Hatch Mott MacDonald

HOLLISTER 6-PARCEL PREZONE

TRAFFIC IMPACT ANALYSIS

HOLLISTER, CALIFORNIA

Draft Report

Prepared For

EMC Planning Group
Monterey, CA
Hollister, CA

February 20, 2015

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LIST OF EXHIBITS

LIST OF APPENDICES

1 INTRODUCTION

This traffic study analyzes the potential traffic impacts associated with the proposed development of six parcels located in Hollister, California. In total, 80 single-family homes are proposed for development on the six parcels, along with completion of currently discontinuous streets. The parcels are located between El Cerro Drive and Los Altos Drive, south Hillcrest Road. The location of the proposed development is shown on **Exhibit 1**. **Exhibit 2A** shows the location of the six study parcels with respect to the local road network.

Exhibits 2B, 2C and 2D show the proposed layout of the residential lots and the street network associated with the proposed developments. **Exhibit 2E** provides a graphic showing individual project layouts consolidated onto one map. The specific street network improvements are labeled on **Exhibit 2E** and are described below.

A – Upgrade El Cerro Drive to a standard street section south of Hillcrest Road and extend El Cerro Drive to connect to the existing segment of El Cerro Drive, north of Poppy Lane Circle.
B – Extend Sawtooth Drive to El Cerro Drive.
E – Extend Sawtooth Drive to connect to the Trinity Drive extension.
F – Extend Trinity Drive into the Brigantino development with a connection to Sawtooth Drive.
G – Extend Bonnie View Drive to the south and connect to El Cerro Drive (C) and existing Bonnie View Road (D).

1.1 Scope of Work

The project would add new trips to the road network. Due to the relatively good historical levels of service along the Hillcrest Road corridor, the low levels of congestion anticipated with a typical residential neighborhood, and because traffic operations are typically worst during the evening period, the focus of this analysis is on the daily and PM peak hour operations of the neighborhood streets.

Traffic operations for the following development scenarios were analyzed:

- Existing Conditions
- Existing Plus Project Conditions
- Background Conditions
- Background Plus Project Conditions
- Cumulative Without Project Conditions
- Cumulative Plus Project Conditions

The intersections and street segments that were studied are shown on **Exhibit 2F**. Weekday PM peak hour traffic conditions were analyzed at the following study intersections:

1. El Cerro Drive / Hillcrest Road
2. Clearview Drive / Hillcrest Road
3. Bonnie View Drive / Sawtooth Drive
4. Clearview Drive / Sawtooth Drive
5. Clearview Drive / El Camino De Vida
6. Trinity Drive / El Camino De Vida
7. El Cerro Drive / Sawtooth Drive (new intersection)

The increase in daily traffic that would be anticipated on the following streets is also analyzed:

1. Sawtooth Drive, Clearview Drive to Trinity Drive (Location E);
2. Trinity Drive, El Camino De Vida to Sawtooth Drive (Location F);
3. Sawtooth Drive, El Cerro Drive to Bonnie View Drive (Location B);
4. Bonnie View Drive, El Cerro Drive to Bonnie View Road (Location C); and
5. Bonnie View Drive, south of Sawtooth Drive (Location G);

The location of the study street segments is shown on **Exhibit 2F**.

The potential change in traffic on the following streets due to the completion of formerly discontinuous streets is analyzed:

1. El Cerro Road, north of Poppy Lane Drive (Location A);
2. Bonnie View Road, south of Bonnie View Drive (Location D).

The potential operational effects of the possible extension of El Dorado Drive into the proposed Brigantino project on Trinity Drive are analyzed qualitatively (Location H).

Improvements recommended for existing traffic conditions as well as mitigations for impacts created by the proposed project are recommended where warranted.

1.2 Traffic Operation Evaluation Methodologies and Level of Service Standards

Intersection traffic operations were evaluated based on the level of service (LOS) concept. LOS is a qualitative description of an intersection's operation, ranging from LOS A to LOS F. Level of Service A represents free flow uncongested traffic conditions. Level of service F represents highly congested traffic conditions with unacceptable delay to vehicles at intersections. The intermediate levels of service represent incremental levels of congestion and delay between these two extremes. LOS descriptions for unsignalized intersections are included as **Appendix A**.

The City of Hollister has established a level of service (LOS) of "C" for the accepted minimum standard of operation for intersections. For this study, LOS C was considered the minimum acceptable level of service for overall intersection operations. The Synchro software program (Version 8.0) was utilized to calculate the LOS values for the study intersections, based on technical procedures documented in the *2010 Highway Capacity Manual*.

Caltrans peak-hour volume signal and channelization warrants were evaluated for the study intersections where appropriate.

1.3 Significance Criteria

All of the study intersections are unsignalized. For unsignalized intersections, the project would create a significant adverse impact on traffic conditions if the following criteria are met:

All-way stop

1. The average overall peak hour level of service at the intersection is LOS C or better without the project: The project traffic causes the peak hour level of service to degrade from an acceptable LOS C or better under no project conditions to an unacceptable LOS D or worse under project conditions.

2. The average overall peak hour level of service is already at an unacceptable LOS D or worse without the project: The addition of project traffic causes the average overall delay to increase five (5) or more seconds.

One-or two-way stop

1. The peak hour delay on the worst approach at a one- or two-way stop-controlled intersection is LOS C or better without the project: The peak hour delay on the worst approach at a one- or two-way stop-controlled intersection degrades from an acceptable LOS C or better under no project conditions to an unacceptable LOS D or worse under project conditions and the traffic volumes at the intersection under project conditions are high enough to satisfy the peak-hour volume traffic signal warrant adopted by Caltrans.
2. The peak hour delay on the worst approach at a one- or two-way stop-controlled intersection is already at an unacceptable LOS D or worse without the project: The traffic volumes at the intersection under project conditions are high enough to satisfy the peak-hour volume traffic signal warrant adopted by Caltrans, and the addition of project traffic causes the delay on the worst stop-controlled approach to increase beyond what it was without the project.

2 EXISTING CONDITIONS

This section of the report evaluates existing conditions and includes a description of the project setting.

2.1 Existing Road Network

Regional access to the project area is provided by Highways 25 and 156. Direct access to the project area is provided by Hillcrest Road.

Highway 25 is a major north-south highway through Monterey, San Benito, and Santa Clara Counties. Highway 25 provides primary access between San Benito and Santa Clara Counties via its connection to Highway 101 south of Gilroy. Highway 25 is also a major arterial through the City of Hollister. It also provides primary north-south access through San Benito County south of Hollister as Airline Highway.

Highway 156 is a major east-west highway connecting northern Monterey County and the Central Valley over two distinct segments. The easternmost segment extends from Highway 101 west of San Juan Bautista to Highway 152 north of Hollister, and is a major freight and commuter route.

Hillcrest Road is an east-west major collector that extends between Fairview Road and McCray Street. West of McCray Street, Hillcrest Road changes designation to South Street. From McCray Street to Memorial Drive, Hillcrest Road is a three-lane roadway segment (two eastbound lanes and one westbound lane). Between Memorial Drive and Fairview Road, Hillcrest Road is a two-lane roadway.

Fairview Road is an arterial traveling in the north-south direction. Fairview Road is located to the east of the City of Hollister.

El Cerro Drive, Clearview Drive, Sawtooth Drive, Trinity Drive and El Camino De Vida are local residential streets.

2.2 Existing Conditions Traffic Volumes

To ascertain the existing weekday PM peak hour traffic conditions, weekday turning movement counts were collected at the study intersections. Traffic counts at the study intersections were conducted on Thursday, January 22, 2015 from 4:00 to 6:00 p.m. The existing weekday PM peak hour traffic volumes at the study intersections are shown on **Exhibit 3**.

2.3 Existing Conditions Intersection Operations

All of the study intersections operate at acceptable levels of service under Existing traffic conditions during the weekday PM peak hour. Weekday PM peak hour intersection levels of service are summarized in **Exhibit 4**. Level of service calculation worksheets are included as **Appendix B** through **Appendix G**.

According to City of Hollister LOS standards the study intersections operate acceptably under Existing Conditions and no improvements are currently recommended from a level of service standpoint.

3 EXISTING PLUS PROJECT CONDITIONS

This section of the report describes the analyses of the study road network under Existing Plus Project traffic conditions. The section includes the analysis of project trip generation, distribution and assignment.

3.1 Project Description

The proposed project involves the development of 80 residential homes on six parcels in the City of Hollister. Development of the project would complete several street segments that would provide new access and circulation opportunities for existing development in the vicinity of the project.

3.2 Project Trip Generation

The estimated trip generation for the project is shown on **Exhibit 5**. Based upon trip generation rates published by the Institute of Transportation Engineers, the project is estimated to generate 762 trips per day, with 61 trips generated during the AM peak hour and 80 trips generated during the PM peak hour.

3.3 Project Trip Distribution and Assignment

The project trip distribution was estimated based upon existing traffic patterns and the locations of complementary land uses. The project trip distribution is summarized in the following table:

To / From	Percentage
West via Hillcrest Road	55%
East via Hillcrest Road	15%
South via El Toro, Bonnie View & Clearview	30%
Total	**100%**

The project PM peak hour trips were assigned to the local road network based on the preceding trip distribution percentages. The project PM peak hour trip assignment is shown on **Exhibit 6**.

3.4 Traffic Diversions

The roadway infrastructure developed by the project will complete currently discontinuous streets. This will provide existing traffic with alternative travel routes and traffic diversions are anticipated.

Potential traffic diversions were estimated based upon the PM peak hour traffic volumes shown on **Exhibit 3**. In addition, traffic volume data collected on Poppy Lane and Bonnie View Road using machine tube counters during the week of January 19, 2015 were also reviewed to assess the potential diversion from these streets with the connection of El Cerro Drive and Bonnie View Road to the road network to the north. The estimated traffic diversion during the PM peak hour upon completion of the project road network is shown on **Exhibit 7**.

3.5 Existing Plus Project Traffic Volumes

Trips generated by the project were combined with existing traffic volumes and the traffic diversions to obtain Existing Plus Project traffic volumes, which are shown on **Exhibit 8**.

3.6 Existing Plus Project Conditions Intersection Operations

All of the study intersections are projected to operate at acceptable levels of service under Existing Plus Project conditions. All intersections would operate at LOS A overall, as with existing conditions. Weekday PM peak hour intersection levels of service are summarized on **Exhibit 4**. Level of service calculation worksheets are included in **Appendix B** through **Appendix H**.

According to City of Hollister LOS standards the study intersections will operate acceptably under Existing Plus Project and no improvements are recommended from a level of service standpoint.

3.7 Daily Traffic Volumes

The increase in daily traffic volume was estimated at the locations where new street connections and extensions are to occur as shown on **Exhibit 2E**. **Exhibit 9** shows the daily traffic volumes at these locations. The traffic volume at the locations would consist of project generated trips and/or existing traffic that was diverted from other travel routes. The daily traffic volumes shown on **Exhibit 9** were estimated based upon the peak hour traffic volumes collected at the study intersections and daily traffic volume counts collected using machine tube counters on Bonnie View Road north of Sunnyslope Road and on Poppy Lane.

The highest increase in daily traffic volume is forecast at the existing northern terminus of Bonnie View Road (Location D) where a daily traffic volume of 316 vehicles is forecast after completion of the project. By comparison, the existing daily traffic volume on Bonnie View Road north of Sunnyslope Road is 383 vehicles per day based upon the traffic volume data collected during the week of January 19, 2015. Further, residential streets are considered to operate at LOS A when carrying up to 1,200 vehicles per day. No significant operational problems are anticipated to occur on the local residential streets because of the development of the proposed project.

