TABLE 1-2

Unsignalized Intersections
Level of Service Definitions
(Highway Capacity Manual)

LEVEL OF SERVICE	DEFINITION	AVERAGE TOTAL DELAY (sec/veh)
A	No delay for stop-controlled approaches.	≤ 10.0
B	Describes operations with minor delay.	≥ 10.0 and ≤ 15.0
C	Describes operations with moderate delays.	≥ 15.0 and ≤ 25.0
D	Describes operations with some delays.	≥ 25.0 and ≤ 35.0
E	Describes operations with high delays and long queues.	≥ 35.0 and ≤ 50.0
F	Describes operations with extreme congestion, with very high delays and long queues unacceptable to most drivers.	≥ 50.0

TABLE 1-3

Segment Level of Service Definitions
(Highway Capacity Manual)

LEVEL OF SERVICE	DEFINITION
A	Represents free flow. Individual vehicles are virtually unaffected by the presence of others in the traffic stream.
B	Is in the range of stable flow, but the presence of other vehicles in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.
C	Is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual vehicles becomes significantly affected by interactions with other vehicles in the traffic stream.
D	Is a crowded segment of roadway with a large number of vehicles restricting mobility and a stable flow. Speed and freedom to maneuver are sewerely restricted, and the driver experiences a generally poor level of comfort and convenience.
E	Represents operating conditions at or near the level capacity. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement..
F	Is used to define forced or breakdown flow (stop-and-go gridlock). This condition exists when the amount of traffic approaches a point where the amount of traffic exceeds the amount that can travel to a destination. Operations within the queues are characterized by stop and go waves, and they are extremely unstable.

2.0 Existing Conditions

2.1 Existing Traffic Counts and Roadway Geometrics

The first step toward assessing Project traffic impacts is to assess existing traffic conditions. Existing AM and PM peak hour turning movements were collected at each Project intersection by National Data and Surveying Services. Traffic counts were conducted for the peak hour periods of 7:00-9:00 AM and 4:00-6:00 PM for all key intersections on Thursday, May 16, 2013. Traffic count data worksheets are provided in Appendix A.

2.2 Existing Functional Roadway Classification System

Functional classification is the process by which streets and highways are grouped into classes, or systems, according to the type of service they are intended to provide. Fundamental to this process is the recognition that individual streets and highways do not serve travel independently in any major way. Rather, most travel involves movement through a network of roads.

The current hierarchical system of roadways consists of the following six (6) basic classifications:

- **Freeways** - are high-speed facilities with full access control. Access and egress to freeways are provided by a system of ramps and interchanges. There are no at-grade intersections on freeways and no traffic control devices such as traffic signals. Right-of-way and cross-sections for freeways are determined by Caltrans on a case-by-case basis. SR 41, south of Avenue 12, is classified as a freeway.

- **Highways** – are high-speed facilities with access limited primarily to intersections with freeways, expressways, and arterials. In rural areas, they may have some direct access to parcels. Highways mainly serve long-distance trips with lower demand than freeways.

- **Expressways** – are high-speed facilities with access limited primarily to intersections with highways, arterials, and major traffic generators. These major highways carry high volumes of traffic from region to region and may serve local businesses directly as well. Right-of-way and cross-sections for expressways are determined by Caltrans on a case-by-case basis.

- **Arterials** – are major highways with at least partial control of access to improve traffic movement. Arterial roadways are generally divided by direction and have multiple through lanes with turn lanes. Arterials have limited access to adjacent land uses and provide a linkage between expressways, collectors, and local streets. Adjacent land uses should, where possible, avoid relying on arterials for parking. According to the County of Madera General Plan, SR 41, Road 200, Yosemite Springs Parkway, and Spinelli Road are classified as mountain arterials.

- **Collectors** – are secondary highways providing multiple lanes (2 or 4) to improve traffic movement, and may have turn lanes. Collectors provide access to adjacent land uses and the local street system and generally will accommodate on-street parking. These roadways link arterials with local streets.

- **Local Streets** – are designed exclusively for property access, typically with a single travel lane in each direction. They are intended to carry low volumes of traffic and support unrestricted on-street parking.

2.3 Affected Streets and Highways

Street and highway intersections and segments near and adjacent to the Project site were analyzed to determine levels of service utilizing HCM-based methodologies described previously. The study intersections and street and highway segments included in this Traffic Technical Report are listed below. Counts were taken on Thursday, May 16, 2013.

Intersections

- SR 41 / Yosemite Springs Parkway
- SR 41 / Road 200
- SR 41 / Spinelli Road-Road 416
- SR 41 / Road 207
- Major Project Access / Yosemite Springs Parkway

Roadway Segments

- SR-41 between:
  - Spinelli Road-Road 416 and Yosemite Springs Parkway
  - Yosemite Springs Parkway and Road 207
  - Road 207 and Road 200
- Yosemite Springs Parkway:
  - West of SR-41

The existing lane geometry at key study area intersections is shown in Figure 2-1. Two (2) of the existing study intersections are currently signalized, while two (2) are unsignalized. Figures 2-2 and 2-3 show existing traffic volumes for the AM and PM peak hours in the study area.

2.4 Level of Service

Intersection Capacity Analysis

All intersection LOS analyses were estimated using Synchro 7 Software. Various roadway geometrics, traffic and pedestrian volumes, and properties (yellow time, red time, peak hour factors, etc) were input into the Synchro 7 Software program in order to accurately determine the travel delay and LOS for each Study scenario. The intersection LOS and delays reported represent the Synchro outputs. Synchro assumptions, listed below, show the various Synchro inputs and methodologies used in the analysis.

- LANE GEOMETRY
  - Existing intersection and roadway segment geometrics were observed in the field and applied to Synchro.
  - Storage lengths for turn lanes, including the deceleration length, for existing intersections were

measured in the field.

- TRAFFIC CONDITIONS

  - The peak hour factor for existing conditions were determined using existing counts based on approach of movement.
  - The peak hour factor for future scenarios is 0.92 based upon Table 19 of the National Cooperative Highway Research Program (NCHRP) Report 599.
  - Posted roadway link speeds were input into the Synchro network.
  - The Right Turn on Red parameter was set to 'Yes'.
  - Heavy vehicle percentages were applied as follows and is based on the HCM default or Caltrans' truck data available on its website:
    - SR-41 – 6%
    - All other roadways – 3%

- SIGNAL TIMING PARAMETERS

  - A cycle length of 60 to 90 seconds was input for each intersection because it is a conservative estimate as well as the highest reasonable cycle length that should be assumed for 3 phase signals.
  - Signal phasing and yellow and all-red clearance interval signal timing was based on existing timing sheets. Signal phasing remained constant throughout scenarios unless the project or any other planned improvements are specifically changing an intersection. Lead-Lag Optimize was set to "fixed" for all scenarios.
  - All intersection cycle lengths and offsets were optimized

For reference, Synchro 7 worksheets are provided in Appendix B. Referencing Table 2-1, results of the analysis show that none of the study intersections exceed Caltrans' minimum level of service standard of 'C'.

Segment Analysis

Results of the LOS segment analysis along the existing street and highway system in the project area are reflected in Table 2-2. Street segment capacity for SR 41 and Yosemite Springs Parkway was determined using HCM methodology. HCS 2010 Worksheets are included in Appendix C. Results of the analysis show that all three of the SR 41 study segments are operating worse than Caltrans' minimum level of service 'C'. The existing segment LOS will serve as the standard for these three roadway segments.

