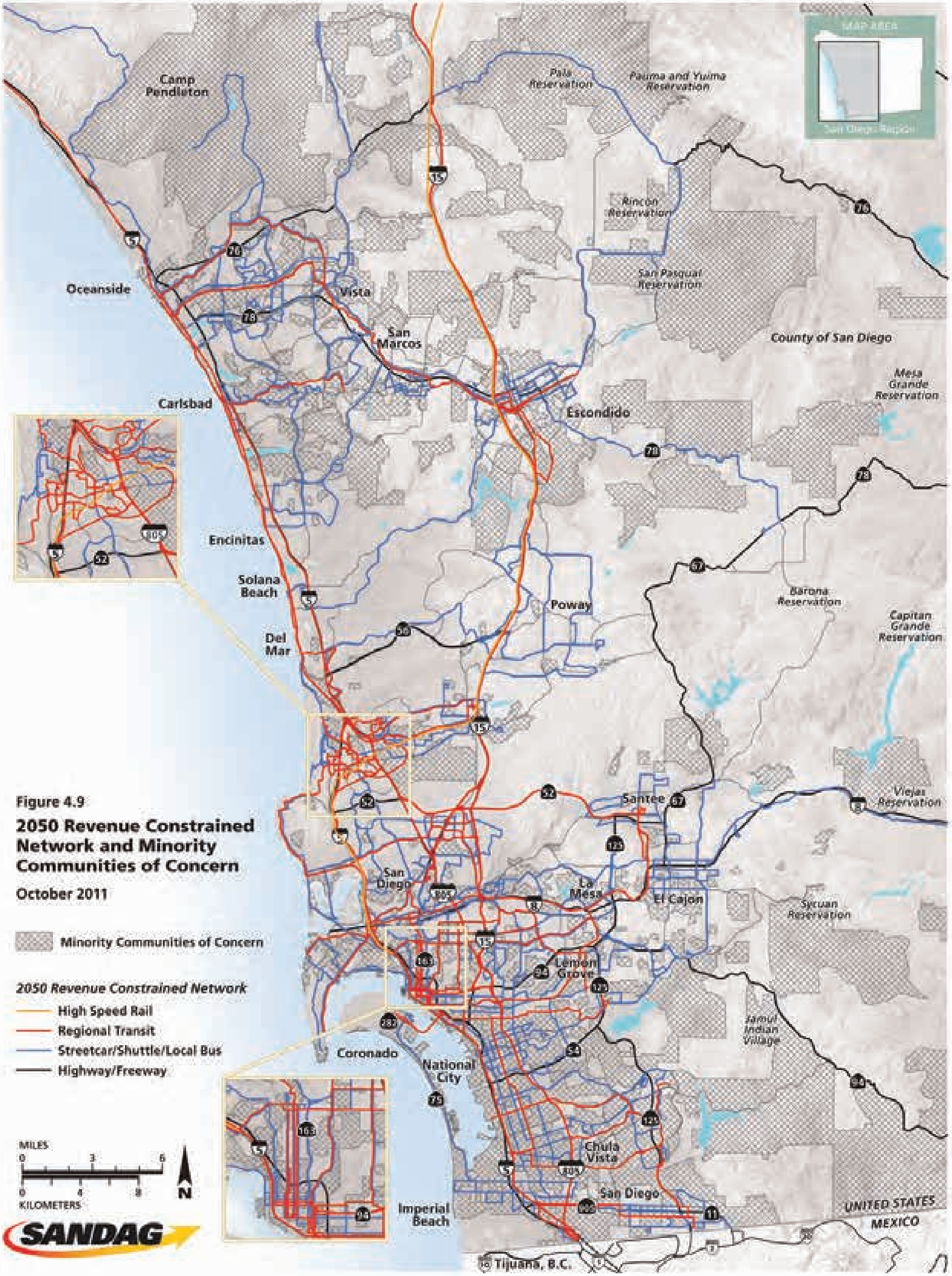

Camp Pendleton
Pala Reservation
Pauma and Yuima Reservation
MAP AREA
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Rincon Reservation
San Pasqual Reservation
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Mesa Grande Reservation
Carlsbad
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Barona Reservation
Poway
Capitan Grande Reservation
Del Mar
Santee
Viejas Reservation
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure 4.9
2050 Revenue Constrained Network and Minority Communities of Concern
October 2011
Minority Communities of Concern
2050 Revenue Constrained Network
High Speed Rail
Regional Transit
Streetcar/Shuttle/Local Bus
Highway/Freeway
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

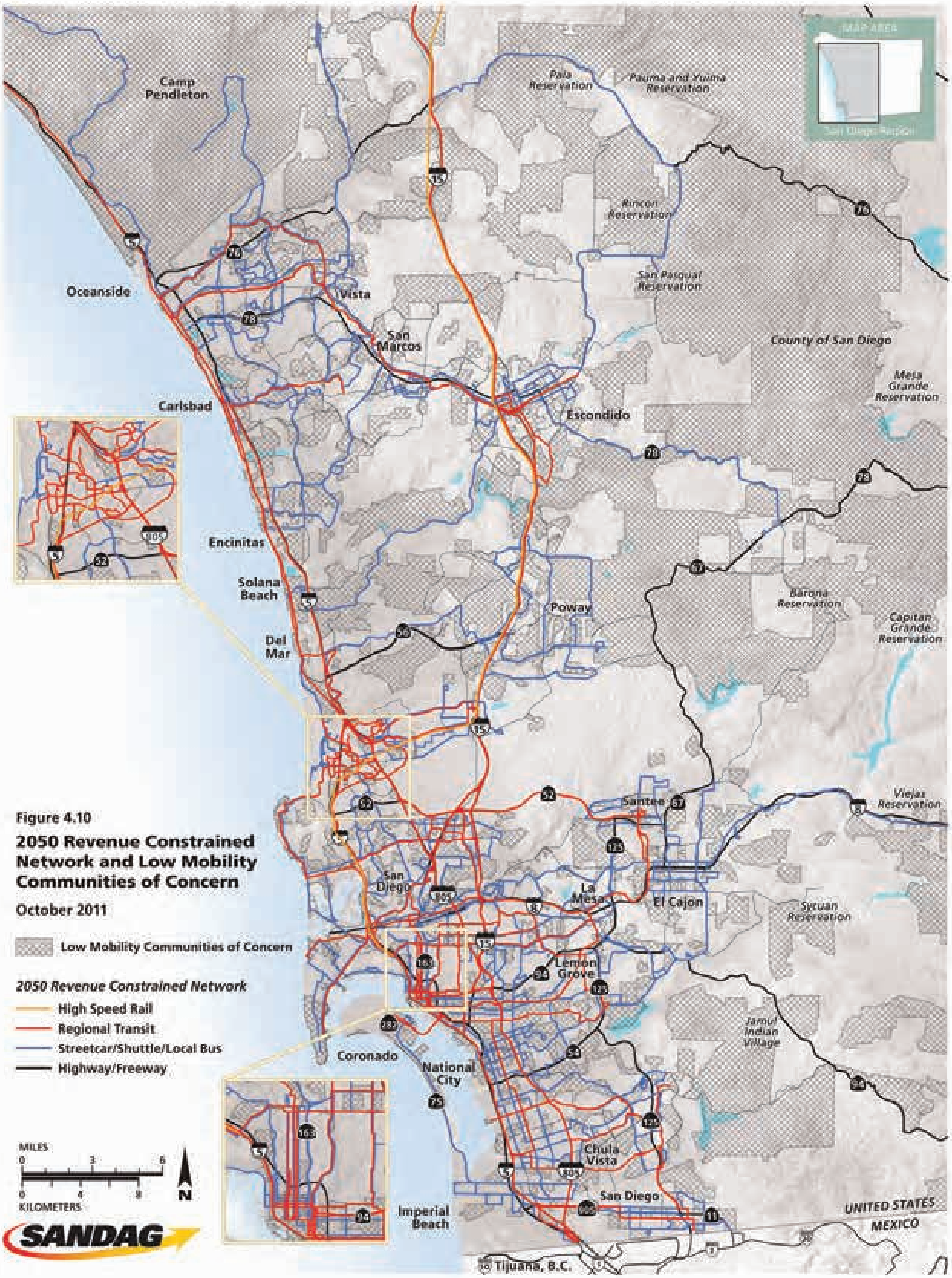

Figure 4.10

2050 Revenue Constrained Network and Low Mobility Communities of Concern

October 2011

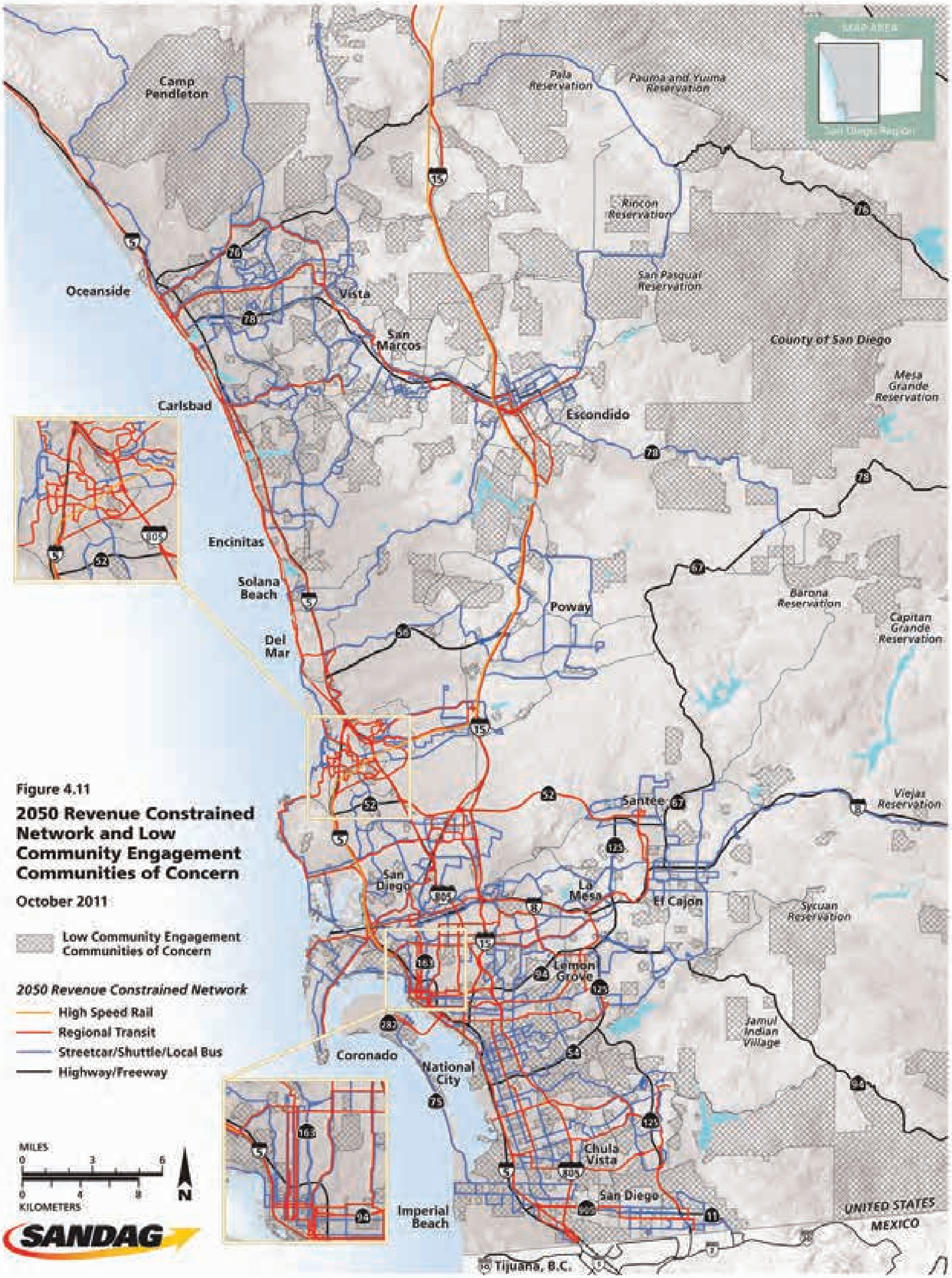

Figure 4.11

2050 Revenue Constrained Network and Low Community Engagement Communities of Concern

October 2011

Table 4.5 – Average Travel Time Per Person Trip

Performance Measure	Existing (2008)	2050 No Build	2020 Revenue Constrained	2035 Revenue Constrained	2050 Revenue Constrained
Average travel time per person trip – All Trip Types Combined (minutes)					
Low Income Community of Concern	15	17	15	16	17
Non-Low Income population	16	17	16	16	17
Minority Community of Concern	15	17	15	16	16
Non-Minority population	16	17	16	16	17
Low Mobility Community of Concern	16	18	16	17	17
Non-Low Mobility population	16	17	15	16	17
Low Community Engagement Community of Concern	15	17	15	16	17
Non-Low Community Engagement population	16	17	16	16	17
Average travel time per person trip – Auto, Drive Alone (minutes)					
Low Income Community of Concern	16	18	16	17	17
Non-Low Income population	17	18	16	17	17
Minority Community of Concern	16	18	16	16	17
Non-Minority population	17	18	16	17	18
Low Mobility Community of Concern	16	18	16	17	17
Non-Low Mobility population	16	18	16	17	17
Low Community Engagement Community of Concern	16	18	16	17	17
Non-Low Community Engagement population	17	18	17	17	18
Average travel time per person trip – Auto, Carpool (minutes)					
Low Income Community of Concern	13	14	12	13	14
Non-Low Income population	13	14	13	13	14
Minority Community of Concern	12	13	11	12	13
Non-Minority population	13	14	13	14	14
Low Mobility Community of Concern	13	14	12	13	14
Non- Low Mobility population	13	14	12	13	14
Low Community Engagement Community of Concern	12	14	12	13	13
Non-Low Community Engagement population	13	14	13	14	14

Table 4.5 – Average Travel Time Per Person Trip (Continued)

Performance Measure	Existing (2008)	2050 No Build	2020 Revenue Constrained	2035 Revenue Constrained	2050 Revenue Constrained
Average travel time per person trip - Transit (minutes)					
Low Income Community of Concern	53	55	54	50	48
Non-Low Income population	58	59	58	53	52
Minority Community of Concern	56	57	56	52	49
Non-Minority population	54	56	55	51	50
Low Mobility Community of Concern	54	56	55	50	49
Non-Low Mobility population	59	60	59	54	53
Low Community Engagement Community of Concern	57	58	57	53	51
Non-Low Community Engagement population	56	58	56	52	51

Table 4.6 – Commute Trips within 30 minutes and Percent of Homes within 1/2 Mile of a Transit Stop

Performance Measure	Existing (2008)	2050 No Build	2020 Revenue Constrained	2035 Revenue Constrained	2050 Revenue Constrained
Commute trips within 30 minutes					
Low Income Community of Concern					
SOV/Drove alone	79%	71%	80%	76%	74%
Carpool	80%	72%	83%	78%	75%
Transit	15%	15%	18%	22%	23%
Non Low Income population					
SOV/Drove alone	72%	67%	72%	69%	69%
Carpool	73%	69%	77%	71%	71%
Transit	5%	5%	7%	10%	11%
Minority Community of Concern					
SOV/Drove alone	75%	70%	77%	73%	72%
Carpool	76%	71%	81%	75%	74%
Transit	9%	10%	12%	16%	17%
Non-Minority population					
SOV/Drove alone	72%	66%	72%	69%	68%
Carpool	73%	68%	76%	71%	70%
Transit	5%	6%	8%	11%	11%
Low Mobility Community of Concern					
SOV/Drove alone	78%	71%	79%	75%	73%
Carpool	79%	72%	83%	77%	75%
Transit	12%	13%	15%	19%	20%
Non-Low Mobility population					
SOV/Drove alone	72%	67%	72%	69%	69%
Carpool	73%	69%	77%	71%	71%
Transit	6%	6%	8%	11%	12%
Low Community Engagement Community of Concern					
SOV/Drove alone	77%	70%	78%	74%	73%
Carpool	78%	71%	82%	76%	74%
Transit	12%	13%	15%	19%	21%
Non-Low Community Engagement population					
SOV/Drove alone	72%	67%	72%	69%	69%
Carpool	73%	69%	77%	71%	71%
Transit	5%	5%	8%	11%	11%

Table 4.6 – Commute Trips within 30 minutes and Percent of Homes within 1/2 Mile of a Transit Stop (Continued)

Performance Measure	Existing (2008)	2050 No Build	2020 Revenue Constrained	2035 Revenue Constrained	2050 Revenue Constrained
Percentage of Homes within 1/2 Mile of a Transit Stop					
Low Income Community of Concern	93%	90%	90%	90%	91%
Non-Low Income population	59%	56%	58%	59%	60%
Minority Community of Concern	81%	78%	79%	79%	80%
Non-Minority population	55%	54%	55%	56%	57%
Low Mobility Community of Concern	72%	72%	71%	73%	74%
Non-Low Mobility population	65%	62%	64%	64%	66%
Low Community Engagement Community of Concern	90%	86%	87%	86%	87%
Non-Low Community Engagement population	57%	55%	57%	58%	59%

Table 4.7 – Auto Travel Times to Amenities

Performance Measure	Existing (2008)	2050 No Build	2020 Revenue Constrained	2035 Revenue Constrained	2050 Revenue Constrained
Auto travel time					
Percentage of Population within 30 min of Schools (higher education, including vocational)					
Low Income Community of Concern	99%	99%	99%	99%	99%
Non-Low Income population	99%	99%	99%	99%	99%
Minority Community of Concern	99%	99%	99%	99%	99%
Non-Minority population	99%	99%	99%	99%	99%
Low Mobility Community of Concern	98%	97%	97%	97%	97%
Non-Low Mobility population	100%	99%	100%	100%	99%
Low Community Engagement Community of Concern	99%	99%	99%	99%	99%
Non-Low Community Engagement population	99%	99%	99%	99%	99%
Percentage of Population within 30 min of San Diego International Airport					
Low Income Community of Concern	75%	75%	76%	76%	75%
Non-Low Income population	71%	64%	72%	69%	67%
Minority Community of Concern	75%	74%	76%	75%	76%
Non-Minority population	70%	61%	70%	67%	62%
Low Mobility Community of Concern	71%	66%	71%	70%	67%
Non-Low Mobility population	73%	68%	73%	72%	70%
Low Community Engagement Community of Concern	70%	69%	70%	70%	69%
Non- Low Community Engagement population	74%	67%	74%	72%	69%
Percentage of Population within 15 min of Healthcare (hospitals, community clinics)					
Low Income Community of Concern	99%	99%	100%	99%	99%
Non-Low Income population	97%	96%	97%	97%	96%
Minority Community of Concern	99%	99%	99%	99%	99%
Non-Minority population	96%	95%	96%	96%	95%
Low Mobility Community of Concern	97%	96%	97%	97%	96%
Non-Low Mobility population	98%	97%	98%	98%	98%
Low Community Engagement Community of Concern	99%	99%	99%	99%	99%
Non-Low Community Engagement population	97%	96%	97%	97%	96%
Percentage of Population within 15 min of Parks and Beaches					
Low Income Community of Concern	100%	100%	100%	100%	100%
Non-Low Income population	99%	99%	99%	99%	99%
Minority Community of Concern	100%	100%	100%	100%	100%
Non-Minority population	99%	99%	99%	99%	99%
Low Mobility Community of Concern	100%	100%	100%	100%	100%
Non-Low Mobility population	99%	99%	99%	99%	99%
Low Community Engagement Community of Concern	100%	100%	100%	100%	100%
Non-Low Community Engagement population	99%	99%	99%	99%	99%

Table 4.8 – Transit Travel Times to Amenities

Performance Measure	Existing (2008)	2050 No Build	2020 Revenue Constrained	2035 Revenue Constrained	2050 Revenue Constrained
Transit Travel Time					
Percentage of Population within 30 min of Schools (Higher Education, including Vocational)					
Low Income Community of Concern	87%	87%	87%	87%	90%
Non-Low Income population	69%	68%	70%	71%	72%
Minority Community of Concern	85%	83%	85%	86%	87%
Non-Minority population	62%	63%	65%	65%	66%
Low Mobility Community of Concern	76%	77%	76%	77%	79%
Non-Low Mobility population	72%	72%	74%	75%	76%
Low Community Engagement Community of Concern	85%	85%	85%	85%	88%
Non-Low Community Engagement population	68%	67%	70%	70%	72%
Percentage of Population within 30 min of San Diego International Airport					
Low Income Community of Concern	4%	6%	6%	7%	10%
Non-Low Income population	5%	7%	7%	7%	8%
Minority Community of Concern	3%	5%	4%	4%	7%
Non-Minority population	7%	9%	9%	9%	11%
Low Mobility Community of Concern	5%	8%	8%	9%	12%
Non-Low Mobility population	5%	6%	6%	6%	7%
Low Community Engagement Community of Concern	3%	4%	4%	5%	8%
Non-Low Community Engagement population	6%	8%	7%	8%	9%
Percentage of Population within 15 min of Healthcare (Hospitals, Community Clinics)					
Low Income Community of Concern	72%	71%	71%	72%	73%
Non-Low Income population	24%	23%	23%	25%	27%
Minority Community of Concern	53%	50%	51%	52%	54%
Non-Minority population	21%	22%	21%	23%	25%
Low Mobility Community of Concern	50%	51%	49%	52%	56%
Non-Low Mobility population	32%	31%	31%	33%	34%
Low Community Engagement Community of Concern	65%	62%	64%	64%	66%
Non-Low Community Engagement population	23%	23%	23%	25%	27%

Table 4.8 – Transit Travel Times to Amenities (Continued)

Performance Measure	Existing (2008)	2050 No Build	2020 Revenue Constrained	2035 Revenue Constrained	2050 Revenue Constrained
Percentage of Population within 15 min of Parks and Beaches					
Low Income Community of Concern	67%	66%	67%	67%	68%
Non-Low Income population	54%	53%	55%	56%	58%
Minority Community of Concern	60%	58%	60%	61%	64%
Non-Minority population	56%	55%	56%	56%	57%
Low Mobility Community of Concern	60%	60%	61%	61%	63%
Non-Low Mobility population	57%	55%	57%	58%	60%
Low Community Engagement Community of Concern	61%	59%	61%	60%	62%
Non-Low Community Engagement population	56%	55%	57%	58%	60%

Table 4.9 – Distribution of RTP Expenditures per Capita

Performance Measure	Existing (2008)	2050 No Build	2020 Revenue Constrained	2035 Revenue Constrained	2050 Revenue Constrained
Low Income Community of Concern	N/A	$6,100	N/A	N/A	$18,500
Non-Low Income population	N/A	$6,100	N/A	N/A	$14,700
Minority Community of Concern	N/A	$6,100	N/A	N/A	$16,300
Non-Minority population	N/A	$6,000	N/A	N/A	$15,100
Low Mobility Community of Concern	N/A	$6,100	N/A	N/A	$17,400
Non-Low Mobility population	N/A	$6,100	N/A	N/A	$15,100
Low Community Engagement Community of Concern	N/A	$6,000	N/A	N/A	$17,100
Non-Low Community Engagement population	N/A	$6,100	N/A	N/A	$15,100

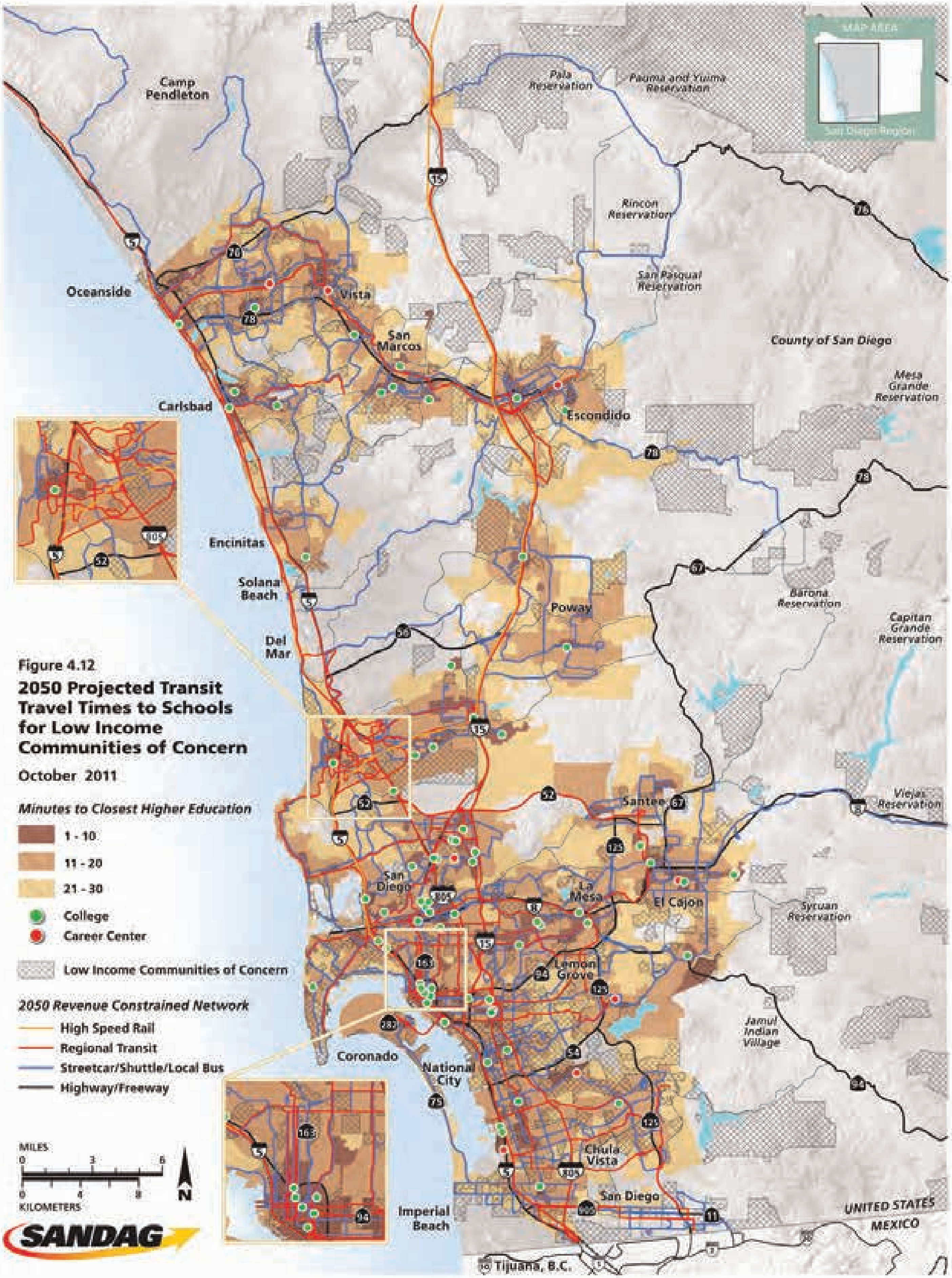

Figure 4.12
2050 Projected Transit Travel Times to Schools for Low Income Communities of Concern
October 2011

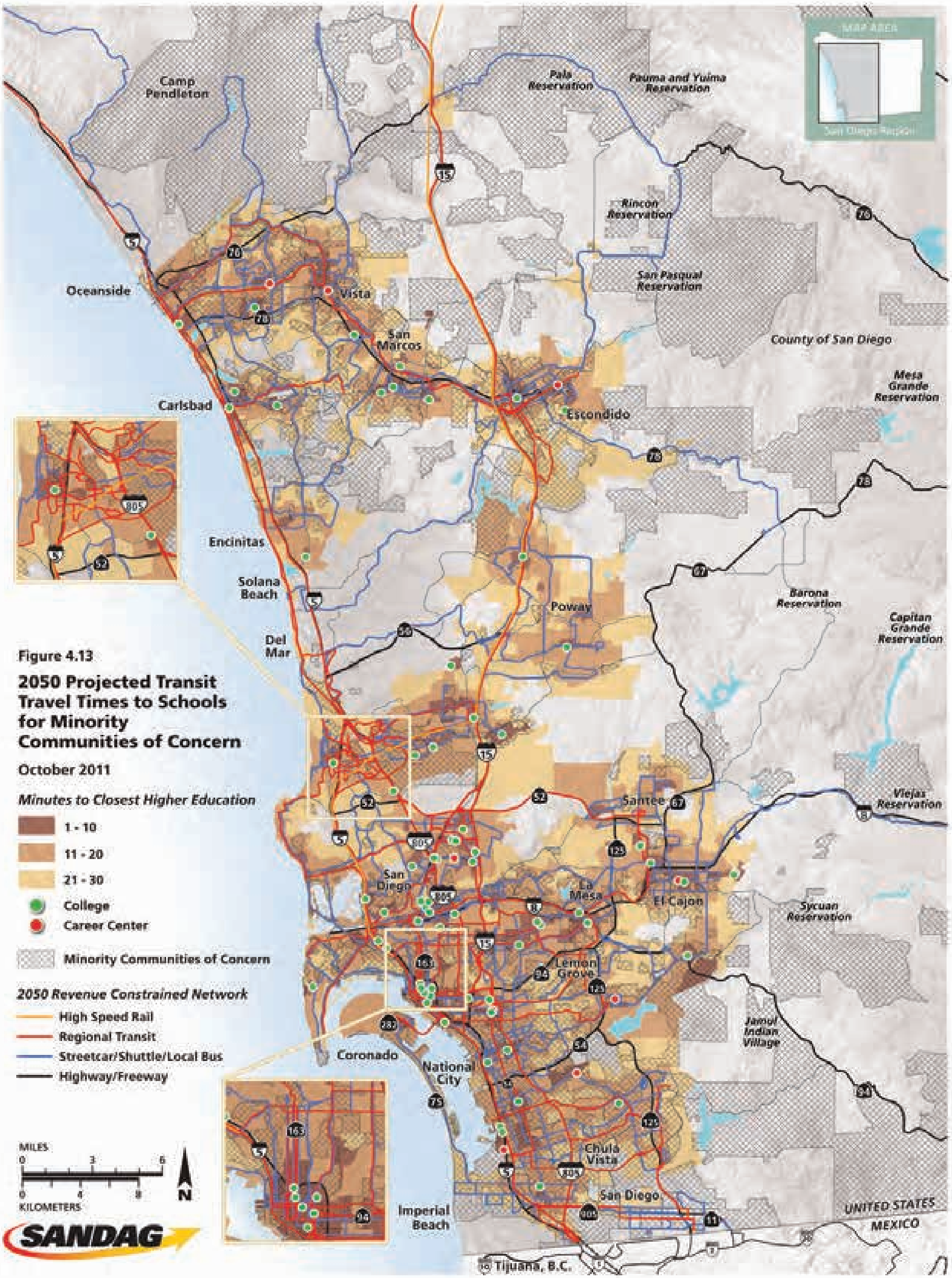

Figure 4.13
2050 Projected Transit Travel Times to Schools for Minority Communities of Concern
October 2011
Minutes to Closest Higher Education
1 - 10
11 - 20
21 - 30
College
Career Center
Minority Communities of Concern
2050 Revenue Constrained Network
High Speed Rail
Regional Transit
Streetcar/Shuttle/Local Bus
Highway/Freeway
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG
Camp Pendleton
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
San Pasqual Reservation
County of San Diego
Mesa Grande Reservation
Oceanside
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San Marcos
Carlsbad
Escondido
Encinitas
Solana Beach
Del Mar
Poway
Barona Reservation
Capitan Grande Reservation
Santee
Viejas Reservation
San Diego
La Mesa
El Cajon
Sycuan Reservation
Lemon Grove
Jamul Indian Village
Coronado
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Chula Vista
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UNITED STATES
MEXICO
Tijuana, B.C.

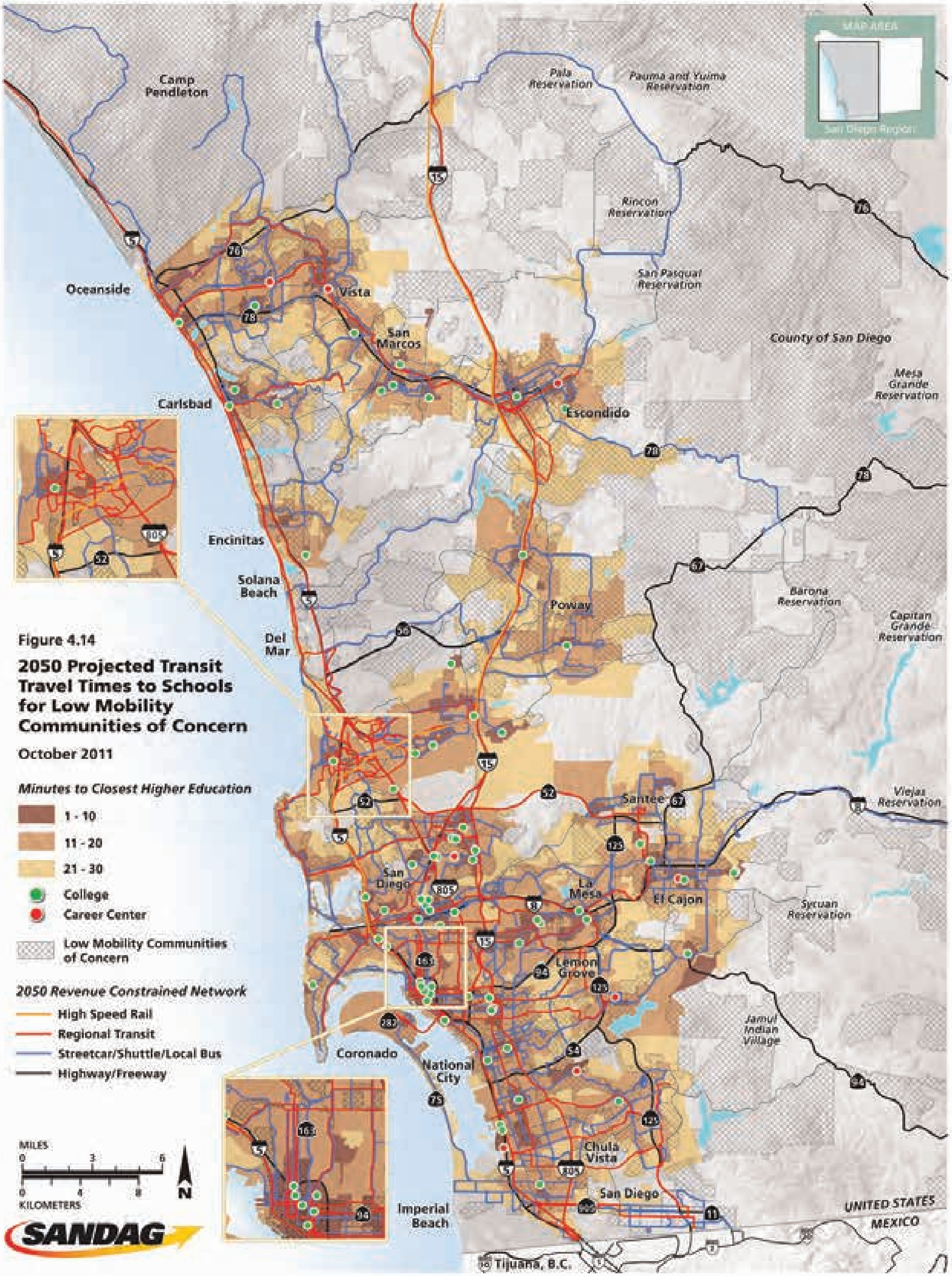

Figure 4.14
2050 Projected Transit Travel Times to Schools for Low Mobility Communities of Concern
October 2011
Minutes to Closest Higher Education
1 - 10
11 - 20
21 - 30
College
Career Center
Low Mobility Communities of Concern
2050 Revenue Constrained Network
High Speed Rail
Regional Transit
Streetcar/Shuttle/Local Bus
Highway/Freeway
MILES
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Camp Pendleton
Pala Reservation
Pauma and Yuima Reservation
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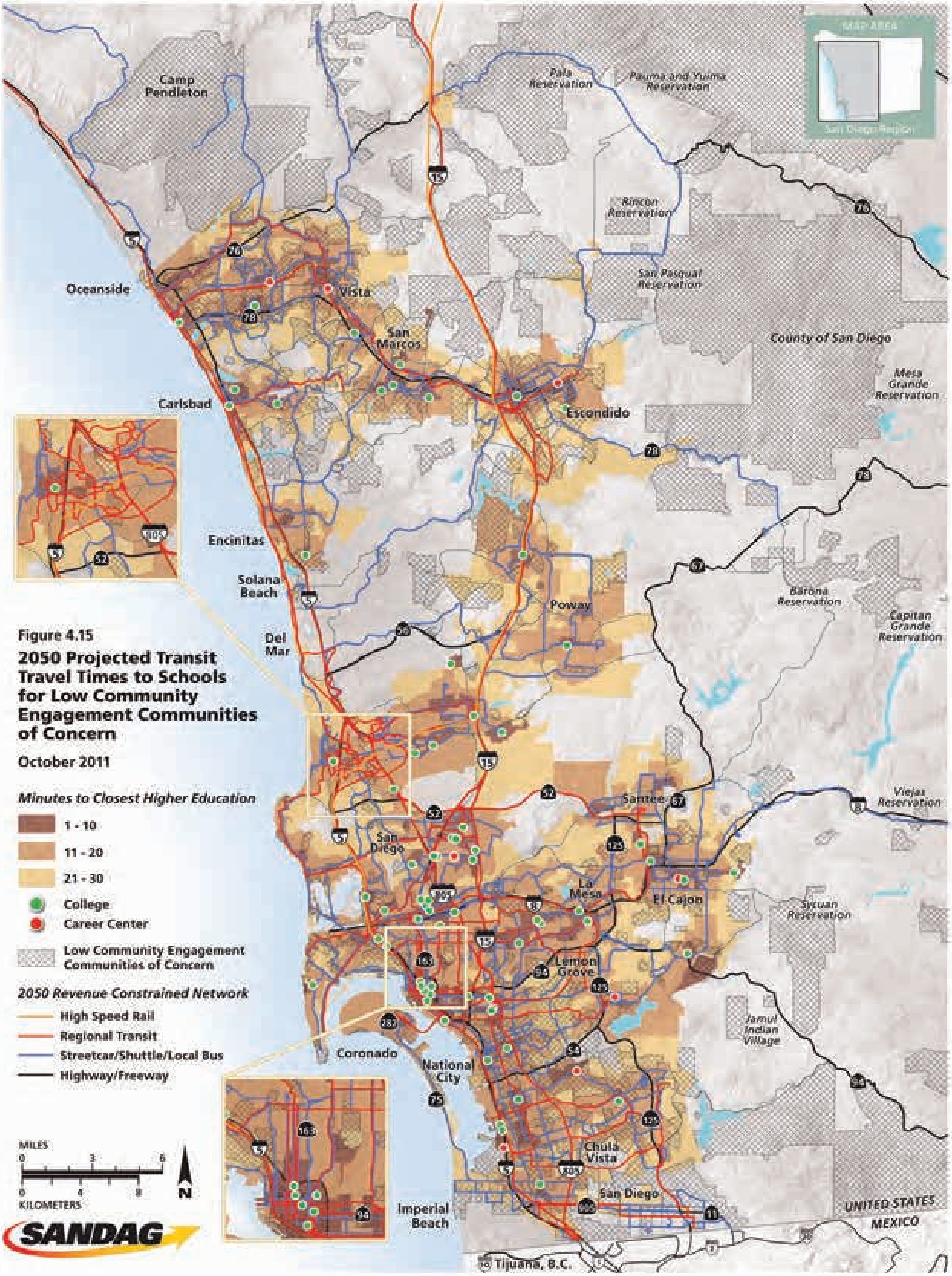
Figure 4.15
2050 Projected Transit Travel Times to Schools for Low Community Engagement Communities of Concern
October 2011
Minutes to Closest Higher Education
1 - 10
11 - 20
21 - 30
College
Career Center
Low Community Engagement Communities of Concern
2050 Revenue Constrained Network
High Speed Rail
Regional Transit
Streetcar/Shuttle/Local Bus
Highway/Freeway
MILES
0
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KILOMETERS
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Map Area
San Diego Region
Camp Pendleton
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Pauma and Yuima Reservation
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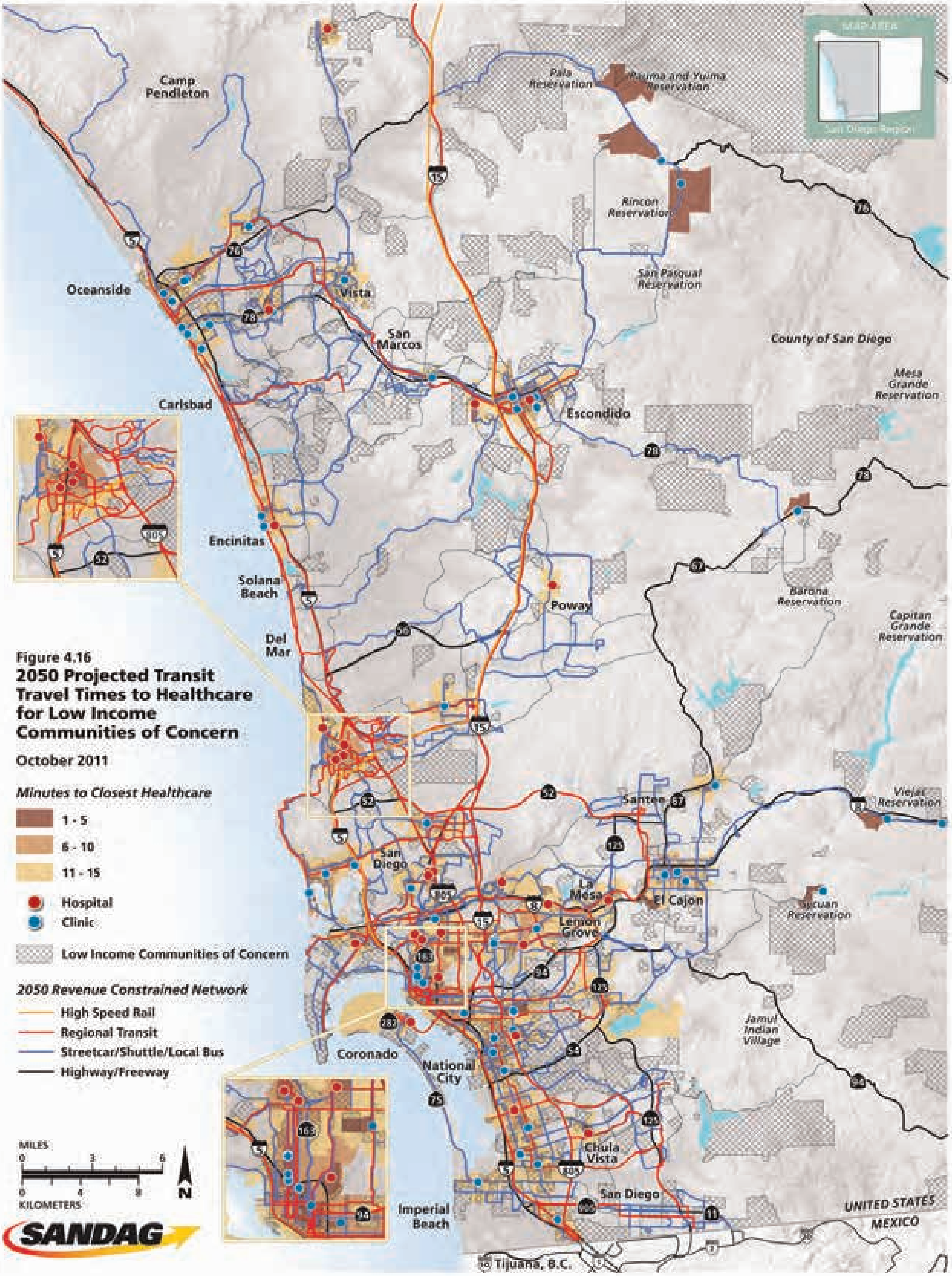

Figure 4.16
2050 Projected Transit Travel Times to Healthcare for Low Income Communities of Concern

October 2011

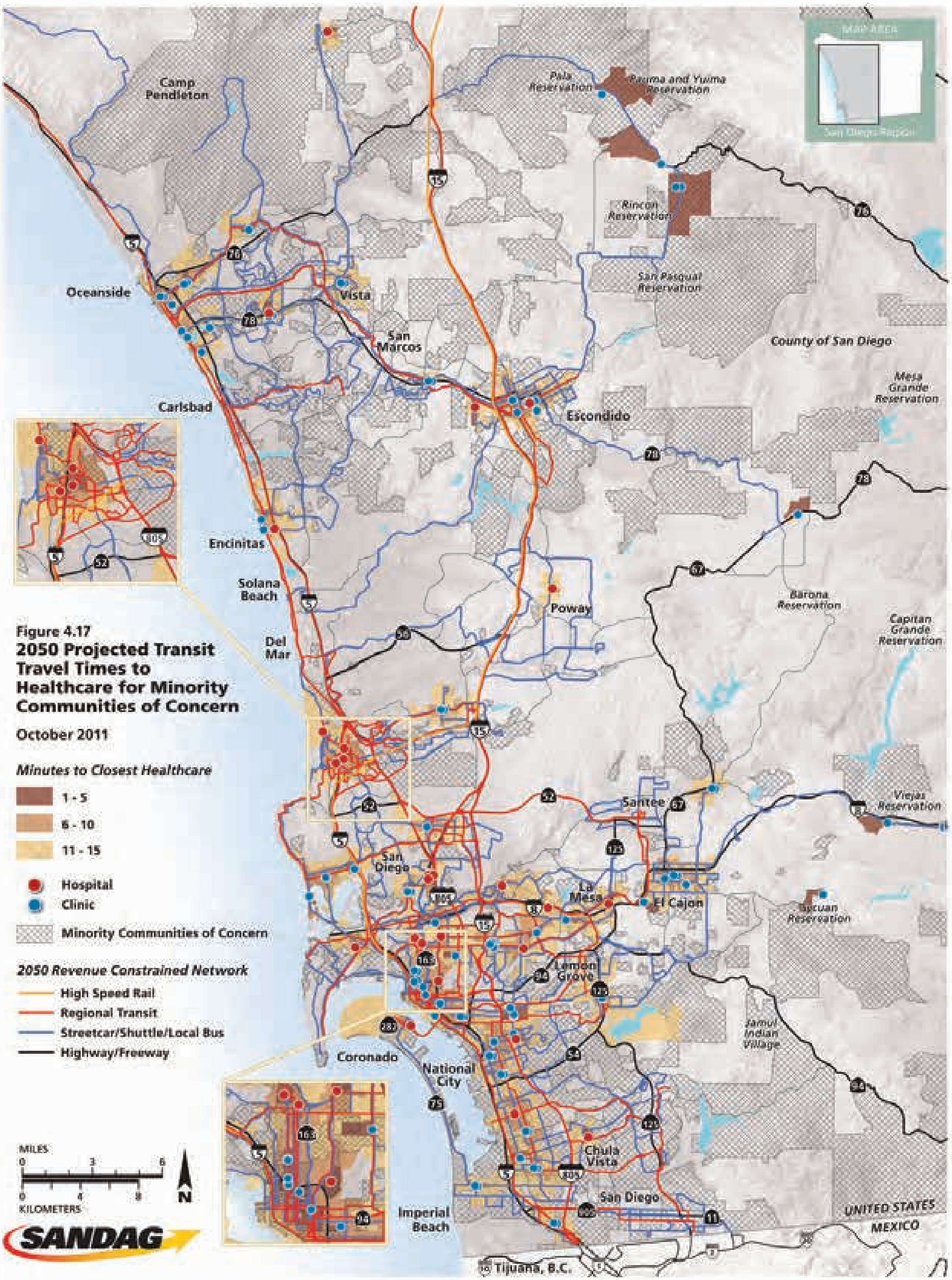
Figure 4.17
2050 Projected Transit Travel Times to Healthcare for Minority Communities of Concern
October 2011
Minutes to Closest Healthcare
1 - 5
6 - 10
11 - 15
Hospital
Clinic
Minority Communities of Concern
2050 Revenue Constrained Network
High Speed Rail
Regional Transit
Streetcar/Shuttle/Local Bus
Highway/Freeway
MILES
0
3
6
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4
8
KILOMETERS
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Oceanside
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Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
San Pasqual Reservation
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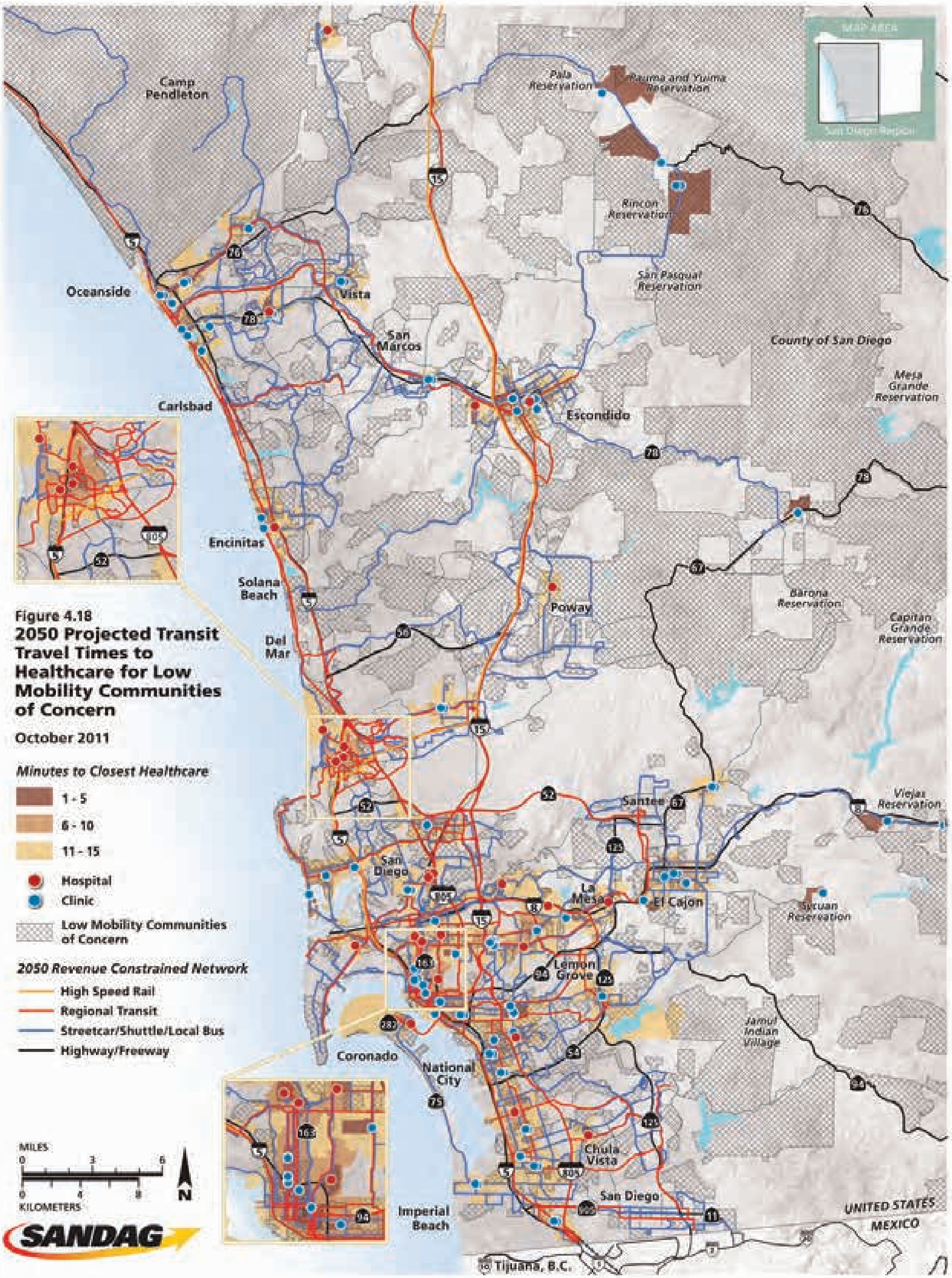
Viejas Reservation
Sycuan Reservation
Jamul Indian Village
UNITED STATES
MEXICO


Camp Pendleton
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UNITED STATES
MEXICO
Tijuana, B.C.
MAP AREA
San Diego Region
Figure 4.18
2050 Projected Transit Travel Times to Healthcare for Low Mobility Communities of Concern
October 2011
Minutes to Closest Healthcare
1 - 5
6 - 10
11 - 15
Hospital
Clinic
Low Mobility Communities of Concern
2050 Revenue Constrained Network
High Speed Rail
Regional Transit
Streetcar/Shuttle/Local Bus
Highway/Freeway
MILES
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3
6
0
4
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KILOMETERS
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SANDAG

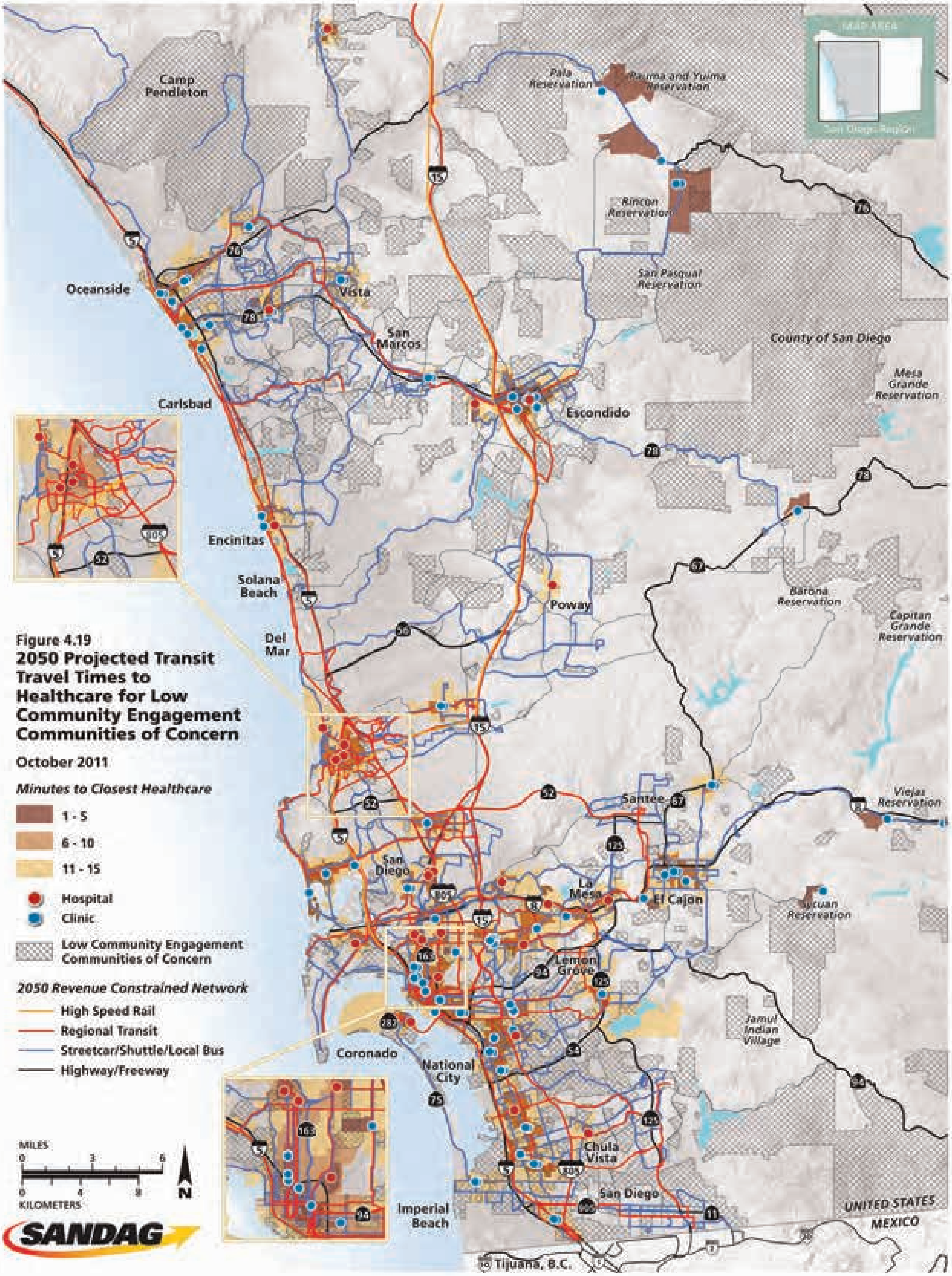

Figure 4.19
2050 Projected Transit Travel Times to Healthcare for Low Community Engagement Communities of Concern
October 2011
Minutes to Closest Healthcare
1 - 5
6 - 10
11 - 15
Hospital
Clinic
Low Community Engagement Communities of Concern
2050 Revenue Constrained Network
High Speed Rail
Regional Transit
Streetcar/Shuttle/Local Bus
Highway/Freeway
MILES
0 3 6
0 4 8
KILOMETERS
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SANDAG
Camp Pendleton
Pala Reservation
Pauma and Yuima Reservation
Rincon Reservation
San Pasqual Reservation
County of San Diego
Mesa Grande Reservation
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MAP AREA
San Diego Region

The next question analyzed was whether LIM populations would receive a similar or greater benefit compared with non-LIMs under the 2050 RTP, relative to the No Build alternative. Key findings are discussed below:

Average Travel Time: The modeling results show no difference in average travel times between LIM and non-LIM populations in the 2050 RTP. The average travel time per person trip for LIM and non-LIM populations, as well as other Communities of Concern, is marginally higher in 2050 than it is today (increasing from 15-16 minutes to 16-17 minutes). There are substantial transit travel time improvements (6-8 minute travel time savings per trip) when compared with the No Build alternative. There are no significant differences in improvements for LIM and non-LIM populations (Table 4.5).

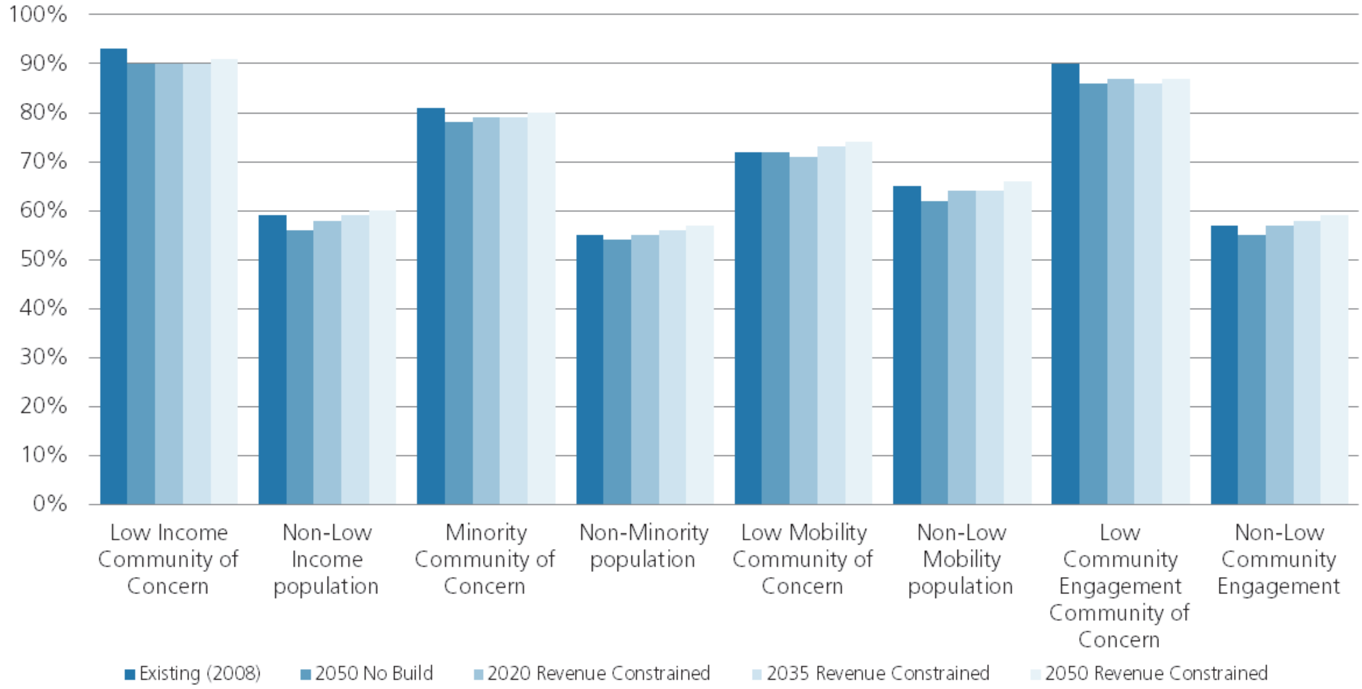
Job Access: LIM populations would receive slightly greater accessibility gains for peak period work trips lasting up to 30 minutes in which they drive alone, carpool, or take public transit, compared with non-LIM populations. When comparing job access (i.e., the proportion of jobs accessible within a 30-minute commute trip) between the No Build alternative and the 2050 RTP, there are moderate levels of improvement (2-3 percentage points) with the 2050 RTP for job access by auto (drive alone and carpool) for Communities of Concern and for other neighborhoods. The biggest gains are seen for people who use public transit to get to work. This improves by 7-8 percentage points for Communities of Concern, when comparing the 2050 RTP with the No Build alternative (Table 4.6).

Access to Transit: The percentage of homes within a half-mile of a transit stop will increase for LIM populations, but those gains are expected to be slightly higher for non-LIM populations. The 2050 RTP increases the percentage of homes served by transit in Low Income, Minority, Low Mobility, and Low Community Engagement Communities of Concern, compared with the No Build alternative. Accessibility gains are slightly higher for communities other than Communities of Concern, because the 2050 RTP Scenario extends some transit services to some higher-income areas not previously served by public transit (Table 4.6 and Figure 4.20).

Access to Schools: Ninety-nine percent of the LIM population has auto access to higher education facilities. Access to schools within a 30-minute drive is expected to remain virtually the same for both LIM and non-LIM populations. Access via public transit is expected to improve both for LIM and non-LIM populations, with slightly higher accessibility gains for non-LIM populations. Access to higher education via public transit shows substantial improvement with the 2050 RTP, compared with the No Build alternative. The 2050 RTP substantially improves access for Communities of Concern, and also maintains higher levels of access for Communities of Concern, compared with other communities (Tables 4.7 and 4.8).

Access to San Diego International Airport (SDIA): Access to SDIA within 30 minutes by driving is expected to be 76 percent for minority and 62 percent for non-minority populations, with marginally higher gains for minority populations relative to non-minority populations. Access to SDIA within 30 minutes via public transit is lower for minority populations but is expected to improve significantly with the 2050 RTP. Transit access to SDIA is expected to improve by 2-4 percentage points for Communities of Concern. Across all communities, the 2050 RTP maintains or improves auto access, compared with the No Build alternative. Slightly lower gains in accessibility for

Figure 4.20 – Percent of Homes within a 1/2 Mile of a Transit Stop



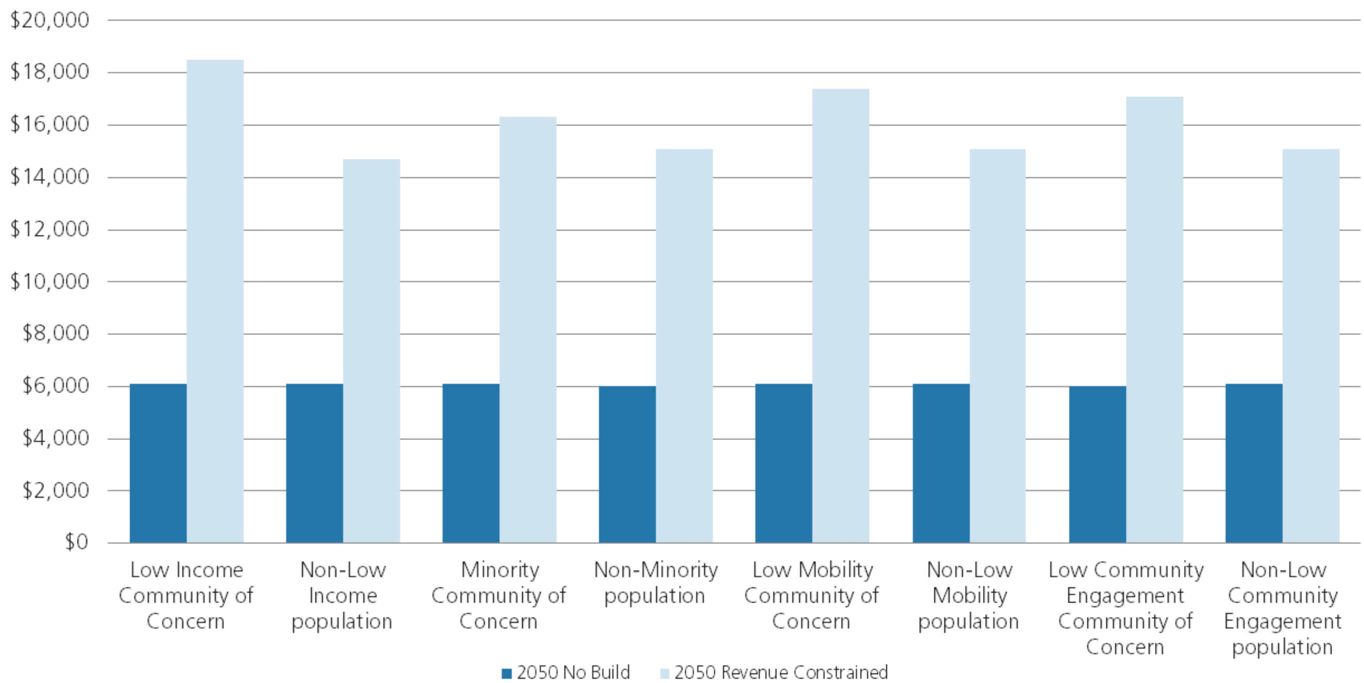
Communities of Concern is expected, compared with other communities. Low income populations, however, are expected to enjoy better auto access to SDIA than non-low income populations would in 2050 (Tables 4.7 and 4.8).

Access to Healthcare Facilities: Access to healthcare facilities within a 15-minute auto or transit travel time is projected to remain virtually the same for both LIM and non-LIM populations. Currently, access by auto to the region's major hospitals and community clinics is high for nearly all communities. Between 96-99 percent of the region's population can access a hospital or community clinic within a 15-minute drive. The 2050 RTP preserves this high level of access for Communities of Concern, compared with the No Build alternative. Access remains higher for LIM than for non-LIM populations in the future (Tables 4.7 and 4.8). Transit access to healthcare facilities, both under existing conditions and in 2050, is substantially higher for Communities of Concern, compared to other communities.

Access to Parks or Beaches: Under existing conditions, auto access to parks or beaches is high at 99 percent or greater for both LIM and non-LIM communities. There are considerable improvements in transit access in the 2050 RTP, compared with the No Build alternative. Access to parks or beaches by transit is expected to improve by 2 percentage points for low income populations and by 6 percentage points for minority populations over the No Build alternative. For low mobility and low community engagement populations, the expected improvement is 3 percentage points. The 2050 RTP provides streetcar services that also will enhance access to parks (Tables 4.7 and 4.8).

Distribution of Proposed RTP Expenditures per Capita: The analysis for low income populations shows that the 2050 RTP would result in higher increases in RTP investments per capita for low income populations, compared with higher income populations (Figure 4.21). The rate of increase in investments per capita is projected to be 203 percent for low income populations, compared with 141 percent for higher income populations.

Figure 4.21 – Distribution of RTP Expenditures per Capita



The 2050 RTP would result in a slightly higher growth rate in investment per capita for LIM populations, compared with non-LIM populations.

The analysis for minority populations, meanwhile, shows that the 2050 RTP would result in slightly higher increases in investments per capita for minority populations, compared with non-minority populations. The rate of increase in investments per capita is projected to be 167 percent for minority populations, compared with 152 percent for non-minority populations.

2008 Existing Conditions Analysis

The social equity performance measures outlined above for the 2050 RTP Transportation Network Scenario were compared with 2008 existing conditions to determine how mobility and accessibility indicators would change over time for LIM populations, compared with non-LIM populations (Tables 4.5 through 4.8). Data for 2008 investments per capita are not available for LIM and non-LIM populations; therefore, an analysis of this performance measure was not possible. Key findings for the other performance measures are outlined below:

Average Travel Time: The modeling results suggest that travel times for LIM and non-LIM populations will be similar. When comparing travel times by mode, there are substantial improvements in transit travel times (4-7 minute travel time savings per trip, on average, for both LIM and non-LIM) compared with existing conditions (Table 4.5).

Job Access: The percentage of peak period work trips taking up to 30 minutes, in which people drive alone or carpool to work, is expected to decline similarly for both LIM and non-LIM populations. Improvements using public transportation, however, are expected for both populations, with slightly higher gains for the LIM population. When compared with existing conditions (i.e., job access in 2008), some decreases in job access by auto (both for driving alone and carpooling) are expected. Although, with major public transit investments in the 2050 RTP, substantial improvements in job access by public transit are expected for Communities of Concern (8-9 percentage point improvement) and other areas (a 6 percentage point improvement) (Table 4.6).

Access to Transit: Most LIM homes (93 percent for Low Income and 81 percent for Minority) were within a half mile of a transit stop in 2008. With the 2050 RTP, the percentage of homes within a half mile of a transit stop would remain virtually the same for LIM populations. Slightly higher gains in accessibility are expected for non-LIM populations, when compared with LIM populations because of significant public transit investments (Table 4.6).

Access to Schools: Under existing conditions, between 98 and 99 percent of Communities of Concern live within a 30-minute drive from schools. This is expected to remain at similar levels for both LIM and non-LIM populations with the 2050 RTP. Access via public transit, however, is expected to improve slightly for all Communities of Concern. For example, low income, low mobility, and low community Engagement populations will see a 3 percentage point increase in accessibility, while minority populations will see a 2 percentage point increase. Communities of Concern are expected to experience nearly equal gains in accessibility to schools than other communities across all modes of transportation (driving alone/carpooling and using public transit) (Tables 4.7 and 4.8).

Access to SDIA: The percentage of the population within 30 minutes of SDIA is expected to remain at current levels for LIM populations for those who drive alone and carpool. However, access to SDIA by transit for the LIM population will increase substantially between 4-6 percentage points. People from non-LIM populations who drive alone or carpool to the airport are expected to experience a decline in accessibility. Under existing conditions, three quarters of LIM Communities of Concern, and about 70 percent of the low mobility and low community Engagement Communities of Concern, can get to San Diego International Airport (SDIA) within a 30-minute drive. Meanwhile, between three and seven percent of the region's population (both LIM and non-LIM populations) can get to the airport within 30 minutes using public transit. Under existing conditions, non-LIM populations have slightly lower access to the airport via auto, compared to LIM populations. Transit access also will increase significantly between 3-4 percentage points for the non-LIM populations (Tables 4.7 and 4.8).

Access to Healthcare Facilities: Ninety-nine percent of LIM populations live within a 15-minute drive of a healthcare facility. This is not expected to change significantly from today to 2050. Today, Communities of Concern enjoy higher levels of access by public transit to get to major hospitals and community clinics, compared with other communities. Between half and nearly three-quarters of Communities of Concern populations can get to a hospital or community clinic within 15 minutes using public transit (Tables 4.7 and 4.8).

Access to Parks or Beaches: Based on existing travel conditions and the existing distribution of parks (including federal, state, regional, and community parks) and beaches, virtually all of the region's population (99%-100%) can get to a park or beach within a 15-minute drive. That is expected to hold true in the future, under the 2050 RTP. Meanwhile, it takes much longer for many people to get to parks or beaches using public transit. Today about two-thirds of people who live in the region's Communities of Concern can get to a park within 15 minutes using public transit and, with the 2050 RTP, slight accessibility gains are expected (Tables 4.7 and 4.8).

Overall, infrastructure investments in the 2050 RTP will result in significant improvements for LIM populations. Under

the 2050 RTP, between 80 and 91 percent of homes within LIM communities are expected to be within a half mile of a transit stop. The percentage of commute trips within 30 minutes via transit will increase significantly for all Communities of Concern from existing conditions and the No Build alternative. For low income populations it will go from 15 percent to 23 percent. For minority populations, it will increase from 9 percent to 17 percent. Transit access to critical amenities such as schools will increase for all Communities of Concern between 2 and 3 percentage points from existing conditions, while transit access to healthcare will remain relatively constant. Transit access to parks or beaches for all Communities of Concern increases anywhere from 1 to 4 percentage points from existing conditions.

Policy Issues

While developing the framework for the 2050 RTP, stakeholders raised some issues that would require a policy-level discussion for future plans, including some that should be part of the social equity policy discussion for the next update of the RCP. In 2012, SANDAG will be compiling social equity best practices for consideration to identify possible improvements and creation of a comprehensive social equity program for SANDAG. This effort will include consideration of social equity in project rankings and modeling, and measurement of health impacts in communities of concern. The following is a set of policy issues that were raised by stakeholders for consideration in future RTP cycles and other planning efforts.

Voice in the Decision-Making Process

Stakeholders interested in social equity and environmental issues want to make sure that vulnerable populations have a meaningful voice in the decision-making process. Specific comments included:

- More permanent forums within Communities of Concern are needed to encourage ongoing communication and education about regional planning initiatives. In the absence of such forums, residents have only intermittent opportunities to express their concerns and opinions on such matters.

- The digital divide often means that computer-based tools are not always the best way to reach people. Residents should have more opportunities to communicate face-to-face with regional planners, to learn about the planning process and to make meaningful contributions to planning initiatives.

- SANDAG staff was praised for being enthusiastic and well informed in the Speakers' Bureau, but people in some communities and groups would have appreciated hearing from people who look like themselves and speak their language.

Public Health and Transportation

Stakeholders raised the issue of the importance of incorporating public health considerations in transportation planning. Federal transportation statutes require inclusion of quality-of-life factors in planning documents. (See, for example, 23 USC 135 (f)(1)(E)) Health issues often affect vulnerable populations disproportionately, when compared with the larger population. Vulnerable populations in the San Diego region include seniors, children, low income people, minorities, and people with disabilities. Recent reports from the U.S. Centers for Disease Control and Prevention show that the incidence of obesity is disproportionately high among vulnerable populations. From 2006 through 2008, blacks were 51 percent more likely and Hispanics were 21 percent more likely than non-Hispanic whites to be obese, according to the 2009 Behavioral Risk Factor Surveillance System report. In addition, the 2009 Pediatric Nutrition Surveillance System report shows that 14.6 percent of children aged 2-4 years from low income households are obese.

The social equity analysis conducted for the 2050 RTP evaluated the 2050 RTP transportation network for benefits and impacts of transportation investments on Communities of Concern in the San Diego region. The eight performance measures used for this analysis also are related to improved health outcomes in local communities. Improved access to parks, walking, bicycling amenities, and public transit service should lead to increased physical activity. Equitable investments in transportation infrastructure should improve mobility for the elderly, children, people with disabilities, and households without a car.

Affordability of Transit Fares

Many stakeholders in the Communities of Concern raised the issue of the affordability of public transportation, indicating an accessibility issue. Transit budgets, however, have experienced reductions over the past several years with no additional funding arriving to fill the budget gaps. Therefore, any fare reductions would have to be matched with service reductions. In many cases, service reductions would have a greater impact on individuals who depend on transit. Surveys also have indicated a preference among riders for better service compared with the alternative of higher fares. Many transit riders also have indicated that they are willing to pay the fare if the service gets them to where they need to go – whether to jobs, medical centers, schools, or shopping.

SANDAG has implemented new types of passes including a 30-day pass than can be bought on any day of the month to reduce the burden on people with limited incomes who may not have the cash to buy a pass at the end of each month. In addition, a 14-day

pass was introduced to reduce the initial cash outlay but still offer a significant savings over daily cash fares. Also, the sale of day passes was introduced on buses to enable users to make more trips in one day for a low fixed price. The *TransNet* sales tax ordinance also provides a subsidy to transit operators to enable them to sell senior/disabled/Medicare passes at a 75 percent discount and youth passes at a 50 percent discount. These are among the most generous discounts in the nation and well above the 50 percent cash fare discount for seniors, disabled and Medicare patients mandated by the federal government.

Infrastructure and Amenities

It has been documented in a number of regions in California that – all things being equal – LIM communities sometimes have less access to various types of amenities than others do. As discussed previously in this chapter, new social equity performance measures were added, following a recommendation from stakeholders and approval by the Board, to analyze existing access to a number of key amenities for the 2050 RTP.

Nevertheless, there are other issues that SANDAG could consider in future planning efforts. They include:

Jobs/Housing "Fit"

The stakeholders concerned with social equity and environmental justice are concerned with the "fit" between the types of jobs and the appropriate stock of housing available near those jobs. The issues of jobs/housing balance and jobs/housing fit are addressed in RHNA, which SANDAG is preparing in conjunction with the 2050 RTP. State housing element law (Government Code Section 65584 et seq.) and Senate Bills (SB) 375 and 575 (Steinberg) are guiding SANDAG work on these issues. State housing element law requires SANDAG to prepare the RHNA before each housing element cycle. The RHNA Plan allocates each jurisdiction a share of the region's very low, low, moderate, and above moderate income housing needs (as determined by the California Department of Housing and Community Development (HCD) in consultation with SANDAG) for the next housing element cycle. Each jurisdiction then prepares a housing element that identifies adequate sites for the RHNA numbers it is allocated and indicates the programs that it will implement to help ensure the provision in particular of lower and moderate income housing. The RHNA and local housing elements help ensure an adequate range of housing opportunities throughout the region, and particularly within and in proximity to our employment centers.

The SANDAG RHNA is consistent with the state's housing element law (Government Code Section 65484(d)(1)-(4)), which requires that the RHNA meet the following objectives:

- Increasing the housing supply and the mix of housing types, tenure, and affordability in all cities and counties within the region in an equitable manner, which shall result in all jurisdictions receiving an allocation of units for low and very low income households
- Promoting an improved intraregional relationship between jobs and housing
- Allocating a lower proportion of housing need to an income category when a jurisdiction already has a disproportionately high share of households in that income category, as compared to the countywide distribution of households in that category from the most recent decennial United States census

- Promoting infill development and socioeconomic equity, the protection of environmental and agricultural resources, and the encouragement of efficient development patterns

SB 375 requires SANDAG to integrate the preparation of the RTP with the RHNA. As shown during the preparation of the RHNA and SCS, the 2050 Regional Growth Forecast demonstrates that local jurisdictions in the region have adopted, or are in the process of preparing and adopting, plans and zoning ordinances with adequate residential capacity to meet the region's housing needs for the fifth housing element cycle and during the timeframe of the 2050 RTP. The planning efforts embodied in the RHNA and local housing elements will move the region and local jurisdictions toward ensuring a mix of housing types and affordability, thus providing workers of all income levels with opportunities to live close to work. Meeting these objectives is a key focus in the development of the RHNA methodology and ultimately the RHNA plan, which will be adopted in conjunction with the 2050 RTP. Success in the actual production of affordable lower income housing units in the region requires funding sources and regulatory measures adopted by local jurisdictions.

Community Cohesion and Inclusionary Design

Studies have shown that low income and minority communities are intensely affected when the informal social networks that form the basis of their social power are disrupted. During the development of 2050 RTP projects, environmental justice analyses will examine the social and environmental impacts of specific projects at that stage. SANDAG, as a regional planning agency, acts as a regional resource to encourage smart growth that considers equity issues. The Smart Growth Toolkit is a resource for local jurisdictions seeking to encourage walkability, complete streets, and transit-oriented development (www.sandag.org/smartgrowth). Discussions will continue among jurisdictions on the importance of community cohesion and inclusionary design in the context of a future RCP update.

Transit Oriented Development vs. Gentrification

The San Diego region's RCP and Sustainable Communities Strategy land use pattern call for most of the region's future residential and employment growth to occur near existing and planned public transit facilities in the urbanized western third of the region. When general and community plans and/or rezoning and specific plans occur in these areas to allow higher density development, property values can increase and gentrification can occur. The degree to which gentrification occurs and its effects vary widely, and challenges cannot be addressed by a one-size-fits-all approach. The types of strategies that can be implemented to reduce the negative effects of neighborhood changes around transit stations and along transit corridors, while capitalizing on the positive effects, are largely pursued by local jurisdictions. But a toolkit could be developed at the regional level to identify and encourage the adoption of such strategies by local jurisdictions, in a similar manner to the design guidelines prepared for smart growth.

During the development of 2050 RTP projects, environmental justice analyses will examine the social and environmental impacts of specific projects at that stage.

The following actions support the Plan's Social Equity Chapter recommendations:

Social Equity	
Actions	**Responsible Party**
1. Continue the development of modeling tools such as the Activity Based Model (ABM) to provide more refined analyses to support environmental justice.	SANDAG
2. Strengthen partnerships with community-based networks for ongoing education, citizen input, engagement, and access to LEP persons.	SANDAG and Community-Based Partners
3. Refine educational strategies for outreach and expand outreach programs so they include low technology and more face-to-face communication.	SANDAG and Community-Based Partners
4. Expand educational programs to integrate young people and seniors in a meaningful way.	SANDAG and Community-Based Partners
5. Develop a scope of work for a study on how to measure 'cumulative disadvantage' in the distribution of infrastructure investments. This refers to historically marginalized populations – particularly minorities – whose neighborhoods have been underserved by transportation investment over time, limiting their ability to attract other concomitant benefits such as attracting businesses, housing projects, and other elements that contribute to their quality of life.	SANDAG and Community-Based Partners
6. Propose addressing the issue of Transit Oriented Development and gentrification, as well as potential tools to address them, in the update of the RCP.	SANDAG, local jurisdictions, and Community-Based Partners
7. Consider further analysis of jobs/housing fit in the update of the RCP.	SANDAG, local jurisdictions, and Community-Based Partners
8. Consider adding a social equity factor for future project rankings.	SANDAG

Chapter 5

Financial Strategies: Paying Our Way

Chapter Contents

The financial analysis of the recommended transportation improvements in the 2050 Regional Transportation Plan (RTP or the Plan) focuses on four components: Systems Development (transit, managed lanes and highways, local streets and roads, grade separations, and goods movement projects), Land Use, Systems Management, and Demand Management. The capital, operating, maintenance, and rehabilitation costs of the region's transportation systems during the next 41 years are compared with forecasts of available revenues. Actions are recommended to obtain the revenues necessary to implement improvements included in the Plan. The level of improvements possible under the revenue constrained scenario is included as part of the financial analysis.

A revenue constrained forecast scenario has been developed for the 2050 RTP

Unconstrained Needs

Based on the analysis of travel demand in the region to 2050, needs have been identified for transportation improvements and associated operations, maintenance, and rehabilitation. These needs require funding above and beyond assumed revenues. While no specific discussion is included regarding revenues needed to meet these Unconstrained Needs, this document does include the level of investment needed to fully fund the desired list of projects through 2050.

A revenue constrained forecast scenario has been developed for the 2050 RTP. This scenario includes a general description of the key assumptions that SANDAG used to develop projections of each of the major revenue sources, as well as a summary of the analysis of total costs and revenues.

Revenue Constrained Scenario

State and federal planning regulations require the development of a Revenue Constrained plan. Such a plan is based on current and reasonably available sources and levels of federal, state, and local transportation revenue, projected out to the year 2050. This scenario includes federal and state formula funds, as well as federal and state discretionary funds for existing projects. Future revenue forecasts for new revenues are based on reasonable assumptions of existing programs, as well as new sources extrapolated from documented sources.

Revenue Assumptions

The assumptions made for each major revenue source included in the Plan's financial analysis are provided below. All revenues have been escalated to the year that dollars are expended, and they are based on the escalation factor appropriate for that specific revenue source. Additional details for each fund source also are included in Technical Appendix 1.

Local Revenues

TransNet Half-Cent Local Sales Tax

These revenues are assumed to increase each year, above the $204 million received in FY 2010. This assumption is based on the growth in taxable retail sales as projected by the SANDAG Demographic and Economic Forecasting Model (DEFM). The amounts shown represent the funds estimated to be available through 2050. In November 2004, San Diego County voters approved an extension of the sales tax for transportation through the year 2048.

The 2050 RTP further assumes that sometime prior to 2048, San Diego voters will approve a second extension of the *TransNet* sales tax program. This will allow revenues to continue to be collected beyond 2048. It is anticipated that about $25.2 billion in sales taxes will be generated for regional transportation improvements. An additional $6.3 billion in bond proceeds is estimated to be available to pay for major capital transportation projects.

One of the more innovative components of the sales tax extension ordinance is an initiative for early environmental mitigation, which is designed to reduce the future costs of major transportation projects. The Ordinance identifies specific amounts of money available to use toward mitigation activities required for major highway, transit, regional arterial, and local street and road improvements identified in the Plan. This initiative for early environmental mitigation is expected to expedite the implementation of transportation projects and reduce the costs associated with mitigation or permit delays. The intent is to establish a program to acquire and manage critical habitat areas, and to create a reliable approach for funding required mitigation for future transportation improvements. The result is reduced future costs and accelerated projects.

Although the *TransNet* Extension went into effect in April 2008, the SANDAG Board of Directors approved accelerating several key regional transportation projects beginning in 2005. Since that time, the Board of Directors has revised and expanded the scope of the Early Action Program (EAP). The EAP consists of several major projects that are expected to significantly relieve traffic congestion and expand transit services. The EAP strategy is to leverage as many federal and state dollars as are available, and then borrow against future *TransNet* revenues to complete these projects ahead of their initial schedules.

The Ordinance specifies subprograms within the program, including funding for major capital projects, bicycle and pedestrian projects, local street projects, and funding to provide transit service. Within the transit share, there is a set-aside to subsidize the senior and disabled patrons, as well as to comply with Americans with Disabilities Act (ADA) requirements.

Developer Impact Fees

The Regional Transportation Congestion Improvement Program (RTCIP), an element of the *TransNet* Extension Ordinance, requires the 18 cities and the County of San Diego to collect an exaction from the private sector for each new housing unit constructed in their jurisdiction. The RTCIP has been implemented in the San Diego region since July 1, 2008. The *TransNet* Extension Ordinance requires SANDAG to annually adjust the minimum RTCIP fee amount on July 1 of each year, based on an analysis of construction cost indices, such as the Engineering News Record and the Caltrans Construction Cost Index (CCI), but no less than two percent. The purpose of this annual adjustment is to ensure that the RTCIP retains its purchasing power to improve the regional arterial system. The SANDAG Board of Directors approved a two percent adjustment, raising the RTCIP fee from $2,071 to $2,123 beginning July 1, 2011.

Due to the recent decline in the CCI, the assumed escalation rates are two percent per year through 2015. This reflects the latest slowdown in the economy. From the year 2016 on, however, the escalation rate is estimated to be three percent per year. This reflects the historical growth trend in the CCI. The total amount collected is estimated at $1.4 billion, and is calculated based on the number of new housing units forecast to be developed between 2010 and 2050.

Transportation Development Act (TDA) Quarter-Cent Sales Tax

These are assumed to grow from the $99 million received in FY 2010, in the same manner as *TransNet* funds because TDA funds also are based on the growth of sales taxes. TDA funds may be used for transit operating or capital purposes, but they are not eligible for use on non-transit-related highway or local street and road improvements. The state statute that governs this program also includes specific funding for bicycle and pedestrian projects, as well as for accessible service for the disabled. For planning purposes, it is assumed that 10 percent would be used to match capital projects, and the balance would be available for operations. Future year estimates are based on the growth in taxable retail sales as projected by DEFM, the SANDAG forecasting model. The total TDA revenues estimated to be available during the RTP period is $12.3 billion.

Local Street and Road Gas Taxes

These are assumed to be available at the current level of gas tax subventions to cities and the County of San Diego for local street and road purposes. (Actual receipts totaled $92.2 million in FY 2007.) These revenues are increased each year, based on the estimated growth rate in the number of gallons of fuel consumed in the region projected by Caltrans. These projections reflect future fuel efficiency, vehicle miles traveled (VMT), and the projected mix of the vehicle fleet (i.e., gas, diesel, electric, etc.) or an increase of between 1.7 percent and 2.4 percent annually. The total estimated revenue from the gas tax is $6.2 billion.

Local Street and Road General Fund and Other Revenues

These revenues are based on information provided in the State Controller's annual reports for local street and road expenditures and revenues. The average amount of general fund contributions and other revenues (including fines and forfeitures, interest earnings, and other miscellaneous revenue sources) used for local street and road expenditures in recent years is assumed to continue. The ten-year average for local general fund contributions to local street improvements regionwide is $48.7 million annually. Other revenues, meanwhile, have averaged $237 million annually. These revenues are projected to increase 3 percent each year (historical average is about 4.3 percent), and they total $31.9 billion.