The Brigantino lot layout could be modified to incorporate an extension of El Dorado Drive into the Brigantino development. (See **Exhibit 2D**.) This would provide Brigantino residents and as well as residents located west of Brigantino with the opportunity to connect to Los Altos Drive to access Hillcrest Road. Because the predominant trips generated by the local neighborhood development is predominantly oriented to and from the west, the amount of diversion from west to east would be relatively minimal, but trips generated by the Brigantino development oriented to/from the east would likely divert to Los Altos Drive due to shorter travel distances.

The El Dorado extension would also allow residents in the El Dorado-Los Altos Drive neighborhood with the opportunity to access Hillcrest Road via Clearview Drive rather than Los Altos Drive. In addition, some El Dorado-Los Altos Drive residents with destinations to the south would travel through the Brigantino development to access Clearview Drive (via Trinity Drive or Sawtooth Drive). Due to the low density of development in the El Dorado-Los Altos Drive neighborhood, the volume of traffic that would be added to Trinity Drive and Sawtooth Drive would be relatively small and would not create significant operational impacts.

4 BACKGROUND CONDITIONS

This section of the report describes the analyses of the study road network under background traffic conditions. Background conditions models traffic conditions with traffic from approved but not yet constructed developments added to the study intersections.

4.1 Background Conditions Traffic Volumes

A listing of approved but not yet constructed or occupied projects within San Benito County and the City of Hollister are included in **Appendix I**. The list of approved projects was referenced from *Gonzales Property Residential Transportation Impact Analysis*, Hexagon Transportation Consultants, October 30, 2014.

Weekday PM peak hour traffic generated by approved projects were estimated and assigned to the local road network and combined with existing peak hour traffic volumes to obtain background condition PM peak hour traffic volumes, which are shown on **Exhibit 9**. The analysis of Background Conditions assumes full development of the approved projects.

4.2 Background Conditions Intersection Operations

Intersection levels of service for the Background Condition are summarized on **Exhibit 4**. Level of service calculation worksheets are included in **Appendix B** through **Appendix G**.

All study intersections will operate at LOS A overall under Background Conditions, which would better than the LOS C standard for the City of Hollister.

5 BACKGROUND PLUS PROJECT CONDITIONS

This section of the report describes the analysis of the study road network under Background Plus Project traffic conditions. Background Plus Project conditions includes traffic from approved but not yet constructed developments and project traffic added to the existing traffic volumes at the study intersections.

5.1 Background Plus Project Conditions Traffic Volumes

The project trip assignment and the traffic diversions associated with the completed street network were combined with the Background peak hour volumes to obtain Background Plus Project Buildout conditions traffic volumes, which are shown in **Exhibits 10**.

5.2 Background Plus Project Conditions Intersection Operations

Intersection levels of service for the Background Plus Project Conditions are summarized on **Exhibit 4**. LOS calculation worksheets are included in **Appendix B** through **Appendix H**.

All study intersections are projected to operate at a LOS A overall during the PM peak hour under Background Plus Project traffic conditions.

The northbound Clearview Drive approach to Hillcrest Road is projected to operate at LOS F during the PM peak hour under Background Plus Project Conditions. Under Background Conditions, the northbound Clearview Drive approach to Hillcrest Road would also operate at LOS F and the project would cause the delay on the approach to increase by 9.1 seconds. These conditions partially satisfy the impact significance criteria contained in Section 1.3 of this report. However, the volumes at the intersection would not be sufficiently high to meet the California MUTCD Peak Hour Volume traffic signal warrant criteria, which is required to meet the significance criteria. The signal warrant worksheet for the Clearview Drive/Hillcrest Road intersection is included in **Appendix J**. Therefore, the project's impact to the intersection is not significant.

Based upon the analysis of Background and Background Plus Project Conditions, the project would not significantly impact the study intersections.

5.3 Daily Traffic Volumes

Development of the approved projects should not result in significant changes to the peak hour traffic volumes carried on the local residential streets in the study area. Therefore, the daily traffic volume estimates provided in the Existing Plus Project section of this report should also be valid for the analysis of Background Plus Project Conditions.

6 CUMULATIVE CONDITIONS

This section of the report describes the analyses of the study road network under Cumulative 2035 traffic conditions. The cumulative conditions analysis is based on the 2035 traffic volume forecasts from the San Benito County General Plan Draft PEIR.

Future growth based upon the 2025 traffic volume forecasts documented in the San Benito County General Plan Draft PEIR were used to quantify cumulative condition traffic volumes at the two study intersections on Hillcrest Road. For the remaining study intersections, as well as all of the study segments, little traffic growth is anticipated beyond the Background Plus Project traffic volumes for the cumulative condition, primarily due to few vacant parcels in the immediate neighborhood. The Existing Plus Project and Background Plus Project analyses established that the intersections of the local residential streets will operate at LOS A during the PM peak hour for the Existing and Background analysis scenarios (Intersections 3 through 7). There is sufficient additional capacity at these intersections to serve additional traffic demand should volumes at these intersections increase as a result of further development in the City and County. Therefore, the analysis of Cumulative Conditions was limited to the Hillcrest Road / El Cerro Drive and Hillcrest Road / Clearview Drive intersections.

6.1 Cumulative Conditions Traffic Volumes

Cumulative growth in traffic volumes at the two Hillcrest Road study intersections was estimated based on the percent increases between the existing and 2035 General Plan forecast volumes in the San Benito County General Plan Draft PEIR. Cumulative conditions traffic volumes without the proposed project are shown on **Exhibit 11**.

6.2 Cumulative Conditions Intersection Operations

Intersection levels of service are summarized in **Exhibit 4**. LOS calculation worksheets are included in **Appendix B** and **Appendix C**.

The two Hillcrest Road study intersections are projected to operate at LOS A overall under Cumulative without project conditions.

7 CUMULATIVE PLUS PROJECT CONDITIONS

This section of the report describes the analysis of the study road network under Cumulative Plus Project Buildout traffic conditions.

7.1 Cumulative Plus Project Conditions Traffic Volumes

The trips generated by the proposed project including the traffic diversions were combined with the Cumulative peak hour volumes to obtain Cumulative Plus Project conditions traffic volumes, which are shown in **Exhibit 12**.

7.2 Cumulative Plus Project Conditions Intersection Operations

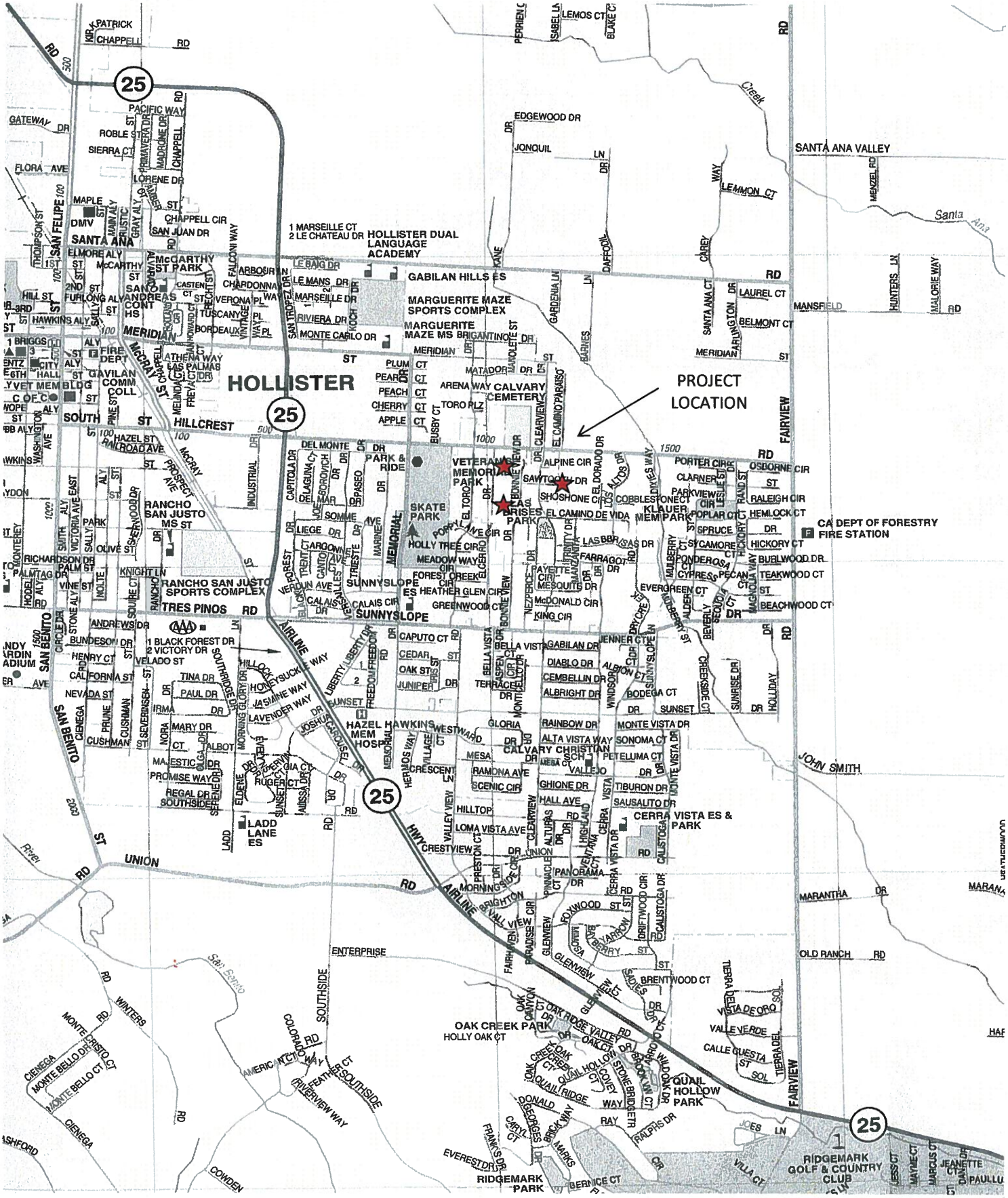
Intersection levels of service are summarized in **Exhibit 4**. LOS calculation worksheets are included in **Appendix B** and **Appendix C**.

The two Hillcrest Road intersections are projected to operate at LOS A overall under Cumulative With Project Conditions. As with the previous analysis scenarios, the northbound Clearview Drive approach to Hillcrest Road is projected to operate at LOS F during the PM peak hour. However, volumes at the intersection would not be sufficiently high to meet the California MUTCD Peak Hour Volume traffic signal warrant criteria, which are required to meet the significance criteria. Therefore, intersection signalization at this intersection is not recommended. Clearview

8 CONCLUSIONS

This traffic impact analysis evaluated the potential impacts from the traffic that would be generated by the proposed 6-Parcel Prezone project on the surrounding road network.

Development of the project would not create significant traffic impacts to the intersections that were studied. In addition, no significant operational problems are anticipated to occur on the local residential streets because of the development of the proposed project.