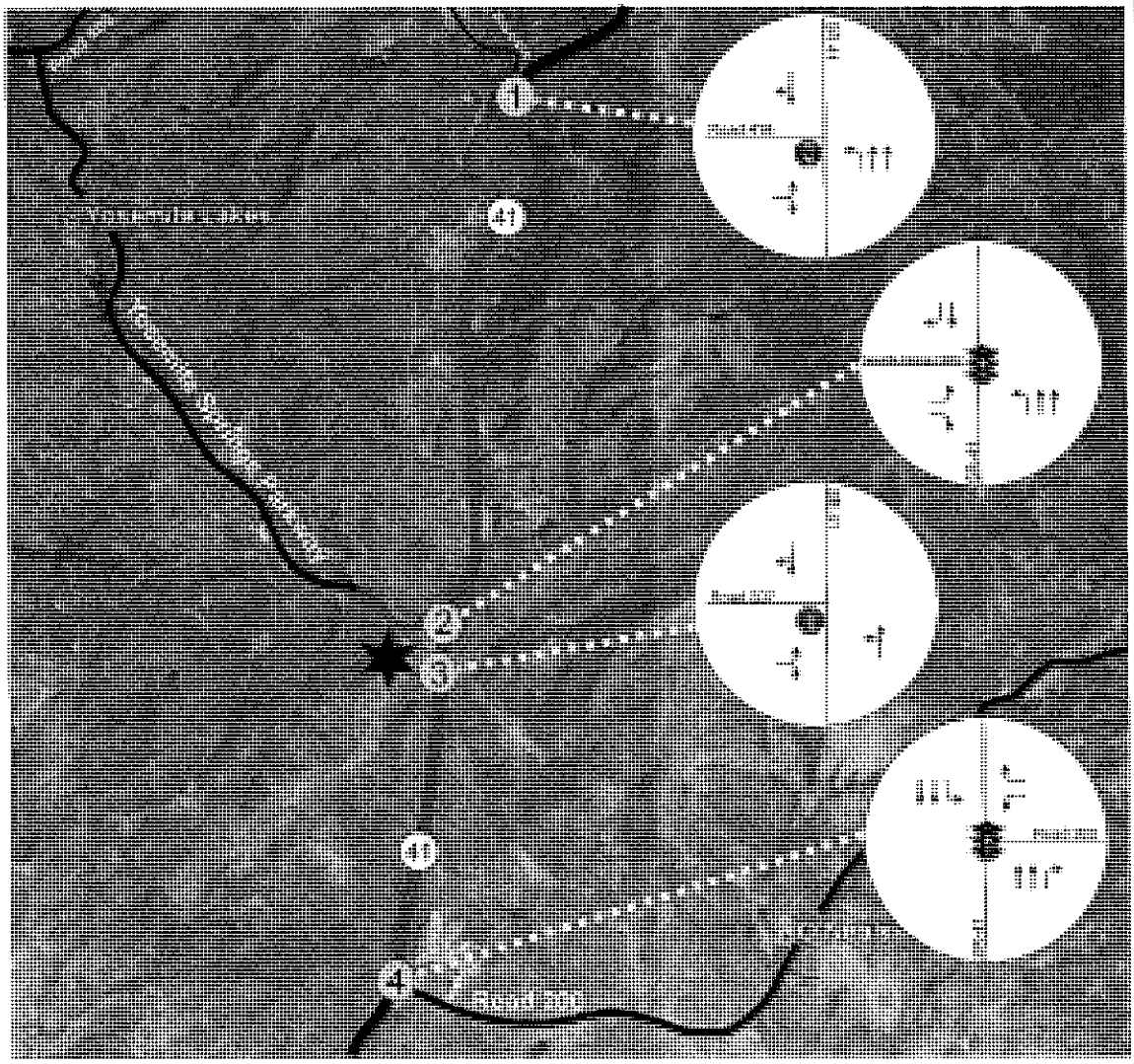

FIGURE 2-1

Existing 2013 Lane Geometry

LEGEND

Project Site | Study Intersections | Study Segments

Traffic Signal | Stop Sign

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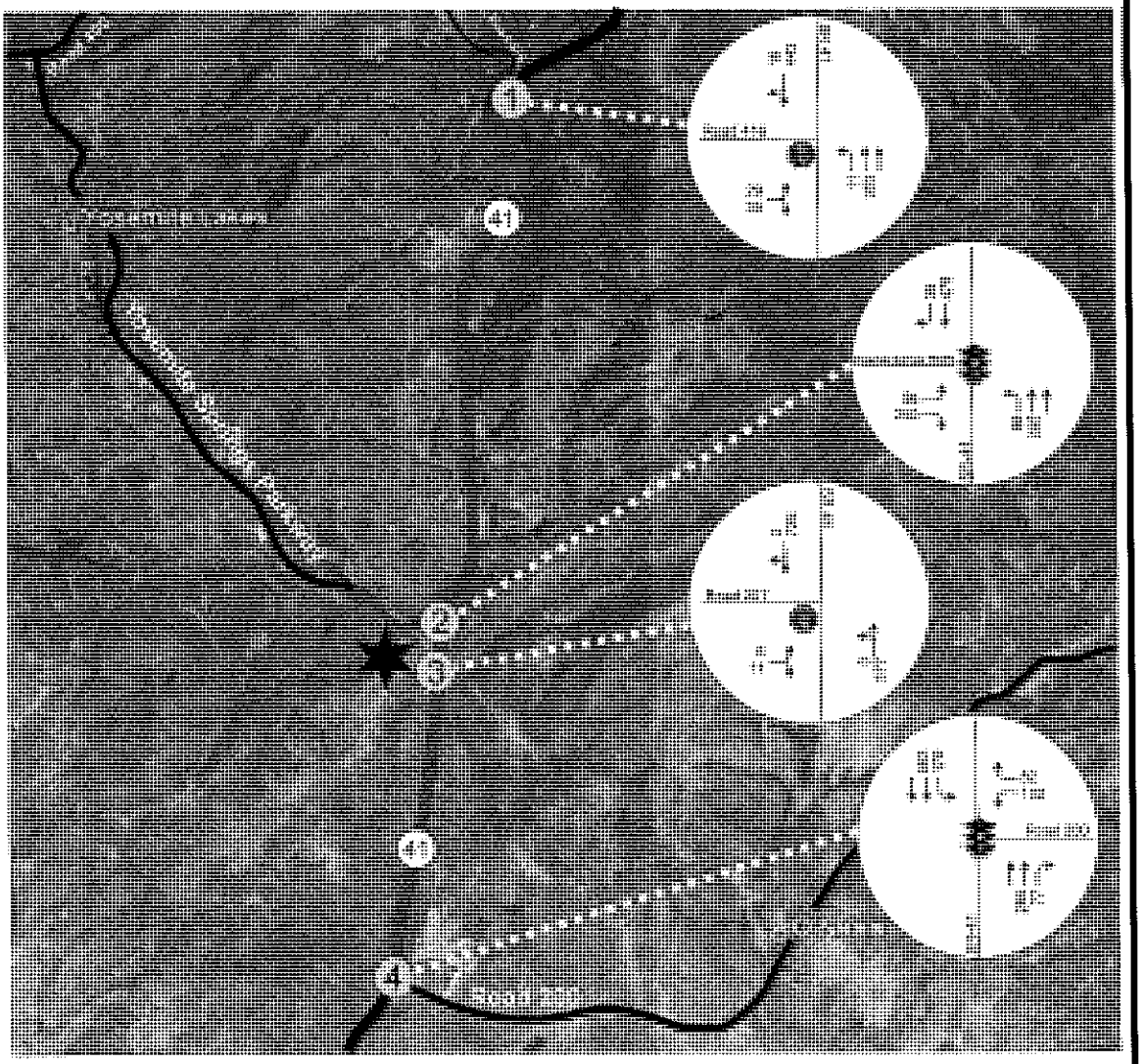

FIGURE 2-2

Existing 2013 AM Peak Hour Traffic

LEGEND

Project Site | Study Intersections | Study Segments

Traffic Signal | Stop Sign | Peak Hour Traffic

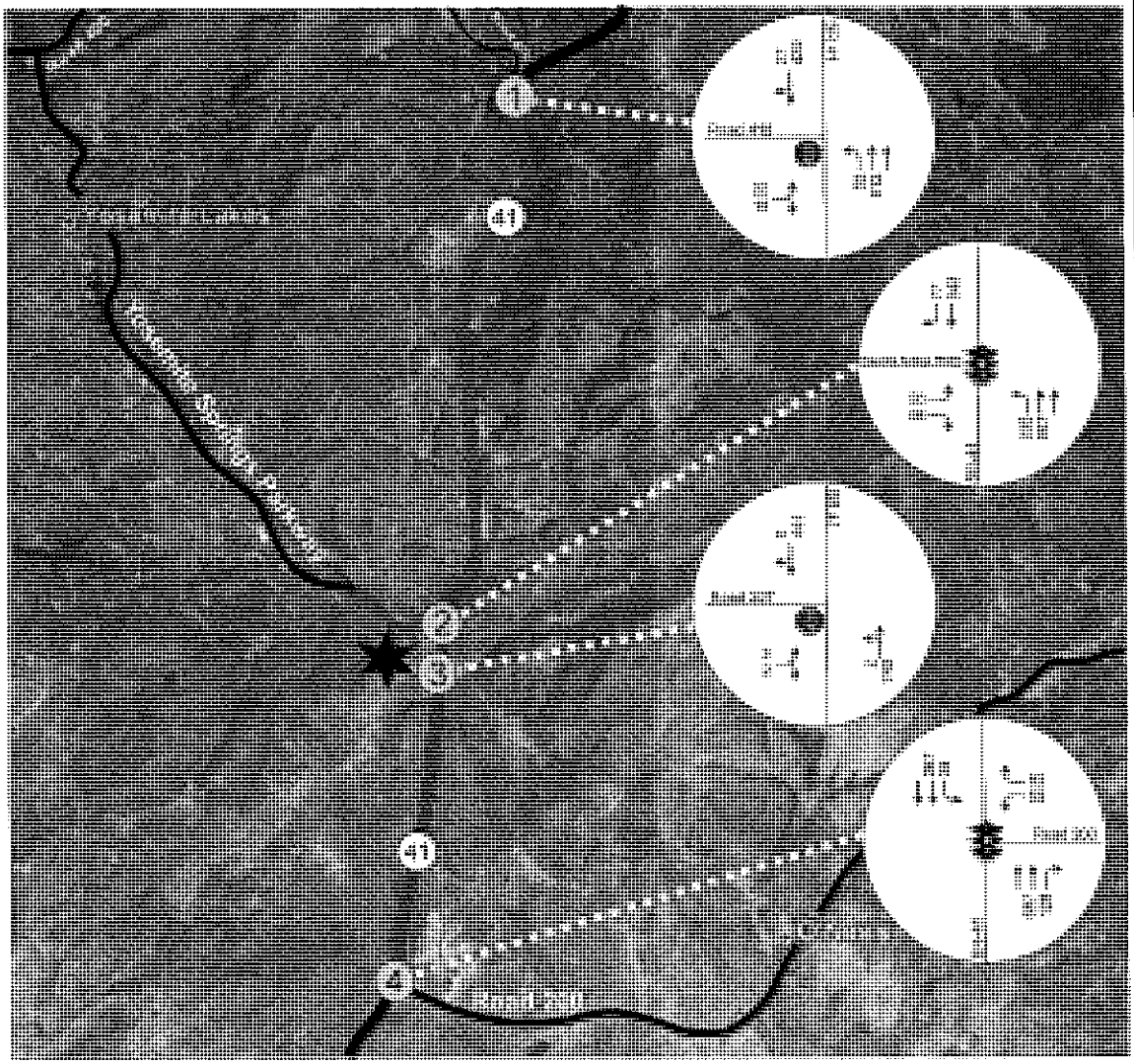

FIGURE 2-3

Existing 2013 PM Peak Hour Traffic

LEGEND

Project Site | Study Intersections | Study Segments

Traffic Signal | Stop Sign | ← ## Peak Hour Traffic

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TABLE 2-1

Existing Intersection Operations

INTERSECTION	CONTROL	PEAK HOUR	EXISTING 2013	
			DELAY	LOS
1. SR-41 / Spinelli Road-Road 416	One-Way Stop Sign	AM	15.4	C
		PM	17.2	C
2. SR-41 / Yosemite Springs Parkway	Signalized	AM	14.4	B
		PM	13.4	B
3. SR-41 / Road 207	One-Way Stop Sign	AM	20.1	C
		PM	18.2	C
4. SR-41 / Road 200	Signalized	AM	14.2	B
		PM	8.4	A

DELAY is measured in seconds

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

For signalized controlled intersections, delay results show the average for the entire intersection. For one-way stop controlled intersections, delay results show the delay for the worst movement.

