved by the U.S. EPA to forecast regional emissions (EMFAC 2011). The U.S. DOT, in consultation with the U.S. EPA, made its conformity determination on June 28, 2013. (Letter may be found at: sandag.org/uploads/projectid/projectid_410_16214.pdf.) For this non-attainment designation, tribal areas that were previously excluded are now included as part of the San Diego region non-attainment designation.¹ In addition, the U.S. EPA final rule also provides for the revocation of the 1997 Eight-Hour Ozone NAAQS for transportation conformity purposes effective July 20, 2013. In a D.C. Circuit Court decision on December 23, 2014 (NRDC v. EPA, No. 12-1321) it was determined that the attainment date for marginal areas would be set for July 20, 2015.

The San Diego region also has been designated by the U.S. EPA as a federal maintenance area for the Carbon Monoxide (CO) standard. On November 8, 2004, ARB submitted the 2004 revision to the California SIP for CO to the U.S. EPA. Effective January 30, 2006, the U.S. EPA has approved this Maintenance Plan as a SIP revision.

Transportation Conformity: Modeling Procedures

Introduction

SANDAG has developed the Revenue Constrained Scenario for San Diego Forward: The Regional Plan (Regional Plan) which serves as the basis for the required air quality conformity analysis. Conformity of the 2014 RTIP Amendment No. 7 has been determined simultaneously for consistency purposes. Tables B.9 and B.11 include the conformity analysis for both the 2050 Revenue Constrained Regional Plan and the 2014 RTIP Amendment No. 7. The Regional Plan provides information on revenue assumptions and the Revenue Constrained Scenario (Chapter 3). In addition, this conformity determination fulfills the requirement of SB 375, which requires a Sustainable Communities Strategy that allows for compliance with Section 176 of the federal CAA. (California Government Code, Section 65080(b)(2)(B)(viii).)

Growth forecasts

Every three to five years, SANDAG produces a long-range forecast of population, housing, and employment growth for the San Diego region. The most recent forecast is the Series 13, 2050 Regional Growth Forecast (accepted for planning purposes by the SANDAG Board on October 25, 2013), which was utilized in the development of the Regional Plan and the 2014 RTIP Amendment No. 7. (Item No. 8, sandag.org/uploads/meetingid/meetingid_3489_16764.pdf.)

The forecast process relies upon three integrated forecasting models. The first model, the Demographic and Economic Forecasting Model (DEFM), provides a detailed econometric and demographic forecast for the entire region. The second model, the Production, Exchange, Consumption, Allocation Model (PECAS), considers land economics and the potential for redevelopment in determining subregional allocation of employment and housing. The third model, the Urban Development Model (UDM), allocates the results of the first two models to Master Geographic Reference Areas (MGRAs) based upon the current plans and policies of the jurisdictions. MGRAs are the base unit of geography for SANDAG subregional land use models. Similar in size to Census blocks or block groups, MGRAs are designed to nest within other administrative boundaries such as Census tracts, school districts, and jurisdictions among others, allowing MGRA-level forecast data to be aggregated up to larger areas.
On August 6, 2014, SANDAG consulted with the San Diego Region Conformity Working Group (CWG), comprised of representatives of SANDAG, Caltrans, SDAPCD, U.S. EPA, U.S. DOT, and ARB, on the use of the Series 2013, 2050 Regional Growth Forecast (2013) for the air quality conformity analysis of the Regional Plan and the 2014 RTIP Amendment No. 7 conformity redetermination. Previously, both the U.S. DOT and the U.S. EPA concurred that approved local land use plans should be used as input in the air quality conformity process and concurred that these plans have been appropriately incorporated into the Series 2013, 2050 Regional Growth Forecast. Figure B.1 and Table B.1 show the regional population, jobs, and housing growth forecast for the San Diego region through 2050.

**Figure B.1**
San Diego Regional Population, Jobs, and Housing Forecast

![Graph showing population, jobs, and housing growth from 1970 to 2050](image)

Source: Series 13, 2050 Regional Growth Forecast, SANDAG, October 2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Employment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>3,143,429</td>
<td>1,450,913</td>
</tr>
<tr>
<td>2020</td>
<td>3,435,713</td>
<td>1,624,124</td>
</tr>
<tr>
<td>2035</td>
<td>3,853,698</td>
<td>1,769,938</td>
</tr>
<tr>
<td>2050</td>
<td>4,068,759</td>
<td>1,911,405</td>
</tr>
</tbody>
</table>

Source: Series 13, 2050 Regional Growth Forecast, SANDAG, October 2013

The Series 13, 2050 Regional Growth Forecast is based largely upon the adopted general plans and community plans, and policies of the 18 cities and the County. Because many of the local general plans have horizon years of 2030 – 20 years before the 2050 Growth Forecast horizon year, the later part of the forecast was developed in collaboration with each of the local jurisdictions through an iterative process that allowed each city to provide their projections for
land uses in those later years. The planning assumptions used for the Regional Plan were less than five years old at the
time the conformity analysis began. Federal RTP guidelines require that the Regional Plan cover a forecast period of a
minimum of 20 years.

Transportation modeling
SANDBAG uses a calibrated and validated activity-based model (ABM) to support the development of the Regional
Plan. An ABM simulates individual and household transportation decisions that comprise their daily travel itinerary. It
predicts whether, where, when, and how people travel outside their home for activities such as work, school,
shopping, healthcare, and recreation.

ABMs are becoming the standard travel demand modeling technology used by large Metropolitan Planning
Organizations (MPOs), including the Southern California Association of Governments, and the Bay Area Metropolitan
Transportation Commission. These models allow for a more nuanced analysis of complex policies and projects. The
powerful analytic capabilities of an ABM are particularly helpful in evaluating social equity, carpooling, transit access,
parking conditions, tolling, and pricing. Because an ABM tracks the characteristics of each person, the model can be
used to analyze the travel patterns of a wide range of socio-economic groups. For example, a household with many
members may be more likely to carpool, own multiple vehicles, and share shopping responsibilities.

ABM outputs are used as inputs for regional emissions forecasts. The estimates of regional transportation-related
emissions analyses conducted for the Regional Plan meet the requirements established in the Transportation
Conformity Regulation (40 CFR §93.122(b) and §93.122(c)). These requirements relate to the procedures to
determine regional transportation-related emissions, including the use of network-based travel models, methods to
estimate traffic speeds and delays, and the estimation of vehicle miles traveled (VMT).

The regionally significant projects, and the timing for when they are expected to be open to traffic in each analysis
year, are documented in Tables B.13 - B.15. The design concept and scope of projects allows adequate model
representation to determine intersections with regionally significant facilities, route options, travel times, transit
ridership, and land use.

This document describes the key modeling units, ABM model flow, the San Diego residents travel module, highway
and transit networks, data sources, and emissions modeling.

Key modeling units
An ABM simulates individual and household travel decisions through tours, that is, a journey that begins and ends at
home. A tour includes a chain of trips (segments of travel with a given origin and destination). The advantage of
modeling tours and trips hierarchy is to ensure spatial, temporal, and modal consistency and integrity across trips
within a tour.

To simulate trips and tours made by individuals and households, the SANDAG ABM includes a total of eight
person-types, shown in Table B.2. The person-types are mutually exclusive with respect to age, work status, and
school status.
Table B.2
Person Types

<table>
<thead>
<tr>
<th>Number</th>
<th>Person-Type</th>
<th>Age</th>
<th>Work Status</th>
<th>School Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Full-time worker³</td>
<td>18+</td>
<td>Full-time</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>Part-time worker</td>
<td>18+</td>
<td>Part-time</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>College student</td>
<td>18+</td>
<td>Any</td>
<td>College+</td>
</tr>
<tr>
<td>4</td>
<td>Non-working adult</td>
<td>18 – 64</td>
<td>Unemployed</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>Non-working senior</td>
<td>65+</td>
<td>Unemployed</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>Driving age student</td>
<td>16 – 17</td>
<td>Any</td>
<td>Pre-college</td>
</tr>
<tr>
<td>7</td>
<td>Non-driving student</td>
<td>6 – 15</td>
<td>None</td>
<td>Pre-college</td>
</tr>
<tr>
<td>8</td>
<td>Pre-schooler</td>
<td>0 – 5</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Further, workers are stratified by their occupation to take full advantage of information provided by the land use and demographic models. Table B.3 outlines the worker categories. These models are used to segment destination choice attractiveness for work location choice, based on the occupation of the worker.

Table B.3
Occupation Types

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Management, Business, Science, and Arts</td>
</tr>
<tr>
<td>2</td>
<td>Services</td>
</tr>
<tr>
<td>3</td>
<td>Sales and Office</td>
</tr>
<tr>
<td>4</td>
<td>Natural Resources, Construction, and Maintenance</td>
</tr>
<tr>
<td>5</td>
<td>Production, Transportation, and Material Moving</td>
</tr>
<tr>
<td>6</td>
<td>Military</td>
</tr>
</tbody>
</table>

The SANDAG ABM assigns one of the activity types to each out-of-home location that a person travels to in the simulation, shown in Table B.4. The activity types are grouped according to whether the activity is mandatory, maintenance, or discretionary. The classification scheme of activities into the three categories helps differentiate the importance of the activities. Mandatory includes work and school activities. Maintenance includes household-related activity such as drop-off and pick-up of children, shopping, and medical appointments. Discretionary includes social and recreational activities. To determine which person-types can be used for generating each activity type, the model assigns eligibility requirements. For example, a full-time worker will generate mandatory work activities while a non-working adult, or senior, is eligible for non-mandatory activities. The classification scheme of each activity type reflects the relative importance or natural hierarchy of the activity, where work and school activities are typically the most inflexible in the person’s daily travel itinerary.
### Table B.4
**Activity Types**

<table>
<thead>
<tr>
<th>Type</th>
<th>Purpose</th>
<th>Description</th>
<th>Classification</th>
<th>Eligibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Work</td>
<td>Working at regular workplace or work-related activities outside the home</td>
<td>Mandatory</td>
<td>Workers and students</td>
</tr>
<tr>
<td>2</td>
<td>University</td>
<td>College+</td>
<td>Mandatory</td>
<td>Age 18+</td>
</tr>
<tr>
<td>3</td>
<td>High School</td>
<td>Grades 9-12</td>
<td>Mandatory</td>
<td>Age 14-17</td>
</tr>
<tr>
<td>4</td>
<td>Grade School</td>
<td>Grades K-8</td>
<td>Mandatory</td>
<td>Age 5-13</td>
</tr>
<tr>
<td>5</td>
<td>Escorting</td>
<td>Pick-up/drop-off passengers (auto trips only)</td>
<td>Maintenance</td>
<td>Age 16+</td>
</tr>
<tr>
<td>6</td>
<td>Shopping</td>
<td>Shopping away from home</td>
<td>Maintenance</td>
<td>5+ (if joint travel, all persons)</td>
</tr>
<tr>
<td>7</td>
<td>Other Maintenance</td>
<td>Personal business/services and medical appointments</td>
<td>Maintenance</td>
<td>5+ (if joint travel, all persons)</td>
</tr>
<tr>
<td>8</td>
<td>Social/Recreational</td>
<td>Recreation, visiting friends/family</td>
<td>Discretionary</td>
<td>5+ (if joint travel, all persons)</td>
</tr>
<tr>
<td>9</td>
<td>Eat Out</td>
<td>Eating outside of home</td>
<td>Discretionary</td>
<td>5+ (if joint travel, all persons)</td>
</tr>
<tr>
<td>10</td>
<td>Other Discretionary</td>
<td>Volunteer work, religious activities</td>
<td>Discretionary</td>
<td>5+ (if joint travel, all persons)</td>
</tr>
</tbody>
</table>

The SANDAG ABM models a full travel day of activity broken into one-half hour intervals. These one-half hour increments begin at 3 a.m. and end at 3 a.m. the next day, though the hours between 1 a.m. and 5 a.m. are aggregated to reduce computational burden. The ABM ensures temporal integrity so that no activities are scheduled with conflicting time windows, with the exception of short activities/tours that are completed within a one-half hour increment. The ABM assigns auto and transit traffic at five discrete time-of-day periods aggregated from the five half-hour intervals shown in Table B.5.

### Table B.5
**Time Periods for Level of Service Skims and Assignment**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Begin Time</th>
<th>End Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Early</td>
<td>3:00 a.m.</td>
<td>5:59 a.m.</td>
</tr>
<tr>
<td>2</td>
<td>A.M. Peak</td>
<td>6:00 a.m.</td>
<td>8:59 a.m.</td>
</tr>
<tr>
<td>3</td>
<td>Midday</td>
<td>9:00 a.m.</td>
<td>3:29 p.m.</td>
</tr>
<tr>
<td>4</td>
<td>P.M. Peak</td>
<td>3:30 p.m.</td>
<td>6:59 p.m.</td>
</tr>
<tr>
<td>5</td>
<td>Evening</td>
<td>7:00 p.m.</td>
<td>2:59 a.m.</td>
</tr>
</tbody>
</table>

The SANDAG ABM uses three-tier zone systems shown in Table B.6: Zone System. The Master-Geographic Reference Area (MGRA) zone system is used for transit access and calculations, and location choice models; the Traffic Analysis
The ABM includes 26 modes available to residents, including auto by occupancy, toll/non-toll choice and lanes for high occupancy vehicle (HOV) or non-HOV, walk and bike modes, and walk and drive access to five different transit line-haul modes. Pay modes are those that involve paying a choice or “value” toll.
Table B.7 lists the trip modes defined in the SANDAG ABM.

To model transit flow, the ABM uses five transit line-haul modes: (1) Commuter Rail (COASTER), (2) Light Rail Transit (LRT) (including Trolley, SPRINTER, and Streetcar), (3) Bus Rapid Transit (BRT)/Rapid Bus, (4) Express Bus, and (5) Local Bus. The mode of access to transit includes walk, park & ride (PNR), and kiss & ride (KNR or drop-off).

<table>
<thead>
<tr>
<th>Number</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Drive Alone (Non-Toll)</td>
</tr>
<tr>
<td>2</td>
<td>Drive Alone (Toll)</td>
</tr>
<tr>
<td>3</td>
<td>Share Ride 2 Person (Non-Toll, Non-HOV)</td>
</tr>
<tr>
<td>4</td>
<td>Share Ride 2 Person (Non-Toll, HOV)</td>
</tr>
<tr>
<td>5</td>
<td>Share Ride 2 Person (Toll, HOV)</td>
</tr>
<tr>
<td>6</td>
<td>Share Ride 3+ Person (Non-Toll, Non-HOV)</td>
</tr>
<tr>
<td>7</td>
<td>Share Ride 3+ Person (Non-Toll, HOV)</td>
</tr>
<tr>
<td>8</td>
<td>Share Ride 3+ Person (Toll, HOV)</td>
</tr>
<tr>
<td>9</td>
<td>Walk-Local Bus</td>
</tr>
<tr>
<td>10</td>
<td>Walk-Express Bus</td>
</tr>
<tr>
<td>11</td>
<td>Walk-BRT</td>
</tr>
<tr>
<td>12</td>
<td>Walk-Light Rail</td>
</tr>
<tr>
<td>13</td>
<td>Walk-Heavy Rail</td>
</tr>
<tr>
<td>14</td>
<td>PNR-Local Bus</td>
</tr>
<tr>
<td>15</td>
<td>PNR-Express Bus</td>
</tr>
<tr>
<td>16</td>
<td>PNR-Bus Rapid Transit (BRT)/Rapid Bus</td>
</tr>
<tr>
<td>17</td>
<td>PNR-Light Rail</td>
</tr>
<tr>
<td>18</td>
<td>PNR-Heavy Rail</td>
</tr>
<tr>
<td>19</td>
<td>KNR-Local Bus</td>
</tr>
<tr>
<td>20</td>
<td>KNR-Express Bus</td>
</tr>
<tr>
<td>21</td>
<td>KNR-BRT</td>
</tr>
<tr>
<td>22</td>
<td>KNR-Light Rail</td>
</tr>
<tr>
<td>23</td>
<td>KNR-Heavy Rail</td>
</tr>
<tr>
<td>24</td>
<td>Walk</td>
</tr>
<tr>
<td>25</td>
<td>Bike</td>
</tr>
<tr>
<td>26</td>
<td>School Bus (only available for school purpose)</td>
</tr>
</tbody>
</table>
ABM model flow

To simulate San Diego residents and non-residents travel, and freight travel, the SANDAG ABM includes several models and steps.

Figure B.3 outlines the overall flow of the SANDAG ABM. It starts with building highway and transit networks in the traffic assignment software followed by highway assignment to create congested highway and transit travel times. A parallel step is to create a year-specific active transportation network and generate walking accessibility measures between MGRAs, between MGRA and TAP, and bike accessibility measures between MGRAs and between TAZs. The congested highway and transit skims, and the walking and biking accessibility measures, are inputs to the simulated models. The congested highway skims are also inputs to the aggregate models. Once the simulated and aggregated models generate trips by residents or various travelers, the ABM aggregates the vehicle trips from MGRA to TAZ to TAZ matrices by time of day, by toll and non-toll, and by vehicle class, and assigns the vehicle trips to the highway network. The highway assignment generates the congested networks by time of day. The ABM then skims the congested networks to provide accessibility for the next iteration of the simulated and aggregated models. The process iterates three feedback loops. The last iteration assigns both highway and transit trips and creates skims for land use models. The outputs from the final step are used to generate input for EMFAC emissions modeling.

At the heart of the SANDAG ABM is the San Diego County residents’ travel module. It simulates San Diegan’s daily travel choices. In addition to the residents’ travel, there are trips made by visitors, commercial vehicles, and freight transportation. A number of special travel models (commercial vehicle model, truck model, air passenger model, external trip model, visitor model, and crossborder model) account for these other sources of transportation demand. The models are run in parallel with the residents’ travel module. Trips generated from the simulated and aggregate models are summed up to an auto trip matrix and transit trip matrix by time of day by mode, and assigned to highway and transit networks.

After network assignment, the EMFAC model is used to generate emissions summaries based on the inputs generated by the post processing of highway assignment outputs.

San Diego residents travel module

The San Diego residents’ travel module is comprised of numerous interacting components called “sub-modules.” It starts with generating a representative population for the San Diego region. Once a representative population is created, the model predicts long-term and medium-term decisions such as a choice of work or school location and a household's choice of number of cars to own. Next, each person's day is scheduled, taking into account the priority of various activities and interaction among the household members. Once all journeys to and from home have been scheduled, the model predicts specific travel details such as mode, the number of stops to make, where to stop, and when to depart from each stop to continue the tour. The final step of the ABM is traffic assignment where trips are summarized by traffic analysis zones and assigned to the transportation network.
Figure B.3
SANDAG ABM Flow Chart

Import and Build Highway/Transit Networks

Skims
- Highway Assignment
- Highway/Transit Skimming

Aggregated Travel
- Commercial Travel Model
- Heavy Truck Model
- External-Internal Model
- External-External Model

Simulated Travel
- San Diego Residents Travel
- Internal-External Model
- Cross Border Mexican Resident Model
- Airport Model
- Visitor Model

Build AT Network
- Create AT Accessibility

Feedback Loops

Aggregate Auto and Transit Trips

Final Step
- Highway /Transit Assignment
- Land-Use Skim
The following section discusses the sub-modules, in the order that each sub-module is taken within the San Diego residents’ travel module.

Step 1: Population synthesis (build a representative population that looks like San Diego)
The first step is to create a ‘synthetic’ population of San Diego County. A synthetic population is a table that has a record for every individual and household, with the individual’s and the household’s characteristics. For example, if there are 41,000 18-year-old males in the region in 2050, there would be approximately 41,000 records in the table for males age 18, with each record also having other characteristics such as school enrollment and labor force participation status. Taken as a whole, this synthetic population represents the decision-makers whose travel choices the model will simulate in later steps. For each simulation year, a full population is synthesized to match the forecasted socio-economic and housing characteristics of each part of the region at the zonal level. These forecasts, a key ABM input, come from the land use model. Synthesis works by replicating a sample of census records (each containing complete household and individual characteristics) and placing them around the region in such a way that the forecasted characteristics of each zone are matched.

Step 2: Work and school location (assign a work location to workers and a school location to students)
The second step predicts where each individual will go to work or school, if applicable. The work and school location sub-module simulates each worker’s choice of work location, taking into account many factors, including ease-of-travel and the number of employees by occupation type in each location. The sub-module also simulates each student’s choice of school, taking into account factors that include the distance from home to school, school enrollment, and district boundaries. The results from this step affect later travel choices significantly because of the prominent role that workplace and school usually play in the itinerary of workers and students.

