Foothill Ranch Towne Centre Residential General Plan Amendment and Zone Change Traffic Study

August 2012 Draft Report

Prepared For: Brookfield Residential

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August 6, 2012

Draft Report

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Table of Contents

1.0 INTRODUCTION 1.1

1.1 PROJECT DESCRIPTION 1.1

1.2 ANALYSIS SCOPE AND METHODOLOGY 1.1

1.2.1 Study Area 1.5

1.2.2 Traffic Model Background 1.5

1.3 PERFORMANCE CRITERIA 1.7

1.4 REFERENCES 1.12

2.0 PROJECT DESCRIPTION 2.1

2.1 PROJECT LOCATION AND ACCESS 2.1

2.2 TRIP GENERATION 2.1

2.3 TRIP DISTRIBUTION 2.5

3.0 TRANSPORTATION SETTING 3.1

3.1 EXISTING CONDITIONS 3.1

3.1.1 Average Daily Traffic Volumes 3.1

3.1.2 Peak Hour Intersection Levels of Service 3.1

3.1.3 Existing-Plus-Project Conditions 3.9

3.1.4 Existing Conditions (HCM Delay Methodology) 3.9

3.2 PLANNED CIRCULATION SYSTEM 3.9

4.0 YEAR 2015 PROJECT IMPACT ANALYSIS 4.1

4.1 YEAR 2015 TRAFFIC IMPACTS 4.1

4.1.1 Average Daily Traffic Volumes 4.1

4.1.2 Peak Hour Intersection Levels of Service 4.1

4.1.3 2015 Conditions (HCM Delay Methodology) 4.8

5.0 YEAR 2030 PROJECT IMPACT ANALYSIS 5.1

5.1 YEAR 2030 TRAFFIC IMPACTS 5.1

5.1.1 Average Daily Traffic Volumes 5.1

5.1.2 Peak Hour Intersection Levels of Service 5.1

5.1.3 2030 Conditions (HCM Delay Methodology) 5.1

6.0 ACCESS ANALYSIS 6.1

6.1 ON-SITE VOLUMES AND INTERSECTION ANALYSIS 6.1

6.2 SIGNALIZATION 6.1

6.3 LEFT-TURN STORAGE 6.7

6.4 MAIN ENTRY ACCESS 6.7

6.5 GATED ACCESS 6.11

7.0 FINDINGS AND CONCLUSIONS 7.1

Appendices

Appendix A: Intersection Capacity Utilization (ICU) Worksheets
Appendix B: Highway Capacity Manual (HCM) Intersection Analysis Worksheets

List of Figures

Figure 1-1 Project Location - Local 1.2
Figure 1-2 Project Location - City 1.3
Figure 1-3 Proposed Project Access 1.4
Figure 1-4 Traffic Analysis Study Area 1.6

Figure 2-1 Project Location 2.2
Figure 2-2 Proposed Project Access 2.3
Figure 2-3 2030 Project Trip Distribution 2.6

Figure 3-1 Circulation System within Study Area 3.2
Figure 3-2 Existing ADT Volumes (000s) – Counts and Existing-Plus-Project 3.3
Figure 3-3 Existing Peak Hour Volumes 3.4
Figure 3-4 Existing-Plus-Project Peak Hour Volumes 3.5
Figure 3-5 Peak Hour Level of Service (LOS) – Existing 3.7
Figure 3-6 Peak Hour Level of Service (LOS) – Existing-Plus-Project 3.8

Figure 4-1 2015 ADT Volumes (000s) – No-Project and With-Project 4.2
Figure 4-2 2015 Peak Hour Volumes – No-Project 4.3
Figure 4-3 2015 Peak Hour Volumes – With-Project 4.4
Figure 4-4 2015 Peak Hour Level of Service (LOS) – No-Project 4.5
Figure 4-5 2015 Peak Hour Level of Service (LOS) –With-Project 4.6

Figure 5-1 2030 ADT Volumes (000s) – No-Project and With-Project 5.2
Figure 5-2 2030 Peak Hour Volumes – No-Project 5.3
Figure 5-3 2030 Peak Hour Volumes – With-Project 5.4
Figure 5-4 2030 Peak Hour Level of Service (LOS) – No-Project 5.5
Figure 5-5 2030 Peak Hour Level of Service (LOS) – With-Project 5.6

Figure 6.1 Proposed Project Vesting Tentative Tract Map No. 17446 ..... 6.2
Figure 6.2 2030 With-Project ADT Volumes and Transportation Setting 6.3
Figure 6.3 Peak Hour Volumes 6.4
Figure 6.4 Peak Hour Volume Warrant (Lower Speeds/Urban Areas) 6.6
Figure 6.5 Auto Center Drive Median Changes 6.10
Figure 6.6 Proposed Project Entries 6.12

Figure A-1 Intersection Location Map A.5

List of Tables

Table 1-1 Level of Service Descriptions – Signalized Intersections 1.8
Table 1-2 Intersection Level of Service Ranges (ICU Methodology) 1.9
Table 1-3 Performance Criteria for Intersections Analyzed Within the Study Area..... 1.10
Table 1-4 Intersection Level of Service Ranges (HCM Delay Methodology)..... 1.91

Table 2-1 Project Trip Generation Summary 2.4

Table 3-1 Existing Intersection LOS Summary (ICU Methodology)..... 3.6
Table 3-2 Existing Intersection LOS Summary (HCM Delay Methodology)..... 3.10

Table 4-1 2015 Intersection LOS Summary (ICU Methodology) 43.67
Table 4-2 2015 Intersection LOS Summary (HCM Delay Methodology) 4.9

Table 5-1 2030 Intersection LOS Summary (ICU Methodology) 5.7
Table 5-2 2030 Intersection LOS Summary (HCM Delay Methodology) 5.8

Table 6-1 2030 With-Project Intersection LOS Summary (ICU Methodology)..... 6.5
Table 6-2 2030 With-Project Intersection LOS Summary (HCM Delay Methodology)..... 6.5
Table 6-3 2030 Peak Hour Signal Warrant Summary..... 6.8
Table 6-4 2030 Left-Turn Storage Length Requirements 6.9

1.0 Introduction

This report presents the findings of a traffic study for the proposed residential project in the Foothill Ranch Towne Centre area in the city of Lake Forest in Orange County, California (hereinafter referred to as the proposed project). The purpose of the study is to evaluate the potential traffic circulation impacts of the proposed project pursuant to City-adopted California Environmental Quality Act (CEQA) thresholds of significance. A project site plan access analysis is also presented in this report.

1.1 Project Description

The proposed project is comprised of 151 attached residential units ("condominiums") and includes a General Plan Amendment (GPA) and Zone Change (ZC) for property within Foothill Ranch Towne Centre in the city of Lake Forest. The property is bounded by Portola Parkway to the northeast, Auto Center Drive to the south, an existing retail center to the southwest and Bake Parkway to the northwest. The GPA and ZC application proposes to change the project site from non-residential to residential use.

Portola Parkway, a five- to six-lane major arterial, is accessible by the project via Auto Center Drive, a two-lane local collector east of the project site, and to Bake Parkway and Lake Forest Drive, both four-lane primary arterials, via Auto Center Drive to Towne Centre Drive (a four-lane secondary arterial) south of the project site. The State Route 241 (SR-241) toll road can be accessed via Lake Forest Drive and Alton Parkway southeast and northwest of the project site, respectively, approximately a half mile to a mile from the project site. Interstate 5 Freeway (I-5) is approximately five miles southwest of the project via Bake Parkway and Lake Forest Drive.

Figures 1-1 and 1-2 illustrate the location of the proposed project, and Figure 1-3 shows the proposed project access points on Auto Center Drive, both of which are full access with gated entry/exit. The primary access is just south of Portola Parkway and the secondary access is on the south end of the project site just northeast of existing commercial near Towne Centre Drive. The primary entry is accessible by both residents and guests while the secondary access is restricted to residents only.

1.2 Analysis Scope and Methodology

The analysis in this report identifies potential impacts of the proposed project based on existing traffic conditions and short-term (2015) and long-term 2030 future traffic conditions. Existing traffic conditions are based on observed traffic counts, whereas future traffic conditions were prepared using the Lake Forest Traffic Analysis Model (LFTAM). The project site, which has been the subject of previous traffic analyses, was last approved in 2009 for hotel and retail development. However, since that project was not developed the no-project conditions assumed

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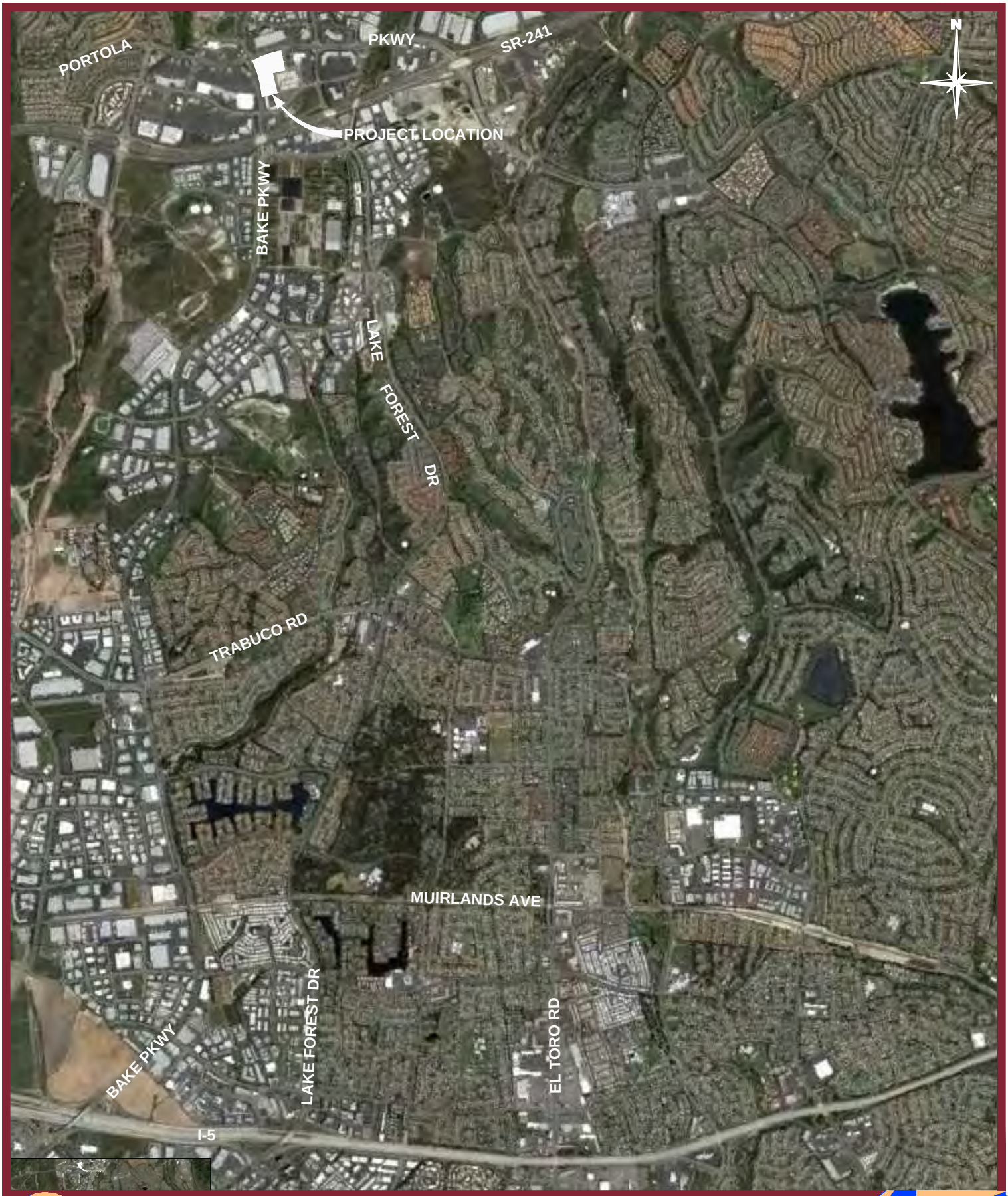
Project Location
- Local

Figure 1-1



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Project Location - City

Figure 1-2

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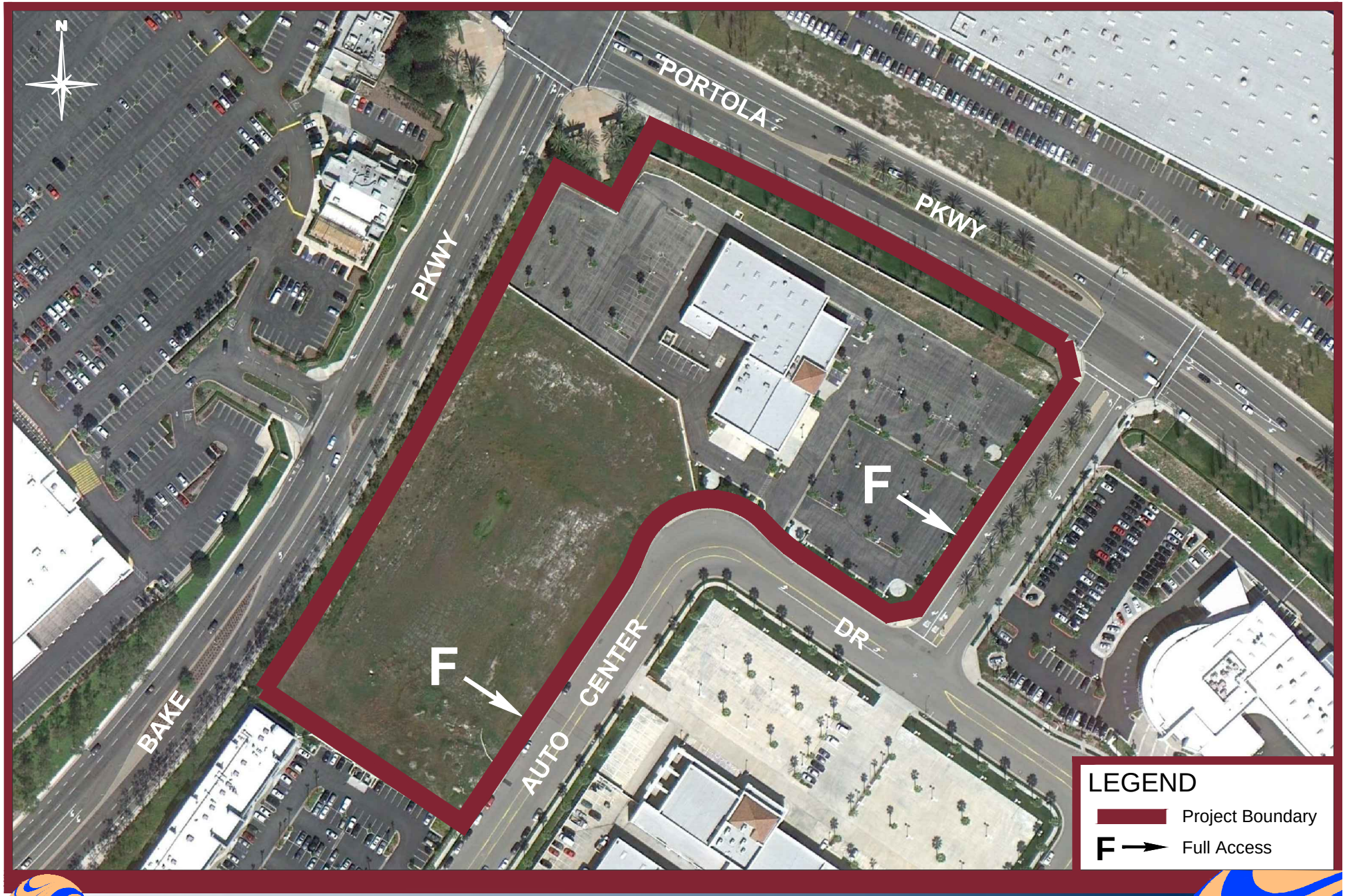

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Proposed Project Access

Figure 1-3

for the future (years 2015 and 2030) include the currently vacant auto dealership on the site. However, the existing-plus-project traffic conditions are compared to existing conditions that are collected from counts carried out in March 2012. The forecasts for the proposed project are based on the LFTAM version used for the Shea/Baker project southwest of the project site. For purposes of this traffic analysis, full buildout of the proposed project has been assumed to occur for each analysis time frame.

Major development projects approved and pending near the project vicinity are included in the future traffic conditions analyzed in this report along with any circulation system improvements related to those projects. These projects include Kaiser, Trumark, Shea/Baker, Whisler, Serrano Summit (on the Irvine Ranch Water District site), Sports Park (at Glass Creek) and Portola Center development.

The associated improvements that address any future deficiencies and accommodate future traffic due to the Opportunities Study Area (OSA) projects in the city of Lake Forest and outside traffic have been incorporated in a citywide mitigation program referred to as the Lake Forest Transportation Mitigation (LFTM) Program. In this traffic study, the LFTM improvements are assumed in the long-range conditions as are the buildout of all OSA projects.

1.2.1 Study Area

Figure 1-4 illustrates the study area defined in this traffic study and applied in the analysis that is summarized in this report for the proposed project. The study area limits (Portola Parkway to the northeast, Lake Forest Drive to the southeast, Rancho Parkway to the southwest and Bake Parkway to the northwest) were reviewed during the course of this study based on no-project versus with-project traffic forecast data to verify whether or not significant project impacts occur beyond the study area boundary based on the circulation system performance criteria applied in the study. Based on the findings of the project traffic impact analysis, no expansion of the study area beyond the limits presented here is warranted.

1.2.2 Traffic Model Background

As previous mentioned, the traffic forecast data for the proposed project was prepared using the LFTAM version from the Shea/Baker traffic study, and for analysis purposes, full buildout of the proposed project has been assumed to occur for each analysis time frame. The LFTAM traffic forecasting model is a focused sub-area model derived from the Orange County Transportation Analysis Model (OCTAM) and was specifically designed to provide detailed forecasting capability within the city of Lake Forest including the study area. The OCTAM is maintained by the Orange County Transportation Authority (OCTA), and has been developed according to the Orange County sub-area traffic modeling guidelines adopted by the OCTA. The OCTA has certified the LFTAM traffic model as being consistent with the OCTAM regional model.

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Traffic Analysis Study Area

Figure 1-4

1.3 Performance Criteria

In this report, a set of performance criteria is utilized to identify future level of service (LOS) deficiencies on the study area circulation system and also to define impacts and peak hour intersection capacity utilization (ICU) values of significance. According to the Highway Capacity Manual (HCM) summarized in Table 1-1, traffic LOS is designated "A" through "F" with LOS "A" representing free flow conditions and LOS "F" representing severe traffic congestion. The intersection criteria involve the use of peak hour ICU values. The ICU ranges that correspond to LOS "A" through "F" are presented in Table 1-2. By practice, the ICU methodology assumes that intersections are signalized. LOS "D" (ICU not to exceed .90) is the performance standard for the intersections in the study area.

The performance criteria presented in Table 1-3 are based on LOS calculation methodology and performance standard that have been adopted by the city of Lake Forest and by the OCTA as part of the Congestion Management Program (CMP). The performance criteria applied here is the same as used in previous OSA traffic analyses. When the project causes the intersection to exceed the performance standard (LOS "D"), mitigation is required to bring the intersection back to acceptable level of service. If the intersection is already deficient (i.e., exceeds the performance standard) under no-project conditions and the project contributes further to the deficiency by increasing the ICU by .02 or more, mitigation is required to bring the location back to no-project level of service conditions.

The Highway Capacity Manual (HCM) intersection analysis methodology was used to provide additional information on the LOS based on the estimated average delay for unsignalized intersections and Caltrans intersections. The vehicle delay ranges that correspond to LOS "A" through "F" as specified in the HCM are summarized in Table 1-4.

The HCM delay and ICU analyses are both based on peak hour volumes and use individual turn movements and the corresponding intersection lane geometry to estimate level of service. For the HCM delay analyses, different procedures are used depending on the type of intersection control.

For a signalized intersection, "average stopped delay" per vehicle for the overall intersection is used to determine level of service. The procedures are those set out in the HCM and utilize peak hour turn movement volumes and intersection lane geometry in the calculation.

For an unsignalized intersection or an intersection that is stop sign-controlled with stop control on the minor street only, the "unsignalized intersection methodology" of the HCM is used. For these intersections, the LOS is dependent on the occurrence of gaps in the traffic flow of the major street. The analysis is based on measured or computed control delay per vehicle for each movement, and LOS is not defined for the intersection as a whole, but only for the worst minor street movement(s). For all-way stop controlled locations, the LOS is defined for the intersection as a whole.

Table 1-1 Level of Service Descriptions – Signalized Intersections

Levels of service (LOS) for signalized intersections are defined in terms of control delay as follows:	
LOS	**Description**
A	LOS A describes operations with low control delay, up to 10 seconds per vehicle. This LOS occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	LOS B describes operations with control delay greater than 10 and up to 20 seconds per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than the LOS A, causing higher levels of delay.
C	LOS C describes operations with control delay greater than 20 and up to 35 seconds per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles, and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.
D	LOS D describes operations with control delay greater than 35 and up to 55 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	LOS E describes operations with control delay greater than 55 and up to 80 seconds per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent.
F	LOS F describes operations with control delay in excess of 80 seconds per vehicle. This level, considered unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of lane groups. It may also occur at high V/C ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.
Source: Highway Capacity Manual 2010, Transportation Research Board of the National Academies.	

Table 1-2 Intersection Level of Service Ranges (ICU Methodology)

Level of Service (LOS)	Intersection Capacity Utilization (ICU)
A	.00 – .60
B	.61 – .70
C	.71 – .80
D	.81 – .90
E	.91 – 1.00
F	Above 1.00

Table 1-3 Performance Criteria for Intersections Analyzed Within the Study Area

V/C Calculation Methodology

Level of service based on peak hour intersection capacity utilization (ICU) values calculated using the following assumptions:

Saturation Flow Rate: 1,700 vehicles per hour per lane
Clearance Interval: .05
Right-Turn-On-Red Utilization Factor*: .75
* "De facto" right-turn lane is assumed in the ICU calculation if 19 feet from edge to outside of through-lane exists and parking is prohibited during peak periods.

Performance Standard

All study area intersections: Level of Service D (peak hour ICU less than or equal to .90).

Mitigation Requirement

For ICU greater than the acceptable level of service, mitigation of the project contribution is required to bring intersection back to acceptable level of service where the deficiency is caused by the project or to no-project conditions or better where the project adds to a an already deficient condition and the project contribution is .02 or greater (i.e., more than 1.0 percent).

Table 1-4 Intersection Level of Service Ranges (HCM Delay Methodology)

Level of Service (LOS)	Highway Capacity Manual (HCM) Average Delay (Unsignalized)	Highway Capacity Manual (HCM) Average Delay (Signalized)
A	.00 – 10.0 seconds	.00 – 10.0 seconds
B	10.1 – 15.0 seconds	10.1 – 20.0 seconds
C	15.1 – 25.0 seconds	20.1 – 35.0 seconds
D	25.1 – 35.0 seconds	35.1 – 55.0 seconds
E	35.1 – 50.0 seconds	55.1 – 80.0 seconds
F	Above 50.0 seconds	Above 80.0 seconds

1.4 References

1. "City of Lake Forest Vacant Land Opportunities Phase III Traffic Study," Austin-Foust Associates, Inc., July 8, 2005.
2. "City of Lake Forest Vacant Land Opportunities Phase III Alternative 7 (Hybrid Alternative) Traffic Study," Austin-Foust Associates, Inc., November 7, 2007 (Approved by Lake Forest City Council on June 3, 2008).
3. "City of Lake Forest Vacant Land Opportunities Phase III Alternative 8 Traffic Study," Austin-Foust Associates, Inc., September 21, 2009.
4. "City of Lake Forest Serrano Summit (IRWD Site) Traffic Study," Austin-Foust Associates, Inc., April 8, 2010.
5. "Village at Foothill Ranch Traffic Impact Study in the City of Lake Forest," KOA Corporation, August 2008. (Revised Approved in 2009.)
6. "Shea/Baker Ranch Traffic Study," LSA Associates, Inc., August 2011.
7. "Kaiser Permanente Foothill Ranch MOB Focused Site Access Analysis," Linscott, Law and Greenspan Engineers, April 18, 2011.

2.0 Project Description

The proposed project is comprised of 151 attached residential units ("condominiums") and is located within Foothill Ranch Towne Centre in the city of Lake Forest. This chapter describes the traffic characteristics of the proposed project including the project access points. The trip generation estimates and traffic distribution patterns associated with the proposed project are then presented. This project description information is applied in the traffic impact analysis sections of this report to analyze the project under year 2015 and 2030 conditions.

2.1 Project Location and Access

The proposed project illustrated in Figures 2-1 is bounded by Portola Parkway to the northeast, Auto Center Drive to the south, an existing retail center to the southwest and Bake Parkway to the northwest. The SR-241 is the closest regional facility to the project and can be accessed via nearby Alton Parkway and Lake Forest Drive.

Figure 2-2 shows the proposed project access points on Auto Center Drive, both of which are full access with gated entry/exit. The primary access is just south of Portola Parkway and the secondary access is on the south end of the project site just northeast of existing commercial near Towne Centre Drive. The primary entry is accessible by both residents and guests while the secondary access is restricted to residents only.

2.2 Trip Generation

As previously mentioned, the project site, which has been the subject of previous traffic analyses, was last approved in 2009 for hotel and retail development. That project was not developed so the no-project conditions assumed for the future (years 2015 and 2030) include the currently vacant auto dealership on the site since the building was designed for and can be occupied by an auto dealer at any time. However, the existing-plus-project traffic conditions are compared to existing conditions that are collected from counts carried out in March 2012. At the time of the counts, the project site was occupied by a temporary use, a non-profit used clothing store. Therefore nominal trips from this use are included in the existing conditions.

The land uses and trip generation on the project site for existing, 2015 and 2030 under no-project and with-project conditions are summarized in Table 2-1. As indicated in Table 2-1 and according to the trip generation estimates, the proposed project at buildout is forecast to generate around 102 AM and 118 PM peak hour trips and 1,231 daily trips. The with-project traffic forecasts, which includes the entire buildout of the project, results in nominal trip generation differences when compared to the no-project forecasts that assumes the auto dealer use currently

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Project Location

Figure 2-1

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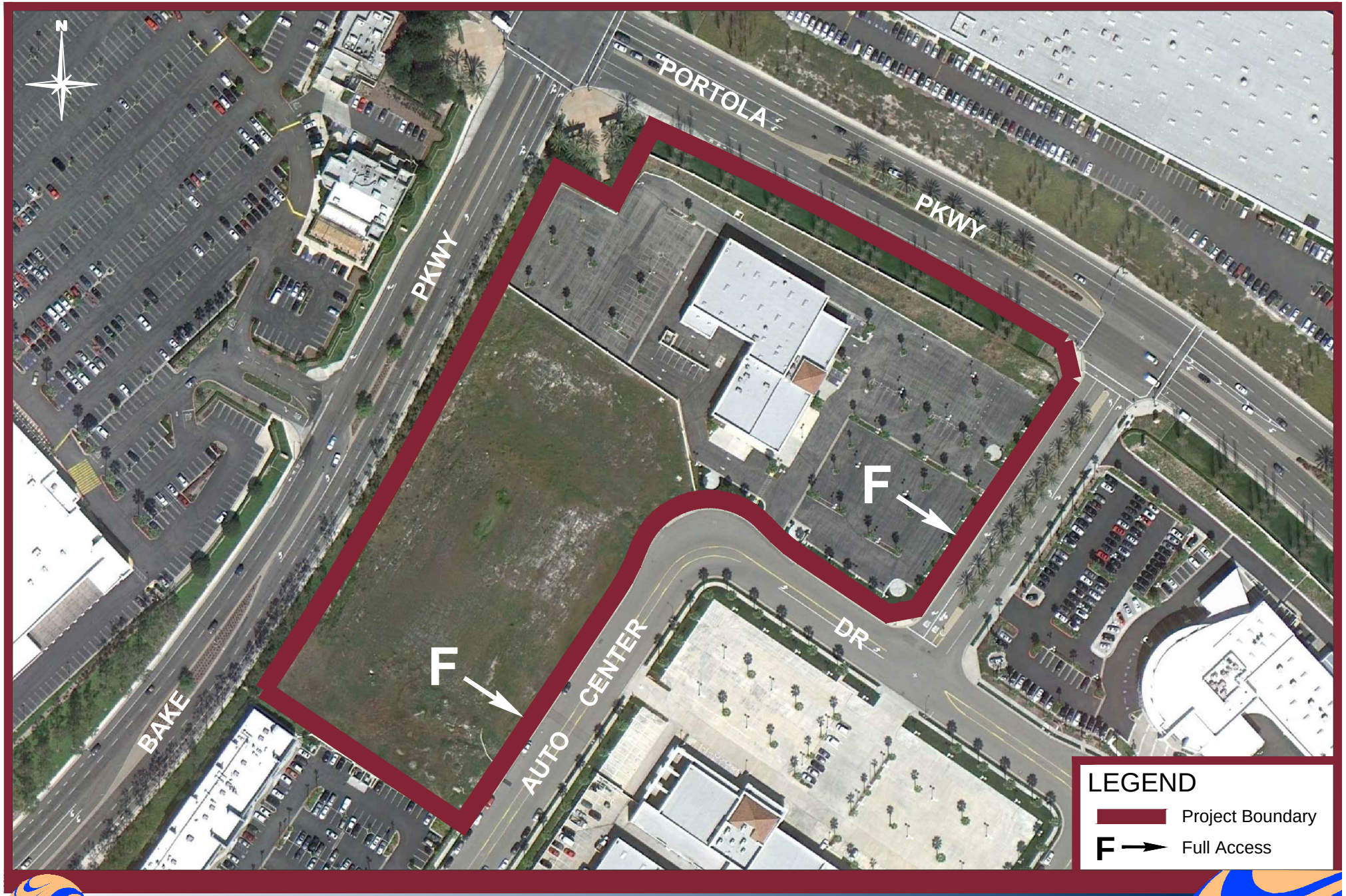

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Proposed Project Access

Figure 2-2

Table 2-1 Project Trip Generation Summary

Land Use	Amount*	Unit	AM Peak Hour			PM Peak Hour			ADT
			In	Out	Total	In	Out	Total	
No-Project (2015 and 2030)									
Auto Dealer	27.743	TSF	42	15	57	28	44	72	926
With-Project (Existing, 2015 and 2030)									
Auto Dealer	0	TSF	0	0	0	0	0	0	0
Condominium	151	DU	26	76	102	68	50	118	1,231
TOTAL			26	76	102	68	50	118	1,231
DIFFERENCE			-16	61	45	40	6	46	305
Trip Rates									
Auto Dealer (1)		TSF	1.50	.53	2.03	1.01	1.58	2.59	33.34
Condominium (2)		DU	.17	.50	.67	.45	.33	.78	8.15

Notes: The traffic model forecasts for no-project and with-project conditions include the uses above. However, the existing-plus-project conditions are compared to existing conditions which currently include a temporary nominal trip generating use on the project site.