TABLE 2-2

Existing Street Segment Operations

SEGMENT	DESCRIPTION	DIRECTION	PEAK HOUR	EXISTING 2013	
				VOLUME	LOS
1. SR-41: Spinelli Road-Road 416 to Yosemite Springs Parkway	Two-lane Undivided to Three-Lane Undivided *	NB	AM	**351**	**D**
			PM	**564**	**D**
		SB	AM	**513**	D
			PM	**441**	D
2. SR-41: Yosemite Springs Parkway to Road 207	Two-lane Undivided	NB	AM	**383**	**D**
			PM	**742**	**E**
		SB	AM	**727**	**E**
			PM	**441**	D
3. SR-41: Road 207 to Road 200	Two-lane Undivided to Three-Lane Undivided *	NB	AM	**380**	**D**
			PM	**742**	**E**
		SB	AM	**736**	**E**
			PM	**443**	D
4. Yosemite Springs Parkway: West of SR-41	Two-Lane Undivided	EB	AM	306	D
			PM	148	C
		WB	AM	126	C
			PM	312	D

LOS = Level of Service / **BOLD** denotes LOS standard has been exceeded

* Segments were conservatively analyzed assuming two-lane undivided thresholds.

3.0 Traffic Impacts

This chapter provides an assessment of the traffic the Project is expected to generate and the impact of that traffic on the surrounding street system.

3.1 Trip Generation

To assess the impacts that the Project may have on the surrounding street and highway segments and intersections, the first step is to determine Project trip generation. Project trip generation was estimated as shown in Table 3-1. The trip generation was based on the ITE Trip Generation Manual, 8th Edition.

TABLE 3-1

Project Trip Generation

LAND USE	SIZE	TRIP RATE SOURCE	DAILY TRIP ENDS		AM PEAK HOUR					PM PEAK HOUR				
			RATE	VOLUME	RATE	IN:OUT SPLIT	VOLUME IN	VOLUME OUT	VOLUME TOTAL	RATE	IN:OUT SPLIT	VOLUME IN	VOLUME OUT	VOLUME TOTAL
Specialty Retail Center	57,628 sq.ft	ITE (814)	44.32	2,554						2.71	44:56	69	87	156
Fast-Food with Drive-Through Window	4,500 sq.ft.	ITE (934)	496.12	2,233	49.35	51:49	113	109	222	33.84	52:48	85	82	152
Mini-Mart Gas Station	12 Fueling Stations	ITE (946)	152.84	1,834	11.93	51:49	73	70	143	13.94	51:49	85	82	167
Senior Adult Housing	30 units	ITE (252)	3.48	104	0.13	36:64	1	3	4	0.16	60:40	3	2	5
Internal Trip Reduction (5%)[1]				**336**			**9**	**9**	**18**			**12**	**12**	**24**
Pass-By Reduction (15%)[2]				**958**			**27**	**27**	**54**			**34**	**34**	**68**
Non-Pass-By (Primary) TRIPS				**5,431**			**151**	**146**	**297**			**196**	**207**	**388**

Source: Generation factors from ITE Trip Generation Manual, 8th Edition.
Trip ends are one-way traffic movements, entering or leaving.
The numbers in parenthesis are ITE land use codes.

1: Multi-Use Trip Reduction Rate Applied = 5%
2: The Pass-by trip reduction was applied to ITE Codes 814 and 946. The peak hour in/out split for pass-by trips is 50:50.

A multi-use or captured trip reduction rate was applied to all generated trips. Table 3-1 estimates a reduction of 5% considering reductions for multi-use or "captured" trips, which are trips that are "internal to the site" resulting in reductions at entrances, at adjacent intersections, and on adjacent roadways. There will be a mini mart/gas station, fast-food restaurant, senior adult apartment, and retail uses located on the Project site.

A 15% trip reduction for "pass-by" trips was applied to retail generated trips as allowed by Caltrans Traffic Study Guidelines. Figures 5.10 and 5.11 of the *Trip Generation Handbook* show pass-by trips for a gasoline service station with a convenience market for the weekday AM and PM peak period. In each

case, a pass-by percentage of approximately 35% represents the lower bound for the gasoline service station with a convenience market sites where data has been collected. Since the *Trip Generation Handbook* does not provide pass-by trip data for specialty retail land uses, the pass-by data for the shopping center land use was reviewed. Figures 5.5 and 5.6 of the *Trip Generation Handbook* show pass-by trips for a shopping center for the weekday PM peak period and Figure 5.7 shows pass-by trips for the Saturday midday peak period. In all cases, a pass-by percentage of 15% represents the lower bound for the vast majority of the shopping center sites where data has been collected. Based on the data described above, a pass-by percentage of 15% was selected on the basis of engineering judgment in order to provide a conservative estimate of pass-by trips. Reference Appendix D for pass-by percentage figures from the *Trip Generation Handbook*. The application of the 15% pass-by trip reduction results in a trip reduction of 54 AM peak hour trips and 68 PM peak hour trips.

Considering the trip generation process described above, the proposed Project is estimated to generate 5,431 new daily trips, 297 new trips during the AM peak hour, and 388 new trips during the PM peak hour.

3.2 Trip Distribution

To facilitate the estimation of trip distribution for this Project, a model run was requested from the Madera County Transportation Commission (MCTC). The model was used as a general basis for distributing the Project traffic. Outputs from the select zone model run are included in Appendix E. Trip distribution entering and exiting the Project driveways were manually distributed based on engineering judgment. Trip distribution for existing plus project, near-term, and Cumulative Year 2035 conditions are shown in Figures 3-1 and 3-2.

3.3 Project Traffic

Project traffic as shown in Table 3-1 was distributed to the roadway system using the trip distribution percentages shown in Figures 3-1 and 3-2. A graphical representation of the resulting AM and PM peak hour Project trips used is shown in Figures 3-3 through 3-8.

The 15% pass-by trips shown in Figures 3-5 and 3-8, which were applied to the gasoline service station with a convenience market, fast food restaurant, and the specialty retail land uses, were completed using the following steps:

- The amount of traffic (in both directions) traveling along SR-41 and Yosemite Springs Parkway adjacent to the Project site were compared in order to proportionately split the 15% pass-by reduction among the two streets

- The amount of traffic traveling in the north and southbound directions along SR-41 were then compared in order to proportionately split the Pass-by percentage, assigned from step one, amongst the north and southbound directions. This step determines the pass-by percentage traveling in each direction. The same process was completed for Yosemite Springs Parkway

- The assignment of Pass-by trips to the driveways along SR-41 and Yosemite Springs Parkway were then derived from the result of the previous step. Pass-by trips were subtracted from the through movements at the driveways and added to the driveway entering and exiting turning movements

- Pass-by trips were then reflected at the intersection of SR-41 at Yosemite Springs Parkway

