



SAN DIEGO

F  **R**  **W**  **A**  **R**  **R** 

THE 2019 FEDERAL REGIONAL TRANSPORTATION PLAN





SAN DIEGO



THE 2019 FEDERAL REGIONAL TRANSPORTATION PLAN



October 2019



401 B Street, Suite 800, San Diego, CA 92101 | (619) 699-1900 | SDForward.com

SANDAGregion @SANDAG #SDForward

Board of Directors

The 18 cities and county government are SANDAG serving as the forum for regional decision-making. SANDAG builds consensus; plans, engineers, and builds public transit; makes strategic plans; obtains and allocates resources; and provides information on a broad range of topics pertinent to the region's quality of life.

Chair

Hon. Steve Vaus

Vice Chair

Hon. Catherine Blakespear

Executive Director

Hasan Ikhtrata

City of Carlsbad

Hon. Cori Schumacher, Councilmember
(A) Hon. Barbara Hamilton, Councilmember
(A) Hon. Priya Bhat-Patel, Mayor Pro Tem

City of Chula Vista

Hon. Mary Salas, Mayor
(A) Hon. Steve Padilla, Councilmember
(A) Hon. John McCann, Councilmember

City of Coronado

Hon. Richard Bailey, Mayor
(A) Hon. Bill Sandke, Councilmember
(A) Hon. Mike Donovan, Councilmember

City of Del Mar

Hon. Ellie Haviland, Deputy Mayor
(A) Hon. Dwight Worden, Councilmember
(A) Hon. Dave Druker, Mayor

City of El Cajon

Hon. Bill Wells, Mayor
(A) Hon. Steve Goble, Deputy Mayor

City of Encinitas

Hon. Catherine Blakespear, Mayor
(A) Hon. Tony Kranz, Councilmember
(A) Hon. Joe Mosca, Councilmember

City of Escondido

Hon. Paul McNamara, Mayor
(A) Hon. Olga Diaz, Councilmember
(A) Hon. Mike Morasco, Councilmember

City of Imperial Beach

Hon. Serge Dedina, Mayor
(A) Hon. Mark West, Councilmember
(A) Hon. Paloma Aguirre, Councilmember

City of La Mesa

Hon. Kristine Alessio, Councilmember
(A) Hon. Bill Baber, Councilmember
(A) Hon. Colin Parent, Vice Mayor

City of Lemon Grove

Hon. Racquel Vasquez, Mayor
(A) Hon. Jennifer Mendoza, Councilmember
(A) Hon. Jerry Jones, Councilmember

City of National City

Hon. Alejandra Sotelo-Solis, Mayor
(A) Hon. Mona Rios, Councilmember
(A) Hon. Ron Morrison, Vice Mayor

City of Oceanside

Hon. Jack Feller, Deputy Mayor
(A) Hon. Christopher Rodriguez, Councilmember
(A) Hon. Esther Sanchez, Councilmember

City of Poway

Hon. Steve Vaus, Mayor
(A) Hon. John Mullin, Councilmember
(A) Hon. Caylin Frank, Councilmember

City of San Diego

Hon. Kevin Faulconer, Mayor
(A) Hon. Mark Kersey, Councilmember
(A) Hon. Chris Cate, Councilmember
Hon. Georgette Gomez, Council President
(A) Hon. Barbara Bry, Council President Pro Tem
(A) Hon. Monica Montgomery, Councilmember

City of San Marcos

Hon. Rebecca Jones, Mayor
(A) Hon. Sharon Jenkins, Mayor Pro Tem
(A) Hon. Maria Nunez, Councilmember

City of Santee

Hon. John Minto, Mayor
(A) Hon. Ronn Hall, Councilmember
(A) Hon. Rob McNelis, Councilmember

City of Solana Beach

Hon. David A. Zito, Mayor
(A) Hon. Jewel Edson, Deputy Mayor
(A) Hon. Kristi Becker, Councilmember

City of Vista

Hon. Judy Ritter, Mayor
(A) Hon. Amanda Rigby, Councilmember
(A) Hon. John Franklin, Deputy Mayor

County of San Diego

Hon. Jim Desmond, Supervisor
(A) Hon. Dianne Jacob, Chair
Hon. Kristin Gaspar, Supervisor
(A) Hon. Greg Cox, Vice Chair
(A) Hon. Nathan Fletcher, Supervisor

Advisory Members

Imperial County

Hon. Jesus Eduardo Escobar, Supervisor
(A) Mark Baza, Imperial County Transportation Commission

