APPENDIX J

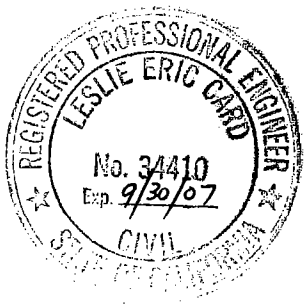
TRAFFIC STUDY

TRAFFIC STUDY

UPPER SANTA ANA RIVER WASH
SAN BERNARDINO COUNTY, CALIFORNIA

This Traffic Study
has been prepared under the supervision of
Leslie E. Card, P.E.

Signed Leslie E. Card



LSA

August 31, 2007

TRAFFIC STUDY

UPPER SANTA ANA RIVER WASH

SAN BERNARDINO COUNTY, CALIFORNIA

Prepared for:

San Bernardino Valley Water Conservation District
1630 W. Redlands Boulevard, Suite A
Post Office Box 1839
Redlands, California 92373
(909) 793-2503

Prepared by:

LSA Associates, Inc.
1500 Iowa Avenue, Suite 200
Riverside, California 92507
(951) 781-9310

LSA Project No. SBW330

LSA

August 31, 2007

TABLE OF CONTENTS

INTRODUCTION 1

PROJECT DESCRIPTION 2
LAND USE ALTERNATIVES 2
ACCESS ALTERNATIVES 4

ANALYSIS METHODOLOGY 6
STUDY AREA DETERMINATION 6
EXISTING TRAFFIC VOLUMES 11
DEVELOPMENT OF FUTURE TRAFFIC VOLUMES 14
LEVEL OF SERVICE DEFINITIONS AND PROCEDURES 24
LEVEL OF SERVICE STANDARD 26

EXISTING CONDITIONS 26

PROJECT TRAFFIC 26
PROJECT TRIP GENERATION 26
TRIP DISTRIBUTION AND ASSIGNMENT 30

OPENING YEAR (2008) CONDITIONS 30
YEAR 2008 BACKGROUND CONDITIONS (LAND USE ALTERNATIVES 3 AND 4, ACCESS ALTERNATIVE C) 30
YEAR 2008 CONDITIONS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE A 40
YEAR 2008 CONDITIONS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE B 40
YEAR 2008 CONDITIONS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE D 40
YEAR 2008 CONDITIONS – LAND USE ALTERNATIVES 2, ACCESS ALTERNATIVE C 53

FORECAST YEAR 2030 CONDITIONS 53
YEAR 2030 BACKGROUND CONDITIONS (LAND USE ALTERNATIVES 3 AND 4, ACCESS ALTERNATIVE C) 53
YEAR 2030 CONDITIONS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE A 59
YEAR 2030 CONDITIONS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE B 59
YEAR 2030 CONDITIONS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE D 59
YEAR 2030 CONDITIONS – LAND USE ALTERNATIVE 2, ACCESS ALTERNATIVE C 65

PROJECT CONTRIBUTION TO TOTAL NEW VOLUMES 65

CIRCULATION IMPROVEMENTS 74
YEAR 2008 IMPROVEMENTS – BACKGROUND CONDITIONS (LAND USE ALTERNATIVES 3 AND 4) 74
YEAR 2008 IMPROVEMENTS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE A 74
YEAR 2008 IMPROVEMENTS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE B 74
YEAR 2008 IMPROVEMENTS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE D 74
YEAR 2008 IMPROVEMENTS – LAND USE ALTERNATIVE 2, ACCESS ALTERNATIVE C 75
YEAR 2030 IMPROVEMENTS – BACKGROUND CONDITIONS (LAND USE ALTERNATIVES 3 AND 4) 75
YEAR 2030 IMPROVEMENTS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE A 75
YEAR 2030 IMPROVEMENTS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE B 77
YEAR 2030 IMPROVEMENTS – LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE D 80
YEAR 2030 IMPROVEMENTS – LAND USE ALTERNATIVE 2, ACCESS ALTERNATIVE C 82

COST ESTIMATES 84

FIFTH STREET SIGNAL COORDINATION ANALYSIS 92

SR-30/FIFTH STREET INTERCHANGE QUEUING ANALYSIS 94
LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE A 94
LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE B 100
LAND USE ALTERNATIVE 1, ACCESS ALTERNATIVE D 100
LAND USE ALTERNATIVE 2, ACCESS ALTERNATIVE C 103

SR-30 FREEWAY RAMP MERGE/DIVERGE ANALYSIS 103
EXISTING (2004) VOLUME DEVELOPMENT 103
YEAR 2030 VOLUME DEVELOPMENT 106
YEAR 2008 VOLUME DEVELOPMENT 107
FREEWAY LEVEL OF SERVICE ANALYSIS PROCEDURE 107
FREEWAY LEVEL OF SERVICE ANALYSIS – EXISTING CONDITIONS 114
FREEWAY LEVEL OF SERVICE ANALYSIS – YEAR 2008 BACKGROUND CONDITIONS 114
FREEWAY LEVEL OF SERVICE ANALYSIS – YEAR 2008 LAND USE ALTERNATIVE 1 CONDITIONS 117
FREEWAY LEVEL OF SERVICE ANALYSIS – YEAR 2008 LAND USE ALTERNATIVE 2 CONDITIONS 117

FREEWAY LEVEL OF SERVICE ANALYSIS – YEAR 2030, ALL CONDITIONS 117

SUMMARY AND CONCLUSIONS 117

APPENDICES (ON COMPACT DISC)

APPENDIX A: TRIP GENERATION INFORMATION FROM ROBERTSON'S AND CEMEX
APPENDIX B: EXISTING TRAFFIC COUNTS
APPENDIX C: DETAILED PROJECT TRIPS ASSIGNMENTS
APPENDIX D: TRAFFIC VOLUME DEVELOPMENT WORKSHEETS
APPENDIX E: CUMULATIVE PROJECT VOLUME DEVELOPMENT WORKSHEETS
APPENDIX F: LEVEL OF SERVICE CALCULATION WORKSHEETS
APPENDIX G: COST ESTIMATE CALCULATIONS
APPENDIX H: MINIMUM GREEN TIME CALCULATIONS
APPENDIX I: EXISTING AND PROPOSED INTERSECTION GEOMETRICS WITH MEASUREMENTS
APPENDIX J: TRAFFIC MODEL SHEETS
APPENDIX K: TRIP DISTRIBUTION FIGURE
APPENDIX L: SIGNAL WARRANTS
APPENDIX M: SYNCHRO NETWORK ILLUSTRATIONS
APPENDIX N: COORDINATED SIGNAL LEVELS OF SERVICE WORKSHEETS
APPENDIX O: QUEUE LENGTH WORKSHEETS
APPENDIX P: FREEWAY VOLUME DEVELOPMENT WORKSHEETS
APPENDIX Q: FREEWAY LEVEL OF SERVICE WORKSHEETS
APPENDIX R: "NO PLANT" SCENARIO ANALYSIS

FIGURES AND TABLES

FIGURES

Figure 1: Regional and Project Location 3
Figure 2A: Access Alternative A 7
Figure 2B: Access Alternative B 8
Figure 2C: Access Alternative C 9
Figure 2D: Access Alternative D 10
Figure 3: Existing Intersection Geometrics and Stop Control 12
Figure 4: Existing (2004) Peak Hour PCE Traffic Volumes 13
Figure 5: Existing Plant Traffic (in PCEs) 16
Figure 6: Existing (2004) Peak Hour PCE Traffic Volumes Without Plant Traffic 17
Figure 7: 2004 to 2008 Growth in Peak Hour PCE Traffic Volumes 18
Figure 8: Cumulative Project Trips 20
Figure 9: 2008 Background (Without Plant) PCE Peak Hour Traffic Volumes 21
Figure 10: Year 2008 Background Peak Hour PCE Traffic Volumes 22
Figure 11: New Cemex Aggregate Truck Trip Distribution – Access Alternative A 31
Figure 12: New Cemex Aggregate Truck Trip Distribution – Access Alternative B 32
Figure 13: New Cemex Aggregate Truck Trip Distribution – Access Alternative C 33
Figure 14: New Cemex Aggregate Truck Trip Distribution – Access Alternative D 34
Figure 15: New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 1, Access Alternative A 35
Figure 16: New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 1, Access Alternative B 36
Figure 17: New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 1, Access Alternative D 37
Figure 18: New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 2, Access Alternative C 38
Figure 19: Base Intersection Geometrics and Stop Control Access Alternative A 41
Figure 20: Change In Existing Plant Trips due to Fifth Street Access Land Use Alternative 1, Access Alternative A 42
Figure 21: Year 2008 With New Cemex Aggregate Trips (PCEs) – Land Use Alternative 1, Access Alternative A 43
Figure 22: Base Intersection Geometrics and Stop Control Access Alternative B 45
Figure 23: Change in Existing Plant Trips due to Conversion of 3rd Street to One-Way Land Use Alternative 1, Access Alternative B 46
Figure 24: Change in 2008 Background (Non-Plant) Trips due to Conversion of 3rd Street to One-Way, Land Use Alternative 1, Access Alternative B 47
Figure 25: Year 2008 With New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 1, Access Alternative B 48
Figure 26: Base Intersection Geometrics and Stop Control – Access Alternative D 50
Figure 27: Change in Existing Plant Trips due to Conversion of 3rd Street to One-Way, Land Use Alternative 1, Access Alternative D 51

Figure 28: Year 2008 With New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 1, Access Alternative D 52
Figure 29: Year 2008 With New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 2, Access Alternative C 55
Figure 30: Year 2030 Background Peak Hour PCE Traffic Volumes 57
Figure 31: Year 2030 With New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 1, Access Alternative A 60
Figure 32: Change in 2030 Background (Non-Plant) Trips due to Conversion of 3rd Street to One-Way, Land Use Alternative 1, Access Alternative B 62
Figure 33: Year 2030 With New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 1, Access Alternative B 63
Figure 34: Year 2030 With New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 1, Access Alternative D 66
Figure 35: Year 2030 With New Cemex Aggregate Trips (in PCEs) – Land Use Alternative 2, Access Alternative C 68
Figure 36: Year 2008 Intersection Geometrics With Mitigation – Land Use Alternative 2, Access Alternative C 76
Figure 37: 2030 Mitigated Intersection Geometrics and Stop Control – Land Use Alternative 1, Access Alternative A 78
Figure 38: 2030 Mitigated Intersection Geometrics and Stop Control – Land Use Alternative 1, Access Alternative B 81
Figure 39: 2030 Mitigated Intersection Geometrics and Stop Control – Land Use Alternative 1, Access Alternative D 83
Figure 40: 2030 Mitigated Intersection Geometrics and Stop Control – Land Use Alternative 2, Access Alternative C 85

TABLES

Table A: Cumulative Project Trip Generation 19
Table B: Level of Service Definitions 24
Table C: Level of Service Criteria for Unsignalized and Signalized Intersections 25
Table D: Existing (2004) Intersection Levels of Service 27
Table E: Project New Trip Generation – Aggregate Trucks, Land Use Alternative 1 28
Table F: Project New Trip Generation – Aggregate Trucks, Land Use Alternative 2 29
Table G: Year 2008 Background (With Plant) Intersection Levels of Service 39
Table H: Year 2008 Intersection Levels of Service – Land Use Alternative 1, Access Alternative A 44
Table I: Year 2008 Intersection Levels of Service – Land Use Alternative 1, Access Alternative B 49
Table J: Year 2008 Intersection Levels of Service – Land Use Alternative 1, Access Alternative D 54
Table K: Year 2008 Intersection Levels of Service – Land Use Alternative 2, Access Alternative C 56
Table L: Year 2030 Background (With Plant) Intersection Levels of Service 58
Table M: Year 2030 Intersection Levels of Service – Land Use Alternative 1, Access Alternative A 61

Table N: Year 2030 Intersection Levels of Service – Land Use Alternative 1, Access Alternative B 64
Table O: Year 2030 Intersection Levels of Service – Land Use Alternative 1, Access Alternative D 67
Table P: Year 2030 Intersection Levels of Service – Land Use Alternative 2, Access Alternative C 69
Table Q: Project Contribution to Total New Traffic – Land Use Alternative 1, Access Alternative A 70
Table R: Project Contribution to Total New Traffic – Land Use Alternative 1, Access Alternative B 71
Table S: Project Contribution to Total New Traffic – Land Use Alternative 1, Access Alternative D 72
Table T: Project Contribution to Total New Traffic – Land Use Alternative 2, Access Alternative C 73
Table U: Year 2008 With Improvements Intersection Levels of Service – Land Use Alternative 2, Access Alternative C 86
Table V: Summary of Year 2030 Intersection Improvements 87
Table W: Year 2030 With Improvements Intersection Levels of Service – Land Use Alternative 1, Access Alternative A 88
Table X: Year 2030 With Improvements Intersection Levels of Service – Land Use Alternative 1, Access Alternative B 89
Table Y: Year 2030 With Improvements Intersection Levels of Service – Land Use Alternative 1, Access Alternative D 90
Table Z: Year 2030 With Improvements Intersection Levels of Service – Land Use Alternative 2, Access Alternative C 91
Table AA: Project Contributions to Year 2030 Circulation Improvement Costs 93
Table BB: Intersection Levels of Service With Signal Coordination – Land Use Alternative 1, Access Alternative A 95
Table CC: Intersection Levels of Service With Signal Coordination – Land Use Alternative 1, Access Alternative B 96
Table DD: Intersection Levels of Service With Signal Coordination – Land Use Alternative 1, Access Alternative D 97
Table EE: Intersection Levels of Service With Signal Coordination – Land Use Alternative 2, Access Alternative C 98
Table FF: Year 2030 Queuing Analysis – Land Use Alternative 1, Access Alternative A 99
Table GG: Year 2030 Queuing Analysis – Land Use Alternative 1, Access Alternative B 101
Table HH: Year 2030 Queuing Analysis – Land Use Alternative 1, Access Alternative D 102
Table II: Year 2030 Queuing Analysis – Land Use Alternative 2, Access Alternative C 104
Table JJ: Existing (2004) SR-30 Freeway PCE Volumes 105
Table KK: Year 2030 SR-30 Freeway PCE Volumes 108
Table LL: Year 2030 SR-30 Freeway PCE Volumes with New Cemex Aggregate Trucks – Land Use Alternative 1, Access Alternatives A, B, and D 109
Table MM: Year 2030 SR-30 Freeway PCE Volumes with New Cemex Aggregate Trucks – Land Use Alternative 2, Access Alternative C 110
Table NN: Year 2008 SR-30 Freeway PCE Volumes 111
Table OO: Year 2008 SR-30 Freeway PCE Volumes with New Cemex Aggregate Trucks – Land Use Alternative 1, Access Alternatives A, B and D 112

Table PP: Year 2008 SR-30 Freeway PCE Volumes with New Cemex Aggregate Trucks – Land Use Alternative 2, Access Alternative C 113
Table QQ: Level of Service Criteria for Ramp Junctions 114
Table RR: Existing (2004) SR-30 Freeway Mainline Levels of Service 115
Table SS: Year 2008 SR-30 Freeway Mainline Levels of Service 116
Table TT: Year 2008 SR-30 Freeway Mainline Levels of Service– Land Use Alternative 1, Access Alternatives A, B and D 118
Table UU: Year 2008 SR-30 Freeway Mainline Levels of Service– Land Use Alternative 2, Access Alternative C 119

INTRODUCTION

This traffic study has been prepared to assess the potential circulation impacts associated with the issuance of new mining permits for the Cemex Construction Materials, L.P. (Cemex) and Robertson's Ready Mix (Robertson's) quarries and associated processing plants in the Upper Santa Ana River Wash area in San Bernardino County. The impacts from new mining areas and other activities described in the "Upper Santa Ana River Wash Land Management Plan and Habitat Conservation Plan" (Plan) are assessed in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Plan. This Traffic Study will be included as an appendix to the EIR/EIS.

Some of the quarries' existing mining permits predate the construction of State Route 30 (SR-30), which now serves as the primary route for passenger vehicles and trucks to access the processing plants, via the interchange at Fifth Street. Since the use of SR-30 by some of these vehicles has not previously been analyzed in conjunction with the issuance of current mining permits, this study specifically addresses forecast future traffic volumes at key intersections between the Robertson's and Cemex plants and the Fifth Street interchange on SR-30. In addition, four mining activity land use alternatives and three alternative means of providing access to and from the processing plants are analyzed.

This report analyzes existing traffic conditions and project-related traffic impacts for the anticipated "opening year" (2008) of the project and for the long-range forecast year 2030 condition. This traffic study analyzes both weekday a.m. peak hour and p.m. peak hour conditions. The a.m. peak hour is the one hour of highest traffic volumes occurring between 7:00 and 9:00 a.m. The p.m. peak hour is the one hour of highest traffic volumes occurring between 4:00 and 6:00 p.m. Consistent with the California Environmental Quality Act (CEQA), future traffic conditions are compared to existing (2004) conditions to determine project impacts.

The issuance of the proposed mining permits will potentially result in an increase in the number of vehicles traveling to and from both Robertson's and Cemex's processing plants but will not result in an increase of 250 Passenger Car Equivalent (PCE) vehicle trips during either the a.m. or p.m. peak hours. Therefore, a Traffic Impact Analysis (TIA) pursuant to the San Bernardino County Congestion Management Program (CMP) is not required.

This report includes the following 18 appendices:

Appendix A: Trip Generation Information from Robertson's and Cemex;
Appendix B: Existing Traffic Counts;
Appendix C: Detailed Project Trips Assignments;
Appendix D: Traffic Volume Development Worksheets;
Appendix E: Cumulative Project Volume Development Worksheets;
Appendix F: Level of Service Calculation Worksheets;
Appendix G: Cost Estimate Calculations;
Appendix H: Minimum Green Time Calculations;
Appendix I: Existing and Proposed Intersection Geometrics with Measurements;
Appendix J: Traffic Model Sheets;
Appendix K: Trip Distribution Figure;
Appendix L: Signal Warrants;
Appendix M: Synchro Network Illustrations;

Appendix N: Coordinated Signal Levels of Service Worksheets;
Appendix O: Queue Length Worksheets;
Appendix P: Freeway Volume Development Worksheets;
Appendix Q: Freeway Level of Service Worksheets; and
Appendix R: "No Plant" Scenario Analysis.

PROJECT DESCRIPTION

The "project" analyzed in this report is the issuance of new mining permits to Cemex and Robertson's. Depending on the land use and access alternative selected (see "Land Use Alternatives" below), this action may result in an increase in traffic generated by both processing plants and potential changes in the local distribution of trips resulting from proposed changes in access to the processing plants.

The locations of the Cemex and Robertson's plants are shown in Figure 1. The access to Cemex's processing plant is located on Orange Street, in the City of Redlands. The access to Robertson's processing plant is located on Alabama Street, also in the City of Redlands. The majority of vehicles traveling to the processing plants use SR-30 and Fifth Street to reach the processing plants on Orange Street and Alabama Street. The SR-30/Fifth Street interchange is located in the City of Highland.

Currently, Cemex has approval per a contract signed in 1990 with the City of Redlands to process up to 7 million tons per year (MTPY) of aggregate material. Air quality permits from the South Coast Air Quality Management District (SCAQMD) limit the plant to 5.40 MTPY based on 300 operating days annually. Cemex's average production for the past three years (2003–2005) based on truck tickets was 2.533 MTPY. In 2005, Cemex sales were 2.942 million tons.

Robertson's has land use approval to produce 2 MTPY of aggregate material at its plant. SCAQMD air quality permits limit production to 2.55 MTPY based on 300 operating days annually. Robertson's average production for the past three years (2003–2005), based on truck tickets or sales, is 1.809 MTPY. In 2005, Robertson's produced 1.857 million tons.

Robertson's material is shipped by aggregate trucks owned and operated by Robertson's and are centrally dispatched; therefore, the facility has control over when trucks enter and exit the plant. In conjunction with the proposed increase in production and an increase in the number of daily truck trips at the Robertson's plant, Robertson's will change the hourly distribution of aggregate truck trips, so that the number of a.m. and p.m. peak hour trips generated by the Robertson's facility under the new permits will be less than or equal to the number of trips generated under existing conditions. It should also be noted that the batch plant that supplies the ready mix concrete is already operating at its capacity in the existing condition. As a result, the number of Robertson's concrete trucks would not increase with the new mining permits.

Land Use Alternatives

This analysis examines four mining land use alternatives that are being considered for approval as part of the project. These alternatives are as follows:

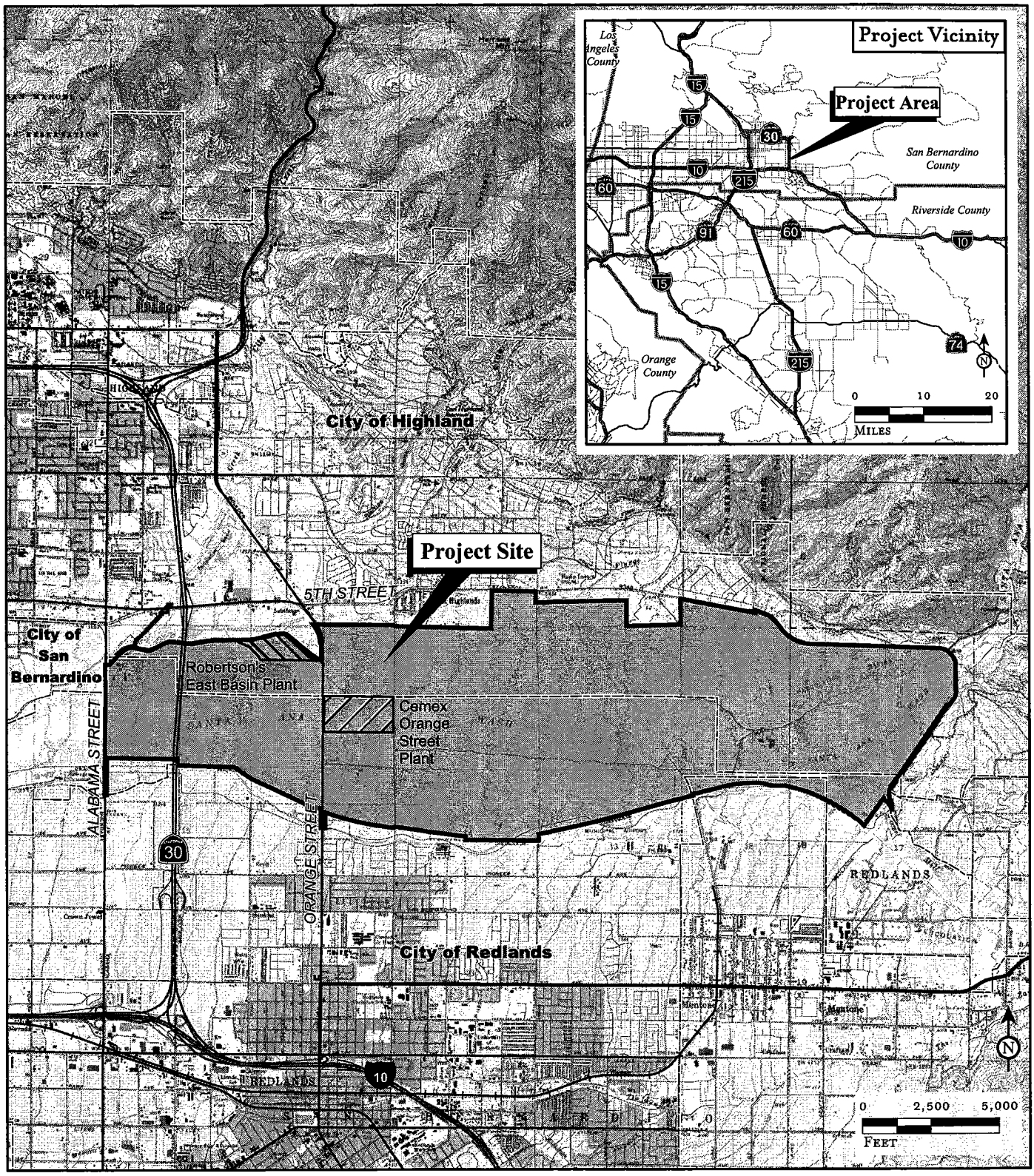


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FIGURE 1

JURISDICTIONAL BOUNDARY

SANTA ANA RIVER WASH PLAN BOUNDARY

CEMEX ORANGE STREET PLANT

ROBERTSON'S EAST BASIN PLANT

SOURCE: USGS 7.5' Quads: Yucaipa, Redlands, Keller Peak and Harrison Mountain, CA.; Thomas Bros., 2004

Upper Santa Ana River Wash

Regional and Project Location

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- Land Use Alternative 1 – Under this alternative, the maximum aggregate materials permitted to be mined would total 6.00 MTPY. Cemex would have mining operations on approximately 700 acres and production would be limited to 3.00 MTPY. Robertson's mining operations would occur on approximately 505 acres and mining production would be limited to 3.00 MTPY.
- Land Use Alternative 2 – Under this alternative, the land uses would be similar to Alternative 1; however, the land uses would be located in different areas and the maximum aggregate materials mined and produced would total 7.50 MTPY. Cemex would have mining operations on approximately 1,137 acres and mining production would be limited to 4.00 MTPY. Robertson's mining operations would occur on approximately 605 acres and mining production would be limited to 3.50 MTPY.
- Land Use Alternative 3 – Under this alternative, the tonnage permitted to be mined and processed per year would be the same as is currently being processed by the mining plant facilities. Cemex is currently averaging approximately 2.53 MTPY and Robertson's is averaging approximately 1.81 MTPY. The mining operations would be conducted in the same location and have the same acreage as Land Use Alternative 1; however, the tonnage per year processed would be limited to 4.5 MTPY total for both Robertson's and Cemex.
- Land Use Alternative 4 – Under this "No Project" alternative, there would be no change in the existing land use pattern. The mining companies would continue to operate under their existing permits and mine the permitted quarries. Cemex currently averages 2.53 MTPY with maximum production limited to 5.40 MTPY based on air quality permit conditions on approximately 576 acres and Robertson's currently averages 1.81 MTPY on approximately 283 acres.

It should be noted that the land uses alternatives affect the levels of aggregate mining only. Ready-mix operations will be unchanged by the proposed project. A detailed description of the land use alternatives can be found in the EIR/EIS for this project. Because Alternatives 3 and 4 would generate the same number of trips and would have the same trip distribution on the public roadways, these alternatives are considered one alternative ("Background With Plant") for purposes of the traffic study. Intersection Level of Service for this alternative is reported, but no intersection mitigations or cost contributions have been calculated.

Access Alternatives

This analysis examines four alternative means of providing access to the processing plants that are being considered for implementation as part of the project. These alternatives are as follows:

- **Access Alternative A** – All of Robertson's aggregate and concrete trucks and Cemex's aggregate trucks (other than those making local deliveries) will access the plants via a new direct connection to Fifth Street west of SR-30, described in the paragraphs below. Cemex aggregate trucks will travel on a new, private paved road from Orange Street at the signalized entrance to the Cemex plant to the new connection to Fifth Street. Cemex aggregate trucks will not travel on Orange Street or Fifth Street east of SR-30 except for local deliveries. Robertson's aggregate trucks will travel on their existing access road from their East Basin Plant to the new connection to Fifth Street. This new connection road will be approximately 1,800 feet in length and will be shared by both operators' aggregate trucks and Robertson's concrete trucks.

The dedicated truck access will be constructed on Fifth Street immediately east of the City Creek Bridge. This access will allow trucks to make westbound right turns from Fifth Street onto a new, paved roadway under the bridge to travel to both Robertson's and Cemex's plants. Trucks will also be able to make northbound right turns from the new roadway onto Fifth Street to travel to SR-30.

The access point for the entrance to the new truck roadway to the processing plants will be located approximately 300 feet west of the SR-30 southbound off-ramp. The angle of the off-ramp intersection with Fifth Street will facilitates truck turning movements; however, trucks making the westbound right turn onto the new roadway will potentially have to slow to make the turn, delaying traffic behind them. Therefore, a westbound deceleration lane will be provided to allow trucks to move out of the through lane before making their turning maneuver. This deceleration lane will not extend all the way back to the off-ramp; however, to prevent non-quarry related traffic from unintentionally entering the lane and then needing to make a lane change to exit it. In addition, if feasible, the access to the new roadway will be angled to facilitated truck turning movements.

The access point for the exit onto Fifth Street from the new truck roadway to the processing plants will be located approximately 400 feet west of the SR-30 southbound on-ramp. Trucks making the northbound right turn from the new roadway onto Fifth Street will be provided with an acceleration lane extending all way to the on-ramp, so that trucks destined for the SR-30 southbound on-ramp will not be required to merge with traffic in the existing right-turn lane.

- **Access Alternative B** – All of Robertson's aggregate and concrete trucks (other than those making local deliveries) will access their plants via the existing Robertson's driveway on Alabama Street. Cemex's aggregate trucks will access their plant via the existing Cemex driveway on Alabama Street. Cemex's trucks will travel on a new, private paved road connecting to Orange Street at the signalized entrance to the Cemex plant. Outbound Cemex and Robertson's trucks will travel from the intersection of Palm Avenue/Third Street to the intersection of Church Avenue/Fifth Street using Third Street, which will be reconstructed primarily as a one-way roadway and connect with Fifth Street. Inbound Cemex and Robertson's trucks will travel west on Fifth Street from SR-30, south on Alabama Street and left into their respective driveways. Cemex aggregate and concrete trucks will not travel on Orange Street or Fifth Street east of SR-30 except for local deliveries.
- **Access Alternative C** – Access to the plants will be unchanged from current conditions. Aggregate and concrete trucks will access Robertson's plant via Fifth Street and Palm Avenue/Alabama Street. Aggregate trucks will access Cemex's Orange Street plant via Fifth Street and Boulder Avenue/Orange Street. The roadway network will remain unchanged.
- **Access Alternative D** – This alternative combines elements of Access Alternatives A and B. Robertson's aggregate and concrete trucks and Cemex's aggregate trucks that are inbound from SR-30 or Fifth Street east of SR-30 will access the plants via a new direct connection to Fifth Street west of SR-30. The new direct connection will have the same features as the one described under Access Alternative A. Inbound trucks from the west and local deliveries will access the plant using the driveways on Alabama Street. Outbound Cemex aggregate and Robertson's aggregate and concrete trucks headed for Fifth Street east of SR-30 or SR-30 northbound will exit at their respective driveways on Alabama Street and travel north to the intersection of Palm Avenue/Third Street and then to the intersection of Church Avenue/Fifth Street using Third Street, which will be reconstructed primarily as a one-way roadway and connect with Fifth Street

as in Access Alternative B. Outbound trucks going south on SR-30 will exit onto Fifth Street via the new connection described in Alternative A and would travel on a dedicated lane from the plant exit to SR-30 southbound. Cemex aggregate trucks will travel on a new, private paved road from Orange Street at the signalized entrance to the Cemex plant to either the new connection to Fifth Street, or the driveways on Alabama, depending on the direction of travel. Cemex aggregate trucks will not travel on Orange Street or Fifth Street east of SR-30 except for local deliveries. Robertson's aggregate trucks using the new connection to Fifth Street will travel on their existing access road from their East Basin Plant to the new connection to Fifth Street. This new connection road will be approximately 1,800 feet in length and will be shared by both operators' aggregate trucks and Robertson's concrete trucks.

Figures 2A, 2B, 2C, and 2D illustrate the four access alternatives. For Land Use Alternative 1 with a total production of 6 MTPY, Access Alternatives A, B, and D will be analyzed. Access Alternative C, the existing truck route alternative, will be analyzed with Land Use Alternative 2, as the new access roads are not part of this land use alternative's description. Land Use Alternative 3 is a reduced production alternative and impacts would be less than the existing condition. Land Use Alternative 4 is the "no project" or existing condition alternative and is described as the baseline. Land Use Alternative 1 in combination with Access Alternative D is the Preferred Alternative.

ANALYSIS METHODOLOGY

This study evaluates existing conditions, opening year 2008 conditions, and forecast year 2030 conditions in the vicinity of the proposed project. This report examines four alternative land uses and four alternative means of providing access to the processing plants. This report examines a.m. peak hour and p.m. peak hour traffic conditions in the vicinity of the proposed project.

This report uses a methodology to calculate project contribution to intersection volumes for CEQA compliance. This method, specified by the San Bernardino County CMP and used for CEQA compliance, defines project traffic to be the difference between the year 2030 with project peak hour traffic volumes and the existing peak hour traffic volumes. The project percentage contribution to total new traffic is then calculated by dividing the total new project peak hour trip volume at each study area intersection by the total new traffic.

Study Area Determination

The following key intersections between the plants and the SR-30/Fifth Street interchange are included in this analysis:

- Palm Avenue/Fifth Street;
- Palm Avenue/Third Street;
- Alabama Street/Robertson's Access;
- Alabama Street/Cemex Access;
- Church Avenue/Fifth Street;
- Truck Access/Fifth Street (future intersection);

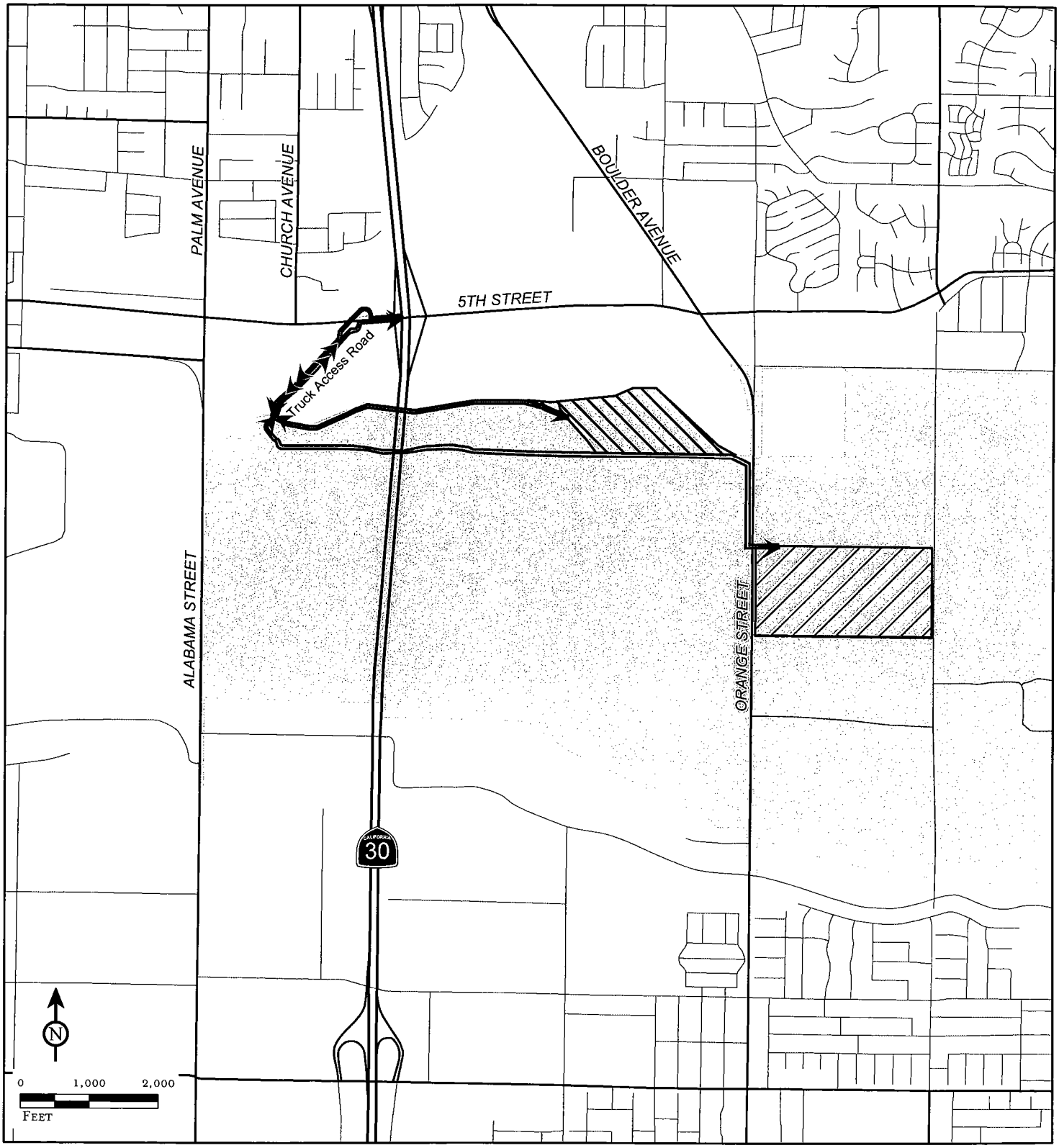

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FIGURE 2A

SANTA ANA RIVER WASH PLAN BOUNDARY

AGGREGATE PROCESSING PLANTS

CEMEX ORANGE STREET PLANT

ROBERTSON'S EAST BASIN PLANT

TRUCK ACCESS

CEMEX AGGREGATE

ROBERTSON'S CONCRETE AND AGGREGATE

Upper Santa Ana River Wash

Access Alternative A

SOURCE: Thomas Bros., 2001

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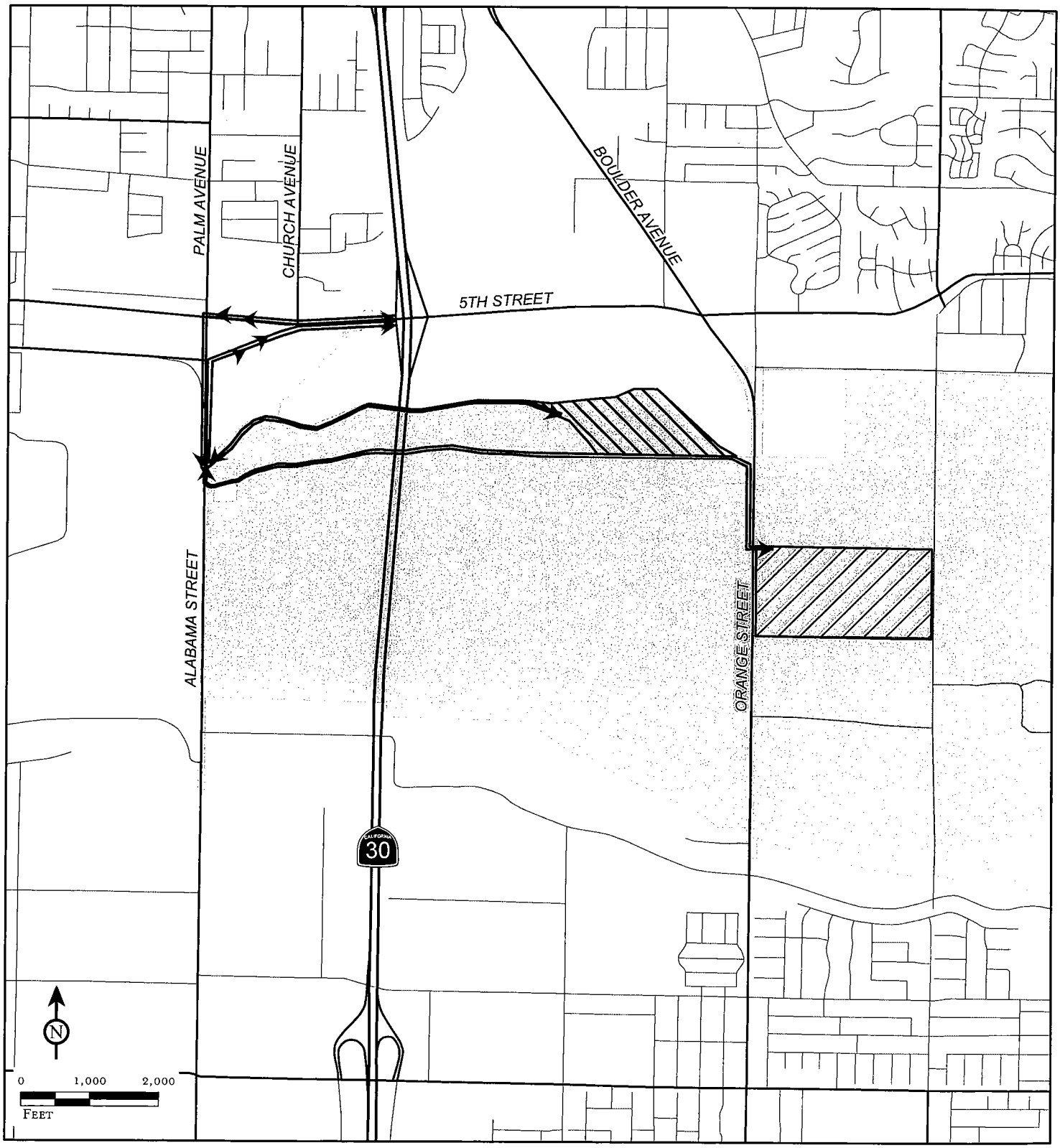

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FIGURE 2B

SANTA ANA RIVER WASH PLAN BOUNDARY

AGGREGATE PROCESSING PLANTS

CEMEX ORANGE STREET PLANT

ROBERTSON'S EAST BASIN PLANT

TRUCK ACCESS

CEMEX AGGREGATE

ROBERTSON'S CONCRETE AND AGGREGATE

Upper Santa Ana River Wash

Access Alternative B

SOURCE: Thomas Bros., 2001

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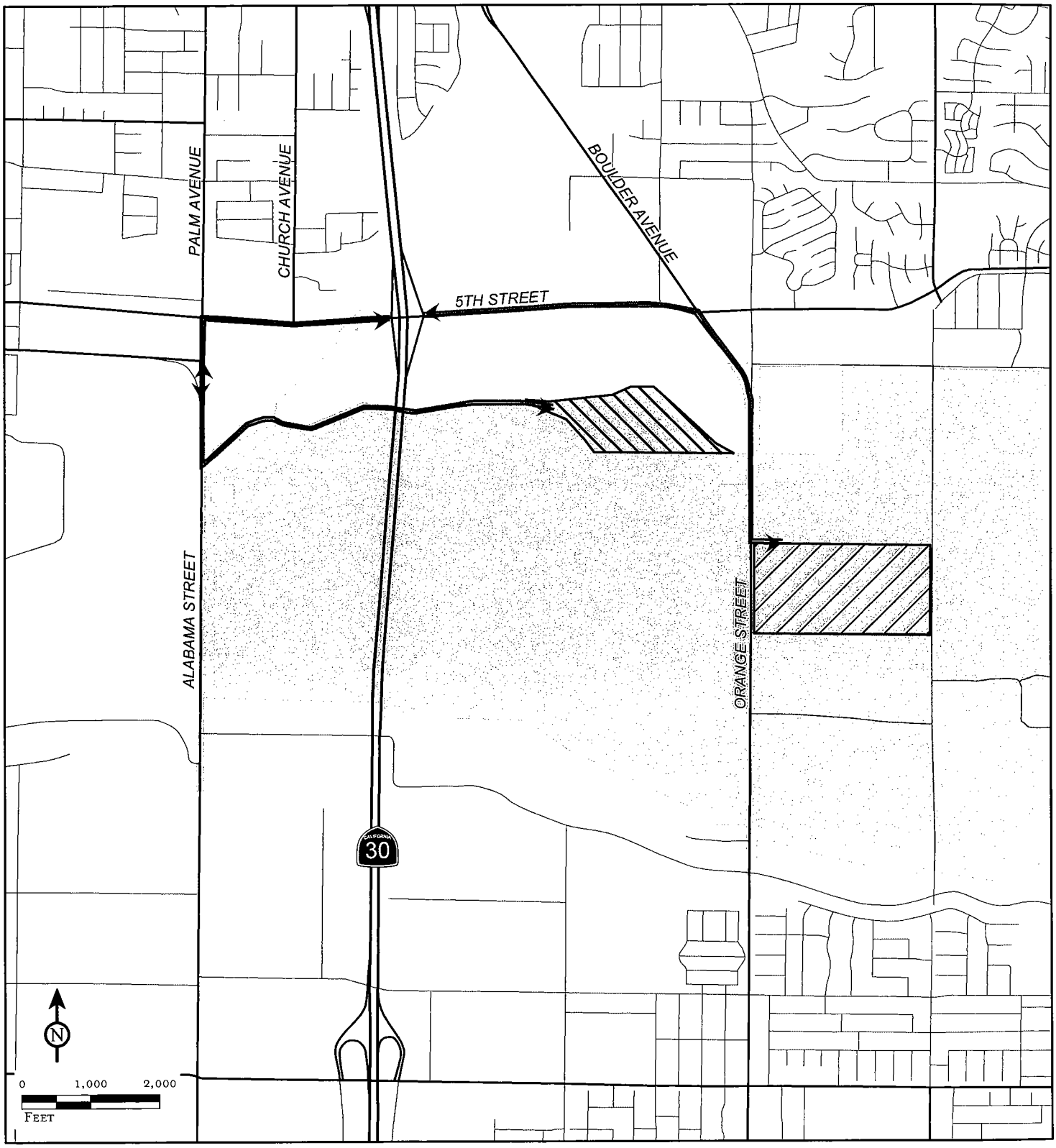

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FIGURE 2C

SANTA ANA RIVER WASH PLAN BOUNDARY

AGGREGATE PROCESSING PLANTS

CEMEX ORANGE STREET PLANT

ROBERTSON'S EAST BASIN PLANT

TRUCK ACCESS

CEMEX AGGREGATE

ROBERTSON'S CONCRETE AND AGGREGATE

Upper Santa Ana River Wash

Access Alternative C

SOURCE: Thomas Bros., 2001

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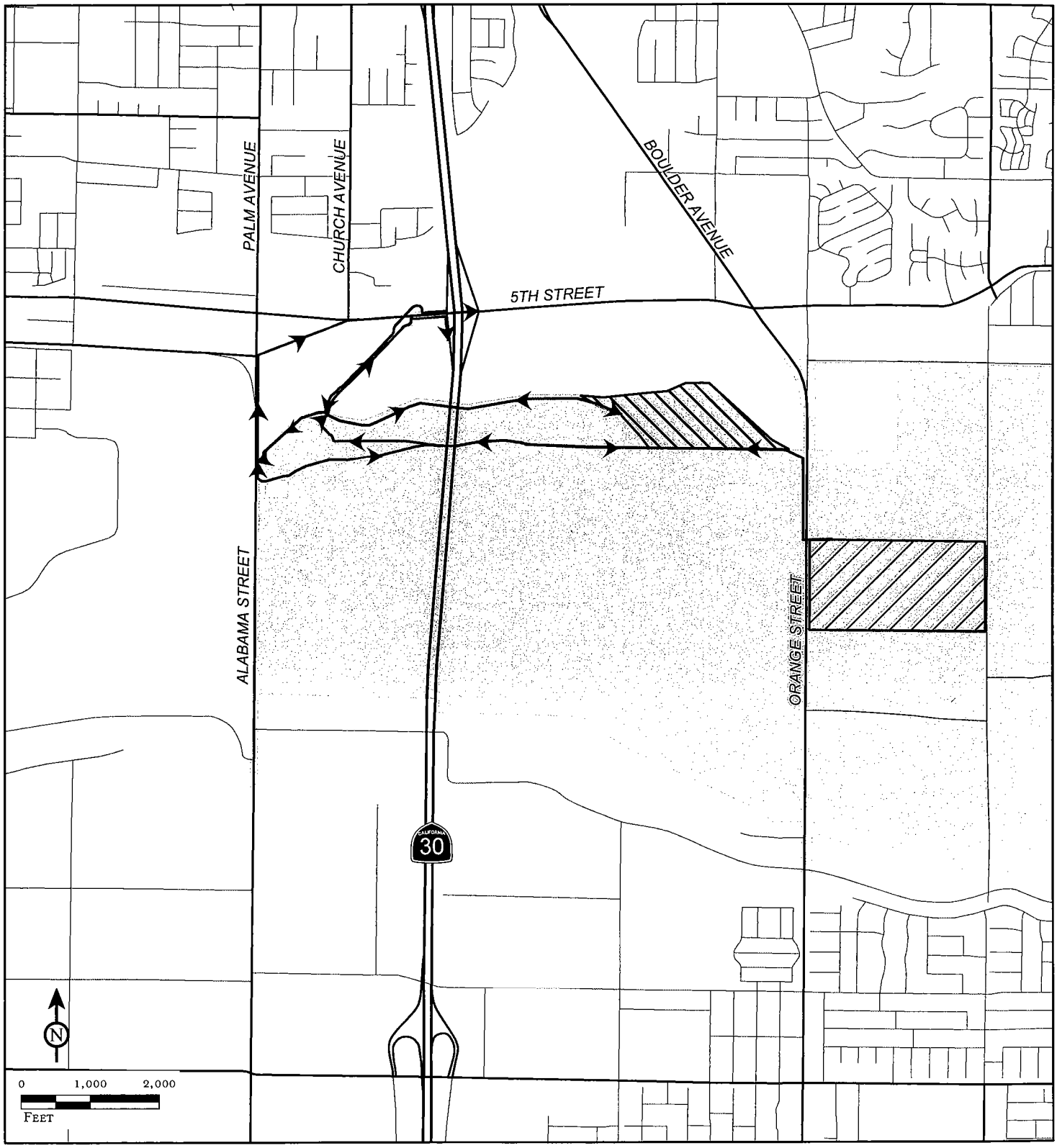

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FIGURE 2D

SANTA ANA RIVER WASH PLAN BOUNDARY

AGGREGATE PROCESSING PLANTS

CEMEX ORANGE STREET PLANT

ROBERTSON'S EAST BASIN PLANT

TRUCK ACCESS

ROBERTSON'S AGGREGATE

CEMEX CONCRETE AND AGGREGATE

ROBERTSON'S & CEMEX

Upper Santa Ana River Wash

Access Alternative D

SOURCE: Thomas Bros., 2001

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- SR-30 Southbound Ramps/Fifth Street;
- SR-30 Northbound Ramps/Fifth Street;
- Boulder Avenue/Fifth Street; and
- Orange Street/Cemex Access.