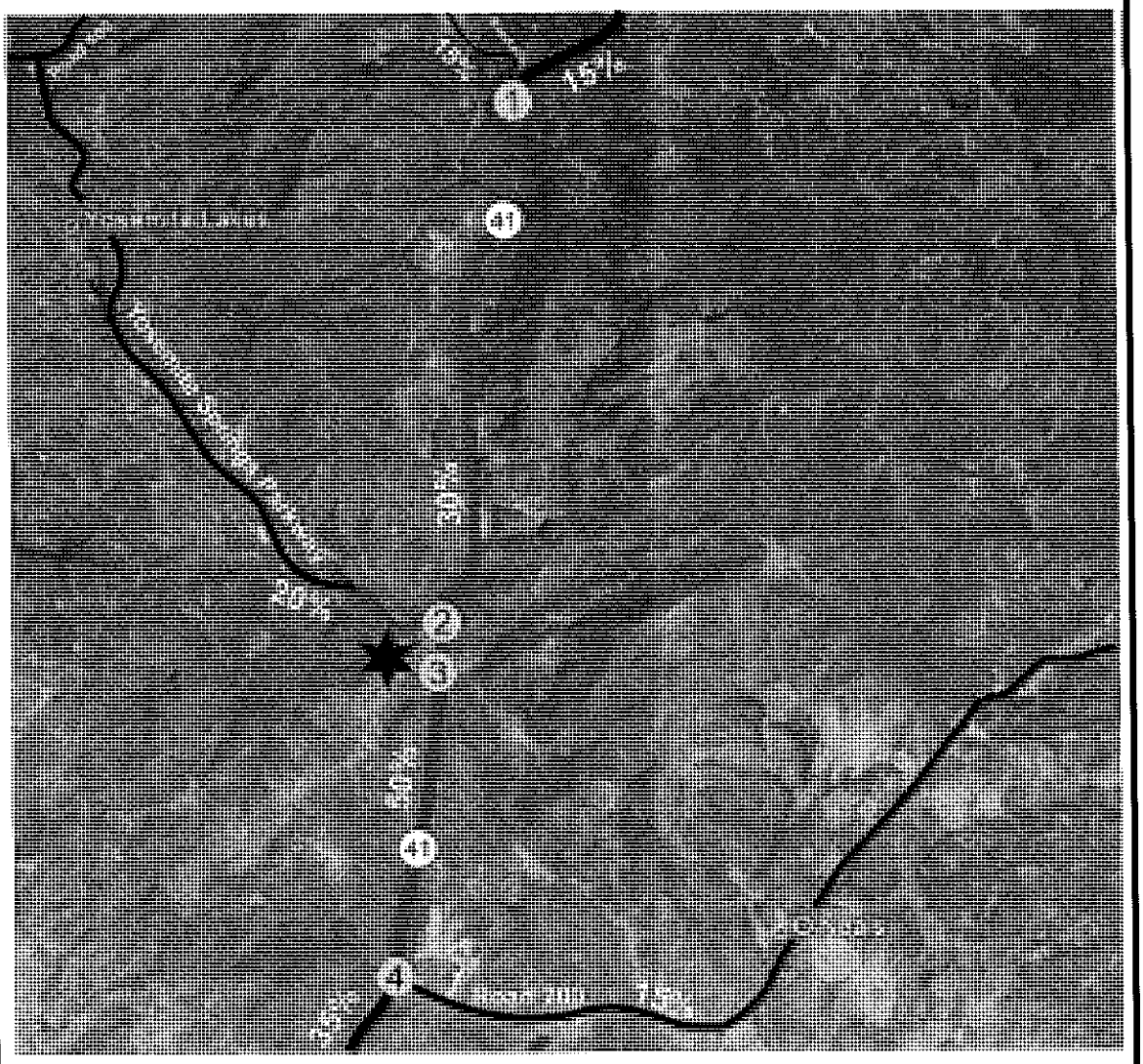

FIGURE 3-1

Project Trip Distribution

LEGEND

★ Project Site (#) Study Intersections ▬ Study Segments

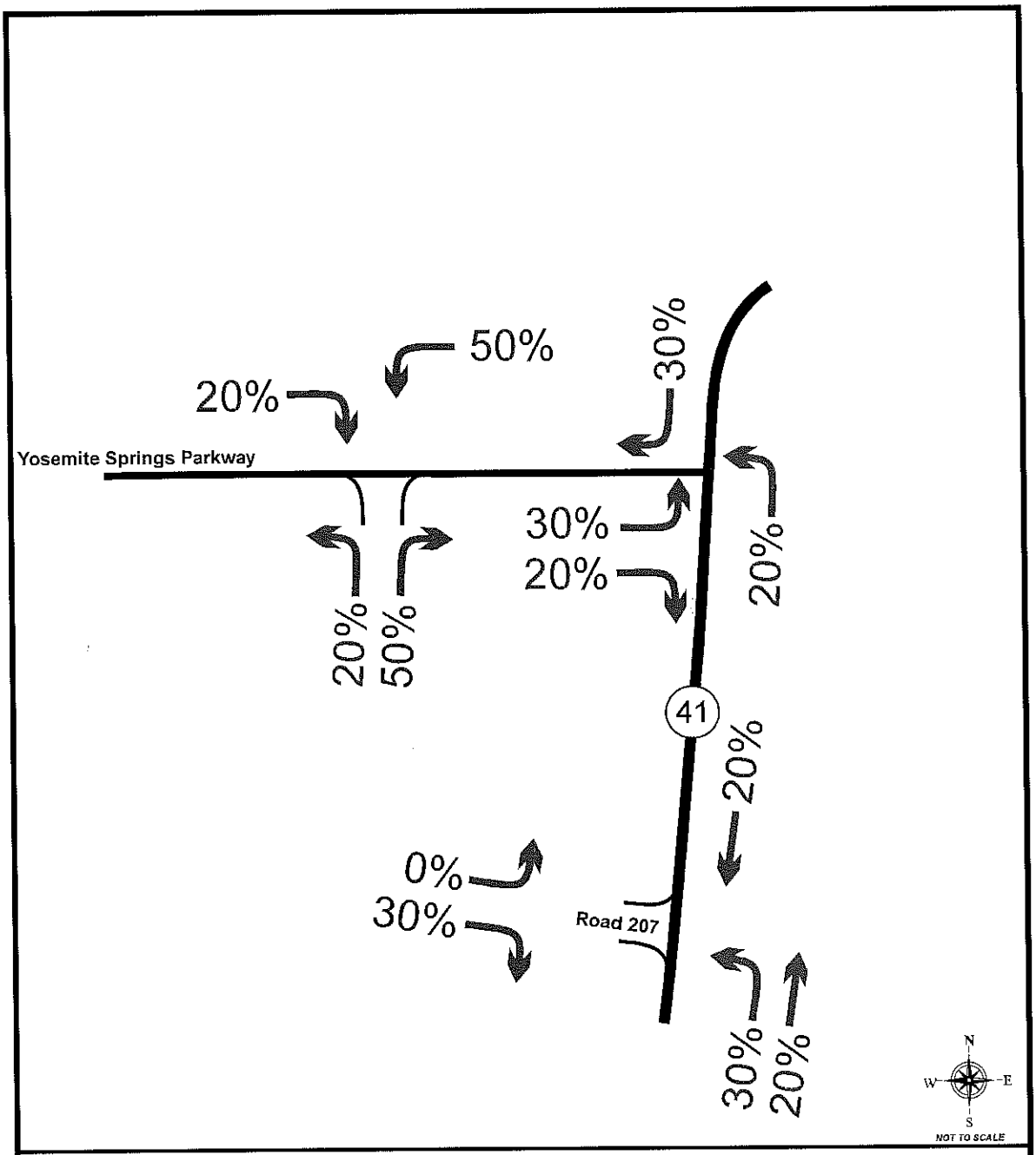

FIGURE 3-2

Project Trip Distribution at Project Driveways

LEGEND

← XX% Inbound Trip Distribution Percentage

← XX% Outbound Trip Distribution Percentage

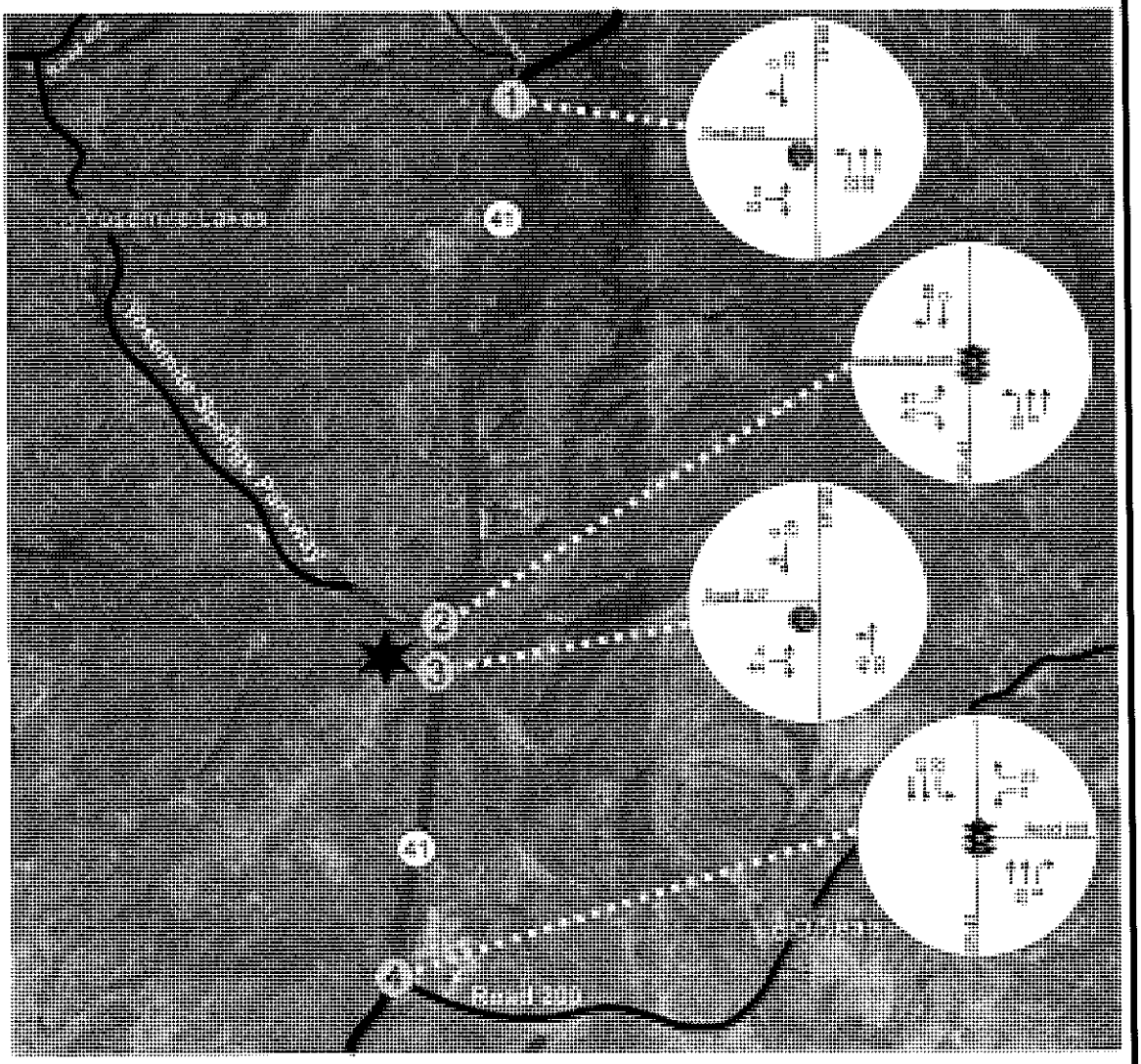

FIGURE 3-3

AM Peak Hour Project Trips

LEGEND

Project Site | Study Intersections | Study Segments

Traffic Signal | Stop Sign | ## Peak Hour Project Trips