Step 3: Determine certain mobility characteristics of individuals and households
This step predicts the number of automobiles each household owns, whether each household owns a toll transponder, and whether worker parking costs are employer-reimbursed. The sub-module assigns each household zero cars, one car, two cars, three cars, or ‘four or more’ cars, taking into account a number of criteria, including household size, income, number of drivers, and how easy it is to reach destinations from the household’s place of residence. This step sets certain mobility characteristics that influence how people travel.

Step 4: Schedule the day
The fourth step begins by predicting a ‘daily activity’ pattern for each individual. A daily activity pattern is a theme that dictates an individual’s schedule. A ‘mandatory’ pattern means that an individual travels to work and/or school, and then schedules other activities around work/school. An ‘at-home’ pattern means that an individual’s daily schedule involves no travel in the region. A ‘non-mandatory’ pattern means that an individual’s daily schedule involves traveling, but only to destinations other than work or school. The pattern-type of other household members influences an individual’s daily pattern type. For example, if a child stays home from school, a working parent might be more likely to stay home from work as well.

Once the sub-module selects an individual’s daily activity pattern, it schedules the tours that he or she will take. Recall that a tour is a journey that begins and ends at home, and it can include stops at other destinations on the way to or from the primary destination. The ABM deals with three main categories of tours: (1) mandatory tours, (2) joint tours, and (3) non-mandatory tours. Mandatory tours have work or school as the primary destination. Joint tours involve out-of-home activities that multiple members of a household partake in together. Non-mandatory tours involve purposes other than work or school that an individual undertakes independent of other members of his or her
household. The sub-module schedules each tour type by predicting how many tours of that type there are, who will participate in the tour, where the main destination is, and when to depart and arrive (see Figure B.4).

Figure B.4
Predicting Tour Type Scheduling Details

For individuals assigned a ‘mandatory’ activity pattern, the sub-module first assigns the number of work tours and/or school tours they will make. After the number of these mandatory tours has been determined, the sub-module selects the time of departure from and arrival back home for each tour.

After scheduling the mandatory tours, the sub-module calculates time remaining for other tours. Remaining intervals of time are called “residual time windows,” and other tours can only be scheduled in these open slots (see Figure B.5 for an example) to guarantee temporal consistency.

Figure B.5
Tour Scheduling Windows

In time remaining after mandatory tours are scheduled, the sub-module determines the number of joint tours to be made for each household. It only schedules joint tours in the time windows that overlap between individuals after it accounts for mandatory activities. After the number and purpose of these joint tours has been determined, the sub-module decides which household members will participate in each joint tour and whether the joint tour must involve a combination of children and adults. The sub-module then chooses a specific destination for the tour and the specific times when tour participants will depart from and arrive back home together. Next, ‘non-mandatory’ tours are scheduled. For each household, the sub-module decides what other tours need to be made for the purpose of household ‘maintenance’ activities such as shopping. These tours are assigned to specific household members to carry out individually. For the person who is assigned each maintenance tour, the model selects a specific destination and schedules the tour to take place in a time window that mandatory tours and joint tours have left open. Finally, in what time remains, the model decides whether each individual will take non-mandatory ‘discretionary’ tours. These low-priority tours involve activities related to recreation, eating out, and social functions. Discretionary tours can only
take place in time windows that remain after all other tours have been scheduled. The sub-module chooses a specific destination and departure/arrival combination for each discretionary tour a person makes.

**Step 5: Make tour and trip-level decisions**
The ABM then selects more detailed characteristics of each tour for every traveler. This step fills in travel details after the major aspects of the day have been scheduled. Tour characteristics that need to be determined include: primary mode of the tour, how many times to stop, where to stop, and when to depart from each stop to continue the tour. Figure B.6 includes the available modes and mode hierarchy. After tour characteristics are set, the sub-module determines the mode of each trip (conditional upon tour mode). Recall that trips are segments of tours that have a given origin and destination. If the trip mode involves an automobile and the destination is a parking-constrained area, then the model chooses a parking location for the traveler at the trip destination.

*Figure B.6
Tour and Trip Modes*

**Step 6: Aggregating and assigning auto and transit trips**
The previous step provided travel details for each person down to the trip level. In this final step, the model sums all trips taken by individuals in San Diego County along with trips generated by other models that represent special categories of travel within the region that are not covered by the ABM. The model aggregates auto trips in TAZ to TAZ matrices by time of day and assigns trips to the highway network, and aggregates transit trips in TAP to TAP matrices by time of day and assigns to the transit network.

SANDAG loads traffic using the Multimodal Multiclass Assignment function of the traffic assignment software. Multiclass assignment allows SANDAG to assign the eight vehicle modes (drive alone non-toll, drive alone toll, share ride 2 non-toll non HOV, share ride 2 non-toll HOV, share ride 2 toll HOV, share ride 3+ non-toll non HOV, share ride 3+ non-toll HOV, and share ride 3+ toll HOV) plus the six truck toll, and non-toll by truck class modes (light-heavy duty non-toll/toll, medium-heavy duty non-toll/toll, and heavy-heavy duty non-toll/toll) in one combined procedure.

The highway assignment model works by finding roads that provide the shortest travel impedance between each zone pair. Trips between zone pairs are then accumulated on road segments making up minimum paths. Highway
impedances consider posted speed limits, signal delays, congestion delays, and costs. The model computes congestion delays for each segment based on the ratio of the traffic volume to roadway capacity. Motorists may choose different paths during peak hours, when congestion can be heavy, and off-peak hours, when roadways are typically free flowing. For this reason, traffic is assigned separately for five time periods (as defined in the Key Modeling Units section). Vehicle trip tables for each scenario reflect increased trip-making due to population growth and variations in travel patterns due to the alternative transportation facilities/networks proposed. Customized programs process outputs from highway assignment and generate total VMTs by vehicle class, and percentage of VMTs by speed bin and by vehicle class. This information is input to the EMFAC program to generate emissions summaries.

For transit assignment, traffic assignment software assigns TAP to TAP transit trips to the network. Altogether, 75 separate transit assignments are produced for five time periods: (1) walk, (2) park & ride, (3) kiss & ride, (4) auto access, and (5) line-haul modes. These individual assignments are summed to obtain total transit ridership forecasts.

**Model inputs**
The SANDAG ABM utilizes a variety of data as inputs. Besides the growth forecast inputs (used to provide existing and planned land use and demographic characteristics) there are three major inputs: (1) highway networks used to describe existing and planned roadway facilities, (2) transit networks used to describe existing and planned public transit service, and (3) an active transportation network used to describe non-motorized bicycle and pedestrian facilities.

The regionally significant projects, and the years they are expected to open to traffic for each analysis year, are documented in Tables B.13 - B.15. The design concept and scope of projects allow adequate model representation to determine intersections with regionally significant facilities, route options, travel times, transit ridership, and land use. The VMT for non-regionally significant federal projects is also accounted for in the regional emissions analysis.

**Highway networks**
The regional highway networks in the Regional Plan and 2014 RTIP Amendment No. 7 include all roads classified by local jurisdictions in their general plan circulation elements. These roads include freeways, expressways, and the Regional Arterial System (RAS). The RAS consists of all conventional state highways, prime arterials, and selected major streets. In addition, some local streets are included in the networks for connectivity between TAZs.

The route improvements and additions in the Regional Plan and 2014 RTIP Amendment No. 7 are developed to provide adequate travel service that is compatible with adopted regional policies for land use and population growth. All regionally significant projects are included in the quantitative emissions analysis. These include all state highways, all proposed national highway system routes, all regionally significant arterials, and all "other principal arterials" functionally classified by the Federal Highway Administration (FHWA). These include both federal and non-federal regionally significant projects.

The networks also account for programs intended to improve the operation of the highway system, including HOV lanes, Managed Lanes, and ramp metering. Existing and proposed toll facilities also are modeled to reflect time, cost, and capacity effects of these facilities. State Route (SR) 125 South, SR 11, SR 241, and additional lanes on Interstate 15 (I-15) north of SR 78, and additional lanes on I-5 north of Vandegrift Boulevard, are modeled toll facilities included in the Revenue Constrained Plan for the San Diego region.

In addition, several Managed/HOV lanes are included in the Revenue Constrained Plan (Table B.14). Facilities with proposed Managed Lanes include I-5, I-15, I-805, SR 52, SR 54, SR 78, SR 94, and SR 125. Managed Lanes are defined as reversible HOV routes and HOV routes with two or more lanes in the peak direction. Additionally, one-lane
HOV facilities that operate as two-person carpool lanes in the earlier years of the Regional Plan transition to Managed Lanes by 2035. It is assumed that the excess capacity not utilized by carpools and transit on these facilities would be managed so that single occupant vehicles could use these lanes under a pricing mechanism. Traffic flows would be managed so that the facility would operate at Level of Service (LOS) D or better.

SANDAG maintains a master transportation network from which a specific year network, between the years 2010 and 2050, can be built. For air quality conformity analyses of the Regional Plan and 2014 RTIP Amendment No. 7, SANDAG built and verified five highway networks (2015, 2025, 2035, 2040, and 2050) from the master transportation network.

A list of the major highway and near-term regional arterial projects included in the conformity analysis, along with information on phasing for their implementation, are included in Tables B.14 and B.15. Locally funded, regionally significant projects have also been or are included in the air quality conformity analysis. These projects are funded with TransNet Extension funds – a 40-year, half-cent local sales tax extension approved by voters in 2004 – that expires in 2048; and other local revenue sources.

**Transit networks**

SANDAG also maintains transit network datasets for existing and proposed transit systems. Most transit routes run over the same streets, freeways, HOV lanes, and ramps used in the highway networks. The only additional facilities that are added to the master transportation network for transit modeling purposes are:

- Rail lines used by commuter rail, Trolleys, Streetcars
- Streets used by buses that are not part of local general plan circulation elements

BRT service has stop spacing similar to commuter rail stations and operating characteristics midway between rail and bus service. BRT service is provided by advanced design buses operating on HOV lanes or Managed Lanes, some grade-separated transit ways, and surface streets with priority transit systems.

Bus speeds assumed in the transit networks are derived from modeled highway speeds and reflect the effects of congestion. Higher bus speeds may result for transit vehicles operating on highways with HOV lanes and HOV bypass lanes at ramp meters, compared to those routes that operate on highways where these facilities do not exist.

In addition to transit travel times, transit fares are required as input to the mode choice model. A customized procedure using the traffic assignment software replicates the San Diego region’s fare policies for riders (seniors, disabled, students), which differ among:

- Local Buses, which collect a flat fare of between $1 and $2.50 (depending on the type of service)
- Trolleys, which charge $2.50 for all trips
- SPRINT, which charges $2
- Commuter rail (COASTER), which has a zone-based fare of between $4 and $5.50
- Proposed regional BRT routes, which are assumed to charge $2.50 ($5 for Rapid BRT)
- Proposed Rapid Bus routes, which are assumed to charge $2.25

Fares are expressed in 2010 dollars and are assumed to remain constant in inflation-adjusted dollars over the forecast period.
Near-term transit route changes are drawn from the Coordinated Plan, which was produced in cooperation with the region’s transit agencies. Longer range improvements are proposed as a part of the Regional Plan development and other transit corridor studies. In addition to federal and state-funded projects, locally-funded transit projects that are regionally significant have been included in the air quality conformity analysis of the Regional Plan and the 2014 RTIP Amendment No. 7. Once network coding is completed, the ABM is run for the applicable scenarios (2015, 2025, 2035, 2040, and 2050). There have been no transit fares or operating policy changes since the adoption of the 2050 RTP.

**Active transportation networks**

SANDAG maintains an all-street active transportation network including existing and planned bike projects to support bike project evaluation and impact analysis. Based on the proposed bike projects in the regional bikeway system developed through Riding to 2050 - San Diego Regional Bike Plan, SANDAG generates year-specific active transportation networks and uses these networks to create accessibility measures from MGRA to MGRA, and from TAZ to TAZ for walking and biking modes. These active transportation accessibility measures are inputs to the SANDAG ABM to simulate people’s choice of travel mode and choice of bike routes.

The active transportation networks include five classification types for bike facilities in the regional bikeway system: (1) class I – bike path, (2) class II – bike lanes, (3) class III – bike routes, (4) bike boulevard, and (5) cycle track. Appendix U.16 includes detailed description of the bike facility classification system.

**Data sources**

Besides network inputs, SANDAG relies on several survey data to estimate and calibrate the model parameters. The most important survey data is household travel survey data. The latest household travel survey conducted for SANDAG was the 2006 Household Travel Behavior Survey (TBS06). Since 1966, consistent with the state of the practice for the California Household Travel Survey, and National Household Travel Survey, SANDAG and Caltrans conduct a comprehensive travel survey of San Diego county every ten years. TBS06 surveyed 3,651 households in San Diego County. The survey asked all household members to record all trips for a specified 24-hour weekday period using a specially designed travel log.

Additional data needed for the mode choice components of the ABM come from a transit on-board survey. The most recent SANDAG survey of this kind is the 2009 Transit On-Board Survey (OBS09). OBS09 collected data on transit trip purpose, origin and destination address, access and egress mode to and from transit stops, the on/off stop for surveyed transit routes, number of transit routes used, and demographic information. The total number of OBS09 survey records is 42,854.

Population synthesis requires two types of data: (1) individual household and person census records from San Diego County, and (2) aggregate data pertaining to the socio-demographic characteristics of each zone in the region. The first type of data is available from the Public Use Micro-data Sample (PUMS), a representative sample of complete household and person records that is released with the Census and American Communities Survey. The second type of data is from the census for the base-year and from land use forecasts for future years.

Table B.8 lists data sources mentioned above, along with other necessary sources of data. Modeling parking location choice, and employer-reimbursement of parking cost, depends on parking survey data collected from 2010 into early 2011 as well as a parking supply inventory. The transponder ownership sub-model requires data on transponder users. Data needed for model validation and calibration include traffic counts, transit-boarding data, Census Transportation Planning Package (CTPP) data, and Caltrans Performance Measurement System (PeMS) and Highway Performance Monitoring System (HPMS) data.
Table B.8
ABM Input Data

<table>
<thead>
<tr>
<th>SANDAG Surveys</th>
<th>Outside Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Travel Behavior Survey (2006)</td>
<td>San Diego International Airport Air Passenger Survey</td>
</tr>
<tr>
<td>Interregional Travel Behavior Survey (2006)</td>
<td>Traffic and Bicycle counts</td>
</tr>
<tr>
<td>Transit On-Board Survey (2009)</td>
<td>Census data</td>
</tr>
<tr>
<td>Parking Inventory Survey (2010)</td>
<td>• Census Transportation Planning Package (CTPP)</td>
</tr>
<tr>
<td>Parking Behavior Survey (2010)</td>
<td>• Public Use Micro-data Sample (PUMS)</td>
</tr>
<tr>
<td>Border Crossing Survey (2011)</td>
<td>• American Communities Survey (ACS)</td>
</tr>
<tr>
<td>Visitor Survey (2011)</td>
<td>• Census Transportation Planning Package (CTPP)</td>
</tr>
<tr>
<td>Special Events Survey (2011)</td>
<td>• Public Use Micro-data Sample (PUMS)</td>
</tr>
<tr>
<td>Commercial Vehicles Survey (2011)</td>
<td>• Transponder ownership data</td>
</tr>
<tr>
<td></td>
<td>• Caltrans’ Performance Measurement System (PeMS)</td>
</tr>
<tr>
<td></td>
<td>• Caltrans’ Highway Performance Monitoring System (HPMS)</td>
</tr>
</tbody>
</table>

Motor Vehicle Emissions Modeling

Emissions model

In September 2011, ARB released EMFAC 2011 and the U.S. EPA approved this emissions model for use in conformity determinations on March 6, 2013. EMFAC 2011 is an integrated model that combines emission rate data with vehicle activity to calculate regional emissions. EMFAC 2011 reflects ARB rulemakings for on-road diesel fleet rules, Pavley Clean Car Standards, and the Low Carbon Fuel Standard (LCFS). EMFAC 2011 is made up of three modules: (1) EMFAC 2011-SG (scenario air quality assessment), (2) EMFAC 2011-LDV (passenger vehicle emissions), and (3) EMFAC 2011-HD (diesel trucks and buses). As noted in ARB’s EMFAC 2011 Technical Documentation, EMFAC 2011-SG takes the output from EMFAC 2011-LDV and EMFAC 2011-HD and applies scaling factors to estimate emissions consistent with regional VMT and speeds. Scaling factors are based on changes in total VMT, VMT distribution by vehicle class, and speed distribution. The SG module reports total emissions as tons per average weekday for each pollutant by vehicle class, and the total vehicle fleet for years between 1990 and 2035.

Using EMFAC 2011-SG, projections of daily regional emissions were prepared for reactive organic gases (ROG), nitrogen oxides (NOx), and CO.

The following process emissions are generated for each pollutant:

- All Pollutants – Running Exhaust, Idling Exhaust, Starting Exhaust, Total Exhaust
- ROG and total organic gasses – Diurnal Losses, Hot-Soak Losses, Running Losses, Resting Losses, Total Losses
- EMFAC 2011 models two fuels (gasoline and diesel) and 42 vehicle classes, including the following categories:
  - Passenger cars
  - Motorcycles
  - Motor homes
  - Light-duty trucks
The air quality analysis of the Regional Plan and 2014 RTIP Amendment No. 7 conformity redetermination was conducted using EMFAC 2011-SG.

On December 30, 2014, ARB released EMFAC 2014. EMFAC 2014 represents ARB’s current understanding of motor vehicle travel activities and their associated emission levels. On May 15, 2015, ARB released an updated version, EMFAC 2014 v1.0.7; however, it has not yet been approved by U.S. EPA for use in conformity determinations. The draft conformity analysis also was performed with EMFAC2014 v1.0.7 and all projected emissions met the applicable SIP budgets.

The regional emissions projections for the Regional Plan and 2014 RTIP Amendment No. 7 were produced with EMFAC 2011 and are included in Tables B.9 and B.11.

**Regional emissions forecasts**

Regional travel demand forecasts were initiated in October 2014. Output from the SANDAG ABM was then processed to be useful for emissions modeling for the conformity determination of the Regional Plan and 2014 RTIP Amendment No. 7 conformity redetermination.

The analysis years were selected to comply with 40 CFR §93.106(a)(1) and §93.118(a) of the Transportation Conformity Regulations and the approved methodology for conducting the air quality conformity analyses for the Regional Plan and 2014 RTIP Amendment No. 7 conformity redetermination.

**Eight-hour ozone standard**

Effective April 4, 2013, the U.S. EPA found the Eight-Hour Ozone budgets included in the Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County adequate for transportation conformity purposes. Beginning in October 2014, SANDAG prepared countywide forecasts of average weekday ROG and NOx emissions for 2015, 2020 (interpolated), 2025, 2035, 2040, and 2050. ROG and NOx emissions are based upon the summer season. ROG and NOx data for 2020 are included to demonstrate conformity to the budgets included in the Maintenance Plan.

**CO standard**

Beginning in October 2014, CO regional emissions were projected for 2015, 2018 (interpolated), 2025, 2035, 2040, and 2050. CO emissions are based upon the winter season. CO data for 2018 is included to demonstrate conformity to the budget included in the Maintenance Plan.
Emissions modeling results
An emissions budget is the part of the SIP that identifies emissions levels necessary for meeting emissions reduction milestones, attainment, or maintenance demonstrations. To determine conformity of the Regional Plan and the 2014 RTIP Amendment No. 7, the Regional Plan must comply with the emission analysis described in the Regional Emissions Forecast section. Table B.9 shows that the projected ROG and NOx emissions from the Regional Plan and 2014 RTIP Amendment No. 7 are below the ROG and NOx budgets and satisfy the requirements of 40 CFR §93.118(a). Air quality conformity ozone standards relate to ozone that occurs near ground level as a result of various human activities. At the ground level, ozone is formed by chemical reactions of “precursor” pollutants – oxides of nitrogen (NOx) and volatile organic compounds – also known as reactive organic gases (ROG).