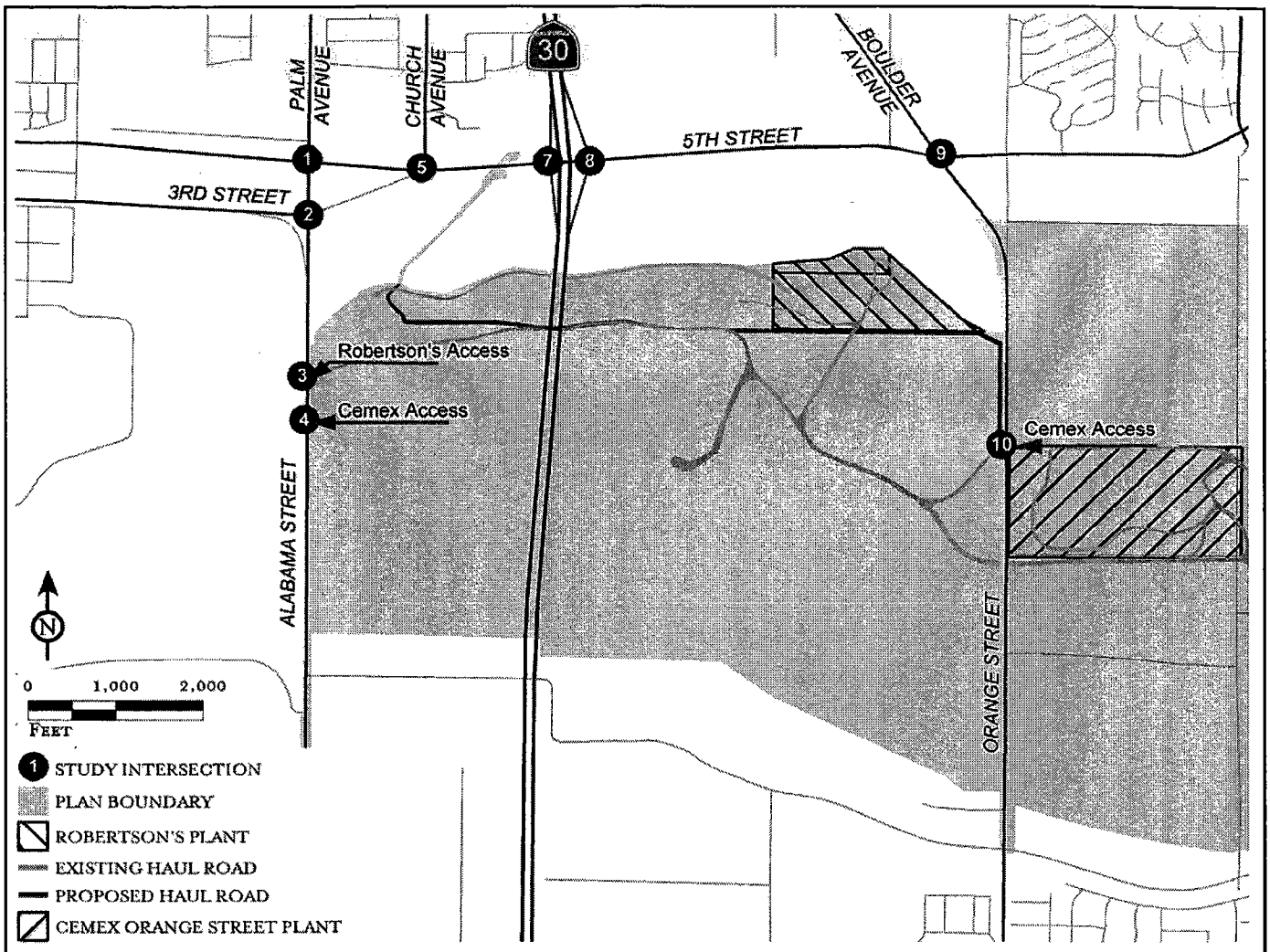
Figure 3 illustrates the locations and existing intersection geometrics of the study intersections. Detailed lane configurations and measurements of all existing intersections are illustrated in figures contained in Appendix I. Per SANBAG TIA methodology, a dedicated right-turn lane has been assumed at the intersections where the rightmost through lane is at least 20 feet wide. These right-turn lanes are indicated with a "D" (for "de facto") in the figure so that they may be distinguished from right-turn lanes that are actually striped.

Since the vast majority of project traffic will travel to the north on either Orange Street or Alabama Street or directly onto Fifth Street to access SR-30, no intersections south of the processing plants on either Orange Street or Alabama Street are included in this analysis.

Existing Traffic Volumes

Existing traffic conditions at study area intersections are based on a.m. and p.m. peak hour intersection turning movement counts collected by Counts Unlimited, Inc. in November 2004, December 2004, and May 2005. Count sheets are contained in Appendix B. Existing a.m. and p.m. peak hour traffic volume at all intersections is illustrated in Figure 4. Details of the procedures used at each location to obtain the existing traffic conditions are described below.

- **Palm Avenue/Fifth Street** – This count was taken in November 2004 when Alabama Street over the Santa Ana River was open. No vehicle classification was collected at this intersection. Truck volumes have been estimated based on truck percentages at adjacent intersections and converted to PCE trips by using a factor of 2.5 for all trucks. The passenger vehicle and truck PCE volume on the south and east legs of the intersection were then increased to match those at the adjacent intersections to preserve conservation of vehicle flow.
- **Palm Avenue/Third Street** – This count was taken in December 2004 when Alabama Street over the Santa Ana River was open. Vehicle classification was collected with categories of passenger vehicles, 2-axle trucks, 3-axle trucks, and trucks with 4 or more axles. The volumes have been converted to PCE trips by using a PCE factor of 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for trucks with 4 or more axles. The passenger vehicle and truck PCE volumes on the south leg of the intersection were then increased to account for the higher number of trucks and passenger vehicles reported at Robertson's driveway and to preserve conservation of vehicle flow.
- **Robertson's and Cemex Driveways on Alabama Street** – These counts were taken in May 2005 when Alabama Street over the Santa Ana River was closed due to construction. Because all vehicles were forced to travel north at this time, turning movements were not recorded. Vehicle classification was collected with categories of passenger vehicles, Cemex concrete trucks, Robertson's concrete trucks, Robertson's aggregate trucks, other concrete trucks, other aggregate trucks (including Matich aggregate trucks), and all other trucks (not included in any of the above



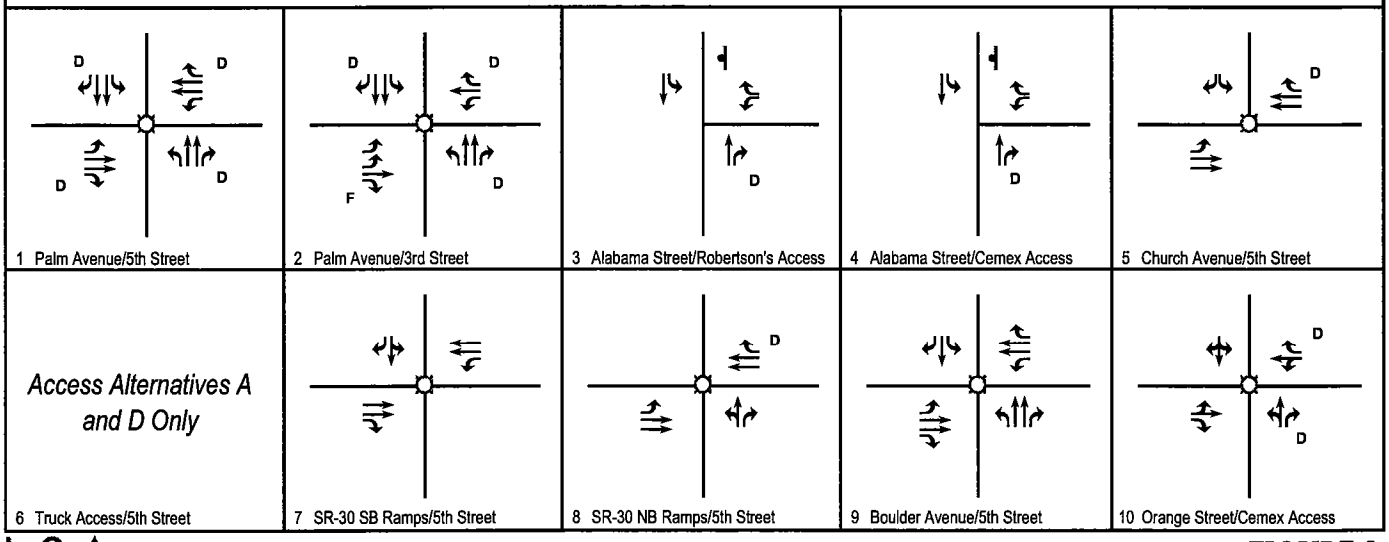


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FIGURE 3

Legend
Signal
Stop Sign
F Free Right Turn
D De Facto Right Turn

Upper Santa Ana River Wash
Existing Intersection Geometrics and Stop Control

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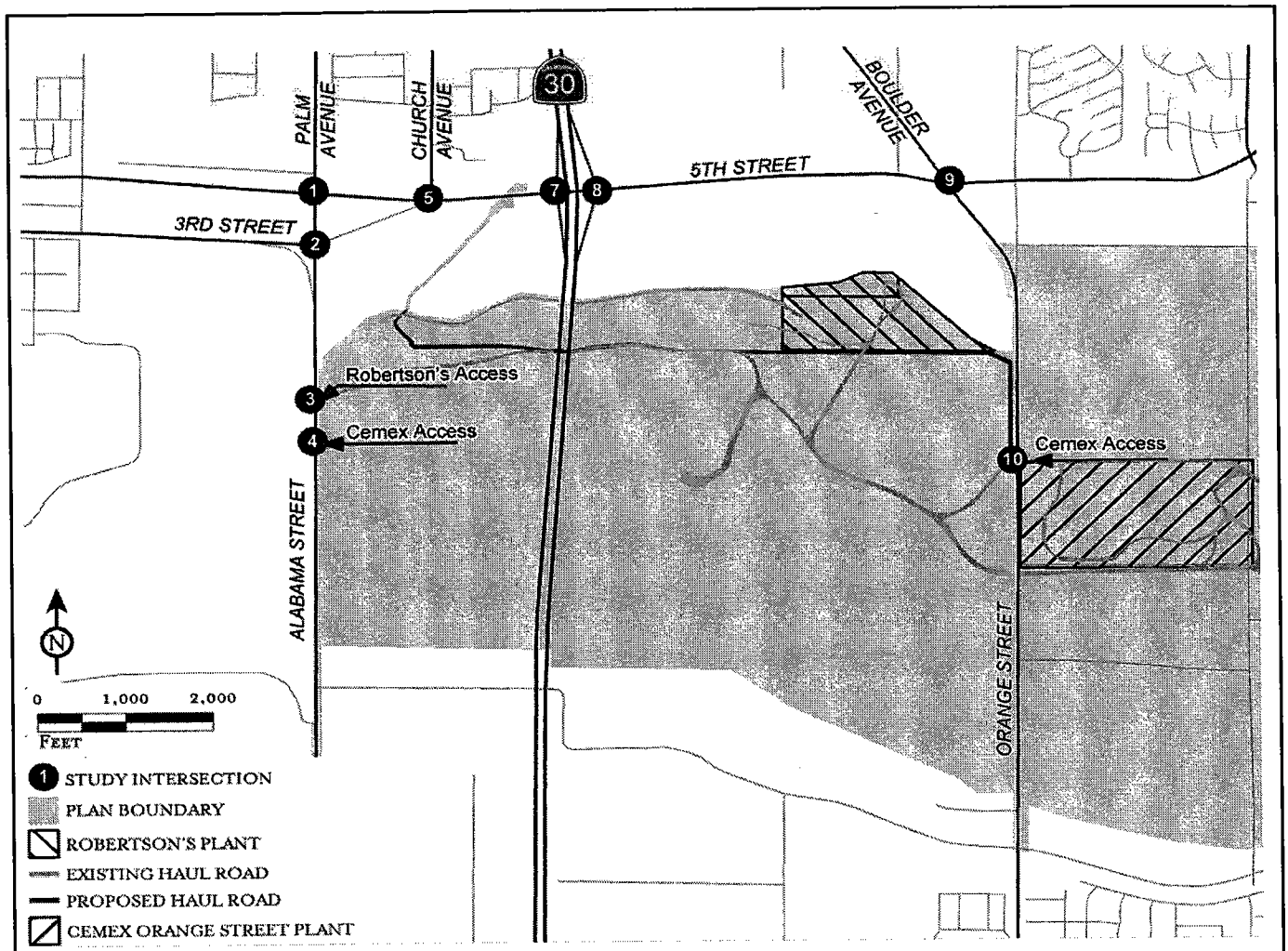

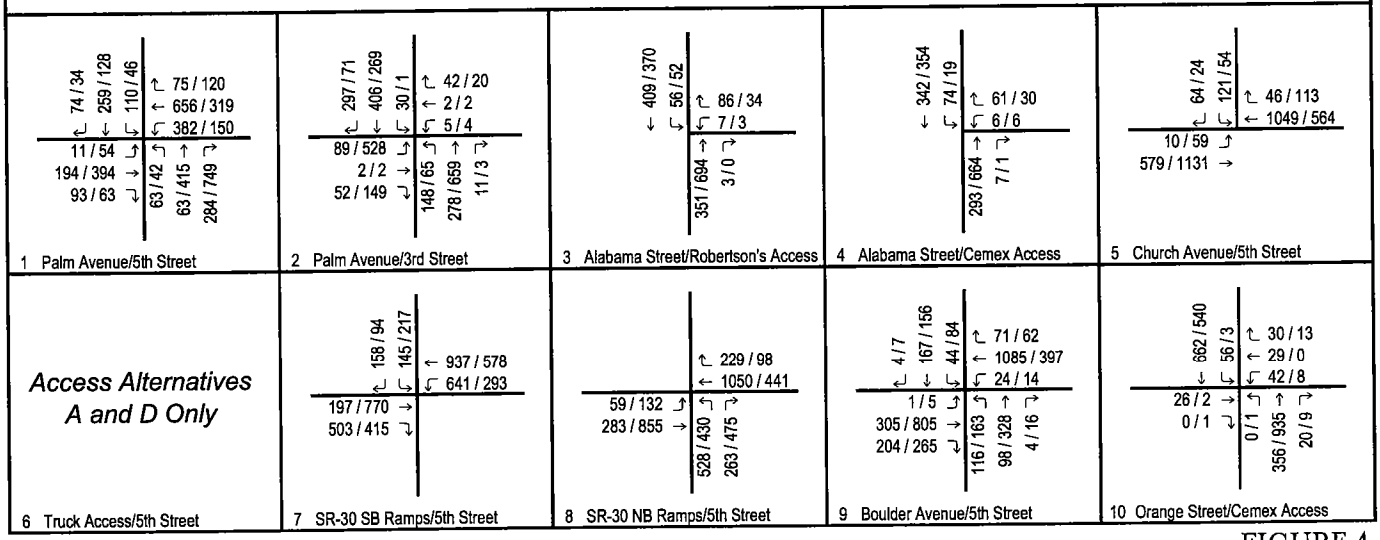

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123 / 456 AM / PM Volume

FIGURE 4

Upper Santa Ana River Wash

Existing (2004) Peak Hour PCE Traffic Volumes

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categories). Robertson's aggregate trucks, Robertson's concrete trucks and Cemex concrete trucks were converted to PCEs by applying a PCE factor of 3.0. All remaining trucks were combined (category "not classified" in the table in Appendix D) and converted to PCE by applying a PCE factor of 2.5. The turning movements at the driveways (and all other intersections) were estimated based on assumed trip distribution for each type of vehicle. For this purpose concrete and aggregate trucks have been assumed to have a common distribution. Passenger vehicles and other trucks are also assumed to have a common distribution. Turning volumes (in PCEs) for each type of trip at all study intersections are reported in Appendix C. The northbound and southbound through volumes at the driveways were taken from the passenger vehicle approach and departure volumes on the south leg of Palm Avenue/Third Street.

- **Church Avenue/Fifth Street** – This count was taken in November 2004 when Alabama Street over the Santa Ana River was open. Vehicle classification was collected with categories of passenger vehicles, 2-axle trucks, 3-axle trucks, and trucks with 4 or more axles. The volumes have been converted to PCE trips by using a PCE factor of 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for trucks with 4 or more axles. The passenger vehicle and truck PCE volumes on the east leg of the intersection were then increased to account for the higher number of trucks and passenger vehicles reported at the SR-30 Southbound Ramps/Fifth Street to preserve conservation of vehicle flow.
- **SR-30 Ramps/Fifth Street and Boulder Avenue/Fifth Street** – These counts were taken in November 2004 when Alabama Street over the Santa Ana River was open. Vehicle classification was collected with categories of passenger vehicles, 2-axle trucks, 3-axle trucks, concrete trucks, aggregate trucks, and trucks with 4 or more axles (excluding the concrete and aggregate trucks). Because concrete and aggregate trucks were not counted by company (i.e., Cemex versus Robertson's), they cannot be used to distribute the trucks according to the different alternatives and have therefore been added into the 4+ axle truck category. The volumes have been converted to PCE trips by using a PCE factor of 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for trucks with 4 or more axles. The passenger vehicle and truck PCE volumes on the west leg of the northbound ramp were then adjusted so that the number of trucks and passenger vehicles reported would balance with the vehicles at the SR-30 Southbound Ramps/Fifth Street and conservation of vehicle flow would be preserved.
- **Cemex Driveway/Orange Street** – This count was taken in November 2004 when Alabama Street over the Santa Ana River was open. Vehicle classification was collected with categories of passenger vehicles, 2-axle trucks, 3-axle trucks, concrete trucks, aggregate trucks, and trucks with 4 or more axles (excluding the concrete and aggregate trucks). Although concrete and aggregate trucks were not counted by company (i.e., Cemex versus Robertson's), it has been assumed that all trucks entering the driveway are Cemex trucks. The volumes have been converted to PCE trips by using a PCE factor of 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for trucks with 4 or more axles (including concrete and aggregate trucks).

Development of Future Traffic Volumes

Opening Year (2008) Background Traffic Volumes. The following describes in detail the methodology to determine the 2008 background traffic volumes.

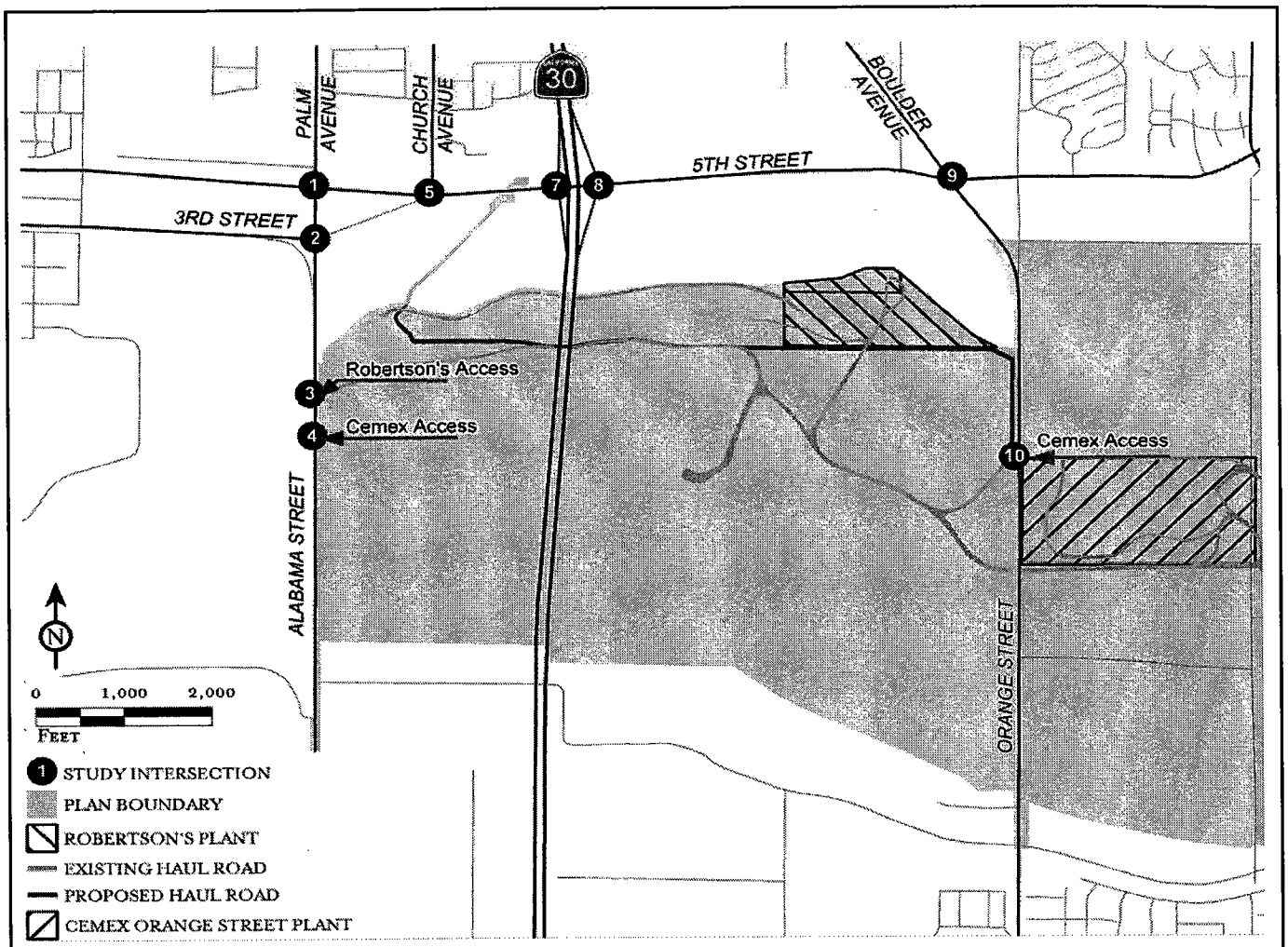
1. The existing plant traffic was estimated based on the volumes counted at each of the three project driveways and an estimated distribution for each type of trip. As described above, concrete and aggregate trucks were assumed to have the same distribution, as were passenger vehicles and other trucks. The existing volumes (in PCEs) of each type of trip are illustrated in the figures included in Appendix C. The total plant traffic (in PCEs) at all study intersections is illustrated in Figure 5. These volumes were subtracted from the existing traffic volumes to produce year 2004 background "without plant" volumes which are illustrated in Figure 6.
2. Year 2004 background without plant volumes were increased by 8.24 percent to account for a compounding ambient growth rate of 2 percent annually; this growth in all "non-plant" traffic is illustrated in Figure 7.
3. Information regarding cumulative projects was obtained from the City of Highland and was reviewed to determine which projects would have a significant impact on traffic at the study intersections. The following five projects were determined to be significant:

   - Southeast corner of Boulder Avenue/Fifth Street – 300 attached (multifamily) dwelling units.
   - Southeast corner of Boulder Avenue/Fifth Street – Drive-through pharmacy retail center.
   - Southwest corner of Boulder Avenue/Fifth Street – Gasoline station with retail center and Jack-in-the-Box restaurant.
   - Northeast corner of Boulder Avenue/Fifth Street – 123 detached (single-family) houses.
   - Fifth Street between Boulder Avenue and SR-30 – 40,000-square foot office park.

   For analysis purposes, the cumulative projects were grouped into two areas that would be expected to have the same trip distribution at the study intersections. Trip generation for each of the cumulative projects was developed using rates from the Institute of Transportation Engineers (ITE) *Trip Generation* (7^{th} Ed.). Total a.m. peak hour, p.m. peak hour, and daily trip generation for both analysis areas is shown in Table A. Trip distribution patterns were developed separately for each of these two analysis areas. The total cumulative project trips at study area intersections are illustrated in Figure 8. Detailed cumulative project distribution and assignment tables are included in Appendix E.
4. The cumulative project volumes developed in step 3 and the ambient growth calculated in step 2 were added to the 2004 background without plant volumes developed in step 1 to develop 2008 background without plant volumes. Year 2008 background "without plant" traffic volumes are illustrated in Figure 9.
5. The existing plant trips subtracted in step 1 were then added back to the 2008 background without plant volumes developed in step 4 to produce 2008 background traffic volumes. Year 2008 background volumes are illustrated in Figure 10.

Appendix Tables D-1 through D-9 show the development of existing PCE volumes and year 2008 background PCE volumes.

Forecast Year 2030 Volumes. The year 2030 traffic volumes for the proposed project were developed using data from the East Valley Traffic Model (EVTM), maintained by the City of San Bernardino. The EVTM includes a passenger vehicle model and a truck model. The base year for the



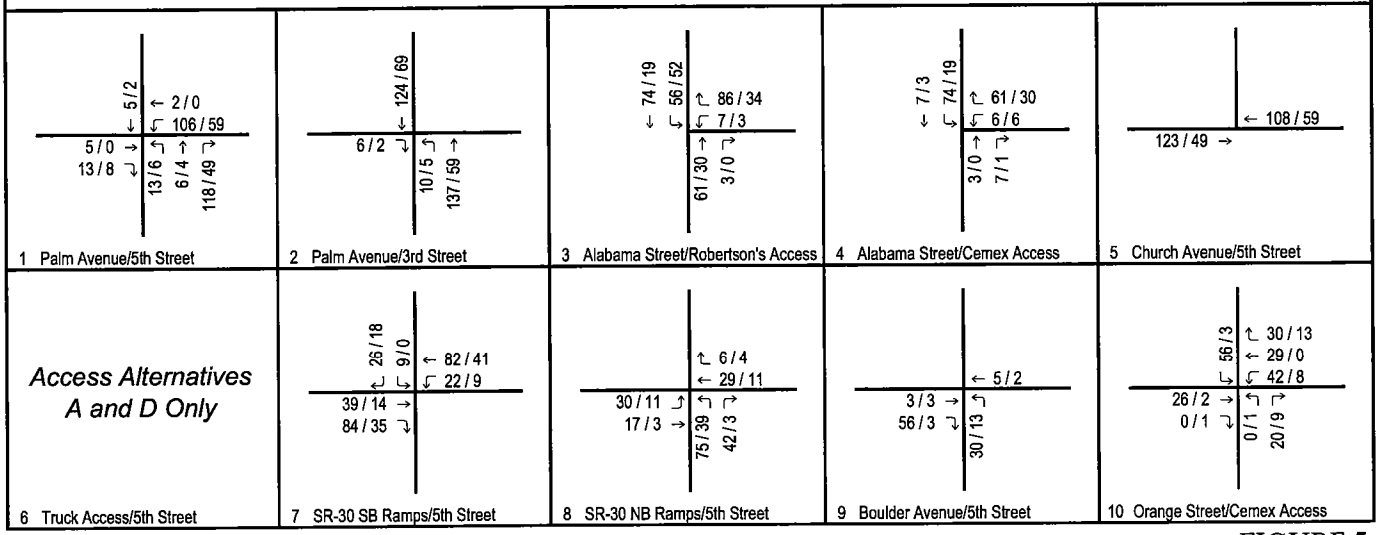


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FIGURE 5

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Total Plant Traffic (in PCEs)

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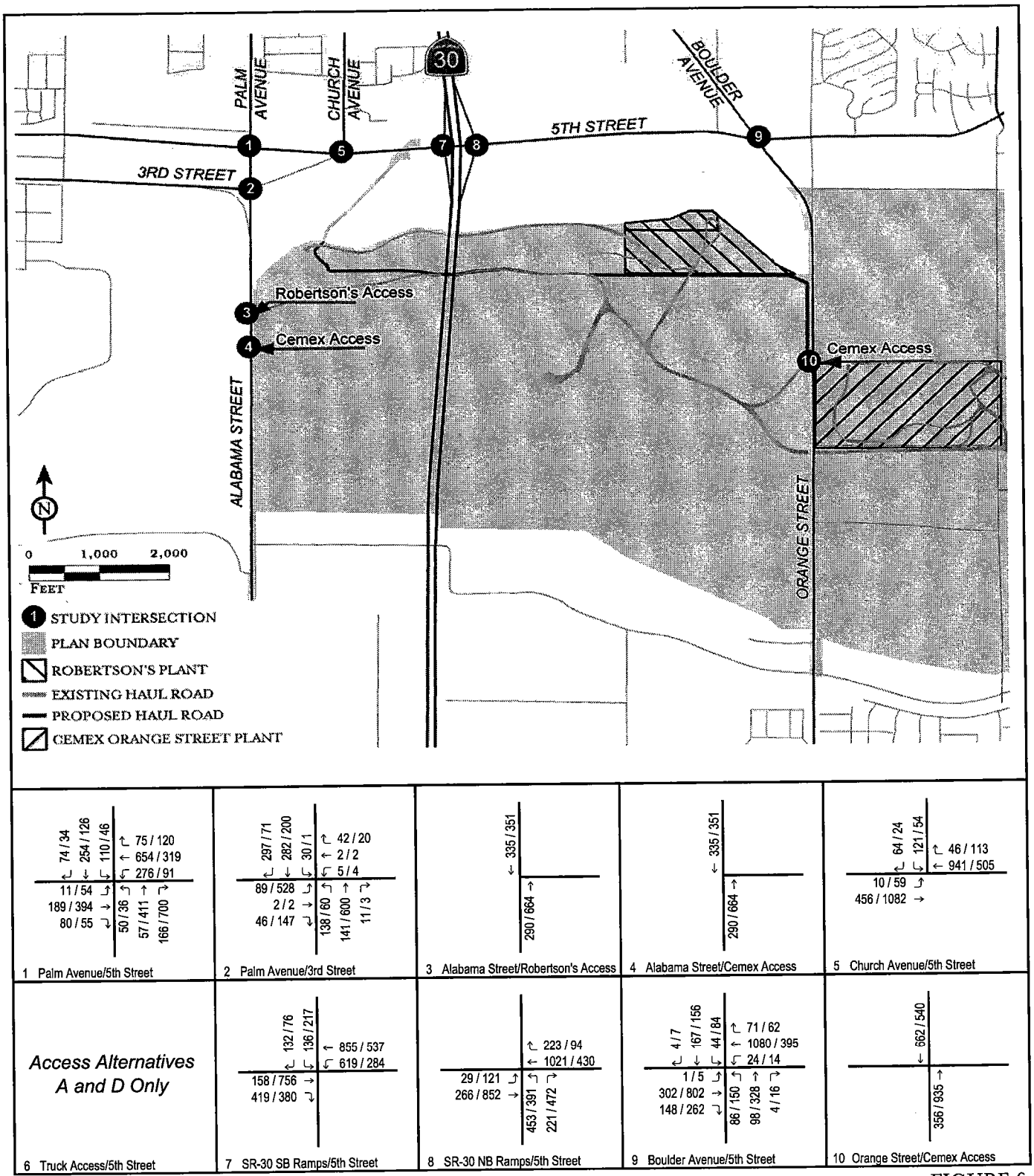

FIGURE 6

LSA

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Existing (2004) Peak Hour PCE Traffic Volumes

Without Existing Plant Traffic

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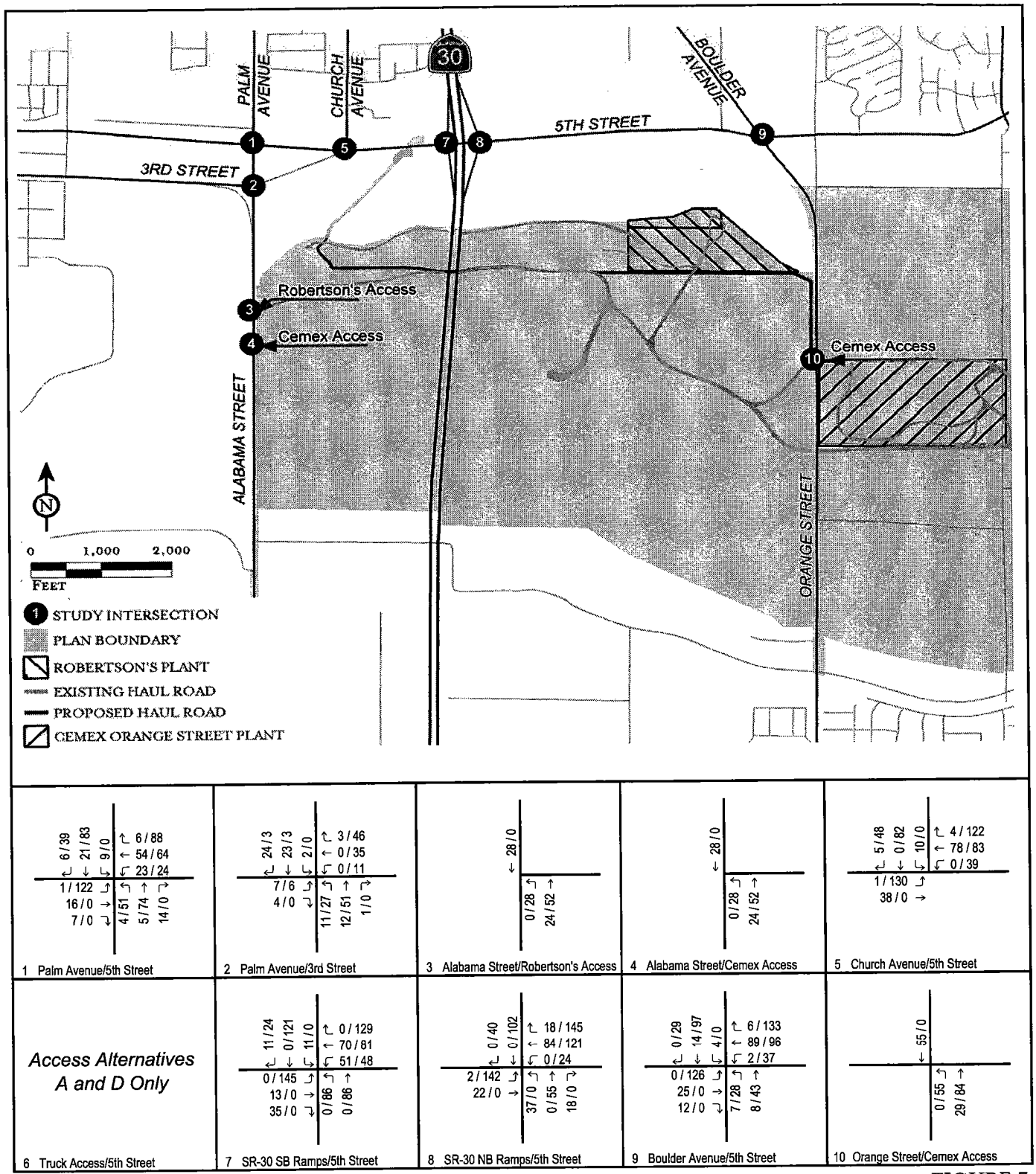

FIGURE 7

LSA

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

2004 to 2008

Growth in Peak Hour PCE Traffic Volumes

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Table A - Cumulative Project Trip Generation

No.	Location	Area	Land Use	No. of Units	Unit		A.M. Peak Hour In	A.M. Peak Hour Out	A.M. Peak Hour Total	P.M. Peak Hour In	P.M. Peak Hour Out	P.M. Peak Hour Total	Daily
1	Southeast corner of Fifth Street/Orange Street	A	Multi-family attached	300	DU	Rate[1]	0.07	0.37	0.44	0.35	0.17	0.52	5.86
						Trips	21	111	132	105	51	156	1,758
2	Northeast corner of Fifth Street and Boulder Avenue	A	Single Family Detached	123	DU	Rate[2]	0.19	0.56	0.75	0.64	0.37	1.01	9.57
						Trips	23	69	92	79	46	125	1,177
3	Southeast corner of Fifth Street/Boulder	A	Pharmacy	13.000	TSF	Rate[3]	1.52	1.14	2.66	4.22	4.40	8.62	88.16
						Trips	20	15	35	55	57	112	1,146
			Area A Total Traffic				64	195	259	239	154	393	4081
4	Southwest corner of Fifth Street/Boulder	B	Gas Station	12	Pumps	Rate[4]	5.03	5.03	10.06	6.69	6.69	13.38	162.78
						Trips	60	60	120	80	80	160	1,953
4	Southwest corner of Fifth Street/Boulder	B	Fast-food restaurant	3.000	TSF	Rate[5]	27.09	26.02	53.11	18.01	16.63	34.64	496.12
						Trips	81	78	159	54	50	104	1,488
5	Fifth Street east of SR-30	B	Office Park	40.000	TSF	Rate[6]	1.36	0.19	1.55	0.25	1.24	1.49	11.01
						Trips	54	8	62	10	50	60	440
			Area B Total Traffic				195	146	341	144	180	324	3,881
			Total Traffic				**259**	**341**	**600**	**383**	**334**	**717**	**7,962**

1 Trip generation based on rates from Land Use 230 - "Residential Condominium/Townhouse" from Institute of Transportation Engineers (ITE), *Trip Generation* (7th Edition)

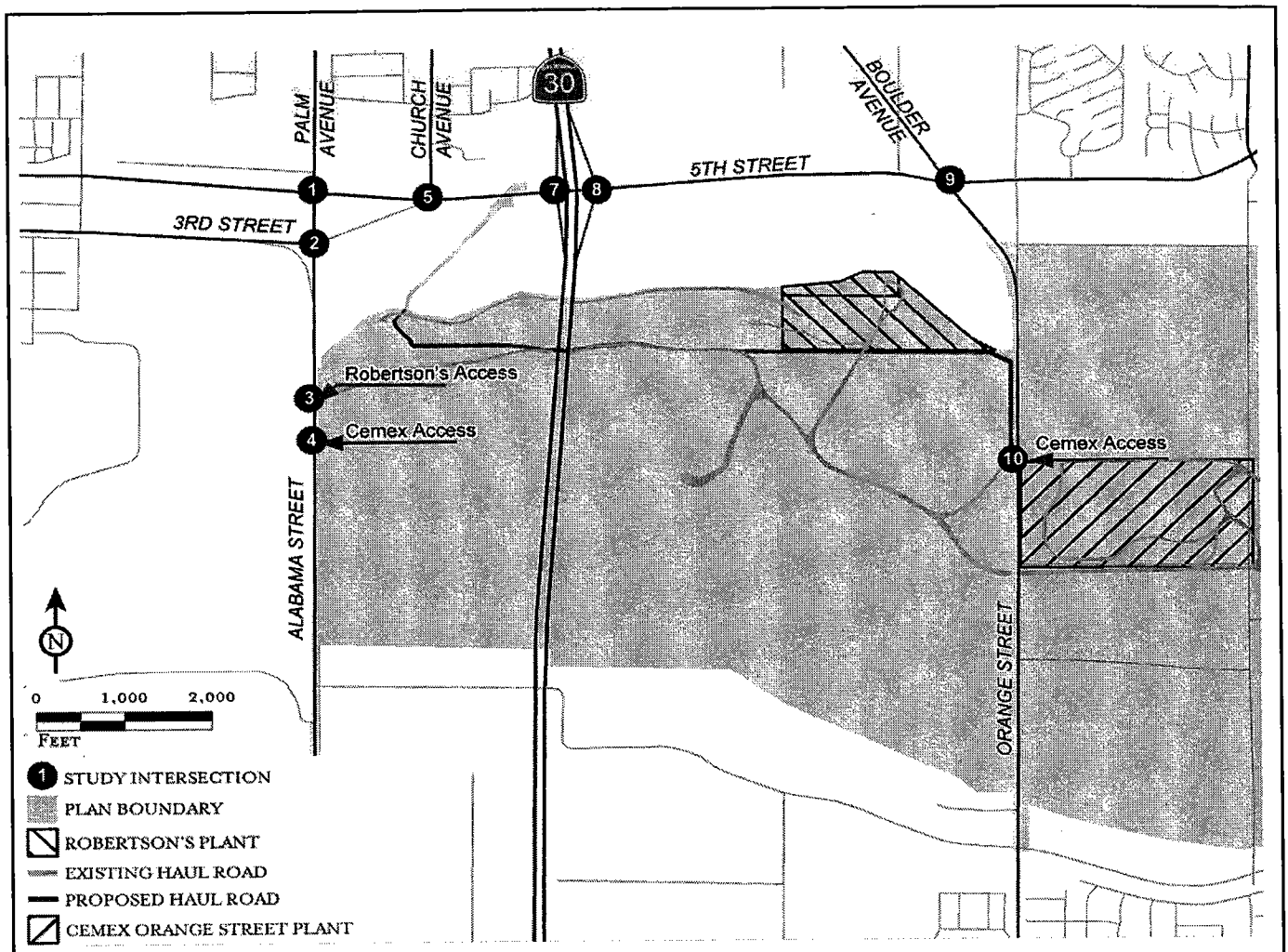
2 Trip generation based on rates from Land Use 210 - "Single Family Detached Housing" from Institute of Transportation Engineers (ITE), T*rip Generation* (7th Edition)

3 Trip generation based on rates from Land Use 881 - "Pharmacy/Drugstore with Drive-Through Window" from ITE *Trip Generation* (7th Edition). Because precise floor area is not known, an estimate has been used.

4 Trip generation based on rates from Land Use 945 - "Gasoline/Service Station with Convenience Market" from ITE *Trip Generation* (7th Edition). Because the precise number of pumps is not known, an estimate has been used.

5 Trip generation based on rates from Land Use 934 - "Fast-food Restaurant with Drive-Through Window" from ITE *Trip Generation* (7th Edition). Because the exact floor area is not known, an estimate has been used.