Future Local Revenues

A provision in the *TransNet* Ordinance specified that "SANDAG agrees to act on additional regional funding measures (a ballot measure and/or other secure funding commitments) to meet the long-term requirements for implementing habitat conservation plans in the San Diego region, within the time frame necessary to allow a ballot measure to be considered by the voters no later than four years after passage of the *TransNet* Extension." A component of the future ballot measure is to fund transit operations. Although still being evaluated, a ballot measure could occur as early as 2012. Using the existing *TransNet* program as the basis for estimating revenues, the assumption is that ¼ cent of the sales tax would fund transit projects. These revenues are assumed to begin in 2016. The rate of growth assumed is the same as with *TransNet* and TDA. Revenues estimated to be available total $11.9 billion.

Toll Road and Port of Entry Funding

This funding is derived from debt financing backed by future toll revenues, and it is expected to be available for major phases of toll road and port of entry (POE) construction projects for State Route 11 (SR 11), SR 125, SR 241, and for Interstate 5 (I-5) and I-15. Total toll revenue is estimated at $5.9 billion.

Public Private Partnerships/Transit Oriented Developments (TODs)

There are two components to this source of revenue. One is from transit stations, and the other is from funds used to pay for streetcars. TOD revenues are based on existing agreements that the transit agency has with developers, using the agreed-upon acreage per square feet ratio ($20/sq. ft. and an

8 percent return), and using CPI for escalation. The total TOD available is estimated at $381 million.

One of the new options for mobility planned in this RTP is to use streetcars to improve connectivity within certain neighborhoods. Cities across the country have implemented or are proposing streetcar projects, often as a redevelopment tool to improve livability within redevelopment areas. As a result, much of the funding for these streetcar projects comes from local agencies and public/private partnerships. Based on this experience in other cities, about 90 percent of the cost is assumed to be borne by these types of funding sources. The combined estimated revenue anticipated to be available from TOD and for three streetcar projects detailed in the Plan is about $1.2 billion.

FasTrak® Revenues

These revenues are based on actual revenues on the I-15 corridor, net of operating costs in FY 2010. These revenues are expected to be available for public transportation purposes.

The assumption includes a growth rate consistent with inflation, and the expectation that a new 20-mile managed lane segment along the region's major freeways will be completed each decade. These new managed lane segments are expected to provide an additional level of funding similar to what is raised along the existing I-15 corridor. These assumptions, plus an annual increase based on CPI, provide an estimated $582 million in revenues.

Passenger Fares

The passenger farebox recovery rate was maintained at 35 percent over the RTP period to reflect the continuation of existing farebox recovery levels in the future. Actual fare revenues are assumed by multiplying the farebox recovery rate by the FY 2010 to FY 2015 operating cost projections included in the FY 2011 budgets for the North County Transit District (NCTD) and the Metropolitan Transit System (MTS). Beyond this time period, an annual operating cost growth rate of 3.3 percent is assumed, which also is multiplied by the farebox recovery rate to derive the annual estimated passenger fares. This includes projected revenues for new rail, BRT, and Rapid Bus services included in the *TransNet* Ordinance. Total estimated fares are $14.9 billion.

Prior Year Funds in RTIP

These revenues represent already expended or obligated funds for projects that are scheduled for completion within the first ten years of the RTP, where the total cost of the project is shown on the expenditure side. Total prior year funds equals $707 million.

State Revenues

State Transportation Improvement Program Funds

These revenues are consistent with the amounts available for new and existing programming through FY 2015, as included in the 2010 State Transportation Improvement Program (STIP) Fund Estimate. Beyond the year 2015, STIP funds are assumed to increase 5 percent annually, based on historical and recent legislative changes. STIP funding has come primarily from Proposition 42 Transportation Investment Fund (TIF) transfers (the gasoline sales tax); Proposition 1B bond proceeds (the Transportation Facilities Account, or TFA); and the Public Transportation Account (PTA). This has recently changed, due to the passage of the "gas tax swap" legislation (ABx8 6, Chapter 11, Statutes of 2010; and ABx8 9, Chapter 12, Statutes of 2010). Effective July 1, 2010, the gas tax swap eliminated the tax on gasoline sales and increased the gasoline excise tax from 18 cents to 35.3 cents per gallon. While intended to be revenue neutral, the gas tax swap has significantly altered STIP funding sources by eliminating TIF funding, reducing PTA funding, and adding State Highway Account (SHA) funding. Despite this change, the assumptions used under this program remain, given that it is intended to be revenue-neutral.

The San Diego region anticipates receiving at least a minimum formula "County Share," and a proportionate share of the STIP Interregional Program funds over time as well. The total STIP funds assumed include revenue from both the Regional and Interregional STIP shares. The STIP funds are flexible, and they are available for capital projects to increase the capacity of highways, public transit, and local roads. The STIP funds also are available for efforts to manage demands on the transportation system (TDM), and for planning, programming, and monitoring activities. Beginning with the *TransNet* Plan of Finance approved by the SANDAG Board of Directors in July 2010, 90 percent of all new STIP revenues are assumed to be set aside for EAP projects, as stipulated by Board direction. These include highway, transit, and mixed-mode projects, and the remaining 10 percent for other regionally significant projects such as planning and program monitoring and TDM. Beyond the completion of the EAP, the 2050 RTP assumes sufficient funding from non-*TransNet* sources to match *TransNet* funds. Total STIP is estimated at approximately $7.8 billion.

Traffic Congestion Relief Program (TCRP)

These revenues are assumed to be available for specific projects as provided in state law. All remaining unallocated TCRP funds are assumed to be available in the next five years. About $76 million of the original $483 million identified for San Diego County remained to be allocated at the end of FY 2010.

Proposition 42 (Local Streets and Roads)

These revenues are assumed based on future fuel consumption, as estimated by Caltrans, which increases between 1.7 percent and 2.42 percent annually. No changes to fuel prices are assumed. Total revenue estimated is $2.7 billion.

State Transit Assistance (STA)

In March 2010, the governor signed into law ABx8 6 and ABx8 9, which restored the STA program (a prior budget action had suspended the program altogether) at $400 million for FY 2011 and $350 million for FY 2012. Because the STA is no longer tied to the sales tax on gasoline, a 3 percent escalation factor was used. Total revenue is estimated at $1.5 billion.

State Highway Operations and Preservation Program (SHOPP) and Maintenance and Operations Program

These revenues are assumed to be available to meet Caltrans' identified needs for state highway operations and maintenance. State law requires that these expenditures are given priority over new construction, and they are funded "off the top" of the State Highway Account before any funding for new construction projects is allocated. The 2010 base year estimates of $11 million annually for operations and administration costs, and $69 million annually for maintenance costs were increased at 3 and 5 percent per year, respectively. This reflects historical trends, and a gradual increase in these costs as the size and the age of the system to be maintained increases over time. The revenues needed for these purposes, as identified by Caltrans, are assumed to be available. For programs to reduce collisions on state highways, as well as other programs related to rehabilitating and operating highways, funds are assumed to be available, consistent with the Financially Constrained ten-year SHOPP plan through FY 2020. The approximate annual level of funding through the SHOPP is assumed to be $87 million at the end of the current four-year SHOPP period in FY 2014. A subsequent nominal growth rate of 5 percent is assumed beyond FY 2014. Estimated needs for SHOPP activities that exceed the estimated revenues are identified as part of the overall Unconstrained Needs. The SHOPP funds total an estimated $18.9 billion.

Proposition 1B Infrastructure Bonds/Other

These revenues are assumed to be available for specific projects in which funding was awarded but no allocations were made. For those projects, the revenues are based on the actual award (through FY 2015), as approved by the California Transportation Commission (CTC). Additional future revenues were assumed based on a review of past revenues awarded to the region that were not part of the normal formula. These new sources include the Traffic Congestion Relief Program, Propositions 108/116, Proposition 42, and Propositions 1A and 1B. To be conservative, revenues begin in FY 2019 and are assumed to be $250 million annually over a five-year period. They then escalate 5 percent every five years. The total assumed to be available is $9.6 billion.

Proposition 1A High-Speed Rail Bonds

These revenues are assumed to be available based on the November 2008 voter-approved infrastructure bond program. This program funds capital improvements to intercity rail lines, commuter rail lines, and urban rails systems that provide direct connectivity to the high speed train system and its facilities. Between both the formula program and the competitive program, the CTC approved about $100 million to the region. The funds are being used by NCTD to implement the Positive Train Control project. SANDAG is using the funds to implement eligible rail projects. Future year funding for this source of revenue is combined with the future assumptions for Prop. 1B funding, which is described above.

Other State-Managed Federal Programs and Freeway Service Patrol

These revenues are assumed as various federal transportation programs administered by the state in the San Diego region continue. They include the Safe Routes to School Program; the Highway Safety Program; the Highway Bridge Program, among other programs; and the annual state legislative appropriated Freeway Service Patrol Program. The total estimated revenue is $1.5 billion.

High-Speed Rail

In addition to the Proposition 1A funds discussed above, it is assumed that additional state funds will be available beginning in 2041 to complete the section within San Diego County of the state's High-Speed Rail line. The total assumed from this source is $16.6 billion.

Prior Year Funds in RTIP

These revenues represent already expended or obligated funds for projects that are scheduled for completion within the first ten years of the RTP where the total cost of the project is shown on the expenditure side. Total prior year funds equals $561 million.

Federal Revenues

FTA Discretionary (Section 5309)

There are two types of funds. The Full Funding Grant Agreement (FFGA) is a multi-year commitment from the Federal Transit Administration (FTA) to fund one project. The other is the annual, or sometimes one-time funding for specific projects. The revenues assumed include those from an FFGA for the Mid-Coast Trolley Extension project and from future earmarks for major transit projects identified in the Plan. This assumes that every decade beginning in 2020, the San Diego region would secure one large New Starts FFGA, similar in size to the Mid-Coast project and three Small Starts projects. This is based on the historical track record for the region, which has been successful in securing FFGAs for previous projects such as the Mission Valley East and SPRINTER projects, as well as the Mid-City Rapid. The total revenues estimated are $7.9 billion.

FTA Formula (Section 5307/5309/ 5310/5316/5317)

Sections 5307 and 5309 formula funds are mainly used for capital projects and to purchase transit vehicles. Section 5310 funds are specifically designated to assist nonprofit groups in meeting the transportation needs of the elderly and individuals with disabilities when transportation service is unavailable, insufficient, or inappropriate to meet their needs. This funding is allocated on a competitive basis and administered at the state level. Section 5316 funds projects related to the development and maintenance of transportation services designed to transport welfare recipients and eligible low income individuals to and from jobs and activities related to their employment. The Section 5317 program aims to provide additional tools to overcome existing barriers facing Americans with disabilities who seek integration into the work force and full participation in society. This program seeks to reduce barriers to transportation services and expand the transportation mobility options available to people with disabilities beyond the requirements of the ADA of 1990.

Beginning with funds appropriated in FY 2010 and continuing through 2015, revenues reflect the funds assumed in the Regional Transportation Improvement Program (RTIP). Beyond 2015, the growth rate is estimated to be 5 percent. Beginning in 2020 and every six years thereafter, a 10 percent step increase is assumed due to future transportation bill reauthorizations. This is a conservative assumption, given that since the Intermodal Surface Transportation Efficiency Act (ISTEA) (1991), the average step increase has been about 25 percent with each reauthorization. Additionally, in 2024, a 10 percent increase is assumed, corresponding with the new Mid-Coast service data. Also assumed is an additional 15 percent in 2033, to include other service expansions per the SANDAG Mid-Range Transit Plan. The federal formula funding is partly derived from transit data such as vehicle miles and population. With the service expansions included in the Plan, it is assumed additional revenues would follow. No other service expansions are assumed. The total revenues estimated are $13.3 billion.

Surface Transportation Program/ Congestion Mitigation and Air Quality Improvement

These revenue assumptions are based on estimates provided by Caltrans and included in the 2010 RTIP through FY 2015. They also are based on an assumed annual growth rate of 5 percent after FY 2015. The Surface Transportation Program (STP) funds are flexible, and they may be used for a wide range of capital projects. The Congestion Mitigation and Air Quality (CMAQ) Improvement funds are for projects that help reduce congestion and improve air quality. Eligible projects include the construction of high occupancy vehicle (HOV) lanes, the purchase of transit vehicles, rail improvements, and Transportation Demand Management, among others. CMAQ also can be used for transit operations for the first three years of new transit service. For purposes of the RTP, it was assumed that 90 percent of these funds would be set aside for EAP projects, and the remaining 10 percent would be set aside for other regionally significant projects. Beyond the completion of the EAP, the 2050 RTP assumes sufficient funding from non-*TransNet* sources to match *TransNet* funds. The total revenues estimated are $7.2 billion.

Other Federal Highway Administration (FHWA)

These revenues are assumed based on actual earmarks or funds from the High Priority Program (HPP) to FY 2013. Beginning in FY 2014, the average HPP award is assumed to escalate 5 percent per year. The total revenue estimated is $1.8 billion.

Federal Railroad Administration Discretionary

The federal stimulus program added new responsibility to the Federal Railroad Administration (FRA) to administer funding for high-speed rail and intercity rail. Although the program is new, it is anticipated that the funding will continue, based on the priority placed on high-speed rail at the federal level. The San Diego region has received $64 million during the past two fiscal years. It is assumed that the region's annual share of these funds would increase by 2.5 percent annually. The total revenue estimated is $1.8 billion.

Corridors and Borders Infrastructure/ Other Freight and Goods Movement

The Corridors and Borders Infrastructure program is a revamped program under SAFETEA-LU, which allocates the funds based on a formula to those regions that qualify. The purpose of the program is to improve the safe movement of motor vehicles at or across the land border between the United States and Canada and the land border between the United States and Mexico. As the region directly connects with Mexico, the San Diego region qualifies for these funds. The Plan uses the actual allocation to FY 2010. It then uses an average annual allocation from SAFETEA-LU ($19 million), beginning in FY 2012 and escalating by 5 percent annually. The total revenue estimated is $2.4 billion.

Since the passage of ISTEA in 1991, the DOT has reported on intermodal connectors. Assuming DOT's continuing obligation, the Plan assumes that years of study will lead to a nationwide freight policy program that will help support the movement of goods. Beginning in 2017, the Plan assumes $10 million per year escalated by CPI which totals $710 million over life of the Plan.

The total revenue estimated under these categories is $3.1 billion.

Prior Year Funds in RTIP

These revenues represent already expended or obligated funds for projects that are scheduled for completion within the first ten years of the RTP where the total cost of the project is shown on the expenditure side. Total prior year funds are $736 million.

Air Quality and Transportation Control Measures

The U.S. Environmental Protection Agency (EPA) designated the San Diego air basin as non-attainment for the federal 1997 Eight-Hour Ozone standard, effective June 15, 2004. As such, federal regulations require the timely implementation of transportation control measures (TCMs) included in the approved State Implementation Plan (SIP). They include ridesharing, transit service improvements, traffic-flow improvements, and bicycle facilities and programs.

The 2050 RTP ensures the continuation of the TCMs as described in Chapters 6, 7, and 8. The short-term implementation document, the 2010 Regional Transportation Improvement Program (RTIP), includes substantial targeted funds for the implementation of the four Transportation Tactics adopted in the 1991 Regional Air Quality Strategy (RAQS)/1982 SIP for air quality improvement. These Transportation Tactics also are included as TCMs in the 1982 SIP and have been fully implemented.

The 2010 RTIP provides for the expeditious implementation of the four Transportation Tactics included in the 1991 RAQS.

Revenue Constrained Scenario Analysis

The Revenue Constrained Scenario analysis provides a revenue estimate than can pay for future transportation improvements envisioned in the Plan. The federal gas tax is assumed to stay at today's levels (18.4 cents per gallon) through 2050. For the state, the passage of the "gas tax swap" (ABx8 6, and ABx8 9) eliminated the sales tax on gasoline sales. But it increased the gasoline excise tax from 18 cents to 35.3 cents which results in no net change to revenues. Total revenues estimated for the entire 2050 RTP are about $213.8 billion (in year of expenditure). A summary of the major funding sources described above is provided in Table 5.1 and Figure 5.1.

Local funds make up 55 percent of the total revenue, with state and federal funds providing 28 percent and 17 percent, respectively. It also should be pointed out that revenues are shown phased in by decade or period (Table 5.1). This means that the funding information is available between 2010-2020, 2021-2030, 2031-2040, and 2041-2050. The corresponding expenditures also are shown by these same time periods, and they do not exceed the revenues available. This shows that the Revenue Constrained Scenario also is constrained by these analysis periods. Lastly, projects that are listed in the initial years of the RTP are the same ones that either are already programmed in the current five-year RTIP (the five-year period ends in FY 2014/15) or are anticipated to be included in future near-term updates of the RTIP.

Figure 5.1 – Major Revenue Sources/Revenue Constrained Scenario ($213.8 Billion in Year of Expenditures)

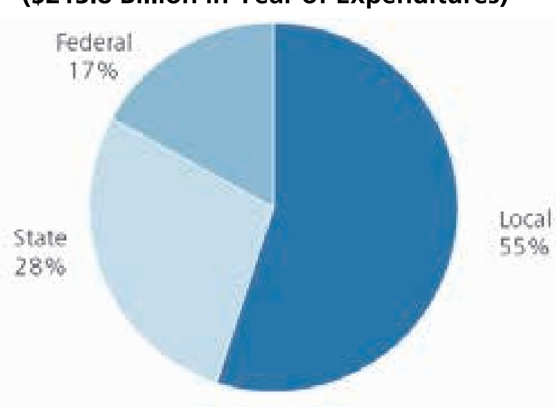


Table 5.2 and Figure 5.2 summarize the $213.8 billion in expenditures under the Revenue Constrained Scenario. About 50 percent of the total expenditures are for transit purposes, 24 percent for highway purposes, 17 percent for local street and road improvements, and 4 percent for Systems and Demand Management and Active Transportation programs. The remaining 5 percent of expenditures are for debt service and non-highway goods movement projects. The specific projects and services included in the Revenue Constrained Scenario are described in Chapter 6 and Appendix A.

Unconstrained Needs Analysis

Although not developed to the same level of detail as the revenue constrained scenario, an Unconstrained Needs Analysis was prepared to provide a cost estimate for additional projects, programs, and services to meet projected travel demands and to fully fund related operating, maintenance, and rehabilitation needs regionwide. Such improvements would require additional funding above and beyond the reasonably available levels assumed in the 2050 RTP.

Table 5.1 – Major Revenue Sources/Revenue Constrained Scenario

Revenue Sources	Estimated Revenues (in millions of YOE dollars) (1)				
	FY 2010 - 2020	FY 2021 - 2030	FY 2031 - 2040	FY 2041 - 2050	FY 2010 - 2050
Local					
TransNet	$2,997	$4,593	$7,002	$10,656	$25,248
TransNet (Bond Proceeds)	$2,849	$2,178	$1,259	$ -	$6,286
Developer Impact Fees	$292	$342	$376	$427	$1,437
Transportation Development Act (TDA)	$1,457	$2,233	$3,405	$5,181	$12,276
City/County Local Gas Taxes	$1,190	$1,321	$1,649	$2,084	$6,244
General Fund/Miscellaneous Local Road Funds[2]	$5,194	$6,435	$8,648	$11,622	$31,899
Future Local Revenues	$793	$2,296	$3,501	$5,328	$11,918
Toll Road/POE Funding (SR 11, Otay Mesa East POE, SR 125, SR 241, I-5, I-15)	$1,197	$79	$0	$4,591	$5,867
Public Private Partnerships/TODs	$340	$264	$470	$144	$ 1,218
FasTrak® Net Revenues	$18	$87	$176	$301	$582
Passenger Fares	$1,398	$2,371	$4,530	$6,642	$14,941
Prior Year Funds in RTIP	$707	$0	$0	$0	$707
Subtotal	$18,432	$22,199	$31,016	$46,976	$118,623
State					
State Transportation Improvement Program (STIP)/Traffic Congestion Relief Program (TCRP)	$624	$1,380	$2,231	$3,611	$7,846
Proposition 42 (Local Street and Road)	$506	$573	$708	$873	$2,660
State Transit Assistance (STA) Program	$153	$324	$435	$584	$1,496
State Highway Account for Operations/ Maintenance	$2,168	$3,208	$5,176	$8,367	$18,919
Proposition 1B/1A/Other	$1,287	$2,614	$2,853	$2,894	$9,648
Other State Managed Federal Programs/FSP	$229	$244	$388	$618	$1,479
High-Speed Rail	$0	$0	$0	$16,644	$16,644
Prior Year Funds in RTIP	$561	$0	$0	$0	$561
Subtotal	$5,528	$8,343	$11,791	$33,591	$59,253
Federal					
Federal Transit Administration (FTA) Discretionary	$906	$1,108	$2,533	$3,382	$7,929
Federal Transit Administration Formula	$1,122	$1,882	$3,675	$6,661	$13,340
Congestion Mitigation and Air Quality (CMAQ)/ Regional Surface Transportation Program (RSTP)	$819	$1,216	$1,980	$3,225	$7,240
Other Federal Highway Administration (FHWA)	$259	$301	$490	$798	$1,848
Federal Railroad Administration (FRA) Discretionary	$312	$367	$470	$602	$1,751
Corridors and Borders Infrastructure/Other Freight Funds	$328	$560	$867	$1,351	$3,106
Prior Year Funds in RTIP	$736	$0	$0	$0	$736
Subtotal	$4,482	$5,434	$10,015	$16,019	$35,950
(1) Year of Expenditure					
Grand Total Revenue Sources	**$28,442**	**$35,976**	**$52,822**	**$96,586**	**$213,826**

Table 5.2 – Major Expenditures/Revenue Constrained Scenario

Project Categories	Estimated Expenditures (In Millions Of YOE Dollars) [1]				
	FY 2010 - 2020	FY 2021 - 2030	FY 2031 - 2040	FY 2041 - 2050	FY 2010 - 2050
Transit					
Major New Facilities	$4,512	$5,917	$9,583	$12,993	$33,005
Miscellaneous Capital/Rehabilitation/Replacement	$1,392	$2,511	$1,196	$4,923	$10,022
Transit Operations	$3,993	$6,775	$12,942	$18,977	$42,687
ADA and Specialized Transportation Services [2]	$399	$677	$1,294	$1,898	$4,268
High-Speed Rail	$0	$0	$0	$16,644	$16,664
Subtotal	$10,296	$15,880	$25,015	$55,435	$106,626
Highways					
Managed Lanes and Highway Projects	$6,912	$5,374	$5,502	$13,335	$31,123
HOV Connectors	$483	$9	$811	$89	$1,392
Freeway Connectors	$144	$503	$286	$63	$996
Operations	$137	$170	$251	$408	$966
Maintenance	$987	$1,494	$2,434	$3,964	$8,879
Rehabilitation	$1,012	$1,286	$1,732	$2,327	$6,357
Subtotal	$9,675	$8,836	$11,016	$20,186	$49,713
Local Streets and Roads					
Capital Expansion	$1,271	$1,586	$2,168	$2,883	$7,908
Rehabilitation	$1,413	$1,845	$2,454	$3,251	$8,963
Operations & Maintenance	$3,367	$3,995	$5,953	$7,247	$20,562
Subtotal	$6,051	$7,426	$10,575	$13,381	$37,433
Non-Highway Goods Movement/Debt Service					
Non-Highway Goods Movement	$256	$0	$0	$0	$256
Debt Service	$1,223	$2,613	$4,141	$3,880	$11,857
Subtotal	$1,479	$2,613	$4,141	$3,880	$12,113
Land Use/Systems Management/Demand Management					
Smart Growth Incentive Program	$59	$91	$267	$682	$1,099
Safe Routes to Transit	$128	$152	$286	$578	$1,144
Regional Rail Grade Separations	$0	$0	$129	$471	$600
Bicycle/Pedestrian Improvements	$457	$544	$717	$944	$2,662
Transportation Systems Management	$170	$233	$359	$538	$1,300
Transportation Demand Management	$127	$201	$318	$490	$1,136
Subtotal	$941	$1,221	$2,076	$3,703	$7,941
Grand Total Cost	**$28,442**	**$35,976**	**$52,823**	**$96,585**	**$213,826**

[1] Year of Expenditure

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

Figure 5.2 – Major Project Expenditures/ Revenue Constrained Scenario ($213.8 Billion in YOE)

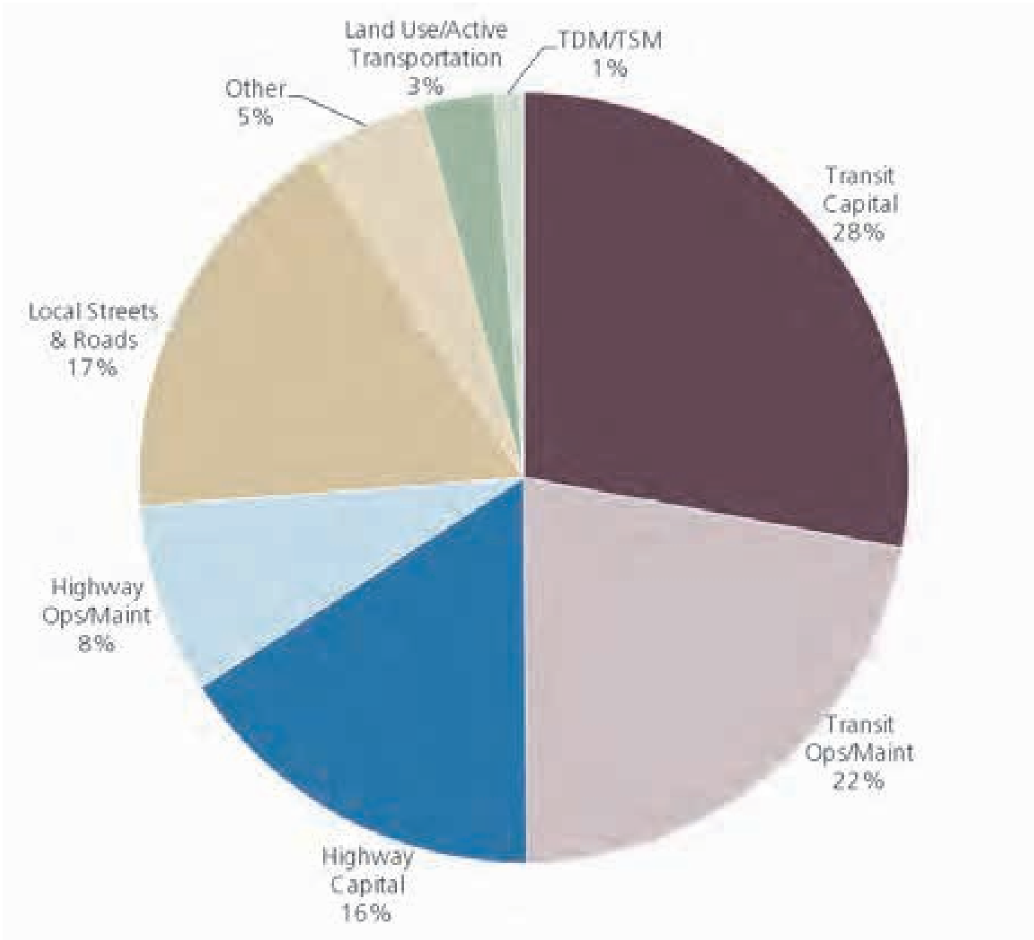


Table 5.3 summarizes the major expenditures included in the Unconstrained Needs Analysis, compared with the Revenue Constrained Scenario. The cost of Unconstrained Needs total $168 billion (in 2010 constant dollars). The Unconstrained Needs exceed the $120 billion (in 2010 constant dollars) in the 2050 RTP by about $48 billion. The $120 billion for the Revenue Constrained Plan, which is shown in 2010 constant dollars, translates into about $213.8 billion when escalated to the year that the dollars are expended. The total Unconstrained Need has not been escalated to year of expenditure dollars. These figures are provided in 2010 constant dollars for comparison purposes.

The additional transit improvements needed to fully implement the regional transit network would result in significantly higher investments in transit capital and operations. Additional Managed Lanes and other highway capital improvements would be needed to address remaining congested segments of the region's transportation system that cannot be accommodated with the $120 billion financial budget established for the 2050 RTP (in 2010 constant dollars).

Highway rehabilitation costs were increased based on estimates provided by Caltrans. The limited revenues under the other scenarios were not sufficient to fund the full level of estimated highway rehabilitation needs. Similarly, the local street and road costs were increased to match the estimates derived from the local agency needs survey.

Table 5.3 – Unconstrained Needs – Major Expenditures

Project Categories		Revenue Constrained	Unconstrained
		Estimated Cost ($ in Millions - 2010 dollars)	
Transit			
Major New Facilities		$20,371	$43,320
Miscellaneous Capital/Rehabilitation/Replacement		$6,824	$8,084
Transit Operations		$19,700	$26,560
ADA and Speicalized Transportation Services		$1,970	$3,275
High-Speed Rail		$7,000	$7,000
	Subtotal	$55,865	$88,239
Highways			
Managed Lanes and Highway Projects		$19,568	$22,744
HOV Connectors		$1,015	$2,864
Freeway Connectors		$710	$830
Operations		$485	$567
Maintenance		$4,801	$5,609
Rehabilitation		$4,985	$5,824
	Subtotal	$31,564	$38,438
Local Streets and Roads			
Capital Expansion		$3,902	$5,114
Rehabilitation		$4,490	$5,874
Operations & Maintenance		$10,947	$14,331
	Subtotal	$19,339	$25,319
Non-Highway Goods Movement		$260	$3,404
Debt Service		$7,652	$7,652
Land Use/Active Transportation/Management			
Smart Growth Incentive Program		$599	$599
Safe Routes to Transit		$700	$700
Regional Rail Grade Separations		$300	$300
Active Transportation		$1,789	$1,789
Transportation Systems Management		$829	$829
Transportation Demand Management		$703	$703
	Subtotal	$4,920	$4,920
Grand Total Cost		**$119,600**	**$167,972**
Surplus/(Deficit)			$(48,372)

The following actions support the Plan's Financial Strategies Chapter recommendations:

Financial Strategies	
Actions	**Responsible Parties**
General Legislative and Funding	
1. Maximize opportunities to leverage local transportation sales tax revenues to attract additional state and federal funds to the region for transportation and related infrastructure improvements.	SANDAG and local agencies
2. Support federal transportation legislation that provides for the following principles:	SANDAG
a. Removing the Federal Highway Trust Fund programs from the Federal Unified Budget process	
b. Establishing federal transportation program authorization and obligational authority levels based on actual and projected Trust Fund revenue levels, including interest received	
c. Maintaining or increasing the level of revenue flowing into the Trust Fund by increasing the federal gas tax rate and/or eliminating or reducing transfers of tax exemptions that shift transportation revenues to other purposes	
d. Increasing the minimum 90.5 percent "fair share" return of federal highway revenues to California	
e. Consolidating most federal highway categorical programs to provide greater flexibility and local discretion in highway fund usage	
f. Authorizing a minimum five-year highway and transit program to provide needed program stability and continuity of federal transportation policy	
g. Provide funding certainty by ensuring timely passage of annual appropriations and reauthorization to maintain and improve the transportation network	
h. Consolidate federal Department of Transportation program requirements among the different funding agencies. For example, a DBE program approved by FHWA should be accepted by FTA and FRA	
3. Support state transportation legislation that provides for the following principles:	SANDAG
a. Increasing state highway revenues as needed to maintain, rehabilitate, and operate the existing state highway system, to match all available federal highway funds, and to fully fund all new construction and right-of-way projects identified in the current State and Regional Transportation Improvement Programs (TIPs)	
b. Ensuring that any re-evaluation of the present formula "County Share" funding provisions and/or any other revenue distribution formula does not penalize counties that provide local sales tax or other local funding to state highway projects	
c. Establishing state/local matching programs or other programs to reward counties that have implemented local sales taxes or other major local funding sources for transportation improvements	

Financial Strategies (Continued)	
Actions	**Responsible Parties**
General Legislative and Funding (Continued)	
d. Sharing of both diesel fuel tax revenues and truck weight fees with local cities and counties and with Caltrans	
e. Allowing local jurisdictions, in cooperation with regional agencies, to jointly determine the allocation of additional local street and road revenues	
f. Increasing transit revenues to support transit operating and capital improvements, including new transit projects	
g. Establishing a user fee-based program to fund transportation infrastructure to accommodate increases in Goods Movement activities	
h. Provide funding certainty by ensuring the timely passage of annual state budgets and the timely selling of bonds to implement voter-approved laws to maintain and improve the transportation network	
4. Support state and federal legislation that provides additional gas tax funding, or equivalent funding from another revenue source, which is needed to implement those projects identified in the RTP.	SANDAG
5. Support state and federal legislation that provides the legal framework for expanded public/private partnerships for specific toll projects identified in the RTP.	SANDAG
6. Support state and federal legislation that provides the legal framework for public agencies to invest in and help develop public toll facilities for projects identified in the RTP.	SANDAG
7. Support state and federal legislation that provides the indexing of gas tax revenues to keep pace with inflation either by increasing the gas tax at regular intervals based on increases in the Construction Cost Index or by changing the tax from a per-gallon basis to a percentage basis so that revenues increase with the price of fuel.	SANDAG
8. Maintain current levels of local general fund and other local discretionary fund support to the local street and road program so that any new or increased revenues to the local street and road program will augment and not replace current revenues.	Local jurisdictions
9. Support state and federal legislation that provides for design-build transportation projects.	SANDAG
Transit	
10. Aggressively pursue the continuation and expansion of existing sources of transit funding and support modifications to those sources to ensure full utilization and maximum flexibility.	SANDAG and transit operators
11. Work with local, state, and federal officials to ensure that the region receives an equitable share of available discretionary transit funds.	SANDAG and transit operators
12. Adjust fare levels as needed to maintain and improve farebox recovery levels over time in order to maximize the level of transit service that can be provided.	SANDAG and transit operators
13. Pursue private sector involvement in the funding of transit facility development and operation through developer contributions, benefit assessment districts, joint development and value capture projects, and other efforts to contribute toward unfunded regional transit facilities.	SANDAG, MTS, NCTD, and local jurisdictions
14. Pursue public/private partnerships/TODs.	SANDAG, MTS, NCTD, and local jurisdictions

Chapter 6

Systems Development: Offering More Travel Choices

Chapter Contents

The recommendations from past and current regional and corridor-specific transportation studies are integral to the development of the Plan.

This chapter of the 2050 Regional Transportation Plan (RTP or the Plan) describes the Plan's priorities for regional transportation infrastructure and service improvements. It includes sections on transit, intercity and high-speed rail, Managed Lanes/highways and arterials, goods movement and intermodal facilities, aviation, regional bikeways, and interregional and binational border planning and coordination.

The existing regional network consists of 610 miles of highways (including 20 miles of high occupancy toll lanes), 123 miles of regional transit service, and more than 1,000 miles of regional arterials. When implemented, the regional improvements in the 2050 RTP will capitalize on the existing transit and highway infrastructure and develop a new, improved network of high-quality transit services and a system of connected and free-flowing Managed Lanes, while still maintaining regional arterials and local roads.

Developing the 2050 RTP Network

The 2050 RTP is developed around five primary components: a Sustainable Communities Strategy, Social Equity and Environmental Justice, Systems Development, Systems Management, and Demand Management. Each component has a unique yet interdependent role in creating a sustainable transportation system that improves mobility, reduces greenhouse gases, and increases travel choices for everyone in the San Diego region through 2050.

Our region has consistently supported a multimodal approach to transportation that looks at the overall system and improvements that benefit all modes, rather than prioritizing one over the other. This approach gives all of the transportation system users choices traveling within and through the region. SANDAG is required to address congestion management through a process involving an analysis of multimodal regionwide strategies that are cooperatively developed to foster safety and integrated management of new and existing transportation facilities eligible for federal funding. The congestion management process is described in more detail in Technical Appendix 20.

Unconstrained Transportation Network

The development of the 2050 RTP started by projecting the region's needs for transit, highway, arterial, goods movement, and active transportation improvements to meet the travel demands of the region's expected population in 2050. Labeled the Unconstrained Network, this network represents a transportation vision that meets the region's needs, assuming there are no revenue constraints.

We use priorities to identify how much of the Unconstrained Network we can build, operate, and maintain given the availability of revenue and flexibility over the life of the Plan. The 2050 RTP builds upon the existing transportation system and the major project commitments planned or under construction, and it makes substantial progress in moving toward the ultimate network needs of the region through 2050.

The recommendations from past and current regional and corridor-specific transportation studies are integral to the development of the Plan (see Appendix E for a list of the studies and links to the documents). Since the 2030 RTP, SANDAG completed a number of studies including the Urban Area Transit Strategy, Interstate 5 (I-5) South Corridor Study, Comprehensive Freight Gateway Study, Destination Lindbergh, and San Diego Regional Bicycle Plan. The recommendations from these studies have been considered in the Plan's development.

Revenue Constrained Network

The Plan's Revenue Constrained Network described in this chapter, combined with the Sustainable Communities Strategy, Systems Management Strategy, and Demand Management Strategy described in other chapters, intend to provide the best balance and benefits across all of the RTP goals – System Preservation & Safety, Mobility, Reliability, Social Equity, a Prosperous Economy, and a Healthy Environment.

Short- and Long-Range Strategies and Actions

The 2050 RTP includes both short-term and long-term strategies that lead to the development of an integrated multimodal transportation system to facilitate the safe and efficient movement of people and goods. While the 2050 RTP serves as the long-range vision for the region, there are many plans and programs that implement the RTP in the short-term. The Regional Transportation Improvement Program (RTIP) is a prioritized five-year program required by federal and state laws and designed to implement the region's overall strategy for providing mobility and improving the efficiency and safety of the transportation system, while reducing transportation-related air pollution in support of efforts to attain air quality standards for the region. The 2010 RTIP may be found at www.sandag.org/2010RTIP. The RTIP incrementally implements the RTP in San Diego region. Additionally, the Coordinated Plan provides a five-year blueprint for the implementation of public transit and social service transportation concepts described in the 2050 RTP.

Focus on Regional Priorities

Funding for transportation is limited, and for several decades it has not kept up with the public's appetite for travel and demand for transportation services. The 2050 RTP recognizes this fact, and it calls for pursuing additional funding while focusing investments on priority corridors and projects. These priorities are derived from two sources. In 2005, after voters approved extending the *TransNet* sales tax, the region established the Early Action Program to advance revenues and expedite high-priority improvements included in the sales tax measure. In addition to the commitment to these *TransNet* projects, shown in Table 6.1, SANDAG prioritized all of the planned transportation projects using adopted criteria for evaluating them. The priorities act as a guide for selecting the multimodal facilities and services essential to meeting the mobility and accessibility goals of the region.

Regional facilities and services connect to larger transportation systems beyond the San Diego region's boundaries (freeways and rail networks in other parts of the state and nation), as well as to local systems of streets, roads, and transit services in our communities. Freight also is moved on the regional transportation network, and it requires good access and connectivity to local logistics centers and terminals to ensure the efficient movement of goods onto and off the network.

Table 6.1 – *TransNet* Early Action Program Project Descriptions

Early Action Project	Description
Blue and Orange Line Trolley Improvements	Track and station rehabilitation, including purchase of low-floor vehicles
I-5 North Coast	Complete environmental document for I-5 widening between La Jolla Village Drive and Vandegrift Boulevard
I-15 Bus Rapid Transit (BRT) Stations (SR 163 to SR 78)	Modify Escondido transit center, construct transit centers at Del Lago, Rancho Bernardo, Sabre Springs, and Mira Mesa
SR 15 BRT Stations & Service	Construct transit centers at University Avenue and El Cajon Boulevard, Sabre Springs station parking structure, and downtown BRT stations, operate BRT service between Escondido and downtown San Diego
I-15 North (Centre City Pkwy to SR 78)	Construct four Managed Lanes with fixed median barrier, add auxiliary lanes
I-15 Middle (SR 56 to Centre City Pkwy)	Construct four Managed Lanes with fixed median barrier, add auxiliary lanes (completed)
I-15 South (SR 163 to SR 56)	Construct four Managed Lanes with movable median barrier, add auxiliary lanes; construct Mira Mesa Direct Access Ramp
I-805 North (SR 52 to I-5)	Complete environmental document for I-805 Managed Lanes
I-805 Middle (SR 94 to SR 52)	Complete environmental document for I-805 Managed Lanes
I-805 South (SR 905 to SR 94)	Complete environmental document for I-805 Managed Lanes
LOSSAN	Coastal rail double tracking and increased and expanded passenger rail service
Mid-City Rapid Bus	Construct and operate Rapid Bus service between San Diego State University (SDSU) and downtown San Diego along El Cajon and Park Boulevards
Mid-Coast Trolley	Construct and operate light rail transit (LRT) service between Old Town transit center, University of California, San Diego (UCSD), and University Towne Centre (UTC)
South Bay BRT	Construct and operate BRT service between Otay Mesa and downtown San Diego via Otay Ranch/Millenia and eastern Chula Vista
SPRINTER	Oceanside to Escondido Rail (completed)
SR 52 (SR 125 to SR 67)	Extend highway from SR 125 to SR 67 (completed)
SR 52 Managed Lanes (I-805 to SR 125)	Construct two Managed Lanes
SR 76 (Melrose Drive to Mission Road)	Widen from two lanes to four lanes
SR 76 (Mission Road to I-15)	Widen from two lanes to four lanes
SuperLoop	High-frequency circulator route in University City serving UCSD and UTC (completed); construct and operate eastern loop

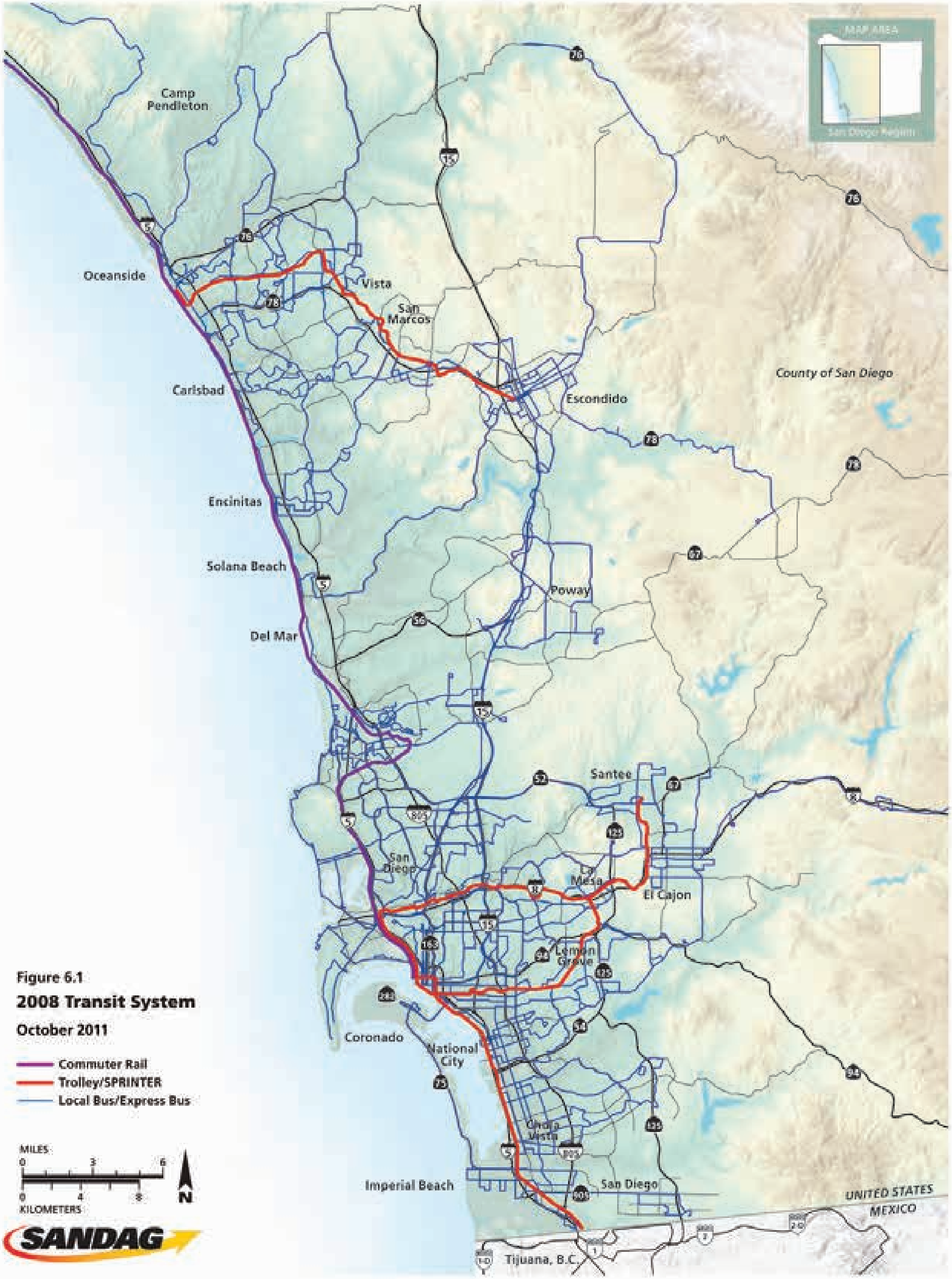


Figure 6.1
2008 Transit System
October 2011

Existing Regional Transit Network

SANDAG serves as the regional transportation planning agency, and it is therefore responsible for long-term transit planning for the San Diego region. This planning function is performed in partnership with the region's two transit operators, the Metropolitan Transit System (MTS); and the North County Transit District (NCTD).

San Diego's existing transit network is illustrated in Figure 6.1. Detailed information on existing services and performance, including social service agency transportation, is contained in the 2010-2014 Regional Short-Range Transit Plan & Coordinated Public Transit–Human Services Transportation Plan (Coordinated Plan) and included in Technical Appendix 10.

A Regional Transit Strategy

Urban Area Transit Strategy

To initiate planning for public transit in the 2050 RTP, SANDAG developed an "Urban Area Transit Strategy." Its overarching goal is to significantly increase the attractiveness of transit, walking, and biking in urbanized areas of the region. The vision calls for a network of fast, flexible, reliable, safe, and convenient transit services that maximize the role of transit in the region and reduce vehicle miles traveled and greenhouse gas emissions.

The planning process for the Urban Area Transit Strategy involved developing a range of differing transit strategies and approaches to determine what kind of transit future would be desired for the San Diego region. This process was extensive. It included brainstorming sessions, public opinion surveys, public input questionnaires, and research on success stories from other regions. Alternative unconstrained transit networks for the San Diego region also were developed, and transportation planners from the United States and other countries made recommendations. Public input on the networks was gathered, and results were evaluated. Industry experts conducted critical reviews, and there were many rounds of modifications and refinements. The process

resulted in an unconstrained transit network that nearly triples the number of transit miles in the region between now and 2050. Detailed results of the Urban Area Transit Strategy are included in Technical Appendix 7.

Public Opinion Survey and Public Input Questionnaire

To obtain input on priorities from the general public, SANDAG also developed a public opinion telephone survey and a public input questionnaire. Overall, results of the public opinion telephone survey and the public input questionnaire revealed that residents of the San Diego region support significant investments in the future of the region's transit network. Detailed results from the survey and questionnaire, and more information from the broader Public Participation Plan, are included in Chapter 9 and Technical Appendix 6.

2050 Regional Transit Network

A key focus of the 2050 RTP is to develop an ambitious and far-reaching transit network that significantly expands the role that transit plays in meeting the region's mobility needs.

To achieve this goal, the 2050 RTP transit vision focuses on three key strategies:

1. Improvements to the current system that will improve the convenience and travel speeds of bus and rail services

2. Implementation of new transit services that will improve transit connections and access in key urban areas and offer new service types designed to attract new riders to transit

3. Enhancements to the transit customer experience to make transit easier, safer, and more enjoyable to use

The different types of transit services designed to implement these three strategies are summarized in Figure 6.2 and discussed in more detail in this chapter.

2050 Unconstrained Transit Network

The Unconstrained Transit Network defines the region's vision for transit in 2050, if funding were available to implement all identified projects. The Unconstrained Transit Network was developed by combining the best transit services evaluated in the Urban Area Transit Strategy. The Unconstrained Transit Network also is focused on developing a strong link between transit and transit-supportive land use patterns to maximize the cost-effectiveness of future transit investments. Detailed performance, including subregional transit mode share goals and results, can be found in Technical Appendix 7.

A key focus of the 2050 RTP is to develop an ambitious and far-reaching transit network that significantly expands the role that transit plays in meeting the region's mobility needs.

Figure 6.2 – Definitions of Transit Services and Facilities for Urban Area Transit Strategy

High-Speed Rail:

France's TGV

Spain's AVE

California High-Speed Rail

Designed for very high-speed long-distance intercity trips with long station spacing and dedicated grade-separated lines. Examples include the Shinkansen in Japan, the TGV in France, and the AVE in Spain. California High-Speed Rail (HSR) currently is being planned from Sacramento to San Diego.

- Vehicles are steel wheel on steel track electrically-powered bidirectional train sets
- Top Speed: 220 miles per hour (mph), but 150 mph maximum expected from San Diego to Escondido and 200 mph maximum from Escondido to Riverside
- Level boarding
- Passenger Capacity: Not yet determined in California. Examples from around the world range from approximately 300 to 1,300 per train but most single level trains have about 400-500
- Operates on dedicated high-speed track with no at-grade crossings
- California HSR system will be over 600 miles

Figure 6.2 – Definitions of Transit Services and Facilities for Urban Area Transit Strategy (Continued)

Intercity Rail:

Amtrak Pacific Surfliner

CalTrain

Designed for long distance intercity trips with long station spacing. Typically shares right of way with freight and commuter rail. Examples include the Amtrak Pacific Surfliner, Amtrak Capitol Corridor, and Amtrak Coast Starlight. Intercity rail accommodates leisure and business travelers with upgraded passenger amenities.

- Intercity rail lines typically use diesel locomotives
- Typical speed: 80 mph
- Typically low floor boarding.
- Average station spacing: 10 to 20 miles
- Typical length of line: 100 to 2,000 miles

Commuter Rail:

San Diego COASTER

Southern California MetroLink

Designed for higher-speed, longer-distance regional trips with stations spacing every four to five miles on average. Examples include the San Diego COASTER, Dallas/Fort Worth Trinity Railway Express, and Southern California Metrolink.

Commuter rail lines use diesel or electric locomotives (diesel are more common and are used in Southern California)

- Typical speed: 80 mph
- Typically low floor boarding
- Supported by Park and Ride lots
- Typical passenger capacity: 130 seats per car operating with 3-8 car trains (typically no standees)
- Operates on a dedicated right of way separate from other vehicles
- Typical length of line: 25-100 miles

Figure 6.2 – Definitions of Transit Services and Facilities for Urban Area Transit Strategy (Continued)

Light Rail Transit (LRT):

San Diego Trolley

San Diego SPRINTER

Designed for medium-distance trips with station spacing about every mile on average. Examples include the San Diego Trolley, the San Diego SPRINTER, Portland MAX, Minneapolis Hiawatha Line, and Houston MetroRail.

- Electric or diesel-powered rail vehicles
- Typical speed: corridor speed limit, generally not exceeding 55 mph
- Typically low floor boarding
- Designed for high-capacity corridors
- Integrates well with street traffic, signals, and pedestrians
- Operates on a dedicated guideway within a separate right of way or on the street
- Typical passenger capacity: 60-140 seated plus standees (per car), with 1-4 cars
- Typical length of line: 6-25 miles

Streetcar:

Portland Modern Streetcar

San Francisco Historic Streetcar

Designed for short-distance trips with station spacing every few blocks or every quarter-mile on average. Examples include the Portland Modern Streetcar, Seattle Streetcar, and San Francisco Historic Streetcar.

- Electric-powered rail vehicles
- Typical speed: speeds up to the speed limit of the street they operate on, generally averaging 12 mph (with stops)
- Designed for dense urban areas, such as downtown areas
- Integrates well with street traffic, signals, and pedestrians
- Operates either in mixed traffic with automobiles or on a dedicated right of way
- Typical passenger capacity: up to 100 seated and standees per car (vehicles generally provide few seats due to short distance nature of trips). Operate as single vehicles
- Typical length of line: 2-6 miles

Figure 6.2 – Definitions of Transit Services and Facilities for Urban Area Transit Strategy (Continued)

Bus Rapid Transit (BRT):

San Diego I-15 BRT

Los Angeles Orange Line

Las Vegas Wright BRT System
(Photo courtesy flipchip/lasvegasvegas.com)

Designed for longer-distance, higher-speed, regional trip-making on a dedicated bus guideway or freeway Managed Lanes/High Occupancy Vehicle (HOV) facilities. All-day, all-stop trunk BRT services can be complemented with peak-period commuter express services designed to provide very limited stop connections to major employment centers. Examples include San Diego Interstate 15 BRT; Los Angeles Orange Line; Eugene, Oregon EmX; and the Brisbane South-East Busway (Australia).

- Diesel or CNG/alternative fuels standard
- Typical speed: corridor speed limit, typically 40-60 mph on average
- Supported by Park and Ride lots
- Designed for high-capacity corridors
- Low floor design
- Operates on dedicated guideway and sometimes in mixed traffic with automobiles
- Typical passenger capacity: 50-60 seated plus standees on arterial routes, 50-80 seated on freeway routes (per bus)
- Typical length of line: 8-15 miles on arterial segments, 10-30 miles on freeway segments
- Typical station spacing: 0.5-1 mile on arterial segments, 4-5 miles on freeway segments

Senior and Persons with Disabilities Services:

MTS Access

- American with Disabilities (ADA) services for those who cannot access regular fixed route services
- Social service agency services, including door-to-door services

Figure 6.2 – Definitions of Transit Services and Facilities for Urban Area Transit Strategy (Continued)

Rapid Bus:

Los Angeles Metro Rapid

Future Mid-City Rapid Bus

Provides higher-speed alternatives to local bus services in high-volume arterial corridors and utilizes a range of lower-capital cost signal priority treatments, short segments of transit-only lanes, and limited station stops to achieve faster travel times. Rapid Bus services can be upgraded to BRT over time through the implementation of dedicated transit lanes to bypass congested arterial segments. Examples include Los Angeles Metro Rapid and Boston Washington Street Silver Line.

- Diesel or CNG/alternative fuels standard
- Typical speed: speeds up to the speed limit of the street they operate on, averaging about 25 mph (with stops)
- Low floor design
- Designed for high-capacity corridors
- Integrates well with street traffic, signals, and pedestrians
- Typical passenger capacity: 40 seated plus standees (per bus)
- Typical length of line: 8-15 miles
- Typical station spacing: 0.5-1 mile

High-Frequency Local Bus:

San Diego Metropolitan Transit System (MTS) Bus

San Diego North County Transit District (NCTD) Bus

Facilitates mid- to short-distance trip making within local communities, with closer station spacing. Local bus services serve as the backbone of the transit system and provide the primary access into local communities where fixed-route services are warranted.

- Typically standard and single articulated buses
- Typical speed: speeds up to the speed limit of the street they operate on, averaging 12 mph (with stops)
- Low floor design
- Integrates well with street traffic, signals, and pedestrians
- Operates in mixed traffic with automobiles, but can benefit from transit-signal priority and queue jump lanes
- Typical passenger capacity: 37-57 seated plus standees (per bus)
- Typical length of line: ranges from less than 5 miles to 25 miles
- Typical station spacing: 1-4 blocks

2050 Revenue Constrained Transit Network

Figure 6.3 illustrates the 2050 Revenue Constrained Transit Network. Table 6.2 is a list of Phased Transit Services showing transit frequencies by route. Table 6.2 also provides the dates service is estimated to begin.

The Revenue Constrained Transit Network is built on the dual philosophy of reinforcing and upgrading existing transit services in key urban corridors, and pursuing new transit projects in the most urbanized areas of the region using a broad combination of transit modes.

Upgrades and new projects include:

- Improvements to the existing Trolley system, including a tunnel in downtown San Diego, to increase the frequency of service and add limited-stop, commuter express services
- Adding new Trolley and BRT lines to provide high-quality regional transit connections along high-demand corridors
- Developing a system of high-speed Rapid Bus services in key arterial corridors to supplement local bus services
- Double tracking the LOSSAN coastal rail corridor to enable more frequent and reliable service on the COASTER and Amtrak
- Double tracking the SPRINTER rail lines to increase the frequency of service and add limited-stop express services
- Creating a system of high-frequency services on many of the existing local bus routes in urban core areas
- Reintroducing streetcar and/or shuttle/circulator services to improve mobility within downtown areas

The Revenue Constrained Transit Network also assumes the development of the California High-Speed Rail network in the San Diego region. The San Diego-Los Angeles route is currently in Stage 2 of Planning, that is the Alternatives Analysis. (For more information see: http://www.cahighspeedrail.ca.gov/Los_Angeles_-_San_Diego.aspx)

As shown in Figure 6.3, 2050 Revenue Constrained Transit Network, new Trolley/SPRINTER lines would connect to more communities. SPRINTER service would be extended to south Escondido. A north-south Trolley corridor would be developed along the I-805 corridor that would connect University City, Kearny Mesa, Mission Valley, Mid-City, southeastern San Diego, National City, Chula Vista, and San Ysidro. Intersecting this I-805 Trolley corridor would be three new east-west Trolley lines between University City and Mira Mesa; from Pacific Beach to East County via Kearny Mesa and Mission Valley; and from downtown San Diego to SDSU via the Mid-City communities.

BRT services would complement the regional Trolley/SPRINTER services by providing regional connections along the I-15 corridor between Escondido and downtown San Diego via Kearny Mesa and Mid-City; the SR 52 corridor between East County and Kearny Mesa/University City; the south I-805 corridor between Otay Mesa/Otay Ranch and downtown San Diego; and between Otay Mesa/Otay Ranch and southeastern San Diego (with a station at 47th Street)/Kearny Mesa/University City.

A system of high-frequency local bus services in key urban arterial corridors will provide both improved local service plus access to regional BRT and rail services. These high-frequency local bus services, planned to operate at 10-minute frequencies throughout the day by 2035, are shown in Appendix A, Table A.5 – Phased Transit Services – Revenue Constrained Plan.

Senior and Human Services

There is an increasing need to provide services for senior and disabled residents in ways that are both appropriate and cost effective.

During the growth forecast period, the number of residents aged 65-84 is projected to more than double and the number of residents age 85 and older is expected to more than triple. Ten percent of the region's population growth between 2008 and 2050 is expected to be in the oldest age group (85 and older). By 2050, nearly 19 percent of the region's population will be 65 or older. In addition, the number of disabled people is expected to rise. As a result, there is an increasing need to provide services for senior and disabled residents in ways that are both appropriate and cost effective.

The 2050 RTP places more attention on transportation for seniors, people with limited means, and individuals with disabilities. These specialized transportation services are coordinated with conventional fixed-route services. SANDAG annually develops a Coordinated Public Transit–Human Services Transportation Plan (also known as the Coordinated Plan) to coordinate fixed route transit service with services provided by organizations that respond to the Americans with Disabilities Act (ADA) requirements, community-based services, non-profit services, and private services. While the 2050 RTP provides a broad framework for these services, the Coordinated Plan provides the specific strategies to guide these investments. The 2050 RTP also includes additional funding for supplemental specialized transportation services, which is estimated to be five percent of the cost of fixed route transit. The Consolidated Transportation Services Agency (CTSA) is the agency designated by SANDAG to coordinate social services transportation in San Diego County.

Safe Routes to Transit

Often the biggest impediment to using transit is the challenge of getting to and from a transit stop or station. Auto-oriented land use patterns, poor pedestrian sidewalk/crosswalk design, lack of bicycle facilities, disconnected street networks, varying topography, and long distances between trip origins and transit stations ("first-mile") or transit stations and trip destinations ("last-mile") all create barriers that are difficult for transit vehicles to negotiate. They also are difficult or impractical for those wishing to access transit to overcome.

Potential strategies to facilitate Safe Routes to Transit include first-mile/last-mile solutions such as enhanced pedestrian crosswalks near transit stations, bicycle lanes that connect to transit and bike parking at transit stations, feeder-distributor bus/shuttle routes, car sharing/station cars, and ridesharing. The 2050 RTP includes $700 million (2010 dollars) toward a Safe Routes to Transit program. These are further discussed as part of the iCommute program in Chapter 8.

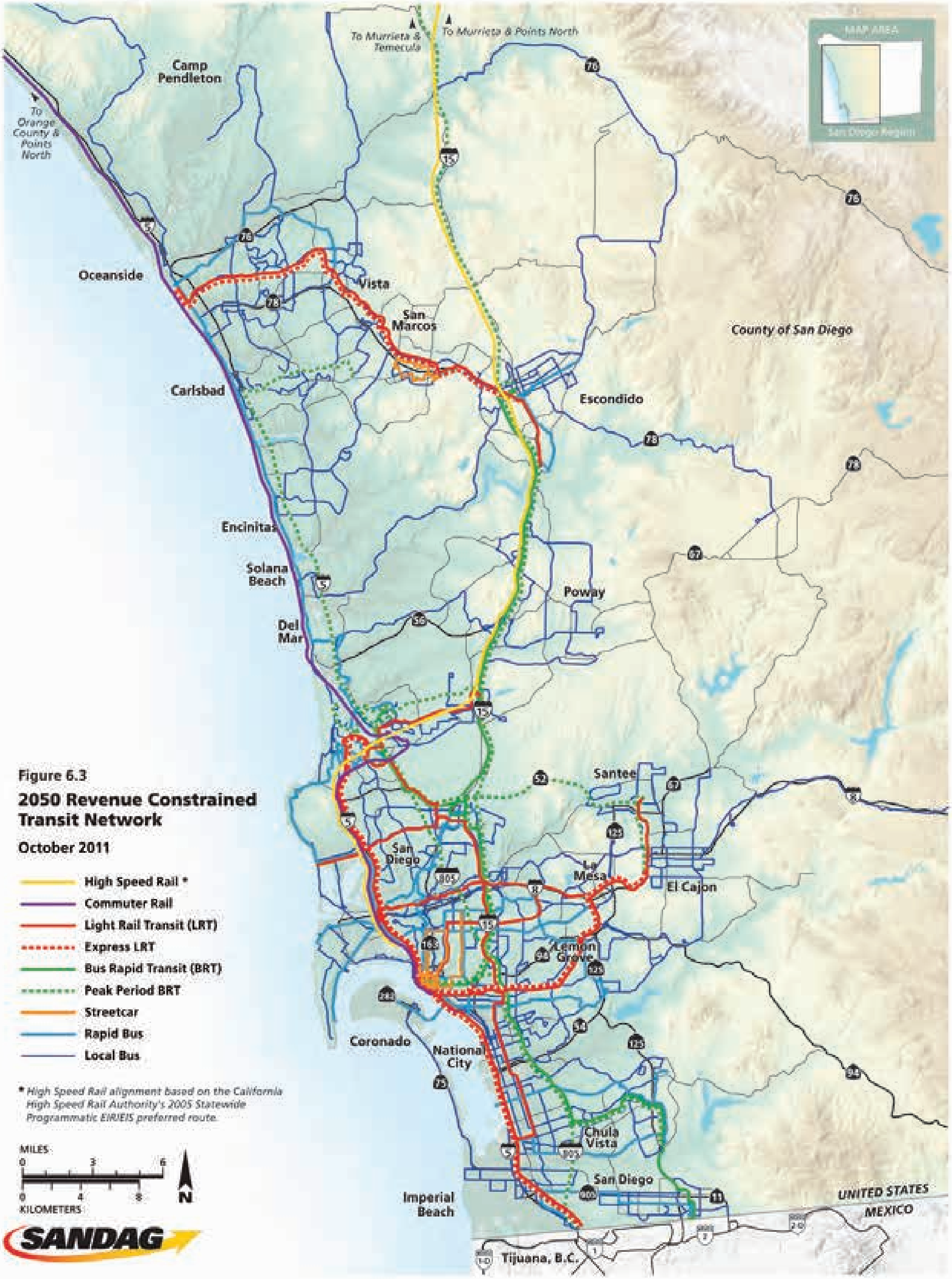


Figure 6.3
2050 Revenue Constrained Transit Network
October 2011

Table 6.2 – Phased Transit Services – Revenue Constrained Plan

Decade	Service	Route	Description	Peak Headway (Minutes)	Off-Peak Headway (Minutes)
2018	COASTER	398	Double tracking/Increased Frequency between Oceanside and downtown San Diego with extension to Convention Center/Petco Park	20	current
2018	Trolley	510	Mid-Coast LRT Extension (peak frequencies 7.5 to downtown/15 to UTC)	7.5/15	15
2018	Trolley	530	Green Line Extend to downtown - Bayside	15	15
2018	BRT	470	Escondido-UTC/UCSD via Mira Mesa Blvd	10	-
2018	BRT	607	Rancho Bernardo - downtown Express	10	-
2018	BRT	608	Escondido - downtown Express	10	-
2018	BRT	610	Temecula (Peak Only)/Escondido - downtown	10	10
2018	BRT	628	South Bay BRT (Otay Mesa - downtown) via Otay Ranch/Millenia	15	-
2018	BRT	680	Otay Mesa to Sorrento Mesa via I-805 Corridor, Otay Ranch/Millenia, National City, Southeastern San Diego, Kearny Mesa	15	15
2018	BRT	688	San Ysidro to Sorrento Mesa Express	15	-
2018	BRT	689	Millenia/Otay Ranch to UTC/Torrey Pines Express	15	-
2018	Rapid	15	Mid-City Rapid (SDSU - downtown) via Mid-City, El Cajon and Park Blvds	10	10
2018	Rapid	201/202	UTC Area Super Loop	10	15
2018	Rapid	350	Escondido to Del Lago via Escondido Blvd and Bear Valley	10	10
2020	Streetcar	554	Hillcrest/Balboa Park/downtown San Diego Loop	10	10
2020	BRT	90	Santee/El Cajon Transit Centers to downtown via SR 94	15	-
2020	BRT	640	I-5 - San Ysidro to downtown and Kearny Mesa via I-5 shoulder lane/HOV lanes, downtown, Hillcrest, Mission Valley	15	15
2020	BRT	870	El Cajon to UTC/Campus Point via Santee, SR 52, I-805 (Peak only)	10	-
2020	Rapid	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	10	10
2020	Shuttle	448/449	San Marcos Shuttle	15	15
2020	Airport Express		I-5 from McClellan-Palomar Airport to San Diego International Airport	30	30
2020	Airport Express		I-15 from Escondido Transit Center to San Diego International Airport	30	30
2020	Airport Express		I-15 from Escondido Transit Center to Crossborder Facility	30	30
2020			Local Bus Routes - 15 minutes in key corridors	15	15

Table 6.2 – Phased Transit Services – Revenue Constrained Plan (Continued)

Decade	Service	Route	Description	Peak Headway (Minutes)	Off-Peak Headway (Minutes)
2030	COASTER	398	Additional double tracking/Increased Frequency	20	60
2030	SPRINTER	399	Double tracking (Oceanside-Escondido) Increased Frequencies)	10	10
2030	Trolley	561	UTC to Mira Mesa via Sorrento Mesa/Carroll Canyon (extension of route 510)	7.5	7.5
2030	Trolley	520	Orange Line - Increased Frequency	7.5	15
2030	Streetcar	553	Downtown San Diego: Little Italy to East Village	10	10
2030	SPRINTER	588	SPRINTER Express	10	15
2030	BRT	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	10	-
2030	Rapid	2	North Park to downtown San Diego via North Park, Golden Hill	10	10
2030	Rapid	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	10	10
2030	Rapid	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	10	10
2030	Rapid	120	Kearny Mesa to downtown via Mission Valley	10	10
2030	Rapid	473	Oceanside to UTC via Hwy 101 Coastal Communities, Carmel Valley	10	10
2030	Rapid	709	H Street Trolley to Otay Ranch/Millenia via H Street Corridor, Southwestern College	10	10
2030	Rapid	910	Coronado to downtown via Coronado Bridge	10	10
2035	Trolley	520	Orange Line - Extend to Airport Intermodal Transit Center	7.5	15
2035	Streetcar	555	30th St to downtown San Diego via North Park/Golden Hill	10	10
2035	Trolley	560	Mid-City to downtown (Phase 1) via El Cajon and Park Blvds	7.5	7.5
2035	Trolley	563	Pacific Beach to El Cajon via Clairemont, Kearny Mesa, Mission Valley, SDSU	7.5	10
2035	BRT	653	Mid-City to Palomar Airport Road via Kearny Mesa/I-805/I-5	15	-
2035	Rapid	11	Spring Valley to SDSU via Southeastern San Diego, downtown, Hillcrest, Mid-City	10	10
2035	Rapid	180	UTC Area Super Loop - Increase Frequencies	10	10
2035	Rapid	471	Downtown Escondido to East Escondido	10	10
2035	Rapid	474	Oceanside to Vista via Mission Ave/Santa Fe Road Corridor	10	10
2035	Rapid	635	Eastlake/EUC to Palomar Trolley via Main Street Corridor	10	10
2035	Rapid	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	10	10

Table 6.2 – Phased Transit Services – Revenue Constrained Plan (Continued)

Decade	Service	Route	Description	Peak Headway (Minutes)	Off-Peak Headway (Minutes)
2035	Rapid	637	North Park to 32nd Street Trolley via Golden Hill	10	10
2035	Rapid	638	San Ysidro to Otay Mesa via Otay, SR 905 Corridor	10	10
2035	Shuttle	448/449	San Marcos - Increase Frequencies	10	10
2035			Local Bus Routes - 10 minutes in key corridors	10	10
2040	Trolley	520	Orange Line - Increased Frequencies	7.5	7.5
2040	Trolley	522	Orange Line Express - El Cajon to downtown San Diego	10	10
2040	Trolley	530	Green Line Extend to downtown - Bayside	7.5	7.5
2040	Trolley	540	Blue Line Express - UTC to San Ysidro via downtown	10	10
2050	Trolley	560	SDSU to downtown (Phase 2) via Mid-City, El Cajon and Park Blvds	7.5	7.5
2050	Trolley	562	UTC to San Ysidro via Kearny Mesa, Mission Valley, Mid-City, Southeastern San Diego, National City, Chula Vista via Highland Ave/4th Avenue	7.5	10

Transit Priority Measures

For transit to offer reliable schedules and competitive travel times, the Plan invests significantly in transit priority measures designed to help people bypass congested arterial and freeway segments. When used on a corridor-wide basis, the use of transit priority measures also can reduce operating costs, leading to a more efficient and cost-effective system. Examples of the types of transit priority measures being pursued as part of the 2050 RTP include signal priority treatments, queue jump lanes, the use of Managed Lanes/HOV lanes, and exclusive bus lanes. A more detailed description of these priority measures is included in Appendix M of Technical Appendix 7.

Transit Experience

In order to attract new market segments to public transportation, the customer experience must be considered. Factors ranging from transit access (e.g., the ability to safely cross streets, station amenities, and real-time information) to vehicle design (e.g., interior design, seat availability and comfort, and Wi-Fi connections) play key roles in people's decisions about which travel modes to choose. In addition, transit stations should be well designed and maintained to create a safe, comfortable environment.

The 2050 RTP includes capital and operating cost resources in the various transit capital and operating projects to implement and maintain a high-quality transit product.

Emerging Technologies

Transportation plans must be responsive to emerging technologies that make existing modes more efficient, and to new modes of transit that could better address transit needs in a given travel corridor. Technology will lead to improvements in how transit operates in the future, and innovative designs and passenger amenities will help make transit attractive to new market segments.

Coastal Rail Improvement Program

The San Diego coastal rail corridor is the southern terminus of the 351-mile Los Angeles-San Diego-San Luis Obispo (LOSSAN) rail corridor. The LOSSAN corridor is the nation's second busiest rail corridor, and it is shared by commuter and intercity passenger and freight rail services. In 2010, more than 8 million passengers used the rail corridor to commute to work, for vacations, and other purposes. For the Amtrak system alone, one in every 10 passengers used the corridor's intercity passenger trains, also known as Pacific Surfliner.

The 2050 RTP proposes critical improvements in areas that will benefit all users of the coastal rail corridor.

In San Diego, the 60-mile coastal rail corridor runs south from Orange County to downtown San Diego. With sections of the corridor dating back to the 1880s, about half of the corridor is single track. Trains traverse six coastal lagoons and the coastal cities of Oceanside, Carlsbad, Encinitas, Solana Beach, Del Mar, and San Diego. NCTD is the owner of the railway between the Orange County line and the southern limits of the City of Del Mar. MTS owns the railway south to the

Santa Fe Depot in the City of San Diego. NCTD operates and maintains the entire San Diego County portion of the LOSSAN corridor.

Pacific Surfliner trains provide intercity passengers with stations in downtown San Diego, Solana Beach, and Oceanside that connect the region to the rest of the nation. Two-thirds of the 2.6 million annual Amtrak passengers use the region's three intercity stations. COASTER commuter trains operate south from Oceanside to downtown San Diego, serving the cities of Carlsbad, Encinitas, Solana Beach, and San Diego. The Southern California Regional Rail Authority (SCRRA) operates Metrolink commuter trains north from Oceanside to Orange and Los Angeles counties and the Inland Empire.

BNSF Railway is the freight rail operator on the corridor, operating trains from the Port of San Diego north. On a typical weekday, there are between 65 and 73 trains operating along portions of the coastal rail corridor, and each operator has a vision for expanding service. Facing shared challenges, the 2050 RTP proposes critical improvements in areas that will benefit all users of the coastal rail corridor. These improvements include future growth in both passenger and freight services. Figure 6.4 displays the 2011 Southern California intercity and commuter rail network.

Service Driven Plan

The 2050 RTP includes substantial improvements to the coastal rail corridor, each of which is phased in according to plans for expanding service for intercity, commuter, and freight trains. Furthermore, additional local/commuter passenger rail service between San Diego and Los Angeles to serve new markets or enhance service to current markets is planned by LOSSAN and its member agencies.

Capital improvements include double tracking the rail line between Orange County and downtown San Diego; building the Del Mar Tunnel; building new platforms at the Del Mar Fairgrounds and at the San Diego Convention Center; building selected grade separations; improving grade crossings; establishing quiet zones; implementing Positive Train Control (PTC); and making other station improvements. Environmental and alternative analyses need to be conducted before construction of the Del Mar Tunnel and other capital improvements can move forward. Station improvements are expected to include parking structures at stations, as well as real-time information for passengers and other amenities. Maintaining rail bridges in a state of good repair is a major goal for the corridor, so the 2050 RTP proposes replacing all aging single track trestle bridges made of timber with modern, double tracked structures.

This corridor also is a priority for the State of California. Since 1974, the State has supported Pacific Surfliner services with capital and operating assistance. These improvements have led to faster, more frequent and more convenient service, improved stations, and increased ridership. Since 2008, the federal government has provided a capital matching program that so far has resulted in $177 million in matching funds for corridor capital projects. In 2006 and 2008, California voters approved the sale of bonds to fund additional rail improvements. A portion of these bond proceeds has been dedicated to double tracking and PTC projects in San Diego County. The *TransNet* Early Action Program includes $300 million in local funds for high-priority rail improvements and additional operating funds for the COASTER.

The LOSSAN Rail Corridor Agency is a Joint Powers Authority (JPA) that coordinates planning and programming on the coastal rail line to increase the rail lines' capacity and improve reliability. SANDAG is a member of the JPA and provides staff support to the authority. The LOSSAN Corridorwide Strategic Implementation Plan, which will identify programs and policies to better coordinate all rail services in the corridor, aims to increase ridership and develop new markets. The plan is expected to be completed in early 2012.

High-Speed Rail Services

The California High-Speed Rail Authority (Authority) was created by the California Legislature in 1996 to develop a plan for the financing, construction, and operation of a statewide, intercity high-speed passenger rail system. The Authority has developed plans for an 800-mile system that includes nine corridors connecting California's major metropolitan areas. Trains will reach speeds in excess of 200 miles per hour in more rural areas on a dedicated, fully grade-separated system, making it possible to travel from San Diego to Los Angeles in less than 80 minutes and San Diego to San Francisco in less than four hours (Figure 6.5).

The Authority completed an environmental impact report for the statewide high-speed rail network in November 2005. In November 2008, California voters approved a $9.95 billion bond measure to complete the planning and environmental phases on all of the state's high-speed rail corridors, and to construct the Bay Area-to-Anaheim segment of the proposed plan as Phase 1. The federal government followed the state's commitment to fund high-speed rail by committing more than $10 billion nationwide through the American Recovery and Investment Act (ARRA) and the Passenger Rail Investment and Improvement Act (PRIIA). The state of California so far has received $3.5 billion for Phase 1 sections of the network.

The San Diego region will be connected to the high-speed rail system by a corridor that links Los Angeles with San Diego via the Inland Empire. This project is now scheduled in Phase 2 of the Authority's plan. Figure 6.6, High-Speed Rail Alternative Alignments, shows the corridor as it stretches from downtown Los Angeles east, through San Bernardino and Riverside counties. It then heads south, through Murrieta and Temecula, to downtown San Diego along the I-15 corridor. More than 17 million people live along this corridor, and nearly 26 million are projected to live along the corridor by 2050. The Authority has completed an Alternatives Analysis, which will narrow alternatives and station options that will then be subject to environmental reviews. These reviews are scheduled to be completed in 2013-14. The state government is working closely with local and regional agencies along the corridor, and it has partnered with SANDAG and other regional transportation agencies along the corridor to form the Southern California Inland Corridor Group. This group will oversee the environmental reviews.

San Diego's high-speed corridor runs from Southwest Riverside County along the I-15 corridor, with a key intermodal transit station planned in the City of Escondido. This transit station will provide connections to the SPRINTER light rail line, local bus and feeder services, and the I-15 BRT service. Continuing south, the high-speed rail route could turn west and run through the University City area to the terminus at the Airport ITC. An alternative is to continue the high-speed rail down along I-15 to SR 163 and terminate at the ITC. At the ITC, the San Diego Trolley, COASTER, Amtrak, future BRT service, local bus, and feeder services all will connect to the state's high-speed trains.

Trains will reach speeds in excess of 200 miles per hour in more rural areas on a dedicated, fully grade-separated system, making it possible to travel from San Diego to Los Angeles in less than 80 minutes and San Diego to San Francisco in less than four hours.

A Flexible Roadway System

Roadways in the region serve many purposes and accommodate different types of travel. They accommodate buses and other transit vehicles, automobiles, the movement of freight, and bicycles. The local streets and arterials that connect our communities are typically used for shorter trips, while the region's highways link homes with major centers for jobs, education, shopping, and recreation. People also use them, of course, for longer trips out of town.

Capacity enhancements are needed to improve mobility on our highways and on regional arterial networks. The region's congestion management process is outlined in Technical Appendix 20.

The 2050 RTP improves the existing highway system and does not propose new highway corridors, with the exception of a two-mile toll highway (State Route 11) that will connect to a new international land port of entry at Otay Mesa East.

The Plan's 2050 vision is for a flexible highway system in which the same lanes used by BRT services also are used by carpools, vanpools, and fee-paying patrons (similar to the FasTrak® system, in which fees support transit services along the I-15 corridor). The highway improvements are focused on making carpooling/vanpooling and transit more time competitive with driving alone by providing Managed Lanes facilities that ensure these alternatives have fast and reliable travel that bypasses main lane congestion. As shown in Figure 6.7, 2050 Revenue Constrained Highway Network, the 2050 RTP includes an extensive network of Managed Lanes, which is critical to many of the Plan's regional transit services.

The Managed Lanes operate at free-flow speeds, and they provide passengers of high occupancy vehicles with a quicker ride. Several Managed Lanes also serve solo drivers who choose to pay a fee to save time. Table 6.3 lists the phased highway improvements. Table 6.4 summarizes the major capital improvements included in the 2050 RTP. Highway and regional arterial improvements in the Plan are coordinated to support and complement the expanded transit system.

Figure 6.4
2011 Southern California Intercity/Commuter Rail
October 2011

Figure 6.5

California High-Speed Train Statewide Overview

October 2011

Source: California High-Speed Rail Authority
Map based on preferred alignments and station locations in the 2005 and 2008* program EIR/Ss.

* *Authority rescinded 2008 Pacheco Pass selection to comply with Atherton judgment. Board will make new decision after revising Bay Area to Central Valley PEIR. New Decision could change depicted alignment connection Bay Area and Central Valley.*

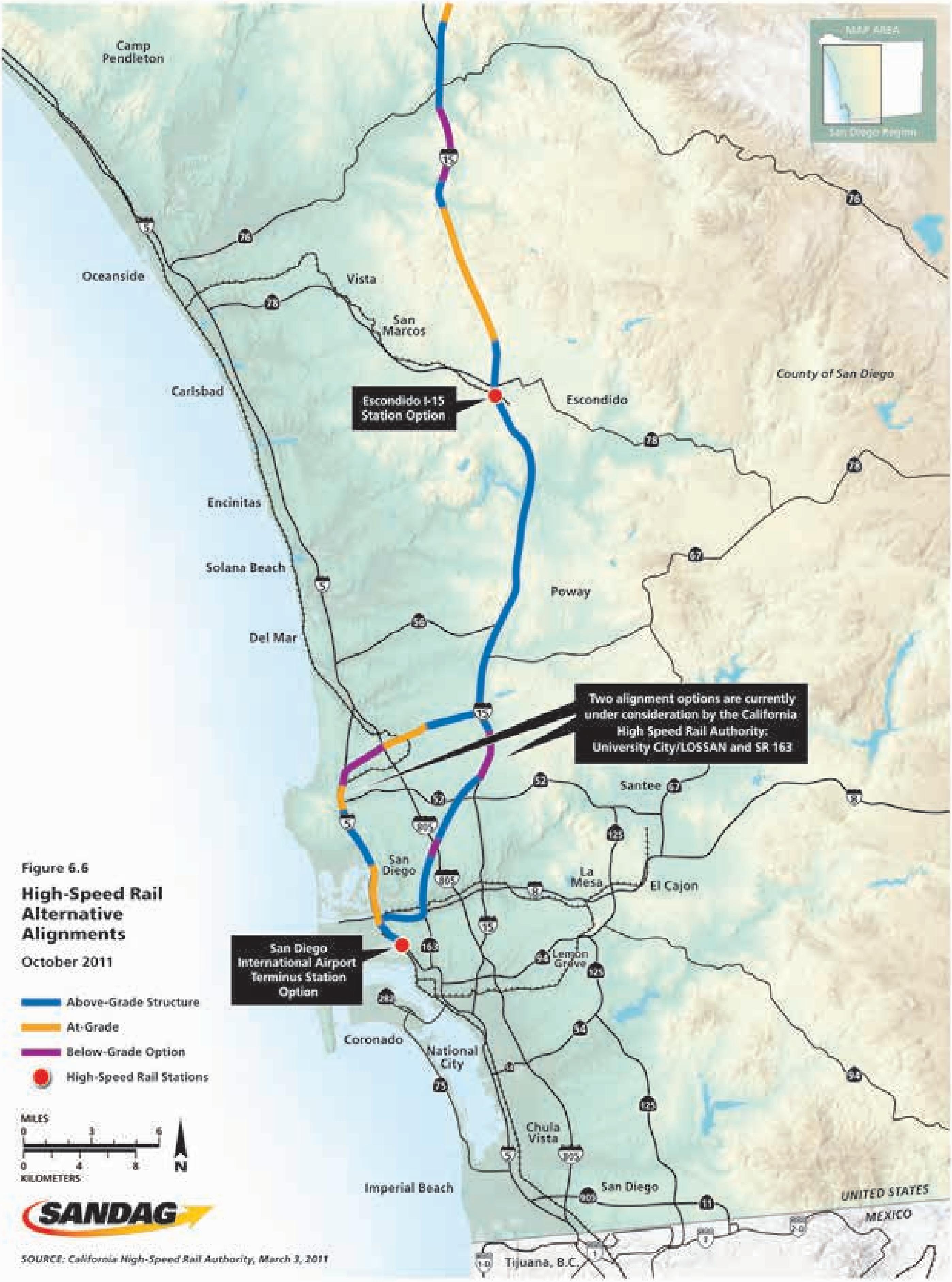


Figure 6.6

High-Speed Rail Alternative Alignments

October 2011

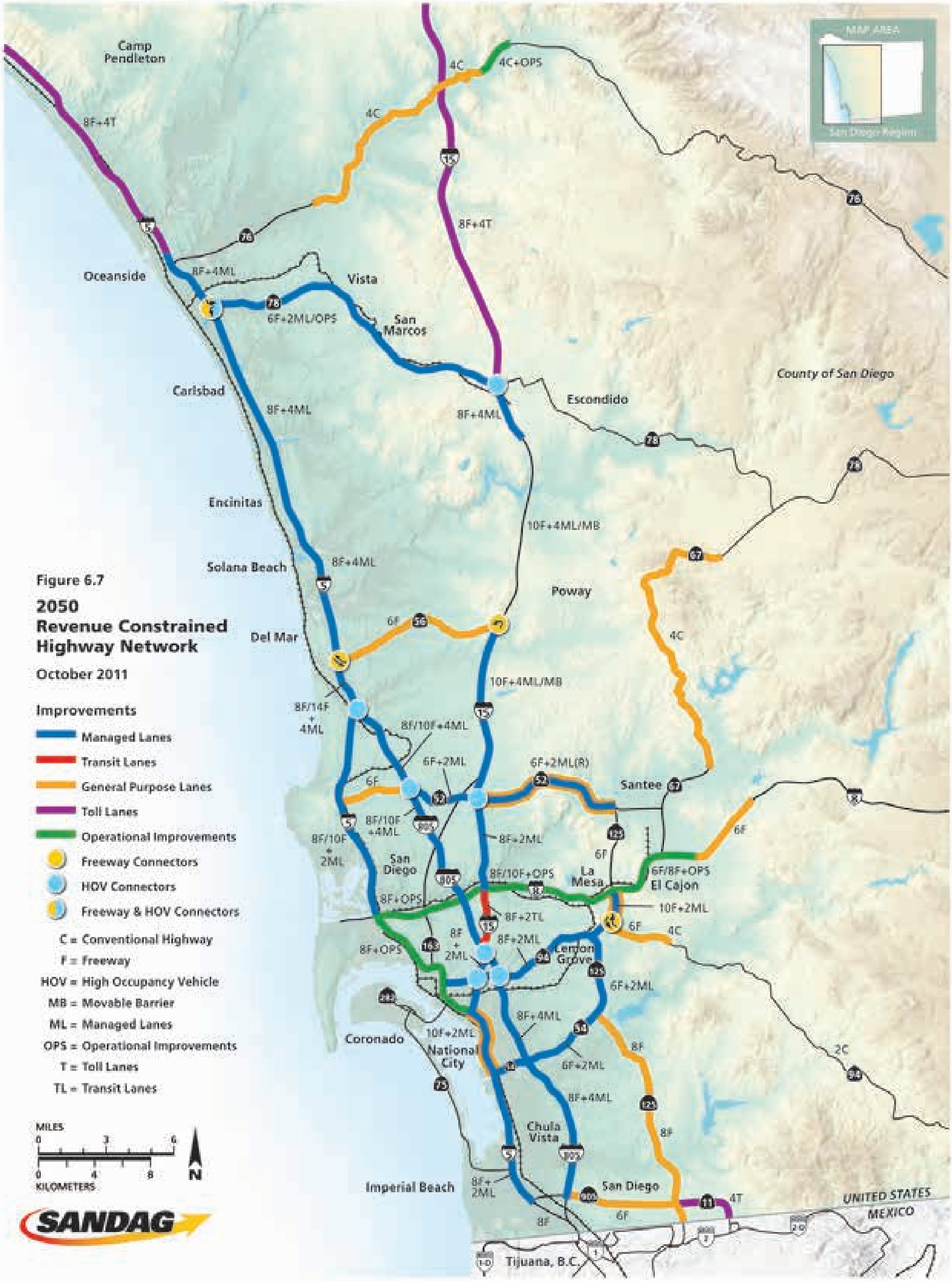


Figure 6.7
2050
Revenue Constrained
Highway Network
October 2011
Improvements
Managed Lanes
Transit Lanes
General Purpose Lanes
Toll Lanes
Operational Improvements
Freeway Connectors
HOV Connectors
Freeway & HOV Connectors
C = Conventional Highway
F = Freeway
HOV = High Occupancy Vehicle
MB = Movable Barrier
ML = Managed Lanes
OPS = Operational Improvements
T = Toll Lanes
TL = Transit Lanes
MILES
KILOMETERS
N
SANDAG
MAP AREA
San Diego Region
Camp Pendleton
Oceanside
Carlsbad
Encinitas
Solana Beach
Del Mar
Vista
San Marcos
Escondido
Poway
County of San Diego
Santee
La Mesa
El Cajon
Lemon Grove
San Diego
Coronado
National City
Chula Vista
Imperial Beach
Tijuana, B.C.
UNITED STATES
MEXICO
8F+4T
8F+4ML
6F+2ML/OPS
4C
4C+OPS
10F+4ML/MB
6F
8F/14F + 4ML
8F/10F+4ML
6F+2ML
6F+2ML(R)
8F/10F +4ML
8F/10F + 2ML
8F+2ML
8F/10F+OPS
6F/8F+OPS
10F+2ML
8F+OPS
8F+2TL
8F + 2ML
10F+2ML
6F+2ML
8F
2C
8F+2ML
4T

Table 6.3 – Phased Highway Projects – Revenue Constrained Plan ($ millions – YOE dollars)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions – YOE Dollars)
2018	I-5	Manchester Ave	SR 78	8F	8F+2HOV	$460
2018	SR 11/Otay Mesa East POE	SR 905	Mexico	--	4T	$755
2018	I-15	SR 163	SR 56	8F+2ML(R)	10F+4ML/MB	$419
2018	I-15	Centre City Parkway	SR 78	8F	8F+4ML	$210
2018	SR 76	Melrose Drive	I-15	2C	4C	$404
2018	SR 241	Orange County	I-5	--	4T	$443
2018	I-805	Palomar St	SR 94	8F	8F+2HOV	$197
2018	I-805	SR 52	Carroll Canyon Rd	8F/10F	8F/10F+2HOV	$160
2018	I-805	Carroll Canyon Rd	I-5 (north)	8F/10F	8F/10F+2ML	$81
2018	SR 905	I-805	Mexico	--	6F	$595
2018	Vesta Street Bridge		Mobility Connector over Harbor Drive at Naval Base San Diego			$59
2018	32nd Street		Freeway Access Enhancement			$ 117
2018	10th Avenue Marine Terminal Entrance		Rail Line Grade Separation/Barrio Logan Enhancement			$66
2018	National City Marine Terminal		Bay Marina Drive, Civic Center Freeway Access Improvements			$7
2020	I-5	La Jolla Village Drive	I-5/I-805 Merge	8F/14F	8F/14F+2ML	$260
2020	I-5/I-805	North to North & South to South (HOV Connectors)				$114
2020	SR 15	I-805	I-8	8F	8F+2TL	$47
2020	I-15	I-8	SR 163	8F	8F+2ML	$135
2020	SR 15/I-805	North to North & South to South (HOV Connectors)				$94
2020	I-15/SR 78	East to South & North to West (HOV Connectors)				$109
2020	SR 78	I-5	I-15	6F	6F+2ML/Operational	$592
2020	SR 94	I-5	I-805	8F	8F+2ML	$499
2020	SR 94/SR 125	South to East (Freeway Connector)				$144
2020	I-805	Palomar St	SR 15	8F/8F+2HOV[1]	8F+4ML	$1,247
2020	I-805/SR 94	North to West & East to South (HOV Connectors)				$166
2020	I-805	SR 52	Carroll Canyon Rd	8F/10F+2HOV	8F/10F+4ML	$406
2020	National City Rail Yard					$7

Table 6.3 – Phased Highway Projects – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions – YOE Dollars)
2030	I-5	Palomar St	SR 15	8F	8F+2ML	$274
2030	I-5	I-5/I-805 Merge	SR 56	8F/14F+2HOV	8F/14F+4ML	$68
2030	I-5	SR 56	Manchester Ave	8F+2HOV	8F+4ML	$685
2030	I-5/SR 56	West to North (Freeway Connector)				$89
2030	I-5/SR 56	South to East (Freeway Connector)				$164
2030	I-5	Manchester Ave	Palomar Airport Rd	8F+2HOV[2]	8F+4ML	$1,301
2030	SR 67	Mapleview St	Dye Rd	2C/4C	4C	$781
2030	SR 94/SR 125	West to North (Freeway Connector)				$247
2030	SR 125	SR 94	I-8	8F	10F	$295
2030	SR 241	Orange County	I-5	4T	6T	$79
2030	I-805	SR 905	Palomar St	8F	8F+4ML	$463
2030	I-805	SR 15	Mission Valley Viaduct	8F	8F+4ML	$315
2030	I-805	Mission Valley Viaduct	SR 52	8F/10F	8F/10F+4ML	$873
2035	I-5	Palomar Airport Rd	SR 78	8F+2HOV[2]	8F+4ML	$1,181
2035	I-5	SR 78	Vandegrift Blvd	8F	8F+4ML	$661
2035	I-5/SR 78	South to East and West to North (HOV Connectors)				$188
2035	I-5/SR 78	North to East and West to South (HOV Connectors)				$189
2035	I-5/SR 78	South to East (Freeway Connector)				$94
2035	I-5/SR 78	West to South (Freeway Connector)				$72
2035	SR 15	SR 94	I-805	8F	8F+2ML	$31
2035	SR 15/SR 94	South to West & East to North (HOV Connectors)				$126
2035	SR 52	I-805	I-15	6F	6F+2ML	$314
2040	I-8	I-15	SR 125	8F/10F	8F/10F+Operational	$226
2040	I-8	SR 125	2nd Street	6F/8F	6F/8F+Operational	$226
2040	SR 52	I-15	SR 125	4F	6F+2ML(R)	$587
2040	SR 56	I-5	I-15	4F	6F	$244
2040	SR 76	I-15	Couser Canyon	2C	4C/6C+Operational	$235

Table 6.3 – Phased Highway Projects – Revenue Constrained Plan ($ millions – YOE dollars) **(Continued)**

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions – YOE Dollars)
2040	SR 94	I-805	College Ave	8F	8F+2ML	$396
2040	SR 94	College Ave	SR 125	8F	8F+2ML	$415
2040	SR 125	SR 94	I-8	10F	10F+2ML	$126
2040	I-805	Mission Valley Viaduct		8F	8F+4ML	$1,101
2040	I-805/SR 52	West to North & South to East (HOV Connectors)				$146
2050	I-5	SR 905	Palomar St	8F	8F+2ML	$226
2050	I-5	SR 54	I-15	8F	10F+2ML	$393
2050	I-5	I-15	I-8	8F	8F+Operational	$2,689
2050	I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	$1,261
2050	I-5	Vandegrift Blvd	Orange County	8F	8F+4T	$1,795
2050	I-8	I-5	I-15	8F	8F+Operational	$1,047
2050	I-8	2nd Street	Los Coches	4F/6F	6F	$129
2050	SR 15	I-5	SR 94	6F	8F+2ML	$214
2050	I-15	Viaduct		8F	8F+2ML	$1,714
2050	I-15	SR 78	Riverside County	8F	8F+4T	$2,392
2050	I-15/SR 52	West to North and South to East (HOV Connectors)				$260
2050	I-15/SR 56	North to West (Freeway Connector)				$186
2050	SR 52	I-5	I-805	4F	6F	$262
2050	SR 54	I-5	SR 125	6F	6F+2ML	$238
2050	SR 94	SR 125	Avocado Blvd	4F	6F	$214
2050	SR 94	Avocado Blvd	Jamacha Rd	4C	6C	$71
2050	SR 94	Jamacha Rd	Steele Canyon Rd	2C/4C	4C	$48
2050	SR 125	SR 905	San Miguel Rd	4T	8F	$262
2050	SR 125	San Miguel Rd	SR 54	4F	8F	$143
2050	SR 125	SR 54	SR 94	6F	6F+2ML	$238

KEY

C = Conventional Highway Lanes

F = Freeway Lanes

HOV = High Occupancy Vehicle Lanes

MB = Movable barrier

ML = Managed lanes (HOV & Value Pricing)

ML(R) = Managed lanes (Reversible)

T = Toll Lanes

TL = Transit Lanes

[1] Project completed in two phases. See improvement from 8F to 8F+2HOV by 2018.