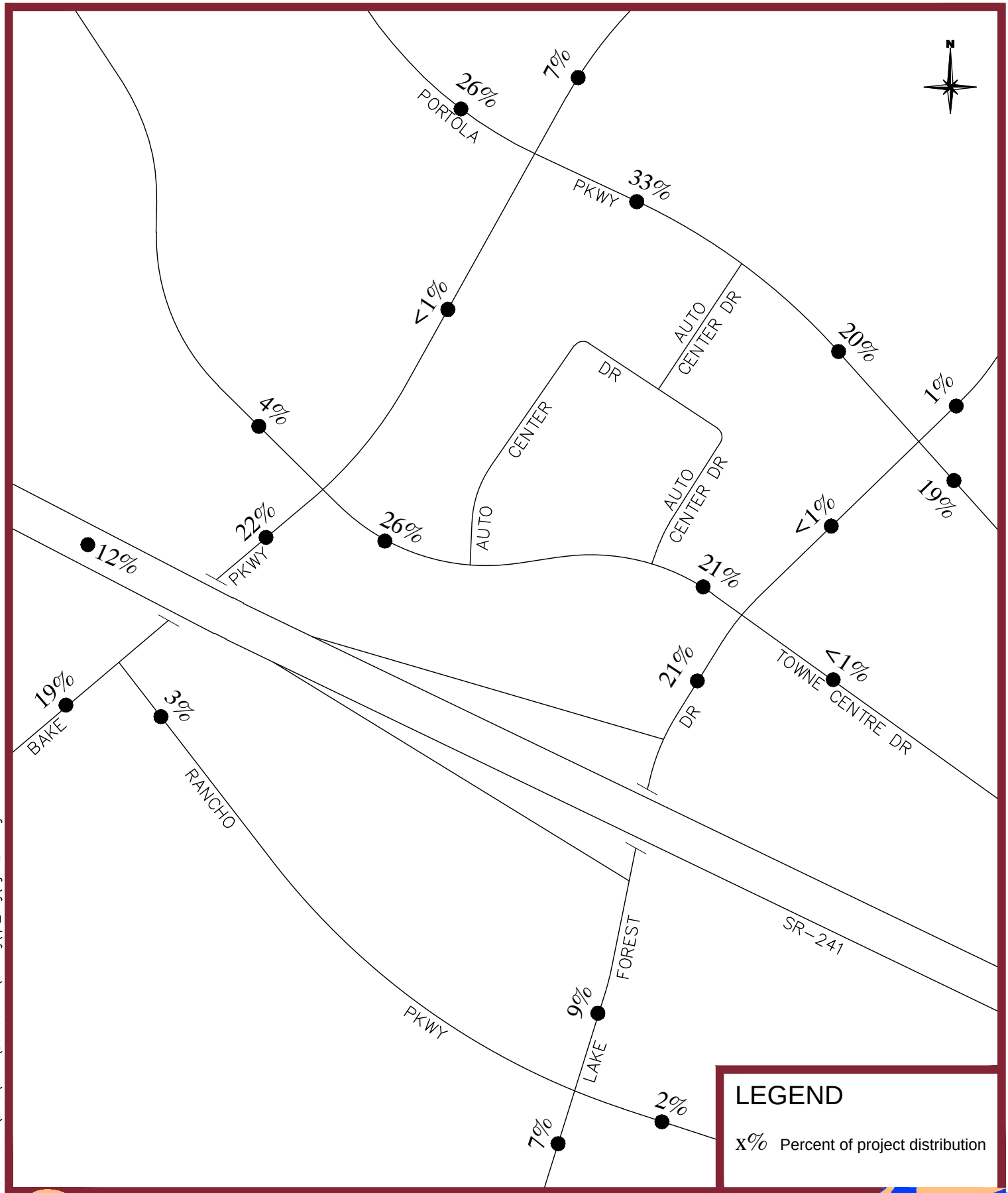
Abbreviations: ADT – Average Daily Trips DU – Dwelling Unit
TSF – Thousand Square Feet

(1) From ITE (Institute of Transportation Engineers' Trip Generation Manual, Eighth Edition)
(2) From OSA (Opportunities Study Area Traffic Study)

on the site. Also the forecasts include a change in peak hour directionality associated with residential use replacing non-residential use resulting in higher outbound volumes in the AM peak hour and higher inbound volumes in the PM peak hour.

2.3 Trip Distribution

Trip distribution patterns for the project site were developed using the LFTAM traffic model and are presented in Figure 2-3 for year 2030. The trip distribution patterns are based on the model's distribution of daily project traffic. These percentages differ slightly in the peak hours, and the traffic models use the individual peak hour distribution patterns to assign peak hour trips.



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2030 Project Trip Distribution

Figure 2-3

3.0 Transportation Setting

This chapter describes the transportation setting for the proposed project. Existing traffic conditions in the traffic analysis study area are summarized, and the future circulation systems planned for 2015 and 2030 study area are described.

3.1 Existing Conditions

The existing circulation system in the study area is illustrated in Figure 3-1 which shows the existing midblock lanes on arterial roadways, the number of existing travel lanes on freeway mainline segments, and the lane geometrics for the analysis intersections depicted here.

Existing traffic conditions in the study area were identified based on observed traffic counts. Current average daily traffic (ADT) counts and AM and PM peak hour turn movement counts at intersection locations in the study area were taken from counts collected in March 2012. The following sub-sections summarize the existing traffic conditions for the various components of the study area circulation system including arterial roads and intersections.

3.1.1 Average Daily Traffic Volumes

Existing and existing-plus-project ADT volumes on the arterial roadway system in the study area are illustrated in Figure 3-2. The only measurable increase in ADT with the project occurs on Portola Parkway just southeast of Bake Parkway which increases from 24,000 ADT to 25,000 ADT. The ADT volumes are not used in the traffic impact analysis but are presented here to provide a reference point for the traffic forecasts and for other environmental issue areas of the project CEQA analysis such as “Air Quality” and “Noise.”

3.1.2 Peak Hour Intersection Levels of Service

Figures 3-3 and 3-4 present the peak hour turn movement volumes for the intersection locations that are analyzed (as depicted in figure 3-1) under existing and existing-plus-project conditions. Existing intersection capacity utilization (ICU) values were calculated using peak hour traffic count data in combination with the existing lane configuration of each location. Existing and existing-plus-project AM and PM peak hour ICU values are summarized in Table 3-1 and illustrated in Figures 3-5 and 3-6 (ICU calculation worksheets are included in Appendix A). Use of the ICU methodology is consistent with the traffic analysis guidelines of the city of Lake Forest and the Orange County Transportation Authority (OCTA) Congestion Management Program (CMP), and by practice the ICU methodology assumes that intersections are signalized. Based on the intersection LOS performance criteria outlined in Chapter 1.0, all intersection locations analyzed in the study area currently operate at an acceptable LOS with no LOS worse than LOS “C.”

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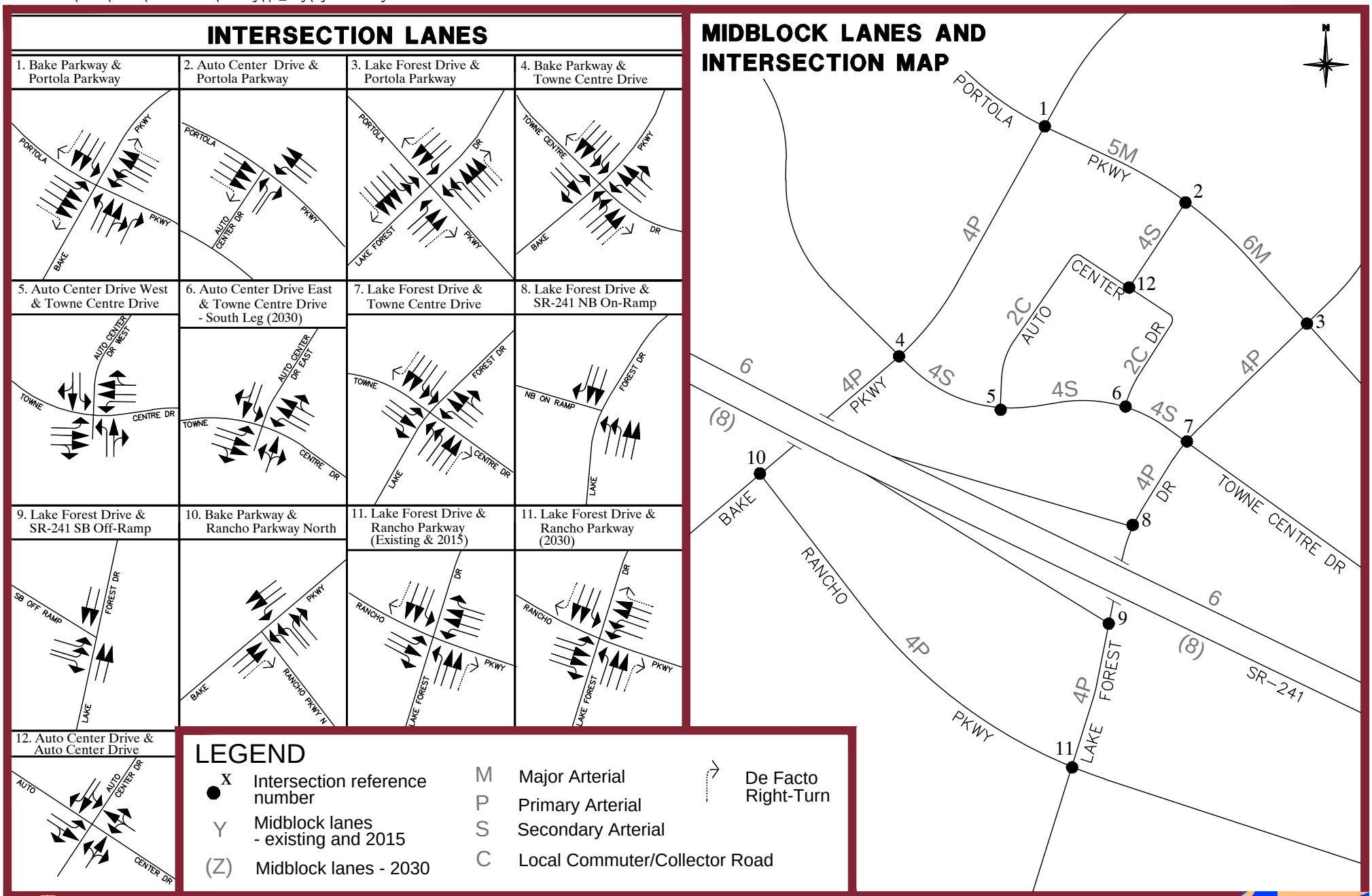

Circulation System within Study Area

Figure 3-1

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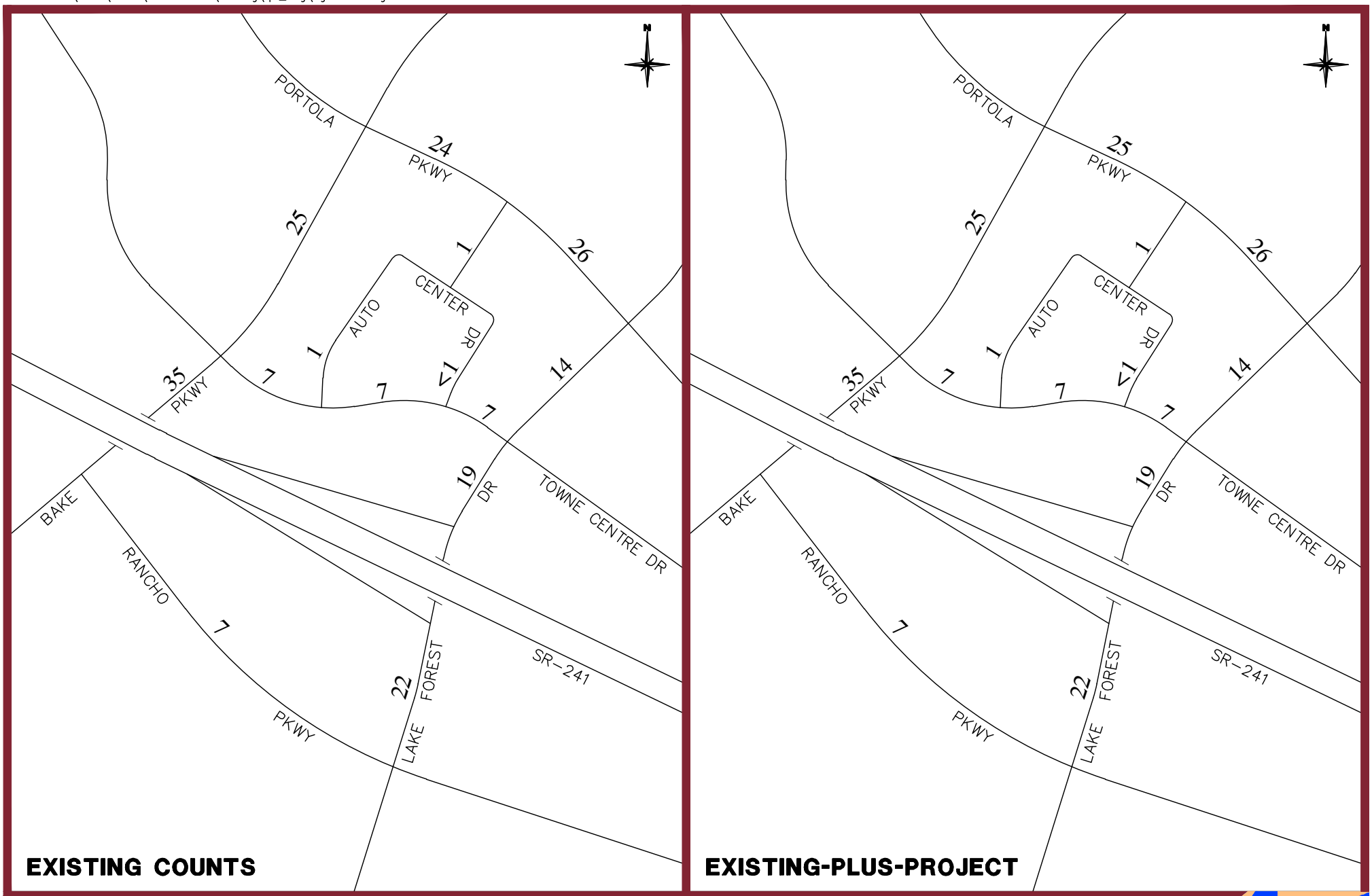

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Existing ADT Volumes (000s)
- Counts and Existing-Plus-Project

Figure 3-2

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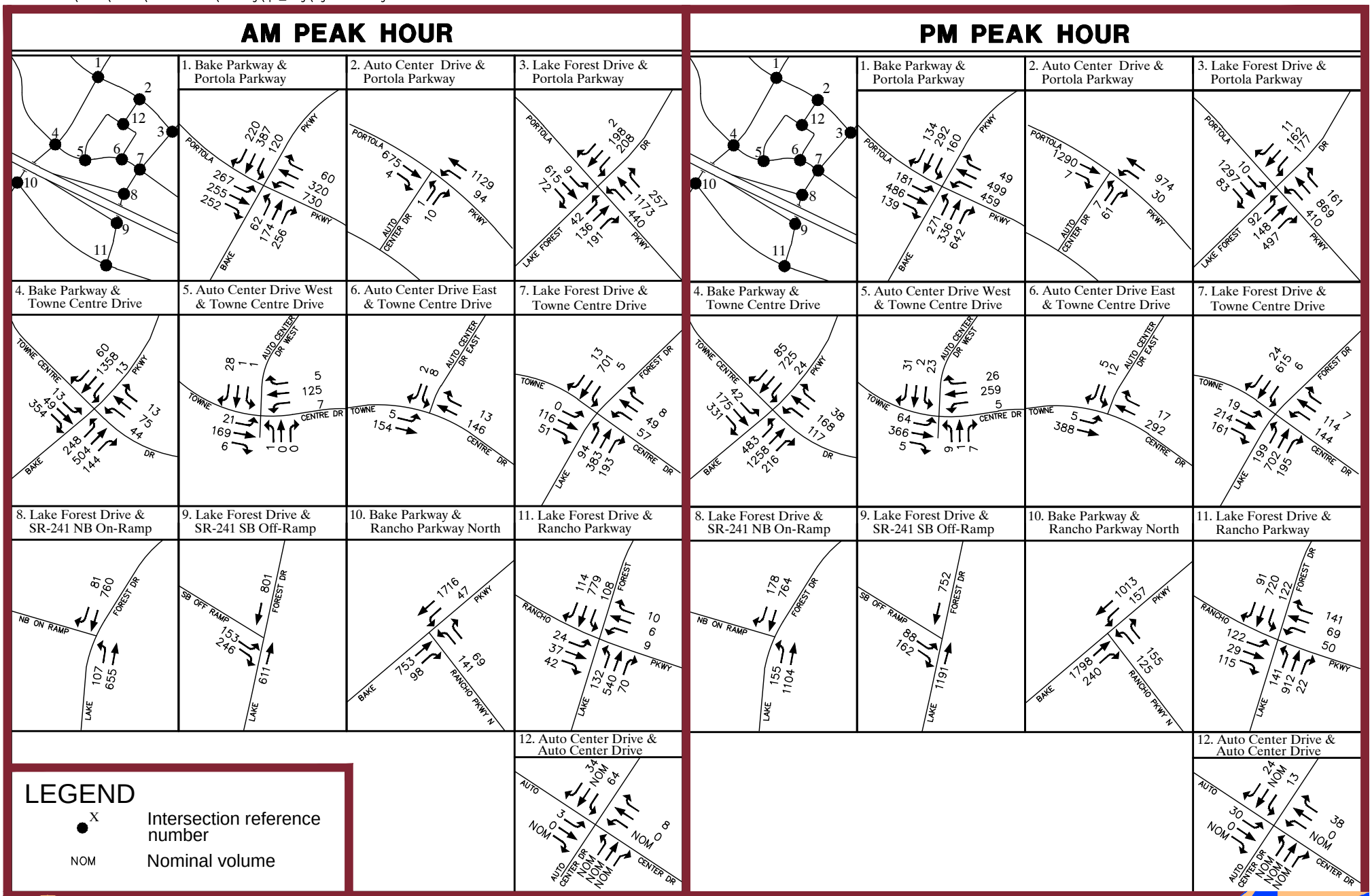

Existing Peak Hour Volumes

Figure 3-3

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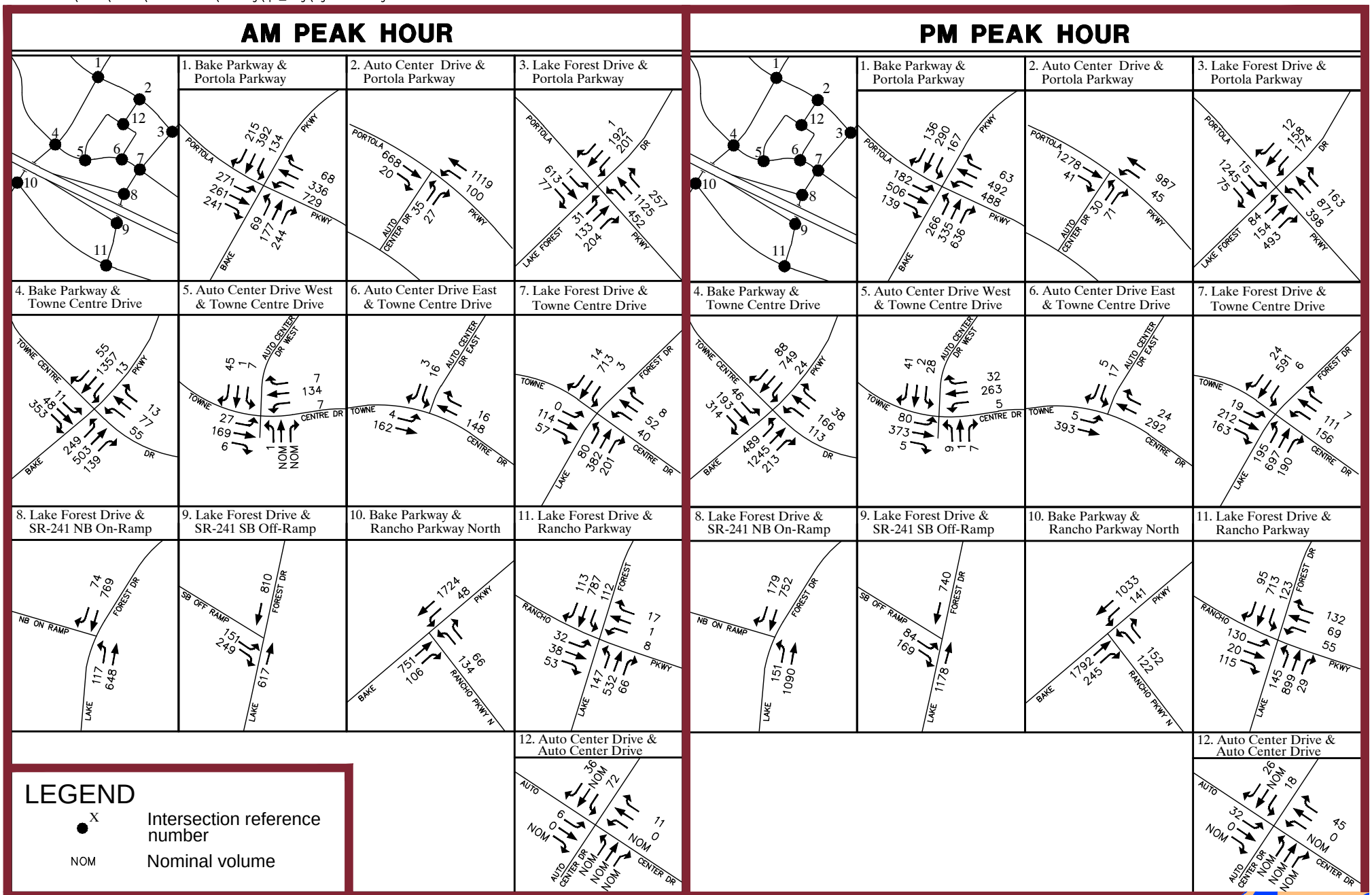

Existing-Plus-Project Peak Hour Volumes

Figure 3-4

Table 3-1 Existing Intersection LOS Summary (ICU Methodology)

Intersection	Existing				Existing-Plus-Project				Difference	
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS	AM	PM
1. Bake & Portola	.53	A	.56	A	.53	A	.55	A	.00	-.01
2. Auto Center & Portola	.38	A	.35	A	.40	A	.36	A	.02	.01
3. Lake Forest & Portola	.46	A	.72	C	.46	A	.71	C	.00	-.01
4. Bake & Towne Centre	.69	B	.60	A	.69	B	.61	B	.00	.01
5. Auto Center W & Towne Centre	.12	A	.20	A	.14	A	.23	A	.02	.03
6. Auto Center E & Towne Centre	.10	A	.17	A	.11	A	.18	A	.01	.01
7. Lake Forest & Towne Centre	.39	A	.50	A	.37	A	.49	A	-.02	-.01
8. Lake Forest & SR-241 NB On-Ramp	.30	A	.37	A	.31	A	.37	A	.01	.00
9. Lake Forest & SR-241 SB Off-Ramp	.43	A	.43	A	.44	A	.42	A	.01	-.01
10. Bake & Rancho N	.59	A	.71	C	.60	A	.70	B	.01	-.01
11. Lake Forest & Rancho	.39	A	.49	A	.39	A	.49	A	.00	.00
12. Auto Center & Auto Center	.09	A	.10	A	.10	A	.11	A	.01	.01

Notes:

[1]See Intersection Location Map in Figure 3-4.

[2]See Table 1-2 for LOS ranges based on ICU.

Abbreviations: ICU – intersection capacity utilization
E,W,N – east, west, north
LOS – level of service
NB,SB – northbound, southbound

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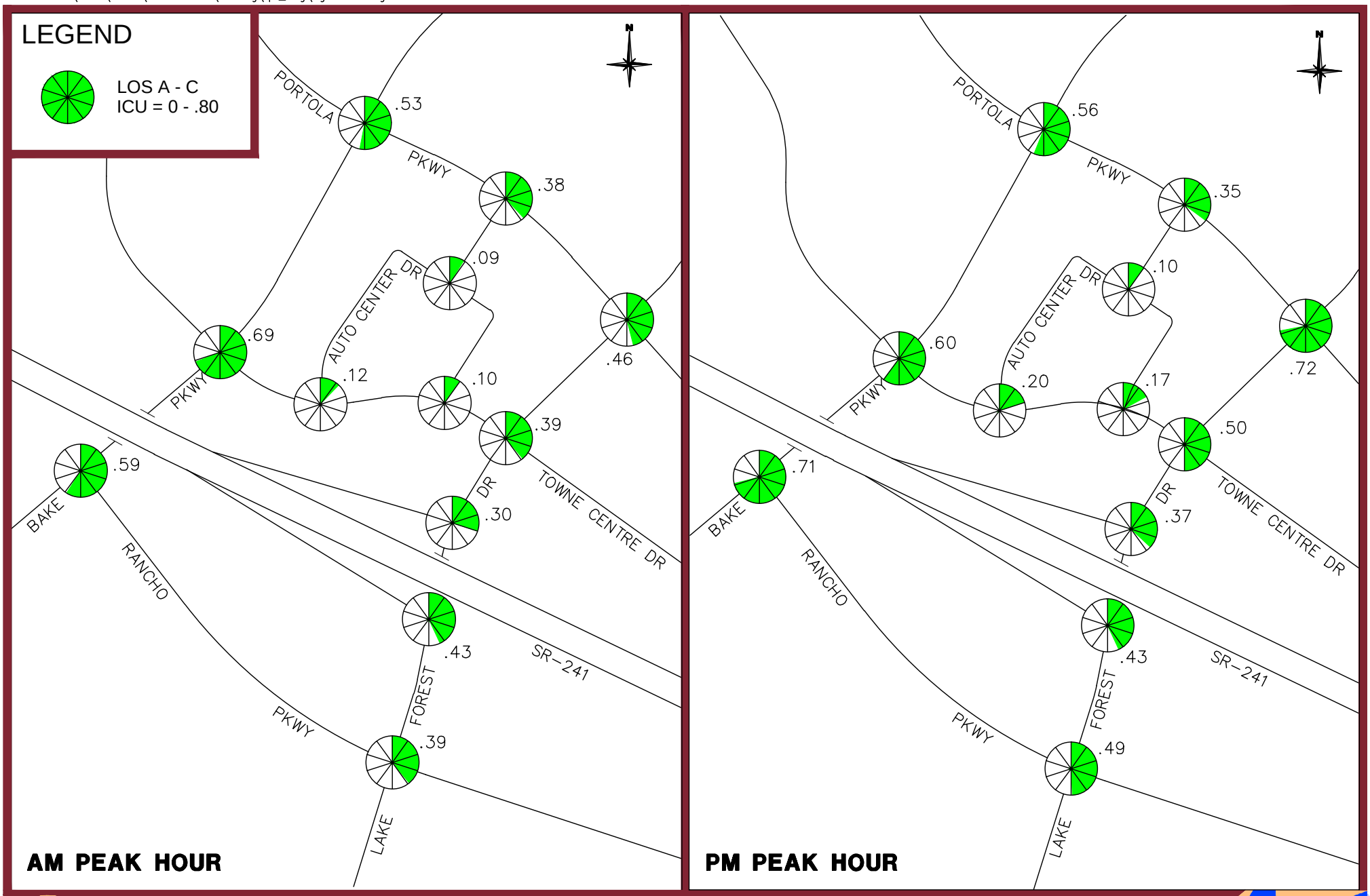

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Peak Hour Level of Service (LOS)
- Existing

Figure 3-5

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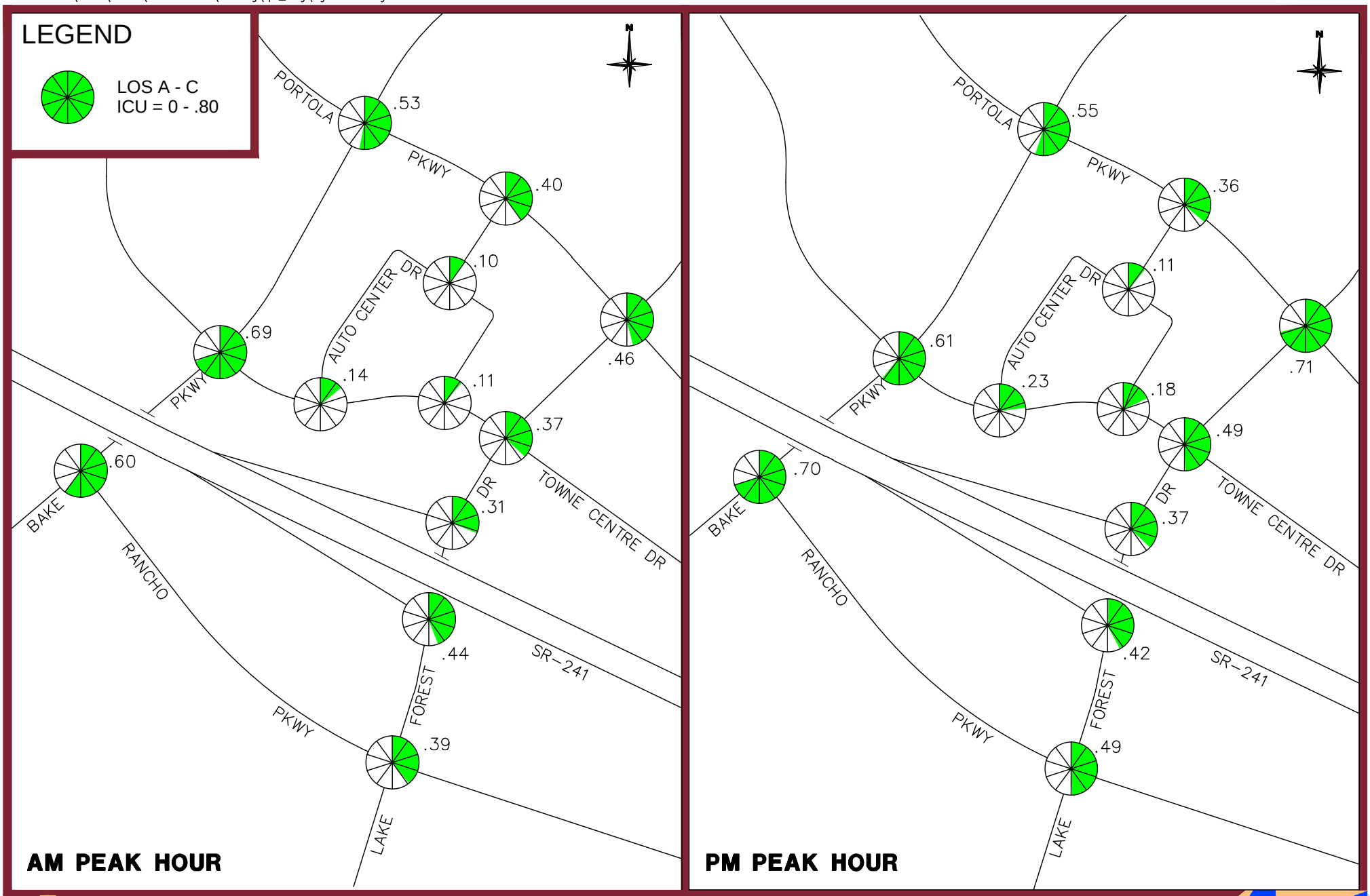

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Peak Hour Level of Service (LOS)
- Existing-Plus-Project

Figure 3-6

3.1.3 Existing-Plus-Project Conditions

Trips for the entire buildout of the project are applied to the existing counts according to the city traffic model. Any redistribution of existing traffic that occurs when residential use is added on to the circulation system as reflected in the traffic model. Also, the existing counts were carried out in March 2012 so the Alton Parkway connection, which was not opened at the time, is not assumed under existing-plus-project conditions. In addition, no adjustments were made to the existing counts to account for any current and temporary uses on the project site so this analysis may slightly overestimate the traffic under this scenario. However, as seen in the existing intersection LOS summary previously presented in this chapter there is still enough capacity available to accommodate the proposed project with all intersections operating at LOS "D" or better in the study area. Therefore no project mitigation would be necessary.

3.1.4 Existing Conditions (HCM Delay Methodology)

Table 3-2 presents the existing and existing-plus-project LOS results for unsignalized intersections and Caltrans intersections in the study area based on the HCM delay methodology. As can be seen in this table, all intersections are shown to operate at LOS "B" or better.

3.2 Planned Circulation System

The circulation system that is planned in the traffic analysis study area under 2015 and 2030 conditions was previously illustrated in Figure 3-1 since there are no changes to the existing circulation system for years 2015 and 2030. Year 2030 conditions reflect buildout of all OSA projects and therefore, improvements to the intersection of Lake Forest Drive and Rancho Parkway according to the Lake Forest Transportation Mitigation (LFTM) Program are assumed. Outside the study area, only committed improvements (i.e., 100% funding source can be identified) are assumed in the year 2015 and year 2030 including Alton Parkway which recently opened to traffic between Towne Centre Drive and Irvine Boulevard. However, Portola Parkway between the SR-241 and its current terminus just northwest of Alton Parkway is not committed. Therefore it has not been assumed.