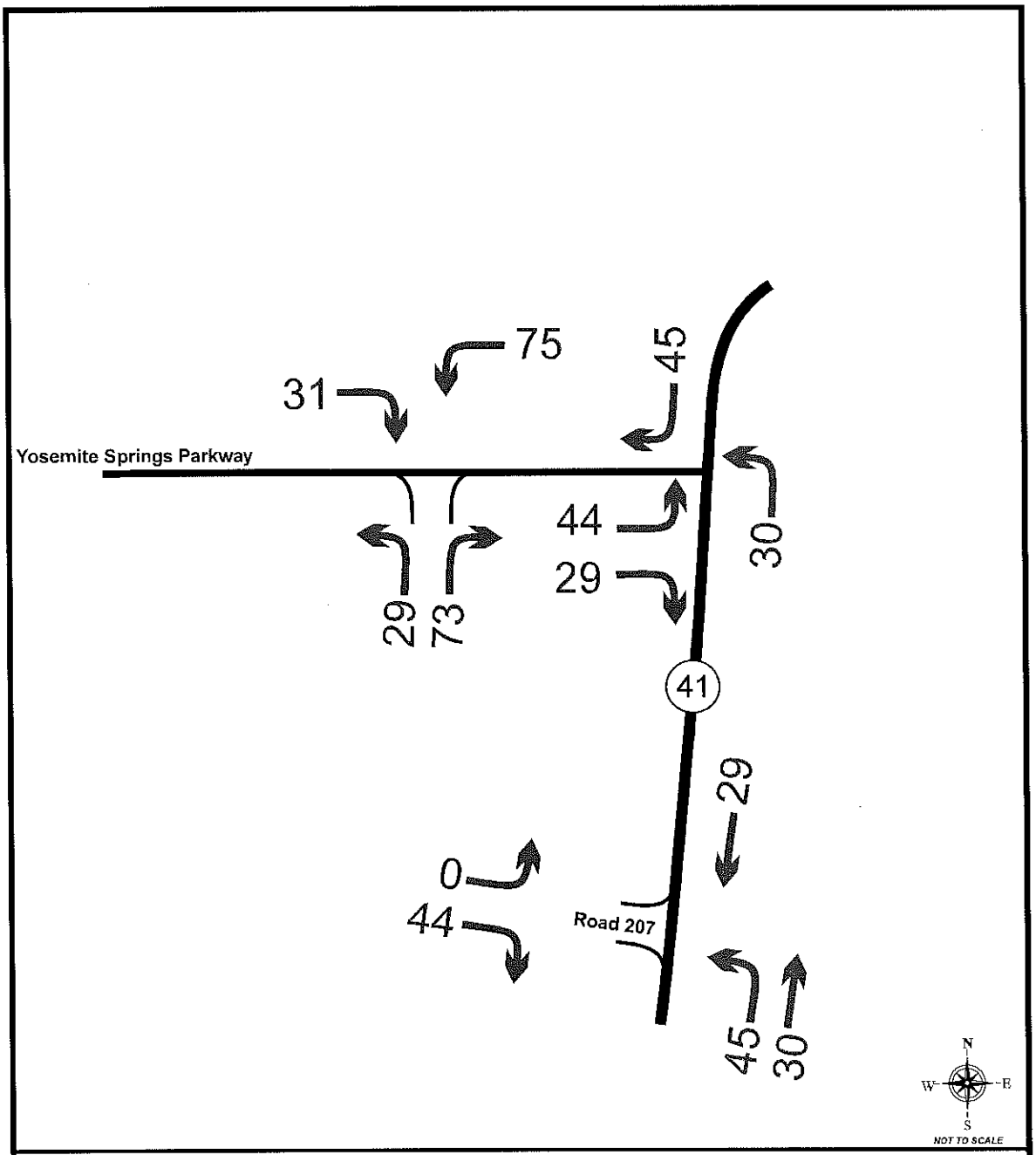

FIGURE 3-4
AM Peak Hour Primary Project Trips at Project Driveways

LEGEND

← XX Inbound Trips
← XX Outbound Trips

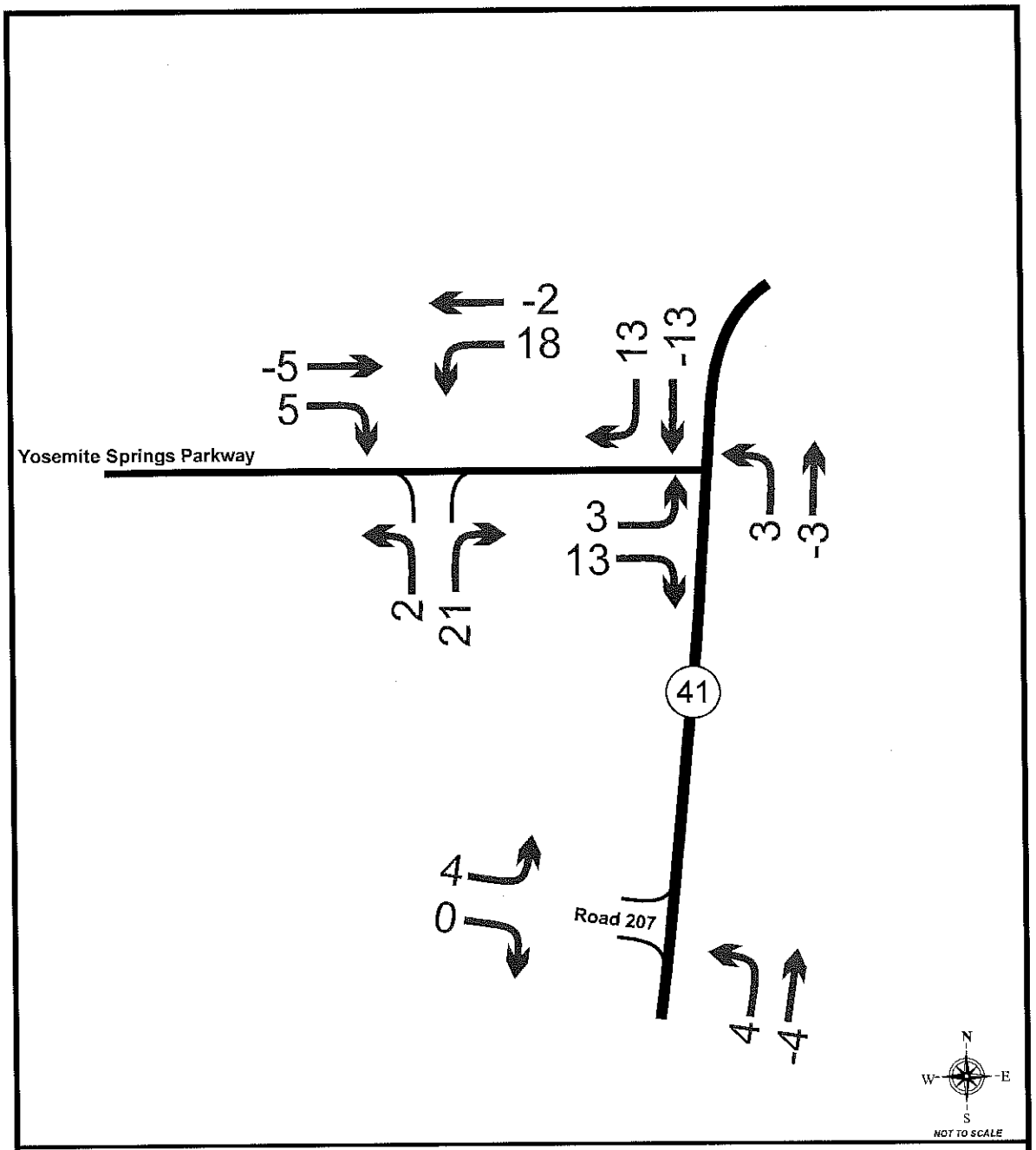

FIGURE 3-5
AM Peak Hour Project Pass-By Trips at Project Driveways

LEGEND

← XX Inbound Trips
← XX Outbound Trips

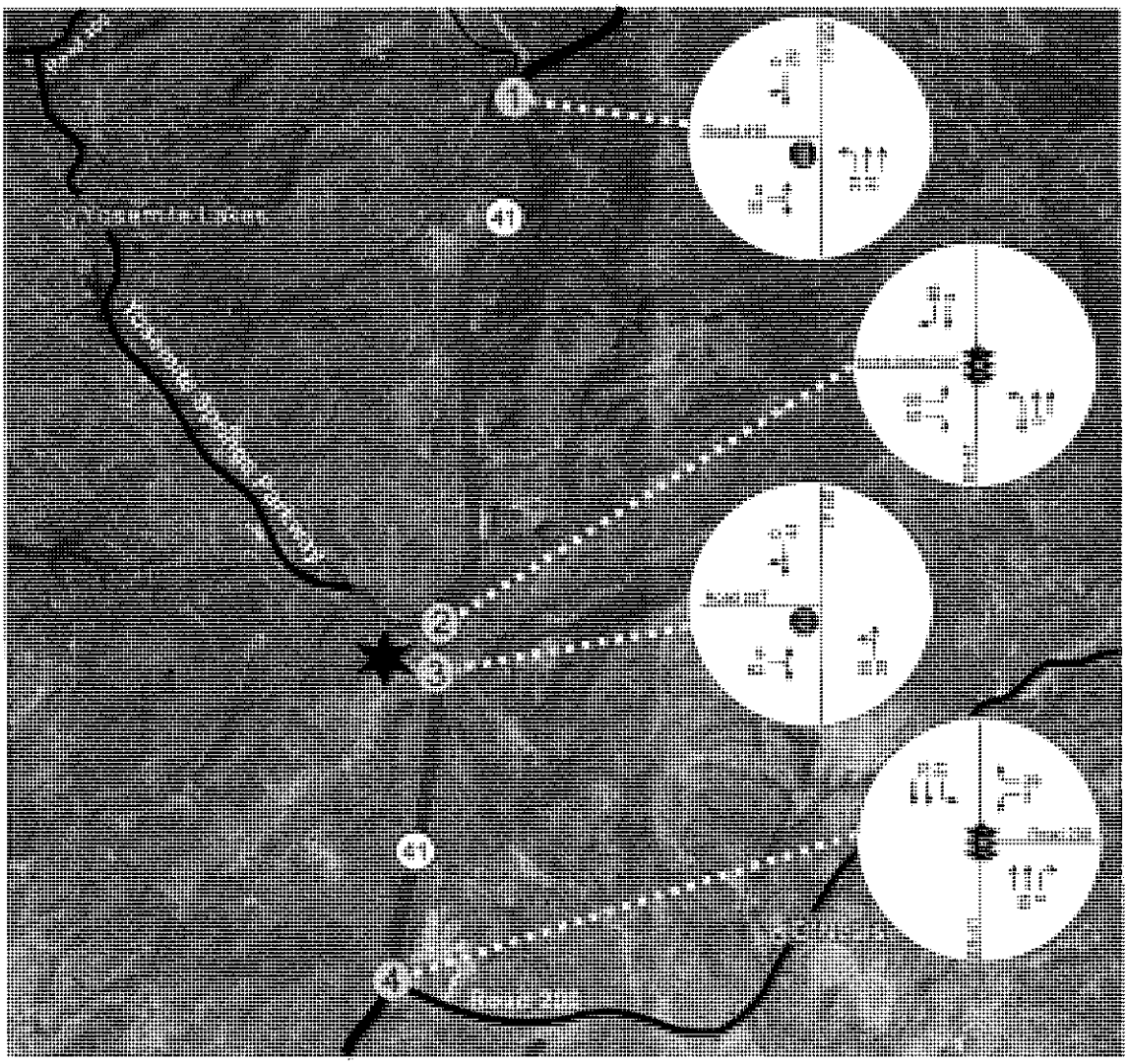

FIGURE 3-6

PM Peak Hour Project Trips

LEGEND

Project Site | Study Intersections | Study Segments

Traffic Signal | Stop Sign | ← ## Peak Hour Project Trips