[2] Project completed in two phases. See improvement from 8F to 8F+2HOV by 2018.

Table 6.4 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars)

Transit Facilities				
TransNet	**Service**	**Route**	**Description**	**Cost**
TransNet	COASTER	398	Double tracking (includes grade separations at Leucadia Blvd + Convention Center/Petco Park and Del Mar Fairgrounds stations, Del Mar Tunnel, and quiet zone improvements)	$4,979
TransNet	SPRINTER	399	Double tracking (includes grade separations at El Camino Real, Vista Village Dr, Melrose Dr, Mission/San Marcos stations + two additional locations)	$1,149
	SPRINTER	588	SPRINTER Express	$334
TransNet	Trolley	510	Mid-Coast LRT Extension	$1,642
TransNet	Trolley	510 and 520	Trolley System Rehabilitation (Blue and Orange Lines)	$456
	Trolley	510	Blue Line Rail Grade Separations (Taylor St, Washington/Sassafras St, 28th St, 32nd St, E St, H St, Palomar St)	$861
	Trolley	520	Orange Line Rail Grade Separations (Euclid Ave, Broadway/Lemon Grove Ave, Allison Ave/University Ave/La Mesa Blvd, Severin St)	$491
	Trolley	522	Orange Line Express - El Cajon to downtown San Diego	$415
	Trolley	540	Blue Line Express - UTC to San Ysidro via downtown	$821
	Trolley	560	SDSU to downtown via Mid-City, El Cajon/Park Blvds	$4,009
	Trolley	561	UTC to Mira Mesa via Sorrento Mesa/Carroll Canyon	$1,556
	Trolley	562	UTC to San Ysidro via Kearny Mesa, Mission Valley, Mid-City, Southeastern San Diego, National City/Chula Vista via Highland Ave/4th Ave	$6,043
	Trolley	563	Pacific Beach to El Cajon via Clairemont, Kearny Mesa, Mission Valley, SDSU	$1,978
	Trolley	510, 520, 540, 522, and 560	Downtown Trolley Tunnel (12th & Imperial Transit Center to County Center/Little Italy Trolley Station)	$4,293
	BRT	90	Santee/El Cajon Transit Centers to downtown via SR 94 (Peak Only)	$0
TransNet	BRT	470	Escondido-UTC/UCSD via Mira Mesa Blvd	$18
TransNet	BRT	610	Temecula (peak only)/Escondido to downtown	$80
TransNet	BRT	628	South Bay BRT (Otay Mesa-downtown) via Otay Ranch/Millenia	$181
	BRT	640	I-5 - San Ysidro to downtown & Kearny Mesa via I-5 shoulder lanes/HOV lanes, downtown, Hillcrest, Mission Valley	$86
	BRT	653	Mid-City to Palomar Airport Road via Kearny Mesa/I-805/I-5	$16
	BRT	870	El Cajon to UTC via Santee, SR 52, I-805	$7
	BRT	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	$17
TransNet	BRT	680 and 688/689	Otay Mesa/San Ysidro to Sorrento Mesa via I-805 Corridor, Otay Ranch/Millenia, National City, Southeastern San Diego, Mid-City, Kearny Mesa	$441
	BRT	120, 610, and 640	Hillcrest to Mission Valley Transit Priority Measures and I-15 Green Line/BRT transfer station	$518

Table 6.4 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Transit Facilities (Continued)				
TransNet	**Service**	**Route**	**Description**	**Cost**
TransNet	BRT	-	South Bay Maintenance Facility	$45
TransNet	BRT	-	Downtown BRT stations/layovers	$97
	Rapid	2	North Park to downtown San Diego via 30th St, Golden Hill	$43
	Rapid	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	$90
	Rapid	11	Spring Valley to SDSU via Southeastern San Diego, downtown, Hillcrest, Mid-City	$157
TransNet	Rapid	15	Mid-City Rapid (downtown to SDSU via North Park, Mid-City)	$63
	Rapid	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	$61
	Rapid	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	$142
	Rapid	120	Kearny Mesa to downtown via Mission Valley	$131
	Rapid	471	Downtown Escondido to East Escondido	$48
	Rapid	473	Oceanside to UTC via Hwy 101 Coastal Communities, Carmel Valley	$176
	Rapid	474	Oceanside to Vista via Mission Ave/Santa Fe Road Corridor	$76
	Rapid	635	Eastlake/EUC to Palomar Trolley via Main Street Corridor	$81
	Rapid	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	$57
	Rapid	637	North Park to 32nd Street Trolley via Golden Hill	$48
	Rapid	638	San Ysidro to Otay Mesa via Otay, SR 905 Corridor	$84
	Rapid	709	H Street Trolley to Millenia via H Street Corridor, Southwestern College	$39
	Rapid	910	Coronado to downtown via Coronado Bridge	$29
	Streetcar	553	Downtown San Diego: Little Italy to East Village	$187
	Streetcar	554	Hillcrest/Balboa Park/downtown San Diego Loop	$284
	Streetcar	555	30th St to downtown San Diego via North Park, Golden Hill	$397
	Shuttle		San Marcos Shuttle[1]	$0
	Airport Express		Airport Express Routes[2]	$55
	Intermodal	-	Airport Intermodal Transit Center	$171
	Intermodal	-	San Ysidro Intermodal Center	$52
	Other	-	Other Improvements (Vehicles/vehicle replacement, maintenance facilities, transit system rehab, regulatory compliance, park and ride, ITS)	$10,022
			Subtotal	$43,027

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

[2] Capital cost to be funded by aviation funds.

Table 6.4 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars) **(Continued)**

Managed Lanes/Highway Projects						
TransNet	**Freeway**	**From**	**To**	**Existing**	**Improvements**	**Cost**
TransNet	I-5	SR 905	SR 54	8F	8F+2ML	$500
TransNet	I-5	SR 54	SR 15	8F	10F+2ML	$393
TransNet	I-5	SR 15	I-8	8F	8F+Operational	$2,689
TransNet	I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	$1,261
TransNet	I-5	La Jolla Village Dr	I-5/I-805 Merge	8F/14F	8F/14F+2ML	$260
TransNet	I-5	I-5/I-805 Merge	SR 56	8F/14F+2HOV	8F/14F+4ML	$68
TransNet	I-5	SR 56	Vandegrift Blvd	8F/8F+2HOV	8/10F+4ML	$4,286
	I-5	Vandegrift Blvd	Orange County	8F	8F+4T	$1,795
	I-8	I-5	SR 125	8F/10F	8F/10F+Operational	$1,273
	I-8	SR 125	2nd Street	6F/8F	6F/8F+Operational	$226
TransNet	I-8	2nd Street	Los Coches	4F/6F	6F	$129
	SR 11/Otay Mesa East POE	SR 905	Mexico	--	4T & POE	$755
	SR 15	I-5	SR 94	6F	8F+2ML	$214
TransNet	SR 15	SR 94	I-805	8F	8F+2ML	$31
TransNet	SR 15	I-805	I-8	8F	8F+2TL	$47
TransNet	I-15	I-8	SR 163	8F	8F+2ML	$1,849
TransNet	I-15	SR 163	SR 56	8F+2ML(R)	10F+4ML/MB	$419
TransNet	I-15	Centre City Parkway	SR 78	8F	8F+4ML	$210
	I-15	SR 78	Riverside County	8F	8F+4T	$2,392
	SR 52	I-5	I-805	4F	6F	$262
	SR 52	I-805	I-15	6F	6F+2ML	$314
TransNet	SR 52	I-15	SR 125	4F	6F+2ML(R)	$587
TransNet	SR 54	I-5	SR 125	6F	6F+2ML	$238
TransNet	SR 56	I-5	I-15	4F	6F	$244
TransNet	SR 67	Mapleview St	Dye Rd	2C/4C	4C	$781
TransNet	SR 76	Melrose Drive	I-15	2C	4C	$404
	SR 76	I-15	Couser Canyon	2C	4C/6C+Operational	$235

Table 6.4 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Managed Lanes/Highway Projects						
TransNet	**Freeway**	**From**	**To**	**Existing**	**Improvements**	**Cost**
TransNet	SR 78	I-5	I-15	6F	6F+2ML/Operational	$592
TransNet	SR 94	I-5	SR 125	8F	8F+2ML	$1,310
TransNet	SR 94	SR 125	Avocado Blvd	4F	6F	$214
TransNet	SR 94	Avocado Blvd	Jamacha Rd	4C	6C	$71
TransNet	SR 94	Jamacha Rd	Steele Canyon Rd	2C/4C	4C	$48
	SR 125	SR 905	San Miguel Rd	4T	8F	$262
	SR 125	San Miguel Rd	SR 54	4F	8F	$143
TransNet	SR 125	SR 54	SR 94	6F	6F+2ML	$238
TransNet	SR 125	SR 94	I-8	8F	10F+2ML	$421
	SR 241	Orange County	I-5	--	4T/6T	$522
TransNet	I-805	SR 905	Carroll Canyon Rd	8F/10F	8F/10F+4ML	$4,764
TransNet	I-805	Carroll Canyon Rd	I-5 (north)	8F/10F	8F/10F+2ML	$81
	SR 905	I-805	Mexico	--	6F	$595
					Subtotal	$ 31,123

HOV Connectors					
TransNet	**Freeway**	**Intersecting Freeway**	**Movement**		**Cost**
	I-5	SR 78	South to East and West to North, North to East and West to South		$377
TransNet	I-5	I-805	North to North & South to South		$114
	I-15	SR 52	West to North and South to East		$260
TransNet	I-15	SR 78	East to South & North to West		$109
TransNet	SR 15	SR 94	South to West & East to North		$126
	SR 15	I-805	North to North & South to South		$94
	I-805	SR 52	West to North & South to East		$146
	I-805	SR 94	North to West & East to South		$166
				Subtotal	$1,392

Table 6.4 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Freeway Connectors				
TransNet	**Freeway**	**Intersecting Freeway**	**Movement**	**Cost**
TransNet	I-5	SR 56	West to North and South to East	$253
TransNet	I-5	SR 78	South to East and West to South	$166
	I-15	SR 56	North to West	$186
TransNet	SR 94	SR 125	South to East and West to North	$391
			Subtotal	$996

Non-Highway Goods Movement Projects			
			Cost
	Vesta Street Bridge	Mobility Connector over Harbor Drive at Naval Base San Diego	$59
	32nd Street	Freeway Access Enhancement	$117
	10th Avenue Marine Terminal Entrance	Rail Line Grade Separation/Barrio Logan Enhancement	$66
	National City Marine Terminal	Bay Marina Drive, Civic Center Freeway Access Improvements	$7
	National City Rail Yard		$7
		Subtotal	$256
		Total	**$76,794**

KEY

C = Conventional Highway Lanes

F = Freeway Lanes

HOV = High Occupancy Vehicle Lanes

MB = Movable barrier

ML = Managed lanes (HOV & Value Pricing)

ML(R) = Managed lanes (Reversible)

T = Toll Lanes

TL = Transit Lanes

Note: All HOV lanes will convert to Managed Lanes by 2035 with an HOV occupancy of HOV3+ people.

Completing Regional Highways

The 2050 RTP includes the funding to maintain and preserve the existing highway system (see Chapter 5 – Financial Strategies). Improving the efficiency of the regional transportation system also is one of the Plan's priorities, and Systems Management and Demand Management strategies are discussed in detail in Chapters 7 and 8, respectively.

After these basic needs are met, the Plan's priorities are to complete missing links in the regional highway system and to develop a Managed Lane network that will serve many modes of transportation. The Plan calls for completing State Routes 11 and 905 serving South County and our border with Mexico. These same highways serve both commuter and freight travel in the region. Two new freeway to freeway connections will be completed along I-5 at its junctions with SR 56 and SR 78. In addition, missing connectors at SR 94/SR 125 will be completed.

The 2050 RTP provides funding for improvements to arterial roadways that are designed to keep public transit flowing smoothly.

Managed Lane Network

Unlike Orange and Los Angeles counties to the north, the San Diego region doesn't have an HOV network on its highways. Currently, about 20 miles of mainline HOV and Managed Lane facilities exist on portions of Interstates 5, 15, and 805. The 2050 RTP will continue to develop a robust Managed Lane network that includes four-lane managed facilities on I-5, I-15, and I-805, and two-lane facilities on State Route 52, SR 54, SR 78, SR 94, and SR 125 (totaling nearly 130 more miles).

The I-15 model showcases the integration of transit and roadways into a flexible transportation system for the corridor. Currently under construction, the I-15 Managed Lanes will create a 20-mile Managed Lane facility between SR 163 and SR 78. When the I-15 Managed Lanes project is completed, it will feature four lanes with a movable barrier (similar to the movable barriers on the San Diego-Coronado Bridge), dynamic pricing, multiple access points to regular highway lanes, and direct access ramps for buses, high occupancy vehicles, and toll-paying customers. A high-frequency rapid transit system of buses will operate in these lanes, connecting people who live in various areas of North County to job centers.

This project is an innovative tool to reduce growing traffic congestion in the corridor. It will offer high-level service to people who ride transit, share rides, and drive solo during rush hours. During off-peak periods, Managed Lanes could be used to help smooth the flow of freight trucks and other vehicles transporting goods throughout the region.

In addition to mainline Managed Lane improvements, the Plan includes direct HOV to HOV connectors at the I-5/I-805 merge, and at eight other interchanges where major HOV facilities intersect.

An Enhanced Focus on Local Streets and Roads

The 2050 RTP provides funding for improvements to arterial roadways that are designed to keep public transit flowing smoothly. Like highways, the arterial network plays an important role in improving regional transit, as well as serving subregional trips. These include extending green lights for public transit vehicles, allowing "queue jumpers" to bypass bottlenecks on local streets, and adding grade separations where needed. These measures link regional arterials to the Managed Lane network and transitways at transit stations and other strategic locations, providing transit vehicles with easy access to the regional network.

Completing the Regional Arterial System is a priority in the 2050 RTP. Regional arterials provide critical links to the highway network, and they serve as alternative routes to highways as well. Planned improvements to the Regional Arterial System (Figure 6.8) are identified in the local circulation elements of each of the local jurisdictions in the San Diego region. A complete list is included in Technical Appendix 4, Table TA 4.26. Local jurisdictions are responsible for improving regional roadways and local streets, to meet their residents' needs and mitigate the effects of local developments. Funding is intended to come from local jurisdictions, including Proposition 42.

The 2050 RTP assumes additional arterial improvements, in addition to projects that increase the capacity of the arterial network. These include coordinating traffic signals, systems that detect traffic, measures that give public transit priority on the network, and management systems that optimize the arterial network and integrate arterial operations with other modes (see Chapter 7).

A Corridor Approach

The 2050 RTP recognizes the importance of planning from a regional perspective and within a subregional context. The Plan recognizes that no one size fits all, in part because the long-term performance of transportation facilities and services depends heavily on surrounding land uses and nearby communities.

The individual modal improvements in the 2050 RTP are tailored to support land uses in major travel corridors. They build upon multimodal systems already in place, and they add preferred improvements recommended in completed transportation planning studies (see Appendix E for a list of studies and links to their location). This corridor approach considers multiple facilities, modes, jurisdictions, and land uses. The objective is to select the most effective mix of strategies to improve mobility along a specific corridor.

To improve sustainability, the 2050 RTP focuses major roadway and transit improvements in urban and suburban areas of the region, encouraging growth away from the region's more rural areas. However, the Plan also recognizes the need to address the unique transportation issues facing the region's rural communities, particularly those affected by increasing development on tribal reservations.

Accommodating bicycle and pedestrian travel also is important as we develop our regional highways and arterials. Highway and arterial improvements, such as freeway interchanges and widened arterial streets, should be designed to encourage bicycling and walking. The *TransNet* Extension Ordinance requires all *TransNet* funded projects to support active transportation, where it is reasonable to do so.

The Plan recognizes that no one size fits all, in part because the long-term performance of transportation facilities and services depends heavily on surrounding land uses and nearby communities.

Public Safety

Several natural disasters and acts of terrorism have brought the safety and security of our transportation system to the forefront. The federal transportation bill, Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), calls for an increased emphasis to be placed on the safety and security of the transportation system. On a regional planning scale, three key areas of concern have been identified: the ability to plan for and react to natural disasters; the capability to respond effectively to man-made events; and the interoperability of various public safety communication systems.

The San Diego region has a number of existing organizations, plans, and infrastructure in place to provide for the safety of the regional transportation system. Additionally, there are a number of current or pending efforts to plan for and respond to large-scale natural or man-made disasters and improve public safety communications systems.

Within the San Diego region, the County of San Diego Office of Emergency Services (OES) coordinates the overall county response to disasters and provides for a single operational area for the coordination of mitigation, preparedness, response, and recovery. The San Diego Transportation Management Center (TMC) integrates Caltrans' Traffic Operations and Maintenance and the California Highway Patrol (CHP) communications in a unified communication and command center and provides communications, surveillance, and computer infrastructure to coordinate transportation management on state highways.

It is important to have plans to evacuate individuals who do not have access to private vehicles. Identified coordination and response agencies provide for a systematic response to natural and man-made disasters. Existing infrastructure, such as changeable message signs (CMS) and the Reverse 911 telephone system, allow for information to be shared expeditiously with portions of the population. The Reverse 911 telephone system was employed with positive results when more than 500,000 people were evacuated during the San Diego County wildfires in October 2007.

As neighbors and key trade partners, it is critical that we ensure safe and time-efficient travel to the economies of both California and Baja California. The U.S. Customs and Border Protection (CPB) has many systems in place to prevent the entry of potentially dangerous individuals and materials. Many physical, technology, and policy systems are in place to ensure safety and security at the border.

SANDAG and various local, state and federal agencies continue to work together to continue to improve the safety and security of the transportation system.

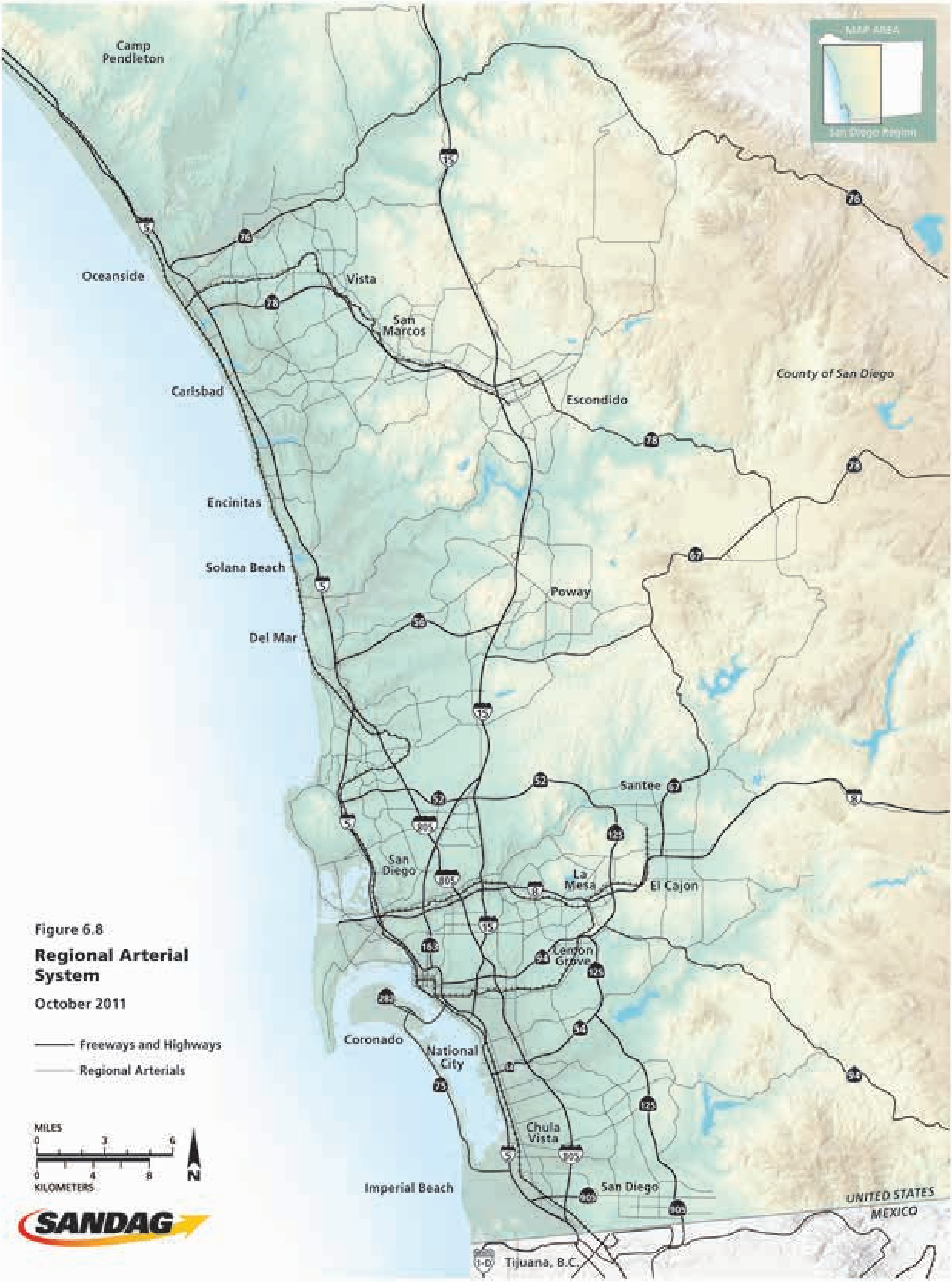


Figure 6.8

Regional Arterial System

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2050 Goods Movement Strategy

The 2050 Goods Movement Strategy (GMS) developed a forecast and truck model, and then produced a menu of projects that reflects the needs of the region and balances freight benefits with sustainability needs. The goods movement portion of the Unconstrained Network consists primarily of road and truckway projects (accommodating more than 90 percent of freight by volume) that comprise the backbone of the freight distribution network. The Unconstrained Network outlined in the 2050 GMS also includes several maritime, rail, border, air cargo, intermodal centers, and pipeline-related projects.

The GMS, as shown in Figure 6.9, serves as the freight component of the 2050 RTP. The GMS considers the growing importance of freight and goods movement to the region's economic prosperity, and it seeks to balance regional and national freight priorities.

The relationship between freight transportation and economic growth has long been recognized as an important ingredient in both regional and national policy.

The San Diego Region Goods Movement Network

The movement of goods in the San Diego region involves intermodal systems of air cargo, border crossings, maritime, pipeline, rail and roadways/truckways. Situated between major production, trade, and population centers, San Diego hosts a wide array of freight transportation and infrastructure components. The freight transportation system includes interstate and state highways, Class I freight rail operations, two short line railroad operations (all freight operations occur on tracks shared with passenger rail services), airport cargo systems, the Port of San Diego with two working marine terminals, and the Otay Mesa and Tecate commercial border crossings.

The existing conditions, capacity needs, and other important issues for each of the region's individual freight systems are summarized in this GMS. The shared freight and passenger components for aviation, border, rail, and roadway systems are discussed more fully by topic in this chapter.

Air Cargo

California's Global Gateways Development Program identifies San Diego International Airport (SDIA) as one of the priority air cargo gateways in California. Most air cargo in the San Diego region is handled through SDIA. Air cargo activity has grown rapidly at SDIA, increasing at an average annual rate of 8.5 percent through 2000. It has since slowed to a more moderate rate of growth of 4.3 percent annually. In 2009, SDIA handled more than 121,000 tons of air cargo. The air cargo capacity at SDIA is currently constrained by limited infrastructure. Therefore, increasing cargo handling capacity, as well as improved access roads, are proposed in the 2050 RTP Unconstrained Network.

Land Ports of Entry

In 2010, nearly $27 billion in goods moved between Mexico and the United States at the Otay Mesa Port of Entry (POE) and at the Tecate POE. The SANDAG 2050 Comprehensive Freight Gateway Study (Gateway Study), included in Technical Appendix 11, projects that the nearly 2 million trucks that crossed the California-Mexico border in 2007 will increase to nearly 5 million trucks in 2050. According to the SANDAG study, "Economic Impacts of Wait Times at the San Diego-Baja California Border," trucks crossing at the border at Otay Mesa and Tecate currently experience delays of more than two hours, on average, even when they are not subjected to secondary inspections. To shorten these delays, the GMS proposes roadway projects at the border, as well as the new Otay Mesa East POE.

Maritime

San Diego Bay is a natural harbor situated about 96 nautical miles southeast of Los Angeles and just north of the U.S.-Mexico border. The Port of San Diego has two marine cargo terminals on San Diego Bay. One is at Tenth Avenue in the City of San Diego, and the other is in National City. In FY 2009-2010, the two terminals handled about 2.8 million revenue tons of cargo. Built in the 1950s, the Tenth Avenue Marine Terminal (TAMT) is a general cargo terminal. It supports cool-frozen food storage, break bulk, dry-liquid bulk, small container operations, and construction materials. The National City Marine Terminal (NCMT) is a primary maritime POE for imported automobiles and lumber, with the capacity to handle 500,000 motor vehicles for distribution by rail and truck throughout the United States.

The Port's maritime capacity is constrained by limited terminal space, landside access constraints, and dock space. While the potential for maritime growth is possible, the expansion of existing and new businesses must be complemented by enhanced terminal capacity and improved highway access. Also, the Port's proximity to the community of Barrio Logan creates the need for context sensitive community improvements to support the port access projects.

Pipeline

In the San Diego region, Kinder Morgan Energy Partners (a private company) is the key provider of bulk freight transport by pipeline. The pipeline network runs between Orange, California and the Kinder Morgan Terminal in San Diego's Mission Valley. The 66-acre terminal has the capacity to distribute significant amounts of petroleum products by truck on I-5, I-805, I-15, and on Friars Road. The volume of petroleum products shipped by pipeline in the region is projected to continually increase, and new pipeline capacity may be required beginning in 2015. Therefore, improved truck access to the pipeline terminal may be needed to ensure the efficient delivery of petroleum products.

Rail

San Diego County is served by three rail companies that own and/or operate rail facilities within the county. In the northern

The 2050 RTP includes proposed rail capacity improvements to reduce current passenger/freight rail bottlenecks and to increase capacity for existing port and border-related freight.

part of the county along the I-5 corridor, BNSF Railway operates on two lines owned by NCTD and MTS. They run from Oceanside to Escondido, and from Oceanside to downtown San Diego. BNSF also operates on a rail line segment between downtown San Diego and the National City Marine Terminal (this segment is owned by BNSF).

In the southern portion of the county, San Diego and Imperial Valley Railroad (SD&IV), a subsidiary of Fortress Investment Group (formerly Rail America Inc.), operates two short lines owned by MTS. One line connects the Santa Fe Depot in downtown San Diego with the San Ysidro border crossing and freight yard. The other line runs from downtown San Diego to the City of Santee, in the eastern part of the region.

Additionally, the Carrizo Gorge Railway (CZRY) owns the rights to operate limited service between the Mexican border at San Ysidro/Tijuana, through Mexico to the U.S.-Mexico border crossing at Tecate. The rail line continues from Tecate to Plaster City in the western part of Imperial County. The section between Tijuana and Tecate is owned by the Mexican government, while the section between Tecate, California and Plaster City is owned by MTS. However, the portion between Division, near Tecate, and Plaster City is currently closed due to bridge repairs.

In 2008, all of the region's rail operators handled about 32,000 carloads, including such commodities as motor vehicles, lumber, chemicals, petroleum, agricultural products, cement, and aggregate.

Freight rail capacity along the coast and south to Mexico is currently constrained by limited infrastructure and the sharing of track with passenger operations including Amtrak, the COASTER, and the Trolley. The 2050 RTP includes proposed rail capacity improvements to reduce current passenger/freight rail bottlenecks and to increase capacity for existing port and border-related freight. New rail logistics centers at key locations would allow rail and truck transfers where the demand for local or subregional industrial/manufacturing is high and where land is less expensive. Track improvements on the San Diego to Tecate line would provide better connections and service to manufacturing centers in Mexico, with the potential to grow rail carloads.

Road/Truckways

The majority of the region's freight travels by truck. Congested freeways and highways slow the movement of freight, especially at key gateway access points. These include the border crossing at Otay Mesa and the port connector roads along Harbor Drive and ultimately to the Interstate system. New Managed Lanes are planned along the region's primary truck routes, including primary north-south routes such as I-5, I-15, and I-805. Also, the potential use of Managed Lanes during off-peak periods for moving goods will be evaluated in the near future. Other proposals for increasing truck capacity include improvements on SR 52, SR 54, SR 67, SR 94, and SR 125.

In the San Diego region, I-5, I-805, and I-15 are the major north-south corridors used by significant numbers of commercial trucks. SR 94/125, I-8, and SR 905/Otay Mesa Road are the region's primary east-west truck corridors.

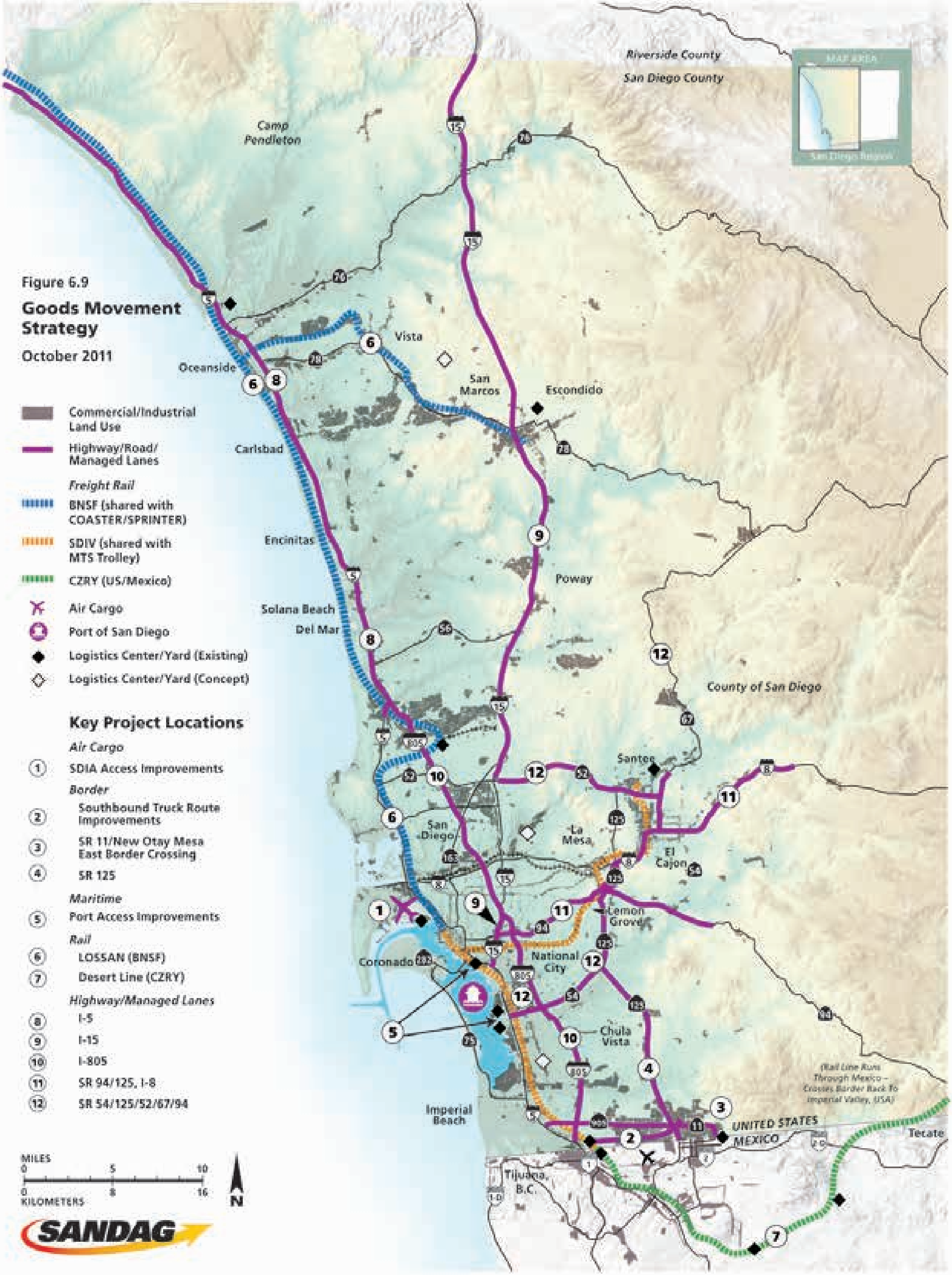

Figure 6.9
Goods Movement Strategy
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Aviation and Ground Access

Existing Conditions

The 2050 RTP includes the development of an Airport Intermodal Transit Center (ITC), adjacent to the airport with direct connections to rail, Trolley, and bus services.

Each year, more than 17 million air passengers use one of the region's three commercial airports: San Diego International Airport (SDIA), McClellan-Palomar Airport, or Tijuana International Airport. These airports are part of the San Diego County Airport System of 12 public use airports in San Diego County, along with Tijuana International (Figure 6.10). SDIA, McClellan-Palomar, and Tijuana International accommodate commercial, general aviation, and corporate services. Airports accommodating only general aviation and corporate services are Brown Field Municipal, Gillespie Field, Montgomery Field, and Ramona. The remaining airports accommodate general aviation only.

In addition, there are airport users that choose to use other airports in the region, including in Mexico, because of the varied air services they offer. For example, of the total San Diego County passengers connecting at Los Angeles International Airport (LAX) annually, about 41 percent originate their travel at SDIA, while about 54 percent connect at LAX using ground transportation (e.g., train, car, and bus). About 5 percent of the passengers connecting at LAX begin their trips at McClellan-Palomar, which currently only offers commercial service to LAX. About 780,000 San Diego County residents traveled to Mexican destinations in 2006. About 640,400 of them, or 83 percent, flew from Tijuana International after crossing the international border.

In 2010, about 127,000 tons of air cargo were shipped from or to the San Diego region. About 90 percent of the cargo handled at SDIA was accommodated on integrated/express carriers that originated from or were destined for downtown San Diego. Just as SDIA is ideally situated for passenger service and general aviation because it is easily accessible, the airport also is ideal for transporting cargo. Moreover, integrated carriers employ vast distribution networks that require a centralized airport. SDIA provides this ideal base for ground transportation.

Senate Bill 10 (SB 10), passed into law in 2007, requires SANDAG and the San Diego County Regional Airport Authority (Airport Authority) to coordinate planning for the multiple modes of transportation that serve the airport. SB 10 primarily requires the development of a Regional Aviation Strategic Plan (RASP) and an Airport Multimodal Accessibility Plan (AMAP). The Airport Authority is the lead agency for the RASP, which analyzes scenarios to improve the performance of the regional airport system. SANDAG is the lead agency for the AMAP, which details a multimodal strategy to improve airport access for cars, shuttles, trucks and other surface transportation. The overarching goal of both the RASP and AMAP is to maximize the efficiency and effectiveness of existing and planned aviation facilities by using all the transportation infrastructure available.

In 2009, SANDAG, the Airport Authority, and the City of San Diego completed Destination Lindbergh, which details a planning strategy for the ultimate buildout of SDIA at its present location. The document evaluated improved intermodal access to the airport, and determined actions that could reduce traffic on surrounding arterial streets. In the recommended buildout plan, terminal gates would remain on the south side of the runway. However, all ground access to the airport would lead to the north side of Pacific Highway, where passengers and cargo would arrive first at the airport at new facilities. A people mover would then bring passengers to a reconstructed terminal on the south side of the runway. Elements of the airport's north side complex include a consolidated rental car facility (CONRAC), a passenger processing facility, and parking structures. Also included is the development of an Airport Intermodal Transit Center (ITC), adjacent to the airport and with direct connections to rail, Trolley, and bus services. The ITC would be located along the existing railroad tracks and connect to airport facilities with a passenger walkway across Pacific Highway. Future improvements would include high-speed train (HST) service and direct connector ramps from I-5.

RASP and AMAP

The Airport Authority initiated the RASP in 2008 by developing 15 scenarios to evaluate how to meet the region's air service needs through 2030. The AMAP, initiated in 2010, studied a number of freeway, roadway, and public transportation improvements based on the aviation demand forecast developed by the Airport Authority and the alternative RASP scenarios.

SDIA

RASP results indicate that the full build-out of the north side terminal at SDIA has no effect on projected enplanements, relative to the Baseline Scenario, because it does not improve the capacity of the airfield. The study also confirmed that SDIA's fleet mix already is nearly optimized because the Airport is projected to have a relatively low proportion of regional jets and turboprops in the future. However, there are other reasons to build out the north side terminal, as well as to construct the opening-day scenario of the Airport ITC. These reasons include improving regional intermodal transportation connections, offering alternatives to driving alone to the airport, and relieving congestion. The ITC will include connections from developments at the north side of the airport to the Trolley, commuter rail, and local and regional buses. These improvements are included in the AMAP, which also calls for the full build out of the ITC, including a high-speed train station, direct access ramps from I-5, and direct express bus service from the I-5 and I-15 corridors.

The RASP evaluated two HST alignments that would offer passengers an alternative solution for ground transportation to cities and airports within California. The study found that diverting a portion of aviation operations to HST, per the assumptions in both alignments, would delay by about five years the time when SDIA capacity becomes constrained. It should be noted that the true long term impact of high speed trains on the region could not be precisely determined. This is because results were evaluated for only three years, with effects being observed only between 2027, when the California High-Speed Rail Authority expects to be running service to San Diego, and 2030. Based on the degree of uncertainty surrounding the timing of HST, as well as the time and cost of accessing and using the service, the best estimate is that between 8 percent and 25 percent of the region's aviation demand to northern California would be diverted to rail.

Crossborder Facility

The RASP found that the number of passengers using Tijuana International would increase by 30 percent with the introduction of the Crossborder Facility (CBF). But the CBF only would marginally alleviate the mid-term constraints on capacity, because it does not materially affect whether travelers choose the airport for domestic travel. This is because U.S. travel from Tijuana, notwithstanding any form of crossborder facility or terminal, is international travel, requiring customs clearance for Mexico-departing and U.S.-arriving passengers. The study found that the CBF attracts more passengers from the Los Angeles region than from San Diego County. This is primarily because the Los Angeles region has a larger service population, and airports there do not have the capacity to serve all the region's residents. The AMAP reviewed a number of ground access improvements to the CBF, including future local bus routes; additional arterial widening projects that are consistent with the draft Otay Mesa community plan update under development by the City of San Diego; and additional improvements to the interchange between SR 905 and Britannia Boulevard. Direct express bus service that provides a one-seat ride from North County Inland is proposed.

McClellan-Palomar Airport

The RASP found that increasing commercial passenger service at McClellan-Palomar does not alleviate capacity constraints at SDIA, primarily because the additional demand that can be accommodated at McClellan-Palomar only accounts for five percent of SDIA's total traffic. The RASP also evaluated using McClellan-Palomar for high-end/corporate general aviation by providing the necessary amenities at the airfield, but it found this would delay only by about two years the time that capacity becomes constrained at SDIA. The AMAP alternatives for improving ground access include additional lanes on Palomar Airport Road, widening of arterial streets for better transit and vehicle access directly to the airport, and direct transit from the Poinsettia COASTER station to the airport terminal.

Gillespie Field

The RASP found that maximizing the use of Gillespie Field for both high-end/corporate and recreational general aviation would delay by about two years the time when capacity becomes constrained at SDIA. Enhanced general aviation is a market that is traditionally difficult for public transit to serve effectively and although the AMAP evaluated a number of potential transit improvements, intersection and signal improvements along Marshall Avenue and the SR 67/Bradley Avenue interchange project are proposed to improve the flow of traffic to the terminal.

Beyond 2030, capacity constraints are likely at SDIA. This will result in the inability of the region to accommodate all demand, potential service disruptions, and higher air fares. Several options, including high-speed trains, also could accommodate additional demand in the 2030 to 2050 timeframe.

The RASP Technical Report is available at www.sdrasp.com and the AMAP is available at www.sandag.org/amap. Both are included in Technical Appendix 12.

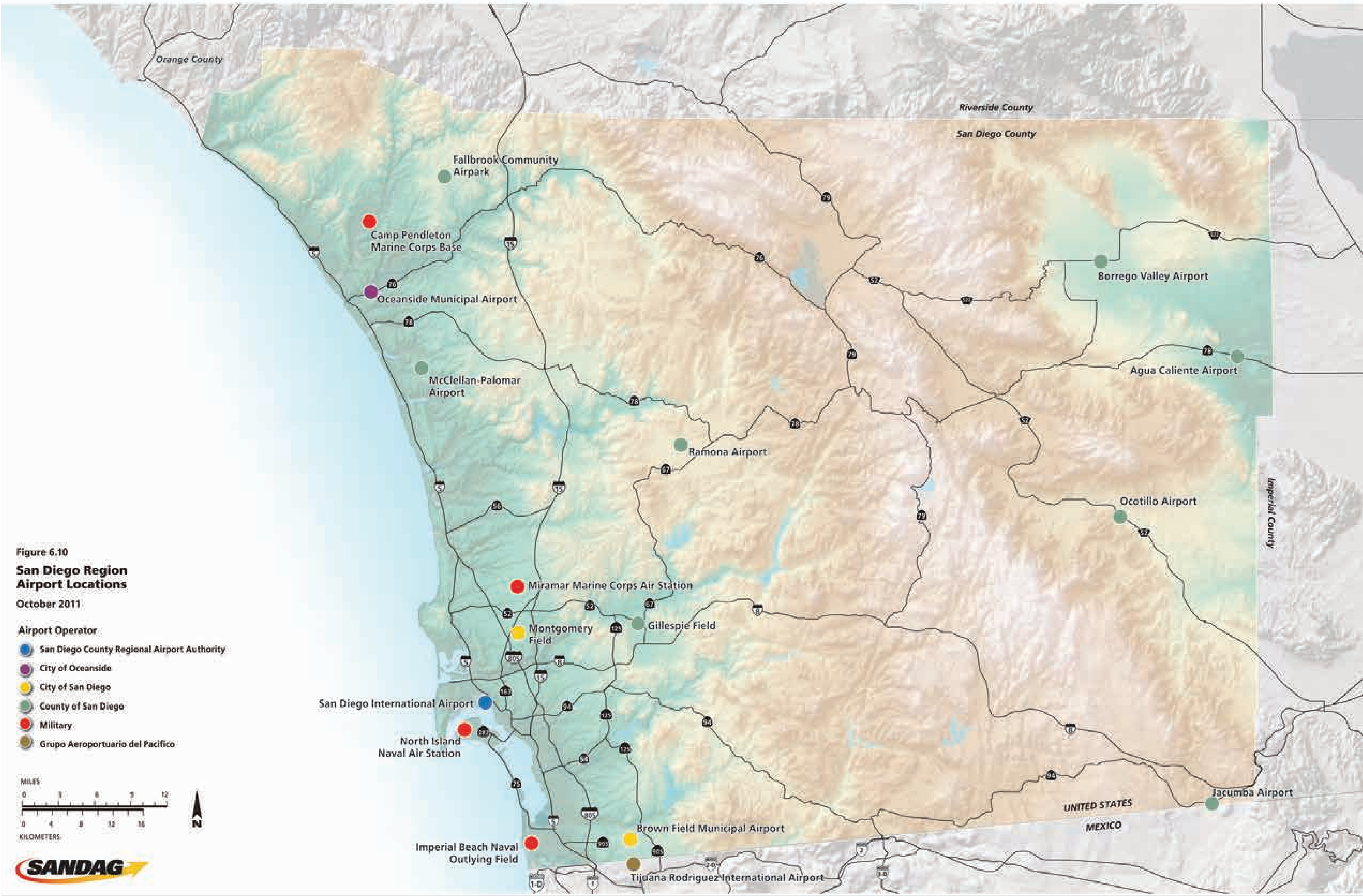

Figure 6.10

San Diego Region Airport Locations

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Active Transportation

Our region can increase mobility, reduce greenhouse gases, and improve public health by making bicycling and walking viable options for everyday travel.

Offering More Choices Will Make Our Transportation System More Efficient

As noted at the beginning of this Chapter, the 2050 RTP is developed around five primary components: a Sustainable Communities Strategy, Social Equity and Environmental Justice, Systems Development, Systems Management, and Demand Management. Each component has a unique yet interdependent role in creating a sustainable transportation system that improves mobility, reduces greenhouse gases, and increases travel choices for everyone in the San Diego region through 2050.

In addition, the Regional Comprehensive Plan (RCP), adopted in 2004, also calls for more transportation options, and a balanced regional transportation system to support smart growth and a more sustainable region. Toward that end, the RCP established a regional objective to "create more walkable and bicycle-friendly communities consistent with good urban design concepts." A well-designed and thoughtfully integrated multimodal transportation system will give people choices, allowing them to select the transportation mode that is best suited for a particular trip. In an area as large and diverse as the San Diego region, this approach is necessary to make the best use of our limited transportation resources.

Active Transportation, Transit, and Smart Growth

Well-planned bicycling and walking facilities support compact, mixed-use communities. They also improve safe routes to rail and bus transit stops/stations. Compact communities with a rich mix of homes and businesses place more destinations within the range of bicycling and walking trips. Studies show that people living in smart growth communities typically drive about 20 percent to 40 percent less than those in suburbs that are highly dependent on driving. Communities conducive to bicycling and walking can support more intensive development because they require fewer auto trips. Even those who choose to drive benefit because mixed-use smart growth neighborhoods are more compact and therefore the distances between destinations are reduced. If properly designed and convenient, bicycling and walking infrastructure will lead to more people choosing bicycling or walking for short trips in smart growth areas.

Well-planned bicycling and walking facilities support compact, mixed-use communities.

Combined with public transportation, walking and bicycling can be a part of longer trips as well. Ninety percent of all public transportation trips begin with walking. Seventy-five percent of people who walk to transit stops walk for less than nine minutes, and 42 percent walk for less than four minutes. Improvements that make the walk to public transit stops more pleasant and safe also will encourage more people to ride public transit. Bicycling in particular has great potential to allow more people to access public transportation conveniently.

Accessing public transit stops by bicycle can shorten travel times significantly. Because bicyclists travel about four times as fast as pedestrians, convenient access by bicycle can increase the geographic area served by one transit station by 16-fold.

Universal Access to Mobility

Good mobility is fundamental to thriving economically, socially, and physically. However, many people in the region do not drive because they are too young or too old. Many more do not drive because of financial constraints, a disability, personal choice, and other reasons. The transportation needs of these people can be met with a mix of options for bicycling, walking, and public transit. Transportation in our region must be accessible for everybody. Support for bicycling and walking is crucial to providing universal mobility.

The 2050 RTP fully funds the identified needs for bicycling and walking over the next 40 years.

This goal is supported by federal, state, regional, and local statutes and policies that require a "complete streets" approach to developing the transportation system. With the adoption of Assembly Bill 1358 – The Complete Streets Act in 2008, California became the first state to require city and county legislative bodies, when revising circulation elements, to identify how they will accommodate all roadway users regardless of their mode of travel. Bicyclists, public transportation vehicles, and pedestrians of all ages and abilities are to be recognized as legitimate roadway users. Streets should be designed to be safer and accessible for all roadway users to promote and enable the creation of livable streets and more livable communities.

Complete Streets policies and practices complement and help to enable Active Transportation projects and programs supported by SANDAG. The benefits of Complete Streets are many and should be a part of improving access and safety in all communities regardless of size or location. Complete Streets encourage improved safety which leads to more walking and bicycling. Shifting some trips to walking, bicycle, and public transit fosters a more balanced transportation system and provides opportunities for people to be more active and thus improve the health of the people in our communities.

Implementation of Complete Streets that provide room for safe bicycling and walking help children get physical activity and opportunities to gain independence. Children who have safe walking and bicycling routes have a more positive view of their neighborhood and are more connected to their community. Safe Routes to School programs will also benefit from Complete Streets policies that can help turn all routes into safe routes.

At the regional level, Section 4(E)(3) of the *TransNet* Extension Ordinance requires all *TransNet* funded projects to support active transportation where it is reasonable to do so.

The benefits of walking and bicycling are many, while the costs of supporting active transportation are relatively minor. The 2050 RTP fully funds the identified needs for bicycling and walking over the next 40 years. Chief among the benefits is the opportunity to improve public health. Using active transportation options such as walking, biking, and public transit reduces vehicle miles traveled; cuts vehicle emissions; reduces respiratory disease due to exposure to environmental contamination from fuel and oil spills; and reduces hypertension due to exposure to high decibels of noise. Switching to an active mode of transportation also incorporates exercise into an activity done by most people everyday. Just a five-mile bicycle trip or a two-mile walk to work provides most people with the minimum 30 minutes of moderate to vigorous physical activity recommended by the Surgeon General.

Riding to 2050: The San Diego Regional Bicycle Plan

The RTP calls for a multimodal regional transportation network that includes a regional bicycle network. Toward that end, Riding to 2050: The San Diego Regional Bicycle Plan (Bicycle Plan) sets forth a vision for a distinctive regional bicycle system composed of interconnected bicycle corridors, support facilities, and programs. The goal is to make bicycling more practical and desirable to a larger number of the region's residents and visitors. The Bicycle Plan is located in Technical Appendix 13 and can be found at www.sandag.org/bicycle. Implementing the plan is critical for the development of a robust active transportation system in the region. The Bicycle Plan is a guide for the future development of the regional bicycle system, through the year 2050.

The Bicycle Plan outlines a range of recommendations to accomplish the regional goals of increasing the number of people who bike, as well as the frequency of bicycle trips for all purposes. It encourages the development of Complete Streets, improving safety for bicyclists and increasing public awareness and support for bicycling in the San Diego region. The recommendations include bicycle infrastructure improvements, programs to encourage cycling and safe cycling behavior, implementation strategies, and policy and design guidelines.

Bicycle Infrastructure Improvements

The Bicycle Plan presents an interconnected network of 40 bicycle corridors (Figure 6.11, 2050 Regional Bicycle Network) that will enable residents to bicycle with greater safety, directness, and convenience within and between major regional destinations. It was developed in coordination with local agencies, in order to connect to and complement local bike networks. The regional bicycle network consists of a combination of standard bicycle facilities, including about 228 miles of Class I bike paths, 213 miles of Class II bike lanes, and 33 miles of Class III bike routes. These facilities and the Regional Bicycle Corridor Classification System are described and depicted in greater detail in Figure 6.12. The Bicycle Plan also proposes two new types of facilities: eight miles of bicycle boulevards and 34 miles of cycle tracks. While they are not defined in the California Highway Design Manual, they are emerging as promising innovative treatments. The plan proposes to develop these two types of facilities as demonstration projects, in order to study their potential for providing greater safety and comfort to bicyclists (see Figure 6.12). Figure 6.13 depicts the adopted corridor alignments and facility classifications of the Regional Bicycle Network. To enhance the regional bicycle network, the Bicycle Plan also includes provisions for secure and convenient bicycle parking, and support facilities that encourage transportation-based bicycle trips and enhanced access to transit.

In April 2011, the SANDAG Board of Directors approved $6.5 million to fund the initial implementation of the Bicycle Plan.

The San Diego Regional Bicycle Plan sets forth a vision for a distinctive regional bicycle system composed of interconnected bicycle corridors, support facilities, and programs.

The Regional Safe Routes to School Strategy supports communities and schools in implementing programs that promote walking and bicycling to school safely and routinely.

The Bicycle Plan acknowledges the importance of completing the regional network of Class I bike paths, which includes the Inland Rail Trail, Coastal Rail Trail, San Diego River Trail, and Bayshore Bikeway. Although many sections of the regional network have been completed, together they fall short of creating a continuous regional network. Completing these segments will make an important contribution in moving toward an interconnected Class I network and provide additional facilities that bicyclists and pedestrians can use now. The initial implementation of the Bicycle Plan includes final design and construction for two portions of the Coastal Rail Trail in the cities of Oceanside and Encinitas as well as preliminary engineering and environmental work to advance portions of the Inland Rail Trail, Coastal Rail Trail, and San Diego River Trail in the cities of San Marcos, Vista, Encinitas, San Diego, Santee, and the County of San Diego.

In addition to the established Class I network, the Bicycle Plan proposes a number of additional projects to provide a comprehensive bicycle network for the San Diego region. Also in April 2011, the Transportation Committee was presented with the prioritized list of these additional projects resulting from applying the Transportation Committee approved project prioritization criteria. Proposed initial implementation of the Bike Plan includes preliminary planning for eight projects from the prioritized list that would serve some of the highest density development in the region.

Safe Routes to School Strategy

The Regional Safe Routes to School Strategy supports communities and schools in implementing programs that promote walking and bicycling to school safely and routinely. In addition to increasing the number of students walking and bicycling to school, Safe Routes to School programs improve health; address traffic safety and personal security issues; mitigate transportation costs; heighten awareness about the benefits of active transportation; and decrease school-related vehicle trips. The result is improved air quality and reduced traffic congestion in school zones.

The Safe Routes to School Strategy is gaining prominence as an effective tool for managing demands on the transportation system, improving air quality, and reducing greenhouse gas emissions.

To achieve these benefits, Safe Routes to School programs encourage children to walk and bicycle to school by planning and evaluating initiatives, improving infrastructure, making sure traffic laws are enforced, education, and other activities. Comprehensive Safe Routes to School programs encompass all of these components. They are commonly referred to as the “Five E’s” (engineering, education, enforcement, encouragement, and evaluation).

While funding for local Safe Routes to School programs primarily comes from the state and federal programs, the planning and implementation of Safe Routes to School programs is inherently local. These efforts rely on collaboration among local jurisdictions, school districts, schools, and community based and nonprofit organizations. Several of these local programs exist throughout the San Diego region.

The Regional Safe Routes to School Strategy seeks to build upon the region's existing Safe Routes to School programs and related efforts. The strategy consists of the following elements:

- Integrating Safe Routes to School into regional planning efforts
- Providing technical assistance to help ensure that local Safe Routes to School programs will be effective and comprehensive
- Establishing partnerships and fostering collaboration among agencies and organizations
- Offering education and encouragement programs that are valuable tools for communities. For example, SchoolPool might otherwise be too costly or onerous to administer locally. SchoolPool is included as part of the iCommute Program (see Chapter 8).

SANDAG is now developing the San Diego Regional Safe Routes to School Strategic Plan. It will detail actions, identify responsible agencies, and estimate the cost of implementing the strategy. The anticipated benefits of this Safe Routes to School Strategy are substantial, and they would help the region meet state targets for reducing greenhouse gas emissions.

California Coastal Trail

The California Coastal Trail (CCT) is made up of a series of trails stretching 1,300 miles up and down the California coastline, as shown in Figure 6.14. Its development is a collaborative effort among the Coastal Conservancy, State Parks, the Coastal Commission, and the nonprofit agency Coastwalk. Designated in 1999 as California's Millennium Legacy Trail, it is defined as "a continuous public right of way along the California coastline; a trail designed to foster appreciation and stewardship of the scenic and natural resources of the coast through hiking and other complementary modes of nonmotorized transportation."

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

SANDAG has developed Technical Memoranda entitled "Feasibility Study for the San Diego Portion of the California Coastal Trail" to inform the scoping of a comprehensive feasibility study for the region. The Memoranda lay the groundwork and gathers preliminary material to help to identify existing and potential network segments, linkages, gaps, and coastal access routes. These Technical Memoranda are located in Technical Appendix 14 and can be found at www.sandag.org/CACoastalTrail.

The California Coastal Trail is intended as a continuous public right of way that extends from the northern border of California to the southern border, all within sight, sound, or at least smell of the ocean.

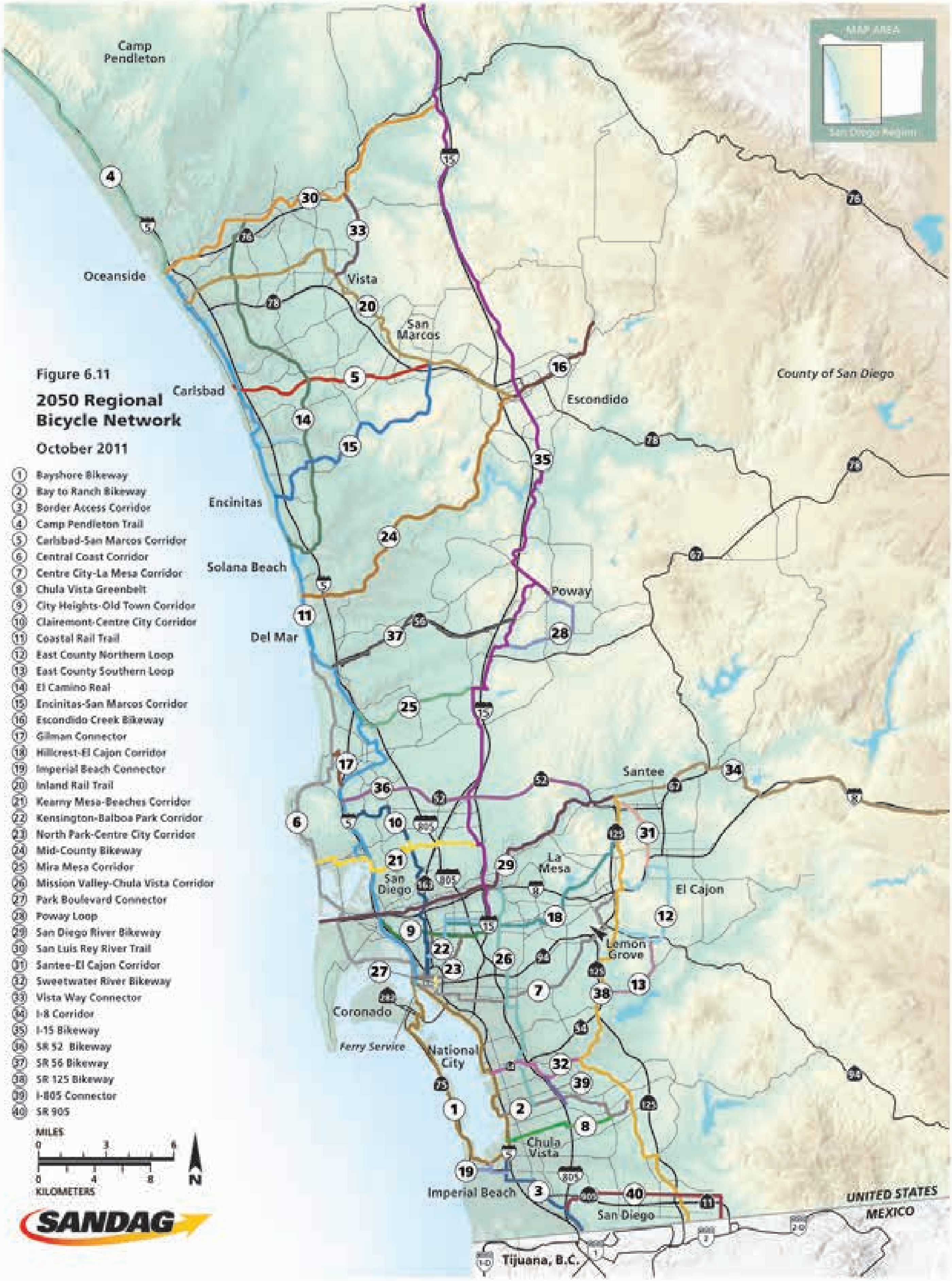
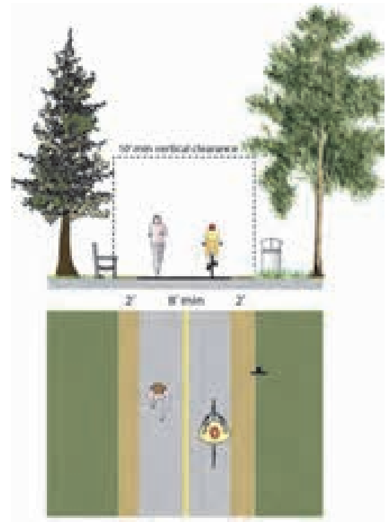


Figure 6.11
2050 Regional Bicycle Network
October 2011

Figure 6.12: Regional Bicycle Corridor Classification System

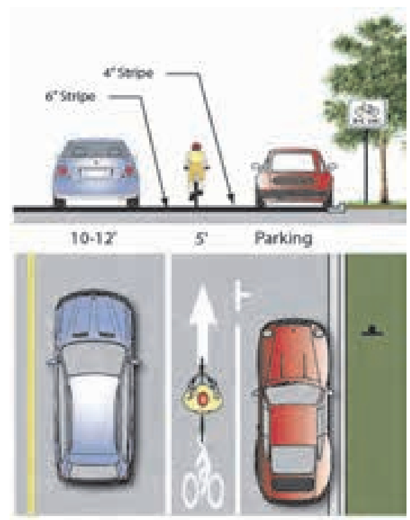
Class I – Bike Path

Bike paths are bikeways that are physically separated from vehicular traffic. Also termed shared-use paths, bike paths accommodate bicycle, pedestrian, and other non-motorized travel. Paths can be constructed in roadway right of way or independent right of way. Bike paths provide critical connections in the region where roadways are absent or are not conducive to bicycle travel.



Class II - Bike Lanes

Bike lanes are defined by pavement markings and signage used to allocate a portion of a roadway for exclusive or preferential bicycle travel. Within the regional corridor system, bike lanes should be enhanced with treatments that improve safety and connectivity by addressing site-specific issues. Such treatments include innovative signage, intersection treatments, and bicycle loop detectors.



Class III - Bike Routes

Bike routes are located on shared roadways that accommodate vehicles and bicycles in the same travel lane. Established by signs, bike routes provide continuity to other bike facilities or designate preferred routes through corridors with high demand. Within the regional corridor system, bike routes should be enhanced with treatments that improve safety and connectivity by addressing site-specific issues.

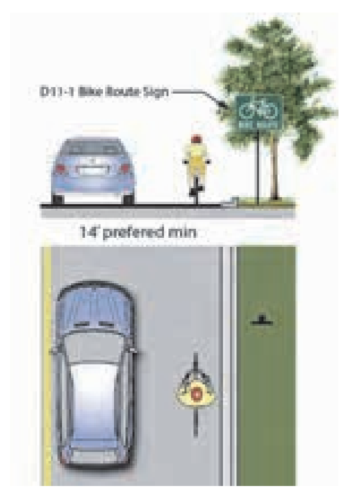
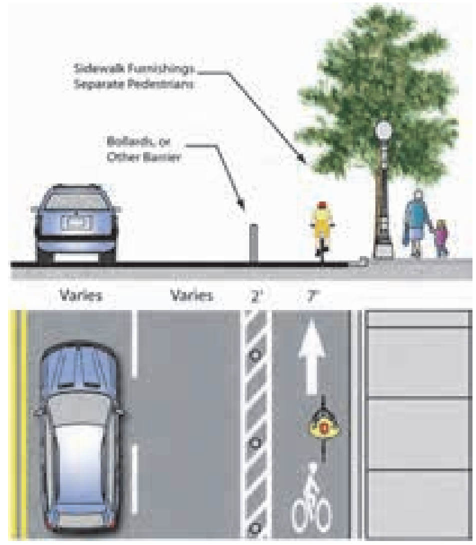


Figure 6.12: Regional Bicycle Corridor Classification System (Continued)

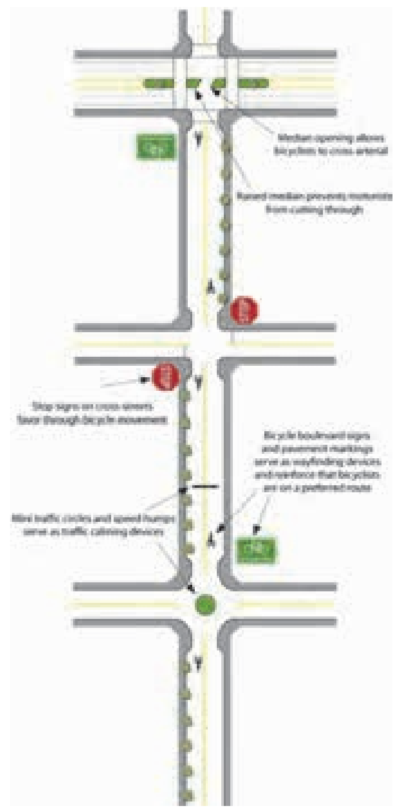
Cycle Tracks

A cycle track is a hybrid type of bicycle facility that combines the experience of a separated path with the on-street infrastructure of a conventional bike lane. Cycle tracks are bikeways located in roadway right of way but separated from vehicle lanes by physical barriers or buffers. Cycle tracks provide for one-way bicycle travel in each direction adjacent to vehicular travel lanes and are exclusively for bicycle use. Cycle tracks are not recognized by Caltrans Highway Design Manual as a bikeway facility. Development of cycle track on segments of the regional corridor system is proposed through experimental, pilot projects.

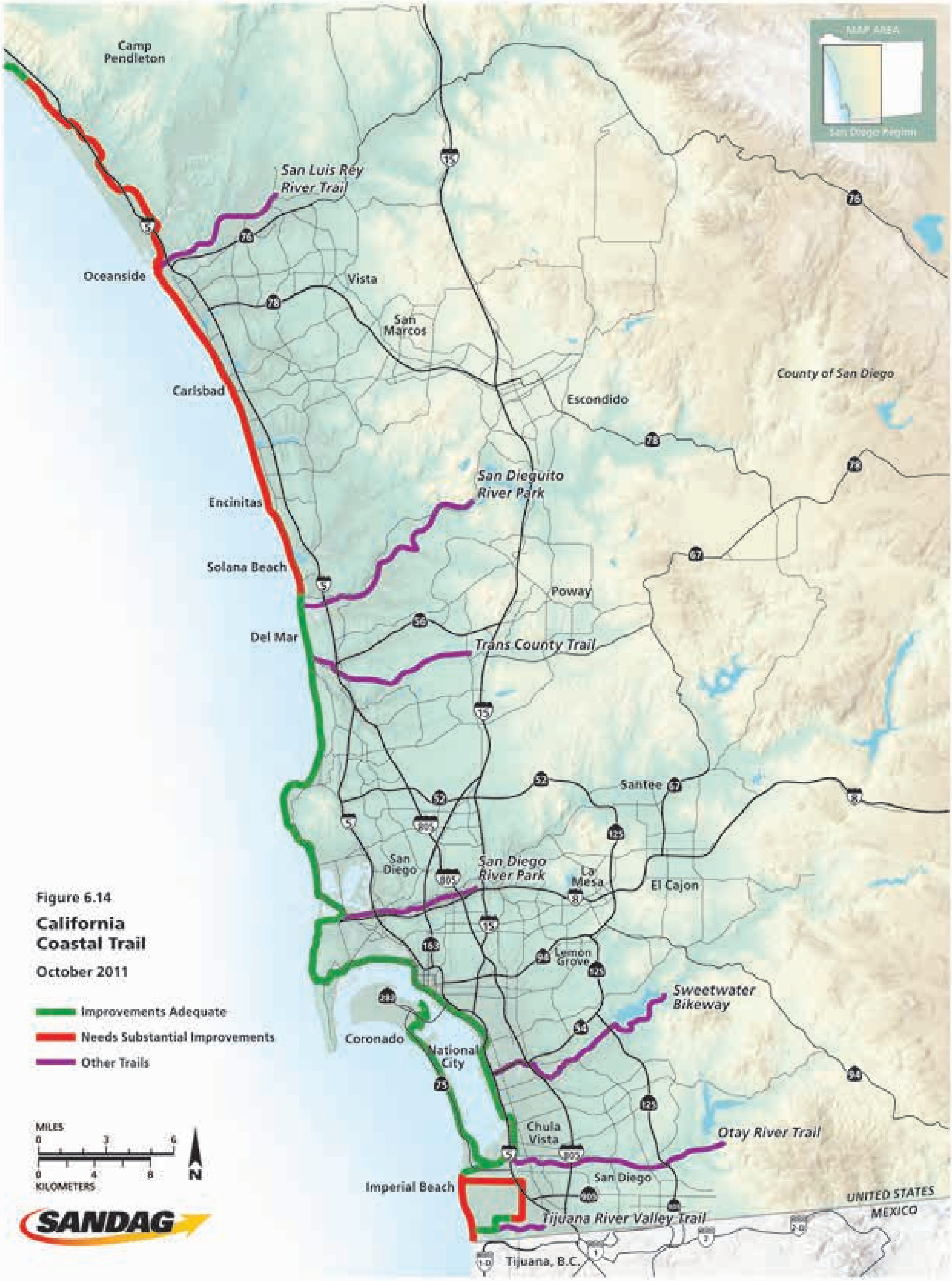


Bicycle Boulevards

Bicycle boulevards are local roads or residential streets that have been enhanced with traffic calming and other treatments to facilitate safe and convenient bicycle travel. Bicycle boulevards accommodate bicyclists and motorists in the same travel lanes, typically without specific vehicle or bicycle lane delineation. These roadway designations prioritize bicycle travel above vehicular travel. The treatments applied to create a bike boulevard heighten motorists' awareness of bicyclists and slow vehicle traffic, making the boulevard more conducive to safe bicycle and pedestrian activity. Bicycle boulevard treatments include signage, pavement markings, intersection treatments, traffic calming measures and can include traffic diversions. Bicycle boulevards are not defined as bikeways by Caltrans Highway Design Manual; however, the basic design features of bicycle boulevards comply with Caltrans standards.



Camp Pendleton
Oceanside
Vista
San Marcos
Carlsbad
Escondido
County of San Diego
Encinitas
Solana Beach
Poway
Del Mar
Santee
San Diego
La Mesa
El Cajon
Lemon Grove
Coronado
Ferry Service
National City
Chula Vista
Imperial Beach
San Diego
UNITED STATES
MEXICO
Tijuana, B.C.
MAP AREA
San Diego Region
Figure 6.13
2050 Regional Bicycle Network Corridor Alignments and Classifications
October 2011
Class I Bike Path
Cycle Track
Bicycle Boulevard
Enhanced Class II - Bike Lane
Enhanced Class III - Bike Route
MILES
0
3
6
0
4
8
KILOMETERS
N
SANDAG



Camp Pendleton
San Luis Rey River Trail
Oceanside
Vista
San Marcos
Carlsbad
Escondido
County of San Diego
San Dieguito River Park
Encinitas
Solana Beach
Poway
Del Mar
Trans County Trail
Santee
San Diego
San Diego River Park
La Mesa
El Cajon
Lemon Grove
Sweetwater Bikeway
Coronado
National City
Chula Vista
Otay River Trail
San Diego
Imperial Beach
Tijuana River Valley Trail
UNITED STATES
MEXICO
Tijuana, B.C.
MAP AREA
San Diego Region
Figure 6.14
California Coastal Trail
October 2011
Improvements Adequate
Needs Substantial Improvements
Other Trails
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

The 2050 RTP looks beyond the San Diego region to link transportation and land use planning across our borders with Orange, Riverside, and Imperial counties, with tribal governments, and with the State of Baja California, Mexico.

Planning Across Borders

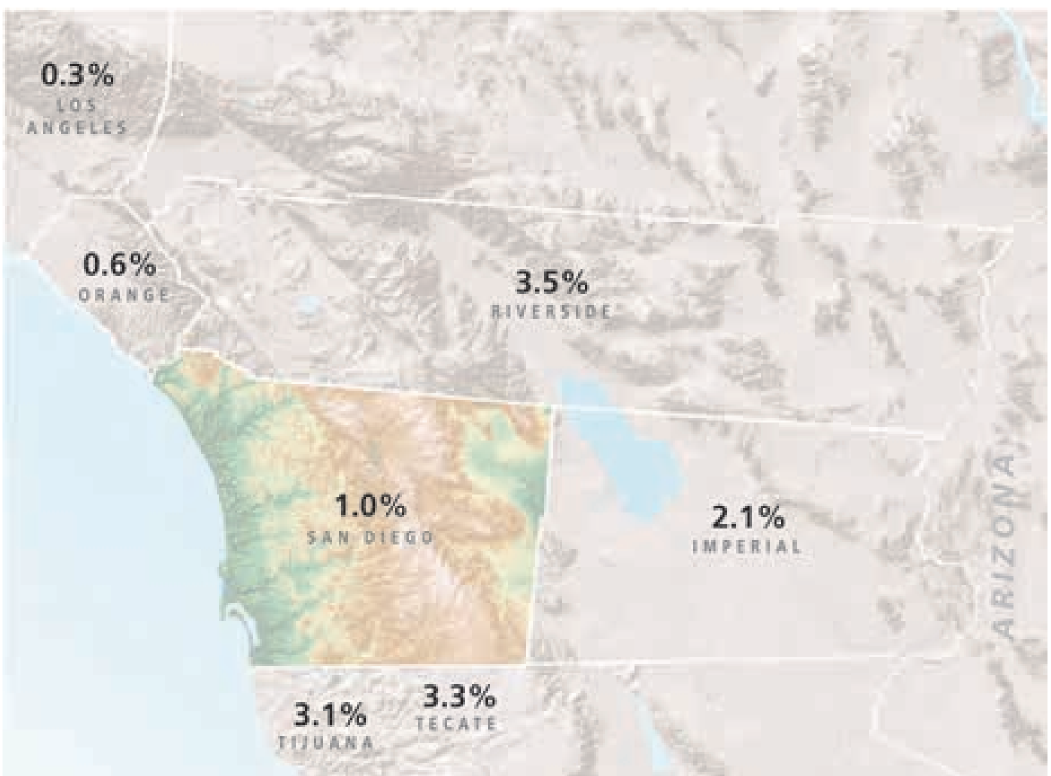
Planning in the San Diego region has traditionally been considered as bounded by San Diego County. However, over the years, our perceived borders have expanded. San Diego County has increasingly close ties to its neighboring counties and to the Republic of Mexico. This challenges us to think of our region as extending beyond our borders. We also are home to 17 diverse tribal governments, each of which is a sovereign nation within our region. The region's distinct characteristics present a variety of opportunities and challenges for coordinating transportation planning along our interregional and binational borders.

How our region grows inevitably impacts those around us, just as growth around us impacts our region. During the past decade, the average annual population growth rate in the San Diego region paralleled the national average. However, the growth rates in Riverside and Imperial counties, and in Baja California, Mexico, were substantially higher as shown in Figure 6.15 Southern California/Northern Baja California Average Annual Percentage Change in Population 2000-2010.

The 2050 RTP looks beyond the San Diego region to link transportation and land use planning across our borders with Orange, Riverside, and Imperial counties, with tribal governments, and with the State of Baja California, Mexico.

The last several years saw a steady increase in interregional and international commuting, as more people chose to live in Riverside County and Baja California, Mexico, while working in

Figure 6.15 – Southern California/Northern Baja California Average Annual Percentage Change in Population 2000-2010



Source: U.S. Census Bureau and Instituto Metropolitano de Planeación (IMPlan) the San Diego region. The 2050 Regional Growth Forecast continues to recognize these travel trends, and it accounts for future housing for our workers both within the San Diego region and outside the region's boundaries.

I-15 Interregional Partnership Program

The I-15 Interregional Partnership (I-15 IRP) is a voluntary partnership of local officials who represent SANDAG and the Western Riverside Council of Governments (WRCOG). The I-15 IRP was formed in 2001 to address the imbalance of jobs and housing that had developed between the San Diego region and southwestern Riverside County over the previous decade.

SANDAG worked closely over the last decade with the I-15 IRP partner agencies – Riverside County Transportation Commission (RCTC), Riverside Transit Agency (RTA), Western Riverside Council of Governments (WRCOG), and Caltrans Districts 8 and 11 – to strengthen the partnership and create an effective interregional framework for addressing transportation, economic development, and housing issues. More information on the I-15 IRP can be found at www.i15irp.org.

Orange County

In 2005, the Borders Committee identified topics for discussion with the Orange County Transportation Authority (OCTA). They included I-5 corridor studies, updates of long range RTPs, and passenger rail improvements. Since that year, staff members from the OCTA and SANDAG have met periodically to strengthen cooperative relationships and to discuss topics of joint interest.

In 2010, the Board of Directors approved the Southern California Association of Governments (SCAG) as the newest advisory member of the Borders Committee. SCAG is the largest council of governments in the United States, functioning as the Metropolitan Planning Organization (MPO) for six counties: Los Angeles, Ventura, San Bernardino, Orange, Riverside, and Imperial. These last three counties border the San Diego region.

I-8 Interregional Partnership with Imperial County

In 2008, the San Diego-Imperial County I-8 Corridor Strategic Plan Joint Policy Advisory Group participated in efforts to develop the I-8 Interregional Partnership with Imperial County by providing policy direction on the development of the I-8 Corridor Strategic Plan.

The Strategic Plan identified issues, established goals and objectives, and developed interregional strategies in the areas of transportation, housing, and employment to ensure adequate levels of service on the I-8 corridor. The Strategic Plan was completed in February 2009. Staff from the Imperial County Transportation Commission, Caltrans District 11, and SANDAG continue to work toward implementing the San Diego-Imperial County I-8 Corridor Strategic Plan.

Government-to-Government Framework with Tribal Nations

The U.S. Constitution and treaties recognize Native American communities as separate and independent political communities, within the territorial boundaries of the United States. The current government-to-government relationship is a federal/tribal relationship, the origin of which flows from treaties, federal statutes, and U.S. Supreme Court decisions. Government-to-government relations between regional planning agencies, local governments, and counties is voluntary. However, regional transportation agencies are required by federal law to consult with tribes in the development of various planning efforts, including the RTP. During the last few years, SANDAG, through its Borders Committee, has been building a government-to-government framework for engaging tribal nations at a regional level. A more detailed description of the tribal consultation process is included in Appendix C.

Binational Transportation

The San Diego region is bounded on the south by the international border with Mexico. Just south of the international border are the cities of Tijuana, Tecate, and Playas de Rosarito, which comprise a metropolitan zone of 1.6 million people. This metropolitan zone is home to important multinational manufacturing plants known as "maquiladoras." Several of these maquiladoras have administrative facilities in San Diego County, and they contribute to the local economy. This binational and symbiotic relationship includes other contributors to the economy, including crossborder travelers who spend money in local retail, tourism, and service sectors. In addition, crossborder travelers visit family and friends, and they attend cultural and sporting events. The success of this relationship depends on access to safe, efficient and secure transportation infrastructure leading to and from the regions' three international ports of entry.

To accommodate the dynamic border transportation system, the 2050 RTP considers major projects to improve land border crossing infrastructure. This includes a proposed POE at Otay Mesa East and the proposed San Diego-Tijuana Airport CBF that would connect Otay Mesa and the Tijuana International Airport. Other projects would improve access to the existing passenger and commercial border crossings in San Ysidro and Otay Mesa, including improvements to freight rail service. Collectively and in conjunction with projects at Imperial County border crossings, these projects would modernize and transform transportation infrastructure along the U.S.-Mexico border, from San Diego-Tijuana east to Arizona-Sonora.

After many years of growth, there has been a downward trend in interregional commuting over the last few years. However, long-term forecasts developed using historical pedestrian and vehicle crossings suggest that crossborder vehicle traffic will increase by more than 40 percent between 2008 and 2050. Additional pedestrian crossings are projected with the construction of the CBF in Otay Mesa. The 2050 Regional Growth Forecast continues to recognize these travel trends, and it accounts for future housing for workers both within the San Diego region as well as outside of the region. Over the 41-year forecast period, it is estimated that an additional 15,000 households would have residents commuting into the region for work. Nearly half of these households would be located in Baja California, Mexico, and much of the remainder would be in Riverside County.

International Border Crossings

The San Diego region shares a common international border with the municipalities of Tijuana and Tecate in the State of Baja California, Mexico. There are three land border POEs that connect Mexico with the San Diego region: San Ysidro-Puerta México, Otay Mesa-Mesa de Otay, and Tecate-Tecate (Figure 6.16).

The population of the border area of San Diego and Tijuana-Tecate exceeded 4.8 million people in 2010. San Diego's population is forecast to increase to nearly 4.4 million by the 2050. The City of Tijuana could grow to about 5 million, based on an annual growth rate of 2.4 percent. Those who cross the border into the United States regularly face long and unpredictable wait times. In 2007 alone, northbound delays for crossbborder personal travel and freight movements were estimated to cost the San Diego-Baja California economies nearly $4.2 billion in lost output, as well as a loss of more than 35,000 jobs. These impacts are felt beyond the border region, and they represent $7.2 billion in lost output and a loss of more than 62,000 jobs for the national economies of the U.S. and Mexico. Both output and job losses are projected to increase over the next ten years, if steps are not taken to improve border crossing and transportation infrastructure and management. Air quality at the border also is affected by excessive idling from trucks and private vehicles.

Southbound Inspections

In the last two years, traffic bottlenecks and wait times for those crossing the border in the southbound direction have become common. In 2009, Mexico launched *Sistema de Aforo Vehicular* (SIAVE), its new program for inspecting inbound vehicles. The program uses weight-in-motion (WIM) scales, license plate readers, and vehicle photographs. In addition, the U.S. Department of Homeland Security performs random vehicle inspections on the southbound lanes of I-5, in the vicinity of the San Ysidro POE, and on southbound lanes of SR 905 approaching the Otay Mesa POE.

In 2007 alone, northbound delays for crossborder personal travel and freight movements were estimated to cost the San Diego-Baja California economies nearly $4.2 billion in lost output, as well as a loss of more than 35,000 jobs.