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Exhibits1.xls - Ex 1

EXHIBIT 1
PROJECT LOCATION

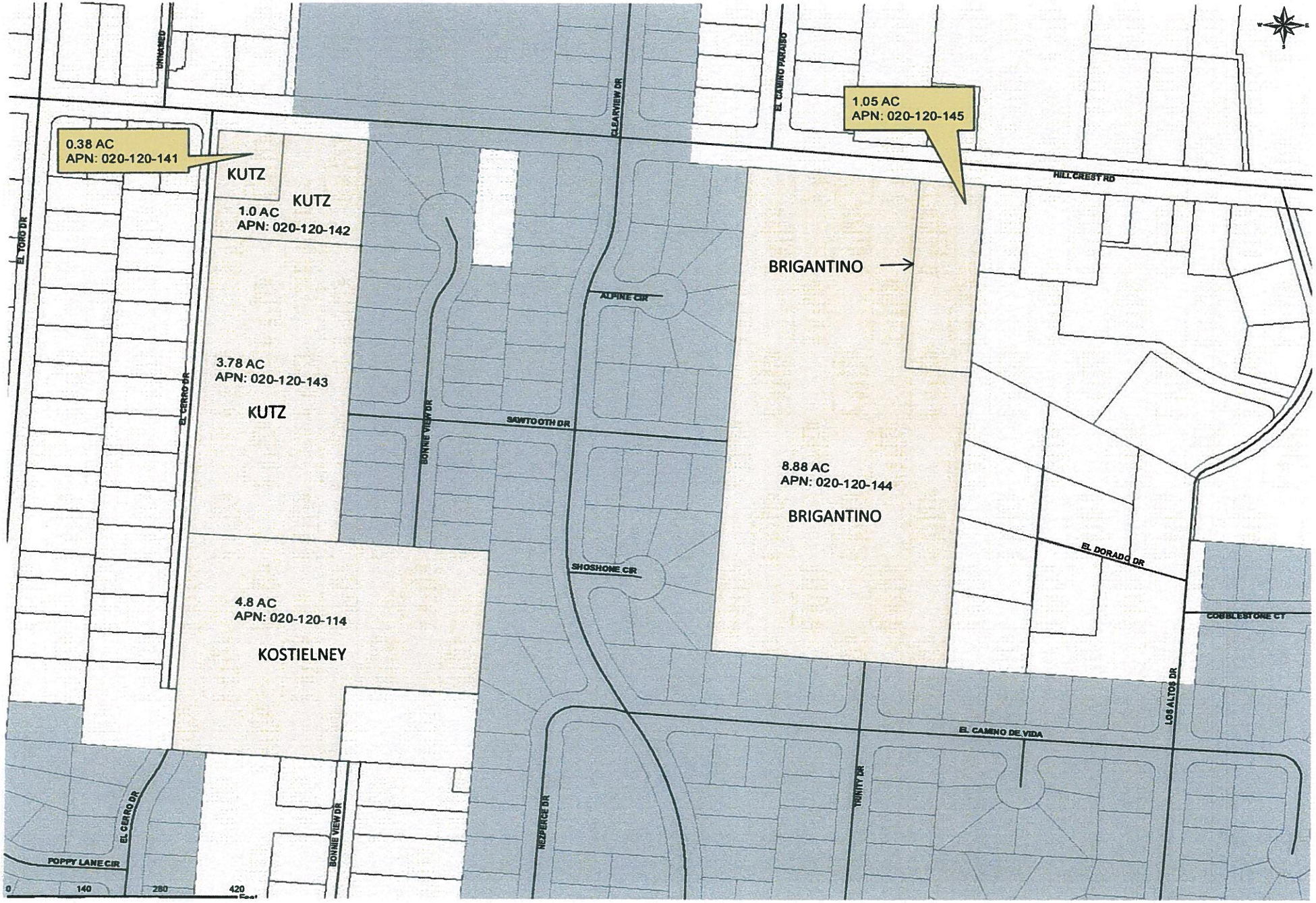
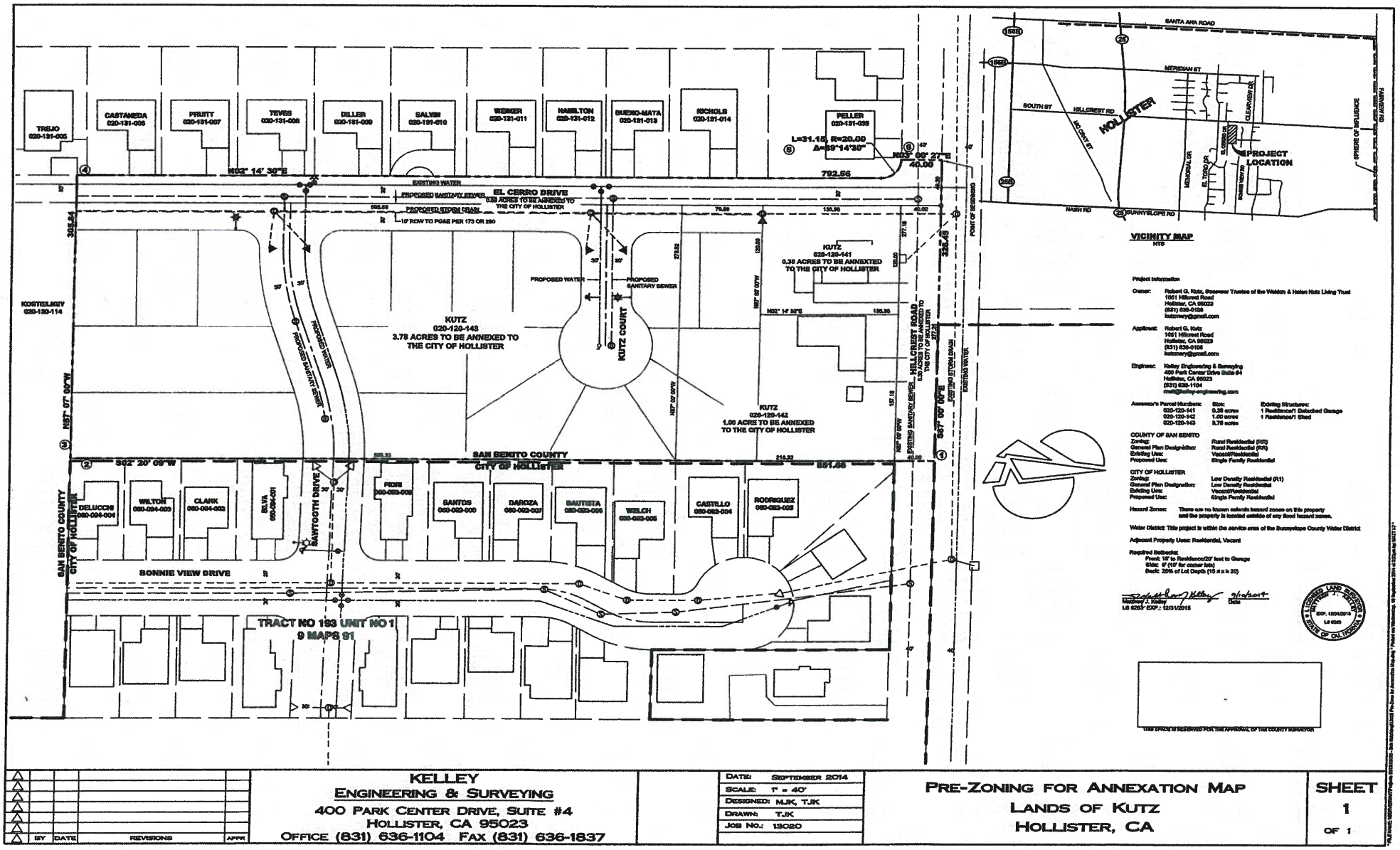


EXHIBIT 2A
PROJECT
PARCEL MAP



Project Information

Owner: Robert G. Kutz, Successor Trustee of the Weldon & Helen Kutz Living Trust
1061 Hillcrest Road
Hollister, CA 95023
(831) 636-0108
kutzmary@gmail.com

Applicant: Robert G. Kutz
1061 Hillcrest Road
Hollister, CA 95023
(831) 636-0108
kutzmary@gmail.com

Engineer: Kelley Engineering & Surveying
400 Park Center Drive Suite #4
Hollister, CA 95023
(831) 636-1104
mail@kelley-engineering.com

Assessor's Parcel Numbers:	Size:	Existing Structures:
020-120-141	0.38 acres	1 Residence/1 Detached Garage
020-120-142	1.00 acres	1 Residence/1 Shed
020-120-143	3.78 acres	

COUNTY OF SAN BENITO
Zoning: Rural Residential (RR)
General Plan Designation: Rural Residential (RR)
Existing Use: Vacant/Residential
Proposed Use: Single Family Residential

CITY OF HOLLISTER
Zoning: Low Density Residential (R1)
General Plan Designation: Low Density Residential
Existing Use: Vacant/Residential
Proposed Use: Single Family Residential

Hazard Zones: There are no known natural hazard zones on this property and the property is located outside of any flood hazard zones.

Water District: This project is within the service area of the Sunnyslope County Water District

Adjacent Property Uses: Residential, Vacant

Required Setbacks:
Front: 15' to Residence/20' feet to Garage
Side: 5' (10' for corner lots)
Back: 20% of Lot Depth (15 ft min 20)

Stephen J. Kelley
LS 6283 EXP.: 12/31/2015

LICENSED LAND SURVEYOR
STEPHEN J. KELLEY
No. 6283
EXP. 12/31/2015
STATE OF CALIFORNIA

THIS SPACE IS RESERVED FOR THE APPROVAL OF THE COUNTY SURVEYOR

BY	DATE	REVISIONS	APPR

KELLEY
ENGINEERING & SURVEYING
400 PARK CENTER DRIVE, SUITE #4
HOLLISTER, CA 95023
OFFICE (831) 636-1104 FAX (831) 636-1837