California Department of Transportation

Bob Franzoia, Acting Director
(A) Cory Binns, District 11 Director
(A) Ann Fox, Deputy Director

Metropolitan Transit System

Hon. Mona Rios
(A) Hon. Nathan Fletcher

North County Transit District

Hon. Tony Kranz
(A) Hon. Priya Bhat-Patel
(A) Hon. Jewel Edson

U.S. Department of Defense

Joe Stuyvesant, Navy Region Southwest Executive Director
(A) Steve Chung, Navy Region Southwest

Port of San Diego

Hon. Garry Bonelli, Chairman
(A) Hon. Michael Zucchet, Commissioner

San Diego County Water Authority

Ron Morrison, Director
(A) Gary Croucher, Vice Chair
(A) Mel Katz, Director

San Diego County Regional Airport Authority

April Boling, Chair
(A) Vacant

Southern California Tribal

Chairmen's Association

Hon. Cody Martinez, Chairman,
Sycuan Band of the Kumeyaay Nation
Hon. Robert Smith, Chairman,
Pala Band of Mission Indians

Mexico

Hon. Carlos González Gutiérrez
Cónsul General of Mexico
(A) Mario Figueroa
Deputy Cónsul General of Mexico
(A) Hon. Natalia Figueroa, Vice Consul

Acknowledgments

Many individuals aided in the preparation of material contained in San Diego Forward: The 2019 Federal Regional Transportation Plan (2019 Federal RTP). SANDAG committees and working groups are acknowledged.

SANDAG Committees and Working Groups

Audit Committee
Borders Committee
Public Safety Committee
Regional Planning Committee
TransNet Independent Taxpayer Oversight Committee
Transportation Committee
Active Transportation Working Group
Cities/County Transportation Advisory Committee
Committee on Binational Regional Opportunities
Community-Based Organizations Working Group
Environmental Mitigation Program Working Group
Freight Stakeholders Working Group
Interagency Technical Working Group on Tribal Transportation Issues
Regional Energy Working Group
Regional Planning Technical Working Group
San Diego Region Conformity Working Group
San Diego Regional Military Working Group
San Diego Regional Traffic Engineers Council
Social Services Transportation Advisory Council

SANDAG Staff

Hasan Ikhata, Executive Director
Coleen Clementson, Acting Director of Land Use and Transportation Planning
Laura Coté, Chief Administrative Officer
Andre Douzdjian, Director of Finance
John Kirk, General Counsel
Jim Linthicum, Chief of Capital Programs and Regional Services
Ray Major, Chief Data Analytics Officer
Irene McCormack, Acting Communications Director
José Nuncio, Director of *TransNet*
Ray Traynor, Chief Strategy and Innovation Officer
Rachel Kennedy, Senior Regional Planner, Project Manager
Elisa Arias, Principal Regional Planner
Sue Alpert, Senior Financial Programming Analyst
Aremy Barrera, Document Processing Specialist III

Acknowledgments (continued)

SANDAG Staff (continued)

Shane Babineaux, Office Services Specialist III
Mike Calandra, Senior Researcher and Modeler
Grace Chung, Senior GIS Analyst
Ryan Chung, Associate Graphic Designer
Josh Clark, Associate Regional Planner
Jane Clough, Senior Regional Planner
Rachel Cortes, Senior Researcher and Modeler
Elizabeth Cox, Communications Manager
Linda Culp, Principal Regional Planner
Rick Curry, Manager of Transportation Analysis and Applications
Stephanie Ellsworth, Regional Planning Intern
Alex Estrella, Senior Regional Planner
James Dreisbach-Towle, Division Director Operations, Transportation & Information Technology
Samantha Foulke, Associate Legal Counsel
Susan Freedman, Senior Regional Planner
Laurie Gartrell, Associate Government Relations Analyst
Tom Goggin, Business Services Supervisor
Andy Gordon, Senior GIS Analyst
Rachel Graffeo, Creative Services Intern
Keith Greer, Principal Regional Planner
Stephanie Guichard, Senior Economic Research Analyst
Andrea Hammann, Associate Marketing Analyst
Jeffery Harns, Senior Programmer Analyst
Joey Hendrix, Document Processing Supervisor
Katie Hentrich, Associate Regional Planner
Zachary Hernandez, Regional Planner II
Susan Huntington, Manager of Financial Programming and Project Control
Alicia Isla, Document Processing Specialist III
Deborah Jones, Associate Account Executive
Tom King, Associate Researcher and Modeler
Chris Kluth, Senior Regional Planner
Pat Landrum, Manager of Data Solutions
Brian Lane, Senior Regional Planner
Seth Litchney, Senior Regional Planner
Cherry Liu, Senior Researcher and Modeler
Anna Lowe, Senior Regional Planner
Yun Ma, Associate Researcher and Modeler
Lisa Madsen, Associate Regional Planner
Marisa Mangan, Associate Regional Planner
Antoinette Meier, Principal Regional Planner