Table B.9
San Diego Forward: The Regional Plan Revenue Constrained Plan and 2014 RTIP Amendment No. 7 Air Quality Conformity Analysis for 2008 Eight-Hour Ozone Standard (EMFAC 2011)

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Weekday Vehicle Starts (1,000s)</th>
<th>Average Weekday Vehicle Miles (1,000s)</th>
<th>ROG SIP Emissions Budget Tons/Day</th>
<th>NOx SIP Emissions Budget Tons/Day</th>
<th>ROG Emissions Tons/Day</th>
<th>NOx Emissions Tons/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>13,311</td>
<td>78,631</td>
<td>53</td>
<td>21</td>
<td>98</td>
<td>38</td>
</tr>
<tr>
<td>2020</td>
<td>13,998</td>
<td>82,963</td>
<td>23</td>
<td>17</td>
<td>38</td>
<td>29</td>
</tr>
<tr>
<td>2025</td>
<td>14,664</td>
<td>87,295</td>
<td>21</td>
<td>14</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>2035</td>
<td>15,185</td>
<td>90,671</td>
<td>21</td>
<td>12</td>
<td>30</td>
<td>17</td>
</tr>
<tr>
<td>2040(1)</td>
<td>15,442</td>
<td>92,256</td>
<td>21</td>
<td>12</td>
<td>30</td>
<td>18</td>
</tr>
<tr>
<td>2050(1)</td>
<td>15,799</td>
<td>94,461</td>
<td>21</td>
<td>13</td>
<td>30</td>
<td>19</td>
</tr>
</tbody>
</table>

(1) The emissions data for 2040 and 2050 was prepared using 2035 emission factors, as emission factors for 2040 and 2050 are not available in EMFAC 2011. Also, adjustment factors are not available for 2035, 2040, and 2050. Modeled emission results for 2035, 2040, and 2050 likely are overestimated due to these two factors.

Note: Emission budgets from the Eight-Hour Ozone Attainment Plan for San Diego County, which were found adequate for transportation conformity purposes by the U.S. EPA effective June 9, 2008, are used for the 2015 analysis year. Emissions budgets from the Redesignation Request and Maintenance Plan for the 1997 National Ozone Standard for San Diego County, which were found adequate for transportation conformity purposes by the U.S. EPA, effective April 4, 2013, are used for all other analysis years. SANDAG utilizes the default EMFAC travel data for some vehicle classes such as school buses. The same ABM travel data was used for the analysis performed with EMFAC 2011 and 2014. Differences in the number of average weekday vehicle starts and vehicle miles traveled in the tables created with EMFAC 2011 and EMFAC 2014 are due to differences in the default assumptions included in EMFAC for the vehicle classifications where SANDAG utilizes the default data (school bus, other bus, motor coach, and all other bus).

Adjustment factors for ROG and NOx were provided by ARB to account for regulations and minor technical improvements not yet included in the California Emissions Forecasting System inventories at the time of EMFAC 2011 development. Table B.10 includes the adjustment factors by category and analysis year. Adjustment factors were
provided for the years 2015, 2020, and 2025. Factors for later years were not available from ARB and, therefore, the adjustment factors for 2025 were carried over into later years.

Table B.10
EMFAC 2011 Adjustment Factors

<table>
<thead>
<tr>
<th></th>
<th>ROG Adjustment Factor (tons/day)</th>
<th>NOx Adjustment Factor (tons/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2015</td>
<td>2020</td>
</tr>
<tr>
<td>AB 1493</td>
<td>0.12</td>
<td>0.22</td>
</tr>
<tr>
<td>Reformulated</td>
<td>0.97</td>
<td>0.72</td>
</tr>
<tr>
<td>Gasoline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smog Check</td>
<td>1.05</td>
<td>0.87</td>
</tr>
<tr>
<td>Advanced Clean Cars</td>
<td>0.04</td>
<td>0.21</td>
</tr>
<tr>
<td>Total*</td>
<td>2.17</td>
<td>2.03</td>
</tr>
</tbody>
</table>

* Totals represent unrounded adjustment factors.

Note: Adjustment factors were provided by ARB. The tons listed are subtracted from the EMFAC 2011 output of tons per day for ROG and NOx. Adjustment factors are not available for years 2035, 2040, and 2050 and, therefore, reflect 2025 adjustments for those years.

Table B.11 shows that projected CO emissions from the Regional Plan and 2014 RTIP Amendment No. 7 are below the 2003 CO budget of 730 tons per day and satisfy the requirements of 40 CFR §93.118(a).
<table>
<thead>
<tr>
<th>Year</th>
<th>Average Weekday Vehicle Starts (1,000s)</th>
<th>Average Weekday Vehicle Miles (1,000s)</th>
<th>SIP Emissions Budget Tons/Day</th>
<th>CO Emissions Tons/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>13,311</td>
<td>78,631</td>
<td>730</td>
<td>223</td>
</tr>
<tr>
<td>2018</td>
<td>13,717</td>
<td>81,230</td>
<td>730</td>
<td>195</td>
</tr>
<tr>
<td>2025</td>
<td>14,664</td>
<td>87,295</td>
<td>730</td>
<td>131</td>
</tr>
<tr>
<td>2035</td>
<td>15,185</td>
<td>90,671</td>
<td>730</td>
<td>114</td>
</tr>
<tr>
<td>2040(1)</td>
<td>15,442</td>
<td>92,256</td>
<td>730</td>
<td>116</td>
</tr>
<tr>
<td>2050(1)</td>
<td>15,799</td>
<td>94,461</td>
<td>730</td>
<td>119</td>
</tr>
</tbody>
</table>

(1) The emissions data for 2040 and 2050 was prepared using 2035 emission factors, as emission factors for 2040 and 2050 are not available in EMFAC 2011. Modeled emission results for 2040 and 2050 likely are overestimated due to this factor.

Note: Emissions budgets for the San Diego region from 2004 Revision to California SIP for CO, Updated Maintenance Plan for Ten Federal Planning Areas (approved as SIP revision in January 2006). Emissions results do not reflect ARB adjustment factors. SANDAG utilizes the default EMFAC travel data for some vehicle classes such as school buses. The same ABM travel data was used for the analysis performed with EMFAC 2011 and 2014. Differences in the number of average weekday vehicle starts and vehicle miles traveled in the tables created with EMFAC 2011 and EMFAC 2014 are due to differences in the default assumptions included in EMFAC for the vehicle classifications where SANDAG utilizes the default data (school bus, other bus, motor coach, and all other bus).
Exempt projects

Section 93.126 of the Transportation Conformity Regulations exempts certain highway and transit projects from the requirement to determine conformity. The categories of exempt projects include safety, mass transit, air quality (ridesharing, bike, and pedestrian facilities), and other (such as planning studies).

Table B.12 illustrates the exempt projects considered in the Regional Plan and 2014 RTIP Amendment No. 7. This table shows short-term exempt projects. Additional unidentified projects could be funded with revenues expected to be available from the continuation of existing state and federal programs.

Table B.12
Exempt Projects

<table>
<thead>
<tr>
<th>Bikeway, Rail Trail, and Pedestrian Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project/Program Description</strong></td>
</tr>
<tr>
<td>Bayshore Bikeway</td>
</tr>
<tr>
<td>Bay-to-Ranch Bikeway</td>
</tr>
<tr>
<td>Border Access Bicycle Corridor</td>
</tr>
<tr>
<td>Camp Pendleton Trail</td>
</tr>
<tr>
<td>Carlsbad – San Marcos Bicycle Corridor</td>
</tr>
<tr>
<td>Central Coast Bicycle Corridor</td>
</tr>
<tr>
<td>Chula Vista Greenbelt</td>
</tr>
<tr>
<td>City Heights – Old Town Bicycle Corridor</td>
</tr>
<tr>
<td>Clairemont – Centre City Bicycle Corridor</td>
</tr>
<tr>
<td>Coastal Rail Trail</td>
</tr>
<tr>
<td>East County Northern Bicycle Loop</td>
</tr>
<tr>
<td>East County Southern Bicycle Loop</td>
</tr>
<tr>
<td>El Camino Real Bicycle Corridor</td>
</tr>
<tr>
<td>Encinitas – San Marcos Bicycle Corridor</td>
</tr>
<tr>
<td>Escondido Creek Bike Path Bridge and Bikeway</td>
</tr>
<tr>
<td>Gilman Bicycle Connector</td>
</tr>
<tr>
<td>Hillcrest – El Cajon Bicycle Corridor</td>
</tr>
<tr>
<td>Imperial Beach Bicycle Connector</td>
</tr>
<tr>
<td>Inland Rail Trail</td>
</tr>
<tr>
<td>Interstate 8 Bicycle Corridor</td>
</tr>
<tr>
<td>SR 15 Bikeway</td>
</tr>
<tr>
<td>Interstate 805 Bicycle Corridor</td>
</tr>
<tr>
<td>Kearny Mesa – Beaches Bicycle Corridor</td>
</tr>
</tbody>
</table>
### Table B.12 (continued)

#### Exempt Projects

##### Bikeway, Rail Trail, and Pedestrian Projects

<table>
<thead>
<tr>
<th>Project/Program Description</th>
<th>Project/Program Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kensington – Balboa Park Bicycle Corridor</td>
<td>Vista Way Bicycle Connector</td>
</tr>
<tr>
<td>West Bernardo Bike Path</td>
<td></td>
</tr>
<tr>
<td>Bridge Rehabilitation/Preservation/Retrofit</td>
<td>Traveler Information Program</td>
</tr>
<tr>
<td>Collision Reduction</td>
<td>Bus on Shoulder Service</td>
</tr>
<tr>
<td>Emergency Response</td>
<td>Compass Card</td>
</tr>
<tr>
<td>Hazard Elimination/Safe Routes to School</td>
<td>FasTrak®</td>
</tr>
<tr>
<td>Highway Maintenance</td>
<td>Freeway Service Patrol</td>
</tr>
<tr>
<td>Safety Improvement Program</td>
<td>Vehicle Automation</td>
</tr>
<tr>
<td>Roadway/Roadside Preservation</td>
<td>Regional Vanpool Program</td>
</tr>
<tr>
<td>Smart Growth Incentive Program</td>
<td>Multimodal Integration and Performance-Based Management</td>
</tr>
<tr>
<td>Safe Routes to Transit</td>
<td>Arterial, Freeway, and Transit Management</td>
</tr>
<tr>
<td>Safe Routes to School</td>
<td>Intelligent Transportation System for Transit</td>
</tr>
<tr>
<td><strong>Transit Terminals</strong></td>
<td></td>
</tr>
<tr>
<td>Airport Intermodal Transit Center/Terminal</td>
<td>Joint Transportation Operations Center</td>
</tr>
<tr>
<td>San Ysidro Intermodal Transit Center/Terminal</td>
<td>Trolley Fiber Communication Network</td>
</tr>
<tr>
<td></td>
<td>Electronic Payment Systems and Universal Transportation Account</td>
</tr>
<tr>
<td></td>
<td>Various Traffic Signal Optimization/Prioritization</td>
</tr>
<tr>
<td></td>
<td>Transit Infrastructure Electrification</td>
</tr>
<tr>
<td></td>
<td>Employer Services and Outreach</td>
</tr>
<tr>
<td></td>
<td>Commuter Services and Bike Program</td>
</tr>
<tr>
<td></td>
<td>Mobility Hubs</td>
</tr>
<tr>
<td></td>
<td>Active Traffic and Demand Management</td>
</tr>
<tr>
<td></td>
<td>Shared Mobility Services</td>
</tr>
</tbody>
</table>
Implementation of Transportation Control Measures
There are four federally-approved Transportation Control Measures (TCMs) that must be implemented in San Diego, which the SIP refers to as transportation tactics. They include: (1) ridesharing, (2) transit improvements, (3) traffic flow improvements, and (4) bike facilities and programs.

These TCMs were established in the 1982 SIP, which identified general objectives and implementing actions for each tactic. The TCMs have been fully implemented. Ridesharing, transit, biking, and traffic flow improvements continue to be funded, although the level of implementation established in the SIP has been surpassed. Information regarding transit projects can be seen in Table B.13, and Appendix A. More detailed information regarding ridesharing and traffic flow improvements is included in Appendix E and information regarding bike facilities and programs is included in Appendix A.

Interagency Consultation Process and Public Input
The consultation process followed to prepare the Air Quality Conformity Analysis for the Regional Plan and 2014 RTIP Amendment No. 7 complies with the San Diego Transportation Conformity Procedures adopted in July 1998. In turn, these procedures comply with federal requirements under 40 CFR §93.106(a)(1). Interagency consultation involves SANDAG (as the MPO for San Diego County), the APCD, Caltrans, ARB, U.S. DOT, and U.S. EPA.

Consultation is a three-tier process that:

- Formulates and reviews drafts through a conformity working group
- Provides local agencies and the public with opportunities for input through existing regional advisory committees and workshops
- Seeks comments from affected federal and state agencies through participation in the development of draft documents and circulation of supporting materials prior to formal adoption

SANDAG consulted on the development of the Air Quality Conformity Analysis of the Regional Plan and 2014 RTIP Amendment No. 7 at public meetings of the San Diego Region CWG, the Transportation Committee, and Board of Directors, as follows:

- On September 5, 2012, SANDAG staff presented information on the agencywide Public Participation Plan (PPP), which serves as an umbrella document for all planning efforts conducted by the agency for discussion. Staff also presented information on Regional Plan draft work program, schedule, and Public Involvement Plan (PIP) for discussion.
- On December 5, 2012, SANDAG staff held a discussion with the CWG on the draft PPP update, which was accepted by the SANDAG Board of Directors at the October 26, 2012, meeting and released for a 45-day public comment period.
- On February 6, 2013, SANDAG staff held a discussion with the CWG on the draft PIP, which was released for public review and comment on January 7, 2013, for a 30-day review period.
- On December 4, 2013, SANDAG staff presented information on the Regional Plan schedule, 2050 regional growth forecast, and transportation modeling for discussion.
- On August 6, 2014, SANDAG staff presented the schedule and updates for the preparation of the Regional Plan and its air quality conformity analysis. Staff presented information on the Series 13 2050 Regional Growth Forecast, 2050 Revenue Forecast, and latest emissions model and emissions budgets.
On September 12, 2014, the SANDAG Board of Directors selected the Revenue Constrained Transportation Scenario for use in developing the Draft Regional Plan. SANDAG staff initiated the air quality conformity modeling for the Draft Regional Plan in September 2014.

On October 1, 2014, SANDAG staff presented further information about the criteria and procedures to be followed for the conformity analysis. Staff presented information on the schedule, transportation modeling, latest emissions model and emissions budgets, TCMs, and public involvement and outreach. Staff confirmed that a redetermination of conformity would be done for the 2014 RTIP Amendment No. 7, in conjunction with the Regional Plan for consistency purposes.

On October 3, 2014, SANDAG staff distributed the draft list of capacity increasing and non-capacity increasing projects to be included in the draft 2014 RTIP Amendment No. 7 for interagency consultation.

On November 14, 2014, SANDAG released the draft air quality conformity analysis of the Regional Plan and 2014 RTIP Amendment No. 7 to the CWG for a 30-day review-and-comment period. The draft air quality analysis was discussed at the December 3, 2014, meeting of the CWG.

On January 30, 2015, SANDAG released the revised draft air quality conformity analysis of the Regional Plan and 2014 RTIP Amendment No. 7, which incorporates emissions analysis utilizing the EMFAC 2014 model, to the CWG for a 30-day review-and-comment period. The draft air quality analysis was discussed at the February 4, 2015, meeting of the CWG.

On April 24, 2015, the SANDAG Board of Directors released the Draft Regional Plan and the 2014 RTIP Amendment No. 7 and its conformity analysis for public review and comment.

On May 21, 2015, the draft Regional Plan EIR was released for a 55-day public comment period. The comment period for the Draft Regional Plan and its conformity analysis, and draft EIR closed on July 15, 2015.

Two public hearings were held on the draft Regional Plan and its conformity determination and the 2014 RTIP Amendment No. 7 conformity determination on June 12, 2015, and June 18, 2015.

Based on comments received from the public and member agencies, refinements were made to the final Regional Plan network. The air quality conformity analysis was released to the CWG and the public on August 19, 2015. The comment period closed on September 25, 2015. The emissions analysis was conducted using the EMFAC2011 and EMFAC2014 v.1.0.7 models.

Members of the public are able to provide comments at meetings of the CWG, the Transportation Committee, and the SANDAG Board of Directors.
<table>
<thead>
<tr>
<th>Conformity Analysis Year</th>
<th>Service</th>
<th>Route</th>
<th>Description</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2025</td>
<td>COASTER</td>
<td>398</td>
<td>Double tracking (20-minute peak frequencies and 120-minute off-peak frequencies and station/platform at Del Mar Fairgrounds)</td>
<td>$445</td>
<td>$445</td>
</tr>
<tr>
<td>2025</td>
<td>SPRINTER</td>
<td>399</td>
<td>SPRINTER efficiency improvements (20-minute frequencies by 2025); double tracking Oceanside to Escondido for 10-minute frequencies and six rail grade separations at El Camino Real, Melrose Dr, Vista Village Dr/Main St, North Dr, Civic Center, Auto Pkwy and Mission Ave</td>
<td>$946</td>
<td>$1339</td>
</tr>
<tr>
<td>2025</td>
<td>Trolley</td>
<td>510</td>
<td>Mid-Coast Trolley Extension</td>
<td>$1,753</td>
<td>$1,753</td>
</tr>
<tr>
<td>2025</td>
<td>Rapid</td>
<td>2</td>
<td>North Park to downtown San Diego via 30th St</td>
<td>$39</td>
<td>$52</td>
</tr>
<tr>
<td>2025</td>
<td>Rapid</td>
<td>10</td>
<td>La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town</td>
<td>$87</td>
<td>$117</td>
</tr>
<tr>
<td>2025</td>
<td>Rapid</td>
<td>120</td>
<td>Kearny Mesa to downtown via Mission Valley</td>
<td>$78</td>
<td>$104</td>
</tr>
<tr>
<td>2025</td>
<td>Rapid</td>
<td>SR 163</td>
<td>Kearny Mesa to downtown via SR 163. Stations at Sharp/Children's Hospital, University Ave, and Fashion Valley Transit Center</td>
<td>$150</td>
<td>$196</td>
</tr>
<tr>
<td>2025</td>
<td>Rapid</td>
<td>550</td>
<td>SDSU to Palomar Station via East San Diego, Southeast San Diego, National City</td>
<td>$59</td>
<td>$78</td>
</tr>
<tr>
<td>2025</td>
<td>Rapid</td>
<td>225</td>
<td>South Bay Rapid (Otay Mesa to downtown) and Otay Mesa ITC (formerly Route 628)</td>
<td>$206</td>
<td>$206</td>
</tr>
<tr>
<td>2025</td>
<td>Rapid</td>
<td>709</td>
<td>H St Trolley Station to Millennia via H St Corridor, Southwestern College</td>
<td>$37</td>
<td>$49</td>
</tr>
<tr>
<td>2025</td>
<td>Rapid</td>
<td>905</td>
<td>Extension of Iris Trolley Station to Otay Mesa Port of Entry (POE) route with new service to Otay Mesa East POE and Imperial Beach</td>
<td>$2</td>
<td>$2</td>
</tr>
<tr>
<td>2025</td>
<td>Streetcar</td>
<td>554</td>
<td>Hillcrest/Balboa Park/downtown San Diego Loop¹</td>
<td>$29</td>
<td>$38</td>
</tr>
<tr>
<td>2025</td>
<td>Airport Express</td>
<td>--</td>
<td>Airport Express Routes²</td>
<td>$52</td>
<td>$62</td>
</tr>
<tr>
<td>2025</td>
<td>Shuttle</td>
<td>448/449</td>
<td>San Marcos Shuttle³</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2025</td>
<td>Transit Lanes</td>
<td>SR 15 from I-805 to I-8</td>
<td>Transit Lane improvement for routes 235, 280/290, 653, and Airport Express Route to Tijuana International Airport. Existing facility at 8F, with improvement of 8F+2TL</td>
<td>$56</td>
<td>$56</td>
</tr>
<tr>
<td>Conformity Analysis Year</td>
<td>Service</td>
<td>Route</td>
<td>Description</td>
<td>Capital Cost ($2014); millions</td>
<td>Capital Cost ($YOE); millions</td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------</td>
<td>-------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>2025</td>
<td>Local Bus Routes - 15 minutes in key corridors</td>
<td>15     minutes in key corridors</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>2035</td>
<td>COASTER</td>
<td>398</td>
<td>Double tracking (20-minute peak frequencies and 60-minute off-peak frequencies, grade separations at Leucadia Blvd, stations/platforms at Convention Center/Gaslamp Quarter, and extension to Camp Pendleton)</td>
<td>$900</td>
<td>$1,357</td>
</tr>
<tr>
<td>2035</td>
<td>Trolley</td>
<td>510</td>
<td>Phase I - Blue Line Frequency Enhancements and rail grade separations at 28th St, 32nd St, E St, H St, Palomar St, and Blue/Orange Track Connection at 12th/Imperial</td>
<td>$205</td>
<td>$292</td>
</tr>
<tr>
<td>2035</td>
<td>Trolley</td>
<td>520</td>
<td>Orange Line Frequency Enhancements and four rail grade separations at Euclid Ave, Broadway/Lemon Grove Ave, Allison Ave/University Ave, Severin Dr</td>
<td>$267</td>
<td>$402</td>
</tr>
<tr>
<td>2035</td>
<td>Trolley</td>
<td>561</td>
<td>UTC to COASTER Connection (extension of Route 510)</td>
<td>$343</td>
<td>$602</td>
</tr>
<tr>
<td>2035</td>
<td>Trolley</td>
<td>562</td>
<td>Phase I - San Ysidro to Kearny Mesa via Chula Vista via Highland Ave/4th Ave, National City, Southeast San Diego, Mid-City, and Mission Valley</td>
<td>$2,333</td>
<td>$4,028</td>
</tr>
<tr>
<td>2035</td>
<td>Rapid</td>
<td>11</td>
<td>Spring Valley to SDSU via Southeast San Diego, downtown, Hillcrest, Mid-City</td>
<td>$113</td>
<td>$173</td>
</tr>
<tr>
<td>2035</td>
<td>Rapid</td>
<td>28</td>
<td>Point Loma to Kearny Mesa via Old Town, Linda Vista</td>
<td>$49</td>
<td>$76</td>
</tr>
<tr>
<td>2035</td>
<td>Rapid</td>
<td>30</td>
<td>Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC</td>
<td>$105</td>
<td>$161</td>
</tr>
<tr>
<td>2035</td>
<td>Rapid</td>
<td>41</td>
<td>Fashion Valley to UTC/UC San Diego via Linda Vista and Clairemont</td>
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<td>El Cajon Transit Center to San Diego International Airport ITC via SR 94, City College (peak only)</td>
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<td>Conformity Analysis Year</td>
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<td>2035</td>
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<td>638</td>
<td>Iris Trolley Station to Otay Mesa via Otay, Airway Dr, SR 905 Corridor</td>
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<td>$67</td>
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| 2035                     | Rapid   | 640A/640B | Route 640A: I-5 - San Ysidro to Old Town Transit Center via City College  
Route 640B: I-5 Iris Trolley/Palomar to Kearny Mesa via Chula Vista, National City and City College | $153                           | $206                          |
| 2035                     | Rapid   | 688/689/690 | Route 688: San Ysidro to Sorrento Mesa via I-805/I-15/SR-52 Corridors (Peak Only)  
Route 689: Otae Mesa Port of Entry (POE) to UTC/Torrey Pines via Otay Ranch/ Millennia, I-805 Corridor (Peak Only)  
Route 690: Mid-City to Sorrento Mesa via I-805 Corridor (Peak Only) | $458                           | $653                          |
| 2035                     | Rapid   | 910   | Coronado to Downtown via Coronado Bridge                                                                                                                                                                    | $26                            | $39                           |
| 2035                     | Streetcar | 553  | Downtown San Diego: Little Italy to East Village¹                                                                                                                                                           | $14                            | $21                           |
| 2035                     | Streetcar | 555  | 30th St to Downtown San Diego via North Park/Golden Hill¹                                                                                                                                                   | $26                            | $45                           |
|                          |         |       | Local Bus Routes - 10 minutes in key corridors                                                                                                                                                              | --                             | --                            |
| 2040                     | SPRINTER | 588  | SPRINTER Express                                                                                                                                                                                             | $244                           | $492                          |
| 2040                     | Trolley  | 510   | Phase II - Blue Line rail grade separations at Taylor St and Ash St                                                                                                                                           | $226                           | $449                          |
| 2040                     | Trolley  | 563   | Pacific Beach to Balboa and Grossmont to Kearny Mesa                                                                                                                                                        | $610                           | $1,229                        |
| 2040                     | Rapid   | 103   | Solana Beach to Sabre Springs Rapid station via Carmel Valley                                                                                                                                                | $67                            | $135                          |
| 2040                     | Rapid   | 440   | Carlsbad to Escondido Transit Center via Palomar Airport Rd                                                                                                                                                 | $51                            | $104                          |
| 2040                     | Rapid   | 473   | Phase II - Oceanside to Solana Beach via Hwy 101 Coastal Communities                                                                                                                                       | $87                            | $176                          |
| 2040                     | Rapid   | 477   | Camp Pendleton to Carlsbad Village via College Blvd, Plaza Camino Real                                                                                                                                      | $80                            | $161                          |
| 2040                     | Rapid   | 235   | Temecula (peak only) Extension of Escondido to Downtown Rapid (formerly Route 610)                                                                                                                                 | $98                            | $198                          |
## Table B.13 (continued)
### Revenue Constrained Scenario Transit Services