DATE:	SEPTEMBER 2014
SCALE:	1" = 40'
DESIGNED:	MJK, TJK
DRAWN:	TJK
JOB NO.:	13020

PRE-ZONING FOR ANNEXATION MAP
LANDS OF KUTZ
HOLLISTER, CA

SHEET 1 OF 1

EXHIBIT 2B
PROJECT SITE PLAN
LANDS OF KUTZ

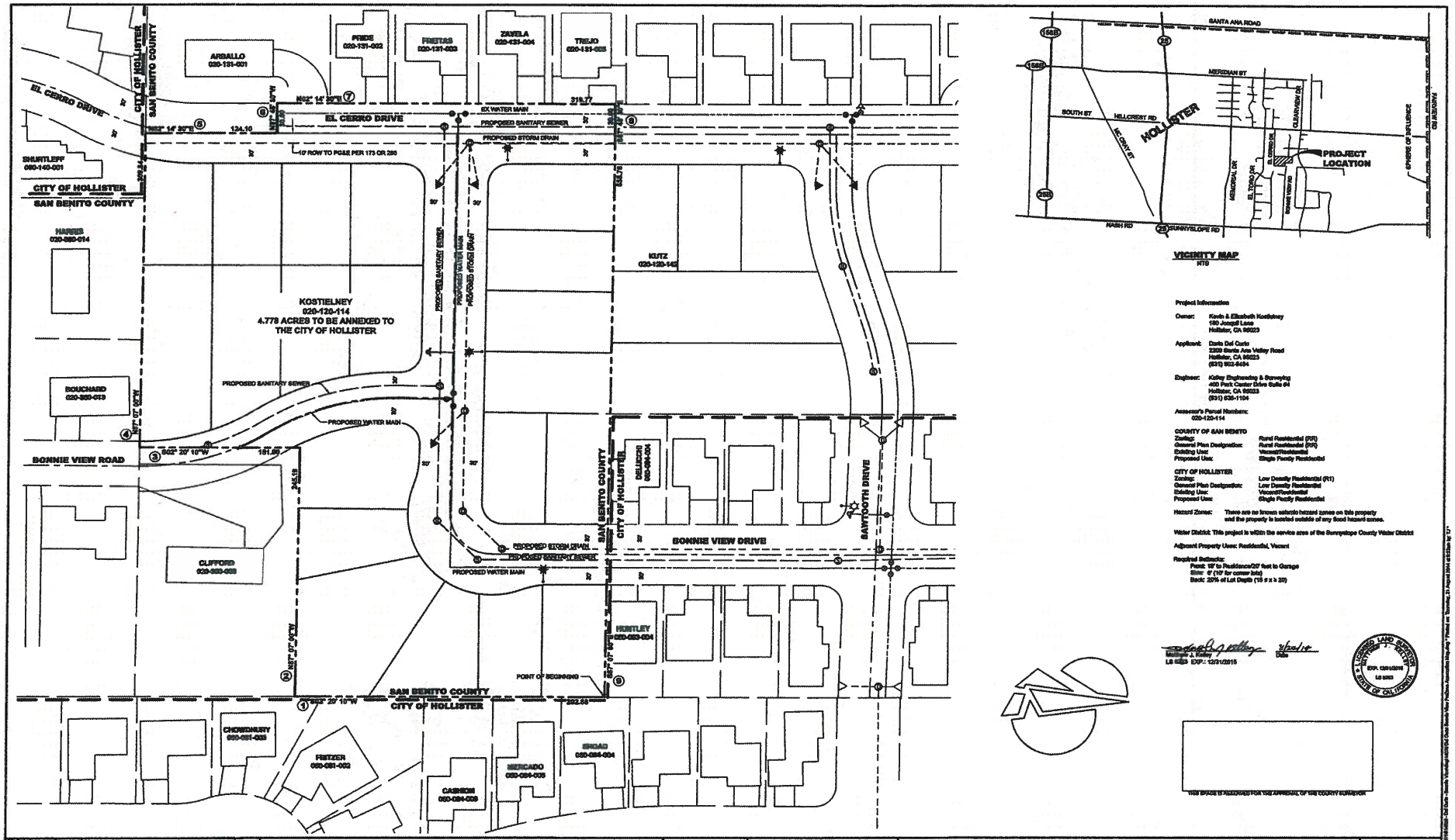


EXHIBIT 2C
PROJECT SITE PLAN
LANDS OF KOSTIELNEY

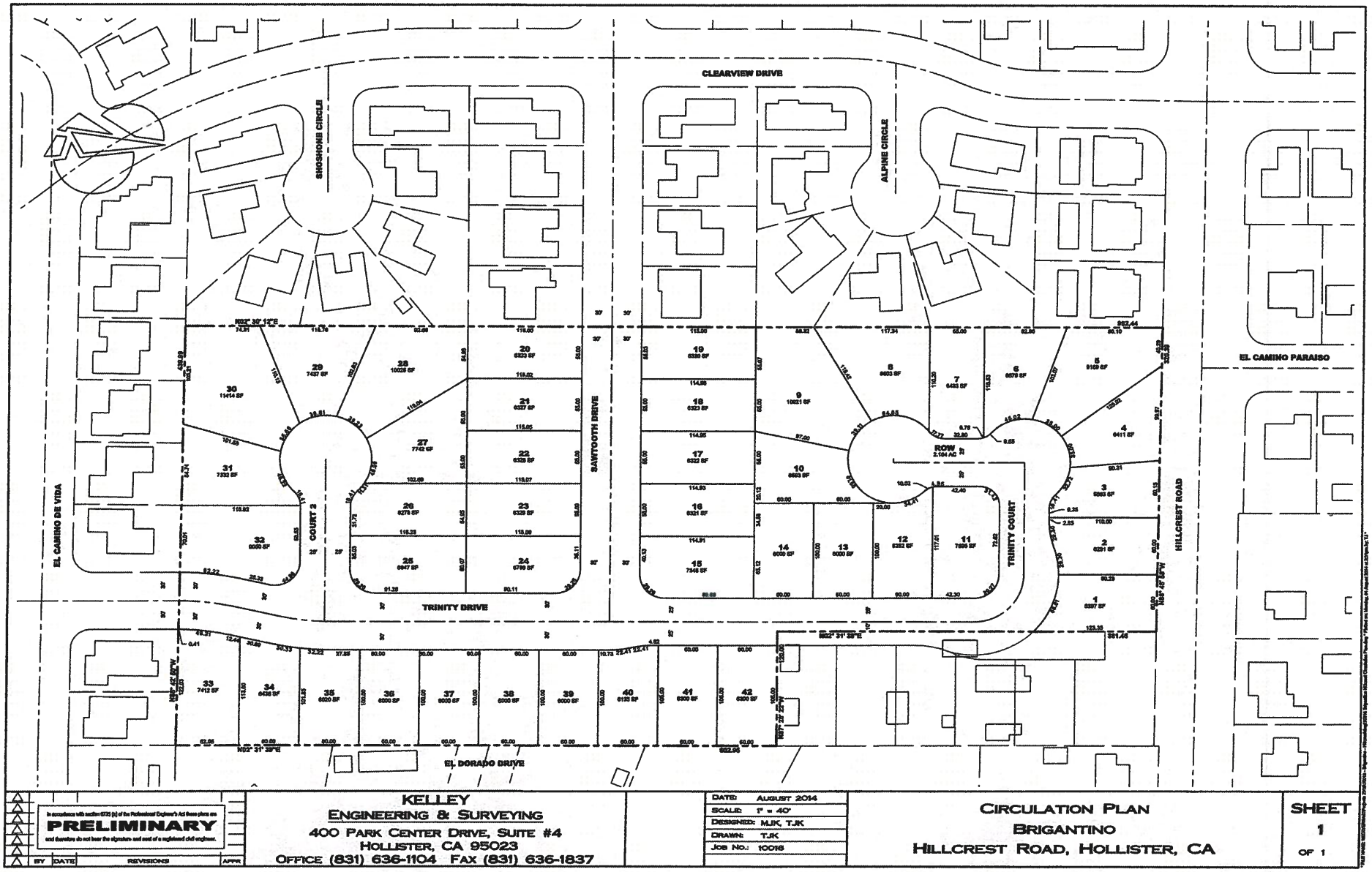


EXHIBIT 2D
PROJECT SITE PLAN
BRIGANTINO

EXHIBIT 2E
CONSOLIDATED PROJECT
PARCEL MAPS

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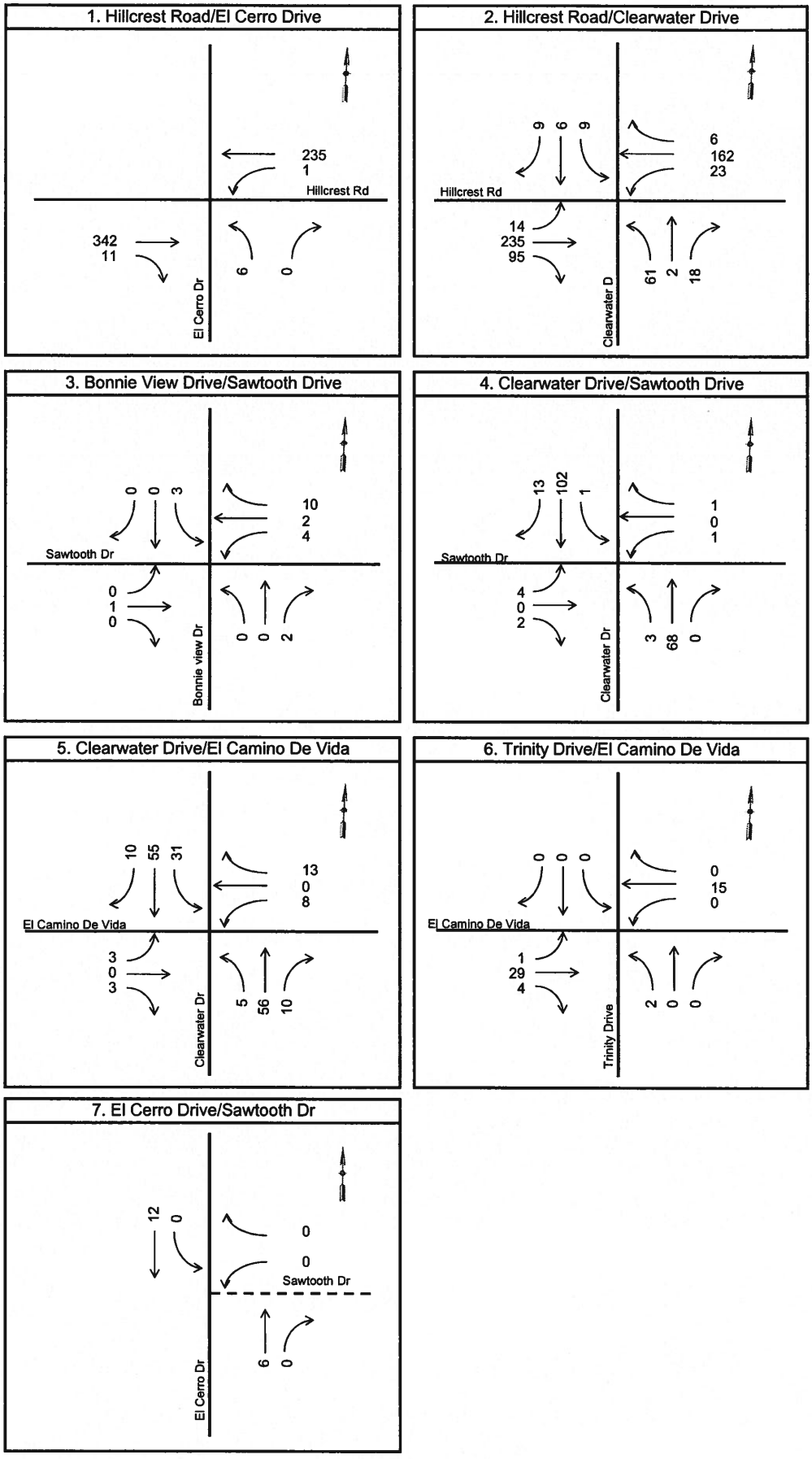
Exhibits1.xls - Ex 2F Study Facilities

EXHIBIT 2F
STUDY FACILITIES



Count date: Thursday, January 22, 2015

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Volumes.xls

EXHIBIT 3
EXISTING PM PEAK HOUR
TRAFFIC VOLUMES

	N-S Street	E-W Street	Existing Lane Configuration	Existing Intersection Control	LOS Standard	Existing Conditions		Existing Plus Project Conditions		Background Conditions		Background Plus Project Conditions		Cumulative Conditions		Cumulative Plus Project Conditions	
						PM Peak Hr.		PM Peak Hr.		PM Peak Hr.		PM Peak Hr.		PM Peak Hr.		PM Peak Hr.	
						Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	El Cerro Drive	Hillcrest Road	NB 1-L/R EB 1-T/R WB 1-L/T	Two-Way Stop (NB) Northbound Approach	C	0.1 13.3	A B	0.9 14.2	A B	0.1 27.3	A D	1.1 33.8	A D	0.1 28.3	A D	1.2 35.7	A E
2	Clearwater Drive	Hillcrest Road	NB 1-L/T/R SB 1-L/T/R EB 1-L, 1-T/R WB 1-L, 1-T/R	Two-Way Stop (NB/SB) Northbound Approach Southbound Approach	C	2.8 14.5 12.5	A B B	3.1 15.2 12.8	A C B	4.0 50.0 27.2	A F D	5.1 59.1 28.9	A F D	4.0 52.8 26.6	A F D	5.4 65.5 30.3	A F D
3	Bonnie View Drive	Sawtooth Drive	NB 1-L/T/R SB 1-L/T/R EB 1-L/T/R WB 1-L/T/R	Two-Way Stop (NB/SB) Northbound Approach Southbound Approach	C	3.3 8.3 8.7	A A A	6.2 8.5 8.5	A A A	3.3 8.3 8.7	A A A	6.2 8.5 8.5	A A A	3.3 8.3 8.7	A A A	6.2 8.5 8.5	A A A
4	Clearwater Drive	Sawtooth Drive	NB 1-L/T/R SB 1-L/T/R EB 1-L/T/R WB 1-L/T/R	All-Way Stop	C	7.6	A	7.6	A	7.6	A	7.6	A	7.6	A	7.6	A
5	Clearwater Drive	El Camino De Vida	NB 1-L/T/R SB 1-L/T/R EB 1-L/T/R WB 1-L/T/R	All-Way Stop	C	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A
6	Trinity Drive	El Camino De Vida	NB 1-L/T/R SB 1-L/T/R EB 1-L/T/R WB 1-L/T/R	Two-Way Stop (NB/SB) Northbound Approach Southbound Approach	C	0.5 9.0 0.0	A A A	2.0 9.3 8.5	A A A	0.5 9.0 0.0	A A A	2.0 9.3 8.5	A A A	0.5 9.0 0.0	A A A	2.0 9.3 8.5	A A A
7	El Cerro Drive	Sawtooth Drive	Future Geometrics NB 1-T/R SB 1-L/T WB 1-L/R	Two-Way Stop (WB) Westbound Approach	C	- -	- -	2.1 8.7	A A	- -	- -	2.1 8.7	A A	- -	- -	2.1 8.7	A A