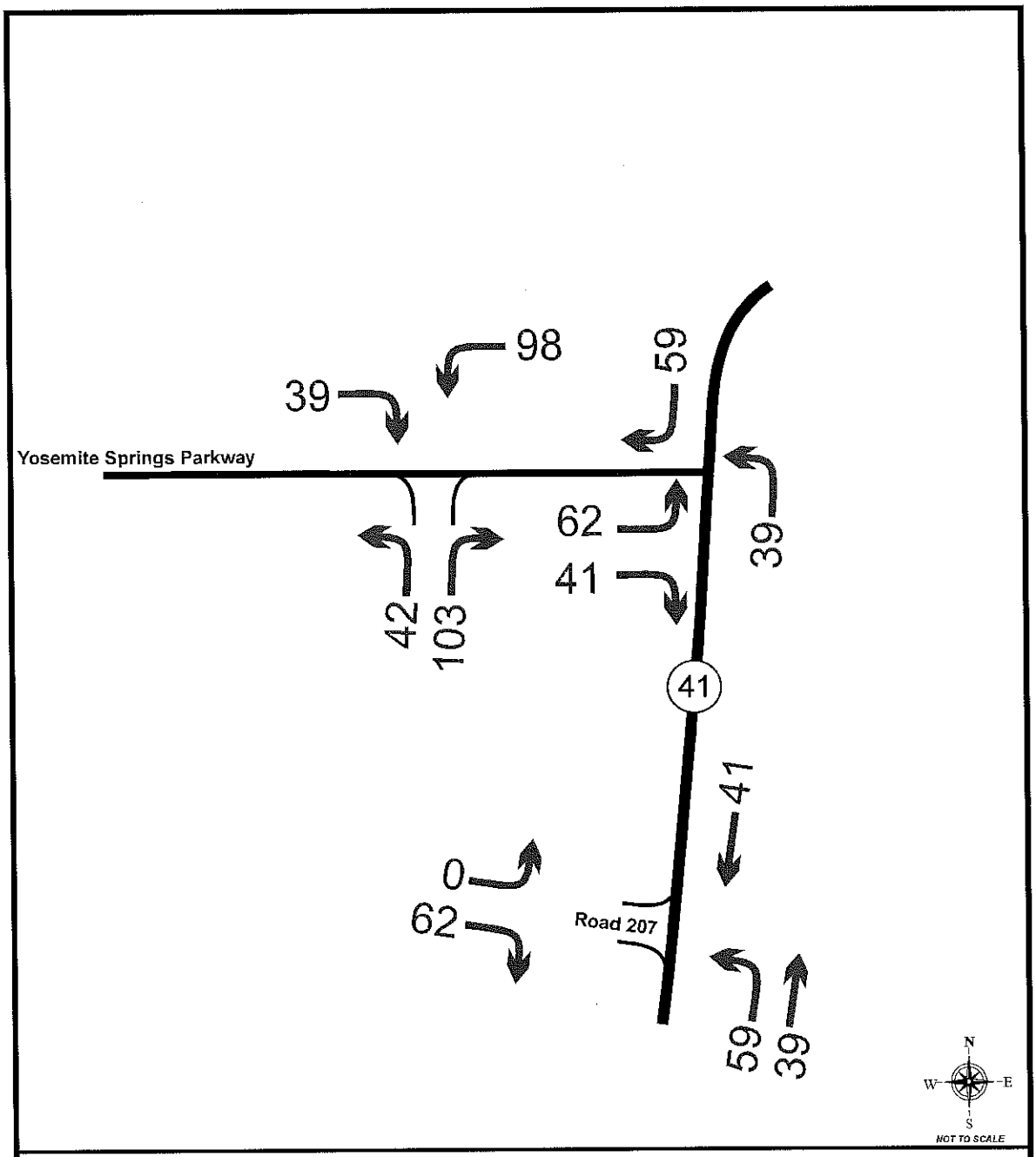

FIGURE 3-7
PM Peak Hour Primary Project Trips at Project Driveways

LEGEND

← XX Inbound Trips
← XX Outbound Trips

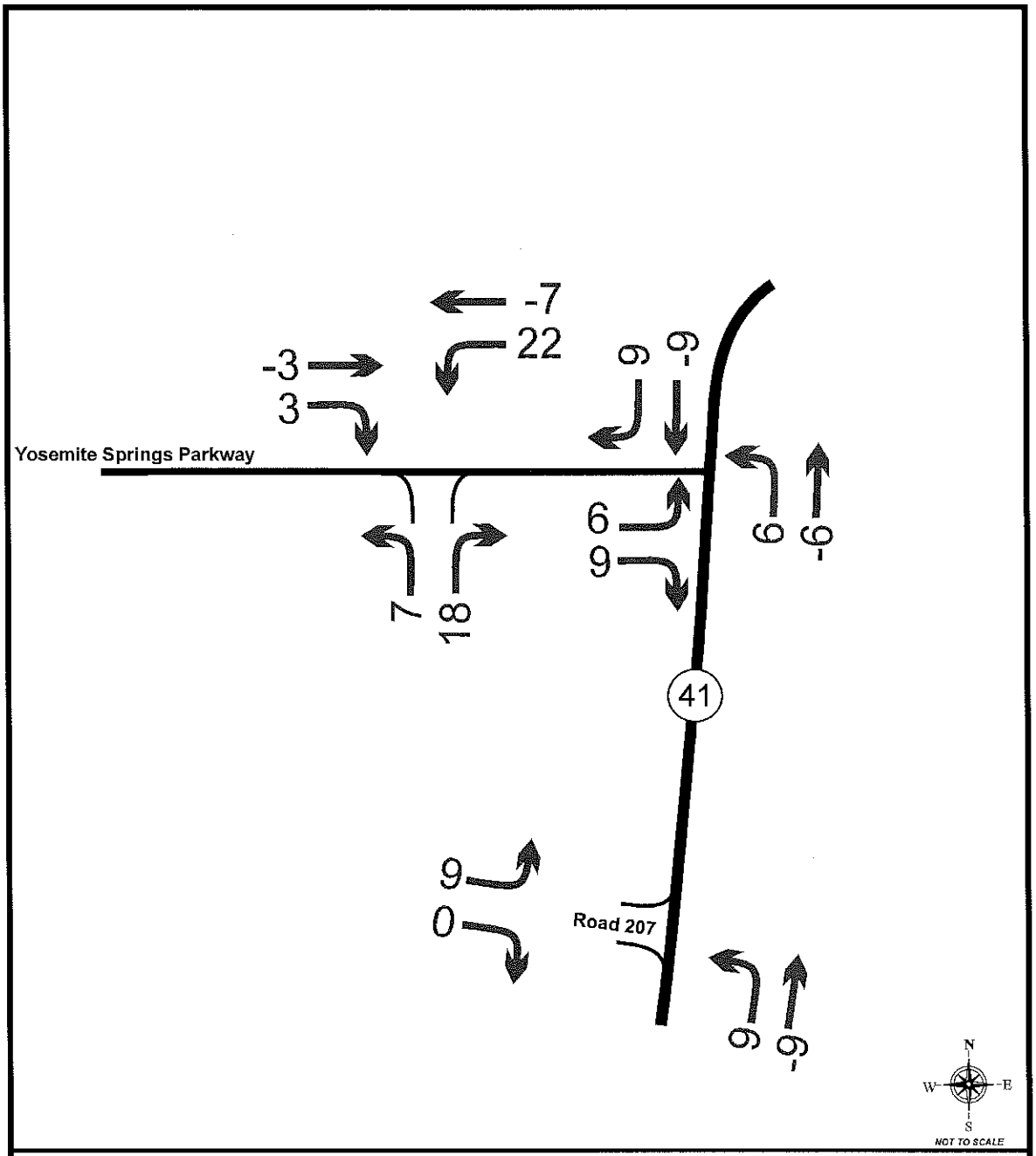

FIGURE 3-8
PM Peak Hour Project Pass-By Trips at Project Driveways

LEGEND

← XX Inbound Trips
← XX Outbound Trips

3.4 Existing Plus Project Traffic Conditions

An Existing Plus Project Scenario was analyzed to include existing (2013) traffic plus traffic generated by the Project. The resulting traffic is shown in Figures 3-9 and 3-10.