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<tr>
<th>Conformity Year</th>
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<th>Capital Cost ($YOE); millions</th>
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<td>2040</td>
<td>Rapid</td>
<td>636</td>
<td>SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline</td>
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<td>North Park to 32nd St Trolley Station via Golden Hill</td>
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<td>COASTER double tracking (completes double tracking; includes Del Mar Tunnel) and grade separations</td>
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<td>El Cajon to UTC via Santee, SR 52, I-805</td>
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Notes:  
1. Streetcar cost is representative of 10 percent of the total capital cost.  
2. Implementation of these services is dependent upon funding from aviation and other private sources.  
3. Capital cost to be funded by the City of San Marcos.
### Table B.14
**Revenue Constrained Scenario Managed Lane and Highway Project List**

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<tr>
<th>Conformity Year</th>
<th>Freeway</th>
<th>From</th>
<th>To</th>
<th>Existing</th>
<th>With Improvements</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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<tbody>
<tr>
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<td>I-5</td>
<td>La Jolla Village Dr</td>
<td>I-5/805 Merge</td>
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<td>8F/14F+2ML</td>
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<td>SR 78</td>
<td>Vandegrift Blvd</td>
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<td>$100</td>
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<td>I-5</td>
<td>Manchester Ave</td>
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<td>I-8</td>
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<td>Carroll Canyon Rd</td>
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**Managed Lanes / Toll Lanes**
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<th>To</th>
<th>Existing</th>
<th>With Improvements</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost (SYOE); millions</th>
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<tbody>
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<td>Twin Oaks</td>
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### Revenue Constrained Scenario Managed Lane and Highway Project List

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<th>From</th>
<th>To</th>
<th>Existing</th>
<th>With Improvements</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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<td>SR 76</td>
<td>I-15</td>
<td>Couser Canyon</td>
<td>2C/4C</td>
<td>4C/6C+ Operational</td>
<td>$131</td>
<td>$261</td>
</tr>
<tr>
<td>2050</td>
<td>I-5</td>
<td>I-15</td>
<td>I-8</td>
<td>8F</td>
<td>8F+ Operational</td>
<td>$1,177</td>
<td>$2,919</td>
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<tr>
<td>2050</td>
<td>I-8</td>
<td>I-5</td>
<td>SR 125</td>
<td>8F/10F</td>
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<td>$667</td>
<td>$1,654</td>
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<td><strong>Managed Lanes Connectors</strong></td>
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<tr>
<td>2025</td>
<td>I-5</td>
<td>SR 78</td>
<td>South to East &amp; West to North, North to East &amp; West to South</td>
<td>$253</td>
<td>$332</td>
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<tr>
<td>2025</td>
<td>I-5</td>
<td>I-805</td>
<td>North to North &amp; South to South</td>
<td>$51</td>
<td>$66</td>
<td></td>
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<tr>
<td>2025</td>
<td>I-15</td>
<td>SR 78</td>
<td>East to South &amp; North to West</td>
<td>$106</td>
<td>$139</td>
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<tr>
<td>2025</td>
<td>SR 15</td>
<td>I-805</td>
<td>North to North &amp; South to South</td>
<td>$81</td>
<td>$106</td>
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Table B.14 (continued)
Revenue Constrained Scenario Managed Lane and Highway Project List

<table>
<thead>
<tr>
<th>Conformity Analysis Year</th>
<th>Freeway</th>
<th>From</th>
<th>To</th>
<th>Capital Cost ($2014); millions</th>
<th>Capital Cost ($YOE); millions</th>
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<tr>
<td>Managed Lanes Connectors (continued)</td>
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<tr>
<td>2025 I-805 SR 94</td>
<td></td>
<td>North to West &amp; East to South</td>
<td>$101</td>
<td>$133</td>
<td></td>
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<tr>
<td>2035 SR 15 SR 94</td>
<td></td>
<td>South to West &amp; East to North</td>
<td>$71</td>
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<td>2040 I-805 SR 52</td>
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<td>West to North &amp; South to East</td>
<td>$91</td>
<td>$181</td>
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<tr>
<td>2050 I-15 SR 52</td>
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<td>West to North &amp; South to East</td>
<td>$130</td>
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<td>Freeway Connectors</td>
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<tr>
<td>2025 I-5 SR 78</td>
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<td>South to East &amp; West to South</td>
<td>$273</td>
<td>$358</td>
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<tr>
<td>2025 SR 11/SR 905 SR 125</td>
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<td>EB SR 905 and WB SR 11 to NB SR 125, NB SR 905 to NB SR 125</td>
<td>$26</td>
<td>$28</td>
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<tr>
<td>2025 SR 11/SR 905 SR 125</td>
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<td>SB 125 to WB SR 905, SB SR 125 to EB SR 11, SB SR 125 to SB SR 905</td>
<td>$74</td>
<td>$90</td>
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<td>2025 SR 94 SR 125</td>
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<td>South to East</td>
<td>$69</td>
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<tr>
<td>2035 I-5 SR 56</td>
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<td>West to North &amp; South to East</td>
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<td>$411</td>
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<tr>
<td>2035 SR 94 SR 125</td>
<td></td>
<td>West to North</td>
<td>$81</td>
<td>$122</td>
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</tr>
<tr>
<td>2050 I-15 SR 56</td>
<td></td>
<td>North to West</td>
<td>$101</td>
<td>$265</td>
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</tr>
<tr>
<td>Year</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
<td>Project Description</td>
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<tr>
<td>2015</td>
<td>CB04A</td>
<td>Carlsbad</td>
<td>El Camino Real Widening - Tamarack Ave to Chestnut Ave</td>
<td>In Carlsbad, widen El Camino Real to prime arterial standards with three travel lanes, bike lanes, and sidewalks in each direction including intersection improvements at Tamarack Avenue and Chestnut Avenue</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>CHV08</td>
<td>Chula Vista</td>
<td>Willow St Bridge Project - Bonita Rd to Sweetwater Rd</td>
<td>Replace 2-lane bridge with 4-lane bridge (Phase I)</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>SD32</td>
<td>San Diego</td>
<td>Carroll Canyon Rd</td>
<td>Carroll Canyon Road from Scranton Road to I-805: extend Carroll Canyon under I-805 including improvements to on/off ramps</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB04B</td>
<td>Carlsbad</td>
<td>El Camino Real and Cannon Rd</td>
<td>In Carlsbad, along the eastside of El Camino Real just south of Cannon Road, widen to prime arterial standards with three through lanes, a right turn lane, and a sidewalk approaching the intersection</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB04C</td>
<td>Carlsbad</td>
<td>El Camino Real - Lisa St to Crestview Dr</td>
<td>In Carlsbad, along the west side of El Camino Real, roadway widening to provide three southbound through lanes, curb, gutter, and sidewalk per prime arterial standards</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB12</td>
<td>Carlsbad</td>
<td>College Blvd Reach A - Badger Ln to Cannon Rd</td>
<td>In Carlsbad, from Badger Lane to Cannon Road, construct a new segment of College Boulevard to provide 4-lane roadway with raised median, bike lanes, and sidewalks/trails in accordance with major arterial standards</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB13</td>
<td>Carlsbad</td>
<td>Poinsettia Ln Reach E - Cassia Dr to Skimmer Ct</td>
<td>In Carlsbad, from Cassia Drive to Skimmer Court, construct a new 4-lane roadway with median, bike lanes, and sidewalks/trails to major arterial standards</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB22</td>
<td>Carlsbad</td>
<td>Avenida Encinas, widen from Palomar Airport Rd to EWPCF</td>
<td>In Carlsbad, Avenida Encinas from Palomar Airport Road southerly to existing improvements adjacent to the Embarcadero Lane, roadway widening to secondary arterial standards</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB30</td>
<td>Carlsbad</td>
<td>El Camino Real – El Camino Real to Tamarack Ave</td>
<td>In Carlsbad, at the intersection of El Camino Real and Tamarack Avenue, construct a second left turn lane from El Camino Real to westbound Tamarack</td>
<td></td>
</tr>
<tr>
<td>Conformity Analysis Year</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
<td>Project Description</td>
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<tr>
<td>2025</td>
<td>CB31</td>
<td>Carlsbad</td>
<td>El Camino Real – La Costa Ave to Arenal Rd</td>
<td>In Carlsbad, along El Camino Real from 700 feet north of La Costa Avenue to Arenal Road, widening along the southbound side of the roadway to provide three travel lanes and a bike lane in accordance with prime arterial standards</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB32</td>
<td>Carlsbad</td>
<td>El Camino Real Widening - Cassia to Camino Vida Roble</td>
<td>In Carlsbad, widen El Camino Real from 900 feet north of Cassia Road to Camino Vida Roble, along the northbound side of the roadway to provide three travel lanes and a bike lane in accordance with prime arterial standards</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB34</td>
<td>Carlsbad</td>
<td>Palomar Airport Rd - Palomar Airport Rd to Paseo Del Norte</td>
<td>In Carlsbad, widening along eastbound Palomar Airport Road to provide a dedicated right turn lane to southbound Paseo Del Norte</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB35</td>
<td>Carlsbad</td>
<td>Palomar Airport Rd - Palomar Airport Rd to Paseo Del Norte</td>
<td>In Carlsbad, lengthen the left turn pocket along eastbound Palomar Airport Road to northbound Paseo Del Norte</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CB38</td>
<td>Carlsbad</td>
<td>El Camino Real – Cannon Rd to Tamarack Ave</td>
<td>El Camino Real from Cannon Road to Tamarack, widen along both sides of El Camino Real from Cannon Road to Tamarack Avenue excluding the limits of project CB04C, to provide a raised median, three travel lanes, bike lane, curb, gutter, and walkway along both sides per prime arterial standards, and a new traffic signal at Lisa Street</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CHV08</td>
<td>Chula Vista</td>
<td>Willow St Bridge Project - Bonita Rd to Sweetwater Rd</td>
<td>Replace 2-lane bridge with 4-lane bridge (Phase II)</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>CHV69</td>
<td>Chula Vista</td>
<td>Heritage Rd Bridge</td>
<td>Heritage Road from Main Street/Nirvana Avenue to Entertainment Circle, widen and lengthen bridge over Otay River from 4-lane to 6-lane bridge that accommodates shoulders, sidewalk, and medial; project is on Heritage Road from the intersection of Main Street and Nirvana Avenue to Entertainment Circle</td>
<td></td>
</tr>
<tr>
<td>Conformity Analysis Year</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
<td>Project Description</td>
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<tr>
<td>2025 CNTY14</td>
<td>San Diego County</td>
<td>South Santa Fe Ave North - Montgomery Dr to South of Woodland Dr</td>
<td>Vista City limits to 700 feet south of Woodland, reconstruct and widen from 2 to 4 lanes including bicycle lane; more detail in 2014 RTIP Project List</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025 CNTY14A</td>
<td>San Diego County</td>
<td>South Santa Fe Ave South</td>
<td>South Santa Fe from 700 feet south of Woodland Drive to Smilax Road, widening of South Santa Fe Avenue to a 5-lane major road with a center left turn lane, curb, gutter, sidewalk, bike lanes, and drainage improvements from 700 feet south of Woodland Drive to Smilax Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025 CNTY21</td>
<td>San Diego County</td>
<td>Bradley Ave Overpass at SR 67</td>
<td>Widen Bradley Avenue from Magnolia Avenue to Mollison Avenue; widen from 2 lanes to 4 lanes plus sidewalks. Replace 2-lane bridge over SR 67 with a 6-lane bridge which accommodates turn pockets.</td>
<td></td>
<td></td>
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<tr>
<td>2025 CNTY24</td>
<td>San Diego County</td>
<td>Cole Grade Rd</td>
<td>Cole Grade Road from north of Horse Creek Trail to south of Pauma Heights Road, widen to accommodate 14-foot traffic lane in both directions, 12-foot center 2-way left turn, 6-foot bike lane and 10-foot pathway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025 CNTY34</td>
<td>San Diego County</td>
<td>Dye Rd Extension</td>
<td>Dye Road to San Vicente Road - in Ramona, study, design, and construct a 2-lane community collector road with intermittent turn lanes, bike lanes, curb, gutter, and pathway/walkway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025 CNTY35</td>
<td>San Diego County</td>
<td>Ramona St Extension</td>
<td>From Boundary Avenue to Warnock Drive - in the community of Ramona, construct new road extension, 2 lanes with intermittent turn lanes, bike lanes, and walkway/pathway</td>
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</tr>
<tr>
<td>2025 CNTY36</td>
<td>San Diego County</td>
<td>San Vicente Rd Improvements</td>
<td>From Warnock Drive to Wildcat Canyon Road - in Ramona, design and reconstruct road improvements, including 2-lane community collector road with intermittent turn lanes, bike lanes, asphalt concrete dike, and pathway/walkway</td>
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<td></td>
</tr>
<tr>
<td>Conformity Analysis Year</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
<td>Project Description</td>
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<tr>
<td>2025</td>
<td>CNTY39</td>
<td>San Diego County</td>
<td>Bear Valley Pkwy North</td>
<td>From San Pasqual Valley Road to Boyle Avenue - widen from 2 to 4 lanes, with a center median, a bike lane and shoulder in each direction of travel</td>
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<tr>
<td>2025</td>
<td>CNTY82</td>
<td>San Diego County</td>
<td>Alpine Blvd Streetscape Improvements</td>
<td>From Tavern Road to South Grade Road – in unincorporated community of Alpine, widen from 2-lane to 3-lane roadway including a median turn-lane with bicycle, parking, and pedestrian improvements</td>
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<tr>
<td>2025</td>
<td>CNTY83</td>
<td>San Diego County</td>
<td>SR67/Highland/Dye Intersection</td>
<td>From SR 67 to 1,000 feet SE of SR 67 – in Ramona, intersection widening (double left turn lanes on Dye/Highland and double through lanes with dedicated right turn lanes on SR 67), signal modification with bicycle and pedestrian improvements, and associated improvements</td>
<td></td>
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<tr>
<td>2025</td>
<td>CNTY88</td>
<td>San Diego County</td>
<td>Ashwood Street Corridor Improvements – Mapleview to Willow</td>
<td>Ashwood Street/Wildcat Canyon Road from Mapleview Street to 1100 feet north of Willow Road in Lakeside- traffic signal improvements at Mapleview and Ashwood; traffic signal installation at Willow and Ashwood/Wildcat Canyon; and the addition of turn lanes, addition of a passing lane in a non-urbanized area, bike lanes, and pedestrian facilities</td>
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<tr>
<td>2025</td>
<td>ESC02A</td>
<td>Escondido</td>
<td>East Valley/Valley Center</td>
<td>Widen roadway from 4 to 6 lanes with raised medians and left turn pockets; modify signal at Lake Wohlford and Valley Center Road; widen bridge over Escondido Creek</td>
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<tr>
<td>2025</td>
<td>ESC04</td>
<td>Escondido</td>
<td>Citracado Pkwy II</td>
<td>West Valley to Harmony Grove, widen from 2 to 4 lanes with raised medians; construct bridge over Escondido Creek</td>
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<tr>
<td>2025</td>
<td>ESC06</td>
<td>Escondido</td>
<td>El Norte Pkwy Bridge at Escondido Creek - Kaile Ln to Key Lime Way</td>
<td>Construct missing 2-lane bridge at Escondido Creek</td>
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</tr>
<tr>
<td>Conformity Analysis Year</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
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<tr>
<td>2025 ESC08 Escondido</td>
<td>ESC08</td>
<td>Escondido</td>
<td>Felicita Ave/Juniper St - from Escondido Blvd to Juniper St and from Juniper St to Chestnut St</td>
<td>Widen from 2 to 4 lanes with left turn pockets, raised medians on Felicita; new traffic signals at Juniper and Chestnut, Juniper, and 13th Avenue, Juniper and 15th Avenue; modify traffic signal at Juniper and Felicita</td>
<td></td>
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<tr>
<td>2025 ESC09 Escondido</td>
<td>ESC09</td>
<td>Escondido</td>
<td>Ninth Ave – La Terraza Blvd to Spruce St</td>
<td>Widen from 2 to 4 lanes with raised median and modify traffic signals at Ninth Avenue and Tulip Street - design phase</td>
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<tr>
<td>2025 ESC24 Escondido</td>
<td>ESC24</td>
<td>Escondido</td>
<td>Centre City Pkwy</td>
<td>Mission Road to SR 78, widen 4 lanes to 6 lanes with intersection improvements</td>
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<tr>
<td>2025 LG13 Lemon Grove</td>
<td>LG13</td>
<td>Lemon Grove</td>
<td>Lemon Grove Ave Realignment Project</td>
<td>Lemon Grove Avenue at SR 94 - a key project in the redevelopment of the city’s downtown Village Specific Plan, this project will realign Lemon Grove Avenue at SR 94 adding traffic lanes and improving access to and from SR 94, reducing motorist delays and emissions</td>
<td></td>
</tr>
<tr>
<td>2025 NC01 National City</td>
<td>NC01</td>
<td>National City</td>
<td>Plaza Blvd Widening</td>
<td>Plaza Boulevard from Highland Avenue to Euclid Avenue, widen from 2 to 3 lanes including a new traffic lane in each direction, new sidewalks, sidewalk widening, traffic signal upgrades, and interconnection at Plaza Boulevard</td>
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<tr>
<td>2025 O06 Oceanside</td>
<td>O06</td>
<td>Oceanside</td>
<td>Melrose Dr Extension</td>
<td>Melrose Drive from North Santa Fe Avenue to Spur Avenue - in Oceanside, future construction of Melrose Drive; 4-lane arterial highway with medians, sidewalks, and bike lanes between North Santa Fe Avenue and Spur Avenue</td>
<td></td>
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<tr>
<td>2025 O22 Oceanside</td>
<td>O22</td>
<td>Oceanside</td>
<td>College Blvd - Vista Way to Old Grove Rd</td>
<td>In Oceanside, widen from the existing 4 lanes to 6 lanes with bike lanes and raised median</td>
<td></td>
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<tr>
<td>2025 SD34 San Diego</td>
<td>SD34</td>
<td>San Diego</td>
<td>El Camino Real</td>
<td>In San Diego on El Camino Real from San Dieguito Road to Via de la Valle, reconstruct and widen from 2 to 4 lanes and extend transition lane and additional grading to avoid biological impacts (CIP 52-479.0)</td>
<td></td>
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<tr>
<td>2025 SD70 San Diego</td>
<td>SD70</td>
<td>San Diego</td>
<td>West Mission Bay Dr Bridge</td>
<td>In San Diego, replace bridge and increase from 4- to 6-lane bridge including Class II bike lane (52-643/500871)</td>
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<tr>
<td>Conformity Analysis Year</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
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<tr>
<td>2025</td>
<td>SD83</td>
<td>San Diego</td>
<td>SR 163/Friars Rd Interchange Modification</td>
<td>Friars Road from Avenida de las Tiendas to Mission Center Road, widen and improve Friars Road and overcrossing; reconstruct interchange including improvements to ramp intersections (Phase I). Construct new connector roadways and structures (Phase II). Construct auxiliary lanes along northbound and southbound SR 163 (Phase III).</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SD90</td>
<td>San Diego</td>
<td>SR 163/Clairemont Mesa Blvd Interchange</td>
<td>From Kearny Villa Road to Kearny Mesa - in San Diego, widen from 4- to 6-lane prime arterial; Phase II of the project - west ramps</td>
<td></td>
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<tr>
<td>2025</td>
<td>SD102A</td>
<td>San Diego</td>
<td>Otay Truck Route Widening</td>
<td>On Otay Truck Route in San Diego from Drucker Lane to La Media, add one lane (total 3 lanes) for trucks; from Britannia to La Media, add one lane for trucks and one lane for emergency vehicles (border patrol/fire department access); along Britannia from Britannia Court to the Otay Truck Route - add one lane for trucks</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SD103</td>
<td>San Diego</td>
<td>I-5/Genesee Ave Interchange</td>
<td>In San Diego, replace Genesee Avenue overcrossing from 4-lane bridge with 6-lane bridge; construct auxiliary lanes and replace Voigt Drive bridge; add additional lane at on/off ramp to Sorrento Valley Road; add one carpool lane and one general purpose lane to on-ramp from Sorrento Valley Road to southbound I-5; install ramp meters at on-ramp and construct a southbound auxiliary lane between Sorrento Valley Road and Genesee Avenue</td>
<td></td>
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<tr>
<td>2025</td>
<td>SD189</td>
<td>San Diego</td>
<td>Sea World Dr Widening and I-5 Interchange Improvements</td>
<td>In San Diego, replace existing 4-lane bridge with an 8-lane bridge with new on/off ramps; widen approachways to add right turn lanes to improve access to Interstate 5 (CIP 52-706.0)</td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
<td>Project Description</td>
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<tr>
<td>2025</td>
<td>SD190</td>
<td>San Diego</td>
<td>Palm Ave/I-805 Interchange</td>
<td>Improvements to the Palm Avenue Bridge over I-805; including repairs to the bridge approaches; a new Project Study Report (PSR) and Preliminary Environmental Assessment Report (PEAR). Phase II of the project will include widening of the bridge, realignment of existing ramps, possible addition of northbound looping entrance ramp, restriping of traffic lanes, and signal modifications.</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SM19</td>
<td>San Marcos</td>
<td>Grand Ave Bridge and Street Improvements</td>
<td>From Discovery Street to San Marcos Boulevard, construct 4-lane arterial bridge and a 6-lane arterial street from Craven to Grand Avenue</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SM22</td>
<td>San Marcos</td>
<td>South Santa Fe - Bosstick to Smilax</td>
<td>From Bosstick to Smilax, realign and signalize the South Santa Fe/Smilax intersection (Phase I)</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SM24</td>
<td>San Marcos</td>
<td>Woodland Pkwy Interchange Improvements</td>
<td>From La Moree Road to Rancheros Drive, modify existing ramps at Woodland Parkway and Barham Drive; widen and realign SR 78 undercrossing and associated work</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SM31</td>
<td>San Marcos</td>
<td>Discovery St Improvements</td>
<td>From Via Vera Cruz to Bent Avenue/Craven Road, widen roadway to 4-lane secondary arterial</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SM32</td>
<td>San Marcos</td>
<td>Via Vera Cruz Bridge and Street Improvements</td>
<td>From San Marcos Boulevard to Discovery Street, widen to 4-lane secondary arterial and construct a bridge at San Marcos Creek</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SM42</td>
<td>San Marcos</td>
<td>Street Improvements: Discovery St - Craven Rd to West of Twin Oaks Valley Rd</td>
<td>In the City of San Marcos, on Discovery Street from Craven Road to west of Twin Oaks Valley Road, construct approximately 5,100 lineal feet of a new 6-lane roadway</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SM43</td>
<td>San Marcos</td>
<td>Street Improvements and Widening on Barham Dr</td>
<td>Twin Oaks Valley Road to La Moree Road in the City of San Marcos, on Barham Drive between Twin Oaks Valley Road and La Moree Road, widen and reconstruct the north side of Barham Drive to a 6-lane prime arterial and associated work</td>
<td></td>
</tr>
<tr>
<td>Conformity Analysis Year</td>
<td>SANDAG ID</td>
<td>Lead Agency</td>
<td>Project Title</td>
<td>Project Description</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>---------------</td>
<td>---------------------</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SM48</td>
<td>San Marcos</td>
<td>Creekside Dr</td>
<td>Construct approximately 3,000 feet of a 2-lane collector road from Via Vera Cruz to Grand Avenue in the City of San Marcos. The road will include two 12-foot lanes, diagonal parking on the north side, and parallel parking on the south side. In addition, the project also will include a 10-foot bike trail meandering along the south side.</td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>SM55</td>
<td>San Marcos</td>
<td>Borden Rd Widening and Improvements</td>
<td>Borden Road from Vineyard to Richland, widening of Borden Road will add an additional roadway capacity to accommodate increase in traffic volumes</td>
<td></td>
</tr>
<tr>
<td>2035</td>
<td>SD81</td>
<td>San Diego</td>
<td>Genesee Ave - Nobel Dr to SR 52</td>
<td>In San Diego, future widening to 6-lane major street north of Decoro Street and to a 6-lane primary arterial south of Decoro Street and included Class II bicycle lanes (CIP 52-458.0)</td>
<td></td>
</tr>
<tr>
<td>2035</td>
<td>SD190</td>
<td>San Diego</td>
<td>Palm Avenue/Interstate I-805 Interchange</td>
<td>Phase III will provide the ultimate build-out of the project which will incorporate improvements of Phase II plus the northbound and southbound entrance ramps (CIP 52-640.0)</td>
<td></td>
</tr>
<tr>
<td>2035</td>
<td>SM10</td>
<td>San Marcos</td>
<td>SR 78/Smilax</td>
<td>Construct new interchange at Smilax Road interchange and SR 78 improvements</td>
<td></td>
</tr>
</tbody>
</table>