Acknowledgments (continued)

SANDAG Staff (continued)

Jim Miller, Senior Economic Research Analyst
Marjani Moore, Document Processing Specialist III
Sanchita Mukherjee, Associate Economic Research Analyst
Tommy Neel, Associate Graphic Designer
Joaquin Ortega, Associate Regional Modeler
Ziying Ouyang, Senior Researcher and Modeler
Jane Park, Associate Programmer Analyst
Sarah Pierce, Associate Regional Planner
Richard Radcliffe, Financial Analyst II
Keri Robinson, Associate Regional Planner
Kendall Reynolds, Office Services Specialist III
Samual Sanford, Associate Regional Planner
Sarah Seal, Document Processing Specialist II
Kim Smith, Senior Regional Planner
Michelle Smith, Senior Financial Programming Analyst
Lisa Starace, Acting Creative Services Manager
Wu Sun, Principal Researcher and Modeler
Tim Sutherland, Manager of Software Development Solutions
David Tedrow, Manager of Economic and Demographic Analysis and Modeling
Karyn Thompson, Associate Graphic Designer
Peter Thompson, Senior Technology Project Manager
Phil Trom, Senior Regional Planner
Kirsten Uchitel, Associate Environmental Planner
Hector Vanegas, Borders Program Manager
Danny Veeh, Associate Regional Planner
Dawn Vettese, Financial Programming Manager
Lindsey Volz, Regional Planning Intern
Kimberly Walters, Document Processing Specialist I
Robyn Wapner, Senior Government Relations Analyst
Francesca Webb, Document Processing Specialist III
Eric Wendt, Associate GIS Analyst
Julie Wiley, Special Counsel
Jennifer Williamson, Principal Regional Planner
Allison Wood, Senior Regional Planner
Susan Xu, Researcher and Modeler II
Nicole Yerkes, Document Processing Specialist I
Yang Zhao, Associate Programmer Analyst
Ariana zur Nieden, Senior Financial Programming Analyst

SANDAG also recognizes the various staff from the California Department of Transportation (Caltrans), Metropolitan Transit System (MTS), North County Transit District (NCTD), Port of San Diego, San Diego County Water Authority, and San Diego County Regional Airport Authority for their participation and assistance with the 2019 Federal RTP.

Bruce Lieberman, Editor

Table of Contents

Chapter 1: Our Region, Our Future

The San Diego Region: A Special Place at a Crossroads	1
An Opportunity to Shape Our Region.....	3
The Importance of Planning	5
Our Roadmap for San Diego Forward: The 2019 Federal Regional Transportation Plan	8
Policy Objective Categories	9
Recognizing the Connections in Our Regional Transportation Plan.....	11
It’s All About Choices.....	16
Endnotes.....	18

Chapter 2: A Strategy for Mobility

Heading Toward 2050 – About Transportation	19
Where We’ve Been and How We Got Here	20
The Transportation Network – A System that Offers More Ways to Get Around.....	32
Building a System That Meets the Needs of a Growing Region.....	33
Selecting the Transportation Network	33
Elements of 21st Century Mobility	34
Promoting Sustainable Mobility: Building Infrastructure for More Environmentally-Friendly Vehicles.....	60
Separating Key Rail Crossings and Busy Streets from One Another.....	62
A Global Gateway: Connecting the Region and Crossing Borders	63
Measuring the Performance of our Regional Transportation Network	71
Up Next: Paying for the Regional Transportation Plan.....	74
Endnotes.....	75

Chapter 3: Financing Our Future

Paying for the Regional Transportation Plan	77
Where Our Transportation Funds Come From, and How We Can Invest Them	78
Our Investment Plan for Transportation: A Brief Analysis	81
Addressing Potential Funding Shortfalls.....	92
State Route 125.....	92
Future Needs.....	92
Looking Ahead.....	93
Endnotes.....	94

Table of Contents (continued)