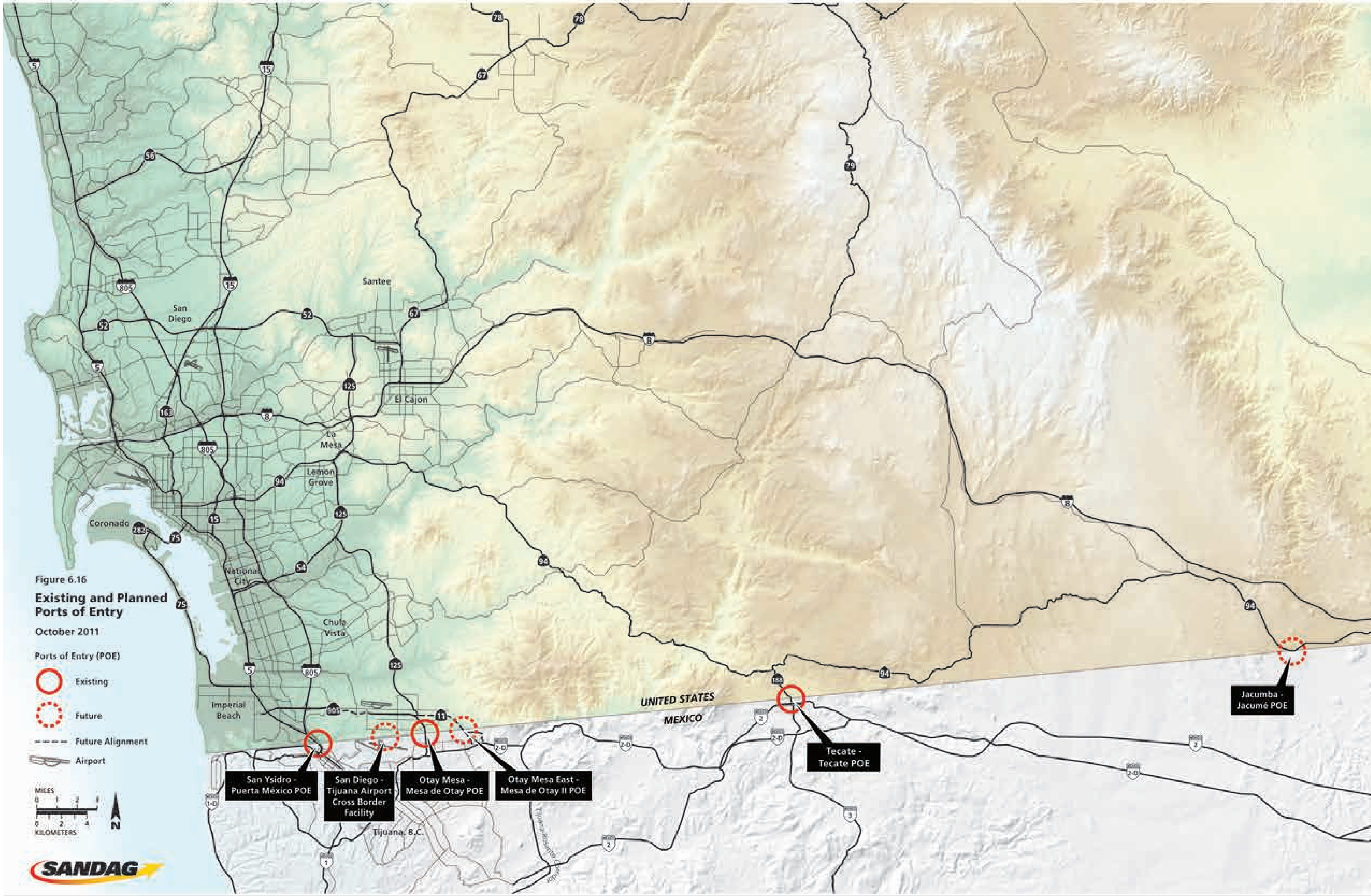


Figure 6.16
Existing and Planned Ports of Entry
October 2011
Ports of Entry (POE)
Existing
Future
Future Alignment
Airport
MILES
KILOMETERS
N
SANDAG
San Diego
Santee
El Cajon
La Mesa
Lemon Grove
Coronado
National City
Chula Vista
Imperial Beach
Tijuana, B.C.
UNITED STATES
MEXICO
San Ysidro - Puerta México POE
San Diego - Tijuana Airport Cross Border Facility
Otay Mesa - Mesa de Otay POE
Otay Mesa East - Mesa de Otay II POE
Tecate - Tecate POE
Jacumba - Jacumé POE

San Ysidro – Puerta México POE

The San Ysidro Land Port of Entry is reportedly the world's busiest land POE, and it is the region's primary gate for auto and pedestrian traffic in both directions.

This POE serves as a federal multimodal inspection facility that provides service for pedestrians, passenger vehicles, and buses. The San Ysidro POE currently has 12 pedestrian and 24 passenger vehicle lanes, including one bus lane. In 2010, this POE handled about 13.3 million passenger vehicles, more than 70,000 buses, and nearly 6.4 million pedestrian northbound inspections.

These figures translate to more than 30 million individual crossings from Tijuana to San Diego. It is estimated that a similar number of crossings take place from San Diego to Tijuana, which means the San Ysidro-Puerta Mexico POE combined handled about 60 million individual crossings in 2010. That's about two percent more travelers than at Los Angeles International Airport, which accommodated about 59 million air passengers in 2010.

Most people who cross northbound on foot or on their bicycles use the Trolley or buses to complete their journey. The Trolley is the most used form of transportation, providing service to about 40 percent of the more than 30,000 daily pedestrian crossers. Consequently, the Blue Line Trolley at the San Ysidro Intermodal Transit Center maintains the Trolley system's highest volume of riders.

San Ysidro POE Reconfiguration and Expansion Project

The U.S. General Services Administration (GSA) is working to expand the San Ysidro border crossing facilities. When completed, the POE would increase its capacity from 24 to 63 northbound vehicle primary inspection booths, including double-stacked booths and one dedicated bus lane. There also would be an increase in the number of northbound pedestrian lanes, from 13 to 20. In addition, the realignment of I-5 would relocate the interstate to Virginia Avenue and Mexico's El Chaparral gate, and increase the number of southbound vehicle lanes from six to 12.

Otay Mesa – Mesa de Otay POE

The Otay Mesa POE in San Diego County is a federal multimodal inspection facility that provides service for pedestrians, passenger vehicles, buses, and commercial vehicles. The Otay Mesa POE currently has six pedestrian lanes, 13 passenger vehicle lanes, one bus lane, and ten commercial inspection booths. It also has 100 bays for handling truck inspections.

The Otay Mesa POE is one of the ten busiest land ports of entry in the country, and it is the busiest commercial border crossing on the California-Baja California border. In 2010, the Otay Mesa POE handled nearly 4.7 million passenger vehicles, more than 729,000 trucks, nearly 35,000 buses, and about 2.2 million pedestrian inspections in the northbound direction. The Otay Mesa commercial crossing continues to rank third, in terms of the dollar value of trade, along the U.S.-Mexico border (after Laredo-Nuevo Laredo and El Paso-Ciudad Juarez in Texas). In 2010, the Otay Mesa POE handled more than $26 billion dollars worth of freight. In 2007, the California Business, Transportation and Housing Agency and the California Environmental Protection Agency identified the San Diego/Border region as one of the state's four "port-to-border" goods movement corridors.

Otay Mesa POE Modernization

The existing infrastructure of the Otay Mesa POE is already taxed, and growth in crossborder trade is expected to continue over

In 2010, the San Ysidro Port of Entry handled about 13.3 million passenger vehicles, more than 70,000 buses, and nearly 6.4 million pedestrian northbound inspections.

time. Short-term circulation improvements to alleviate existing congestion for southbound commercial vehicles at the Otay Mesa POE have been implemented.

The proposed Otay Mesa East POE would be located approximately two miles east of the existing Otay Mesa POE, and it would be the fourth border crossing along the San Diego region's border with Baja California.

In April 2010, in recognition of the need to modernize this POE, the Department of Homeland Security (DHS) was awarded $21.3 million in ARRA funds for some initial modernization projects at the Otay Mesa POE. This project laid the groundwork for future improvements to both commercial and non-commercial portions of the existing port.

Tecate – Tecate POE

The Tecate Land POE is the smallest POE in the region. It is located in the eastern portion of the County of San Diego. It is a multimodal inspection facility that provides service for pedestrians, passenger vehicles, buses, commercial vehicles, and rail (the rail line crosses at Campo, located east of the POE). The Tecate POE currently has two passenger vehicle lanes, two pedestrian lanes, and two commercial vehicle lanes. In 2010, the Port handled more than 810,000 passenger vehicles, about 55,000 trucks, and nearly 508,000 pedestrian northbound inspections. In addition, the Tecate POE handled nearly $778 million in trade in 2010.

Two rail projects, in the conceptual planning stage, to modernize and double-track the Desert Line have been proposed to increase the market potential of this route for the international and interstate movement of goods. In Mexico, roadway improvements are planned to facilitate traffic to and from the POE.

Proposed Otay Mesa East POE

SANDAG and Caltrans, in cooperation with GSA and other project stakeholders, are proposing to construct a new POE and a new toll highway, SR 11, as well as a Commercial Vehicle Enforcement Facility (CVEF). The proposed Otay Mesa East POE would be located approximately two miles east of the existing Otay Mesa POE, and it would be the fourth border crossing along the San Diego region's border with Baja California.

The proposed SR 11 would extend generally east and south for about 2.1 miles, from the SR 905/SR 125 interchange and terminate at the proposed Otay Mesa East POE site at the U.S.-Mexico international border.

To advance this project, Caltrans, in cooperation with GSA and FHWA, initiated project-level environmental clearance studies for SR 11 and the Otay Mesa East POE. SANDAG and Caltrans also are working jointly to develop a financial strategy to build the SR 11/Otay Mesa East POE project and to conduct a traffic and revenue study for the project.

The project on the U.S. side of the border is expected to cost approximately $750 million, and it would be funded through tolls, fees, and other revenues such as California's Proposition 1B Trade Corridors Improvement Fund. Completion of SR 11 and the Otay Mesa East POE are anticipated in 2015.

Jacumba-Jacumé POE

In 2000, SANDAG conducted a feasibility study for a new border crossing that would link Jacumba in San Diego County and Jacumé in the Municipality of Tecate, Mexico. This study recommended that California and Baja California government agencies continue planning and coordination efforts to identify and reserve right of way for inspection facilities and connecting roadways to allow for the development of a future POE. The Secretariat of Infrastructure and Urban Development (SIDUE), Baja California's state planning agency, also has considered this location for a future port of entry in its long-range planning work to improve access for passenger vehicles and trucks that travel between Baja California and locations east of San Diego.

Binational Intermodal Issues

Key intermodal components of the binational transportation system include land POEs and the connecting roadways, rail crossings, a light rail transit connection at San Ysidro, and a planned BRT system at Otay Mesa. The 2050 RTP reflects rail capacity improvements in the San Ysidro freight yard and upgraded truck access to accommodate future rail growth and intermodal truck transfer operations.

Full implementation of the trucking provisions of the North America Free Trade Agreement (NAFTA), which would allow trucks from the United States and Mexico to move freely in each country, is still pending. Nevertheless, binational commercial vehicle traffic already uses the San Diego regional highway system. In 2010, more than 784,000 trucks crossed northbound at the San Diego region-Baja California border. According to the San Diego and Imperial Valley Freight Gateway Study, about 77 percent of these truck trips have a final destination in other California counties. Eight percent are destined outside of the state. The remaining trucks travel within the San Diego region.

San Ysidro Intermodal Transit Center

The San Ysidro Intermodal Transit Center, which is located east of I-5, has improved pedestrian safety and access to various transit services, local businesses, and to the international border. On the west side of I-5, a new intermodal center also has been built. The Friendship Plaza project accommodates transit services, a walking path, and a bicycle lane for people crossing into Mexico, as well as a “kiss and drop” area.

The 2050 RTP includes funding toward transportation improvements of the San Ysidro Intermodal Transportation Center (ITC), which would help improve access for transit users and pedestrians at the San Ysidro POE. The San Ysidro ITC is one of several critical infrastructure projects contemplated at the border to facilitate transportation choices for users entering or leaving the U.S. through this POE.

South Bay Bus Rapid Transit

The planned South Bay BRT project is a 21-mile transit service that will be rapid, reliable, and frequent. It will serve passengers traveling between the Otay Mesa POE and downtown San Diego via eastern Chula Vista. The service is scheduled to begin in 2014.

Major Highway Projects

SR 905 is one of the major highway projects addressing binational transportation needs included in the 2050 RTP. It will connect I-5 and I-805 to the Otay Mesa POE and with the San Diego regional and interregional highway network. The future SR 11 toll road will link to the proposed Otay Mesa East border crossing. Other investments included in the 2050 RTP on I-5, I-8, I-15, and I-805 also will serve these key international trade corridors. The South Bay Expressway (SR 125 tollway), which opened to traffic in 2007, connects the Otay Mesa POE with the San Diego regional and interregional highway network.

Border Airport Services

There are two public airports in the immediate border region. Tijuana International Airport, located in Mesa de Otay, Tijuana, is a passenger and cargo airport with service to major cities in Mexico. It has a single runway of 9,800 feet, with options to extend it up to 15,000 feet and to build a second runway. Brown Field, owned and operated by the City of San Diego, is located in Otay Mesa just north of the border. It is primarily a general aviation field, with one runway of 8,000 feet and a second runway of 3,000 feet.

The 2050 RTP includes funding toward transportation improvements of the San Ysidro ITC, which would help improve access for transit users and pedestrians at the San Ysidro Port of Entry.

The California-Baja California Border Master Plan is a binational, comprehensive approach to coordinate the planning and delivery of projects at land ports of entry.

In September 2008, in an effort to advance the terminal construction plans, the Otay-Tijuana Venture LLC purchased 52 acres of undeveloped industrial land in Otay Mesa to construct the San Diego-Tijuana CBF. The facility will include an above-grade pedestrian bridge linking border facilities in the United States with a commercial passenger airport terminal at Tijuana International Airport. Approval of the Presidential Permit from the U.S. Department of State was granted in August 2010.

Additional approvals from the City of San Diego still need to be secured. The project developer (Otay-Tijuana Venture, LLC) anticipates that the crossborder airport terminal could begin operating in late 2012 or early 2013.

California – Baja California Border Master Plan

Completed in 2008, the California-Baja California Border Master Plan is a binational, comprehensive approach to coordinate the planning and delivery of projects at land POEs, as well as transportation infrastructure serving those POEs in the California-Baja California region. The Border Master Plan was prepared for the U.S./Mexico Joint Working Committee (JWC), and led by Caltrans and the Secretariat of Infrastructure and Urban Development of Baja California.

The California-Baja California Border Master Plan developed a methodology and criteria to evaluate and rank POE projects, as well as roadway, interchange, and rail projects serving the POEs. This Plan created a list of prioritized projects that can serve as a guide to identify important projects within the California-Baja California border region.

POEs were ranked in the following order: Otay Mesa East-Mesa de Otay II (new proposed POE); San Ysidro-Puerta México/Virginia Avenue-El Chaparral POE; Calexico-Mexicali POE; Otay Mesa-Mesa de Otay POE; Tecate-Tecate POE; Calexico East-Mexicali II POE; and Andrade-Los Algodones.

The following actions support the Plan's Systems Development Chapter recommendations:

Systems Development	
Actions	**Responsible Parties**
Priority Corridors	
1. Maintain project evaluation criteria for prioritizing highway, regional transit, goods movement, rail grade separations, and direct freeway and HOV connector projects. Update these criteria to better reflect the goals of the RTP, as needed.	SANDAG
2. Allocate regional funds to transportation projects, programs, and services based on established criteria that give priority to implementing smart growth, the *TransNet* Early Action Program, and performance monitoring efforts.	SANDAG
Transit	
3. Upgrade major existing transit and roadway infrastructure to support transit operations and transit use. This includes:	SANDAG, MTS, NCTD, Caltrans, and local jurisdictions
▪ transit priority measures	
▪ technology enhancements (e.g., improved passenger information, new vehicle	
▪ Safe Routes to Transit including bicycle and pedestrian access improvements	
▪ station upgrades and improvements and rail grade separation projects	
4. Plan, design, and build future transit infrastructure and services identified in the 2050 RTP.	
a) Develop/implement Five- and Ten-Year Transit Project Phasing Plans to facilitate progress toward designing and building the transit projects included in the 2010-2020 phasing years of the 2050 RTP. These include:	
▪ Commuter Rail	MTS, NCTD, SANDAG, and LOSSAN
▪ Light Rail Transit	MTS, NCTD, Caltrans, and SANDAG
▪ Bus Rapid Transit	MTS, NCTD, Caltrans, and SANDAG
▪ Rapid Bus	MTS, NCTD, and SANDAG
▪ Streetcar/Shuttle-Circulator	MTS, NCTD, local jurisdictions, and SANDAG
▪ Local Bus service	MTS, NCTD, and SANDAG
b) Incorporate transit services identified in the 2050 RTP into local general plans, community plans, and specific project development plans, and reserve appropriate right of way.	Local jurisdictions
c) Maximize opportunities for supporting transit in redevelopment areas.	Local jurisdictions and SANDAG

Systems Development (Continued)	
Actions	**Responsible Parties**
Transit (Continued)	
5. Prioritize and implement the Safe Routes to Transit program, including bicycle and pedestrian connections to facilitate first- and last-mile access to high-frequency transit service.	Local jurisdictions and SANDAG
6. Explore policy options for the pricing of regional parking that support public transit and provide opportunities for reinvesting in local neighborhoods in the next update of the Regional Comprehensive Plan.	Local jurisdictions, MTS, NCTD, and SANDAG
7. Aggressively pursue federal, state, and local funding for public transit, and pursue public-private partnerships to maximize the region's opportunities to compete successfully for state and federal funding grants.	MTS, NCTD, and SANDAG
8. Implement recommendations of the Coordinated Public Transit–Human Services Transportation Plan to support specialized transportation services for seniors and individuals with disabilities.	SANDAG, FACT, and social service agencies
9. Annually update the Coordinated Public Transit–Human Services Transportation Plan, which serves as the region's five-year transit plan, and implement service productivity, reliability, and efficiency improvements.	SANDAG
Rail	
10. Complete an evaluation of parking capacity and future demand at coastal rail stations, including a prioritization of infrastructure. Evaluate opportunities for joint financing.	SANDAG, NCTD, LOSSAN, and coastal jurisdictions
11. Based on the Program Environmental Impact Report/Environmental Impact Statement for the LOSSAN corridor, proceed with project-level environmental studies, design and implementation of double tracking, and other rail improvement projects in the coastal rail corridor. Tunnel studies will include appropriate environmental and alternative analyses.	SANDAG, NCTD, MTS, and LOSSAN
12. Support efforts to secure federal and state funding to improve and expand the LOSSAN intercity and commuter passenger rail services.	CHSRA, Caltrans, SANDAG, NCTD, MTS, Amtrak, and LOSSAN member agencies
13. Support the implementation of the LOSSAN Corridorwide Strategic Implementation Plan recommendations for service integration.	SANDAG, NCTD, MTS, and LOSSAN member agencies
14. Coordinate with efforts of the CHSRA for high-speed passenger rail service on the coastal rail and inland I-15 corridors.	SANDAG, Caltrans, NCTD, and MTS
15. Continue engineering and environmental studies for the Los Angeles to San Diego via Inland Empire HST corridor, including coordination with the Southern California Inland Corridor Group.	SANDAG, NCTD, MTS, Caltrans, and SOCAL ICG member agencies
16. Complete planning for the high-speed rail commuter overlay service between Southwest Riverside county and downtown San Diego in order to evaluate inclusion into future RTPs.	SANDAG, Caltrans, CHSRA, NCTD, and MTS

Systems Development (Continued)	
Actions	**Responsible Parties**
Highways and Arterials	
17. Continue to coordinate coastal rail efforts with the LOSSAN member agencies and explore new initiatives, such as a corridor-wide Rail2Rail Program, joint ticketing, and joint customer information.	SANDAG, NCTD, MTS, and LOSSAN member agencies
18. Incorporate the planned highway network, identified in the RTP, into local general plans, community plans, and specific project development plans. Reserve appropriate right of way through the subdivision review process and other means.	Local jurisdictions
19. Develop Project Study Reports (PSRs) in accordance with the priorities identified in the RTP.	Caltrans
20. Provide operational and other improvements, such as auxiliary and passing lanes where appropriate, to improve safety and to maximize the efficiency of highways and arterials. Pursue additional state and federal funding to match the regional program and develop a prioritized list of potential projects to consider in future funding cycles.	SANDAG, Caltrans, and local jurisdictions
21. Implement signal timing programs along the designated Regional Arterial System, and improve traffic signal operations by interconnecting signalized intersections under centralized control and by coordinating with ramp signal systems at freeway interchanges.	SANDAG and local jurisdictions
22. Consider congestion pricing as an alternative whenever major new highway capacity is added.	SANDAG and Caltrans
Goods Movement	
23. Support the development of policies, programs, and funding for moving goods in the state and nation, as well as for infrastructure in the region that supports moving goods.	SANDAG, Caltrans, freight operators, and local jurisdictions
24. Develop strategic alliances for public/private funding partnerships for services related to moving goods in the San Diego region.	SANDAG, Caltrans, Port of San Diego, freight operators, industry, and local jurisdictions
25. Allocate regional funds to projects, programs, and services related to moving goods, based on established criteria and priorities from the San Diego Regional Goods Movement Strategy (GMS).	SANDAG, Caltrans, freight operators, and local jurisdictions
26. Support efforts to secure state and federal rail funding to improve and expand rail services and operations.	Class I railroads, Caltrans, SANDAG, NCTD, MTS, Amtrak, SDIV Short Line, and southern California rail agencies
27. Analyze the economic opportunities available with an expanded role in trade and the movement of goods to determine what role the region should have.	SANDAG, Caltrans, freight operators, and local jurisdictions
28. Update the SANDAG Regional Comprehensive Plan (RCP) to include policies, programs, and guidelines to integrate goods movement land uses and facilities, with minimal impact to adjacent communities.	SANDAG, Caltrans, freight operators, and local jurisdictions

Systems Development (Continued)	
Actions	**Responsible Parties**
Goods Movement (Continued)	
29. Support and provide assistance for the update of local general plans to identify the long-term needs of moving goods, industrial warehousing infrastructure, and connectors to the regional freight network. Coordinate this effort with economic studies and RCP updates.	SANDAG, Caltrans, freight operators, and local jurisdictions
30. Support the development of freight operators' (e.g., rail companies, Port of San Diego) master business and long-term development plans so they include agency trade market analyses, as well as input from economic studies and updates of the RCP and local general plans.	SANDAG, Caltrans, freight operators, and local jurisdictions
31. Continue to evaluate whether to establish logistics centers that would integrate intermodal freight and establish specific staging areas and connectors to the regional freight network.	Caltrans, SANDAG, Port of San Diego, MTS, rail carriers, and shippers
32. Protect right of way when possible for GMS projects as opportunities occur.	SANDAG, local jurisdictions, MTS, rail operations, NCTD, and Caltrans
33. Update and refine the Freight Gateway Study to assess the volume, value, and freight routing data necessary to support decisions concerning the GMS, and implement data collection.	SANDAG, Caltrans, and freight stakeholders
34. Proceed with project-level environmental studies, and the design and implementation of GMS projects as funds become available.	SANDAG, Port of San Diego, Caltrans, MTS, and NCTD
35. Evaluate rail capacity needs and Managed Lanes facilities for moving freight during off-peak periods.	NCTD, MTS, rail operators, Caltrans, local jurisdictions, and SANDAG
36. Develop a strategic plan to determine if innovative technologies can be deployed to improve the efficiency of the region's intermodal freight system.	SANDAG, Caltrans, and freight operators
37. Work with air quality agencies to assess the health impacts of cumulative air emissions from truck, train, and ship engine exhaust on communities in the San Diego region. Report on Trade Corridors Improvement Fund (TCIF) freight projects air quality impacts under Assembly Bill 268 through the California Transportation Commission (CTC).	SANDAG, Caltrans, local jurisdictions, Port of San Diego, air quality agencies, environmental and community stakeholders
38. Work with stakeholder groups to assess the health and safety impacts of truck routes on local streets. Where possible, develop mitigation strategies or alternative routes where there is a significant impact on the local community.	SANDAG, Caltrans, local jurisdictions, Port of San Diego, resource agencies, environmental and community stakeholders
39. Include community representatives from impacted areas such as Barrio Logan on the Freight Stakeholders Group for future discussions on the movement of goods.	SANDAG

Systems Development (Continued)	
Actions	**Responsible Parties**
Aviation and Ground Access	
40. Continue to work with truckers, the Port of San Diego, and rail operators so that they can retrofit or replace diesel engines to reduce emissions.	SANDAG, San Diego County Air Pollution Control District, and California Air Resources Board
41. Continue to work with the California Air Resources Board (CARB) and freight operators to conduct information sessions for the trucking community regarding new air quality regulations for diesel engines.	SANDAG, Caltrans, and trucking industry
42. Continue regional collaboration on multimodal airport planning, including development of the Airport ITC and regular staff and policy-level coordination meetings.	SANDAG, SDCRAA, local jurisdictions
43. Encourage local jurisdictions and transit districts to incorporate airport ground access improvements in local plans.	SANDAG, NCTD, MTS, local jurisdictions.
44. Cooperate on the Airport Authority's Airport Land Use Compatibility Planning per Senate Bill 10. SANDAG will review proposed airport land use compatibility plans and updates to the plans submitted by the Airport Authority, and make a determination as to their compatibility with the airport multimodal accessibility plan.	SANDAG, SDCRAA
Active Transportation	
45. Develop an Active Transportation Early Action Program.	SANDAG
46. Implement a robust regional program to monitor active transportation.	SANDAG
47. Develop systems to forecast and model active transportation in order to better evaluate the benefits of the program.	SANDAG
48. Encourage local government bicycle projects that connect local facilities to regional bicycle corridors.	SANDAG and local jurisdictions
49. Promote consistent signage that directs bicyclists to destinations and increases the visibility of the regional bicycle network.	SANDAG and local jurisdictions
50. Take the lead to implement the regional bike plan in cooperation with local agencies.	SANDAG
51. Implement robust education and encouragement programs in order to encourage more people to walk and ride a bicycle.	SANDAG
52. Consistent with Assembly Bill 1358 - The Complete Streets Act, encourage the reallocation of roadway rights-of-way to accommodate bicycle and pedestrian facilities by providing on-going Complete Streets educational opportunities in conjunction with project funding and incentives.	SANDAG and local jurisdictions
53. Continue to mandate bicycle and pedestrian travel accommodations of all projects funded with *TransNet* revenue, in support of Board Policy No. 031, *TransNet* Ordinance and Expenditure Plan Rules, Rule #21: Accommodation of Bicyclists and Pedestrians.	SANDAG
54. Develop a regional Complete Streets policy.	SANDAG and local jurisdictions

Systems Development (Continued)	
Actions	**Responsible Parties**
Safe Routes to Schools	
55. Develop regional on demand bike lockers that are accessible using a fare payment card, which allows users to access a variety of transit modes administered by multiple agencies.	SANDAG
56. Continue to pursue opportunities to develop an implementation plan for the California Coastal Trail.	SANDAG and local jurisdictions
57. Facilitate the convening of a Regional Safe Routes to School Coalition that will serve as a forum to connect implementing agencies and share relevant information.	SANDAG, non-profit organizations, and local jurisdictions
58. Develop a Regional Safe Routes to School Strategic Plan to articulate the Regional Safe Routes to School Strategy as well as actions to implement the strategy.	SANDAG
59. As part of the Safe Routes to School Strategic Plan, develop cost estimates and a funding strategy to implement the plan.	SANDAG
60. Foster communication and cultivate partnerships by soliciting input on the Regional Safe Routes to School Strategy from SANDAG Policy Advisory Committees and working groups, nonprofit organizations, school districts, and other Safe Routes to School implementers, experts, and local agencies.	SANDAG
Borders	
61. Continue to implement interregional transportation strategies from the I-15 IRP and the San Diego-Imperial County I-8 Corridor Strategic Plan.	SANDAG, Western Riverside Council of Governments (WRCOG), Riverside County Transportation Commission (RCTC), Riverside Transit Agency (RTA), Imperial County Transportation Commission (ICTC), and Caltrans
62. Coordinate transportation projects at county lines with neighboring agencies.	SANDAG, WRCOG, RCTC, RTA, ICTC, Orange County Council of Governments (OCCOG), Orange County Transportation Authority (OCTA), Southern California Association of Governments (SCAG), and Caltrans
63. Support the use of technology at the international land ports of entry, as well as the expansion of SENTRI-like programs for travelers and cargo.	SANDAG, Caltrans, GSA, Customs and Border Protection (CBP), and Department of Homeland Security (DHS)

Systems Development (Continued)	
Actions	**Responsible Parties**
Borders (Continued)	
64. Promote the use of technologies and best practices to reduce vehicle emissions due to congestion and idling at the border.	GSA, DHS, CBP, Caltrans, SANDAG, California Air Resources Board, San Diego County Air Pollution Control District, U.S. EPA, and Mexico's counterpart agencies
65. Support the use of transit centers and transportation facilities by agencies and passengers from outside the county.	SANDAG, NCTD, MTS, Caltrans, WRCOG, RCTC, RTA, ICTC, OCCOG, OCTA, and Caltrans
66. Continue discussions among SANDAG, Caltrans, the County of San Diego, and tribal governments to assess rural/reservation transit and transportation needs, and develop strategies to meet these needs.	SANDAG, Caltrans, the County of San Diego, Reservation Transportation Authority, Bureau of Indian Affairs, County of San Diego, MTS, and NCTD
67. Secure funding for needed transportation infrastructure in the region's border areas, and coordinate the implementation of border-related capital and operating improvements with the General Services Administration (GSA) and other involved agencies.	GSA, DHS, CBP, SANDAG, Caltrans, City of San Diego, the County of San Diego, and Mexico's counterpart agencies
68. Work with Caltrans, DHS, CBP, and other involved agencies to monitor the impacts of northbound and southbound traffic delays at the international land ports of entry and explore opportunities to mitigate these delays.	GSA, DHS, CBP, SANDAG, Caltrans, and Mexico's counterpart agencies
69. Work with related agencies to develop strategies for adapting to climate change.	Caltrans, SANDAG, U.S. DOT, and U.S. EPA
70. Secure funding for needed transportation infrastructure in the region's border area (e.g., San Ysidro POE, SR 11, and the Otay Mesa East POE), and coordinate border-related capital and operating improvements with GSA.	Caltrans, SANDAG, City of San Diego, County of San Diego, GSA, and Mexico's counterpart agencies
71. Work with CBP, GSA, Caltrans, and Mexico to secure funds to study ways to reduce pedestrian wait times and better accommodate bicycle and pedestrian travel, including access improvements to transit stops and provision of walkways for people with disabilities.	GSA, DHS, CBP, Caltrans, SANDAG, and Mexico's counterpart agencies
72. Work with CBP and Caltrans to secure funds to develop performance indicators such as level of service for cross-border vehicle (private and commercial) and pedestrian wait times at the ports of entry.	GSA, DHS, CBP, Caltrans, SANDAG, and Mexico's counterpart agencies

Chapter 7

Systems Management: Making Better Use of What We Have

Chapter Contents

Transportation Systems Management

Reducing traffic congestion, travel times, and air pollution depend on effectively managing the region's transportation system. Known among regional planners as Transportation Systems Management, or TSM, the effort is a core component of the 2050 Regional Transportation Plan (RTP) and its Sustainable Communities Strategy (SCS). Its goal is to smooth the flow of traffic on streets and highways, eliminate bottlenecks, and enhance public transit. TSM investments, detailed in the 2050 RTP, enhance today's transportation network and ensure that future improvements realize their full potential.

TSM investments enhance today's transportation network and ensure that future improvements realize their full potential.

Management of our transportation system depends on implementing several techniques and incorporating advanced technologies, such as metering the flow of traffic onto freeways, coordinating traffic signals, tracking public transit vehicles, and keeping travelers informed – all of which helps keep traffic flowing. Transportation planners also are exploring new strategies that employ cutting-edge technology and innovative operating concepts that expand TSM capabilities.

Our region's transportation agencies are working together to implement two of these innovative concepts, known as Integrated Corridor Management (ICM) and the Connected Vehicle Initiative, formally known as IntelliDrive^{SM}. Both can have a significant impact on improving traffic flows. These and other initiatives will help transportation operators manage the transportation system in real time, can improve safety, are highly cost-effective, and offer the public high value for their tax dollars. By managing our transportation system in real time, operators do not have to rely on pre-established plans that estimate the flow of traffic. Instead, they

can rapidly respond to conditions on the ground at any given time.

The returns or benefits (i.e., in savings from shorter travel times, less fuel consumed, and lower emissions) and improved safety from TSM investments outweigh the costs associated with implementing them. Various studies by the U.S. Department of Transportation (U.S. DOT) and recognized academic and transportation institutions cite TSM benefit-cost ratios ranging from 5:1 to as high as 40:1. Adopting plans to explore and implement TSM solutions will improve the productivity of the region's roadways, highways and transit systems in a cost effective manner.

Intelligent Transportation Systems Strategic Plan

SANDAG has been working on updating the Regional Intelligent Transportation Systems (ITS) Strategic Plan with a ten-year forward look at developing and implementing new technology strategies for TSM. Whereas the 2050 RTP has a 40-year horizon, the ITS Strategic Plan looks at a shorter horizon and focuses on system improvements in the coming decade.

The ITS Strategic Plan was developed through the active participation of the regional stakeholders, including the 18 cities, the County of San Diego, Caltrans District 11, the Metropolitan Transit System, and the North County Transit District. The Plan documents the region's priorities for TSM investments and measures for evaluating the value of ITS projects.

The TSM Chapter of the 2050 RTP was developed with outputs from the ITS Strategic Plan, which are reflected in the following discussion of TSM investments areas. The ITS Strategic Plan describes the work plan for the first ten years of the RTP's 40-year horizon and is included as Technical Appendix 21 of the 2050 RTP.

TSM Investment Areas

A diverse range of investments is needed to best manage the region's transportation system. The objectives of the overall investment strategy are to:

- Emphasize management approaches based on the performance of multiple modes of transportation
- Continue providing travelers information as a means to manage demand and provide choices for travel on the transportation system
- Leverage existing management tools and electronic payment systems for multiple modes of transportation
- Actively explore, evaluate, and implement advanced technologies that can benefit the transportation system

These objectives have been applied across six program areas. Some investments, although identified for a particular mode of transportation, do not necessarily limit the benefits to that particular mode. Investments in pervasive technologies, such as real-time modeling, detection devices, and the Connected Vehicle Initiative, have universal benefits that support solutions across different modes and transportation networks.

Multimodal Integration and Performance-Based Management

As reflected in the TSM investment objectives, an important strategy to maximize the efficiency of the existing system is to cohesively manage all modes of transportation. Our region's ground transportation network is comprised of freeways, roads, and the public transit system. These elements can be identified separately, but they are interdependent and must be managed comprehensively to achieve regional mobility and reliability goals.

Improving mobility requires strategies that give the public reliable choices for travel across the transportation network. These strategies also help balance regional priorities for managing our transportation system and the everyday demands on it. This approach, known as Integrated Performance Management (IPM), relies on the incorporation of a number of ITS and operational initiatives. The application of IPM provides the foundation for managing the entire transportation system based on its overall performance.

Effective integrated performance management relies on the following:

- The application and deployment of performance monitoring tools
- The application of advanced technologies for detection and modeling
- Connections between the management systems for local roads, highways and public transit
- Common and unified transportation policies and procedures

The region is working to demonstrate the benefits of an IPM strategy through the ICM initiative, sponsored by the U.S. DOT. The ICM pilot program focuses on maximizing the management capabilities and efficiency within the I-15 corridor by:

- Managing the flow of traffic onto the interstate (also known as ramp metering)
- Coordinating traffic signals on local streets and freeway interchanges to reduce travel times
- Utilizing managed lanes and congestion pricing to match capacity with demand
- Providing real-time traveler information to promote choices
- Enhancing the Bus Rapid Transit (BRT) system to reduce transit trip times

The I-15 ICM project also includes defining and establishing the institutional commitments to ensure that the corridor is managed and operated based on the combined performance of local roads, I-15, and transit services.

The ICM project has the following objectives:

- Improved Situational Awareness: Operators will have a more comprehensive and accurate understanding of the underlying operational conditions of all transportation networks in the corridor.

- Enhanced Response and Control: Operating agencies within the corridor will work together to improve their management practices and coordinate decision-making, resulting in more effective responses to changing conditions.

- Better Informed Travelers: Travelers will have information they can act on for multiple choices of travel. This will empower them to take more control of their travel decisions, including when to begin a trip and what route to take.

- Improved Corridor Performance: Managing all modes of transportation will improve the overall performance of the corridor, particularly during peak travel times and also when corridor capacity is reduced (e.g., after a traffic accident or during construction).

- All these efforts help reduce congestion and travel times during daily commutes, special events, and emergencies. Achieving these results in other corridors will depend on continued investments in TSM tools. Monitoring the network and performing real-time analysis, with the capability of coordinating traffic across arterials, freeways, and public transit, will help maximize the efficiency of our region's existing transportation system

Performance Monitoring

The collection and analysis of transportation data continues to play a critical role in assessing the performance of the transportation system, changing management tactics, and estimating the benefits of future investments. Limited funding and obstacles to obtaining right of way make building new transportation infrastructure difficult. Greater focus must be placed on using tools that manage traffic flows in real time, in order to better manage traffic conditions.

Mitigating traffic congestion requires sophisticated transportation management software that collects, analyzes, and manages large amounts of real-time information. Real-time data has been used to manage ramp meters, as well as for timing traffic signals on local roadways. These systems dynamically adjust to improve traffic flow based on current conditions. Wider use of these tactics will make the region's entire transportation system more efficient.

SANDAG has identified the following principles of an effective performance monitoring program.

- Data collection, analysis, and management should be automated, uniform year-to-year, and regularly reported to decision-makers and the public.

- The transportation system is multi-faceted and measuring its performance should consider its full complexity, including freeway on-ramps, freeway connectors, principal arterials, public transit, and other features.

- The availability and accuracy of data are critical to operational decisions.

- Periodic public surveys should be conducted to augment automated data.

Several efforts are underway to monitor the performance of our region's transportation system. They include:

- Major Streets and Roads: SANDAG coordinates the annual collection of average daily traffic volumes from Caltrans and from local jurisdictions.

- Freeway System: For most freeways, traffic volumes and speed data are automatically collected by Caltrans through loop detectors embedded under the pavement, as well as through other non-intrusive technologies. About 65 percent of the urban freeway system is automatically monitored by detectors located near freeway on ramps. SANDAG is working to increase this coverage and address data collection needs for connections between freeways and from on/off ramps.

- Transit Service: The Regional Transit Management System (RTMS) is a sophisticated management tool that monitors the performance, in real time, of more than 50 percent of the region's fixed route bus services. The transit operators also use the region's automated fare collection system, known as Compass, to collect data on ridership and payment activities. As these systems are expanded, the region's public transit operators will be able to use them to better manage services and deliver real-time information to customers (e.g., bus speed, mileage, and hours of service).

- Multimodal Performance Measurement System (PeMS): In cooperation with Caltrans, SANDAG is working to enhance the statewide PeMS tool to include real-time data and reporting for arterials and public transit. Historically, PeMS has provided freeway data and performance measures, such as travel times, traffic volumes, and speeds. SANDAG is developing new modules that will provide similar performance statistics for arterials and public transit by incorporating detection data from local streets and real-time performance and passenger count data from public transit vehicles. The completion of the arterial and transit modules will serve as the platform for making PeMS a system for reporting door-to-door travel times, and providing an arterial and corridor-wide performance monitoring framework.

- Transportation Performance Monitoring Reports: SANDAG is involved in several performance monitoring efforts to document, report, and communicate the effectiveness of transportation projects. These efforts include the State of the Commute Report, the *TransNet* Independent Taxpayer Oversight Quarterly Corridor Performance Report, and the RCP Performance Monitoring Report.

Real-Time Modeling/Simulation

Managing our transportation system in real time requires the ability to rapidly analyze data on its current performance and to evaluate solutions to minimize traffic congestion. The ICM project in the San Diego region has this ability. It relies on advancements in processing power, sophisticated algorithms, and the development of software applications that provide real-time multimodal modeling and simulation capabilities. This state-of-the-art solution extrapolates historical data and combines it with real-time data to develop dynamic Decision Support Systems (DSS).

These DSS systems are used to forecast traffic patterns, and then analyze and recommend operational changes to minimize or reduce traffic congestion. This technology allows transportation system managers to modify traffic signal timing and ramp meters; provide travelers with route information and options during recurring congestion or incidents; and analyze and develop new TSM strategies and action plans.

Initial transportation models show that performance-based management approaches, such as ICM, which integrate freeways, arterials, and public transit, can produce benefit-cost ratios ranging from 7:1 to 25:1. The ICM project for the I-15 corridor is expected to significantly improve peak period road conditions, according to modeling. Projected improvements include a savings of 350,000 person-hours of travel time, an 11 percent increase in reliability for expected travel times along the corridor, and annual reductions of more than 3,000 tons of emissions.

Traveler Information

Keeping travelers informed about road conditions is an important part of reducing traffic congestion and improving safety. Informed travelers can help make the transportation system work better by making more intelligent decisions about when and how to travel. This is especially true during accidents and other incidents. Continued investments in improving traveler information, by making it more accessible through new devices and increasing usability through richer trip planning, will help our region meet the mobility and reliability goals of the 2050 RTP.

From the start of their day, commuters begin deciding how they will travel. They check the weather, listen to news reports, and think about where they need to be and when they need to be there. All of this plays into their final decisions about whether to drive, carpool, or take public transit; what routes to take, and when to leave. Our region's efforts to keep commuters informed empowers them to make intelligent decisions about when and how to travel.

The San Diego Regional 511 program and other traveler information efforts offer commuters real-time information on highway speeds, incidents, travel times, and transit arrival times. San Diego 511 is a central source of regional travel information for a variety of programs, including Compass Card, FasTrak®, iCommute, Roadside Assistance, and public transit. San Diego 511 disseminates information by phone, the internet and on TV. As improvements are made to our region's transportation network through investments in public transit and the expansion of carpool and high occupancy toll lanes, keeping travelers informed of their options will help them plan their trips most efficiently. Travelers, for example, may get information on options to drive to a public transit or rideshare stop during their commute. Information about comparative travel times and the environmental consequences of their travel choices will be available by telephone, the Web, and newer devices such as in-vehicle computers, after-market navigation systems, and smart phone apps.

Transportation System Management initiatives such as ICM and Connected Vehicle will improve the quality, usefulness, and delivery of information to travelers. These initiatives eventually will allow travelers to manage their trips better by, among other things, adjusting their travel speed to avoid red lights and prevent traffic jams. Keeping travelers informed will require more outreach and marketing campaigns in which private industry can play a role. This will help to keep travelers up-to-date as their demand grows for information and new business models are needed to support costs.

Arterial Management

Managing arterial roadways (major streets) can reduce delays and result in quicker trips and lower emissions. Investments in this area have been limited in the past because initiatives to measure and manage the performance of arterial roadways were not cost-effective. However, recent advances in wireless technology are making new investments in collecting traffic data along arterial roadways more economical.

Improving the flow of traffic on arterial roadways is among the most cost-effective strategies for reducing stop-and-go traffic, cutting overall travel times, and lowering fuel consumption and pollution.

Expanding these technologies for the Regional Arterial Network System will help improve the region's traffic signal systems. Improvements to arterial detection and signal interconnect will provide the ability to create a traffic signal system that is dynamic and coordinated throughout the region. This enhanced system will help improve the flow of traffic to and from freeways, and the overall effort will help support the mobility, reliability, and system preservation goals of the 2050 RTP.

Improving the flow of traffic on arterial roadways is among the most cost-effective TSM strategies for reducing stop-and-go traffic, cutting overall travel times, and lowering fuel consumption and pollution. The benefit-cost ratios of adopting strategies to better manage arterial roadways have ranged from 17:1 to 40:1, according to national studies. In the San Diego region, initiatives to synchronize traffic lights near I-805 resulted in a benefit-cost ratio of 11:1. They led to about 154,000 fewer hours of delay annually (a 14 percent decrease), about 5.4 million fewer stops annually (a 6 percent decrease), and 149,000 fewer gallons of fuel consumed per year (a 6 percent decrease). Similar results have been demonstrated across the country for other projects, including the optimization of 700 intersections in the Tysons Corner area of Northern Virginia, where the number of hours of delay was reduced by about 22 percent and stops were reduced by about 6 percent.

Improved data collection, analysis, and management for arterials promote a more comprehensive understanding of how traffic can be better managed across arterials and in conjunction with freeways. Past efforts to re-time traffic signals depended heavily on manual data collection, limiting the ability to easily update timing plans for changes in traffic. The results were timing plans that were soon out of date. Technology used today allows operators to re-time traffic signals more frequently, and even adjust them to accommodate real-time traffic conditions. This newer technology also can help operators coordinate the timing of traffic signals on arterials with the flow of traffic to and from freeways.

The Connected Vehicle platform, discussed later in the Emerging Technologies section of this chapter, is another advanced technology that will further improve the management of arterial roadways. Connected Vehicle promotes strategies such as "Eco Driving," which calculates the optimum speed a driver should use in order to avoid stopping at red lights. This could result in reduced traffic congestion, and lower emissions for arterial roadways.

Investing in arterial TSM solutions, which includes the deployment of Connected Vehicle devices along 2,000 miles of arterial roadways, will improve the ability of operators to monitor performance and better manage the flow of traffic along major streets as well as to and from freeways.

Freeway Management

The freeway system is the backbone of our regional transportation network, and continued TSM investments will help to minimize congestion and reduce bottlenecks. Our region has been progressive in deploying and using various tools to better manage freeway traffic flows. They include traffic detection technologies, closed-circuit television (CCTV) cameras, ramp meters, electronic message signs, and the Advanced Transportation Management System (ATMS), which provides central monitoring and sign control for managing incidents. These tools need to be built upon and improved to better manage our transportation system.

Traffic operators at Caltrans District 11 monitor traffic conditions, post information on highway signs, and coordinate with first responders – a commonly-practiced strategy to effectively manage the freeway system. Other regions that employ an ATMS show decreases in crashes, delays, and response times during incidents. In Espola, New Mexico, a traffic management system deployed for NM-68 resulted in a 27.5 percent decrease in the number of crashes, as well as an 87.5 percent reduction in vehicle delays. In Georgia, the NaviGAtor incident management program reduced the duration of an average incident from 67 minutes to 21 minutes. The result was 7.25 million fewer vehicle hours of delay over one year.

About 65 percent of the urban freeway system in the San Diego region is automatically monitored by detectors located near freeway on-ramps. Increased geographical coverage and additional spot detection technology at freeway connectors, off-ramps, and other locations are needed to improve the ability of operators to monitor freeway traffic and better manage the system. Ramp metering is a highly effective tool that reduces congestion. Our region has a significant number of metered ramps, but the technology is coordinated only with the freeway segment closest to the ramp. Optimizing the flow of freeway traffic requires a broader view that considers upstream and downstream flows, as well as the traffic exiting and entering the freeway from

Electronic message signs provide real-time information along critical sections of the freeway network so travelers can be advised of current conditions.

arterials. Future ATMS investments will seek to complete a Universal Ramp Metering System that provides operators with the ability to dynamically adjust ramp metering rates to match specific traffic conditions. These ATMS enhancements will help operators better manage connections between arterial roadways and freeways, making both more efficient.

Our region has successfully implemented sophisticated management systems for bus and Trolley operations.

Advising drivers of downstream traffic conditions is a valuable TSM tactic that traditionally is provided through electronic message signs. These signs provide real-time information along critical sections of the freeway network, so that travelers can be advised of current conditions, and make decisions to modify their route or mode of travel. Documented benefits include decreases in crashes where the signs were used to alert drivers of work zones, and decreases in secondary incidents where drivers are advised of an accident or congestion ahead. Some driver frustration also was reduced when travel time or incident information was displayed along a particular route.

Roadway signs and newer technologies, such as smart phones and the Connected Vehicle can improve the timely delivery of this information and incorporate information about the time that drivers can save by taking public transit or carpooling.

Similar to its application on arterials, Connected Vehicle technology can help make traffic flow smoother along freeways by increasing safety and providing drivers with information such as a recommended speed. The Connected Vehicle initiative includes existing underlying technologies to support driving in narrow lanes, safely reduce the distance between vehicles, deliver relevant information to drivers, allow for paying roadway or parking tolls without a transponder, and provides enhanced data collection. All of these aspects will play a significant role in reducing congestion and lowering emissions.

Another innovative TSM concept that will aid the region's mobility and environmental goals is called Active Transportation and Demand Management (ATDM). This concept applies additional management controls to freeway traffic flows by using electronic signs to introduce variable speed limits and dynamic lane usage. These tactics can smooth the flow of traffic and reduce bottlenecks during peak periods or incidents and provide additional capacity through the use of part-time shoulders.

The Freeway Service Patrol (FSP), which provides roadside assistance to stranded motorists during periods of peak traffic congestion, is a more traditional TSM program that mitigates traffic impacts. FSP focuses on quickly removing disabled vehicles from the freeway when traffic can be at its worst. Reducing the distractions and slowdowns caused by disabled vehicles provides a significant and cost-effective benefit for mobility and safety.

Transit Management – Bus and Rail

Transit management systems help ensure that bus and rail lines are safe and performing optimally. The public transit industry has long used performance-based management techniques. They rely on a variety of rudimentary and sophisticated systems to monitor rubber tire and steel wheel fleet vehicles. These systems also play a critical role in monitoring the safety of public transit drivers and customers, and the system as a whole, through tracking solutions and dedicated voice and data communications.

Our region continues to explore new ways to improve the operation, convenience, and safety of the public transit system. The future application of technologies, such as wireless detection systems, that specifically can identify buses and rail vehicles, real-time simulation software that can predict travel times and passenger loads, and broad solutions such as Connected Vehicle all should be examined for potential benefits.

Our region has successfully implemented sophisticated management systems for bus and Trolley operations, which allow operators to monitor performance and safety and provide customers with real-time information. These systems are essential to the operations of public transit, and future investments will pay for upgrades, life-cycle replacements, and the introduction of new technology. Past investments also include completing the Trolley fiber communications and security network, which supports the management system; CCTV; customer information; and fare collection systems.

Our region’s management systems for bus and rail operations allow public transit managers to develop coordinated service schedules; monitor the adherence to schedules; manage duty rosters; and, in the case of light rail, monitor and control critical wayside elements as well as life and safety systems. Investing in the management of public transit covers four key systems. These include the Regional Scheduling System (RSS), which provides tools for maximizing resources for both bus and rail; the Regional Transit Management System (RTMS), which provides automated dispatching and vehicle tracking for buses; Positive Train Control (PTC), which implements automated safety controls for heavy rail services; and the Centralized Train Control System (CTC), which provides a critical safety system for light rail operations. Each of these transit investment areas are discussed further in the following sections.

Regional Scheduling System (RSS)

The RSS helps public transit operators maximize human resources and minimize the need for additional vehicles by efficiently combining bus routes and rail lines with available resources. The RSS also is used to schedule the correct number of personnel, the frequency of buses, and the configuration of trains to meet expected demands. The system also allows transit operators to perform “what-if” scenarios, to compare proposed system changes and then measure the expected outcome of each scenario.

Regional Transit Management System (RTMS)

The RTMS provides public transit agencies with the ability to track buses via the Global Positioning System (GPS). This enables transit managers to measure on-time performance along routes and for individual buses, and therefore better plan bus service, particularly during periods of peak demand. The RTMS has been integrated with the San Diego 511

The Regional Transit Management System helps improve the reliability of bus schedules by automatically tracking vehicles and directing service changes in real time.

regional traveler information service enabling patrons to request real-time information on the departure time of buses at stops along a particular transit route. The RTMS helps improve the reliability of bus schedules by automatically tracking vehicles and directing service changes in real time.

The RTMS also enables transit signal priority, allowing buses to automatically communicate with traffic signals and request priority treatment in the form of shortened red or extended green signals. This priority treatment provides significant benefit to transit operations by reducing transit trip times and improving schedule reliability.

The region is working to expand the RTMS to include contract and suburban routes in the eastern and southern parts of the county. The inclusion of all fixed route buses in the region will enhance performance monitoring and broaden the availability of real-time traveler information to all transit patrons through 511, and increased deployment of electronic message signs at bus stops.

Positive Train Control (PTC)

In October 2008, the President signed the Rail Safety Improvement Act of 2008 into law. The Act clarifies that the mission of the Federal Railroad Administration is to ensure that rail safety is the highest priority. This new law requires all Class I railroads and intercity passenger and commuter railroads to implement a positive train control (PTC) system by December 31, 2015.

A PTC system, as defined in the new law, must prevent train-to-train collisions due to:

- over-speed derailments
- unauthorized incursions by trains into established work zones
- the movement of a train caused by a switch left in the wrong position

The PTC system meets these requirements by using digital communications and GPS technology to monitor train locations and speeds.

The system integrates with the railroad dispatching system, communicating with PTC equipment on the right of way and onboard each train. A train's speed and performance is therefore monitored in real-time. If an engineer fails to operate the train within defined safety parameters in connection with a wayside signal, a speed restriction, maintenance work zones, or a switch position, the PTC system proactively brings the train to a stop before an unsafe condition materializes.

Centralized Train Control (CTC)

The Trolley CTC system delivers many of the same tools for the rail system that the RTMS delivers for bus operations. The tools include on-time performance and vehicle tracking throughout the system. The CTC system monitors train movement, block signaling, and system functionality around the clock. The system monitors and maintains remote control of traction power substations, which electrify the overhead catenary system. The CTC system also integrates tools for CCTV, public announcements, traveler information systems, and critical life-safety monitoring and control systems installed in tunnels and along other segments of the rail system.

Electronic Payment Services

Electronic Payment Services and Systems is a growing investment area in TSM, due to the development of advanced applications such as transit smartcard systems and open road tolling. Both applications make collecting payments for services quicker and more efficient. Electronic Payment Systems also create opportunities for innovative pricing models. When combined with applications for parking, they can be used to create a Universal Transportation Account (UTA). This type of unified account can help motivate travelers to use the transportation system more efficiently. For example, discounts for parking can be offered when the traveler uses public transit.

The SANDAG Electronic Payment Services area includes three programs: Compass Card for paying transit fares; FasTrak® for tolling; and "Smart Parking," the region's research effort into future applications for parking management and payment. The sections below detail each of these programs and highlight the SANDAG vision for the future in Electronic Payment.

Compass Card

Our region's automated fare collection system, dubbed "Compass Card," was developed and deployed in cooperation with the two regional transit agencies: the North County Transit District (NCTD) and the Metropolitan Transit System (MTS). The Compass Card is a contactless smart card configured to hold transit products such as monthly passes and stored value (i.e., "electronic cash") that can be used to pay fares on a bus or at rail ticket vending machines.

The Compass Card system is used on all urban buses and rail lines in the county. It is fast and easy to use. With a quick "Tap and Ride®," transit users have access to all types of public transportation. It is convenient to use and re-load, with multiple options for purchasing products at agency-operated transit stores, third-party outlets, by phone, and on a secure Web site. Customers also can protect the balances on their cards by obtaining optional "balance protection." The service allows them to receive a replacement card, with the value

or pass restored, if their original card is lost or stolen.

The Compass Card system also provides transit operators with better information about ridership and for analyzing fares. For example, knowing how many transfers a rider makes on his or her way to a destination is crucial to delivering services where they are needed most. The Compass Card system gives operators that capability. The Compass Card system also allows transit agencies to quickly adapt fare structures to meet market conditions. It delivers additional flexibility and agility so agencies can develop and deliver new transit products. The 30-day rolling pass, for example, gives users the flexibility to purchase a pass on their schedule, and not necessarily on the first of the month.

With a quick "Tap and Ride®," transit users have access to all types of public transportation.

FasTrak® - Open Road Tolling

The San Diego region is recognized worldwide for introducing dynamic pricing on high occupancy toll (HOT) lanes on I-15. As a TSM solution, applying open road tolling and HOT lanes balances demand through a performance-based management approach. SANDAG manages this innovative solution through its FasTrak® program.

Regional commuters pay a fee, or toll, through their FasTrak® account to use the I-15 Managed Lanes and State Route 125 (SR 125). Costs vary, from congestion pricing used on I-15 to manage traffic volumes to traditional tolling on SR 125.

Electronic parking systems apply advanced technologies to deliver real-time information about the availability of parking for a particular location or a particular space within a parking facility.

The tolling system maintains customer information, tracks their use of toll roads, and deducts payments from the customer's prepaid account. This is achieved by using transponder Radio Frequency (RF) technology. By using a transponder, customers are able to make toll payments at highway speeds without stopping, eliminating the bottlenecks associated with manually collecting cash at toll booths. The investments made in the I-15 Express Lanes project and the SANDAG FasTrak® program will continue as vital TSM solutions for current and future HOT lanes, in addition to traditional toll facilities. These technologies also can be used to pay for parking and other transportation services.

Smart Parking Systems

Parking continues to grow as an issue in policy discussions about the regional transportation system, in part because there is limited capacity for parking at public transit facilities. Our region needs new ways to monitor how parking facilities are being used, as well as new ways to inform travelers about parking and how to pay for it. Advances in wireless detection technology, meanwhile, have made deploying parking management systems more economical. SANDAG is working with NCTD to pilot the technical, operational, and policy aspects of Smart Parking solutions.

Electronic parking systems apply advanced technologies to deliver real-time information about the availability of parking for a particular location or a particular space within a parking facility. Management information and tools such as pricing are then incorporated. These systems are used to optimize the use of existing parking infrastructure, and to improve the management of supply and demand for parking.

Smart Parking systems have been implemented in the San Francisco Bay Area, in Europe, and in Japanese cities as management tools to more efficiently use parking capacity at transit stations. These systems provide convenient and reliable information and access to transit parking facilities. Providing this type of service helps make transit more competitive than driving alone, research shows.

The continued study and deployment of smart parking management could be further leveraged in coordination with FasTrak® and/or Compass Card to enable SANDAG to explore coordinated pricing for users.

Advanced Technologies

The application of ever improving technology has the ability to help our region achieve its mobility goals, reducing congestion and emissions. Used wisely, technology can increase capacity and maximize the efficiency, utilization, and safety of our current transportation system. Maximizing the potential of TSM requires ongoing research into technologies that improve management capabilities, system operations, and safety. There can be some risks and additional costs in deploying new technologies, but the latest developments warrant a close look to see what they have to offer the San Diego region.

The list of new technologies is extensive, but those available to SANDAG that can have a direct and immediate benefit or bring transformative change to transportation systems management are fairly limited. Still, they are significant. Three technologies in particular have the potential to improve our region's efforts to better manage the transportation system: wireless sensors and detection, real-time modeling and simulation, and the Connected Vehicle initiative. Respectively, these technologies improve performance monitoring and planning information; provide capabilities for proactive management based on predictive data; and introduce a completely new platform for safety, mobility, and environmentally-focused applications.

Wireless Detection

Expanding our region's detection system is a key goal in the effort to improve how the region monitors the performance of our transportation system. Data gathered using a comprehensive sensor and detection program provides a better understanding of how the transportation system is performing. This understanding can then be used to determine which transportation investments can provide the greatest benefits to promote greater mobility. The information also will provide system operators with the data they need to design strategies for better managing the transportation system.

Advances in wireless technology have made comprehensive performance monitoring systems more feasible. The proliferation of wireless technology has resulted in the advent of low-cost sensors and detectors that serve as replacements for traditional methods of collecting data, such as in-pavement loops. The new wave of devices reduces the cost, time, and infrastructure needed to collect data for measuring the performance of transportation systems.

The information captured through this technology helps operators manage and attain an understanding of operational conditions across the transportation system, including along arterial roadways, at parking facilities, and along transit routes and bikeways. The expansion of this technology has given operators the ability to attain a more complete picture of regional and multimodal travel patterns, and to predict volume and speed flows as traffic moves from streets to highways and vice-versa. Improved data, and the expansion of data coverage, also provide the public with a more complete picture.

There are many monitoring systems available, each with its own strengths. Detection technologies that use loops, video, and infra-red sensors are being used in transportation. Wireless solutions involving anonymous probe data using cell phones or Bluetooth devices are in their infancy, but they have gained significant momentum. The benefits and costs associated with implementing each technology should be justified, based on the specific application or project.

Variation between the systems ranges from data quality or accuracy levels to long-term maintenance costs. The level of granularity available from fixed devices exceeds that of probe data because of the lane-level precision that can be gained and because of the number of measurements that are captured. This level of information is needed for systems management, but it may exceed what is needed purely for travelers.

Similar technologies also may help in monitoring emissions. Advances in detection technology are being pursued to determine and directly monitor emissions reductions, as well as other improvements. Using knowledge gained from initiatives such as the "Transportation Air Quality & Congestion

Evaluation" (TRACE) project from the State of Florida's Department of Transportation, advances are being made in small, portable air quality monitors. These air quality monitors, measuring various levels of contaminants that have been identified as contributing to greenhouse gas emissions (e.g. CO, NO, NOx, NO2, PM), are tracked before and after a project's implementation. Therefore, a baseline is established and a tangible measurement of the project benefits is made. These sensors are now economical enough to procure and deploy in sufficient numbers at TSM project sites.

It is important to note that regardless of the various types of technologies available, the overall goal is to achieve a comprehensive view of performance for all modes and transportation networks. Accordingly, a regional focus should be placed on finding a technology solution that provides the greatest benefits from a functional and cost perspective. The advent of low-cost sensors provides opportunities to expand our region's data collection network on arterials and parking facilities. Doing so will help establish a solid foundation for understanding the current and proposed state of the transportation system. Deployment of these detection technologies also provides the information needed to improve system efficiency, safety, and operations. The data also will enrich the quality and extent of the information offered to travelers.

Real-Time Multimodal Modeling and Simulation

Modeling that supports traffic and transportation planning has long been a staple in the transportation field. These models have focused mainly on supporting project development or transportation planning efforts. These efforts have included producing regional travel demand forecast statistics and analysis, as well as project-specific traffic analysis.

An emerging technology within this field is the development of real-time multimodal modeling and simulation applications. These applications are designed to simulate and evaluate traffic flows and multiple operational strategies simultaneously, and to produce recommendations in minutes. Real-time modeling applications complement existing tools by extrapolating historical data and combining it with real-time data to develop dynamic decision support applications. The benefits from this new technology include the ability to forecast traffic patterns and recommend operational changes to minimize delays and congestion. This forecasting and real-time analysis allows transportation system managers to take proactive measures, such as modifying the timing of traffic signals, ramp meters, or speed limits; providing route information and options to travelers during recurring congestion or during incidents; and analyzing and developing new TSM strategies and action plans. The advances in modeling and simulation technology have proven successful in locations such as Madrid, Spain and in Singapore. The deployment of this real-time system locally will allow regional and local operators to improve management of our transportation system.

This technology has been proposed to the U.S. DOT for a demonstration as part of the I-15 ICM project. The technology is planned for development and implementation as part of the I-15 ICM traffic prediction and decision support system. The I-I5 ICM project is planned for completion in 2014, and its findings and corresponding ICM applications will serve as the foundation for pursuing similar deployments along other regional corridors as part of the SANDAG ICM program.

Connected Vehicle

Connected Vehicle is the U.S. DOT program name given to a platform for advanced vehicle communication technologies and applications. It is internationally recognized for significantly improving roadway performance, increasing safety, and providing environmental benefits. Through the development of a ubiquitous high-speed communications network, the Connected Vehicle platform leverages and advances the intelligence of the vehicle itself and the roadway it travels on. Connected Vehicle will enable an entirely new suite of applications that will significantly change the transportation network, performance measurement, and management capabilities.

The U.S. DOT's Joint Program Office has announced that Connected Vehicle is its highest priority program, and it is working with state and local agencies to complete planning and expand pilot deployments. The U.S. DOT envisions broad deployments of Connected Vehicle by 2014 as part of its strategic research plan, which was approved by the ITS Management Council in December 2009. To this end, the U.S. DOT has engaged national and international industry groups to deliver a robust technology environment within which Connected Vehicle will come to fruition on schedule. The Institute of Electrical and Electronics Engineers (IEEE), the Society of Automotive Engineers (SAE), and the American Association of State Highway and Transportation Officials (AASHTO) have worked over the last six years to solidify standards for industry certification. These standards will ensure that robust deployment strategies and plans are available.

The core of the Connected Vehicle platform is the communications network, which addresses safety, traffic management, and traveler information applications by enabling vehicle-to-infrastructure and vehicle-to-vehicle communication. This communications medium between vehicles and roadside devices, such as traffic signals, creates a collective intelligence that can bring vast changes to the planning and operation of transportation systems. These changes improve safety, but they also provide the primary platform for enhancing accessibility, reliability, mobility, and effective systems management. This ubiquitous communications platform will extend to state routes, local streets, buses, bikes, Trolley, and heavy rail systems. It is therefore an important step toward achieving overall goals for regional livability.

Safety

The U.S. DOT, private industry, and educators are strong supporters of Connected Vehicle as a tool to significantly reduce accidents and the number of people killed in highway accidents every year – now totaling about 40,000. In California, more than one million vehicle crashes occur every year, with an economic cost of about $25 billion annually. Of this total number of accidents, 210,000 are injury crashes and 4,000 include fatalities. In the San Diego region, about 25 percent of fatal crashes occur at intersections, while another 25 percent result from vehicles changing lanes or veering off the roadway. The U.S. DOT estimates that Connected

Connected Vehicle is internationally recognized for significantly improving roadway performance, increasing safety, and providing environmental benefits.

Vehicle could reduce annual fatalities by 83 percent, and also significantly reduce the number of crashes not due to driving under the influence of alcohol or drugs.

Human error can be reduced through a variety of improvements to the engineering of a vehicle that increase its overall "intelligence." Vehicles can be made "aware" of other vehicles on the roadway, their speeds, the status of traffic signals they are approaching, and the road conditions ahead. They also can have access to detailed lane-level maps to calculate curve/speed ratios and respond to road hazards.

The initial deployment of Connected Vehicle will likely focus mostly on assistive functions, along with braking and throttle control. But the exchange of information between intelligent vehicles and an intelligent infrastructure will provide a platform for more autonomous functions.

As the technology is deployed, an increasing number of vehicles will become "Connected Vehicle Ready," either when they are manufactured or through after-market installations. Therefore, the penetration of Connected Vehicle into the marketplace, and the level of sophistication of the applications deployed, will work in unison. However, many applications are not dependent on the penetration rate of Connected Vehicle technologies into all vehicles. These include:

- Control Loss Warning: This warns a driver when he or she is about to lose control of the vehicle.
- Red Light Running: The vehicle issues visual, physical, and audible alerts if the driver is at risk of violating a red light or stop sign.
- Curve Speed Warning: The vehicle warns the driver to slow down.
- Road and Travel Conditions Warning: The vehicle is aware of crashes, work zones, slippery road conditions, detours, traffic congestion, weather-related road conditions, parking restrictions, turning restrictions, and other situational elements that may affect the driver. The vehicle issues an audible or visual warning to help a driver avoid these conditions.

As Connected Vehicle is fully deployed – expected sometime between 2018 and 2025 – the numerous applications available to assist a driver increasingly lessen the chances for human error on the road. These applications are expected to become radically more intuitive. Some examples include:

- Electronic Emergency Brake Lights: The vehicle would notify the driver when a vehicle ahead is braking hard.
- Intersection Movement Assist: The vehicle would warn the driver when it is not safe to enter an intersection, for example when something is blocking a driver's view of oncoming traffic.
- Do Not Pass Warning: The aim of this application is to warn the driver if he or she attempts to change lanes and pass when there is a vehicle in the opposing lane within the passing zone.
- Collision Warning and Crash Mitigation: This application would warn the driver of an approaching object (e.g., a stopped vehicle, a slowed vehicle, or a vehicle following too closely), or a vehicle ahead that is suddenly decelerating – whether it is in good or bad weather.
- Blind Spot Warning: The vehicle would warn a driver when he or she tries to change lanes, if there is a car in the blind spot.

- Forward Collision Warning: The vehicle would issue alerts and then warn a driver if he or she fails to apply the brake when a vehicle ahead is stopped or traveling significantly slower.

Mobility

Additionally, the Connected Vehicle platform and the resulting connected intelligent vehicles will enable our transportation system managers to receive and send enhanced decision-quality data to vehicles about the status of the network. This is one of the single greatest opportunities for system managers, across modes and jurisdictional boundaries, to put into effect proactive congestion management strategies that have the potential to deliver a profound impact on the reliability of travel times.

The Connected Vehicle platform provides a connected, data-rich travel environment. The platform will capture real-time data from equipment located onboard all types of vehicles (automobiles, trucks, buses, and bikes) moving within the network. The data will then be available for transportation managers to use in order to optimize our transportation system for peak performance. Drivers, meanwhile, will enjoy unparalleled visibility into the road ahead. To achieve this, the Connected Vehicle platform is used in the following contexts:

- Vehicles as Anonymous Data Probes: Future Connected Vehicle technologies are expected to provide Traffic Management Centers (TMCs) with a richer data set than current wireless devices that are not integrated into vehicles. On Board Equipment (OBE) integrated with a vehicle's electronic systems will be designed to anonymously relay information on vehicle conditions such as traction control or anti-lock braking activation, which are proxies for road surface conditions. The OBE will transmit this data anonymously to Road Side Equipment (RSE), which in turn will relay the information in aggregate form to system operators. The data will be turned into useful information to show operators where roadway maintenance may be needed.

- Ramp Metering: Connected Vehicle technologies of the future could deliver real-time data to optimize the operation of ramp meters in response to changing conditions on the freeway and on nearby surface streets. By ensuring that ramp metering does not merely shift congestion to the arterial network, operators would optimize the capacity of the transportation system. If Connected Vehicle improves the operation of ramp meters by just 5 percent, it will save an estimated 1.2 million gallons of gas nationally every year. The projected savings are valued at $2.8 million, and more than 11,000 tons of $CO2$ emissions would be avoided, once the system is fully deployed.

- Corridor Management: In the future, transportation agencies could use real-time data to manage corridor-level traffic. Travel demands could be balanced across adjacent or parallel facilities, using strategies such as changing the direction of a reversible lane in response to an incident; changing the timing of ramp metering; and using message boards to encourage motorists to divert to a different route.

- Performance Measurement: Connected Vehicle offers the potential to generate an expanded set of measures for monitoring the status and operation of the transportation system. Connected Vehicle generated data could provide metrics to measure the effectiveness of system

The Connected Vehicle platform will play a significant role in reducing greenhouse gas emissions and improving public health.

operation, including travel time, stops, delays, and travel reliability; condition metrics, including indicators of pavement traction, pavement roughness, precipitation, visibility, and air quality; and demand metrics, such as vehicle counts.

- Traveler information: The ability of the platform to send location-specific data and target it to specific vehicles greatly enhances the information available to travelers. This targeted capability introduces the concept of dynamic in-vehicle signage, augmenting or replacing the regulatory or informational signs used today. It also allows real-time messaging on road conditions, the status of traffic signals, and even recommended speeds to smooth the flow of traffic. Further enhancements of this capability and vehicle intelligence could lead to vehicles automatically taking action based on the messages they receive.
- Tolling: Connected Vehicle also is being promoted as the new platform for a nationwide tolling standard. This standard potentially would reduce costs related to infrastructure deployment and ongoing operation by eliminating transponders, leveraging a common platform, and introducing more competition. The integration of new Connected Vehicle applications with vehicle systems also has the capability to introduce new enforcement and pricing strategies for carpool lanes and HOT lanes by detecting the number of occupants in the vehicle.

Environment

By providing the traveling public with real-time information about traffic congestion and other travel conditions, the Connected Vehicle platform can help reduce emissions. The Connected Vehicle platform, combined with environmental applications, will be targeted specifically at reducing fuel consumption, idling, and vehicle miles traveled while reducing acute congestion. It will play a significant role in reducing greenhouse gas emissions and improving public health, particularly in major metropolitan areas, around ports and freight hubs, and on major highways and corridors.

Applications such as Eco-Driving will possibly be the largest single unifying activity for the 40 percent of travel that occurs here in the San Diego region on Connected Vehicle-ready local streets. The concept of "Green Driving" or "Eco Driving" is where the system informs a driver of the speed he or she should travel in order to avoid red lights and instead catch a "wave" of green lights. This can be achieved with or without high levels of penetration by the Connected Vehicle platform into vehicles. Connected Vehicle is a broad-reaching platform that will have a transformational impact on all modes of the nation's transportation network. Delivering a communications platform to increasingly intelligent vehicles will have a profound impact on the way highways and roadways are planned and used. The U.S. DOT is therefore working toward making Connected Vehicle a required safety feature of all new vehicles. The National Highway Traffic Safety Administration is expected to begin the rule-making process in 2013 to adopt this emerging technology.

The following actions support the Plan's Systems Management Chapter recommendations:

Transportation Systems Management	
Actions	**Responsible Parties**
Multimodal Integration and Performance-Based Management	
1. Implement a regional system to implement and maintain the monitoring of 100 percent of the region's urban freeway lanes, on/off ramps and connectors, and critical arterial networks through the use of automated data collection systems.	Caltrans, SANDAG, and local jurisdictions
2. Expand the monitoring of regional transit service with automated data collection through vehicle location systems and automated passenger counters.	SANDAG, MTS, and NCTD
3. Continue developing enhancements to PeMS to improve transportation system performance reporting and to develop corridor measures that comprehensively examine person throughput across highways, arterials, and transit.	SANDAG
4. Complete the demonstration and evaluation of real-time modeling and decision support systems as part of the I-15 Integrated Corridor Management project and apply improvements to other major corridors.	Caltrans, SANDAG, and local jurisdictions
5. Provide regular system performance reports to the SANDAG Board of Directors, Policy Advisory Committees, and working groups for review and action.	SANDAG
Traveler Information	
6. Continue the delivery of traveler information to the public using data collected through performance monitoring investments and disseminated through public and private channels.	Caltrans, SANDAG, and local jurisdictions
7. Enhance traveler information services to provide multimodal choices that promote sustainable strategies and reduce congestion.	SANDAG, MTS, NCTD, and Caltrans
8. Explore new dissemination options such as in-vehicle devices, mobile applications, and Connected Vehicle, and evaluate non-public subsidies for delivery.	SANDAG
Arterial Management	
9. Develop a plan and initiate phased deployment of additional detection devices and/or service for major arterials throughout the region.	SANDAG and local jurisdictions
10. Develop an ongoing program to enhance traffic flows on arterials and to/from freeways using timing updates and a responsive/adaptive system that consider corridor performance and multi-jurisdictional coordination.	SANDAG, local jurisdictions, and Caltrans
11. Evaluate wireless devices, Connected Vehicle, and innovative applications such as Eco Driving to further improve traffic flows and reduce environmental impacts.	SANDAG
12. Develop a plan and initiate phased deployment of additional detection devices for main lanes, HOV/HOT facilities, on/off ramps, and highway connectors.	Caltrans and SANDAG

Transportation Systems Management (Continued)	
Actions	**Responsible Parties**
Freeway Management	
13. Continue improvement of Caltrans District 11 management systems for monitoring the freeways through detection and traffic cameras; and for making real-time adjustments to ramp metering that consider corridor performance.	Caltrans and SANDAG
14. Evaluate the benefits and devise a deployment plan for additional electronic message signs to convey multimodal traveler information using traditional roadside signage and/or advanced in-vehicle solutions.	SANDAG and Caltrans
15. Continue the partnership with the State to monitor and expand the Freeway Service Patrol (FSP) program, to align it with extended peak commute and weekend hours.	SANDAG
16. Implement an automated FSP vehicle fleet tracking and management system to monitor and report FSP program performance.	SANDAG
Transit Management – Bus and Rail	
17. Program the life-cycle replacement of the Communications/Security, Scheduling, Transit Management, and Centralized Train Control systems and evaluate opportunities for improvements.	MTS and NCTD
18. Continue efforts to develop plans to implement Positive Train Control.	NCTD and SANDAG
19. Evaluate and demonstrate the benefits of new technologies such as wireless detection, real-time modeling, and Connected Vehicle for transit.	SANDAG, MTS, and NCTD
Electronic Payment Services	
20. Program the life cycle replacement of the Compass Card and Fastrak® electronic payment systems.	SANDAG, MTS, and NCTD
21. Continue evaluation of Smart Parking systems, the benefits of parking information, and the impact of pricing models.	SANDAG
22. Evaluate and demonstrate the benefits of the Universal Transportation Account concept and coordinated pricing strategies.	SANDAG
Advanced Technologies	
23. Continue research and demonstration efforts to identify and evaluate new TSM technologies.	SANDAG
24. Develop implementation plans and/or pilot projects for wireless detection and real-time modeling/simulation.	SANDAG, MTS, NCTD, and Caltrans
25. Coordinate with the U.S. DOT on Connected Vehicle development and possible early adoption/deployment in San Diego using local, state, and federal funds.	SANDAG

Chapter 8

Demand Management: Innovative Incentives for Taking the Path Less Traveled

Chapter Contents

Capital improvements can take many years and significant resources to implement, but managing the demand for various forms of transportation, also known as Transportation Demand Management (TDM), can provide flexible and cost-effective solutions.

Transportation Demand Management Overview

Our transportation system in the San Diego region faces many challenges. In the past, steady population growth; the dispersion of homes, jobs, schools and services; increased interregional commuting; and the expanded movement of goods all have led to mounting congestion on our roadways. These trends challenged our ability to keep pace with growing travel demands and to operate a reliable transportation system. Capital improvements can take many years and significant resources to implement, but managing the demand for various forms of transportation, also known as Transportation Demand Management (TDM), can provide flexible and cost-effective solutions. Typical TDM programs include ridesharing initiatives such as carpooling, vanpooling, and buspooling; promoting alternative work schedules and teleworking; and promoting bicycling, walking, and the use of public transit. These programs reduce the overall number of vehicle miles traveled (VMT), making more efficient use of our existing roadways and maximizing the movement of people and goods.

This chapter describes our region's effort to implement TDM programs that optimize our investment in the transportation network, and provide our region with viable travel alternatives. Since TDM measures are most effective when coordinated with public education and outreach strategies, this plan combines complementary TDM programs with strategies for motivating and reinforcing sustainable travel behavior.

The 2050 RTP is developed around five primary components: a Sustainable Communities Strategy, Social Equity and Environmental Justice, Systems Development, Systems Management, and Demand Management. Each component has a unique yet interdependent role in creating a sustainable transportation system that improves mobility, reduces greenhouse gases, and increases travel choices for everyone in the San Diego region through 2050.

iCommute – The Regional TDM Program

In 1995, the San Diego Association of Governments (SANDAG) began operating a regional TDM program when it assumed management of "Commuter Computer," the California Department of Transportation's (Caltrans) regional rideshare program. This operation was transformed into the "RideLink" service for the region. In 2009, SANDAG re-branded RideLink as "iCommute" to modernize the program, expand and upgrade services, and reach new audiences. iCommute is now the TDM program for the San Diego region. The goal of the iCommute program is to manage and reduce traffic congestion during peak times, as well as reduce greenhouse gas emissions and other environmental pollutants that result from commuters driving to work alone each day. The iCommute program pulls together proven trip-reduction strategies from the past, and it adds state-of-the-art Internet tools that provide access to convenient transportation choices that reduce auto dependency, vehicle energy consumption, and polluting emissions.

With an innovative Web site (www.iCommuteSD.com) as its central hub for outreach to commuters and employers, iCommute makes it easy to access, evaluate, and compare transportation choices. The "Commute Cost Calculator" provides commuters with the actual cost of their current commute and the potential savings from choosing alternative forms of transportation. "RideMatcher," a tool within the Web site, helps commuters securely find a vanpool, carpool, or bicycle partner. The "TripTracker" tool allows commuters to log their commute trips on an interactive calendar that calculates the financial and environmental costs of their daily commute patterns. The online program also simplifies the administration of regional TDM programs by measuring participation in and demand for TDM programs, and by quantifying the program's benefits at the regional level.

TDM Strategy – Outreach, Education, and Incentives

In the early 1990s, TDM regulations in the San Diego region required employer trip reduction plans. These regulations, including the San Diego County Air Pollution Control District Regulation XIII and the City of San Diego's TDM Ordinance, were enacted when the federal government designated the region's air quality as "severe." To reduce emissions from motor vehicles, the regulations required employers with more than 100 employees, the source of significant peak period traffic, to implement trip reduction plans for their work sites. In 1995, the federal government re-classified the region's air quality designation from "severe" to "serious," and the TDM regulations were rescinded. Since the mid-1990s, participation by area employers and commuters in TDM efforts has been voluntary.

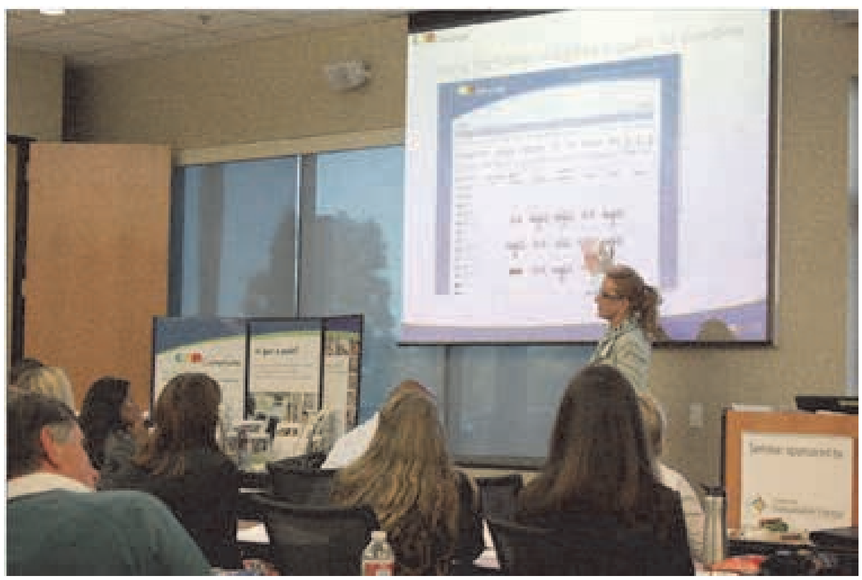
In a voluntary environment, commuters base their travel choices on a desire to save time and money, reduce stress, improve the environment, and other considerations. Employers participate in TDM programs that are easy to implement and make business sense by helping to attract and retain employees and reduce costs. The iCommute TDM strategy seeks to address these personal and business motivations by promoting and educating the public on their transportation choices, and by providing incentives to change travel behavior.

Outreach and Education

Employer Outreach and Services – iCommute's partnership with employers has proven to be the most effective method for promoting alternative travel choices among the region's commuters. This is partly because TDM programs can be tailored to the transportation needs of employees at their specific place of work. iCommute's initial outreach and education efforts have focused on the region's largest employers.

As of May 2011, iCommute has partnered with 157 employers to develop customized commute programs that meet employer and employee needs.

As of July 2011, iCommute has partnered with 159 employers to develop customized commute programs that meet employer and employee needs.



iCommute solicits employer interest and participation in TDM programs through extensive outreach efforts. These include presentations to businesses and professional and industry organizations; participation in employer-sponsored wellness fairs and green fairs; special events and promotions; and coordination of the Diamond Awards, which honor employers who have exceptional commuter benefit programs.

One year after launching the iCommute Web site, more than 10,000 commuters use the online system to improve their commuting choices.

To further assist employers, iCommute developed a comprehensive Commuter Benefit Program Starter Kit that outlines a simple, three-step process to help employers identify their commute needs, design a custom program, and roll it out to their employees. The kit includes sample policies, forms, tax deduction information, commuter program descriptions, and examples of best practices from other companies and agencies. It also includes advice and sample material for how to market a commuter program to employees. iCommute staff also works one-on-one with employers to provide the technical assistance they may need, such as surveying for employee travel preferences, mapping employee commute routes, and developing a customized plan that makes business sense.

Moving forward, iCommute's employer outreach program will continue to be a focal point of communications as the most effective way to reach large numbers of commuters. Marketing efforts will focus on increasing the scope of and participation in commuter benefits programs within mid- to large-size employers that already offer such programs. Additional effort will be placed on establishing new programs in companies that do not already have commuter benefits in place. This will be accomplished through a variety of marketing mechanisms, including:

- more self-service options such as Web-based forums and tutorials
- more incentives for employers and employees
- new and improved events and promotions

Public Outreach – Marketing and outreach are key strategies for the implementation of the SANDAG TDM program. Research shows that access to information will provide commuters with viable choices and guide travel behavior. The iCommute Web site is the primary portal for communicating information on transportation choices and raising awareness about the financial, environmental, and health benefits of TDM programs. The iCommute Web site provides commuters with the information, tools, and resources they need to try an alternative mode of transportation. One year after launching the iCommute Web site, more than 10,000 commuters use the online system to improve their commuting choices.

iCommute seeks to increase awareness about alternative transportation choices through events and promotions such as Bike to Work Day, Rideshare Week, and "Dump the Pump."

Direct outreach to community groups, schools, agencies, and neighborhood organizations also is a key strategy for reaching the region's commuters. Fostering partnerships with organizations and agencies to co-market transportation alternatives leverages marketing resources and augments outreach efforts. Moving forward, building and strengthening relationships with partners and sponsors will be a key strategy for reaching new and larger audiences.

Successful marketing and outreach requires a continuous dialogue with commuters to determine changing public preferences and respond with appropriate programs and services. iCommute will achieve this through ongoing surveys of users and potential users of alternative transportation choices. This information will be used to develop targeted marketing campaigns that deliver appealing messages that inform commuters about improved programs and services.

Agency Outreach – There are many ways that local governments can educate the public and encourage alternatives to driving alone in their communities. Through the SANDAG Energy Roadmap Program, iCommute is partnering with local governments to provide free assistance and tools for assessing, designing, and implementing TDM programs at the employer level and community level. By implementing TDM programs, local governments can reduce energy consumption, help their employees save money and time, decrease traffic congestion, and reduce their community's overall carbon footprint. iCommute encourages establishing TDM programs at the local government level under three categories:

- Commuter policies and benefit programs: iCommute works with local governments in the same way it works with other employers to assess and develop customized commuter benefit programs for their employees.

- TDM in the development review process: The inclusion of TDM measures in the development review process offers developers creative, affordable, and effective ways to reduce motor vehicle trips and their associated impacts. iCommute will work with local governments to develop policies that require or encourage the inclusion of TDM measures in new developments to reduce the environmental impacts of vehicular traffic generated by those projects. Moving forward, iCommute will develop a best practices guide for local jurisdictions that want to make TDM a formal part of their development review process. These linkages also will be included in the update of the Regional Comprehensive Plan.

- TDM in the community: iCommute provides local governments with the tools they need to educate the public and encourage alternatives to driving alone in their communities, including:

  » Providing information on commuting resources and commute alternatives, to be shared with the public through their Web sites, newsletters, and at public venues

  » Soliciting their participation in annual events and campaigns, such as Bike to Work Day, "Dump the Pump," and Rideshare Week

  » Partnering with local governments to evaluate public programs, such as car sharing and bike sharing that encourage making alternative transportation choices

Financial Incentives

Providing people with financial incentives to try alternatives to driving alone is a tried and proven strategy. Currently, iCommute offers a vanpool program subsidy of $400 per month per vanpool as well as the Guaranteed Ride Home (GRH) program. GRH is a safety net for commuters who carpool, vanpool, take an Express Bus, ride the COASTER, or walk or bike to work three or more times per week. GRH provides a free taxicab ride or 24-hour car rental up to three times per year in the event of an unscheduled incident, overtime, or illness. The cost of offering this service is relatively low because it acts as an insurance policy and is seldom actually used. As of July 2011, GRH has 1,988 members enrolled, but on average only a couple hundred rides are issued each year. However, GRH is an

Providing people with financial incentives to try alternatives to driving alone is a tried and proven strategy. Currently, iCommute offers a vanpool program subsidy of $400 per month per vanpool as well as the Guaranteed Ride Home program.

important factor in the commuter's decision to choose an alternative form of transportation. Expanding eligibility for the GRH program may prove to have a positive benefit/cost ratio, and this will be explored in the future.

To increase participation in TDM programs, more aggressive financial incentives for all alternative modes of transportation will be needed. iCommute will continue to develop and pilot varying levels and types of incentives for employers and commuters who are not currently covered by other incentive programs. For example, iCommute plans to launch a carpool incentive program that provides a subsidy for new carpools. iCommute also is exploring partnerships with businesses to provide discounts and incentives to commuters who take alternative modes of transportation and log their sustainable commute trips in the iCommute system.

RideMatcher is a convenient online tool to securely form carpools or vanpools 24/7.