Table 3-2 Existing Intersection LOS Summary (HCM Delay Methodology)

Intersection	Existing				Existing-Plus-Project				Difference	
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
5. Auto Center W & Towne Centre[3]	10.30	B	11.90	B	10.50	B	12.30	B	.20	.40
6. Auto Center E & Towne Centre[3]	9.90	A	11.90	B	10.10	B	12.30	B	.20	.40
8. Lake Forest & SR-241 NB On-Ramp	3.50	A	3.70	A	3.80	A	3.70	A	.30	.00
9. Lake Forest & SR-241 SB Off-Ramp	10.80	B	6.00	A	10.80	B	6.10	A	.00	.10
12. Auto Center & Auto Center[3]	8.70	A	8.70	A	8.80	A	8.80	A	.10	.10

Notes:

[1]See Intersection Location Map in Figure 3-4.

[2]See Table 1-4 for LOS ranges based on delay in seconds.

[3]Assumed to be two-way stop-controlled, where LOS is based on the worst stop-controlled approach.

Abbreviations: E,W,N – east, west, north
LOS – level of service
NB,SB – northbound, southbound

4.0 Year 2015 Project Impact Analysis

This chapter analyzes the impacts of the proposed project on year 2015 traffic conditions in the traffic analysis study area. The potential traffic impacts of the project are assessed based on a comparison of 2015 no-project and with-project conditions.

4.1 Year 2015 Traffic Impacts

As discussed in Chapter 1.0, the Lake Forest Traffic Analysis Model (LFTAM) recently used for the Shea/Baker project was used to prepare the year 2015 no-project and with-project traffic forecasts that are applied in the analysis.

The following sub-sections summarize the resulting 2015 no-project and with-project traffic conditions for arterial roads and intersections.

4.1.1 Average Daily Traffic Volumes

Year 2015 no-project and with-project average daily traffic (ADT) volumes are illustrated in Figure 4-1. Because the project replaces existing use resulting in a nominal difference in daily trips, there are negligible changes in ADT. The only measurable change in year 2015 with the project can be seen on Towne Centre Drive east of Bake Parkway where the ADT increases from 8,000 to 9,000. It should be noted that Alton Parkway which recently opened to traffic between Towne Centre Drive and Irvine Boulevard is included in year 2015. The Alton Parkway extension alleviates traffic along Bake Parkway and, to a lesser degree, Lake Forest Drive by providing additional parallel capacity for traffic to travel resulting in lower volumes than existing conditions along these two roadways.

4.1.2 Peak Hour Intersection Levels of Service

Figures 4-2 and 4-3 illustrate the year 2015 no-project and with-project AM and PM peak hour volumes at the intersections analyzed in the study area. The resulting intersection capacity utilization (ICU) values are illustrated in Figures 4-4 and 4-5 and summarized in Table 4-1 (ICU calculation worksheets are included in Appendix A). Based on the intersection LOS performance criteria and impact thresholds outlined in Chapter 1.0, no intersection location analyzed in the study areas is adversely impacted by the proposed project in the year 2015 ICU analysis (i.e., all intersections with the project are forecast to operate at level of service "D" (LOS D) or better).

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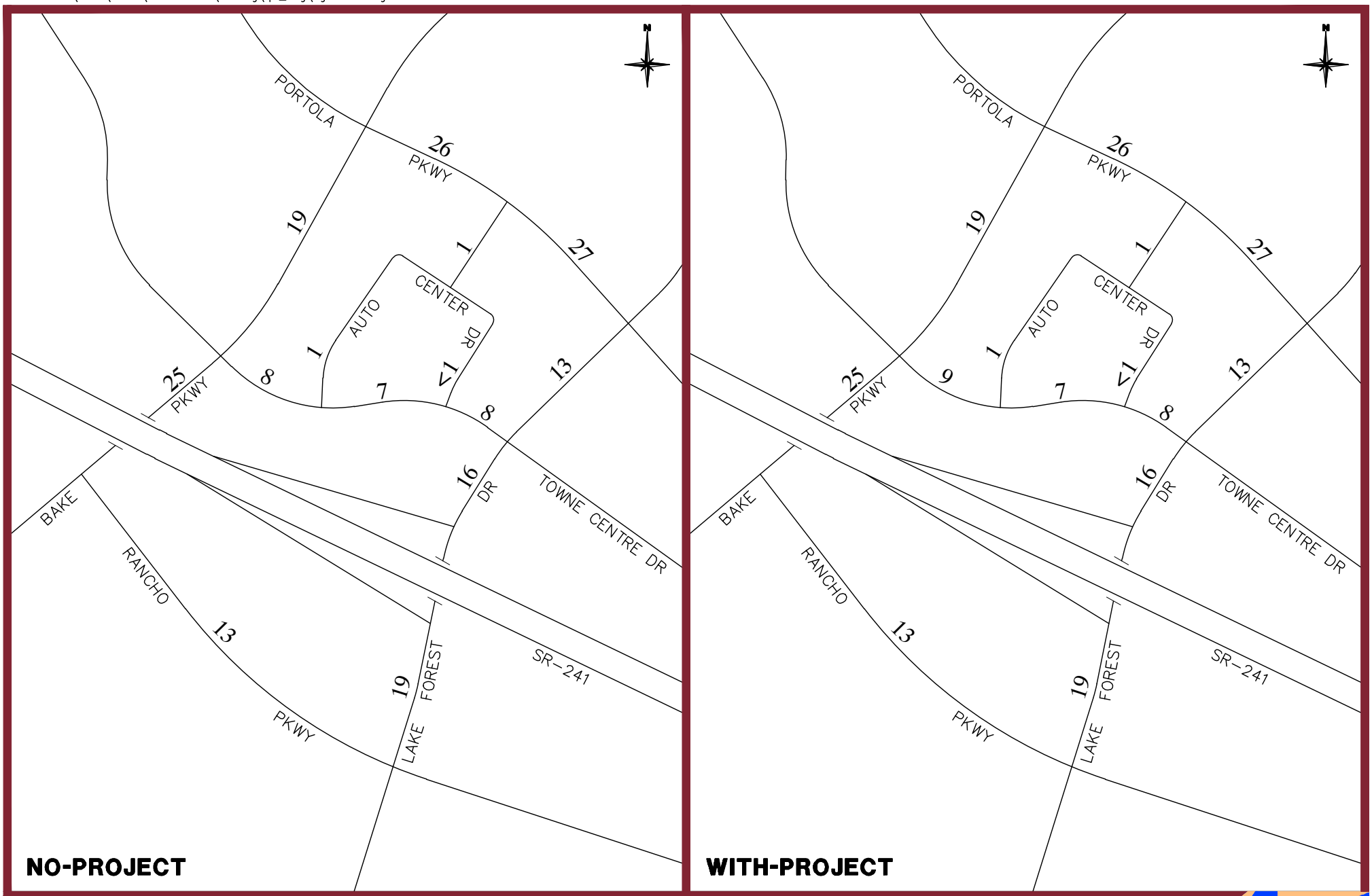

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2015 ADT Volumes (000s)
- No-Project and With-Project

Figure 4-1

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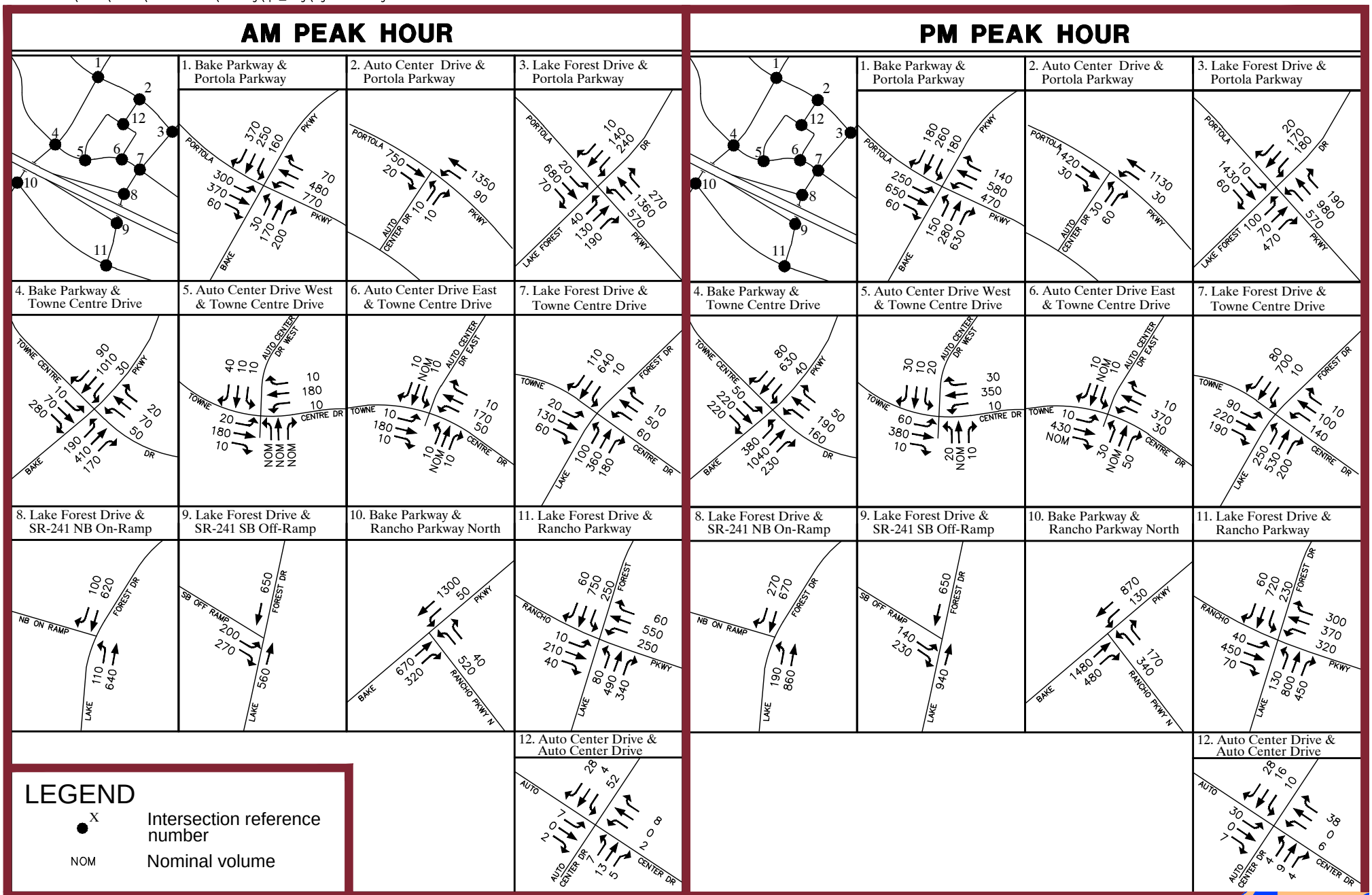

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2015 Peak Hour Volumes - No-Project

Figure 4-2

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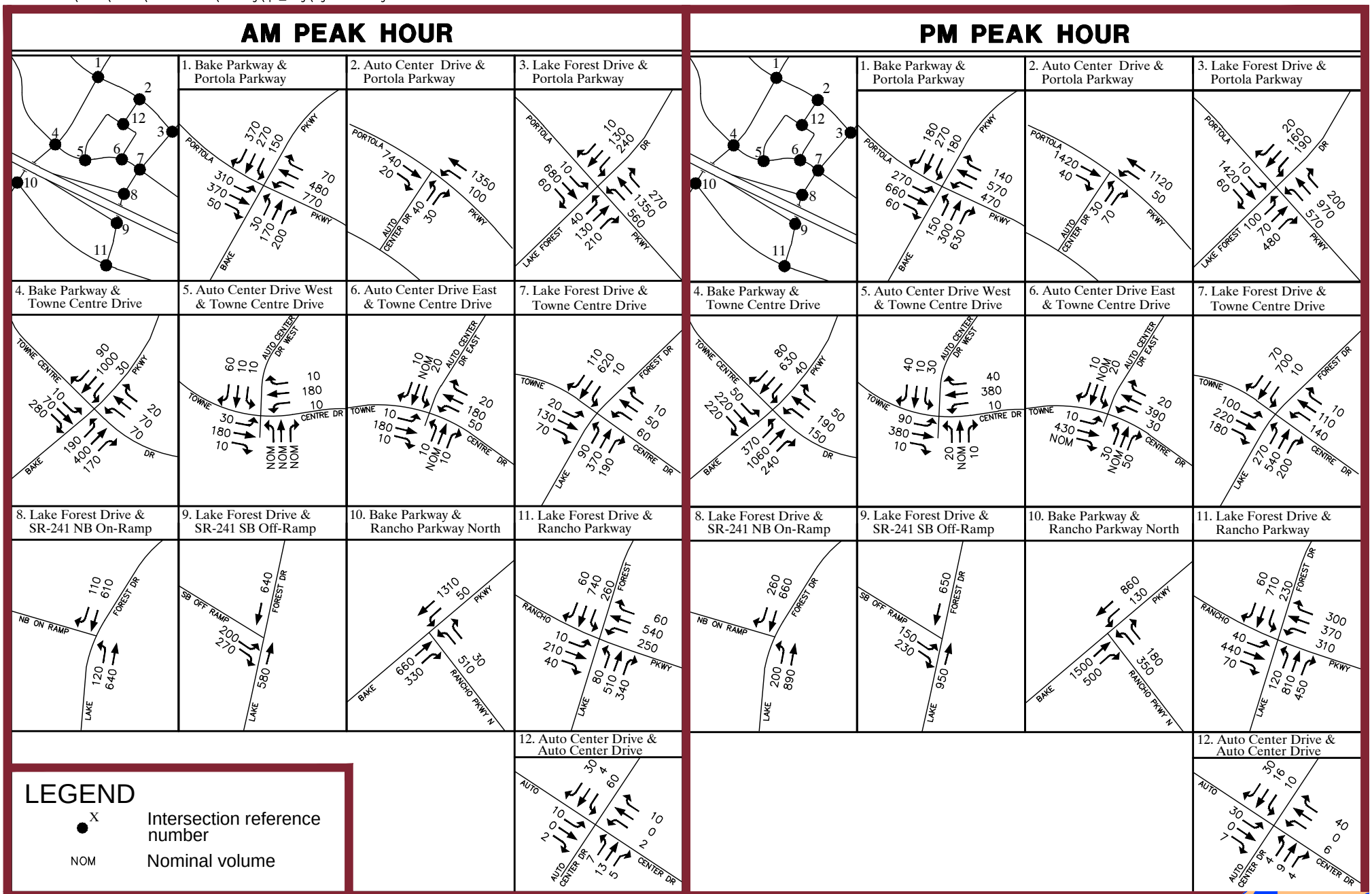

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2015 Peak Hour Volumes - With-Project

Figure 4-3

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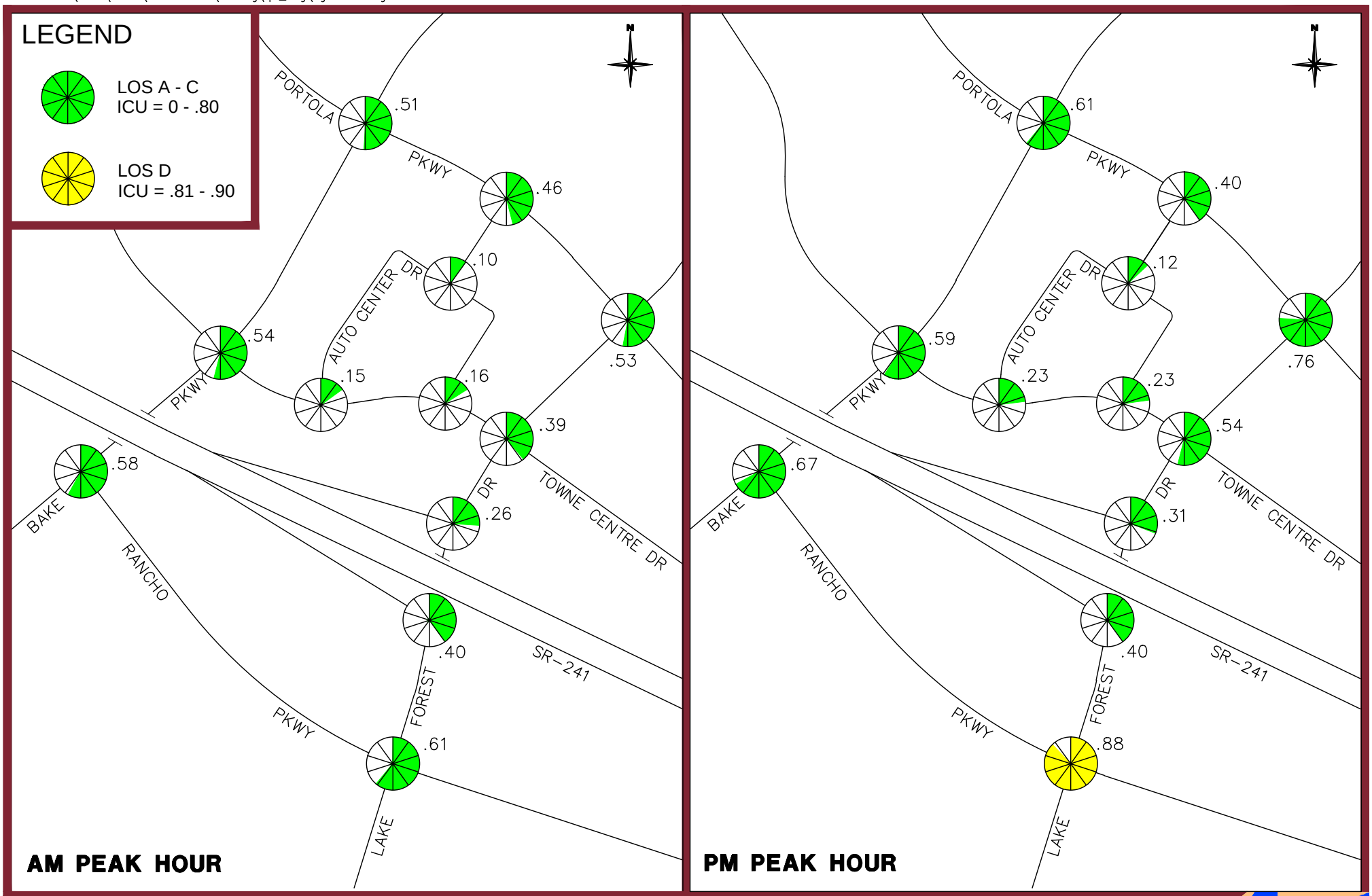

2015 Peak Hour Level of Service (LOS)
- No-Project

Figure 4-4

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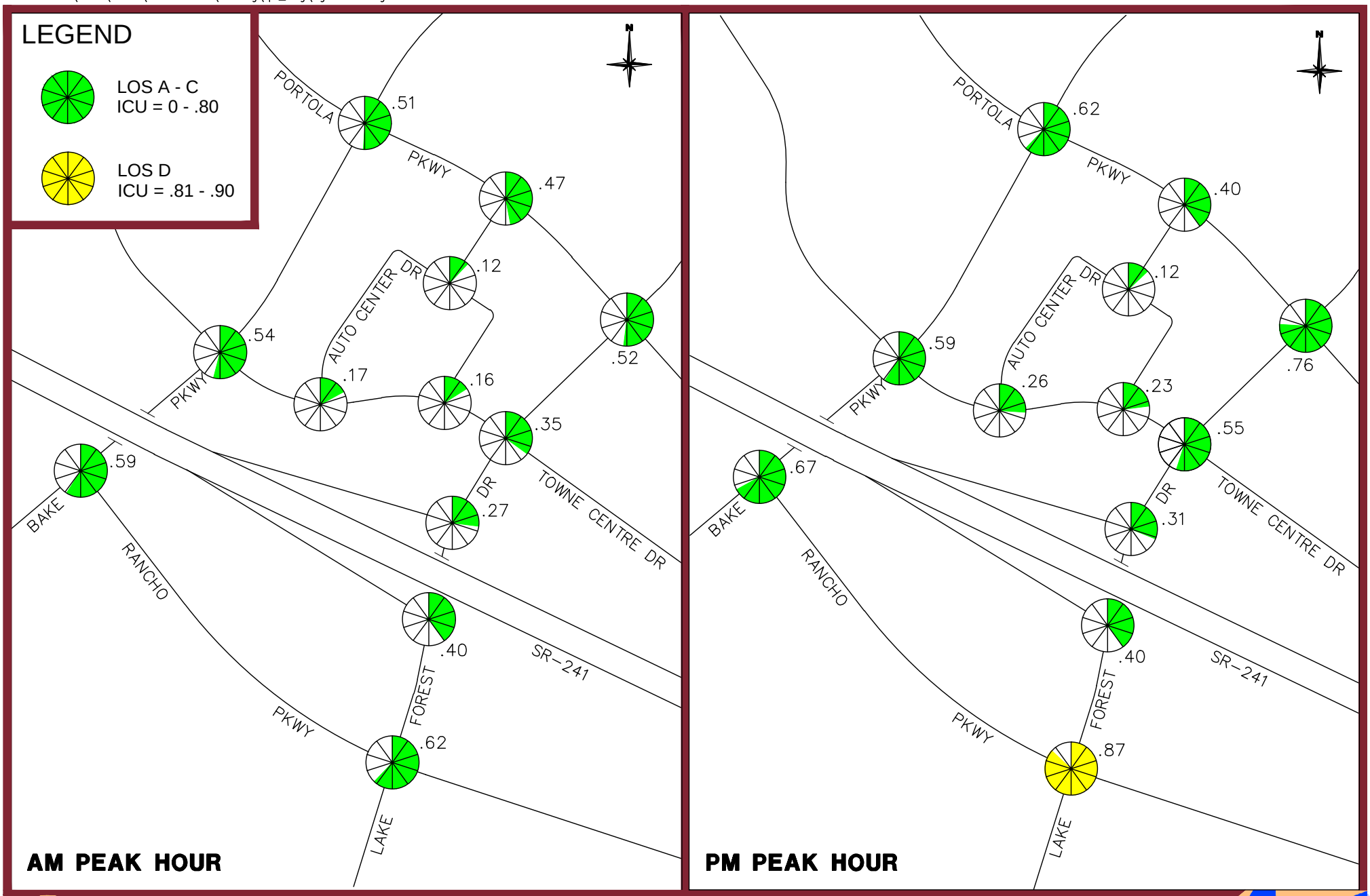

2015 Peak Hour Level of Service (LOS)
- With-Project

Figure 4-5

Table 4-1 2015 Intersection LOS Summary (ICU Methodology)

Intersection	2015 No-Project				2015 With-Project				Difference	
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS	AM	PM
1. Bake & Portola	.51	A	.61	B	.51	A	.62	B	.00	.01
2. Auto Center & Portola	.46	A	.40	A	.47	A	.40	A	.01	.00
3. Lake Forest & Portola	.53	A	.76	C	.52	A	.76	C	-.01	.00
4. Bake & Towne Centre	.54	A	.59	A	.54	A	.59	A	.00	.00
5. Auto Center W & Towne Centre	.15	A	.23	A	.17	A	.26	A	.02	.03
6. Auto Center E & Towne Centre	.16	A	.23	A	.16	A	.23	A	.00	.00
7. Lake Forest & Towne Centre	.39	A	.54	A	.35	A	.55	A	-.04	.01
8. Lake Forest & SR-241 NB On-Ramp	.26	A	.31	A	.27	A	.31	A	.01	.00
9. Lake Forest & SR-241 SB Off-Ramp	.40	A	.40	A	.40	A	.40	A	.00	.00
10. Bake & Rancho N	.58	A	.67	B	.59	A	.67	B	.01	.00
11. Lake Forest & Rancho	.61	B	.88	D	.62	B	.87	D	.01	-.01
12. Auto Center & Auto Center	.10	A	.12	A	.12	A	.12	A	.02	.00

Notes:

[1]See Intersection Location Map in Figure 4-3.

[2]See Table 1-2 for LOS ranges based on ICU.

Abbreviations: ICU – intersection capacity utilization
E,W,N – east, west, north
LOS – level of service
NB,SB – northbound, southbound

4.1.3 2015 Conditions (HCM Delay Methodology)

Table 4-2 presents the year 2015 LOS results for unsignalized intersections and Caltrans intersections in the study area based on the HCM delay methodology. As can be seen in this table, all intersections are forecast to operate at LOS "C" or better.

Table 4-2 2015 Intersection LOS Summary (HCM Delay Methodology)

Intersection	2015 No-Project				2015 With-Project				Difference	
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
5. Auto Center W & Towne Centre[3]	9.70	A	12.70	B	9.70	A	13.60	B	.00	.90
6. Auto Center E & Towne Centre[3]	10.90	B	14.60	B	11.60	B	17.30	C	.70	2.70
8. Lake Forest & SR-241 NB On-Ramp	3.70	A	4.70	A	3.90	A	4.80	A	.20	.10
9. Lake Forest & SR-241 SB Off-Ramp	11.90	B	9.20	A	12.10	B	9.30	A	.20	.10
12. Auto Center & Auto Center[3]	9.10	A	9.50	A	9.10	A	9.50	A	.00	.00

Notes:

[1]See Intersection Location Map in Figure 4-3.

[2]See Table 1-4 for LOS ranges based on delay in seconds.

[3]Assumed to be two-way stop-controlled, where LOS is based on the worst stop-controlled approach.

Abbreviations: E,W,N – east, west, north
LOS – level of service
NB,SB – northbound, southbound

5.0 Year 2030 Project Impact Analysis

This chapter analyzes the impacts of the proposed project on year 2030 traffic conditions in the traffic analysis study area. The potential traffic impacts of the project are assessed based on a comparison of 2030 no-project and with-project conditions.

5.1 Year 2030 Traffic Impacts

As discussed in Chapter 1.0, the Lake Forest Traffic Analysis Model (LFTAM) recently used for the Shea/Baker project was used to prepare the year 2030 no-project and with-project traffic forecasts that are applied in the analysis.

The following sub-sections summarize the resulting 2030 no-project and with-project traffic conditions for arterial roads and intersections.

5.1.1 Average Daily Traffic Volumes

Year 2030 no-project and with-project average daily traffic (ADT) volumes are illustrated in Figure 5-1. Similarly shown in Chapter 4.0 for year 2015, there are negligible changes in ADT because the project replaces existing use resulting in a nominal difference in daily trips. Again the only measurable change with the project can be seen on Towne Centre Drive east of Bake Parkway where the ADT increases from 8,000 to 9,000.

5.1.2 Peak Hour Intersection Levels of Service

Figures 5-2 and 5-3 illustrate the year 2030 no-project and with-project AM and PM peak hour volumes at the intersections analyzed in the study area. The resulting intersection capacity utilization (ICU) values are illustrated in Figures 5-4 and 5-5 and summarized in Table 5-1 (ICU calculation worksheets are included in Appendix A). Based on the intersection LOS performance criteria and impact thresholds outlined in Chapter 1.0, no intersection location analyzed in the study areas is adversely impacted by the proposed project in the year 2030 ICU analysis (i.e., all intersections with the project are forecast to operate at level of service "D" (LOS D) or better).

5.1.3 2030 Conditions (HCM Delay Methodology)

Table 5-2 presents the year 2030 LOS results for unsignalized intersections and Caltrans intersections in the study area based on the HCM delay methodology. As can be seen in this table, all intersections are forecast to operate at LOS "C" or better.

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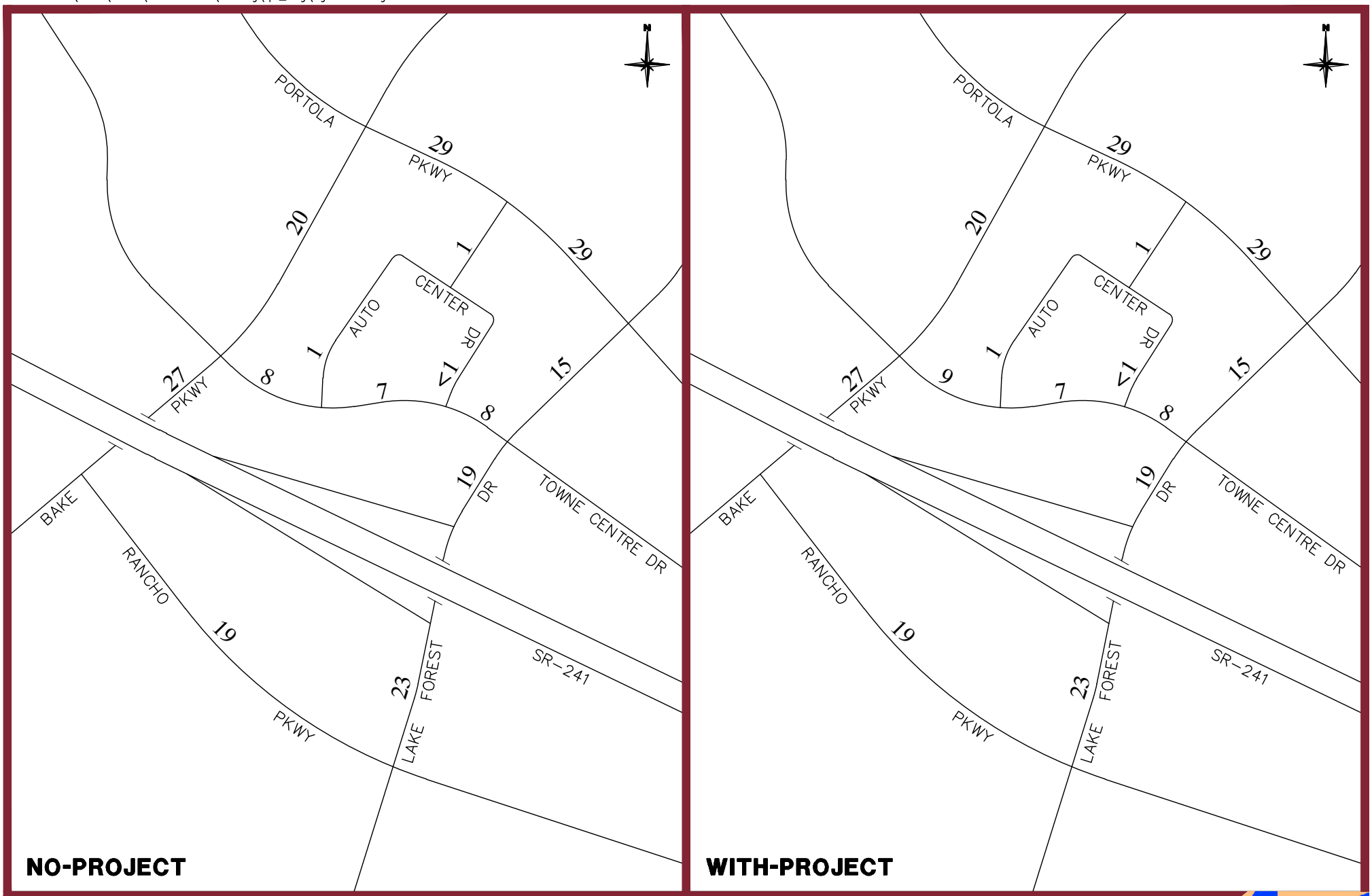