6 Trip generation based on rates from Land Use 710 - "General Office Building" from ITE *Trip Generation* (7th Edition)



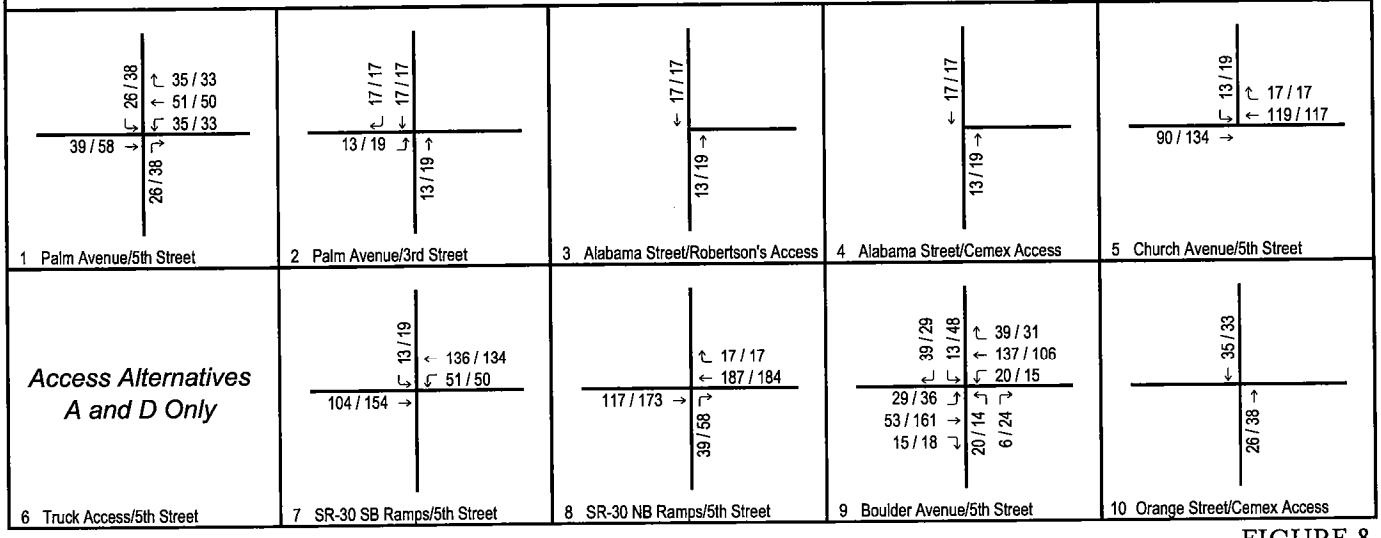


FIGURE 8

LSA

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Cumulative Project Trips

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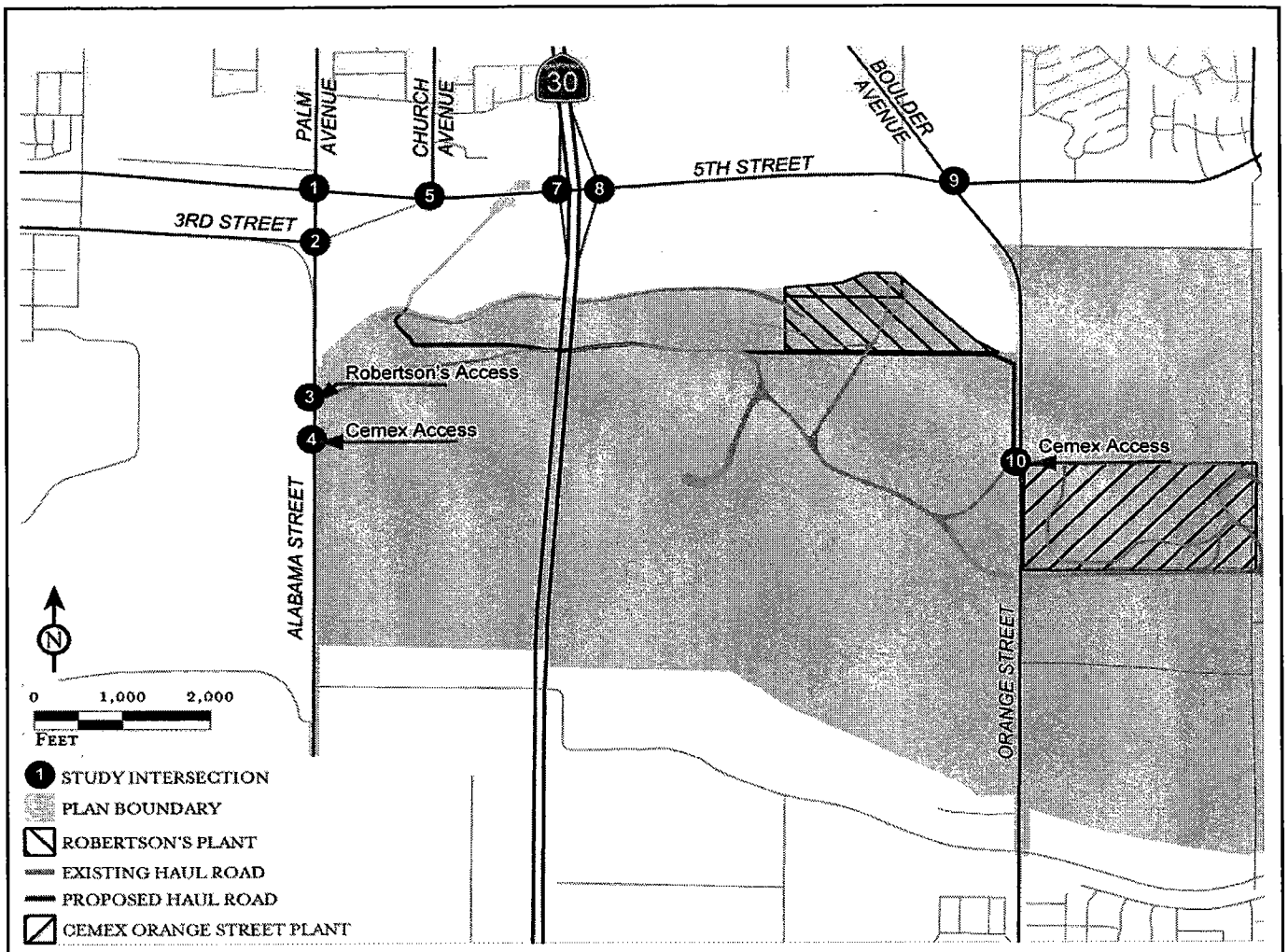

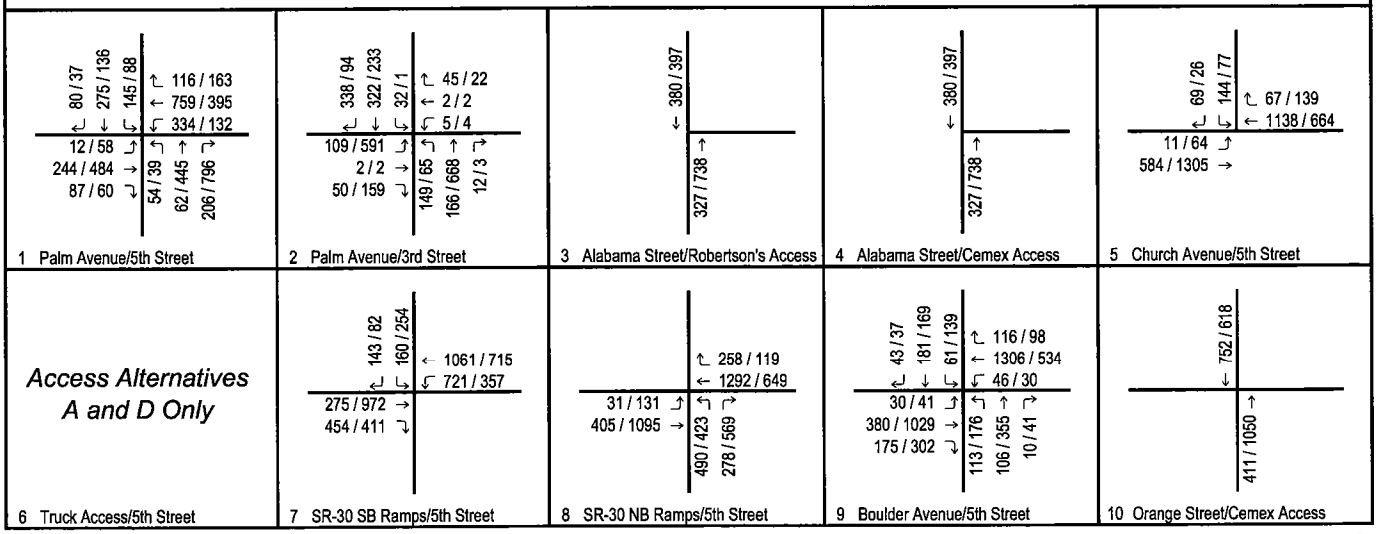

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FIGURE 9

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

2008 Background (Without Plant)

PCE Peak Hour Traffic Volumes

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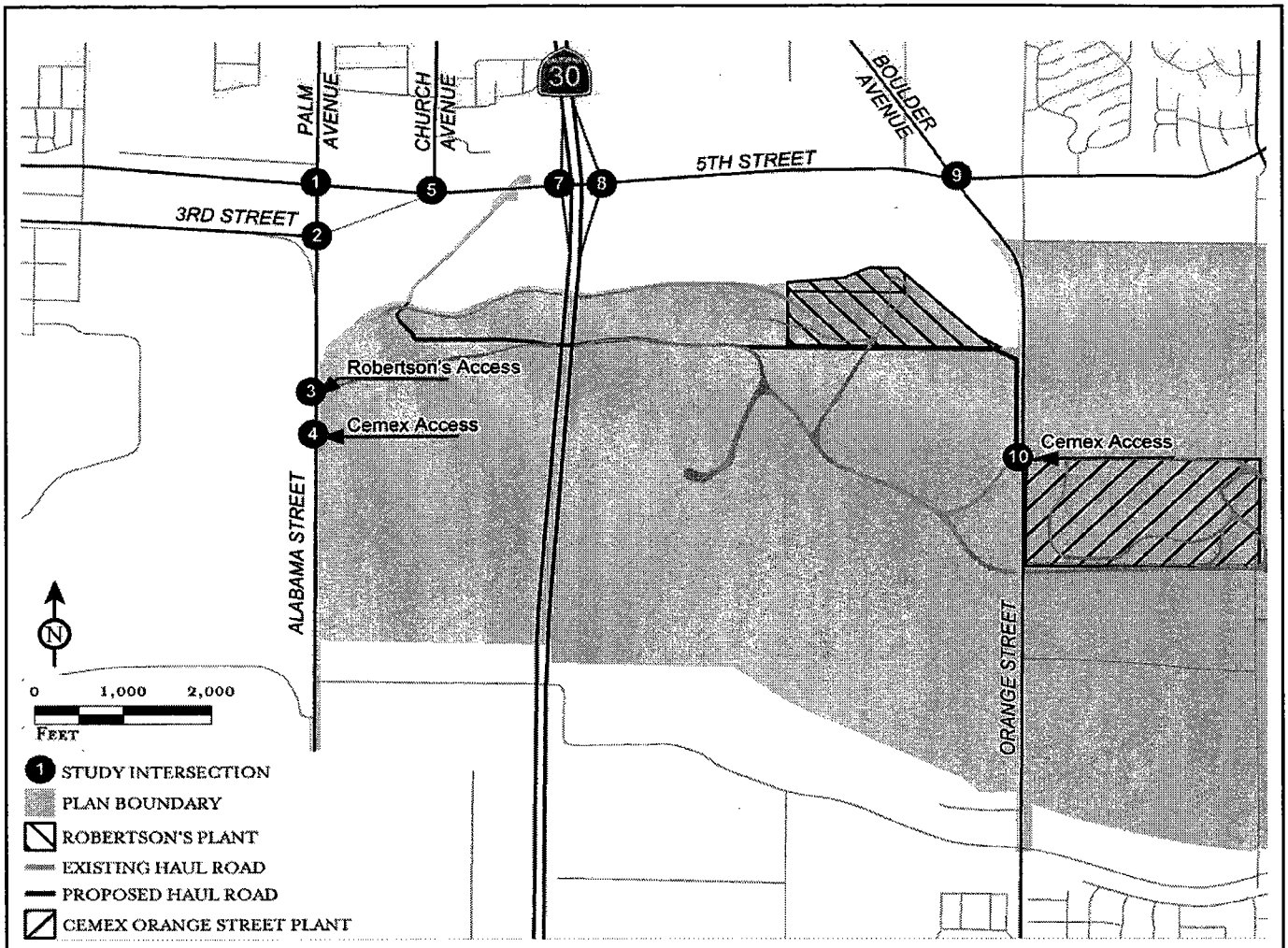

80 / 37 280 / 138 145 / 88 116 / 163 761 / 395 440 / 191 12 / 58 249 / 484 100 / 68 67 / 45 68 / 449 324 / 845	338 / 94 446 / 302 32 / 1 45 / 22 2 / 2 5 / 4 109 / 591 2 / 2 56 / 161 159 / 70 303 / 727 12 / 3	454 / 416 56 / 52 86 / 34 7 / 3 388 / 768 3 / 0	387 / 400 74 / 19 61 / 30 6 / 6 330 / 738 7 / 1	69 / 26 144 / 77 67 / 139 1246 / 723 11 / 64 707 / 1354
1 Palm Avenue/5th Street	2 Palm Avenue/3rd Street	3 Alabama Street/Robertson's Access	4 Alabama Street/Cemex Access	5 Church Avenue/5th Street
Access Alternatives A and D Only	169 / 100 169 / 254 1143 / 756 743 / 366 314 / 986 538 / 446	264 / 123 1321 / 660 61 / 142 422 / 1098 565 / 462 320 / 572	43 / 37 181 / 169 61 / 139 116 / 98 1311 / 536 46 / 30 30 / 41 383 / 1032 231 / 305 143 / 189 106 / 355 10 / 41	752 / 618 56 / 3 30 / 13 29 / 0 42 / 8 26 / 2 0 / 1 0 / 1 411 / 1050 20 / 9
6 Truck Access/5th Street	7 SR-30 SB Ramps/5th Street	8 SR-30 NB Ramps/5th Street	9 Boulder Avenue/5th Street	10 Orange Street/Cemex Access

LSA

FIGURE 10

123 / 456 AM / PM Volume

Upper Santa Ana River Wash
Year 2008 Background
Peak Hour PCE Traffic Volumes

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passenger vehicle model is 2000, and the forecast year is 2030. The base year for the truck model is 1994 (which, according to SCAG, should be assumed to represent year 2000), and the forecast year is 2020. Sheets illustrating the modeled link volumes from SCAG are contained in Appendix J. The socioeconomic data in the EVTM for the forecast years include continued operations of the quarries; therefore, the modeled forecast year traffic volumes include trips generated by the existing plants.

The following describes in detail the methodology employed for passenger vehicles to determine the a.m. and p.m. peak hour intersection turn movements for year 2030 with project conditions:

1. The difference between the modeled 2000 and 2030 peak period directional arterial traffic volumes (for each intersection approach and departure) was identified from loaded network model plots. This difference defines the growth in traffic over the 30-year period.
2. The incremental growth in peak period approach and departure volumes was factored to develop the incremental change in peak hour volumes. The CTP model uses a three-hour a.m. peak period and four-hour p.m. peak period. The Southern California Association of Governments (SCAG) has established that for passenger vehicles the a.m. peak hour comprises 38 percent of the peak period and the p.m. peak hour comprises 28 percent of the peak period. Therefore, the incremental changes in peak period volumes were multiplied by the appropriate factor to develop incremental changes in peak hour volumes.

3. The incremental growth in approach and departure volumes between 2000 and 2030 was factored to reflect the forecast growth between the year of the ground counts (2004) and 2030. For this purpose, linear growth between the 2000 base condition and the forecast 2030 condition was assumed. Since the increment between 2004 and 2030 is 26 years of the 30-year time span, a factor of 0.87 (i.e., 26/30) was used.

4. The forecast growth in approach and departure volumes to 2030 was added to the 2004 ground counts, resulting in post-processed forecast year 2030 link volumes.
5. Forecast year 2030 turn volumes were developed using existing turn volumes and the future approach and departure volumes, based on the methodologies contained in National Cooperative Highway Research Program Report (NCHRP) 255: *Highway Traffic Data for Urbanized Area Project Planning and Design* (Transportation Research Board, December 1982).

The following describes in detail the methodology employed for trucks to determine the a.m. and p.m. peak hour intersection turn movements for year 2030 with project conditions:

1. The difference between the modeled 2000 and 2020 peak period directional arterial traffic volumes (for each intersection approach and departure) was identified from loaded network model plots. This difference defines the growth in traffic over the 20-year period.
2. The incremental growth in peak period approach and departure volumes was factored to develop the incremental change in peak hour volumes. The CTP model uses a three-hour a.m. peak period and four-hour p.m. peak period. SCAG has established that for trucks the a.m. peak hour comprises 33 percent of the peak period and the p.m. peak hour comprises 25 percent of the peak period. Therefore, the incremental changes in peak period volumes were multiplied by the appropriate factor to develop incremental changes in peak hour volumes.

3. The incremental growth in approach and departure volumes between 2000 and 2020 was factored to reflect the forecast growth between the year of the ground counts (2004) and 2030. For this purpose, linear growth between the 2000 base condition and the forecast 2020 condition was assumed. Since the increment between 2004 and 2030 is 26 years of the 20-year time span, a factor of 1.3 (i.e., 26/20) was used.
4. The forecast growth in approach and departure volumes to 2030 was added to the 2004 ground counts, resulting in post-processed forecast year 2030 link volumes.
5. Forecast year 2030 PCE turn volumes were developed using existing turn volumes and the future approach and departure volumes, based on the methodologies contained in NCHRP Report 255: *Highway Traffic Data for Urbanized Area Project Planning and Design* (Transportation Research Board, December 1982).
6. The modeled network includes a connection between Third Street and Church Avenue. Since this connection will not exist except under Access Alternative B, the link volumes for the intersections of Palm Avenue/Third Street and Church Avenue/Fifth Street have been adjusted manually to reflect the correct network.

The passenger vehicle and truck PCE volumes at adjacent study intersections were balanced in a similar manner as the existing (2004) counts to preserve conservation of vehicle flow. Total PCE volumes were developed by summing the passenger vehicle volumes and truck PCE volumes. Volume development sheets are included in Appendix D.

Level of Service Definitions and Procedures

Roadway operations and the relationship between capacity and traffic volumes are generally expressed in terms of levels of service (which are defined using the letter grades A through F). These levels recognize that, while an absolute limit exists as to the amount of traffic traveling through a given intersection (the absolute capacity), the conditions that motorists experience rapidly deteriorate as traffic approaches the absolute capacity. Under such conditions, congestion is experienced. There is general instability in the traffic flow, which means that relatively small incidents (e.g., momentary engine stall) can cause considerable fluctuations in speeds and delays. This near-capacity situation is labeled Level of Service (LOS) E. Beyond LOS E, capacity has been exceeded, and arriving traffic will exceed the ability of the intersection to accommodate it. An upstream queue will then form and continue to expand in length until the demand volume again declines.

A complete description of the meaning of level of service can be found in the Transportation Research Board Special Report 209, *Highway Capacity Manual*. The Manual establishes levels of service A through F. Brief descriptions of the six levels of service, as abstracted from the Manual, are provided in Table B.

Table B – Level of Service Definitions

LOS	Description
A	No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Typically, the approach appears quite open, turns are made easily and nearly all drivers find freedom of operation.

Table B – Level of Service Definitions

LOS	Description
B	This service level represents stable operation, where an occasional approach phase is fully utilized and a substantial number are approaching full use. Many drivers begin to feel restricted within platoons of vehicles.
C	This level still represents stable operating conditions. Occasionally drivers may have to wait through more than one red signal indication, and backups may develop behind turning vehicles. Most drivers feel somewhat restricted, but not objectionably so.
D	This level encompasses a zone of increasing restriction approaching instability at the intersection. Delays to approaching vehicles may be substantial during short peaks within the peak period; however, enough cycles with lower demand occur to permit periodic clearance of developing queues, thus preventing excessive backups.
E	Capacity occurs at the upper end of this service level. It represents the most vehicles that any particular intersection approach can accommodate. Full utilization of every signal cycle is seldom attained no matter how great the demand.
F	This level describes forced flow operations at low speeds, where volumes exceed capacity. These conditions usually result from queues of vehicles backing up from a restriction downstream. Speeds are reduced substantially and stoppages may occur for short or long periods of time due to the congestion. In the extreme case, both speed and volume can drop to zero.

The level of service criteria for unsignalized and signalized intersections are summarized in Table C.

Table C – Level of Service Criteria for Unsignalized and Signalized Intersections

Level of Service	Unsignalized Intersection Average Delay per Vehicle (sec.)	Signalized Intersection Average Delay per Vehicle (sec.)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

For all study area intersections, the 2000 Highway Capacity Manual (HCM 2000) analysis methodologies were used to determine intersection levels of service. All levels of service were calculated using the Traffix version 7.8 software, which uses the HCM 2000 methodologies. Saturation flow rates consistent with CMP guidelines for existing conditions, opening year, and future year analyses were used in the calculations of intersection capacity. Minimum green times required for pedestrian movements were calculated using Equation 16-2 contained in Chapter 16 of the HCM 2000. Minimum green time calculations are included in Appendix H.

Level of Service Standard

All existing entrances to the Robertson's and Cemex plants are under the jurisdiction of the City of Redlands. The intersections of SR-30 Southbound Ramps/Fifth Street and SR-30 Northbound Ramps/Fifth Street are under the jurisdiction of Caltrans. All remaining intersections are under the jurisdiction of the City of Highland. Each of these jurisdictions uses LOS D as the threshold of acceptability. Therefore, any intersection operating at LOS E or F is considered an impact requiring mitigation.

EXISTING CONDITIONS

The existing a.m. and p.m. peak hour PCE volumes for the analysis intersections are illustrated in previously referenced Figure 4. An intersection level of service analysis was conducted for existing conditions to determine current circulation system performance. The existing conditions levels of service for the study area intersections are summarized in Table D. Level of service calculation worksheets are contained in Appendix F. As Table D indicates, all study area intersections are currently operating at satisfactory levels of service.

PROJECT TRAFFIC

Project Trip Generation

Project trip generation for Land Use Alternative 1 is based on information provided by Robertson's and Cemex. Detailed information on the procedure used by the mining companies to calculate new trip generation is included in Appendix A. It should be noted that Wednesday was used as the basis for calculating daily and peak hour trip volumes because Wednesday has historically been the highest production day. This provides for a "worst-case" analysis of intersections impacts. Actual volumes will vary by day. In no case will the annual production volumes exceed the amount allowed. Table E summarizes the new a.m. peak hour, p.m. peak hour, and daily trips generated by the proposed Land Use Alternative 1. As shown in Table E, the Cemex Orange Street Plant is expected to generate 444 new daily PCE trips, with 39 PCE trips occurring during the a.m. peak hour and 9 PCE trips occurring during the p.m. peak hour. The Robertson's Alabama Street plant is expected to generate 768 new daily PCE trips with no trips occurring during the peak hours. As noted earlier, Robertson's trucks are centrally dispatched so that the facility has control over when trucks enter and exit the plant. It should also be noted that employee and miscellaneous delivery trips has been accounted for in the existing driveway counts. The number of employee trips and miscellaneous delivery trips will not increase from the existing number of trips. The existing employee trips and miscellaneous trips have been accounted for in the existing counts.

The mining companies did not directly provide the trip generation for Alternative 2, but LSA has followed the same procedure used by the mining companies to develop the trip generation for Alternative 1, by substituting the increased production levels of Alternative 2. Detailed information on the procedure used by the mining companies to calculate new trip generation is included in Appendix A. Project trips for Land Use Alternative 2 were developed by adjusting the Land Use Alternative 1 project volumes by the ratio of Land Use Alternative 2 to Land Use Alternative 1 production volumes. Table F summarizes the new a.m. peak hour, p.m. peak hour, and daily trips generated by the proposed Land Use Alternative 2. As shown in Table F, the Cemex Orange Street

Table D - Existing (2004) Intersection Levels of Service

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.57	31.0	C	0.75	38.8	D
2 . Palm Avenue/3rd Street	Signal	0.38	26.4	C	0.44	33.1	C
3 . Alabama Street/Robertson's Access	TWSC		11.9	B		15.9	C
4 . Alabama Street/Cemex Access	TWSC		11.1	B		15.8	C
5 . Church Avenue/5th Street	Signal	0.40	13.8	B	0.38	14.3	B
6 . Truck Access/5th Street		*Access Alts. A & D Only*			*Access Alts. A & D Only*		
7 . SR-30 SB Ramps/5th Street	Signal	0.84	25.8	C	0.60	21.6	C
8 . SR-30 NB Ramps/5th Street	Signal	0.71	24.8	C	0.52	23.7	C
9 . Boulder Avenue/5th Street	Signal	0.55	26.6	C	0.47	27.3	C
10 . Orange Street/Cemex Access	Signal	0.56	6.4	A	0.63	3.8	A

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.

Table E - Project New Trip Generation - Aggregate Trucks
Land Use Alternative 1

Land Use	A.M. Peak Hour			P.M. Peak Hour			Daily[5]
	In	Out	Total	In	Out	Total	
Robertson Plunge Creek [1]							
Existing Trucks At 1.81 MPTY Baseline	11	10	21	6	6	12	384
Proposed Trucks at 3.00 MTPY [2]	11	10	21	6	6	12	640
Net New Trucks	0	0	0	0	0	0	256
Net New PCE Trips [3]	0	0	0	0	0	0	768
Cemex Orange Street Plant [4]							
Existing Trucks At 2.53 MPTY Baseline	38	39	77	10	7	17	762
Proposed Trucks at 3.00 MTPY	44	46	90	12	8	20	910
Net New Trucks	6	7	13	2	1	3	148
Net New PCE Trips [3]	18	21	39	6	3	9	444
Total New PCE Trips	**18**	**21**	**39**	**6**	**3**	**9**	**1,212**

Note:

These are ship numbers that reflect waste and stock piling

MTPY=Million Tons Per Year.

[1] Based on Robertson's memo updated February 24, 2006 (3 years of truck data from 2003 to 2005)

[2] Robertson's has the ability to limit shipments during local peak traffic hours, so that NO net change from baseline conditions would occur during these hours.

[3] All values given are in Passenger Car Equivalency (PCE). PCE of 3 has been used for all aggregate trucks

[4] Based on Lilburn Corporation and Cemex memo updated June 16, 2006 (3 years of truck data from 2003 to 2005)

[5] Based on Robertson's memo updated February 24, 2006 and Cemex memo updated June 16, 2006

Table F - Project New Trip Generation - Aggregate Trucks
Land Use Alternative 2

Land Use	A.M. Peak Hour			P.M. Peak Hour			Daily [3]
	In	Out	Total	In	Out	Total	
Robertson Plunge Creek [1]							
Existing Trucks At 1.81 MPTY Baseline	11	10	21	6	6	12	384
Proposed Trucks at 3.50 MTPY	11	10	21	6	6	12	744
Net New Trucks	0	0	0	0	0	0	360
Net New PCE Trips [2]	0	0	0	0	0	0	1,080
Cemex Orange Street Plant							
Existing Trucks At 2.53 MPTY Baseline	38	39	77	10	7	17	762
Proposed Trucks at 4.00 MTPY	59	61	120	15	11	26	1,206
Net New Trucks	21	22	43	5	4	9	444
Net New PCE Trips [2]	63	66	129	15	12	27	1,332
Total New PCE Trips	**63**	**66**	**129**	**15**	**12**	**27**	**2,412**

Note:

These are ship numbers that reflect waste and stock piling

MTPY=Million Tons Per Year.

[1] Robertson's has the ability to limit shipments during local peak traffic hours, so that NO net change from baseline conditions would occur during these hours.

[2] All values given are in Passenger Car Equivalency (PCE). PCE of 3 has been used for all aggregate trucks

[3] Based on Robertson's memo updated February 24, 2006 and Cemex memo updated June 16, 2006

Plant is expected to generate 1,332 new daily PCE trips, with 129 PCE trips occurring during the a.m. peak hour and 27 PCE trips occurring during the p.m. peak hour. The Robertson's Alabama Street plant is expected to generate 1,080 new daily PCE trips with no trips occurring during the peak hours. As noted earlier, Robertson's trucks are centrally dispatched so that the facility has control over the times at which trucks enter and exit the plant.

There will be no increase in trips under Land Use Alternatives 3 and 4; therefore, no trip generation has been calculated for these land use alternatives.

Trip Distribution and Assignment

Project trip distribution patterns were taken from *Traffic Study for the Sunwest Materials Mining Operations* (Kaku Associates, August 1996), which analyzed potential traffic impacts of a proposed expansion of operations at the Robertson's and Cemex facilities. This figure is contained in Appendix K. Figures 11 through 14 illustrate the trip distribution patterns for new Cemex aggregate trips under Alternatives A, B, C, and D, respectively. No trip distribution or assignment is shown for Robertson's trips because Robertson's plant produces no new trips during the peak hours. Similarly, new trip distribution or assignment is shown for employee and miscellaneous deliveries since no new trips are generated. Trip assignment for new Cemex aggregate trips was calculated by multiplying the Cemex trip generation by the trip distribution percentages. Figures 15 through 17 illustrate the total new Cemex aggregate trips at study intersections for Land Use Alternative 1 under Access Alternatives A, B, and D, respectively. Figure 18 illustrates the total new Cemex aggregate trips at study intersections for Land Use Alternative 2, under Access Alternative C.

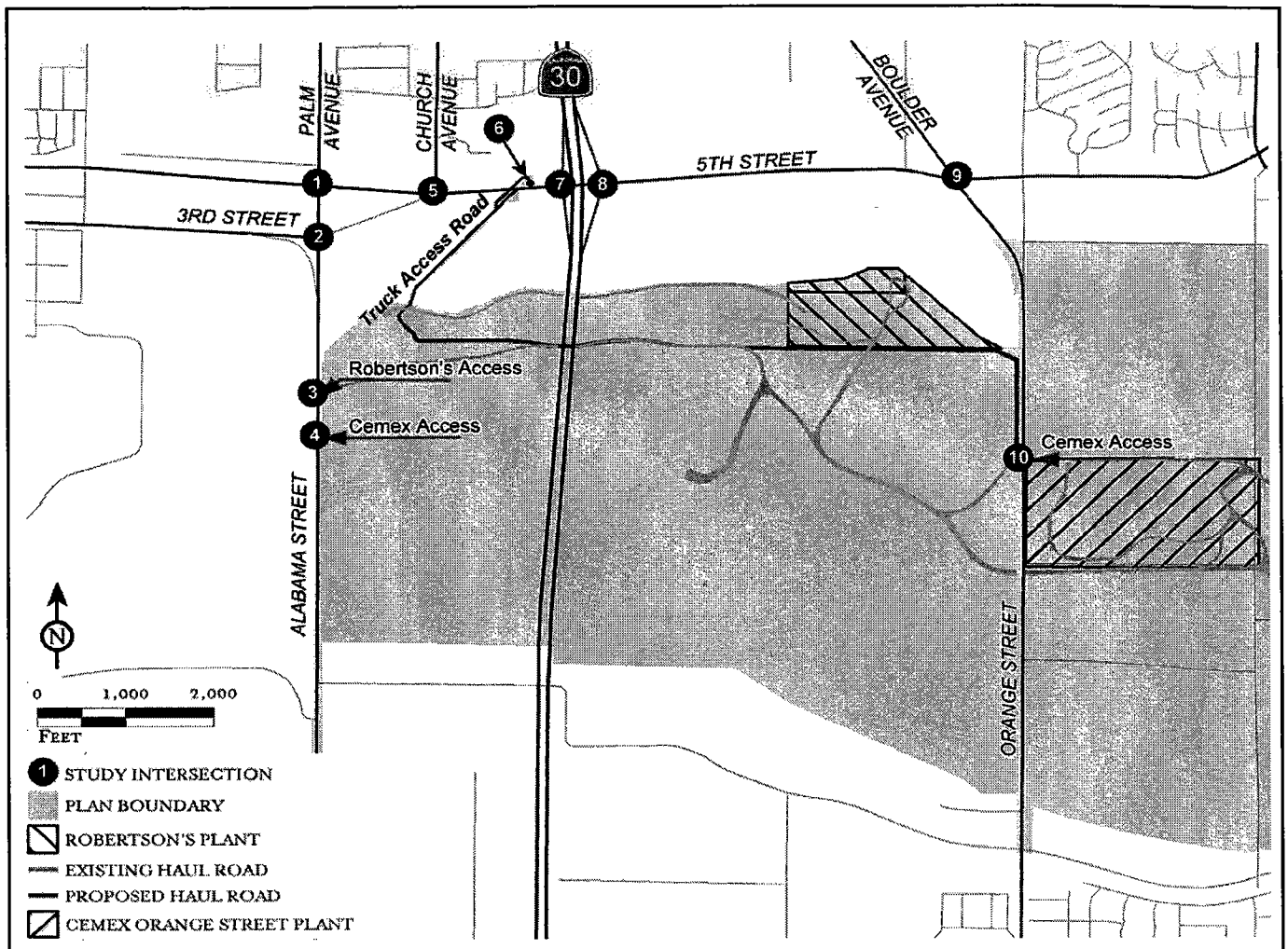
OPENING YEAR (2008) CONDITIONS

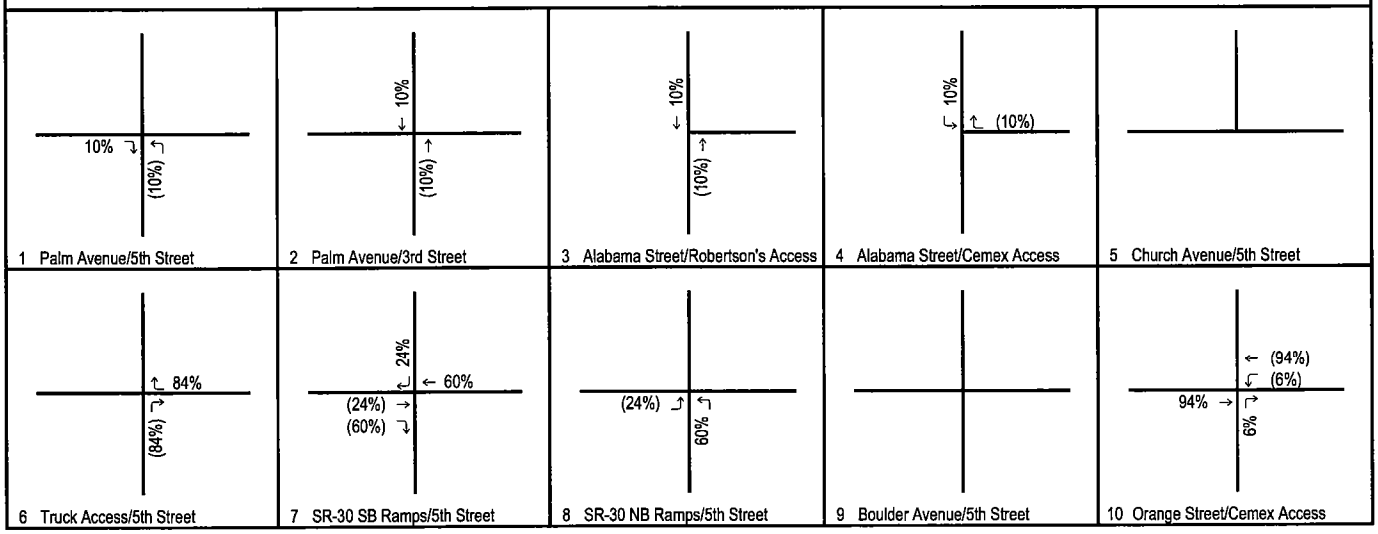
This section discusses forecast year 2008 traffic conditions, which were developed using the approach discussed in the Analysis Methodology section.

Year 2008 Background Conditions (Land Use Alternatives 3 and 4, Access Alternative C)

This condition considers year 2008 conditions without any increase in production at either plant. The base intersection geometrics for this alternative are the same as the existing geometrics illustrated in previously referenced Figure 3. Year 2008 a.m. and p.m. peak hour turn volumes at the study area intersections under Year 2008 background conditions are illustrated in the previously referenced Figure 10. A level of service analysis was conducted to evaluate year 2008 peak hour traffic operations at the study area intersections for Year 2008 background conditions. The results of this analysis are summarized in Table G. The level of service calculation sheets are contained in Appendix F. As indicated in Table G, all intersections examined are projected to operate at satisfactory levels of service under year 2008 background conditions with the exception of the following intersection:

- Palm Avenue/Fifth Street.





LSA

FIGURE 11

12% (34%) Inbound (Outbound) Distribution

Upper Santa Ana River Wash

New Cemex Aggregate Truck Trip Distribution

Land Use Alternative 1, Access Alternative A

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_11_New Cemex Dist Alt A (1/25/2007)

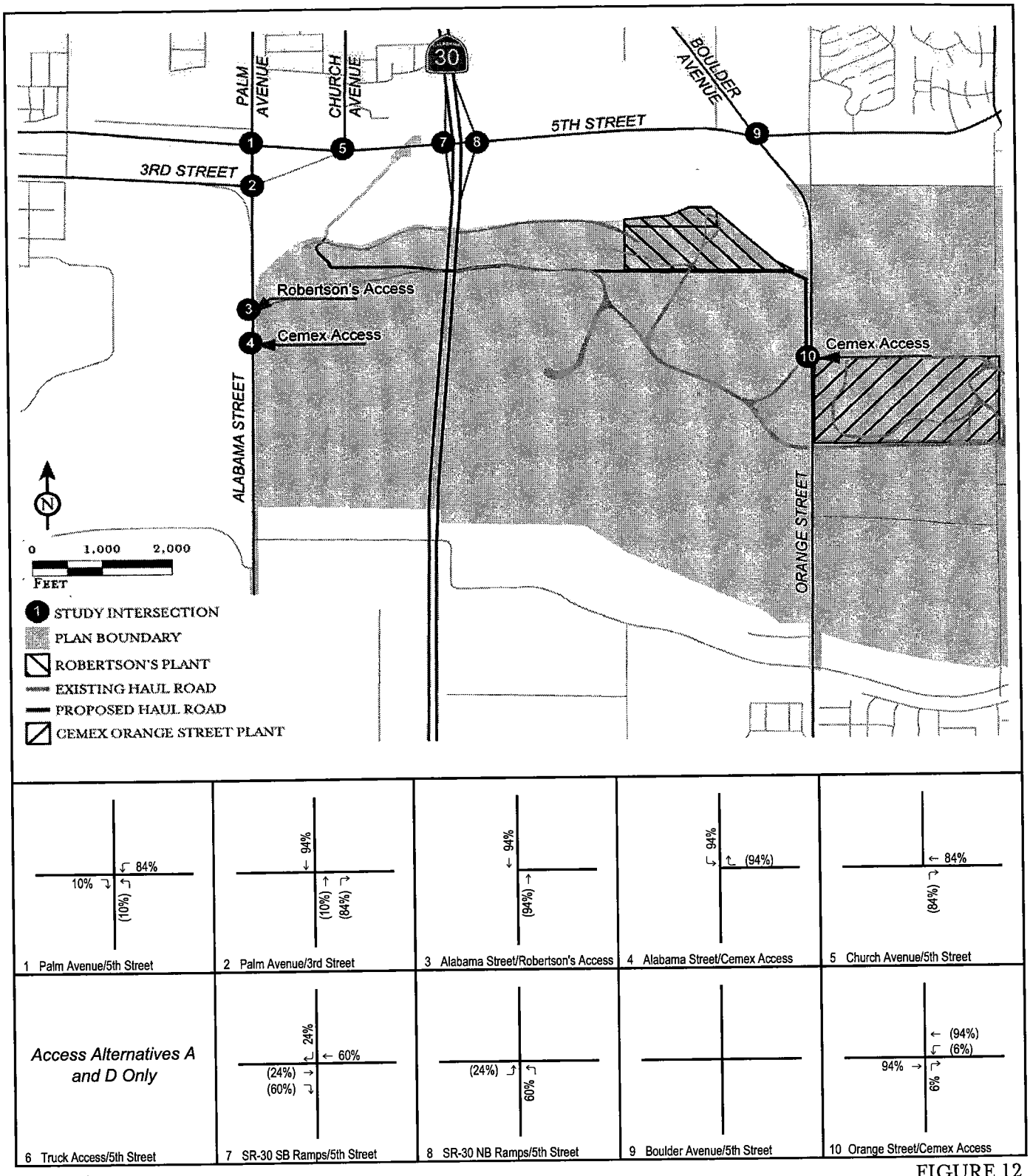


FIGURE 12

LSA

12% (34%) Inbound (Outbound) Distribution

Upper Santa Ana River Wash

New Cemex Aggregate Truck Trip Distribution

Land Use Alternative 1, Access Alternative B

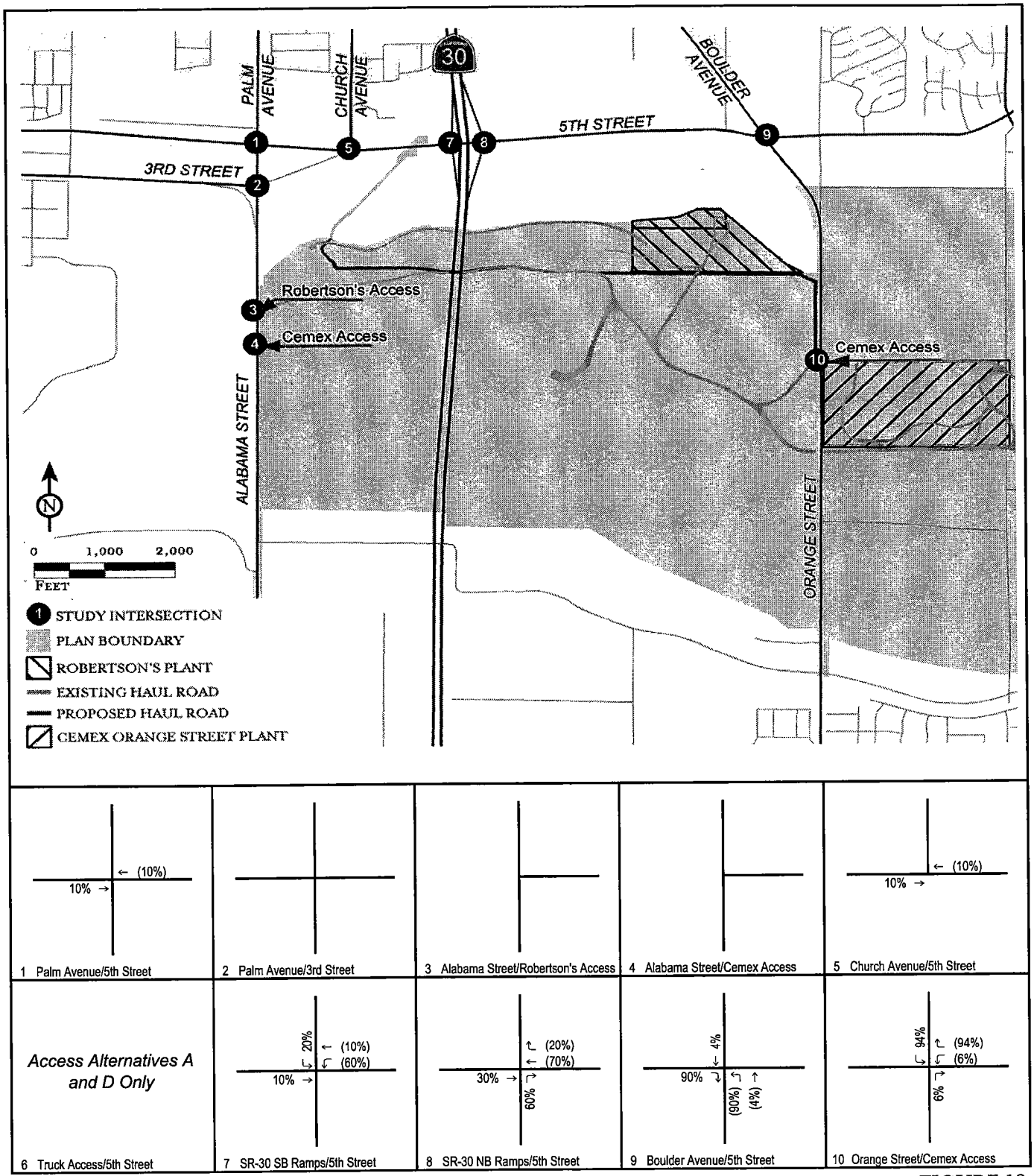


FIGURE 13

LSA

12% (34%) Inbound (Outbound) Distribution

Upper Santa Ana River Wash

New Cemex Aggregate Truck Trip Distribution

Land Use Alternative 2, Access Alternative C

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_13_New Cemex Dist Alt C (1/25/2007)

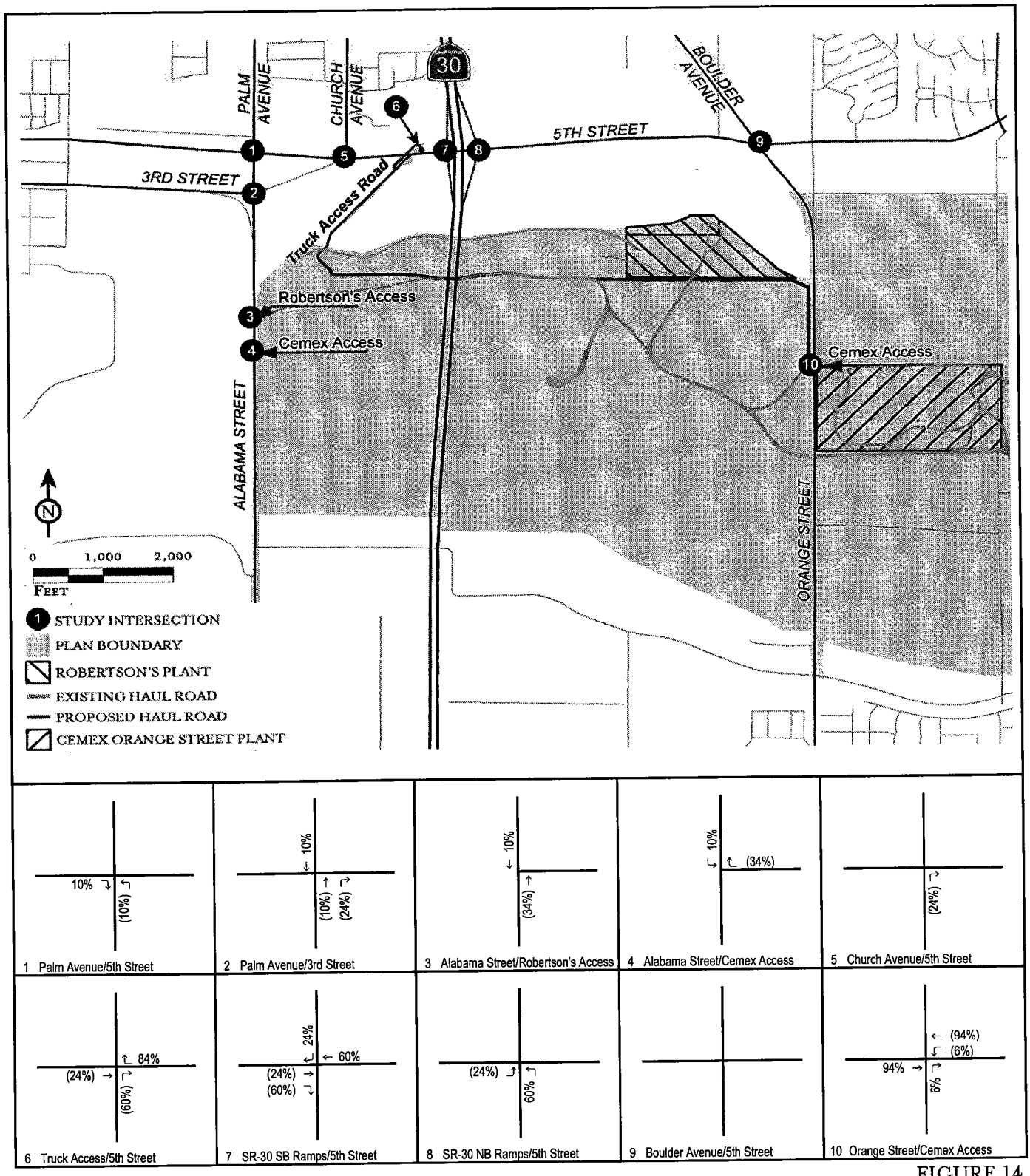


FIGURE 14

LSA

12% (34%) Inbound (Outbound) Distribution

Upper Santa Ana River Wash

New Cemex Aggregate Truck Trip Distribution

Land Use Alternative 1, Access Alternative D

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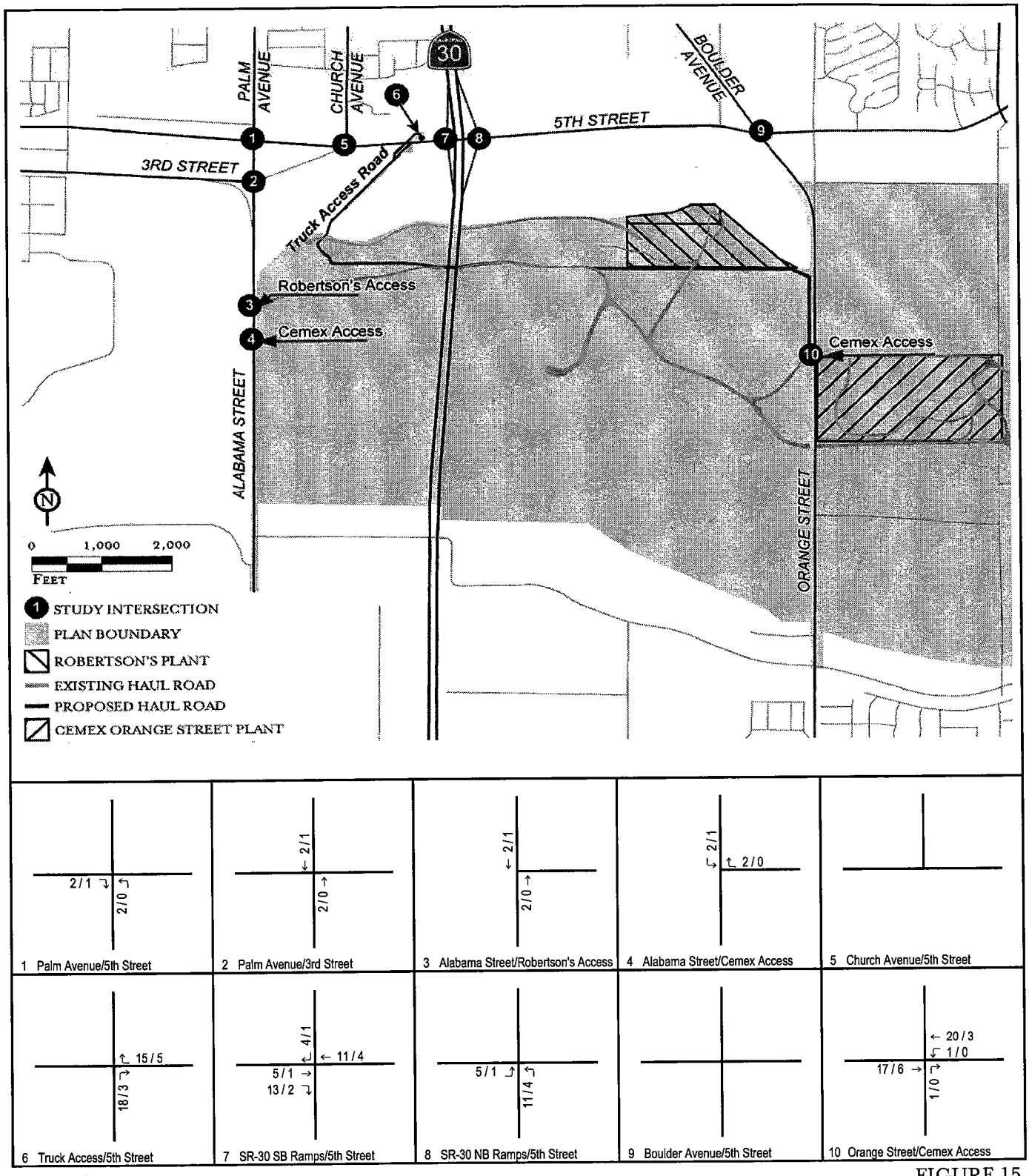