Notes:
1 L, T, R = Left, Through, Right
2 NB, SB, EB, WB = Northbound, Southbound, Eastbound, Westbound

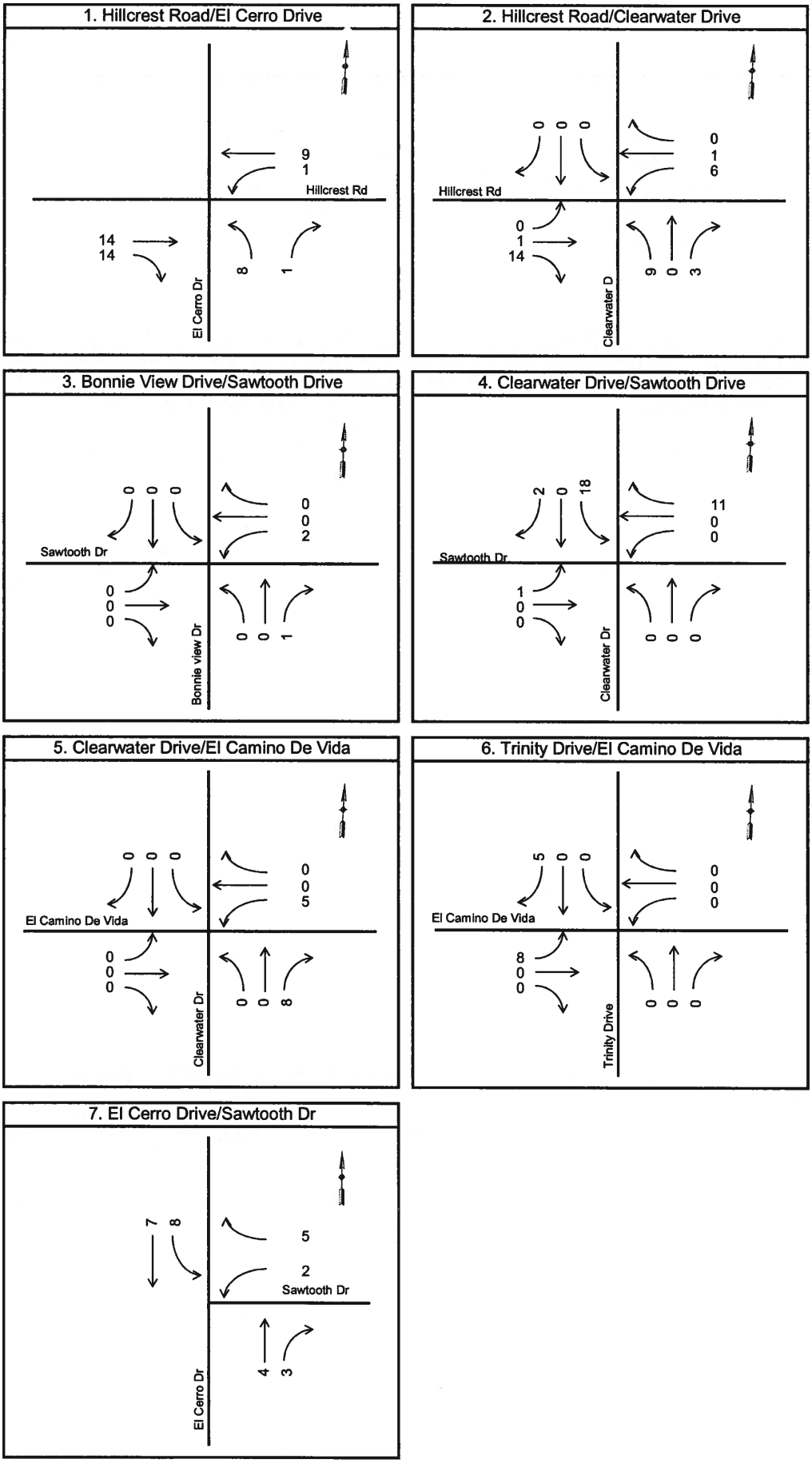
EXHIBIT 4
INTERSECTION LEVELS OF SERVICE

PROJECT TRIP GENERATION

LAND USE TYPE	DAILY	AM PEAK HOUR				PM PEAK HOUR			
		PEAK HOUR	(% OF DAILY)	IN	OUT	PEAK HOUR	(% OF DAILY)	IN	OUT
Residential - Single Family Detached	9.52	0.75	8%	0.25	0.75	1.00	11%	0.63	0.37

PROJECT	SIZE	DAILY TRIPS	AM PEAK HOUR				PM PEAK HOUR			
			PEAK HOUR VOL.	(% OF DAILY)	IN	OUT	PEAK HOUR VOL.	(% OF DAILY)	IN	OUT
1. Kutz	18 SFD	171	14	(8%)	4	10	18	(11%)	11	7
2. Kostielney	20 SFD	190	15	(8%)	4	11	20	(11%)	13	7
3. Brigantino	42 SFD	400	32	(8%)	8	24	42	(11%)	26	16
TOTAL PROJECT	80 SFD	762	61	(8%)	16	45	80	(11%)	50	30

Notes:
1. Trip generation rates published by the Institute of Transportation Engineers, *Trip Generation*, 9th Edition, 2012.



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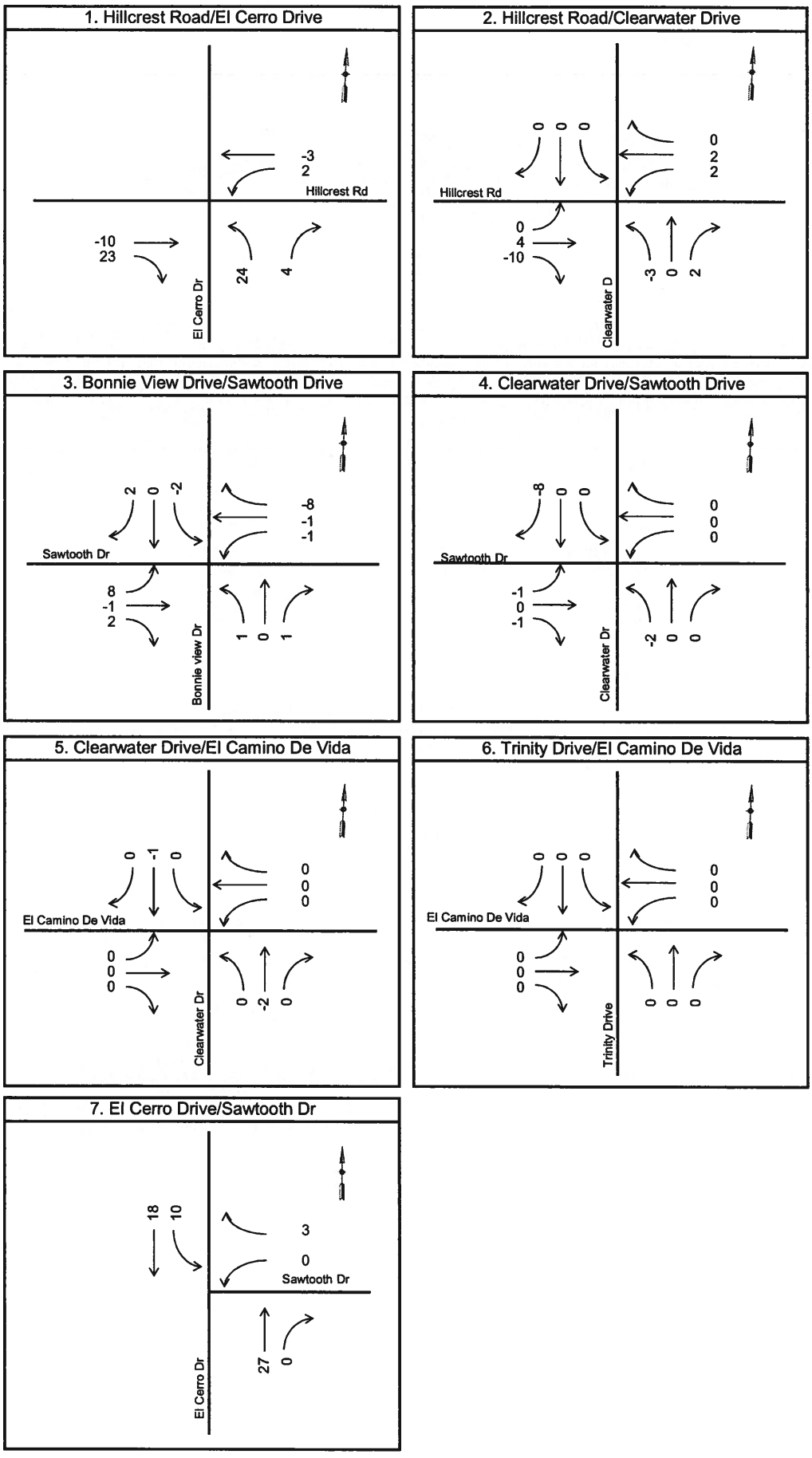
Volumes.xls