Locational Emphasis –TDM programs and incentives are promoted throughout the region. However, due to limited resources, more intensive outreach efforts will be targeted toward locations with the most potential for impact. These are:

- Major employment centers
- Urban areas
- Major corridors with High Occupancy Vehicle (HOV) or Managed Lanes
- Corridors impacted by highway construction
- Areas around public transit stations

iCommute Programs

Regional Vanpool Program

This program provides long-distance commuters with a cost-effective alternative to driving alone. Figure 8.1 illustrates the growth of the vanpool program since the 1990s. SANDAG contracts with vanpool vendors to provide the vehicles, maintenance, and insurance, and it currently provides a $400 monthly subsidy per eligible van to reduce the vehicle lease costs. As of May 2011, the vanpool program accounts for:

- 749 vanpools
- 5,885 daily passengers
- 56-mile average, one-way distance
- 575,232 average vehicle miles reduced each day

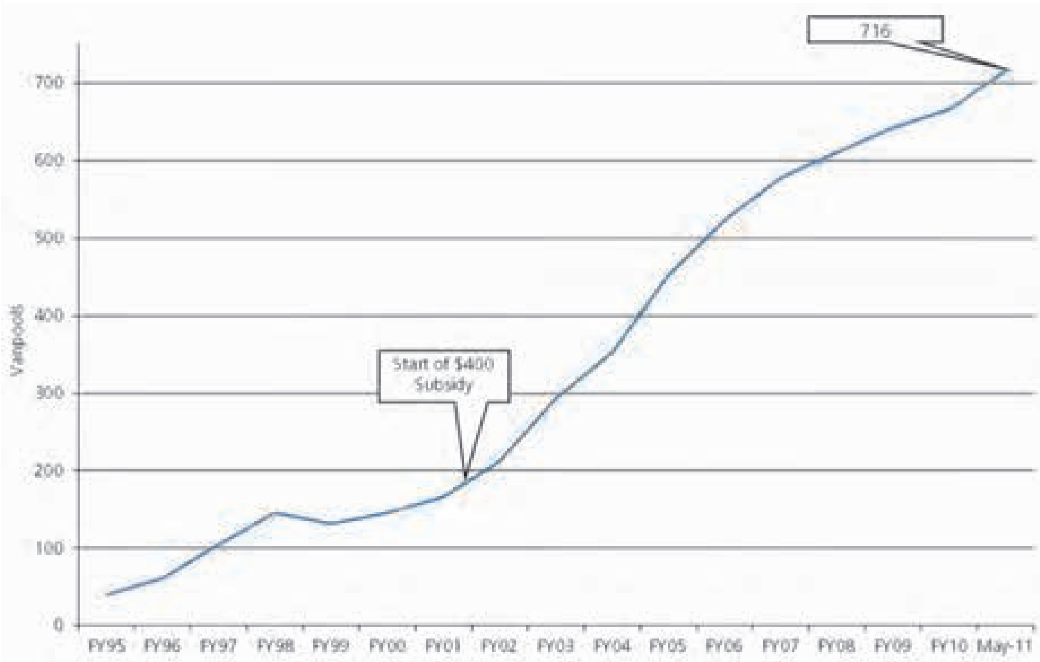
Looking to the future, iCommute will encourage the continued growth of the vanpool program by examining the feasibility of a tiered, monthly subsidy that provides a larger incentive to vanpools with higher vehicle occupancy rates. Additionally, iCommute will support the Regional Energy Strategy and the Climate Action Strategy by introducing clean fuel and electric vehicles into the regional vanpool fleet, as the necessary infrastructure is available to enable this transition.

Carpool Program

iCommute maintains an online database of commuters who are interested in joining a carpool. RideMatcher is a convenient online tool to securely form carpools or vanpools 24/7.

Currently, RideMatcher works best to coordinate regularly scheduled carpools. However, in the future iCommute intends to enhance this technology to promote

Figure 8.1 – Vanpool Growth Trend



ridesharing during major regional events, and instant ridematching on an occasional basis.

To increase the number of carpools and measure VMT reduction attributable to carpooling, iCommute plans to launch a regional carpool incentive program – as recommended in the 2009 Ridelink Carpool Incentive Study. This new program will result in an estimated 5,300 new carpools per year, which would put carpooling on a level playing field with the regional vanpool program. New carpoolers who enroll in the iCommute on-line system would be eligible to receive incentives. Based on the best practices and outcomes from similar programs nationwide, it is expected that after carpooling for three months with the incentive, commuters will be more likely to continue carpooling once the incentive expires. A pilot program is anticipated in Fiscal Year 2012.

Buspool Program

In 2010, SANDAG, the Metropolitan Transit System (MTS), and the Navy collaborated to implement a pilot buspool service (Murph Express) that provides Premium Express Bus service from the Murphy Canyon military housing cluster to Naval Base San Diego. The Navy is one of the San Diego region's largest employers, with about 34,000 naval personnel and civilians who commute within the county to naval facilities. Therefore, the goal of the buspool program is to provide quick and convenient access to military bases, reducing congestion on our region's transportation system, and improving the quality of life for military personnel and the public in general. The operation of the buspool service is funded through the military's Transportation Incentive Program, but SANDAG markets the program and provides technical planning support for the program's expansion. If the pilot project is successful, SANDAG, in cooperation with MTS, will work with the military to expand buspool services to other military housing clusters and facilities. The military may consider options to mandate a certain level of participation in the program as part of their overall TDM strategy. iCommute also will seek similar opportunities and partnerships with other large employers in the region.

The goal of the buspool program is to provide quick and convenient access to military bases, reducing congestion on the region's transportation system and improving the quality of life for military personnel and the public in general.

School Services

iCommute offers SchoolPool, a free, convenient, and secure online carpool, walk, and bikepool matching system for parents who want to share the job of getting their children to and from school. SchoolPool reduces traffic congestion in and around school zones, creating a safer environment for students. The SchoolPool program is open to students in all public and private elementary, middle, and high schools within San Diego County. Figure 8.2 shows the schools in the San Diego Region. Since transitioning to an online SchoolPool program in 2009, 36 schools with nearly 400 parents have enrolled in the service.

In the San Diego region, about one-third of workforce jobs, or 519,000 jobs, are compatible with telework. However, less than 5 percent of the workforce currently participates in a formal telework program.

As part of SchoolPool, iCommute will offer a Walking School Bus and Bike Buddy program that supports regional public health initiatives and the Safe Routes to School strategy by promoting active transportation choices for children (see Chapter 6). iCommute offers parents and schools the online tools to form safe, supervised opportunities for children to walk or bike to school. To promote these services, iCommute plans to hold annual Walk and Bike to School Day events in conjunction with International Walk to School Day starting in 2011. Ongoing education and partnerships with school-based groups such as parent associations will continue to support this effort.

Telework and Alternative Work Schedules

Telework is a transportation alternative that allows employees to work at home, at a nearby satellite facility, or from a "virtual office." Teleworking replaces travel to and from work with telecommunications technologies. The goal of telework is to bring work to employees rather than bringing employees to work, thereby relieving peak-period congestion. In the San Diego region,

about one-third of workforce jobs, or 519,000 jobs, are compatible with telework. However, less than 5 percent of the workforce currently participates in a formal telework program. Studies show that teleworking can improve a company's bottom line with increased productivity, reduced overhead, improved retention, and recruitment, but many companies are reluctant to implement a telework policy. In our region's efforts to identify cost-effective strategies for reducing peak period congestion and the associated greenhouse gas emissions, telework rises to the top. However, telework is a solution that currently lacks a dedicated program. To promote it, iCommute proposes to launch a regionwide telework program that includes incentives and technical assistance to support employers with developing telework policies and programs.

Like the teleworker who avoids the peak period commute by working from home, the employee who participates in a flex schedule or compressed workweek avoids commuting during peak periods. Employees with flexible schedules arrive and/or leave work before or after rush hours. Compressed work weeks, like the "9/80" work schedule, help eliminate one day of home-to-work commuting every two weeks. These alternative schedules are simple yet powerful tools that employers can use to help reduce travel demand while providing employees with flexibility. iCommute will continue to provide employers with the resources they need, such as sample policies, best practices, and technical support to implement and manage alternative work schedules.

Bicycle Encouragement Programs

These programs support the regional bicycle network and promote bicycle commuting by providing services such as the Regional Bicycle Locker program, Bike to Work Day, and the regional bike map. Currently, iCommute manages more than 800 bike lockers at more than 60 transit centers and park and ride lots throughout San Diego County (Figure 8.3). iCommute is now upgrading to "on-demand" bike lockers to simplify reserving lockers and provide additional storage capacity. On-demand bike lockers allow bicycle commuters to use any locker at a given site on a first-come, first-served basis. These state-of-the-art lockers, which use key cards, give multiple users the opportunity to use the same locker, enable the user to reserve lockers using online tools, and provide administrators with information about utilization and demand.

The benefits of on-demand lockers include reduced program administration costs, reduced inappropriate use of lockers, and increased utilization.

iCommute intends to launch more programs that encourage bicycling to support the Regional Bicycle Plan (see Chapter 6). These programs will provide the incentives, recognition, and services that make bicycling a viable choice for commuting. This will include the introduction of bike stations in areas with a high demand for bike lockers. Bike stations provide secure, indoor bicycle parking and amenities. Bike stations have the capacity to accommodate more bikes, requiring less space than traditional bike lockers.

iCommute also is planning bike sharing programs. Bike sharing gives people on-demand access to a fleet of public rental bicycles at designated locations. When used in combination with transit, a shared bike program is an affordable option that can reduce the travel time between home, transit stops, and the office. Bike sharing also encourages the use of public transit by providing commuters with a convenient transportation option for making local trips during the workday.

Multimodal Solutions

Decreasing reliance on conventional auto travel requires seamless transitions between transportation choices.

First- and Last-Mile Solutions

One of the barriers that commuters face when considering public transit is the first- and-last mile of the commute between their homes, transit stops, and work or school. It's essential to provide uncomplicated and safe routes to transit, in order to develop a multimodal transportation network. First- and last-mile solutions include enhanced bike and pedestrian infrastructure around transit stations, services such as carsharing and bike sharing, and short-distance vanpools and shuttles. To increase transit as a viable option for commuting, iCommute will analyze the first- and last-mile barriers to transit along major commute corridors, and identify unique solutions that make transit accessible and viable in specific communities, as part of the SANDAG Safe Routes to Transit program.

Systems Integration

Integrating the Compass Card program with the iCommute online system and TDM programs will promote the transition between modes of transportation and streamline the administration of the TDM program. iCommute will incorporate Compass Card as the universal access and fare card for TDM programs such as bike lockers and stations, carshare, and bikeshare.

This effort will assist in expanding bike-to-work promotions and events during the month of May. These include bike safety education, bike commuting training, and special events. The planned expansion of "Walking School Bus" and "Bike Buddies" programs will complement the Safe Routes to School initiative, and introduce the benefits of active commuting to children. Additionally, the iCommute Web site will be upgraded to add new tools to encourage active commuting. Among them will be an Active Commute Calculator that measures and tracks the personalized health benefits of an active commute choice.

511 Advanced Traveler Information Services (511)

While the iCommute program provides commuters with their travel choices, 511 is the region's central hub for travel information and services. 511 provides commuters with real-time information on travel conditions so they can make informed decisions on what time to travel and what mode or route to take. The SANDAG Intelligent Transportation System (ITS) program manages this service. Features planned for the service include personalized communications such as e-mails and texts specific to a user's commute, help with planning trips across different modes of transportation, and integrating communications with mobile devices.

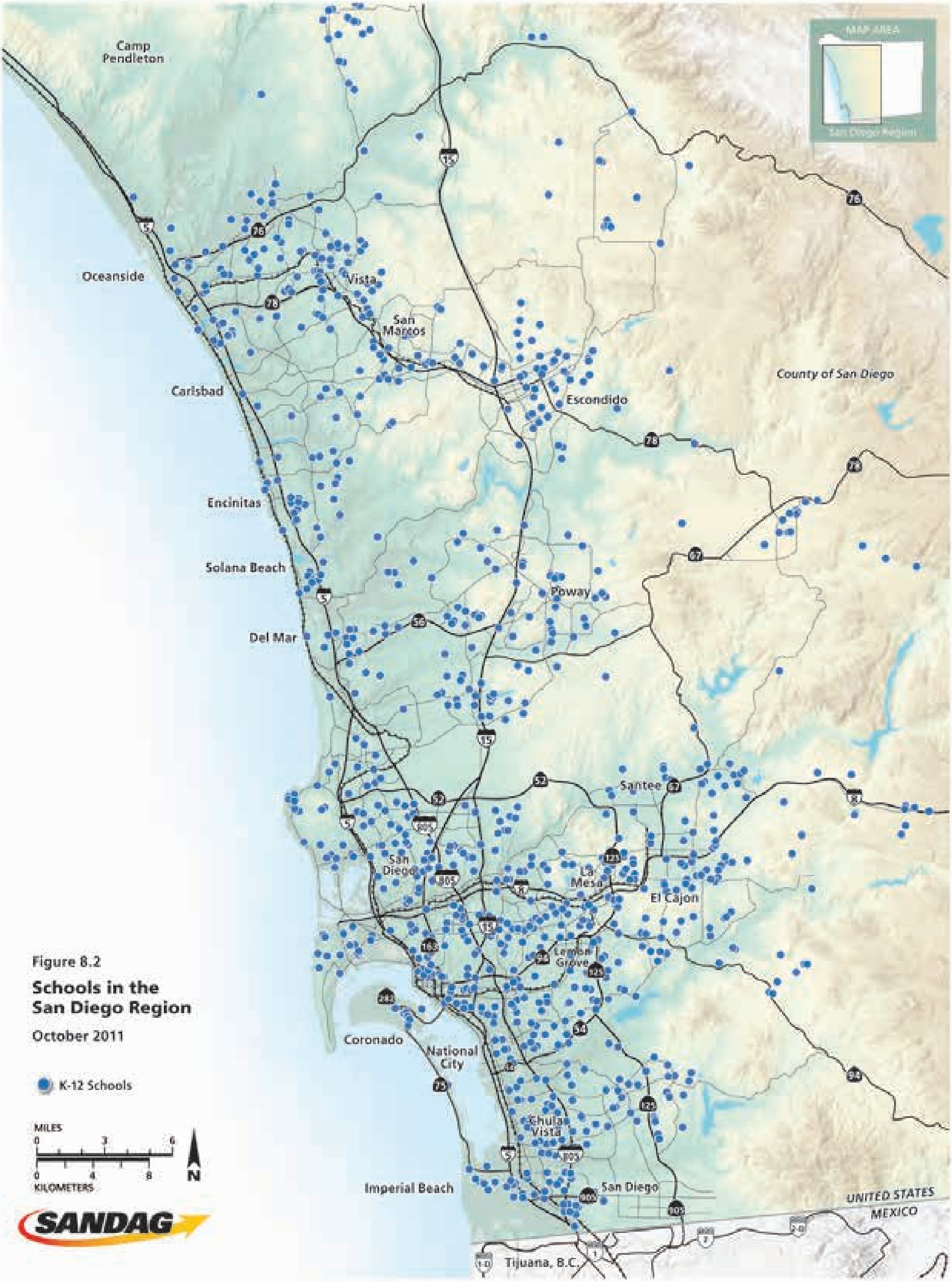


Figure 8.2

Schools in the San Diego Region

October 2011

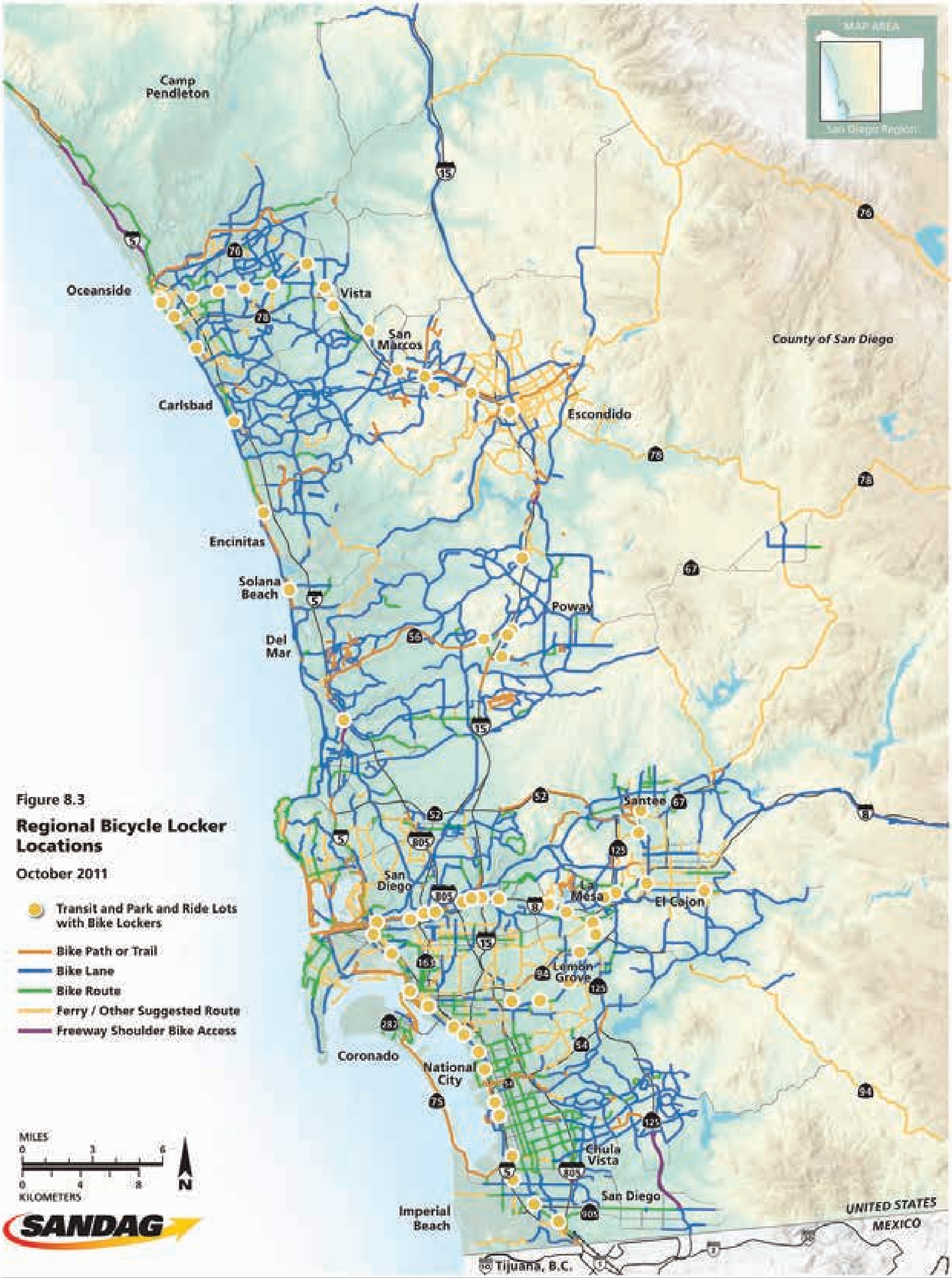


Figure 8.3

Regional Bicycle Locker Locations

October 2011

Opportunities and New Directions

Corridor Approach

One way that TDM measures can complement Systems Development and Systems Management is by supporting the region's corridor approach to transportation planning and implementing projects. Each regional corridor is confronted with unique transportation challenges, depending on the types of facilities available, adjacent land uses, and the surrounding environment. Therefore, a one-size-fits-all TDM strategy for the entire region will not provide optimal results.

With significant roadway improvements anticipated along several regional corridors, iCommute will form partnerships with Caltrans, local jurisdictions, transit agencies, and employers to develop project-specific TDM solutions to improve traffic congestion caused by construction.

Construction Mitigation

Another very tangible way that TDM measures support Systems Development is by applying TDM programs and services as mitigation for major highway construction projects. While temporary in nature, construction-related TDM measures are designed to provide solo commuters with options for avoiding construction-related traffic congestion. Concern over construction-related delays can be a key motivator for commuters to switch their mode or time of travel. Once commuters take action and choose a commute alternative, they may be more likely to continue using an alternative mode after the construction is complete.

With significant roadway improvements anticipated along several regional corridors, iCommute will form partnerships with Caltrans, local jurisdictions, transit agencies, and employers to develop project-specific TDM solutions to improve traffic congestion caused by construction. The model for this collaboration was developed by Caltrans and the City of San Diego in conjunction with the "Survive the Drive" campaign developed for the I-5/I-805 merge widening project completed in 2007. Since then, iCommute has worked with employers along the I-15 corridor to provide commuting solutions during construction of the I-15 Express Lanes. TDM efforts to relieve congestion during highway construction projects include increased funding, marketing of alternative commute options, developing performance measurements during the construction period, and outreach to employers situated near highway construction projects.

Funding and Performance Monitoring

TDM measures are relatively low-cost solutions that can be implemented more quickly than major capital projects, and they provide short-term results that help meet regional goals for reducing greenhouse gas emissions. The TDM plan includes more than $700 million (in 2010 dollars) budgeted over 40 years to fund programs and strategies described in this chapter. They directly support the other RTP strategies.

Quantitative and qualitative performance measures are used to monitor and report on the effectiveness of each element of the regional TDM program. The number of trips and vehicle miles of travel avoided in the region due to the SANDAG iCommute program, as well as the associated environmental and monetary savings, are measured on a monthly basis and reported each quarter. Qualitative performance measures will be captured through annual customer surveys.

The following actions support the plan's Demand Management Chapter recommendations:

Transportation Demand Management	
Actions	**Responsible Parties**
1. Expand outreach, education, and marketing to employers, commuters, schools, and agencies.	SANDAG, employers, schools, and member agencies
2. Develop a formal incentive program for commuters to track eligible trips in iCommute.	SANDAG
3. Develop a tiered vanpool subsidy that will increase participation in the Regional Vanpool Program by 70% by 2020.	SANDAG
4. Implement a regional carpool incentive program that will encourage the start of 5,300 new carpools annually.	SANDAG, employers, member agencies
5. Expand buspool services to additional military housing clusters and facilities.	SANDAG, regional military, MTS, NCTD
6. Increase the number of parents and schools participating in SchoolPool services through outreach and incentives.	SANDAG, schools, parent organizations
7. Launch a regional telework program that provides incentives and technical assistance to support employers with developing formal telework policies and programs.	SANDAG, employers
8. Study and implement bike encouragement programs and services that make bicycling a viable commute choice.	SANDAG
9. Study and implement multimodal solutions that integrate the transportation system and make alternatives to driving alone competitive and reliable.	SANDAG, MTS, NCTD, member agencies
10. Expand education and outreach activities that encourage active commuting.	SANDAG, member agencies
11. Enhance 511 services to include personalized traveler information and services.	SANDAG
12. Collaborate with partner agencies to develop customized TDM solutions for regional corridors.	SANDAG, Caltrans, MTS, NCTD, member agencies

Chapter 9

From the Ground Up: A Comprehensive Public Involvement Program that Generated Input from Stakeholders Throughout San Diego County

Chapter Contents

From the Ground Up

The San Diego Association of Governments (SANDAG) implemented a comprehensive public outreach and involvement program to support the development of the 2050 Regional Transportation Plan (RTP or the Plan) and its Sustainable Communities Strategy (SCS). The 2050 RTP Public Involvement Plan (PIP) is based on the SANDAG Public Participation Plan, adopted by the SANDAG Board of Directors on December 18, 2009, per Government Code Section 65980(b)(2)(E).

Developing the Public Involvement Plan

The Public Involvement Plan guides outreach efforts to build awareness of the regional transportation planning process and identify opportunities for stakeholders to shape the region's future.

The PIP established a process and outlined specific activities for communicating with the public throughout the RTP development process, per Government Code Section 65080(b)(2)(F) (see Technical Appendix 6).

SANDAG developed the PIP with input received from the general public, Regional Planning Stakeholders Working Group (SWG), Regional Planning Committee, Transportation Committee, and the Board of Directors. Parallel to this, a tribal consultation work plan was developed (see Appendix C).

The goals, strategies, and tactics outlined in the PIP guide outreach efforts to build awareness of the regional transportation planning process and to identify opportunities for stakeholders to shape the region's future. The plan also describes SANDAG efforts to gather input on developing priorities and project selection criteria, as well as transportation networks, funding alternatives, how to meet greenhouse gas emissions targets, and other elements of the 2050 RTP. These efforts were coordinated during regular collaborations with the Regional Planning SWG and recipients of community-based outreach grants. The PIP also guided efforts to gather input from individuals, organizations, agencies, and other stakeholders in the development of the 2050 RTP.

Goals

The following broad goals were established to guide the outreach process.

- Raise awareness of the 2050 RTP as the region's updated blueprint for a transportation system that enhances our quality of life and meets our mobility needs for the future
- Stimulate dialogue about the transportation challenges facing the San Diego region
- Provide the public with opportunities to offer input on the 2050 RTP and its SCS, a new feature of the 2050 RTP required by state climate change legislation

- Develop and incorporate into the plan realistic solutions that address the diverse mobility needs of the region's residents, visitors, and business people
- Build public support for transportation improvements outlined in the 2050 RTP

Objectives

The following measurable objectives contributed to accomplishing the goals of the outreach process.

- Gather input from a wide variety of individuals, organizations, agencies, and local governments throughout the 2050 RTP development and decision-making process
- Provide timely and accessible public information about the proposed policies and plans contained in the 2050 RTP to a broad range of regional stakeholders
- Make public information accessible in a variety of formats and languages, using easy-to-understand language and concepts, and a variety of media including innovative visualization techniques
- Hold public workshops and meetings that foster meaningful dialogue and result in effective and inclusive decision-making
- Consider public input at each decision-making milestone in the development of the 2050 RTP
- Meet or exceed local, state, and federal guidelines and requirements for involving the public in the development of the RTP

Strategies

Pursuing the following strategies helped achieve the goals and objectives outlined above.

- Establish a clear project identity to convey information about the 2050 RTP, its SCS, and other RTP elements
- Develop materials on the RTP and other components using easily understood language
- Develop a marketing campaign to build awareness and gather public input
- Regularly involve public stakeholders in the process to foster understanding and agreement on issues related to the development of the 2050 RTP
- Communicate in a variety of ways to keep the public up-to-date on the development of the 2050 RTP, including through presentations; one-on-one and small group meetings; public workshops; written materials; online communications; social media; and the news media

- Provide the public with up-to-date information about the 2050 RTP on a regular basis through presentations, Web site and online communications, written materials, and news
- Provide information and notices on the 2050 RTP, public workshops, and other events to the SANDAG Board and Committee members so they can share information with their constituents and stakeholders
- Document and address public comments received during the public involvement process
- Provide information to the public about the 2050 RTP development process and promote opportunities for input and comments
- Provide information to decision-makers on the comments received throughout the public involvement process
- Assess the effectiveness of the PIP as key phases conclude (i.e., following workshops or the release of draft documents), to evaluate how strategies are working and what enhancements could be made

Community-Based Outreach

To help ensure that public input for the 2050 RTP reflected the diversity of the San Diego region, SANDAG partnered with community-based organizations in Communities of Concern to ensure that local voices were heard. The goal of the Community-Based Outreach Mini-Grant program is to engage and encourage diverse, inclusive, and active public participation from stakeholders in specific communities who traditionally are not involved in regional public policy planning. These stakeholders include low-income households, seniors, minorities, people with disabilities, and other groups.

Through a competitive bid process, SANDAG awarded grant funding to eight community-based organizations to conduct outreach. This outreach was coordinated with other public involvement activities by SANDAG to help prepare the RTP, update the SANDAG Public Participation Plan, and develop other regional initiatives.

Each organization that received a grant appointed one representative to serve as a member of the Regional Planning SWG. The following community-based organizations worked on this outreach and involvement effort:

- Able-Disabled Advocacy
- All Congregations Together
- Casa Familiar
- Chula Vista Community Collaborative
- El Cajon Community Collaborative
- Friends of Adult Day Health Care Centers
- Linda Vista Collaborative
- San Ysidro Business Association

Each group conducted outreach using strategies and techniques to reach residents and stakeholders in the communities they serve. A summary of the reports, public input, and comments from the community-based organizations is included in Technical

Appendix 6. This input was used to help develop the project evaluation criteria, performance measures, environmental justice analyses, network scenarios, and other elements of the 2050 RTP.

Public Workshops/ Public Hearings

Spring 2010 Public Workshops

In spring 2010, SANDAG held five subregional public workshops to provide information and gather input for the development of the 2050 RTP (Table 9.1). These workshops provided the public with information on the Urban Area Transit Strategy and transportation networks, the Notice of Preparation for the 2050 RTP Environmental Impact Report (EIR), and the greenhouse gas target setting process, which is a requirement of Senate Bill 375 (Steinberg, 2008) (SB 375).

Members of the Regional Planning SWG and community-based organizations helped structure the workshop format and assisted with outreach by serving as workshop co-hosts.

Spring 2011 Public Workshops/ Public Hearings

To secure input on the Draft 2050 RTP and SCS, SANDAG conducted five combination public workshops/public hearings and two additional public hearings at regularly scheduled SANDAG meetings (Table 9.2). While SB 375 required two public hearings for public input following the release of the Draft 2050 RTP and SCS, SANDAG held seven hearings to maximize opportunities for public input.

Staff considered the feedback from the spring 2010 public workshops in developing the format for the 2011 outreach. E-mail notification was very successful in building awareness of the public workshops/hearings and the public comment period. The workshop format was discussed at a SWG meeting and feedback was incorporated into the format and activities scheduled. For example, SWG members recommended including access to the Envision 2050 visualization tool at the workshops. A computer station was set up so participants could view the Envision 2050 tool at the workshops.

Table 9.1 – 2050 RTP/SCS Public Workshops – Spring 2010

Date	Time	Location
April 26, 2010	4 to 7 p.m.	Escondido City Hall 201 North Broadway Escondido
April 27, 2010	4 to 7 p.m.	Loma Verde Recreation Center 1420 Loma Lane Chula Vista
April 28, 2010	4 to 7 p.m.	Tri-City Medical Center Wellness Center 6250 El Camino Real Carlsbad
May 3, 2010	4 to 7 p.m.	Bayside Community Center 2202 Comstock Street San Diego
May 6, 2010	4 to 7 p.m.	Ronald Reagan Community Center 195 East Douglas Avenue El Cajon

Table 9.2 – 2050 RTP/SCS Public Workshops and Hearings – Spring 2011

Date	Time	Location
June 7, 2011	4 to 7 p.m.	Encinitas Community & Senior Center 1140 Oakcrest Park Drive Encinitas
June 8, 2011	4 to 7 p.m.	The Joe & Vi Jacobs Center 404 Euclid Avenue San Diego
June 9, 2011	4 to 7 p.m.	Sonrise Community Church 8805 North Magnolia Avenue Santee
June 13, 2011	4 to 7 p.m.	Martin Luther King Jr. Center 140 East 12th Street National City
June 16, 2011	4 to 7 p.m.	San Marcos City Council Chambers 1 Civic Center Drive San Marcos
Draft 2050 RTP and SCS Public Hearings		
June 10, 2011	10 a.m.	SANDAG Board Meeting 401 B Street San Diego
June 21, 2011	5 p.m.	Regional Planning Stakeholders Working Group Meeting 4050 Taylor Street San Diego

All workshops were conducted in an open house format where participants were invited to attend at any time during the workshop; review maps, displays, and information; ask questions of staff; complete comment cards; or speak to a bilingual English/Spanish transcriber to have their comments recorded. The public hearings were officiated by a SANDAG Board member. Transcriptions were produced and provided to the SANDAG Board of Directors and Policy Advisory Committees, as well as provided to the general public.

In total, more than 160 participants attended the workshops. While many comments were received at the workshops/hearings, staff encouraged participants also to access the other tools to provide feedback.

Public Outreach Activities

Public outreach activities, including meetings, presentations, community events, personal contacts, notices, and newsletters, were tracked and recorded to document the wide range of efforts that SANDAG employed to communicate with people throughout the region during the development of the 2050 RTP. These activities are included in table format in Technical Appendix 6.

The Public Involvement and Outreach Activities, included in table format in Technical Appendix 6, list 2050 RTP elements that have been presented since spring 2009 at meetings of the SANDAG Board of Directors, Policy Advisory Committees, Regional Planning SWG, and other working groups and community organizations. These meetings were promoted on the SANDAG Web site, and notices for them were distributed to opt-in e-mail lists. Key milestones are featured at www.sandag.org/news.

These activities also included outreach to affordable housing advocates, transportation advocates, neighborhood and community groups, environmental advocates, builder representatives, broad-based business organizations, landowners, commercial property interests, and homeowner associations (see Technical Appendix 6). Through the 2050 RTP Speakers Bureau, presentations were made to groups representing these interests in order to disseminate information and provide opportunities for input and feedback. In addition, regular communications via newsletter, invitations, and e-mail provided ongoing updates and information on the 2050 RTP development process and how to get involved.

Through the Board of Directors, Policy Advisory Committees, Technical Working Groups, Stakeholder Working Groups, and other meetings and workshops, SANDAG consulted with agencies responsible for land use, natural resources, conservation, and historic preservation (see Technical Appendix 6).

SANDAG placed advertising in 17 print and online publications to promote the spring 2011 public workshops/public hearings schedule. Public input opportunities and the meeting schedule also were promoted on all MTS and NCTD bus, trolley, and rail vehicles in the region. E-mail blasts were distributed to more than 10,000 subscribers, and the SANDAG Facebook page promoted the workshops and public input opportunities. Extensive press coverage was garnered in local and regional newspapers and on television news broadcasts. See additional advertising and notification activities in table format in Technical Appendix 6.

SANDAG promoted several methods by which the public could submit comments on the 2050 RTP, SCS, EIR, and other elements. They include an online form in English and Spanish; printed comment form in English and Spanish; e-mail at: 2050rtp@sandag.org; a toll-free telephone number at (877) 277-5736; a fax number at (619) 699-1905; and U.S. mail or delivery to SANDAG.

Nearly 200 presentations (see Technical Appendix 6) were made between April 2009 and September 2011 throughout the region at business and community organizations. These included chambers of commerce, economic development corporations, taxpayer advocate groups, community collaboratives and community planning groups, local jurisdictions and agencies, trade associations, and other organizations.

A table included in Technical Appendix 6 details the general public involvement planning process that supports the development of the 2050 RTP, and it identifies activities that comply with SB 375 requirements. The tribal consultation process for the 2050 RTP was carried out in a parallel time frame, but it followed a government-to-government framework.

As with other stakeholder groups, input was sought from tribal nations on each step of the process that led to the selection of the Revenue Constrained Transportation Scenario, which forms the basis of the 2050 RTP, including:

- Goals/Objectives
- Project Evaluation Criteria
- Performance Measures
- Travel Times in Corridors

- Sustainable Communities Strategy
- Alternative Scenarios

With input from the Tribal Working Group, the SANDAG Board on June 11, 2010, approved the 2050 RTP Project Evaluation Criteria. These incorporate tribal lands into the overall set of criteria for transit and highway corridors and connectors, as well as the movement of goods.

This effort is summarized in the Government-to-Government Framework with Tribal Nations section of Chapter 6 and detailed in Appendix C.

Public Opinion Survey

SANDAG conducted a public opinion survey in June 2010. The survey provided answers to a number of questions to provide input for the development of the 2050 RTP. Among them: What are residents' priorities when it comes to building more transportation infrastructure, improving transit, and preserving open space? How should the region pay for new infrastructure? Are residents aware of new legislation mandating a reduction in greenhouse gas emissions from cars and light trucks?

SANDAG hired True North Research to conduct a regionwide telephone survey that asked residents about transportation system priorities, gauged awareness of new legislation mandating a reduction in greenhouse gases, and gathered information on what methods the public supports to reduce greenhouse gases from cars and light trucks. The information in the 2050 Regional Transportation Plan: Public Opinion Survey Report (see Technical Appendix 6) helped SANDAG make critical decisions about the 2050 RTP, its SCS, transportation networks, funding priorities, and other transportation infrastructure initiatives.

A total of 1,200 registered voters in the San Diego region were selected using stratified random sampling. This sample of people provided statistically reliable estimates for the region as a whole, as well as within six planning areas (North County West, North County East, North City, Central San Diego, East County, and South County). The study employed a strategic oversample by planning area to balance the statistical margins of error associated with estimates at the planning area level. SANDAG used the survey results to stimulate additional public policy discussions and provide background data to use for developing the 2050 RTP.

The survey results are posted at www.sandag.org/2050rtp.

Public Input Questionnaire

To support the development of the 2050 RTP, SANDAG also developed a public input questionnaire in English and in Spanish that was available online and in print from June to September 2010.

SANDAG distributed printed copies of the questionnaire at community meetings, and to various stakeholders interested in contributing to the development of the 2050 RTP. An online version of the questionnaire was posted on the SANDAG Web site. Information about answering the questionnaire was posted on the SANDAG Web site, distributed in the rEgion and RTP e-mail newsletters, provided at RTP workshops, and disseminated through community-based outreach. Announcements about the questionnaire also were featured in local and regional newspapers. The public input questionnaire contained the same questions as the RTP public opinion phone survey, with a few modifications so it could be converted to online and printed formats. More than 2,600 community members completed the questionnaire. Only one response per computer was allowed. The public input questionnaire was not designed to be representative of everyone's opinions, but rather to serve as a forum for public involvement.

While the questionnaire had the same questions as the statistically valid RTP public opinion telephone survey, the sampling process for the two surveys was quite different. Therefore, the results are different. The RTP public opinion telephone survey was designed to be representative of the region's population. Randomly sampling the population (as was done for the telephone survey) is a scientifically valid way to ensure that the survey results truly represent the views of a majority of residents in the San Diego region. In contrast, people who choose to complete a questionnaire (known as self selection) typically have stronger opinions than the public as a whole. However, the questionnaire did ask more questions about transportation infrastructure and funding priorities than the telephone survey. A report on the public input questionnaire is posted at www.sandag.org/2050rtp.

RTP Video

A three-minute video, entitled "Our Region. Our Future" and produced in English and Spanish, was designed to engage viewers in the discussion about the region's future plans for communities, transportation, employment, the economy, and the environment. The video provides an overview of the work, strategies, forecasts, and public input that are serving as guides for the region's vision through the year 2050.

The 2050 RTP video provides an overview of the work, strategies, forecasts, and public input that are serving as guides for the region's vision through the year 2050.

Visualization Tool

An interactive Web-based visualization tool – called Envision 2050 – was launched in May 2011 following the release of the Draft 2050 RTP and its SCS. The tool visually demonstrated the priorities, investments, transportation system, and other key elements and concepts in the Draft 2050 RTP. The tool also included a Web-based form in English and Spanish for members of the public to submit public comments.

Public Input on the Draft 2050 RTP

Throughout the development of the 2050 RTP, information was provided and public input gathered on various elements of the Plan. They included infrastructure priorities, performance measures, criteria, networks, and funding priorities. As part of this initial development process, public input and feedback were provided to the Policy Advisory Committees and the Board of Directors so this input could be considered during all stages of the decision-making process.

The PIP guided public outreach efforts to gather input on the 2050 RTP, its SCS, and the Draft 2050 RTP EIR. The Regional Planning SWG and community-based organizations provided strategic input and recommendations that SANDAG followed to provide information and obtain public comment on all elements of the 2050 RTP. Following are key accomplishments from the public outreach effort for the 2050 RTP.

Results

- Successfully outreached to partners and stakeholder networks to build awareness of the 2050 RTP and SCS
- Nearly 200 presentations were provided to groups and organizations throughout the county
- Meeting notifications, updates, and informational e-mail blasts were delivered periodically to more than 10,000 subscribers
- Nearly 2,600 visits were made during an 8-week period to the Envision 2050 Web site (www.envision2050sd.com) – an interactive visualization tool that demonstrated the networks and elements of the Draft 2050 RTP and SCS
- Enhanced participation and input from college students, community-based organizations, transportation advocates, transit riders, environmental groups, taxpayer advocates, and others are included in Technical Appendix 6
- A dedicated Web site at www.sandag.org/2050rtp is regularly updated with information, meetings and workshops, and opportunities to provide public input and comments
- Key documents are translated into Spanish and bilingual Spanish/English staff are available at public workshops, hearings, and other meetings
- Nearly 4,100 comments were received on the Draft 2050 RTP and SCS

The following actions support the Plan’s Public Involvement Chapter recommendations:

Public Involvement	
Actions	**Responsible Parties**
1. Continue to use the SANDAG Public Participation Plan to guide efforts to provide information and gather input as 2050 RTP programs and projects are implemented.	SANDAG
2. Implement a process for ongoing collaboration with community-based organizations and other stakeholders in SANDAG programs and projects.	SANDAG, community based organizations, and other stakeholders
3. Track, assess, and report on public outreach and involvement efforts that supported the development of the 2050 RTP and SCS.	SANDAG
4. Follow industry best practices and consider using emerging media, trends, and practices as the 2050 RTP progresses.	SANDAG

Appendix A

2050 RTP Projects, Costs, and Phasing

Appendix Contents

2050 RTP Projects, Costs, and Phasing

This appendix includes information for both the Revenue Constrained Plan and Unconstrained Needs scenario. Detailed highway and transit listings, cost estimates, and phasing are included for the Revenue Constrained Plan. For the Unconstrained Revenue scenario, detailed highway and transit listings and cost estimates are provided. In addition to the projects, costs, and phasing, level of service (LOS) and average daily traffic (ADT) data is included.

Figures A.1 and A.2 depict the 2050 Revenue Constrained transit and highway improvements, respectively. Tables A.1 and A.2 list the capital improvements in the 2050 Revenue Constrained Plan in 2010 and year of expenditure (YOE) dollars, respectively. Tables A.3 and A.4 include highway project phasing with costs shown in 2010 and YOE dollars, respectively. Table A.5 includes transit services phasing and headways for the Revenue Constrained Plan. Tables A.6 and A.7 list major transit expenditures in 2010 and YOE dollars, respectively. Table A.8 lists the phased arterial improvements. In addition to the 2050 Revenue Constrained highway and transit improvements, Figures A.3 through A.6 depict the 2020 and 2035 transit and highway improvements, respectively.

Figure A.7 illustrate the high frequency transit routes in 2035. Figures A.8 and A.9, depict the transit and highway improvements in the 2050 Unconstrained Network, respectively. The 2050 Unconstrained Network is summarized in Tables A.9 through A.11. Table A.9 lists the major capital improvements included in the Unconstrained Network. Tables A.10 and A.11 summarize the differences between the Revenue Constrained and the Unconstrained Networks (transit and highway projects).

Table A.12 lists the projects assumed in the 2050 No Build Scenario.

Figures A.10 and A.11 depict the LOS and ADT volumes for 2008 and for 2050, respectively.

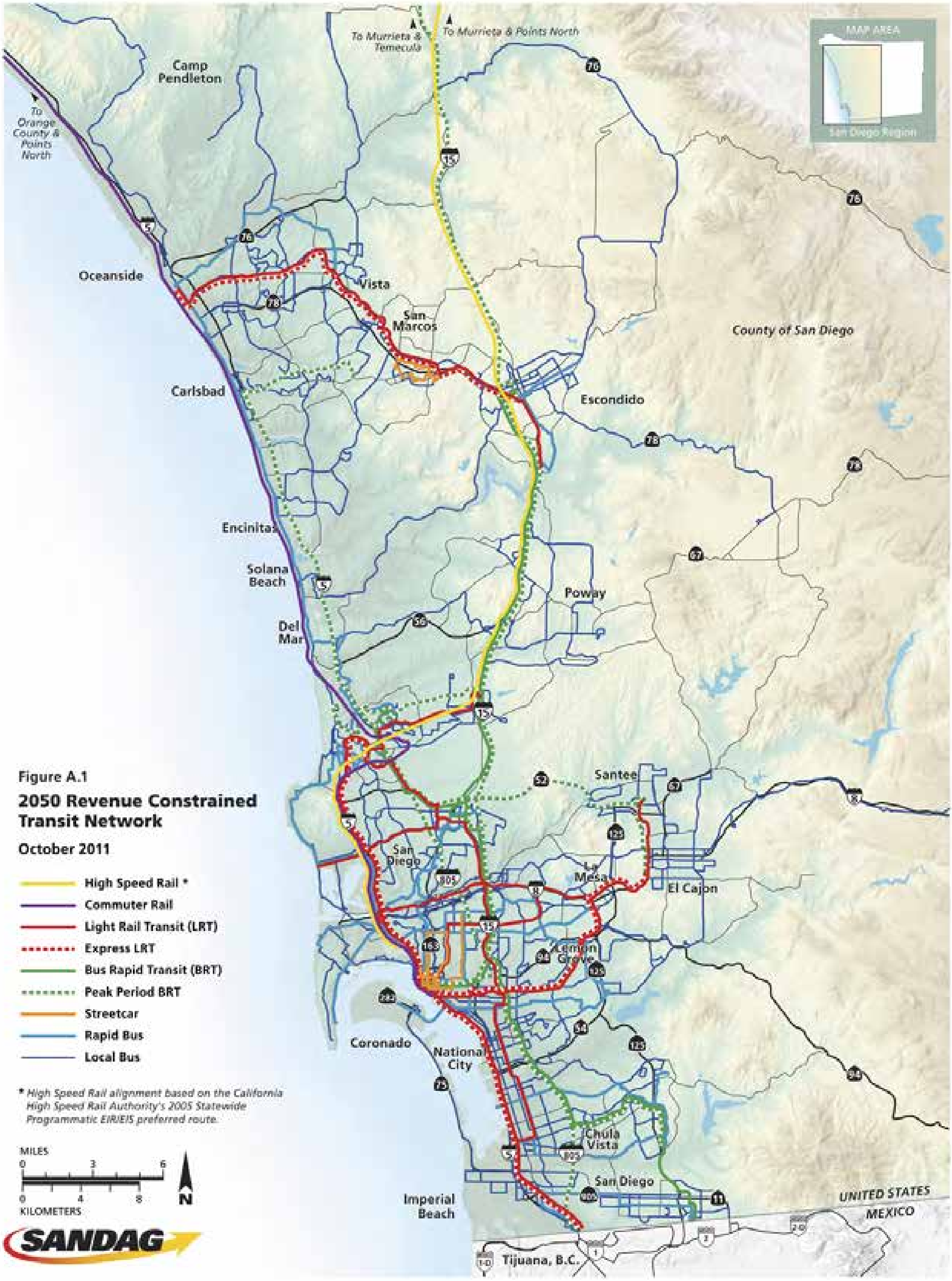


Figure A.1
2050 Revenue Constrained Transit Network
October 2011

- High Speed Rail *
- Commuter Rail
- Light Rail Transit (LRT)
- Express LRT
- Bus Rapid Transit (BRT)
- Peak Period BRT
- Streetcar
- Rapid Bus
- Local Bus

* *High Speed Rail alignment based on the California High Speed Rail Authority's 2005 Statewide Programmatic EIR/EIS preferred route.*

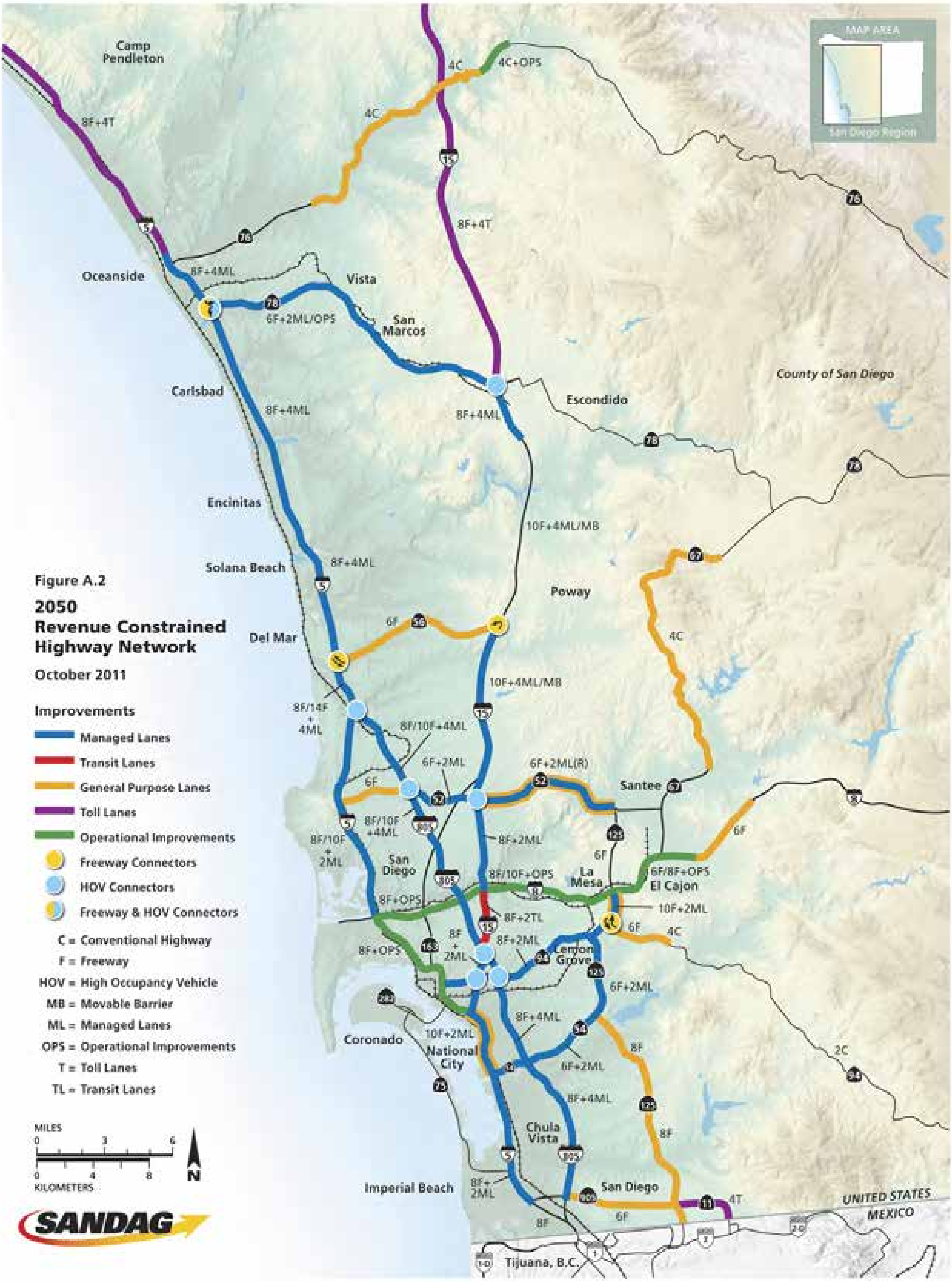


Figure A.2
2050
Revenue Constrained
Highway Network
October 2011
Improvements
Managed Lanes
Transit Lanes
General Purpose Lanes
Toll Lanes
Operational Improvements
Freeway Connectors
HOV Connectors
Freeway & HOV Connectors
C = Conventional Highway
F = Freeway
HOV = High Occupancy Vehicle
MB = Movable Barrier
ML = Managed Lanes
OPS = Operational Improvements
T = Toll Lanes
TL = Transit Lanes
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG
MAP AREA
San Diego Region
Camp Pendleton
Oceanside
Vista
San Marcos
Carlsbad
Escondido
County of San Diego
Encinitas
Solana Beach
Del Mar
Poway
Santee
San Diego
La Mesa
El Cajon
Lemon Grove
Coronado
National City
Chula Vista
Imperial Beach
San Diego
Tijuana, B.C.
UNITED STATES
MEXICO
8F+4T
4C
4C+OPS
8F+4ML
6F+2ML/OPS
10F+4ML/MB
6F
4C
8F/14F + 4ML
8F/10F+4ML
6F+2ML
6F+2ML(R)
8F/10F +4ML
8F/10F + 2ML
8F+2ML
8F/10F+OPS
6F/8F+OPS
8F+OPS
8F+2TL
10F+2ML
8F + 2ML
6F+2ML
8F+4ML
10F+2ML
8F
2C
6F+2ML
8F+4ML
8F+ 2ML
8F
6F
4T

Table A.1 – Capital Improvements – Revenue Constrained Plan ($ millions – 2010 dollars)

Transit Facilities			
Service	**Route**	**Description**	**Cost**
COASTER	398	Double tracking (includes grade separations at Leucadia Blvd and stations/platforms at Convention Center/Petco Park and Del Mar Fairgrounds, Del Mar Tunnel, and quiet zone improvements)	$2,617
SPRINTER	399	Double tracking (includes grade separations at El Camino Real, Vista Village Dr, Melrose Dr, Mission/San Marcos stations and two additional locations)	$970
SPRINTER	588	SPRINTER Express	$284
Trolley	510	Mid-Coast LRT Extension	$1,642
Trolley	510 and 520	Trolley System Rehabilitation (Blue and Orange Lines)	$510
Trolley	510	Blue Line Rail Grade Separations (Taylor St, Washington/ Sassafras St, 28th St, 32nd St, E St, H St, Palomar St)	$550
Trolley	520	Orange Line Rail Grade Separations (Euclid Ave, Broadway/ Lemon Grove Ave, Allison Ave/University Ave/La Mesa Blvd, Severin St)	$312
Trolley	522	Orange Line Express - El Cajon to downtown San Diego	$230
Trolley	540	Blue Line Express - UTC to San Ysidro via downtown	$455
Trolley	560	SDSU to downtown via Mid-City, El Cajon/Park Blvds	$1,921
Trolley	561	UTC to Mira Mesa via Sorrento Mesa/Carroll Canyon	$1,140
Trolley	562	UTC to San Ysidro via Kearny Mesa, Mission Valley, Mid-City, Southeastern San Diego, National City/Chula Vista via Highland Ave/4th Ave	$2,548
Trolley	563	Pacific Beach to El Cajon via Clairemont, Kearny Mesa, Mission Valley, SDSU	$1,262
Trolley	510, 520, 540, 522, and 560	Downtown Trolley Tunnel (12th & Imperial Transit Center to County Center/Little Italy Trolley Station)	$2,592
BRT	90	Santee/El Cajon Transit Centers to downtown via SR 94 (Peak Only)	$0
BRT	470	Escondido – UTC/UCSD via Mira Mesa Blvd	$ 20
BRT	610	Temecula (peak only)/Escondido to downtown	$ 89
BRT	628	South Bay BRT (Otay Mesa-Downtown) via Otay Ranch/Millenia	$200
BRT	640	I-5 - San Ysidro to downtown & Kearny Mesa via I-5 shoulder lanes/HOV lanes, downtown, Hillcrest, Mission Valley	$90
BRT	653	Mid-City to Palomar Airport Road via Kearny Mesa/I-805/I-5	$10
BRT	870	El Cajon to UTC via Santee, SR 52, I-805	$7
BRT	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	$12
BRT	680 and 688/689	Otay Mesa/San Ysidro to Sorrento Mesa via I-805 Corridor, Otay Ranch/Millenia, National City, Southeastern San Diego, Mid-City, Kearny Mesa	$425
BRT	120, 610, and 640	Hillcrest to Mission Valley Transit Priority Measures and I-15 Green Line/BRT transfer station	$400
BRT	-	South Bay Maintenance Facility	$51
BRT	-	Downtown BRT stations/layovers	$110

Table A.1 – Capital Improvements – Revenue Constrained Plan ($ millions – 2010 dollars) (Continued)

Transit Facilities (Continued)			
Service	**Route**	**Description**	**Cost**
Rapid	2	North Park to downtown San Diego via 30th St, Golden Hill	$38
Rapid	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	$85
Rapid	11	Spring Valley to SDSU via Southeastern San Diego, downtown, Hillcrest, Mid-City	$110
Rapid	15	Mid-City Rapid (downtown to SDSU via Mid-City, El Cajon, and Park Blvds)	$68
Rapid	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	$48
Rapid	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	$102
Rapid	120	Kearny Mesa to downtown via Mission Valley	$100
Rapid	471	Downtown Escondido to East Escondido	$31
Rapid	473	Oceanside to UTC via Hwy 101 Coastal Communities, Carmel Valley	$127
Rapid	474	Oceanside to Vista via Mission Ave/Santa Fe Road Corridor	$49
Rapid	635	Eastlake/EUC to Palomar Trolley via Main Street Corridor	$54
Rapid	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	$39
Rapid	637	North Park to 32nd Street Trolley via Golden Hill	$32
Rapid	638	San Ysidro to Otay Mesa via Otay, SR 905 Corridor	$53
Rapid	709	H Street Trolley to Otay Ranch/Millenia via H Street Corridor, Southwestern College	$36
Rapid	910	Coronado to downtown via Coronado Bridge	$25
Streetcar	553	Downtown San Diego: Little Italy to East Village	$277
Streetcar	554	Hillcrest/Balboa Park/downtown San Diego Loop	$249
Streetcar	555	30th St to downtown San Diego via North Park, Golden Hill	$135
Shuttle	448/449	San Marcos Shuttle[1]	$0
Airport Express		Airport Express Routes[2]	$51
Intermodal	-	Airport Intermodal Transit Center	$165
Intermodal	-	San Ysidro Intermodal Transit Center	$50
Other	-	Other Improvements (Vehicles/vehicle replacement, maintenance facilities, transit system rehab, regulatory compliance, park and ride, ITS)	$6,824
		Subtotal	$27,195

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

[2] Capital cost to be funded by aviation funds

Table A.1 – Capital Improvements – Revenue Constrained Plan ($ millions – 2010 dollars) **(Continued)**

Managed Lanes/Highway Projects					
Freeway	**From**	**To**	**Existing**	**Improvements**	**Cost**
I-5	SR 905	SR 54	8F	8F+2ML	$295
I-5	SR 54	SR 15	8F	10F+2ML	$165
I-5	SR 15	I-8	8F	8F+Operational	$1,130
I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	$530
I-5	La Jolla Village Dr	I-5/I-805 Merge	8F/14F	8F/14F+2ML	$250
I-5	I-5/I-805 Merge	SR 56	8F/14F+2HOV	8F/14F+4ML	$50
I-5	SR 56	Vandegrift Blvd	8F/8F+2HOV	8F+4ML	$3,100
I-5	Vandegrift Blvd	Orange County	8F	8F+4T	$754
I-8	I-5	SR 125	8F/10F	8F/10F+Operational	$565
I-8	SR 125	2nd Street	6F/8F	6F/8F+Operational	$125
I-8	2nd Street	Los Coches	4F/6F	6F	$54
SR 11/Otay Mesa East Port of Entry (POE)	SR 905	Mexico	--	4T & POE	$755
SR 15	I-5	SR 94	6F	8F+2ML	$90
SR 15	SR 94	I-805	8F	8F+2ML	$20
SR 15	I-805	I-8	8F	8F+2TL	$45
I-15	I-8	SR 163	8F	8F+2ML	$850
I-15	SR 163	SR 56	8F+2ML(R)	10F+4ML/MB	$419
I-15	Centre City Parkway	SR 78	8F	8F+4ML	$210
I-15	SR 78	Riverside County	8F	8F+4T	$1,005
SR 52	I-5	I-805	4F	6F	$110
SR 52	I-805	I-15	6F	6F+2ML	$223
SR 52	I-15	SR 125	4F	6F+2ML(R)	$325
SR 54	I-5	SR 125	6F	6F+2ML	$100
SR 56	I-5	I-15	4F	6F	$135
SR 67	Mapleview St	Dye Rd	2C/4C	4C	$570
SR 76	Melrose Drive	I-15	2C	4C	$404
SR 76	I-15	Couser Canyon	2C	4C/6C+Operational	$130
SR 78	I-5	I-15	6F	6F+2ML/Operational	$570
SR 94	I-5	SR 125	8F	8F+2ML	$930
SR 94	SR 125	Avocado Blvd	4F	6F	$90
SR 94	Avocado Blvd	Jamacha Rd	4C	6C	$30
SR 94	Jamacha Rd	Steele Canyon Rd	2C/4C	4C	$20

Table A.1 – Capital Improvements – Revenue Constrained Plan ($ millions – 2010 dollars) (Continued)

Managed Lanes/Highway Projects (Continued)					
Freeway	**From**	**To**	**Existing**	**Improvements**	**Cost**
SR 125	SR 905	San Miguel Rd	4T	8F	$110
SR 125	San Miguel Rd	SR 54	4F	8F	$60
SR 125	SR 54	SR 94	6F	6F+2ML	$100
SR 125	SR 94	I-8	8F	10F+2ML	$285
SR 241	Orange County	I-5	--	4T/6T	$501
I-805	SR 905	Carroll Canyon Rd	8F/10F	8F/10F+4ML	$3,781
I-805	Carroll Canyon Rd	I-5 (north)	8F/10F	8F/10F+2ML	$87
SR 905	I-805	Mexico	--	6F	$595
				Subtotal	$19,568

HOV Connectors				
Freeway	**Intersecting Freeway**	**Movement**		**Cost**
I-5	SR 78	South to East and West to North, North to East and West to South		$240
I-5	I-805	North to North & South to South		$110
I-15	SR 52	West to North and South to East		$140
I-15	SR 78	East to South & North to West		$105
SR 15	SR 94	South to West & East to North		$80
SR 15	I-805	North to North & South to South		$90
I-805	SR 52	West to North & South to East		$90
I-805	SR 94	North to West & East to South		$160
			Subtotal	$1,015

Freeway Connectors				
Freeway	**Intersecting Freeway**	**Movement**		**Cost**
I-5	SR 56	West to North and South to East		$185
I-5	SR 78	South to East and West to South		$106
I-15	SR 56	North to West		$100
SR 94	SR 125	South to East and West to North		$319
			Subtotal	$710

Table A.1 – Capital Improvements – Revenue Constrained Plan ($ millions – 2010 dollars) **(Continued)**

Non-Highway Goods Movement Projects		
		Cost
Vesta Street Bridge	Mobility Connector over Harbor Drive at Naval Base San Diego	$60
32nd Street	Freeway Access Enhancement	$119
10th Avenue Marine Terminal Entrance	Rail Line Grade Separation/Barrio Logan Enhancement	$67
National City Marine Terminal	Bay Marina Drive, Civic Center Freeway Access Improvements	$7
National City Rail Yard		$7
	Subtotal	$260
	Total	**$48,748**

Key

C = Conventional Highway Lanes	MB = Movable barrier	T = Toll Lanes
F = Freeway Lanes	ML = Managed lanes (HOV & Value Pricing)	TL = Transit Lanes
HOV = High Occupancy Vehicle Lanes	ML(R) = Managed lanes (Reversible)	

Note: All HOV lanes would convert to Managed Lanes by 2035 with an HOV occupancy of 3+ people.

Table A.2 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars)

Transit Facilities			
Service	**Route**	**Description**	**Cost**
COASTER	398	Double tracking (includes grade separations at Leucadia Blvd, stations/platforms at Convention Center/Petco Park and Del Mar Fairgrounds, Del Mar Tunnel, and quiet zone improvements)	$4,979
SPRINTER	399	Double tracking (includes grade separations at El Camino Real, Vista Village Dr, Melrose Dr, Mission/San Marcos stations and two additional locations)	$1,149
SPRINTER	588	SPRINTER Express	$334
Trolley	510	Mid-Coast LRT Extension	$1,642
Trolley	510 and 520	Trolley System Rehabilitation (Blue and Orange Lines)	$456
Trolley	510	Blue Line Rail Grade Separations (Taylor St, Washington/Sassafras St, 28th St, 32nd St, E St, H St, Palomar St)	$861
Trolley	520	Orange Line Rail Grade Separations (Euclid Ave, Broadway/Lemon Grove Ave, Allison Ave/University Ave/La Mesa Blvd, Severin St)	$491
Trolley	522	Orange Line Express - El Cajon to downtown San Diego	$415
Trolley	540	Blue Line Express - UTC to San Ysidro via downtown	$822
Trolley	560	SDSU to downtown via Mid-City, El Cajon/Park Blvds	$4,009
Trolley	561	UTC to Mira Mesa via Sorrento Mesa/Carroll Canyon	$1,556
Trolley	562	UTC to San Ysidro via Kearny Mesa, Mission Valley, Mid-City, Southeastern San Diego, National City/Chula Vista via Highland Ave/4th Ave	$6,043
Trolley	563	Pacific Beach to El Cajon via Clairemont, Kearny Mesa, Mission Valley, SDSU	$1,978
Trolley	510, 520, 540, 522, and 560	Downtown Trolley Tunnel (12th & Imperial Transit Center to County Center/Little Italy Trolley Station)	$4,293
BRT	90	Santee/El Cajon Transit Centers to downtown via SR 94 (Peak Only)	$0
BRT	470	Escondido – UTC/UCSD via Mira Mesa Blvd	$18
BRT	610	Temecula (peak only)/Escondido to downtown	$80
BRT	628	South Bay BRT (Otay Mesa – downtown) via Otay Ranch/Millenia	$181
BRT	640	I-5 - San Ysidro to downtown & Kearny Mesa via I-5 shoulder lanes/HOV lanes, downtown, Hillcrest, Mission Valley	$86
BRT	653	Mid-City to Palomar Airport Road via Kearny Mesa/I-805/I-5	$16
BRT	870	El Cajon to UTC via Santee, SR 52, I-805	$7
BRT	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	$17
BRT	680 and 688/689	Otay Mesa/San Ysidro to Sorrento Mesa via I-805 Corridor, Otay Ranch/Millenia, National City, Southeastern San Diego, Mid-City, Kearny Mesa	$441
BRT	120, 610, and 640	Hillcrest to Mission Valley Transit Priority Measures and I-15 Green Line/BRT transfer station	$518
BRT	-	South Bay Maintenance Facility	$45
BRT	-	Downtown BRT stations/layovers	$97

Table A.2 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Transit Facilities (Continued)			
Service	**Route**	**Description**	**Cost**
Rapid	2	North Park to downtown San Diego via 30th St, Golden Hill	$43
Rapid	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	$90
Rapid	11	Spring Valley to SDSU via Southeastern San Diego, downtown, Hillcrest, Mid-City	$157
Rapid	15	Mid-City Rapid (downtown to SDSU via Mid-City, El Cajon, and Park Blvds)	$63
Rapid	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	$61
Rapid	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	$142
Rapid	120	Kearny Mesa to downtown via Mission Valley	$131
Rapid	471	Downtown Escondido to East Escondido	$48
Rapid	473	Oceanside to UTC via Hwy 101 Coastal Communities, Carmel Valley	$176
Rapid	474	Oceanside to Vista via Mission Ave/Santa Fe Road Corridor	$76
Rapid	635	Eastlake/EUC to Palomar Trolley via Main Street Corridor	$81
Rapid	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	$57
Rapid	637	North Park to 32nd Street Trolley via Golden Hill	$48
Rapid	638	San Ysidro to Otay Mesa via Otay, SR 905 Corridor	$84
Rapid	709	H Street Trolley to Otay Ranch/Millenia via H Street Corridor, Southwestern College	$39
Rapid	910	Coronado to downtown via Coronado Bridge	$29
Streetcar	553	Downtown San Diego: Little Italy to East Village	$187
Streetcar	554	Hillcrest/Balboa Park/downtown San Diego Loop	$284
Streetcar	555	30th St to downtown San Diego via North Park, Golden Hill	$397
Shuttle	448/449	San Marcos Shuttle[1]	$0
Airport Express		Airport Express Routes[2]	$55
Intermodal	-	Airport Intermodal Transit Center	$171
Intermodal	-	San Ysidro Intermodal Transit Center	$52
Other	-	Other Improvements (Vehicles/vehicle replacement, maintenance facilities, transit system rehab, regulatory compliance, park and ride, ITS)	$10,022
		Subtotal	$43,027

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

[2] Capital cost to be funded by aviation funds.

Table A.2 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Managed Lanes/Highway Projects					
Freeway	**From**	**To**	**Existing**	**Improvements**	**Cost**
I-5	SR 905	SR 54	8F	8F+2ML	$500
I-5	SR 54	SR 15	8F	10F+2ML	$393
I-5	SR 15	I-8	8F	8F+Operational	$2,689
I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	$1,261
I-5	La Jolla Village Dr	I-5/I-805 Merge	8F/14F	8F/14F+2ML	$260
I-5	I-5/I-805 Merge	SR 56	8F/14F+2HOV	8F/14F+4ML	$68
I-5	SR 56	Vandegrift Blvd	8F/8F+2HOV	8F+4ML	$4,286
I-5	Vandegrift Blvd	Orange County	8F	8F+4T	$1,795
I-8	I-5	SR 125	8F/10F	8F/10F+Operational	$1,273
I-8	SR 125	2nd Street	6F/8F	6F/8F+Operational	$226
I-8	2nd Street	Los Coches	4F/6F	6F	$129
SR 11/Otay Mesa East Port of Entry (POE)	SR 905	Mexico	--	4T & POE	$755
SR 15	I-5	SR 94	6F	8F+2ML	$214
SR 15	SR 94	I-805	8F	8F+2ML	$31
SR 15	I-805	I-8	8F	8F+2TL	$47
I-15	I-8	SR 163	8F	8F+2ML	$1,849
I-15	SR 163	SR 56	8F+2ML(R)	10F+4ML/MB	$419
I-15	Centre City Parkway	SR 78	8F	8F+4ML	$210
I-15	SR 78	Riverside County	8F	8F+4T	$2,392
SR 52	I-5	I-805	4F	6F	$262
SR 52	I-805	I-15	6F	6F+2ML	$314
SR 52	I-15	SR 125	4F	6F+2ML(R)	$587
SR 54	I-5	SR 125	6F	6F+2ML	$238
SR 56	I-5	I-15	4F	6F	$244
SR 67	Mapleview St	Dye Rd	2C/4C	4C	$781

Table A.2 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Managed Lanes/Highway Projects (Continued)					
Freeway	**From**	**To**	**Existing**	**Improvements**	**Cost**
SR 76	Melrose Drive	I-15	2C	4C	$404
SR 76	I-15	Couser Canyon	2C	4C/6C+Operational	$235
SR 78	I-5	I-15	6F	6F+2ML/Operational	$592
SR 94	I-5	SR 125	8F	8F+2ML	$1,310
SR 94	SR 125	Avocado Blvd	4F	6F	$214
SR 94	Avocado Blvd	Jamacha Rd	4C	6C	$71
SR 94	Jamacha Rd	Steele Canyon Rd	2C/4C	4C	$48
SR 125	SR 905	San Miguel Rd	4T	8F	$262
SR 125	San Miguel Rd	SR 54	4F	8F	$143
SR 125	SR 54	SR 94	6F	6F+2ML	$238
SR 125	SR 94	I-8	8F	10F+2ML	$421
SR 241	Orange County	I-5	--	4T/6T	$522
I-805	SR 905	Carroll Canyon Rd	8F/10F	8F/10F+4ML	$4,764
I-805	Carroll Canyon Rd	I-5 (north)	8F/10F	8F/10F+2ML	$81
SR 905	I-805	Mexico	--	6F	$595
				Subtotal	$31,123

HOV Connectors			
Freeway	**Intersecting Freeway**	**Movement**	**Cost**
I-5	SR 78	South to East and West to North, North to East and West to South	$377
I-5	I-805	North to North & South to South	$114
I-15	SR 52	West to North and South to East	$260
I-15	SR 78	East to South & North to West	$109
SR 15	SR 94	South to West & East to North	$126
SR 15	I-805	North to North & South to South	$94
I-805	SR 52	West to North & South to East	$146
I-805	SR 94	North to West & East to South	$166
		Subtotal	$1,392

Table A.2 – Capital Improvements – Revenue Constrained Plan ($ millions – YOE dollars) **(Continued)**

Freeway Connectors				
Freeway	**Intersecting Freeway**	**Movement**		**Cost**
I-5	SR 56	West to North and South to East		$253
I-5	SR 78	South to East and West to South		$166
I-15	SR 56	North to West		$186
SR 94	SR 125	South to East and West to North		$391
			Subtotal	$996

Non-Highway Goods Movement Projects			
			Cost
Vesta Street Bridge	Mobility Connector over Harbor Drive at Naval Base San Diego		$59
32nd Street	Freeway Access Enhancement		$117
10th Avenue Marine Terminal Entrance	Rail Line Grade Separation/Barrio Logan Enhancement		$66
National City Marine Terminal	Bay Marina Drive, Civic Center Freeway Access Improvements		$7
National City Rail Yard			$7
		Subtotal	$256
		Total	**$76,794**

KEY

C = Conventional Highway Lanes	MB = Movable barrier	T= Toll Lanes
F = Freeway Lanes	ML = Managed lanes (HOV & Value Pricing)	TL = Transit Lanes
HOV= High Occupancy Vehicle Lanes	ML(R) = Managed lanes (Reversible)	

Note: All HOV lanes would convert to Managed Lanes by 2035 with an HOV occupancy of 3+ people.

Table A.3 – Phased Highway Projects – Revenue Constrained Plan ($ millions – 2010 dollars)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions - 2010 Dollars) Cost	Cumulative Cost
2018	I-5	Manchester Ave	SR 78	8F	8F+2HOV	$480	$480
2018	SR 11/ Otay Mesa East POE	SR 905	Mexico	--	4T	$755	$1,235
2018	I-15	SR 163	SR 56	8F+2ML(R)	10F+4ML/MB	$419	$1,654
2018	I-15	Centre City Parkway	SR 78	8F	8F+4ML	$210	$1,864
2018	SR 76	Melrose Drive	I-15	2C	4C	$404	$2,268
2018	SR 241	Orange County	I-5	--	4T	$443	$2,711
2018	I-805	Palomar St	SR 94	8F	8F+2HOV	$200	$2,911
2018	I-805	SR 52	Carroll Canyon Rd	8F/10F	8F/10F+2HOV	$163	$3,074
2018	I-805	Carroll Canyon Rd	I-5 (north)	8F/10F	8F/10F+2ML	$87	$3,161
2018	SR 905	I-805	Mexico	--	6F	$595	$3,756
2018	Vesta Street Bridge		Mobility Connector over Harbor Drive at Naval Base San Diego			$60	$3,816
2018	32nd Street		Freeway Access Enhancement			$119	$3,935
2018	10th Avenue Marine Terminal Entrance		Rail Line Grade Separation/Barrio Logan Enhancement			$67	$4,002
2018	National City Marine Terminal		Bay Marina Drive, Civic Center Freeway Access Improvements			$7	$4,009
2020	I-5	La Jolla Village Drive	I-5/I-805 Merge	8F/14F	8F/14F+2ML	$250	$4,259
2020	I-5/I-805	North to North & South to South (HOV Connectors)				$110	$4,369
2020	SR 15	I-805	I-8	8F	8F+2TL	$45	$4,414
2020	I-15	I-8	SR 163	8F	8F+2ML	$130	$4,544
2020	SR 15/ I-805	North to North & South to South (HOV Connectors)				$90	$4,634
2020	I-15/SR 78	East to South & North to West (HOV Connectors)				$105	$4,739
2020	SR 78	I-5	I-15	6F	6F+2ML/Operational	$570	$5,309
2020	SR 94	I-5	I-805	8F	8F+2ML	$480	$5,789
2020	SR 94/ SR 125	South to East (Freeway Connector)				$139	$5,928
2020	I-805	Palomar St	SR 15	8F/8F+ 2HOV[1]	8F+4ML	$1,200	$7,128

Table A.3 – Phased Highway Projects – Revenue Constrained Plan ($ millions – 2010 dollars) (Continued)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions - 2010 Dollars) Cost	Cumulative Cost
2020	I-805/ SR 94	North to West & East to South (HOV Connectors)				$160	$7,288
2020	I-805	SR 52	Carroll Canyon Rd	8F/10F+ 2HOV	8F/10F+4ML	$391	$7,679
2020	National City Rail Yard					$7	$7,686
2030	I-5	Palomar St	SR 15	8F	8F+2ML	$200	$7,886
2030	I-5	I-5/I-805 Merge	SR 56	8F/14F+2HOV	8F/14F+4ML	$50	$7,936
2030	I-5	SR 56	Manchester Ave	8F+2HOV	8F+4ML	$500	$8,436
2030	I-5/SR 56	West to North (Freeway Connector)				$65	$8,501
2030	I-5/SR 56	South to East (Freeway Connector)				$120	$8,621
2030	I-5	Manchester Ave	Palomar Airport Rd	8F+2HOV[2]	8F+4ML	$950	$9,571
2030	SR 67	Mapleview St	Dye Rd	2C/4C	4C	$570	$10,141
2030	SR 94/ SR 125	West to North (Freeway Connector)				$180	$10,321
2030	SR 125	SR 94	I-8	8F	10F	$215	$10,536
2030	SR 241	Orange County	I-5	4T	6T	$58	$10,594
2030	I-805	SR 905	Palomar St	8F	8F+4ML	$350	$10,944
2030	I-805	SR 15	Mission Valley Viaduct	8F	8F+4ML	$230	$11,174
2030	I-805	Mission Valley Viaduct	SR 52	8F/10F	8F/10F+4ML	$637	$11,811
2035	I-5	Palomar Airport Rd	SR 78	8F+2HOV[2]	8F+4ML	$750	$12,561
2035	I-5	SR 78	Vandegrift Blvd	8F	8F+4ML	$420	$12,981
2035	I-5/SR 78	South to East and West to North (HOV Connectors)				$120	$13,101
2035	I-5/SR 78	North to East and West to South (HOV Connectors)				$120	$13,221
2035	I-5/SR 78	South to East (Freeway Connector)				$60	$13,281
2035	I-5/SR 78	West to South (Freeway Connector)				$46	$13,327
2035	SR 15	SR 94	I-805	8F	8F+2ML	$20	$13,347
2035	SR 15/ SR 94	South to West & East to North (HOV Connectors)				$80	$13,427
2035	SR 52	I-805	I-15	6F	6F+2ML	$223	$13,650

Table A.3 – Phased Highway Projects – Revenue Constrained Plan ($ millions – 2010 dollars) (Continued)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions - 2010 Dollars) Cost	Cumulative Cost
2040	I-8	I-15	SR 125	8F/10F	8F/10F+Operational	$125	$13,775
2040	I-8	SR 125	2nd Street	6F/8F	6F/8F+Operational	$125	$13,900
2040	SR 52	I-15	SR 125	4F	6F+2ML(R)	$325	$14,225
2040	SR 56	I-5	I-15	4F	6F	$135	$14,360
2040	SR 76	I-15	Couser Canyon	2C	4C/6C+Operational	$130	$14,490
2040	SR 94	I-805	College Ave	8F	8F+2ML	$220	$14,710
2040	SR 94	College Ave	SR 125	8F	8F+2ML	$230	$14,940
2040	SR 125	SR 94	I-8	10F	10F+2ML	$70	$15,010
2040	I-805	Mission Valley Viaduct		8F	8F+4ML	$610	$15,620
2040	I-805/ SR 52	West to North & South to East (HOV Connectors)				$90	$15,710
2050	I-5	SR 905	Palomar St	8F	8F+2ML	$95	$15,805
2050	I-5	SR 54	I-15	8F	10F+2ML	$165	$15,970
2050	I-5	I-15	I-8	8F	8F+Operational	$1,130	$17,100
2050	I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	$530	$17,630
2050	I-5	Vandegrift Blvd	Orange County	8F	8F+4T	$754	$18,384
2050	I-8	I-5	I-15	8F	8F+Operational	$440	$18,824
2050	I-8	2nd Street	Los Coches	4F/6F	6F	$54	$18,878
2050	SR 15	I-5	SR 94	6F	8F+2ML	$90	$18,968
2050	I-15	Viaduct		8F	8F+2ML	$720	$19,688
2050	I-15	SR 78	Riverside County	8F	8F+4T	$1,005	$20,693
2050	I-15/SR 52	West to North and South to East (HOV Connectors)				$140	$20,833
2050	I-15/SR 56	North to West (Freeway Connector)				$100	$20,933
2050	SR 52	I-5	I-805	4F	6F	$110	$21,043
2050	SR 54	I-5	SR 125	6F	6F+2ML	$100	$21,143

Table A.3 – Phased Highway Projects – Revenue Constrained Plan ($ millions – 2010 dollars) (Continued)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions - 2010 Dollars) Cost	Cumulative Cost
2050	SR 94	SR 125	Avocado Blvd	4F	6F	$90	$21,233
2050	SR 94	Avocado Blvd	Jamacha Rd	4C	6C	$30	$21,263
2050	SR 94	Jamacha Rd	Steele Canyon Rd	2C/4C	4C	$20	$21,283
2050	SR 125	SR 905	San Miguel Rd	4T	8F	$110	$21,393
2050	SR 125	San Miguel Rd	SR 54	4F	8F	$60	$21,453
2050	SR 125	SR 54	SR 94	6F	6F+2ML	$100	$21,553

KEY

C = Conventional Highway Lanes

F = Freeway Lanes

HOV = High Occupancy Vehicle Lanes

MB = Movable barrier

ML = Managed lanes (HOV & Value Pricing)

ML(R) = Managed lanes (Reversible)

T = Toll Lanes

TL = Transit Lanes

[1] Project completed in two phases. See improvement from 8F to 8F+2HOV by 2018.

[2] Project completed in two phases. See improvement from 8F to 8F+2HOV by 2018.

Note: All HOV lanes would convert to Managed Lanes by 2035 with an HOV occupancy of 3+ people.

Table A.4 – Phased Highway Projects – Revenue Constrained Plan ($ millions – YOE dollars)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions - YOE Dollars) Cost	Cumulative Cost
2018	I-5	Manchester Ave	SR 78	8F	8F+2HOV	$460	$460
2018	SR 11/ Otay Mesa East POE	SR 905	Mexico	--	4T	$755	$1,215
2018	I-15	SR 163	SR 56	8F+2ML(R)	10F+4ML/MB	$419	$1,634
2018	I-15	Centre City Parkway	SR 78	8F	8F+4ML	$210	$1,844
2018	SR 76	Melrose Drive	I-15	2C	4C	$404	$2,248
2018	SR 241	Orange County	I-5	--	4T	$443	$2,691
2018	I-805	Palomar St	SR 94	8F	8F+2HOV	$197	$2,888
2018	I-805	SR 52	Carroll Canyon Rd	8F/10F	8F/10F+2HOV	$160	$3,048
2018	I-805	Carroll Canyon Rd	I-5 (north)	8F/10F	8F/10F+2ML	$81	$3,129
2018	SR 905	I-805	Mexico	--	6F	$595	$3,724
2018	Vesta Street Bridge		Mobility Connector over Harbor Drive at Naval Base San Diego			$59	$3,783
2018	32nd Street		Freeway Access Enhancement			$117	$3,900
2018	10th Avenue Marine Terminal Entrance		Rail Line Grade Separation/Barrio Logan Enhancement			$66	$3,966
2018	National City Marine Terminal		Bay Marina Drive, Civic Center Freeway Access Improvements			$7	$3,973
2020	I-5	La Jolla Village Drive	I-5/I-805 Merge	8F/14F	8F/14F+2ML	$260	$4,233
2020	I-5/I-805	North to North & South to South (HOV Connectors)				$114	$4,347
2020	SR 15	I-805	I-8	8F	8F+2TL	$47	$4,394
2020	I-15	I-8	SR 163	8F	8F+2ML	$135	$4,529
2020	SR 15/ I-805	North to North & South to South (HOV Connectors)				$94	$4,623
2020	I-15/SR 78	East to South & North to West (HOV Connectors)				$109	$4,732
2020	SR 78	I-5	I-15	6F	6F+2ML/Operational	$592	$5,324
2020	SR 94	I-5	I-805	8F	8F+2ML	$499	$5,823
2020	SR 94/ SR 125	South to East (Freeway Connector)				$144	$5,967
2020	I-805	Palomar St	SR 15	8F/8F+2HOV[1]	8F+4ML	$1,247	$7,214

Table A.4 – Phased Highway Projects – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions - YOE Dollars) Cost	Cumulative Cost
2020	I-805/ SR 94	North to West & East to South (HOV Connectors)				$166	$7,380
2020	I-805	SR 52	Carroll Canyon Rd	8F/10F+ 2HOV	8F/10F+4ML	$406	$7,786
2020	National City Rail Yard					$7	$7,793
2030	I-5	Palomar St	SR 15	8F	8F+2ML	$274	$8,067
2030	I-5	I-5/I-805 Merge	SR 56	8F/14F+2H OV	8F/14F+4ML	$68	$8,135
2030	I-5	SR 56	Manchester Ave	8F+2HOV	8F+4ML	$685	$8,820
2030	I-5/SR 56	West to North (Freeway Connector)				$89	$8,909
2030	I-5/SR 56	South to East (Freeway Connector)				$164	$9,073
2030	I-5	Manchester Ave	Palomar Airport Rd	8F+2HOV[2]	8F+4ML	$1,301	$10,374
2030	SR 67	Mapleview St	Dye Rd	2C/4C	4C	$781	$11,155
2030	SR 94/ SR 125	West to North (Freeway Connector)				$247	$11,402
2030	SR 125	SR 94	I-8	8F	10F	$295	$11,697
2030	SR 241	Orange County	I-5	4T	6T	$79	$11,776
2030	I-805	SR 905	Palomar St	8F	8F+4ML	$463	$12,239
2030	I-805	SR 15	Mission Valley Viaduct	8F	8F+4ML	$315	$12,554
2030	I-805	Mission Valley Viaduct	SR 52	8F/10F	8F/10F+4ML	$873	$13,427
2035	I-5	Palomar Airport Rd	SR 78	8F+ 2HOV[2]	8F+4ML	$1,181	$14,608
2035	I-5	SR 78	Vandegrift Blvd	8F	8F+4ML	$661	$15,269
2035	I-5/SR 78	South to East and West to North (HOV Connectors)				$189	$15,458
2035	I-5/SR 78	North to East and West to South (HOV Connectors)				$188	$15,646
2035	I-5/SR 78	South to East (Freeway Connector)				$94	$15,740
2035	I-5/SR 78	West to South (Freeway Connector)				$72	$15,812
2035	SR 15	SR 94	I-805	8F	8F+2ML	$31	$15,843
2035	SR 15/ SR 94	South to West & East to North (HOV Connectors)				$126	$15,969
2035	SR 52	I-805	I-15	6F	6F+2ML	$314	$16,283

Table A.4 – Phased Highway Projects – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions - YOE Dollars) Cost	Cumulative Cost
2040	I-8	I-15	SR 125	8F/10F	8F/10F+Operational	$226	$16,509
2040	I-8	SR 125	2nd Street	6F/8F	6F/8F+Operational	$226	$16,735
2040	SR 52	I-15	SR 125	4F	6F+2ML(R)	$587	$17,322
2040	SR 56	I-5	I-15	4F	6F	$244	$17,566
2040	SR 76	I-15	Couser Canyon	2C	4C/6C+Operational	$235	$17,801
2040	SR 94	I-805	College Ave	8F	8F+2ML	$396	$18,197
2040	SR 94	College Ave	SR 125	8F	8F+2ML	$415	$18,612
2040	SR 125	SR 94	I-8	10F	10F+2ML	$126	$18,738
2040	I-805	Mission Valley Viaduct		8F	8F+4ML	$1,101	$19,839
2040	I-805/ SR 52	West to North & South to East (HOV Connectors)				$146	$19,985
2050	I-5	SR 905	Palomar St	8F	8F+2ML	$226	$20,211
2050	I-5	SR 54	I-15	8F	10F+2ML	$393	$20,604
2050	I-5	I-15	I-8	8F	8F+Operational	$2,689	$23,293
2050	I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	$1,261	$24,554
2050	I-5	Vandegrift Blvd	Orange County	8F	8F+4T	$1,795	$26,349
2050	I-8	I-5	I-15	8F	8F+Operational	$1,047	$27,396
2050	I-8	2nd Street	Los Coches	4F/6F	6F	$129	$27,525
2050	SR 15	I-5	SR 94	6F	8F+2ML	$214	$27,739
2050	I-15	Viaduct		8F	8F+2ML	$1,714	$29,453
2050	I-15	SR 78	Riverside County	8F	8F+4T	$2,392	$31,845
2050	I-15/SR 52	West to North and South to East (HOV Connectors)				$260	$32,105
2050	I-15/SR 56	North to West (Freeway Connector)				$186	$32,291
2050	SR 52	I-5	I-805	4F	6F	$262	$32,553
2050	SR 54	I-5	SR 125	6F	6F+2ML	$238	$32,791

Table A.4 – Phased Highway Projects – Revenue Constrained Plan ($ millions – YOE dollars) (Continued)

Year Built By	Freeway	From	To	Existing	Improvements	($ Millions - YOE Dollars) Cost	Cumulative Cost
2050	SR 94	SR 125	Avocado Blvd	4F	6F	$214	$33,005
2050	SR 94	Avocado Blvd	Jamacha Rd	4C	6C	$71	$33,076
2050	SR 94	Jamacha Rd	Steele Canyon Rd	2C/4C	4C	$48	$33,124
2050	SR 125	SR 905	San Miguel Rd	4T	8F	$262	$33,386
2050	SR 125	San Miguel Rd	SR 54	4F	8F	$143	$33,529
2050	SR 125	SR 54	SR 94	6F	6F+2ML	$238	$33,767

KEY

C = Conventional Highway Lanes	MB = Movable barrier	T = Toll Lanes
F = Freeway Lanes	ML = Managed lanes (HOV & Value Pricing)	TL = Transit Lanes
HOV = High Occupancy Vehicle Lanes	ML(R) = Managed lanes (Reversible)	

[1] Project completed in two phases. See improvement from 8F to 8F+2HOV by 2018.