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

1 One small portion of tribal land (approximately 119 acres) of the Pechanga Band of Luiseño Indians purchased within the north portion of San Diego County was excluded from the San Diego region 2008 Eight-Hour Ozone Standard non-attainment designation. All other tribal lands within San Diego County were included in the designation.

2 Appendix T: SANDAG Travel Demand Model and Forecasting Documentation includes additional detail regarding the overall model structure.

3 Full-time employment is defined in the SANDAG 2006 household survey as at least 30 hours/week. Part-time is less than 30 hours/week on a regular basis.

4 GP: general purpose lanes of a freeway.
Appendix C
Sustainable Communities Strategy Documentation and Related Information

Appendix Contents
SB 375 Greenhouse Gas Reduction Targets set by the California Air Resources Board and Results of Greenhouse Gas Emissions Reductions
Housing Goals, Capacity, and Proximity to Transit
SANDAG Sustainable Communities Strategy Documentation
Figures Supporting the Sustainable Communities Strategy

Attachments:
1. Correspondence on Technical Methodology to Estimate Greenhouse Gas Emissions
2. SANDAG Off-Model Greenhouse Gas Reduction Methodology
Sustainable Communities Strategy Documentation and Related Information

This appendix includes documentation in support of the Sustainable Communities Strategy (SCS) pursuant to Senate Bill 375 (Steinberg, 2008) (SB 375). This appendix includes a matrix that outlines the requirements in SB 375 and where the Regional Plan addresses the requirements, either in specific chapters of the Regional Plan or in specified appendices (Table C.4). The resource mapping prepared by SANDAG is based on the best practically available scientific information regarding resource areas and farmland. The source data includes: (1) 1995 data for the eastern two-thirds of the County, which cover the entire region and use the Holland classification system (Holland 1996; Oberbauer et al., 2008); (2) 2012 data which cover much of the western one-third of the region and use a classification system of groups, alliances, and associations based on the National Vegetation Classification Standard and the California Manual of Vegetation (Sproul et al., 2011; Sawyer et al., 2009); and (3) Department of Conservation Farmland Mapping and Monitoring Program data, 2010.

This appendix includes the following figures to support the SCS:

- Figure C.1: Housing Near High Frequency Transit
- Figure C.2: 2020 Land Use
- Figure C.3: 2035 Land Use
- Figure C.4: San Diego Region Wetlands
- Figure C.5: San Diego Region Important Agricultural Lands
- Figure C.6: San Diego Regional Habitat Preserved Lands
- Figure C.7: San Diego Region Generalized Vegetation
- Figure C.8: Potential Aggregate Supply Sites
- Figure C.9: 2020 Employment and Housing Density
- Figure C.10: 2035 Employment and Housing Density
- Figure C.11: 2035 Potential Transit Priority Project Areas

Appendix C also contains links to two SANDAG Board of Directors reports that support the development of the transportation network selected for San Diego Forward: The Regional Plan:

- August 15, 2014 – Draft Revenue Constrained Transportation Scenarios
- September 12, 2014 – Preferred Revenue Constrained Transportation Scenario
The Technical Methodology to estimate greenhouse gas emissions submitted to the California Air Resources Board (ARB) on June 7, 2013, as well as ARB’s acknowledgment of receiving this methodology also are included in Appendix C, Attachment 1.

- June 7, 2013 – Correspondence from SANDAG to ARB regarding Technical Methodology to estimate greenhouse gas emissions from the San Diego Association of Governments Sustainable Communities Strategy.
- August 12, 2013 – Correspondence from ARB to SANDAG regarding Technical Methodology to estimate greenhouse gas emissions.

**SB 375 Greenhouse Gas Reduction Targets set by the California Air Resources Board and Results of Greenhouse Gas Emissions Reductions**

The path toward living more sustainably is clear: focus housing and job growth in urbanized areas where there is existing and planned transportation infrastructure, protect sensitive habitat and open space, invest in a transportation network that provides people with transportation options that reduce greenhouse gas emissions, and implement the plan through incentives and collaboration.

As part of its mandate under SB 375, in 2010 the California Air Resources Board (ARB) set specific targets for reducing greenhouse gas emissions for cars and light trucks for each of the state’s regions from a 2005 base year. The greenhouse gas targets set for the San Diego region call for a 7 percent per capita reduction by 2020, and a 13 percent per capita reduction by 2035. The SCS will result in a 15 percent reduction in emissions by 2020, and a 21 percent reduction by 2035 – far more than what the state mandates require – as shown in Table C.1. The greenhouse gas reductions for the final Regional Plan were calculated using the ARB model EMFAC 2014 v. 1.0.7 and adjustment factors provided by ARB to account for differences in emission rates between EMFAC 2007 (used to set the targets) and this latest version of the emissions model (EMFAC 2014 v.1.0.7). The per capita greenhouse gas reductions for 2020 and 2035 have changed from the draft Regional Plan to the final Regional Plan by 3 percentage points. The ARB adjustment factor for SANDAG reduces the per capita results for both 2020 and 2035 by 2 percentage points. For example, before the ARB adjustment, per capita reductions for 2020 were 17 percent, and after applying the adjustment, the reductions become 15 percent. The additional 1 percentage point difference for 2020 and 2035 is due to final travel demand model runs, which also use EMFAC 2014 v.1.0.7 to estimate greenhouse gas emissions. Attachment 2 describes the off-model greenhouse gas reduction methodology that supplements the SANDAG Activity Based Model calculations as well as the ARB adjustment referenced above.

<table>
<thead>
<tr>
<th>Table C.1</th>
<th>SB 375 Greenhouse Gas Reduction Targets and Regional Plan Greenhouse Gas Emissions Reductions Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2020</td>
</tr>
<tr>
<td>ARB Targets</td>
<td>7 percent</td>
</tr>
<tr>
<td>Greenhouse Gas Emissions Reductions</td>
<td>15 percent</td>
</tr>
</tbody>
</table>

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

Source: ARB and SANDAG
Breakdown of the Regional Plan’s SCS Components that Contribute to SB 375 Per Capita Greenhouse Gas Reductions

Several components and strategies contribute toward SB 375 per capita greenhouse gas reductions from passenger vehicles. Approximately half of the reductions would result from the Regional Plan’s investments in transit projects and their operations, managed lanes, active transportation projects, and TDM measures that support teleworking (i.e., working from home or telecommuting). About one-quarter of the reductions are estimated from changing land use and population characteristics, while another quarter are projected from increases in the cost of driving (auto operating costs).

Housing Goals

Figure C.1 and Table C.2 show that the number of homes located within one half-mile of high frequency public transit services will increase from 35 percent in 2012 to 63 percent in 2050 (for population this increase is 35 percent to 61 percent). This increase is due to new transit services, detailed in Appendix A: Transportation Projects, Costs, and Phasing, and to growth being primarily concentrated in the urbanized areas.

![Figure C.1: Housing Near High Frequency Public Transit](image-url)

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2020</th>
<th>2035</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within Half Mile of Transit</td>
<td>412,050</td>
<td>648,622</td>
<td>831,837</td>
<td>929,785</td>
</tr>
<tr>
<td>Not Within Half Mile of Transit</td>
<td>753,768</td>
<td>601,062</td>
<td>562,946</td>
<td>562,150</td>
</tr>
<tr>
<td>Total</td>
<td>1,165,818</td>
<td>1,249,684</td>
<td>1,394,783</td>
<td>1,491,935</td>
</tr>
</tbody>
</table>
Table C.3 shows that the projected increase in new housing capacity is generally higher for areas with densities above 20 dwelling units per acre. The increases reflect extensive work by local jurisdictions to update general and specific plans to accommodate future growth and development in the urbanized areas of the region where existing and planned public transit is located.
### Table C.3
**Series 13 Regional Growth Forecast Estimated Housing Capacity by Jurisdiction and Subregion**

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>0 to 10</th>
<th>10 to 20</th>
<th>20 to 30</th>
<th>30+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of San Diego</td>
<td>46,446</td>
<td>11,328</td>
<td>49,508</td>
<td>84,747</td>
<td>192,029</td>
</tr>
<tr>
<td>Unincorporated</td>
<td>40,625</td>
<td>11,330</td>
<td>4,621</td>
<td>5,794</td>
<td>62,370</td>
</tr>
<tr>
<td>North County Coastal</td>
<td>7,526</td>
<td>2,734</td>
<td>1,654</td>
<td>3,140</td>
<td>15,054</td>
</tr>
<tr>
<td>Carlsbad</td>
<td>4,106</td>
<td>1,507</td>
<td>-</td>
<td>-</td>
<td>5,613</td>
</tr>
<tr>
<td>Del Mar</td>
<td>(28)*</td>
<td>44</td>
<td>-</td>
<td>-</td>
<td>16</td>
</tr>
<tr>
<td>Encinitas</td>
<td>1,204</td>
<td>764</td>
<td>741</td>
<td>-</td>
<td>2,709</td>
</tr>
<tr>
<td>Oceanside</td>
<td>2,170</td>
<td>398</td>
<td>403</td>
<td>3,140</td>
<td>6,111</td>
</tr>
<tr>
<td>Solana Beach</td>
<td>74</td>
<td>21</td>
<td>510</td>
<td>-</td>
<td>605</td>
</tr>
<tr>
<td>North County Inland</td>
<td>16,484</td>
<td>1,635</td>
<td>1,077</td>
<td>12,622</td>
<td>31,818</td>
</tr>
<tr>
<td>Escondido</td>
<td>6,194</td>
<td>745</td>
<td>133</td>
<td>3,923</td>
<td>10,995</td>
</tr>
<tr>
<td>Poway</td>
<td>900</td>
<td>17</td>
<td>35</td>
<td>452</td>
<td>1,404</td>
</tr>
<tr>
<td>San Marcos</td>
<td>8,468</td>
<td>(112)*</td>
<td>187</td>
<td>395</td>
<td>8,938</td>
</tr>
<tr>
<td>Vista</td>
<td>922</td>
<td>985</td>
<td>722</td>
<td>7,852</td>
<td>10,481</td>
</tr>
<tr>
<td>East County</td>
<td>3,014</td>
<td>1,555</td>
<td>1,457</td>
<td>19,702</td>
<td>25,728</td>
</tr>
<tr>
<td>El Cajon</td>
<td>(283)*</td>
<td>763</td>
<td>566</td>
<td>10,633</td>
<td>11,679</td>
</tr>
<tr>
<td>La Mesa</td>
<td>759</td>
<td>188</td>
<td>215</td>
<td>7,055</td>
<td>8,217</td>
</tr>
<tr>
<td>Lemon Grove</td>
<td>201</td>
<td>168</td>
<td>180</td>
<td>1,372</td>
<td>1,921</td>
</tr>
<tr>
<td>Santee</td>
<td>2,337</td>
<td>436</td>
<td>496</td>
<td>642</td>
<td>3,911</td>
</tr>
<tr>
<td>South Bay</td>
<td>21,166</td>
<td>597</td>
<td>2,856</td>
<td>43,424</td>
<td>68,043</td>
</tr>
<tr>
<td>Chula Vista</td>
<td>20,356</td>
<td>441</td>
<td>1,561</td>
<td>10,070</td>
<td>32,428</td>
</tr>
<tr>
<td>Coronado</td>
<td>61</td>
<td>2</td>
<td>94</td>
<td>24</td>
<td>181</td>
</tr>
<tr>
<td>Imperial Beach</td>
<td>6</td>
<td>62</td>
<td>341</td>
<td>1,431</td>
<td>1,840</td>
</tr>
<tr>
<td>National City</td>
<td>743</td>
<td>92</td>
<td>860</td>
<td>31,899</td>
<td>33,594</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>135,261</td>
<td>29,179</td>
<td>61,173</td>
<td>169,429</td>
<td>395,042</td>
</tr>
</tbody>
</table>