EXHIBIT 6
PROJECT PM PEAK HOUR
TRIP ASSIGNMENT



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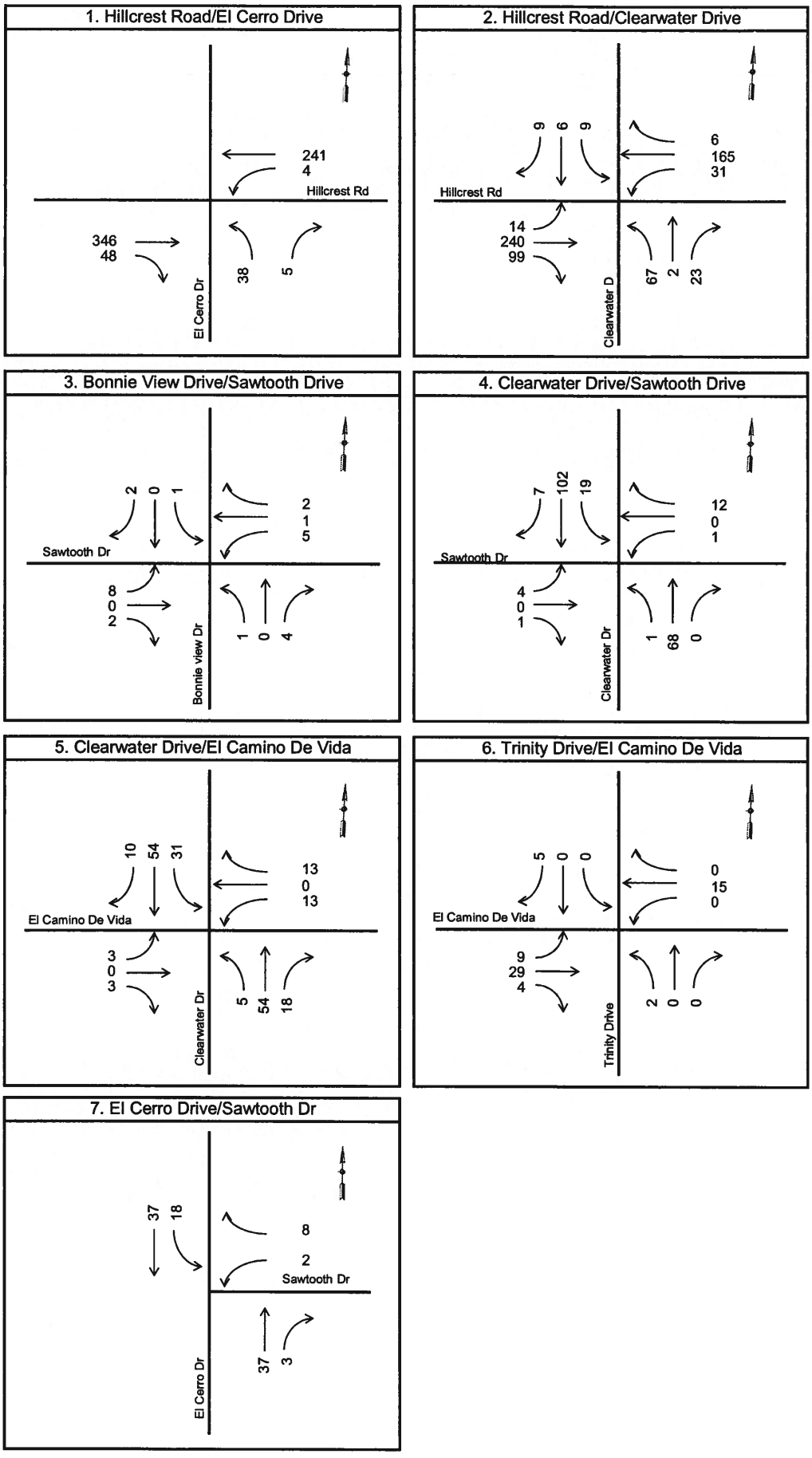
Volumes.xls