[2] Project completed in two phases. See improvement from 8F to 8F+2HOV by 2018.

Note: All HOV lanes would convert to Managed Lanes by 2035 with an HOV occupancy of 3+ people.

Table A.5 – Phased Transit Services – Revenue Constrained Plan

Decade	Service	Route	Description	Peak Headway (Minutes)	Off-Peak Headway (Minutes)
2018	COASTER	398	Double tracking/Increased Frequency between Oceanside and downtown San Diego with extension to Convention Center/Petco Park	20	Current
2018	Trolley	510	Mid-Coast LRT Extension (peak frequencies 7.5 to downtown/15 to UTC)	7.5/15	15
2018	Trolley	530	Green Line Extend to downtown – Bayside	15	15
2018	BRT	470	Escondido – UTC/UCSD via Mira Mesa Blvd	10	-
2018	BRT	607	Rancho Bernardo – downtown Express	10	-
2018	BRT	608	Escondido – downtown Express	10	-
2018	BRT	610	Temecula (Peak Only)/Escondido – downtown	10	10
2018	BRT	628	South Bay BRT (Otay Mesa – downtown) via Otay Ranch/Millenia	15	-
2018	BRT	680	Otay Mesa to Sorrento Mesa via I-805 Corridor, Otay Ranch/Millenia, National City, Southeastern San Diego, Kearny Mesa	15	15
2018	BRT	688	San Ysidro to Sorrento Mesa Express	15	-
2018	BRT	689	Millenia/Otay Ranch to UTC/Torrey Pines Express	15	-
2018	Rapid	15	Mid-City Rapid (SDSU – downtown) via Mid-City, El Cajon and Park Blvds	10	10
2018	Rapid	201/202	UTC Area Super Loop	10	15
2018	Rapid	350	Escondido to Del Lago via Escondido Blvd & Bear Valley	10	10
2020	Streetcar	554	Hillcrest/Balboa Park/downtown San Diego Loop	10	10
2020	BRT	90	Santee/El Cajon Transit Centers to downtown via SR 94	15	-
2020	BRT	640	I-5 - San Ysidro to downtown & Kearny Mesa via I-5 shoulder lanes/HOV lanes, downtown, Hillcrest, Mission Valley	15	15
2020	BRT	870	El Cajon to UTC via Santee, SR 52, I-805 (Peak only)	10	-
2020	Rapid	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	10	10
2020	Shuttle	448/449	San Marcos Shuttle	15	15
2020	Airport Express		I-5 from McClellan-Palomar Airport to San Diego International Airport	30	30
2020	Airport Express		I-15 from Escondido Transit Center to San Diego International Airport	30	30
2020	Airport Express		I-15 from Escondido Transit Center to Cross Border Facility	30	30
2020			Local Bus Routes - 15 minutes in key corridors	15	15

Table A.5 – Phased Transit Services – Revenue Constrained Plan (Continued)

Decade	Service	Route	Description	Peak Headway (Minutes)	Off-Peak Headway (Minutes)
2030	COASTER	398	Additional Double tracking/Increased Frequency	20	60
2030	SPRINTER	399	Double tracking (Oceanside-Escondido) Increased Frequencies	10	10
2030	Trolley	561	UTC to Mira Mesa via Sorrento Mesa/Carroll Canyon (extension of route 510)	7.5	7.5
2030	Trolley	520	Orange Line - Increased Frequency (existing 15/15)	7.5	15
2030	Streetcar	553	Downtown San Diego: Little Italy to East Village	10	10
2030	SPRINTER	588	SPRINTER Express	10	15
2030	BRT	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	10	-
2030	Rapid	2	North Park to downtown San Diego via North Park, Golden Hill	10	10
2030	Rapid	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	10	10
2030	Rapid	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	10	10
2030	Rapid	120	Kearny Mesa to downtown via Mission Valley	10	10
2030	Rapid	473	Oceanside to UTC via Hwy 101 Coastal Communities, Carmel Valley	10	10
2030	Rapid	709	H Street Trolley to Otay Ranch/Millenia via H Street Corridor, Southwestern College	10	10
2030	Rapid	910	Coronado to downtown via Coronado Bridge	10	10
2035	Trolley	520	Orange Line - Extend to Airport Intermodal Transit Center	7.5	15
2035	Streetcar	555	30th St to downtown San Diego via North Park/Golden Hill	10	10
2035	Trolley	560	Mid-City to downtown (Phase 1) via El Cajon and Park Blvds	7.5	7.5
2035	Trolley	563	Pacific Beach to El Cajon via Clairemont, Kearny Mesa, Mission Valley, SDSU	7.5	10
2035	BRT	653	Mid-City to Palomar Airport Road via Kearny Mesa/I-805/I-5	15	-
2035	Rapid	11	Spring Valley to SDSU via Southeastern San Diego, Downtown, Hillcrest, Mid-City	10	10
2035	Rapid	201/202	UTC Area Super Loop - Increase Frequencies	10	10
2035	Rapid	471	Downtown Escondido to East Escondido	10	10
2035	Rapid	474	Oceanside to Vista via Mission Ave/Santa Fe Road Corridor	10	10
2035	Rapid	635	Eastlake/EUC to Palomar Trolley via Main Street Corridor	10	10
2035	Rapid	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	10	10
2035	Rapid	637	North Park to 32nd Street Trolley via Golden Hill	10	10

Table A.5 – Phased Transit Services – Revenue Constrained Plan (Continued)

Decade	Service	Route	Description	Peak Headway (Minutes)	Off-Peak Headway (Minutes)
2035	Rapid	638	San Ysidro to Otay Mesa via Otay, SR 905 Corridor	10	10
2035	Shuttle	448/449	San Marcos - Increase Frequencies	10	10
2035			Local Bus Routes - 10 minutes in key corridors	10	10
2040	Trolley	520	Orange Line - Increased Frequencies	7.5	7.5
2040	Trolley	522	Orange Line Express - El Cajon to downtown San Diego	10	10
2040	Trolley	530	Green Line Extend to downtown - Bayside	7.5	7.5
2040	Trolley	540	Blue Line Express - UTC to San Ysidro via downtown	10	10
2050	Trolley	560	SDSU to downtown (Phase 2) via Mid-City, El Cajon and Park Blvds	7.5	7.5
2050	Trolley	562	UTC to San Ysidro via Kearny Mesa, Mission Valley, Mid-City, Southeastern San Diego, National City/Chula Vista via Highland Ave/4th Ave	7.5	10

Table A.6 – Major Transit Expenditures – Revenue Constrained Plan ($ millions – 2010 dollars)

Project Categories	2010 - 2020	2021 - 2030	2031 - 2040	2041 - 2050	Total
Major New Facilities	$4,519	$4,001	$6,345	$5,506	$20,371
Miscellaneous Capital/Rehabilitation/Replacement	$1,368	$1,807	$1,142	$2,507	$6,824
Transit Operations	$3,449	$4,220	$5,840	$6,191	$19,700
ADA, Senior, and Specialized Transportation Services	$345	$422	$584	$619	$1,970
High-Speed Rail	$0	$0	$0	$7,000	$7,000
TOTAL	**$9,681**	**$10,450**	**$13,911**	**$21,823**	**$55,865**

Table A.7 – Major Transit Expenditures - Revenue Constrained Plan ($ millions – YOE dollars)

Project Categories	2010 - 2020	2021 - 2030	2031 - 2040	2041 - 2050	Total
Major New Facilities	$4,512	$5,917	$9,583	$12,993	$33,005
Miscellaneous Capital/Rehabilitation/Replacement	$1,392	$2,511	$1,196	$4,923	$10,022
Transit Operations	$3,993	$6,775	$12,942	$18,977	$42,687
ADA, Senior, and Specialized Transportation Services	$399	$677	$1,294	$1,898	$4,268
High-Speed Rail	$0	$0	$0	$16,644	$16,644
TOTAL	**$10,296**	**$15,880**	**$25,015**	**$55,435**	**$106,626**

Table A.8 – Phased Arterial Projects[1] – Revenue Constrained Plan

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2018	CB04A	Carlsbad	El Camino Real Widening - Tamarack Avenue to Chestnut Avenue	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
2018	CB04B	Carlsbad	El Camino Real and Cannon Road	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
2018	CB04C	Carlsbad	El Camino Real - Lisa Street to Crestview Drive	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
2018	CB12	Carlsbad	College Boulevard Reach A - Badger Lane to Cannon Road	In Carlsbad, from Badger Lane to Cannon Road, 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
2018	CB13	Carlsbad	Poinsettia Lane Reach E - Cassia Drive to Skimmer Court	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
2018	CB22	Carlsbad	Avenida Encinas - Widen from Palomar Airport Road to EWPCF	In Carlsbad, Avenida Encinas from Palomar Airport Road southerly to existing improvements adjacent to the EWPCF, roadway widening to Secondary Arterial standards
2018	CB24	Carlsbad	College Boulevard and Palomar Airport Road - Intersection Improvements	In Carlsbad, at the intersection of College Blvd. and Palomar Airport Road, roadway widening along southbound College Blvd. to provide dual left turns, one thru lane, one shared thru/right turn lane and one right turn lane and to lengthen right turn lanes on the other approaches to the intersection
2018	CB26	Carlsbad	Melrose and Palomar Airport Road	In Carlsbad, at the intersection of Palomar Airport Road and Melrose Drive, roadway widening along southbound Melrose to provide an additional right turn lane to westbound Palomar Airport Road
2018	CB32	Carlsbad	El Camino Real Widening - Cassia to Camino Vida Roble	In Carlsbad, widen El Camino Real from 900 feet north of Cassia Road to Camino Vida Roble, along the northbound side of the roadway to provide three travel lanes and a bike lane in accordance with Prime Arterial standards
2018	CB30	Carlsbad	El Camino Real – El Camino Real to Tamarack Avenue	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

[1] The arterials listed in this table reflect locally initiated projects that were submitted by local jurisdictions in the 2010 Regional Transportation Improvement Program.

Table A.8 – Phased Arterial Projects – Revenue Constrained Plan (Continued)

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2018	CB31	Carlsbad	El Camino Real – La Costa Avenue to Arenal Road	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
2018	CB33	Carlsbad	Palomar Airport Road and El Camino Real Right Turn Lane	In Carlsbad, widening along eastbound Palomar Airport Road to provide a dedicated right turn lane to southbound El Camino Real
2018	CB34	Carlsbad	Palomar Airport Road - Palomar Airport Road to Paseo Del Norte	In Carlsbad widening along eastbound Palomar Airport Road to provide a dedicated right turn lane to southbound Paseo Del Norte
2018	CB35	Carlsbad	Palomar Airport Road - Palomar Airport Road to Paseo Del Norte	In Carlsbad lengthen the left turn pocket along eastbound Palomar Airport Road to northbound Paseo Del Norte
2018	CHV08	Chula Vista	Willow Street Bridge Project - Bonita Road to Sweetwater Road	Replace and widen bridge including shoulders
2018	CHV20	Chula Vista	North Fourth Avenue and Brisbane Street	Add additional lane on east side of Fourth Avenue
2018	CNTY14	San Diego County	South Santa Fe Avenue North - Montgomery Drive to South of Woodland Drive	Vista City limits to 700 feet south of Woodland - reconstruct and widen from 2 to 4 lanes including bicycle lane
2018	CNTY21	San Diego County	Bradley Avenue Overpass at SR 67 - Magnolia Avenue to Mollison Avenue	Widen Bradley Avenue including the SR 67 overpass from 2 to 4 lanes plus sidewalks
2018	CNTY24	San Diego County	Cole Grade Road - North of Horse Creek Trail to South of Pauma Heights Road	Widen to accommodate 14-ft traffic lane in both direction, 12-ft center 2-way left turn, 6-ft bike lane & 10-ft pathway
2018	CNTY34	San Diego County	Dye Road Extension - Dye Road to San Vicente Road	In Ramona, study, design and construct a 2-lane community collector road with intermittent turn lanes, bike lanes, curb, gutter, and pathway/walkway
2018	CNTY35	San Diego County	Ramona Street Extension - 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
2018	CNTY36	San Diego County	San Vicente Road Improvements - Warnock Drive to Wildcat Canyon Road	In Ramona, design and reconstruct road improvements, including 2-lane community collector road with intermittent turn lanes, bike lanes, asphalt concrete dike, and pathway/walkway

Table A.8 – Phased Arterial Projects – Revenue Constrained Plan **(Continued)**

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2018	CNTY39	San Diego County	Bear Valley Parkway North - 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
2018	CNTY76	San Diego County	Jamacha Blvd (Phase 1 and 2) - Omega Street to Sweetwater Spring Boulevard	In unincorporated Spring Valley, the current funds programmed are for Phase 1 - between Omega Street and Spring Valley Glen, widen from 2-lane to 4-lane roadway with bicycle and pedestrian improvements
2018	ENC31	Encinitas	I-5/Encinitas Boulevard Interchange Modification	Modify interchange to improve safety and alleviate congestion (design only)
2018	ESC02	Escondido	Bear Valley/East Valley/Valley Center - Citrus Avenue to Beven Drive	Realignment and widening from 2 to 4 lanes
2018	ESC02A	Escondido	East Valley/Valley Center	Widen roadway from 4 to 6 lanes with raised medians and left turn pockets; modify signal at Lake Wohlford and Valley Center Road; widen bridge over Escondido Creek
2018	ESC03	Escondido	Citracado Parkway - Don Lee Place to Vineyard	Widen from 2 to 4 lanes with left turn pockets and new traffic signal at Aero Way and Citracado Parkway
2018	ESC04	Escondido	Citracado Parkway II - West Valley to Harmony Grove	Widen from 2 to 4 lanes with raised medians, construct bridge over Escondido Creek
2018	ESC05	Escondido	El Norte Parkway Phase IV	Widen from 2 to 4 lanes and construct missing section of El Norte Pkwy. with left turn pockets, raised medians and new traffic signals
2018	ESC06	Escondido	El Norte Parkway Bridge at Escondido Creek - Kaile Lane to Key Lime Way	Construct missing 2-lane bridge at Escondido Creek
2018	ESC08	Escondido	Felicita Avenue/ Juniper Street - from Escondido Boulevard to Juniper Street and from Juniper Street to Chestnut Street	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
2018	ESC09	Escondido	Ninth Avenue – La Terraza Boulevard to Spruce Street	Widen from 2 to 4 lanes with raised median and modify traffic signals at Ninth Avenue and Tulip Street - design phase
2018	ESC24	Escondido	Centre City Parkway - Mission Road to SR 78	Widen 4 lanes to 6 lanes with intersection improvements

Table A.8 – Phased Arterial Projects – Revenue Constrained Plan (Continued)

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2018	ESC25	Escondido	Citracado/Nordahl - Country Club Lane to SR 78	Widen from 4 lanes to 6 lanes with double left turn lanes and exclusive right turn lanes
2018	LG13	Lemon Grove	Street Improvements (Congestion Relief)	Lemon Grove Avenue Realignment Project: A key project in the redevelopment of the city's downtown Village Specific Plan, this project improves access to and from SR 94, reducing motorist delays and emissions, while greatly enhancing the visual appeal of the block adjacent to the trolley station.
2018	NC01	National City	Plaza Boulevard Widening	Widen from 2 to 3 lanes including a new traffic lane in each direction, new sidewalks, sidewalk widening, traffic signal upgrades and interconnection
2018	O06	Oceanside	Melrose Drive	Extension in Oceanside, future construction of 4-lane arterial highway with medians, sidewalks and bike lanes
2018	O26	Oceanside	SR 76 & Rancho Del Oro Boulevard	Widen SR 76 for one additional lane width 1,500 feet west and east of Rancho del Oro Boulevard
2018	O27	Oceanside	Coast Highway and SR 76	Roundabout in Oceanside, construction of a traffic circle at the intersection of North Coast Highway and SR 76; the traffic circle will be unsignalized; free traffic flow at all approaches
2018	POW02	Poway	Espola Road	Widen Espola Road from 2 to 3 lanes with 8-foot bike lanes/shoulders
2018	SD34	San Diego	El Camino Real	In San Diego on El Camino Real from San Dieguito Road to Via de la Valle - reconstruct and widen from 2 to 4 lanes and extend transition lane and additional grading to avoid biological impacts (CIP 52-479.0)
2018	SD70	San Diego	West Mission Bay Drive Bridge	In San Diego, replace bridge and increase from 4- to 6-lane bridge including Class II bike lane (52-643)
2018	SD83	San Diego	SR 163/Friars Road Interchange Modification	Friars Road from Avenida de las Tiendas to Mission Center Road widen and improve Friars Road and overcrossing; reconstruct interchange including improvements to ramp intersections (Phase 1). Construct new connector roadways and structures (Phase 2). Construct auxiliary lanes along northbound and southbound SR 163 (Phase 3)
2018	SD90	San Diego	SR 163/Clairemont Mesa Boulevard Interchange	In San Diego, widen from 4- to 6-lane prime arterial; Phase II of the project - west ramps (CIP 52-745.0)

Table A.8 – Phased Arterial Projects – Revenue Constrained Plan (Continued)

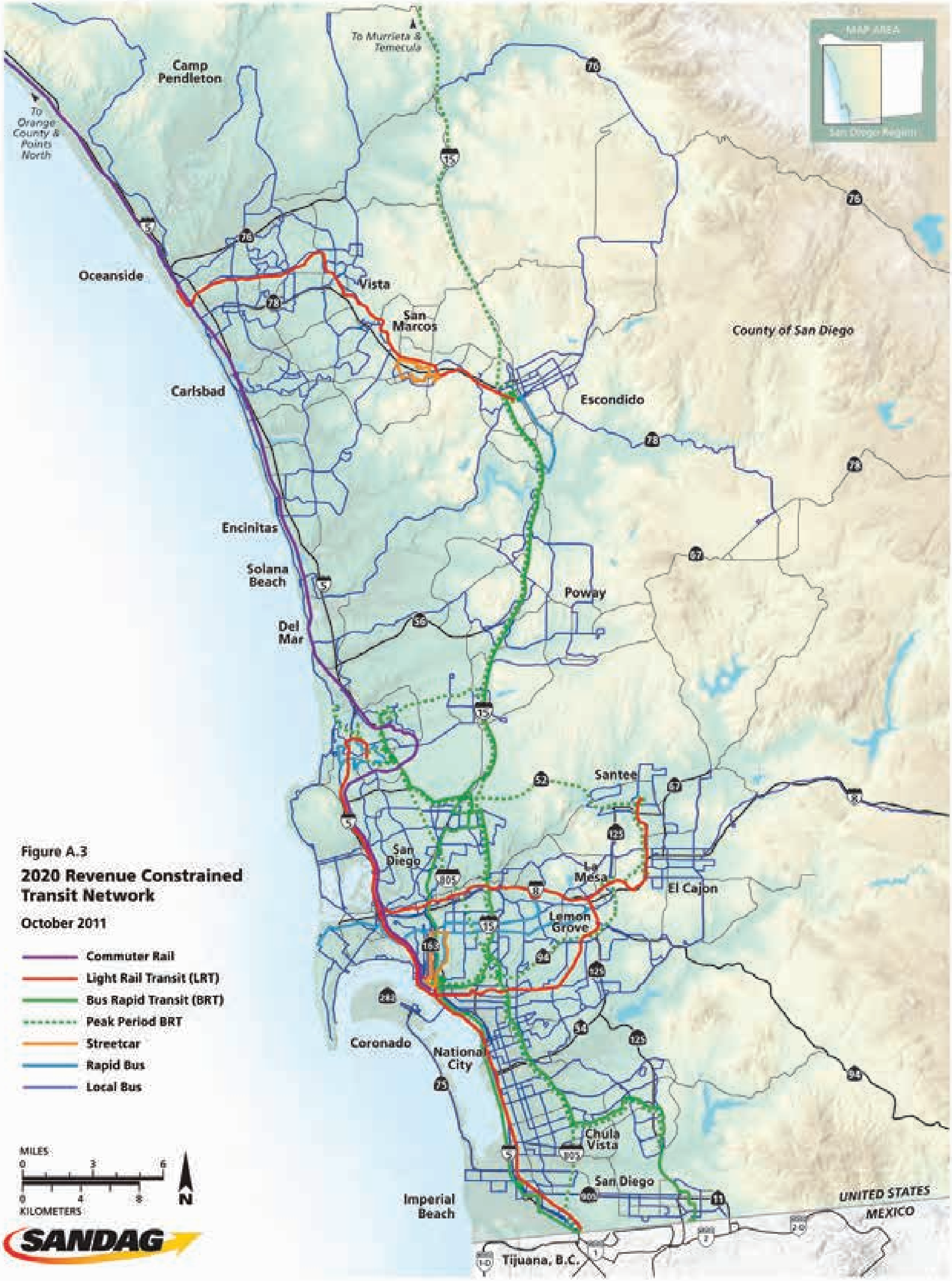
Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2018	SD102A	San Diego	Otay Truck Route Widening	On Otay Truck Route in San Diego from Drucker Lane to La Media, add one lane (total 3 lanes) for trucks; from Britannia to La Media, add one lane for trucks and one lane for emergency vehicles (Border Patrol/fire department access); along Britannia from Britannia Court to the Otay Truck Route - add one lane for trucks
2018	SD103	San Diego	I-5/Genesee Avenue Interchange	In San Diego, replace Genesee Avenue over crossing from 4-lane bridge with 6-lane bridge; construct auxiliary lanes and replace Voigt Drive bridge; add additional lane at on/off ramp to Sorrento Valley Rd.; 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
2018	SD133	San Diego	Mira Sorrento Place	Mira Sorrento Place from Scranton Road to Vista Sorrento Parkway in San Diego widen the existing 2-lane 560-foot portion of Mira Sorrento Place (40-foot road width, 55-foot right of way) to a 4-lane collector (72-foot road width, 92-foot right of way), and extend the road to intersect with Vista Sorrento Parkway at the existing on/off ramps to I-805
2018	SM19	San Marcos	Grand Avenue Bridge	In San Marcos, construct 4-lane arterial; between Bent Avenue to Discovery Street construct 6-lane arterial
2018	SM22	San Marcos	South Santa Fe - Bosstick to Smilax	Widen and realign existing road to 4-lane secondary arterial standards
2018	SM24	San Marcos	Woodland Parkway Interchange Improvements – La Moree Road to Rancheros Drive	Modify existing ramps at Woodland Parkway and Barham Drive; widen and realign Barham Drive to accommodate a new eastbound SR 78 on-ramp; widen and realign SR 78 undercrossing and associated work
2018	SM25	San Marcos	Borden Road Street Improvements and Bridge Construction - Twin Oaks to Woodward Street	Construction of approximately 700 lineal feet of a new 4-lane secondary arterial including a bridge
2018	SM30	San Marcos	San Marcos Boulevard Street Improvements - Rancho Santa Fe to Bent Avenue	Widen road to a 6-lane prime arterial
2018	SM31	San Marcos	Discovery Street Improvements - McMahr Rd to Bent Avenue/Craven Road	Widen roadway to 4-lane secondary arterial

Table A.8 – Phased Arterial Projects – Revenue Constrained Plan (Continued)

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2018	SM32	San Marcos	Via Vera Cruz Bridge and Street Improvements - San Marcos Boulevard to Discovery Street	Widen to 4-lane secondary arterial and construct a bridge at San Marcos Creek
2018	SM42	San Marcos	Street Improvements: Discovery Street - Craven Road to West of Twin Oaks Valley Road	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
2018	SM43	San Marcos	Barham Drive - 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
2018	SM44	San Marcos	Eastbound SR 78 Auxiliary lane - Woodland Parkway to Nordahl Road	Construct auxiliary lanes along eastbound SR 78 between Woodland Parkway Interchange and Nordahl Road Interchange; includes widening of Mission Road undercrossing
2018	SM48	San Marcos	Creekside Drive	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.
2018	VISTA08A	Vista	W. Vista Way - Emerald Drive to Grapevine Road	The scope of this project is to provide right of way acquisition and construction for the widening of W. Vista Way a distance of 1,500 feet from the intersection with Emerald Drive to the intersection with Grapevine Road
2020	CNTY14A	San Diego County	South Santa Fe Avenue South - 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 ft. south of Woodland Dr to Smilax Road
2020	O22	Oceanside	College Boulevard - Vista Way to Old Grove Road	In Oceanside, widen from the existing 4 lanes to 6 lanes with bike lanes and raised median
2020	O23	Oceanside	College Boulevard Bridge - San Luis Rey River	In Oceanside, widen from 4 to 6 lanes plus bike lanes and a striped-only median; widening includes the approach roadway and the bridge deck over the San Luis Rey River - Design Phase
2020	SD189	San Diego	Sea World Drive Widening and I- 5 Interchange Improvements	In San Diego, replace existing 4-lane bridge with an 8-lane bridge with new on/off ramps; widen approachways to add right turn lanes to improve access to I-5 (CIP 52-706.0)

Table A.8 – Phased Arterial Projects – Revenue Constrained Plan (Continued)

Conformity Analysis Year	SANDAG ID	Lead Agency	Project Title	Project Description
2020	SD190	San Diego	Palm Avenue/ I-805 Interchange	In San Diego, future widening of Palm Avenue Bridge including providing for repairs to the bridge approaches and abutments, installing sidewalks, signals, and striping ▪ Phase I was work pertaining to re-striping to reconfigure travel lanes; no actual modifications to the physical geometry of the bridge took place ▪ Phase II of the project will widen the bridge on the north side; in addition to this the scope of work will also contain restriping of the lanes and modifications to the on/off ramps ▪ Phase III of the project will widen the bridge on the south side; in addition to this the scope of work will also contain restriping of the lanes and modifications to the on/off ramps ▪ Both Phase II and III will have environmental documentation prepared and all technical studies performed before entering into full design signage modifications: also modify freeway on and off ramps (CIP 52-640.0)
2030	SD81	San Diego	Genesee Avenue - Nobel Drive to SR 52	In San Diego, future widening to 6-lane major street north of Decoro Street and to a 6-lane primary arterial south of Decoro Street and included Class II bicycle lanes (CIP 52-458.0)
2030	SM10	San Marcos	SR 78/Smilax	Construct new interchange at Smilax Road interchange and SR 78 improvements


MAP AREA
San Diego Region
To Murrieta & Temecula
Camp Pendleton
To Orange County & Points North
Oceanside
Vista
San Marcos
County of San Diego
Carlsbad
Escondido
Encinitas
Solana Beach
Poway
Del Mar
Santee
San Diego
La Mesa
El Cajon
Lemon Grove
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.3
2020 Revenue Constrained Transit Network
October 2011
Commuter Rail
Light Rail Transit (LRT)
Bus Rapid Transit (BRT)
Peak Period BRT
Streetcar
Rapid Bus
Local Bus
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

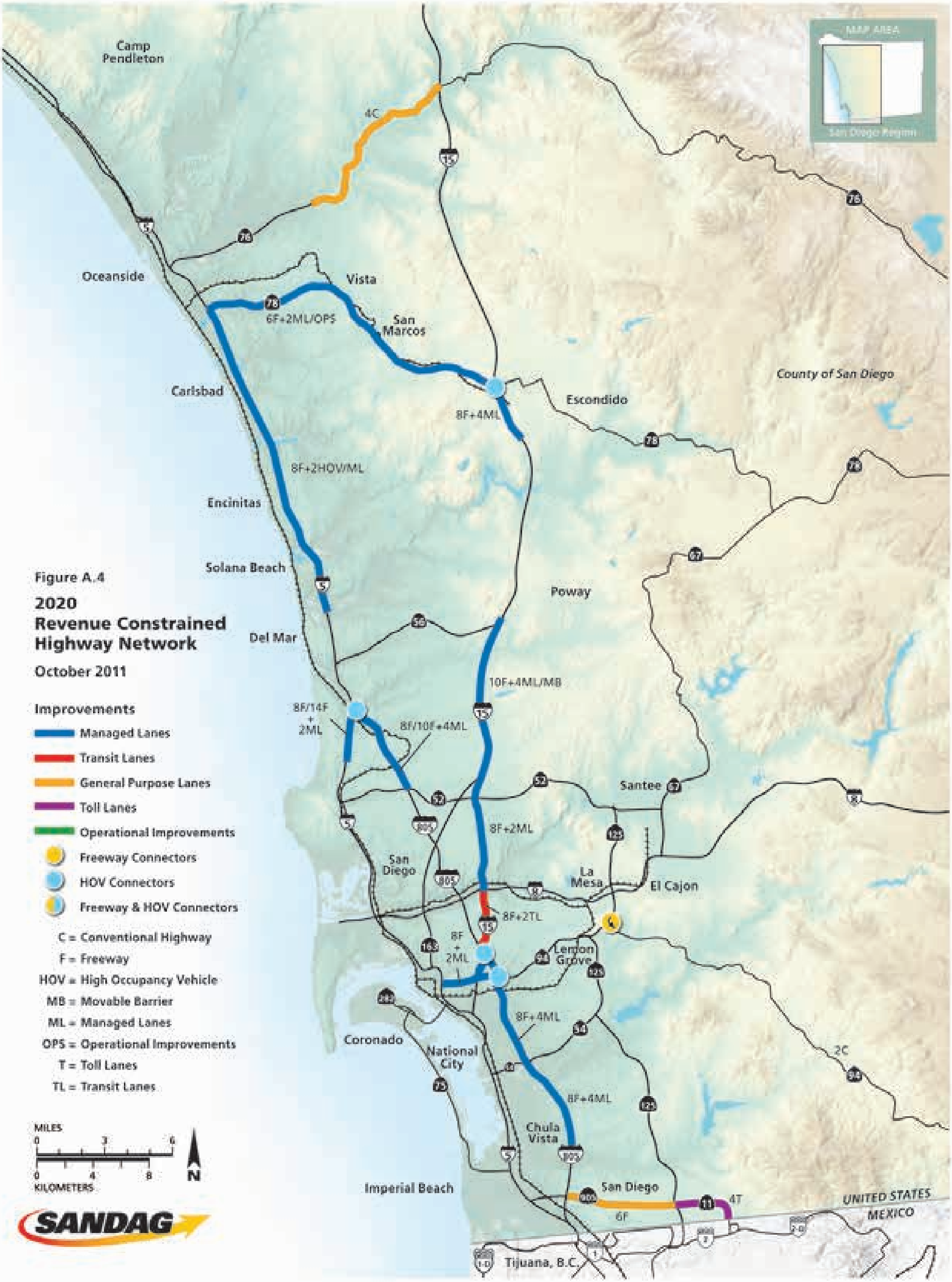
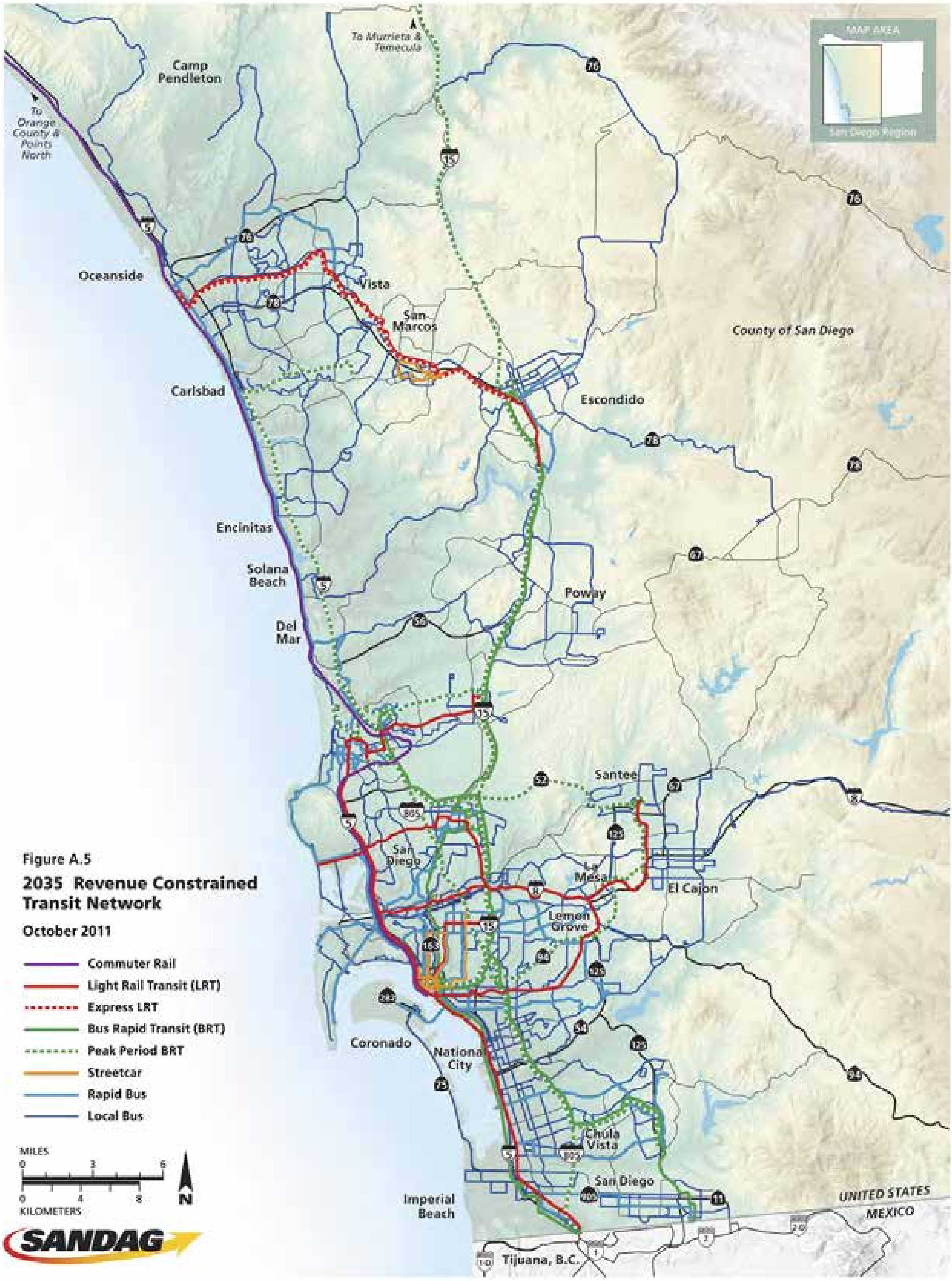


Figure A.4

2020 Revenue Constrained Highway Network

October 2011



MAP AREA
San Diego Region
To Murrieta & Temecula
Camp Pendleton
To Orange County & Points North
Oceanside
Vista
San Marcos
County of San Diego
Carlsbad
Escondido
Encinitas
Solana Beach
Poway
Del Mar
Santee
San Diego
La Mesa
El Cajon
Lemon Grove
Coronado
National City
Chula Vista
San Diego
Imperial Beach
UNITED STATES
MEXICO
Tijuana, B.C.
Figure A.5
2035 Revenue Constrained Transit Network
October 2011
Commuter Rail
Light Rail Transit (LRT)
Express LRT
Bus Rapid Transit (BRT)
Peak Period BRT
Streetcar
Rapid Bus
Local Bus
MILES
0 3 6
0 4 8
KILOMETERS
N
SANDAG

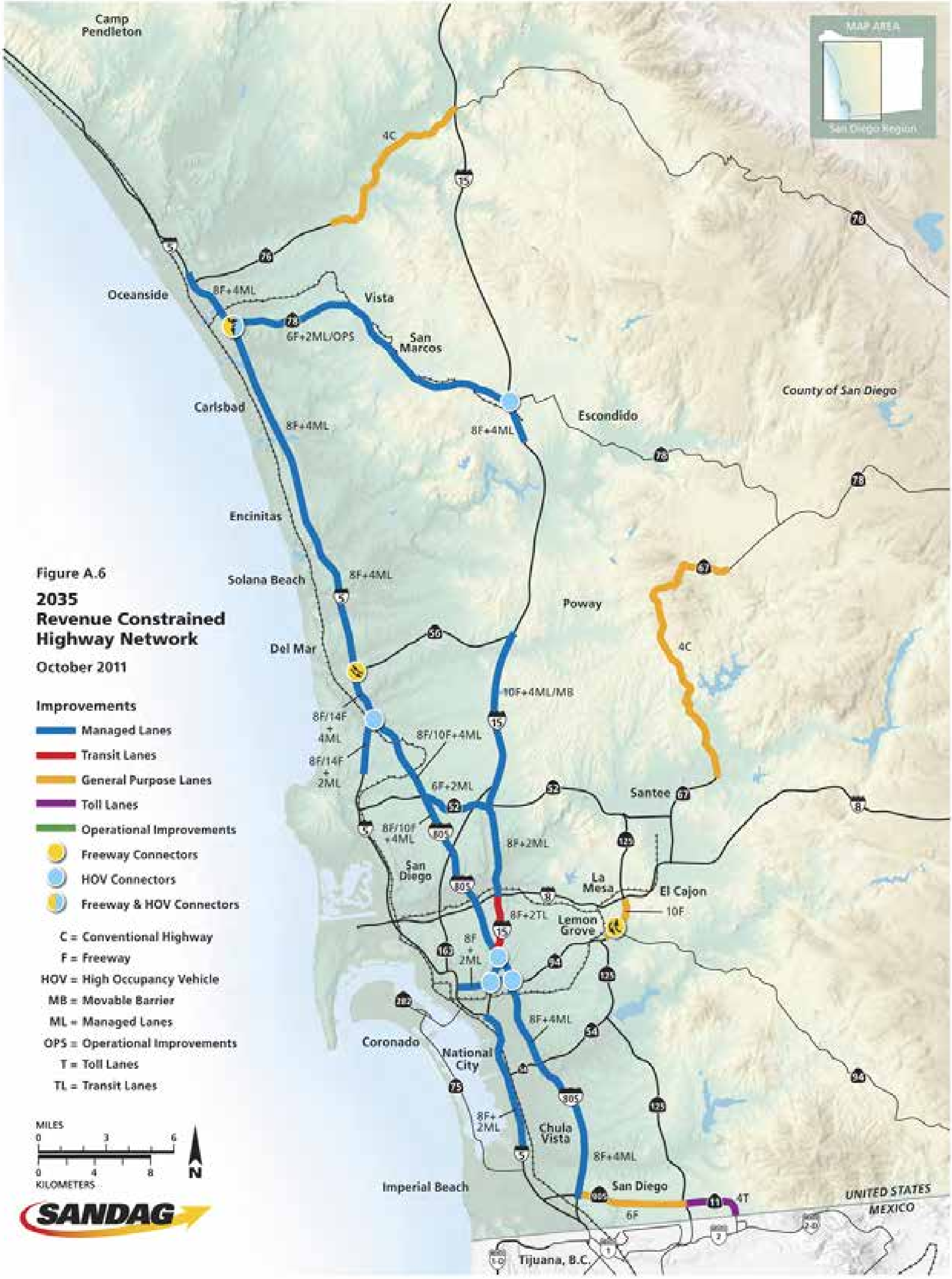


Figure A.6
2035
Revenue Constrained
Highway Network
October 2011
Improvements
Managed Lanes
Transit Lanes
General Purpose Lanes
Toll Lanes
Operational Improvements
Freeway Connectors
HOV Connectors
Freeway & HOV Connectors
C = Conventional Highway
F = Freeway
HOV = High Occupancy Vehicle
MB = Movable Barrier
ML = Managed Lanes
OPS = Operational Improvements
T = Toll Lanes
TL = Transit Lanes
MILES
0
3
6
0
4
8
KILOMETERS
N
SANDAG
MAP AREA
San Diego Region
Camp Pendleton
Oceanside
Vista
San Marcos
Carlsbad
Escondido
County of San Diego
Encinitas
Solana Beach
Del Mar
Poway
Santee
San Diego
La Mesa
El Cajon
Lemon Grove
Coronado
National City
Chula Vista
Imperial Beach
San Diego
UNITED STATES
MEXICO
Tijuana, B.C.
4C
8F+4ML
6F+2ML/OPS
8F+4ML
8F+4ML
8F+4ML
10F+4ML/MB
8F/14F + 4ML
8F/14F + 2ML
8F/10F+4ML
6F+2ML
8F/10F +4ML
8F+2ML
8F+2TL
10F
8F + 2ML
8F+4ML
8F+ 2ML
8F+4ML
4C
6F
4T

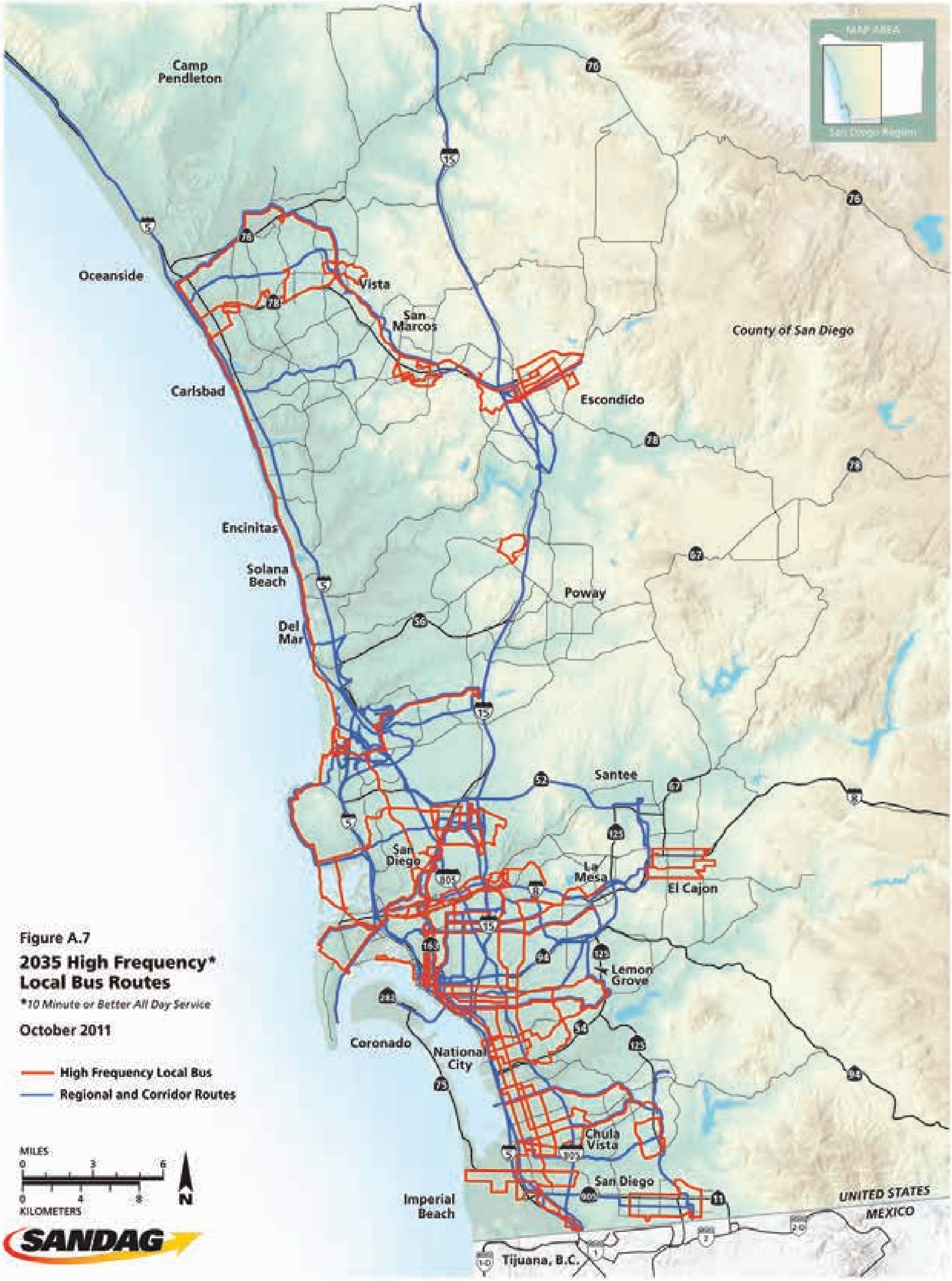


Figure A.7

2035 High Frequency* Local Bus Routes

*10 Minute or Better All Day Service

October 2011

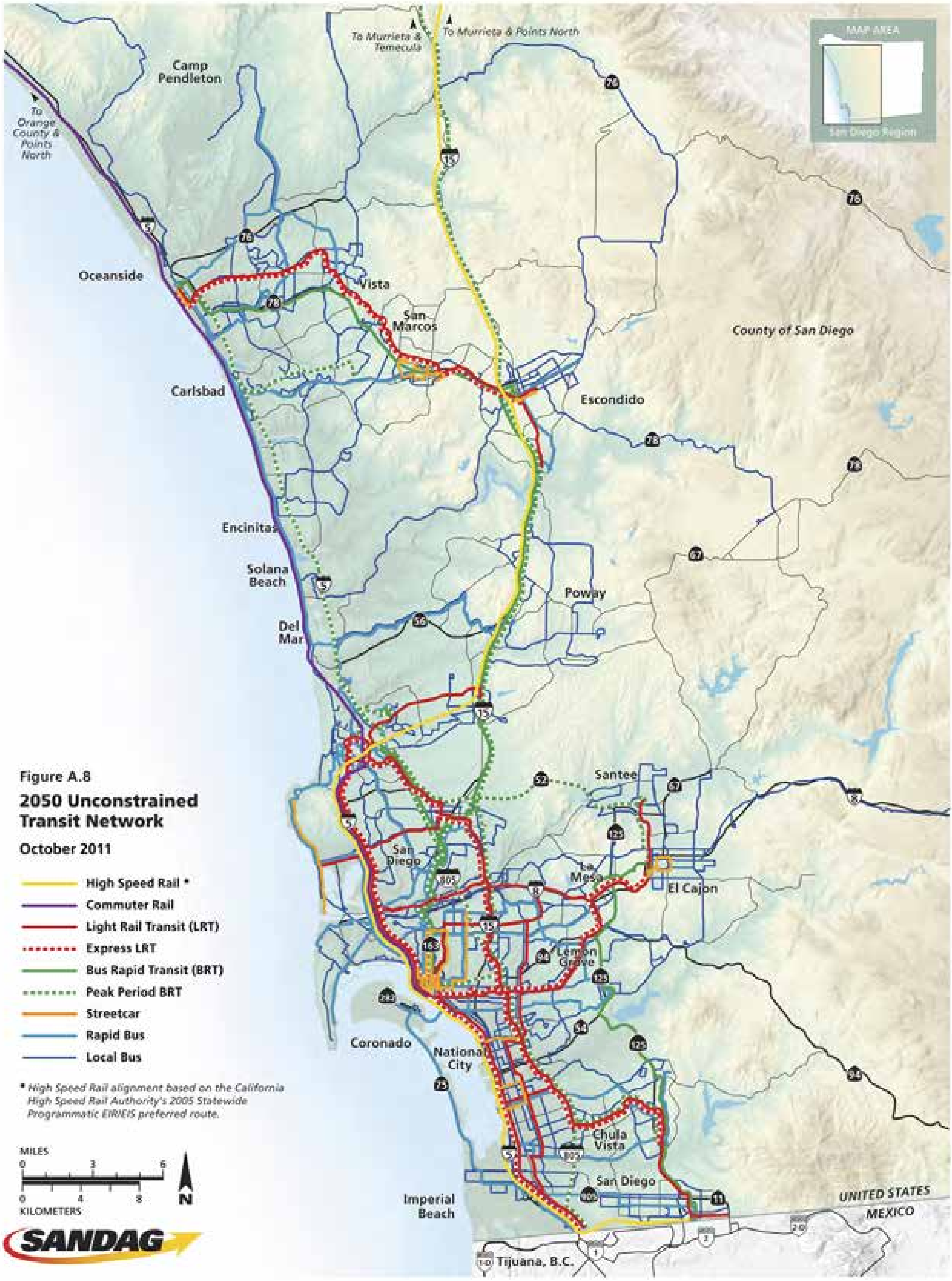


Figure A.8
2050 Unconstrained Transit Network
October 2011


Figure A.9
2050 Unconstrained Highway Network
October 2011
Improvements
Managed Lanes
Transit Lanes
General Purpose Lanes
Toll Lanes
Operational Improvements
Freeway Connectors
HOV Connectors
Freeway & HOV Connectors
C = Conventional Highway
F = Freeway
HOV = High Occupancy Vehicle
MB = Movable Barrier
ML = Managed Lanes
OPS = Operational Improvements
T = Toll Lanes
TL = Transit Lanes
MILES
KILOMETERS
SANDAG
Camp Pendleton
Oceanside
Vista
San Marcos
Carlsbad
Escondido
Encinitas
Solana Beach
Del Mar
Poway
County of San Diego
Santee
San Diego
La Mesa
El Cajon
Lemon Grove
Coronado
National City
Chula Vista
Imperial Beach
San Diego
UNITED STATES
MEXICO
Tijuana, B.C.
MAP AREA
San Diego Region

Table A.9 – Major Capital Improvements – Unconstrained Network

Transit Facilities			
			($ Millions – 2010 Dollars)
Service	**Route**	**Description**	**Cost**
High Speed Rail	598	Commuter Rail Overlay (Temecula to Airport ITC)	$330
High Speed Rail	-	Extension from Airport ITC to International border	$3,557
COASTER	398	Double Tracking (includes all COASTER improvements, positive train control, and UTC tunnel)	$5,606
SPRINTER	399	Double Tracking (includes all SPRINTER improvements and extension to South Escondido)	$1,029
SPRINTER	588	SPRINTER Express	$284
Trolley	510	Mid-Coast LRT Extension	$1,642
Trolley	510 and 520	Trolley System Rehabilitation (Blue and Orange Lines)	$510
Trolley	510	Blue Line Rail Grade Separations	$550
Trolley	520	Orange Line Rail Grade Separations	$312
Trolley	522	Orange Line Express - El Cajon to downtown San Diego	$230
Trolley	540	Blue Line Express - UTC to San Ysidro via downtown	$455
Trolley	550	SDSU to San Ysidro via East San Diego, SE San Diego, National City	$1,665
Trolley	560	SDSU to downtown via El Cajon Blvd/Mid-City (transition of Mid-City Rapid to LRT)	$1,921
Trolley	561	UTC to Mira Mesa via Sorrento Mesa/Carroll Cyn (extension of route 510)	$1,140
Trolley	562	UTC to San Ysidro via Kearny Mesa, Mission Valley, Mid-City, National City/Chula Vista via Highland Ave/4th Ave	$2,548
Trolley	563	Pacific Beach to El Cajon via Kearny Mesa, Mission Valley, SDSU	$1,262
Trolley	564	Otay Mesa East Border Crossing to Western Chula Vista via Otay Ranch/Millenia	$854
Trolley	566	Palomar Street Trolley Station to UTC via Mid-City, Kearny Mesa	$327
Trolley	510, 520, 540, 522 and 560	Downtown Trolley Tunnel	$2,592
Trolley	Various	Downtown Bus Tunnel and Hubs	$2,917
BRT	90	Santee/El Cajon Transit Centers to downtown via SR 94 (peak only) (interim service for Route 522 Orange Line Express)	$0
BRT	430	Oceanside to Escondido (peak only)	$234
BRT	470	Escondido to UTC via Mira Mesa Blvd	$20
BRT	610	Temecula (peak only)/Escondido to downtown (Sabre Springs/Mira Mesa PNRs, Mid-City Stations)	$89
BRT	628	South Bay BRT (Otay Mesa-downtown)	$200

Table A.9 – Major Capital Improvements – Unconstrained Network (Continued)

Transit Facilities (Continued)			
			($ Millions – 2010 Dollars)
Service	**Route**	**Description**	**Cost**
BRT	640	I-5 - San Ysidro to downtown & Kearny Mesa via I-5 shoulder lanes/HOV lanes, downtown, Hillcrest/Mission Valley Guideway (interim service for Route 540 Blue Line Express	$90
BRT	650	Chula Vista to Palomar Airport Road Business Park via I-805/I-5 (peak only)	$80
BRT	652	Downtown to UTC via Kearny Mesa Guideway/I-805	$2
BRT	653	Mid-City to Palomar Airport Road via Kearny Mesa/I-805/I-5	$10
BRT	870	El Cajon to UTC via Santee, SR 52, I-805	$7
BRT	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	$12
BRT	680 and 688/689	Otay Mesa/San Ysidro to Sorrento Mesa via I-805 Corridor, Otay Ranch/Millenia, National City, Southeastern San Diego, Mid-City, Kearny Mesa	$425
BRT	120, 610, and 640	Hillcrest to Mission Valley Transit Priority Measures, Full Guideway downtown to Kearny Mesa, and I-15 Green Line transfer station	$3,302
BRT	692	El Cajon to Otay Mesa via Spring Valley, SR 125, Millenia	$6
BRT	940	Oceanside to UTC via I-5, Carlsbad, Encinitas (peak only)	$38
BRT	-	South Bay Maintenance Facility	$51
BRT	-	Downtown BRT stations/layovers	$110
Rapid	2	North Park to downtown San Diego via 30th St	$38
Rapid	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	$85
Rapid	11	Spring Valley to SDSU via SE San Diego, downtown, Hillcrest, Mid-City	$110
Rapid	15	Mid-City Rapid SDSU to downtown (interim service for Route 560 Trolley)	$68
Rapid	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	$48
Rapid	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	$102
Rapid	41	Fashion Valley to UTC/UCSD via Linda Vista and Clairemont	$54
Rapid	103	Solana Beach to Sabre Springs BRT station via Carmel Valley	$70
Rapid	120	Kearny Mesa to downtown	$100
Rapid	440	Carlsbad to San Marcos via Palomar Airport Road	$50
Rapid	471	Downtown Escondido to East Escondido	$31
Rapid	473	Oceanside to UTC via Hwy 101 Coastal Communities, Carmel Valley	$127
Rapid	474	Oceanside to Vista via Mission Ave/Santa Fe Road Corridor	$49
Rapid	477	Camp Pendleton to Carlsbad Village via College Blvd, Plaza Camino Real	$78

Table A.9 – Major Capital Improvements – Unconstrained Network (Continued)

Transit Facilities (Continued)			
			($ Millions – 2010 Dollars)
Service	**Route**	**Description**	**Cost**
Rapid	635	Eastlake/EUC to Palomar Trolley via Main Street Corridor	$54
Rapid	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	$39
Rapid	637	North Park to 32nd Street Trolley via Golden Hill	$32
Rapid	638	San Ysidro to Otay Mesa via Otay, SR 905 Corridor	$53
Rapid	639	Otay to North Island via Imperial Beach and Silver Strand, Coronado	$53
Rapid	709	H Street Trolley to Millenia via H Street Corridor, Southwestern College	$36
Rapid	910	Coronado to downtown via Coronado Bridge	$25
Streetcar	551	Chula Vista downtown	$1,340
Streetcar	552	National City downtown	$400
Streetcar	553	Downtown San Diego: Little Italy to East Village	$277
Streetcar	554	Hillcrest/Balboa Park/downtown San Diego Loop	$249
Streetcar	555	30th St to downtown San Diego via North Park/Golden Hill	$139
Streetcar	557	El Cajon downtown	$1,600
Streetcar	558	Escondido downtown	$500
Streetcar	559	Oceanside downtown	$450
Streetcar	565	Mission Beach to la Jolla via Pacific Beach	$2,390
Shuttle	-	San Marcos Shuttle[1]	$0
Airport Express		Airport Express Routes[2]	$51
Intermodal	-	Airport Intermodal Transit Center	$165
Intermodal	-	San Ysidro Intermodal Transit Center	$50
Intermodal	-	Otay Mesa East Intermodal Transit Center	$0
Other	-	Other Improvements (Vehicles/vehicle replacement, maintenance facilities, transit system rehab, regulatory compliance, park and ride, ITS)	$8,084
		Subtotal	$51,404

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

[2] Capital cost to be funded by aviation funds

Table A.9 – Major Capital Improvements – Unconstrained Network (Continued)

Managed Lanes/Highway Projects					
					($ Millions – 2010 Dollars)
Freeway	**From**	**To**	**Existing**	**Improvements**	**Cost**
I-5	SR 905	SR 54	8F	8F+2ML	$295
I-5	SR 54	I-15	8F+2ML	10F+2ML	$165
I-5	I-15	I-8	8F	8F+Operational	$1,130
I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	$530
I-5	La Jolla Village Drive	I-5/I-805 Merge	8F/14F	8F/14F+2ML	$300
I-5	I-5/I-805 Merge	SR 56	8F/14F+2HOV	8F/14F+4ML	$40
I-5	SR 56	Manchester Ave	8F+2HOV	10F+4ML	$655
I-5	Manchester Ave	Palomar Airport Road	8F	10F+4ML	$1,710
I-5	Palomar Airport Road	Vandegrift	8F	10F+4ML	$1,585
I-5	Vandegrift Blvd	Orange County	8F	8F+4T	$754
I-8	I-5	I-15	8F	8F+Operational	$440
I-8	I-15	SR 125	8F/10F	8F/10F+Operational	$125
I-8	SR 125	2nd Street	6F/8F	6F/8F+Operational	$125
I-8	2nd Street	Los Coches	4F/6F	6F	$54
I-8	Los Coches	Dunbar Rd	4F/6F	6F	$335
SR 11/Otay Mesa East Port of Entry (POE)	SR 905	Mexico	--	4T + POE	$755
SR 15	I-5	SR 94	6F	8F+2ML	$90
SR 15	SR 94	I-805	8F	8F+2ML	$20
SR 15	I-805	I-8	8F	8F+2TL	$45
I-15	Viaduct		8F	8F+2ML	$720
I-15	I-8	SR 163	8F	8F+2ML	$130
I-15	SR 163	SR 56	8F+2ML(R)	10F+4ML/MB	$419
I-15	Centre City Parkway	SR 78	8F+4ML	10F+4ML	$210
I-15	SR 78	Riverside County	8F	8F+4T	$1,005

Table A.9 – Major Capital Improvements – Unconstrained Network (Continued)

Managed Lanes/Highway Projects (Continued)					
					($ Millions – 2010 Dollars)
Freeway	**From**	**To**	**Existing**	**Improvements**	**Cost**
SR 52	I-5	I-805	4F	6F	$110
SR 52	I-805	I-15	6F	6F+2ML	$223
SR 52	I-15	SR 125	4F	6F+3ML(R)	$440
SR 52	SR 125	SR 67	4F	6F	$120
SR 54	I-5	SR 125	6F	6F/8F+2ML	$140
SR 56	I-5	I-15	4F	6F+2ML	$220
SR 67	I-8	Mapleview St	4F/6F	6F/8F	$360
SR 67	Mapleview St	Dye Rd	2C/4C	4C	$570
SR 76	I-5	Melrose Drive	4E	6E	$225
SR 76	Melrose Drive	I-15	2C	4C	$404
SR 76	I-15	Couser Canyon	2C	4C/6C+Operational	$130
SR 78	I-5	I-15	6F	6F+2ML/Operational	$570
SR 94	I-5	I-805	8F	8F+2ML	$480
SR 94	I-805	College Ave	8F	10F+2ML	$290
SR 94	College Ave	SR 125	8F	8F+2ML	$230
SR 94	SR 125	Avocado Blvd	4F	6F	$90
SR 94	Avocado Blvd	Jamacha Rd	4C	6C	$30
SR 94	Jamacha Rd	Steele Canyon Rd	4C	6C	$20
SR 125	SR 905	San Miguel Rd	4T	8F	$110
SR 125	San Miguel Rd	SR 54	4F	8F	$60
SR 125	SR 54	SR 94	6F	8F+2ML	$140
SR 125	SR 94	I-8	8F	10F+2ML	$285
SR 163	I-805	I-15	8F	8F+2ML	$320
SR 241	Orange County	I-5	--	4T/6T	$501
I-805	SR 905	Carroll Canyon Rd	8F/10F	8F/10F+4ML	$3,781
I-805	Carroll Canyon Rd	I-5 (north)	8F/10F	8F/10F+2ML	$87
SR 905	I-5	I-805	4F	8F	$150
SR 905	I-805	Mexico	--	8F	$1,021
				Subtotal	$22,744

Table A.9 – Major Capital Improvements – Unconstrained Network (Continued)

HOV Connectors			
			($ Millions – 2010 Dollars)
Freeway	**Intersecting Freeway**	**Movement**	**Cost**
I-5	SR 15	North to North and South to South	$183
I-5	SR 54	West to South and North to East	$120
I-5	SR 54	South to East and West to North	$120
I-5	SR 56	South to East and West to North	$170
I-5	SR 56	North to East and West to South	$80
I-5	SR 78	South to East and West to North, North to East and West to South	$240
I-5	I-805	North to North & South to South	$116
I-15	SR 52	West to North and South to East	$140
I-15	SR 52	West to South and North to East	$140
I-15	SR 56	East to North and South to West	$180
I-15	SR 78	East to South & North to West	$105
I-15	SR 94	South to West & East to North	$80
I-15	SR 163	North to North and South to South	$160
I-15	I-805	North to North & South to South	$90
SR 52	SR 125	North to West and East to South	$100
SR 94	SR 125	East to North and South to West	$140
I-805	SR 52	West to North & South to East	$90
I-805	SR 54	North to West and East to South	$140
I-805	SR 94	West to South and North to East	$160
I-805	SR 94	East to North and South to East	$160
I-805	SR 163	North to North and South to South	$150
		Subtotal	$2,864

Table A.9 – Major Capital Improvements – Unconstrained Network (Continued)

Freeway Connectors

Freeway	Intersecting Freeway	Movement	($ Millions – 2010 Dollars) Cost
I-5	I-8	East to North and South to West	$320
I-5	SR 56	West to North and South to East	$185
I-5	SR 78	South to East and West to South	$106
I-5	SR 94	North to East	$120
I-15	SR 56	North to West	$100
SR 94	SR 125	South to East and West to North	$319
		Subtotal	$830

Non-Highway Goods Movement

		($ Millions – 2010 Dollars)
Vesta Street Bridge	Mobility connector over Harbor Drive at Naval Base San Diego	$60
32nd Street	Freeway access enhancement	$119
10th Avenue Marine Terminal Entrance	Rail line grade separation/Barrio Logan enhancement	$67
10th Avenue Marine Terminal Entrance	Enhance military project capacity, expand open storage	$19
National City Marine Terminal	Bay Marina Drive, Civic Center freeway access improvements	$7
National City Marine Terminal	Wharf extension, vehicle processing facility, berths 24-10 and 24-11	$151
National City Rail Yard		$7
Desert Line	Basic Service, rehabilitation	$182
Logistics Center - South County		$180
Logistics Center - North County		$2,130
Logistics Center - Mid County		$166
San Diego International Airport	Access to I-5	$32
San Diego International Airport	Aircraft/ground access, AC facilities, transload	$111
Future Expansion	Freeway/ground access N. field	$173
	Subtotal	$3,404
	Total	$79,986

KEY

C = Conventional Highway Lanes	MB = Movable barrier	T = Toll Lanes
F = Freeway Lanes	ML = Managed lanes (HOV & Value Pricing)	TL = Transit Lanes
HOV = High Occupancy Vehicle Lanes	ML(R) = Managed lanes (Reversible)	

Note: All HOV lanes would convert to Managed Lanes by 2035 with an HOV occupancy of 3+ people.

Table A.10 – Summary of 2050 Revenue Constrained Plan and Unconstrained Scenario – Transit Services and Headways

Service	Route	Description	Revenue Constrained Peak/Off-Peak	Unconstrained Peak/Off-Peak
HSR	598	Temecula to Lindbergh Intermodal Transit Center	N/A	15/15
COASTER	398	Increase in COASTER service (includes all improvements)	20/60	15/15
SPRINTER	399	Increase in SPRINTER Rail (includes all improvements)	10/10	7.5/7.5
SPRINTER	588	SPRINTER Express	10/15	10/10
Trolley	510	Increase in Existing Blue Line Trolley Service (includes all improvements)	7.5/7.5	7.5/7.5
Trolley	520	Increase in Existing Orange Line Trolley Service (includes all improvements)	7.5/7.5	7.5/7.5
Trolley	522	Orange Line Express - El Cajon to downtown San Diego	10/10	10/10
Trolley	530	Increase in Green Line Trolley Service	10/10	7.5/7.5
Trolley	540	Blue Line Express - UTC to San Ysidro via downtown	10/10	10/10
Trolley	550	SDSU to San Ysidro via East San Diego, SE San Diego, National City	N/A	7.5/7.5
Trolley	560	SDSU to downtown via El Cajon Blvd/Mid-City (transition of Mid-City Rapid to LRT)	7.5/7.5	7.5/7.5
Trolley	561	UTC to Mira Mesa via Sorrento Mesa/Carroll Canyon	Note A	7.5/7.5
Trolley	562	UTC to San Ysidro via Kearny Mesa, Mission Valley, Mid-City, National City/Chula Vista via Highland Ave/ 4th Ave	7.5/10	7.5/7.5
Trolley	563	Pacific Beach to El Cajon via Kearny Mesa, Mission Valley, SDSU	7.5/10	7.5/7.5
Trolley	564	Otay Mesa East Border Crossing to Western Chula Vista via Otay Ranch/Millenia	7.5/7.5	7.5/7.5
Trolley	566	Express Palomar Street Trolley Station to UTC via Mid-City, Kearny Mesa	N/A	10/10
BRT	90	Santee/El Cajon Transit Centers to downtown via SR 94 (Peak Only)	Note B	Note B
BRT	430	Oceanside to Escondido via SR 78 Managed Lanes	N/A	10/10
BRT	470	Escondido-UTC via Mira Mesa Blvd	10/NA	10/NA
BRT	610	Temecula (peak only)/Escondido to downtown	10/NA	10/10
BRT	628	South Bay BRT (Otay Mesa-downtown)	15/15	15/15
BRT	640	San Ysidro to Kearny Mesa via I-5 shoulder lanes/HOV lanes, downtown, Hillcrest/Mission Valley Guideway (interim service for Blue Line Express Route 540)	Note C	Note C

Table A.10 – Summary of 2050 Revenue Constrained Plan and Unconstrained Scenario – Transit Services and Headways (Continued)

Service	Route	Description	Revenue Constrained Peak/Off-Peak	Unconstrained Peak/Off-Peak
BRT	650	Chula Vista to Palomar Airport Road Business Park via I-805/I-5 (Peak Only)	N/A	15/15
BRT	652	Downtown to UTC via Kearny Mesa Guideway/I-805	N/A	10/10
BRT	653	Mid-City to Palomar Airport Road via Kearny Mesa/I-805/ I-5	15/NA	15/NA
BRT	870	El Cajon to UTC via Santee, SR 52, I-805	10/NA	10/NA
BRT	890	El Cajon to Sorrento Mesa via SR 52, Kearny Mesa	10/NA	10/NA
BRT	680	Otay Mesa to Sorrento Mesa via I-805	15/15	-
BRT	688	Millenia/San Ysidro to Sorrento Mesa Express	15/NA	15/NA
BRT	689	Millenia/Otay Ranch to UTC/Torrey Pines Express	15/NA	15/NA
BRT	692	El Cajon to Otay Mesa via Spring Valley, SR 125, Millenia	N/A	10/10
BRT	940	Oceanside to UTC via I-5, Carlsbad, Encinitas (Peak Only)	N/A	10/10
Rapid	2	North Park to downtown San Diego via 30th St	10/10	10/10
Rapid	10	La Mesa to Ocean Beach via Mid-City, Hillcrest, Old Town	10/10	10/10
Rapid	11	Spring Valley to SDSU via SE San Diego, downtown, Hillcrest, Mid-City	10/10	10/10
Rapid	15	Mid-City Rapid SDSU - downtown	Note D	Note D
Rapid	28	Point Loma to Kearny Mesa via Old Town, Linda Vista	10/10	10/10
Rapid	30	Old Town to Sorrento Mesa via Pacific Beach, La Jolla, UTC	10/10	10/10
Rapid	41	Fashion Valley to UTC/UCSD via Linda Vista and Clairemont	N/A	10/10
Rapid	103	Solana Beach to Sabre Springs BRT station via Carmel Valley	N/A	15/15
Rapid	120	Kearny Mesa to downtown	10/10	10/10
Rapid	201/202	UTC Area Super Loop - Increase Frequencies	10/10	10/10
Rapid	350	Escondido to Del Lago via Escondido Blvd & Bear Valley	10/10	10/10
Rapid	440	Carlsbad to San Marcos via Palomar Airport Road Corridor	N/A	10/10
Rapid	471	Downtown Escondido to East Escondido	10/10	10/10
Rapid	473	Oceanside to UTC via Hwy 101 Coastal Communities, Carmel Valley	10/10	10/10
Rapid	474	Oceanside to Vista via Mission Ave/Santa Fe Road Corridor	10/10	10/10
Rapid	477	Camp Pendleton to Carlsbad Village via College Boulevard, Plaza Camino Real	N/A	10/10

Table A.10 – Summary of 2050 Revenue Constrained Plan and Unconstrained Scenario – Transit Services and Headways (Continued)

Service	Route	Description	Revenue Constrained Peak/Off-Peak	Unconstrained Peak/Off-Peak
Rapid	635	Eastlake/EUC to Palomar Trolley via Main Street Corridor	10/10	10/10
Rapid	636	SDSU to Spring Valley via East San Diego, Lemon Grove, Skyline	10/10	10/10
Rapid	637	North Park to 32nd Street Trolley via Golden Hill	10/10	10/10
Rapid	638	San Ysidro to Otay Mesa via Otay, SR 905 Corridor	10/10	10/10
Rapid	639	Otay to North Island via Imperial Beach and Silver Strand, Coronado	N/A	10/10
Rapid	709	H Street Trolley to Millenia via H Street Corridor, Southwestern College	10/10	10/10
Rapid	910	Coronado to downtown via Coronado Bridge	10/10	10/10
Streetcar	551	Chula Vista downtown	N/A	10/10
Streetcar	552	National City downtown	N/A	10/10
Streetcar	553	Downtown San Diego: Little Italy to East Village	10/10	10/10
Streetcar	554	Hillcrest/Balboa Park/downtown San Diego Loop	10/10	10/10
Streetcar	555	30th St to downtown San Diego via North Park/ Golden Hill	10/10	10/10
Streetcar	557	El Cajon downtown	N/A	10/10
Streetcar	558	Escondido downtown	N/A	10/10
Streetcar	559	Oceanside downtown	N/A	10/10
Streetcar	565	Mission Beach to La Jolla via Pacific Beach	N/A	10/10
Shuttle	448/449	San Marcos Shuttle	10/10	10/10
Airport Express		Airport Express Routes	30/30	30/30

Notes:

A Included as extensions to Route 510 Blue Line

B Interim service until implementation of Route 522 Orange Line Express

C Interim service until implementation of Route 540 Blue Line Express

D Interim service until implementation of Route 560 Trolley Line

Table A.11 – Summary of 2050 Revenue Constrained Plan and Unconstrained Scenario – Highway Projects

Managed Lanes/Highway Projects					
Freeway	From	To	Existing	Revenue Constrained	Unconstrained
I-5	SR 905	SR 54	8F	8F+2ML	8F+2ML
I-5	SR 54	SR 15	8F	10F+2ML	10F+2ML
I-5	I-15	I-8	8F	8F+Operational	8F+Operational
I-5	I-8	La Jolla Village Dr	8F/10F	8F/10F+2ML	8F/10F+2ML
I-5	La Jolla Village Dr	I-5/I-805 Merge	8F/14F	8F/14F+2ML	8F/14F+2ML
I-5	I-5/I-805 Merge	SR 56	8F/14F+2HOV	8F/14F+4ML	8F/14F+4ML
I-5	SR 56	Manchester Ave	8F/10F+2HOV	8F+4ML	10F+4ML
I-5	Manchester Ave	Palomar Airport Rd	8F	8F+4ML	10F+4ML
I-5	Palomar Airport Rd	Vandegrift	8F	8F+4ML	10F+4ML
I-5	Vandegrift Blvd	Orange County	8F	8F+4T	8F+4T
I-8	I-5	I-15	8F	8F+Operational	8F+Operational
I-8	I-15	SR 125	8F/10F	8F/10F+Operational	8F/10F+Operational
I-8	SR 125	2nd Street	6F/8F	6F/8F+Operational	6F/8F+Operational
I-8	2nd Street	Los Coches	4F/6F	6F	6F
I-8	Los Coches	Dunbar Rd	4F/6F	4F/6F	6F
SR 11/ Otay Mesa East POE	SR 905	Mexico	--	4T+POE	4T+POE
SR 15	I-5	SR 94	6F	8F+2ML	8F+2ML
SR 15	SR 94	I-805	8F	8F+2ML	8F+2ML
SR 15	I-805	I-8	8F	8F+2TL	8F+2TL
I-15	Viaduct		8F	8F+2ML	8F+2ML
I-15	I-8	SR 163	8F	8F+2ML	8F+2ML
I-15	SR 163	SR 56	8F+2ML(R)	10F+4ML/MB	10F+4ML/MB
I-15	SR 56	Centre City Parkway	10F+4ML/MB	10F+4ML/MB	10F+4ML/MB
I-15	Centre City Parkway	SR 78	8F	8F+4ML	10F+4ML
I-15	SR 78	Riverside County	8F	8F+4T	8F+4T
SR 52	I-5	I-805	4F	6F	6F
SR 52	I-805	I-15	6F	6F+2ML	6F+2ML
SR 52	I-15	SR 125	4F	6F+2ML(R)	6F+3ML(R)
SR 52	SR 125	SR 67	4F	4F	6F

Table A.11 – Summary of 2050 Revenue Constrained Plan and Unconstrained Scenario – Highway Projects (Continued)

Managed Lanes/Highway Projects (Continued)					
Freeway	From	To	Existing	Revenue Constrained	Unconstrained
SR 54	I-5	SR 125	6F	6F+2ML	6F/8F+2ML
SR 56	I-5	I-15	4F	6F	6F+2ML
SR 67	I-8	Mapleview St	4F/6F	4F/6F	6F/8F
SR 67	Mapleview St	Dye Rd	2C/4C	4C	4C
SR 76	I-5	Melrose Drive	4E	4E	6E
SR 76	Melrose Drive	I-15	2C	4C	4C
SR 76	I-15	Couser Canyon	2C	4C/6C+Operational	4C/6C+Operational
SR 78	I-5	I-15	6F	6F+2ML/Operational	6F+2ML/Operational
SR 94	I-5	I-805	8F	8F+2ML	8F+2ML
SR 94	I-805	College Ave	8F	8F+2ML	10F+2ML
SR 94	College Ave	SR 125	8F	8F+2ML	8F+2ML
SR 94	SR 125	Avocado Blvd	4F	6F	6F
SR 94	Avocado Blvd	Jamacha Rd	4C	6C	6C
SR 94	Jamacha Rd	Steele Canyon Rd	4C	6C	6C
SR 94	Steele Canyon Rd	Melody Rd	2C	2C	4C
SR 125	SR 905	San Miguel Rd	4T	8F	8F
SR 125	San Miguel Rd	SR 54	4F	8F	8F
SR 125	SR 54	SR 94	6F	6F+2ML	8F+2ML
SR 125	SR 94	I-8	8F	10F+2ML	10F+2ML
SR 163	I-805	I-15	8F	8F	8F+2ML
SR 241	Orange County	I-5	--	4T/6T	4T/6T
I-805	SR 905	Carroll Canyon Rd	8F/10F	8F/10F+4ML	8F/10F+4ML
I-805	Carroll Canyon Rd	I-5 (north)	8F/10F	8F/10F+2ML	8F/10F+2ML
SR 905	I-5	I-805	4F	4F	8F
SR 905	I-805	Mexico	--	6F	8F

Table A.11 – Summary of 2050 Revenue Constrained Plan and Unconstrained Scenario – Highway Projects (Continued)

HOV Connectors				
Freeway	**Intersecting Freeway**	**Movement**	**Revenue Constrained**	**Unconstrained**
I-5	SR 15	North to North and South to South		✓
I-5	SR 54	West to South and North to East		✓
I-5	SR 54	South to East and West to North		✓
I-5	SR 56	South to East and West to North		✓
I-5	SR 56	North to East and West to South		✓
I-5	SR 78	South to East and West to North, North to East and West to South	✓	✓
I-5	I-805	North to North & South to South	✓	✓
I-15	SR 52	West to North and South to East	✓	✓
I-15	SR 52	West to South and North to East		✓
I-15	SR 56	East to North and South to West		✓
I-15	SR 78	East to South & North to West	✓	✓
I-15	SR 94	South to West & East to North	✓	✓
I-15	SR 163	North to North and South to South		✓
I-15	I-805	North to North & South to South	✓	✓
SR 52	SR 125	North to West and East to South		✓
SR 94	SR 125	East to North and South to West		✓
I-805	SR 52	West to North & South to East	✓	✓
I-805	SR 54	North to West and East to South		✓
I-805	SR 94	West to South and North to East		✓
I-805	SR 94	East to North and South to East		✓
I-805	SR 94	North to West & East to South	✓	✓
I-805	SR 163	North to North and South to South		✓

Freeway Connectors				
Freeway	**Intersecting Freeway**	**Movement**	**Revenue Constrained**	**Unconstrained**
I-5	I-8	East to North and South to West		✓
I-5	SR 56	West to North and South to East	✓	✓
I-5	SR 78	South to East and West to South	✓	✓
I-5	SR 94	North to East		✓
I-15	SR 56	North to West	✓	✓
SR 94	SR 125	South to East and West to North	✓	✓

Table A.11 – Summary of 2050 Revenue Constrained Plan and Unconstrained Scenario – Highway Projects (Continued)

Non-Highway Goods Movement Projects			
Vesta Street Bridge	Mobility Connector over Harbor Drive at Naval Base San Diego	✓	✓
32nd Street	Freeway Access Enhancement	✓	✓
10th Avenue Marine Terminal Entrance	Rail Line Grade Separation/Barrio Logan Enhancement	✓	✓
10th Avenue Marine Terminal Entrance	Enhance military project capacity, expand open storage		✓
National City Marine Terminal	Bay Marina Drive, Civic Center Freeway Access Improvements	✓	✓
National City Marine Terminal	Wharf extension, vehicle processing facility, berths 24-10 and 24-11		✓
National City Rail Yard		✓	✓
Desert Line	Basic Service, rehabilitation		✓
Logistics Center - South County			✓
Logistics Center - North County			✓
Logistics Center - Mid County			✓
San Diego International Airport	Access to I-5		✓
San Diego International Airport	Aircraft/ground access, AC facilities, transload		✓
Future Expansion	Freeway/ground access N. field		✓

KEY

C = Conventional Highway Lanes

F = Freeway Lanes

HOV = High Occupancy Vehicle Lanes

MB = Movable barrier

ML = Managed lanes (HOV & Value Pricing)

ML(R) = Managed lanes (Reversible)

T = Toll Lanes

TL = Transit Lanes

Note: All HOV lanes would convert to Managed Lanes by 2035 with an HOV occupancy of 3+ people.

Table A.12 – 2050 No Build Projects

The following transportation projects were assumed to be built in the 2050 No Build Scenario.

Highway	From	To	Note
I-15	SR 163	SR 78	Under construction
SR 52	SR 125	SR 67	Opened to traffic March 2011
SR 76	Mission Road	I-15	Under construction/development
I-805	Carroll Cyn Road	I-5/I-805 Merge	Under construction
SR 905	I-805	Mexico	Under construction
Transit			
I-15 Bus Rapid Transit (BRT) (downtown and UTC)			Under construction
SuperLoop			In service
Mid-City Rapid Bus			Final design
South Bay BRT (downtown)			Environmental

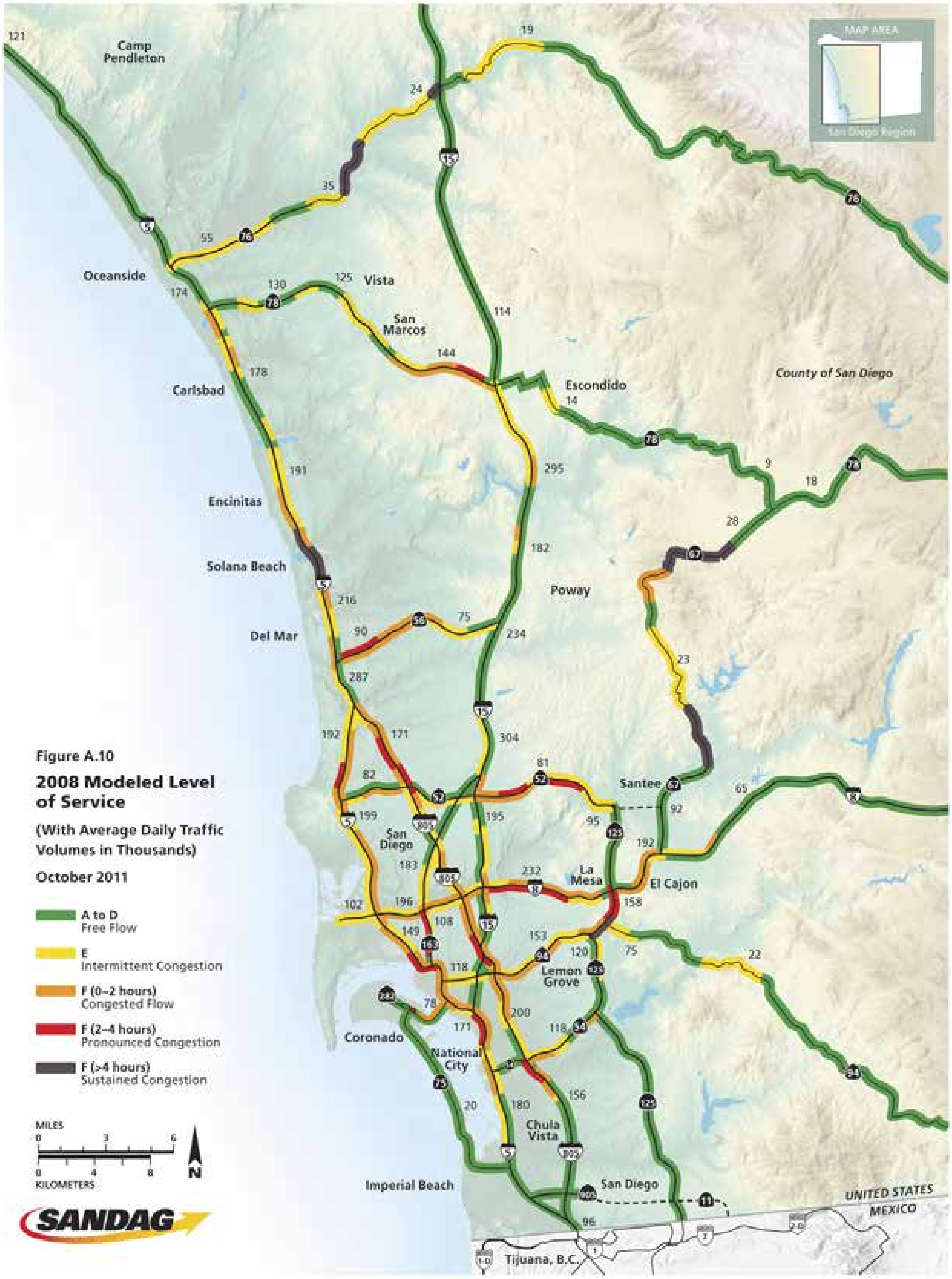


Figure A.10

2008 Modeled Level of Service

(With Average Daily Traffic Volumes in Thousands)

October 2011

Figure A.11

2050 Modeled Level of Service

(With Average Daily Traffic Volumes in Thousands)

October 2011

Appendix B

Air Quality Planning and Transportation Conformity

Appendix Contents

Background

The federal Clean Air Act (CAA), which was last amended in 1990, requires the U.S. Environmental Protection Agency (EPA) to set national ambient air quality standards (NAAQS) for pollutants considered harmful to public health and the environment. California has adopted state air quality standards that are more stringent than the NAAQS. Areas with levels that exceed 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. These attainment plans are called State Implementation Plans (SIPs). 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 176(c) of the federal Clean Air Act (42 USC §7506(c)), the San Diego Association of Governments (SANDAG) and the U.S. Department of Transportation (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.

The San Diego region attained the federal One-Hour Ozone Standard in 2001. The U.S. EPA redesignated the San Diego air basin as attainment/maintenance and approved the One-Hour Ozone Maintenance Plan as a SIP revision, effective on July 28, 2003. On June 15, 2005, the U.S. EPA revoked the federal One-Hour Ozone Standard after the 1997 Eight-Hour Ozone Standard became applicable.

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.

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. However, the U.S. EPA, in response to a court decision, is expected to rule in 2011 that the San Diego basic non-attainment area be reclassified as a Subpart 2 Serious non-attainment area, with a maximum statutory attainment date of June 15, 2013. Final U.S. EPA action on this proposed reclassification has yet to be taken.

Several areas that are tribal lands in eastern San Diego County were excluded from the 1997 Eight-Hour Ozone Standard non-attainment designation. As shown in Figure B.1, the following are attainment areas for the 1997 Eight-Hour Ozone NAAQS: La Posta Areas #1 and #2, Cuyapaipe, Manzanita, and Campo Areas #1 and #2.

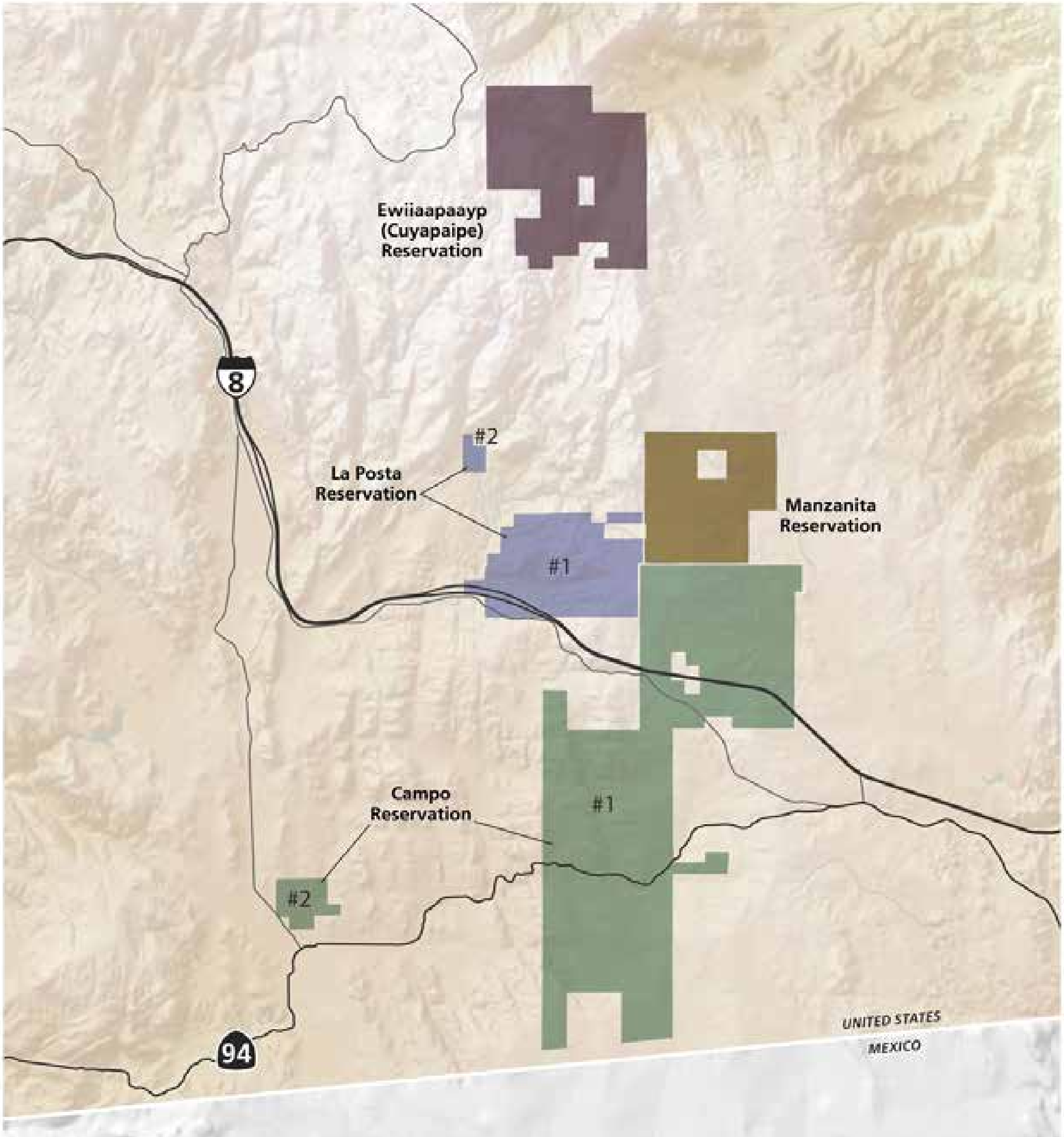


Figure B.1

Eastern San Diego County Attainment Areas for the Eight-Hour Ozone NAAQS

October 2011

Data Source: US EPA, Region 9 GIS Center
1997 Eight-Hour Ozone Standard

MILES 0 1 2 3
0 2 4 KILOMETERS
N

In cooperation with the San Diego APCD and SANDAG, the California Air Resources Board (CARB) developed an Eight-Hour Ozone Attainment Plan for the 1997 Eight-Hour Ozone Standard, which was submitted to the U.S. EPA on June 15, 2007. 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.