2030 ADT Volumes (000s)
- No-Project and With-Project

Figure 5-1

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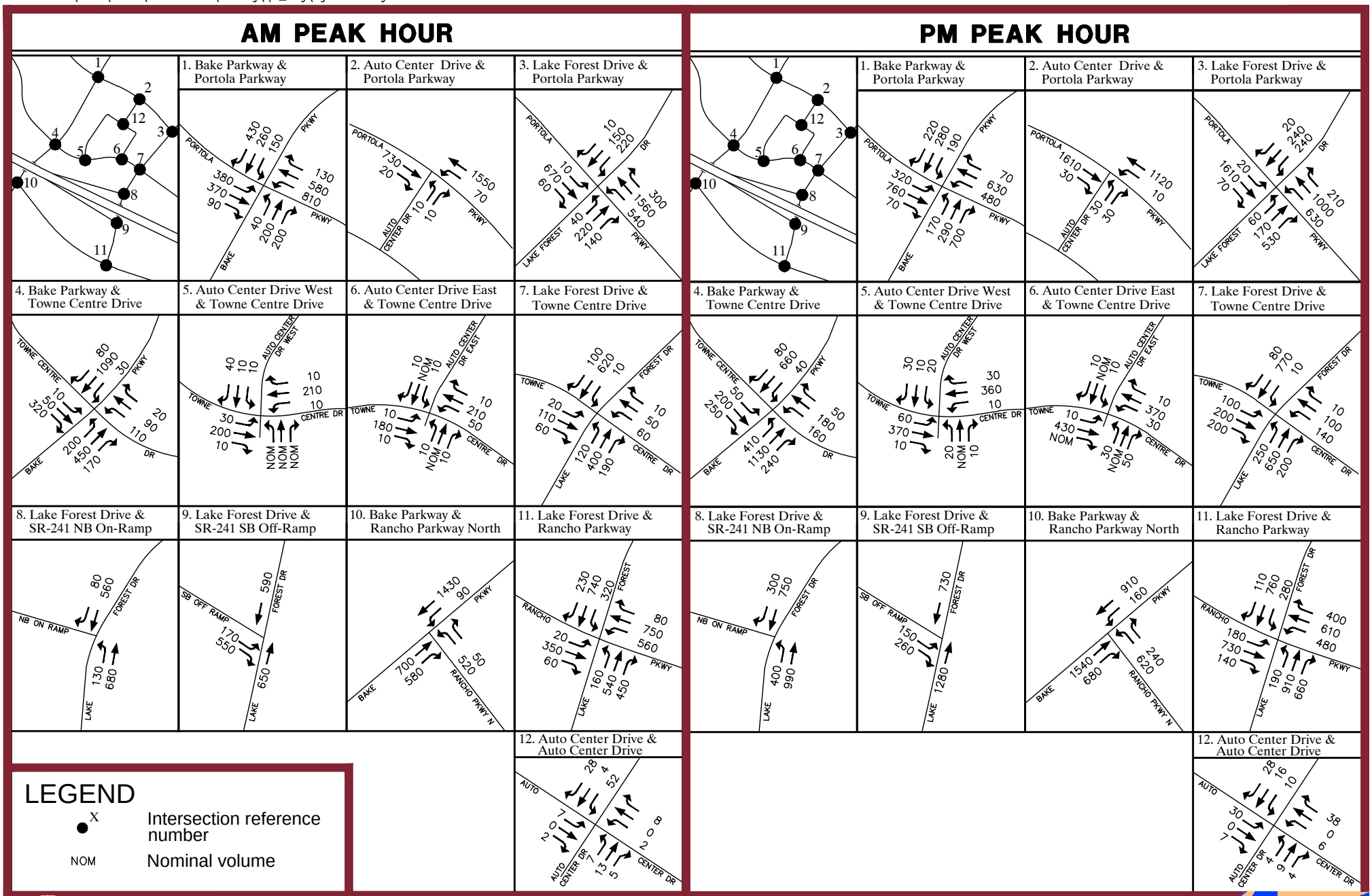

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2030 Peak Hour Volumes
- No-Project

Figure 5-2

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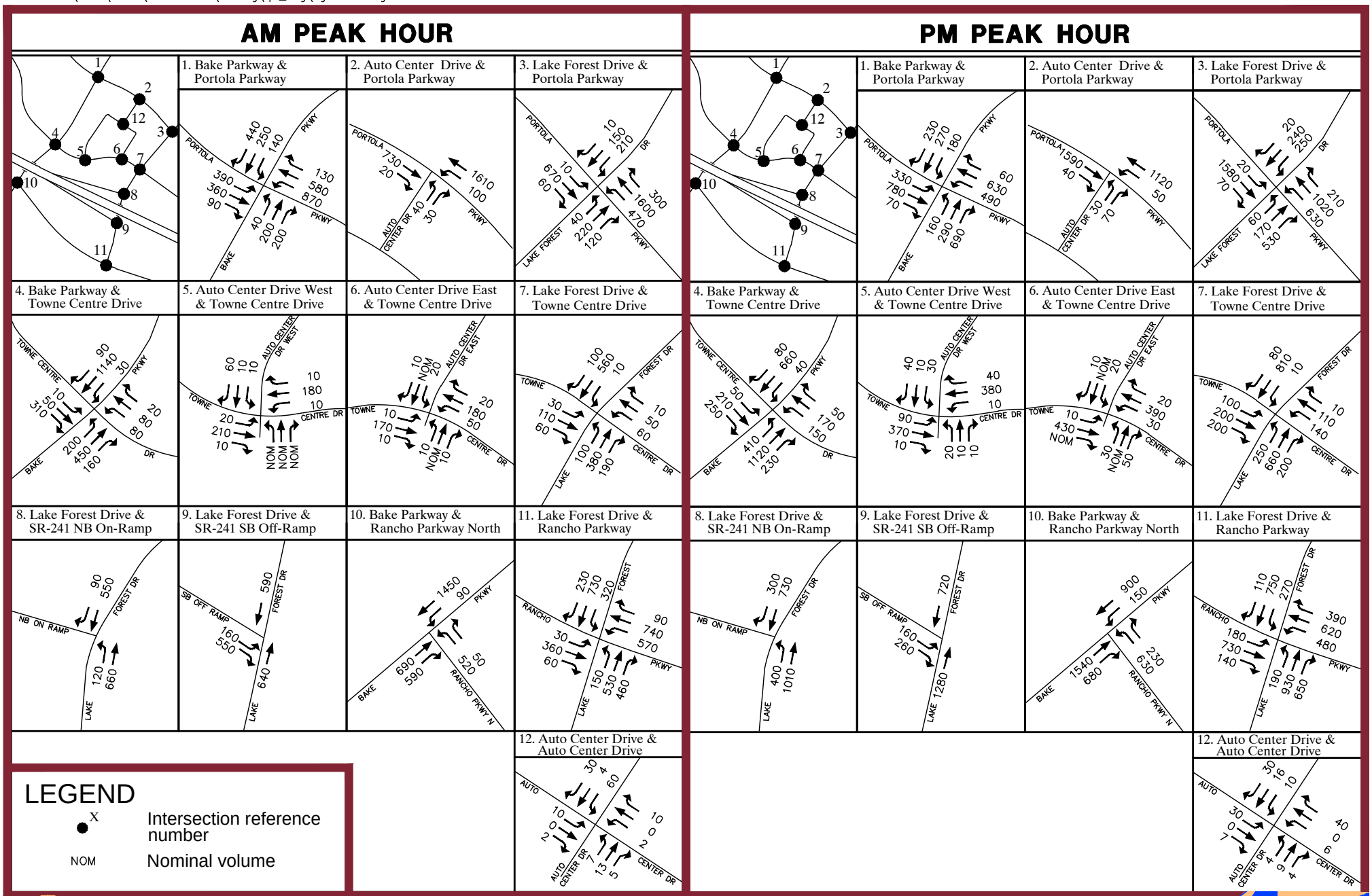

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2030 Peak Hour Volumes - With-Project

Figure 5-3

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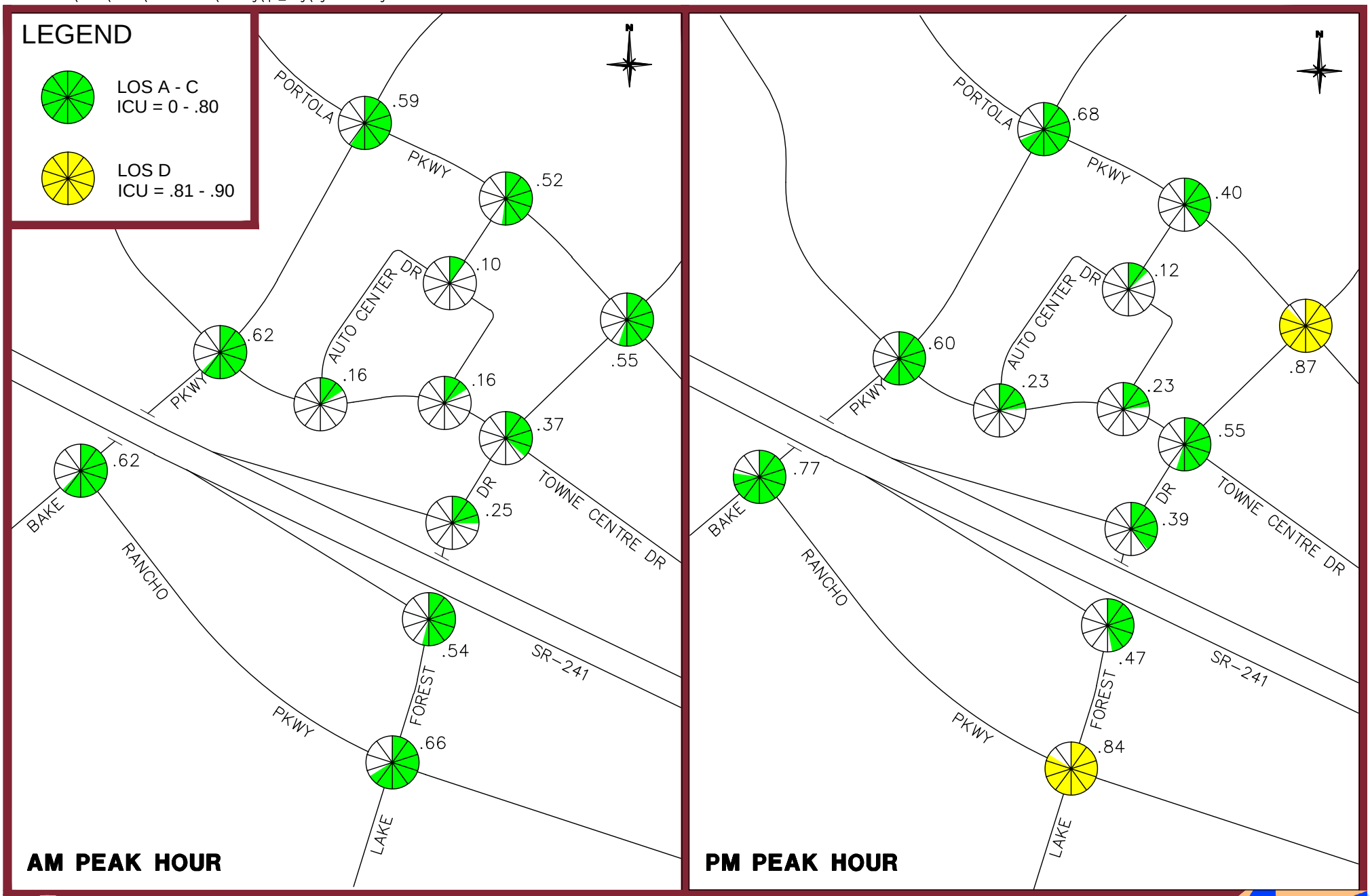

2030 Peak Hour Level of Service (LOS)
- No-Project

Figure 5-4

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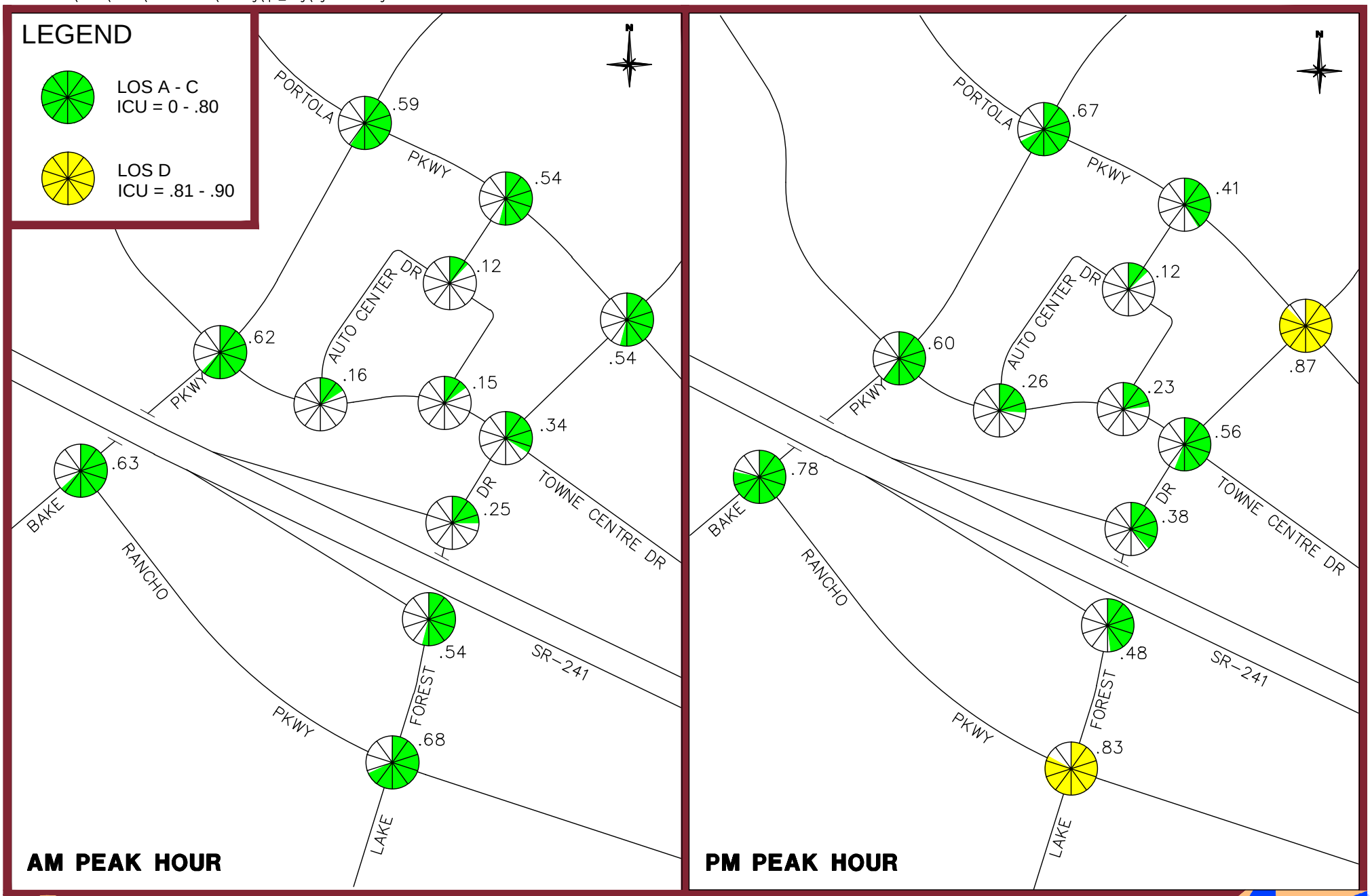


2030 Peak Hour Level of Service (LOS)
- With-Project

Figure 5-5

Table 5-1 2030 Intersection LOS Summary (ICU Methodology)

Intersection	2030 No-Project				2030 With-Project				Difference	
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	ICU	LOS	ICU	LOS	ICU	LOS	ICU	LOS	AM	PM
1. Bake & Portola	.59	A	.68	B	.59	A	.67	B	.00	-.01
2. Auto Center & Portola	.52	A	.40	A	.54	A	.41	A	.02	.01
3. Lake Forest & Portola	.55	A	.87	D	.54	A	.87	D	-.01	.00
4. Bake & Towne Centre	.62	B	.60	A	.62	B	.60	A	.00	.00
5. Auto Center W & Towne Centre	.16	A	.23	A	.16	A	.26	A	.00	.03
6. Auto Center E & Towne Centre	.16	A	.23	A	.15	A	.23	A	-.01	.00
7. Lake Forest & Towne Centre	.37	A	.55	A	.34	A	.56	A	-.03	.01
8. Lake Forest & SR-241 NB On-Ramp	.25	A	.39	A	.25	A	.38	A	.00	-.01
9. Lake Forest & SR-241 SB Off-Ramp	.54	A	.47	A	.54	A	.48	A	.00	.01
10. Bake & Rancho N	.62	B	.77	C	.63	B	.78	C	.01	.01
11. Lake Forest & Rancho	.66	B	.84	D	.68	B	.83	D	.02	-.01
12. Auto Center & Auto Center	.10	A	.12	A	.12	A	.12	A	.02	.00

Notes:

[1]See Intersection Location Map in Figure 5-3.

[2]See Table 1-2 for LOS ranges based on ICU.

Abbreviations: ICU – intersection capacity utilization
E,W,N – east, west, north
LOS – level of service
NB,SB – northbound, southbound

Table 5-2 2030 Intersection LOS Summary (HCM Delay Methodology)

Intersection	2030 No-Project				2030 With-Project				Difference	
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour			
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	AM	PM
5. Auto Center W & Towne Centre[3]	9.90	A	12.60	B	9.70	A	14.10	B	-.20	1.50
6. Auto Center E & Towne Centre[3]	11.10	B	14.60	B	11.60	B	17.30	C	.50	2.70
8. Lake Forest & SR-241 NB On-Ramp	4.00	A	7.40	A	4.10	A	7.40	A	.10	.00
9. Lake Forest & SR-241 SB Off-Ramp	18.90	B	10.30	B	18.90	B	10.40	B	.00	.10
12. Auto Center & Auto Center[3]	9.10	A	9.50	A	9.10	A	9.50	A	.00	.00

Notes:

[1]See Intersection Location Map in Figure 5-3.

[2]See Table 1-4 for LOS ranges based on delay in seconds.

[3]Assumed to be two-way stop-controlled, where LOS is based on the worst stop-controlled approach.

Abbreviations: E,W,N – east, west, north
LOS – level of service
NB,SB – northbound, southbound

6.0 Access Analysis

This chapter presents an analysis of the on-site access for the proposed residential project of 151 attached residential units ("condominiums") in the Foothill Ranch Towne Centre area in the city of Lake Forest in Orange County, California (hereinafter referred to as the proposed project). Information provided will be specific site access information in support of the site plan analysis level of approval that will also serve as a basis for the design of project level roadways and intersections. The subjects covered include driveway access, lane geometry, left-turn storage requirements, gate stacking and signalization.

6.1 On-Site Volumes and Intersection Analysis

The proposed project can be seen in the site plan presented in Figure 6-1. Access to the project is provided at two gated driveways along Auto Center Drive. The main entry is a full access for residents and guests and is approximately 180 feet south of Portola Parkway. The secondary entry is also a full access and is approximately 640 feet from the main entry. However the secondary entry is only accessible by residents.

The analysis presented in this chapter is based on the worst-case scenario which is year 2030. The future average daily traffic (ADT), roadway midblock lanes, analysis intersections and lane configurations in this access analysis are illustrated in Figure 6-2. The project peak hour volumes and year 2030 with-project volumes are shown in Figure 6-3.

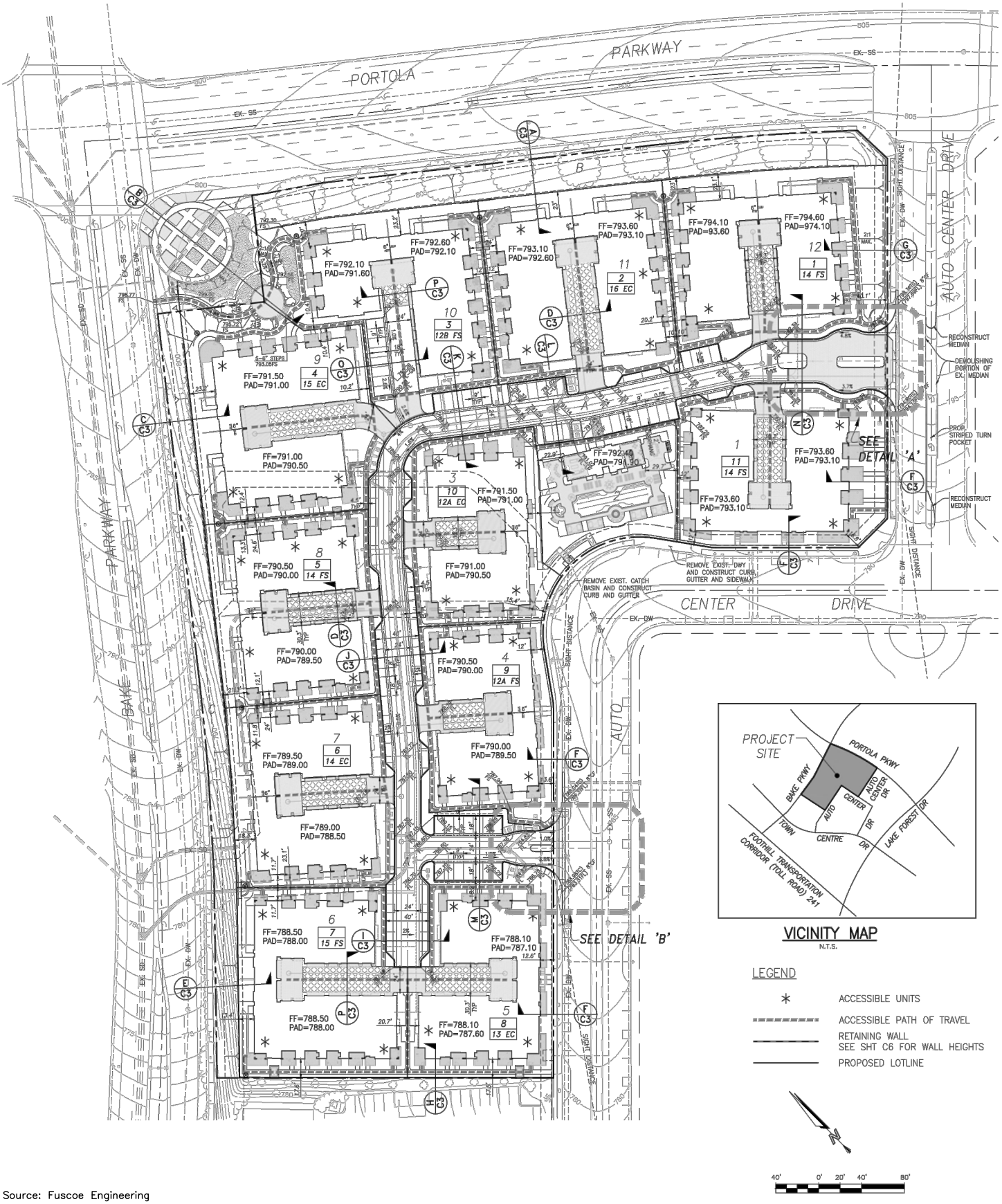
The intersection capacity utilization (ICU) values are summarized in Table 6-1. As can be seen in this table, all three locations with the project are operating at level of service (LOS) "A".

Since the three analysis intersections are unsignalized, the Highway Capacity Manual (HCM) delay methodology was also used to determine the LOS. The results based on delay are presented in Table 6-2. The table shows that all intersections are forecast to operate at LOS "A".

6.2 Signalization

Traffic signal warrants based on peak hour volumes as adopted by the Federal Highway Administration and Caltrans were used here to determine the need for signalization. In applying this warrant, the volumes of both the major and minor street must meet or exceed those shown on the curves in Figure 6-4 for conditions when the speed on the major street is 35 miles per hour (mph) or less which is assumed for Auto Center Drive.

Determining the major street approach for the signal warrant involves calculating the number of vehicles approaching the intersection on both major street legs. The highest total volume for either the continuous east and west approach or the north and south approach during either AM and PM is determined to be the major street approach for both peak hours. The minor street peak hour



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Proposed Project
Vesting Tentative Tract Map No.17446

Figure 6-1

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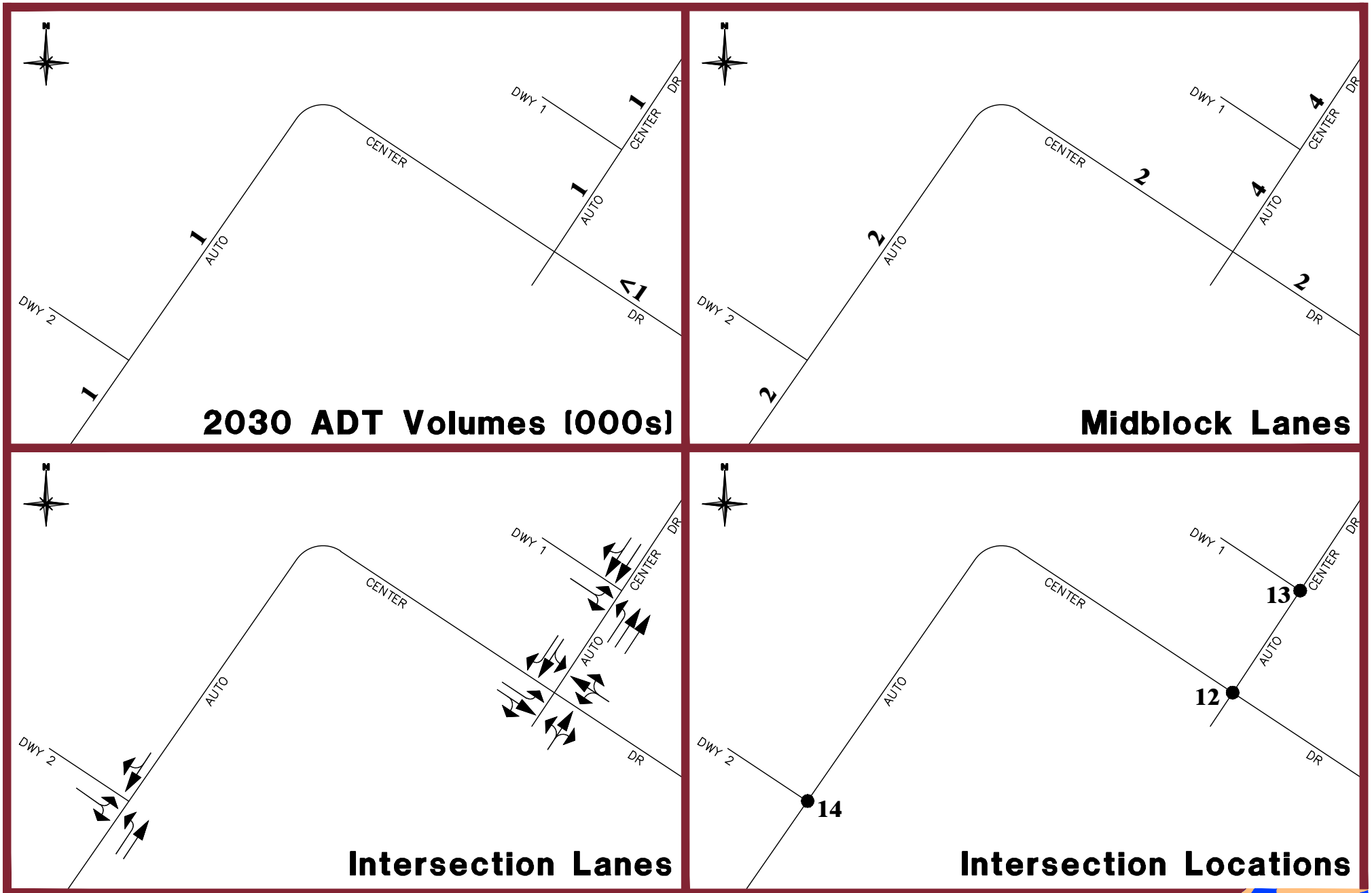

2030 With-Project ADT Volumes
and Transportation Setting

Figure 6-2

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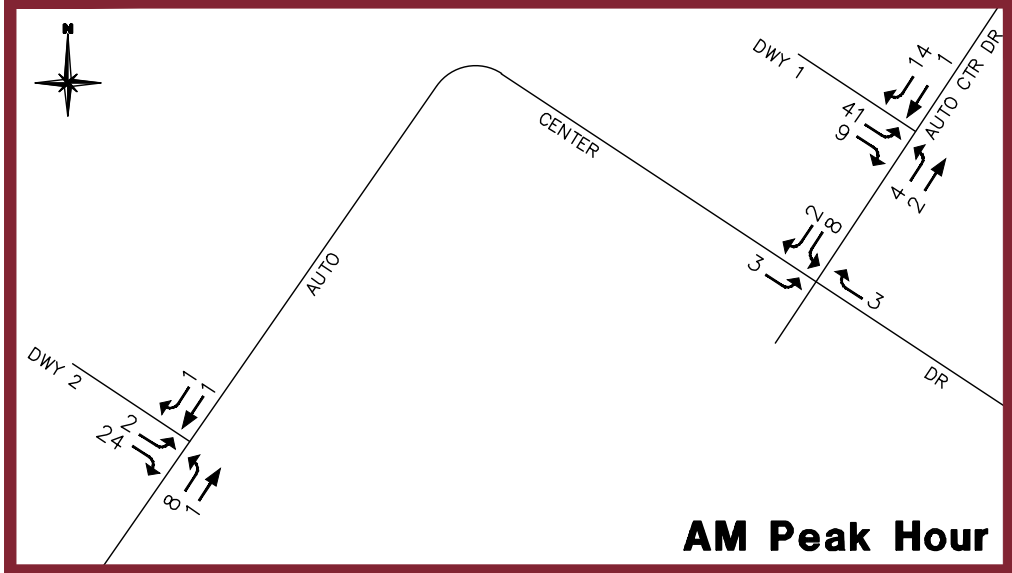
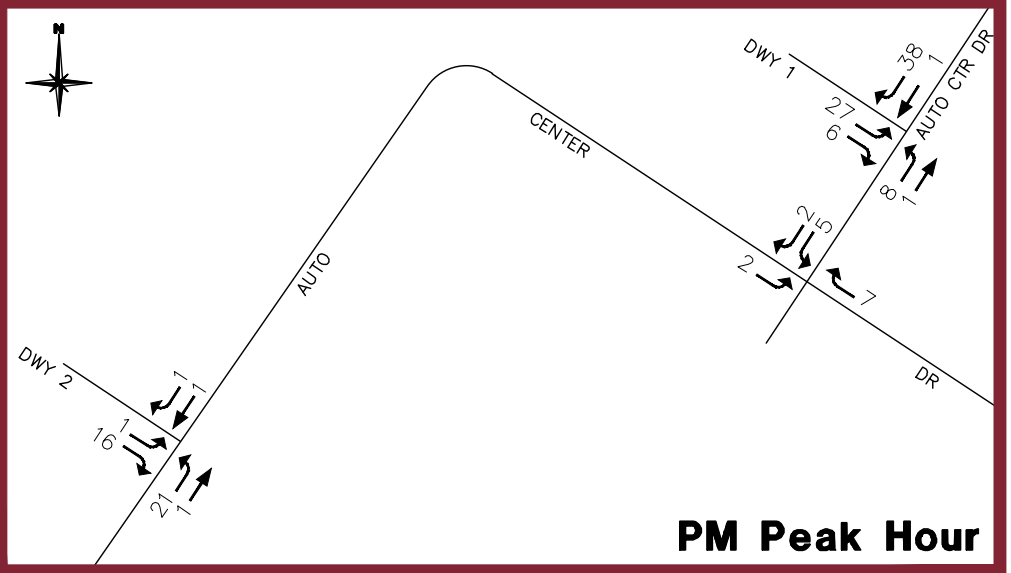
PROJECT VOLUMES