EXHIBIT 7
PM PEAK HOUR
TRAFFIC DIVERSIONS



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Volumes.xls

EXHIBIT 8
EXISTING PLUS PROJECT
PM PEAK HOUR
TRAFFIC VOLUMES

EXHIBIT 9
EXISTING PLUS PROJECT
DAILY TRAFFIC VOLUME

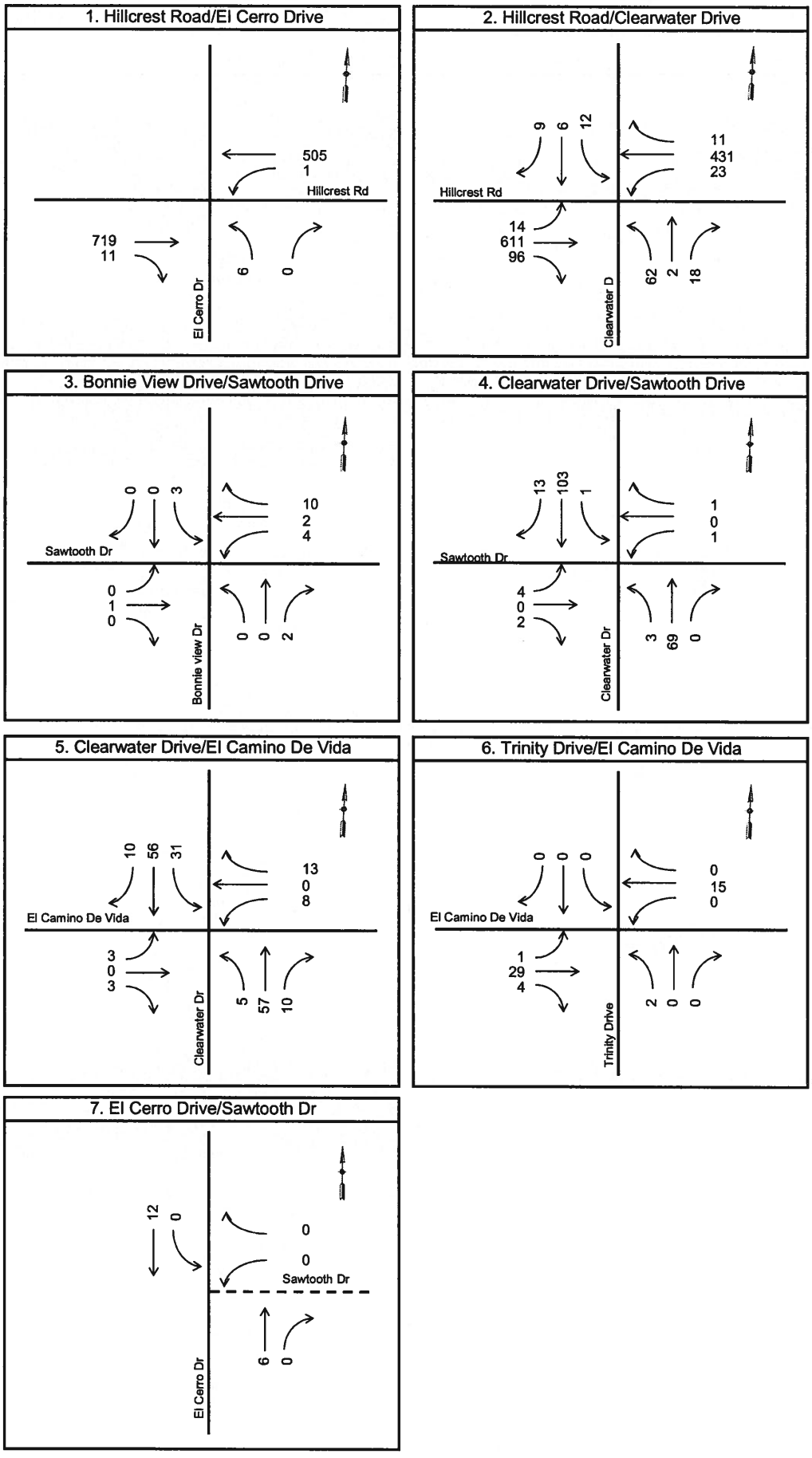

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EXHIBIT 10
BACKGROUND
PM PEAK HOUR
TRAFFIC VOLUMES

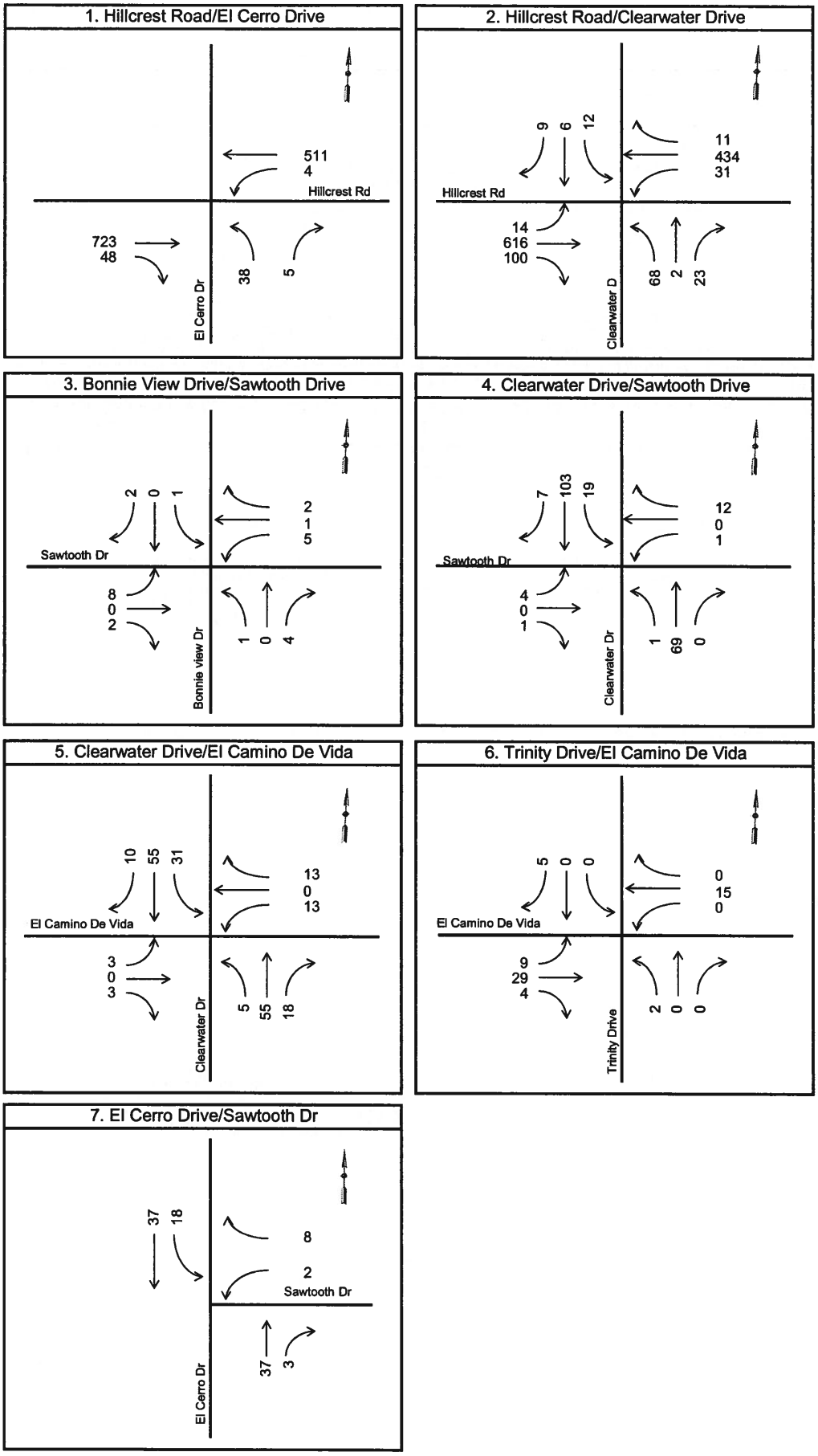

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EXHIBIT 11
BACKGROUND PLUS PROJECT
PM PEAK HOUR
TRAFFIC VOLUMES

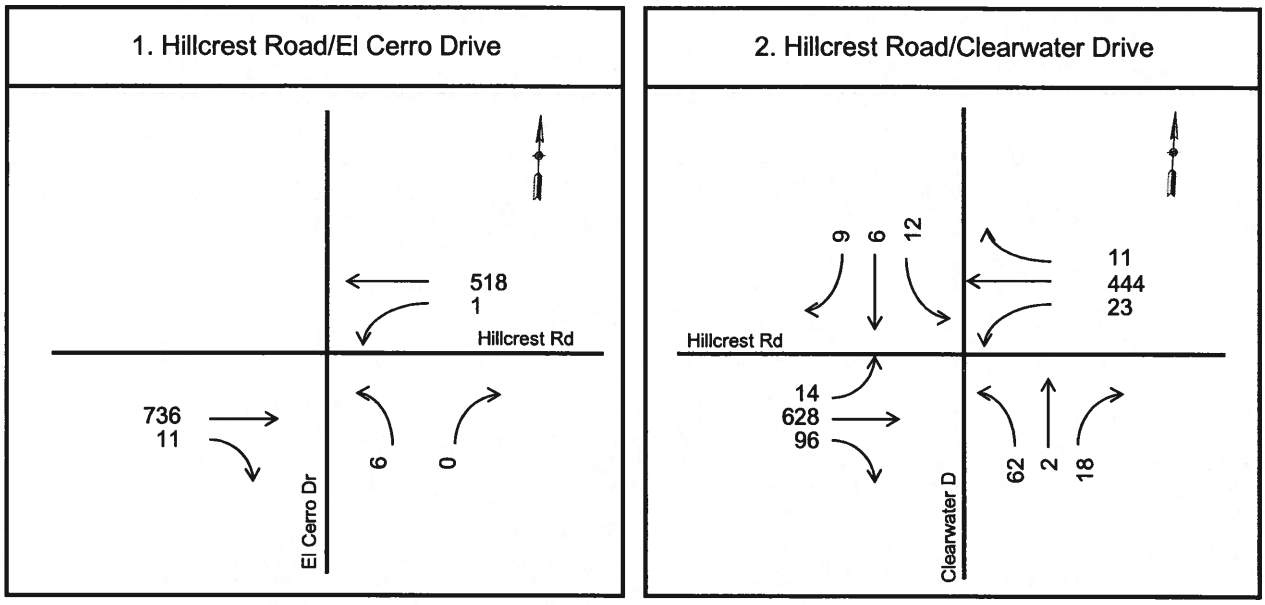

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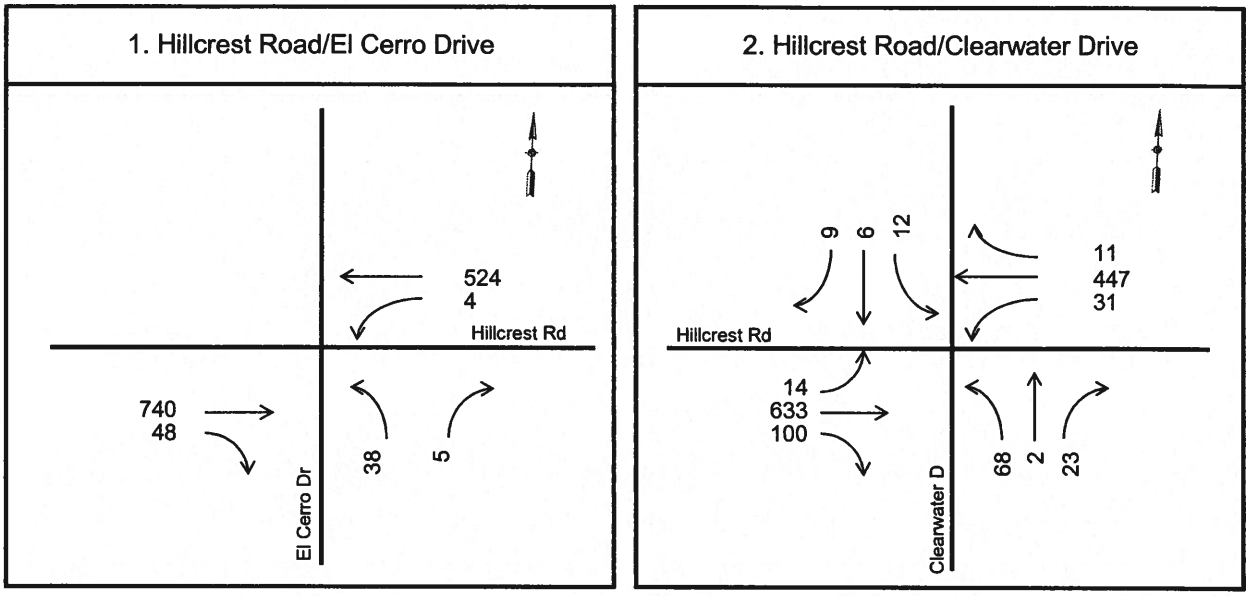
EXHIBIT 12
CUMULATIVE WITHOUT PROJECT
PM PEAK HOUR
TRAFFIC VOLUMES



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Volumes.xls

EXHIBIT 13
CUMULATIVE WITH PROJECT
PM PEAK HOUR
TRAFFIC VOLUMES

APPENDIX A
DESCRIPTION OF LEVEL OF SERVICE

APPENDIX A1

LEVEL OF SERVICE (LOS) DESCRIPTION
UNSIGNALIZED INTERSECTIONS WITH TWO-WAY STOP CONTROL (TWSC)

TWSC intersections are widely used and stop signs are used to control vehicle movements at such intersections. At TWSC intersections, the stop-controlled approaches are referred to as the minor street approaches; they can be either public streets or private driveways. The intersection approaches that are not controlled by stop signs are referred to as the major street approaches. A three-leg intersection is considered to be a standard type of TWSC intersection if the single minor street approach (i.e. the stem of the T configuration) is controlled by a stop sign. Three-leg intersections where two of the three approaches are controlled by stop signs are a special form of unsignalized intersection control.

At TWSC intersections, drivers on the controlled approaches are required to select gaps in the major street flow through which to execute crossing or turning maneuvers on the basis of judgment. In the presence of a queue, each driver on the controlled approach must use some time to move into the front-of-queue position and prepare to evaluate gaps in the major street flow. Capacity analysis at TWSC intersections depends on a clear description and understanding of the interaction of drivers on the minor or stop-controlled approach with drivers on the major street. Both gap acceptance and empirical models have been developed to describe this interaction.

Thus, the capacity of the controlled legs is based on three factors:

- the distribution of gaps in the major street traffic stream;
- driver judgment in selecting gaps through which to execute the desired maneuvers; and
- the follow-up time required by each driver in a queue.

The delay experienced by a motorist is made up of a number of factors that relate to control, geometrics, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, in the absence of incident, control, traffic or geometric delay. Average control delay for any particular minor movement is a function of the capacity of the approach and the degree of saturation and referred to as level of service.

LEVEL OF SERVICE (LOS) CRITERIA FOR TWSC INTERSECTIONS

(Reference 2010 Highway Capacity Manual)

Level of Service	Control Delay (seconds / vehicle)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

APPENDIX A2

LEVEL OF SERVICE (LOS) DESCRIPTION
UNSIGNALIZED INTERSECTIONS WITH ALL-WAY STOP CONTROL (AWSC)

AWSC intersections require every vehicle to stop at the intersection before proceeding. Since each driver must stop, the judgement as to whether to proceed into the intersection is a function of traffic conditions on the other approaches. While giving priority to the driver on the right is a recognized rule in some areas, it is not a good descriptor of actual intersection operations. What happens is the development of a consensus of right-of-way that alternates between the drivers on the intersection approaches, a consensus that depends primarily on the intersection geometry and the arrival patterns at the stop line.

If no traffic is present on the other approaches, a driver can proceed immediately after the stop is made. If there is traffic on one or more of the other approaches, a driver proceeds only after determining that there are no vehicles currently in the intersection and that it is the driver's turn to proceed. Since no traffic signal controls the stream movement or allocates the right-of-way to each conflicting stream, the rate of departure is controlled by the interaction between the traffic streams themselves.

For AWSC intersections, the average control delay (in seconds per vehicle) is used as the primary measure of performance. Control delay is the increased time of travel for a vehicle approaching and passing through an AWSC intersection, compared with a free-flow vehicle if it were not required to slow down or stop at the intersection.

The criteria for AWSC intersections have different threshold values than do those for signalized intersections, primarily because drivers expect different levels of performance from different kinds of traffic control devices (i.e traffic signals, two way stop or all way stop, etc.). The expectation is that a signalized intersection is designed to carry higher traffic volumes than an AWSC intersection and a higher level of control delay is acceptable at a signalized intersection for the same LOS.

For AWSC analysis using the HCM 2010 method, the LOS shown reflects the weighted average of the delay on each of the approaches.

LEVEL OF SERVICE (LOS) CRITERIA FOR AWSC INTERSECTIONS
(Reference 2010 Highway Capacity Manual)

Level of Service	Control Delay (seconds / vehicle)
A	**0 - 10**
B	**>10 - 15**
C	**>15 - 25**
D	**>25 - 35**
E	**>35 - 50**
F	**>50**

APPENDIX B
INTERSECTION LEVEL OF SERVICE WORKSHEETS

El Cerro Drive/Hillcrest Road

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	342	11	1	235	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	372	12	1	255	7	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	384	0	636	378
Stage 1	-	-	-	-	378	-
Stage 2	-	-	-	-	258	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1174	-	442	669
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	785	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1174	-	442	669
Mov Cap-2 Maneuver	-	-	-	-	442	-
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	784	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	442	-	-	1174	-
HCM Lane V/C Ratio	0.015	-	-	0.001	-
HCM Control Delay (s)	13.3	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	346	48	4	241	38	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	376	52	4	262	41	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	428	0	673	402
Stage 1	-	-	-	-	402	-
Stage 2	-	-	-	-	271	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1131	-	421	648
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	775	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1131	-	419	648
Mov Cap-2 Maneuver	-	-	-	-	419	-
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	772	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	14.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	437	-	-	1131	-
HCM Lane V/C Ratio	0.107	-	-	0.004	-
HCM Control Delay (s)	14.2	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	719	11	1	505	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	782	12	1	549	7	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	793	0	1339	788
Stage 1	-	-	-	-	788	-
Stage 2	-	-	-	-	551	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	828	-	168	391
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	577	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	828	-	168	391
Mov Cap-2 Maneuver	-	-	-	-	168	-
Stage 1	-	-	-	-	448	-
Stage 2	-	-	-	-	576	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	27.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	168	-	-	828	-
HCM Lane V/C Ratio	0.039	-	-	0.001	-
HCM Control Delay (s)	27.3	-	-	9.4	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	723	48	4	511	38	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	786	52	4	555	41	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	838	0	1376	812
Stage 1	-	-	-	-	812	-
Stage 2	-	-	-	-	564	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	796	-	160	379
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	569	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	796	-	159	379
Mov Cap-2 Maneuver	-	-	-	-	159	-
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	565	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	33.8
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	171	-	-	796	-
HCM Lane V/C Ratio	0.273	-	-	0.005	-
HCM Control Delay (s)	33.8	-	-	9.5	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	736	11	1	518	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	800	12	1	563	7	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	812	0	1371	806
Stage 1	-	-	-	-	806	-
Stage 2	-	-	-	-	565	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	814	-	161	382
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	569	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	814	-	161	382
Mov Cap-2 Maneuver	-	-	-	-	161	-
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	568	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	28.3
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	161	-	-	814	-
HCM Lane V/C Ratio	0.041	-	-	0.001	-
HCM Control Delay (s)	28.3	-	-	9.4	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	740	48	4	524	38	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	804	52	4	570	41	5

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	857	0	1408	830
Stage 1	-	-	-	-	830	-
Stage 2	-	-	-	-	578	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	783	-	153	370
Stage 1	-	-	-	-	428	-
Stage 2	-	-	-	-	561	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	783	-	152	370
Mov Cap-2 Maneuver	-	-	-	-	152	-
Stage 1	-	-	-	-	428	-
Stage 2	-	-	-	-	557	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	35.7
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	163	-	-	783	-
HCM Lane V/C Ratio	0.287	-	-	0.006	-
HCM Control Delay (s)	35.7	-	-	9.6	0
HCM Lane LOS	E	-	-	A	A
HCM 95th %tile Q(veh)	1.1	-	-	0	-