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, CARB 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 of the 2050 San Diego RTP to meet the required air quality conformity analysis. Conformity of the 2010 RTIP Amendment No. 13 has been determined simultaneously for consistency purposes. Tables B.2 and B.4 include the conformity analysis for both the 2050 Revenue Constrained RTP and the 2010 RTIP Amendment No. 13. The 2050 RTP provides information on revenue assumptions and the Revenue Constrained Scenario (Chapter 5). In addition, this conformity determination fulfills the requirements of SB 375, which requires a Sustainable Communities Strategy that allows for compliance with Section 176 of the federal Clean Air Act. (California Government Code, Section 65080(b)(2)(B)(iii)).

2050 RTP Air Quality Conformity Methodology

While the horizon year of this RTP is 2050, the current version of the emissions model approved by the U.S. EPA, EMission FACtors (EMFAC) 2007 only contains emission factors to 2040. Because no other emissions model is approved for use in conformity determinations by metropolitan planning organizations (MPOs) in California, staff explored options under the Transportation Conformity Rule to conduct the air quality conformity determination for the 2050 RTP.

SANDAG staff conducted interagency consultation on the proposed methodology for preparing the 2050 RTP air quality conformity analysis with the San Diego Region Conformity Working Group (CWG) at its August 4 and September 1, 2010, meetings. The CWG is comprised of staff representatives from SANDAG, the San Diego APCD, Caltrans, CARB, the U.S. DOT and U.S. EPA.

The CWG concurred with the proposed methodology. On September 17, 2010, the SANDAG Transportation Committee accepted, for review and distribution, the draft proposed methodology for conducting the air quality conformity determination for the 2050 RTP for a 30-day comment period. A public hearing on shortening the conformity timeline and the proposed methodology for the regional emissions analysis was held at the October 15, 2010, SANDAG Transportation Committee meeting. No comments were received at the hearing or in writing. The SANDAG Board of Directors approved the proposed methodology for conducting the 2050 RTP air quality conformity analysis on November 19, 2010.

In concurrence with the approved methodology, SANDAG staff conducted the Air Quality Conformity Analysis for the 2050 RTP for 2011 through 2040, with the analysis years of 2018, 2020, 2030, and 2040. SANDAG conducted a regional emissions analysis (for information purposes only) for 2050. To perform the informational analysis for 2050, SANDAG used the 2050 travel data from the SANDAG transportation model as input into EMFAC 2007 for the last year of the EMFAC 2007 model (2040).

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 is the 2050 Regional Growth Forecast, which the SANDAG Board of Directors accepted on February 26, 2010, for planning purposes.

The forecast process relies on three integrated forecasting models. The first one, the Demographic and Economic Forecasting Model (DEFM), provides a detailed econometric and demographic forecast for the entire region. The second one, the Interregional Commuting Model, provides a forecast of commuting between the San Diego region, Orange County, southwest Riverside County, Imperial County, and Tijuana/Northern Baja California. The third one, the Urban Development Model, allocates the results of the first two models to subregional areas based upon the current plans and policies of the jurisdictions.

In April 2010, SANDAG consulted with the San Diego Region CWG on the use of the 2050 Regional Growth Forecast for the air quality conformity analysis for the 2050 RTP conformity determination and the CWG concurred. Previously, both the U.S. DOT and the U.S. EPA concurred that approved plans should be used as input in the air quality conformity process. Figure B.2 and Table B.1 show the regional population, jobs, and housing growth forecast for the San Diego region through 2050.

The 2050 Regional Growth Forecast is based largely on the adopted general plans and community plans and policies of the 18 cities, and in some cases, includes draft plans that are nearing completion. 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 its projections for land uses in those later years. For unincorporated areas, the forecast is based on the County's referral alternative draft of the General Plan update, with additional constraints included for sensitive habitat areas.

Figure B.2 – San Diego Regional Population, Jobs, and Housing Forecast

Source: 2050 Regional Growth Forecast, SANDAG, February 2010

Table B.1 – San Diego Regional Population and Employment Forecast

2050 Regional Growth Forecast		
Year	**Population**	**Civilian Employment**
2008	3,131,552	1,411,811
2020	3,535,000	1,515,346
2030	3,870,000	1,648,361
2040	4,163,688	1,773,399
2050	4,384,867	1,898,769

Source: 2050 Regional Growth Forecast, SANDAG, February 2010

Transportation Modeling

SANDAG follows a widely used, four-step transportation modeling process of trip generation, trip distribution, mode choice, and assignment to forecast travel activity in the San Diego region. After a first pass through the four steps, a feedback process is used to pass congested travel conditions back into trip distribution and through to assignment. After several feedback iterations, a final pass is made through the mode choice and assignment steps to reflect congested travel conditions in mode decision-making. Travel model results are then combined with additional post-process input and output functions to form the complete modeling chain. For the first time, a truck model is run parallel to the four-step model. Truck origin-destination trip tables are merged with vehicle trip tables for highway assignment and air quality procedures.

The estimates of regional transportation-related emissions analyses meet the requirements established in the Transportation Conformity Rule, 40 CFR Sections 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 of travel. TransCAD 5.0 is the transportation planning computer package used by SANDAG to provide a framework for performing much of the computer processing involved with modeling, and it is used for the trip distribution and assignment steps. Another software package used extensively in the modeling process is ArcInfo. This Geographic Information System (GIS) maintains, manipulates, and displays transportation, land use, and demographic data. SANDAG has written numerous programs that provide a linkage between TransCAD and ArcInfo. Other custom programs perform some modeling functions, such as trip generation and mode choice. A number of data files and surveys are used to calibrate the transportation models. These include:

- 1995 San Diego Region Travel Behavior Study
- 2006 San Diego Household Travel Study
- 2001 Caltrans Statewide Travel Survey
- 2001-2003 San Diego Regional Transit Survey
- External Trip Surveys (2006 Interregional Travel Behavior Study)
- Traffic Generation Studies

- 1991 San Diego Visitor Survey
- 2000 Census Transportation Planning Package
- 2010 Freight Gateway Study
- 2002 Freight Analysis Framework

In addition to model parameters derived from these surveys and studies, there are three major inputs to the transportation models:

- Growth forecast inputs used to describe existing and planned land use patterns and demographic characteristics
- Highway networks used to describe existing roadway facilities and planned improvements to the roadway system
- Transit networks used to describe existing and planned public transit service

Highway Networks

The regional highway networks in the 2050 RTP 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 zones.

The route improvements and additions in the 2050 RTP 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.

The networks also account for programs intended to improve the operation of the highway system, including High Occupancy Vehicle (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 125 (SR 125) South, SR 11, SR 241, and additional lanes on Interstate 15 (I-15) north of SR 78 as well as 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. Facilities with proposed Managed Lanes include I-5, I-15, and I-805; and SR 52, SR 54, SR 78, SR 94, and SR 125. Managed Lanes are defined as reversible HOV routes or 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 plan transition to Managed Lanes by 2035. It is assumed that the excess capacity not used 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 D or better.

Based on the networks and programs described above, the transportation forecasts of the 2050 RTP differentiate among eight highway modes:

- Drive alone non-toll
- Drive alone toll
- Shared-ride non HOV/non-toll
- Shared-ride HOV/non-toll
- Shared-ride HOV/toll
- Light – heavy-duty
- Medium – heavy-duty
- Heavy – heavy-duty

SANDAG maintains a master highway network from which a specific-year network between the years 2008 (the 2050 Regional Growth Forecast base year) and 2050 can be built. Four networks were built and verified (2018, 2020, 2030, and 2040) for air quality conformity analyses of the 2050 RTP. A network also was built and verified for the year 2050 for an air quality analysis for informational purposes.

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, is included in Tables A.4 and A.8, located in Appendix A. Locally funded, regionally significant projects also have been included in the air quality conformity analysis. These projects are funded with *TransNet* funds, a 20-year, half-cent local sales tax for transportation that expired in 2008; *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. As a result, the only additional facilities that are added to the transportation coverage for transit modeling purposes are:

- Trolley and commuter rail lines
- Streets used by buses that are not part of local general plan circulation elements

Seven transit modes group routes with similar operating characteristics. They are:

- Commuter Rail
- Trolley/Light Rail
- Bus Rapid Transit (BRT)
- Rapid Bus
- Limited-Express Bus
- Express Bus
- Local Bus

BRT service would have stations similar to commuter rail and light rail, and operating characteristics midway between rail and bus service. BRT service would be provided by advanced design buses operating on HOV lanes or Managed Lanes, some grade-separated transit ways, and surface streets with priority transit systems. Once TransCAD transit networks have been built, TransCAD finds minimum time paths between transit access points (TAPs). TAPs are selected transit stops that are used to represent walk and auto access to the transit system.

The following four sets of paths are created for modes:

- A.M. Peak-period local bus
- A.M. Peak-period premium service
- Midday local bus
- Midday premium service

Bus speeds assumed in the transit networks are derived from modeled highway speeds and reflect the effects of congestion. Regional and express transit routes on surface streets are assumed to operate out of congestion due to priority transit treatments. Higher bus speeds may result for transit vehicles operating on highways with HOV lanes and HOV bypass lanes at ramp meters, compared with 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. TransCAD procedures replicate the San Diego region's complex fare policies which differ among:

- Buses, which collect a flat fare of between $1 and $4, depending on the type of service
- Trolleys, which charge $2.50 for all trips
- SPRINTER, which charges $2
- Commuter rail (COASTER), which has a zone-based fare of between $5 and $6.50
- Proposed regional BRT routes, which are assumed to charge $4
- Proposed Rapid Bus routes, which are assumed to charge $2.50

Fares are expressed in 1999 dollars (consistent with household incomes from the 2050 Regional Growth Forecast) 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 RTP 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 2050 RTP. These transit projects also are funded with *TransNet* funds or other local revenue sources. Once network coding is completed, the transportation models are run for the applicable scenarios (2018, 2020, 2030, 2040, and 2050 (for informational purposes)). A list of major regional transit projects included in the draft air quality conformity analysis, as well as information on phasing their implementation, is included in Table A.5, located in Appendix A.

Trip Generation

A trip generation analysis is the first step in the transportation modeling process. Average weekday trip ends, by all forms of transportation and starting and ending in each zone, are estimated for ten trip types:

- Home-to-work
- Home-to-college
- Home-to-school
- Home-to-shop
- Home-to-other

- Work-to-other
- Other-other
- Serve passenger
- Visitor
- Airport

The model computes person trips, which account for all forms of transportation – including automobiles, trucks, taxicabs, motorcycles, public transit, bicycling, and walking.

The trip-generation model works by applying trip rates to zone-level growth forecasts. The model calculates each of the trip ends separately as trip productions and attractions. Trip production rates are expressed as trips per household, while trip production rates vary by trip type and structure type. Trip attractions are expressed as trips per acre of nonresidential land use or trips per household. Trip attraction rates vary by trip type and land use category. The 2050 Regional Growth Forecast was used to produce trip-generation forecasts for the years 2018, 2020, 2030, 2040, and 2050. Trip generation rates were established by utilizing data from traffic generator studies, as well as expanding rates from the 1995 San Diego Region Travel Behavior Study, the 2006 San Diego Household Travel Study, and the 2001 Caltrans Statewide Travel Survey.

The model reduces future year person-trips by a small amount to reflect the increased use of teleworking and e-commerce. Reduction factors of 1, 3, or 5 percent were applied to selected trip purposes and land uses. Telework reduction factors depend on the likelihood that the land use type would have employee categories that could feasibly telecommute. Reduction factors start in the year 2020.

The truck model follows a process similar to the one followed by the person model. The model computes truck vehicle trips for heavy-duty trucks, including light heavy-duty, medium heavy-duty, and heavy heavy-duty trucks. The truck classifications correspond to the CARB truck classifications used in the air quality model EMFAC. Trip production and attraction rates are expressed as trips per employee, and the rates vary by employee industry category.

Trip Distribution

After the trip generation analysis is completed, trip movements between zones are determined using a form of the trip distribution model known as the doubly-constrained, gamma-function gravity model. Inputs to the trip distribution model include zone-level trip generation forecasts by trip type, zone-to-zone impedances, and gamma function parameters by trip type and 4D category. 4D index categories attempt to define locations by their density, diversity, distance, and urban design characteristics. A high 4D index value represents areas that would be considered smart growth and would result in shortened trip lengths. In this way, the model is designed to reflect changing trip patterns in response to the types of new development in land use scenarios. The model also modifies trip patterns as new roadways are added.

A truck trip distribution analysis is performed in a similar manner, but it is used to distribute vehicle trips rather than person-trips by purpose, as in the person model. The truck model also uses different distribution parameters by vehicle type, which are not segmented by 4D category.

The model is calibrated to match observed trip length frequencies from the 2006 Household Travel Study and the 2001 Caltrans Statewide Travel Survey. Zone-to-zone impedances are a composite measure of peak and off-peak travel times and costs by highway, transit, and non-motorized modes.

Mode Choice

At this point in the modeling process, total person-trip movements between zones are split into different forms of transportation by highway, transit, and non-motorized modes (bicycling and walking). Highway modes include drive-alone non-toll, drive-alone toll, shared-ride non HOV/non-toll, shared-ride HOV/non-toll, and shared-ride HOV/toll. Nine transit modes differentiate transit trips by three ride modes (rail, BRT, and bus) and three access modes (walk, drive, and drop-off). The mode choice model is designed to link mode use to demographic assumptions, highway network conditions, transit system configuration, land use alternatives, parking costs, transit fares, and auto operating costs. Trips between zone pairs are allocated to modes based on the cost and time of traveling by a particular mode, compared with the cost and time of traveling by other modes. For example, vehicle trips on a congested route would be more likely to be diverted to light rail than vehicle trips on an uncongested freeway.

Income level also is considered, because lower-income households tend to own fewer automobiles and therefore make more trips by transit and carpooling. People in higher income households tend to choose modes based on time and convenience rather than cost. The mode choice model is calibrated using the 1995 San Diego Travel Behavior Study and the 2006 Household Travel Study trip tables by mode and income, as well as 2001-2003 Regional Transit Survey transit trip characteristics. Regional-level Census 2000 work-trip mode shares also were used to fine tune mode-share estimates.

Highway and transit travel times reflect highway congestion effects from the final iteration of the feedback loop. The model produces a.m. peak, p.m. peak, and off-peak period trip tables for vehicles and transit riders. The a.m. peak period is from 6 to 9 a.m. and the p.m. peak period is from 3 to 6 p.m. The off-peak period covers the remaining 18 hours of the day.

Highway and Transit Assignment

Highway assignment produces traffic-volume estimates for all roadway segments in the system. These traffic volumes are an important input to emissions modeling. Similarly, transit trips are assigned to transit routes and segments.

Highway

SANDAG loads traffic using the TransCAD Multimodal Multiclass Assignment function. Before loading the traffic onto the network, the three truck modes are combined with the five passenger vehicle modes. Multi-class assignment allows SANDAG to assign the eight vehicle modes (as defined in the highway network section) 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 during off-peak hours, when roadways are typically free flowing. For this reason, traffic is assigned separately for a.m. peak, p.m. peak, and off-peak periods. 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.

Model accuracy is assessed by comparing model estimated traffic volumes with actual traffic counts obtained through the SANDAG traffic monitoring program and the Highway Performance Monitoring System estimates of Vehicle Miles of Travel (VMT).

After completing the highway assignments, additional processing is needed. Adjustments are made for calibration error volume, HOV/managed lane volume, bus volumes, hourly distribution factors, Level of Service, and travel time.

Transit

For transit assignment, TransCAD software assigns TAP-to-TAP transit trips to the network. Eight separate transit assignments are produced for peak and off-peak periods, walk and auto access, and local bus and premium service. These individual assignments are summed to obtain total transit ridership forecasts.

Before assigning transit trips, external transit trips coming into San Diego from outside the region need to be added to the internal transit trips estimated by the mode choice model. Currently, few transit trips enter from the north or east. However, more than 20,000 transit trips cross the Mexican border each day. To account for these trips, an external transit trip table for the base year is developed from on-board transit ridership surveys and factored to future years based on border crossing trends.

For accuracy, transit ridership forecasts from the transit assignment model are compared with transit counts from the SANDAG transit passenger counting program to determine whether transit modeling parameters need to be adjusted.

Some of these comparisons of model-estimated boardings with actual boardings include:

- System-level boardings, which may reveal transfer rate problems and lead to changes to the transfer wait time factor in the mode choice model
- Boardings by mode, which may reveal modal biases and lead to changes in mode choice modal constants
- Boardings by frequency of service, which may show biases that lead to changes in the first wait factor in the mode choice model
- A Centre City screenline crossing, which may lead to changes in parking costs and boardings by stop location, which may indicate problems with specific generators, such as a university

Post-TransCAD Processing

Standard TransCAD output needs to be reformatted and adjusted to be useful for emissions modeling. Several routines and computer programs have been written to accomplish the following major functions:

- Correcting link-specific traffic volume forecasts for calibration errors
- Adding in estimated travel on roads not in the transportation modeling process

- Computing link speeds based on corrected link volumes, highway capacity manual relationships between congestion and speed (or signal delay)
- Splitting link volumes into heavy-duty truck and other traffic to obtain speed distributions by vehicle class
- Preparing a data set that contains total VMT, number of trip starts, and VMT by speed category by time of day for each vehicle class

The travel demand modeling procedures used for the 2050 RTP differ from previous modeling procedures in three key ways, as described in the previous sections. To summarize, first a truck model is run parallel to the four-step model. Truck origin-destination trip tables are merged with vehicle trip tables for highway assignment and air quality procedures. Second, new inputs are used, including the recently completed 2010 Freight Gateway Study (a forecast of freight traffic in the region), 2002 Freight Analysis Framework data, and the 2050 Regional Growth Forecast projections. Third, a 4D (density, diversity, distance, and urban design characteristics) category is used as an input into the trip distribution model. These new inputs and procedures have contributed to changes in output for emissions modeling.

Motor Vehicle Emissions Modeling

Emissions Model

In November 2006, CARB released EMFAC 2007, an emissions inventory model that calculates emissions for motor vehicles operating in California. It is an integrated model that combines emission rate data with vehicle activity to calculate regional emissions. The U.S. EPA approved EMFAC 2007 for use in conformity determinations on January 18, 2008. The EMFAC 2007 model supports the calculation of emissions for the Burden mode. The Burden mode is used for calculating regional emission inventories. In this mode, the model reports total emissions as tons per day for each pollutant, by vehicle class, and the total vehicle fleet. The Burden mode uses emission factors that have been corrected for ambient conditions and speeds combined with vehicle activity to calculate emissions in tons per day. Vehicle activity includes the number of vehicles, daily VMT, and the number of daily trips.

The air quality analysis of the 2050 RTP was conducted using the EMFAC 2007 Burden mode. Projections of daily regional emissions were prepared for reactive organic gases (ROG), nitrogen oxides (NOx), and CO.

On-road motor vehicle emissions are attributed to several different processes:

- Starting exhaust
- Running exhaust
- Idle exhaust (calculated for heavy-duty trucks only)
- Resting and diurnal evaporation
- Running losses
- Hot soak evaporation

Emission factors vary by vehicle class, fuel usage, and technology. The fuels modeled are gasoline, diesel, and electricity-powered vehicles. Technology categories can be grouped into catalyst, non-catalyst, and diesel. Thirteen vehicle classes are modeled:

- Passenger car
- Two types of light-duty trucks

- Medium-duty truck
- Two types of light heavy-duty trucks
- Medium heavy-duty truck
- Heavy heavy-duty truck
- Line-haul vehicle
- Urban bus
- School bus
- Motorcycle
- Motor home

Emission factors for processes that vary by temperature (i.e., starting exhaust, hot soak, and running exhaust) are broken down further by specified temperature ranges. Exhaust emission factors also are broken down by speed range.

Regional Emissions Forecasts

Regional transportation forecasts were initiated in December 2010. Output from the TransCAD model was then reformatted and adjusted to be useful for emissions modeling.

Eight-Hour Ozone Standard

Effective June 9, 2008, the U.S. EPA found the eight-hour ozone budgets included in the Eight-Hour Ozone Attainment Plan for San Diego County adequate for transportation conformity purposes. Beginning in December 2010, SANDAG prepared countywide forecasts of average weekday ROG and NOx emissions for 2018, 2020, 2030, 2040, and 2050 (for informational purposes) using the EMFAC 2007 model. ROG and NOx emissions are based on the summer season.

The analysis years were selected to comply with 40 CFR Sections 93.106(a)(1) and 93.118(a) of the Transportation Conformity Rule and the approved methodology for conducting the 2050 RTP Air Quality Conformity Analysis, which shortened the conformity horizon to 2040 and requires an informational analysis of the plan horizon year (2050). According to these sections of the Conformity Rule, the first horizon year (2018) must be within ten years from the base year used to validate the regional transportation model (2008), the last horizon year must be the last year of the transportation plan's forecast period, or in the case of the 2050 RTP, the last year of the conformity determination (2040), and the horizon years may be no more than ten years apart (2020 and 2030).

CO Standard

CO regional emissions were projected for 2018, 2020, 2030, 2040, and 2050 (for informational purposes) for the conformity determination of the 2050 RTP. CO emissions are based on the winter season.

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 2050 RTP, the plan must comply with the emissions analysis described in the Regional Emissions Forecast section. Table B.2 shows that projected ROG and NOx emissions from the 2050 RTP are below the ROG and Nox budgets.

Adjustment factors for ROG and NOx were provided by CARB to account for recently-adopted emission control programs not reflected in EMFAC 2007 and other corrections. Table B.3 includes the adjustment factors by analysis year.

Table B.2 – 2050 Revenue Constrained RTP – Air Quality Conformity Analysis for Eight-Hour Ozone (EMFAC 2007)

			ROG		NOx	
Year	Average Weekday Vehicle Starts (1,000s)	Average Weekday Vehicle Miles (1,000s)	SIP Emissions Budget Tons/Day	ROG Emissions Tons/Day	SIP Emissions Budget Tons/Day	NOx Emissions Tons/Day
2018	14,760	85,073	53	26	98	42
2020	14,979	86,155	53	24	98	38
2030	16,396	98,912	53	19	98	28
2040	17,676	107,715	53	18	98	28
2050(1)	18,942	117,825	53	19	98	31

(1) The emission data for 2050 was prepared using 2040 emission factors, as emission factors for 2050 are not available. The 2050 RTP air quality conformity analysis was conducted for the years 2011 – 2040. Emissions data for 2050 is included for informational purposes only.

Note: Emissions budgets are 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.

Table B.3 – EMFAC 2007 Adjustment Factors

Year	ROG Adjustment Factor (Tons/Day)	NOx Adjustment Factor (Tons/Day)
2018	0.25	2.48
2020	0.33	2.40
2030	0.71	2.80

Note: Adjustment factors were provided by CARB. The tons listed are subtracted from the EMFAC 2007 output of tons per day for ROG and NOx.

Table B.4 shows that projected CO emissions from the 2050 RTP are below the 2003 CO budget of 730 tons per day.

Exempt Projects

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

Table B.5 illustrates the exempt projects considered in the 2050 Revenue Constrained RTP. 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.4 – 2050 Revenue Constrained RTP Air Quality Conformity Analysis for Carbon Monoxide (EMFAC 2007)

			CO	
Year	Average Weekday Vehicle Starts (1,000s)	Average Weekday Vehicle Miles (1,000s)	SIP Emissions Budget Tons/Day	CO Emissions Tons/Day
2018	14,760	85,073	730	231
2020	14,979	86,115	730	207
2030	16,396	98,912	730	158
2040	17,676	107,715	730	144
2050(2)	18,942	117,825	730	157

(2) The emission data for 2050 was prepared using 2040 emission factors, as emission factors for 2050 are not available. The 2050 RTP air quality conformity analysis was conducted for the years 2011 – 2040. Emissions data for 2050 is included for informational purposes only.

Note: Emissions budgets for the San Diego region are from 2004 Revision to California State Implementation Plan for Carbon Monoxide, Updated Maintenance Plan for Ten Federal Planning Areas (Approved as a SIP revision in January 2006).

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 ridesharing, transit service improvements, traffic-flow improvements, and bicycle 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, bicycling, and traffic-flow improvements continue to be funded, although the level of implementation established in the SIP has been surpassed.

Table B.5 – Exempt Projects

Project/Program Description	Project/Program Description
Bikeway, Rail Trail, and Pedestrian Projects	
Bayshore Bikeway	Maple Street Pedestrian Plaza
Bay-to-Ranch Bikeway	Mid-County Bikeway
Border Access Bicycle Corridor	Mira Mesa Bicycle Corridor
Camp Pendleton Trail	Mission Valley – Chula Vista Bicycle Corridor
Carlsbad – San Marcos Bicycle Corridor	North Park – Centre City Bicycle Corridor
Central Coast Bicycle Corridor	Otay Mesa Port of Entry Pedestrian/Bicycle Facilities
Chula Vista Greenbelt	Park Boulevard Bicycle Connector
City Heights – Old Town Bicycle Corridor	Poway Bicycle Loop
Clairemont – Centre City Bicycle Corridor	San Diego Regional Bicycle Plan
Coastal Rail Trail	San Diego River Multi-Use Bicycle and Pedestrian Path
East County Northern Bicycle Loop	San Luis Rey River Trail
East County Southern Bicycle Loop	Santee – El Cajon Bicycle Corridor
El Camino Real Bicycle Corridor	SR 52 Bikeway
Encinitas – San Marcos Bicycle Corridor	SR 56 Bikeway
Escondido Creek Bike Path Bridge and Bikeway	SR 56/Black Mountain Road Bikeway Interchange
Gilman Bicycle Connector	SR 125 Bicycle Corridor
Hillcrest – El Cajon Bicycle Corridor	SR 905 Bicycle Corridor
Imperial Beach Bicycle Connector	Sweetwater River Bikeway
Inland Rail Trail	Tecate International Border Crossing Pedestrian Facilities
Interstate 8 Bicycle Corridor	Ted Williams Parkway Pedestrian Bridge at Shoal Creek
Interstate 15 Bikeway	Third Avenue Bicycle and Pedestrian Access
Interstate 805 Bicycle Corridor	Vista Way Bicycle Connector
Kearny Mesa – Beaches Bicycle Corridor	West Bernardo Bike Path
Kensington – Balboa Park Bicycle Corridor	

Table B.5 – Exempt Projects (Continued)

Project/Program Description	Project/Program Description
Safety Improvement Program	**Transportation Systems Management**
Bridge Rehabilitation/Preservation/Retrofit	Automated Traveler Information System (ATIS)
Collision Reduction	Bus on Shoulder Service
Emergency Response	Compass Card
Hazard Elimination/Safe Routes to School	FasTrak®
Highway Maintenance	Freeway Service Patrol
Safety Improvement Program	Connected Vehicle Roadside Devices
Roadway/Roadside Preservation	Intermodal Transportation Management System (IMTMS)
Smart Growth Incentive Program	ITS Operations
Transit Terminals	Joint Transportation Operations Center (JTOC)
Airport Intermodal Transit Center/Terminal	Trolley Fiber Communication Network
San Ysidro Intermodal Transit Center/Terminal	Universal Transportation Account
	Various Traffic Signal/Prioritization

Interagency Consultation Process and Public Input

The consultation process followed to prepare the Air Quality Conformity Analysis for the 2050 RTP complies with the San Diego Transportation Conformity Procedures adopted in July 1998. In turn, these procedures comply with federal requirements under 40 CFR 93. Interagency consultation involves SANDAG (as the MPO for San Diego County), APCD, Caltrans, CARB, U.S. DOT, and U.S. EPA. In addition, pursuant to Government Code Section 14522.2, the methodology and key assumptions of travel demand models are provided in Technical Appendix 15.

Consultation is a three-tier process that:

- Formulates and review 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 the circulation of supporting materials prior to formal adoption

SANDAG consulted on the development of the Air Quality Conformity Analysis of the 2050 RTP at meetings of the San Diego Region CWG, as follows:

- On August 4, 2010, SANDAG staff presented the RTP process and timeline, schedule for the 2050 RTP development, and information on some of the RTP conformity procedures, including the Public Involvement Plan, pollutant budgets and Transportation Control Measures. Additionally, staff presented the 2050 RTP Draft Proposed Conformity Analysis Methodology for review and comment by the CWG and requested any comments in writing by August 20, 2010.

- On September 1, 2010, SANDAG presented information on the 2050 Growth Forecast and the 2050 RTP Travel Demand Model. Staff also presented once more the 2050 RTP Draft Proposed Conformity Analysis Methodology, to provide the group with another opportunity to review the information and provide any comments. No comments were received.

- On September 17, 2010, the SANDAG Transportation Committee accepted for review and distribution the draft proposed methodology for conducting the air quality conformity determination for the 2050 RTP for a 30-day comment period.

- On October 6, 2010, SANDAG staff presented information on several conformity criteria and procedures for the development of the 2050 RTP, including 2050 RTP public outreach, latest emissions model, and draft revenue constrained financial assumptions.

- On October 15, 2010, the SANDAG Transportation Committee held a public hearing to solicit public comments on shortening the conformity timeline and on the proposed methodology for the regional emissions analysis. No comments were received at the hearing or in writing.

- On November 19, 2010, the SANDAG Board of Directors approved the 2050 RTP Conformity Analysis Methodology for use in the Draft 2050 RTP and its air quality conformity determination.

- On December 17, 2010, the SANDAG Board of Directors selected the Revenue Constrained Transportation Network to be included in the Draft 2050 RTP and its Air Quality Conformity Analysis.

- SANDAG staff initiated the air quality conformity modeling for the Draft 2050 RTP on December 17, 2010.

- At the January 5, 2011, CWG meeting, SANDAG staff presented the 2050 RTP revenue constrained and exempt project lists.

- On February 25, 2011, the Draft 2050 RTP Air Quality Conformity Analysis was released to the CWG for a 30-day review period.

- At the March 2, 2011, CWG meeting, the Draft 2050 RTP Air Quality Conformity Analysis was discussed.

- On April 22, 2011, the SANDAG Board of Directors released the Draft 2050 RTP, including its air quality conformity analysis, for a public review period that closed on July 8, 2011.

- On July 26, 2011, the revised air quality conformity analysis document was released to the CWG for a 30-day review period that closed on August 26, 2011.

- On August 1, 2011, the revised air quality conformity analysis document was released to the public for a 30-day review period that ended on August 31, 2011. No comments were received.

Members of the public have been welcomed to provide comments at meetings of the San Diego Region CWG, the Transportation Committee, and the SANDAG Board of Directors.

Appendix C

Tribal Consultation

Appendix Contents

Introduction

The U.S. Constitution and treaties recognize Native American communities as separate and independent political communities within the territorial boundaries of the United States – nations within a nation. In the San Diego region, there are 17 federally recognized tribal nations with jurisdiction over 18 reservations – the most in any county in the United States, as shown in Figure C.1.[i]

Federal legislation requires that federally recognized tribal governments be consulted in the development of Regional Transportation Plans (RTP) and programs (Title 23, U.S.C. 450.312 and 316(c)). In particular, the current federal transportation authorization, the Safe, Accountable, Flexible, and Efficient Transportation Act: A Legacy for Users (SAFETEA-LU) reinforces the federal emphasis on tribal government participation. President Obama in his November 5, 2009, Memorandum on Tribal Consultation (Federal Register, vol. 74, No. 215, 11/9/09) reiterated the directive for public agencies to incorporate tribal consultation into their plans and programs in a timely and meaningful manner. In February 2010 the Department of Transportation led the way with a revised Tribal Consultation Plan that resulted from extensive consultation with tribal leadership across the country.[ii]

How this consultation should occur is left to the Metropolitan Planning Organizations (MPOs) and the tribal governments. SANDAG, as an MPO, has forged a strong working relationship with the tribal nations in our region, based on a regional framework of communication, coordination, and collaboration in the regional transportation planning process. This appendix documents the tribal consultation process for the 2050 RTP. It includes: the background on the transportation needs, as the tribal nations in the region identified them; a discussion of the development of the regional government-to-government framework that has emerged in recent years; documentation of milestones in collaborative transportation planning that have occurred since the 2030 RTP; and the tribal transportation strategies for the 2050 RTP discussed and agreed upon at the 2010 San Diego Regional Tribal Summit. The objectives for the 2050 RTP, with regard to tribal nations and regional transportation planning, were to:

- Engage federally recognized tribal governments in the region in the transportation planning process in a timely, meaningful, and effective manner
- Strengthen the current framework for government-to-government engagement at a regional level
- Based on a government-to-government dialogue and negotiation, pursue a set of mutually agreed upon prioritized strategies to improve tribal transportation in the region in four areas: roadways, transit, funding, and information sharing/technical assistance

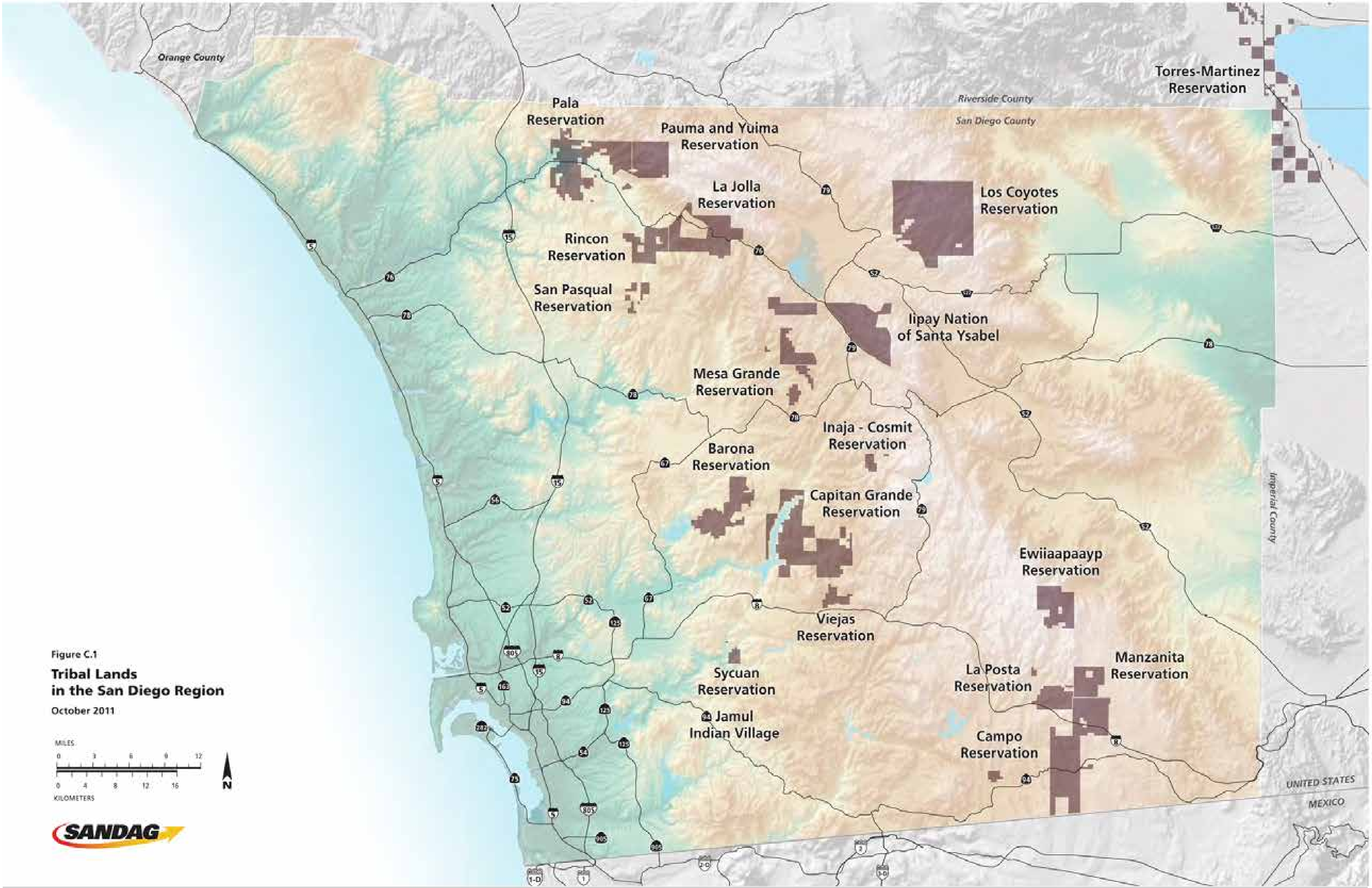


Figure C.1
Tribal Lands in the San Diego Region
October 2011

Background

Historically, the relationship between local governments and federally recognized tribal governments has been contentious. While the federal-tribal relationship is well established, the local-tribal government relationship has not been as clearly defined. Despite efforts to reach out to local governments, tribal governments indicate that for many years they were not well received. This has changed considerably in recent years. With the advent of gaming, local perceptions have changed, according to various tribal leaders. As a condition of the development of more recent gaming compacts, some tribes are required to negotiate mitigation agreements with the local land use authorities adjacent to them. What has not been clearly delineated by the state or federal government is the mechanism for including tribal input into the regional transportation planning process. The federal government requires "consultation" with tribal governments. However, the definition of meaningful consultation, or more in-depth coordination and cooperation, is being developed on a case-by-case basis in various parts of the country. There is clearly an increasing need to better coordinate and assess the impacts of tribal development and future plans on the regional transportation system, as well as how regional plans and planning principles, such as smart growth strategies, affect tribal development.

Tribal Nations in San Diego

Of the 107 federally recognized Indian tribes in California, 17 are located in San Diego County. Historically, the tribal members of today's bands represent four Indian cultural/linguistic groups that have populated this entire region for more than 10,000 years, taking advantage of its abundant natural resources and diverse ecological system for their livelihoods. The four nations are: the Luiseño, who traditionally inhabited the land along the San Luis Rey River in north and northwestern San Diego County; the Cahuilla, who live in the mountains in the northeastern part of the county and into the Coachella and Imperial Valleys; the Cupeño, who live in the Warner Springs area; and the Kumeyaay (Northern Ipai/Southern Tipai), who live in the southern part of the county from the coast to the mountains and all the way to what is today Baja California.

In the years just prior to California becoming a state, the federal government developed treaties with Native Nations in the region in an effort to reduce tribal and settler violence at the end of the U.S.-Mexican War and during the onset of the Gold Rush. However, these treaties were never ratified; they were thwarted on the U.S. Senate floor by pressure from the new California Senators, and the tribal nations that had signed the treaties were never informed. In 1875, President Ulysses S. Grant signed an Executive Order based on several of the "lost treaties," creating the Santa Ysabel, Pala, Sycuan, La Jolla, Rincon, and Capitan Grande[iii] tribal reservations. Most of the current tribal reservations were established by the end of the 19th century; however, several were established well into the 20th century.[iv] Today, these four ethnic groups are distributed across 18 reservations and are represented by 17 federally recognized tribal governments as shown in Table C.1.[v]

As domestic sovereign nations, tribes are subject to federal regulations, but they are not subject to local or state regulations unless the U.S. Congress delegates implementation of federal law to the state. From a governance perspective, tribal governments are considered a separate category of government from the federal, state, and local governments. In addition to the standard governmental functions of regulating, taxing, and delivering services, tribal governments act to preserve

Table C.1 – Federally Reconized Indian Reservations and Tribal Governments in the San Diego Region

Reservation Name	Tribal Government
Barona*	Barona Band of Mission Indians
Campo*	Campo Band of Mission Indians of the Kumeyaay Nation
Capitan Grande	Joint Power Authority between Barona and Viejas
Ewiiaapaayp***	Ewiiaapaayp Band of Kumeyaay Indians
Inaja and Cosmit	Inaja Cosmit Band of Diegueño Mission Indians
Jamul Indian Village	Jamul Indian Village. A Kumeyaay Nation
La Jolla	La Jolla Band of Luiseño Indians
La Posta**	La Posta Band of the Kumeyaay Nation
Los Coyotes	Los Coyotes Band of Cahuilla/Cupeño Indians
Manzanita	Manzanita Band of Diegueño Mission Indians
Mesa Grande	Mesa Grande Band of Diegueño Mission Indians
Pala*	Pala Band of Mission Indians
Pauma and Yuima*	Pauma Band of Luiseño Indians
Rincon*	Rincon Band of Luiseño Indians
San Pasqual*	San Pasqual Band of Diegueno Mission Indians
Santa Ysabel**	Iipay Nation of Santa Ysabel
Sycuan*	Sycuan Band of the Kumeyaay Nation
Viejas*	Viejas Band of Kumeyaay Indians

Source: SANGIS, Bureau of Indian Affairs
*tribe with gaming facility
**tribe with less than 350 slot facility
***Previously known as 'Cuyapaipe'

and protect tribal culture and the tribal community, including determining tribal membership. Tribal governments also are responsible for the development, management, and operation of tribal economic enterprises. Most of the land within the boundaries of reservations is owned by tribes and held in trust by the federal government.[vi] Tribes are a distinct category of land use authority. Native American reservations currently cover more than 116,000 acres in the San Diego region, approximately four percent of the region's land base.

Current Conditions

A number of planning issues surround these reservations, as they are all located in remote areas outside of incorporated areas. The degree of remoteness ranges from those that are outside the urban transportation system but near major highways such as Viejas, to those that are not even fully connected to county roads, such as Los Coyotes. Inadequate access to and from the reservations often results in a lack of economic opportunity, as well as insufficient health, social, and cultural services.

Tribal Economic Development

Gaming is a traditional social activity among many tribal nations. However, tribal gaming enterprises expanded exponentially nationwide in the early 1990s as a result of the passage of the Federal Indian Gaming Regulatory Act (IGRA). The IGRA was the result of a legal battle between the Cabazon Band of Mission Indians and the State of California over the issue of the definition of sovereignty.[vii] The State claimed that Cabazon was violating the state's anti-gambling laws, while the tribe asserted its sovereign right to pursue its own economic interests. In 1987, the U.S. Supreme Court ruled in favor of Cabazon, prompting Congress to pass a federal gaming regulatory act to define how gaming should be conducted nationwide and what role states should have in that activity.[viii] Although several tribes in the San Diego region already had well-established bingo facilities, by the 1990s most of the tribes had developed or had agreements to develop gaming facilities as a means of economic development. San Diego County now has ten tribal gaming facilities, which is the greatest concentration of Indian gaming facilities in any county in the United States (refer to Table C.1).[ix]

Gaming-related and other types of development have led to rapid economic growth for these tribes, while also providing jobs and stimulating the regional economy.[x] In the San Diego region, statistics show that the

Indian gaming industry as a whole has created more than 12,000 permanent jobs in the region, resulting in a $1 billion industry with about $500 million in goods and services purchased annually and $500 million in payroll. It should be noted, however, that the poverty level among the Native American population remains below the national average. Some gaming tribes have been much more successful than others, and there are six tribes in the region that are not involved in gaming.

This economic growth has been accompanied by increases in traffic, jobs-housing accessibility issues, and the need for additional resources such as water and energy. Even those tribes that do not have gaming facilities continue to have economic development, transportation, and infrastructure needs that have not been met.

Since the mid-1990s, tribal governments in San Diego have been developing gaming compacts with the State of California that have allowed them to plan and develop gaming facilities on their reservations. The planning framework used for the RTP is one of concentrating development in existing, more urban areas and connecting public transit to appropriate smart growth opportunity areas. The 2050 RTP considered existing tribal land use patterns in land use and transportation forecast modeling. But it did not consider forecast land use because limited information was available from tribal governments. As part of the gaming compact process, tribal governments are required to submit to the State a Tribal Environmental Impact Report. The findings are subject to negotiation between the tribal government and the land use authority adjacent to it. However, there are currently no protocols for exchanging information about long-term land use and transportation plans on tribal lands for the regional planning process.

The County of San Diego, in its capacity as the adjacent land use authority to all tribal developments in the San Diego region, conducted traffic needs assessments related to tribal developments, which intensified after the enactment of the federal IGRA. In its 2003 report on the impact of tribal development on its roadways, the County requested that SANDAG consider the impacts of tribal development on the regional transportation system.[xi]

"It is estimated that 38.5 miles of County-maintained arterials in the vicinity of the Reservations will need additional road capacity improvements. Of those 38.5 miles, about 15.6 were identified under Baseline Conditions as needing improvements solely due to non-tribal development in the unincorporated area. The additional 22.9 miles is due to existing and near-term development of tribal projects."

Based on that information, the County negotiated cooperative agreements with several tribes for "fair share" funding to mitigate traffic impacts. Nonetheless, according to the County report, level of service (LOS) on several road segments in the State Route (SR) 76, SR 67, and SR 94 corridors was estimated to deteriorate because of increased traffic volumes associated with the gaming facilities. Both Caltrans and the County called for additional corridor studies in the unincorporated area associated with gaming facilities.

Currently, the main input required to accurately incorporate tribal land use into transportation forecast modeling for the RTP is the square footage of gaming area which produces the estimate of Average Daily Trips (ADT). Currently, ten tribal gaming facilities are in operation. The estimated square footage of each facility is shown in Table C.2. It is anticipated that through government-to-government discussions with tribal governments, more accurate protocols can be developed for assessing traffic impacts. The available 2009 data on square footage devoted to gaming was incorporated into the travel forecasting for the 2050 RTP.

At the same time that there are concerns about the impact of gaming facilities on the regional transportation system, some tribal lands are isolated from the regional transportation system because they are situated in unincorporated portions of the county. All non-gaming tribes[xii] in San Diego County receive funding from gaming tribes in the form of a Revenue Sharing Trust Fund (RSTF)[xiii] to support the administration of their nations. But their isolation from the transportation system – in terms of infrastructure and transit services – limits their ability to improve the health and well-being of tribal members who reside on the reservation, as well as their ability to explore alternative means of self-sufficiency. As more tribal members return to their reservations to live, this will continue to be an issue regardless of the success of tribal enterprises. Regardless of the overall goal of the 2050 RTP, the region's tribes must be serviced by the federally funded regional transportation system. It is critical to balance the needs of the region with the needs of the tribal nations for a system that serves everyone.

Table C.2 – Square Footage of Gaming Facilities for Trip Generation Estimates

Name	Casino Name	Year Opened	Square Footage of Existing Operation	Number of Restaurants	Square Footage of Gaming Floor	Number of Gaming Machines; Tables	Number of Employees
			SR 76 Corridor				
Pala Band of Mission Indians	Pala Casino Resort & Spa	2001	650,000	10	210,000	2,000; 80	1,775
Pauma Band of Luiseño-Yuima Indians	Casino Pauma	2001	65,000	3	37,000	1,090; 18	500
Rincon Band of Luiseño Indians	Harrah's Rincon Casino & Resort	2002	263,000	8	55,000	1,600; 59	1,500
San Pasqual Band of Diegueño Indians	Valley View Casino	2001	124,000	3	75,000	2,016; 30	1,100
			SR 79 Corridor				
Iipay Nation of Santa Ysabel*	Santa Ysabel Casino Resort	2007	30,000	1	15,000	349; 8	169
			I-8 Corridor				
Barona Band of Mission Indians	Barona Resort & Casino	2003**	305,000	11	101,550	2,000; 85	3,000
Campo Band of Kumeyaay Mission Indians	Golden Acorn Casino	2001	60,000	1	40,000	750; 12	325
La Posta Band of the Kumeyaay Nation***	La Posta Casino	2007	20,000	1	20,000	349; 0	90
Sycuan Band of the Kumeyaay Nation	Sycuan Casino & Resort	1983	238,000	4	100,000	2,271; 85	2,000
Viejas Band of Kumeyaay Indians	Viejas Casino & Turf Club	1991	333,000	6	210,000	2,000; 85	2,000
		Totals 2009:	**2,088,000**	**46**	**1,072,000**	**14,425; 447**	**12,459**

Source: Cruz, Manny, "San Diego Indian Gaming," *San Diego Metropolitan Magazine, April 2009*

* Not considered a gaming tribe for the purposes of the Special Distribution Trust Fund.

** Barona Big Top opened in January 1994

*** Not considered a gaming tribe for the purposes of the Special Distribution Trust Fund.

Tribal Transportation Needs Assessment

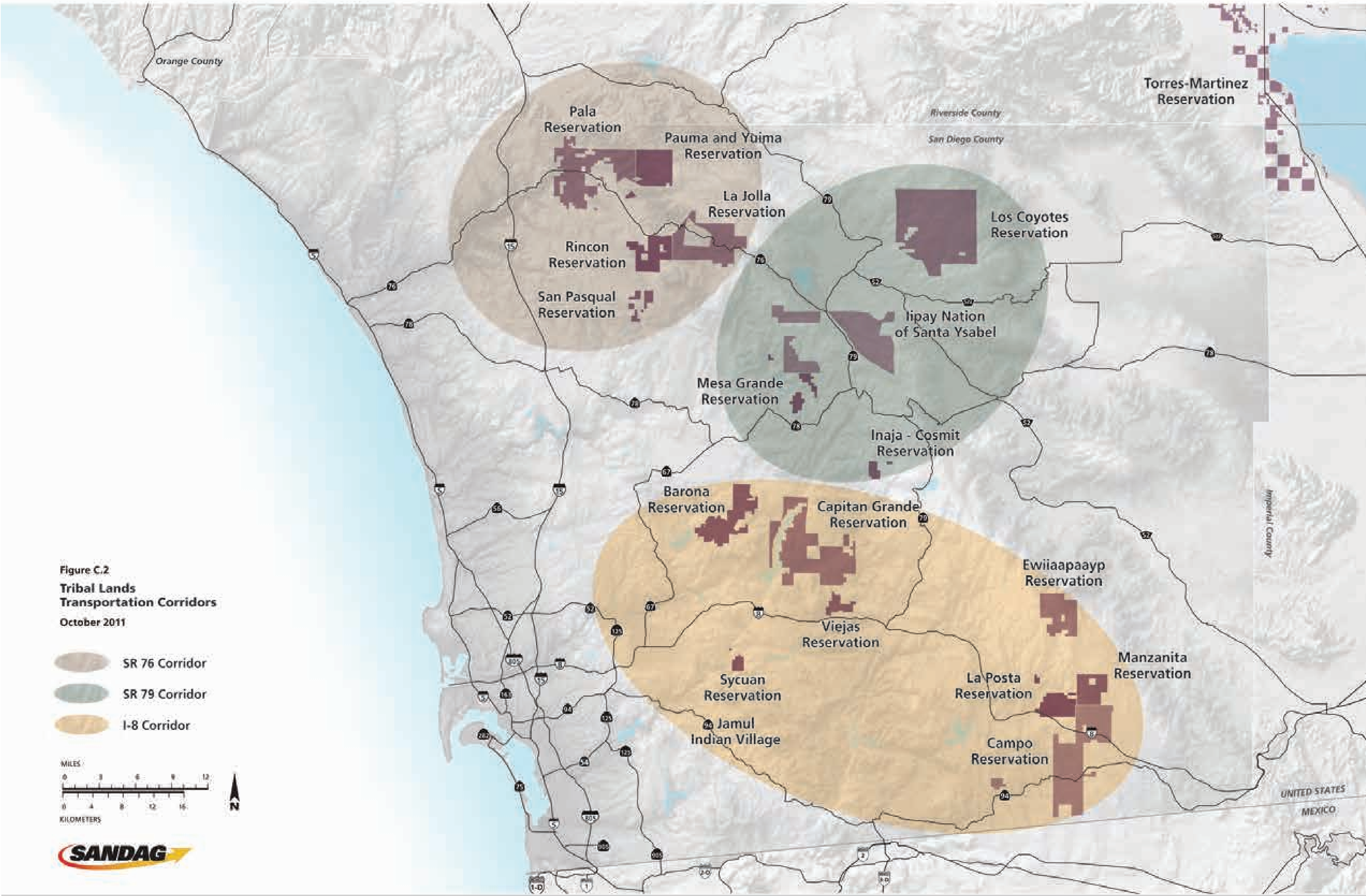
To better understand the transportation needs of tribal nations in the region, Caltrans District 11 and SANDAG designed, developed, and implemented a joint Tribal Transportation Needs Assessment in 2005, as part of the 2030 RTP process. It served as a component of an overall transportation needs assessment. The goal of this component was to: (a) initiate a process of building better relationships with tribes in San Diego and Imperial Counties; (b) establish a baseline of awareness of the transportation issues affecting each tribe in order to facilitate partnerships among Caltrans, tribal governments, and the regional transportation agencies; and (c) promote more efficient identification of mutual transportation concerns and the development of appropriate solutions.

For the purpose of examining long-range transportation issues, tribal nations in the region were grouped into three clusters based on key transportation corridors: SR 76, which runs east-west in North County; SR 79, which runs north-south in the eastern half of the county; and, Interstate 8 (I-8), which runs east-west in the southern area of the county (Figure C.2).

Technical Workshop – Identifying Strategies

In preparation for the 2006 San Diego Regional Tribal Summit, staff from SANDAG, Caltrans, the County of San Diego, the Southern California Tribal Chairmen's Association (SCTCA), and the Reservation Transportation Authority (RTA) worked together to hold a technical transportation workshop hosted by the Viejas Band of Kumeyaay Indians. The goal was to discuss the results of the Tribal Transportation Needs Assessment and provide an opportunity for tribal transportation managers to discuss issues and strategies to improve tribal transportation programs in the region with transportation planning staff from SANDAG, Caltrans, the County of San Diego, the Metropolitan Transit System (MTS), the North County Transit District (NCTD), and the Bureau of Indian Affairs (BIA).

The group analyzed the current state of transportation programs in the region. It first discussed the obstacles to overcome in order to improve tribal transportation programs. It then discussed those strengths in the region that could be leveraged for improvement. Among the obstacles tribal representatives mentioned were: (a) the lack of communication and follow-up from agencies; (b) complex government processes and a lack of understanding of tribal processes; (c) the lack of understanding of the transportation funding process and how to access it; (d) disconnects between transportation planning priorities of local and regional agencies and tribal governments; and (e) rigid organizational cultures and legal constraints that limit collaboration.


Orange County
Riverside County
San Diego County
Imperial County
Pala Reservation
Pauma and Yuima Reservation
La Jolla Reservation
Rincon Reservation
San Pasqual Reservation
Torres-Martinez Reservation
Los Coyotes Reservation
Iipay Nation of Santa Ysabel
Mesa Grande Reservation
Inaja - Cosmit Reservation
Barona Reservation
Capitan Grande Reservation
Ewiiaapaayp Reservation
Viejas Reservation
Manzanita Reservation
Sycuan Reservation
La Posta Reservation
Jamul Indian Village
Campo Reservation
UNITED STATES
MEXICO
Figure C.2
Tribal Lands Transportation Corridors
October 2011
SR 76 Corridor
SR 79 Corridor
I-8 Corridor
MILES
0 3 6 9 12
0 4 8 12 16
KILOMETERS
N
SANDAG

Among the strengths that could be leveraged to improve tribal transportation-related programs, the group mentioned the following: (a) tribal governments acknowledged that agencies are recognizing the problems and are willing to work on them; (b) agencies have been working together more effectively in recent years, and there is an increased mutual respect; (c) the existence of tribal liaisons in the agencies has facilitated communication and coordination; (d) policy mandates from the federal and state level are helping to create the political will to cooperate; (e) intertribal councils such as the RTA and the SCTCA are focusing more on policy-level tribal needs and partnerships; and (f) there is increasing evidence of a desire on both parts to understand one another and work on collaborative solutions.

The group then developed a set of strategies to improve tribal transportation programs in the San Diego region, including:
(a) government-to-government framework;
(b) transportation infrastructure; (c) transit;
(d) transportation funding; (e) information sharing/technical assistance. The policy-level strategies were submitted to the SCTCA and SANDAG Boards for consideration as part of the 2006 San Diego Regional Tribal Summit organized by the two intergovernmental councils and hosted by the Pala Band of Mission Indians.

2006 San Diego Regional Tribal Summit

At the 2006 Tribal Summit, the SANDAG and SCTCA Boards went through the strategies, discussed them, and then participated in an interactive polling exercise to determine where there were areas of mutual concern, in order to identify possible areas of collaboration. The resulting cooperative action agenda approved by both the SANDAG and SCTCA Boards has served as the focus of collaborative planning since that time.

A Regional Government-to-Government Framework

The integrated work plan, which was developed in collaboration with the RTA, SCTCA, Caltrans, and the County of San Diego for the planning of the 2006 Tribal Summit, demonstrated that working collaboratively, public agencies and tribal governments can create a mechanism for timely, meaningful, and effective involvement of tribal governments in the regional transportation planning process. One of the major outcomes of the Summit was the commitment among various regional partner agencies to strengthen the current government-to-government framework for engaging tribal nations in the planning process.

Regional Partners

The core of the framework is an ongoing institutional dialogue among key stakeholders at the regional level. Today, all three principal transportation planning agencies in the region have full-time tribal liaisons: SANDAG, Caltrans, and the County of San Diego.

Public Agencies

Caltrans District 11: Caltrans was the first state agency in California to enact an agency-wide policy on tribal consultation. The Native American Liaison program was established in 2002 to work with the 19 tribes in its jurisdiction. Its objectives are to: (a) establish close coordination and early project involvement with tribal governments to streamline funding, environmental, and project delivery processes in areas on or near reservations; (b) ensure that Caltrans programs do not adversely affect important California Native American sites, traditions, or practices; (c) encourage cooperation between other agencies and local tribal governments; (d) assist with training, information dissemination, and project delivery; and (e) consider the Tribal Employment Rights Ordinance (TERO) from individual tribes for employment and contracting opportunities for Native Americans on Caltrans projects on or near reservations.

County of San Diego: The County's Tribal Liaison was established in 2001. Liaison responsibilities include: identifying and resolving issues related to impacts of tribal economic development projects on infrastructure and other county services in unincorporated areas; providing support and tracking legislation and policy matters related to tribes for the County Board of Supervisors and the Chief Administrative Officer; participating in regional land use and transportation planning, economic and services forecasting, funding, and development activities; and assisting tribes with permitting and other issues.

San Diego Association of Governments (SANDAG): SANDAG has been pursuing government-to-government relations with tribal governments in the region through the Borders Committee. This committee discusses policy issues related to borders-related planning from three perspectives: interregional, binational, and tribal. In 2005, the Southern California Tribal Chairmen's Association joined the Borders Committee as an Intertribal Council of Governments to engage in a dialogue on tribal planning issues with other neighboring Councils of Government, including Imperial, Riverside, and Orange Counties, as well as the Republic of Mexico (as represented by the Consul General in San Diego). The SANDAG Tribal Liaison is a member of the Land Use and Transportation Planning Department, which provides technical support to the Borders Committee as well as to the Board of Directors and other Policy Advisory Committees.

Intertribal Organizations

Intertribal organizations play a key role as facilitators for this regional government-to-government framework. SANDAG has a strong working relationship with two key intertribal associations to strengthen communication, coordination, and collaboration with area tribes.

Southern California Tribal Chairmen's Association (SCTCA): The SCTCA is a multiservice, nonprofit corporation established in 1972 by a consortium of 19 federally recognized Indian tribes in Southern California. As an intertribal council, the SCTCA serves as a forum for a wide variety of issues for its member tribes. In June 2005, the SCTCA joined as an advisory member of the Borders Committee, similar to SANDAG's relationships with other associations of governments, including the Imperial County Transportation Commission and Western Riverside Council of Governments. The SCTCA now has a legislative analyst who serves as staff counterpart to the SANDAG Tribal Liaison to facilitate follow through on the directives of elected officials.

Reservation Transportation Authority (RTA): The RTA, founded in 1998, is a consortium of Southern California Indian tribal governments designated as a Public Law 93-638 contracting entity that provides transportation education, planning, and program administration for tribal government members. Their intertribal service area includes tribes in San Bernardino, Riverside, San Diego, and Imperial Valley (Figure C.3). At a technical level, SANDAG and the RTA have collaborated on a number of tribal transportation planning projects, particularly in the area of mobility management in recent years.

Framework – Policy Level

The regional government-to-government framework for working with tribal nations in the region has been strengthened during the last several years. The priority was to build the institutional trust that would form the basis for future cooperation. It was important to work together on action items that were identified at the 2006 Tribal Summit that would have immediate results, as well as to build strategic alliances for more long-term solutions.

Periodic Summits

An overarching element of the government-to-government framework is having periodic summits between the Boards of Directors of the two principal intergovernmental agencies – SCTCA and SANDAG. By bringing together the entire board of each agency, it offers an opportunity for tribal and non-tribal elected officials from the region to engage in a diplomatic dialogue, identify issues of mutual concern, and develop priority actions that can be carried out through the partnership framework.

SCTCA Representation on SANDAG

One of the key issues raised by the tribal leaders at the 2006 Summit was tribal representation on SANDAG. The SANDAG Board of Directors and the tribal governments recognized the benefits to be gained by taking a cooperative approach to planning for an improved quality of life for the San Diego region. The leadership of SANDAG and SCTCA had discussions over several months in 2006 regarding the development of a formula for tribal representation which would involve tribal governments in policy decisions at SANDAG, while respecting tribal sovereignty. At a policy level, SCTCA and the SANDAG signed a Memorandum of Understanding (MOU) on January 26, 2007 memorializing the agreement to have the SCTCA join the SANDAG Board of Directors and Policy Advisory Committees, including the Transportation, Borders, Regional Planning, and Public Safety Committees, as advisory members. As meetings are scheduled monthly or twice a month (Board/Transportation Committee) and last for two to three hours, the commitment of the tribal leadership to participate is significant. Tribal leaders are now part of the regional decision-making process at a policy level, offering a tribal perspective to complex regional issues on an ongoing basis.

Tribal Liaison to SCTCA Board of Directors

At the policy level, the representatives of the SCTCA sit on the various SANDAG Policy Advisory Committees. However, the SCTCA also wanted to ensure that major initiatives in which SANDAG was engaged also were shared directly with the entire tribal leadership. Therefore, the SANDAG Tribal Liaison coordinates with the SCTCA representatives to SANDAG to bring briefings on major, agency-wide initiatives to inform the tribal leadership and obtain feedback from all tribal nations to the process. This has included diverse SANDAG work efforts, such as the Coordinated Public Transit Plan – Human Services Transportation, the Regional Energy Strategy, and the *TransNet* Environmental Mitigation Program, among others. This creates a systematic feedback loop to ensure that all tribal nations are involved in the process and have an opportunity to raise issues and provide feedback.

Tribal Issues brought to SANDAG Policy Advisory Committees

As members of the various SANDAG Policy Advisory Committees, SCTCA representatives have brought tribal issues to their respective committees. Several presentations on a number of issues have been made, including: background on Public Law 280 and its impact on tribal nations in California; the Intertribal Court System among San Diego tribes; tribal energy planning efforts; intertribal initiatives on fire recovery; and tribal transit initiatives, among others. On a periodic basis, the SANDAG Tribal Liaison meets with the SCTCA representatives to discuss current issues, develop an agenda of presentations, and provide technical assistance when requested to bring these briefings to the appropriate Policy Advisory Committees. In 2010, the SCTCA approved its legislative analyst to become a counterpart staff member for facilitating follow up on tribal issues.

Framework – Technical Level

Interagency Technical Working Group on Tribal Transportation Issues

One of the critical technical outcomes of the 2006 Tribal Summit was the strategic action of creating an ongoing forum for discussion on tribal transportation issues between the tribal nations and public agencies that have an influence on tribal transportation. The Boards of SCTCA and SANDAG approved the charter for the Interagency Technical Working Group on Tribal Transportation Issues (Working Group) during the summer of 2006. The Barona Band of Mission Indians hosted the Working Group's kick off meeting in October 2006. The Working Group reports to the Borders Committee and all tribes in San Diego can be members. Currently, 14 of the 17 tribes in the region are formal members of the Working Group (Table C.3 – Current Membership Roster).[xiv] At the request of the tribal nations, the Working Group has two co-chairs, a tribal leader, and the Chief Deputy Executive Director of SANDAG. Tribes stated that this would ensure that their concerns and issues were discussed directly at the executive level. The Working Group is staffed by SANDAG, meets quarterly, and tribal nations alternate hosting the meetings at different reservations. Since 2006, Pala, Pauma, Rincon, San Pasqual, Barona, Campo, and Viejas have hosted the Working Group meetings.

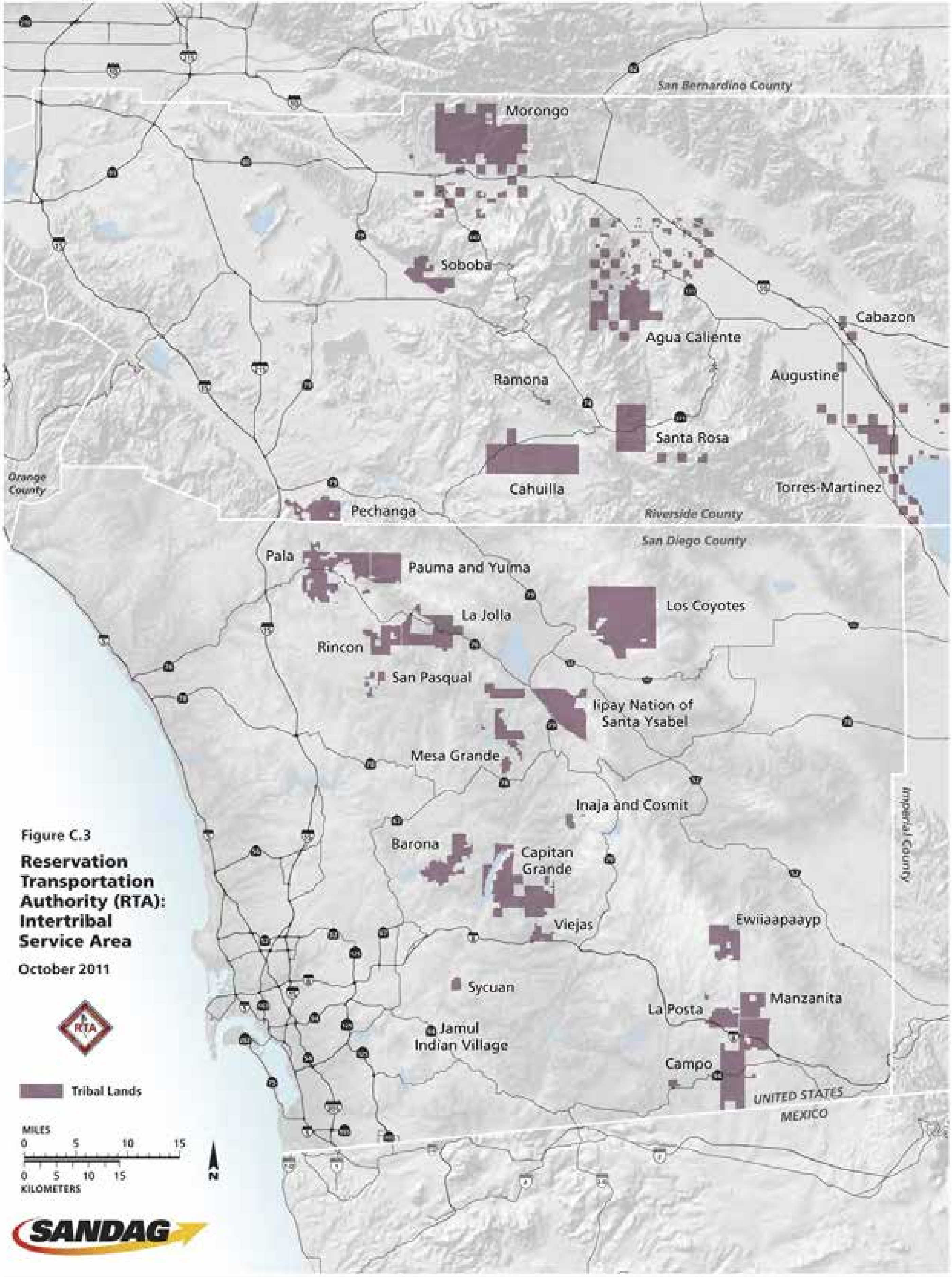

San Bernardino County
Morongo
Soboba
Agua Caliente
Cabazon
Augustine
Ramona
Santa Rosa
Cahuilla
Torres-Martinez
Orange County
Pechanga
Riverside County
San Diego County
Pala
Pauma and Yuima
Los Coyotes
La Jolla
Rincon
San Pasqual
Iipay Nation of Santa Ysabel
Mesa Grande
Inaja and Cosmit
Imperial County
Figure C.3
Reservation Transportation Authority (RTA): Intertribal Service Area
October 2011
Barona
Capitan Grande
Viejas
Ewiiaapaayp
Sycuan
Manzanita
La Posta
Jamul Indian Village
Campo
Tribal Lands
UNITED STATES
MEXICO
MILES
0 5 10 15
0 5 10 15
KILOMETERS
N
SANDAG

Table C.3 – Current Membership Roster: Interagency Technical Working Group on Tribal Transportation Issues

MEMBERS (Tribal Governments)

Albert ‘Boxie’ Phoenix
Barona Band of Mission Indians

Monique LaChappa (Tribal Chair)
Campo Band of Mission Indians

William Micklin (Executive Director)
Ewiiaapaayp Band of the Kumeyaay Nation

Virgil Perez (Tribal Chair)
Iipay Nation of Santa Ysabel

Ray Hunter (Tribal Councilmember)
Jamul Indian Village. A Kumeyaay Nation

La Vonne Peck (Tribal Chair)
La Jolla Band of Luiseño Indians

Eric LaChappa (Tribal Secretary/Treasurer)
La Posta Band of the Kumeyaay Nation

Milton Campbell (Tribal Councilmember)
Los Coyotes Band of Cahuilla/Cupeño Indians

Mark Romero (Tribal Chair)
Mesa Grande Band of Mission Indians

Ana Venegas (Tribal Consultant)
Pala Band of Mission Indians

Marlaine Bojorquez (Tribal Vice Chair)
Pauma Band of Luiseño Indians

Bo Mazzetti (Tribal Chair)
Rincon Band of Luiseño Indians

Carmen Mojado (Tribal Secretary)
San Luis Rey Band of Luiseño Indians

Dave Toler (Tribal Delegate; Co-Chair, Working Group)
San Pasqual Band of Diegueño Indians

Robert ‘Cita’ Welch (Tribal Vice Chairman)
Viejas Band of Kumeyaay Nation

ADVISORY (Public Agencies)

Superintendent Robert ‘RJ’ Eben
Bureau of Indians Affairs (BIA), Southern California Agency

Gustaf Silva (Tribal Liaison)
Caltrans, District 11

Teresa Brownyard (Tribal Liaison)
County of San Diego

Devin Braun (Senior Transportation Planner)
Metropolitan Transit System (MTS)

Timothy McCormick (Director of Service Planning)
North County Transit District (NCTD)

Tony Largo (Construction Manager)
Reservation Transportation Authority (RTA)

Renée Wasmund (Chief Deputy Executive Director; Co-Chair, Working Group)
San Diego Association of Governments (SANDAG)

The purpose of the Interagency Technical Working Group on Tribal Transportation Issues is to serve as a forum for tribal governments in the region to discuss and coordinate transportation issues of mutual concern with the various public planning agencies in the region, including SANDAG, Caltrans, the County of San Diego, and the transit operators. In partnership with the RTA, the Working Group monitors and provides input on implementing strategies and planning activities related to transportation, which were mutually developed through the San Diego Regional Tribal Summit.

The Working Group responsibilities include reviewing current activities and plans being implemented by SANDAG and the tribal governments in an effort to coordinate programs, address issues of concern, and ensure that the needs and issues of tribal governments are being incorporated into the transportation planning process at the regional level. The Working Group provides feedback and comments on current and planned activities, and provides technical advice on the implementation of these activities. The Working Group also assists with the associated outreach to the tribal community on transportation issues of regional significance.

SANDAG-RTA Partnership for Tribal Transportation Planning

SANDAG and the Reservation Transportation Authority signed a Memorandum of Understanding (MOU) in 2005 to collaborate on tribal transportation. SANDAG and the RTA have pursued and obtained funding for a number of tribal transportation planning projects since the 2006 Summit, which are detailed in the next section. The focus of much of the collaborative planning work between the RTA and SANDAG has been in expanding the RTA's mission from transportation infrastructure on tribal reservations to mobility, including transit and transportation demand management (TDM). In so doing, the RTA has become one of several mobility partners of SANDAG, taking the lead on integrating tribal mobility projects into the system. This has benefited not only tribes, but rural population as well.

Milestones in Collaborative Tribal Transportation Planning

For the 2030 RTP, a set of objectives was established for tribal transportation planning. Through the consultation process, which included a survey of tribal transportation needs, a joint technical workshop to analyze the results, and a policy-level summit, a set of cooperative strategies to improve tribal transportation was developed between the SCTCA and the SANDAG Board of Directors. Table C.4 is a timeline of activities that shows the recommendations, actions, and milestones achieved through the period since the adoption of the 2030 RTP. There are four principal transportation-related policy areas that were considered in the 2030 RTP as a result of the consultation process with tribal governments, and these have continued as areas for future collaboration. They are: roadway infrastructure, funding, transit, and information sharing/data gathering. The matrix highlights the collaborative nature of all of the various efforts. In some cases, tribal nations took the lead, while in other areas the County of San Diego, Caltrans, SANDAG, or the RTA led the effort.

Table C.4 – Collaborative Tribal Transportation Planning Milestones/Accomplishments (2006–2010)

MAJOR STRATEGIC AREAS/ACTIONS	FY06–FY10 (2006–2010)
Strengthen the Mechanisms for Engaging Tribal Governments	
Action: Held policy-level summit	
Action: Developed collaborative action agenda	
Action: Created interagency working group on tribal transportation issues	
Transportation Infrastructure	
Action: Supported Indian Reservation Roads Inventory process	Interagency discussions to ensure tribes could include county/state highways in IRR Inventories
Action: Identified tribal corridors and coordinate relevant studies/projects	
1. State Routes	
* SR76 Operational Improvements Study	RTA contracted;Pala provided local match
* SR76 East widening to Rosemary Quarry	Significant funding from Pala per Mitigation Agreement
* SR79 @ Ipaay Nation entrance	Ipaay Nation designed, constructed, and funded
2. County/Reservation Roads	
* Valley Center Road	County funding with contributions from San Pasqual, Rincon, Pala, and Pauma
* Wildcat Canyon Road	Barona/County shared cost
* Pala Mission Road (culvert improvement)	Pala/County shared cost
* Viejas Grade/Willows Road intersection	Viejas provided full funding
* Dehesa Rd/entrance at Sycuan entrance	Sycuan designed, constructed, and funded
*Lake Wohlford Improvements at Valley View entrance	San Pasqual designed, constructed, and funded
* Valley Center Road Bridge Replacement	Federal and County funding
*Black Canyon Bridge Replacement	Federal grant/County funding
*Black Canyon Rd Improvement near Mesa Grande	Constructed by the Calif. Innovative Readiness Training Program at request of Mesa Grande
Transit/Mobility Planning	
Action: Sought funding and implement tribal-focused transit planning projects	
1. Tribal Transit Feasibilty Study	Caltrans Transit Technical Assistance Grant
2. FTA Tribal Transit Program	RTA received funding for FY07; FY08; and is pending FY09; MOU w/NCTD
3. Tribal TDM Outreach - Phase I (San Diego)	Caltrans EJ Grant/Partnership with SANDAG
4. Tribal TDM Outreach - Phase II (Riverside)	EJ Grant/Dist 8
Transportation Funding	
Action: Created opportunities for pooling/leveraging transportation funding	
1. Pala Mitigation Agreement with County	Includes provisions to collaborate on funding for Tribal TMA; transit; I-15/SR76 P&R
2. Pauma Mitigation Agreement with County	Includes provisions to collaborate on funding for Tribal TMA; transit; I-15/SR76 P&R
Information Sharing/Technical Assistance	
Action: Agencies provided ongoing training to tribal governments on funding processes, transportation, and regional planning	

Lead Agency/Group: Caltrans; County of SD; Reservation Transportation Authority (RTA); SANDAG/ALL; Tribe(s)

Transportation Infrastructure

As with all land use authorities, improvements in transportation infrastructure are key to improving the potential of each tribal nation's ability to compete in a global economy and provide its citizens with access to housing, jobs, education, healthcare, and entertainment. Efforts have been made to help tribes increase funding for their own transportation planning, by updating their Indian Reservation Roads (IRR) Inventory through the BIA. Tribal governments also have made significant contributions to county and state road infrastructure as part of their mitigation agreements with the County of San Diego.

Supported the Indian Reservation Roads Inventory

One major change for tribal nations that occurred as part of SAFETEA-LU was the change to the IRR program. Traditionally, the formula for tribes to receive transportation funding through the BIA had been based on the number reservation road miles. For small land-based tribes like those in California, the prior IRR formula resulted in only minimal IRR funding. However, SAFETEA-LU acknowledged that tribal transportation systems for many tribes include access to state highways as well as county and city roads. Therefore, under SAFETEA-LU, tribes can include segments of roads and highways not owned by them in their inventory. In order to do that, a letter of acknowledgement is required from the owner of the road.

In 2008, Caltrans headquarters received a grant from the Federal Highway Administration (FHWA) to support tribal efforts in California to update IRR inventories to increase tribal shares of federal funding. Most of the tribal nations in the San Diego region participated in that initiative. The tribes and agencies that form the Working Group collaborated to ensure that all tribes in the region that wanted to update their inventory in order to increase their federal transportation planning funding had the support to do so. Caltrans hired a consultant to work with tribes to complete the technical inventories. Caltrans then sent every participating tribe a compact disc with all of the completed data. Each tribe, then, was responsible for submitting a Tribal Transportation Plan, a council resolution indicating the road segments to be considered in their inventory, and letters of acknowledgement from the owners of the non-tribal road segments to be included. Caltrans and the County of San Diego, through the Working Group, provided to the tribes that requested them letters of acknowledgement for the segments of roads or state highways that are critical to their tribal transportation system.

Despite some regional setbacks, California tribes have so far increased their share of IRR funding from 1 to 5 percent. The current funding formula has been so successful for California tribes that there is now a controversy among large land-based tribes and small land-based tribes over whether to maintain the current formula. The National Tribal Advisory Committee to the BIA IRR program continues to discuss whether the formula should be continued or modified in the next federal surface transportation reauthorization. Currently, the Pacific Region of the BIA is working with the tribes in the San Diego region to correct their inventories and submit for funding. The RTA is taking the lead in coordinating these efforts with the BIA.

As tribal nations are developing and updating their reservation roads inventories, competition has increased exponentially among tribal nations across the country. The BIA now requires tribes to prioritize their projects through a long-range Tribal Transportation Plan (TTP) that justifies the request for funding and shows how the road will contribute to their long-range goals and objectives. Often, tribes (especially small land-based tribes) do not have these. As such, their IRR inventories are incomplete. In an effort to set tribal transportation systems in the context of the RTP, SANDAG is including the TTPs of any tribes that would like them included, as a diplomatic courtesy. Technical Appendix 8 includes TTPs or summary TTPs for those tribes that provided them to SANDAG, along with a map that shows how each tribe is connected to the regional transportation system.

Identified Tribal Corridors and Coordinated Relevant Studies/Projects

State Routes*:* A number of collaborative projects undertaken since 2006 affected the SR 76, SR 79, and SR 67 corridors. One particular project highlights the importance of collaboration for infrastructure improvements, and it has received national attention as a model for how state Departments of Transportation (DOTs) should work on a government-to-government basis with tribal nations. Caltrans and the RTA conducted a study of SR 76 east of the I-15 to determine what kinds of operational improvements could be made to improve the safety of the SR 76 East corridor. The study identified estimated costs for potential operational improvements, as well as a methodology for allocating fair share contributions to the developing property owners in the corridor. Additionally, this study identified potential alternative funding options from federal, state, local, and private sources. The study was funded in part by a statewide Caltrans grant. The Pala Band of Mission Indians provided the local match, and the RTA conducted the study. By bringing together the State (through Caltrans), the tribes, the County of San Diego, SANDAG, environmental resource agencies, and the public during the study process, new and innovative measures were explored for strengthening the State's existing ability to plan and fund transportation improvements. The recommendations from the study were incorporated into the 2050 RTP.

County/Reservation*:* A number of infrastructure projects have been planned, designed, and implemented since 2007. These projects are a combination of Caltrans-permitted projects, County-permitted projects, and County Capital Improvement Program (CIP) projects. These were all projects that involved collaborations between the County Department of Public Works and various tribes. For example, the Valley Center Road Widening project (completed in 2009) was designed and constructed by the County with funding contributions from San Pasqual, Rincon, Pauma, and Pala. In some cases, the tribe was the lead, such as for the

Lake Wohlford improvements at the entrance to Valley View, or the improvements to Black Canyon Road near Mesa Grande funded by a grant Mesa Grande received. Another example is the Viejas Grade/Willows Road intersection improvement project. The recommendations for road improvements were the result of the Viejas Band's collaboration with adjoining property owners and San Diego County Supervisor Dianne Jacob. The County Department of Public Works (DPW) designed the project, and construction was funded in full by the Viejas Band.

Transit/Mobility Planning

Another area of tribal transportation planning that emerged since the 2006 Tribal Summit was a focus on transit and mobility planning. Transit and mobility management are two areas in which more short-term solutions to access the transportation system can be addressed. Through collaborative planning in this area, the tribes, SANDAG, and the two transit agencies have developed innovative projects, which are contributing to improved mobility in tribal communities and for other rural residents.

Tribal Transit Feasibility Study

Caltrans awarded SANDAG a transit assistance planning grant to determine the feasibility of implementing transit service in one or two key transportation corridors between selected tribal reservations and cities and/or urbanized community planning areas in the unincorporated area of San Diego County. This report examined traditional public transit services, as well as the potential for nontraditional services that could be funded by private sources and/or public-private partnerships.

The study was a collaborative effort among SANDAG, the RTA, and the region's transit agencies — the Metropolitan Transit System and the North Country Transit District. SANDAG contracted with a consultant to conduct the technical analysis for this study, which provided the information needed to leverage additional funding for transit service for the 17 federally recognized tribal governments in San Diego County. The Working Group provided guidance to the consultant throughout the study.

The study identified transportation corridors and service options to improve connections between the tribal reservations and the urban transit system. Recommendations included potential service enhancements to existing services, and new rural transit routes focused on connecting the tribal community (Figures C.4 and C.5). The study provided a financial assessment and identified potential sources of funding.

FTA Tribal Transit Grant Program

The Tribal Transit Feasibility Study provided the technical basis for the Working Group to pursue funding to implement the recommendations. The RTA applied successfully for FY 2007 through FY 2010 funding, for a total of $1.6 million. Although the RTA received the highest level of funding for each cycle, the awards were significantly less than the total project costs to fund the entire plan. The Working Group discussed the options available and decided to focus the funds on supporting an enhanced service on one of the NCTD routes, Route 388/389, which runs from the Escondido Transit Center through Valley Center to Pala. One of the principal recommendations for the Northern Corridor was to enhance that service and create an express portion of the route that would run up and down the I-15 corridor from the Escondido Transit Center to Pala, completing a service loop and permitting those on the SR 76 corridor (including members of five tribes) to take an express bus to and from the Escondido Transit Center.

In addition to the operating funds provided by the FTA Tribal Transit program, the RTA successfully applied for American Recovery and Reinvestment Act of 2009 (ARRA) funds associated with the FY 2009 funding cycle. Only FY 2008 Tribal Transit grant recipients could compete for these ARRA funds. The RTA received $1.1 million for transit capital improvements for the region through this program, and it is now collaborating with the transit agencies and SANDAG to implement the projects. This includes improvements to the Park and Ride on the I-15/SR 76 interchange. The proposal was based on the recommendations in the Tribal Transit Feasibility Study.

Tribal TDM Outreach – Phase I (San Diego)

The objective of this collaborative project between the RTA and SANDAG was to strengthen the participation of tribal nations in the San Diego region in the regional TDM program.

The tribal gaming facilities are now major employers in the region, yet their involvement in the region's commuter services program (iCommute) was limited. Sycuan, Viejas, Barona, and Campo in the I-8 corridor employ about 9,000 people. In the SR 76 corridor, Pala, Pauma, Rincon, and San Pasqual employ 5,500 people. It is estimated that each gaming facility attracts 7,000 to 15,000 guests daily. Although many tribal members now live on the reservations, non-tribal employees travel from all over the region and other counties, including Riverside, Imperial, and Orange counties, to jobs on the reservations. These commutes would be considered 'reverse' commutes because urban residents are traveling to rural employment opportunities.

SANDAG, the RTA, and the SCTCA collaborated on an assessment of the needs of tribal employers and developed a strategy to meet these needs. SANDAG assisted the RTA in developing a business marketing plan for establishing a Tribal Transportation Management Association (TTMA) that would coordinate with the SANDAG iCommute program. The tribal TMA, a private, nonprofit, member-controlled organization, would provide the institutional framework for the recommended TDM programs and services that were developed as a result of the study. Six tribal enterprises participated in the study and completed commuter surveys in their facilities. They included: Pala, Pauma, Rincon, Viejas, Sycuan, and Santa Ysabel. In FY 2009/2010, the RTA successfully applied for a grant for Phase II of this project. The goal was to focus efforts on their tribal members in the Riverside area through a Caltrans planning grant provided to them through District 8.