3.5 Cumulative Project Traffic

Traffic impact analyses typically require the analysis of cumulative projects (approved or pending developments that have not yet been built in the vicinity of the Project) in addition to the proposed Project. The cumulative projects included in this TIS include the Green Acres Development located at the northeast corner of SR 41 and Road 200, Madera Ranch Quarry located off of SR 41 and Road 209, the Granite Construction Company Quarry located at Road 208 and Road 209 in Madera County, and Vulcan's Austin Quarry located at SR-41 and SR-145. Trip generation and distribution information for the cumulative projects was based on information found in the corresponding TIS reports and or operational statement. Trip generation and distribution information are provided in Appendix F. Figures 3-11 and 3-12 show the AM and PM peak hour trips for Cumulative project traffic.

3.6 Near-Term (Year 2014) Opening Day Traffic Conditions

A Near-Term Scenario was analyzed to include 2014 traffic (Project opening-day) plus traffic generated by the Project plus traffic generated by other projects approved or being processed by Madera County. Interpolating between the Year 2010 and 2035 segment volumes of the regional travel models determined the 2014 street segment volumes. The TurnsW32 program calculated the forecasted turning movement volumes for the year 2014 by utilizing these 2014 segment volumes along with the existing traffic volumes for all turning movements. For reference, TurnsW32 worksheets are provided in Appendix G. The resulting traffic is shown in Figures 3-13 and 3-14.

3.7 Cumulative Year 2035 Without Project Traffic Conditions

The impacts of the Project were analyzed considering future traffic conditions, approximately twenty-one (21) years after the assumed opening day of the Project, or in this case the year 2035. The levels of traffic expected in 2035 relate to the cumulative effect of traffic increases resulting from the implementation of the General Plans of local agencies, including Madera County. Traffic conditions without the Project in the Year 2035 were estimated using the MCTC regional travel model. Future traffic forecasts along study area roadway segments were estimated by utilizing the incremental method published by Fresno Council of Governments (Fresno COG) and the TurnsW32 program.

For reference, the MCTC model outputs are provided in Appendix E. Traffic conditions resulting from this scenario are shown in Figures 3-15 and 3-16.

3.8 Cumulative Year 2035 With Project Traffic Conditions

The addition of Project trips, which were distributed to the roadway system using the trip distribution percentages shown in Figure 3-1 (Section 3.3), were added to Cumulative Year 2035 Without Project traffic volumes. This leads to the results shown in Figures 3-17 and 3-18.