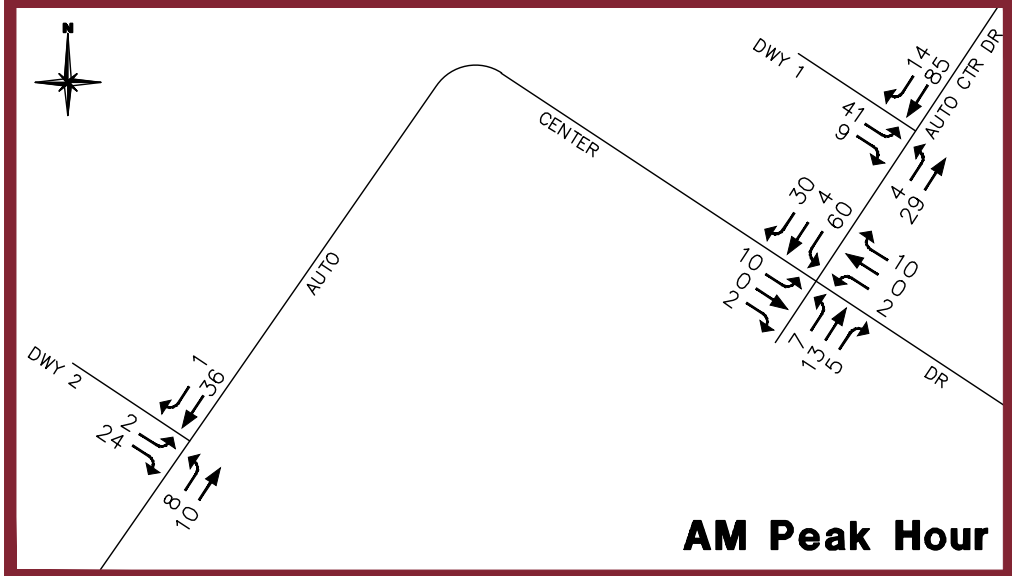


AM Peak Hour

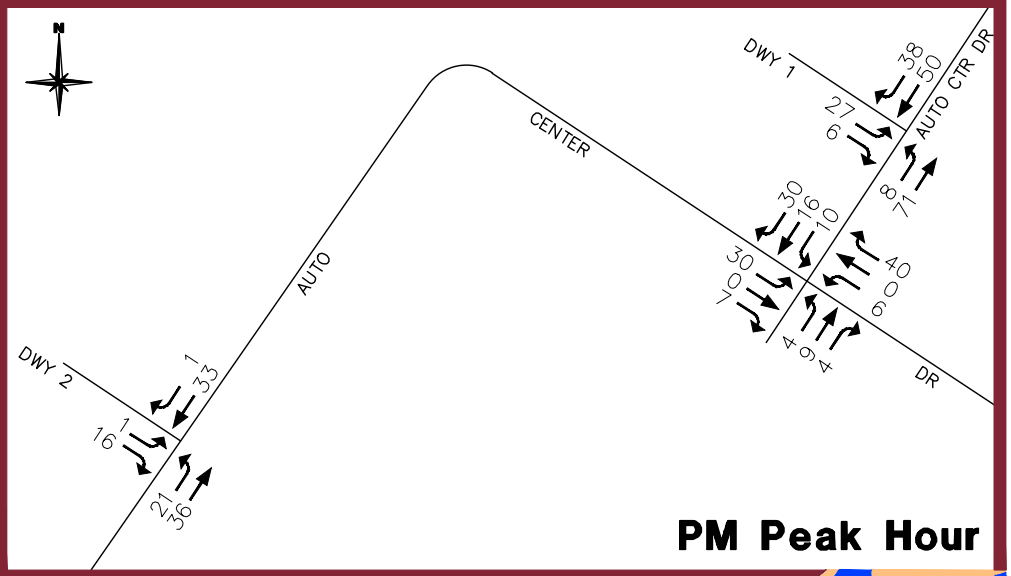


PM Peak Hour

2030 WITH-PROJECT VOLUMES



AM Peak Hour



PM Peak Hour

Stantec

Peak Hour Volumes

Figure 6-3

Table 6-1 2030 With-Project Intersection LOS Summary (ICU Methodology)

Intersection	AM Peak Hour		PM Peak Hour	
	ICU	LOS	ICU	LOS
12. Auto Center Dr & Auto Center Dr	.12	A	.13	A
13. Auto Center Dr & Driveway 1	.11	A	.10	A
14. Auto Center Dr & Driveway 2	.09	A	.09	A

Table 6-2 2030 With-Project Intersection LOS Summary (HCM Delay Methodology)

Intersection	AM Peak Hour		PM Peak Hour	
	Delay(sec)	LOS	Delay(sec)	LOS
12. Auto Center Dr & Auto Center Dr	9.10	A	9.50	A
13. Auto Center Dr & Driveway 1	9.40	A	9.30	A
14. Auto Center Dr & Driveway 2	8.60	A	8.60	A

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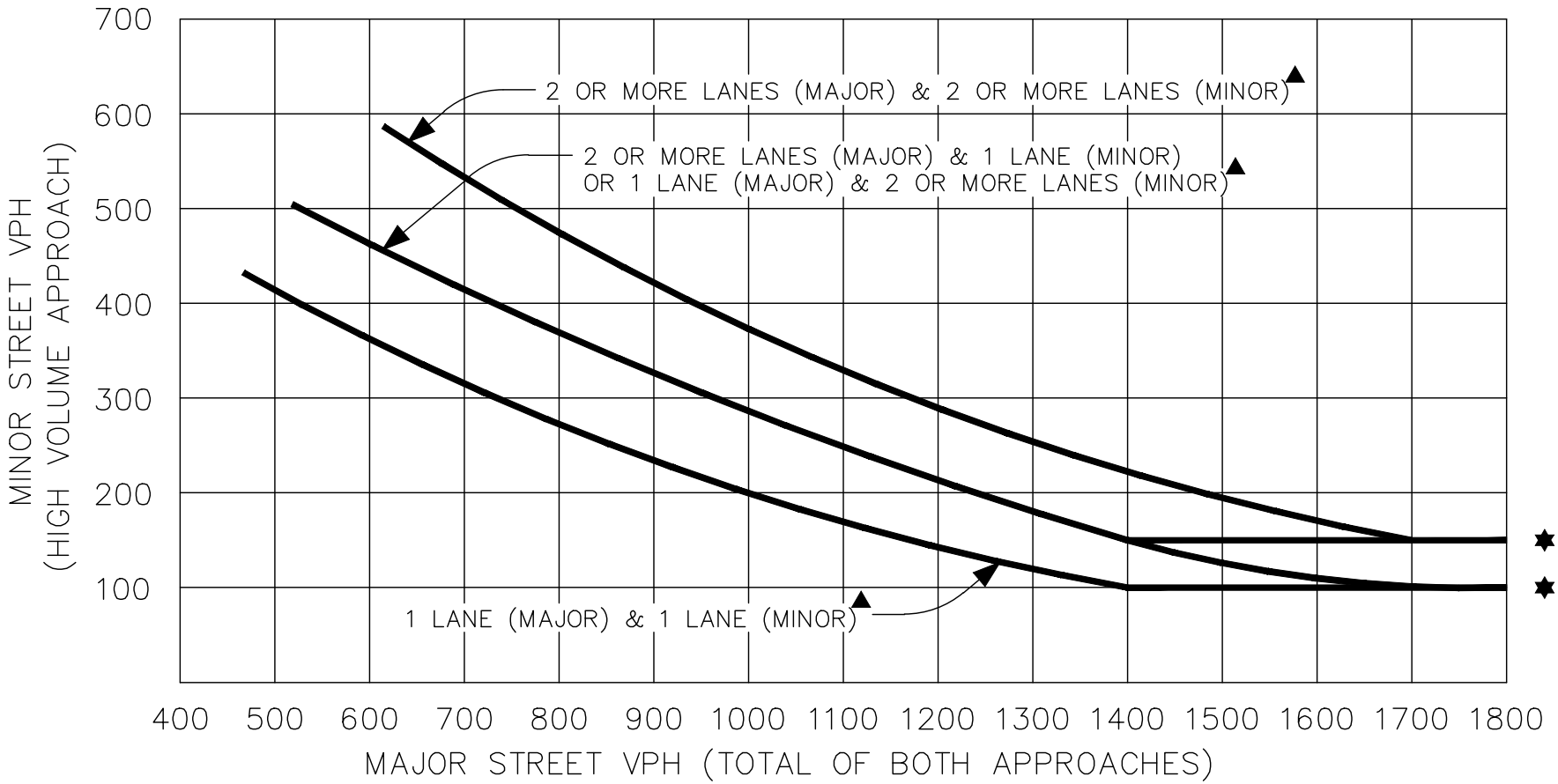

▲ NOTE: THESE CURVES ARE RECOMMENDED FOR USE IN AREAS OF URBAN CLASSIFICATION (i.e. POSTED SPEED LIMIT ON THE MAJOR STREET IS 70 km/h or 35 MPH OR LESS).

✸ NOTE: 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES, AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH ONE LANE.

Source: MUTCD – Figure 4C-3

Stantec

Peak Hour Volume Warrant
(Lower Speeds/Urban Areas)

Figure 6-4

signal warrant volume is the number of peak hour vehicles approaching the intersection on only the highest volume leg. The highest volume for either the AM or PM determines the minor approach for both peak hours.

The signal warrant analysis has been carried out for all three intersections analyzed here using the approach volumes previously presented in Figure 6-3. The signal warrant analysis for 2030 with project conditions is summarized in Table 6-3, and based on the application of the warrant, no intersection requires traffic signals. Typically, signals are not installed until signal warrants are met.

6.3 Left-Turn Storage

Left-turn pocket lengths at the study area intersections along Auto Center Drive with exclusive left-turn lanes were estimated based on the highest peak hour volume under year 2030 conditions previously presented in Figure 6-3. Although not the case here, where pocket lengths exceed the standard 150 feet for public roadways or 90 feet for private access, the length is based on one foot per peak hour left-turn volume (highest of AM and PM) and rounded into increments of 10. The worst-case estimated left-turn storage length requirements for the intersections analyzed are summarized in Table 6-4.

As can be seen from the table, the existing eastbound left-turn pocket of 150 feet on Auto Center Drive at Auto Center Drive is adequate to accommodate the estimated volume of 50 peak hour trips (PM). This is based on vehicle storage requirements, and is thereby exclusive of a transition length (typically, 90 feet). The two-way left-turn lane along Auto Center Drive is adequate to accommodate the estimated 21 peak hour trips (PM) at the secondary entry.

6.4 Main Entry Access

The main entry for the project site (referred to as Auto Center Drive at Driveway 1) is a full access to residents and guests and is approximately 180 feet south of Portola Parkway. In order to accommodate this full project access, changes are necessary to the median along Auto Center Drive. Figure 6-5 presents the conceptual striping plan that reflects these necessary changes.

A review of the volumes in Figure 6-3 indicates that during the peak hours (AM and PM) a modest volume of traffic is expected which is well within the available roadway capacity. For example, the peak hour flow rate of through traffic on Auto Center Drive is 99 (85 through plus 14 right-turns in the AM peak hour) vehicles per hour (vph). As a comparison, the capacity of Auto Center Drive is 3,400 vph (1,700 vph for each of the two travel lanes). As a result, the worst-case peak hour volume flow rate is less than five percent of the capacity of the roadway. This also means that ample gaps for traffic to turn into or out of the main entry will occur since the through traffic on Auto Center Drive will only be one vehicle every 35 to 40 seconds. The gaps suitable to accommodate left turning traffic into the main entry need to be four to six seconds long for

Table 6-3 2030 Peak Hour Signal Warrant Summary

Intersection (North/South Rd & East/West Rd)	Direction	AM Peak Hour	PM Peak Hour
12. Auto Center Drive (Major) & Auto Center Drive (Minor)			
Major Approach	Northbound	25	17
	Southbound	94	56
	Total	119	73
Minor Approach	Westbound	12	46
Satisfies Warrant (Lower Speeds/ Urban Areas)?		No	No
13. Auto Center Drive (Major) & Driveway 1 (Minor)			
Major Approach	Northbound	33	79
	Southbound	99	88
	Total	132	167
Minor Approach	Eastbound	50	33
Satisfies Warrant (Lower Speeds/ Urban Areas)?		No	No
14. Auto Center Drive (Major) & Driveway 2 (Minor)			
Major Approach	Northbound	18	57
	Southbound	37	34
	Total	55	91
Minor Approach	Eastbound	26	17
Satisfies Warrant (Lower Speeds/ Urban Areas)?		No	No

Table 6-4 2030 Left-Turn Storage Length Requirements

Intersection (N/S Rd & E/W Rd)	Movement	Peak Hour	Volume	Lanes	Volume/Lane	Length
12. Auto Center Drive	EBL	PM	30	1	30	150'
& Auto Center Drive						
13. Auto Center Drive	NBL	PM	8	1	8	90'
& Driveway 1						
14. Auto Center Drive	NBL	PM	21	1	21	90'
& Driveway 2						

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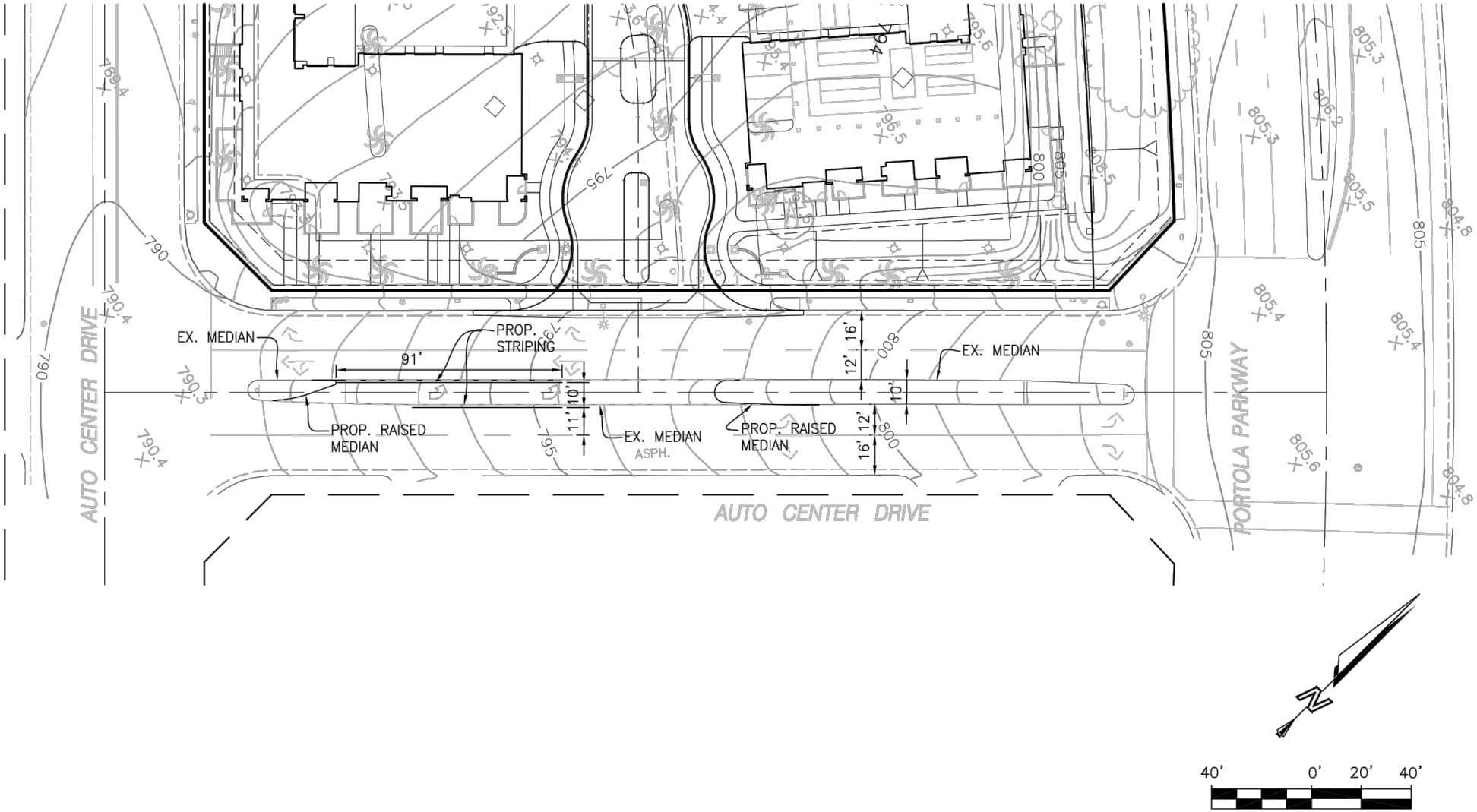


Source: Fuscoe Engineering

Stantec

Auto Center Drive Median Changes

Figure 6-5

motorists to feel safe to complete their turning movements. For exiting left turns, motorists typically seek 7.5 to 8 second gaps to comfortably feel safe in entering the traffic stream.

As previously mentioned, the site plan shows that there is enough storage to allow northbound left-turns into the project site on Auto Center Drive at the main entry. In addition, as indicated by traffic data previously presented there is adequate spacing between the intersection at Portola Parkway and the project access to accommodate the northbound left-turns on Auto Center Drive at Portola Parkway intersection so that traffic would not back up to block the project access. Using the projected PM peak hour traffic volumes as a worst case scenario, there will also be adequate green time allocated for the northbound traffic volume (100) on Auto Center Drive at Portola Parkway (a t-intersection) to clear the intersection without impeding the ability of project traffic to make left-turns out of the project main entry.

The theoretical volume to capacity (V/C) ratio for the intersection of Auto Center Drive/Auto Center Drive as previously presented is 0.12 (level of service (LOS) A). For simplicity, the ICU methodology used in this calculation assumes that the intersection is signalized. As a worst-case and assuming this intersection was controlled by an all-way stop control, the V/C ratio will double to around 0.25 but the LOS will remain an A.

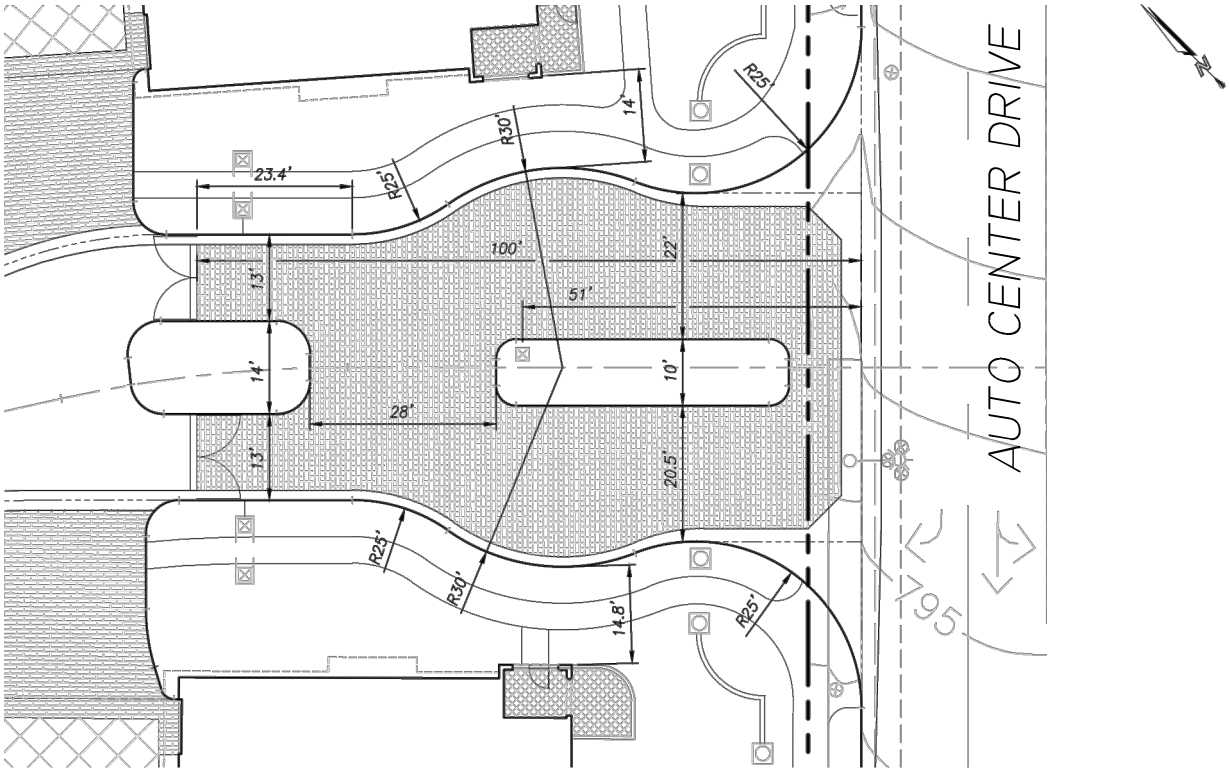
6.5 Gated Access

The project site is proposed to be accessed by two gated entries (see Figure 6-6). The locations of the proposed gates were previously shown in the site plan for Tentative Tract No. 17446 in Figure 6-1.

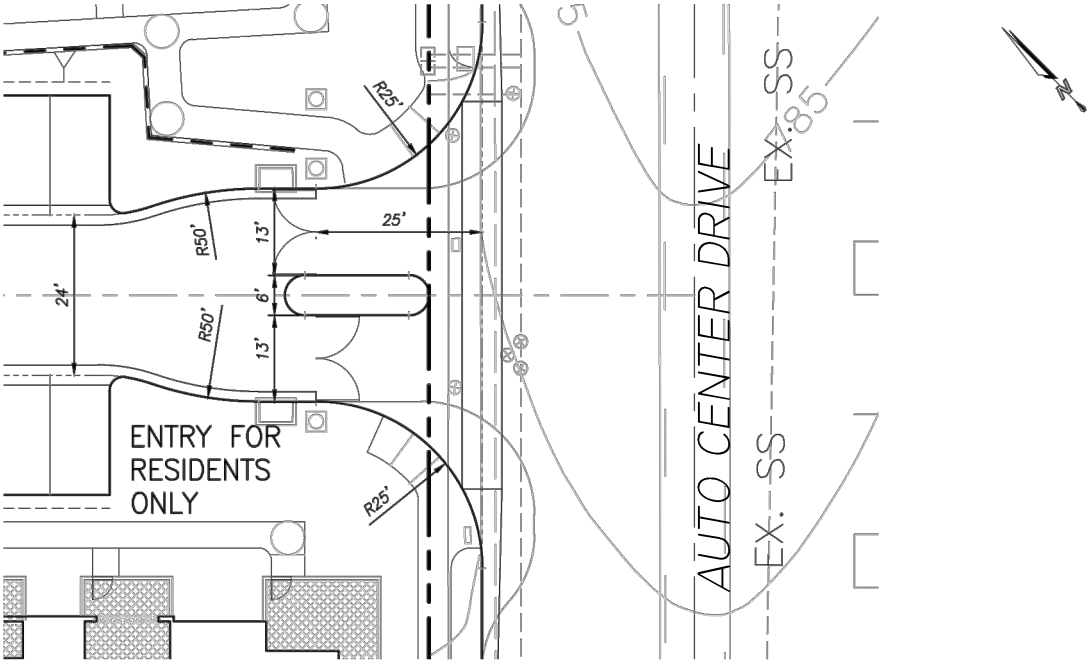
The vehicle stacking distance behind the gate is a function of the number of residences within the project. The Orange County Resources and Development Management Department Standard Plan 1107 requires one foot of stacking per dwelling unit served. The storage area is measured from curb line of gate to adjacent public street (Auto Center Drive). Multiple lanes are allowed to satisfy the storage distance. Also when multiple entries are provided, the total project storage can be spread accordingly. It should be noted that the storage area for an entry lane adjacent to a call box should be measured from the call box to curb line of the adjacent public street.

The proposed project includes 151 attached residential units ("condominiums"). Based on the number of units (151) and the Orange County Standard Plan 1107, the storage length recommended is 151 feet, which is the total stacking requirement. Also multiple entry lanes will reduce the actual stacking requirements behind each gate.

Access Entry A (Primary Entry)



Access Entry B (Secondary Entry)



Source: Fuscoe Engineering

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Stantec

Proposed Project Entries

Figure 6-6

Review of the site plan shows that the lengths provided as summarized below are adequate for the design of the entries.

Main Entry	100 feet (one entry lane) 51 feet (de facto second entry lane measured from call box)
Secondary Entry	25 feet

7.0 Findings and Conclusions

The traffic impacts of the proposed residential project in the Foothill Ranch Towne Centre area in the city of Lake Forest in Orange County, California were identified by analyzing the traffic conditions for the study area circulation system based on three time frames: existing, 2015 and 2030 future traffic conditions. In each case, traffic conditions under no-project and with-project were compared to identify the potential traffic impacts of the project. The project site remains as existing (i.e., auto dealer use) under future (2015 and 2030) no-project conditions, and the proposed project change to residential is assumed to be fully developed under existing-plus-project and future year 2015 and 2030 with-project conditions.

The two future settings (2015 and 2030) are based on the existing circulation system plus improvements that are planned to be in place in each future time frame and the land use and development growth that is projected in each future time frame.

The circulation system performance criteria applied in the analysis are based on level of service (LOS) calculation methodologies and performance standards for intersections that have been used by previous reports in the city of Lake Forest including the Vacant Land Opportunities Study Area.

The results of the existing, year 2015 and year 2030 project impact analysis, which are summarized in detail in Chapters 3.0 through 5.0 of this report, indicate that the proposed project is not forecast to significantly impact any intersections in the study area. Therefore no project mitigation measures are required The intersection LOS summaries presented in each chapter indicated that enough capacity is available to accommodate the proposed project with all intersections operating at LOS "D" or better in the study area.

The results of the analysis presented in Chapter 6.0 indicate that the proposed project meets the requirements for site access including the lane geometry at the main entry. Adequate design of the project access driveways, including the addition of an all access main entry just south of Portola Parkway, will accommodate the proposed residential project with no adverse traffic conditions on the local circulation system.

Appendix A

Intersection Capacity Utilization (ICU) Worksheets

Appendix A Intersection Capacity Utilization (ICU) Worksheets

This appendix summarizes information pertaining to the intersection analysis portion of the traffic study for the proposed project. Intersection location reference map is provided in Figure A-1 for the project study area. The AM and PM peak hour intersection capacity utilization (ICU) worksheets for existing and future traffic analysis scenarios analyzed in the study area are presented in the following order by intersection:

ICU Data Scenarios

1. Existing Counts
2. Existing-Plus-Project
3. 2015 No-Project
4. 2015 With-Project
5. 2030 No-Project
6. 2030 With-Project

ICU Calculation Methodology

The ICU calculation procedure is based on a critical movement methodology that shows the amount of capacity utilized by each critical movement at an intersection. A capacity of 1,700 vehicles per hour per lane is assumed together with a .05 clearance interval. A "de facto" right-turn lane is used in the ICU calculation for cases where a curb lane is wide enough to separately serve both through and right-turn traffic (typically with a width of 19 feet or more from curb to outside of through-lane with parking prohibited during peak periods). Such lanes are treated the same as striped right-turn lanes during the ICU calculations, but they are denoted on the ICU calculation worksheets using the letter "d" in place of a numerical entry for right-turn lanes.

The methodology also incorporates a check for right-turn capacity utilization. Both right-turn-on-green (RTOG) and right-turn-on-red (RTOR) capacity availability are calculated and checked against the total right-turn capacity need. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The following example shows how this adjustment is made.

Example for Northbound Right

1. Right-Turn-On-Green (RTOG)

If NBT is critical move, then:
RTOG = V/C (NBT)
Otherwise,
RTOG = V/C (NBL) + V/C (SBT) - V/C (SBL)

2. Right-Turn-On-Red (RTOR)

If WBL is critical move, then:
RTOR = V/C (WBL)
Otherwise,
RTOR = V/C (EBL) + V/C (WBT) - V/C (EBT)

3. Right-Turn Overlap Adjustment

If the northbound right is assumed to overlap with the adjacent westbound left, adjustments to the RTOG and RTOR values are made as follows:

RTOG = RTOG + V/C (WBL)
RTOR = RTOR - V/C (WBL)

4. Total Right-Turn Capacity (RTC) Availability For NBR

RTC = RTOG + factor x RTOR
Where factor = RTOR saturation flow factor (75%)

Right-turn adjustment is then as follows: Additional ICU = V/C (NBR) – RTC

A zero or negative value indicates that adequate capacity is available and no adjustment is necessary. A positive value indicates that the available RTOR and RTOG capacity does not adequately accommodate the right-turn V/C, therefore the right-turn is essentially considered to be a critical movement. In such cases, the right-turn adjustment is noted on the ICU worksheet and it is included in the total capacity utilization value. When it is determined that a right-turn adjustment is required for more than one right-turn movement, the word "multi" is printed on the worksheet instead of an actual right-turn movement reference, and the right-turn adjustments are cumulatively added to the total capacity utilization value. In such cases, further operational evaluation is typically carried out to determine if under actual operational conditions, the critical right-turns would operate simultaneously, and therefore a right-turn adjustment credit should be applied.

Shared Lane V/C Methodology

For intersection approaches where shared usage of a lane is permitted by more than one turn movement (e.g., left/through, through/right, left/through/right), the individual turn volumes are evaluated to determine whether dedication of the shared lane is warranted to any one given turn movement. The following example demonstrates how this evaluation is carried out:

Example for Shared Left/Through Lane

1. Average Lane Volume (ALV)

$$ALV = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Lanes (including shared lane)}}$$

2. ALV for Each Approach

$$ALV\ (Left) = \frac{\text{Left-Turn Volume}}{\text{Left Approach Lanes (including shared lane)}}$$

$$ALV\ (Through) = \frac{\text{Through Volume}}{\text{Through Approach Lanes (including shared lane)}}$$

3. Lane Dedication is Warranted

If ALV (Left) is greater than ALV then full dedication of the shared lane to the left-turn approach is warranted. Left-turn and through V/C ratios for this case are calculated as follows:

$$V/C\ (Left) = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (including shared lane)}}$$

$$V/C\ (Through) = \frac{\text{Through Volume}}{\text{Through Approach Capacity (excluding shared lane)}}$$

Similarly, if ALV (Through) is greater than ALV then full dedication to the through approach is warranted, and left-turn and through V/C ratios are calculated as follows:

$$V/C\ (Left) = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (excluding shared lane)}}$$

$$V/C\ (Through) = \frac{\text{Through Volume}}{\text{Through Approach Capacity (including shared lane)}}$$

4. Lane Dedication is not Warranted

If ALV (Left) and ALV (Through) are both less than ALV, the left/through lane is assumed to be truly shared and each left, left/through or through approach lane carries an evenly distributed volume of traffic equal to ALV. A combined left/through V/C ratio is calculated as follows:

$$\text{V/C (Left/Through)} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Capacity (including shared lane)}}$$

This V/C (Left/Through) ratio is assigned as the V/C (Through) ratio for the critical movement analysis and ICU summary listing.

If split phasing has not been designated for this approach, the relative proportion of V/C (Through) that is attributed to the left-turn volume is estimated as follows:

If approach has more than one left-turn (including shared lane), then:

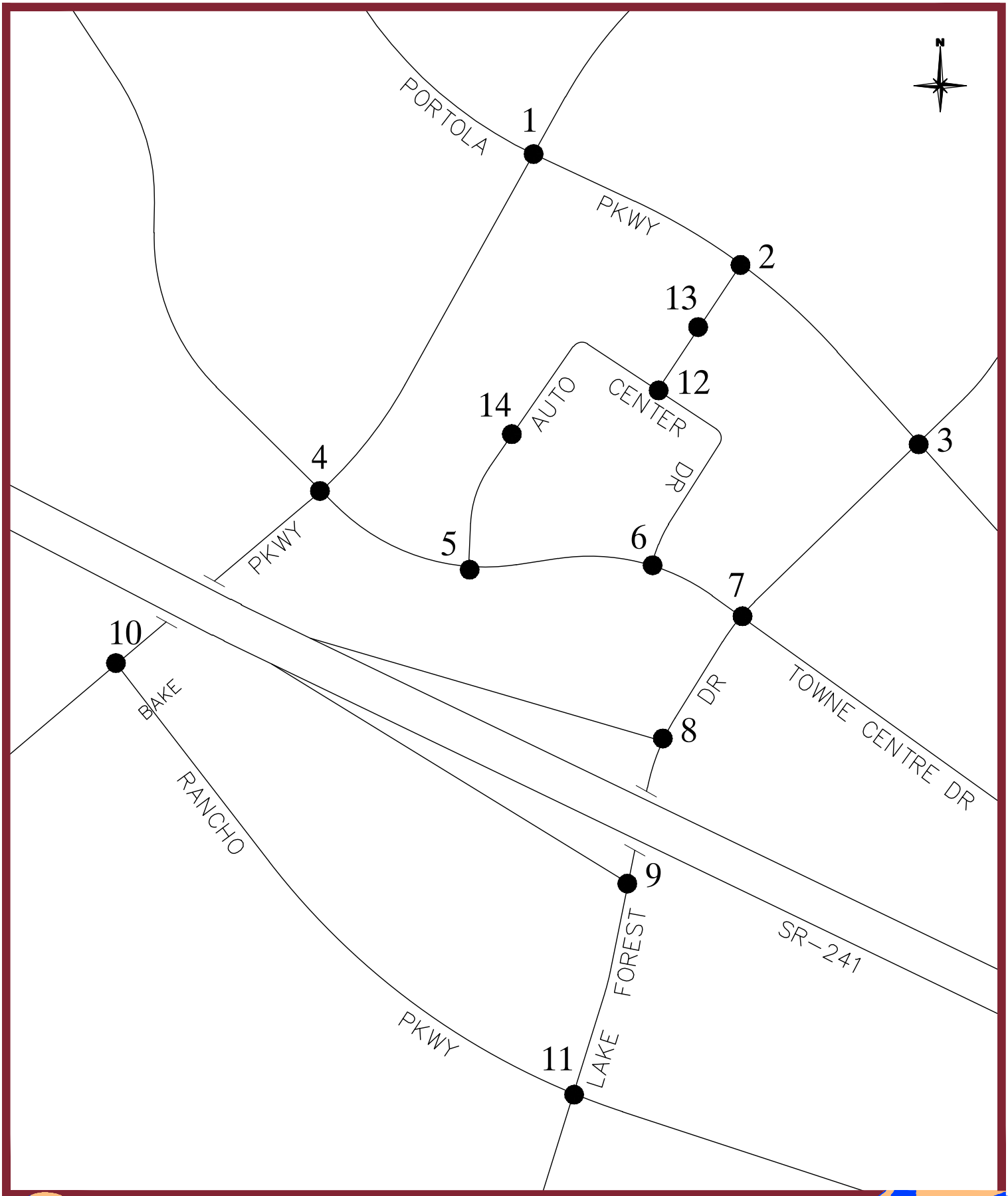
V/C (Left) = V/C (Through)

If approach has only one left-turn lane (shared lane), then:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Single Approach Lane Capacity}}$$

If this left-turn movement is determined to be a critical movement, the V/C (Left) value is posted in brackets on the ICU summary printout.