LSA

123 / 456 AM / PM Volume

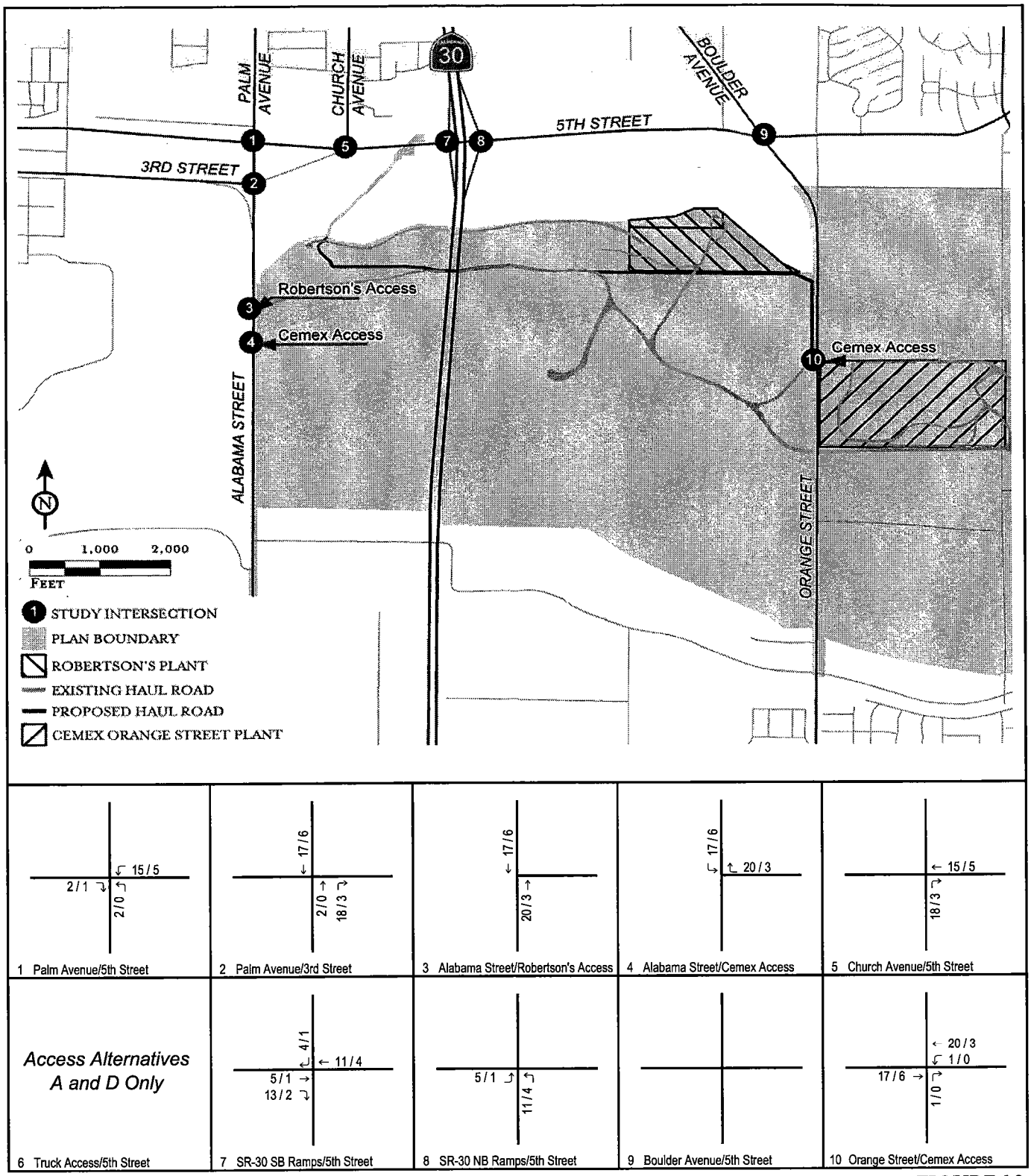
FIGURE 15

Upper Santa Ana River Wash

New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 1, Access Alternative A

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_15_New Cemex Trips Alt 1A (1/25/2007)



LSA

FIGURE 16

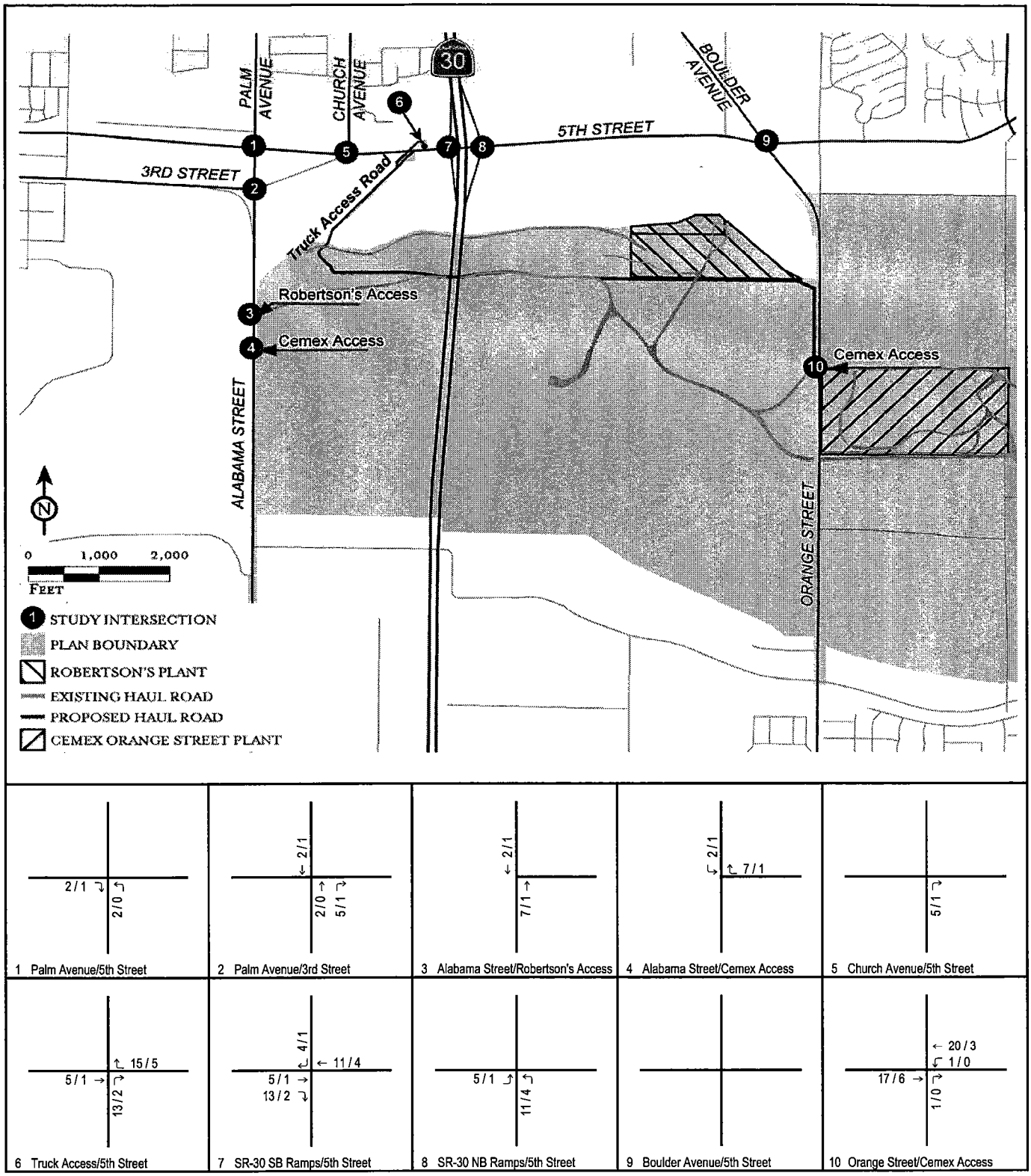
123 / 456 AM / PM Volume

Upper Santa Ana River Wash

New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 1, Access Alternative B

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_16_New Cemex Trips Alt 1B (1/25/2007)



LSA

FIGURE 17

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 1, Access Alternative D

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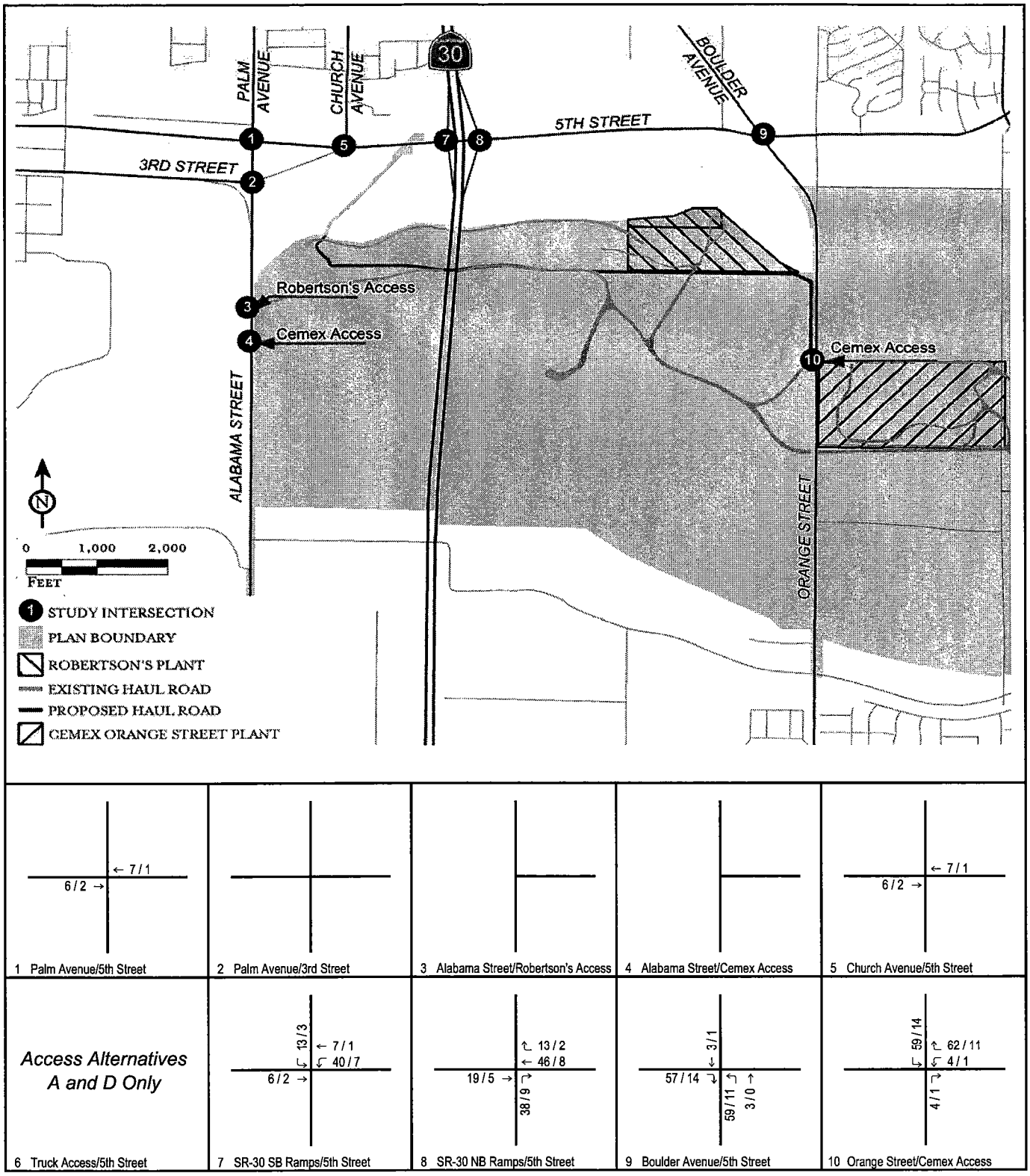


LSA

FIGURE 18

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 2, Access Alternative C

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_18_New Cemex Trips Alt 2C (1/25/2007)

Table G - Year 2008 Background (With Plant) Intersection Levels of Service

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour			
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	
1 . Palm Avenue/5th Street	Signal	0.67	35.6	D	0.90	56.1	E	*
2 . Palm Avenue/3rd Street	Signal	0.43	26.9	C	0.48	35.0	C	
3 . Alabama Street/Robertson's Access	TWSC		12.5	B		17.5	C	
4 . Alabama Street/Cemex Access	TWSC		11.6	B		17.4	C	
5 . Church Avenue/5th Street	Signal	0.47	15.0	B	0.46	14.8	B	
6 . Truck Access/5th Street		*Access Alts. A & D Only*			*Access Alts. A & D Only*			
7 . SR-30 SB Ramps/5th Street	Signal	0.94	32.8	C	0.72	23.8	C	
8 . SR-30 NB Ramps/5th Street	Signal	0.82	28.1	C	0.70	25.3	C	
9 . Boulder Avenue/5th Street	Signal	0.67	32.7	C	0.58	30.3	C	
10 . Orange Street/Cemex Access	Signal	0.62	6.4	A	0.71	5.0	A	

* Exceeds LOS standard.

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.

Year 2008 Conditions – Land Use Alternative 1, Access Alternative A

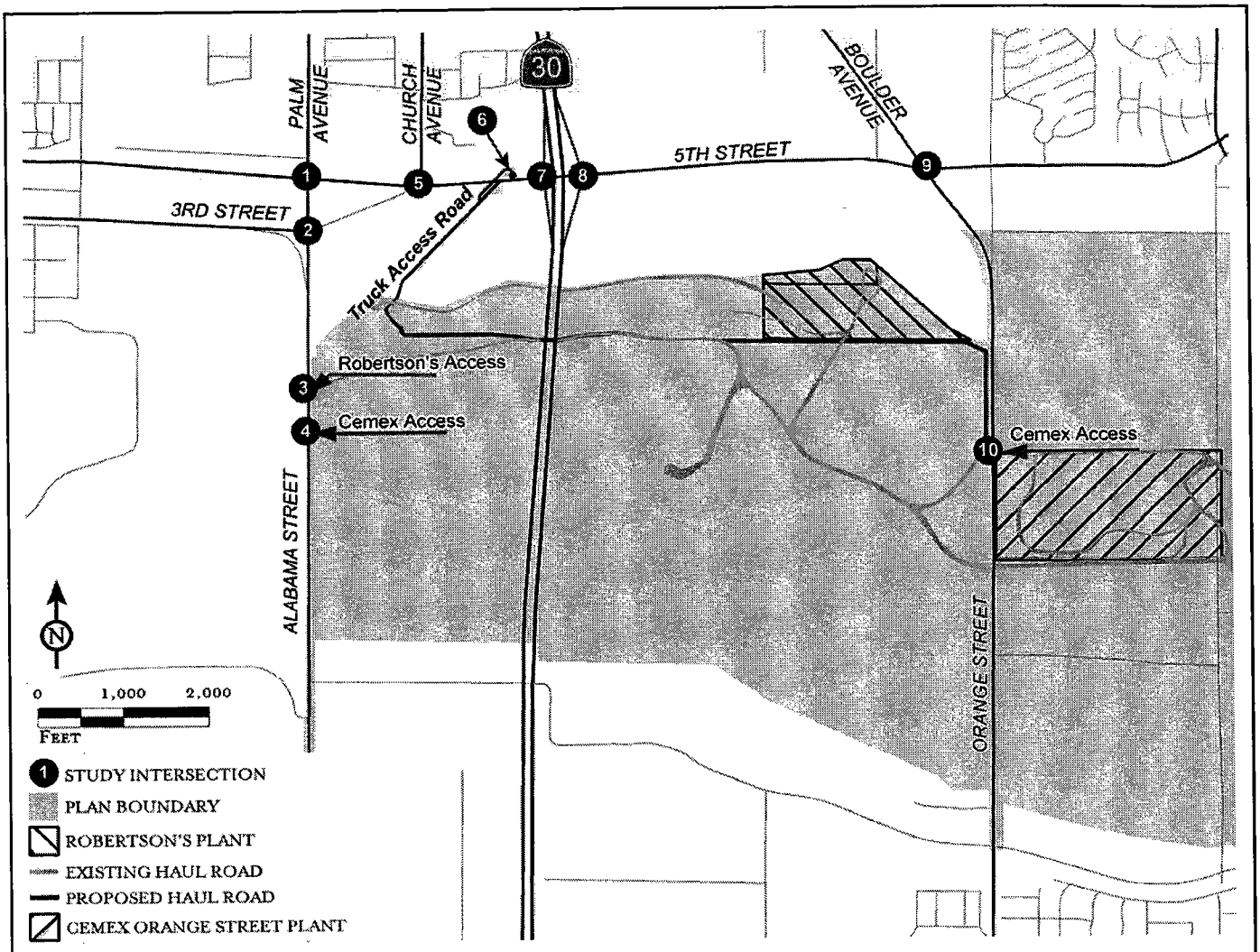
This condition considers the addition of traffic generated by the increase in production under Land Use Alternative 1 to the 2008 background conditions, as well as changes in traffic patterns resulting from proposed access changes in Alternative A. The base intersection geometrics for Access Alternative A are illustrated in Figure 19. The change in trip patterns of the existing plant trips due to the use of Access Alternative A is shown in Figure 20. The new Cemex aggregate trips under Land Use Alternative 1, Access Alternative A were added to the year 2008 background traffic volumes. "Year 2008 with new Cemex aggregate trips" a.m. and p.m. peak hour turn volumes at the study area intersections under Land Use Alternative 1, Access Alternative A are illustrated in Figure 21. A level of service analysis was conducted to evaluate year 2008 peak hour traffic operations at the study area intersections for Land Use Alternative 1 with Access Alternative A. The results of this analysis are summarized in Table H. The level of service calculation sheets are contained in Appendix F. As indicated in Table H, all intersections examined are projected to operate at satisfactory levels of service under year 2008 Alternative 1 conditions with Access Alternative A.

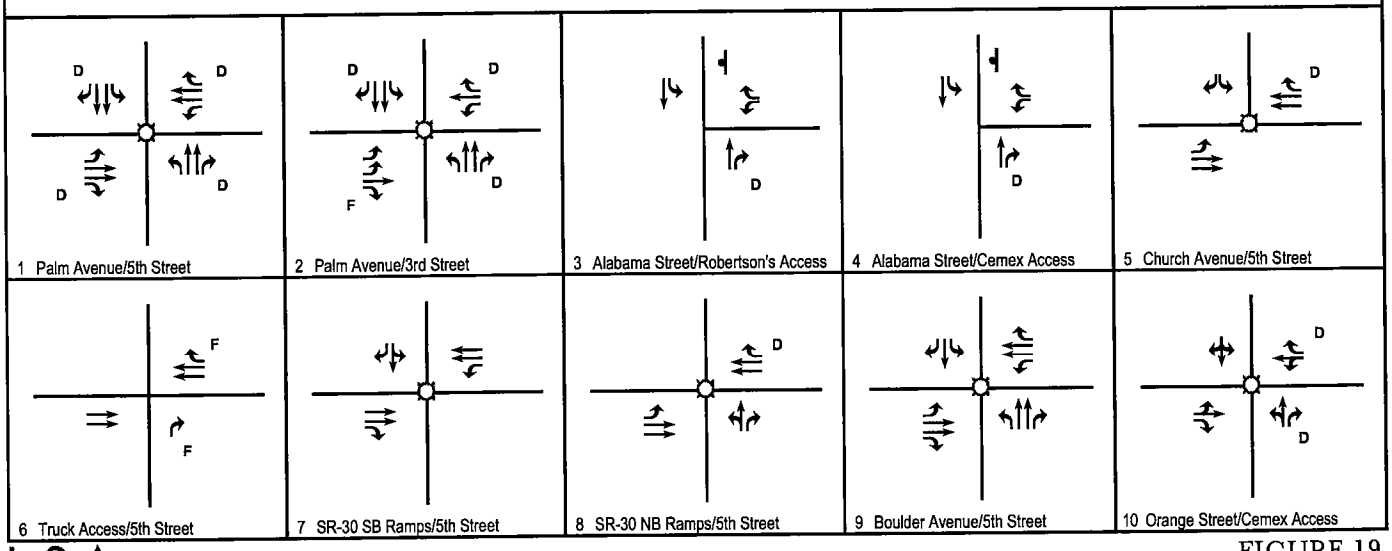
Year 2008 Conditions – Land Use Alternative 1, Access Alternative B

This condition considers the addition of traffic generated by the increase in production under Land Use Alternative 1 to the 2008 background conditions, as well as changes in traffic patterns resulting from proposed access changes in Alternative B. The base intersection geometrics for Alternative B are illustrated in Figure 22. The change in trip patterns of the existing plant trips due to the use of Alternative B is shown in Figure 23. The change in background (non-plant) traffic in Alternative B due to the conversion of Third Street to a one-way street is illustrated in Figure 24. The new Cemex aggregate trips under Land Use Alternative 1, Access Alternative B were added to the year 2008 background traffic volumes. "Year 2008 with new Cemex aggregate trips" a.m. and p.m. peak hour turn volumes at the study area intersections under Land Use Alternative 1, Access Alternative B are illustrated in Figure 25. A level of service analysis was conducted to evaluate year 2008 peak hour traffic operations at the study area intersections for Land Use Alternative 1 with Access Alternative B. The results of this analysis are summarized in Table I. The level of service calculation sheets are contained in Appendix F. As indicated in Table I, all intersections examined are projected to operate at satisfactory levels of service under year 2008 Alternative 1 conditions with Access Alternative B.

Year 2008 Conditions – Land Use Alternative 1, Access Alternative D

This condition considers the addition of traffic generated by the increase in production under Land Use Alternative 1 to the 2008 background conditions, as well as changes in traffic patterns resulting from proposed access changes in Alternative D. The base intersection geometrics for Alternative D are illustrated in Figure 26. The change in trip patterns of the existing plant trips due to the use of Alternative D is shown in Figure 27. The change in background (non-plant) traffic in Alternative D due to the conversion of Third Street to a one-way street is illustrated in previously referenced Figure 24. The new Cemex aggregate trips under Land Use Alternative 1, Access Alternative D were added to the year 2008 background traffic volumes. "Year 2008 with new Cemex aggregate trips" a.m. and p.m. peak hour turn volumes at the study area intersections under Land Use Alternative 1, Access Alternative D are illustrated in Figure 28. A level of service analysis was conducted to evaluate year 2008 peak hour traffic operations at the study area intersections for Land Use





LSA

FIGURE 19

Legend

¤ Signal

⊣ Stop Sign

F Free Right Turn

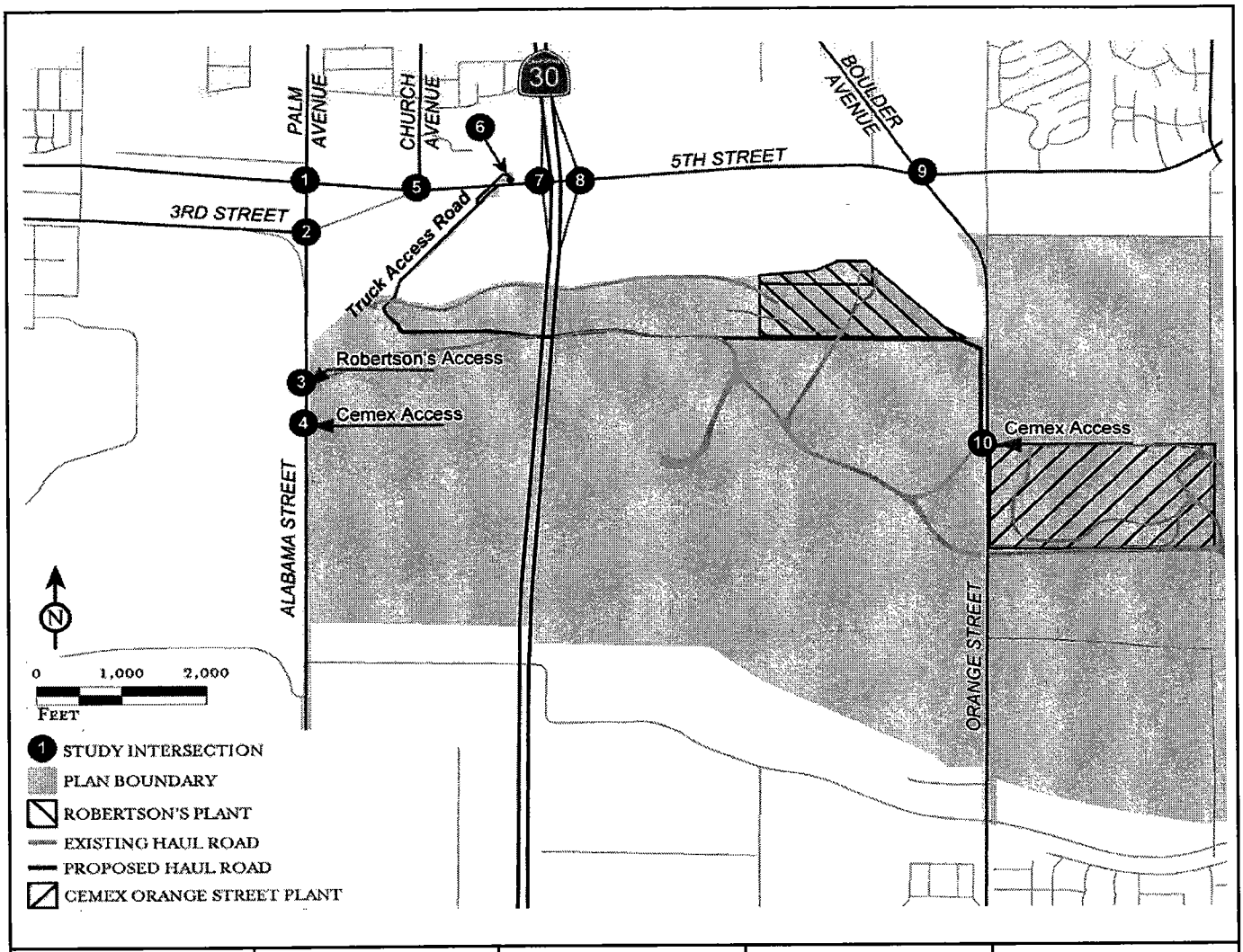
D De Facto Right Turn

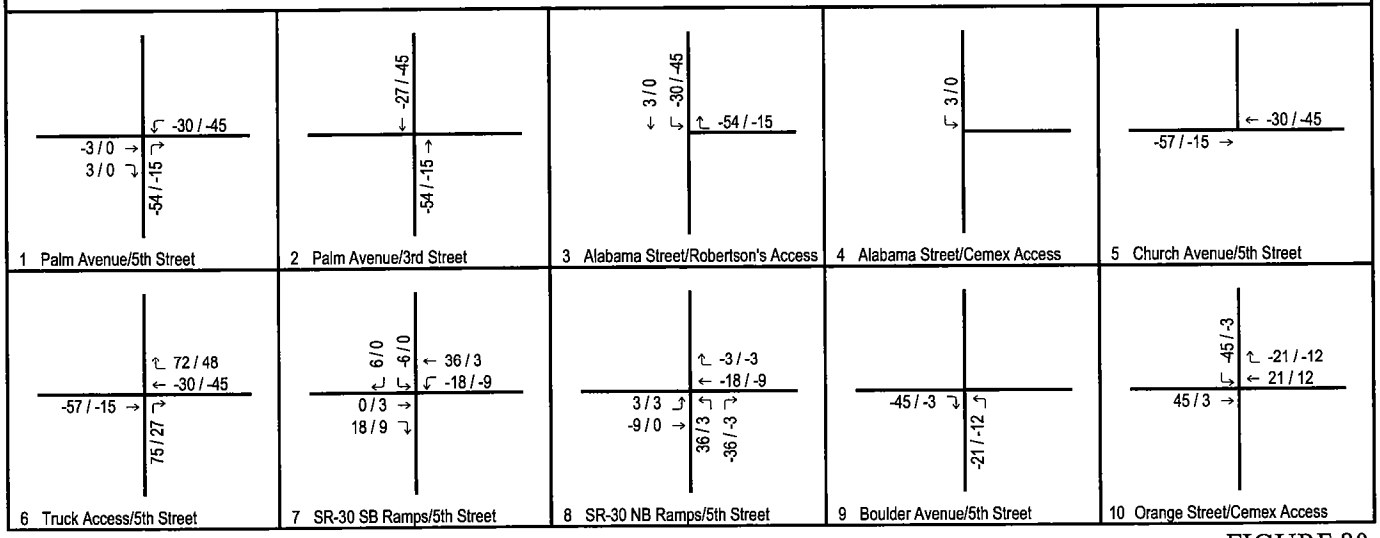
Upper Santa Ana River Wash

Base Intersection Geometrics and Stop Control

Access Alternative A

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_19_Alt A geometrics 1/25/2007





LSA

FIGURE 20

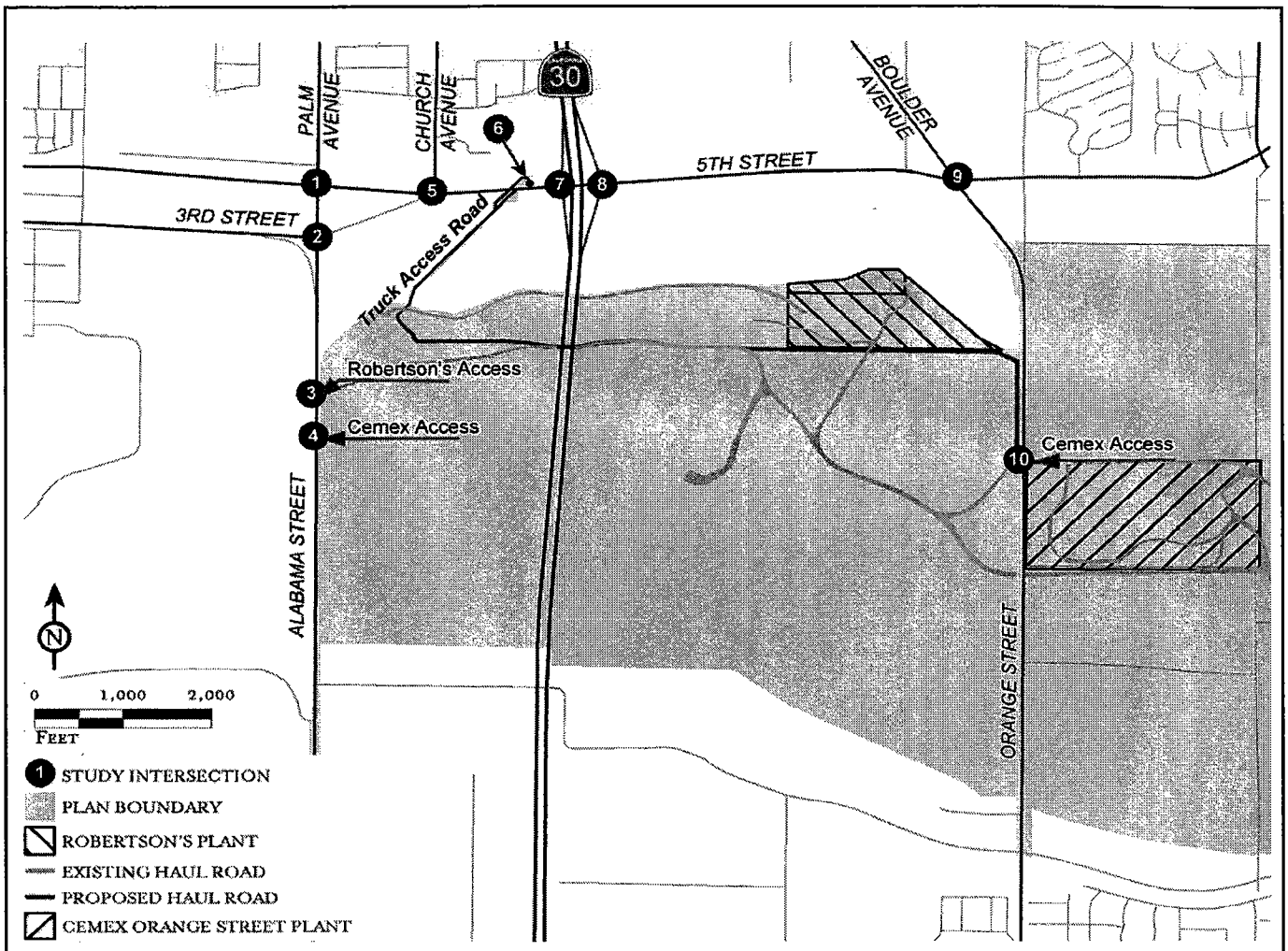
123 / 456 AM / PM Volume

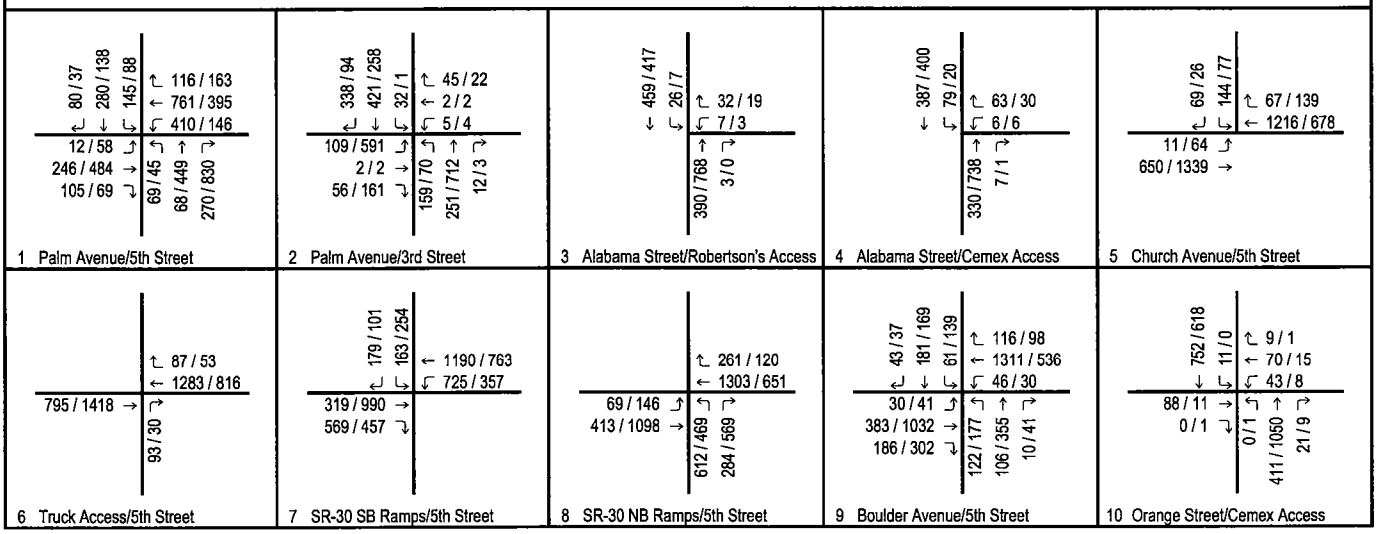
Upper Santa Ana River Wash

Change in Existing Plant Trips

Due to Fifth Street Access (Access Alternative A)

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_20_Plant Traffic Change to Alt A (1/25/2007)





LSA

FIGURE 21

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Year 2008 With New Cemex Aggregate Trips (in PCEs)

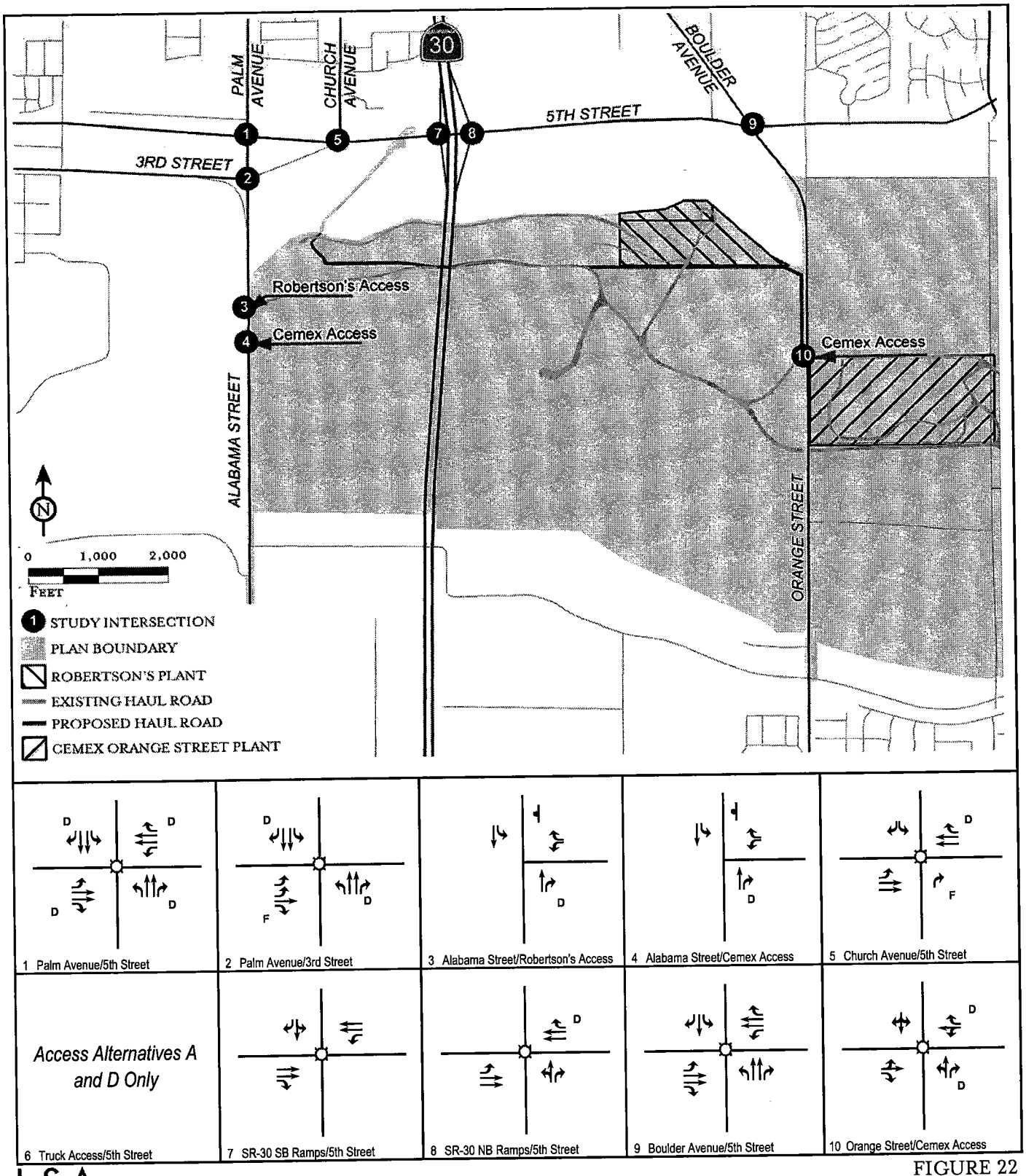
Land Use Alternative 1, Access Alternative A

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_21_2008 Alt 1A With New Cemex (1/25/2007)

Table H - Year 2008 Intersection Levels of Service
Land Use Alternative 1, Access Alternative A

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.62	33.4	C	0.86	47.3	D
2 . Palm Avenue/3rd Street	Signal	0.43	26.7	C	0.48	34.2	C
3 . Alabama Street/Robertson's Access	TWSC		12.5	B		17.2	C
4 . Alabama Street/Cemex Access	TWSC		11.6	B		17.5	C
5 . Church Avenue/5th Street	Signal	0.46	14.9	B	0.45	14.8	B
6 . Truck Access/5th Street	TWSC	*No Conflicting Movement*			*No Conflicting Movement*		
7 . SR-30 SB Ramps/5th Street	Signal	0.95	33.5	C	0.72	23.6	C
8 . SR-30 NB Ramps/5th Street	Signal	0.85	30.5	C	0.70	25.3	C
9 . Boulder Avenue/5th Street	Signal	0.66	31.2	C	0.57	29.9	C
10 . Orange Street/Cemex Access	Signal	0.62	9.3	A	0.72	5.2	A

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.



LSA

FIGURE 22

Legend
Signal
Stop Sign
F Free Right Turn
D De Facto Right Turn

Upper Santa Ana River Wash
Base Intersection Geometrics and Stop Control
Access Alternative B

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_22_Alt B geometrics 1/25/2007

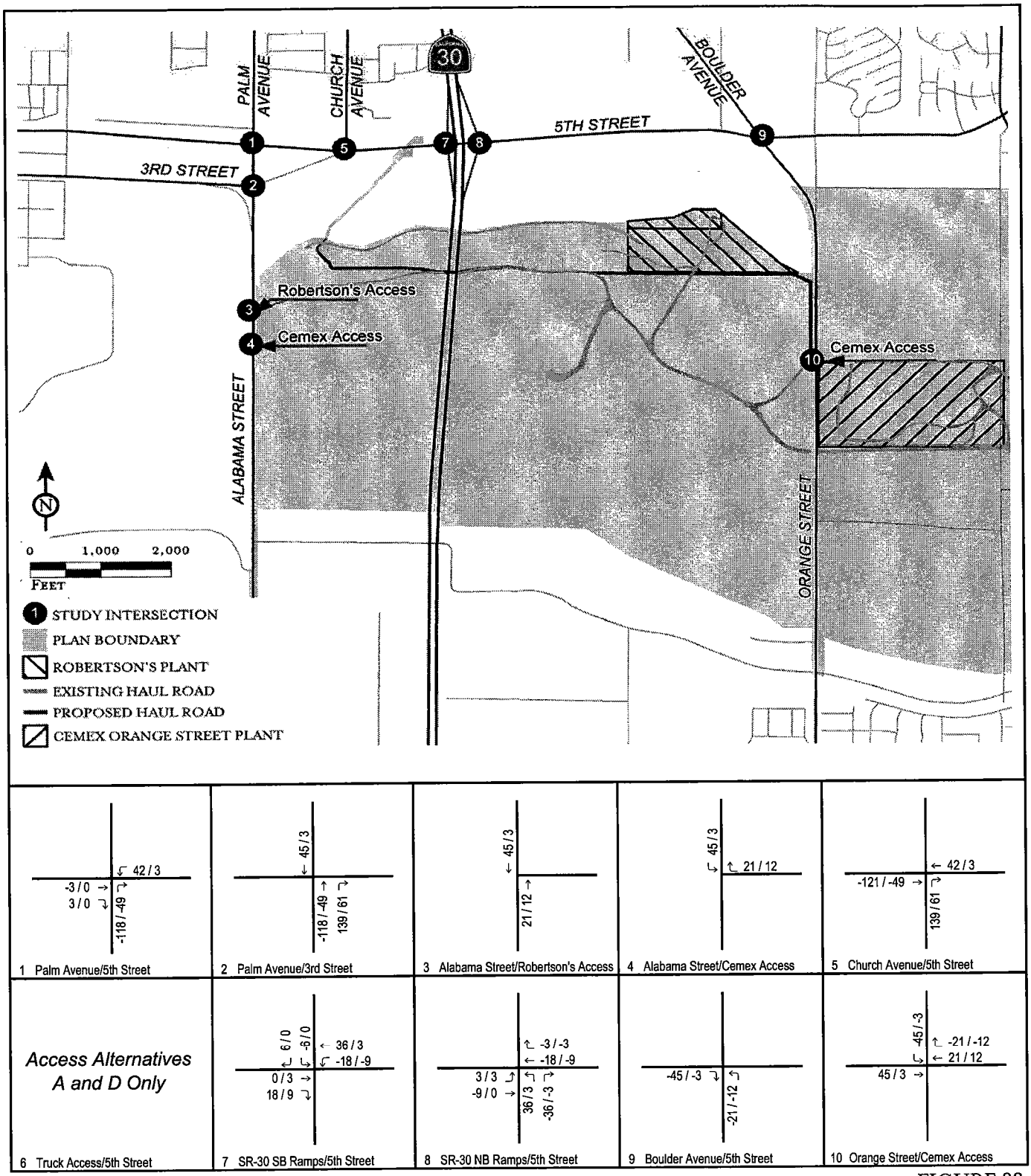


FIGURE 23

LSA

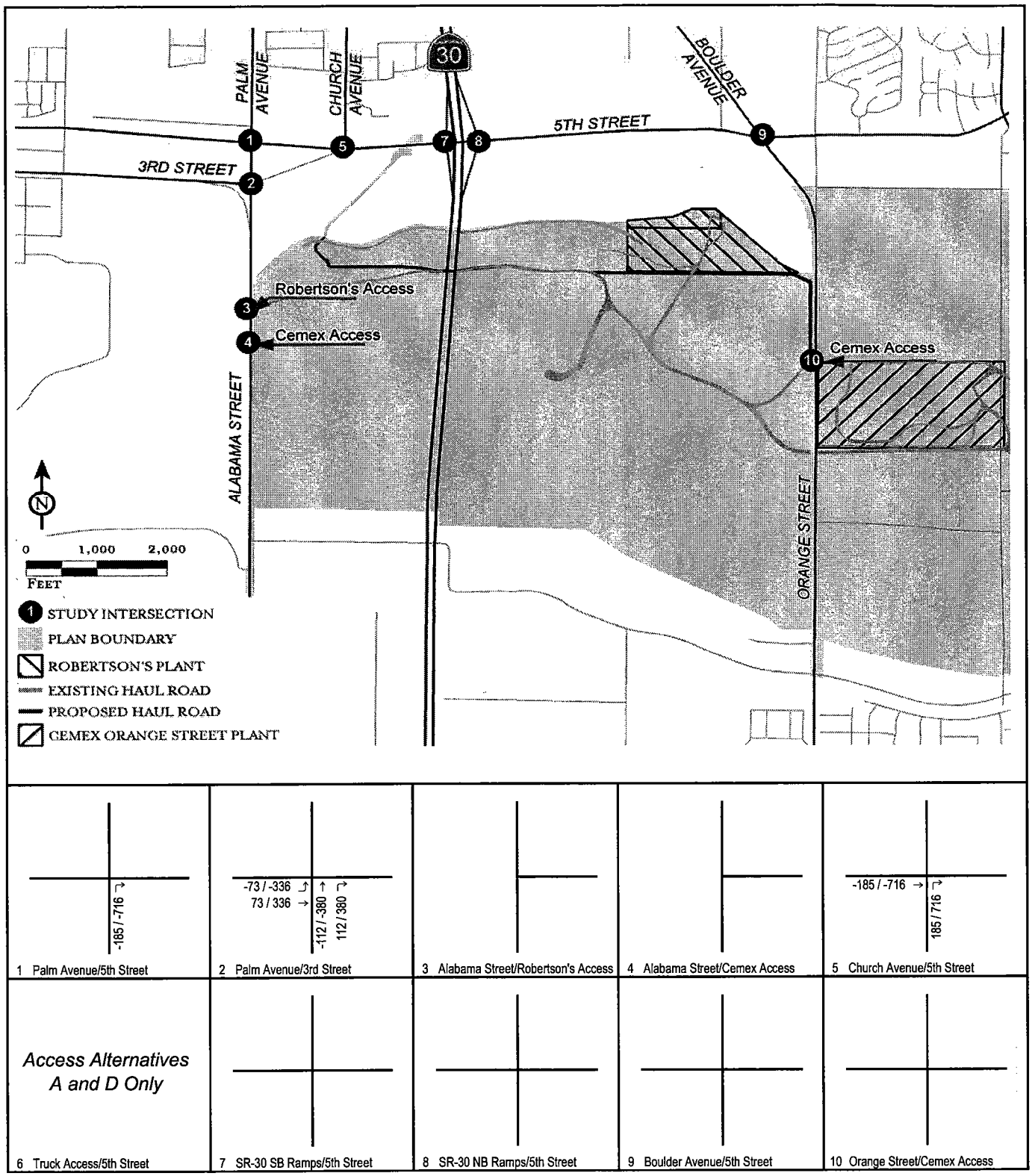
123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Change in Existing Plant Trips

Due to Conversion of 3rd Street to One-Way (Access Alternative B)

R:\SBW330\Traffic\Formatted To EIR\January 2007\g30_23_Plant Traffic Change to Alt B (1/25/2007)



LSA

FIGURE 24

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Change in 2008 Background (Non-Plant) Trips
Due to Conversion of 3rd Street to One-Way