Chapter 4: Benefits of the Plan

How We Can All Benefit	95
Planning for Economic Prosperity	96
Promoting Both Economic Vitality and Equity: The Big Picture	98
Achieving Social Equity.....	99
The Economic Analysis of our Regional Transportation Plan	105
Taking Action.....	105
Endnotes.....	106

Chapter 5: Ensuring Performance

Putting San Diego Forward: The Regional Transportation Plan into Action	107
The Importance of Collaboration and Incentives.....	108
Actions to Implement the Plan	111
Monitoring the Plan’s Success	117
Conclusion: Forging a Shared Path toward a Sustainable and Prosperous Future	119
Endnotes.....	121

List of Appendices

Appendix A: Transportation Projects, Costs, and Phasing

Appendix B: Air Quality Planning and Transportation Conformity

Appendices C through U can be found in electronic format at www.sdforward.com

Appendix C: SANDAG Federal Congestion Management Process

Appendix D: Federal System Performance Report

Appendix E: Transportation System and Demand Management Programs, and Emerging Technologies

Appendix F: Public Involvement Program

Appendix G: Tribal Consultation Process for San Diego Forward: The 2019 Federal Regional Transportation Plan: Communication, Cooperation, and Coordination

Appendix H: Social Equity: Engagement and Analysis

Appendix I: Stormwater and Resiliency

Appendix J: Regional Growth Forecast

Appendix K: Glossary of Transportation Terms, Abbreviations, and Acronyms

Appendix L: Regional Housing Needs Assessment Plan

Appendix M: Transportation Project Evaluation Criteria and Rankings

Appendix N: Evaluating the Performance of the Transportation Network

Appendix O: Transportation Financial Background

Appendix P: Benefit-Cost Analysis

Appendix Q: Travel and Tourism

Appendix R: Transportation Security and Safety

Appendix S: Monitoring Performance

Appendix T: SANDAG Travel Demand Model and Forecasting Documentation

Appendix U: Related Technical Studies and Supporting Documents

Appendix U1: The 2018 Coordinated Plan

Appendix U2: Regional Complete Streets Policy

List of Appendices (continued)

- Appendix U3: Intraregional Tribal Transportation Strategy
- Appendix U4: SANDAG Regional Transit Oriented Development Strategy
- Appendix U5: California State Wildlife Action Plan
- Appendix U6: Regional Aviation Strategic Plan and San Diego Airport Multimodal Accessibility Plan
- Appendix U7: Regional Mobility Hub Implementation Strategy
- Appendix U8: San Diego Region Intelligent Transportation Systems Strategic Plan
- Appendix U9: Regional Energy Strategy for the San Diego Region
- Appendix U10: Management Strategic Plan for Conserved Lands in Western San Diego County
- Appendix U11: San Diego Regional Alternative Fuel Readiness Plan
- Appendix U12: San Diego Regional Plug-In Electric Vehicle Readiness Plan
- Appendix U13: Housing: Providing Homes for all Residents
- Appendix U14: Borders
- Appendix U15: 2016 Freight Gateway Study Update
- Appendix U16: Active Transportation Implementation Strategy
- Appendix U17: Urban Area Transit Strategy
- Appendix U18: 2015 Regional Plan Sustainable Communities Strategy
- Appendix U19: California Coastal Trail Technical Memoranda

List of Tables

Chapter 1: Our Region, Our Future

Table 1.1	2019 Federal Regional Transportation Plan Elements.....	4
-----------	---	---

Chapter 3: Financing Our Future

Table 3.1	Revenue Sources.....	79
Table 3.2	Major Expenditures by Mode	83
Table 3.3	SR 125 South Bay Expressway Toll Facility: Projected Revenues and Costs	92

Appendix A: Transportation Projects, Costs, and Phasing

Table A.1	Revenue Constrained Projects	2
Table A.2	Phased Revenue Constrained Projects	13
Table A.3	Phased Revenue Constrained Arterial Projects	26
Table A.4	Revenue Constrained Freight and Goods Movement Projects.....	30
Table A.5	Revenue Constrained and Unconstrained Projects.....	33
Table A.6	No-Build Projects.....	52