* Negative capacity is a result of redevelopment to either a different density range or to commercial land.
## Table C.4
### SANDAG Sustainable Communities Strategy Documentation

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCS Requirement</strong></td>
<td><strong>CGC Section 65080(b)(2)(B)</strong> Each metropolitan planning organization shall prepare a sustainable communities strategy subject to the requirements of Part 450 of Title 23 of and Part 93 of Title 40 of the Code of Federal Regulations, including the requirement to utilize the most recent planning assumptions considering local general plans and other factors. The sustainable communities strategy shall:</td>
</tr>
<tr>
<td></td>
<td>See Regional Plan Chapters 2 and 5. Also see Appendices C (SCS Documentation and Related Information), J (Regional Growth Forecast), L (Regional Housing Needs Assessment Plan), and S (Monitoring Performance)</td>
</tr>
<tr>
<td><strong>Land Use</strong></td>
<td><strong>CGC Section 65080(b)(2)(B)(i)</strong> identify the general location of uses, residential densities, and building intensities within the region;</td>
</tr>
<tr>
<td></td>
<td>See Regional Plan Chapter 2 and Appendices C (SCS Documentation and Related Information Figures C-2 and C-3), and J (Regional Growth Forecast)</td>
</tr>
<tr>
<td><strong>Housing Goals</strong></td>
<td><strong>CGC Section 65080(b)(2)(B)(vi)</strong> consider the state housing goals specified in Sections 65580 and 65581;</td>
</tr>
<tr>
<td></td>
<td>See Regional Plan Chapter 2 and Appendices C (SCS Documentation and Related Information), L (Regional Housing Needs Assessment Plan), and U.13 (Housing: Providing Homes for all Residents)</td>
</tr>
<tr>
<td>Subject Area</td>
<td>Addressed</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>CGC Section 65080(b)(2)(B)(ii)</td>
<td>identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth; See Regional Plan Chapter 2 and Appendices J (Regional Growth Forecast), L (Regional Housing Needs Assessment Plan), and U.13 (Housing: Providing Homes for all Residents)</td>
</tr>
<tr>
<td>CGC Section 65080(b)(2)(B)(iii)</td>
<td>identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Section 65584; See Regional Plan Chapter 2 and Appendices L (Regional Housing Needs Assessment Plan), and U.13 (Housing: Providing Homes for all Residents)</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>CGC Section 65080(b)(2)(B)(v) gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (a) and (b) of Section 65080.01; See Regional Plan Chapter 2 and Appendix C figures titled:</td>
</tr>
<tr>
<td></td>
<td>• Figure C.4 San Diego Region Wetlands</td>
</tr>
<tr>
<td></td>
<td>• Figure C.5 San Diego Region Important Agricultural Lands</td>
</tr>
<tr>
<td></td>
<td>• Figure C.6 San Diego Region Habitat Conservation Lands</td>
</tr>
<tr>
<td></td>
<td>• Figure C.7 San Diego Region Generalized Vegetation</td>
</tr>
<tr>
<td>Subject Area</td>
<td>Addressed</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Transportation Network</td>
<td><strong>CGC Section 65080(b)(2)(B)(iv)</strong> identify a transportation network to service the transportation needs of the region;</td>
</tr>
<tr>
<td>Meeting Greenhouse Gas Reduction Targets</td>
<td><strong>CGC Section 65080(b)(2)(B)(vii)</strong> 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;</td>
</tr>
<tr>
<td>Meeting Federal Air Quality Requirements</td>
<td><strong>CGC Section 65080(b)(2)(B)(viii)</strong> allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act (42 U.S.C. §7506).</td>
</tr>
<tr>
<td>Informational Meetings</td>
<td><strong>CGC Section 65080(b)(2)(E)</strong> The metropolitan planning organization shall conduct at least two informational meetings in each county within the region for members of the board of supervisors and city councils on the sustainable communities strategy and alternative planning strategy, if any. Only one informational meeting is needed in each county if it is attended by representatives of the county board of supervisors and city councils that represent a majority of the cities representing a majority of the population in the incorporated areas of that county.</td>
</tr>
<tr>
<td>Subject Area</td>
<td>Addressed</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------</td>
</tr>
<tr>
<td><strong>Public Participation Plan</strong></td>
<td>CGC Section 65080(b)(2)(F) Each metropolitan planning organization shall adopt a public participation plan, for development of the sustainable communities strategy and an alternative planning strategy, if any, that includes all of the following:</td>
</tr>
<tr>
<td><strong>Public Participation Plan – outreach</strong></td>
<td>CGC Section 65080(b)(2)(F)(i) Outreach efforts to encourage the active participation of a broad range of stakeholder groups in the planning process, consistent with the agency’s adopted Federal Public Participation Plan, including, but not limited to, affordable housing advocates, transportation advocates, neighborhood and community groups, environmental advocates, home builder representatives, broad-based business organizations, landowners, commercial property interests, and homeowner associations.</td>
</tr>
<tr>
<td><strong>Public Participation Plan – consultation</strong></td>
<td>CGC Section 65080(b)(2)(F)(ii) Consultation with congestion management agencies, transportation agencies, and transportation commissions.</td>
</tr>
<tr>
<td><strong>Public Participation Plan - workshops</strong></td>
<td>CGC Section 65080(b)(2)(F)(iii) Three workshops throughout the region to provide the public with the information and tools necessary to provide a clear understanding of the issues and policy choices. Each workshop, to the extent practicable, shall include urban simulation computer modeling to create visual representations of the SCS and the alternative planning strategy.</td>
</tr>
<tr>
<td><strong>Public Participation Plan – SCS public review</strong></td>
<td>CGC Section 65080(b)(2)(F)(iv) Preparation and circulation of a draft SCS and an alternative planning strategy, if one is prepared, not less than 55 days before adoption of a final regional transportation plan.</td>
</tr>
<tr>
<td>Subject Area</td>
<td>Addressed</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Public Participation Plan – public hearings</strong></td>
<td>CGC Section 65080(b)(2)(F)(v) At least three public hearings on the draft sustainable communities strategy in the regional transportation plan and alternative planning strategy, if one is prepared. If the metropolitan transportation organization consists of a single county, at least two public hearings shall be held. To the maximum extent feasible, the hearings shall be in different parts of the region to maximize the opportunity for participation by members of the public throughout the region. See Appendix F (Public Involvement Program)</td>
</tr>
<tr>
<td><strong>Public Participation Plan – public notice</strong></td>
<td>CGC Section 65080(b)(2)(F)(vi) A process for enabling members of the public to provide a single request to receive notices, information, and updates. See Appendix F (Public Involvement Program)</td>
</tr>
<tr>
<td><strong>Consultation with Local Agency Formation Commission</strong></td>
<td>CGC Section 65080(b)(2)(G) In preparing a sustainable communities strategy, the metropolitan planning organization shall consider spheres of influence that have been adopted by the local agency formation commissions within its region. See Regional Plan Chapter 2 and Appendix I (Consultation with the Local Agency Formation Commission)</td>
</tr>
<tr>
<td><strong>ARB Greenhouse Gas Reduction Targets for San Diego Region</strong></td>
<td>CGC Section 65080(b)(2)(H) Prior to adopting a sustainable communities strategy, the metropolitan planning organization shall quantify the reduction in greenhouse gas emissions projected to be achieved by the sustainable communities strategy and set forth the difference, if any, between the amount of that reduction and the target for the region established by the state board. See Regional Plan Chapter 2 and Appendix C (SCS Documentation and Related Information, Table C.1)</td>
</tr>
</tbody>
</table>
### Table C.4 (continued)
**SANDAG Sustainable Communities Strategy Documentation**

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consideration of Financial Incentives for Cities and Counties with Resource Areas or Farmlands</strong></td>
<td>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.</td>
</tr>
</tbody>
</table>
Figure C.2
2020 Land Use
October 2015

- Residential
  - Single Family Residential
  - Multi-Family Residential
- Mixed Use, Commercial, and Industrial
  - Mixed Use
  - Commercial and Office
  - Heavy and Light Industry
- Public Facilities and Utilities
  - Military
  - Transportation, Communications, Utilities
  - Education and Institutions
- Open Space Parks and Recreation
  - Open Space Parks
  - Recreation
- Agriculture and Rural Residential
  - Spaced Rural Residential
  - Agriculture
- Indian Reservations
  - Indian Reservations
- Other
  - Vacant

*Includes Mobile Homes
**Rural residential estates may have small orchards or fields

San Diego Forward: The Regional Plan
Figure C.3
2035 Land Use
October 2015

Residential
- Single Family Residential
- Multi-Family Residential*

Mixed Use, Commercial, and Industrial
- Mixed Use
- Commercial and Office
- Heavy and Light Industry

Public Facilities and Utilities
- Military
- Transportation, Communications, Utilities
- Education and Institutions

Open Space Parks and Recreation
- Open Space Parks
- Recreation

Agriculture and Rural Residential
- Spaced Rural Residential**
- Agriculture
- Indian Reservations
- Other
- Indian Reservations
- Vacant

*Includes Mobile Homes
**Rural residential estates may have small orchards or fields

MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS

SANDAG

Appendix C:: Sustainable Communities Strategy Documentation and Related Information
Figure C.4
San Diego Region Wetlands
October 2015

Vegetated Wetlands
Water Bodies

MILES
KILOMETERS

San Diego Forward: The Regional Plan
Figure C.5
San Diego Region
Important Agricultural Lands
October 2015

USDA Farmland Category
- Agriculture Preserve Land
- Williamson Act (2007)
- Farmland of Local Importance
- Prime Farmland
- Farmland of Statewide Importance
- Unique Farmland

Appendix C: Sustainable Communities Strategy Documentation and Related Information
San Diego Regional Habitat Preserved Lands
October 2015

- Conserved Habitat Lands
- Proposed Conserved Habitat Lands

Habitat Conservation Planning Areas

1 - Multiple Habitat Conservation Program (MHCP)
2 - East County Multiple Species Conservation Program (MSCP)
3 - South County Multiple Species Conservation Program (MSCP)
4 - North County Multiple Species Conservation Program (MSCP)

Figure C.6
San Diego Forward: The Regional Plan
Figure C.7
San Diego Region
Generalized Vegetation
October 2015

- Chaparral
- Coastal Sage Scrub
- Coastal Wetlands / Beach
- Coniferous Forest
- Desert Chaparral
- Desert Dunes / Badlands
- Desert Scrub
- Grassland
- Oak Forest
- Other Wetlands
- Other Woodlands
- Riparian
- Urban, Disturbed Habitat, Agriculture, Eucalyptus Woodlands
- Water

Source: AECOM 2014, SANDAG 1997

Appendix C: Sustainable Communities Strategy Documentation and Related Information


Figure C.8
Potential Aggregate Supply Sites
October 2015

Mineral Resource Zone (MRZ) Classification
- MRZ-2: Resource Present
- MRZ-3: Resource Potentially Present
- MRZ-4: Inconclusive
- Unclassified

Source: San Diego Region Aggregate Supply Study, 2011

SANDEDG
San Diego Forward: The Regional Plan
Figure C.9
2020 Housing and Employment Density
October 2015

- Housing Density
  1 dot = 100 Housing Units

- Employment Density/Building Intensity
  1 dot = 100 jobs
Figure C.10
2035 Housing and Employment Density
October 2015

- Housing Density
  1 dot = 100 Housing Units

- Employment Density/Building Intensity
  1 dot = 100 jobs

MILES
0 1 2 3 4 5
KILOMETERS
0 1 2 3 4
Figure C.11
2035 Potential Transit Priority Project Areas
October 2015

- Potential Transit Priority Project Areas*
- High Quality Transit Corridors**
- Existing and Planned Rail Stations

* 1/2 mile buffer from center of transit line or from mid-point of station location
** Includes major transit stops and 15-minute peak period service as defined in SB 375

Map Area
San Diego Region

Appendix C: Sustainable Communities Strategy Documentation and Related Information
Endnotes

1 Consistent with SB 375, this map identifies the general location of uses, residential densities, and building intensities in 2020. (Government Code Section 65080(b)(2)(B)(i)).

2 Consistent with SB 375, this map identifies the general location of uses, residential densities, and building intensities in 2035. (Government Code Section 65080(b)(2)(B)(i)).

3 http://www.sandag.org/index.asp?meetingID=3957&fuseaction=meetings.detail

4 http://www.sandag.org/index.asp?meetingID=3851&fuseaction=meetings.detail
June 7, 2013

Mr. Richard Corey  
Executive Officer  
California Air Resources Board  
1001 I Street  
Sacramento, CA 95814

Dear Mr. Corey:

SUBJECT: Technical Methodology to Estimate Greenhouse Gas Emissions from the San Diego Association of Governments Sustainable Communities Strategy

California Government Code 65080(b)(2)(I)(i) requires each Metropolitan Planning Organization to submit a description to the state board of the technical methodology it intends to use to estimate the greenhouse gas emissions from its sustainable communities strategy and, if appropriate, its alternative planning strategy. The enclosed document outlines the planning and modeling methodology the San Diego Association of Governments (SANDAG) intends to use to estimate the greenhouse gas emissions from its sustainable communities strategy and alternative planning strategy, if necessary. I am pleased to inform you the upcoming SANDAG Regional Plan will use an open, activity-based model that will be fully integrated with our new Production Exchange, Consumption, and Allocation System (PECAS) land use and economic model. This advancement will allow for a more detailed review of the interaction between land use and transportation in this plan.

Sincerely,

Gary L. Gallegos  
Executive Director

GGA/CDA/bga

Attachment: Technical Methodology to Estimate Greenhouse Gas Emissions
This report outlines key San Diego Forward: The Regional Plan (Regional Plan) planning efforts and inputs, including a description of its transportation and land use modeling platform. The Regional Plan serves as the San Diego Association of Governments (SANDAG) long-range planning document for the San Diego region, and it also functions as the Regional Transportation Plan and its Sustainable Communities Strategy (2050 RTP/SCS), which will comply with state and federal regulations including California Senate Bill 375 (Steinberg, 2008) and federal air quality conformity.

The Regional Plan brings together the updates of the SANDAG Regional Comprehensive Plan, the long-range blueprint planning document, and the 2050 RTP/SCS. A unified document provides San Diego residents a more accessible document that includes an overall vision for the region with a concrete implementation program. SANDAG anticipates the Regional Plan and its Environmental Impact Report (EIR) will be adopted by the Board of Directors in summer 2015.

What's New in the Regional Plan

The Regional Plan will continue to build on the planning and implementation progress since the adoption of the 2050 RTP/SCS in October 2011. The list below highlights some of the planning work that has been taking place in the San Diego region since 2011:

- An early action program to advance design and construction of projects included in the Regional Bicycle Plan
- A strategy to implement a broader Active Transportation Program that would include Safe Routes to School and Safe Routes to Transit
- Evaluation of alternative land use and transportation scenarios to further reduce projected Greenhouse Gas (GHG) emission levels
- Completion of a new transportation, land use, and economic modeling framework including an Activity-Based Transportation Model and Production Exchange, Consumption, and Allocation System (PECAS)
- Testing public health analytical tools for potential future planning work
- Development of a Regional Transit Oriented Development strategy to foster a greater level of development that supports investments in public transit
- Development of a Regional Complete Streets Policy for use at the regional and local level

In addition to the planning work, SANDAG and its partners are implementing the 2050 RTP/SCS, including the delivery of the following projects:

- SuperLoop Bus Service connecting the University of California San Diego and the adjacent major employment and housing centers of the North University area
- Expansion of the Bayshore Bikeway in Chula Vista
- New Bus Rapid Transit Stations and Managed Lanes along the Interstate 15 corridor
Technical Methodology to Estimate Greenhouse Gas Emissions

- Completion of the State Route 905 connecting the Otay Mesa International Port of Entry to the Interstate 5 and Interstate 805 corridors
- Double tracking of the COASTER and Amtrak LOSSAN corridor through northern San Diego County, including improved pedestrian crossings and tidal lagoon enhancements
- Completion of eight Smart Growth Incentive Program Capital Projects, including the Lemon Grove Main Street Promenade which will provide pedestrian enhancements to integrate planned mixed-use development at an existing light rail station

San Diego Forward: The Regional Plan Work Plan

On February 22, 2013, the SANDAG Board of Directors reviewed the work program for the Regional Plan. The work program provides the overall framework and schedule to develop and adopt the Regional Plan in 2015. Highlights of the work plan include the following activities:

- Engage in public outreach and involvement
- Establish the Regional Plan vision, goals, and policy objectives
- Prepare the 2050 Regional Growth Forecast update (Series 13)
- Refine and develop policy areas
- Incorporate recommendations from more detailed planning studies
- Develop Sustainable Community Strategies (SCS) and Alternative Planning Strategy (if needed)
- Update revenue and cost projections for projects, programs, and services
- Update regional arterial system (as needed)
- Update airport multimodal and rail planning
- Update transportation project evaluation criteria
- Update performance measures for the Regional Plan
- Develop financially unconstrained multimodal transportation scenario
- Develop revenue constrained alternative transportation scenarios and select preferred scenario
- Perform air quality conformity analysis
- Produce draft Regional Plan
- Prepare draft EIR
- Address feedback from public comment period
Technical Methodology to Estimate Greenhouse Gas Emissions

- Adopt final Regional Plan and certify final EIR
- Air quality conformity determination by United States Department of Transportation
- Air Resources Board (ARB) determination on the adopted SCS

Public Involvement Plan

The Public Involvement Plan (PIP) is intended to support the development of the Regional Plan, creating a variety of opportunities for individuals, organizations, agencies, and other stakeholders to provide meaningful input. The PIP was created based on input obtained throughout the fall of 2012 from the SANDAG Board of Directors, Policy Advisory Committees, working groups, surveys, and a public workshop held in October 2012. The PIP was drafted using the guidelines provided by the agency’s overall Public Participation Plan, which sets the foundation for specific public outreach approaches. The PIP describes efforts that SANDAG will undertake to secure input on: developing sustainability and land use goals; priorities for transportation projects, programs, and services; transportation networks; infrastructure recommendations; funding alternatives; policies and programs; performance measures; GHG emissions targets; and other related issues.

Implementation of this PIP will accomplish the following:

- Provide a road map to ensure that all interested stakeholders are given the chance to participate in the process
- Reach beyond traditional methods to encourage participation from a wide variety of members of the public
- Communicate the importance of the plan and the opportunities to participate in the process
- Educate the public about SANDAG and its role in the region
- Establish the new Regional Plan as a critical policy document helping to balance our future housing, jobs, land use, transportation, health, social equity, economic, and environmental sustainability needs

This PIP is intended to be a living document. Because of the fluid nature of public participation, this plan may be updated at major milestones and adjusted in response to issues and circumstances that arise throughout the planning process.

Series 13: 2050 Regional Growth Forecast

The Series 13 Regional Growth Forecast serves as the foundation for the Regional Plan and other planning documents (e.g., water, general plans) across the region. SANDAG denotes forecasts by a sequential series number. The forecast under development is known as the Series 13: 2050 Regional Growth Forecast. The forecast used in the 2050 RTP/SCS, adopted in October 2011, was the Series 12: 2050 Regional Growth Forecast.

The regional forecast is developed by SANDAG with input from expert demographers, economists, developers, planners, and natural resource managers. These experts review economic and
demographic assumptions about fertility, migration, inflation, and other indicators. In addition to the traditional expert panel review SANDAG conducts, SANDAG also has reviewed the forecast with key stakeholders across the region, including transportation, land use, and economic development advocates.

SANDAG uses its Demographic and Economic Forecasting Model (DEFM) to develop the regional forecast. The DEFM was first developed to support the Series 4 forecast in the late 1970's. The DEFM uses a standard cohort-survival modeling technique along with econometric tools to estimate future growth. The DEFM has a proven track record of accuracy; since Series 4 (1977), on average, it has been within 4 percent of observed population growth.

The DEFM results will feed the sub-regional allocation models to develop city and neighborhood level forecasts. The Series 13 sub-regional forecast will use a new tool called PECAS. This model offers several enhancements beyond the sub-regional forecasting models used in prior forecasts by introducing economic conditions and return on investment calculations into the projections of development, re-development, and infill. In addition to new data sources, PECAS continues to rely upon the land use plans, policies, and zoning ordinances of the 18 cities, the County of San Diego, and other land use authorities. To ensure that local plans and policies are accurately reflected in the subregional forecast, the local jurisdictions and member agencies complete a review of its land use inputs (including general plans, planned land use, and housing capacity) via an online review tool.