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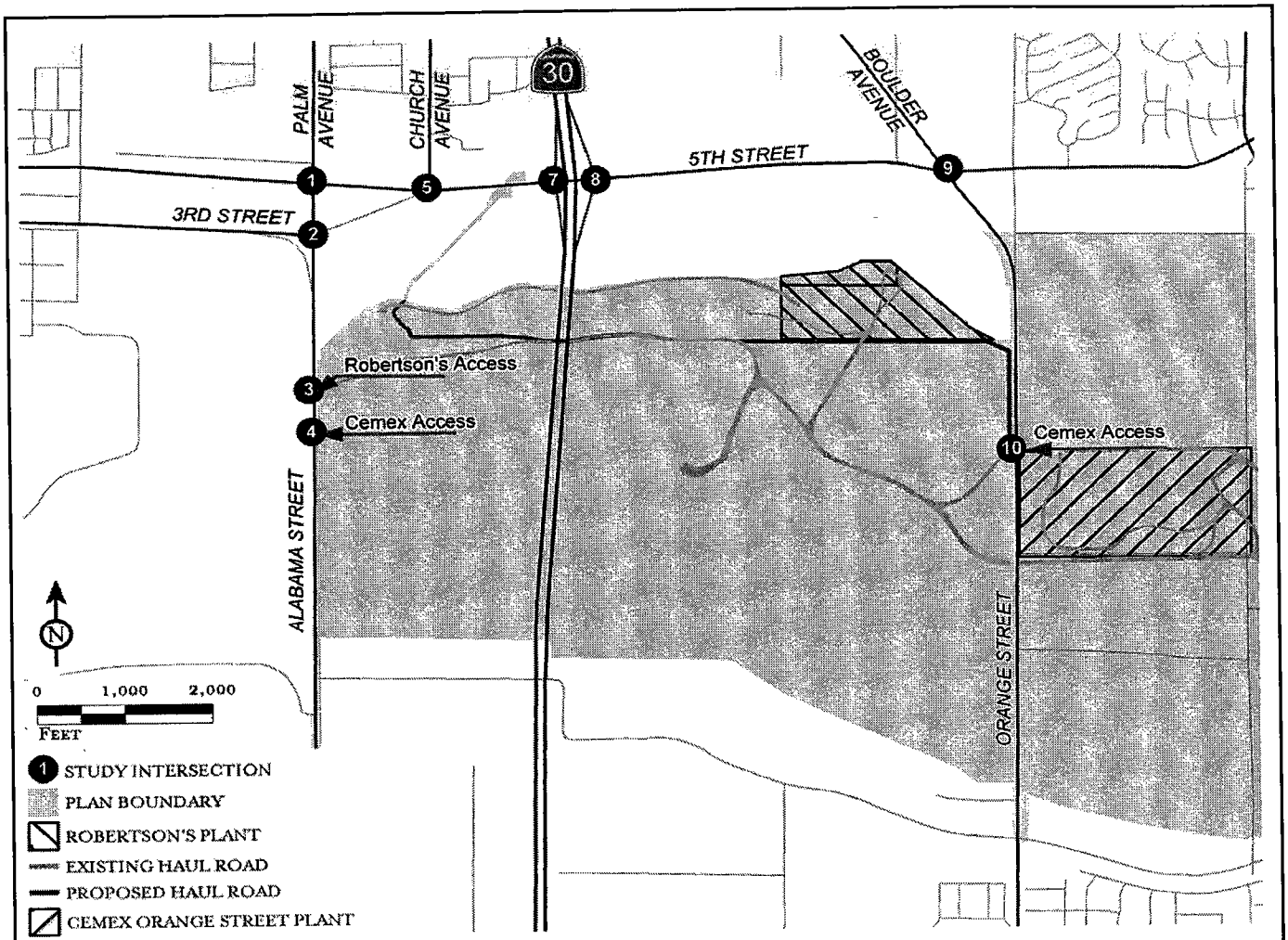

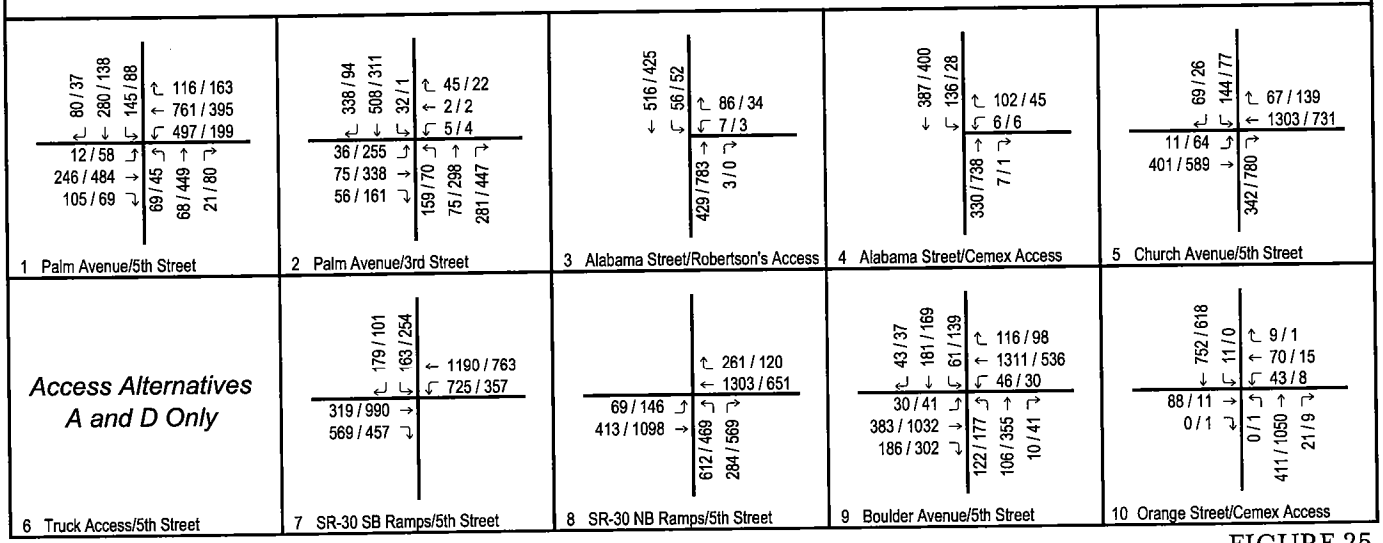

FIGURE 25

LSA

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Year 2008 With New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 1, Access Alternative B

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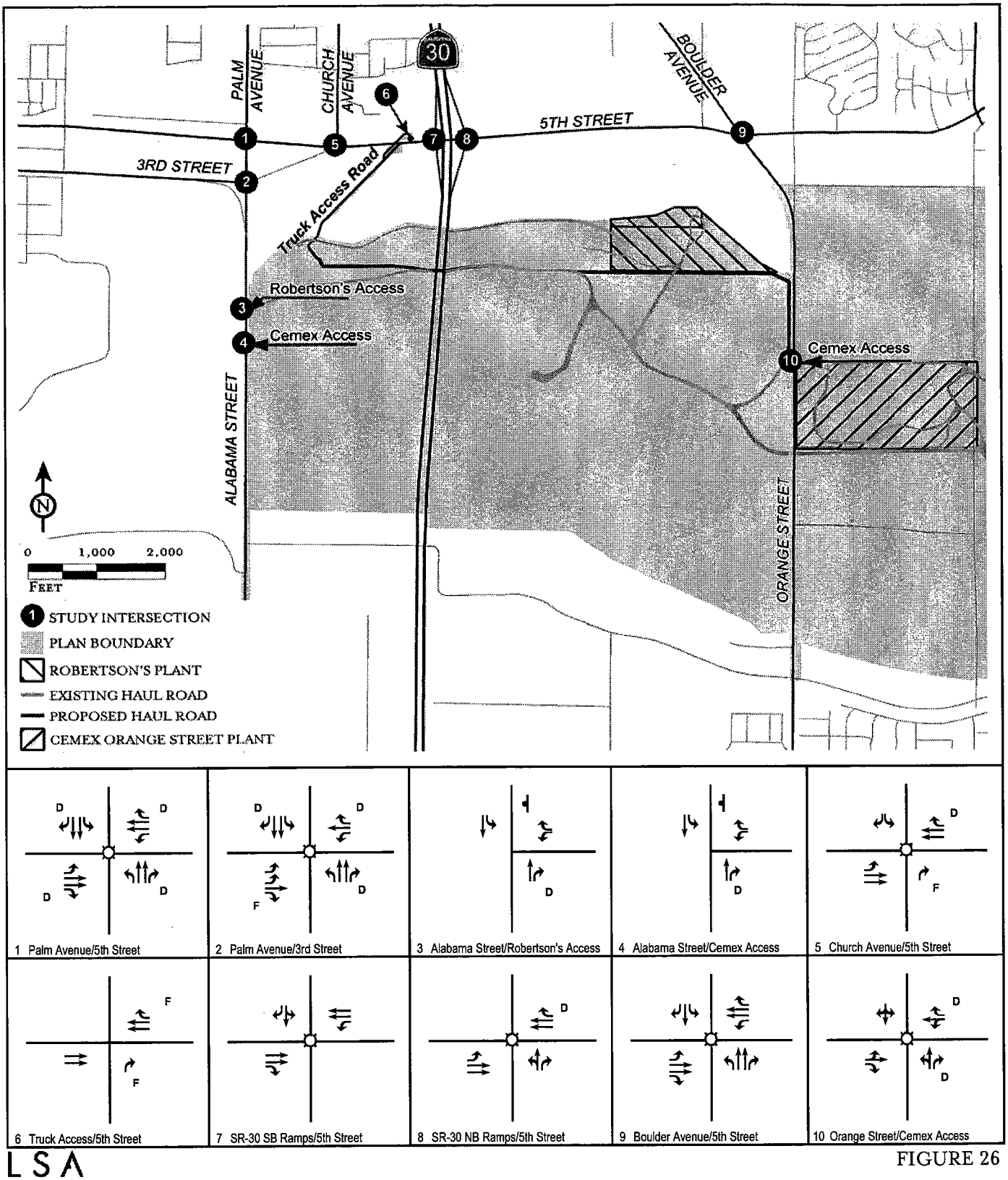
Table I - Year 2008 Intersection Levels of Service
Land Use Alternative 1, Access Alternative B

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.54	40.9	D	0.50	28.9	C
2 . Palm Avenue/3rd Street	Signal	0.41	26.1	C	0.53	29.6	C
3 . Alabama Street/Robertson's Access	TWSC		13.1	B		17.8	C
4 . Alabama Street/Cemex Access	TWSC		12.0	B		17.5	C
5 . Church Avenue/5th Street	Signal	0.49	16.5	B	0.30	12.7	B
6 . Truck Access/5th Street		*Access Alts. A & D Only*			*Access Alts. A & D Only*		
7 . SR-30 SB Ramps/5th Street	Signal	0.95	33.5	C	0.72	23.6	C
8 . SR-30 NB Ramps/5th Street	Signal	0.85	30.5	C	0.70	25.3	C
9 . Boulder Avenue/5th Street	Signal	0.66	31.2	C	0.57	29.9	C
10 . Orange Street/Cemex Access	Signal	0.62	9.3	A	0.72	5.2	A

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.



LSA

FIGURE 26

Legend
Signal
Stop Sign
F Free Right Turn
D De Facto Right Turn

Upper Santa Ana River Wash
Base Intersection Geometrics and Stop Control
Access Alternative D

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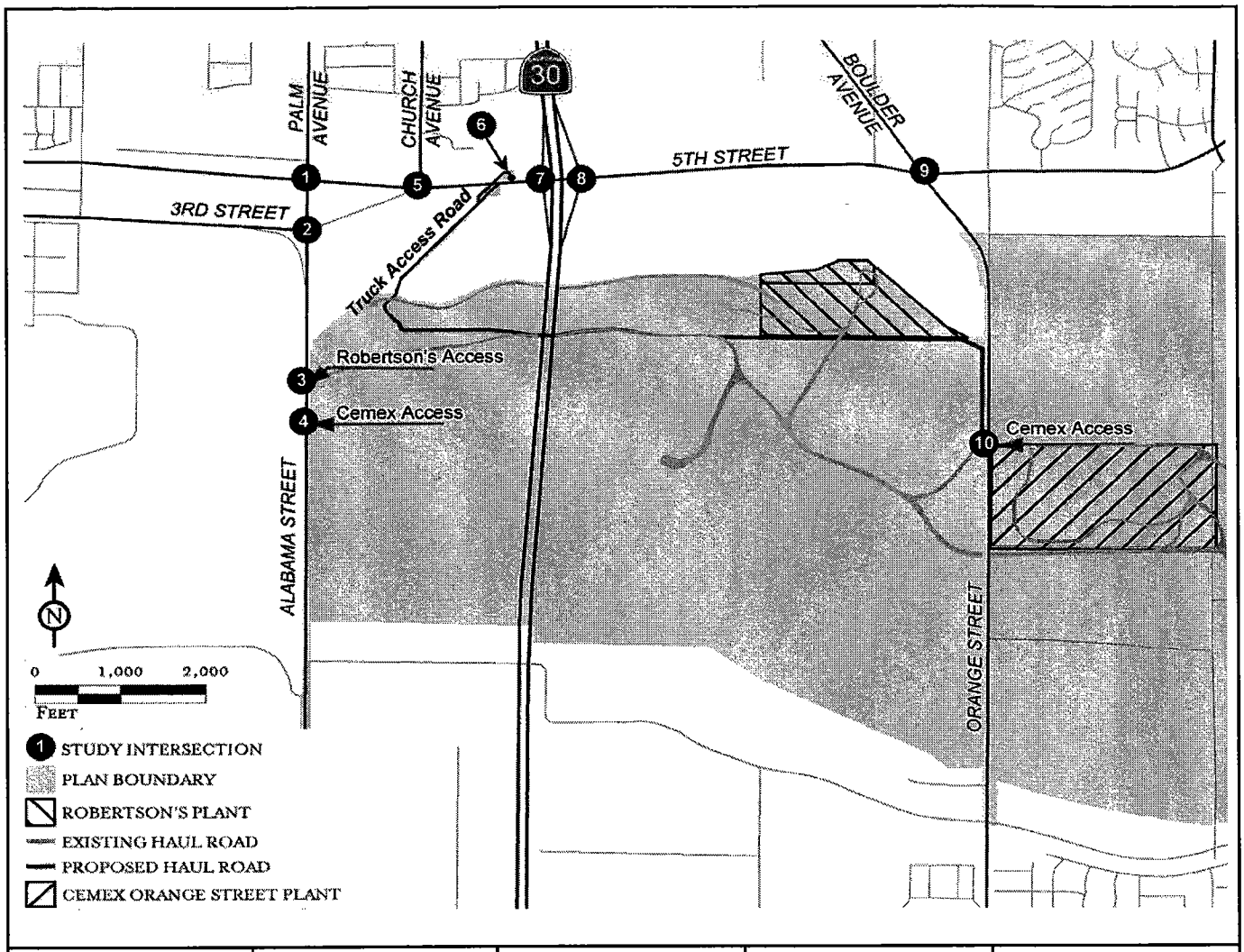

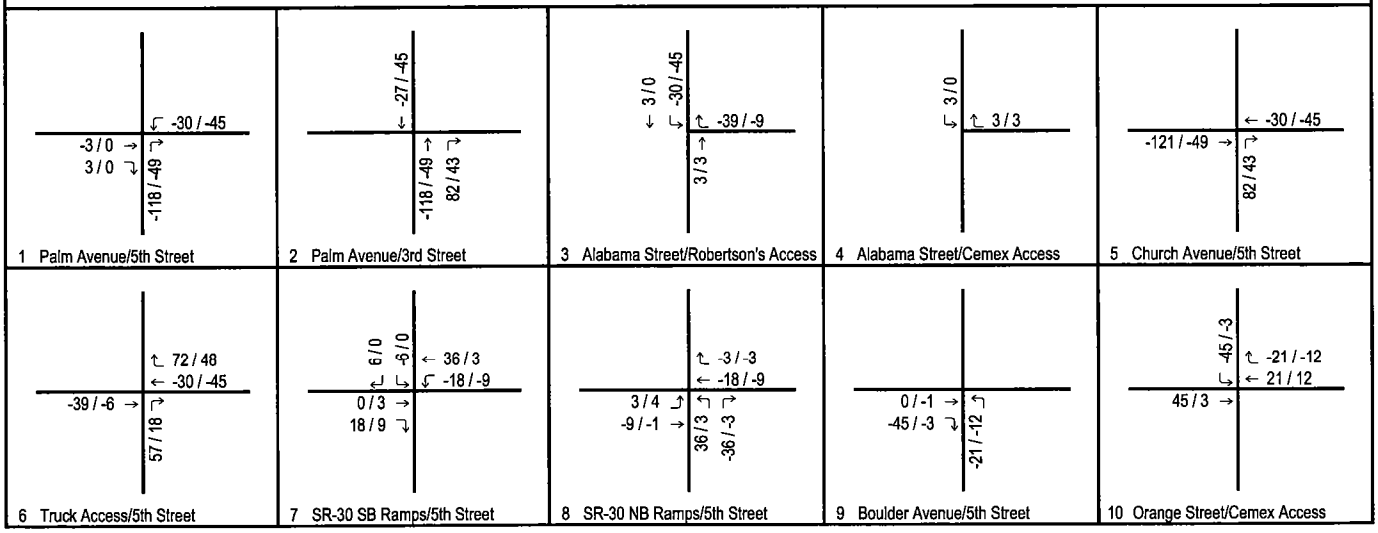

LSA

FIGURE 27

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Change in Existing Plant Trips

Due to Fifth Street Access (Access Alternative D)

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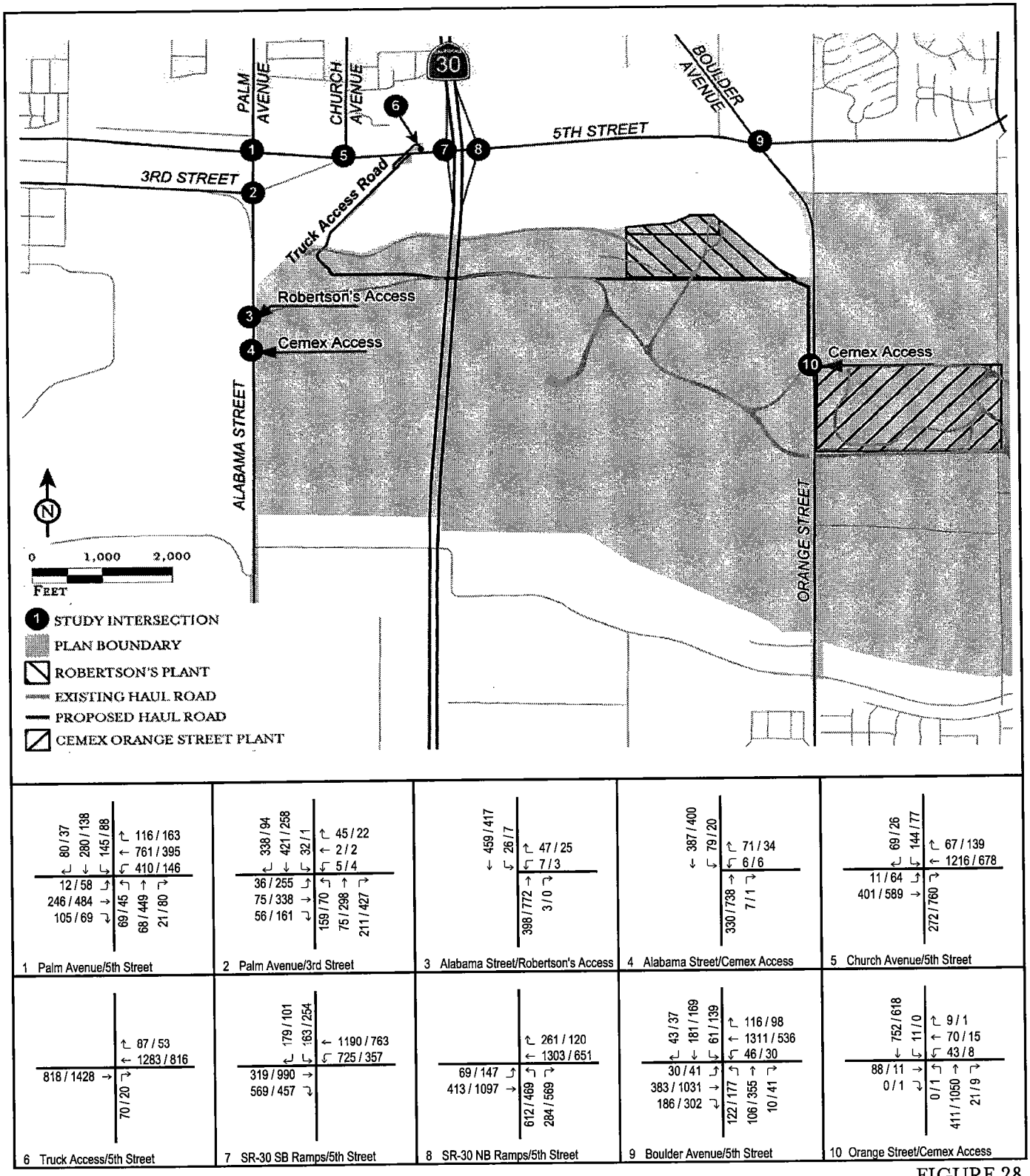

LSA

FIGURE 28

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Year 2008 With New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 1, Access Alternative D

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Alternative 1 with Access Alternative D. The results of this analysis are summarized in Table J. The level of service calculation sheets are contained in Appendix F. As indicated in Table J, all intersections examined are projected to operate at satisfactory levels of service under year 2008 Alternative 1 conditions with Access Alternative D.

Year 2008 Conditions – Land Use Alternative 2, Access Alternative C

This condition considers the addition of traffic generated by the increase in production under Land Use Alternative 2 to the 2008 background conditions. The base intersection geometrics for this alternative are unchanged from the existing geometrics illustrated in previously referenced Figure 3. There are no changes in plant trips or background traffic because access is unchanged from existing conditions (Access Alternative C). The new Cemex aggregate trips under Land Use Alternative 2 and Access Alternative C were added to the year 2008 background traffic volumes. "Year 2008 with new Cemex aggregate trips a.m. and p.m. peak hour turn volumes at the study area intersections under Land Use Alternative 2, Access Alternative C are illustrated in Figure 29. A level of service analysis was conducted to evaluate year 2008 peak hour traffic operations at the study area intersections for Land Use Alternative 2. The results of this analysis are summarized in Table K. The level of service calculation sheets are contained in Appendix F. As indicated in Table K, all intersections examined are projected to operate at satisfactory levels of service under year 2008 Alternative 2 conditions with Access Alternative C with the exception of the following intersection:

- Palm Avenue/Fifth Street.

FORECAST YEAR 2030 CONDITIONS

This section discusses forecast year 2030 traffic conditions, which were developed using the approach discussed in the Analysis Methodology section.

Year 2030 Background Conditions (Land Use Alternatives 3 And 4, Access Alternative C)

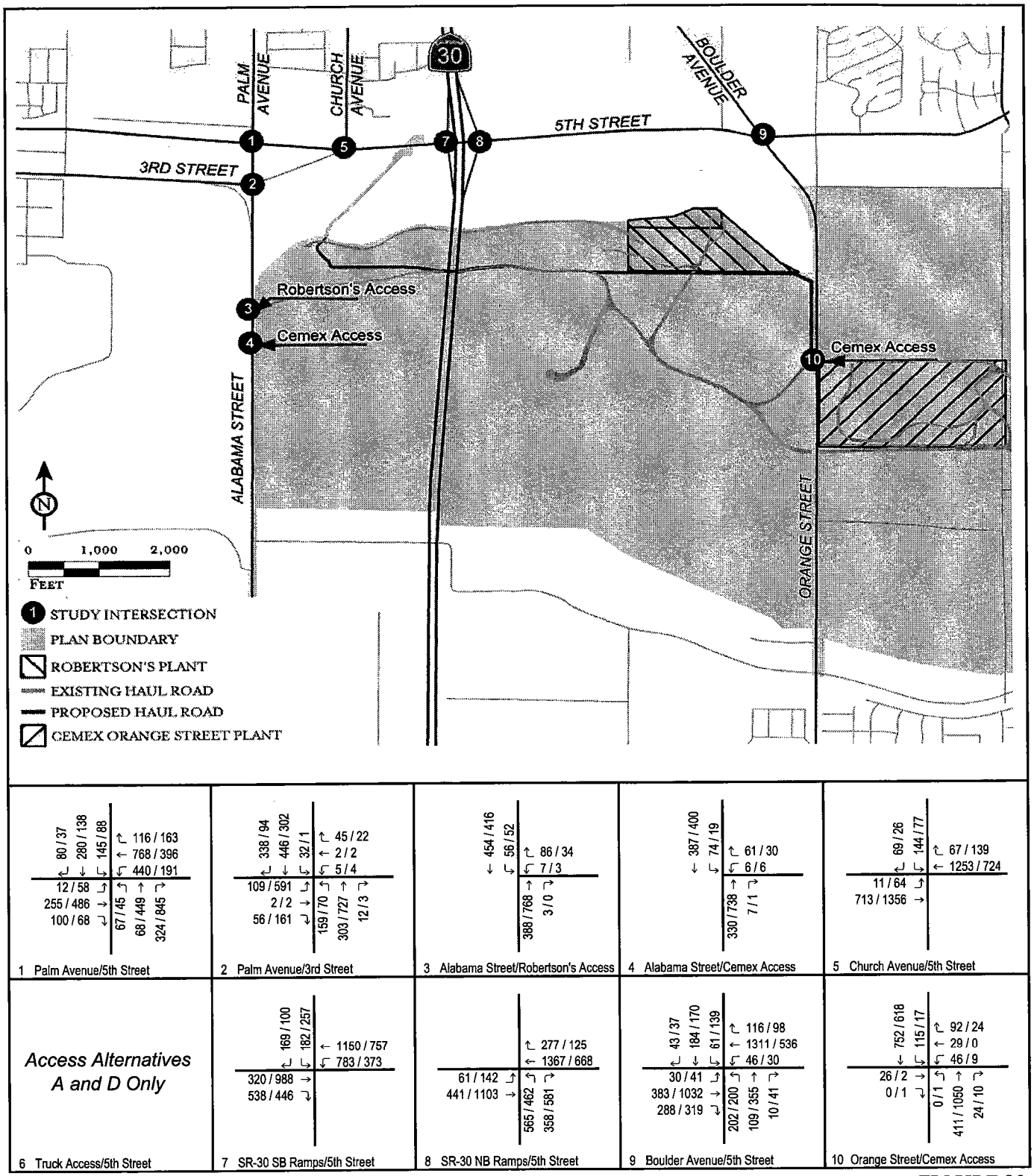
This condition considers year 2030 conditions without any increase in production at either plant. The base intersection geometrics for this alternative are the same as the existing geometrics illustrated in previously referenced Figure 3. Year 2030 a.m. and p.m. peak hour turn volumes at the study area intersections under Alternatives 3 and 4 are illustrated in Figure 30. A level of service analysis was conducted to evaluate year 2030 peak hour traffic operations at the study area intersections for background conditions. The results of this analysis are summarized in Table L. The level of service calculation sheets are contained in Appendix F. As indicated in Table L, all intersections examined are projected to operate at LOS E or F during at least one peak hour under year 2030 background conditions, with exception of the following intersection:

- Church Avenue/Fifth Street.

Table J - Year 2008 Intersection Levels of Service
Land Use Alternative 1, Access Alternative D

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.49	33.4	C	0.47	28.3	C
2 . Palm Avenue/3rd Street	Signal	0.41	26.0	C	0.52	29.6	C
3 . Alabama Street/Robertson's Access	TWSC		12.4	B		17.2	C
4 . Alabama Street/Cemex Access	TWSC		11.6	B		17.4	C
5 . Church Avenue/5th Street	Signal	0.46	15.7	B	0.28	12.7	B
6 . Truck Access/5th Street		*No Conflicting Movement*			*No Conflicting Movement*		
7 . SR-30 SB Ramps/5th Street	Signal	0.95	33.5	C	0.72	23.6	C
8 . SR-30 NB Ramps/5th Street	Signal	0.85	30.5	C	0.70	25.3	C
9 . Boulder Avenue/5th Street	Signal	0.66	31.2	C	0.57	29.9	C
10 . Orange Street/Cemex Access	Signal	0.62	9.3	A	0.72	5.2	A

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.



LSA

FIGURE 29

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Year 2008 With New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 2, Access Alternative C

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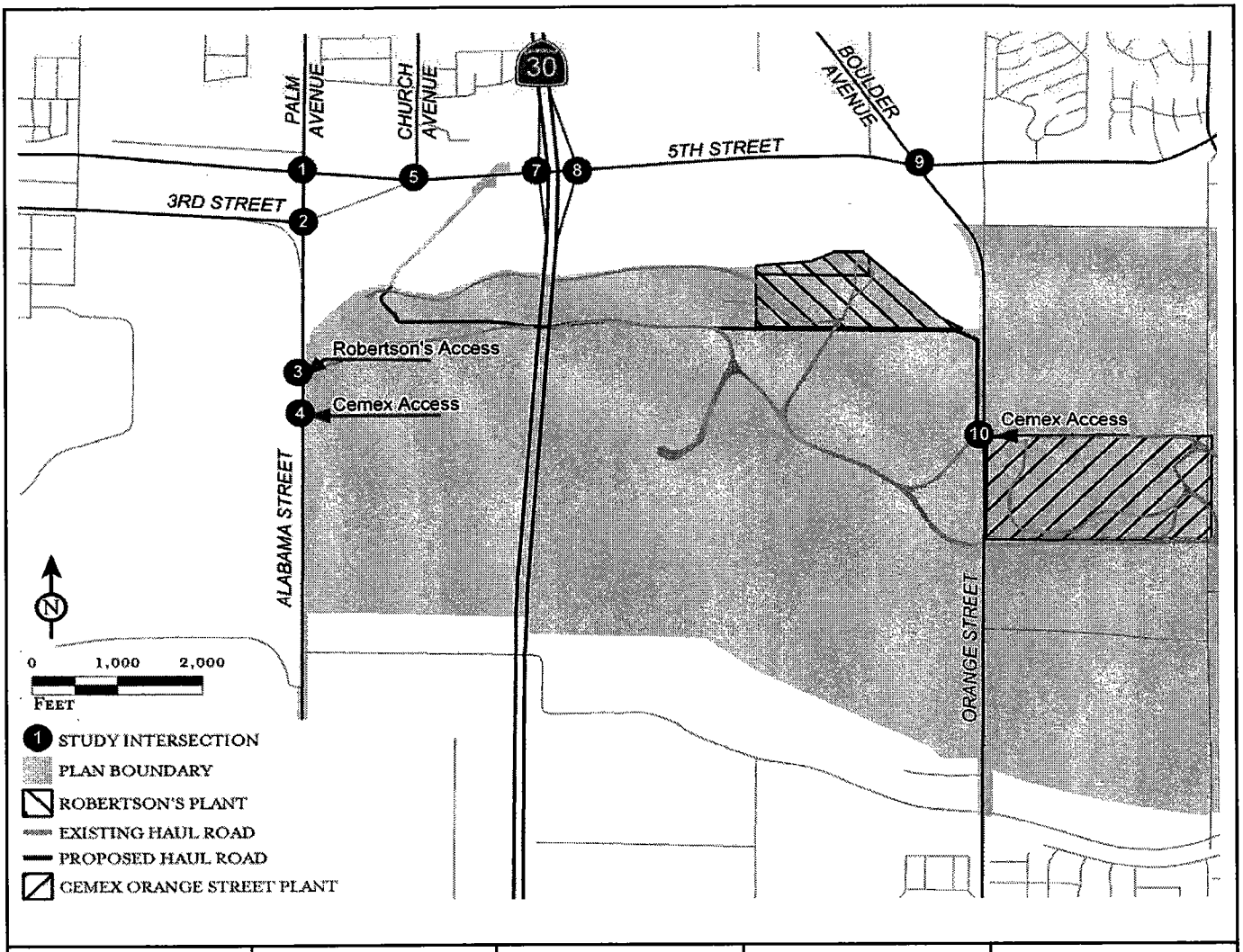
Table K - Year 2008 Intersection Levels of Service
Land Use Alternative 2, Access Alternative C

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour			
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS	
1 . Palm Avenue/5th Street	Signal	0.78	44.7	D	0.93	59.8	E	*
2 . Palm Avenue/3rd Street	Signal	0.43	26.9	C	0.48	35.0	C	
3 . Alabama Street/Robertson's Access	TWSC		12.5	B		17.5	C	
4 . Alabama Street/Cemex Access	TWSC		11.6	B		17.4	C	
5 . Church Avenue/5th Street	Signal	0.47	15.0	B	0.46	14.8	B	
6 . Truck Access/5th Street		*Access Alts. A & D Only*			*Access Alts. A & D Only*			
7 . SR-30 SB Ramps/5th Street	Signal	0.98	36.7	D	0.73	24.1	C	
8 . SR-30 NB Ramps/5th Street	Signal	0.83	28.8	C	0.71	25.5	C	
9 . Boulder Avenue/5th Street	Signal	0.72	41.0	D	0.59	30.7	C	
10 . Orange Street/Cemex Access	Signal	0.68	8.6	A	0.71	5.2	A	

* Exceeds LOS standard.

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.



120 / 67 ↲ 893 / 325 ↓ 102 / 61 ↳ ↱ 74 / 125 ← 995 / 534 ↰ 1173 / 335 22 / 76 ↳ 317 / 783 → 219 / 275 ↴ 84 / 196 ↰ 134 / 974 ↑ 521 / 1611 ↱ 1 Palm Avenue/5th Street	625 / 281 ↲ 1634 / 653 ↓ 26 / 1 ↳ ↱ 40 / 16 ← 1 / 4 ↰ 8 / 6 273 / 880 ↳ 5 / 1 → 343 / 456 ↴ 295 / 463 ↰ 426 / 1885 ↑ 11 / 4 ↱ 2 Palm Avenue/3rd Street	1931 / 1063 ↓ 56 / 52 ↳ ↱ 86 / 34 ↰ 7 / 3 646 / 2318 → 3 / 0 ↱ 3 Alabama Street/Robertson's Access	1864 / 1047 ↓ 74 / 19 ↳ ↱ 61 / 30 ↰ 6 / 6 588 / 2288 → 7 / 1 ↱ 4 Alabama Street/Cemex Access	225 / 59 ↲ 191 / 89 ↳ ↱ 76 / 193 ← 2017 / 936 25 / 165 ↳ 914 / 2291 → 5 Church Avenue/5th Street
Access Alternatives A and D Only 6 Truck Access/5th Street	439 / 134 ↲ 275 / 248 ↳ ← 1654 / 996 ↰ 765 / 497 307 / 1430 → 798 / 950 ↴ 7 SR-30 SB Ramps/5th Street	↱ 280 / 194 ← 1569 / 874 113 / 239 ↳ 469 / 1439 → 850 / 619 ↰ 452 / 753 ↱ 8 SR-30 NB Ramps/5th Street	11 / 64 ↲ 687 / 772 ↓ 207 / 321 ↳ ↱ 76 / 107 ← 1246 / 155 ↰ 441 / 4 3 / 11 ↳ 450 / 1001 → 367 / 458 ↴ 271 / 625 ↰ 220 / 1059 ↑ 49 / 64 ↱ 9 Boulder Avenue/5th Street	1762 / 1474 ← 56 / 3 ↳ ↱ 30 / 13 ← 29 / 0 ↰ 42 / 8 26 / 2 → 0 / 1 ↴ 0 / 1 ↰ 678 / 2176 ↑ 20 / 9 ↱ 10 Orange Street/Cemex Access

LSA

FIGURE 30

123 / 456 AM / PM Volume

Upper Santa Ana River Wash
Year 2030 Background
Peak Hour PCE Traffic Volumes

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Table L - Year 2030 Background (With Plant) Intersection Levels of Service

Intersection	Control	A.M. Peak Hour V/C	A.M. Peak Hour Delay (sec)	A.M. Peak Hour LOS		P.M. Peak Hour V/C	P.M. Peak Hour Delay (sec)	P.M. Peak Hour LOS	
1 . Palm Avenue/5th Street	Signal	1.26	191.9	F	*	1.46	187.2	F	*
2 . Palm Avenue/3rd Street	Signal	0.80	71.5	E	*	0.87	180.2	F	*
3 . Alabama Street/Robertson's Access	TWSC		35.6	E	*		337.8	F	*
4 . Alabama Street/Cemex Access	TWSC		33.2	D			359.4	F	*
5 . Church Avenue/5th Street	Signal	0.74	30.1	C		0.71	24.5	C	
6 . Truck Access/5th Street		*Access Alts. A & D Only*				*Access Alts. A & D Only*			
7 . SR-30 SB Ramps/5th Street	Signal	1.21	74.1	F	*	1.02	38.1	F	*
8 . SR-30 NB Ramps/5th Street	Signal	1.06	66.7	F	*	0.87	32.7	C	
9 . Boulder Avenue/5th Street	Signal	1.09	83.5	F	*	1.17	111.9	F	*
10 . Orange Street/Cemex Access	Signal	1.15	84.4	F	*	1.33	146.5	F	*

* Exceeds LOS standard.

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.

Year 2030 Conditions – Land Use Alternative 1, Access Alternative A

This condition considers the addition of traffic generated by the increase in production under Land Use Alternative 1 to the 2030 background conditions, as well as changes in traffic patterns resulting from proposed access changes in Alternative A. The base intersection geometrics for Alternative A are illustrated in previously referenced Figure 19. The change in project trips due to the use of Alternative A is the same as that illustrated for year 2008 conditions, shown in previously referenced Figure 20. The new Cemex aggregate trips under Land Use Alternative 1, Access Alternative A were added to the year 2030 background traffic volumes. "Year 2030 with new Cemex aggregate trips" a.m. and p.m. peak hour turn volumes at the study area intersections under Land Use Alternative 1, Access Alternative A are illustrated in Figure 31. A level of service analysis was conducted to evaluate year 2030 peak hour traffic operations at the study area intersections for Land Use Alternative 1 with Access Alterative A. The results of this analysis are summarized in Table M. The level of service calculation sheets are contained in Appendix F. As indicated in Table M, all intersections examined are projected to operate at LOS E or F during at least one peak hour under year 2030 Alternative 1 conditions with Access Alternative A, with exception of the following two intersections:

- Church Avenue/Fifth Street; and
- Truck Access/Fifth Street.

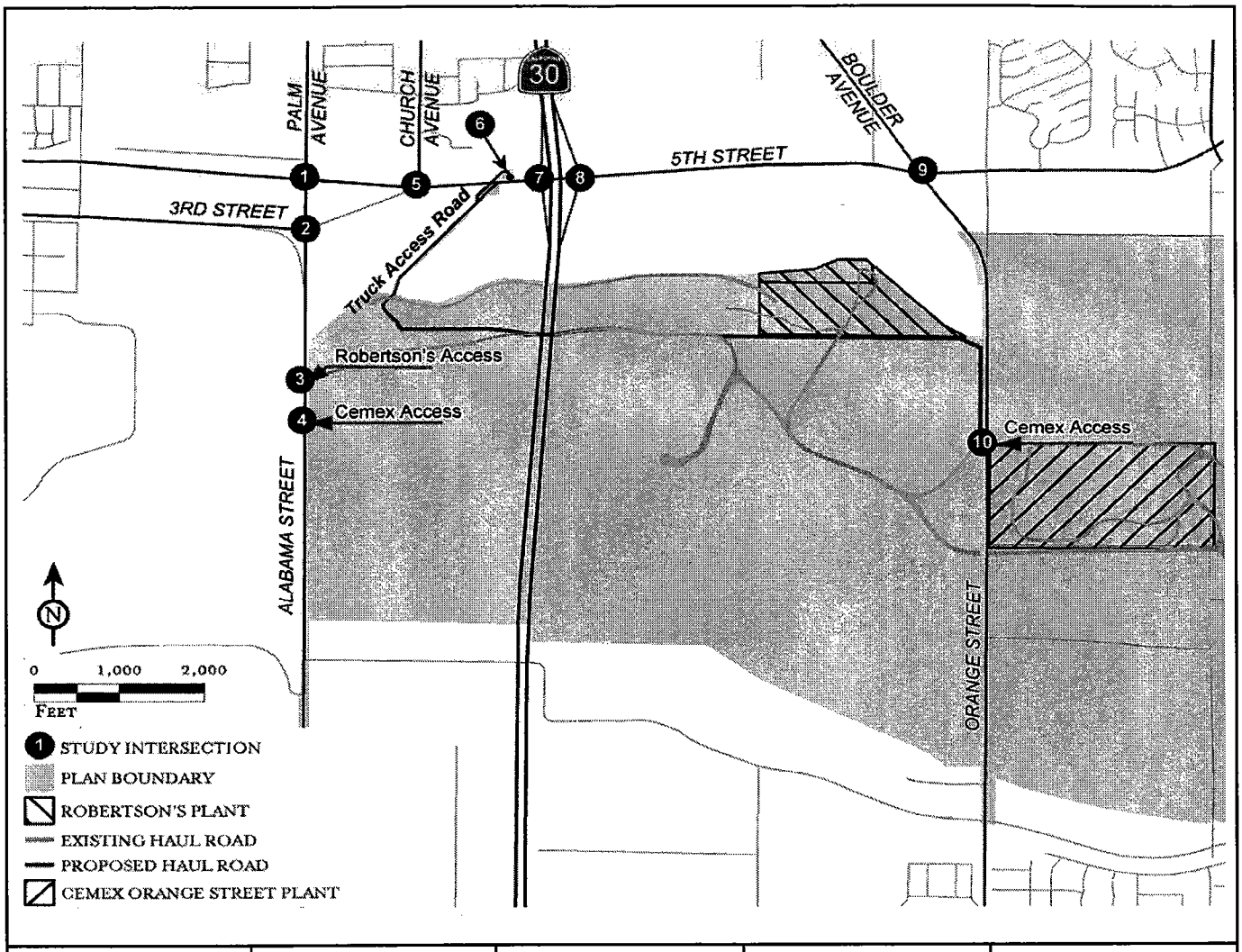
Year 2030 Conditions – Land Use Alternative 1, Access Alternative B

This condition considers the addition of traffic generated by the increase in production under Land Use Alternative 1 to the 2030 Background conditions, as well as changes in traffic patterns resulting from proposed access changes in Alternative B. The base intersection geometrics for Alternative B (prior to mitigation) are illustrated in previously referenced Figure 22. The change in project trips due to the use of Alternative B is the same as that illustrated for year 2008 conditions, shown in previously referenced Figure 23. The change in 2030 background (non-plant) traffic in Alternative B due to the conversion of Third Street to a one-way street is illustrated in Figure 32. The new Cemex aggregate trips under Land Use Alternative 1, Access Alternative B were added to the year 2030 background traffic volumes. "Year 2030 with new Cemex aggregate trips" a.m. and p.m. peak hour turn volumes at the study area intersections under Land Use Alternative 1, Access Alternative B are illustrated in Figure 33. The results of this analysis are summarized in Table N. The level of service calculation sheets are contained in Appendix F. As indicated in Table N, all intersections examined are projected to operate at LOS E or F during at least one peak hour under year 2030 Alternative 1 conditions with Access Alternative B, with exception of the following intersection:

- Church Avenue/Fifth Street.

Year 2030 Conditions – Land Use Alternative 1, Access Alternative D

This condition considers the addition of traffic generated by the increase in production under Land Use Alternative 1 to the 2030 Background conditions, as well as changes in traffic patterns resulting from proposed access changes in Alternative D. The base intersection geometrics for Alternative D (prior to mitigation) are illustrated in previously referenced Figure 26. The change in project trips due



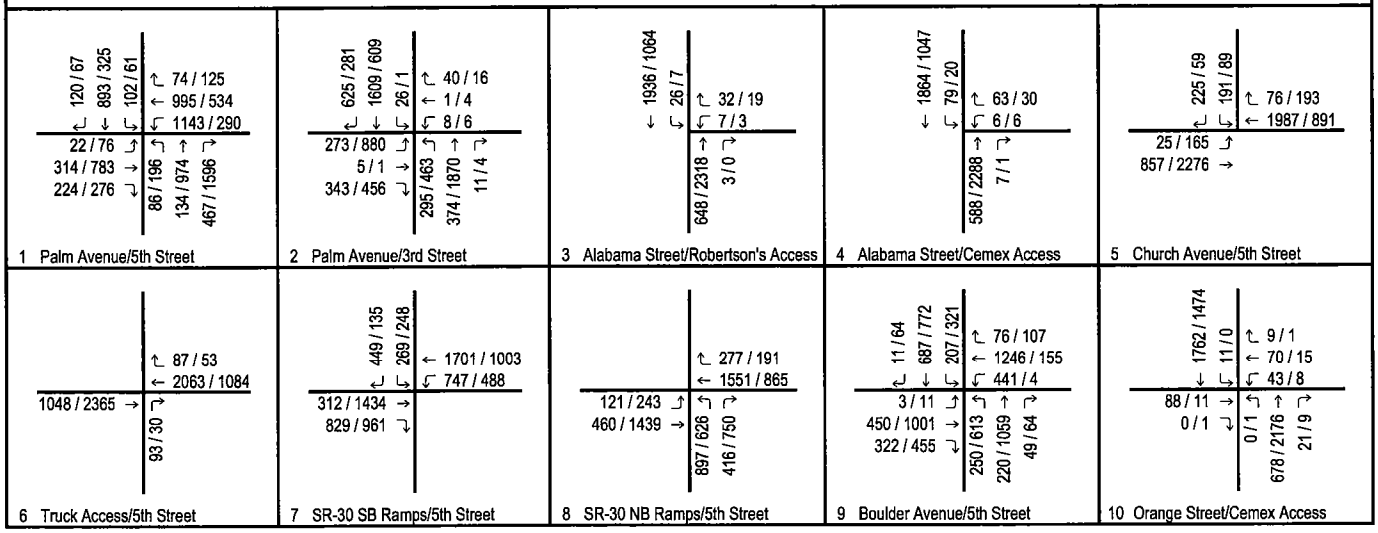


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FIGURE 31

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Year 2030 With New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 1, Access Alternative A

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Table M - Year 2030 Intersection Levels of Service
Land Use Alternative 1, Access Alternative A

Intersection	Control	A.M. Peak Hour V/C	A.M. Peak Hour Delay (sec)	A.M. Peak Hour LOS		P.M. Peak Hour V/C	P.M. Peak Hour Delay (sec)	P.M. Peak Hour LOS	
1 . Palm Avenue/5th Street	Signal	1.21	179.8	F	*	1.42	175.0	F	*
2 . Palm Avenue/3rd Street	Signal	0.79	64.6	E	*	0.87	167.7	F	*
3 . Alabama Street/Robertson's Access	TWSC		56.2	F	*		253.3	F	*
4 . Alabama Street/Cemex Access	TWSC		33.2	D			361.1	F	*
5 . Church Avenue/5th Street	Signal	0.73	28.2	C		0.71	23.9	C	
6 . Truck Access/5th Street	TWSC	*No Conflicting Movement*				*No Conflicting Movement*			
7 . SR-30 SB Ramps/5th Street	Signal	1.22	76.1	F	*	1.02	37.9	F	*
8 . SR-30 NB Ramps/5th Street	Signal	1.09	74.6	F	*	0.87	32.7	C	
9 . Boulder Avenue/5th Street	Signal	1.05	80.3	F	*	1.16	109.7	F	*
10 . Orange Street/Cemex Access	Signal	1.15	74.3	F	*	1.34	141.0	F	*

* Exceeds LOS standard.

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.