Appendix B: Air Quality Planning and Transportation Conformity

Table B.1	San Diego Regional Population and Employment Forecast	4
Table B.2	Person Types.....	6
Table B.3	Occupation Types	6
Table B.4	Activity Types.....	7
Table B.5	Time Periods for Level of Service Skims and Assignment.....	7
Table B.6	Zone System	8
Table B.7	Trip Modes.....	9
Table B.8	ABM2 Input Data.....	18
Table B.9	2019 Federal Regional Transportation Plan and 2018 RTIP, as amended Conformity Analysis for the 2008 and 2015 Eight-Hour Ozone Standards (EMFAC 2017)	20
Table B.10	Exempt Projects.....	21
Table B.11	Phased Highway Projects –2019 Federal Regional Transportation Plan	24
Table B.12	Phased Transit Services –2019 Federal Regional Transportation Plan	27
Table B.13	Phased Arterial Projects –2019 Federal Regional Transportation Plan.....	31

List of Tables (continued)

Appendices C through U can be found in electronic format at www.sdforward.com

Appendix D: Federal System Performance Report

Table D.1	Statewide Performance Management 1 Safety Targets.....	3
Table D.2	PM 1 Performance Measure Methodology	5
Table D.3	2018 RTIP Safety Program Summary by Project Category	6
Table D.4	PM 2 Statewide Performance Management 2 Pavement and Bridge Condition Targets.....	9
Table D.5	PM 2 Performance Measure Methodology	10
Table D.6	Pavement Category Rating System	11
Table D.7	2018 RTIP NHS Pavement Program Summary	11
Table D.8	2018 RTIP NHS Bridge Investments	12
Table D.9	PM 3 Performance Target Approval Dates for System Performance, Freight, and CMAQ.....	14
Table D.10	PM 3 Statewide and Regional Targets	15
Table D.11	PM 3 Performance Measure Methodology	17
Table D.12	Regional TAM Targets.....	19
Table D.13	2018 RTIP Transit Asset Management Program Summary by Category.....	20

Appendix E: Transportation System and Demand Management Programs, and Emerging Technologies

Table E.1	Transportation System Management.....	4
Table E.2	Transportation Demand Management	5

Appendix G: Tribal Consultation Process for San Diego Forward: The 2019 Federal Regional Transportation Plan: Communication, Cooperation, and Coordination

Table G.1	American Indian Reservations and Federally Recognized Tribal Governments in the San Diego Region.....	5
Table G.2	2019 Regional Transportation Plan – Tribal Strategic Objectives by Policy Area	27

List of Tables (continued)

Appendix H: Social Equity: Engagement and Analysis

Table H.1	List of Community-Based Organization Partners.....	5
Table H.2	Summary of Findings from Social Equity Analysis	22
Table H.3	Average Peak-Period Travel Time to Work	24
Table H.3.1	Social Equity Calculation for Average Peak-Period Travel Times to Work	25
Table H.4	Change in the Percent of Income Consumed by Out-of-Pocket Transportation Costs.....	26
Table H.4.1	Social Equity Calculation for Change in Percent of Income Consumed by Out-of-Pocket Transportation Costs	26
Table H.5	Percent of Population within 0.5 Miles of a High Frequency Transit Stop.....	27
Table H.5.1	Social Equity Calculation for Percentage of Population within 0.5 Miles of a High Frequency Transit Stop.....	27
Table H.6	Percent of Population within 0.5 Miles of a Transit Stop.....	28
Table H.6.1	Social Equity Calculation for Percentage of Population within 0.5 Miles of a Transit Stop.....	28
Table H.7	Percent of Population within 0.25 Miles of a Bike Facility	29
Table H.7.1	Social Equity Calculation for Percentage of Population within 0.25 Miles of a Bike Facility (Class 1 and II, Cycletrack, and Bike Boulevard)	29
Table H.8	Percent of Population within 30 Minutes of Jobs and Higher Education Enrollment	31
Table H.8.1	Social Equity Calculation for Percent of Population within 30 Minutes of Jobs and Higher Education Enrollment	31
Table H.9	Percent of Population within 15 Minutes of Retail.....	33
Table H.9.1	Social Equity Calculation for Percent of Population within 15 Minutes of Retail.....	34
Table H.10	Percent of Population within 15 Minutes of Healthcare.....	35
Table H.10.1	Social Equity Calculation for Percent of Population within 15 Minutes of Healthcare.....	35
Table H.11	Percent of Population within 15 Minutes of Active Park	38
Table H.11.1	Social Equity Calculation for Percent of Population within 15 Minutes of Active Park	39
Table H.12	Percent of Population within 15 Minutes of Active Beach.....	40
Table H.12.1	Social Equity Calculation for Percent of Population within 15 Minutes of Active Beach	41
Table H.13	Average PM Exposure	42
Table H.13.1	Social Equity Calculation for Average PM Exposure (Grams per Person).....	43
Table H.14	Benefits to Disadvantaged Populations.....	44