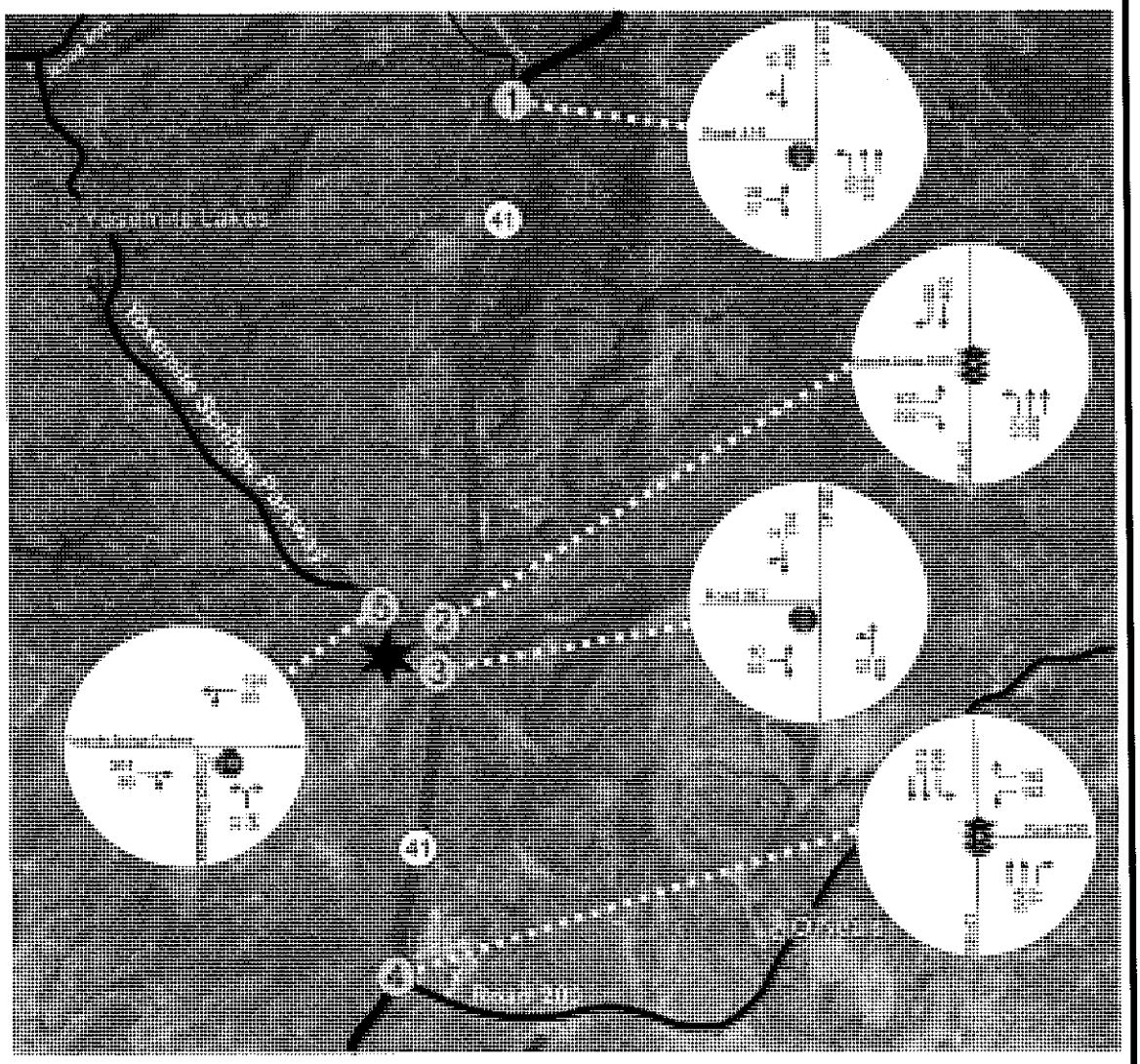

FIGURE 3-9

Existing Plus Project AM Peak Hour Traffic

LEGEND

Project Site | Study Intersections | Study Segments

Traffic Signal | Stop Sign | ## Peak Hour Traffic

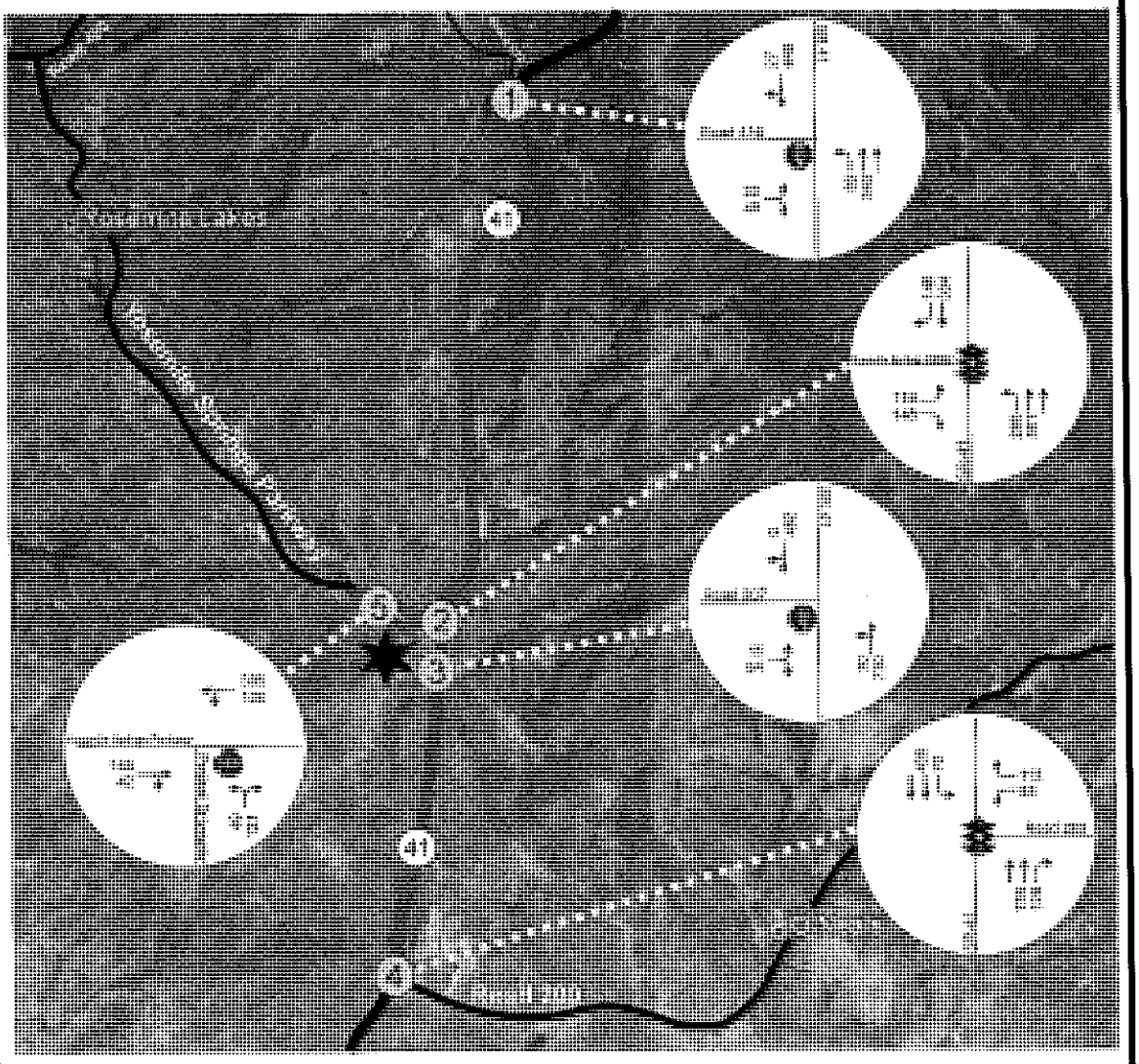

FIGURE 3-10

Existing Plus Project PM Peak Hour Traffic

LEGEND

Project Site | Study Intersections | Study Segments

Traffic Signal | Stop Sign | Peak Hour Traffic

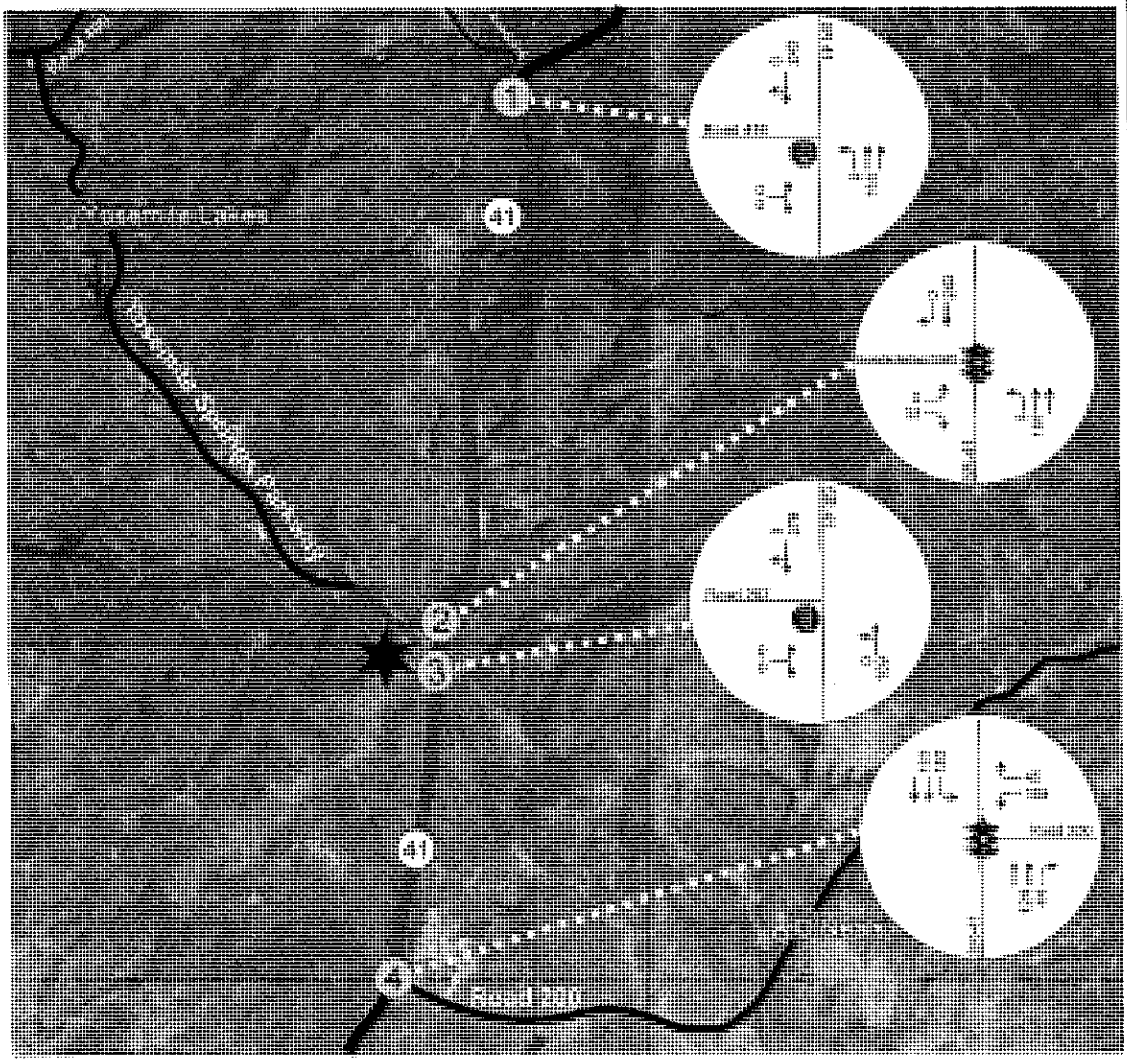

FIGURE 3-11

Cumulative Project AM Peak Hour Traffic

LEGEND

Project Site | Study Intersections | Study Segments

Traffic Signal | Stop Sign | ← ## Peak Hour Traffic

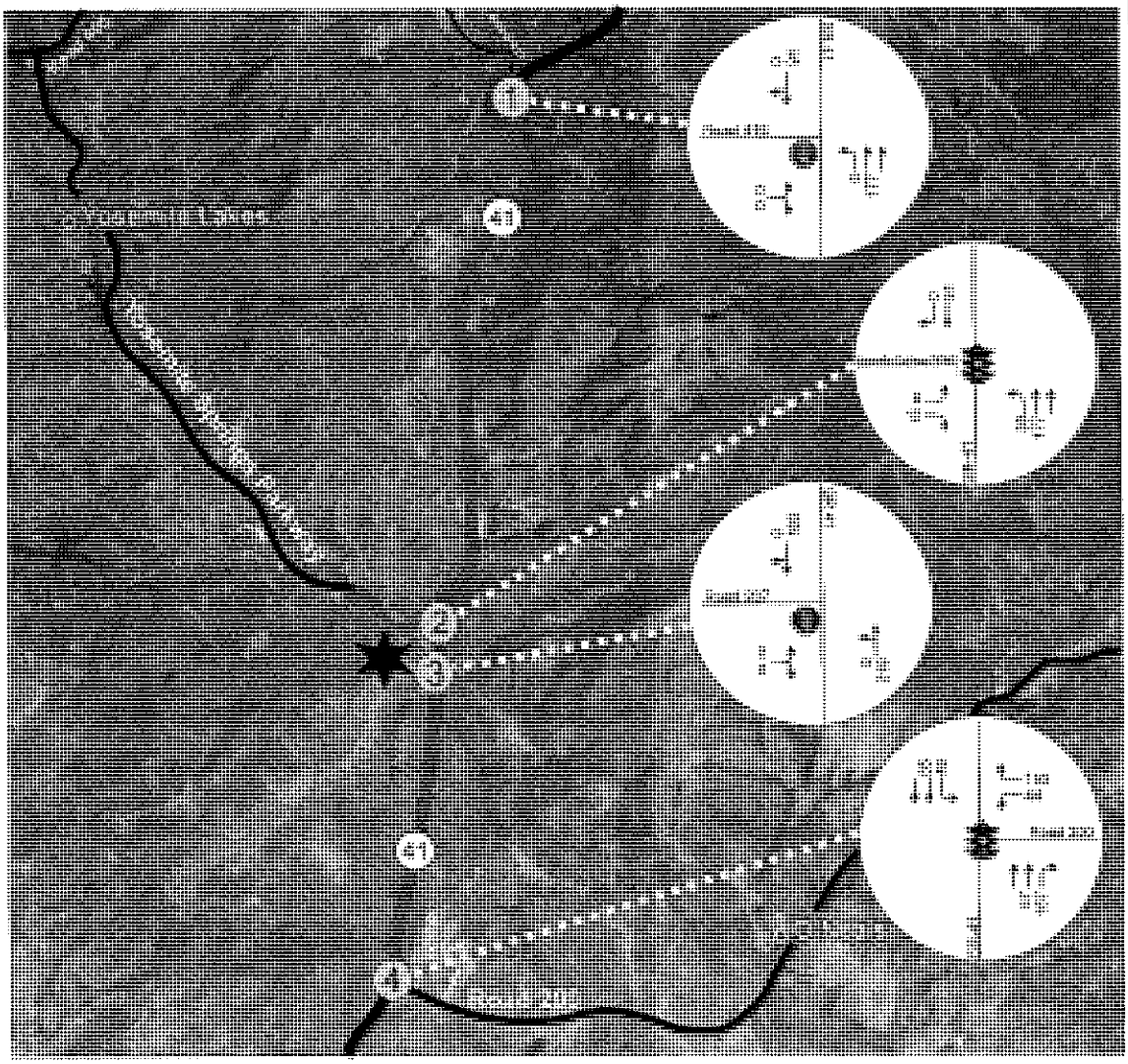

FIGURE 3-12

Cumulative Project PM Peak Hour Traffic

LEGEND

Project Site | Study Intersections | Study Segments

Traffic Signal | Stop Sign | ← ## Peak Hour Traffic

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