These same steps are carried out for shared through/right lanes. If full dedication of a shared through/right lane to the right-turn movement is warranted, the right-turn V/C value calculated in step three is checked against the RTOR and RTOG capacity. When an approach contains more than one shared lane (e.g., left/through and through/right), steps one and two listed above are carried out for the three turn movements combined. Step four is carried out if dedication is not warranted for either of the shared lanes. If dedication of one of the shared lanes is warranted to one movement or another, step three is carried out for the two movements involved, and then steps one through four are repeated for the two movements involved in the other shared lane.



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Intersection Location Map

Figure A-1

1. Bake & Portola

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	62	.04*	271	.16*
NBT	1.5	5100	174	{.05}	336	{.15}
NBR	1.5		256		642	
SBL	1	1700	120	.07	160	.09
SBT	2	3400	387	.11*	292	.09*
SBR	d	1700	220	.13	134	.08
EBL	1	1700	267	.16	181	.11*
EBT	3	5100	255	.05*	486	.10
EBR	d	1700	252	.15	139	.08
WBL	2	3400	730	.21*	459	.14
WBT	2	3400	320	.09	499	.15*
WBR	d	1700	60	.04	49	.03
Right Turn Adjustment			EBR	.07*		
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.53**		**.56**

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	69	.04*	266	.16
NBT	1.5	5100	177	{.05}	335	{.15}*
NBR	1.5		244		636	
SBL	1	1700	134	.08	167	.10*
SBT	2	3400	392	.12*	290	.09
SBR	d	1700	215	.13	136	.08
EBL	1	1700	271	.16*	182	.11*
EBT	3	5100	261	.05	506	.10
EBR	d	1700	241	.14	139	.08
WBL	2	3400	729	.21	488	.14
WBT	2	3400	336	.10*	492	.14*
WBR	d	1700	68	.04	63	.04
Right Turn Adjustment			EBR	.06*		
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.53**		**.55**

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	30	.02	150	.09
NBT	1.5	5100	170	{.05}*	280	{.13}*
NBR	1.5		200		630	
SBL	1	1700	160	.09*	180	.11*
SBT	2	3400	250	.07	260	.08
SBR	d	1700	370	.22	180	.11
EBL	1	1700	300	.18*	250	.15*
EBT	3	5100	370	.07	650	.13
EBR	d	1700	60	.04	60	.04
WBL	2	3400	770	.23	470	.14
WBT	2	3400	480	.14*	580	.17*
WBR	d	1700	70	.04	140	.08
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.51**		**.61**

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	30	.02	150	.09
NBT	1.5	5100	170	{.05}*	300	{.13}*
NBR	1.5		200		630	
SBL	1	1700	150	.09*	180	.11*
SBT	2	3400	270	.08	270	.08
SBR	d	1700	370	.22	180	.11
EBL	1	1700	310	.18*	270	.16*
EBT	3	5100	370	.07	660	.13
EBR	d	1700	50	.03	60	.04
WBL	2	3400	770	.23	470	.14
WBT	2	3400	480	.14*	570	.17*
WBR	d	1700	70	.04	140	.08
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.51**		**.62**

1. Bake & Portola

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	40	.02	170	.10
NBT	1.5	5100	200	{.06}*	290	{.14}*
NBR	1.5		200		700	
SBL	1	1700	150	.09*	190	.11*
SBT	2	3400	260	.08	280	.08
SBR	d	1700	430	.25	220	.13
EBL	1	1700	380	.22*	320	.19*
EBT	3	5100	370	.07	760	.15
EBR	d	1700	90	.05	70	.04
WBL	2	3400	810	.24	480	.14
WBT	2	3400	580	.17*	630	.19*
WBR	d	1700	130	.08	70	.04
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.59**		**.68**

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	40	.02	160	.09
NBT	1.5	5100	200	{.06}*	290	{.13}*
NBR	1.5		200		690	
SBL	1	1700	140	.08*	180	.11*
SBT	2	3400	250	.07	270	.08
SBR	d	1700	440	.26	230	.14
EBL	1	1700	390	.23*	330	.19*
EBT	3	5100	360	.07	780	.15
EBR	d	1700	90	.05	70	.04
WBL	2	3400	870	.26	490	.14
WBT	2	3400	580	.17*	630	.19*
WBR	d	1700	130	.08	60	.04
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.59**		**.67**

2. Auto Center & Portola

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	1	.00	7	.00
NBT	0	0	0		0	
NBR	1	1700	10	.01	61	.04
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5100	675	.13	1290	.25
EBR	d	1700	4	.00	7	.00
WBL	1	1700	94	.06	30	.02
WBT	2	3400	1129	.33*	974	.29*
WBR	0	0	0		0	
Right Turn Adjustment					NBR	.01*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.38**		**.35**

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	35	.02*	30	.02*
NBT	0	0	0		0	
NBR	1	1700	27	.02	71	.04
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5100	668	.13	1278	.25
EBR	d	1700	20	.01	41	.02
WBL	1	1700	100	.06	45	.03
WBT	2	3400	1119	.33*	987	.29*
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.40**		**.36**

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	10	.01*	30	.02*
NBT	0	0	0		0	
NBR	1	1700	10	.01	60	.04
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5100	750	.15	1420	.28
EBR	d	1700	20	.01	30	.02
WBL	1	1700	90	.05	30	.02
WBT	2	3400	1350	.40*	1130	.33*
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.46**		**.40**

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	40	.02*	30	.02*
NBT	0	0	0		0	
NBR	1	1700	30	.02	70	.04
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5100	740	.15	1420	.28
EBR	d	1700	20	.01	40	.02
WBL	1	1700	100	.06	50	.03
WBT	2	3400	1350	.40*	1120	.33*
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.47**		**.40**

2. Auto Center & Portola

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	10	.01*	30	.02*
NBT	0	0	0		0	
NBR	1	1700	10	.01	30	.02
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5100	730	.14	1610	.32
EBR	d	1700	20	.01	30	.02
WBL	1	1700	70	.04	10	.01
WBT	2	3400	1550	.46*	1120	.33*
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.52**		**.40**

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	40	.02*	30	.02*
NBT	0	0	0		0	
NBR	1	1700	30	.02	70	.04
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	3	5100	730	.14	1590	.31*
EBR	d	1700	20	.01	40	.02
WBL	1	1700	100	.06	50	.03*
WBT	2	3400	1610	.47*	1120	.33
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.54**		**.41**

3. Lake Forest & Portola

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	42	.02	92	.05
NBT	2	3400	136	.04*	148	.04*
NBR	d	1700	191	.11	497	.29
SBL	1	1700	208	.12*	177	.10*
SBT	2	3400	198	.06	162	.05
SBR	d	1700	2	.00	11	.01
EBL	2	3400	9	.00	10	.00
EBT	3	5100	615	.12*	1297	.25*
EBR	d	1700	72	.04	83	.05
WBL	2	3400	440	.13*	410	.12*
WBT	3	5100	1173	.23	869	.17
WBR	d	1700	257	.15	161	.09
Right Turn Adjustment					NBR	.16*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.46**		**.72**

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	31	.02	84	.05
NBT	2	3400	133	.04*	154	.05*
NBR	d	1700	204	.12	493	.29
SBL	1	1700	201	.12*	174	.10*
SBT	2	3400	192	.06	158	.05
SBR	d	1700	1	.00	12	.01
EBL	2	3400	1	.00	15	.00
EBT	3	5100	613	.12*	1245	.24*
EBR	d	1700	77	.05	75	.04
WBL	2	3400	452	.13*	398	.12*
WBT	3	5100	1125	.22	871	.17
WBR	d	1700	257	.15	163	.10
Right Turn Adjustment					NBR	.15*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.46**		**.71**

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	40	.02	100	.06
NBT	2	3400	130	.04*	70	.02*
NBR	d	1700	190	.11	470	.28
SBL	1	1700	240	.14*	180	.11*
SBT	2	3400	140	.04	170	.05
SBR	d	1700	10	.01	20	.01
EBL	2	3400	20	.01	10	.00
EBT	3	5100	680	.13*	1430	.28*
EBR	d	1700	70	.04	60	.04
WBL	2	3400	570	.17*	570	.17*
WBT	3	5100	1360	.27	980	.19
WBR	d	1700	270	.16	190	.11
Right Turn Adjustment					NBR	.13*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.53**		**.76**

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	40	.02	100	.06
NBT	2	3400	130	.04*	70	.02*
NBR	d	1700	210	.12	480	.28
SBL	1	1700	240	.14*	190	.11*
SBT	2	3400	130	.04	160	.05
SBR	d	1700	10	.01	20	.01
EBL	2	3400	10	.00	10	.00
EBT	3	5100	680	.13*	1420	.28*
EBR	d	1700	60	.04	60	.04
WBL	2	3400	560	.16*	570	.17*
WBT	3	5100	1350	.26	970	.19
WBR	d	1700	270	.16	200	.12
Right Turn Adjustment					NBR	.13*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.52**		**.76**

3. Lake Forest & Portola

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	40	.02	60	.04
NBT	2	3400	220	.06*	170	.05*
NBR	d	1700	140	.08	530	.31
SBL	1	1700	220	.13*	240	.14*
SBT	2	3400	150	.04	240	.07
SBR	d	1700	10	.01	20	.01
EBL	2	3400	10	.00	20	.01
EBT	3	5100	670	.13	1610	.32*
EBR	d	1700	60	.04	70	.04
WBL	2	3400	540	.16	630	.19*
WBT	3	5100	1560	.31*	1000	.20
WBR	d	1700	300	.18	210	.12
Right Turn Adjustment					NBR	.12*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.55**		**.87**

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	40	.02	60	.04
NBT	2	3400	220	.06*	170	.05*
NBR	d	1700	120	.07	530	.31
SBL	1	1700	210	.12*	250	.15*
SBT	2	3400	150	.04	240	.07
SBR	d	1700	10	.01	20	.01
EBL	2	3400	10	.00	20	.01
EBT	3	5100	670	.13	1580	.31*
EBR	d	1700	60	.04	70	.04
WBL	2	3400	470	.14	630	.19*
WBT	3	5100	1600	.31*	1020	.20
WBR	d	1700	300	.18	210	.12
Right Turn Adjustment					NBR	.12*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.54**		**.87**

4. Bake & Towne Centre

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	248	.07*	483	.14
NBT	2	3400	504	.15	1258	.37*
NBR	d	1700	144	.08	216	.13
SBL	2	3400	13	.00	24	.01*
SBT	2	3400	1358	.40*	725	.21
SBR	d	1700	60	.04	85	.05
EBL	1	1700	13	.01	42	.02
EBT	1	1700	49	.03*	175	.10*
EBR	1	1700	354	.21	331	.19
WBL	1	1700	44	.03*	117	.07*
WBT	2	3400	75	.03	168	.06
WBR	0	0	13		38	
Right Turn Adjustment			EBR	.11*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .69 .60

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	249	.07*	489	.14
NBT	2	3400	503	.15	1245	.37*
NBR	d	1700	139	.08	213	.13
SBL	2	3400	13	.00	24	.01*
SBT	2	3400	1357	.40*	749	.22
SBR	d	1700	55	.03	88	.05
EBL	1	1700	11	.01	46	.03
EBT	1	1700	48	.03*	193	.11*
EBR	1	1700	353	.21	314	.18
WBL	1	1700	55	.03*	113	.07*
WBT	2	3400	77	.03	166	.06
WBR	0	0	13		38	
Right Turn Adjustment			EBR	.11*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .69 .61

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	190	.06*	380	.11
NBT	2	3400	410	.12	1040	.31*
NBR	d	1700	170	.10	230	.14
SBL	2	3400	30	.01	40	.01*
SBT	2	3400	1010	.30*	630	.19
SBR	d	1700	90	.05	80	.05
EBL	1	1700	10	.01	50	.03
EBT	1	1700	70	.04*	220	.13*
EBR	1	1700	280	.16	220	.13
WBL	1	1700	50	.03*	160	.09*
WBT	2	3400	70	.03	190	.07
WBR	0	0	20		50	
Right Turn Adjustment			EBR	.06*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .54 .59

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	190	.06*	370	.11
NBT	2	3400	400	.12	1060	.31*
NBR	d	1700	170	.10	240	.14
SBL	2	3400	30	.01	40	.01*
SBT	2	3400	1000	.29*	630	.19
SBR	d	1700	90	.05	80	.05
EBL	1	1700	10	.01	50	.03
EBT	1	1700	70	.04*	220	.13*
EBR	1	1700	280	.16	220	.13
WBL	1	1700	70	.04*	150	.09*
WBT	2	3400	70	.03	190	.07
WBR	0	0	20		50	
Right Turn Adjustment			EBR	.06*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .54 .59

4. Bake & Towne Centre

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	200	.06*	410	.12
NBT	2	3400	450	.13	1130	.33*
NBR	d	1700	170	.10	240	.14
SBL	2	3400	30	.01	40	.01*
SBT	2	3400	1090	.32*	660	.19
SBR	d	1700	80	.05	80	.05
EBL	1	1700	10	.01	50	.03
EBT	1	1700	50	.03*	200	.12*
EBR	1	1700	320	.19	250	.15
WBL	1	1700	110	.06*	160	.09*
WBT	2	3400	90	.03	180	.07
WBR	0	0	20		50	
Right Turn Adjustment			EBR	.10*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .62 .60

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	200	.06*	410	.12
NBT	2	3400	450	.13	1120	.33*
NBR	d	1700	160	.09	230	.14
SBL	2	3400	30	.01	40	.01*
SBT	2	3400	1140	.34*	660	.19
SBR	d	1700	90	.05	80	.05
EBL	1	1700	10	.01	50	.03
EBT	1	1700	50	.03*	210	.12*
EBR	1	1700	310	.18	250	.15
WBL	1	1700	80	.05*	150	.09*
WBT	2	3400	80	.03	170	.06
WBR	0	0	20		50	
Right Turn Adjustment			EBR	.09*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for EBR

TOTAL CAPACITY UTILIZATION .62 .60

5. Auto Center W & Towne Centre

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	1	.00	9	.01*
NBT	1	1700	0	.00	1	.00
NBR	0	0	0		7	
SBL	1	1700	1	.00	23	.01
SBT	1	1700	1	.02*	2	.02*
SBR	0	0	28		31	
EBL	1	1700	21	.01	64	.04*
EBT	2	3400	169	.05*	366	.11
EBR	0	0	6		5	
WBL	1	1700	7	.00	5	.00
WBT	2	3400	125	.04	259	.08*
WBR	0	0	5		26	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.12**		**.20**

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	1	.00	9	.01*
NBT	1	1700	0	.00	1	.00
NBR	0	0	0		7	
SBL	1	1700	7	.00	28	.02
SBT	1	1700	1	.03*	2	.03*
SBR	0	0	45		41	
EBL	1	1700	27	.02*	80	.05*
EBT	2	3400	169	.05	373	.11
EBR	0	0	6		5	
WBL	1	1700	7	.00	5	.00
WBT	2	3400	134	.04*	263	.09*
WBR	0	0	7		32	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.14**		**.23**

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	0	.00	20	.01*
NBT	1	1700	0	.00	0	.01
NBR	0	0	0		10	
SBL	1	1700	10	.01	20	.01
SBT	1	1700	10	.03*	10	.02*
SBR	0	0	40		30	
EBL	1	1700	20	.01*	60	.04*
EBT	2	3400	180	.06	380	.11
EBR	0	0	10		10	
WBL	1	1700	10	.01	10	.01
WBT	2	3400	180	.06*	350	.11*
WBR	0	0	10		30	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.15**		**.23**

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	0	.00	20	.01*
NBT	1	1700	0	.00	0	.01
NBR	0	0	0		10	
SBL	1	1700	10	.01	30	.02
SBT	1	1700	10	.04*	10	.03*
SBR	0	0	60		40	
EBL	1	1700	30	.02*	90	.05*
EBT	2	3400	180	.06	380	.11
EBR	0	0	10		10	
WBL	1	1700	10	.01	10	.01
WBT	2	3400	180	.06*	380	.12*
WBR	0	0	10		40	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.17**		**.26**

5. Auto Center W & Towne Centre

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	0	.00	20	.01*
NBT	1	1700	0	.00	0	.01
NBR	0	0	0		10	
SBL	1	1700	10	.01	20	.01
SBT	1	1700	10	.03*	10	.02*
SBR	0	0	40		30	
EBL	1	1700	30	.02*	60	.04*
EBT	2	3400	200	.06	370	.11
EBR	0	0	10		10	
WBL	1	1700	10	.01	10	.01
WBT	2	3400	210	.06*	360	.11*
WBR	0	0	10		30	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.16**		**.23**

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	0	.00	20	.01*
NBT	1	1700	0	.00	10	.01
NBR	0	0	0		10	
SBL	1	1700	10	.01	30	.02
SBT	1	1700	10	.04*	10	.03*
SBR	0	0	60		40	
EBL	1	1700	20	.01*	90	.05*
EBT	2	3400	210	.06	370	.11
EBR	0	0	10		10	
WBL	1	1700	10	.01	10	.01
WBT	2	3400	180	.06*	380	.12*
WBR	0	0	10		40	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.16**		**.26**

6. Auto Center E & Towne Centre

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1700	8	.00	12	.01*
SBT	0	0	0		0	
SBR	1	1700	2	.00	5	.00
EBL	1	1700	5	.00	5	.00
EBT	2	3400	154	.05	388	.11*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3400	146	.05*	292	.09
WBR	0	0	13		17	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.10**		**.17**

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	0	0	0		0	
NBR	0	0	0		0	
SBL	1	1700	16	.01*	17	.01*
SBT	0	0	0		0	
SBR	1	1700	3	.00	5	.00
EBL	1	1700	4	.00	5	.00
EBT	2	3400	162	.05	393	.12*
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	2	3400	148	.05*	292	.09
WBR	0	0	16		24	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.11**		**.18**

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	10	{.01}*	30	{.02}*
NBT	1	1700	0	.01	0	.02
NBR	1	1700	10	.01	50	.03
SBL	1	1700	10	.01	10	.01
SBT	1	1700	0	.01*	0	.01*
SBR	0	0	10		10	
EBL	1	1700	10	.01	10	.01
EBT	2	3400	180	.06*	430	.13*
EBR	0	0	10		0	
WBL	1	1700	50	.03*	30	.02*
WBT	2	3400	170	.05	370	.11
WBR	0	0	10		10	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.16**		**.23**

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	10	{.01}*	30	{.02}*
NBT	1	1700	0	.01	0	.02
NBR	1	1700	10	.01	50	.03
SBL	1	1700	20	.01	20	.01
SBT	1	1700	0	.01*	0	.01*
SBR	0	0	10		10	
EBL	1	1700	10	.01	10	.01
EBT	2	3400	180	.06*	430	.13*
EBR	0	0	10		0	
WBL	1	1700	50	.03*	30	.02*
WBT	2	3400	180	.06	390	.12
WBR	0	0	20		20	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.16**		**.23**

6. Auto Center E & Towne Centre

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	10	{.01}*	30	{.02}*
NBT	1	1700	0	.01	0	.02
NBR	1	1700	10	.01	50	.03
SBL	1	1700	10	.01	10	.01
SBT	1	1700	0	.01*	0	.01*
SBR	0	0	10		10	
EBL	1	1700	10	.01	10	.01
EBT	2	3400	180	.06*	430	.13*
EBR	0	0	10		0	
WBL	1	1700	50	.03*	30	.02*
WBT	2	3400	210	.06	370	.11
WBR	0	0	10		10	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.16**		**.23**

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	10	{.01}*	30	{.02}*
NBT	1	1700	0	.01	0	.02
NBR	1	1700	10	.01	50	.03
SBL	1	1700	20	.01	20	.01
SBT	1	1700	0	.01*	0	.01*
SBR	0	0	10		10	
EBL	1	1700	10	.01	10	.01
EBT	2	3400	170	.05*	430	.13*
EBR	0	0	10		0	
WBL	1	1700	50	.03*	30	.02*
WBT	2	3400	180	.06	390	.12
WBR	0	0	20		20	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.15**		**.23**

7. Lake Forest & Towne Centre

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	94	.03*	199	.06*
NBT	2	3400	383	.11	702	.21
NBR	d	1700	193	.11	195	.11
SBL	2	3400	5	.00	6	.00
SBT	2	3400	701	.21*	615	.18*
SBR	d	1700	13	.01	24	.01
EBL	1	1700	0	.00	19	.01
EBT	1	1700	116	.07*	214	.13*
EBR	1	1700	51	.03	161	.09
WBL	1	1700	57	.03*	144	.08*
WBT	2	3400	49	.02	114	.04
WBR	0	0	8		7	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.39**		**.50**

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	80	.02*	195	.06*
NBT	2	3400	382	.11	697	.21
NBR	d	1700	201	.12	190	.11
SBL	2	3400	3	.00	6	.00
SBT	2	3400	713	.21*	591	.17*
SBR	d	1700	14	.01	24	.01
EBL	1	1700	0	.00	19	.01
EBT	1	1700	114	.07*	212	.12*
EBR	1	1700	57	.03	163	.10
WBL	1	1700	40	.02*	156	.09*
WBT	2	3400	52	.02	111	.03
WBR	0	0	8		7	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.37**		**.49**

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	100	.03*	250	.07*
NBT	2	3400	360	.11	530	.16
NBR	d	1700	180	.11	200	.12
SBL	2	3400	10	.00	10	.00
SBT	2	3400	640	.19*	700	.21*
SBR	d	1700	110	.06	80	.05
EBL	1	1700	20	.01	90	.05
EBT	1	1700	130	.08*	220	.13*
EBR	1	1700	60	.04	190	.11
WBL	1	1700	60	.04*	140	.08*
WBT	2	3400	50	.02	100	.03
WBR	0	0	10		10	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.39**		**.54**

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	90	.03*	270	.08*
NBT	2	3400	370	.11	540	.16
NBR	d	1700	190	.11	200	.12
SBL	2	3400	10	.00	10	.00
SBT	2	3400	620	.18*	700	.21*
SBR	d	1700	110	.06	70	.04
EBL	1	1700	20	.01	100	.06
EBT	1	1700	130	.08*	220	.13*
EBR	1	1700	70	.04	180	.11
WBL	1	1700	10	.01*	140	.08*
WBT	2	3400	50	.03	110	.04
WBR	0	0	60	.04	10	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.35**		**.55**

7. Lake Forest & Towne Centre

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	120	.04*	250	.07*
NBT	2	3400	400	.12	650	.19
NBR	d	1700	190	.11	200	.12
SBL	2	3400	10	.00	10	.00
SBT	2	3400	620	.18*	770	.23*
SBR	d	1700	100	.06	80	.05
EBL	1	1700	20	.01	100	.06
EBT	1	1700	110	.06*	200	.12*
EBR	1	1700	60	.04	200	.12
WBL	1	1700	60	.04*	140	.08*
WBT	2	3400	50	.02	100	.03
WBR	0	0	10		10	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.37**		**.55**

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	100	.03*	250	.07*
NBT	2	3400	380	.11	660	.19
NBR	d	1700	190	.11	200	.12
SBL	2	3400	10	.00	10	.00
SBT	2	3400	560	.16*	810	.24*
SBR	d	1700	100	.06	80	.05
EBL	1	1700	30	.02	100	.06
EBT	1	1700	110	.06*	200	.12*
EBR	1	1700	60	.04	200	.12
WBL	1	1700	60	.04*	140	.08*
WBT	2	3400	50	.02	110	.04
WBR	0	0	10		10	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.34**		**.56**

8. Lake Forest & SR-241 NB

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	107	.03*	155	.05
NBT	2	3400	655	.19	1104	.32*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	760	.22*	764	.22
SBR	1	1700	81	.05	178	.10
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .30 .37

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	117	.03*	151	.04
NBT	2	3400	648	.19	1090	.32*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	769	.23*	752	.22
SBR	1	1700	74	.04	179	.11
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .31 .37

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	110	.03*	190	.06*
NBT	2	3400	640	.19	860	.25
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	620	.18*	670	.20*
SBR	1	1700	100	.06	270	.16
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .26 .31

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	120	.04*	200	.06
NBT	2	3400	640	.19	890	.26*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	610	.18*	660	.19
SBR	1	1700	110	.06	260	.15
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .27 .31

8. Lake Forest & SR-241 NB

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	130	.04	400	.12*
NBT	2	3400	680	.20*	990	.29
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	560	.16	750	.22*
SBR	1	1700	80	.05	300	.18
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .25 .39

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	120	.04*	400	.12*
NBT	2	3400	660	.19	1010	.30
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	550	.16*	730	.21*
SBR	1	1700	90	.05	300	.18
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .25 .38

9. Lake Forest & SR-241 SB

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	611	.18	1191	.35*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	801	.24*	752	.22
SBR	0	0	0		0	
EBL	2	3400	153	.05*	88	.03*
EBT	0	0	0		0	
EBR	1	1700	246	.14	162	.10
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.09*		
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .43 .43

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	617	.18	1178	.35*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	810	.24*	740	.22
SBR	0	0	0		0	
EBL	2	3400	151	.04*	84	.02*
EBT	0	0	0		0	
EBR	1	1700	249	.15	169	.10
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.11*		
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .44 .42

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	560	.16	940	.28*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	650	.19*	650	.19
SBR	0	0	0		0	
EBL	2	3400	200	.06*	140	.04*
EBT	0	0	0		0	
EBR	1	1700	270	.16	230	.14
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.10*	EBR	.03*
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .40 .40

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	580	.17	950	.28*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	640	.19*	650	.19
SBR	0	0	0		0	
EBL	2	3400	200	.06*	150	.04*
EBT	0	0	0		0	
EBR	1	1700	270	.16	230	.14
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.10*	EBR	.03*
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .40 .40

9. Lake Forest & SR-241 SB

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	650	.19*	1280	.38*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	590	.17	730	.21
SBR	0	0	0		0	
EBL	2	3400	170	.05*	150	.04*
EBT	0	0	0		0	
EBR	1	1700	550	.32	260	.15
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.25*		
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .54 .47

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	640	.19*	1280	.38*
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	590	.17	720	.21
SBR	0	0	0		0	
EBL	2	3400	160	.05*	160	.05*
EBT	0	0	0		0	
EBR	1	1700	550	.32	260	.15
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Right Turn Adjustment			EBR	.25*		
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .54 .48

10. Bake & Rancho N

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	753	.22	1798	.53*
NBR	d	1700	98	.06	240	.14
SBL	1	1700	47	.03	157	.09*
SBT	2	3400	1716	.50*	1013	.30
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3400	141	.04*	125	.04*
WBT	0	0	0		0	
WBR	2	3400	69	.02	155	.05
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .59 .71

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	751	.22	1792	.53*
NBR	d	1700	106	.06	245	.14
SBL	1	1700	48	.03	141	.08*
SBT	2	3400	1724	.51*	1033	.30
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3400	134	.04*	122	.04*
WBT	0	0	0		0	
WBR	2	3400	66	.02	152	.04
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .60 .70

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	670	.20	1480	.44*
NBR	d	1700	320	.19	480	.28
SBL	1	1700	50	.03	130	.08*
SBT	2	3400	1300	.38*	870	.26
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3400	520	.15*	340	.10*
WBT	0	0	0		0	
WBR	2	3400	40	.01	170	.05
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .58 .67

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	660	.19	1500	.44*
NBR	d	1700	330	.19	500	.29
SBL	1	1700	50	.03	130	.08*
SBT	2	3400	1310	.39*	860	.25
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3400	510	.15*	350	.10*
WBT	0	0	0		0	
WBR	2	3400	30	.01	180	.05
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .59 .67

10. Bake & Rancho N

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	700	.21	1540	.45*
NBR	d	1700	580	.34	680	.40
SBL	1	1700	90	.05	160	.09*
SBT	2	3400	1430	.42*	910	.27
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3400	520	.15*	620	.18*
WBT	0	0	0		0	
WBR	2	3400	50	.01	240	.07
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .62 .77

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	690	.20	1540	.45*
NBR	d	1700	590	.35	680	.40
SBL	1	1700	90	.05	150	.09*
SBT	2	3400	1450	.43*	900	.26
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3400	520	.15*	630	.19*
WBT	0	0	0		0	
WBR	2	3400	50	.01	230	.07
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .63 .78

11. Lake Forest & Rancho

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	132	.08*	141	.08
NBT	2	3400	540	.16	912	.27*
NBR	d	1700	70	.04	22	.01
SBL	1	1700	108	.06	122	.07*
SBT	2	3400	779	.23*	720	.21
SBR	d	1700	114	.07	91	.05
EBL	1	1700	24	.01	122	.07*
EBT	1	1700	37	.02*	29	.02
EBR	1	1700	42	.02	115	.07
WBL	1	1700	9	.01*	50	.03
WBT	2	3400	6	.00	69	.02*
WBR	1	1700	10	.01	141	.08
Right Turn Adjustment					WBR	.01*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.39**		**.49**

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	147	.09*	145	.09
NBT	2	3400	532	.16	899	.26*
NBR	d	1700	66	.04	29	.02
SBL	1	1700	112	.07	123	.07*
SBT	2	3400	787	.23*	713	.21
SBR	d	1700	113	.07	95	.06
EBL	1	1700	32	.02*	130	.08*
EBT	1	1700	38	.02	20	.01
EBR	1	1700	53	.03	115	.07
WBL	1	1700	8	.00	55	.03
WBT	2	3400	1	.00*	69	.02*
WBR	1	1700	17	.01	132	.08
Right Turn Adjustment					WBR	.01*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.39**		**.49**

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	80	.05	130	.08
NBT	2	3400	490	.14*	800	.24*
NBR	d	1700	340	.20	450	.26
SBL	1	1700	250	.15*	230	.14*
SBT	2	3400	750	.22	720	.21
SBR	d	1700	60	.04	60	.04
EBL	1	1700	10	.01	40	.02
EBT	1	1700	210	.12*	450	.26*
EBR	1	1700	40	.02	70	.04
WBL	1	1700	250	.15*	320	.19*
WBT	2	3400	550	.16	370	.11
WBR	1	1700	60	.04	300	.18
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.61**		**.88**

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	80	.05	120	.07
NBT	2	3400	510	.15*	810	.24*
NBR	d	1700	340	.20	450	.26
SBL	1	1700	260	.15*	230	.14*
SBT	2	3400	740	.22	710	.21
SBR	d	1700	60	.04	60	.04
EBL	1	1700	10	.01	40	.02
EBT	1	1700	210	.12*	440	.26*
EBR	1	1700	40	.02	70	.04
WBL	1	1700	250	.15*	310	.18*
WBT	2	3400	540	.16	370	.11
WBR	1	1700	60	.04	300	.18
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.62**		**.87**

11. Lake Forest & Rancho

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	160	.09	190	.11
NBT	2	3400	540	.16*	910	.27*
NBR	d	1700	450	.26	660	.39
SBL	1	1700	320	.19*	280	.16*
SBT	2	3400	740	.22	760	.22
SBR	d	1700	230	.14	110	.06
EBL	1	1700	20	.01	180	.11
EBT	2	3400	350	.10*	730	.21*
EBR	1	1700	60	.04	140	.08
WBL	2	3400	560	.16*	480	.14*
WBT	2	3400	750	.22	610	.18
WBR	d	1700	80	.05	400	.24
Right Turn Adjustment					NBR	.01*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.66**		**.84**

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	150	.09	190	.11
NBT	2	3400	530	.16*	930	.27*
NBR	d	1700	460	.27	650	.38
SBL	1	1700	320	.19*	270	.16*
SBT	2	3400	730	.21	750	.22
SBR	d	1700	230	.14	110	.06
EBL	1	1700	30	.02	180	.11
EBT	2	3400	360	.11*	730	.21*
EBR	1	1700	60	.04	140	.08
WBL	2	3400	570	.17*	480	.14*
WBT	2	3400	740	.22	620	.18
WBR	d	1700	90	.05	390	.23
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.68**		**.83**