Appendix J: Regional Growth Forecast

Table J.1	Series 14 Regional Growth Forecast Population by Jurisdiction	6
Table J.2	Series 14 Regional Growth Forecast Employment by Jurisdiction	7
Table J.3	Series 14 Regional Growth Forecast Total Housing Units by Jurisdiction	8

List of Tables (continued)

Appendix M: Transportation Project Evaluation Criteria and Rankings

Table M.1	Project Evaluation Criteria Highway Corridors	2
Table M.2	Highway Corridor Project Rankings	5
Table M.3	Project Evaluation Criteria Transit Services	8
Table M.4	Transit Service Project Rankings.....	11
Table M.5	Regional Bike Plan Network Corridor Rankings.....	15
Table M.6	Project Evaluation Criteria Managed Lane Connector	20
Table M.7	Managed Lane Connector Project Rankings	22
Table M.8	Project Evaluation Criteria Freeway Connector	24
Table M.9	Freeway Connector Project Rankings.....	26
Table M.10	Project Evaluation Criteria	27
Table M.11	Rail Grade Separation Project Rankings.....	31
Table M.12	Regional Arterials by Jurisdiction	33

Appendix N: Evaluating the Performance of the Transportation Network

Table N.1	San Diego Forward: The 2019 Federal Regional Transportation Plan: Performance Measures	2
Table N.2	Revenue Constrained Network Performance Measures.....	4

Appendix O: Transportation Financial Background

Table O.1	Revenue Sources: Availability Assumptions and Risk Assessment.....	14
-----------	--	----

Appendix P: Benefit-Cost Analysis

Table P.1	Benefit-Cost Analysis Results (2019\$ Billion)	3
Table P.2	Truck / Commercial Vehicle Values of Time (2019\$)	9
Table P.3	Vehicle Operating Costs (2019\$).....	10

Appendix S: Monitoring Performance

Table S.1	Performance Monitoring Indicators and Data Sources	2
-----------	--	---

List of Tables (continued)

Appendix T: SANDAG Travel Demand Model and Forecasting Documentation

Table T.1	SANDAG ABM2 Travel Markets.....	4
Table T.2	Time Periods for Level-of-Service Skims and Assignment	10
Table T.3	Person Types.....	11
Table T.4	Occupation Types	12
Table T.5	Activity Types.....	13
Table T.6	Trip Modes for Assignment.....	14
Table T.7	Accessibility Measures.....	20
Table T.8	Number of Choices in CDAP Model	28
Table T.9	Skims Used in Tour Mode Choice (by Value of Time).....	35
Table T.10	Tour and Trip Mode Correspondence Rules.....	53
Table T.11	US-SD Vehicle Occupancy Factors	66
Table T.12	US-SD Diurnal Factors	66
Table T.13	SANDAG Surveys and Data	72
Table T.14	Outside Data Sources.....	73
Table T.15	Telework Future Assumptions	75
Table T.16	Acronyms.....	80

List of Figures

Chapter 1: Our Region, Our Future

Figure 1.1	San Diego Region	3
Figure 1.2	2016 Population and Employment Densities	13
Figure 1.3	2050 Population and Employment Densities	13
Figure 1.4	San Diego Region Population, Jobs, and Housing Forecast	14

Chapter 2: A Strategy for Sustainability

Figure 2.1	2016 Population and Employment Densities with Transportation Network	23
Figure 2.2	2050 Housing and Employment Densities and Urban Area Transit Strategy Boundary	24
Figure 2.3	2050 Population and Employment Densities with Transit Network	27
Figure 2.4	2050 Population and Employment Densities with Managed Lanes and Highway Network Improvements	28
Figure 2.5	2050 Population and Employment Densities with Regional Bike Network	29
Figure 2.6	Southern California Intercity/Commuter Rail and San Diego Region Airport Locations	37
Figure 2.7	2050 Revenue Constrained Rail Services	40
Figure 2.8	2050 Revenue Constrained <i>Rapid</i> Services	41
Figure 2.9	2050 Revenue Constrained Transit Network	44
Figure 2.10	2050 Revenue Constrained Regional Bike Network	46
Figure 2.11	2050 Regional Bike Network Corridor Alignments	47
Figure 2.12	2050 Revenue Constrained Managed Lanes and Highway Network	51
Figure 2.13	Mobility Hub Concept	59
Figure 2.14	Unconstrained Goods Movement Strategy	67
Figure 2.15	National Highway Freight Network: California (South)	68
Figure 2.16	Performance Measures	72