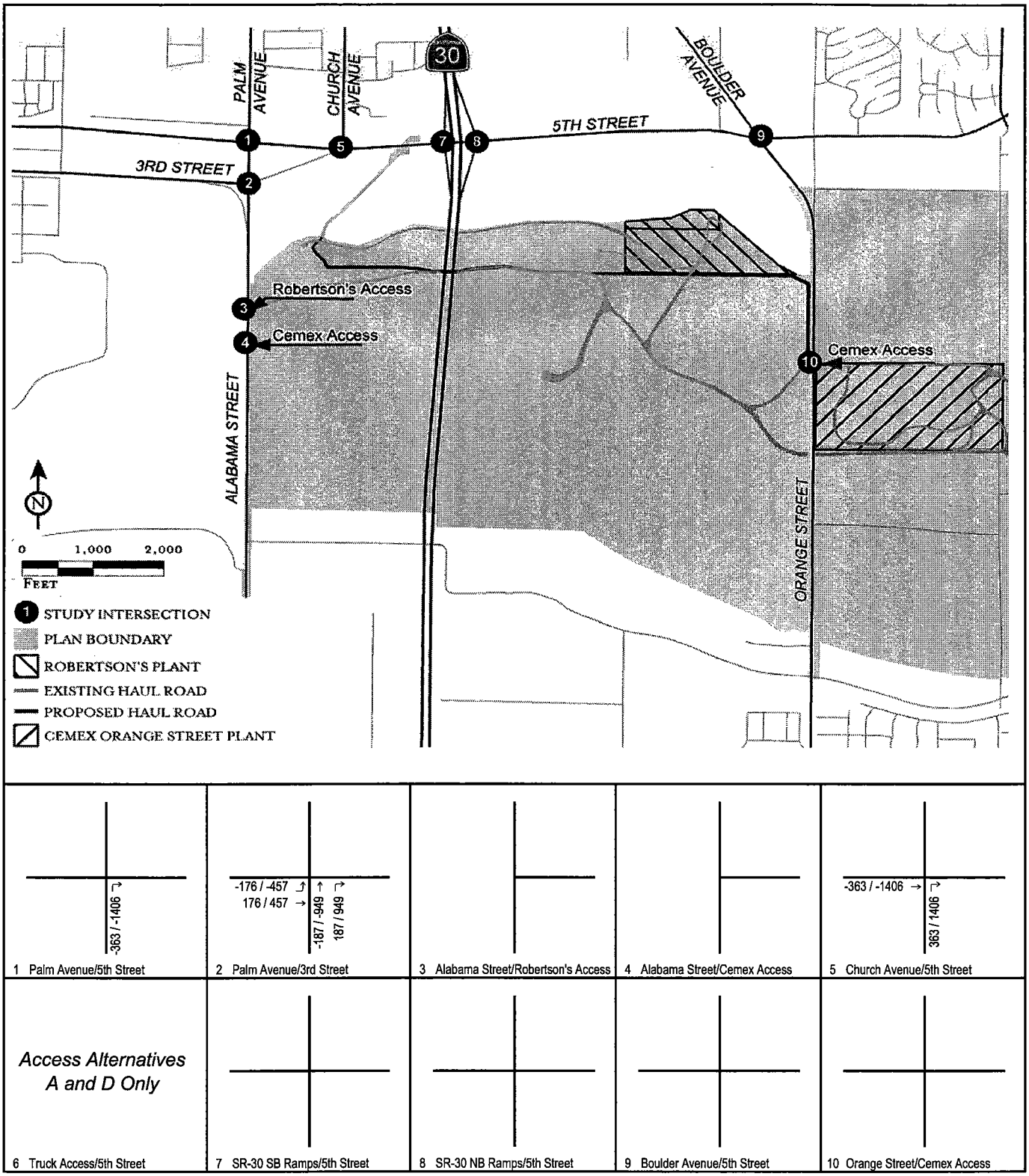

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FIGURE 32

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Change in 2030 Background (Non-Plant) Trips
Due to Conversion of 3rd Street to One-Way

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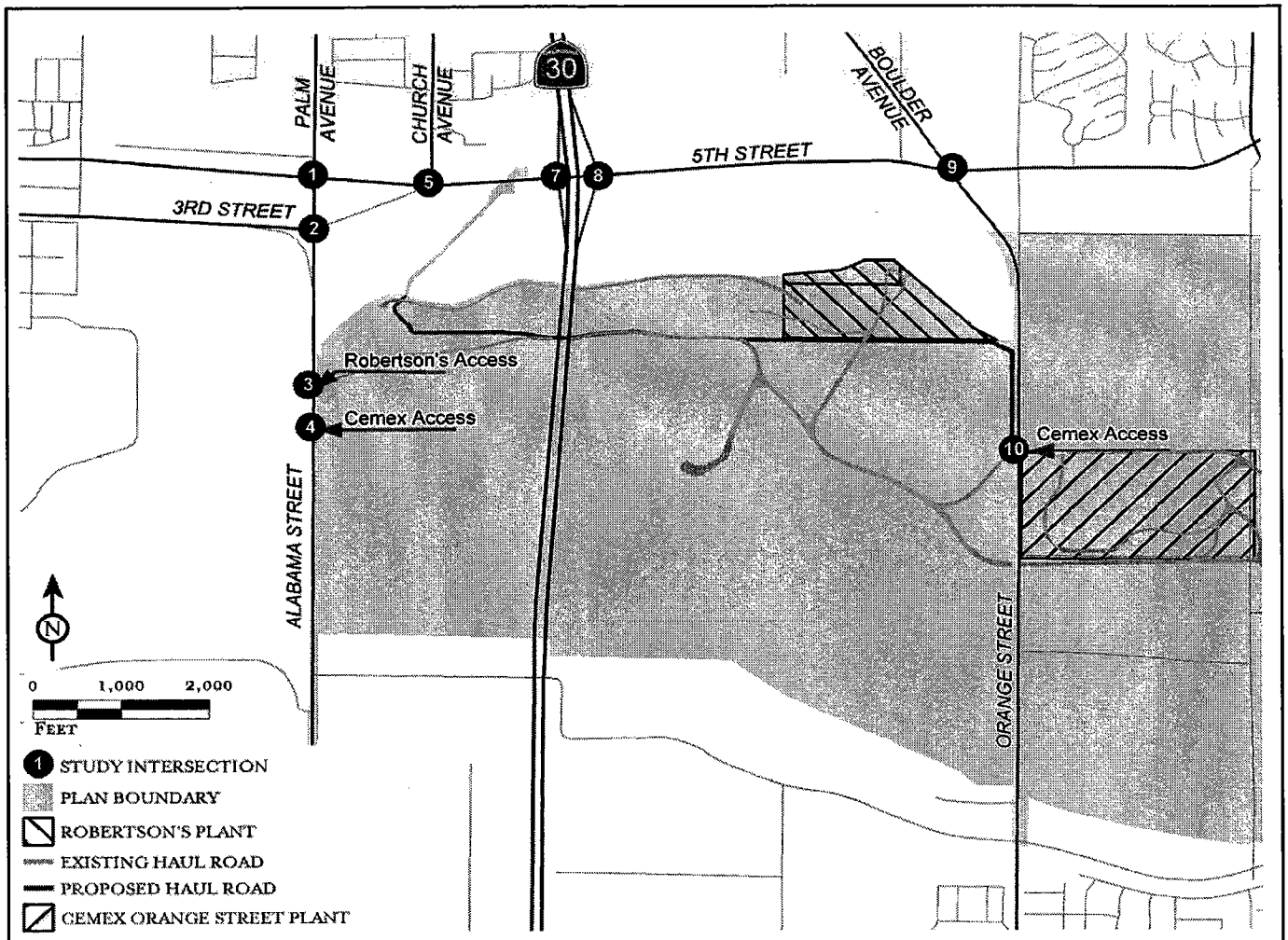

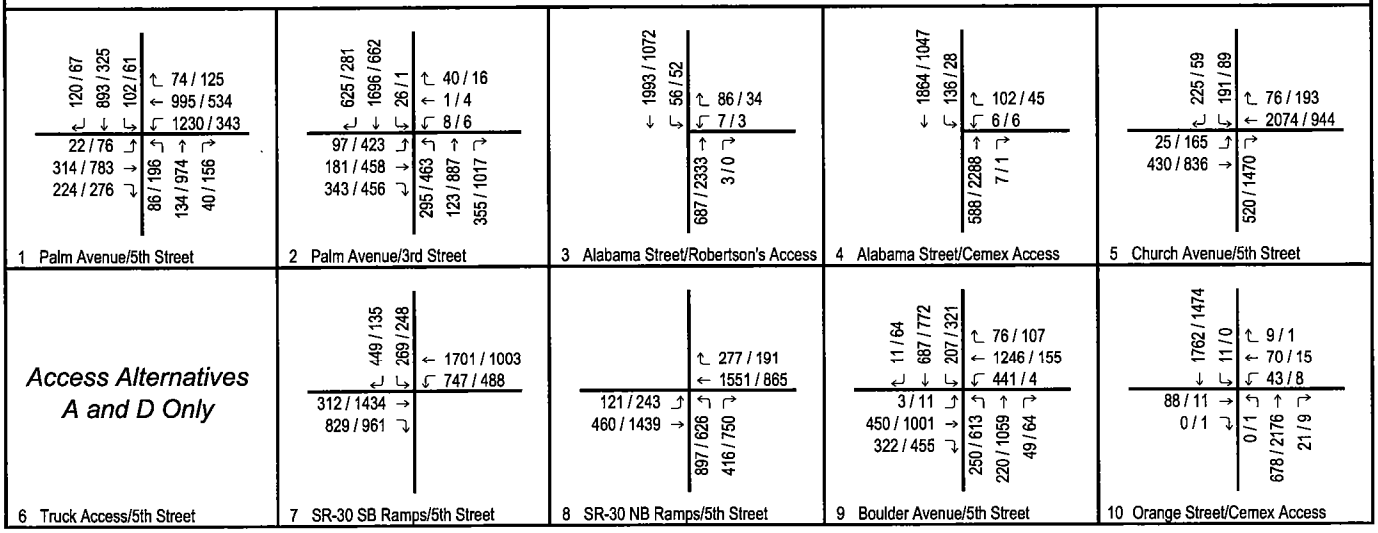

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FIGURE 33

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Year 2030 With New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 1, Access Alternative B

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Table N - Year 2030 Intersection Levels of Service
Land Use Alternative 1, Access Alternative B

Intersection	Control	A.M. Peak Hour V/C	A.M. Peak Hour Delay (sec)	A.M. Peak Hour LOS		P.M. Peak Hour V/C	P.M. Peak Hour Delay (sec)	P.M. Peak Hour LOS	
1 . Palm Avenue/5th Street	Signal	1.24	220.4	F	*	0.62	37.9	D	
2 . Palm Avenue/3rd Street	Signal	0.81	70.9	E	*	0.77	75.5	E	*
3 . Alabama Street/Robertson's Access	TWSC		41.4	E	*		352.3	F	*
4 . Alabama Street/Cemex Access	TWSC		31.4	D			425.0	F	*
5 . Church Avenue/5th Street	Signal	0.76	38.9	D		0.42	16.3	B	
6 . Truck Access/5th Street		*Access Alts. A & D Only*				*Access Alts. A & D Only*			
7 . SR-30 SB Ramps/5th Street	Signal	1.22	76.1	F	*	1.02	37.9	F	*
8 . SR-30 NB Ramps/5th Street	Signal	1.09	74.6	F	*	0.87	32.7	C	
9 . Boulder Avenue/5th Street	Signal	1.05	80.3	F	*	1.16	109.7	F	*
10 . Orange Street/Cemex Access	Signal	1.15	74.3	F	*	1.34	141.0	F	*

* Exceeds LOS standard.

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.

to the use of Alternative D is the same as that illustrated for year 2008 conditions, shown in previously referenced Figure 27. The change in 2030 background (non-plant) traffic in Alternative D due to the conversion of Third Street to a one-way street is illustrated in previously referenced Figure 32. The new Cemex aggregate trips under Land Use Alternative 1, Access Alternative D were added to the year 2030 background traffic volumes. "Year 2030 with new Cemex aggregate trips" a.m. and p.m. peak hour turn volumes at the study area intersections under Land Use Alternative 1, Access Alternative D are illustrated in Figure 34. The results of this analysis are summarized in Table O. The level of service calculation sheets are contained in Appendix F. As indicated in Table O, all intersections examined are projected to operate at LOS E or F during at least one peak hour under year 2030 Alternative 1 conditions with Access Alternative D, with exception of the following two intersections:

- Church Avenue/Fifth Street; and
- Truck Access/Fifth Street.

Year 2030 Conditions – Land Use Alternative 2, Access Alternative C

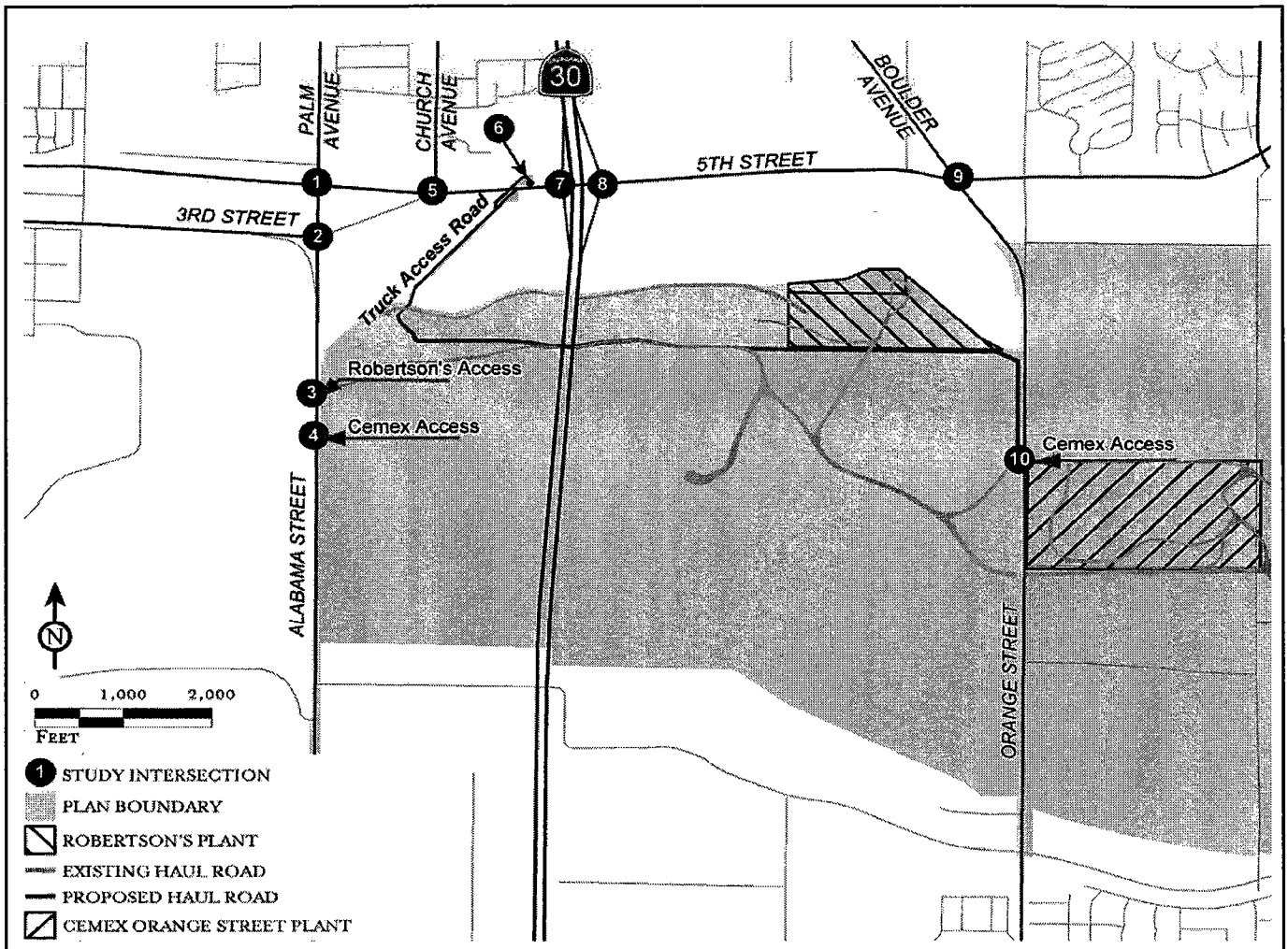
This condition considers the addition of traffic generated by the increase in production under Land Use Alternative 2. The base intersection geometrics for this alternative are the same as the existing geometrics illustrated in previously referenced Figure 3. There are no changes in plant trips or background traffic because access is unchanged from existing conditions (Access Alternative C). The new Cemex aggregate trips under Land Use Alternative 2 and Access Alternative C were added to the year 2030 background traffic volumes. "Year 2030 with new Cemex aggregate trips" a.m. and p.m. peak hour turn volumes at the study area intersections under Land Use Alternative 2, Access Alternative C are illustrated in Figure 35. A level of service analysis was conducted to evaluate year 2030 peak hour traffic operations at the study area intersections for Land Use Alternative 2. The results of this analysis are summarized in Table P. The level of service calculation sheets are contained in Appendix F. As indicated in Table P, all intersections examined are projected to operate at LOS E or F during at least one peak hour under year 2030 Alternative 2 conditions with Access Alternative C, with exception of the following intersection:

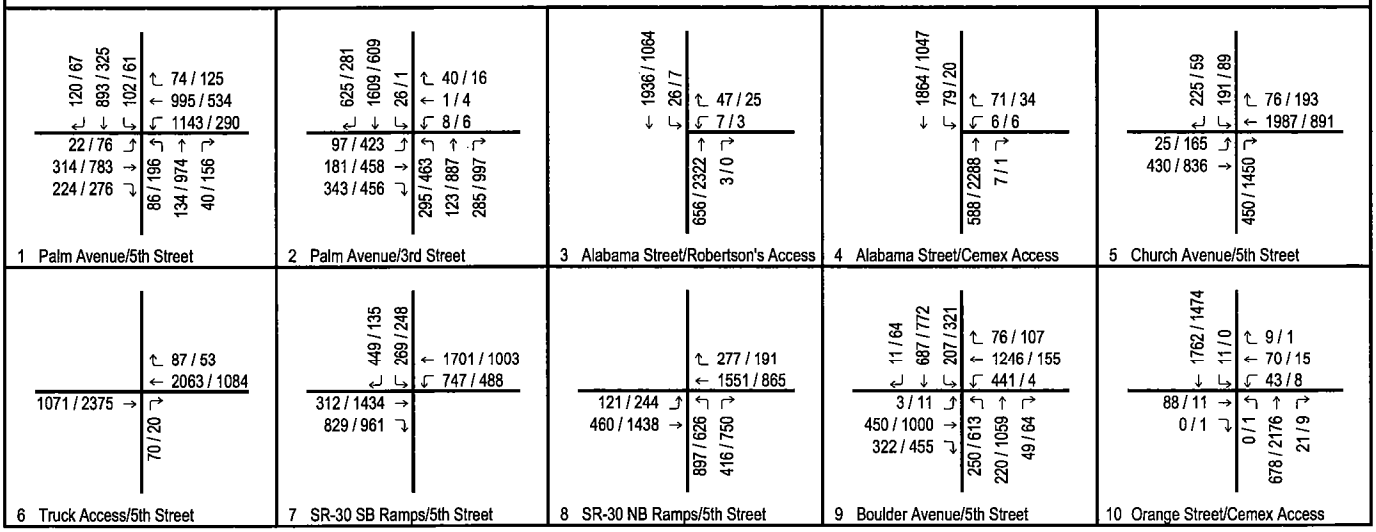
- Church Avenue/Fifth Street.

PROJECT CONTRIBUTION TO TOTAL NEW VOLUMES

The contribution of project increment traffic to total new traffic was determined for all study area intersections for Land Use Alternatives 1 and 2. No contribution was calculated for background (Alternatives 3 and 4) conditions because the project trips are unchanged from the existing conditions. The project contributions have been calculated based on both a.m. and p.m. peak hour volumes, with the higher of the two listed as the worst case for each intersection. Tables Q through S summarize the project contributions to study area intersections for Land Use Alternative 1 with Access Alternatives A, B, and D, respectively. Table T summarizes the project contributions to study area intersections for Land Use Alternative 2 with Access Alternative C.

New Cemex aggregate trips is the total new peak hour Cemex aggregate trips at each study area intersection, as described in the "Project Traffic" section above. The total new traffic is the difference





LSA

FIGURE 34

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Year 2030 With New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 1, Access Alternative D

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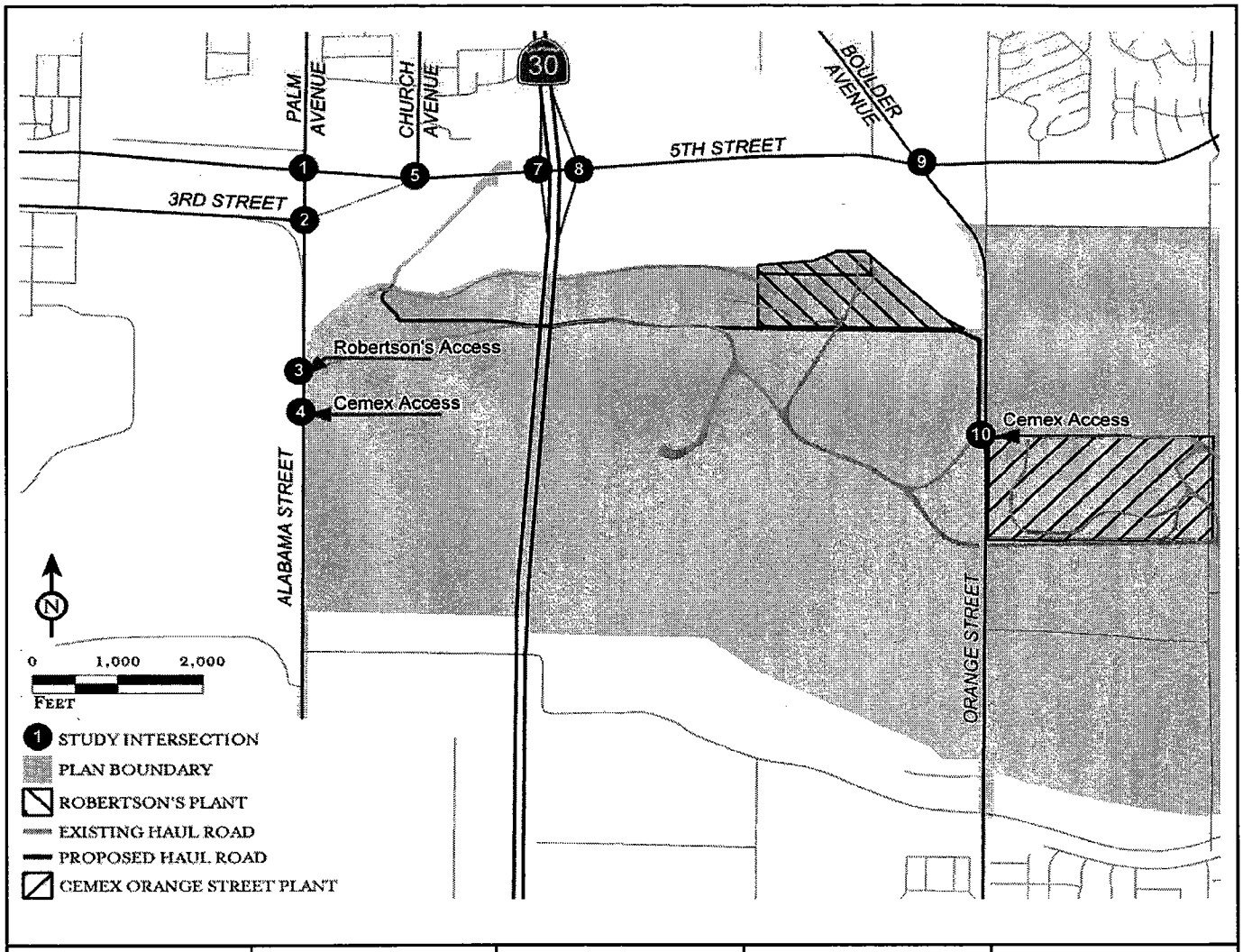
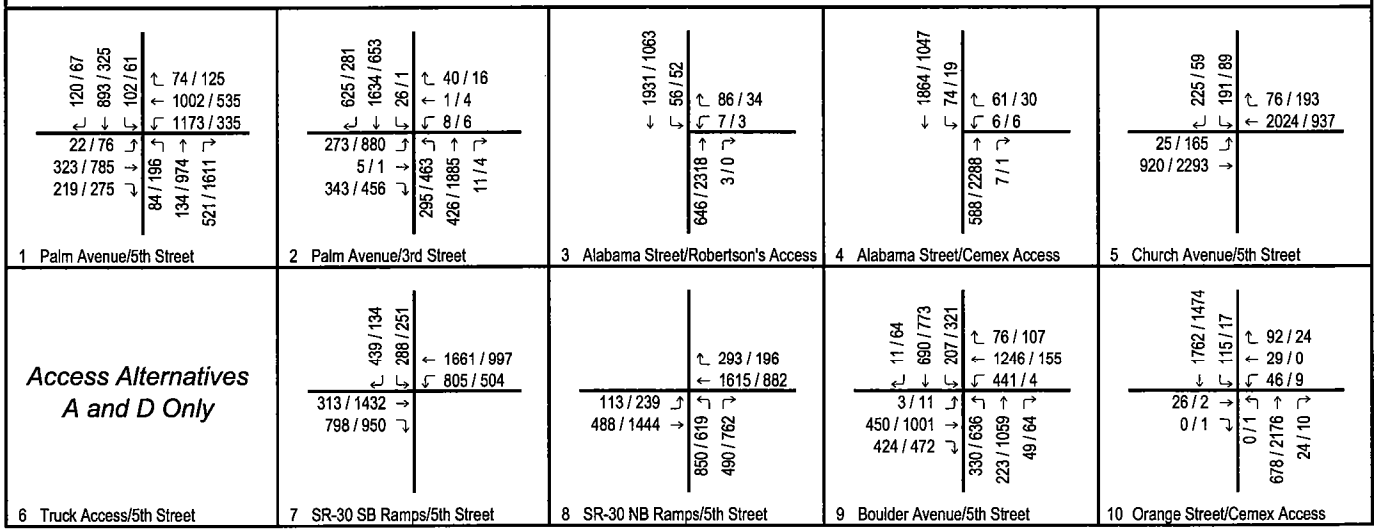
Table O - Year 2030 Intersection Levels of Service
Land Use Alternative 1, Access Alternative D

Intersection	Control	A.M. Peak Hour V/C	A.M. Peak Hour Delay (sec)	A.M. Peak Hour LOS		P.M. Peak Hour V/C	P.M. Peak Hour Delay (sec)	P.M. Peak Hour LOS	
1 . Palm Avenue/5th Street	Signal	1.19	190.1	F	*	0.59	36.0	D	
2 . Palm Avenue/3rd Street	Signal	0.79	62.2	E	*	0.75	72.8	E	*
3 . Alabama Street/Robertson's Access	TWSC		45.3	E	*		264.8	F	*
4 . Alabama Street/Cemex Access	TWSC		31.3	D			368.4	F	*
5 . Church Avenue/5th Street	Signal	0.73	31.0	C		0.40	16.2	B	
6 . Truck Access/5th Street		*No Conflicting Movement*				*No Conflicting Movement*			
7 . SR-30 SB Ramps/5th Street	Signal	1.22	76.1	F	*	1.02	37.9	F	*
8 . SR-30 NB Ramps/5th Street	Signal	1.09	74.6	F	*	0.87	32.7	C	
9 . Boulder Avenue/5th Street	Signal	1.05	80.3	F	*	1.16	109.7	F	*
10 . Orange Street/Cemex Access	Signal	1.15	74.3	F	*	1.34	141.0	F	*

* Exceeds LOS standard.

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.





LSA

FIGURE 35

123 / 456 AM / PM Volume

Upper Santa Ana River Wash

Year 2030 With New Cemex Aggregate Trips (in PCEs)

Land Use Alternative 2, Access Alternative C

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Table P - Year 2030 Intersection Levels of Service
Land Use Alternative 2, Access Alternative C

Intersection	Control	A.M. Peak Hour V/C	A.M. Peak Hour Delay (sec)	A.M. Peak Hour LOS		P.M. Peak Hour V/C	P.M. Peak Hour Delay (sec)	P.M. Peak Hour LOS	
1 . Palm Avenue/5th Street	Signal	1.26	191.5	F	*	1.46	187.2	F	*
2 . Palm Avenue/3rd Street	Signal	0.80	71.5	E	*	0.87	180.2	F	*
3 . Alabama Street/Robertson's Access	TWSC		35.6	E	*		337.8	F	*
4 . Alabama Street/Cemex Access	TWSC		33.2	D			359.4	F	*
5 . Church Avenue/5th Street	Signal	0.75	30.7	C		0.71	24.5	C	
6 . Truck Access/5th Street		*Access Alts. A & D Only*				*Access Alts. A & D Only*			
7 . SR-30 SB Ramps/5th Street	Signal	1.23	79.7	F	*	1.03	39.0	F	*
8 . SR-30 NB Ramps/5th Street	Signal	1.08	70.0	F	*	0.88	33.2	C	
9 . Boulder Avenue/5th Street	Signal	1.16	93.7	F	*	1.17	114.3	F	*
10 . Orange Street/Cemex Access	Signal	1.20	96.0	F	*	1.33	146.7	F	*

* Exceeds LOS standard.

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.

Table Q - Project Contribution to Total New Traffic
Land Use Alternative 1, Access Alternative A

Intersection	A.M. Peak Hour					P.M. Peak Hour					
	Total Approach Volume		Total	Project	Project	Total Approach Volume		Total	Project	Project	Worst
	2004	2030	Growth	Trips	%	2004	2030	Growth	Trips	%	Case
1 . Palm Avenue/5th Street	2,264	4,574	2,310	4	0.2%	2,514	5,303	2,789	1	0.0%	0.2%
2 . Palm Avenue/3rd Street	1,362	3,610	2,248	4	0.2%	1,773	4,591	2,818	1	0.0%	0.2%
3 . Alabama Street/Robertson's Access	912	2,652	1,740	4	0.2%	1,153	3,411	2,258	1	0.0%	0.2%
4 . Alabama Street/Cemex Access	783	2,607	1,824	4	0.2%	1,074	3,392	2,318	1	0.0%	0.2%
5 . Church Avenue/5th Street	1,869	3,361	1,492	0	0.0%	1,945	3,673	1,728	0	0.0%	0.0%
7 . SR-30 SB Ramps/5th Street	2,581	4,307	1,726	33	1.9%	2,367	4,269	1,902	8	0.4%	1.9%
8 . SR-30 NB Ramps/5th Street	2,412	3,722	1,310	16	1.2%	2,431	4,114	1,683	5	0.3%	1.2%
9 . Boulder Avenue/5th Street	2,123	3,962	1,839	0	0.0%	2,302	4,626	2,324	0	0.0%	0.0%
10 . Orange Street/Cemex Access	1,221	2,682	1,461	39	2.7%	1,512	3,696	2,184	9	0.4%	2.7%

Table R - Project Contribution to Total New Traffic
Land Use Alternative 1, Access Alternative B

Intersection	A.M. Peak Hour					P.M. Peak Hour					
	Total Approach Volume		Total	Project	Project	Total Approach Volume		Total	Project	Project	Worst
	2004	2030	Growth	Trips	%	2004	2030	Growth	Trips	%	Case
1 . Palm Avenue/5th Street	2,264	4,234	1,970	19	1.0%	2,514	3,916	1,402	6	0.4%	1.0%
2 . Palm Avenue/3rd Street	1,362	3,790	2,428	37	1.5%	1,773	4,674	2,901	9	0.3%	1.5%
3 . Alabama Street/Robertson's Access	912	2,832	1,920	37	1.9%	1,153	3,494	2,341	9	0.4%	1.9%
4 . Alabama Street/Cemex Access	783	2,703	1,920	37	1.9%	1,074	3,415	2,341	9	0.4%	1.9%
5 . Church Avenue/5th Street	1,869	3,541	1,672	33	2.0%	1,945	3,756	1,811	8	0.4%	2.0%
7 . SR-30 SB Ramps/5th Street	2,581	4,307	1,726	33	1.9%	2,367	4,269	1,902	8	0.4%	1.9%
8 . SR-30 NB Ramps/5th Street	2,412	3,722	1,310	16	1.2%	2,431	4,114	1,683	5	0.3%	1.2%
9 . Boulder Avenue/5th Street	2,123	3,962	1,839	0	0.0%	2,302	4,626	2,324	0	0.0%	0.0%
10 . Orange Street/Cemex Access	1,221	2,682	1,461	39	2.7%	1,512	3,696	2,184	9	0.4%	2.7%

Table S - Project Contribution to Total New Traffic
Land Use Alternative 1, Access Alternative D

Intersection	A.M. Peak Hour					P.M. Peak Hour					Worst Case
	Total Approach Volume		Total Growth	Project Trips	Project %	Total Approach Volume		Total Growth	Project Trips	Project %	
	2004	2030				2004	2030				
1 . Palm Avenue/5th Street	2,264	4,147	1,883	4	0.2%	2,514	3,863	1,349	1	0.1%	0.2%
2 . Palm Avenue/3rd Street	1,362	3,633	2,271	9	0.4%	1,773	4,601	2,828	2	0.1%	0.4%
3 . Alabama Street/Robertson's Access	912	2,675	1,763	9	0.5%	1,153	3,421	2,268	2	0.1%	0.5%
4 . Alabama Street/Cemex Access	783	2,615	1,832	9	0.5%	1,074	3,396	2,322	2	0.1%	0.5%
5 . Church Avenue/5th Street	1,869	3,384	1,515	5	0.3%	1,945	3,683	1,738	1	0.1%	0.3%
7 . SR-30 SB Ramps/5th Street	2,581	4,307	1,726	33	1.9%	2,367	4,269	1,902	8	0.4%	1.9%
8 . SR-30 NB Ramps/5th Street	2,412	3,722	1,310	16	1.2%	2,431	4,114	1,683	5	0.3%	1.2%
9 . Boulder Avenue/5th Street	2,123	3,962	1,839	0	0.0%	2,302	4,625	2,323	0	0.0%	0.0%
10 . Orange Street/Cemex Access	1,221	2,682	1,461	39	2.7%	1,512	3,696	2,184	9	0.4%	2.7%

Table T - Project Contribution to Total New Traffic
Land Use Alternative 2, Access Alternative C

Intersection	A.M. Peak Hour					P.M. Peak Hour					
	Total Approach Volume		Total	Project	Project	Total Approach Volume		Total	Project	Project	Worst
	2004	2030	Growth	Trips	%	2004	2030	Growth	Trips	%	Case
1 . Palm Avenue/5th Street	2,264	4,667	2,403	13	0.5%	2,514	5,365	2,851	3	0.1%	0.5%
2 . Palm Avenue/3rd Street	1,362	3,687	2,325	0	0.0%	1,773	4,650	2,877	0	0.0%	0.0%
3 . Alabama Street/Robertson's Access	912	2,729	1,817	0	0.0%	1,153	3,470	2,317	0	0.0%	0.0%
4 . Alabama Street/Cemex Access	783	2,600	1,817	0	0.0%	1,074	3,391	2,317	0	0.0%	0.0%
5 . Church Avenue/5th Street	1,869	3,461	1,592	13	0.8%	1,945	3,736	1,791	3	0.2%	0.8%
7 . SR-30 SB Ramps/5th Street	2,581	4,304	1,723	66	3.8%	2,367	4,268	1,901	13	0.7%	3.8%
8 . SR-30 NB Ramps/5th Street	2,412	3,849	1,437	116	8.1%	2,431	4,142	1,711	24	1.4%	8.1%
9 . Boulder Avenue/5th Street	2,123	4,150	2,027	122	6.0%	2,302	4,667	2,365	26	1.1%	6.0%
10 . Orange Street/Cemex Access	1,221	2,772	1,551	129	8.3%	1,512	3,714	2,202	27	1.2%	8.3%

between the year 2030 with project traffic volumes and the existing (2004) peak hour traffic volumes. The project percentage of contribution to total new traffic is calculated by dividing the project increment by the total new traffic.

As stated previously, these calculations consider only the growth in traffic up to the levels of the SCAG estimates for population housing and employment for 2030. In an ultimate General Plan build out horizon, growth in traffic may exceed these volumes, reducing the percentage of contribution of the proposed project. Therefore, these percentages should be evaluated in this context before application to mitigation costs to reflect the total project fair-share contribution.

CIRCULATION IMPROVEMENTS

At all intersections where project development is forecast to have an impact, improvements must be identified as mitigation measures. For intersections that meet a jurisdiction's minimum level of service standard under existing conditions, the mitigation measures must maintain conformance with that standard. For intersections that fail to meet a jurisdiction's minimum level of service standard under existing conditions, the mitigation measures must maintain the existing level of service. For all improvements, the length of the additional lanes has been assumed to be 600 feet upstream and 600 feet downstream for through lanes, 600 feet for right-turn lanes, and 240 feet for left-turn lanes in accordance with SANBAG CMP guidelines.

Year 2008 Improvements – Background Conditions (Land Use Alternatives 3 and 4)

No improvements have been identified for year 2008 background (Land Use Alternatives 3 and 4) conditions, because the project does not contribute to the increase in traffic in this scenario.

Year 2008 Improvements – Land Use Alternative 1, Access Alternative A

No improvements are required for this scenario other than those that will be constructed as part of Access Alternative A as described in the "Project Description" section of this report.

Year 2008 Improvements – Land Use Alternative 1, Access Alternative B

No improvements are required for this scenario other than those that will be constructed as part of Access Alternative B as described in the "Project Description" section of this report.

Year 2008 Improvements – Land Use Alternative 1, Access Alternative D

No improvements are required for this scenario other than those that will be constructed as part of Access Alternative D as described in the "Project Description" section of this report.

Year 2008 Improvements – Land Use Alternative 2, Access Alternative C

The following improvement is required under year 2008 conditions for Land Use Alternative 2 to meet the level of service standards:

- **Palm Avenue/Fifth Street** – Add a northbound right-turn lane and restripe the rightmost northbound through lane as a shared through/right-turn lane. This improvement will require approximately 12 feet of additional right-of-way on the south leg of the intersection.

Figure 36 illustrates the intersection geometrics with the recommended improvement for Land Use Alternative 2.

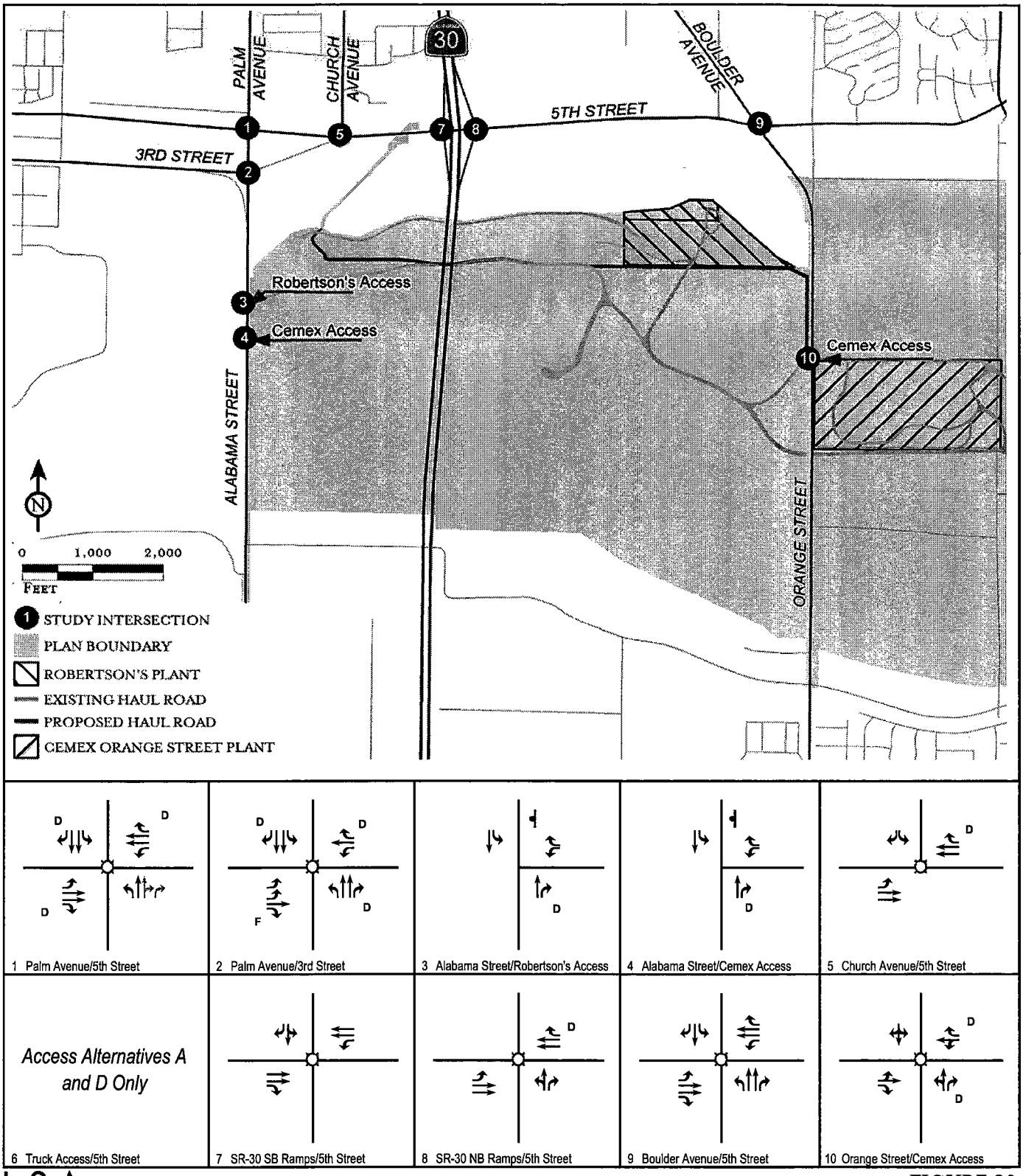
Year 2030 Improvements – Background Conditions (Land Use Alternatives 3 and 4)

No improvements have been identified for year 2030 background (Land Use Alternatives 3 and 4) conditions, because the project does not contribute to the increase in traffic in this scenario.

Year 2030 Improvements – Land Use Alternative 1, Access Alternative A

In addition to the improvements that will be constructed as part of Access Alternative A as described in the "Project Description" section of this report, the following improvements are required under year 2030 conditions for Land Use Alternative 1 with Access Alternative A to meet the level of service standards:

- **Palm Avenue/Fifth Street** – Add a westbound left-turn lane. Add two northbound right-turn lanes, one of which will be a continuous lane from Third Street to Fifth Street. Modify signal to provide northbound right-turn overlap phasing. Increase cycle length to 130 seconds. Cycle lengths up to 130 seconds for future year analyses are recommended on pages C-12 and C-13 of Appendix C of the SANBAG CMP (2005 Update). It has been assumed that an opposing left-turn pocket will be constructed on the west leg of the intersection but will not be striped as a turn lane. The improvements will require approximately 12 feet of additional right-of-way on the east, and west legs of the intersection, and 24 feet on the east side of the south leg of the intersection.
- **Palm Avenue/Third Street** – Add an eastbound left-turn lane and a northbound through lane. Widen the east leg departure lane by one lane to preserve proper alignment of the eastbound through lane. Increase cycle length to 130 seconds. Cycle lengths up to 130 seconds for future year analyses are recommended on pages C-12 and C-13 of Appendix C of the SANBAG CMP (2005 Update). This improvement will require approximately 12 feet of additional right-of-way on the south and west legs of the intersection. It should be noted that these improvements would result in three eastbound left-turn lanes, which is not a desirable mitigation to the City of Highland.
- **Alabama Street/Robertson's Access** – Install a traffic signal. Add a northbound through lane and a southbound through lane. Due to the proximity to the Cemex driveway, the driveways will have to be combined for signalization. A peak hour signal warrant is included in Appendix L. This improvement will require approximately 24 feet of additional right-of-way on Alabama Street.



LSA

FIGURE 36

Legend

- Signal
- Stop Sign
- F Free Right Turn
- D De Facto Right Turn
- Existing Lane
- Added/Modified Lane

Upper Santa Ana River Wash

2008 Mitigated Intersection Geometrics and Stop Control

Land Use Alternative 2, Access Alternative C

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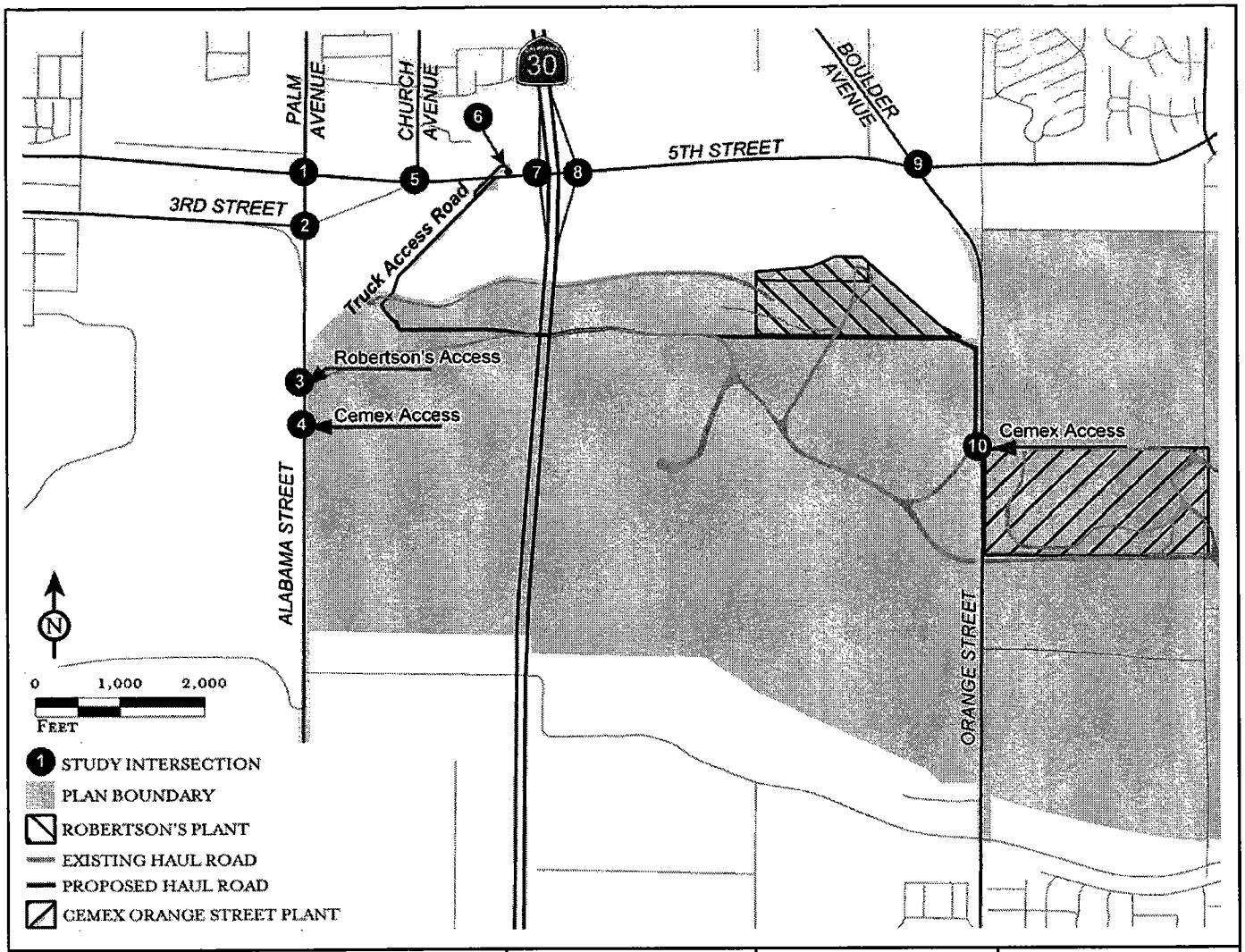
- **SR-30 Southbound Ramps/Fifth Street** – Widen Fifth Street to two eastbound through lanes, an eastbound shared through/right-turn lane, a dedicated eastbound right-turn lane, three westbound through lanes, and two westbound left-turn lanes. This improvement is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City. This improvement will require approximately 12 feet of right-of-way on both sides of Fifth Street under the SR-30 bridge.
- **SR-30 Northbound Ramps/Fifth Street** – Widen Fifth Street to three eastbound through lanes, an eastbound left-turn lane, two westbound through lanes, and a westbound shared through/right-turn lane (wide enough for de facto right-turn lane). Add a northbound left-turn lane to the off-ramp. Provide a minimum of 190 feet of storage length for the eastbound left-turn lane to allow for stacking of queued vehicles as analyzed in the "SR-30/Fifth Street Interchange Queuing Analysis" section of this report. Widening of Fifth Street to six lanes is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City. These improvements will require approximately 12 feet of right-of-way on both sides of Fifth Street under the SR-30 bridge. Approximately 12 feet of additional right-of-way will also be required on the south leg of the intersection unless Caltrans approval to restripe the off-ramp is obtained.
- **Boulder Avenue/Fifth Street** – Restripe the existing southbound right-turn lane as a shared through/right-turn lane and add a northbound left-turn lane. Two southbound departure lanes already exist on Boulder Avenue; therefore, the additional southbound through lane can be added by restriping the roadway and making appropriate modifications to the traffic signal. It has been assumed that an opposing left-turn pocket will be constructed on the north leg of the intersection, but will not be striped as a turn lane. The improvements will require approximately 12 feet of additional right-of-way on the north, south, and west legs of the intersection.
- **Orange Street/Cemex Access** – Add a northbound through lane and a southbound through lane. This improvement will require approximately 24 feet of additional right-of-way on Orange Street.