12. Auto Center Dr & Auto Center Dr

Existing Counts

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1700	0	.00	0	.00
NBR	0	0	0		0	
SBL	0	0	64		13	
SBT	1	1700	0	.04*	0	.01*
SBR	1	1700	34	.02	24	.01
EBL	1	1700	3	.00	30	.02*
EBT	1	1700	0	.00	0	.00
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1700	0	.00*	0	.02*
WBR	0	0	8		38	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.09**		**.10**

Existing-Plus-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	1	1700	0	.00	0	.00
NBR	0	0	0		0	
SBL	0	0	72		18	
SBT	1	1700	0	.04*	0	.01*
SBR	1	1700	36	.02	26	.02
EBL	1	1700	6	.00	32	.02*
EBT	1	1700	0	.00	0	.00
EBR	0	0	0		0	
WBL	0	0	0		0	
WBT	1	1700	0	.01*	0	.03*
WBR	0	0	11		45	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.10**		**.11**

2015 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	7		4	
NBT	1	1700	13	.01*	9	.01
NBR	0	0	5		4	
SBL	0	0	52	{.03}*	10	
SBT	1	1700	4	.03	16	.02*
SBR	1	1700	28	.02	28	.02
EBL	1	1700	7	.00	30	.02*
EBT	1	1700	0	.00	0	.00
EBR	0	0	2		7	
WBL	0	0	2		6	
WBT	1	1700	0	.01*	0	.03*
WBR	0	0	8		38	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.10**		**.12**

2015 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	7		4	
NBT	1	1700	13	.01*	9	.01
NBR	0	0	5		4	
SBL	0	0	60	{.04}*	10	
SBT	1	1700	4	.04	16	.02*
SBR	1	1700	30	.02	30	.02
EBL	1	1700	10	.01*	30	.02*
EBT	1	1700	0	.00	0	.00
EBR	0	0	2		7	
WBL	0	0	2		6	
WBT	1	1700	0	.01*	0	.03*
WBR	0	0	10		40	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.12**		**.12**

12. Auto Center Dr & Auto Center Dr

2030 No-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	7		4	
NBT	1	1700	13	.01*	9	.01
NBR	0	0	5		4	
SBL	0	0	52	{.03}*	10	
SBT	1	1700	4	.03	16	.02*
SBR	1	1700	28	.02	28	.02
EBL	1	1700	7	.00	30	.02*
EBT	1	1700	0	.00	0	.00
EBR	0	0	2		7	
WBL	0	0	2		6	
WBT	1	1700	0	.01*	0	.03*
WBR	0	0	8		38	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.10**		**.12**

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	7		4	
NBT	1	1700	13	.01*	9	.01
NBR	0	0	5		4	
SBL	0	0	60	{.04}*	10	
SBT	1	1700	4	.04	16	.02*
SBR	1	1700	30	.02	30	.02
EBL	1	1700	10	.01*	30	.02*
EBT	1	1700	0	.00	0	.00
EBR	0	0	2		7	
WBL	0	0	2		6	
WBT	1	1700	0	.01*	0	.03*
WBR	0	0	10		40	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.12**		**.12**

13. Auto Center Dr & Driveway 1

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	4	.00	8	.00
NBT	2	3400	29	.01	71	.02
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	2	3400	85	.03*	50	.03*
SBR	0	0	14		38	
EBL	0	0	41		27	{.02}*
EBT	1	1700	0	.03*	0	.02
EBR	0	0	9		6	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .11 .10

14. Auto Center Dr & Driveway 2

2030 With-Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	8	.00	21	.01*
NBT	1	1700	10	.01	36	.02
NBR	0	0	0		0	
SBL	0	0	0		0	
SBT	1	1700	36	.02*	33	.02*
SBR	0	0	1		1	
EBL	0	0	2		1	
EBT	1	1700	0	.02*	0	.01*
EBR	0	0	24		16	
WBL	0	0	0		0	
WBT	0	0	0		0	
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

TOTAL CAPACITY UTILIZATION .09 .09

Appendix B

Highway Capacity Manual (HCM) Intersection Analysis Worksheets

HCM Intersection Analysis Data Set 1
Existing and Existing-Plus-Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	21	169	6	7	125	5	1	0	0	1	1	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	184	7	8	136	5	1	0	0	1	1	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	141			190			347	389	95	291	390	71
vC1, stage 1 conf vol							233	233		154	154	
vC2, stage 2 conf vol							114	157		138	236	
vCu, unblocked vol	141			190			347	389	95	291	390	71
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			100	100	100	100	100	97
cM capacity (veh/h)	1439			1381			681	640	943	744	640	977

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	23	122	68	8	91	51	1	0	1	32
Volume Left	23	0	0	8	0	0	1	0	1	0
Volume Right	0	0	7	0	0	5	0	0	0	30
cSH	1439	1700	1700	1381	1700	1700	681	1700	744	960
Volume to Capacity	0.02	0.07	0.04	0.01	0.05	0.03	0.00	0.00	0.00	0.03
Queue Length 95th (ft)	1	0	0	0	0	0	0	0	0	3
Control Delay (s)	7.5	0.0	0.0	7.6	0.0	0.0	10.3	0.0	9.8	8.9
Lane LOS	A			A			B	A	A	A
Approach Delay (s)	0.8			0.4			10.3		8.9	
Approach LOS							B		A	

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	21.5%	ICU Level of Service	A
Analysis Period (min)	15		

5: Auto Center Drive West & Towne Centre Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	64	366	5	5	259	26	9	1	7	23	3	31
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	398	5	5	282	28	10	1	8	25	3	34
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	310			403			727	860	202	653	849	155
vC1, stage 1 conf vol							540	540		307	307	
vC2, stage 2 conf vol							187	321		346	542	
vCu, unblocked vol	310			403			727	860	202	653	849	155
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			100			98	100	99	95	99	96
cM capacity (veh/h)	1248			1152			433	431	806	517	440	863

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	70	265	138	5	188	122	10	9	25	37
Volume Left	70	0	0	5	0	0	10	0	25	0
Volume Right	0	0	5	0	0	28	0	8	0	34
cSH	1248	1700	1700	1152	1700	1700	433	727	517	796
Volume to Capacity	0.06	0.16	0.08	0.00	0.11	0.07	0.02	0.01	0.05	0.05
Queue Length 95th (ft)	4	0	0	0	0	0	2	1	4	4
Control Delay (s)	8.1	0.0	0.0	8.1	0.0	0.0	13.5	10.0	12.3	9.7
Lane LOS	A			A			B	B	B	A
Approach Delay (s)	1.2			0.1			11.9		10.8	
Approach LOS							B		B	

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

6: Auto Center Drive East & Towne Centre Drive

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	154	146	13	8	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	167	159	14	9	2
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	173				260	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173				260	86
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1401				704	955

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	5	84	84	106	67	9	2
Volume Left	5	0	0	0	0	9	0
Volume Right	0	0	0	0	14	0	2
cSH	1401	1700	1700	1700	1700	704	955
Volume to Capacity	0.00	0.05	0.05	0.06	0.04	0.01	0.00
Queue Length 95th (ft)	0	0	0	0	0	1	0
Control Delay (s)	7.6	0.0	0.0	0.0	0.0	10.2	8.8
Lane LOS	A					B	A
Approach Delay (s)	0.2			0.0		9.9	
Approach LOS						A	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	14.4%	ICU Level of Service	A
Analysis Period (min)	15		

6: Auto Center Drive East & Towne Centre Drive

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	388	292	17	12	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	422	317	18	13	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	336				548	168
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	336				548	168
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	99
cM capacity (veh/h)	1220				464	847

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	5	211	211	212	124	13	5
Volume Left	5	0	0	0	0	13	0
Volume Right	0	0	0	0	18	0	5
cSH	1220	1700	1700	1700	1700	464	847
Volume to Capacity	0.00	0.12	0.12	0.12	0.07	0.03	0.01
Queue Length 95th (ft)	0	0	0	0	0	2	0
Control Delay (s)	8.0	0.0	0.0	0.0	0.0	13.0	9.3
Lane LOS	A					B	A
Approach Delay (s)	0.1			0.0		11.9	
Approach LOS						B	

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	20.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	0	0	0	0	8	0	0	0	64	0	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	0	0	0	0	9	0	0	0	70	0	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	9			0			43	15	0	11	11	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	9			0			43	15	0	11	11	4
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	93	100	97
cM capacity (veh/h)	1611			1623			925	877	1085	1005	882	1079

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	3	0	0	9	0	70	37
Volume Left	3	0	0	0	0	70	0
Volume Right	0	0	0	9	0	0	37
cSH	1611	1700	1700	1700	1700	1005	1079
Volume to Capacity	0.00	0.00	0.00	0.01	0.00	0.07	0.03
Queue Length 95th (ft)	0	0	0	0	0	6	3
Control Delay (s)	7.2	0.0	0.0	0.0	0.0	8.8	8.5
Lane LOS	A				A	A	A
Approach Delay (s)	7.2		0.0		0.0	8.7	
Approach LOS					A	A	

Intersection Summary			
Average Delay	8.0		
Intersection Capacity Utilization	13.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	0	0	0	0	38	0	0	0	13	0	24
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	0	0	0	41	0	0	0	14	0	26
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	41			0			91	107	0	86	86	21
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	41			0			91	107	0	86	86	21
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	100	100	98	100	98
cM capacity (veh/h)	1568			1623			857	767	1085	886	788	1057

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	33	0	0	41	0	14	26
Volume Left	33	0	0	0	0	14	0
Volume Right	0	0	0	41	0	0	26
cSH	1568	1700	1700	1700	1700	886	1057
Volume to Capacity	0.02	0.00	0.00	0.02	0.00	0.02	0.02
Queue Length 95th (ft)	2	0	0	0	0	1	2
Control Delay (s)	7.3	0.0	0.0	0.0	0.0	9.1	8.5
Lane LOS	A				A	A	A
Approach Delay (s)	7.3		0.0		0.0	8.7	
Approach LOS					A	A	

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	18.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	107	655	760	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	116	712	826	88
RTOR Reduction (vph)	0	0	0	0	0	15
Lane Group Flow (vph)	0	0	116	712	826	73
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			7.2	90.0	74.8	74.8
Effective Green, g (s)			7.2	90.0	74.8	74.8
Actuated g/C Ratio			0.08	1.00	0.83	0.83
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			275	3539	2941	1316
v/s Ratio Prot			c0.03	0.20	c0.23	
v/s Ratio Perm						0.05
v/c Ratio			0.42	0.20	0.28	0.06
Uniform Delay, d1			39.4	0.0	1.7	1.3
Progression Factor			0.90	1.00	1.00	1.00
Incremental Delay, d2			1.0	0.1	0.2	0.1
Delay (s)			36.5	0.1	1.9	1.4
Level of Service			D	A	A	A
Approach Delay (s)	0.0			5.2	1.9	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	3.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	155	1104	764	178
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	168	1200	830	193
RTOR Reduction (vph)	0	0	0	0	0	38
Lane Group Flow (vph)	0	0	168	1200	830	155
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			9.7	90.0	72.3	72.3
Effective Green, g (s)			9.7	90.0	72.3	72.3
Actuated g/C Ratio			0.11	1.00	0.80	0.80
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			370	3539	2843	1272
v/s Ratio Prot			0.05	c0.34	0.23	
v/s Ratio Perm						0.10
v/c Ratio			0.45	0.34	0.29	0.12
Uniform Delay, d1			37.7	0.0	2.3	1.9
Progression Factor			0.94	1.00	1.00	1.00
Incremental Delay, d2			0.8	0.2	0.3	0.2
Delay (s)			36.3	0.2	2.5	2.1
Level of Service			D	A	A	A
Approach Delay (s)	0.0			4.7	2.5	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	153	246	0	611	801	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	166	267	0	664	871	0
RTOR Reduction (vph)	0	150	0	0	0	0
Lane Group Flow (vph)	166	117	0	664	871	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	12.2	12.2		69.8	69.8	
Effective Green, g (s)	12.2	12.2		69.8	69.8	
Actuated g/C Ratio	0.14	0.14		0.78	0.78	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	465	215		2745	2745	
v/s Ratio Prot	0.05			0.19	c0.25	
v/s Ratio Perm		c0.07				
v/c Ratio	0.36	0.54		0.24	0.32	
Uniform Delay, d1	35.3	36.3		2.8	3.0	
Progression Factor	1.00	1.00		1.00	0.98	
Incremental Delay, d2	0.5	2.8		0.2	0.3	
Delay (s)	35.8	39.1		3.0	3.2	
Level of Service	D	D		A	A	
Approach Delay (s)	37.8			3.0	3.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	88	162	0	1191	752	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	176	0	1295	817	0
RTOR Reduction (vph)	0	160	0	0	0	0
Lane Group Flow (vph)	96	16	0	1295	817	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	8.4	8.4		73.6	73.6	
Effective Green, g (s)	8.4	8.4		73.6	73.6	
Actuated g/C Ratio	0.09	0.09		0.82	0.82	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	148		2894	2894	
v/s Ratio Prot	c0.03			c0.37	0.23	
v/s Ratio Perm		0.01				
v/c Ratio	0.30	0.11		0.45	0.28	
Uniform Delay, d1	38.1	37.4		2.4	1.9	
Progression Factor	1.00	1.00		1.00	0.06	
Incremental Delay, d2	0.5	0.3		0.5	0.2	
Delay (s)	38.6	37.7		2.9	0.4	
Level of Service	D	D		A	A	
Approach Delay (s)	38.0			2.9	0.4	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	27	169	6	7	134	7	1	0	0	7	1	45
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	184	7	8	146	8	1	0	0	8	1	49
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	153			190			383	414	95	315	414	77
vC1, stage 1 conf vol							246	246		165	165	
vC2, stage 2 conf vol							138	168		151	249	
vCu, unblocked vol	153			190			383	414	95	315	414	77
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			100	100	100	99	100	95
cM capacity (veh/h)	1425			1381			650	625	943	726	627	969

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	29	122	68	8	97	56	1	0	8	50
Volume Left	29	0	0	8	0	0	1	0	8	0
Volume Right	0	0	7	0	0	8	0	0	0	49
cSH	1425	1700	1700	1381	1700	1700	650	1700	726	958
Volume to Capacity	0.02	0.07	0.04	0.01	0.06	0.03	0.00	0.00	0.01	0.05
Queue Length 95th (ft)	2	0	0	0	0	0	0	0	1	4
Control Delay (s)	7.6	0.0	0.0	7.6	0.0	0.0	10.5	0.0	10.0	9.0
Lane LOS	A			A			B	A	B	A
Approach Delay (s)	1.0			0.4			10.5		9.1	
Approach LOS							B		A	

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	24.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	80	373	5	5	263	32	9	1	7	28	2	41
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	405	5	5	286	35	10	1	8	30	2	45
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	321			411			782	914	205	699	899	160
vC1, stage 1 conf vol							582	582		314	314	
vC2, stage 2 conf vol							199	332		385	585	
vCu, unblocked vol	321			411			782	914	205	699	899	160
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	93			100			98	100	99	94	99	95
cM capacity (veh/h)	1236			1144			401	405	801	488	417	856

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	87	270	141	5	191	130	10	9	30	47
Volume Left	87	0	0	5	0	0	10	0	30	0
Volume Right	0	0	5	0	0	35	0	8	0	45
cSH	1236	1700	1700	1144	1700	1700	401	714	488	816
Volume to Capacity	0.07	0.16	0.08	0.00	0.11	0.08	0.02	0.01	0.06	0.06
Queue Length 95th (ft)	6	0	0	0	0	0	2	1	5	5
Control Delay (s)	8.1	0.0	0.0	8.2	0.0	0.0	14.2	10.1	12.9	9.7
Lane LOS	A			A			B	B	B	A
Approach Delay (s)	1.4			0.1			12.3		10.9	
Approach LOS							B		B	

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	4	162	148	16	16	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	176	161	17	17	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	178				266	89
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	178				266	89
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1395				698	951

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	4	88	88	107	71	17	3
Volume Left	4	0	0	0	0	17	0
Volume Right	0	0	0	0	17	0	3
cSH	1395	1700	1700	1700	1700	698	951
Volume to Capacity	0.00	0.05	0.05	0.06	0.04	0.02	0.00
Queue Length 95th (ft)	0	0	0	0	0	2	0
Control Delay (s)	7.6	0.0	0.0	0.0	0.0	10.3	8.8
Lane LOS	A					B	A
Approach Delay (s)	0.2			0.0		10.1	
Approach LOS						B	

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	14.6%	ICU Level of Service	A
Analysis Period (min)	15		

6: Auto Center Drive East & Towne Centre Drive

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	393	292	24	17	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	427	317	26	18	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	343				555	172
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	343				555	172
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				96	99
cM capacity (veh/h)	1212				460	842

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	5	214	214	212	132	18	5
Volume Left	5	0	0	0	0	18	0
Volume Right	0	0	0	0	26	0	5
cSH	1212	1700	1700	1700	1700	460	842
Volume to Capacity	0.00	0.13	0.13	0.12	0.08	0.04	0.01
Queue Length 95th (ft)	0	0	0	0	0	3	0
Control Delay (s)	8.0	0.0	0.0	0.0	0.0	13.2	9.3
Lane LOS	A					B	A
Approach Delay (s)	0.1			0.0		12.3	
Approach LOS						B	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	0	0	0	0	11	0	0	0	72	0	36
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	0	0	0	12	0	0	0	78	0	39
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	12			0			52	25	0	19	19	6
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	12			0			52	25	0	19	19	6
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	92	100	96
cM capacity (veh/h)	1607			1623			909	865	1085	992	871	1077

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	7	0	0	12	0	78	39
Volume Left	7	0	0	0	0	78	0
Volume Right	0	0	0	12	0	0	39
cSH	1607	1700	1700	1700	1700	992	1077
Volume to Capacity	0.00	0.00	0.00	0.01	0.00	0.08	0.04
Queue Length 95th (ft)	0	0	0	0	0	6	3
Control Delay (s)	7.2	0.0	0.0	0.0	0.0	8.9	8.5
Lane LOS	A				A	A	A
Approach Delay (s)	7.2		0.0		0.0	8.8	
Approach LOS					A	A	

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	15.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	32	0	0	0	0	45	0	0	0	18	0	26
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	0	0	0	0	49	0	0	0	20	0	28
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	49			0			98	118	0	94	94	24
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	49			0			98	118	0	94	94	24
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			100	100	100	98	100	97
cM capacity (veh/h)	1558			1623			846	755	1085	874	778	1052

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	35	0	0	49	0	20	28
Volume Left	35	0	0	0	0	20	0
Volume Right	0	0	0	49	0	0	28
cSH	1558	1700	1700	1700	1700	874	1052
Volume to Capacity	0.02	0.00	0.00	0.03	0.00	0.02	0.03
Queue Length 95th (ft)	2	0	0	0	0	2	2
Control Delay (s)	7.4	0.0	0.0	0.0	0.0	9.2	8.5
Lane LOS	A				A	A	A
Approach Delay (s)	7.4		0.0		0.0	8.8	
Approach LOS					A	A	

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	18.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	117	648	769	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	127	704	836	80
RTOR Reduction (vph)	0	0	0	0	0	15
Lane Group Flow (vph)	0	0	127	704	836	65
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			8.7	90.0	73.3	73.3
Effective Green, g (s)			8.7	90.0	73.3	73.3
Actuated g/C Ratio			0.10	1.00	0.81	0.81
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			332	3539	2882	1289
v/s Ratio Prot			c0.04	0.20	c0.24	
v/s Ratio Perm						0.04
v/c Ratio			0.38	0.20	0.29	0.05
Uniform Delay, d1			38.1	0.0	2.0	1.6
Progression Factor			0.90	1.00	1.00	1.00
Incremental Delay, d2			0.7	0.1	0.3	0.1
Delay (s)			34.9	0.1	2.3	1.7
Level of Service			C	A	A	A
Approach Delay (s)	0.0			5.4	2.2	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	3.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	151	1090	752	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	164	1185	817	195
RTOR Reduction (vph)	0	0	0	0	0	38
Lane Group Flow (vph)	0	0	164	1185	817	157
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			9.6	90.0	72.4	72.4
Effective Green, g (s)			9.6	90.0	72.4	72.4
Actuated g/C Ratio			0.11	1.00	0.80	0.80
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			366	3539	2847	1273
v/s Ratio Prot			0.05	c0.33	0.23	
v/s Ratio Perm						0.10
v/c Ratio			0.45	0.33	0.29	0.12
Uniform Delay, d1			37.7	0.0	2.2	1.9
Progression Factor			0.94	1.00	1.00	1.00
Incremental Delay, d2			0.8	0.2	0.3	0.2
Delay (s)			36.3	0.2	2.5	2.1
Level of Service			D	A	A	A
Approach Delay (s)	0.0			4.6	2.4	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	151	249	0	617	810	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	164	271	0	671	880	0
RTOR Reduction (vph)	0	146	0	0	0	0
Lane Group Flow (vph)	164	125	0	671	880	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	12.5	12.5		69.5	69.5	
Effective Green, g (s)	12.5	12.5		69.5	69.5	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	477	220		2733	2733	
v/s Ratio Prot	0.05			0.19	c0.25	
v/s Ratio Perm		c0.08				
v/c Ratio	0.34	0.57		0.25	0.32	
Uniform Delay, d1	35.0	36.2		2.9	3.1	
Progression Factor	1.00	1.00		1.00	0.97	
Incremental Delay, d2	0.4	3.3		0.2	0.3	
Delay (s)	35.5	39.5		3.1	3.3	
Level of Service	D	D		A	A	
Approach Delay (s)	38.0			3.1	3.3	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	84	169	0	1178	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	184	0	1280	804	0
RTOR Reduction (vph)	0	167	0	0	0	0
Lane Group Flow (vph)	91	17	0	1280	804	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	8.3	8.3		73.7	73.7	
Effective Green, g (s)	8.3	8.3		73.7	73.7	
Actuated g/C Ratio	0.09	0.09		0.82	0.82	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	317	146		2898	2898	
v/s Ratio Prot	c0.03			c0.36	0.23	
v/s Ratio Perm		0.01				
v/c Ratio	0.29	0.12		0.44	0.28	
Uniform Delay, d1	38.1	37.5		2.3	1.9	
Progression Factor	1.00	1.00		1.00	0.07	
Incremental Delay, d2	0.5	0.4		0.5	0.2	
Delay (s)	38.6	37.8		2.8	0.4	
Level of Service	D	D		A	A	
Approach Delay (s)	38.1			2.8	0.4	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Intersection Analysis Data Set 2

2015 No-Project and With-Project

5: Auto Center Drive West & Towne Centre Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	180	10	10	180	10	0	0	0	10	10	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	196	11	11	196	11	0	0	0	11	11	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	207			207			413	473	103	364	473	103
vC1, stage 1 conf vol							245	245		223	223	
vC2, stage 2 conf vol							168	228		141	250	
vCu, unblocked vol	207			207			413	473	103	364	473	103
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			100	100	100	98	98	95
cM capacity (veh/h)	1362			1362			634	603	932	689	606	932

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	22	130	76	11	130	76	0	0	11	54
Volume Left	22	0	0	11	0	0	0	0	11	0
Volume Right	0	0	11	0	0	11	0	0	0	43
cSH	1362	1700	1700	1362	1700	1700	1700	1700	689	841
Volume to Capacity	0.02	0.08	0.04	0.01	0.08	0.04	0.00	0.00	0.02	0.06
Queue Length 95th (ft)	1	0	0	1	0	0	0	0	1	5
Control Delay (s)	7.7	0.0	0.0	7.7	0.0	0.0	0.0	0.0	10.3	9.6
Lane LOS	A			A			A	A	B	A
Approach Delay (s)	0.7			0.4			0.0		9.7	
Approach LOS							A		A	

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	22.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	380	10	10	350	30	20	0	10	20	10	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	413	11	11	380	33	22	0	11	22	11	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	413			424			799	984	212	766	973	207
vC1, stage 1 conf vol							549	549		418	418	
vC2, stage 2 conf vol							250	435		348	554	
vCu, unblocked vol	413			424			799	984	212	766	973	207
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			99			95	100	99	95	97	96
cM capacity (veh/h)	1142			1132			413	398	793	467	410	800

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	65	275	149	11	254	159	22	11	22	43
Volume Left	65	0	0	11	0	0	22	0	22	0
Volume Right	0	0	11	0	0	33	0	11	0	33
cSH	1142	1700	1700	1132	1700	1700	413	793	467	646
Volume to Capacity	0.06	0.16	0.09	0.01	0.15	0.09	0.05	0.01	0.05	0.07
Queue Length 95th (ft)	5	0	0	1	0	0	4	1	4	5
Control Delay (s)	8.3	0.0	0.0	8.2	0.0	0.0	14.2	9.6	13.1	11.0
Lane LOS	A			A			B	A	B	B
Approach Delay (s)	1.1			0.2			12.7		11.7	
Approach LOS							B		B	

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		

6: Auto Center Drive East & Towne Centre Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	180	10	50	170	10	10	0	10	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	196	11	54	185	11	11	0	11	11	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	196			207			435	527	103	429	527	98
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	196			207			435	527	103	429	527	98
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			98	100	99	98	100	99
cM capacity (veh/h)	1375			1362			481	433	932	485	433	939

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	11	130	76	54	123	72	22	11	11
Volume Left	11	0	0	54	0	0	11	11	0
Volume Right	0	0	11	0	0	11	11	0	11
cSH	1375	1700	1700	1362	1700	1700	635	485	939
Volume to Capacity	0.01	0.08	0.04	0.04	0.07	0.04	0.03	0.02	0.01
Queue Length 95th (ft)	1	0	0	3	0	0	3	2	1
Control Delay (s)	7.6	0.0	0.0	7.8	0.0	0.0	10.9	12.6	8.9
Lane LOS	A			A			B	B	A
Approach Delay (s)	0.4			1.7			10.9	10.7	
Approach LOS							B	B	

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	26.5%	ICU Level of Service	A
Analysis Period (min)	15		

6: Auto Center Drive East & Towne Centre Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	430	0	30	370	10	30	0	50	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	467	0	33	402	11	33	0	54	11	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	413			467			766	967	234	783	962	207
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	413			467			766	967	234	783	962	207
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			88	100	93	96	100	99
cM capacity (veh/h)	1142			1090			279	243	768	256	245	800

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	11	312	156	33	268	145	87	11	11
Volume Left	11	0	0	33	0	0	33	11	0
Volume Right	0	0	0	0	0	11	54	0	11
cSH	1142	1700	1700	1090	1700	1700	464	256	800
Volume to Capacity	0.01	0.18	0.09	0.03	0.16	0.09	0.19	0.04	0.01
Queue Length 95th (ft)	1	0	0	2	0	0	17	3	1
Control Delay (s)	8.2	0.0	0.0	8.4	0.0	0.0	14.5	19.7	9.6
Lane LOS	A			A			B	C	A
Approach Delay (s)	0.2			0.6			14.5	14.6	
Approach LOS							B	B	

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

12: Auto Center Drive & Auto Center Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	0	2	2	0	8	7	13	5	52	4	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	2	2	0	9	8	14	5	57	4	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	9			2			53	29	1	36	26	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	9			2			53	29	1	36	26	4
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	98	99	94	99	97
cM capacity (veh/h)	1611			1620			911	858	1083	948	862	1079

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	8	2	2	9	27	61	30
Volume Left	8	0	2	0	8	57	0
Volume Right	0	2	0	9	5	0	30
cSH	1611	1700	1620	1700	911	941	1079
Volume to Capacity	0.00	0.00	0.00	0.01	0.03	0.06	0.03
Queue Length 95th (ft)	0	0	0	0	2	5	2
Control Delay (s)	7.2	0.0	7.2	0.0	9.1	9.1	8.4
Lane LOS	A		A		A	A	A
Approach Delay (s)	5.6		1.4		9.1	8.9	
Approach LOS					A	A	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

12: Auto Center Drive & Auto Center Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	0	7	6	0	38	4	9	4	10	16	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	8	7	0	41	4	10	4	11	17	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	41			8			121	123	4	108	107	21
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	41			8			121	123	4	108	107	21
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			99	99	100	99	98	97
cM capacity (veh/h)	1568			1613			800	748	1080	842	764	1057

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	33	8	7	41	18	28	30
Volume Left	33	0	7	0	4	11	0
Volume Right	0	8	0	41	4	0	30
cSH	1568	1700	1613	1700	820	792	1057
Volume to Capacity	0.02	0.00	0.00	0.02	0.02	0.04	0.03
Queue Length 95th (ft)	2	0	0	0	2	3	2
Control Delay (s)	7.3	0.0	7.2	0.0	9.5	9.7	8.5
Lane LOS	A		A		A	A	A
Approach Delay (s)	6.0		1.0		9.5	9.1	
Approach LOS					A	A	

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	110	640	620	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	120	696	674	109
RTOR Reduction (vph)	0	0	0	0	0	20
Lane Group Flow (vph)	0	0	120	696	674	89
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			8.5	90.0	73.5	73.5
Effective Green, g (s)			8.5	90.0	73.5	73.5
Actuated g/C Ratio			0.09	1.00	0.82	0.82
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			324	3539	2890	1293
v/s Ratio Prot			c0.03	0.20	c0.19	
v/s Ratio Perm						0.06
v/c Ratio			0.37	0.20	0.23	0.07
Uniform Delay, d1			38.2	0.0	1.9	1.6
Progression Factor			0.93	1.00	1.00	1.00
Incremental Delay, d2			0.7	0.1	0.2	0.1
Delay (s)			36.1	0.1	2.1	1.7
Level of Service			D	A	A	A
Approach Delay (s)	0.0			5.4	2.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	190	860	670	270
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	207	935	728	293
RTOR Reduction (vph)	0	0	0	0	0	61
Lane Group Flow (vph)	0	0	207	935	728	232
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			10.8	90.0	71.2	71.2
Effective Green, g (s)			10.8	90.0	71.2	71.2
Actuated g/C Ratio			0.12	1.00	0.79	0.79
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			412	3539	2800	1252
v/s Ratio Prot			c0.06	c0.26	0.21	
v/s Ratio Perm						0.15
v/c Ratio			0.50	0.26	0.26	0.19
Uniform Delay, d1			37.1	0.0	2.5	2.3
Progression Factor			0.92	1.00	1.00	1.00
Incremental Delay, d2			0.9	0.2	0.2	0.3
Delay (s)			34.9	0.2	2.7	2.6
Level of Service			C	A	A	A
Approach Delay (s)	0.0			6.5	2.7	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	4.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

9: Lake Forest Drive & SR-241 SB Off-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	270	0	560	650	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	293	0	609	707	0
RTOR Reduction (vph)	0	183	0	0	0	0
Lane Group Flow (vph)	217	110	0	609	707	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	12.8	12.8		69.2	69.2	
Effective Green, g (s)	12.8	12.8		69.2	69.2	
Actuated g/C Ratio	0.14	0.14		0.77	0.77	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	488	225		2721	2721	
v/s Ratio Prot	0.06			0.17	c0.20	
v/s Ratio Perm		c0.07				
v/c Ratio	0.44	0.49		0.22	0.26	
Uniform Delay, d1	35.3	35.6		2.9	3.0	
Progression Factor	1.00	1.00		1.00	0.46	
Incremental Delay, d2	0.6	1.7		0.2	0.2	
Delay (s)	36.0	37.3		3.1	1.6	
Level of Service	D	D		A	A	
Approach Delay (s)	36.7			3.1	1.6	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

9: Lake Forest Drive & SR-241 SB Off-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	140	230	0	940	650	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	152	250	0	1022	707	0
RTOR Reduction (vph)	0	208	0	0	0	0
Lane Group Flow (vph)	152	42	0	1022	707	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	9.9	9.9		72.1	72.1	
Effective Green, g (s)	9.9	9.9		72.1	72.1	
Actuated g/C Ratio	0.11	0.11		0.80	0.80	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	378	174		2835	2835	
v/s Ratio Prot	c0.04			c0.29	0.20	
v/s Ratio Perm		0.03				
v/c Ratio	0.40	0.24		0.36	0.25	
Uniform Delay, d1	37.3	36.6		2.5	2.2	
Progression Factor	1.00	1.00		1.00	0.89	
Incremental Delay, d2	0.7	0.7		0.4	0.2	
Delay (s)	38.0	37.3		2.9	2.2	
Level of Service	D	D		A	A	
Approach Delay (s)	37.6			2.9	2.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	180	10	10	180	10	0	0	0	10	10	60
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	196	11	11	196	11	0	0	0	11	11	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	207			207			457	495	103	386	495	103
vC1, stage 1 conf vol							266	266		223	223	
vC2, stage 2 conf vol							190	228		163	272	
vCu, unblocked vol	207			207			457	495	103	386	495	103
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			100	100	100	98	98	93
cM capacity (veh/h)	1362			1362			593	588	932	675	592	932