Chapter 3: Financing Our Future

Figure 3.1	Major Revenue Sources	78
Figure 3.2	Phased Revenues	78
Figure 3.3	2019 Federal RTP Funding Distribution	81
Figure 3.4	Major Project Expenditures	82

Chapter 5: Ensuring Performance

Figure 5.1	Performance Monitoring Indicators	118
------------	---	-----

List of Figures (continued)

Appendix A: Transportation Projects, Costs, and Phasing

Figure A.1	2025 Revenue Constrained Transit Network	52
Figure A.2	2035 Revenue Constrained Transit Network	53
Figure A.3	2050 Revenue Constrained Transit Network	54
Figure A.4	2025 Revenue Constrained Managed Lanes and Highway Network	55
Figure A.5	2035 Revenue Constrained Managed Lanes and Highway Network	56
Figure A.6	2050 Revenue Constrained Managed Lanes and Highway Network	57
Figure A.7	2025 Revenue Constrained Regional Bike Network	58
Figure A.8	2035 Revenue Constrained Regional Bike Network	59
Figure A.9	2050 Revenue Constrained Regional Bike Network	60
Figure A.10	Planned California High-Speed Train Overview	61
Figure A.11	2025 and 2035 High Frequency Local Bus Routes	62
Figure A.12	2016 Transit System	63
Figure A.13	2016 Managed Lanes and Highway Network	64
Figure A.14	2016 Regional Bike Network	65
Figure A.15	Regional Arterial System	66
Figure A.16	California Coastal Trail and County of San Diego Community Trails	67
Figure A.17	2050 Unconstrained Transit Network	68
Figure A.18	2050 Unconstrained Managed Lanes and Highway Network	69
Figure A.19	2050 Unconstrained Regional Bike Network	70
Figure A.20	Unconstrained Goods Movement Strategy	71
Figure A.21	National Highway Freight Network: California (South)	72

Appendix B: Air Quality Planning and Transportation Conformity

Figure B.1	San Diego Regional Population, Jobs, and Housing Forecast	3
Figure B.2	Example Master-Geographic Reference Area – Transit Access Point Transit Accessibility	8
Figure B.3	SANDAG ABM2 Flow Chart	11
Figure B.4	Predicting Tour Type Scheduling Details	13
Figure B.5	Tour Scheduling Windows	13
Figure B.6	Tour and Trip Modes	14

List of Figures (continued)

Appendices C through U can be found in electronic format at www.sdfoward.com

Appendix C: SANDAG Federal Congestion Management Process

Figure C.1	CMP Elements – Federal Guidance / SANDAG Process.....	2
Figure C.2	Congestion Management Process Network.....	4
Figure C.3	SOV Analysis Process.....	9

Appendix D: Federal System Performance Report

Figure D.1	Statewide Fatalities	7
Figure D.2	Statewide Fatality Rates	7
Figure D.3	Statewide Serious Injuries.....	8
Figure D.4	Statewide Serious Injury Rates.....	8
Figure D.5	Statewide Non-Motorized Fatalities and Serious Injuries.....	9
Figure D.6	2010 Census Urbanized Area – October 2015	13
Figure D.7	Regional Revenue Vehicles Targets and Observed Performance.....	21
Figure D.8	Regional Service Vehicles Targets and Observed Performance	22
Figure D.9	Regional Rail Performance Restriction Targets and Observed Performance	23
Figure D.10	Regional Facilities Targets and Observed Performance.....	24

Appendix G: Tribal Consultation Process for San Diego Forward: The 2019 Federal Regional Transportation Plan: Communication, Cooperation, and Coordination

Figure G.1	Tribal Lands in the San Diego Region	1
Figure G.2	Kumeyaay Map.....	4
Figure G.3	Relative Importance of Goal Areas for Transportation Improvements	13
Figure G.4	Project Screening Tool.....	14

List of Figures (continued)