Once the sub-regional forecast is complete, the detailed demographic forecast is produced. The Program for Age, Sex, and Ethnicity Forecast (PASEF) is a demographic model designed to forecast detailed demographic characteristics at a neighborhood level. PASEF projects population for 18 five-year age groups (0-4, 5-9,...,80-84, and 85+) broken down by gender and ethnicity for the region and smaller geographies.

A more detailed description of the land use forecasting models is included below in the *Modeling the Regional Plan* section of this report.

**Evaluation Criteria and Performance Measure Development and Implementation**

Project evaluation criteria is one element of a multistep process used to develop the revenue constrained multimodal transportation network for the Regional Plan. Evaluation criteria have been used in previous transportation plans including in the 2050 RTP/SCS. Project prioritization along with other factors such as funding availability, project readiness, and overall network connectivity are considered when developing the proposed transportation network alternatives.

In past transportation plans, SANDAG also has utilized performance measures to evaluate the performance of proposed revenue constrained transportation networks. The performance measures from the 2050 RTP/SCS included metrics to evaluate safety, multimodal mobility and reliability, goods movement, social equity, environmental impacts, and the relationship between land use and transportation. Performance measures are used to compare the proposed network alternatives and serve as a tool to select the preferred revenue constrained network scenario.

SANDAG is currently analyzing both the evaluation criteria and performance measures to incorporate best practices being used in the transportation planning field. Revisions for evaluation criteria are intended to simplify and standardize the criteria across different modal categories.
Performance measure revisions will assess the effectiveness of existing measures and consider new components including public health factors. Consultant assistance has been retained to research the best practices of other Metropolitan Planning Organizations (MPO) and various transportation research institutions and to develop refinements of the evaluation criteria and performance measures. The revised transportation project evaluation criteria and the updated performance measures will be presented to the SANDAG Board of Directors in fall 2013 for approval.

Land Use and Transportation Scenarios

The development of alternative land use and transportation scenarios, including the evaluation of potential pricing and parking strategies, is proposed to test strategies that could result in further reductions of GHG emissions beyond those forecasted in the 2050 RTP/SCS. The Series 13 sub-regional forecast will provide the baseline scenario against which alternative scenarios are compared.

Initial work on defining the scenario assumptions will begin in spring 2013, and scenario testing will begin in summer 2013. Through this planning process, various scenarios will be prepared, tested, and analyzed by early 2014, so results can inform the development of revenue-constrained transportation network scenarios.

A consultant team is assisting SANDAG in developing inputs and assumptions to assess the alternative land use and transportation scenarios. The scenarios will be measured against indicators, tested for performance, and refined throughout 2013. Sketch planning and travel demand models will be used in this planning effort.

Modeling the Regional Plan

SANDAG will use an integrated land use, economic, and transportation modeling system to estimate the GHG in the Regional Plan. Over the past five years, SANDAG has developed a new PECAS, Population Synthesizer (PopSyn), Activity-Based Model (ABM), Commercial Travel Model (CTM), and updated its Heavy-Duty Truck Model (HDTM).

The integrated system includes: (1) DEFM; (2) PECAS in conjunction with Urban Development Model (UDM); (3) detailed demographic forecast (PASEF and PopSyn); (4) the ABM and CTM; and (5) the latest Emission Factors (EMFAC) model from ARB (currently EMFAC 2011). Depending on model sensitivity to certain transportation policies, SANDAG will consider using off-model factors (or ARB defined Policies and Practices) as recommended by the Regional Targets Advisory Committee (RTAC). The Regional Plan model will have a base year of 2012.

The first model component, DEFM, is an econometric forecasting model with a demographic module. DEFM produces an annual forecast of the size and structure of the region’s economy and a demographic forecast consistent with that future economy. For the economic forecast, DEFM relates historical changes in the region’s economy to historical changes in the United States’ economy using input-output and econometric methodologies. The demographic module uses a cohort survival model to forecast population by age, gender, and ethnicity. DEFM produces a wealth of data about the region’s future economic and demographic characteristics. Among the more important elements are the size and composition of the population, employment by industry sector,
household and personal income, housing units by structure type, vacancy status and persons per household, labor force, and school enrollment.

Next, PECAS offers several improvements over more traditional spatial interaction “gravity” models. PECAS attempts to account for variation in the cost and quality of goods and services, as well as individual tastes and preferences. By integrating spatial characteristics (travel distances, land availability) and the economic system (prices, income), PECAS can evaluate a wider range of socio-economic impacts resulting from land use and transportation policies. PECAS is able to model the effects of land use and transportation policies on the wages, rents, productivity, and overall benefit to industrial and socio-economic groups.

PECAS has two component modules: the Activity Allocation (AA) Module and Space Development (SD) Module. The AA Module models the areas in which households and firms locate and who buys what from whom. Households located in one submarket interact with businesses throughout the region by both providing labor and purchasing goods and services. Businesses exchange their products with other businesses located throughout the region and use household labor as part of their production process. The SD Module models the actions of real estate developers who provide space (land use and floor space) in which households and firms can locate, responding to demand from households and businesses in AA for space in certain areas. These modules are run in one-year steps, with SD following AA. As a final step in the PECAS process, zonal control targets for housing and jobs are allocated to the parcel level with the UDM.

The third model component includes PASEF and the PopSyn. PASEF is a demographic model designed to forecast detailed demographic characteristics at a neighborhood level. The detailed demographic forecast comes directly from DEFM, but requires aggregating the single year of age detail into the five-year age groups used in PASEF, and an adjustment for special populations. The model projects population for 18 five-year age groups (0-4, 5-9,…,80-84, and 85+) broken down by gender and ethnicity for the region and smaller geographies. PASEF produces population controls used by the PopSyn.

The PopSyn generates a synthetic population for the region. This synthetic population represents the individual travelers that the ABM will simulate. For each simulation year, a full population is synthesized to match the forecasted socio-economic and housing characteristics of each part of the region at the zonal level. These forecasts, a key ABM input, come from the land use models described above. Synthesis works by replicating a sample of Census or American Community Survey Public Use Microdata Sample records (each containing complete household and individual characteristics) and placing them around the region in such a way that the forecasted characteristics of each zone are matched.

The fourth model component, the ABM, forecasts travel activity. The ABM simulates individual and household transportation decisions that compose their daily travel itinerary. People travel for activities such as work, school, shopping, healthcare, and recreation, and the ABM attempts to predict whether, where, when, and how this travel occurs. The ABM addresses both household-level and person-level travel choices including intra-household interactions between household members. It also offers sensitivity to demographic and socio-economic changes by the enhanced and flexible population synthesis procedures as well as by the fine level of model segmentation.
Technical Methodology to Estimate Greenhouse Gas Emissions

The ABM operates at fine temporal and spatial resolution: a half hour temporal resolution for the tour generation, mode choice, and trip generation. These 30-minute intervals are aggregated into five time-of-day periods for auto, transit, and non-motorized assignment. The ABM takes advantage of the Master Geographic Reference Area (MGRA) zone system, which is the most disaggregate zonal system currently in use in any travel demand model in the United States. The SANDAG current MGRA system consists of 23,000 zones (Series 13 version), which are roughly equivalent to Census block groups. To avoid computational burden, SANDAG relies on a 4,900 Transportation Analysis Zone (TAZ) system for the auto assignment step, but performs transit calculations at the more detailed MGRA level.

While the ABM addresses personal travel, the CTM addresses travel made in the region for non-personal reasons. Commercial travel is defined as heavy-duty truck trips with both origin and destination in San Diego County; professional service vehicle trips such as trips generated by plumbers, gardeners, and electricians; light-duty freight trips such as trips generated by trash trucks, light construction trucks, food delivery vehicle operators; postal and package couriers (such as FedEx and UPS); and at-work business trips generated by company employees.

The CTM is a disaggregate tour-based model used to forecast “local” intra-region commercial travel. The model starts with aggregate tour generation by industry type followed by disaggregate simulation of the tour attributes such as mode, purpose, exact start time, stop purposes, stop locations, and stop durations. The trip list produced by the CTM is transformed into trip tables by vehicle class for assignment with the ABM person trip tables. This model construct allows for more realistic commercial movements over trip-based models since commercial movements tend to have complex tours with a large number of stops.

An external HDTM addresses external to internal, internal to external, and external to external truck trips for San Diego County. The model is based on disaggregated Freight Analysis Framework forecast data. External trucks by commodity are allocated to TAZs based on employment types. Both the CTM and HDTM external model work on the same TAZ system as the ABM.

At the end of the modeling system is the EMFAC model, which takes vehicle miles traveled (VMT) by vehicle class and fuel type, and VMT speed distributions by vehicle class, post processed from the ABM/Commercial Vehicle Model, and calculates the GHG emissions for the SCS.

SANDAG strives to stay in the forefront of forecasting technology by subjecting its efforts to peer review and presenting the methodology at relevant meetings and conferences.

Active Transportation Enhancements

The Active Transportation Model component enhances the ABM to provide greater sensitivity and broader capabilities to address Active Transportation projects and policies and inform the SANDAG policy development and future decision-making. These enhancements include a complete representation of bike and pedestrian networks, and associated attributes such as facility type, distance, and grade; a new Bike-Route Choice Model; and revised and recalibrated trip and tour mode choices in ABM.

The first phase of the Active Transportation Model development is a seven-month project that is anticipated be completed in the second half of 2013. In this phase, a Bike-Route Choice Model will
be borrowed from San Francisco County and will be calibrated and validated with San Diego local bike count datasets. In cooperation with the County of San Diego and San Diego State University, SANDAG has installed 28 permanent bicycle count stations around the region to continuously monitor bicycle and pedestrian activity on key regional corridors.

A bike travel behavior survey will be conducted in future phases to estimate a San Diego Bike-Route Choice Model. With these enhancements, the integrated ABM and Active Transportation model can be used to assess the impact of bike and pedestrian investments on bike ridership and pedestrian volume changes, diversion of ridership on parallel facilities, mode share changes, VMT reductions, and GHG emission reductions. The Active Transportation Model will produce a set of non-motorized travel related Regional Transportation Plan (RTP) performance measures.

**Emissions Modeling**

The latest version of EMFAC (currently EMFAC 2011) will be used to calculate the GHG emissions for the Regional Plan based on the transportation model outputs. The transportation model post processes highway and transit assignment information to create EMFAC input files containing vehicle trips by vehicle class and fuel type, VMT by vehicle class and fuel type, and VMT speed distributions by vehicle class and hour. The current version of EMFAC projects the following GHG pollutants: carbon dioxide, carbon monoxide, nitrous oxides, total hydrocarbons, and methane.

**Feedback in the Regional Travel Demand Model**

A noteworthy feature of the forecasting process is the feedback of information from one model to another. For example, regionwide projections of economic activity from the DEFM are used in the AA Module of PECAS, and then AA Module results are used for the SD Module of PECAS. Similarly, data from AA are major inputs to the transportation model, and then transportation model data are used in subsequent AA calculations. A key feature of the modeling system is the central role that land use and transportation policies play in determining future travel patterns and the associated location of people, houses, and jobs.

**Off-Model Techniques to Measure GHG**

While the impacts of certain policy scenarios cannot be measured in the Travel Demand Model, SANDAG may use these policy scenarios to meet its GHG targets established by ARB. In these instances, SANDAG will rely on off-model techniques based on academic literature reviews, collaboration with other MPOs, and consultation with ARB’s Policies and Practices Guidelines. Any off-model techniques used will be fully documented and justified in the final RTP, SCS, and/or model documentation.

**RTP Consistency with RTAC Target Setting Process**

SANDAG anticipates using the methodology described in this report to calculate GHG emissions for the Regional Plan and its SCS as well as the current GHG target setting process as outlined by the RTAC and any subsequent updates by ARB. SANDAG may revise the methodology to be used in the regional plan in consultation with ARB if updated software (e.g., EMFAC 2013) or a more accurate methodology becomes available during the target-setting revision process.
Technical Methodology to Estimate Greenhouse Gas Emissions

Addressing GHG Emissions after 2035 in the Regional Plan

SANDAG will use the modeling methodology outlined in this document to calculate GHG emission for 2020 and 2035 for the SCS as required by California Government Code 65080. SANDAG will perform an analysis of GHG emissions through 2050. As the Regional Plan is being developed, SANDAG will work with the appropriate federal and state agencies to ensure its 2050 methodology is consistent with best practices and conforms to all applicable state and federal regulations.
August 12, 2013

Mr. Gary Gallegos
Executive Director
San Diego Association of Governments
401 B Street, Suite 800
San Diego, California 92101-4231

Dear Mr. Gallegos:

Thank you for submitting the San Diego Association of Governments’ (SANDAG) proposed technical methodology for quantifying the greenhouse gas emissions resulting from the regional Sustainable Communities Strategy (SCS) currently being developed as part of the next regional transportation plan scheduled to be adopted in 2015. Your letter dated June 7, 2013 satisfies the requirement in Government Code section 65080(b)(2)(J)(l) that each Metropolitan Planning Organization submit to Air Resources Board (ARB) a description of the technical methodology that it will use, prior to beginning the region’s public process to develop a strategy for meeting SB 375 targets.

We look forward to continuing our collaboration with SANDAG as you begin to prepare the San Diego region’s second SCS. We appreciate the fact that SANDAG is undertaking a significant effort to develop new and updated modeling tools, including an Activity Based Model, which will be used in the planning process for the 2015 SCS.

If you have any questions, please contact Ms. Lynn Terry, Deputy Executive Officer, at (916) 322-2739.

Sincerely,

Richard W. Corey
Executive Officer

cc: Ms. Lynn Terry
Deputy Executive Officer

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: http://www.arb.ca.gov
SANDAG Off-Model Greenhouse Gas Reduction Methodology

To forecast the outcomes of the transportation network included in the Regional Plan, SANDAG uses the Activity Based Model (ABM) to estimate performance measures. However, some strategies including carshare, vanpool programs, carpool programs, plug-in electric vehicle (PEV) charging stations, managed lane automation, and transit managed lane automation are not captured fully by the SANDAG ABM or the California Air Resources Board (ARB) Emissions Factor model. These off-model strategies are included to account for their additional reductions of greenhouse gas emissions. This attachment documents both the methodology and explanation of benefits from these off-model strategies.

Carshare

Carshare is one aspect of shared mobility highlighted in San Diego Forward: The Regional Plan. Carshare can provide first mile/last mile connections to transit or fill gaps in the region’s transit services by providing an efficient transportation alternative for commute and non-commute trips. A carshare service provides members with access to a vehicle for short-term use, such as Car2Go and Zipcar. Shared vehicles are distributed across a network of locations (or specified service area) within urban communities. Members can access the vehicles at any time with a reservation and are charged by time or by mile. Carshare provides some of the benefits of a personal vehicle without the costs associated with owning one. The SANDAG Transportation Demand Management (TDM) program seeks to incentivize and expand the reach of carshare to employment centers and urban communities that are not currently served by this mobility option and that the private market may be hesitant to enter in order to complement and improve access to regional transit services.

Methodology and calculations

A minimum level of density and supporting land use is required to initiate and sustain most carshare services. The following methodology pertains exclusively to investments in carshare, the shared mobility service type with the greatest amount of history and data available, and for which SANDAG is taking credit for under SB 375 in terms of reduced greenhouse gas emissions. Past research on traditional (or round-trip) carshare models\(^1\) has demonstrated that between 10 percent\(^2\) and 13 percent\(^3\) of the eligible population is expected to join a carshare service. In the San Diego region, the eligible population is defined as anyone age 18 or older, the current minimum age requirement for a carshare membership. Additionally, a residential density threshold was established for each milestone year to determine which portions of the San Diego region are most suited for carshare investment through 2050. In 2020, the assumed minimum residential density is 69 persons per acre or higher and in 2035 and 2050 the assumed minimum residential density is 55 persons per acre or higher.\(^4\) In line with past research coupled with the recent introduction of one-way\(^5\) and peer-to-peer\(^6\) carshare in the San Diego region, a conservative proportion of the region’s eligible population living in communities that meet these residential density thresholds was considered to estimate the adoption of carshare in the region over time:

- 2020 – 15% of the eligible population, or approximately 52,791 people
- 2035 – 20% of the eligible population, or approximately 146,914 people
- 2050 – 25% of the eligible population, or approximately 227,615 people
The daily VMT reduction for each milestone year is calculated by multiplying the estimated number of carshare members by seven miles (the average daily VMT reduction per carshare member\(^7\)).

SB 375 emissions reduced by milestone year were calculated by multiplying the average daily VMT reduction for each milestone year by the derived CO\(_2\) emission factor of 0.9484 lbs / mile for 2020, 0.9408 lbs / mi for 2035, and 0.9407 lbs / mi for 2050.\(^8\)

<table>
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<tr>
<th>Table 1</th>
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<td>Daily VMT Reduction</td>
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<td>SB 375 Emissions (lbs)</td>
<td>350,474</td>
</tr>
</tbody>
</table>

**Vanpools**  
The Regional Vanpool Program is currently offered by SANDAG. Vanpools have been shown to reduce greenhouse gas emissions since only one (albeit larger) vehicle is required to transport the same number of people that would normally take 7 to 15 single-occupant vehicles to transport. Based on historic trends the program is assumed to grow 13 percent by 2020 (approximately 811 vanpools), 62 percent by 2035 (approximately 1,163 vanpools), and 110 percent by 2050 (approximately 1,512 vanpools). Future growth assumptions are based on restructuring the current $400 monthly subsidy program to encourage the formation of larger vanpools and sustain program participation, policy changes that reduce barriers to entry, improved program administration, and targeted marketing to key employment industries and underserved populations.

**Methodology and calculations**  
Growth of the Regional Vanpool Program is tied to the assumption of a slight increase in the monthly subsidy over time and available funding for program administration. Eighty percent of all vans are assumed to carry up to eight passengers, and 20 percent of all vans are assumed to carry up to ten passengers.

Average daily VMT reduction calculation for each milestone year:

\[
\text{Average daily VMT reduction} = (\text{Proportion of eight-passenger vans} \times \text{Number of projected vanpools in the milestone year} \times \text{Number of total passengers excluding the driver} \times \text{Average round-trip vanpool commute distance}) + (\text{Proportion of ten-passenger vans} \times \text{Number of projected vanpools in the milestone year} \times \text{Number of total passengers excluding the driver} \times \text{Average round-trip vanpool commute miles})
\]

SB375 emissions reduced by milestone year were calculated by multiplying the average daily VMT reduction for each milestone year by the derived CO\(_2\) emission factor of 0.9484 lbs / mile for 2020, 0.9408 lbs / mi for 2035, and 0.9407 lbs / mi for 2050.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Vanpool VMT and CO(_2) Reduction Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2020</td>
</tr>
<tr>
<td>Daily VMT Reduction</td>
<td>678,339</td>
</tr>
<tr>
<td>SB 375 Emissions (lbs)</td>
<td>643,349</td>
</tr>
</tbody>
</table>
**Carpools**
SANDAG evaluated the investment in a carpool incentive program to promote the use of fewer vehicles to transport the same number of people to and from work. A carpool incentive was pilot tested with select employers in 2012. Based on lessons learned from the pilot, a formal carpool incentive program is expected to launch in the summer of 2016. The proposed program would incentivize the formation of 17,582 new carpools between now and 2050. Based upon anticipated budget and staffing levels, an incentive of $30 per month per carpooler for three continuous months at a budget of $100,000 per year would reasonably accommodate up to 488 new carpools annually.

**Methodology and calculations**
Following the initial three-month incentive period, assumed carpool program retention rates per carpool are 90 percent after one year, 50 percent after two years, 25 percent after three years, and 0 percent after four years. It is assumed that approximately 1,293 new carpools carrying 2,716 carpoolers would exist in 2020, 2035, and 2050 based on these retention rates. Carpool size is assumed to be 2.1, and daily VMT per capita is assumed to be 26 miles.

Average daily VMT reduction calculation for each milestone year:

Total number of carpools x Average carpool size (excluding the driver) x Average round-trip commute miles

SB 375 emissions reduced by milestone year were calculated by multiplying the average daily VMT reduction for each milestone year by the derived emission factor of 0.9484 lbs / mile for 2020, 0.9408 lbs / mile for 2035, and 0.9407 lbs / mile for 2050.