Figure 37 illustrates the intersection geometrics with the recommended improvements for Land Use Alternative 1, Access Alternatives A.

Year 2030 Improvements – Land Use Alternative 1, Access Alternative B

In addition to the improvements that will be constructed as part of Access Alternative B as described in the "Project Description" section of this report, the following improvements are required under year 2030 conditions for Land Use Alternative 1 with Access Alternative B to meet the level of service standards:

- **Palm Avenue/Fifth Street** – Add a westbound left-turn lane. Increase cycle length to 130 seconds. Cycle lengths up to 130 seconds for future year analyses are recommended on pages C-12 and C-13 of Appendix C of the SANBAG CMP (2005 Update). It has been assumed that an opposing left-turn pocket will be constructed on the west leg of the intersection but will not be striped as a turn lane. The improvements will require approximately 12 feet of additional right-of-way on the east and west legs of the intersection.



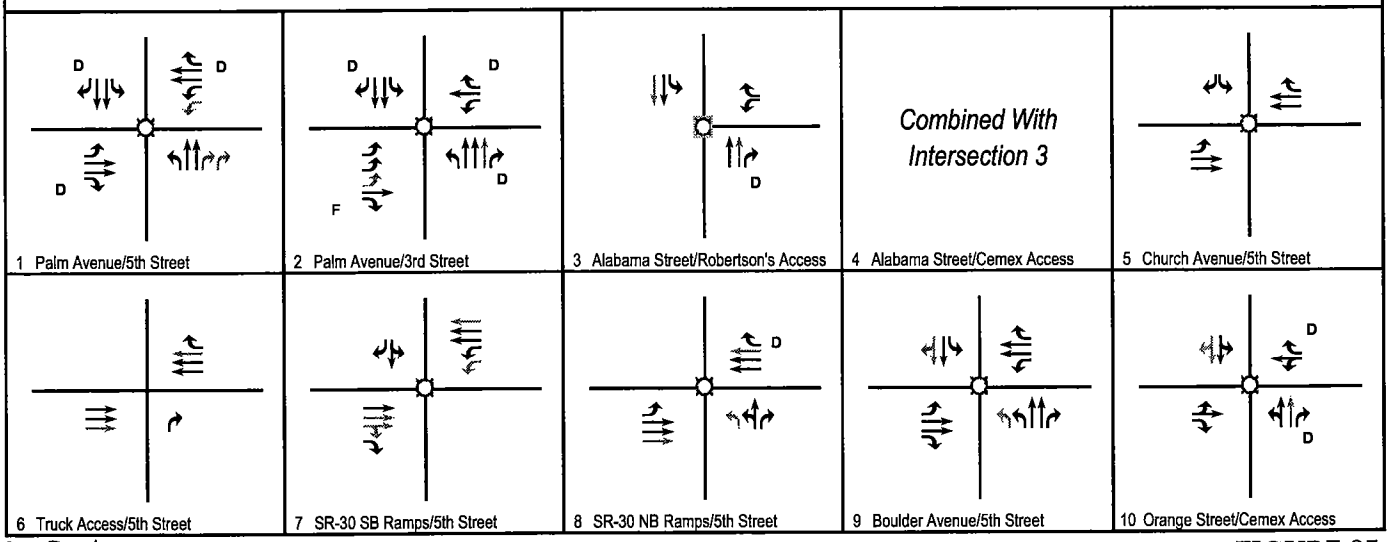


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FIGURE 37

Legend

- Signal
- Stop Sign
- **F** Free Right Turn
- **D** De Facto Right Turn
- Existing Lane
- Added/Modified Lane

Upper Santa Ana River Wash

2030 Mitigated Intersection Geometrics and Stop Control

Land Use Alternative 1, Access Alternative A

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- **Palm Avenue/Third Street** – Add a northbound right-turn lane and restripe the outermost northbound through lane as a shared through/right-turn lane. Widen east leg of Third Street to accommodate a second eastbound departure lane. Increase cycle length to 130 seconds. Cycle lengths up to 130 seconds for future year analyses are recommended on pages C-12 and C-13 of Appendix C of the SANBAG CMP (2005 Update). This improvement will require approximately 12 feet of additional right-of-way on south and east legs of the intersection.
- **Alabama Street/Robertson's Access** – Install a traffic signal. Add a northbound through lane and a southbound through lane. Due to the proximity to the Cemex driveway, the driveways will have to be combined for signalization. A peak hour signal warrant is included in Appendix L. This improvement will require approximately 24 feet of additional right-of-way on Alabama Street.
- **SR-30 Southbound Ramps/Fifth Street** – Widen Fifth Street to two eastbound through lanes, an eastbound shared through/right-turn lane, a dedicated eastbound right-turn lane, three westbound through lanes, and two westbound left-turn lanes. This improvement is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City. This improvement will require approximately 12 feet of right-of-way on both sides of Fifth Street under the SR-30 bridge.
- **SR-30 Northbound Ramps/Fifth Street** – Widen Fifth Street to three eastbound through lanes, an eastbound left-turn lane, two westbound through lanes and a westbound shared through/right-turn lane (wide enough for de facto right-turn lane). Add a northbound left-turn lane to the off-ramp. Provide a minimum of 220 feet of storage length for the eastbound left-turn lane to allow for stacking of queued vehicles as analyzed in the "SR-30/Fifth Street Interchange Queuing Analysis" section of this report. Widening of Fifth Street to six lanes is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City. These improvements will require approximately 12 feet of right-of-way on both sides of Fifth Street under the SR-30 bridge. Approximately 12 feet of additional right-of-way will also be required on the south leg of the intersection unless Caltrans approval to restripe the off-ramp is obtained.
- **Boulder Avenue/Fifth Street** – Restripe the existing southbound right-turn lane as a shared through/right-turn lane and add a northbound left-turn lane. Two southbound departure lanes already exist on Boulder Avenue; therefore, the additional southbound through lane can be added by restriping the roadway and making appropriate modifications to the traffic signal. It has been assumed that an opposing left-turn pocket will be constructed on the north leg of the intersection but will not be striped as a turn lane. The improvements will require approximately 12 feet of additional right-of-way on the north, south, and west legs of the intersection.
- **Orange Street/Cemex Access** – Add a northbound through lane and a southbound through lane. This improvement will require approximately 24 feet of additional right-of-way on Orange Street.

The following improvement is recommended for the conversion of Third Street to a one-way street:

- **Church Avenue/Fifth Street** – Add a northbound free right-turn lane corresponding to the Third Street connection. Restripe the east leg of the intersection to a six-lane roadway. The restriping to six lanes can be accommodated within the existing right-of-way and is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City.

Figure 38 illustrates the intersection geometrics with the recommended improvements for Land Use Alternative 1, Access Alternative B.

Year 2030 Improvements – Land Use Alternative 1, Access Alternative D

In addition to the improvements that will be constructed as part of Access Alternative D as described in the "Project Description" section of this report, the following improvements are required under year 2030 conditions for Land Use Alternative 1 with Access Alternative D to meet the level of service standards:

- **Palm Avenue/Fifth Street** – Add a westbound left-turn lane. Increase cycle length to 130 seconds. Cycle lengths up to 130 seconds for future year analyses are recommended on pages C-12 and C-13 of Appendix C of the SANBAG CMP (2005 Update). It has been assumed that an opposing left-turn pocket will be constructed on the west leg of the intersection but will not be striped as a turn lane. The improvements will require approximately 12 feet of additional right-of-way on the east and west legs of the intersection.
- **Palm Avenue/Third Street** – Add a northbound right-turn lane and restripe the outermost northbound through lane as a shared through/right-turn lane. Widen east leg of Third Street to accommodate a second eastbound departure lane. Increase cycle length to 130 seconds. Cycle lengths up to 130 seconds for future year analyses are recommended on pages C-12 and C-13 of Appendix C of the SANBAG CMP (2005 Update). This improvement will require approximately 12 feet of additional right-of-way on south and east legs of the intersection.
- **Alabama Street/Robertson's Access** – Install a traffic signal. Add a northbound through lane and a southbound through lane. Due to the proximity to the Cemex driveway, the driveways will have to be combined for signalization. A peak hour signal warrant is included in Appendix L. This improvement will require approximately 24 feet of additional right-of-way on Alabama Street.
- **SR-30 Southbound Ramps/Fifth Street** – Widen Fifth Street to two eastbound through lanes, an eastbound shared through/right-turn lane, a dedicated eastbound right-turn lane, three westbound through lanes, and two westbound left-turn lanes. This improvement is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City. This improvement will require approximately 12 feet of right-of-way on both sides of Fifth Street under the SR-30 bridge.
- **SR-30 Northbound Ramps/Fifth Street** – Widen Fifth Street to three eastbound through lanes, an eastbound left-turn lane, two westbound through lanes, and a westbound shared through/right-turn lane (wide enough for de facto right-turn lane). Add a northbound left-turn lane to the off-ramp. Provide a minimum of 180 feet of storage length for the eastbound left-turn lane to allow for stacking of queued vehicles as analyzed in the "SR-30/Fifth Street Interchange Queuing Analysis" section of this report. Widening of Fifth Street to six lanes is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City. These improvements will require approximately 12 feet of right-of-way on both sides of Fifth Street under the SR-30 bridge. Approximately 12 feet of additional right-of-way will also be required on the south leg of the intersection unless Caltrans approval to restripe the off-ramp is obtained.

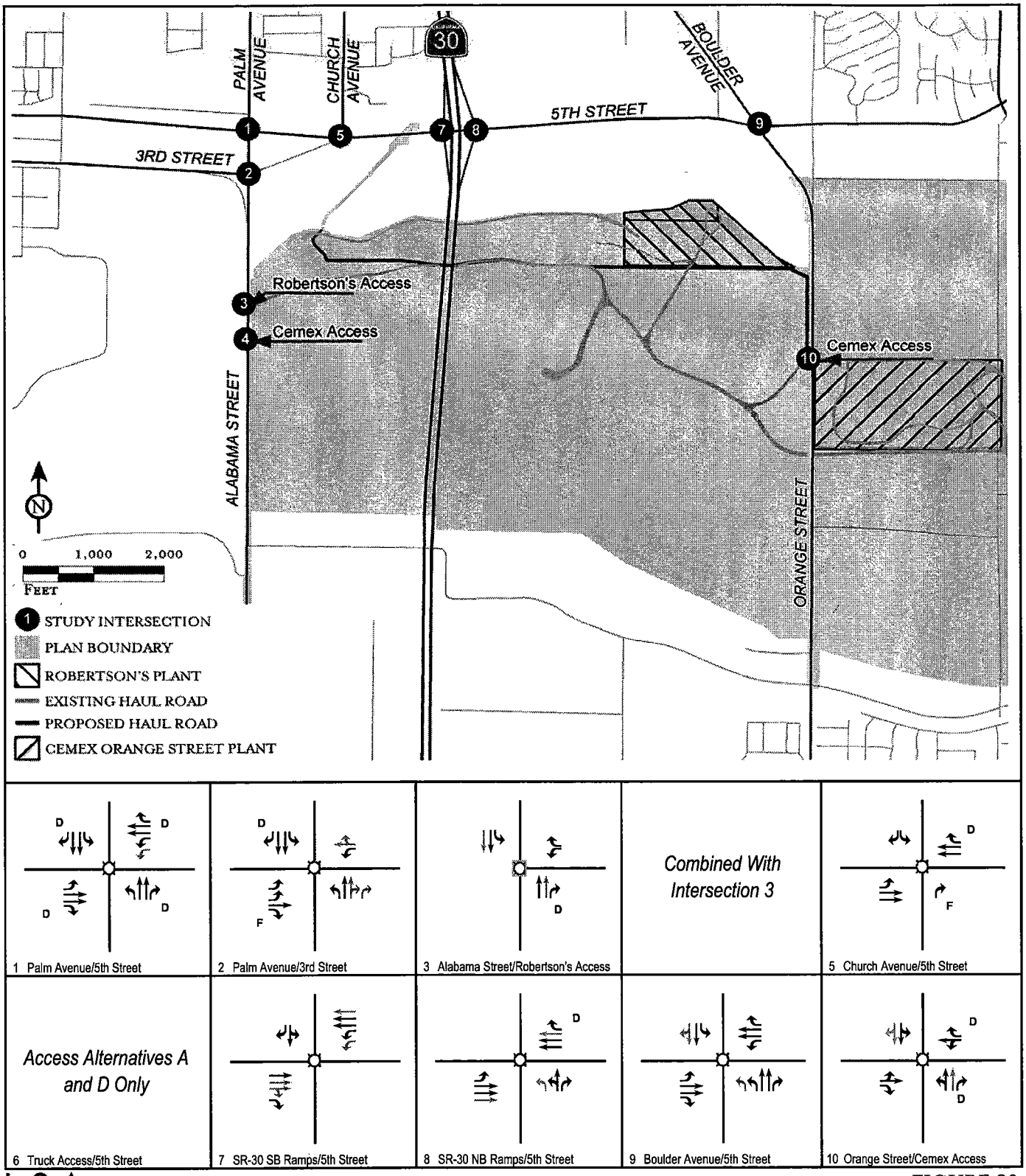

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FIGURE 38

Legend

- Signal
- Stop Sign
- **F** Free Right Turn
- **D** De Facto Right Turn
- Existing Lane
- Added/Modified Lane

Upper Santa Ana River Wash

2030 Mitigated Intersection Geometrics and Stop Control

Land Use Alternative 1, Access Alternative B

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- **Boulder Avenue/Fifth Street** – Restripe the existing southbound right-turn lane as a shared through/right-turn lane and add a northbound left-turn lane. Two southbound departure lanes already exist on Boulder Avenue; therefore, the additional southbound through lane can be added by restriping the roadway and making appropriate modifications to the traffic signal. It has been assumed that an opposing left-turn pocket will be constructed on the north leg of the intersection but will not be striped as a turn lane. The improvements will require approximately 12 feet of additional right-of-way on the north, south, and west legs of the intersection.
- **Orange Street/Cemex Access** – Add a northbound through lane and a southbound through lane. This improvement will require approximately 24 feet of additional right-of-way on Orange Street.

The following improvement is recommended for the conversion of Third Street to a one-way street:

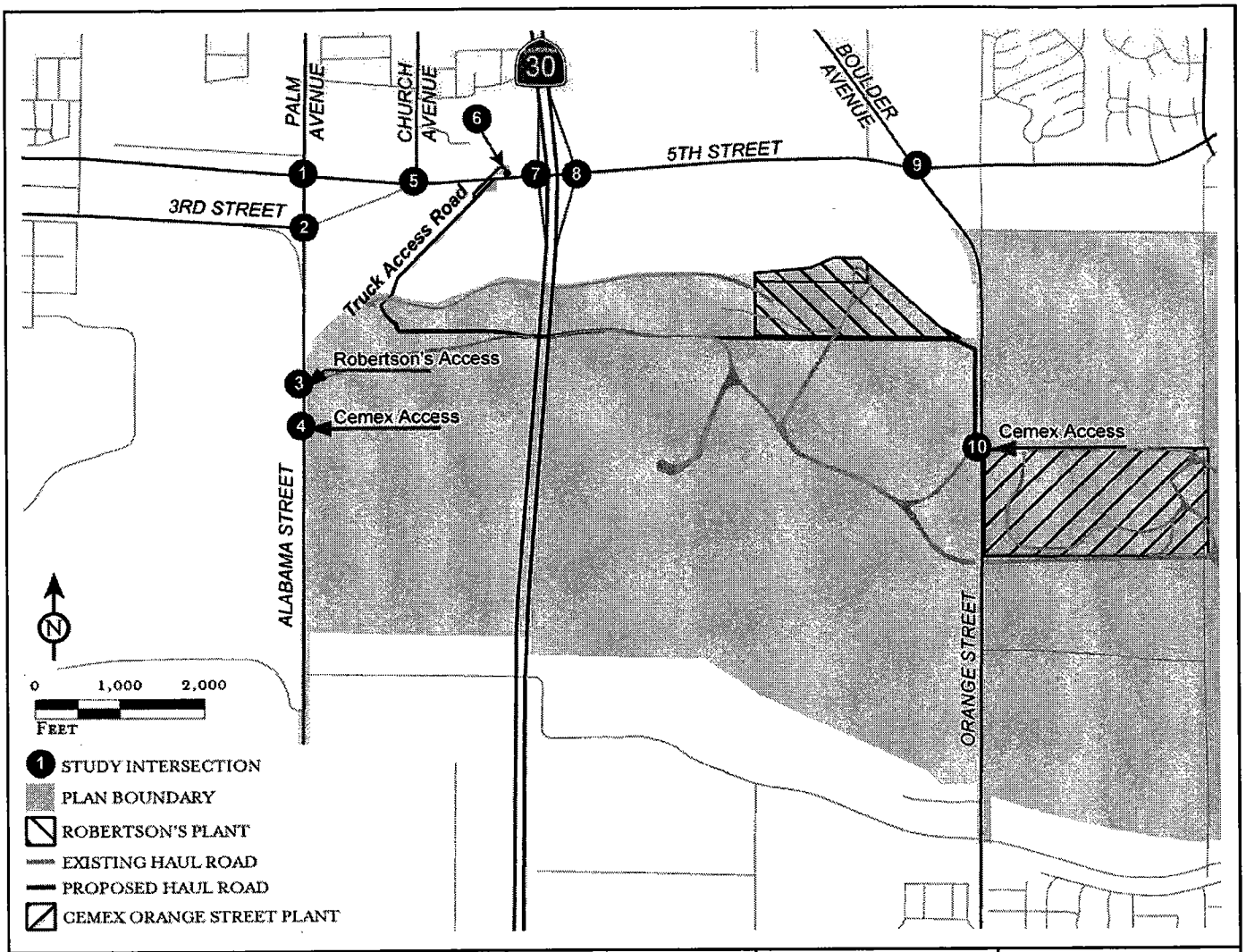
- **Church Avenue/Fifth Street** – Add a northbound free right-turn lane corresponding to the Third Street connection. Restripe the east leg of the intersection to a six-lane roadway. The restriping to six lanes can be accommodated within the existing right-of-way and is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City.

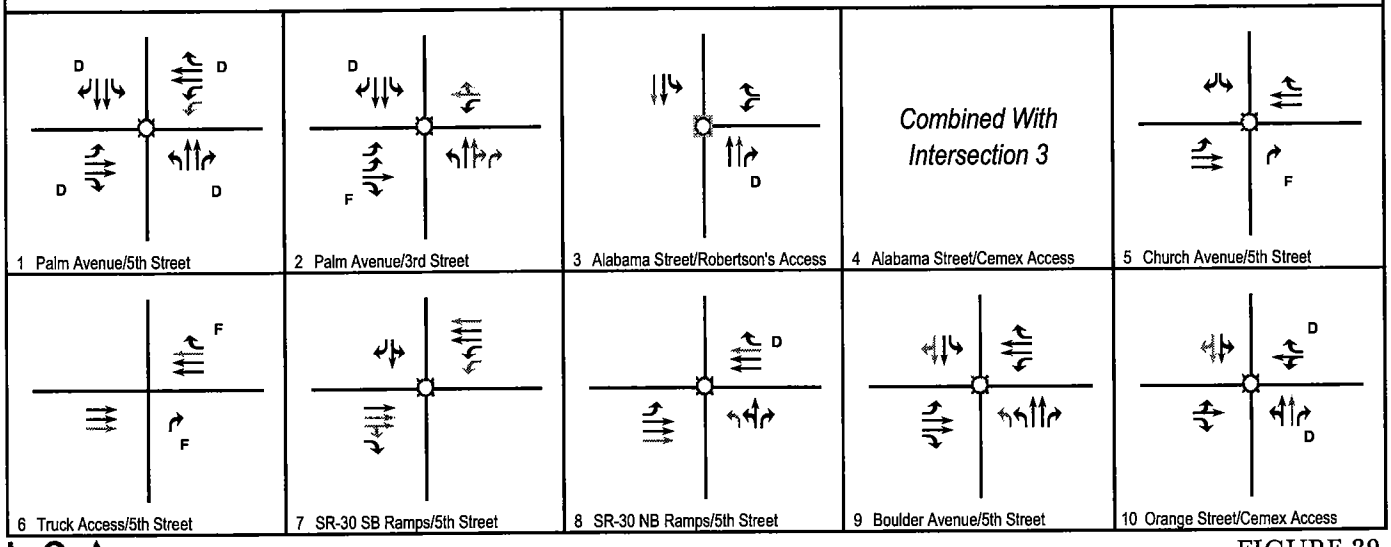
Figure 39 illustrates the intersection geometrics with the recommended improvements for Land Use Alternative 1, Access Alternative D.

Year 2030 Improvements – Land Use Alternative 2, Access Alternative C

The following improvements are required under year 2030 conditions for Land Use Alternative 2 with Access Alternative C to meet the level of service standards:

- **Palm Avenue/Fifth Street** – Add a westbound left-turn lane. Add two northbound right-turn lanes. Modify signal to provide northbound right-turn overlap phasing. Increase cycle length to 130 seconds. Cycle lengths up to 130 seconds for future year analyses are recommended on pages C-12 and C-13 of Appendix C of the SANBAG CMP (2005 Update). It has been assumed that an opposing left-turn pocket will be constructed on the west leg of the intersection but will not be striped as a turn lane. The improvements will require approximately 12 feet of additional right-of-way on the east and west legs of the intersection, and 24 feet on the east side of the south leg of the intersection.
- **Palm Avenue/Third Street** – Add an eastbound left-turn lane and a northbound through lane. Increase cycle length to 130 seconds. Cycle lengths up to 130 seconds for future year analyses are recommended on pages C-12 and C-13 of Appendix C of the SANBAG CMP (2005 Update). This improvement will require approximately 12 feet of additional right-of-way on the south and west legs of the intersection.
- **Alabama Street/Robertson's Access** – Install a traffic signal. Add a northbound through lane and a southbound through lane. Due to the proximity to the Cemex driveway, the driveways will have to be combined for signalization. A peak hour signal warrant is included in Appendix L. This improvement will require approximately 24 feet of additional right-of-way on Alabama Street.





LSA

FIGURE 39

Legend

- Signal
- Stop Sign
- **F** Free Right Turn
- **D** De Facto Right Turn
- Existing Lane
- Added/Modified Lane

Upper Santa Ana River Wash

2030 Mitigated Intersection Geometrics and Stop Control

Land Use Alternative 1, Access Alternative D

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- **SR-30 Southbound Ramps/Fifth Street** – Widen Fifth Street to two eastbound through lanes, an eastbound shared through/right-turn lane, a dedicated eastbound right-turn lane, three westbound through lanes, and two westbound left-turn lanes. This improvement is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City. This improvement will require approximately 12 feet of right-of-way on both sides of Fifth Street under the SR-30 bridge.

  SR-30 Northbound Ramps/Fifth Street – Widen Fifth Street to three eastbound through lanes, an eastbound left-turn lane, two westbound through lanes, and a westbound shared through/right-turn lane (wide enough for de facto right-turn lane). Add a northbound left-turn lane to the off-ramp. Widening of Fifth Street to six lanes is consistent both with the City of Highland's General Plan roadway network and conceptual drawings of Fifth Street provided by the City. These improvements will require approximately 12 feet of right-of-way on both sides of Fifth Street under the SR-30 bridge. Approximately 12 feet of additional right-of-way will also be required on the south leg of the intersection unless Caltrans approval to restripe the off-ramp is obtained.

- **Boulder Avenue/Fifth Street** – Restripe the existing southbound right-turn lane as a shared through/right-turn lane and add a northbound left-turn lane. Two southbound departure lanes already exist on Boulder Avenue; therefore, the additional southbound through lane can be added by restriping the roadway and making appropriate modifications to the traffic signal. It has been assumed that an opposing left-turn pocket will be constructed on the north leg of the intersection but will not be striped as a turn lane. The improvements will require approximately 12 feet of additional right-of-way on the north, south, and west legs of the intersection.

- **Orange Street/Cemex Access** – Add a northbound through lane and a southbound through lane. This improvement will require approximately 24 feet of additional right-of-way on Orange Street.

Figure 40 illustrates the intersection geometrics with the recommended improvements under Land Use Alternative 2, Access Alternative C.

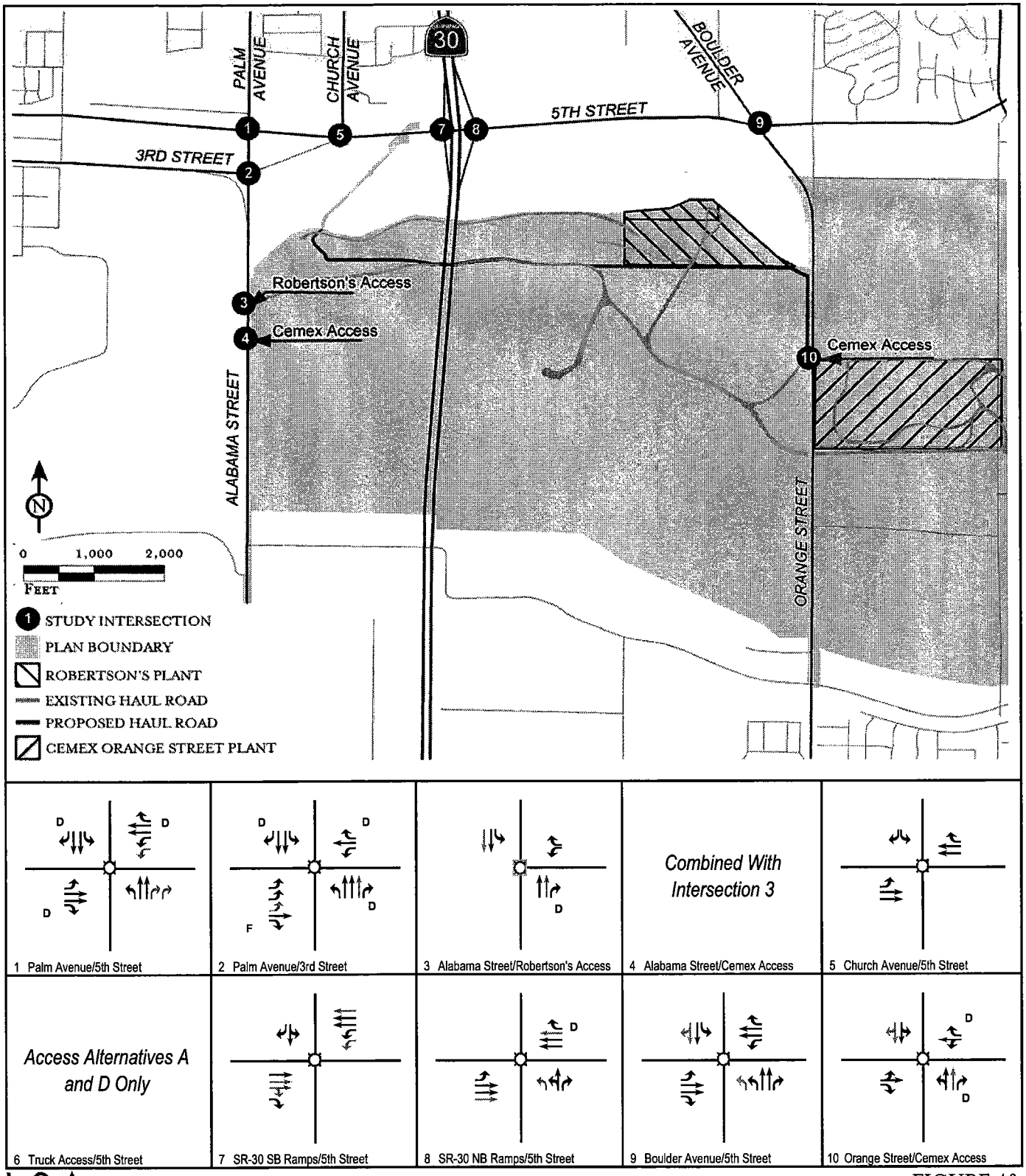
Table U shows the year 2008 level of service with the implementation of the recommended improvement for Land Use Alternative 2.

Table V shows a summary of year 2030 intersection improvements for all alternatives. Tables W, X and Y show the levels of service with the implementation of the recommended improvements for Land Use Alternative 1 under Access Alternatives A, B, and D, respectively. Table Z shows the levels of service with the implementation of the recommended improvements under Land Use Alternative 2, Access Alternative C.

Detailed figures showing existing and proposed intersection geometrics and lane widths are provided in Appendix I.

COST ESTIMATES

Cost estimates have been developed for the circulation improvements recommended for year 2008 and year 2030. The detailed cost estimate calculations are included in Appendix G.



LSA

FIGURE 40

Legend

- Signal
- Stop Sign
- F Free Right Turn
- D De Facto Right Turn
- Existing Lane
- Added/Modified Lane

Upper Santa Ana River Wash

2030 Mitigated Intersection Geometrics and Stop Control

Land Use Alternative 2, Access Alternative C

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Table U - Year 2008 With Improvements Intersection Levels of Service
Land Use Alternative 2, Access Alternative C

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.57	38.2	D	0.63	30.0	C
2 . Palm Avenue/3rd Street	Signal	0.43	26.9	C	0.48	35.0	C
3 . Alabama Street/Robertson's Access	TWSC		12.5	B		17.5	C
4 . Alabama Street/Cemex Access	TWSC		11.6	B		17.4	C
5 . Church Avenue/5th Street	Signal	0.47	15.0	B	0.46	14.8	B
6 . Truck Access/5th Street		*Access Alts. A & D Only*			*Access Alts. A & D Only*		
7 . SR-30 SB Ramps/5th Street	Signal	0.98	36.7	D	0.73	24.1	C
8 . SR-30 NB Ramps/5th Street	Signal	0.83	28.8	C	0.71	25.5	C
9 . Boulder Avenue/5th Street	Signal	0.72	41.0	D	0.59	30.7	C
10 . Orange Street/Cemex Access	Signal	0.68	8.6	A	0.71	5.2	A

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service

Table V - Summary of Year 2030 Intersection Improvements

Intersection	Alternative 1A Improvements	Alternative 1B Improvements	Alternative 1D Improvements	Alternative 2 Improvements
Palm Avenue/5th Street	Add a westbound left turn lane and two northbound right turn lanes with right turn overlap phasing.	Add a westbound left turn lane.	Add a westbound left turn lane.	Add a westbound left turn lane and two northbound right turn lanes with right turn overlap phasing.
Palm Avenue/3rd Street	Add an eastbound left-turn lane and a northbound through lane. Widen the east leg departure by one lane to preserve proper alignment of the eastbound through lane.	Add a northbound right turn lane, restripe rightmost northbound through lane as a shared through/right turn lane. Widen east leg of intersection to accommodate two departure lanes.	Add a northbound right turn lane, restripe rightmost northbound through lane as a shared through/right turn lane. Widen east leg of intersection to accommodate two departure lanes.	Add an eastbound left-turn lane and a northbound through lane. Widen the east leg departure by one lane to preserve proper alignment of the eastbound through lane.
Alabama Street/Robertson's Access-Cemex Access*	Install a traffic signal. Add a northbound through lane and a southbound through lane.	Install a traffic signal. Add a northbound through lane and a southbound through lane.	Install a traffic signal. Add a northbound through lane and a southbound through lane.	Install a traffic signal. Add a northbound through lane and a southbound through lane.
Church Avenue/Fifth Street		Add south leg to intersection corresponding to 3rd Street connection	Add south leg to intersection corresponding to 3rd Street connection	
SR-30 Southbound Ramps/5th Street	Widen 5th Street to two eastbound through lanes, an eastbound through right turn lane, an eastbound right turn lane, three westbound through lanes, and two westbound left turn lanes.	Widen 5th Street to two eastbound through lanes, an eastbound through right turn lane, an eastbound right turn lane, three westbound through lanes, and two westbound left turn lanes.	Widen 5th Street to two eastbound through lanes, an eastbound through right turn lane, an eastbound right turn lane, three westbound through lanes, and two westbound left turn lanes.	Widen 5th Street to two eastbound through lanes, an eastbound through right turn lane, an eastbound right turn lane, three westbound through lanes, and two westbound left turn lanes.
SR-30 Northbound Ramps/5th Street	Widen 5th Street to three eastbound through lanes, an eastbound left turn lane, two westbound through lanes and a westbound through/right lane (wide enough for defacto right). Add a northbound left turn lane to the off-ramp. Provide a minimum of 190 feet of storage for the eastbound left-turn lane.	Widen 5th Street to three eastbound through lanes, an eastbound left turn lane, two westbound through lanes and a westbound through/right lane. Add a northbound left turn lane to the off-ramp. Provide a minimum of 220 feet of storage for the eastbound left-turn lane.	Widen 5th Street to three eastbound through lanes, an eastbound left turn lane, two westbound through lanes and a westbound through/right lane. Add a northbound left turn lane to the off-ramp. Provide a minimum of 180 feet of storage for the eastbound left-turn lane.	Widen 5th Street to three eastbound through lanes, an eastbound left turn lane, two westbound through lanes and a westbound through/right lane. Add a northbound left turn lane to the off-ramp.
Boulder Avenue/5th Street	Restripe southbound right turn lane as a shared through/right turn lane, add a northbound left turn lane.	Restripe southbound right turn lane as a shared through/right turn lane, add a northbound left turn lane.	Restripe southbound right turn lane as a shared through/right turn lane, add a northbound left turn lane.	Restripe southbound right turn lane as a shared through/right turn lane, add a northbound left turn lane.
Orange Street/Cemex Access	Add a northbound through lane and a southbound through lane.	Add a northbound through lane and a southbound through lane.	Add a northbound through lane and a southbound through lane.	Add a northbound through lane and a southbound through lane.

* Driveways combined for signalization due to proximity.

Table W - Year 2030 With Improvements Intersection Levels of Service
Land Use Alternative 1, Access Alternative A

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.83	46.4	D	0.77	34.6	C
2 . Palm Avenue/3rd Street	Signal	0.66	36.4	D	0.58	44.9	D
3 . Alabama Street/Robertson's Access	Signal	0.56	8.0	A	0.70	9.7	A
4 . Alabama Street/Cemex Access		*Combined with Intersection 3*			*Combined with Intersection 3*		
5 . Church Avenue/5th Street	Signal	0.73	28.2	C	0.71	23.9	C
6 . Truck Access/5th Street	TWSC	*No Conflicting Movement*			*No Conflicting Movement*		
7 . SR-30 SB Ramps/5th Street	Signal	0.76	24.1	C	0.67	19.7	B
8 . SR-30 NB Ramps/5th Street	Signal	0.66	23.1	C	0.76	27.7	C
9 . Boulder Avenue/5th Street	Signal	0.67	50.6	D	0.83	45.7	D
10 . Orange Street/Cemex Access	Signal	0.59	5.6	A	0.66	3.1	A

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.

Table X - Year 2030 With Improvements Intersection Levels of Service
Land Use Alternative 1, Access Alternative B

Intersection	Control	A.M. Peak Hour V/C	A.M. Peak Hour Delay (sec)	A.M. Peak Hour LOS	P.M. Peak Hour V/C	P.M. Peak Hour Delay (sec)	P.M. Peak Hour LOS
1 . Palm Avenue/5th Street	Signal	0.86	47.2	D	0.67	39.1	D
2 . Palm Avenue/3rd Street	Signal	0.80	48.7	D	0.64	43.6	D
3 . Alabama Street/Robertson's Access	Signal	0.66	17.2	B	0.73	10.5	B
4 . Alabama Street/Cemex Access		*Combined with Intersection 3*			*Combined with Intersection 3*		
5 . Church Avenue/5th Street	Signal	0.76	38.9	D	0.42	16.3	B
6 . Truck Access/5th Street		*Access Alts. A & D Only*			*Access Alts. A & D Only*		
7 . SR-30 SB Ramps/5th Street	Signal	0.76	24.1	C	0.67	19.7	B
8 . SR-30 NB Ramps/5th Street	Signal	0.66	23.1	C	0.76	27.7	C
9 . Boulder Avenue/5th Street	Signal	0.66	43.8	D	0.81	48.7	D
10 . Orange Street/Cemex Access	Signal	0.59	5.6	A	0.66	3.1	A

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service

Table Y - Year 2030 With Improvements Intersection Levels of Service
Land Use Alternative 1, Access Alternative D

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.83	44.2	D	0.65	38.2	D
2 . Palm Avenue/3rd Street	Signal	0.77	44.5	D	0.62	43.3	D
3 . Alabama Street/Robertson's Access	Signal	0.56	8.6	A	0.70	9.8	A
4 . Alabama Street/Cemex Access		*Combined with Intersection 3*			*Combined with Intersection 3*		
5 . Church Avenue/5th Street	Signal	0.72	31.0	C	0.42	16.2	B
6 . Truck Access/5th Street		*No Conflicting Movement*			*No Conflicting Movement*		
7 . SR-30 SB Ramps/5th Street	Signal	0.76	24.1	C	0.67	19.7	B
8 . SR-30 NB Ramps/5th Street	Signal	0.66	23.1	C	0.76	27.8	C
9 . Boulder Avenue/5th Street	Signal	0.66	43.8	D	0.81	48.7	D
10 . Orange Street/Cemex Access	Signal	0.59	5.7	A	0.66	3.2	A

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service

Table Z - Year 2030 With Improvements Intersection Levels of Service
Land Use Alternative 2, Access Alternative C

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.83	47.7	D	0.77	35.1	D
2 . Palm Avenue/3rd Street	Signal	0.75	46.9	D	0.70	49.2	D
3 . Alabama Street/Robertson's Access	Signal	0.56	14.6	B	0.72	10.3	B
4 . Alabama Street/Cemex Access		*Combined with Intersection 3*			*Combined with Intersection 3*		
5 . Church Avenue/5th Street	Signal	0.75	30.7	C	0.71	24.5	C
6 . Truck Access/5th Street		*Access Alt. A Only*			*Access Alt. A Only*		
7 . SR-30 SB Ramps/5th Street	Signal	0.76	24.3	C	0.67	20.0	B
8 . SR-30 NB Ramps/5th Street	Signal	0.68	23.1	C	0.77	28.0	C
9 . Boulder Avenue/5th Street	Signal	0.72	47.6	D	0.81	49.2	D
10 . Orange Street/Cemex Access	Signal	0.61	5.1	A	0.65	3.2	A

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service

The year 2008 intersection improvement costs Land Use Alternative 2 using Access Alternative C are $144,280. Year 2008 cost estimates are provided for informational purposes only; project contributions to improvement costs are based on year 2030 improvement cost estimates.

The year 2030 improvement costs and project contributions are as follows:

Land Use Alternative 1, Access Alternative A – The improvement costs at study area intersections under this alternative are $2,247,370, including $130,500 for the signalization of the Robertson's/Cemex driveways on Alabama Street. The project's fair-share contribution to intersection improvements is $149,985, which includes $130,500 for the signalization of the Robertson's/Cemex driveways on Alabama Street and $19,485 for all other off-site improvements. These calculations do not consider the cost of building the truck access road on Fifth Street, which will be paid for by the mining companies.

- **Land Use Alternative 1, Access Alternative B** – The improvement costs at study area intersections under this alternative are $2,251,430, including $130,500 for the signalization of the Robertson's/Cemex driveways on Alabama Street. The project's fair-share contribution to intersection improvements is $159,932, which includes $29,432 for all other off-site improvements and $130,500 for the signalization of Robertson's/Cemex driveways on Alabama Street.
- **Land Use Alternative 1, Access Alternative D** – The improvement costs at study area intersections under this alternative are $2,251,430, including $130,500 for the signalization of the Robertson's/Cemex driveways on Alabama Street. The project's fair-share contribution to intersection improvements is $151,212, which includes $20,712 for all other off-site improvements and $130,500 for the signalization of Robertson's/Cemex driveways on Alabama Street.
- **Land Use Alternative 2, Access Alternative C** – The improvement costs at study area intersections under this alternative are $2,247,370 including $130,500 for the signalization of the Robertson's/Cemex driveways on Alabama Street. The project's fair-share contribution to intersection improvements is $231,024, which represents $130,500 for the signalization of the Robertson's/Cemex driveways on Alabama Street and $100,524 for all other off-site improvements.

The year 2030 improvement costs and project contributions to these improvements are summarized in Table AA. The unit costs are based on standard preliminary construction cost estimates for CMP improvements. The cost estimates include unit costs for pavement striping and signing changes. These cost estimates do not include preliminary engineering or right-of-way acquisition, and are intended solely for the purpose of discussion with local jurisdictions. They do not imply any legal responsibility or formula for contributions to mitigation.

FIFTH STREET SIGNAL COORDINATION ANALYSIS

To ensure that the recommended improvements along Fifth Street associated with the Fifth Street truck access road and the Third Street extension would not hinder the ability to implement a signal coordination plan in the future, a more detailed analysis of Fifth Street between Palm Avenue and Boulder Avenue was performed for all land use and access alternatives using Synchro version 6.0

Table AA - Project Contributions to Year 2030 Circulation Improvement Costs

Land Use Alternative 1, Access Alternative A

Intersection	Total Cost	Fair-Share Percent	Fair-Share Contribution
Palm Avenue/5th Street	$314,070	0.2%	$544
Palm Avenue/3rd Street	$266,800	0.2%	$475
Alabama Street/Robertson's-Cemex Access Signalization*	$130,500	100.0%	$130,500
Alabama Street/Robertson's-Cemex Access*	$170,810	0.2%	$393
SR-30 Southbound Ramps/5th Street	$140,800	1.9%	$2,692
SR-30 Northbound Ramps/5th Street	$648,300	1.2%	$7,918
Boulder Avenue/5th Street	$296,530	0.0%	$0
Orange Street/Cemex Access	$279,560	2.7%	$7,463
Total Intersection Improvements	**$2,247,370**		**$149,985**

*Due to the short distance between the driveways, the driveways will have to be combined in order to signalize the intersection.

Land Use Alternative 1, Access Alternative B

Intersection	Total Cost	Fair-Share Percent	Fair-Share Contribution
Palm Avenue/5th Street	$253,750	1.0%	$2,447
Palm Avenue/3rd Street	$203,870	1.5%	$3,107
Alabama Street/Robertson's-Cemex Access Signalization*	$130,500	100.0%	$130,500
Alabama Street/Robertson's-Cemex Access*	$170,810	1.9%	$3,292
Church Avenue/Fifth Street	$127,310	2.0%	$2,513
SR-30 Southbound Ramps/5th Street	$140,800	1.9%	$2,692
SR-30 Northbound Ramps/5th Street	$648,300	1.2%	$7,918
Boulder Avenue/5th Street	$296,530	0.0%	$0
Orange Street/Cemex Access	$279,560	2.7%	$7,463
Total Intersection Improvements	**$2,251,430**		**$159,932**

*Due to the short distance between the driveways, the driveways will have to be combined in order to signalize the intersection.

Land Use Alternative 1, Access Alternative D

Intersection	Total Cost	Fair-Share Percent	Fair-Share Contribution
Palm Avenue/5th Street	$253,750	0.2%	$539
Palm Avenue/3rd Street	$203,870	0.4%	$808
Alabama Street/Robertson's-Cemex Access Signalization*	$130,500	100.0%	$130,500
Alabama Street/Robertson's-Cemex Access*	$170,810	0.5%	$872
Church Avenue/Fifth Street	$127,310	0.3%	$420
SR-30 Southbound Ramps/5th Street	$140,800	1.9%	$2,692
SR-30 Northbound Ramps/5th Street	$648,300	1.2%	$7,918
Boulder Avenue/5th Street	$296,530	0.0%	$0
Orange Street/Cemex Access	$279,560	2.7%	$7,463
Total Intersection Improvements	**$2,251,430**		**$151,212**

*Due to the short distance between the driveways, the driveways will have to be combined in order to signalize the intersection.

Land Use Alternative 2, Access Alternative C

Intersection	Total Cost	Fair-Share Percent	Fair-Share Contribution
Palm Avenue/5th Street	$314,070	0.5%	$1,699
Palm Avenue/3rd Street	$266,800	0.0%	$0
Alabama Street/Robertson's-Cemex Access Signalization*	$130,500	100.0%	$130,500
Alabama Street/Robertson's-Cemex Access*	$170,810	0.0%	$0
SR-30 Southbound Ramps/5th Street	$140,800	3.8%	$5,393
SR-30 Northbound Ramps/5th Street	$648,300	8.1%	$52,333
Boulder Avenue/5th Street	$296,530	6.0%	$17,847
Orange Street/Cemex Access	$279,560	8.3%	$23,252
Total Intersection Improvements	**$2,247,370**		**$231,024**

*Due to the short distance between the driveways, the driveways will have to be combined in order to signalize the intersection.

software. The turning movement volumes, lane geometrics, and minimum green time information were taken from those recommended in the Year 2030 mitigated scenario. Screenshots illustrating the roadway network configuration used for each access alternative are included in Appendix M. The individual Synchro files are included with this report on CD-ROM. The analysis indicates that signal coordination is possible for all land use and access alternatives. The intersection of Boulder Avenue/Fifth Street does not require coordination due to the long distance between Boulder Avenue and SR-30. Tables BB, CC, and DD summarize the intersection levels of service with signal coordination for Land Use Alternative 1 under Access Alternatives A, B, and D, respectively. Table EE summarizes the intersection levels of service with signal coordination for Land Use Alternative 2 under Access Alternative C. Detailed level of service worksheets and signal timing information are included in Appendix N. As can be seen in Tables BB, CC, DD, and EE, the levels of service generally improve with signal coordination.

SR-30/FIFTH STREET INTERCHANGE QUEUING ANALYSIS

Storage lengths at the Fifth Street ramps have been analyzed to determine whether adequate distance is provided to store queued vehicles without causing vehicles to back up into the through lanes on Fifth Street or onto the freeway. The estimated queue length in feet for each movement at the ramp intersections was calculated using Synchro 6.0 software, which uses the HCM 2000 50th percentile and 95th percentile queue length methodology. This method computes the mean maximum queue length at the start of the green, computes the mean maximum back of the queue some time after the start of the green, and then estimates the 95th percentile design queue by multiplying this mean by a factor of two. This analysis was performed based on Year 2030 with project traffic volumes using the mitigated geometrics and coordinated signal timings.