Appendix H: Social Equity: Engagement and Analysis

Figure H.1	Community-Based Organization Partners	6
Figure H.2	San Diego Region Population by Race and Ethnicity	8
Figure H.3	San Diego Region Population by Age and Gender	9
Figure H.4	Existing Conditions: Educational Attainment	11
Figure H.5	Existing Conditions: Linguistic Isolation	12
Figure H.6	Existing Conditions: Poverty	13
Figure H.7	Existing Conditions: Unemployment	14
Figure H.8	2050 Revenue Constrained Transit Network and Low-Income Populations	19
Figure H.9	2050 Revenue Constrained Transit Network and Minority Populations	20
Figure H.10	2050 Revenue Constrained Transit Network and Senior Populations	21
Figure H.11	2050 Population within 30 Minutes of Jobs and Higher Education via Transit (low-income vs. non low-income)	32
Figure H.12	2050 Population within 15 Minutes of Healthcare via Transit (seniors vs. non-seniors)	36
Figure H.13	2050 Population within 15 Minutes of Healthcare via Transit (low-income vs. non low-income)	37

Appendix J: Regional Growth Forecast

Figure J.1	San Diego Region Population, Jobs, and Housing Forecast	1
Figure J.2	Components of Population Change (Births, Deaths, and Migration)	3
Figure J.3	San Diego Region Population by Age and Gender	3
Figure J.4	2025 Housing and Employment Densities	9
Figure J.5	2035 Housing and Employment Densities	10
Figure J.6	2050 Housing and Employment Densities	11

Appendix M: Transportation Project Evaluation Criteria and Rankings

Figure M.1	Regional Arterial System	46
------------	--------------------------------	----

List of Figures (continued)

Appendix T: SANDAG Travel Demand Model and Forecasting Documentation

Figure T.1	SANDAG ABM2 Flow Chart	6
Figure T.2	Treatment of Space - TAZs and MGRAs	8
Figure T.3	Example MGRA - TAP Transit Accessibility	9
Figure T.4	Resident Travel Model Design and Linkage Between Sub-Models	16
Figure T.5	Auto Ownership Nesting Structure	23
Figure T.6	Example of DAP Model Alternatives for a 3-Person Household	29
Figure T.7	Tour Mode Choice Model Structure	34
Figure T.8	School Escort Model Example of Bundling Children by Half-Tour	37
Figure T.9	Model Structure for Joint Non-Mandatory Tours	38
Figure T.10	Application of the Person Participation Model	40
Figure T.11	Mexican Resident Cross Border Travel Model	56
Figure T.12	SAN Airport Ground Access Travel Model	59
Figure T.13	SANDAG Visitor Model Design	62
Figure T.14	San Diego County Cordons	65
Figure T.15	CVM Tour-based Model Structure	69
Figure T.16	ABM2 Auto Operating Costs	76
Figure T.17	Cross Border Tours	77
Figure T.18	San Diego International Airport Enplanements	78
Figure T.19	CBX Enplanements	78
Figure T.20	External Trips	79
Figure T.21	Non-Cross Border External Trips into the San Diego Region	79

Appendix U13: Housing: Providing Homes for all Residents

Figure U13.1	Housing Types in the San Diego Region, 2018	2
Figure U13.2	Regional Scale Smart Growth Concept Map	7

Appendix U14: Borders

Figure U14.1	The San Diego Region, Sovereign Indian Nations, and Neighboring Areas	2
Figure U14.2	Tribal Lands and Local Jurisdictions in the San Diego Region	5
Figure U14.3	San Ysidro-Puerta México/Ped West El Chaparral POE Improvement Projects	13
Figure U14.4	SR 11 Otay Mesa East Port of Entry Overview	16
Figure U14.5	Total Trade Value via Truck: California-Baja California Commercial Land POEs	19
Figure U14.6	Multimodal Infrastructure	21
Figure U14.7	Tijuana River Watershed	40
Figure U14.8	Watersheds in the San Diego Region – October 2015	43

Appendix U16: Active Transportation Implementation Strategy

Figure U16.1	2050 Revenue Constrained Active Transportation Network.....	3
Figure U16.2	2050 Unconstrained Active Transportation Network	4
Figure U16.3	2016 Population and Employment Densities with Regional Bike Network.....	6
Figure U16.4	2050 Population and Employment Densities with Regional Bike Network.....	7
Figure U16.5	2050 Revenue Constrained Safe Routes to Transit Improvements	8
Figure U16.6	2050 Revenue Constrained Bicycle Pedestrian Improvements at Freeway Interchanges	9
Figure U16.7	2050 Unconstrained Safe Routes to Transit Retrofits	12
Figure U16.8	2050 Unconstrained Bicycle/Pedestrian Improvements at Freeway Interchanges Retrofits.....	13