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Carpool VMT and CO₂ Reduction Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2020</td>
</tr>
<tr>
<td>Daily VMT Reduction</td>
<td>36,986</td>
</tr>
<tr>
<td>SB 375 Emissions (lbs)</td>
<td>35,078</td>
</tr>
</tbody>
</table>

**Plug-In Electric Vehicles (PEV) Charging Stations**
The State of California has a goal to have 1.5 million zero emissions vehicles (ZEVs) operating in California by 2025. ZEVs include both Plug-in Electric Vehicles (PEVs) and fuel cell electric vehicles. To achieve additional greenhouse gas reductions beyond the state goals, a larger network of electric vehicle charging stations (EVCS) is needed to extend the electric range of plug-in hybrid electric vehicles. SANDAG will establish a Regional Charger Program by setting aside approximately $30 million of Congestion Management and Air Quality (CMAQ) Improvement Program funds expected between 2020 and 2050 (approximately $1 million annually) to fund an incentive program for the installation of publicly available EVCS. According to the Electric Power Research Institute (EPRI), one EVCS is needed for every five PEVs, with a breakdown of 75 percent Level 1 EVCS (which adds 2-5 miles of range per hour of charging) and 25 percent Level 2 EVCS (which adds 10-20 miles of range per hour of charging). Increasing the number of publicly available EVCS would reduce greenhouse gas emissions by extending the electric range of plug-in hybrid electric vehicles that would replace gasoline-powered internal combustion engines. The calculations and expected emissions reductions attributed to the Regional Charger Program are shown here.
Methodology and calculations
By 2025, the state’s target is for 15.4 percent of new car sales to be ZEVs; of this, 9 percent would be Plug-in Electric Vehicles (PEVs). SANDAG assumes that after 2025, these percentages for annual sales remain constant, but overall ZEV fleet continues to grow due to vehicle turnover. Currently, plug-in hybrids drive 30 percent of their miles in electric mode and the remainder in gasoline mode. The build-out of a robust charger network would increase this percentage to 41 percent. The 11 percent increase in electric miles from plug-in hybrid vehicles results in the additional greenhouse gas reductions summarized below. The funding for the program would provide incentives for the installation of publicly available EVCS throughout the region. The program currently assumes incentive levels of $250 per Level 1 EVCS and $2,100 per Level 2 EVCS, and would add 6,065 EVCS by 2020, 35,697 EVCS by 2035, and 43,376 EVCS by 2050.

<table>
<thead>
<tr>
<th>Table 4</th>
<th>Plug-In Hybrid Electric Vehicles and Added e VMT</th>
<th>2020</th>
<th>2035</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Plug-in Hybrid Vehicles</td>
<td></td>
<td>34,326</td>
<td>182,484</td>
<td>220,882</td>
</tr>
<tr>
<td>Daily VMT per vehicle</td>
<td></td>
<td>21.83</td>
<td>20.48</td>
<td>19.90</td>
</tr>
<tr>
<td>Total Daily VMT</td>
<td></td>
<td>749,259</td>
<td>3,737,510</td>
<td>4,394,701</td>
</tr>
<tr>
<td>eVMT (30%)</td>
<td></td>
<td>224,778</td>
<td>1,121,253</td>
<td>1,318,410</td>
</tr>
<tr>
<td>eVMT with Program (41%)</td>
<td></td>
<td>307,196</td>
<td>1,532,379</td>
<td>1,801,827</td>
</tr>
<tr>
<td>Added eVMT (11%)</td>
<td></td>
<td>82,418</td>
<td>411,126</td>
<td>483,417</td>
</tr>
<tr>
<td>Emission Factor - per mile reduced</td>
<td></td>
<td>0.9484</td>
<td>0.9408</td>
<td>0.9407</td>
</tr>
<tr>
<td>CO₂ reduced</td>
<td></td>
<td>78,167</td>
<td>386,783</td>
<td>454,765</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 5</th>
<th>PEV Charging Stations and CO₂ Reduction Results</th>
<th>2020</th>
<th>2035</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB 375 Emissions (lbs)</td>
<td></td>
<td>78,167</td>
<td>386,783</td>
<td>454,765</td>
</tr>
</tbody>
</table>

Managed Lane Automation
In 2050, assuming vehicle automation technology becomes available to vehicles accessing managed lane facilities, the managed lane facilities will have 80 percent higher capacity to handle these zero emission vehicles.

Methodology and calculations
SANDAG conducted a model run with 80 percent increased capacity on the managed lane system. Using output from the model run, SANDAG calculated total managed lane (ML) VMT for the SB 375 vehicle classes. To account for all ML vehicles operating as zero emission vehicles, the VMT from ML was removed from the EMFAC inputs. Using the ML VMT modified EMFAC file, an emissions profile was created. The off-model calculation reflects the CO₂ emission differences between the Regional Plan preferred scenario and the automated managed lane scenario.
Table 6  
**Regional Plan and Managed Lane Automated Scenario CO₂ Emissions**

<table>
<thead>
<tr>
<th></th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>2050 Regional Plan CO₂ Emissions (SB 375)</td>
<td>82,215,442 lbs / day</td>
</tr>
<tr>
<td>Automated ML Scenario CO₂ Emissions</td>
<td>77,896,235 lbs / day</td>
</tr>
<tr>
<td>Emissions Difference</td>
<td>(4,319,207) lbs / day</td>
</tr>
</tbody>
</table>

Table 7  
**Managed Lane Automation and CO₂ Reduction Results**

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2035</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB 375 Emissions (lbs)</td>
<td>–</td>
<td>–</td>
<td>4,319,207</td>
</tr>
</tbody>
</table>

**Transit Managed Lane Automation Programs**

In 2050, assuming vehicle automation technology becomes available to transit vehicles, the automated transit vehicles would result in lower operating costs that would potentially allow for more frequent service on certain routes and lower fares.

**Methodology and calculations**

SANDAG conducted a model run with increased transit operations on well utilized transit routes. Using output from the transit operations model run, SANDAG calculated total greenhouse gas emissions for the SB 375 vehicle classes. The off-model calculation reflects the CO₂ emission differences between the 2050 Regional Plan preferred scenario and the automated transit scenario.

Table 8  
**Regional Plan and Automated Transit Scenario CO₂ Emissions**

<table>
<thead>
<tr>
<th></th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>2050 Regional Plan CO₂ Emissions (SB 375)</td>
<td>82,215,442 lbs / day</td>
</tr>
<tr>
<td>Automated Transit Scenario CO₂ Emissions</td>
<td>81,282,787 lbs / day</td>
</tr>
<tr>
<td>Emissions Difference</td>
<td>(932,655) lbs / day</td>
</tr>
</tbody>
</table>

Table 9  
**Transit Managed Lane Automation and CO₂ Reduction Results**

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2035</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB 375 Emissions (lbs)</td>
<td>–</td>
<td>–</td>
<td>932,655</td>
</tr>
</tbody>
</table>
Summary of Off-Model Strategies
The six off-model greenhouse gas reduction measures described above are projected to reduce daily vehicle miles traveled (VMT) by nearly 3 million miles by 2050, which translates to a daily CO₂ emissions reduction of 4,214 tons per day by 2050 (or approximately 2 lbs. per person) as shown in Table 10.

<table>
<thead>
<tr>
<th>TABLE 10</th>
<th>Summary of Off-Model Strategies (CO₂ lbs / day)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2020</td>
</tr>
<tr>
<td>Carshare</td>
<td>(350,474)</td>
</tr>
<tr>
<td>Vanpools</td>
<td>(643,349)</td>
</tr>
<tr>
<td>Carpools</td>
<td>(35,078)</td>
</tr>
<tr>
<td>Plug-in Electric Vehicle Charging Stations</td>
<td>(78,167)</td>
</tr>
<tr>
<td>Managed Lane Automation</td>
<td>–</td>
</tr>
<tr>
<td>Transit Automation</td>
<td>–</td>
</tr>
<tr>
<td><strong>Total SB 375 CO₂ Off-Model Adjustments</strong></td>
<td>(1,107,068)</td>
</tr>
</tbody>
</table>

ARB EMFAC 2007 to EMFAC 2014 CO₂ Adjustments
On June 30, 2015, ARB staff transmitted a memorandum to Metropolitan Planning Organization (MPO) technical staff providing “guidance on how to deal with changes arising from different EMFAC versions” for the greenhouse gas quantification determinations for the second round of Sustainable Communities Strategies (SCS). According to the enclosed memorandum, in 2010, ARB established regional SB 375 greenhouse gas targets in the form of a percent reduction per capita from 2005 for passenger vehicles using the ARB Emission Factor model, EMFAC 2007. Since the time when targets were set using EMFAC 2007, ARB has released two subsequent versions, EMFAC 2011 and EMFAC 2014. ARB has updated the carbon dioxide (CO₂) emission rates in EMFAC 2011 and EMFAC 2014, based on recent emission testing data and updated energy consumption for air conditioning. In addition, vehicle fleet mix has been updated in EMFAC 2011 and again in EMFAC 2014 based on the latest available Department of Motor Vehicle data at the time of model development. These changes have lowered the overall CO₂ emission rates in EMFAC 2011 and EMFAC 2014 compared to EMFAC 2007.
ARB staff developed a methodology to allow MPOs to adjust the calculation of percent reduction in per capita CO₂ emissions used to meet the established targets when using either EMFAC 2011 or EMFAC 2014 for their second round RTP/SCS. This method will neutralize the changes in fleet average emission rates between the version used for the first RTP/SCS and the version used for the second RTP/SCS. The adjustment for SANDAG is +2 percent per capita reductions; that is, SANDAG has to reduce the estimated change in CO₂ by two additional percentage points. For example, before the ARB adjustment, SB 375 per capita reductions for 2020 were 17 percent, and after applying the adjustment, the reductions became 15 percent. Table 11 provides a summary of the CO₂ per capita reductions from the on-model components, from the off-model analysis of the six strategies included in this attachment, and the ARB adjustment factor.

<table>
<thead>
<tr>
<th>Table 11</th>
<th>Summary of CO₂ Per Capita Reductions – On and Off-Model Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2020</td>
</tr>
<tr>
<td>Per Capita Reduction (On-Model Results Only)</td>
<td>16%</td>
</tr>
<tr>
<td>Per Capita Reduction (Off-Model Results Only)</td>
<td>1%</td>
</tr>
<tr>
<td>ARB Adjustment Factor</td>
<td>-2%</td>
</tr>
<tr>
<td>Total Per Capita Reduction</td>
<td>15%</td>
</tr>
</tbody>
</table>
Endnotes

1 Round-trip carshare services require users to return a rented vehicle to the pick-up location (e.g., Zipcar).
4 Residential density thresholds align with those established for the SANDAG Smart Growth Opportunity Areas. Mixed-Use Transit Corridors require a residential density minimum of 69 persons per acre while Community Center and/or Town Centers align with a residential density minimum of 55 persons per acre. Additional information on SANDAG Smart Growth Opportunity Areas can be found here: http://www.sandag.org/uploads/projectid/projectid_296_14002.pdf.
5 A one-way carshare service allows a user to rent a vehicle at one location and end the trip at another location within the carshare service area (e.g., car2go).
6 Peer-to-peer carshare allows vehicle owners to rent their personal cars to others for a daily or hourly rate via a website or mobile app (e.g., RelayRides). This model offers a way in which vehicle owners can maximize vehicle use in lieu of keeping it parked at a single location.
7 The daily VMT reduction of seven miles per carshare member was established based on academic research: (1) Shaheen and Cohen, “Innovative Mobility Carsharing Outlook” (Summer 2013); (2) Cervero, Golub, and Nee, “City CarShare: Longer-Term Travel-Demand and Car Ownership Impacts”, July 2006, Transportation Research Board 2007 Annual Meeting paper.
8 Emissions rates from EMFAC 2014 v.1.0.7.
9 Figure not inclusive of marketing and administrative costs.
10 ($30 gift card + $2.50 activation fee per card) x 3 months x 2.1 people per carpool.
11 Retention rates were based on case study research. In 2009 SANDAG commissioned a study to analyze rideshare incentive programs and develop an incentive program framework for the San Diego region. The study evaluated rideshare incentive programs offered by the San Bernardino Association of Governments (SANBAG) and the Riverside County Transportation Commission (RCTC) and found that 90 percent of participants continued to rideshare after participating in the program. A Transportation Research Board (TRB) study entitled “Duration of Carpool and Vanpool by Rides Clients” evaluates the San Francisco Bay Area ridesharing program and found that 50 percent of participants were still carpooling 30 months after they received assistance from the rideshare program. Research from Denver (Survey of Work Commuters in the Denver Area, DRCOG (2010)) and Virginia (Methodologies for Determining Carpooler and Vanpool Average Life Bases and the Average Fuel Economy of Commuter Vehicles, VHTRC) revealed that the average lifespan of a carpool was between 2.25 - 3.2 years.
12 Per the SANDAG activity-based model.
To All MPO Technical Staff,

Now that many of the MPOs are working on their second round of SCSs, and with ARB recently releasing a new version of EMFAC, we want to provide guidance on how to deal with changes arising from different EMFAC versions as you do your GHG quantification determinations for the second round of SCSs.

We request that you use the attached methodology if you will be using a different version of EMFAC for quantifying reductions from your second SCS than the EMFAC version you used for your first SCS. Our intent with this methodology is to maintain the same level of stringency for meeting the current targets even though there are emission rate changes when switching EMFAC versions. When targets are updated next year, they will probably be based on EMFAC 2014, therefore, this methodology would not be required with the new targets until a new version of EMFAC was released to supersede EMFAC 2014. Our plan is to update the methodology at that time.

Please look over this methodology and let us know if you have any questions or concerns. For general questions, please contact me by email at jonathan.taylor@arb.ca.gov or by phone at 916-445-8699. For specific technical questions on the adjustment calculations, please contact Nesamani Kalandiyur at nesamani.kalandiyur@arb.ca.gov or 916-324-0466.

I’d like to take this opportunity to thank all of you for your generous assistance and patience as ARB staff have evaluated your SCSs. I am sure you are all proud of your accomplishments in meeting the goals of SB 375, and we ARB staff look forward to continuing to work with all of you.

Best,

Jon

Jonathan Taylor, P.E.
Assistant Chief,
Air Quality Planning and Science Division
California Air Resources Board
jonathan.taylor@arb.ca.gov
Ph. 916-445-8699
FAX: 916-322-3646
Methodology to Calculate CO2 Adjustment to EMFAC Output for SB 375 Target Demonstrations

Background:

In 2010, ARB established regional SB 375 greenhouse gas (GHG) targets in the form of a percent reduction per capita from 2005 for passenger vehicles using the ARB Emission Factor model, EMFAC 2007. EMFAC is a California-specific computer model that calculates weekday emissions of air pollutants from all on-road motor vehicles including passenger cars, trucks, and buses. ARB updates the EMFAC model periodically to reflect the latest planning assumptions (such as vehicle fleet mix) and emissions estimation data and methods. Since the time when targets were set using EMFAC2007, ARB has released two subsequent versions, EMFAC2011\(^1\) and EMFAC2014\(^2\).

ARB has improved the carbon dioxide (CO2) emission rates in EMFAC2011 and EMFAC2014, based on recent emission testing data and updated energy consumption for air conditioning. In addition, vehicle fleet mix has been updated in EMFAC2011 and again in EMFAC2014 based on the latest available Department of Motor Vehicle data at the time of model development. These changes have lowered the overall CO2 emission rates in EMFAC2011 and EMFAC2014 compared to EMFAC2007.

Purpose:

Some metropolitan planning organizations (MPOs) used EMFAC 2007 to quantify GHG emissions reductions from their first Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS); others used EMFAC 2011. As MPOs estimate GHG emissions reductions from subsequent RTP/SCSs, they will use the latest approved version of EMFAC, but using a different model will influence their estimates and their ability to achieve SB 375 targets. The goal of this methodology is to hold each MPO to the same level of stringency in achieving their SB 375 targets regardless of the version of EMFAC used for its second RTP/SCS.

ARB staff has developed this methodology to allow MPOs to adjust the calculation of percent reduction in per capita CO2 emissions used to meet the established targets when using either EMFAC2011 or EMFAC2014 for their second RTP/SCS. This method will neutralize the changes in fleet average emission rates between the version used for the first RTP/SCS and the version used for the second RTP/SCS. The methodology adjusts for the small benefit or disbenefits resulting from the use of a different version of EMFAC by accounting for changes in emission rates, and applies an

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\(^1\) EMFAC2011 was approved by USEPA in March 2013.
\(^2\) EMFAC2014 is under review for USEPA approval.
adjustment when quantifying the percent reduction in per capita CO2 emissions using EMFAC2011 or EMFAC2014.

Applicability:

The adjustment is applicable when the first RTP/SCS was developed using either EMFAC2007 or EMFAC2011 and the second RTP/SCS will be developed using a different version of the model (EMFAC2011 or EMFAC2014).

- Hold the 2005 baseline CO2 per capita estimated in the first RTP/SCS constant. Use both the human population and transportation activity data (VMT and speed distribution) from the first RTP/SCS to calculate the adjustment.
- Add the adjustment to the percent reduction in CO2 per capita calculated with EMFAC2011 or EMFAC2014 for the second RTP/SCS. This will allow equivalent comparison to the first RTP/SCS where emissions were established with EMFAC 2007 or EMFAC2011.

Example Adjustment Calculation (hypothetical for illustration purposes):

In this example, the first RTP/SCS was developed using EMFAC2007 and the second RTP/SCS using EMFAC2011 to calculate the CO2 per capita.

Step 1: Compile the CO2 per capita numbers from the MPO’s first adopted RTP/SCS using EMFAC 2007 without any off-model adjustments for calendar years (CY) 2005, 2020, and 2035 for passenger vehicles.

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>EMFAC2007 CO2 Per capita (lbs/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>30.0</td>
</tr>
<tr>
<td>2020</td>
<td>28.8</td>
</tr>
<tr>
<td>2035</td>
<td>27.6</td>
</tr>
</tbody>
</table>

Step 2: Calculate the percent reductions in CO2 per capita from the 2005 base year for CY 2020 and 2035 from Step 1.

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>EMFAC2007 Percent Reductions (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>4.0%</td>
</tr>
<tr>
<td>2035</td>
<td>8.0%</td>
</tr>
</tbody>
</table>

Step 3: Develop the input files for the EMFAC2011 model using the same activity data for CY 2020 and 2035 from the first adopted RTP/SCS (same activity data used in Step 1) and execute the model.
Step 4: Calculate the CO2 per capita for CY 2020 and 2035 using the EMFAC2011 output from Step 3; do not include Pavley I, LCFS, and ACC benefits for passenger vehicles.

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>EMFAC2011 CO2 Per capita (lbs/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>28.2</td>
</tr>
<tr>
<td>2035</td>
<td>27.9</td>
</tr>
</tbody>
</table>

Step 5: Calculate the percent reductions in CO2 per capita for CY 2020 and 2035 calculated in Step 4 from base year 2005 established in Step 1.

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>EMFAC2011 Percent Reductions (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>6.0%</td>
</tr>
<tr>
<td>2035</td>
<td>7.0%</td>
</tr>
</tbody>
</table>

Step 6: Calculate the difference in percent reductions between Step 5 and Step 2 (subtract Step 5 results from Step 2 results) for CY 2020 and 2035; this yields the adjustment for the respective CY.

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>EMFAC2011 Adjustment (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>-2.0%</td>
</tr>
<tr>
<td>2035</td>
<td>+1.0%</td>
</tr>
</tbody>
</table>

Step 7: Develop the input files for the EMFAC2011 model using the activity data from the new/second RTP/SCS for CY 2020 and 2035 without any off-model adjustments and execute the model.

Step 8: Calculate the CO2 per capita for CY 2020 and 2035 using the EMFAC2011 output from Step 7; do not include Pavley I, LCFS, and ACC benefits for passenger vehicles.

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>EMFAC2011 CO2 Per capita (lbs/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>26.4</td>
</tr>
<tr>
<td>2035</td>
<td>26.1</td>
</tr>
</tbody>
</table>

Step 9: Calculate the percent reductions in CO2 per capita for CY 2020 and 2035 calculated in Step 8 from base year 2005 established in Step 1.

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>EMFAC2011 Percent Reductions (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>12.0%</td>
</tr>
<tr>
<td>2035</td>
<td>13.0%</td>
</tr>
</tbody>
</table>
Step 10: Add the adjustment factors from Step 6 to the percent reductions calculated for the new/second RTP/SCS (Step 9) using EMFAC 2011 for CY 2020 and 2035.

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>Adjusted Percent Reductions (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>10.0%</td>
</tr>
<tr>
<td>2035</td>
<td>14.0%</td>
</tr>
</tbody>
</table>

Follow the same steps to adjust for use of EMFAC2007 or EMFAC2011 to EMFAC2014. Do not include any off-model adjustments during application of the EMFAC adjustment factor.