Land Use Alternative 1, Access Alternative A

Table FF summarizes the results of the queuing analysis for Land Use Alternative 1 using Access Alternative A. Synchro queue length reports are included in Appendix O. As can be seen in Table FF, the average (50th percentile) queue is expected to be within the available storage length at all locations; however, the 95th percentile queue is expected to exceed the available storage length at the following locations:

- **SR-30 Southbound Ramps/Fifth Street, southbound right-turn lane.** The 95th percentile queue for the southbound right-turn lane in the a.m. peak hour is forecast to be 207 feet, which will exceed the storage available in the 200-foot right-turn lane by 7 feet. This is does not represent a serious operational deficiency, as the total length of the off-ramp is approximately 700 feet, and the queue would not exceed the length of the ramp. Additionally, the ramp is at least 26 feet wide for more than 300 feet beyond the point where the right-turn lane is striped, which would allow right-turning vehicles to create a de facto turn lane.
- **SR-30 Northbound Ramps/Fifth Street, eastbound left-turn lane.** The 95th percentile queue for the eastbound left-turn lane in the p.m. peak hour is forecast to be 187 feet, which will exceed the storage available in the 150-foot left-turn lane by 37 feet. When the improvements to the Fifth Street interchange recommended in the "Circulation Improvements" section of this report are constructed, the eastbound left-turn lane should be striped to a minimum of 190 feet in length. Since the storage available in the westbound left-turn lanes at SR-30 Southbound Ramps/5th

Table BB - Year 2030 Intersection Levels of Service with Signal Coordination
Land Use Alternative 1, Access Alternative A

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.82	41.7	D	0.74	27.2	C
5 . Church Avenue/5th Street	Signal	0.70	15.8	B	0.71	10.9	B
6 . Truck Access/5th Street	TWSC	*No Conflicting Movement*			*No Conflicting Movement*		
7 . SR-30 SB Ramps/5th Street	Signal	0.64	18.9	B	0.63	17.6	B
8 . SR-30 NB Ramps/5th Street	Signal	0.66	19.8	B	0.74	24.6	C
9 . Boulder Avenue/5th Street	Signal	0.77	36.6	D	0.76	36.5	D

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service
TWSC = Two-Way Stop Control
For TWSC intersections, reported delay is for worst-case approach.

Table CC - Year 2030 Intersection Levels of Service with Signal Coordination
Land Use Alternative 1, Access Alternative B

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.81	38.0	D	0.68	25.8	C
5 . Church Avenue/5th Street	Signal	0.73	20.2	C	0.43	15.9	B
6 . Truck Access/5th Street		*Access Alts. A & D Only*			*Access Alts. A & D Only*		
7 . SR-30 SB Ramps/5th Street	Signal	0.64	18.9	B	0.62	18.8	B
8 . SR-30 NB Ramps/5th Street	Signal	0.66	19.8	B	0.75	22.7	C
9 . Boulder Avenue/5th Street	Signal	0.72	36.5	D	0.80	37.8	D

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service

Table DD - Year 2030 Intersection Levels of Service with Signal Coordination
Land Use Alternative 1, Access Alternative D

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.78	36.4	D	0.64	36.4	D
5 . Church Avenue/5th Street	Signal	0.70	19.1	B	0.41	20.2	C
6 . Truck Access/5th Street		*No Conflicting Movement*			*No Conflicting Movement*		
7 . SR-30 SB Ramps/5th Street	Signal	0.62	17.7	B	0.62	18.9	B
8 . SR-30 NB Ramps/5th Street	Signal	0.66	19.9	B	0.74	24.3	C
9 . Boulder Avenue/5th Street	Signal	0.76	36.5	D	0.80	37.2	D

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service

Table EE - Year 2030 Intersection Levels of Service with Signal Coordination
Land Use Alternative 2, Access Alternative C

Intersection	Control	A.M. Peak Hour			P.M. Peak Hour		
		V/C	Delay (sec)	LOS	V/C	Delay (sec)	LOS
1 . Palm Avenue/5th Street	Signal	0.81	36.2	D	0.73	29.3	C
5 . Church Avenue/5th Street	Signal	0.78	22.0	C	0.71	15.4	B
6 . Truck Access/5th Street		*Access Alts. A & D Only*			*Access Alts. A & D Only*		
7 . SR-30 SB Ramps/5th Street	Signal	0.63	18.5	B	0.63	18.1	B
8 . SR-30 NB Ramps/5th Street	Signal	0.65	19.1	B	0.76	20.4	C
9 . Boulder Avenue/5th Street	Signal	0.81	42.3	D	0.83	39.4	D

Notes:
V/C = Volume/Capacity Ratio
LOS = Level of Service

Table FF - Year 2030 Queuing Analysis

Land Use Alternative 1, Access Alternative A

Movement	No. of Lanes	Storage Length (feet)	A.M. Peak Hour 50% Queue (feet)	A.M. Peak Hour 95% Queue (feet)	A.M. Peak Hour Storage Adequate? (50%/95%)	P.M. Peak Hour 50% Queue (feet)	P.M. Peak Hour 95% Queue (feet)	P.M. Peak Hour Storage Adequate? (50%/95%)
5th Street/SR-30 SB Ramps								
EBTR	3	1,350	46	72	Yes/Yes	244	292	Yes/Yes
EBR	1	450	0	59	Yes/Yes	66	188	Yes/Yes
WBL*	2	350	134	174	Yes/Yes	108	161	Yes/Yes
WBT	3	450	94	157	Yes/Yes	23	48	Yes/Yes
SBL	1	700	73	119	Yes/Yes	129	208	Yes/Yes
SBR	1	200	134	207	**Yes/No**	0	43	Yes/Yes
5th Street/SR-30 NB Ramps								
EBL	1	150	35	71	Yes/Yes	146	m187	**Yes/No**
EBT	3	450	27	41	Yes/Yes	46	44	Yes/Yes
WBT	1	3,400	186	227	Yes/Yes	140	193	Yes/Yes
WBR (defacto)	3	200	0	38	Yes/Yes	0	51	Yes/Yes
NBL	2	650	149	232	Yes/Yes	132	206	Yes/Yes
NBR	1	1,200	22	69	Yes/Yes	425	#683	Yes/Yes

* Westbound left turn has a 250' turn pocket and a 450' trap lane. The effective storage length is 350'.

\# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

m Volume is metered by upstream signal.

Street is at least 176 feet greater than the 95th percentile queue in these lanes, it is feasible to reduce the length of the left-most westbound left-turn lane at the southbound ramp to provide additional storage length for the eastbound left-turn lane at the northbound ramp.

Land Use Alternative 1, Access Alternative B

Table GG summarizes the results of the queuing analysis for Land Use Alternative 1 using Access Alternative B. Synchro queue length reports are included in Appendix O. As can be seen in Table GG, the average (50th percentile) queue is expected to be within the available storage length at all locations; however, the 95th percentile queue is expected to exceed the available storage length at the following locations:

- **SR-30 Southbound Ramps/Fifth Street, southbound right-turn lane.** The 95th percentile queue for the southbound right-turn lane in the a.m. peak hour is forecast to be 259 feet, which will exceed the storage available in the 200-foot right-turn lane by 59 feet. This is does not represent a serious operational deficiency, as the total length of the off-ramp is approximately 700 feet, and the queue would not exceed the length of the ramp. Additionally, the ramp is at least 26 feet wide for more than 300 feet beyond the point where the right-turn lane is striped, which would allow right-turning vehicles to create a de facto turn lane.
- **SR-30 Northbound Ramps/Fifth Street, eastbound left-turn lane.** The 95th percentile queue for the eastbound left-turn lane in the p.m. peak hour is forecast to be 218 feet, which will exceed the storage available in the 150-foot left-turn lane by 68 feet. When the improvements to the Fifth Street interchange recommended in the "Circulation Improvements" section of this report are constructed, the eastbound left-turn lane should be striped to a minimum of 220 feet in length. Since the storage available in the westbound left-turn lanes at SR-30 Southbound Ramps/5th Street is at least 132 feet greater than the 95th percentile queue in these lanes, it is feasible to reduce the length of the left-most westbound left-turn lane at the southbound ramp to provide additional storage length for the eastbound left-turn lane at the northbound ramp.

Land Use Alternative 1, Access Alternative D

Table HH summarizes the results of the queuing analysis for Land Use Alternative 1 using Access Alternative D. Synchro queue length reports are included in Appendix O. As can be seen in Table HH, the average (50th percentile) queue is expected to be within the available storage length at all locations; however, the 95th percentile queue is expected to exceed the available storage length at the following locations:

- **SR-30 Southbound Ramps/Fifth Street, southbound right-turn lane.** The 95th percentile queue for the southbound right-turn lane in the a.m. peak hour is forecast to be 265 feet, which will exceed the storage available in the 200-foot right-turn lane by 65 feet. This is does not represent a serious operational deficiency, as the total length of the off-ramp is approximately 700 feet, and the queue would not exceed the length of the ramp. Additionally, the ramp is at least 26 feet wide for more than 300 feet beyond the point where the right-turn lane is striped, which would allow right-turning vehicles to create a de facto turn lane.

Table GG - Year 2030 Queuing Analysis

Land Use Alternative 1, Access Alternative B

Movement	No. of Lanes	Storage Length (feet)	A.M. Peak Hour 50% Queue (feet)	A.M. Peak Hour 95% Queue (feet)	A.M. Peak Hour Storage Adequate? (50%/95%)	P.M. Peak Hour 50% Queue (feet)	P.M. Peak Hour 95% Queue (feet)	P.M. Peak Hour Storage Adequate? (50%/95%)
5th Street/SR-30 SB Ramps								
EBTR	3	1,350	57	90	Yes/Yes	250	304	Yes/Yes
EBR	1	240	0	74	Yes/Yes	79	222	Yes/Yes
WBL*	2	350	168	218	Yes/Yes	109	157	Yes/Yes
WBT	3	450	117	196	Yes/Yes	4	4	Yes/Yes
SBL	1	700	91	149	Yes/Yes	129	208	Yes/Yes
SBR	1	200	167	259	**Yes/No**	0	43	Yes/Yes
5th Street/SR-30 NB Ramps								
EBL	1	150	43	89	Yes/Yes	132	m218	**Yes/No**
EBT	3	450	34	51	Yes/Yes	12	27	Yes/Yes
WBT	1	3,400	233	284	Yes/Yes	153	193	Yes/Yes
WBR (defacto)	3	200	0	47	Yes/Yes	0	51	Yes/Yes
NBL	2	650	187	291	Yes/Yes	129	202	Yes/Yes
NBR	1	1,200	27	87	Yes/Yes	417	#672	Yes/Yes

* Westbound left turn has a 250' turn pocket and a 450' trap lane. The effective storage length is 350'.

\# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

m Volume is metered by upstream signal.

Table HH - Year 2030 Queuing Analysis

Land Use Alternative 1, Access Alternative D

Movement	No. of Lanes	Storage Length (feet)	A.M. Peak Hour 50% Queue (feet)	A.M. Peak Hour 95% Queue (feet)	A.M. Peak Hour Storage Adequate? (50%/95%)	P.M. Peak Hour 50% Queue (feet)	P.M. Peak Hour 95% Queue (feet)	P.M. Peak Hour Storage Adequate? (50%/95%)
5th Street/SR-30 SB Ramps								
EBTR	3	1,350	57	90	Yes/Yes	259	310	Yes/Yes
EBR	1	450	0	74	Yes/Yes	91	238	Yes/Yes
WBL*	2	350	156	236	Yes/Yes	105	157	Yes/Yes
WBT	3	450	92	113	Yes/Yes	23	44	Yes/Yes
SBL	1	700	93	153	Yes/Yes	129	208	Yes/Yes
SBR	1	200	171	265	**Yes/No**	0	43	Yes/Yes
5th Street/SR-30 NB Ramps								
EBL	1	150	43	78	Yes/Yes	148	m180	**Yes/No**
EBT	3	450	11	14	Yes/Yes	32	31	Yes/Yes
WBT	1	3,400	234	303	Yes/Yes	141	192	Yes/Yes
WBR (defacto)	3	200	0	50	Yes/Yes	0	51	Yes/Yes
NBL	2	650	187	291	Yes/Yes	132	206	Yes/Yes
NBR	1	1,200	27	87	Yes/Yes	425	683	Yes/Yes

* Westbound left turn has a 250' turn pocket and a 450' trap lane. The effective storage length is 350'.

\# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

m Volume is metered by upstream signal.

- **SR-30 Northbound Ramps/Fifth Street, eastbound left-turn lane.** The 95th percentile queue for the eastbound left-turn lane in the p.m. peak hour is forecast to be 180 feet, which will exceed the storage available in the 150-foot left-turn lane by 30 feet. When the improvements to the Fifth Street interchange recommended in the "Circulation Improvements" section of this report are constructed, the eastbound left-turn lane should be striped to a minimum of 180 feet in length. Since the storage available in the westbound left-turn lanes at SR-30 Southbound Ramps/5th Street is at least 114 feet greater than the 95th percentile queue in these lanes, it is feasible to reduce the length of the left-most westbound left-turn lane at the southbound ramp to provide additional storage length for the eastbound left-turn lane at the northbound ramp.

Land Use Alternative 2, Access Alternative C

Table II summarizes the results of the queuing analysis for Land Use Alternative 2 using Access Alternative C. Synchro queue length reports are included in Appendix O. As can be seen in Table II, the average (50th percentile) queue is expected to be within the available storage length at all locations; however, the 95th percentile queue is expected to exceed the available storage length at the following location:

- **SR-30 Southbound Ramps/Fifth Street, southbound right-turn lane.** The 95th percentile queue for the southbound right-turn lane in the a.m. peak hour is forecast to be 256 feet, which will exceed the storage available in the 200-foot right-turn lane by 56 feet. This is does not represent a serious operational deficiency, as the total length of the off-ramp is approximately 700 feet, and the queue would not exceed the length of the ramp. Additionally, the ramp is at least 26 feet wide for more than 300 feet beyond the point where the right-turn lane is striped. This would allow right-turning vehicles to create a de facto turn lane or restriping to create a longer right turn pocket, if necessary.

SR-30 FREEWAY RAMP MERGE/DIVERGE ANALYSIS

To determine the effect of project trucks on the SR-30 freeway a detailed merge/diverge analysis has been performed. The methodology used to develop the volumes used for the analysis and the results of the analysis are described below.

Existing (2004) Volume Development

The following describes the development of existing a.m. and p.m. peak-hour freeway mainline and ramp volumes. Detailed volume development worksheets are included in Appendix P.

1. Existing (2004) p.m. peak-hour bidirectional (total two-way) freeway mainline volumes on the segment of SR-30 between Fifth Street and San Bernardino Avenue were taken from 2004 Caltrans traffic volume data. Caltrans data indicate that the a.m. peak hour on this segment represents 8.49 percent of daily traffic and the p.m. peak hour represents 8.98 percent of daily traffic. Therefore, the a.m. peak hour volume has been calculated to be 94.5 percent (or 8.49/8.98) of the p.m. peak hour volume on this segment. Hence, the p.m. peak-hour mainline volume has been multiplied by 0.945 to develop the a.m. peak hour mainline volume for this segment. Existing a.m. peak hour and p.m. peak-hour counts for this segment are shown in Table JJ.

Table II - Year 2030 Queuing Analysis

Land Use Alternative 2, Access Alternative C

Movement	No. of Lanes	Storage Length (feet)	A.M. Peak Hour 50% Queue (feet)	A.M. Peak Hour 95% Queue (feet)	A.M. Peak Hour Storage Adequate? (50%/95%)	P.M. Peak Hour 50% Queue (feet)	P.M. Peak Hour 95% Queue (feet)	P.M. Peak Hour Storage Adequate? (50%/95%)
5th Street/SR-30 SB Ramps								
EBTR	3	1,350	57	90	Yes/Yes	224	310	Yes/Yes
EBR	1	240	0	72	Yes/Yes	79	238	Yes/Yes
WBL*	2	350	169	259	Yes/Yes	103	157	Yes/Yes
WBT	3	450	126	198	Yes/Yes	19	44	Yes/Yes
SBL	1	700	101	165	Yes/Yes	116	208	Yes/Yes
SBR	1	200	165	256	**Yes/No**	0	43	Yes/Yes
5th Street/SR-30 NB Ramps								
EBL	1	150	41	88	Yes/Yes	82	m122	Yes/Yes
EBT	3	450	11	14	Yes/Yes	32	32	Yes/Yes
WBT	1	3,400	236	286	Yes/Yes	130	168	Yes/Yes
WBR (defacto)	3	200	0	46	Yes/Yes	0	47	Yes/Yes
NBL	2	650	178	287	Yes/Yes	111	178	Yes/Yes
NBR	1	1,200	60	145	Yes/Yes	375	#626	Yes/Yes

* Westbound left turn has a 250' turn pocket and a 450' trap lane. The effective storage length is 350'.

\# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

m Volume is metered by upstream signal.

Table JJ - Existing (2004) SR-30 Freeway PCE Traffic Volumes

A.M. Peak Hour										
	Bidirectional Volume				Northbound[4]			Southbound[4]		
Freeway Segment	Total Vehicles[1]	Truck %[2]	Auto (Veh.)	Truck (Veh.)	Auto (Veh.)	Truck (Veh.)	Truck PCE[3]	Auto (Veh.)	Truck (Veh.)	Truck PCE[3]
State Route 30										
San Bernardino Ave to 5th Street	6,710	4.65%	6,398	312	2,719	133	200	3,679	179	269
Southern Ramp					607	70	105	979	63	95
Between 5th Street Ramps[5]					2,112	63	95	2,700	116	174
Northern Ramp					267	10	15	265	17	26
5th Street to Base Line[5]					2,379	73	110	2,965	133	200

P.M. Peak Hour										
	Bidirectional Volume				Northbound[4]			Southbound[4]		
Freeway Segment	Total Vehicles[1]	Truck %[2]	Auto (Veh.)	Truck (Veh.)	Auto (Veh.)	Truck (Veh.)	Truck PCE[3]	Auto (Veh.)	Truck (Veh.)	Truck PCE[3]
State Route 30										
San Bernardino Ave to 5th Street	7,100	4.65%	6,770	330	3,547	173	260	3,223	157	236
Southern Ramp					725	68	102	663	21	32
Between 5th Street Ramps[5]					2,822	105	158	2,560	136	204
Northern Ramp					214	7	11	249	21	32
5th Street to Base Line[5]					3,036	112	168	2,809	157	236

[1] PM Peak hour count from Caltrans' 2004 Annual Average Daily Traffic volume data. Based on Caltrans' reported peak hour K-Factors, AM peak hour volume has been determined to be 94.5% of PM peak hour volume

[2] Total truck percentage from Caltrans' 2004 Annual Average Daily Truck Traffic volume Data.

[3] Passenger Car Equivalent volume, using a PCE factor of 1.5 for all trucks, based on HCM.

[4] Based on Caltrans data of 57.5% of total peak hour traffic in peak direction (Southbound) in the AM peak hour, and 52.4% of total peak hour traffic in the peak direction (Northbound) in the PM peak hour

[5] Northbound and southbound peak hour data calculated by adding/subtracting on-ramp and off-ramp values, as appropriate

2. The northbound and southbound freeway mainline volumes for the segment of SR-30 between Fifth Street and San Bernardino Avenue have been developed based on directional splits taken from 2004 Caltrans traffic volume data. During the a.m. peak hour, 42.5 percent of the total traffic is traveling northbound and 57.5 percent of the total traffic is traveling southbound. During the p.m. peak hour, 52.4 percent of the total traffic is traveling northbound and 47.6 percent of the total traffic is traveling southbound. Existing northbound and southbound volumes based on the directional splits are shown in Table JJ.
3. The freeway mainline volumes have been converted to PCE volumes by applying a truck percentage and using a truck PCE factor of 1.5, as specified in the *Highway Capacity Manual* (HCM). The truck percentage has been taken from 2004 Caltrans truck traffic volume data. The a.m. and p.m. peak hour northbound and southbound freeway mainline PCE volumes for the segment of SR-30 between Fifth Street and San Bernardino Avenue are shown in Table JJ.
4. Entering and exiting volumes at the Fifth Street interchange ramps are based on total approach and departure volumes at the ramp terminus intersections as reported in Table D-1 in Appendix D. Entering and exiting truck volumes were converted to PCE volumes using the same factor of 1.5 as used for the freeway mainline. Freeway mainline volumes between the Fifth Street ramps and between Fifth Street and Base Line Road were determined by adding and subtracting the on-ramp and off-ramp volumes at the interchange, as appropriate. Table JJ provides a summary of the existing freeway and ramp traffic volumes at the Fifth Street ramps.

Year 2030 Volume Development

The following describes the methodology used to post-process EVTM traffic model volumes to develop a.m. and p.m. peak-hour freeway mainline and ramp volumes for 2030 conditions:

1. The 2030 freeway mainline volumes for the segment of SR-30 between Fifth Street and San Bernardino Avenue were developed from the CMP model using the same post-processing procedures described for passenger vehicles and trucks to develop 2030 intersection approach and departure volumes.
2. The CMP model considers trucks in PCEs using a conversion factor of 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for trucks with four or more axles. Because the HCM methodology for freeway segment specifies a PCE factor of 1.5 for all trucks, the truck PCE volumes required conversion to avoid over-estimating impacts. The conversion was performed by calculating the existing (2004) average PCE for trucks on the segment between Fifth Street and San Bernardino Avenue using Caltrans 2004 truck classification information and a PCE conversion factor of 1.5 for 2-axle trucks, 2.0 for 3-axle trucks, and 4.0 for trucks with four or more axles.
3. The truck volume (in vehicles) was calculated by dividing the modeled truck PCE volume by the calculated average PCE factor. The truck volume was the converted to the HCM-specified PCE using a factor of 1.5.
4. Entering and exiting volumes at the Fifth Street interchange ramps are based on total approach and departure volumes at the ramp terminus intersections, as calculated in Table D-24 of Appendix D. The same process shown in steps 2 and 3 was used to convert the PCE volumes to the HCM-specified PCE, but the conversion was based on the 2004 average PCE volume calculated at the ramps based on the volumes shown in Table D-1 of Appendix D. Freeway

mainline volumes between the Fifth Street Ramps and between Fifth Street and Base line Road were calculated and subtracting the on-ramp and off-ramp volumes at the interchange, as appropriate. Table KK provides a summary of 2030 background freeway and ramp traffic volumes at the Fifth Street ramps. Appendix P shows the post-processed volumes for these segments.

5. The new aggregate trips were added to the 2030 background volumes to develop the "with project" conditions for each land use alternative. Because the different access alternatives only change how the project trucks access the freeway, not the volume of trucks on the freeway, the freeway mainline volumes are the same for all access alternatives, and differ only between the two land use alternatives. Because the intersection analysis considered aggregate trucks to have a PCE of 3.0, the project truck PCE volume was divided by 1.5 to derive the HCM-specified PCE of 1.5 for all trucks. Table LL summarizes the Year 2030 freeway mainline and ramp volumes with the addition of project truck under Land Use Alternative 1. Table MM summarizes the Year 2030 freeway mainline and ramp volumes with the addition of project trucks under Land Use Alternative 2.

Year 2008 Volume Development

The following describes the methodology used to develop a.m. and p.m. peak hour freeway mainline and ramp volumes for opening year (2008) conditions:

1. The Year 2008 background freeway mainline and ramp volumes were developed by interpolating between existing (2004) volumes and year 2030 volumes. For the purposes of this interpolation, a linear growth rate has been assumed. Table NN shows the year 2008 background freeway mainline and ramp volumes.
2. The new aggregate trips were added to the 2030 background volumes to develop the "with project" conditions for each land use alternative. Because the different access alternatives only change how the project trucks access the freeway, not the volume of trucks on the freeway, the freeway mainline volumes are the same for all access alternatives, and differ only between the two land use alternatives. Because the intersection analysis considered aggregate trucks to have a PCE of 3.0, the project truck PCE volume was divided by 1.5 to derive the HCM-specified PCE of 1.5 for all trucks. Table OO summarizes the year 2008 freeway mainline and ramp volumes with the addition of project truck under Land Use Alternative 1. Table PP summarizes the year 2008 freeway mainline and ramp volumes with the addition of project trucks under Land Use Alternative 2.

Freeway Level of Service Analysis Procedure

Peak-hour volumes in ramp influence areas were analyzed using the methodology contained in HCM Chapter 25 (Ramps and Ramp Junctions), with calculations performed using HCS+ software. The analysis of on-ramps examines the impacts of merging onto the freeway, while the analysis of off-ramps examines the impacts of diverging from the freeway. A free-flow speed (FFS) of 64 miles per hour has been used for the freeway mainline, consistent with the HCM recommendation for a 2-lane freeway in an urbanized area with 1.25-mile average interchange spacing. A ramp speed of 25 miles per hour has been used for the on-ramps and a ramp speed of 45 miles per hour has been used for the

Table KK - Year 2030 SR-30 Freeway PCE Traffic Volumes

Freeway Segment	A.M. Peak Hour				P.M. Peak Hour			
	Auto (Veh.)	Truck (Veh.)	Truck PCE	Total PCE	Auto (Veh.)	Truck (Veh.)	Truck PCE	Total PCE
Northbound								
San Bernardino Avenue to 5th Street	4,729	441	662	5,391	5,767	594	891	6,658
Southern Ramp	1,095	80	120	1,215	1,165	80	120	1,285
Between 5th Street Ramps	3,634	361	542	4,176	4,602	514	771	5,373
Northern Ramp	301	44	66	367	384	21	32	416
5th Street to Base Line	3,935	405	608	4,543	4,986	535	803	5,789
Southbound								
San Bernardino Avenue to 5th Street	5,799	637	956	6,755	4,993	475	713	5,706
Southern Ramp	1,321	93	140	1,461	1,298	71	107	1,405
Between 5th Street Ramps	4,478	544	816	5,294	3,695	404	606	4,301
Northern Ramp	566	67	101	667	261	40	60	321
5th Street to Base Line	5,044	611	917	5,961	3,956	444	666	4,622

Table LL - Year 2030 SR-30 Freeway PCE Traffic Volumes with New Cemex Aggregate Trucks

Land Use Alternative 1, Access Alternatives A, B, and D

Freeway Segment	A.M. Peak Hour				P.M. Peak Hour			
	2030 w/o Project PCE	Alt. 1 New Agg. Trucks (Veh.)	Alt. 1 New Agg. Trucks PCE	2030 With New Proj. Trucks PCE	2030 w/o Project PCE	Alt. 1 New Agg. Trucks (Veh.)	Alt. 1 New Agg. Trucks PCE	2030 With New Proj. Trucks PCE
Northbound								
San Bernardino Avenue to 5th Street	5,391	4	6	5,397	6,658	1	2	6,660
Southern Ramp	1,215	4	6	1,221	1,285	1	2	1,287
Between 5th Street Ramps	4,176	0	0	4,176	5,373	0	0	5,373
Northern Ramp	367	2	3	370	416	0	0	416
5th Street to Base Line	4,543	2	3	4,546	5,789	0	0	5,789
Southbound								
San Bernardino Avenue to 5th Street	6,755	4	6	6,761	5,706	1	2	5,708
Southern Ramp	1,461	4	6	1,467	1,405	1	2	1,407
Between 5th Street Ramps	5,294	0	0	5,294	4,301	0	0	4,301
Northern Ramp	667	1	2	669	321	0	0	321
5th Street to Base Line	5,961	1	2	5,963	4,622	0	0	4,622

Table MM - Year 2030 SR-30 Freeway PCE Traffic Volumes with New Cemex Aggregate Trucks

Land Use Alternative 2, Access Alternative C

Freeway Segment	A.M. Peak Hour				P.M. Peak Hour			
	2030 w/o Project PCE	Alt. 2 New Agg. Trucks (Veh.)	Alt. 2 New Agg. Trucks PCE	2030 With New Proj. Trucks PCE	2030 w/o Project PCE	Alt. 2 New Agg. Trucks (Veh.)	Alt. 2 New Agg. Trucks PCE	2030 With New Proj. Trucks PCE
Northbound								
San Bernardino Avenue to 5th Street	5,391	13	20	5,411	6,658	3	5	6,663
Southern Ramp	1,215	13	20	1,235	1,285	3	5	1,290
Between 5th Street Ramps	4,176	0	0	4,176	5,373	0	0	5,373
Northern Ramp	367	4	6	373	416	1	2	418
5th Street to Base Line	4,543	4	6	4,549	5,789	1	2	5,791
Southbound								
San Bernardino Avenue to 5th Street	6,755	13	20	6,775	5,706	2	3	5,709
Southern Ramp	1,461	13	20	1,481	1,405	2	3	1,408
Between 5th Street Ramps	5,294	0	0	5,294	4,301	0	0	4,301
Northern Ramp	667	4	6	673	321	1	2	323
5th Street to Base Line	5,961	4	6	5,967	4,622	1	2	4,624

Table NN - Year 2008 SR-30 Freeway PCE Traffic Volumes

Freeway Segment	A.M. Peak Hour					P.M. Peak Hour				
	2004 PCE	2030 PCE	2004 - 2030 Growth	2004 - 2008 Growth	2008 PCE	2004 PCE	2030 PCE	2004 - 2030 Growth	2004 - 2008 Growth	2008 PCE
Northbound										
San Bernardino Avenue to 5th Street	2,919	5,391	2,472	380	3,299	3,807	6,658	2,851	439	4,246
Southern Ramp	712	1,215	503	77	789	827	1,285	458	70	897
Between 5th Street Ramps	2,207	4,176	1,969	303	2,510	2,980	5,373	2,393	368	3,348
Northern Ramp	282	367	85	13	295	225	416	191	29	254
5th Street to Base Line	2,489	4,543	2,054	316	2,805	3,204	5,789	2,585	398	3,602
Southbound										
San Bernardino Avenue to 5th Street	3,948	6,755	2,807	432	4,380	3,459	5,706	2,247	346	3,805
Southern Ramp	1,074	1,461	387	60	1,134	695	1,405	710	109	804
Between 5th Street Ramps	2,874	5,294	2,420	372	3,246	2,764	4,301	1,537	236	3,000
Northern Ramp	291	667	376	58	349	281	321	40	6	287
5th Street to Base Line	3,165	5,961	2,796	430	3,595	3,045	4,622	1,577	243	3,288

Table OO - Year 2008 SR-30 Freeway PCE Traffic Volumes with New Cemex Aggregate Trucks

Land Use Alternative 1, Access Alternatives A, B, and D

Freeway Segment	A.M. Peak Hour				P.M. Peak Hour			
	2008 Background PCE	Alt. 1 New Agg. Trucks (Veh.)	Alt. 1 New Agg. Trucks PCE	2008 With New Proj. Trucks PCE	2008 Background PCE	Alt. 1 New Agg. Trucks (Veh.)	Alt. 1 New Agg. Trucks PCE	2008 With New Proj. Trucks PCE
Northbound								
San Bernardino Avenue to 5th Street	3,299	4	6	3,305	4,246	1	2	4,248
Southern Ramp	789	4	6	795	897	1	2	899
Between 5th Street Ramps	2,510	0	0	2,510	3,348	0	0	3,348
Northern Ramp	295	2	3	298	254	0	0	254
5th Street to Base Line	2,805	2	3	2,808	3,602	0	0	3,602
Southbound								
San Bernardino Avenue to 5th Street	4,380	4	6	4,386	3,805	1	2	3,807
Southern Ramp	1,134	4	6	1,140	804	1	2	806
Between 5th Street Ramps	3,246	0	0	3,246	3,000	0	0	3,000
Northern Ramp	349	1	2	351	287	0	0	287
5th Street to Base Line	3,595	1	2	3,597	3,288	0	0	3,288

Table PP - Year 2008 SR-30 Freeway PCE Traffic Volumes with New Cemex Aggregate Trucks

Land Use Alternative 2, Access Alternative C

Freeway Segment	A.M. Peak Hour				P.M. Peak Hour			
	2008 w/o Project PCE	Alt. 2 New Agg. Trucks (Veh.)	Alt. 2 New Agg. Trucks PCE	2008 With New Proj. Trucks PCE	2008 w/o Project PCE	Alt. 2 New Agg. Trucks (Veh.)	Alt. 2 New Agg. Trucks PCE	2008 With New Proj. Trucks PCE
Northbound								
San Bernardino Avenue to 5th Street	3,299	13	20	3,319	4,246	3	5	4,251
Southern Ramp	789	13	20	809	897	3	5	902
Between 5th Street Ramps	2,510	0	0	2,510	3,348	0	0	3,348
Northern Ramp	295	4	6	301	254	1	2	256
5th Street to Base Line	2,805	4	6	2,811	3,602	1	2	3,604
Southbound								
San Bernardino Avenue to 5th Street	4,380	13	20	4,400	3,805	2	3	3,808
Southern Ramp	1,134	13	20	1,154	804	2	3	807
Between 5th Street Ramps	3,246	0	0	3,246	3,000	0	0	3,000
Northern Ramp	349	4	6	355	287	1	2	289
5th Street to Base Line	3,595	4	6	3,601	3,288	1	2	3,290

off-ramps. The speed of the ramps should be considered conservative since passenger vehicles, which make up the majority of ramp traffic, would likely enter and exit the freeway at higher speeds.

Level of service is calculated based on the density in passengers per mile per lane (pc/mi/ln), with LOS E being the lowest acceptable level of service. Any segment for which demand is forecast to exceed capacity is considered to automatically operate at LOS F, and density and speed functions do not hold for this condition due to unstable traffic flow. Table QQ shows the level of service criteria for freeway ramp junctions.

Table QQ – Level of Service Criteria for Ramp Junctions

Level of Service	Density (pc/mi/ln) for Merge and Diverge Areas
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 28
D	> 28 and ≤ 35
E	>35
F	Demand Exceeds Capacity

Freeway Level of Service Analysis – Existing Conditions

A level of service analysis was conducted to evaluate existing (2004) peak hour traffic operations at the Fifth Street ramps. The results of this analysis are summarized in Table RR. The level of service calculation sheets are contained in Appendix Q. As indicated in Table RR, all freeway segments examined operate at LOS E or better under existing (2004) conditions.

Freeway Level of Service Analysis – Year 2008 Background Conditions

A level of service analysis was conducted to evaluate year 2008 background peak hour traffic operations on SR-30 at the Fifth Street ramp influence areas. Table SS summarizes the results of this analysis. The level of service calculation sheets are contained in Appendix Q. As indicated in Table SS, the following freeway segments are projected to operate at LOS F under year 2008 background conditions:

- **SR-30 Northbound, south of Fifth Street Off-Ramp (p.m. peak hour)** – This segment is forecast to operate at LOS F during the a.m. peak period due to demand exceeding freeway capacity.
- **SR-30 Southbound, south of Fifth Street On-Ramp (a.m. peak hour)** – This segment is forecast to operate at LOS F during the a.m. peak period due to demand exceeding freeway capacity.

Table RR - Existing (2004) SR-30 Freeway Mainline Levels of Service

Freeway Segment	Lanes	A.M. Peak Hour Speed (mi/hr)	A.M. Peak Hour Density (pc/mi/ln)	A.M. Peak Hour LOS	P.M. Peak Hour Speed (mi/hr)	P.M. Peak Hour Density (pc/mi/ln)	P.M. Peak Hour LOS
Northbound							
5th Street Off-Ramp Influence Area	2	55.9	31.5	D	55.7	39.8	E
5th Street On-Ramp Influence Area	2	56.0	26.4	C	54.0	32.5	D
Southbound							
5th Street Off-Ramp Influence Area	2	56.8	33.8	D	56.8	32.7	D
5th Street On-Ramp Influence Area	2	51.0	38.4	E	53.0	34.4	D

Notes:

* Exceeds level of service standard

† Volume exceeds capacity; speed and density not defined for over capacity segment

Level of Service (LOS) criteria are provided in the *Highway Capacity Manual* , and are based on density, expressed in terms of passenger cars per mile per lane (pc/mi/ln).

Table SS - Year 2008 SR-30 Freeway Mainline Levels of Service

Freeway Segment	Lanes	A.M. Peak Hour Speed (mi/hr)	A.M. Peak Hour Density (pc/mi/ln)	A.M. Peak Hour LOS	P.M. Peak Hour Speed (mi/hr)	P.M. Peak Hour Density (pc/mi/ln)	P.M. Peak Hour LOS
Northbound							
5th Street Off-Ramp Influence Area	2	55.7	35.1	E	†	†	F *
5th Street On-Ramp Influence Area	2	55.0	29.1	D	53.0	35.9	E
Southbound							
5th Street Off-Ramp Influence Area	2	56.7	37.9	E	56.8	35.0	D
5th Street On-Ramp Influence Area	2	†	†	F *	52.0	37.3	E

Notes:

* Exceeds level of service standard

† Volume exceeds capacity; speed and density not defined for over capacity segment

Level of Service (LOS) criteria are provided in the *Highway Capacity Manual* , and are based on density, expressed in terms of passenger cars per mile per lane (pc/mi/ln).

Freeway Level of Service Analysis – Year 2008 Land Use Alternative 1 Conditions

A level of service analysis was conducted to evaluate year 2008 Land Use Alternative 1 peak hour traffic operations on SR-30 at the Fifth Street ramp influence area. Table TT summarizes the results of this analysis. The level of service calculation sheets are contained in Appendix Q. As indicated in Table TT, addition of new project traffic under Land Use Alternative 1 does not change level of service, increase density, or decrease speed in the ramp influence area.

Freeway Level of Service Analysis – Year 2008 Land Use Alternative 2 Conditions

A level of service analysis was conducted to evaluate year 2008 Land Use Alternative 2 peak hour traffic operations on SR-30 at the Fifth Street ramp influence areas. Table UU summarizes the results of this analysis. The level of service calculation sheets are contained in Appendix Q. As indicated in Table UU, the addition of new project traffic under Land Use Alternative 2 does not change level of service. Project traffic increases density by up to 0.2 passenger car per mile per lane and decreases average speed in the ramp influence area by up to 0.2 mile per hour.

Freeway Level of Service Analysis – Year 2030, All Conditions

A level of service analysis was conducted to evaluate year 2030 peak hour traffic operations on SR-30 at the Fifth Street ramp influence area under Background with Plant, Land Use Alternative 1, and Land Use Alternative 2 conditions. The results of this analysis indicate that both directions of the freeway will operate at LOS F during both peak periods in the vicinity of the ramps under year 2030 Background with Plant, Land Use Alternative 1, and Land Use Alternative 2 conditions. The level of service calculation sheets are contained in Appendix Q. No summary tables have been shown because speed and density relations do not apply to LOS F conditions, and therefore no quantitative comparison can be made.

SUMMARY AND CONCLUSIONS

This section of the report summarizes the results and conclusions of the traffic analysis for the issuance of new mining permits for the Cemex and Robertson's quarries in the Upper Santa Ana River Wash area. The key results are summarized below.

1. This report analyzed both a.m. and p.m. peak hour operations for the following ten study area intersections:
   - Palm Avenue/Fifth Street;
   - Palm Avenue/Third Street;
   - Alabama Street/Robertson's Access;
   - Alabama Street/Cemex Access;
   - Church Avenue/Fifth Street;
   - Truck Access/Fifth Street (future intersection);
   - SR-30 Southbound Ramps/Fifth Street;

Table TT - Year 2008 SR-30 Freeway Mainline Levels of Service

Land Use Alternative 1, Access Alternatives A, B and D

Freeway Segment	Lanes	A.M. Peak Hour Speed (mi/hr)	A.M. Peak Hour Density (pc/mi/ln)	A.M. Peak Hour LOS	P.M. Peak Hour Speed (mi/hr)	P.M. Peak Hour Density (pc/mi/ln)	P.M. Peak Hour LOS
Northbound							
5th Street Off-Ramp Influence Area	2	55.7	35.1	E	†	†	F *
5th Street On-Ramp Influence Area	2	55.0	29.1	D	53.0	35.9	E
Southbound							
5th Street Off-Ramp Influence Area	2	56.7	37.9	E	56.8	35.0	D
5th Street On-Ramp Influence Area	2	†	†	F *	52.0	37.3	E

Notes:

* Exceeds level of service standard

† Volume exceeds capacity; speed and density not defined for over capacity segment

Level of Service (LOS) criteria are provided in the *Highway Capacity Manual* , and are based on density, expressed in terms of passenger cars per mile per lane (pc/mi/ln).

Table UU - Year 2008 SR-30 Freeway Mainline Levels of Service

Land Use Alternative 2, Access Alternative C

Freeway Segment	Lanes	A.M. Peak Hour Speed (mi/hr)	A.M. Peak Hour Density (pc/mi/ln)	A.M. Peak Hour LOS	P.M. Peak Hour Speed (mi/hr)	P.M. Peak Hour Density (pc/mi/ln)	P.M. Peak Hour LOS
Northbound							
5th Street Off-Ramp Influence Area	2	55.7	35.3	E	†	†	F *
5th Street On-Ramp Influence Area	2	55.0	29.2	D	53.0	36.0	E
Southbound							
5th Street Off-Ramp Influence Area	2	56.7	37.9	E	56.8	35.0	D
5th Street On-Ramp Influence Area	2	†	†	F *	52.0	37.3	E

Notes:

* Exceeds level of service standard

† Volume exceeds capacity; speed and density not defined for over capacity segment

Level of Service (LOS) criteria are provided in the *Highway Capacity Manual* , and are based on density, expressed in terms of passenger cars per mile per lane (pc/mi/ln).

- SR-30 Northbound Ramps/Fifth Street;
- Boulder Avenue/Fifth Street; and
- Orange Street/Cemex Access.

2. The report analyzed four alternative mining land uses for the plants and four alternative means of accessing the plants.
3. The analysis included examination of the following conditions:
   - Existing (2004) conditions;
   - Opening Year (2008) background conditions;
   - Opening Year (2008) conditions for each land use alternative;
   - Year 2030 background conditions; and
   - Year 2030 conditions for each land use alternative.
4. The existing (2004) a.m. and p.m. peak hour intersection turn volumes for analysis locations were collected by Counts Unlimited, Inc. Under existing conditions, all study area intersections are operating at satisfactory levels of service.
5. Under Land Use Alternative 1, the plants are expected to generate 1,212 new daily PCE trips, with 39 new PCE trips occurring during the a.m. peak hour and 9 new PCE trips during the p.m. peak hour.
6. Under Land Use Alternative 2, the project is expected to generate 2,412 new daily PCE trips, with 129 new PCE trips occurring during the a.m. peak hour and 27 new PCE trips occurring during the p.m. peak hour.
7. There will be no increase in trips under Land Use Alternatives 3 and 4; therefore, no trip generation has been calculated for these land uses. These alternatives are analyzed as "background conditions."
8. Under 2008 background conditions, the following study area intersection will operate at an unsatisfactory level of service:
   - Palm Avenue/Fifth Street.
9. Under 2008 conditions with Land Use Alternative 1 using Access Alternatives A, B and D, all study area intersections will operate at satisfactory levels of service.
10. Under 2008 conditions with Land Use Alternative 2 using Access Alternative C, the following study area intersection will operate at an unsatisfactory level of service:
    - Palm Avenue/Fifth Street.
11. Under 2030 background conditions, only the following study area intersection will operate at a satisfactory level of service:
    - Church Avenue/Fifth Street.
12. Under 2030 conditions with Land Use Alternative 1 using Access Alternative A, only the following study area intersections will operate at a satisfactory level of service:
    - Church Avenue/Fifth Street; and

- Truck Access/Fifth Street.

13. Under 2030 conditions with Land Use Alternative 1 using Access Alternative B, only the following study area intersections will operate at a satisfactory level of service:
    - Church Avenue/Fifth Street.
14. Under 2030 conditions with Land Use Alternative 1 using Access Alternative D, only the following study area intersections will operate at a satisfactory level of service:
    - Church Avenue/Fifth Street; and
    - Truck Access/Fifth Street.
15. Under 2030 conditions with Land Use Alternative 2 using Access Alternative C, only the following study area intersection will operate at a satisfactory level of service:
    - Church Avenue/Fifth Street.
16. Circulation Improvements are required for year 2008 conditions with Land Use Alternative 2 using Access Alternative C. These improvements are as follows:
    - Palm Avenue/Fifth Street—Add a northbound right-turn lane and restripe the rightmost northbound through lane as a through/right-turn lane.
17. The year 2008 intersection improvement cost for Land Use Alternative 2 using Access Alternative C is $144,280.
18. Circulation improvements are required for the year 2030 conditions. These improvements and their associated costs are summarized in the previously referenced Table V.
19. The year 2030 total improvement costs at study area intersections and project fair-share contribution costs are summarized in the previously referenced Table AA.
20. With the implementation of the improvements recommended for each scenario, all study intersections will operate at a satisfactory level of service.
21. With the addition of the new truck access road and Third Street extension, signal coordination is still possible.

Summary Items 22 through 26 refer to the results of the queuing analysis:

22. Queuing at the Fifth Street ramps was analyzed with signal coordination for Year 2030 Land Use Alternative 1, Access Alternative A. The results of the analysis indicate that the average (50^{th} percentile) queue is expected to be within the available storage length at all locations; however, the 95^{th} percentile queue is expected to exceed the available storage length of the southbound right-turn lane at the southbound ramp and the eastbound left-turn lane at the northbound ramp.

23. Queuing at the Fifth Street ramps was analyzed with signal coordination for Year 2030 Land Use Alternative 1, Access Alternative B. The results of the analysis indicate that the average (50^{th} percentile) queue is expected to be within the available storage length at all locations; however, the 95^{th} percentile queue is expected to exceed the available storage length of the southbound right-turn lane at the southbound ramp and the eastbound left-turn lane at the northbound ramp.

24. Queuing at the Fifth Street ramps was analyzed with signal coordination for Year 2030 Land Use Alternative 1, Access Alternative D. The results of the analysis indicate that the average (50th percentile) queue is expected to be within the available storage length at all locations; however, the 95th percentile queue is expected to exceed the available storage length of the southbound right-turn lane at the southbound ramp and the eastbound left-turn lane at the northbound ramp.

25. Queuing at the Fifth Street ramps was analyzed with signal coordination for Year 2030 Land Use Alternative 2, Access Alternative C. The results of the analysis indicate that the average (50th percentile) queue is expected to be within the available storage length at all locations; however, the 95th percentile queue is expected to exceed the available storage length of the southbound right-turn lane at the southbound ramp.

25. In the cases where the queue at the southbound right-turn lane at the southbound ramp exceeds the capacity, this is does not represent a serious operational deficiency, as the total length of the off-ramp is approximately 700 feet, and the queue would not exceed the length of the ramp. Additionally, the ramp is at least 26 feet wide for more than 300 feet beyond the point where the right-turn lane is striped, which would allow right-turning vehicles to create a de facto turn lane.

26. In the cases where the queue at the eastbound left-turn lane at the northbound ramp exceeds the capacity, it is recommended that when the other improvements to the Fifth Street interchange are constructed, the eastbound left-turn lane should be striped to a length that would accommodate the queues. Since the storage available in the westbound left-turn lanes at SR-30 Southbound Ramps/5th Street is greater than the 95th percentile queue in these lanes, it is feasible to reduce the length of the left-most westbound left-turn lane at the southbound ramp to provide additional storage length for the eastbound left-turn lane at the northbound ramp.

Summary Items 27 through 33 refer to the results of the merge/diverge analysis:

27. Under existing (2004) conditions, SR-30 operates at a satisfactory level of service in the vicinity of the Fifth Street ramps.

28. Under Year 2008 Background conditions, SR-30 is forecast to operate at an unsatisfactory level of service in the southbound direction near the Fifth Street on-ramp in the a.m. peak period and in the northbound direction near the Fifth Street off-ramp in the p.m. peak period.

29. Under Year 2008 With New Cemex Aggregate Trucks, Land Use Alternative 1, Access Alternatives A, B, and D, SR-30 is forecast to operate at an unsatisfactory level of service in the southbound direction near the Fifth Street on-ramp in the a.m. peak period and in the northbound direction near the Fifth Street off-ramp in the p.m. peak period.

30. Under Year 2008 With New Cemex Aggregate Trucks, Land Use Alternative 2, Access Alternatives C, SR-30 is forecast to operate at an unsatisfactory level of service in the southbound direction near the Fifth Street on-ramp in the a.m. peak period and in the northbound direction near the Fifth Street off-ramp in the p.m. peak period.

31. Under Year 2030 Background conditions, SR-30 is forecast to operate at an unsatisfactory level of service in the vicinity of the Fifth Street ramps in both directions during both peak periods.

32. Under Year 2030 With New Cemex Aggregate Trucks, Land Use Alternative 1, Access Alternatives A, B, and D, SR-30 is forecast to operate at an unsatisfactory level of service in the vicinity of the Fifth Street ramps in the both directions during both peak periods.
33. Under Year 2030 With New Cemex Aggregate Trucks, Land Use Alternative 2, Access Alternatives C, SR-30 is forecast to operate at an unsatisfactory level of service in the vicinity of the Fifth Street ramps in both directions during both peak periods.