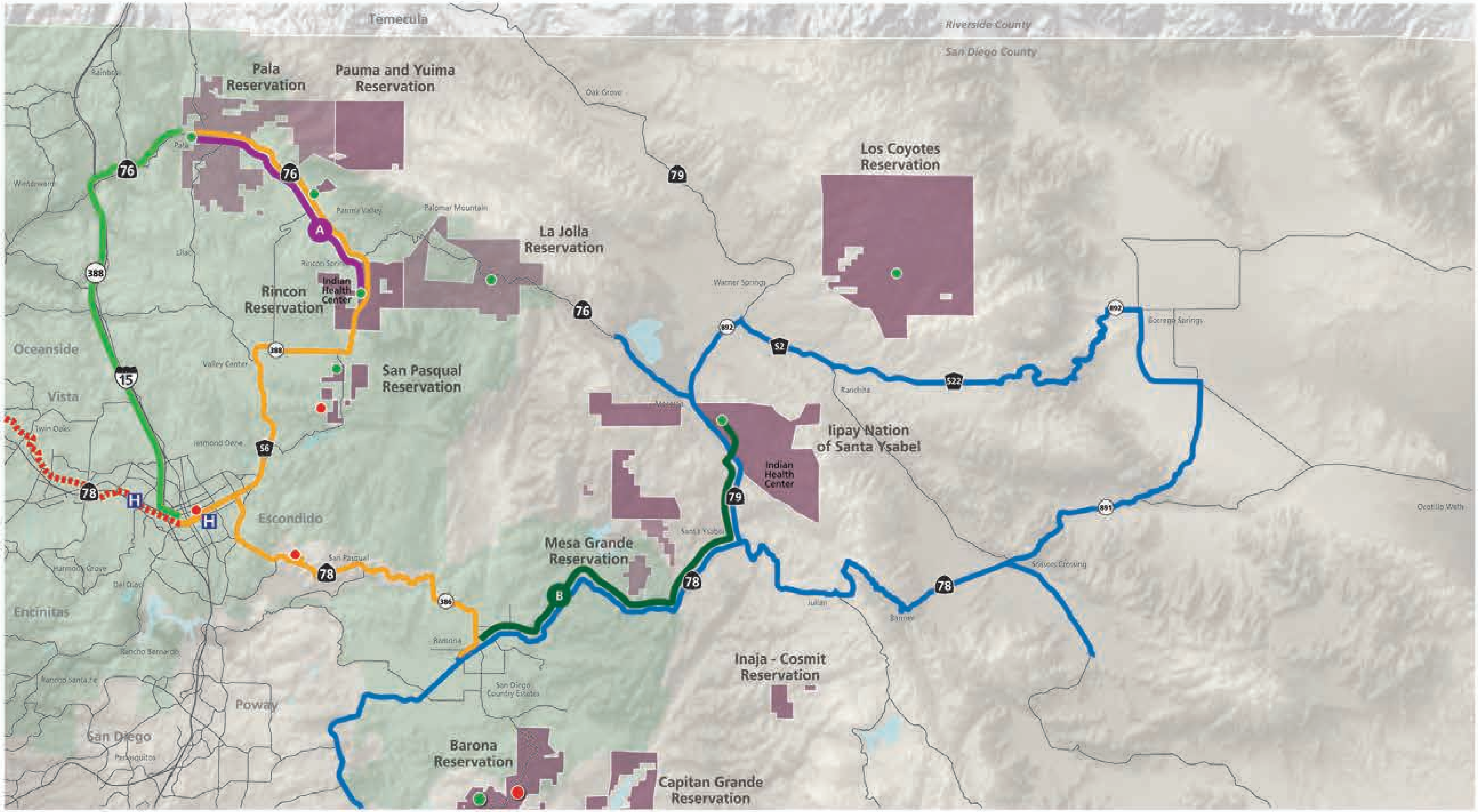


Figure C.4

2007 Tribal Transit Feasibility Study (proposed service for North Tribal Corridor)

October 2011

Transit Agency Boundaries
- MTS
- NCTD

Existing Transit Services
- MTS Routes
- NCTD Routes
- SPRINTER

Proposed New Services
- A Pala/Rincon
- B Santa Ysabel/Ramona
- 388 I-15 Extension

- H Hospitals
- Major Employers
- Tribal Employment Centers

MILES 0 3 6

KILOMETERS 0 4 8

N

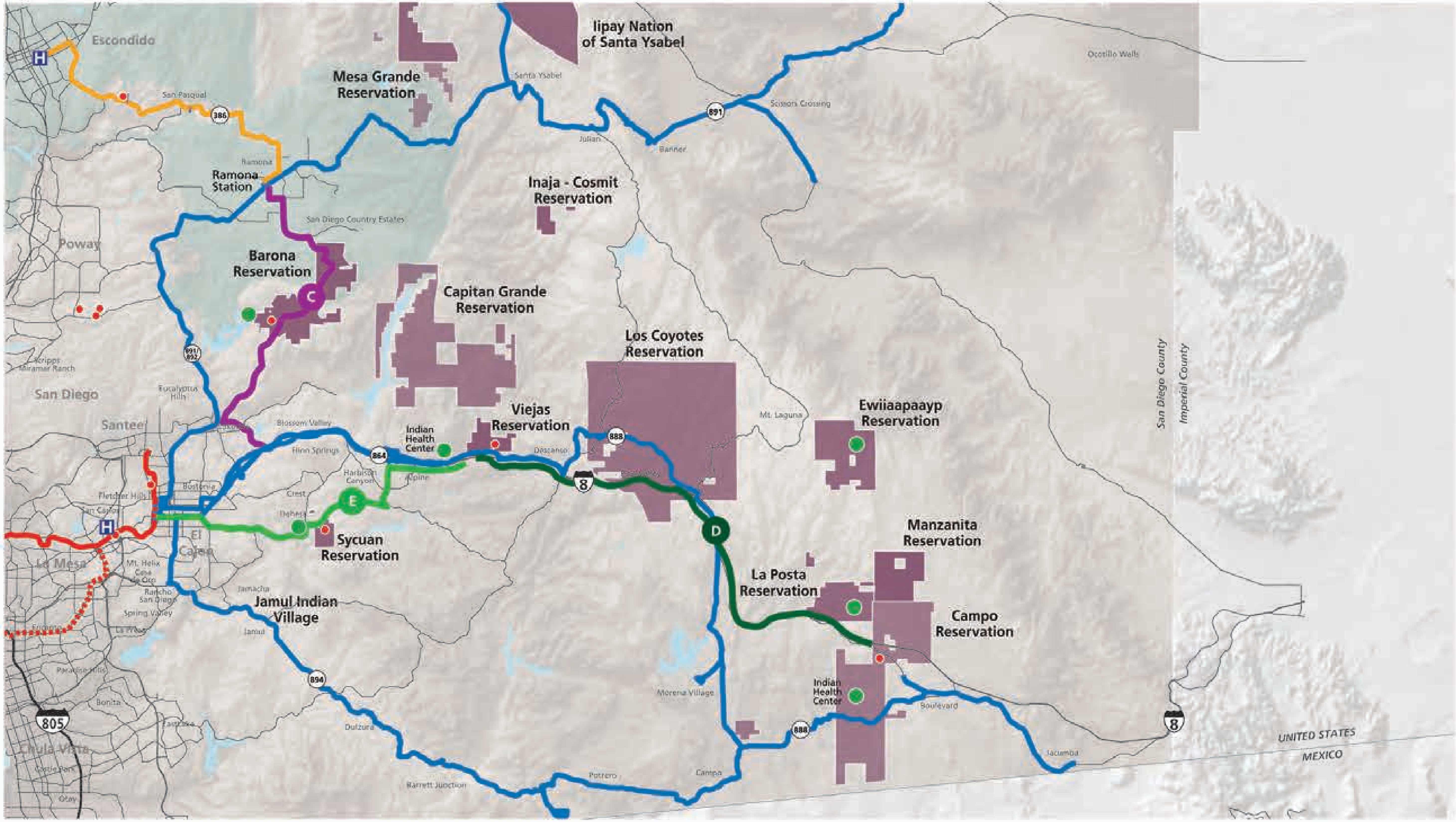


Figure C.5

2007 Tribal Transit Feasibility Study (proposed service for South Tribal Corridor)

October 2011

Transit Agency Boundaries
- MTS
- NCTD

Existing Transit Services
- MTS Routes
- NCTD Routes
- Green Line
- Orange Line

Proposed New Services
- C Barona
- D Campo/Viejas/Indian Health Ctr
- E Sycuan/Viejas/Indian Health Ctr

- H Hospitals
- Major Employers
- Tribal Employment Centers

MILES 0 3 6
0 4 8 KILOMETERS
N

RTA

SANDAG

Transportation Funding

One of the action items established at the 2006 Tribal Summit was to create opportunities for pooling or leveraging transportation funding. Since the 2006 Summit, the County of San Diego and several tribal nations have negotiated innovative mitigation agreements, which include components for supporting collaborative transit and TDM initiatives.

Pala Mitigation Agreement with County of San Diego

In 2007, the County of San Diego and the Pala Band of Mission Indians entered into an agreement related to the expansion of their gaming facility, which included considering future TDM and transit improvements. They include: (a) a TDM program being developed by the RTA with assistance from SANDAG; (b) a possible Park-and-Ride facility at the I-15/SR 76 junction; (c) a possible Interregional Transit Service Plan being developed by SANDAG and the Riverside County Transportation Commission (RCTC); and (d) support for an NCTD bus stop. Pala was an active member of the RTA's initial TDM Outreach program.

Pauma Mitigation Agreement with County of San Diego

In 2008, the County of San Diego and the Pauma Band of Luiseño Indians entered into an agreement related to the building of a gaming facility and hotel, which included support for TDM and transit as well as fair share contributions for the operational improvements on SR 76 East, as determined from the Caltrans Operational Improvements Study. The agreement included a commitment to support the tribal effort to create a TTMA. It included consideration of membership with a specific contribution based on the RTA's business plan, should the TTMA be formed. Pauma also committed to having 20 percent of its employees participate daily in carpools, vanpools, or other rideshare programs.

Information Sharing/Technology Assistance

One of the commitments that resulted from the 2006 Tribal Summit was to provide ongoing training to tribal governments on funding processes, as well as transportation and regional planning. SANDAG has worked closely with the Tribal Transportation Assistance Program (TTAP), currently managed by the National Indian Justice Center (NIJC) under contract with Caltrans, to ensure that tribal nations in San Diego are aware of and have appropriate and timely information for taking advantage of funding opportunities and other training for tribal transportation planning.[xv]

The NIJC has been invited to the Working Group on a number of occasions to share information and training opportunities with area tribes. The Working Group has become an important venue for discussing statewide transportation issues with San Diego tribes.

In addition, SANDAG, through its Service Bureau, has made available to tribal governments technical support for planning and data analysis services. A number of tribes have taken advantage of these services for their own planning efforts.

2050 RTP Process – Integration of Tribal Nations

Building on the successes of the last RTP, members of the Working Group were asked to review the tribal transportation planning objectives and strategies developed during the last cycle for the 2030 RTP. The objective was to determine which of them have been accomplished and which ones continue to be issues that should be addressed; and to identify any new areas that should be considered. The Working Group developed a tribal consultation work plan, beginning as soon as the SANDAG Board approved the overall 2050 RTP work plan. The Working Group and the SCTCA Board were involved in each step of the development of the 2050 RTP.

Recommended Strategies

Several workshops were held with the Working Group, as well as the RTA and the SCTCA Board, between September and November 2009 to obtain input on updating the 2030 Tribal Transportation Strategies for the 2050 RTP planning process. Their recommendations are listed in Table C.5, and they were discussed at the 2010 San Diego Regional Tribal Summit between the Boards of SANDAG and the SCTCA. The objective was to identify and prioritize a set of strategies to be considered in the development of the 2050 RTP.

2010 San Diego Regional Tribal Summit

On April 9, 2010, the Rincon Band of Luiseño Indians hosted the 2010 San Diego Regional Tribal Summit. The summit was the result of collaboration among SANDAG, SCTCA, Caltrans, and the County of San Diego. The purpose was to bring together elected leaders from local governments who make up the SANDAG Board of Directors and the 17 federally recognized tribal governments in the San Diego region. Their goal was to identify policy-level issues of mutual concern related to transportation and regional planning, and to formulate a set of priority areas for actions that can be addressed over the next few years. In particular, the Tribal Summit provided a timely opportunity to discuss tribal input regarding transportation and important regional planning issues for inclusion in the 2050 RTP. The Tribal Summit drew more than 100 participants, including elected officials from 13 tribal governments in the region, the SANDAG Board of Directors, members of SANDAG's policy advisory committees, various public agencies that work with tribal governments, and interested organizations and stakeholders.

Among the key issues raised were:

- The value of the SCTCA being represented on the SANDAG Board and Policy Advisory Committees

- The critical importance of working together on statewide issues
- The importance of developing a collaborative legislative agenda
- The importance of nontribal elected officials understanding tribal sovereignty
- Opportunities for developing a collaborative funding strategy for transportation

After a plenary discussion among the SANDAG and SCTCA boards, during which recommended strategies were clarified and considered, the Board members prioritized their "Top Five" strategies for consideration in the 2050 RTP using interactive polling technology. The overall top five strategies, identified by combining the scores of the SANDAG and SCTCA Boards to form the collaborative agenda, were:

- Developing a collaborative legislative agenda that benefits the region (83 percent)
- Identifying critical regional arterials serving Tribal Nations that should be incorporated into the 2050 RTP (83 percent)
- Incorporating existing Tribal Transportation Plans into the 2050 RTP (71 percent)
- Coordinating the funding and implementation of planning studies, in order to identify critical transportation corridors to tribal reservations and adjacent communities (58 percent)
- Providing ongoing information to tribal governments on funding processes, transportation, and regional planning (50 percent)

Integration of Tribal Governments into the 2050 RTP

Through the government-to-government framework in place, tribal nations in the San Diego region were able to have an unprecedented voice in the process of the development of the 2050 RTP.

As with other stakeholder groups, input was sought from tribal nations during each step of the process that led to the selection of the Revenue Constrained Transportation Scenario which forms the basis of the 2050 RTP, including:

- Goals/Objectives
- Project Evaluation Criteria
- Performance Measures
- Corridors for travel times
- Sustainable Communities Strategy
- Alternative Scenarios

With input from the Tribal Working Group, the SANDAG Board on June 11, 2010, approved the 2050 RTP Project Evaluation Criteria, incorporating tribal lands into the overall set of criteria for transit and highway corridors and connectors, as well as the movement of goods. When considering the selection of travel time corridors, options were discussed with tribal leaders, leading to two of the ten corridors focusing on tribal connections. All revenue constrained scenarios were discussed with the Working Group and with the SCTCA Board in detail. Their issues and concerns were incorporated, and the SCTCA Board endorsed the Hybrid Scenario — which was accepted by the SANDAG Board as the Preferred Alternative for the 2050 RTP.

Table C.5 – 2050 RTP – Recommended Strategies for Tribal Transportation

Strategic Area	Action
Government-to-Government Framework	Public agencies should understand tribal plans, how they are developed and implemented Develop collaborative legislative agenda that benefits the region
Transportation Infrastructure	Identify corridors critical to tribal reservations and coordinate the funding and implementation of relevant studies Identify critical regional arterials serving tribal nations which should be included in the RTP Coordinate the incorporation of existing Tribal Transportation Plans (TTP) into the current RTP
Transit	Collaborate on the issue of reverse commuting for tribal enterprise employees and pursuing funding opportunities Collaborate on the pursuit of funding opportunities to implement the recommendations from the *Tribal Transit Feasibility Study* Collaborate on the development of a Tribal Transportation Management Association (TTMA) for increased tribal participation in TDM programs regionwide.
Transportation Funding	Create opportunities for pooling/leveraging transportation funding for mutually important projects Collaborate and advocate for new transportation funding in the region, including transit and TDM Identify mechanisms for providing ongoing funding for new or additional transportation programs, including transit services and TDM
Information Sharing/Technical Assistance	Agencies will provide ongoing training to tribal governments on funding processes, transportation, and regional planning Provide information on technical support for planning and data analysis services to tribal governments parallel to member agencies

[i] Barona and Viejas have joint power authority over the 18th reservation – Capitan Grande.

[ii] http://www.fhwa.dot.gov/tribal/consultation.htm

[iii] The Capitan Grande Reservation included the Bands that would later become the Barona Band of Mission Indians relocated to the Barona Valley Ranch (1932) and subsequently the Barona Indian Reservation, and the Viejas Band of Kumeyaay Indians that relocated to Baron Long Ranch (1934) and subsequently the Viejas Indian Reservation.

[iv] The Jamul Indian Village did not receive federal recognition until 1975; other landless California tribes such as the San Luis Rey Band of Mission Indians continue to seek federal recognition.

[v] The original inhabitants of the still federally recognized Capitan Grande reservation established in the 1890s were moved to two different ranches in 1932 when the City of San Diego, by act of the U.S. Congress, acquired more than 7,000 acres of land inside that reservation territory to build the El Capitan Reservoir. Capitan Grande is currently uninhabited and jointly managed by the Barona and Viejas tribal governments.

[vi] For many tribal governments, land ownership is complex because reservations often have non-Indian owned in-holdings and/or allotments or individual land parcels owned by tribal members. This complicates land and resource management for tribal governments.

[vii] Neuman, Lisa. 2005. "Commentary: From Clean Water to Casinos: Why Sovereignty is Important to Native Americans." Maine Policy Review. Vol. 13(2): 30-32

[viii] California vs. Cabazon Band of Mission Indians, 480 US 202 (1987).

[ix] Several new projects or expansions have been approved, but put on hold due to the current economy.

[x] For additional discussion on the impact of tribal gaming in California, see The Center for California Native Nations, "An Impact Analysis of Tribal Government Gaming in California." University of California at Riverside. January 2006

[xi] For a comprehensive overview, see San Diego County study "Update on Impacts of Tribal Economic Development Projects in San Diego County," April 2003. Contact the Department of Land Use and Planning for a copy of this document.

[xii] The 1999 Compact defines a 'non-gaming' tribe as a tribe that has no gaming or operates less than 350 gaming devices. Gaming devices are defined to be Class III devices. Class II devices, or bingo gaming devices, are not included in this count.

[xiii] The State Controller's Office began distributing checks to tribal governments in August 2001. "Eighty-five of the 109 federally recognized tribes in California (those that have either small or no gaming operations) will receive checks that will provide these Tribes with funds to help meet the critical needs of their communities. Tribes will manage the RSTF distributions in a variety of ways, including providing per capita distributions of direct cash benefits." Source: www.calindian.org/nl_fall2001.htm

[xiv] The Working Group includes one California tribe, the San Luis Rey Band of Luiseño Indians, which has state recognition but is currently not federally recognized as they are landless. That brings the Working Group membership to fifteen tribes.

[xv] For more information on the CA/Nevada TTAP program through the National Indian Justice Center (NIIJC), see www.nijc.org/ttap.html

Appendix D

Sustainable Communities Strategy Background Documentation

Appendix Contents

Sustainable Communities Strategy (SCS) Documentation

Appendix D provides the documentation to support conclusions identified in the Sustainable Communities Strategy (Chapter 3) of the 2050 Regional Transportation Plan (RTP or the Plan). The SCS is a new element of the RTP, the goal of which is to show how integrated land use and transportation planning will help the region reduce its greenhouse gas (GHG) emissions from light trucks and automobiles and meet the targets established by the California Air Resources Board (CARB).

A reference tool included in Appendix D is a matrix that demonstrates where the requirements of the SCS contained in SB 375 can be found in the SCS (Chapter 3). The matrix specifies the page number of the SCS and other sections of the 2050 RTP where each of the requirements of SB 375 can be found.

Other documents in this Appendix include the SANDAG Board report regarding the alternative scenarios and the RHNA allocation report. See Appendix B and Technical Appendix 15 for additional travel demand model information.

The following documents are included in Appendix D:

1. Figure D.1 – 2020 Planned Land Use North County Subregional Map
2. Figure D.2 – 2020 Planned Land Use North City Subregional Map
3. Figure D.3 – 2020 Planned Land Use Mid-City and East County Subregional Map
4. Figure D.4 – 2020 Planned Land Use South County Subregional Map
5. Figure D.5 – 2035 Planned Land Use North County Subregional Map
6. Figure D.6 – 2035 Planned Land Use North City Subregional Map
7. Figure D.7 – 2035 Planned Land Use Mid-City and East County Subregional Map
8. Figure D.8 – 2035 Planned Land Use South County Subregional Map
9. Figure D. 9 – 2050 Transit Network and Higher Density Land Uses North County Subregional Area
10. Figure D.10 – 2050 Transit Network and Higher Density Land Uses North City Subregional Area
11. Figure D.11 – 2050 Transit Network and Higher Density Land Uses Mid-City and East County Subregional Area
12. Figure D.12 – 2050 Transit Network and Higher Density Land Uses South County Subregional Area
13. Sustainable Communities Strategy Content/Government Code Section Requirements Matrix
14. SANDAG Board of Directors Report - 2050 RTP Alternative Scenarios
15. SANDAG Methodology Memo to CARB
16. CARB Response to SANDAG Methodology Memo
17. CEQA Exemption Criteria
18. SANDAG Regional Housing Needs Determination from HCD
19. Draft RHNA for the 2013 – 2020 Housing Element Cycle – Report to SANDAG Board of Directors and RHNA Fact Sheet

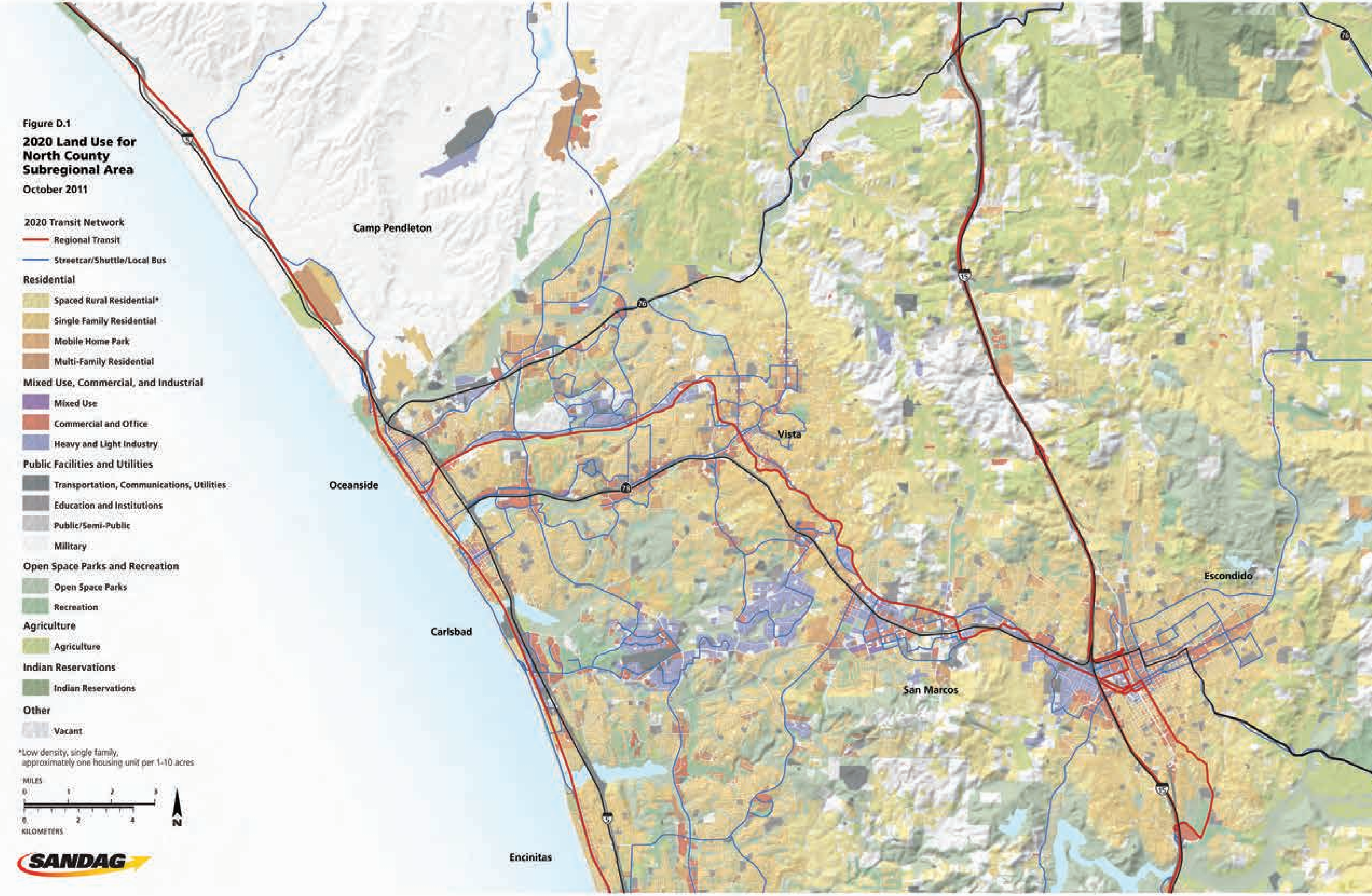


Figure D.1
2020 Land Use for North County Subregional Area
October 2011

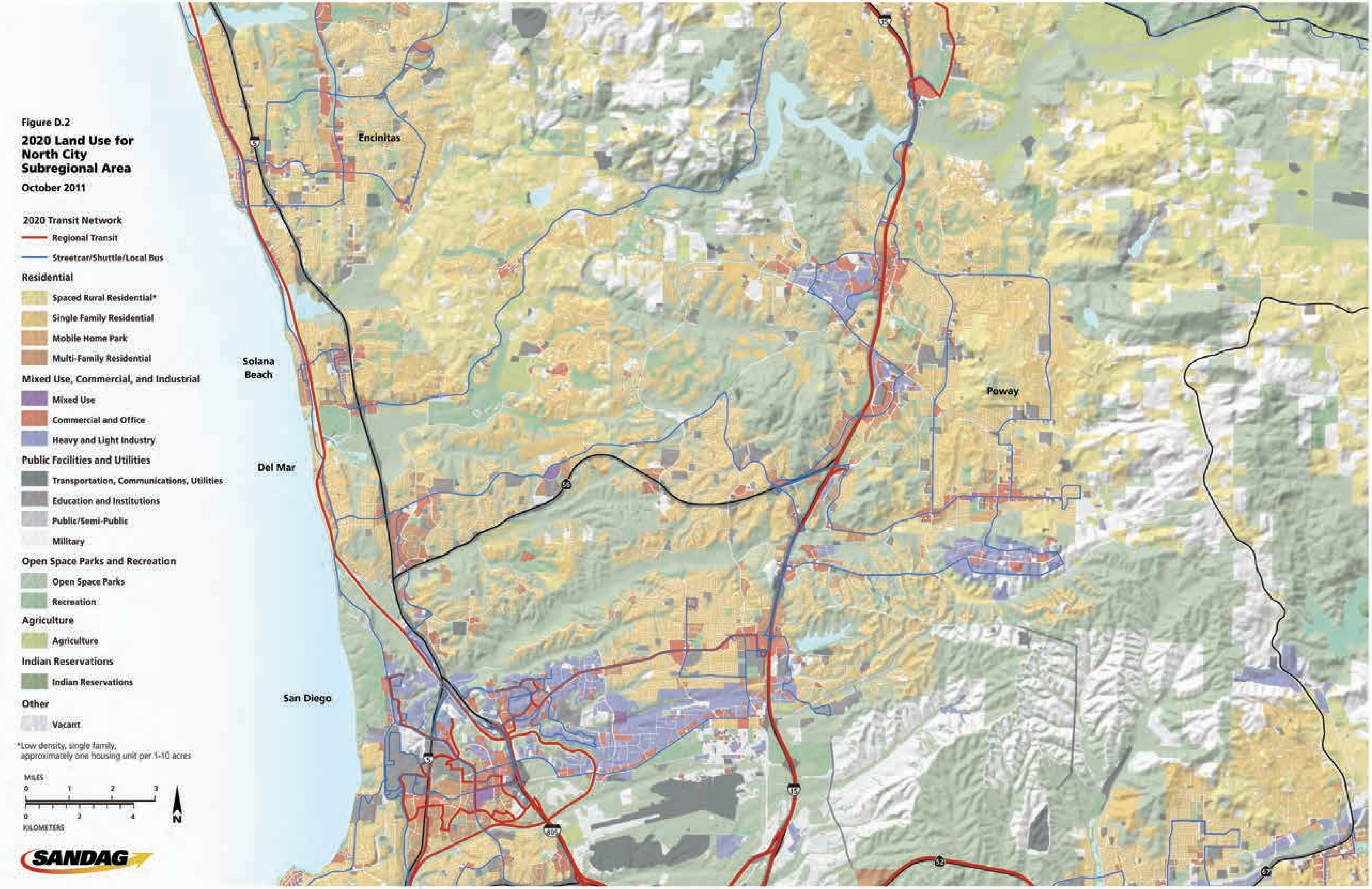


Figure D.2
2020 Land Use for North City Subregional Area
October 2011

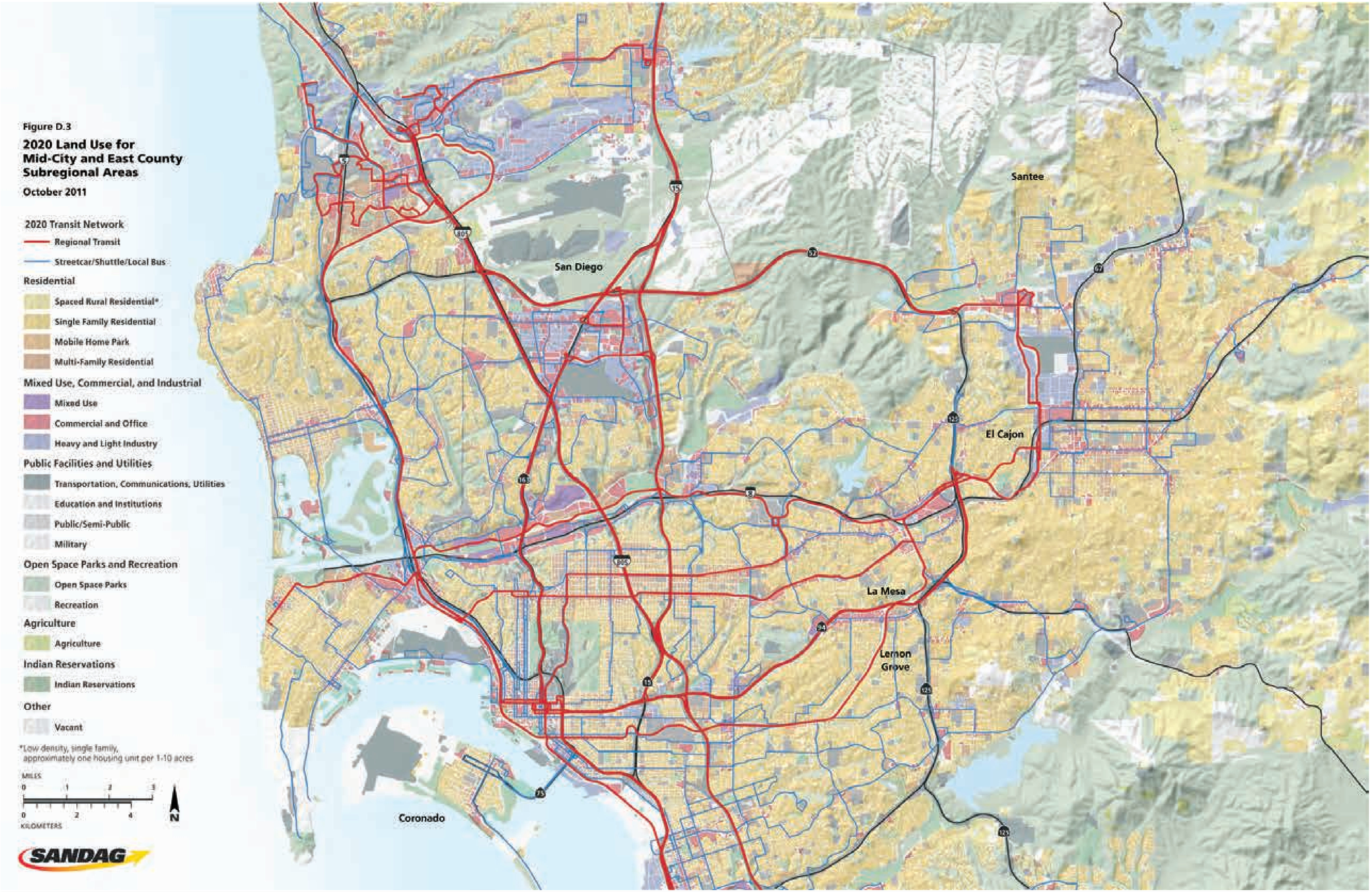


Figure D.3
2020 Land Use for Mid-City and East County Subregional Areas
October 2011
2020 Transit Network
Regional Transit
Streetcar/Shuttle/Local Bus
Residential
Spaced Rural Residential*
Single Family Residential
Mobile Home Park
Multi-Family Residential
Mixed Use, Commercial, and Industrial
Mixed Use
Commercial and Office
Heavy and Light Industry
Public Facilities and Utilities
Transportation, Communications, Utilities
Education and Institutions
Public/Semi-Public
Military
Open Space Parks and Recreation
Open Space Parks
Recreation
Agriculture
Agriculture
Indian Reservations
Indian Reservations
Other
Vacant
*Low density, single family, approximately one housing unit per 1-10 acres
MILES
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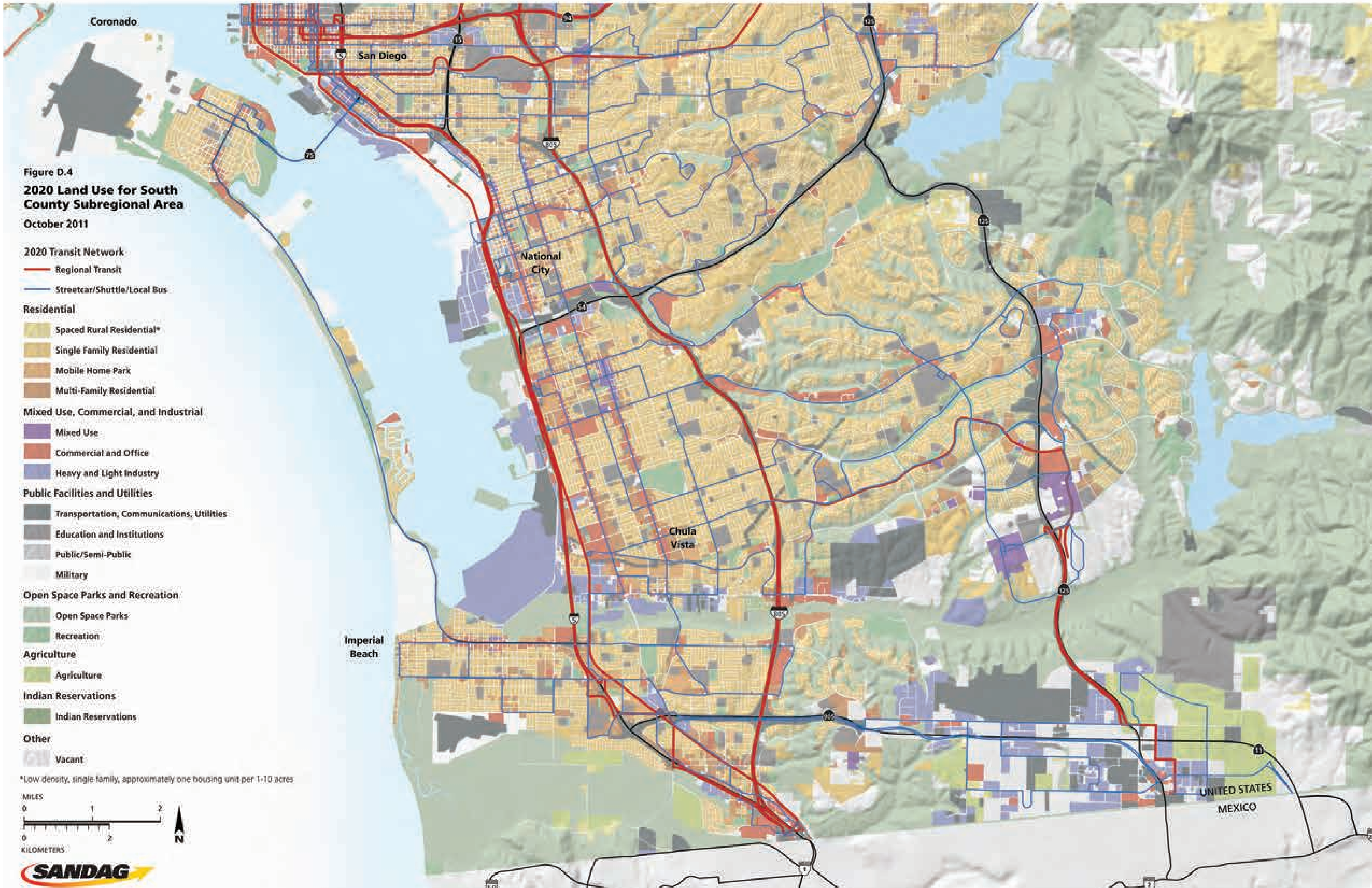
0 2 4
KILOMETERS
N
SANDAG
Santee
San Diego
El Cajon
La Mesa
Lemon Grove
Coronado


Coronado
San Diego
National City
Chula Vista
Imperial Beach
UNITED STATES
MEXICO
Figure D.4
2020 Land Use for South County Subregional Area
October 2011
2020 Transit Network
Regional Transit
Streetcar/Shuttle/Local Bus
Residential
Spaced Rural Residential*
Single Family Residential
Mobile Home Park
Multi-Family Residential
Mixed Use, Commercial, and Industrial
Mixed Use
Commercial and Office
Heavy and Light Industry
Public Facilities and Utilities
Transportation, Communications, Utilities
Education and Institutions
Public/Semi-Public
Military
Open Space Parks and Recreation
Open Space Parks
Recreation
Agriculture
Agriculture
Indian Reservations
Indian Reservations
Other
Vacant
*Low density, single family, approximately one housing unit per 1-10 acres
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0 1 2
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KILOMETERS
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SANDAG

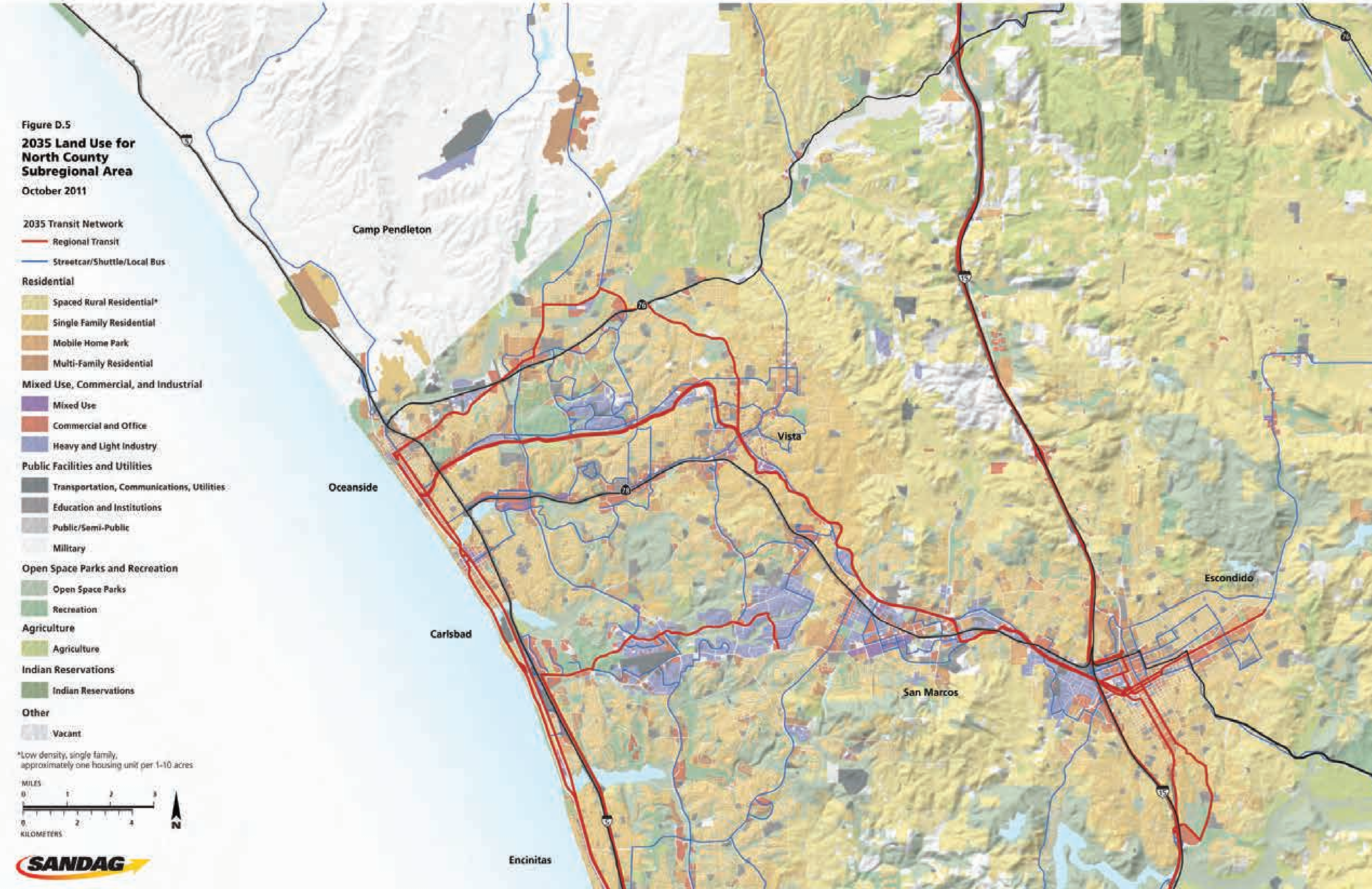
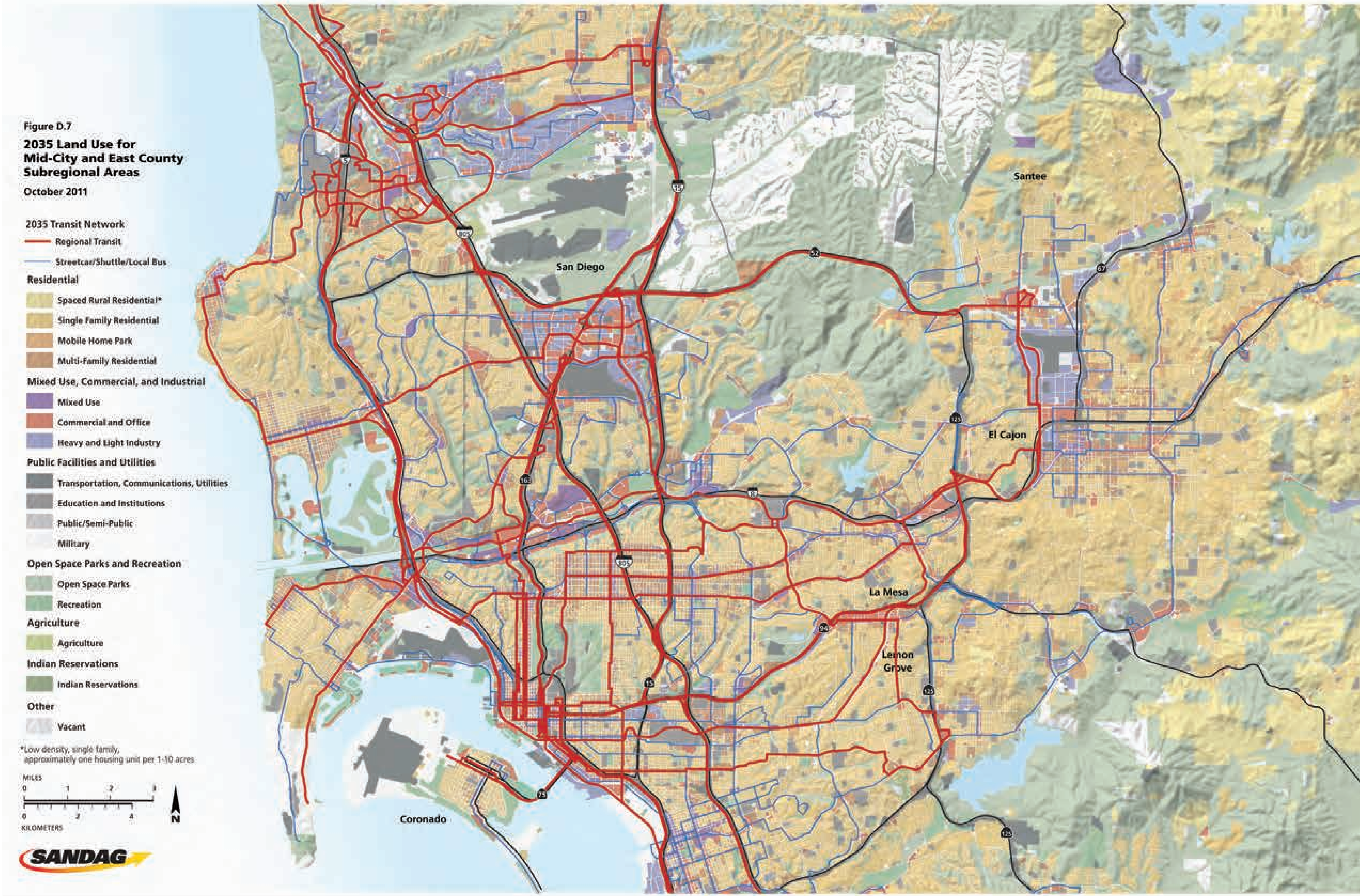


Figure D.5
2035 Land Use for North County Subregional Area
October 2011

Figure D.6
2035 Land Use for North City Subregional Area
October 2011

Figure D.7
2035 Land Use for Mid-City and East County Subregional Areas
October 2011



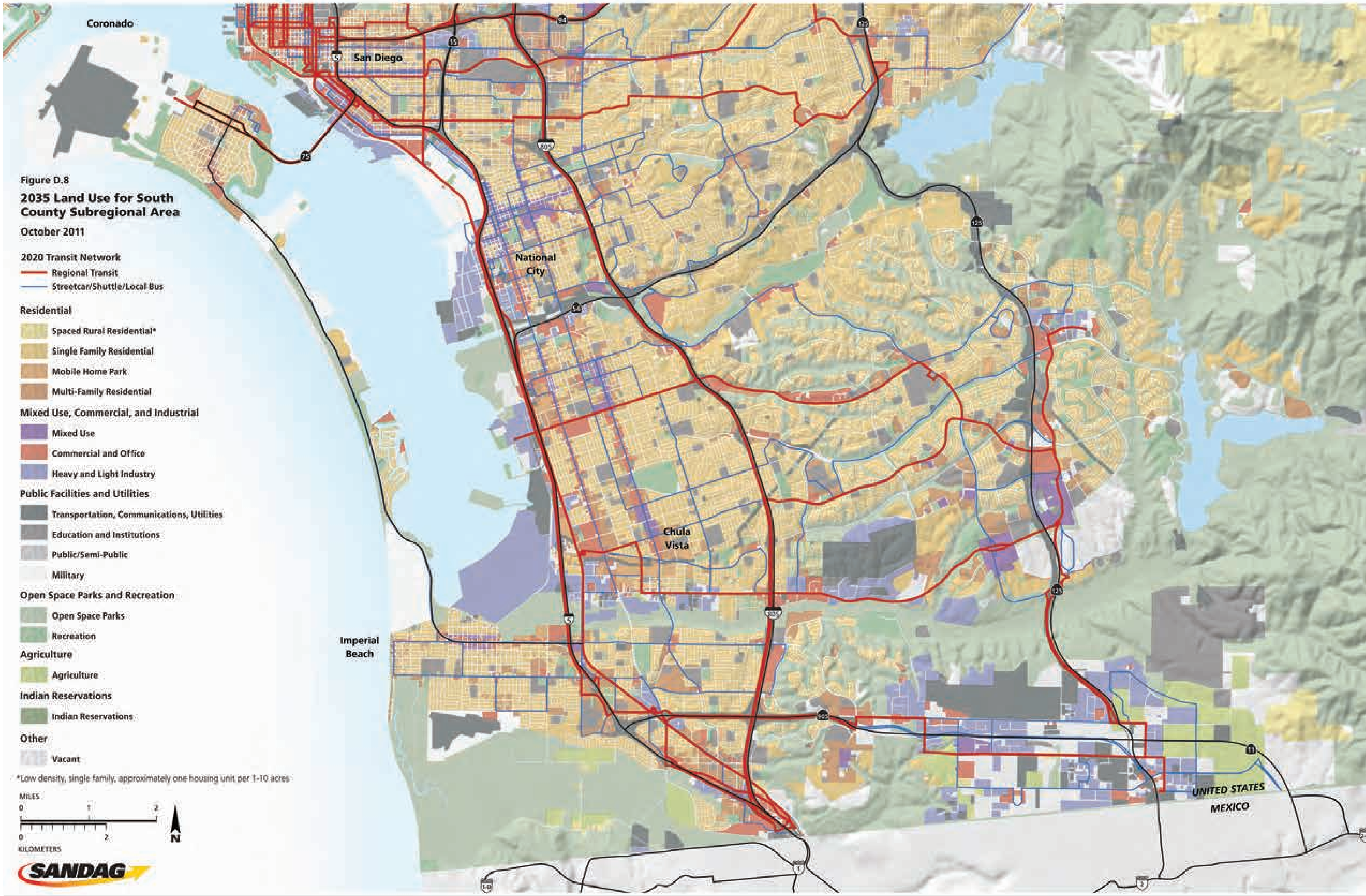


Figure D.8
2035 Land Use for South County Subregional Area
October 2011
2020 Transit Network
Regional Transit
Streetcar/Shuttle/Local Bus
Residential
Spaced Rural Residential*
Single Family Residential
Mobile Home Park
Multi-Family Residential
Mixed Use, Commercial, and Industrial
Mixed Use
Commercial and Office
Heavy and Light Industry
Public Facilities and Utilities
Transportation, Communications, Utilities
Education and Institutions
Public/Semi-Public
Military
Open Space Parks and Recreation
Open Space Parks
Recreation
Agriculture
Agriculture
Indian Reservations
Indian Reservations
Other
Vacant
*Low density, single family, approximately one housing unit per 1-10 acres
MILES
0
1
2
0
2
KILOMETERS
N
SANDAG
Coronado
San Diego
National City
Chula Vista
Imperial Beach
UNITED STATES
MEXICO


Figure D.9
2050 Transit Network and
Higher Density Land Uses
North County Subregional Area
October 2011
High Density Land Uses
Mixed Use
20 or more dwelling units per acre and 30 or more jobs per acre
Residential
10 or more dwelling units per acre
Residential
20 or more dwelling units per acre
Employment
30 or more jobs per acre
Transit Network
High Quality Transit Corridors
major transit stops and/or 15-minute peak period services
1/2-mile from center of transit line
MILES
KILOMETERS
N
SANDAG
Camp Pendleton
Oceanside
Vista
Carlsbad
San Marcos
Escondido
Encinitas

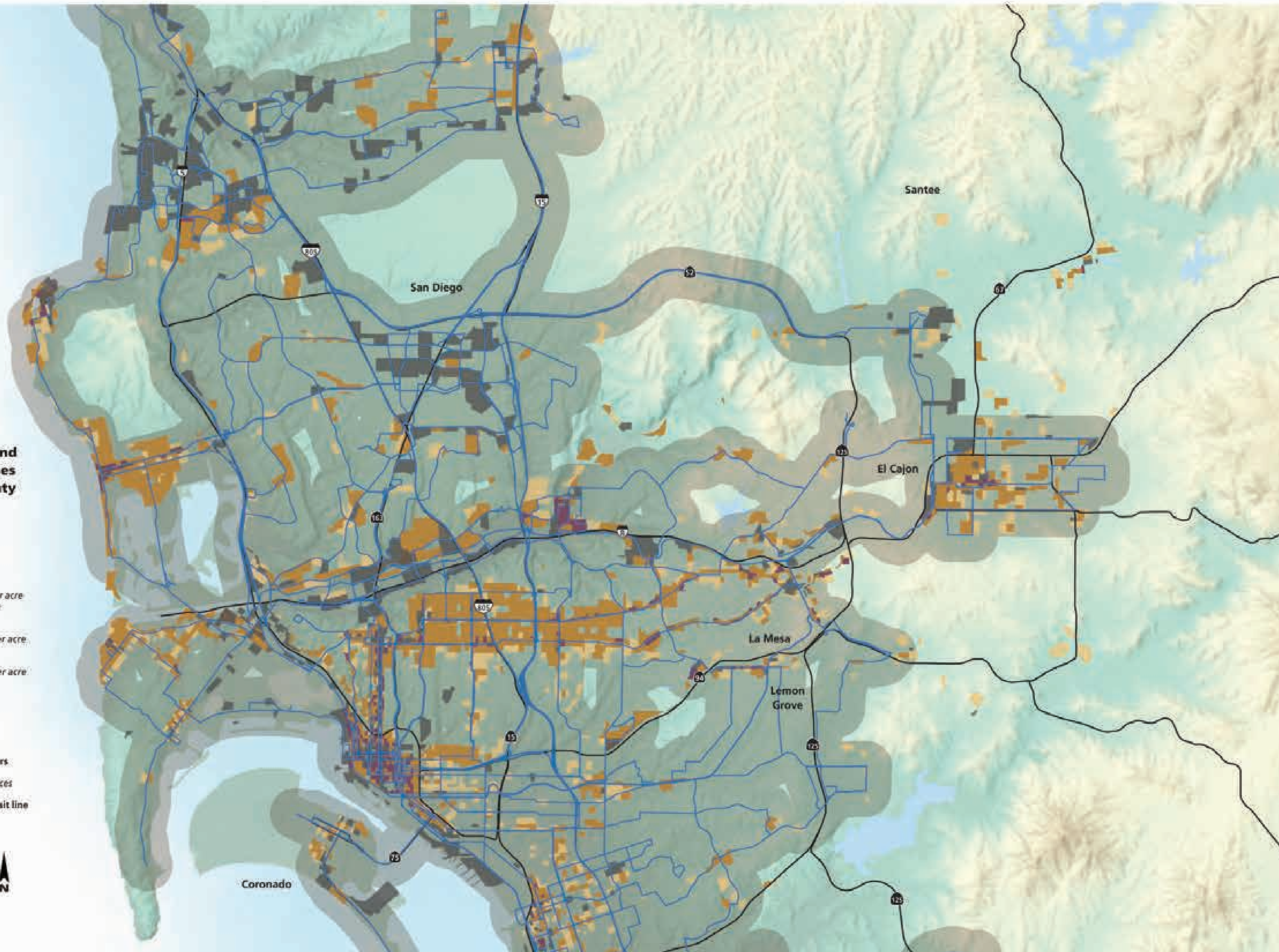


Figure D.11

2050 Transit Network and Higher Density Land Uses Mid-City and East County Subregional Areas

October 2011

High Density Land Uses

- **Mixed Use** *20 or more dwelling units per acre and 30 or more jobs per acre*
- **Residential** *10 or more dwelling units per acre*
- **Residential** *20 or more dwelling units per acre*
- **Employment** *30 or more jobs per acre*

Transit Network

- **High Quality Transit Corridors** *major transit stops and/or 15-minute peak period services*
- **1/2-mile from center of transit line**

MILES 0 1 2 3

0 2 4 KILOMETERS

N

SANDAG

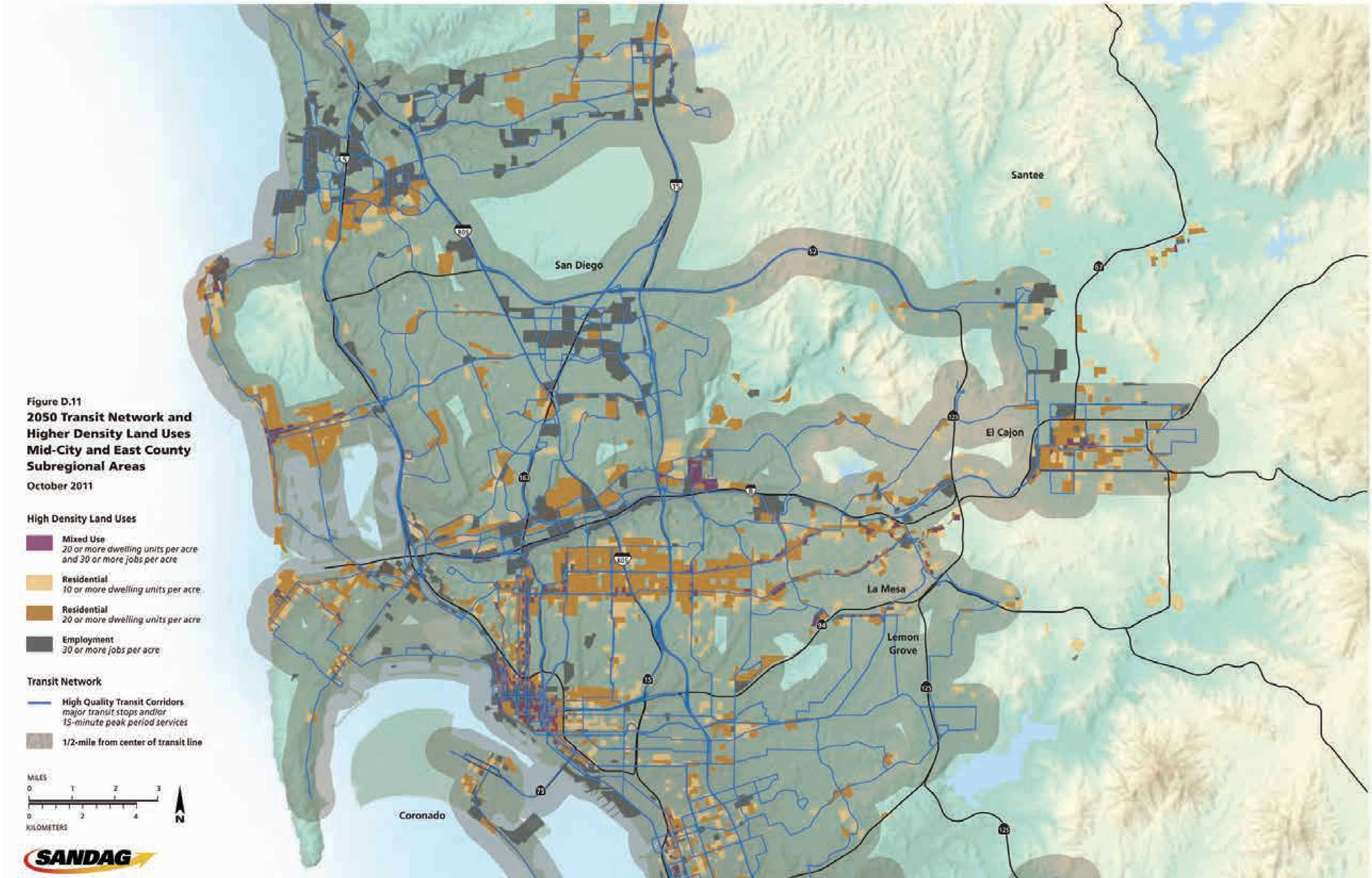


Figure D.11
2050 Transit Network and Higher Density Land Uses Mid-City and East County Subregional Areas
October 2011

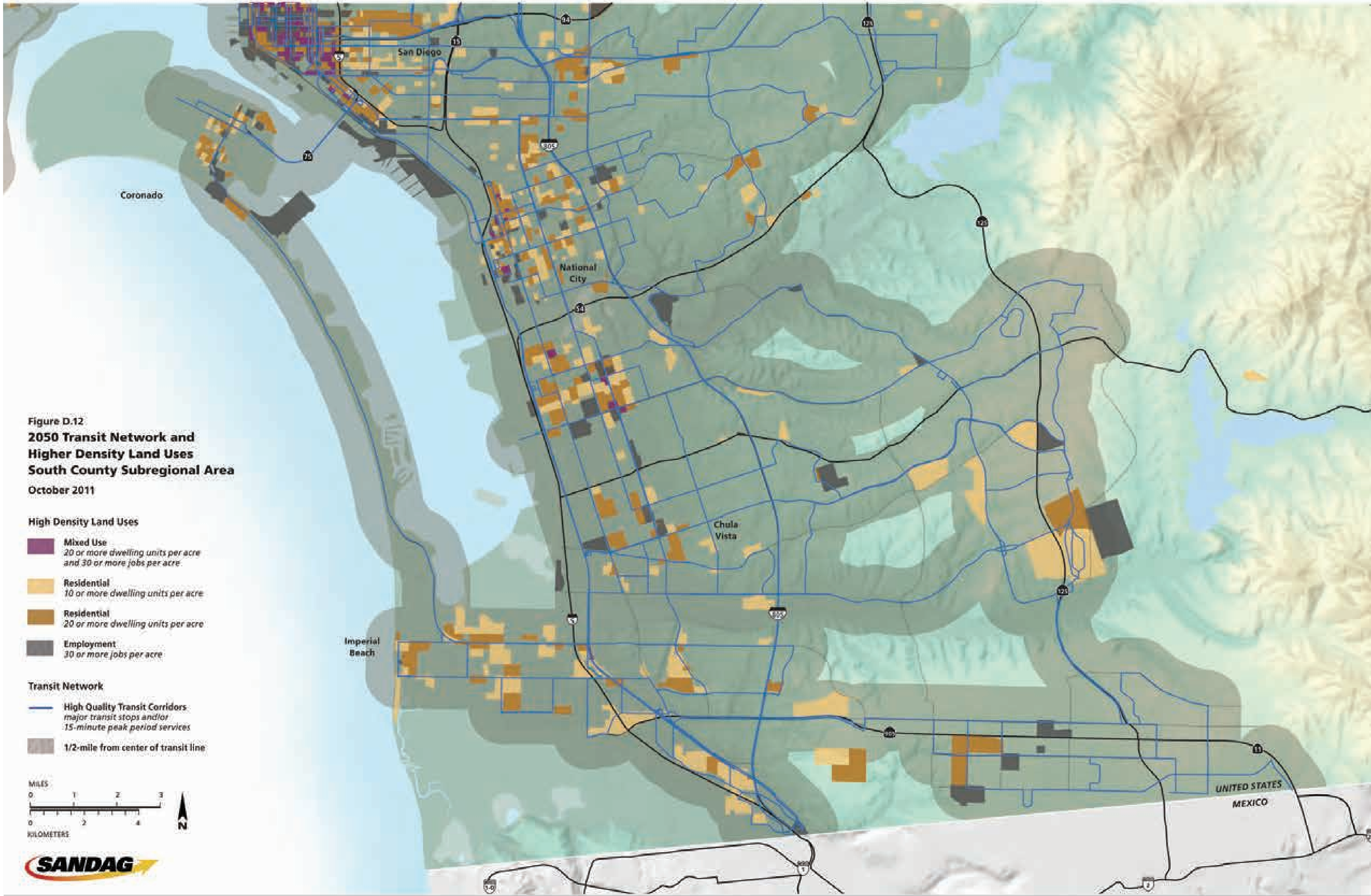


Figure D.12
2050 Transit Network and Higher Density Land Uses South County Subregional Area
October 2011

SANDAG Sustainable Communities Strategy - SB 375/SB 575 Requirements

Subject Area	SB 375 / SB 575 Requirements	Addressed
SCS Requirement	**CGC Section 65080(b)(2)(B)** *Each metropolitan planning organization shall prepare a sustainable communities strategy, subject to the requirements of Part 450 of Title 23 of, and Part 93 of Title 40 of, the Code of Federal Regulations, including the requirement to utilize the most recent planning assumptions considering local general plans and other factors. The sustainable communities strategy shall:*	SCS pg. 3-2
Land Use	**CGC Section 65080(b)(2)(B)(i)** *identify the general location of uses, residential densities, and building intensities within the region;*	SCS pg. 3-7
Housing Goals	**CGC Section 65080(b)(2)(B)(vi)** *consider the state housing goals specified in Sections 65580 and 65581;*	SCS pg. 3-39
	CGC Section 65080(b)(2)(B)(ii) *identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan taking into account net migration into the region, population growth, household formation and employment growth;.*	SCS pg. 3-39
	CGC Section 65080(b)(2)(B)(iii) *identify areas within the region sufficient to house an eight-year projection of the regional housing need for the region pursuant to Section 65584;*	SCS pg. 3-39
Natural Resources	**CGC Section 65080(b)(2)(B)(v)** *gather and consider the best practically available scientific information regarding resource areas and farmland in the region as defined in subdivisions (a) and (b) of Section 65080.01;*	SCS pg. 3-44
Transportation Network	**CGC Section 65080(b)(2)(B)(iv)** *identify a transportation network to service the transportation needs of the region;*	SCS pg. 3-61

SANDAG Sustainable Communities Strategy - SB 375/SB 575 Requirements

Subject Area	SB 375 / SB 575 Requirements	Addressed
Meeting Greenhouse Gas Reduction Targets	**CGC Section 65080(b)(2)(B)(vii):** *set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if there is a feasible way to do so, the greenhouse gas emission reduction targets approved by the state board;*	SCS pg. 3-64
Meeting Federal Air Quality Requirements	**CGC Section 65080(b)(2)(B)(viii)** *allow the regional transportation plan to comply with Section 176 of the federal Clean Air Act (42 U.S.C. Sec. 7506).*	SCS pg. 3-70
Informational Meetings	**CGC Section 65080(b)(2)(E)** *The metropolitan planning organization shall conduct at least two informational meetings in each county within the region for members of the board of supervisors and city councils on the sustainable communities strategy and alternative planning strategy, if any.*	Technical Appendix 6: Public Participation Plan, Public Involvement Plan
Public Participation Plan	**CGC Section 65080(b)(2)(F)** *Each metropolitan planning organization shall adopt a public participation plan, for development of the sustainable communities strategy and an alternative planning strategy, if any, that includes all of the following: etc.*	Technical Appendix 6: Public Participation Plan, Public Involvement Plan
Public Participation Plan – outreach	**CGC Section 65080(b)(2)(F)(i)** *Outreach efforts to encourage the active participation of a broad range of stakeholder groups in the planning process, consistent with the agency's adopted Federal Public Participation Plan, including, but not limited to, affordable housing advocates, transportation advocates, neighborhood and community groups, environmental advocates, home builder representatives, broad-based business organizations, landowners, commercial property interests, and homeowner associations.*	Technical Appendix 6: Public Participation Plan, Public Involvement Plan
Public Participation Plan – consultation	**CGC Section 65080(b)(2)(F)(ii)** *Consultation with congestion management agencies, transportation agencies, and transportation commissions.*	Technical Appendix 6: Public Participation Plan, Public Involvement Plan
Public Participation Plan - workshops	**CGC Section 65080(b)(2)(F)(iii)** *Three workshops throughout the region to provide the public with the information and tools necessary to provide a clear understanding of the issues and policy choices. Each workshop, to the extent practicable, shall include urban simulation computer modeling to create visual representations of the SCS and the alternative planning strategy.*	Technical Appendix 6: Public Participation Plan, Public Involvement Plan

SANDAG Sustainable Communities Strategy - SB 375/SB 575 Requirements

Subject Area	SB 375 / SB 575 Requirements	Addressed
Public Participation Plan – SCS public review	**CGC Section 65080(b)(2)(F)(iv)** *Preparation and circulation of a draft SCS and an alternative planning strategy, if one is prepared, not less than 55 days before adoption of a final regional transportation plan.*	Technical Appendix 6: Public Participation Plan, Public Involvement Plan
Public Participation Plan – public hearings	**CGC Section 65080(b)(2)(F)(v)** *At least three public hearings on the draft sustainable communities strategy in the regional transportation plan and alternative planning strategy, if one is prepared. If the metropolitan transportation organization consists of a single county, at least two public hearings shall be held. To the maximum extent feasible, the hearings shall be in different parts of the region to maximize the opportunity for participation by members of the public throughout the region.*	Technical Appendix 6: Public Participation Plan, Public Involvement Plan
Public Participation Plan – public notice	**CGC Section 65080(b)(2)(F)(vi)** *A process for enabling members of the public to provide a single request to receive notices, information, and updates.*	Technical Appendix 6: Public Participation Plan, Public Involvement Plan
Consultation with Local Agency Formation Commission	**CGC Section 65080(b)(2)(G)** *In preparing a sustainable communities strategy, the metropolitan planning organization shall consider spheres of influence that have been adopted by the local agency formation commissions within its region.*	SCS pg. 3-73
CARB Greenhouse Gas Reduction Targets for San Diego Region	**CGC Section 65080(b)(2)(H)** *Prior to adopting a sustainable communities strategy, the metropolitan planning organization shall quantify the reduction in greenhouse gas emissions projected to be achieved by the sustainable communities strategy and set forth the difference, if any, between the amount of that reduction and the target for the region established by the state board.*	SCS pg. 3-3

Subject Area	SB 375 / SB 575 Requirements	Addressed
Relationship between SCS and Local Government Land Use Authority	**CGC Section 65080(b) (2) (K)** *Neither a sustainable communities strategy nor an alternative planning strategy regulates the use of land, nor, except as provided by subparagraph (J), shall either one be subject to any state approval. Nothing in a sustainable communities strategy shall be interpreted as superseding the exercise of the land use authority of cities and counties within the region. Nothing in this section shall be interpreted to limit the state board's authority under any other provision of law. Nothing in this section shall be interpreted to authorize the abrogation of any vested right whether created by statute or by common law. Nothing in this section shall require a city's or county's land use policies and regulations, including its general plan, to be consistent with the regional transportation plan or an alternative planning strategy.* *Nothing in this section requires a metropolitan planning organization to approve a sustainable communities strategy that would be inconsistent with Part 450 of Title 23 of, or Part 93 of Title 40 of, the Code of Federal Regulations and any administrative guidance under those regulations.* *Nothing in this section relieves a public or private entity or any person from compliance with any other local, state, or federal law.*	SCS pg. 3-71

SANDAG Sustainable Communities Strategy - SB 375/SB 575 Requirements

Subject Area	SB 375 / SB 575 Requirements	Addressed
Exemption of Projects Contained in Previously Approved Plans and Programs	**CGC Section 65080(b) (2) (L)** *Nothing in this section requires projects programmed for funding on or before December 31, 2011, to be subject to the provisions of this paragraph if they (i) are contained in the 2007 or 2009 Federal Statewide Transportation Improvement Program, (ii) are funded pursuant to Chapter 12.49 (commencing with Section 8879.20) of Division 1 of Title 2, or (iii) were specifically listed in a ballot measure prior to December 31, 2008, approving a sales tax increase for transportation projects. Nothing in this section shall require a transportation sales tax authority to change the funding allocations approved by the voters for categories of transportation projects in a sales tax measure adopted prior to December 31, 2010. For purposes of this subparagraph, a transportation sales tax authority is a district, as defined in Section 7252 of the Revenue and Taxation Code, that is authorized to impose a sales tax for transportation purposes.*	SCS pg. 3-62
Consideration of Financial Incentives for Cities and Counties with Resource Areas or Farmlands	**CGC Section 65080(b) (4)(C)** *The metropolitan planning organization or county transportation agency, whichever entity is appropriate, shall consider financial incentives for cities and counties that have resource areas or farmland, as defined in Section 65080.01, for the purposes of, for example, transportation investments for the preservation and safety of the city street or county road system and farm to market and interconnectivity transportation needs. The metropolitan planning organization or county transportation agency, whichever entity is appropriate, shall also consider financial assistance for counties to address countywide service responsibilities in counties that contribute towards the greenhouse gas emission reduction targets by implementing policies for growth to occur within their cities.*	SCS pg. 3-46

Subject Area	SB 375 / SB 575 Requirements	Addressed
Consideration of Alternative Planning Scenario	**CGC Section 65080.3.** *(a) Each transportation planning agency with a population that exceeds 200,000 persons may prepare at least one "alternative planning scenario" for presentation to local officials, agency board members, and the public during the development of the triennial regional transportation plan and the hearing required under subdivision (c) of Section 65080.* *(b) The alternative planning scenario shall accommodate the same amount of population growth as projected in the plan but shall be based on an alternative to attempts to reduce the growth in traffic congestion, make more efficient use of existing transportation infrastructure, and reduce the need for costly future public infrastructure.* *(c) The alternative planning scenario shall be developed in collaboration with a broad range of public and private stakeholders, including local elected officials, city and county employees, relevant interest groups, and the general public. In developing the scenario, the agency shall consider all of the following:* *(1) Increasing housing and commercial development around transit facilities and in close proximity to jobs and commercial activity centers.* *(2) Encouraging public transit usage, ridesharing, walking, bicycling, and transportation demand management practices.* *(3) Promoting a more efficient mix of current and future job sites, commercial activity centers, and housing opportunities.* *(4) Promoting use of urban vacant land and "brownfield" redevelopment.* *(5) An economic incentive program that may include measures such as transit vouchers and variable pricing for transportation.* *(d) The planning scenario shall be included in a report evaluating all of the following:* *(1) The amounts and locations of traffic congestion.* *(2) Vehicle miles traveled and the resulting reduction in vehicle emissions.* *(3) Estimated percentage share of trips made by each means of travel specified in subparagraph (C) of paragraph (1) of subdivision (b) of Section 65080.* *(4) The costs of transportation improvements required to accommodate the population growth in accordance with the alternative scenario.* *(5) The economic, social, environmental, regulatory, and institutional barriers to the scenario being achieved.* *(e) If the adopted regional transportation plan already achieves one or more of the objectives set forth in subdivision (c), those objectives need not be discussed or evaluated in the alternative planning scenario.* *(f) The alternative planning scenario and accompanying report shall not be adopted as part of the regional transportation plan, but it shall be distributed to cities and counties within the region and to other interested parties, and may be a basis for revisions to the transportation projects that will be included in the regional transportation plan.* *(g) Nothing in this section grants transportation planning agencies any direct or indirect authority over local land use decisions.* *(h) This section does not apply to a transportation plan adopted on or before September 1, 2001, proposed by a transportation planning agency with a population of less than 1,000,000 persons.*	Technical Appendix 9: November 19, 2010, Board Report, December 17, 2010, Board Report

BOARD OF DIRECTORS
NOVEMBER 19, 2010

AGENDA ITEM NO. 10-11-13
ACTION REQUESTED – DISCUSSION

2050 REGIONAL TRANSPORTATION PLAN: REVENUE CONSTRAINED TRANSPORTATION NETWORK SCENARIOS

File Number 3100500

Introduction

During the past few months, staff presented the draft 2050 Regional Transportation Plan (RTP) Unconstrained Highway and Transit Networks at meetings of the Board of Directors; the Regional Planning, Transportation, and Borders Committees; various SANDAG working groups; and at other public meetings for input. At its July 23, 2010, meeting, the Board accepted the draft Unconstrained Transportation Network for use in the development of the draft 2050 RTP.

Based on revenue projections through 2050, four Revenue Constrained Transportation Network Scenarios (Scenarios) have been developed using prioritized project lists and other factors. The Scenarios attempt to build and operate as much of the Unconstrained Transportation Network as possible, given revenue availability and flexibility, and project priorities. These Scenarios were presented at the September, October, and November Board meetings.

This report provides: (1) a summary of the Scenarios' performance, including economic impact, social equity, and greenhouse gas (GHG) emissions analyses, and (2) a summary of feedback received from stakeholders, several working groups and Policy Advisory Committees (PACs), and at the November 5, 2010, Board meeting. The Board of Directors is asked to consider this information and provide further input and direction on the Scenarios, leading toward the selection of a potential preferred Scenario at its December 17, 2010 meeting.

Discussion

Alternative Revenue Constrained Transportation Network Scenarios

As described above, based on revenue projections to 2050, four Scenarios with a range of modal emphases were developed using prioritized project lists and other factors. The Scenarios are Transit Emphasis, Rail/Freight Emphasis, Highway Emphasis, and Fusion.

Descriptions of the four Scenarios were included in the September 24, 2010; October 22, 2010; and November 5, 2010, Board reports. At the November Board meeting, staff made a presentation that provided clarifying information on the Scenarios, such as the proposed full implementation of the Transportation Demand Management, Transportation Systems Management, and Active Transportation programs and projects. Additional information on the rail grade separations also was provided.

Scenario Performance

SANDAG evaluated the various Scenarios based upon Board-approved plan performance measures. Draft results for the performance measures, including new data that were previously under development, are included in Attachment 1 for 2008 existing conditions, the 2050 No Build Alternative, and the four Scenarios. *The Big Picture* and *The Details* below present an overview of the findings of the evaluation of draft results for those performance measures that showed more significant differences compared to the 2050 No Build alternative. *What will be different from today?* highlights the outcomes of indicators that are projected to change the most compared to current (2008) conditions. Attachment 2 contains projected travel times in key corridors. Findings of the Cost-Benefit Analysis of the four Scenarios will be presented at the December 17, 2010, Board meeting.

The Big Picture

In fall 2009, to set the stage for the development of the 2050 RTP, the Board established the vision for the Plan, as follows.

> *A transportation system that supports a prosperous economy, promotes a healthy and safe environment, including climate change protection, and provides a higher quality of life for all San Diego County residents. The transportation system should better link jobs, homes, and major activity centers by enabling more people to use transit and to walk and bike; efficiently transport goods; and provide fast, convenient, effective transportation options for all people.*

First, the 2050 Unconstrained Transportation Network was developed with this vision at the forefront. Subsequently, four financially constrained Scenarios that include all projects, programs, and services from the *TransNet* Extension Ordinance through 2048 were crafted from the Unconstrained Transportation Network.[1] These Scenarios were developed taking into account the allowable uses of the projected local, state, federal, and private revenues anticipated through 2050.

The intent in developing these four Scenarios was to compare and contrast the systemwide performance of networks that emphasize different mixes of projects, geographic distribution of projects, and modal choices. For example, both the Transit Emphasis and Fusion Scenarios propose substantial investments in light rail transit (LRT) services; and while Transit Emphasis focuses on reinforcing and upgrading existing LRT routes, Fusion proposes new LRT routes to serve a wider geographic area. Highway Emphasis includes the highest investments in bus rapid transit (BRT) and Rapid Bus services.

All Scenarios are multimodal in nature. A greater modal emphasis that provides some differentiation among the Scenarios results from a small share estimated at three percent of the total projected revenues (approximately $3 billion to $3.5 billion out of a total of $100 billion to $110 billion) that has the flexibility to be allocated for transit, highway, or other capital projects. For example, while the Transit Emphasis Scenario assumes all flexible funding toward transit projects, the Highway Emphasis Scenario assumes all flexible funding for highway projects.

[1] *TransNet* projects are included in all Scenarios with the exception of the I-805 corridor where different improvements are being tested in some Scenarios.

A substantial share of the total projected revenues through 2050, or approximately 40 percent, would be needed for maintenance and rehabilitation of the existing and proposed transportation infrastructure and for road operational improvements. The Rail/Freight Emphasis Scenario would have a slightly lower investment in this category since it includes fewer operational improvements on the Interstate 8 (I-8) corridor.

Compared to the 2050 No Build alternative[2], which includes projects under construction or in advance stages of development, all Scenarios are projected to improve the performance of the transportation system and conform to the goals and policy objectives set forth by the Board, as described below.

- All Scenarios show modest improvements in reducing vehicle collisions per capita. This indicator is calculated using historical accident data, which does not reflect implementation of Intelligent Transportation System (ITS) initiatives proposed in the Scenarios. Currently, there is no accepted methodology for capturing the potential effects of Transportation System Management (TSM) improvements on safety.
- Compared to the 2050 No Build alternative, all Scenarios would result in a strong improvement in the percentage of work and higher education trips than can be made within 30 minutes during peak periods. Three out of four trips would take 30 minutes or less if driving alone or carpooling. Approximately 14 percent to 15 percent of work and higher education trips could be accessed within 30 minutes by transit, compared to eight percent in the No Build alternative.
- The proportion of peak period travel in congested conditions by auto and by transit would be reduced significantly across all Scenarios. Congested auto travel would drop from 28 percent to about 10 percent to 12 percent, with the Highway Emphasis Scenario resulting in the greatest reduction of congested auto travel. Transit travel in congested conditions would go down from 9 percent to 4 percent in all Scenarios for local and rapid buses traveling on shared facilities. Similarly, truck delays would be reduced from about 34,000 daily hours to fewer than 14,000 daily hours in all Scenarios, or a 60 percent to 65 percent reduction.
- Vehicle miles traveled (VMT) per capita would be reduced by 12 percent to 13 percent in all Scenarios. The Highway Emphasis Scenario would reduce VMT per capita by the least percentage of the four Scenarios.
- The amount of daily travel by transit is projected to nearly double across all Scenarios, with the Highway Emphasis scenario showing slightly lower gains.
- Access to transit also is projected to improve compared to the No Build alternative. The percent of peak period and daily trips within half a mile of a transit stop would increase by five percentage points. More than three out of four trips could access transit within half a mile.

[2] The 2050 No Build Alternative includes the following projects: I-15 from SR 163 to SR 78, SR 52 from SR 125 to SR 67, SR 76 from Mission Road to I-15, I-805 HOV lanes from Carroll Canyon Road to the I-5/I-805 Merge, SR 905 from I-805 to Mexico, I-15 BRT to Downtown and UTC, SuperLoop, Mid-City Rapid Bus, South Bay BRT (Downtown).

- The four Scenarios show a substantial increase in carpooling, use of transit, and biking/walking for work trips (both peak period and all day). Mode share for carpooling would increase by half, and it would more than double for both work trips by transit and by bike/walk. Given more robust travel choices in all Scenarios, overall, mode share for commuting using alternative modes (carpool, transit, bike/walk) is projected to increase from 18 percent to 31 percent. Nearly one out of three commute trips would be made by alternative modes compared to fewer than one out of five trips in the No Build alternative.
- All Scenarios are projected to more than double the share of work trips by bike/walk compared to the No Build alternative (from 2.4 percent to more than 5 percent).

The Details

Indicators that display more contrast across the Scenarios are highlighted below.

- The Highway Emphasis and Transit Emphasis Scenarios overall would provide the highest level of interregional transit services to neighboring counties and Mexico.
- As explained above, the Highway Emphasis Scenario would reduce the percentage of peak period travel in congested conditions by auto from 28 percent to about 10 percent. The other three Scenarios would reduce that proportion to 12 percent.
- The Transit Emphasis Scenario would result in the lowest acreage of constrained lands[3] used for proposed transit and highway projects (245 acres), and the Highway Emphasis Scenario would consume the highest number of acres (362 acres).
- The initial Social Equity analysis (pages 6 through 9) suggests that the Transit Emphasis Scenario appears to be the most beneficial for low income and minority (LIM) populations in terms of the distribution of proposed RTP expenditures per capita. The data for all Social Equity performance measures indicate, however, that none of the Scenarios would create a substantial statistical disparity for LIM populations when compared to non-LIM populations.

What will be different from today?

- Regionwide, the commute to work would look quite a bit different: carpooling to work would increase by nearly 80 percent (from 116,000 trips in 2008 to more than 200,000 trips in 2050), use of transit would more than double, and biking/walking to work would go up 2.5 times in peak periods.
- On a daily basis, the number of trips made by biking or walking would increase by more than two and a half times compared to current levels.
- Air quality in the region would continue to improve as pollutants that create smog would be reduced significantly due to cleaner fuels and more fuel-efficient vehicles.

Economic Analysis

A key addition to the 2050 RTP is the inclusion of an economic analysis of alternative transportation strategies. This analysis helps to determine the overall contribution to the economy from the proposed $100 billion to $110 billion transportation investment and the most economically effective Scenario over the long-term (40 years). To accomplish the analysis, SANDAG used two separate and very different types of analytical techniques: a traditional Economic Impact Analysis (EIA) that

[3] Constrained lands include resource areas as defined in Senate Bill 375 (Steinberg, 2008), such as parks and open space, habitat in conservation plans, and agricultural areas.

estimates the value of the proposed RTP expenditures on the regional economy, and a Cost-Benefit Analysis (CBA) that highlights the transportation choices and phasing of the planned improvements for each alternative and compares those values against a baseline alternative (in this case the No Build alternative). Preliminary results of the EIA are presented in this section. An evaluation of the CBA on the alternative Scenarios is underway and will be completed as the projects, services, and programs proposed in the Scenarios are phased for 2020 and 2035. This evaluation is anticipated to be available in December 2010.

Economic Impact Analysis

The economic impact analysis estimates how much of the regional economy is supported by the proposed RTP expenditures and uses a modeling tool called input-output analysis. The direct impacts from the proposed RTP expenditures come from both construction (one-time) expenditures and annual operation and maintenance costs totaling about $100 billion to $110 billion over the next 40 years. These direct expenditures set in motion a sequence of indirect and induced expenditures that ripple through the economy creating additional economic activity. The sequence of the impacts, as the expenditures ripple through the economy, is tracked using the direct, indirect, and induced categories. These three categories together represent the ability of the region to respond to the direct expenditures. If some part of the product or service cannot be supplied from the regional economy, it (part of the expenditure) "leaks" out of the region and is spent in the location where the part of the product or service originates from (e.g. transit vehicles). The total value of the expenditures accommodated by the regional economy is measured in terms of output, jobs, and wages. The input-output (I-O) model that SANDAG uses is the IMPLAN model.

Because there is a great deal of funding overlap between the alternative Scenarios the results produced from the I-O model should be similar. In addition to funding similarity, there are other characteristics of the I-O model that would lead to similar results. First, the I-O model is not sensitive to project expenditure schedules, so the impact on the economy from a project completed in year 20 is the same as completing the project in year 1. Second, the model is not sensitive to changes that may occur after the project is complete and is not connected to fluctuations in the performance of the transportation system, so the model would not account for the value of improved travel times, or for the reduction in travel time benefits as congestion builds over time. Last, the I-O model is based on a set of linear relationships, so more expenditures in the same transportation area (roadways, buses, railcars) will result in a linear and proportional outcome or impact. These limitations of the I-O model are addressed and considered in the CBA. Together the EIA and the CBA present a more complete picture of the RTP's contribution to the regional economy.

A 2050 RTP Economic Analyses Ad Hoc Technical Working Group was convened to review the CBA and EIA methodologies, inputs, and preliminary results. This group includes representatives from all San Diego County regional economic development councils, regional universities and research organizations, the City of San Diego Planning and Community Investment Department, and the County Department of Health and Human Services.

The results from the draft EIA indicate that the Highway Emphasis Scenario would result in the greatest average annual jobs, payroll impacts, and output over the 40-year life of the RTP, followed by the Transit Emphasis Scenario (Table 3). Total annual jobs in the Highway Emphasis Scenario are estimated at 36,700, which is comparable, for example, to the size of the Information industry (which includes telecommunications) in San Diego, and is larger than the Computer and Electronics Manufacturing, Architecture and Engineering, and Research and Development industries in

San Diego. The Highway Emphasis scenario results in total annual average payroll impacts estimated at $1.9 billion (this includes direct, indirect, and induced), and output impacts estimated at $4.8 billion. Given that Gross Regional Product was approximately $169 billion in 2008, the average annual output impact of the proposed RTP expenditures, which ranges from $4.6 billion to $4.8 billion, is equivalent to nearly three percent of the total regional economy.

The economic impact measures for the highest and lowest ranked alternatives differ by about 6 percent. The draft analyses estimate that the Rail/Freight Emphasis Scenario could result in about 2,000 fewer total jobs annually, $100 million less in payroll impacts, and $200 million less output value when compared to the Highway Emphasis Scenario. The differences are relatively small, and reflect the effect of different expenditures across Scenarios, particularly with respect to the mix of infrastructure constructed, vehicles purchased, ongoing operations, and right-of-way acquired. For example, right-of-way acquisition is a land-transfer that does not generate any local jobs. Thus, Scenarios that require more right-of-way acquisition may have a lower overall job impact estimate. In addition, project design, construction, and operations generate different levels of jobs per dollar spent. Therefore, to the extent that the mix of projects varies across Scenarios (more right-of-way purchased in one, more light rail lines built in another, more transit vehicles procured outside the region) the results will differ.

Table 1
2050 RTP Revenue Constrained Scenarios
Economic Impact Analyses: Preliminary Results (in $ billions)

	Transit Emphasis	Rail/Freight Emphasis	Highway Emphasis	Fusion
Average Annual Jobs	35,500	34,700	36,700	35,300
Payroll impacts	$1.8	$1.8	$1.9	$1.8
Output	$4.7	$4.6	$4.8	$4.6

Social Equity

The Social Equity performance measures require some elaboration as the data must be evaluated in several ways. As part of the performance evaluation of the Revenue Constrained Transportation Network Scenarios, using Board-approved performance measures, preliminary social equity analyses have been conducted for all Social Equity indicators, as follows:

1. Average travel time;
2. Percent of work trips accessible in 30 minutes in peak periods by drive alone, carpool, and transit;
3. Percent of homes within a half-mile of a transit stop;
4. Percent of population within 30 minutes of schools (colleges, vocational, and job training)[4];
5. Percent of population within 30 minutes of San Diego International Airport (SDIA);
6. Percent of population within 15 minutes of healthcare (hospitals and clinics);

[4] Access to schools, SDIA, healthcare and parks/beaches was calculated for auto travel times. Data for transit travel times is under development.

7. Percent of population within 15 minutes of parks or beaches (excluding neighborhood parks); and
8. Distribution of proposed RTP expenditures per capita.

Attachment 1 shows preliminary draft results for these indicators (performance measures 32 through 39 for low-income and minority [LIM] populations and non-LIM populations). Additional social equity performance indicators for other populations also are included. In some discussion areas of this report, LIM populations are referenced in the aggregate, but in Attachment 1 and certain sections of this report the low-income and minority populations are analyzed and referenced separately since there is not a direct overlap of these populations.

Preliminary analyses of the Scenarios have been conducted to determine whether any of the Scenarios would conflict with requirements in Title VI of the Civil Rights Act or other applicable social equity laws, which require that the benefits and burdens of the projects in the various Scenarios be equitably distributed between the LIM and non-LIM populations. A threshold question is whether each of the Scenarios will improve conditions for LIM populations, relative to the 2050 No Build alternative or 2008 existing conditions.

2050 No Build Analysis

The initial modeling results for the performance indicators referenced above show that all of the Scenarios will maintain or improve conditions for LIM populations compared to the 2050 No Build alternative. LIM populations would fare better in the mobility and accessibility indicators with the investments proposed in every Scenario. RTP investments per capita for LIM populations would range from an increase of nearly 90 percent to more than doubling for each of the 2050 Scenarios compared to the 2050 No Build Alternative. Moreover, none of the Scenarios when compared to one another has a significantly different impact on LIM populations.

The next question analyzed was whether LIM populations would receive a similar or greater benefit compared to non-LIMs under each of the Scenarios relative to the No Build alternative. Key findings are outlined below:

1. The preliminary modeling results show no difference in average travel times between LIM and non-LIM populations for each of the Scenarios in 2050.
2. LIM populations would receive slightly greater accessibility gains for drive alone, carpool, and transit peak period work trips (within 30 minutes) compared to non-LIM populations.
3. The percent of homes within a half-mile of a transit stop shows accessibility gains for the LIM populations, but those gains are slightly higher for non-LIM populations.
4. Access to schools within a 30-minute period would remain virtually constant for both LIM and non-LIM populations,
5. Access to SDIA shows similar levels of accessibility for both minority and non-minority populations, and marginally higher gains for non-low income populations.
6. The percent of population within 15 minutes of healthcare facilities is projected to remain at virtually the same levels for both LIM and non-LIM populations.
7. No difference in access to parks/beaches is projected for both LIM and non-LIM populations.