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	33	130	76	11	130	76	0	0	11	76
Volume Left	33	0	0	11	0	0	0	0	11	0
Volume Right	0	0	11	0	0	11	0	0	0	65
cSH	1362	1700	1700	1362	1700	1700	1700	1700	675	861
Volume to Capacity	0.02	0.08	0.04	0.01	0.08	0.04	0.00	0.00	0.02	0.09
Queue Length 95th (ft)	2	0	0	1	0	0	0	0	1	7
Control Delay (s)	7.7	0.0	0.0	7.7	0.0	0.0	0.0	0.0	10.4	9.6
Lane LOS	A			A			A	A	B	A
Approach Delay (s)	1.1			0.4			0.0		9.7	
Approach LOS							A		A	

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	22.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	380	10	10	380	40	20	0	10	30	10	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	413	11	11	413	43	22	0	11	33	11	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	457			424			891	1092	212	870	1076	228
vC1, stage 1 conf vol							614	614		457	457	
vC2, stage 2 conf vol							277	478		413	620	
vCu, unblocked vol	457			424			891	1092	212	870	1076	228
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			99			94	100	99	92	97	94
cM capacity (veh/h)	1101			1132			361	352	793	419	371	774

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	98	275	149	11	275	181	22	11	33	54
Volume Left	98	0	0	11	0	0	22	0	33	0
Volume Right	0	0	11	0	0	43	0	11	0	43
cSH	1101	1700	1700	1132	1700	1700	361	793	419	636
Volume to Capacity	0.09	0.16	0.09	0.01	0.16	0.11	0.06	0.01	0.08	0.09
Queue Length 95th (ft)	7	0	0	1	0	0	5	1	6	7
Control Delay (s)	8.6	0.0	0.0	8.2	0.0	0.0	15.6	9.6	14.3	11.2
Lane LOS	A			A			C	A	B	B
Approach Delay (s)	1.6			0.2			13.6		12.4	
Approach LOS							B		B	

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	180	10	50	180	20	10	0	10	20	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	196	11	54	196	22	11	0	11	22	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	217			207			440	549	103	446	543	109
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	217			207			440	549	103	446	543	109
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			98	100	99	95	100	99
cM capacity (veh/h)	1349			1362			477	421	932	472	424	924

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	11	130	76	54	130	87	22	22	11
Volume Left	11	0	0	54	0	0	11	22	0
Volume Right	0	0	11	0	0	22	11	0	11
cSH	1349	1700	1700	1362	1700	1700	631	472	924
Volume to Capacity	0.01	0.08	0.04	0.04	0.08	0.05	0.03	0.05	0.01
Queue Length 95th (ft)	1	0	0	3	0	0	3	4	1
Control Delay (s)	7.7	0.0	0.0	7.8	0.0	0.0	10.9	13.0	8.9
Lane LOS	A			A			B	B	A
Approach Delay (s)	0.4			1.6			10.9	11.6	
Approach LOS							B	B	

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	430	0	30	390	20	30	0	50	20	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	467	0	33	424	22	33	0	54	22	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	446			467			777	1000	234	810	989	223
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	446			467			777	1000	234	810	989	223
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			88	100	93	91	100	99
cM capacity (veh/h)	1111			1090			274	232	768	245	236	781

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	11	312	156	33	283	163	87	22	11
Volume Left	11	0	0	33	0	0	33	22	0
Volume Right	0	0	0	0	0	22	54	0	11
cSH	1111	1700	1700	1090	1700	1700	458	245	781
Volume to Capacity	0.01	0.18	0.09	0.03	0.17	0.10	0.19	0.09	0.01
Queue Length 95th (ft)	1	0	0	2	0	0	17	7	1
Control Delay (s)	8.3	0.0	0.0	8.4	0.0	0.0	14.7	21.1	9.7
Lane LOS	A			A			B	C	A
Approach Delay (s)	0.2			0.6			14.7	17.3	
Approach LOS							B	C	

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	0	2	2	0	10	7	13	5	60	4	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	2	2	0	11	8	14	5	65	4	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	11			2			62	38	1	44	34	5
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			2			62	38	1	44	34	5
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	98	99	93	99	97
cM capacity (veh/h)	1608			1620			896	847	1083	936	852	1078

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	11	2	2	11	27	70	33
Volume Left	11	0	2	0	8	65	0
Volume Right	0	2	0	11	5	0	33
cSH	1608	1700	1620	1700	900	930	1078
Volume to Capacity	0.01	0.00	0.00	0.01	0.03	0.07	0.03
Queue Length 95th (ft)	1	0	0	0	2	6	2
Control Delay (s)	7.3	0.0	7.2	0.0	9.1	9.2	8.4
Lane LOS	A		A		A	A	A
Approach Delay (s)	6.0		1.2		9.1	8.9	
Approach LOS					A	A	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	23.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	0	7	6	0	40	4	9	4	10	16	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	8	7	0	43	4	10	4	11	17	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	43			8			123	126	4	109	108	22
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	43			8			123	126	4	109	108	22
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			99	99	100	99	98	97
cM capacity (veh/h)	1565			1613			795	746	1080	841	763	1055

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	33	8	7	43	18	28	33
Volume Left	33	0	7	0	4	11	0
Volume Right	0	8	0	43	4	0	33
cSH	1565	1700	1613	1700	817	791	1055
Volume to Capacity	0.02	0.00	0.00	0.03	0.02	0.04	0.03
Queue Length 95th (ft)	2	0	0	0	2	3	2
Control Delay (s)	7.3	0.0	7.2	0.0	9.5	9.7	8.5
Lane LOS	A		A		A	A	A
Approach Delay (s)	6.0		0.9		9.5	9.1	
Approach LOS					A	A	

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	120	640	610	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	130	696	663	120
RTOR Reduction (vph)	0	0	0	0	0	22
Lane Group Flow (vph)	0	0	130	696	663	98
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			8.8	90.0	73.2	73.2
Effective Green, g (s)			8.8	90.0	73.2	73.2
Actuated g/C Ratio			0.10	1.00	0.81	0.81
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			336	3539	2878	1288
v/s Ratio Prot			c0.04	0.20	c0.19	
v/s Ratio Perm						0.06
v/c Ratio			0.39	0.20	0.23	0.08
Uniform Delay, d1			38.1	0.0	1.9	1.7
Progression Factor			0.92	1.00	1.00	1.00
Incremental Delay, d2			0.7	0.1	0.2	0.1
Delay (s)			35.7	0.1	2.1	1.8
Level of Service			D	A	A	A
Approach Delay (s)	0.0			5.7	2.1	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	3.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	200	890	660	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	217	967	717	283
RTOR Reduction (vph)	0	0	0	0	0	60
Lane Group Flow (vph)	0	0	217	967	717	223
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			11.0	90.0	71.0	71.0
Effective Green, g (s)			11.0	90.0	71.0	71.0
Actuated g/C Ratio			0.12	1.00	0.79	0.79
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			420	3539	2792	1249
v/s Ratio Prot			c0.06	c0.27	0.20	
v/s Ratio Perm						0.14
v/c Ratio			0.52	0.27	0.26	0.18
Uniform Delay, d1			37.0	0.0	2.5	2.3
Progression Factor			0.91	1.00	1.00	1.00
Incremental Delay, d2			1.0	0.2	0.2	0.3
Delay (s)			34.9	0.2	2.7	2.6
Level of Service			C	A	A	A
Approach Delay (s)	0.0			6.5	2.7	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	4.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	270	0	580	640	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	293	0	630	696	0
RTOR Reduction (vph)	0	155	0	0	0	0
Lane Group Flow (vph)	217	138	0	630	696	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	13.8	13.8		68.2	68.2	
Effective Green, g (s)	13.8	13.8		68.2	68.2	
Actuated g/C Ratio	0.15	0.15		0.76	0.76	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	526	243		2682	2682	
v/s Ratio Prot	0.06			0.18	c0.20	
v/s Ratio Perm		c0.09				
v/c Ratio	0.41	0.57		0.23	0.26	
Uniform Delay, d1	34.4	35.3		3.2	3.3	
Progression Factor	1.00	1.00		1.00	0.50	
Incremental Delay, d2	0.5	3.0		0.2	0.2	
Delay (s)	35.0	38.4		3.4	1.9	
Level of Service	C	D		A	A	
Approach Delay (s)	36.9			3.4	1.9	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	230	0	950	650	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	250	0	1033	707	0
RTOR Reduction (vph)	0	208	0	0	0	0
Lane Group Flow (vph)	163	42	0	1033	707	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	10.1	10.1		71.9	71.9	
Effective Green, g (s)	10.1	10.1		71.9	71.9	
Actuated g/C Ratio	0.11	0.11		0.80	0.80	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	385	178		2827	2827	
v/s Ratio Prot	c0.05			c0.29	0.20	
v/s Ratio Perm		0.03				
v/c Ratio	0.42	0.24		0.37	0.25	
Uniform Delay, d1	37.2	36.4		2.6	2.3	
Progression Factor	1.00	1.00		1.00	0.88	
Incremental Delay, d2	0.8	0.7		0.4	0.2	
Delay (s)	38.0	37.1		2.9	2.2	
Level of Service	D	D		A	A	
Approach Delay (s)	37.5			2.9	2.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Intersection Analysis Data Set 3
2030 No-Project and With-Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	200	10	10	210	10	0	0	0	10	10	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	217	11	11	228	11	0	0	0	11	11	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	239			228			473	549	114	429	549	120
vC1, stage 1 conf vol							288	288		255	255	
vC2, stage 2 conf vol							185	261		174	293	
vCu, unblocked vol	239			228			473	549	114	429	549	120
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			100	100	100	98	98	95
cM capacity (veh/h)	1325			1337			592	565	917	647	570	909

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	33	145	83	11	152	87	0	0	11	54
Volume Left	33	0	0	11	0	0	0	0	11	0
Volume Right	0	0	11	0	0	11	0	0	0	43
cSH	1325	1700	1700	1337	1700	1700	1700	1700	647	813
Volume to Capacity	0.02	0.09	0.05	0.01	0.09	0.05	0.00	0.00	0.02	0.07
Queue Length 95th (ft)	2	0	0	1	0	0	0	0	1	5
Control Delay (s)	7.8	0.0	0.0	7.7	0.0	0.0	0.0	0.0	10.7	9.7
Lane LOS	A			A			A	A	B	A
Approach Delay (s)	1.0			0.3			0.0		9.9	
Approach LOS							A		A	

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

5: Auto Center Drive West & Towne Centre Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	60	370	10	10	360	30	20	0	10	20	10	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	402	11	11	391	33	22	0	11	22	11	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	424			413			793	984	207	772	973	212
vC1, stage 1 conf vol							538	538		429	429	
vC2, stage 2 conf vol							255	446		342	543	
vCu, unblocked vol	424			413			793	984	207	772	973	212
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			99			95	100	99	95	97	96
cM capacity (veh/h)	1132			1142			416	398	800	465	412	793

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	65	268	145	11	261	163	22	11	22	43
Volume Left	65	0	0	11	0	0	22	0	22	0
Volume Right	0	0	11	0	0	33	0	11	0	33
cSH	1132	1700	1700	1142	1700	1700	416	800	465	644
Volume to Capacity	0.06	0.16	0.09	0.01	0.15	0.10	0.05	0.01	0.05	0.07
Queue Length 95th (ft)	5	0	0	1	0	0	4	1	4	5
Control Delay (s)	8.4	0.0	0.0	8.2	0.0	0.0	14.1	9.6	13.1	11.0
Lane LOS	A			A			B	A	B	B
Approach Delay (s)	1.1			0.2			12.6		11.7	
Approach LOS							B		B	

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

6: Auto Center Drive East & Towne Centre Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	180	10	50	210	20	10	0	10	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	196	11	54	228	22	11	0	11	11	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	250			207			457	582	103	478	576	125
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250			207			457	582	103	478	576	125
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			98	100	99	98	100	99
cM capacity (veh/h)	1313			1362			464	403	932	448	406	902

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	11	130	76	54	152	98	22	11	11
Volume Left	11	0	0	54	0	0	11	11	0
Volume Right	0	0	11	0	0	22	11	0	11
cSH	1313	1700	1700	1362	1700	1700	619	448	902
Volume to Capacity	0.01	0.08	0.04	0.04	0.09	0.06	0.04	0.02	0.01
Queue Length 95th (ft)	1	0	0	3	0	0	3	2	1
Control Delay (s)	7.8	0.0	0.0	7.8	0.0	0.0	11.0	13.2	9.0
Lane LOS	A			A			B	B	A
Approach Delay (s)	0.4			1.4			11.0	11.1	
Approach LOS							B	B	

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

6: Auto Center Drive East & Towne Centre Drive

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	430	0	30	370	10	30	0	50	10	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	467	0	33	402	11	33	0	54	11	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	413			467			766	967	234	783	962	207
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	413			467			766	967	234	783	962	207
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			88	100	93	96	100	99
cM capacity (veh/h)	1142			1090			279	243	768	256	245	800

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	11	312	156	33	268	145	87	11	11
Volume Left	11	0	0	33	0	0	33	11	0
Volume Right	0	0	0	0	0	11	54	0	11
cSH	1142	1700	1700	1090	1700	1700	464	256	800
Volume to Capacity	0.01	0.18	0.09	0.03	0.16	0.09	0.19	0.04	0.01
Queue Length 95th (ft)	1	0	0	2	0	0	17	3	1
Control Delay (s)	8.2	0.0	0.0	8.4	0.0	0.0	14.5	19.7	9.6
Lane LOS	A			A			B	C	A
Approach Delay (s)	0.2			0.6			14.5	14.6	
Approach LOS							B	B	

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	0	2	2	0	8	7	13	5	52	4	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	0	2	2	0	9	8	14	5	57	4	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	9			2			53	29	1	36	26	4
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	9			2			53	29	1	36	26	4
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	98	99	94	99	97
cM capacity (veh/h)	1611			1620			911	858	1083	948	862	1079

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	8	2	2	9	27	61	30
Volume Left	8	0	2	0	8	57	0
Volume Right	0	2	0	9	5	0	30
cSH	1611	1700	1620	1700	911	941	1079
Volume to Capacity	0.00	0.00	0.00	0.01	0.03	0.06	0.03
Queue Length 95th (ft)	0	0	0	0	2	5	2
Control Delay (s)	7.2	0.0	7.2	0.0	9.1	9.1	8.4
Lane LOS	A		A		A	A	A
Approach Delay (s)	5.6		1.4		9.1	8.9	
Approach LOS					A	A	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	0	7	6	0	38	4	9	4	10	16	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	8	7	0	41	4	10	4	11	17	30
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	41			8			121	123	4	108	107	21
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	41			8			121	123	4	108	107	21
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			99	99	100	99	98	97
cM capacity (veh/h)	1568			1613			800	748	1080	842	764	1057

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	33	8	7	41	18	28	30
Volume Left	33	0	7	0	4	11	0
Volume Right	0	8	0	41	4	0	30
cSH	1568	1700	1613	1700	820	792	1057
Volume to Capacity	0.02	0.00	0.00	0.02	0.02	0.04	0.03
Queue Length 95th (ft)	2	0	0	0	2	3	2
Control Delay (s)	7.3	0.0	7.2	0.0	9.5	9.7	8.5
Lane LOS	A		A		A	A	A
Approach Delay (s)	6.0		1.0		9.5	9.1	
Approach LOS					A	A	

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	130	680	560	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	141	739	609	87
RTOR Reduction (vph)	0	0	0	0	0	17
Lane Group Flow (vph)	0	0	141	739	609	70
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			9.1	90.0	72.9	72.9
Effective Green, g (s)			9.1	90.0	72.9	72.9
Actuated g/C Ratio			0.10	1.00	0.81	0.81
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			347	3539	2867	1282
v/s Ratio Prot			c0.04	c0.21	0.17	
v/s Ratio Perm						0.04
v/c Ratio			0.41	0.21	0.21	0.05
Uniform Delay, d1			37.9	0.0	2.0	1.7
Progression Factor			0.87	1.00	1.00	1.00
Incremental Delay, d2			0.7	0.1	0.2	0.1
Delay (s)			33.9	0.1	2.1	1.8
Level of Service			C	A	A	A
Approach Delay (s)	0.0			5.5	2.1	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	4.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	400	990	750	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	435	1076	815	326
RTOR Reduction (vph)	0	0	0	0	0	58
Lane Group Flow (vph)	0	0	435	1076	815	268
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			16.8	90.0	65.2	65.2
Effective Green, g (s)			16.8	90.0	65.2	65.2
Actuated g/C Ratio			0.19	1.00	0.72	0.72
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			641	3539	2564	1147
v/s Ratio Prot			c0.13	c0.30	0.23	
v/s Ratio Perm						0.17
v/c Ratio			0.68	0.30	0.32	0.23
Uniform Delay, d1			34.1	0.0	4.4	4.1
Progression Factor			0.88	1.00	1.00	1.00
Incremental Delay, d2			2.5	0.2	0.3	0.5
Delay (s)			32.4	0.2	4.8	4.6
Level of Service			C	A	A	A
Approach Delay (s)	0.0			9.5	4.7	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	170	550	0	650	590	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	185	598	0	707	641	0
RTOR Reduction (vph)	0	52	0	0	0	0
Lane Group Flow (vph)	185	546	0	707	641	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	38.7	38.7		43.3	43.3	
Effective Green, g (s)	38.7	38.7		43.3	43.3	
Actuated g/C Ratio	0.43	0.43		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1476	681		1703	1703	
v/s Ratio Prot	0.05			c0.20	0.18	
v/s Ratio Perm		c0.34				
v/c Ratio	0.13	0.80		0.42	0.38	
Uniform Delay, d1	15.5	22.3		15.1	14.8	
Progression Factor	1.00	1.00		1.00	0.88	
Incremental Delay, d2	0.0	6.7		0.7	0.6	
Delay (s)	15.5	29.0		15.9	13.7	
Level of Service	B	C		B	B	
Approach Delay (s)	25.8			15.9	13.7	
Approach LOS	C			B	B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

9: Lake Forest Drive & SR-241 SB Off-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	260	0	1280	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	283	0	1391	793	0
RTOR Reduction (vph)	0	197	0	0	0	0
Lane Group Flow (vph)	163	86	0	1391	793	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	11.2	11.2		70.8	70.8	
Effective Green, g (s)	11.2	11.2		70.8	70.8	
Actuated g/C Ratio	0.12	0.12		0.79	0.79	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	427	197		2784	2784	
v/s Ratio Prot	0.05			c0.39	0.22	
v/s Ratio Perm		c0.05				
v/c Ratio	0.38	0.44		0.50	0.28	
Uniform Delay, d1	36.2	36.5		3.4	2.6	
Progression Factor	1.00	1.00		1.00	2.20	
Incremental Delay, d2	0.6	1.5		0.6	0.2	
Delay (s)	36.8	38.0		4.0	6.0	
Level of Service	D	D		A	A	
Approach Delay (s)	37.6			4.0	6.0	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	210	10	10	180	10	0	0	0	10	10	60
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	228	11	11	196	11	0	0	0	11	11	65
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	207			239			467	505	120	380	505	103
vC1, stage 1 conf vol							277	277		223	223	
vC2, stage 2 conf vol							190	228		158	283	
vCu, unblocked vol	207			239			467	505	120	380	505	103
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			100	100	100	98	98	93
cM capacity (veh/h)	1362			1325			594	589	909	681	590	932

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	22	152	87	11	130	76	0	0	11	76
Volume Left	22	0	0	11	0	0	0	0	11	0
Volume Right	0	0	11	0	0	11	0	0	0	65
cSH	1362	1700	1700	1325	1700	1700	1700	1700	681	860
Volume to Capacity	0.02	0.09	0.05	0.01	0.08	0.04	0.00	0.00	0.02	0.09
Queue Length 95th (ft)	1	0	0	1	0	0	0	0	1	7
Control Delay (s)	7.7	0.0	0.0	7.7	0.0	0.0	0.0	0.0	10.4	9.6
Lane LOS	A			A			A	A	B	A
Approach Delay (s)	0.6			0.4			0.0		9.7	
Approach LOS							A		A	

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	90	370	10	10	380	40	20	10	10	30	10	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	402	11	11	413	43	22	11	11	33	11	43
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	457			413			880	1082	207	870	1065	228
vC1, stage 1 conf vol							603	603		457	457	
vC2, stage 2 conf vol							277	478		413	609	
vCu, unblocked vol	457			413			880	1082	207	870	1065	228
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			99			94	97	99	92	97	94
cM capacity (veh/h)	1101			1142			365	354	800	412	375	774

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2
Volume Total	98	268	145	11	275	181	22	22	33	54
Volume Left	98	0	0	11	0	0	22	0	33	0
Volume Right	0	0	11	0	0	43	0	11	0	43
cSH	1101	1700	1700	1142	1700	1700	365	491	412	638
Volume to Capacity	0.09	0.16	0.09	0.01	0.16	0.11	0.06	0.04	0.08	0.09
Queue Length 95th (ft)	7	0	0	1	0	0	5	3	6	7
Control Delay (s)	8.6	0.0	0.0	8.2	0.0	0.0	15.5	12.7	14.5	11.2
Lane LOS	A			A			C	B	B	B
Approach Delay (s)	1.6			0.2			14.1		12.4	
Approach LOS							B		B	

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	170	10	50	180	20	10	0	10	20	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	185	11	54	196	22	11	0	11	22	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	217			196			429	538	98	440	533	109
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	217			196			429	538	98	440	533	109
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			96			98	100	99	95	100	99
cM capacity (veh/h)	1349			1375			485	427	939	477	430	924

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	11	123	72	54	130	87	22	22	11
Volume Left	11	0	0	54	0	0	11	22	0
Volume Right	0	0	11	0	0	22	11	0	11
cSH	1349	1700	1700	1375	1700	1700	640	477	924
Volume to Capacity	0.01	0.07	0.04	0.04	0.08	0.05	0.03	0.05	0.01
Queue Length 95th (ft)	1	0	0	3	0	0	3	4	1
Control Delay (s)	7.7	0.0	0.0	7.7	0.0	0.0	10.8	12.9	8.9
Lane LOS	A			A			B	B	A
Approach Delay (s)	0.4			1.5			10.8	11.6	
Approach LOS							B	B	

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	430	0	30	390	20	30	0	50	20	0	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	467	0	33	424	22	33	0	54	22	0	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	446			467			777	1000	234	810	989	223
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	446			467			777	1000	234	810	989	223
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			88	100	93	91	100	99
cM capacity (veh/h)	1111			1090			274	232	768	245	236	781

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2
Volume Total	11	312	156	33	283	163	87	22	11
Volume Left	11	0	0	33	0	0	33	22	0
Volume Right	0	0	0	0	0	22	54	0	11
cSH	1111	1700	1700	1090	1700	1700	458	245	781
Volume to Capacity	0.01	0.18	0.09	0.03	0.17	0.10	0.19	0.09	0.01
Queue Length 95th (ft)	1	0	0	2	0	0	17	7	1
Control Delay (s)	8.3	0.0	0.0	8.4	0.0	0.0	14.7	21.1	9.7
Lane LOS	A			A			B	C	A
Approach Delay (s)	0.2			0.6			14.7	17.3	
Approach LOS							B	C	

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	0	2	2	0	10	7	13	5	60	4	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	0	2	2	0	11	8	14	5	65	4	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	11			2			62	38	1	44	34	5
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	11			2			62	38	1	44	34	5
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			99	98	99	93	99	97
cM capacity (veh/h)	1608			1620			896	847	1083	936	852	1078

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	11	2	2	11	27	70	33
Volume Left	11	0	2	0	8	65	0
Volume Right	0	2	0	11	5	0	33
cSH	1608	1700	1620	1700	900	930	1078
Volume to Capacity	0.01	0.00	0.00	0.01	0.03	0.07	0.03
Queue Length 95th (ft)	1	0	0	0	2	6	2
Control Delay (s)	7.3	0.0	7.2	0.0	9.1	9.2	8.4
Lane LOS	A		A		A	A	A
Approach Delay (s)	6.0		1.2		9.1	8.9	
Approach LOS					A	A	

Intersection Summary			
Average Delay	8.1		
Intersection Capacity Utilization	23.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	0	7	6	0	40	4	9	4	10	16	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	0	8	7	0	43	4	10	4	11	17	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	43			8			123	126	4	109	108	22
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	43			8			123	126	4	109	108	22
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			99	99	100	99	98	97
cM capacity (veh/h)	1565			1613			795	746	1080	841	763	1055

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	33	8	7	43	18	28	33
Volume Left	33	0	7	0	4	11	0
Volume Right	0	8	0	43	4	0	33
cSH	1565	1700	1613	1700	817	791	1055
Volume to Capacity	0.02	0.00	0.00	0.03	0.02	0.04	0.03
Queue Length 95th (ft)	2	0	0	0	2	3	2
Control Delay (s)	7.3	0.0	7.2	0.0	9.5	9.7	8.5
Lane LOS	A		A		A	A	A
Approach Delay (s)	6.0		0.9		9.5	9.1	
Approach LOS					A	A	

Intersection Summary			
Average Delay	6.0		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	41	9	4	29	85	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	45	10	4	32	92	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					275	
pX, platoon unblocked						
vC, conflicting volume	124	54	108			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	124	54	108			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	99	100			
cM capacity (veh/h)	855	1002	1481			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	54	4	16	16	62	46
Volume Left	45	4	0	0	0	0
Volume Right	10	0	0	0	0	15
cSH	878	1481	1700	1700	1700	1700
Volume to Capacity	0.06	0.00	0.01	0.01	0.04	0.03
Queue Length 95th (ft)	5	0	0	0	0	0
Control Delay (s)	9.4	7.4	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.4	0.9			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	27	6	8	71	50	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	7	9	77	54	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)					275	
pX, platoon unblocked						
vC, conflicting volume	131	48	96			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	131	48	96			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	99	99			
cM capacity (veh/h)	845	1011	1496			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	36	9	39	39	36	59
Volume Left	29	9	0	0	0	0
Volume Right	7	0	0	0	0	41
cSH	871	1496	1700	1700	1700	1700
Volume to Capacity	0.04	0.01	0.02	0.02	0.02	0.03
Queue Length 95th (ft)	3	0	0	0	0	0
Control Delay (s)	9.3	7.4	0.0	0.0	0.0	0.0
Lane LOS	A	A				
Approach Delay (s)	9.3	0.8			0.0	
Approach LOS	A					

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	16.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	24	8	10	36	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	26	9	11	39	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	68	40	40			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	68	40	40			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	99			
cM capacity (veh/h)	932	1032	1569			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	28	9	11	40
Volume Left	2	9	0	0
Volume Right	26	0	0	1
cSH	1023	1569	1700	1700
Volume to Capacity	0.03	0.01	0.01	0.02
Queue Length 95th (ft)	2	0	0	0
Control Delay (s)	8.6	7.3	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.6	3.2		0.0
Approach LOS	A			

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	16.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	1	16	21	36	33	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	17	23	39	36	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	121	36	37			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121	36	37			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	99			
cM capacity (veh/h)	862	1036	1574			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	18	23	39	37
Volume Left	1	23	0	0
Volume Right	17	0	0	1
cSH	1024	1574	1700	1700
Volume to Capacity	0.02	0.01	0.02	0.02
Queue Length 95th (ft)	1	1	0	0
Control Delay (s)	8.6	7.3	0.0	0.0
Lane LOS	A	A		
Approach Delay (s)	8.6	2.7		0.0
Approach LOS	A			

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	17.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	120	660	550	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	130	717	598	98
RTOR Reduction (vph)	0	0	0	0	0	18
Lane Group Flow (vph)	0	0	130	717	598	80
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			8.8	90.0	73.2	73.2
Effective Green, g (s)			8.8	90.0	73.2	73.2
Actuated g/C Ratio			0.10	1.00	0.81	0.81
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			336	3539	2878	1288
v/s Ratio Prot			c0.04	c0.20	0.17	
v/s Ratio Perm						0.05
v/c Ratio			0.39	0.20	0.21	0.06
Uniform Delay, d1			38.1	0.0	1.9	1.7
Progression Factor			0.97	1.00	1.00	1.00
Incremental Delay, d2			0.7	0.1	0.2	0.1
Delay (s)			37.7	0.1	2.1	1.7
Level of Service			D	A	A	A
Approach Delay (s)	0.0			5.9	2.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	4.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	0	400	1010	730	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0	4.0	4.0	4.0
Lane Util. Factor			0.97	0.95	0.95	1.00
Frt			1.00	1.00	1.00	0.85
Flt Protected			0.95	1.00	1.00	1.00
Satd. Flow (prot)			3433	3539	3539	1583
Flt Permitted			0.95	1.00	1.00	1.00
Satd. Flow (perm)			3433	3539	3539	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	435	1098	793	326
RTOR Reduction (vph)	0	0	0	0	0	58
Lane Group Flow (vph)	0	0	435	1098	793	268
Turn Type			Prot	NA	NA	Perm
Protected Phases			5	2	6	
Permitted Phases						6
Actuated Green, G (s)			16.8	90.0	65.2	65.2
Effective Green, g (s)			16.8	90.0	65.2	65.2
Actuated g/C Ratio			0.19	1.00	0.72	0.72
Clearance Time (s)			4.0	4.0	4.0	4.0
Vehicle Extension (s)			3.0	3.0	3.0	3.0
Lane Grp Cap (vph)			641	3539	2564	1147
v/s Ratio Prot			c0.13	c0.31	0.22	
v/s Ratio Perm						0.17
v/c Ratio			0.68	0.31	0.31	0.23
Uniform Delay, d1			34.1	0.0	4.4	4.1
Progression Factor			0.88	1.00	1.00	1.00
Incremental Delay, d2			2.5	0.2	0.3	0.5
Delay (s)			32.4	0.2	4.7	4.6
Level of Service			C	A	A	A
Approach Delay (s)	0.0			9.3	4.7	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

9: Lake Forest Drive & SR-241 SB Off-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	160	550	0	640	590	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	598	0	696	641	0
RTOR Reduction (vph)	0	52	0	0	0	0
Lane Group Flow (vph)	174	546	0	696	641	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	38.7	38.7		43.3	43.3	
Effective Green, g (s)	38.7	38.7		43.3	43.3	
Actuated g/C Ratio	0.43	0.43		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1476	681		1703	1703	
v/s Ratio Prot	0.05			c0.20	0.18	
v/s Ratio Perm		c0.34				
v/c Ratio	0.12	0.80		0.41	0.38	
Uniform Delay, d1	15.4	22.3		15.1	14.8	
Progression Factor	1.00	1.00		1.00	0.89	
Incremental Delay, d2	0.0	6.7		0.7	0.6	
Delay (s)	15.4	29.0		15.8	13.8	
Level of Service	B	C		B	B	
Approach Delay (s)	26.0			15.8	13.8	
Approach LOS	C			B	B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

9: Lake Forest Drive & SR-241 SB Off-Ramp

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	160	260	0	1280	720	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3433	1583		3539	3539	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3433	1583		3539	3539	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	174	283	0	1391	783	0
RTOR Reduction (vph)	0	201	0	0	0	0
Lane Group Flow (vph)	174	82	0	1391	783	0
Turn Type	NA	Perm		NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	11.2	11.2		70.8	70.8	
Effective Green, g (s)	11.2	11.2		70.8	70.8	
Actuated g/C Ratio	0.12	0.12		0.79	0.79	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	427	197		2784	2784	
v/s Ratio Prot	0.05			c0.39	0.22	
v/s Ratio Perm		c0.05				
v/c Ratio	0.41	0.41		0.50	0.28	
Uniform Delay, d1	36.3	36.4		3.4	2.6	
Progression Factor	1.00	1.00		1.00	2.21	
Incremental Delay, d2	0.6	1.4		0.6	0.2	
Delay (s)	37.0	37.8		4.0	6.0	
Level of Service	D	D		A	A	
Approach Delay (s)	37.5			4.0	6.0	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			