APPENDIX C
INTERSECTION LEVEL OF SERVICE WORKSHEETS

Clearwater Drive/Hillcrest Road

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	235	95	23	162	6	61	2	18	9	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	205	-	-	140	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	250	101	24	172	6	65	2	19	10	6	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	179	0	0	351	0	0	562	558	301	565	605	176
Stage 1	-	-	-	-	-	-	330	330	-	224	224	-
Stage 2	-	-	-	-	-	-	232	228	-	341	381	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1397	-	-	1208	-	-	438	438	739	436	412	867
Stage 1	-	-	-	-	-	-	683	646	-	779	718	-
Stage 2	-	-	-	-	-	-	771	715	-	674	613	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1397	-	-	1208	-	-	418	425	739	413	399	867
Mov Cap-2 Maneuver	-	-	-	-	-	-	418	425	-	413	399	-
Stage 1	-	-	-	-	-	-	676	639	-	771	704	-
Stage 2	-	-	-	-	-	-	741	701	-	647	606	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1	14.5	12.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	463	1397	-	-	1208	-	-	508
HCM Lane V/C Ratio	0.186	0.011	-	-	0.02	-	-	0.05
HCM Control Delay (s)	14.5	7.6	-	-	8	-	-	12.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.7	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	240	99	31	165	6	67	2	23	9	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	205	-	-	140	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	255	105	33	176	6	71	2	24	10	6	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	182	0	0	361	0	0	591	586	308	596	635	179
Stage 1	-	-	-	-	-	-	338	338	-	245	245	-
Stage 2	-	-	-	-	-	-	253	248	-	351	390	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1393	-	-	1198	-	-	419	422	732	415	396	864
Stage 1	-	-	-	-	-	-	676	641	-	759	703	-
Stage 2	-	-	-	-	-	-	751	701	-	666	608	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1393	-	-	1198	-	-	397	406	732	388	381	864
Mov Cap-2 Maneuver	-	-	-	-	-	-	397	406	-	388	381	-
Stage 1	-	-	-	-	-	-	669	634	-	751	684	-
Stage 2	-	-	-	-	-	-	715	682	-	635	601	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	1.2	15.2	12.8
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	449	1393	-	-	1198	-	-	486
HCM Lane V/C Ratio	0.218	0.011	-	-	0.028	-	-	0.053
HCM Control Delay (s)	15.2	7.6	-	-	8.1	-	-	12.8
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.8	0	-	-	0.1	-	-	0.2

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	611	96	23	431	11	62	2	18	12	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	205	-	-	140	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	650	102	24	459	12	66	2	19	13	6	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	470	0	0	752	0	0	1252	1250	701	1254	1295	464
Stage 1	-	-	-	-	-	-	731	731	-	513	513	-
Stage 2	-	-	-	-	-	-	521	519	-	741	782	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1092	-	-	858	-	-	149	173	439	149	162	598
Stage 1	-	-	-	-	-	-	413	427	-	544	536	-
Stage 2	-	-	-	-	-	-	539	533	-	408	405	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1092	-	-	858	-	-	138	166	439	137	155	598
Mov Cap-2 Maneuver	-	-	-	-	-	-	138	166	-	137	155	-
Stage 1	-	-	-	-	-	-	407	421	-	537	521	-
Stage 2	-	-	-	-	-	-	509	518	-	383	399	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.5	50	27.2
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	163	1092	-	-	858	-	-	191
HCM Lane V/C Ratio	0.535	0.014	-	-	0.029	-	-	0.15
HCM Control Delay (s)	50	8.3	-	-	9.3	-	-	27.2
HCM Lane LOS	F	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	2.7	0	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	616	100	31	434	11	68	2	23	12	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	205	-	-	140	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	655	106	33	462	12	72	2	24	13	6	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	473	0	0	762	0	0	1279	1277	709	1286	1325	468
Stage 1	-	-	-	-	-	-	738	738	-	534	534	-
Stage 2	-	-	-	-	-	-	541	539	-	752	791	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1089	-	-	850	-	-	143	166	434	141	156	595
Stage 1	-	-	-	-	-	-	410	424	-	530	524	-
Stage 2	-	-	-	-	-	-	525	522	-	402	401	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1089	-	-	850	-	-	131	157	434	126	148	595
Mov Cap-2 Maneuver	-	-	-	-	-	-	131	157	-	126	148	-
Stage 1	-	-	-	-	-	-	404	418	-	523	504	-
Stage 2	-	-	-	-	-	-	490	502	-	372	395	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.6	59.1	28.9
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	159	1089	-	-	850	-	-	179
HCM Lane V/C Ratio	0.622	0.014	-	-	0.039	-	-	0.16
HCM Control Delay (s)	59.1	8.4	-	-	9.4	-	-	28.9
HCM Lane LOS	F	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	3.4	0	-	-	0.1	-	-	0.6

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	628	95	23	444	6	61	2	18	9	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	205	-	-	140	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	668	101	24	472	6	65	2	19	10	6	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	479	0	0	769	0	0	1280	1276	719	1283	1323	476
Stage 1	-	-	-	-	-	-	748	748	-	524	524	-
Stage 2	-	-	-	-	-	-	532	528	-	759	799	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1083	-	-	845	-	-	143	167	428	142	156	589
Stage 1	-	-	-	-	-	-	404	420	-	537	530	-
Stage 2	-	-	-	-	-	-	531	528	-	399	398	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1083	-	-	845	-	-	132	160	428	130	149	589
Mov Cap-2 Maneuver	-	-	-	-	-	-	132	160	-	130	149	-
Stage 1	-	-	-	-	-	-	398	414	-	530	515	-
Stage 2	-	-	-	-	-	-	501	513	-	374	392	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.5	52.8	26.6
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	157	1083	-	-	845	-	-	192
HCM Lane V/C Ratio	0.549	0.014	-	-	0.029	-	-	0.133
HCM Control Delay (s)	52.8	8.4	-	-	9.4	-	-	26.6
HCM Lane LOS	F	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	2.8	0	-	-	0.1	-	-	0.5

Intersection	
Int Delay, s/veh	5.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	14	633	100	31	447	11	68	2	23	12	6	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	205	-	-	140	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	673	106	33	476	12	72	2	24	13	6	10

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	487	0	0	780	0	0	1311	1309	727	1317	1357	481
Stage 1	-	-	-	-	-	-	756	756	-	547	547	-
Stage 2	-	-	-	-	-	-	555	553	-	770	810	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1076	-	-	837	-	-	136	159	424	134	149	585
Stage 1	-	-	-	-	-	-	400	416	-	521	517	-
Stage 2	-	-	-	-	-	-	516	514	-	393	393	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1076	-	-	837	-	-	124	151	424	120	141	585
Mov Cap-2 Maneuver	-	-	-	-	-	-	124	151	-	120	141	-
Stage 1	-	-	-	-	-	-	394	410	-	514	497	-
Stage 2	-	-	-	-	-	-	481	494	-	363	388	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.6	65.5	30.3
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	151	1076	-	-	837	-	-	171
HCM Lane V/C Ratio	0.655	0.014	-	-	0.039	-	-	0.168
HCM Control Delay (s)	65.5	8.4	-	-	9.5	-	-	30.3
HCM Lane LOS	F	A	-	-	A	-	-	D
HCM 95th %tile Q(veh)	3.7	0	-	-	0.1	-	-	0.6

APPENDIX D
INTERSECTION LEVEL OF SERVICE WORKSHEETS

Bonnie View Drive/Sawtooth Drive

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	1	0	4	2	10	0	0	2	3	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	61	61	61	61	61	61	61	61	61
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	0	7	3	16	0	0	3	5	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	20	0	0	2	0	0	27	35	2	28	27	11
Stage 1	-	-	-	-	-	-	2	2	-	25	25	-
Stage 2	-	-	-	-	-	-	25	33	-	3	2	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1596	-	-	1620	-	-	983	857	1082	981	866	1070
Stage 1	-	-	-	-	-	-	1021	894	-	993	874	-
Stage 2	-	-	-	-	-	-	993	868	-	1020	894	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1596	-	-	1620	-	-	980	854	1082	975	863	1070
Mov Cap-2 Maneuver	-	-	-	-	-	-	980	854	-	975	863	-
Stage 1	-	-	-	-	-	-	1021	894	-	993	871	-
Stage 2	-	-	-	-	-	-	989	865	-	1017	894	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.8	8.3	8.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1082	1596	-	-	1620	-	-	975
HCM Lane V/C Ratio	0.003	-	-	-	0.004	-	-	0.005
HCM Control Delay (s)	8.3	0	-	-	7.2	0	-	8.7
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	8	0	2	5	1	2	1	0	4	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	61	61	61	61	61	61	61	61	61
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	0	3	8	2	3	2	0	7	2	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	5	0	0	3	0	0	49	49	2	51	50	3
Stage 1	-	-	-	-	-	-	28	28	-	20	20	-
Stage 2	-	-	-	-	-	-	21	21	-	31	30	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1616	-	-	1619	-	-	951	843	1082	948	841	1081
Stage 1	-	-	-	-	-	-	989	872	-	999	879	-
Stage 2	-	-	-	-	-	-	998	878	-	986	870	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1616	-	-	1619	-	-	939	832	1082	933	830	1081
Mov Cap-2 Maneuver	-	-	-	-	-	-	939	832	-	933	830	-
Stage 1	-	-	-	-	-	-	981	865	-	991	875	-
Stage 2	-	-	-	-	-	-	990	874	-	972	863	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.8	4.5	8.5	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1050	1616	-	-	1619	-	-	1027
HCM Lane V/C Ratio	0.008	0.008	-	-	0.005	-	-	0.005
HCM Control Delay (s)	8.5	7.2	0	-	7.2	0	-	8.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	0	1	0	4	2	10	0	0	2	3	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	61	61	61	61	61	61	61	61	61
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	0	7	3	16	0	0	3	5	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	20	0	0	2	0	0	27	35	2	28	27	11
Stage 1	-	-	-	-	-	-	2	2	-	25	25	-
Stage 2	-	-	-	-	-	-	25	33	-	3	2	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1596	-	-	1620	-	-	983	857	1082	981	866	1070
Stage 1	-	-	-	-	-	-	1021	894	-	993	874	-
Stage 2	-	-	-	-	-	-	993	868	-	1020	894	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1596	-	-	1620	-	-	980	854	1082	975	863	1070
Mov Cap-2 Maneuver	-	-	-	-	-	-	980	854	-	975	863	-
Stage 1	-	-	-	-	-	-	1021	894	-	993	871	-
Stage 2	-	-	-	-	-	-	989	865	-	1017	894	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.8	8.3	8.7
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1082	1596	-	-	1620	-	-	975
HCM Lane V/C Ratio	0.003	-	-	-	0.004	-	-	0.005
HCM Control Delay (s)	8.3	0	-	-	7.2	0	-	8.7
HCM Lane LOS	A	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	8	0	2	5	1	2	1	0	4	1	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	61	61	61	61	61	61	61	61	61	61	61	61
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	13	0	3	8	2	3	2	0	7	2	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	5	0	0	3	0	0	49	49	2	51	50	3
Stage 1	-	-	-	-	-	-	28	28	-	20	20	-
Stage 2	-	-	-	-	-	-	21	21	-	31	30	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1616	-	-	1619	-	-	951	843	1082	948	841	1081
Stage 1	-	-	-	-	-	-	989	872	-	999	879	-
Stage 2	-	-	-	-	-	-	998	878	-	986	870	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1616	-	-	1619	-	-	939	832	1082	933	830	1081
Mov Cap-2 Maneuver	-	-	-	-	-	-	939	832	-	933	830	-
Stage 1	-	-	-	-	-	-	981	865	-	991	875	-
Stage 2	-	-	-	-	-	-	990	874	-	972	863	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	5.8	4.5	8.5	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	1050	1616	-	-	1619	-	-	1027
HCM Lane V/C Ratio	0.008	0.008	-	-	0.005	-	-	0.005
HCM Control Delay (s)	8.5	7.2	0	-	7.2	0	-	8.5
HCM Lane LOS	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

APPENDIX E
INTERSECTION LEVEL OF SERVICE WORKSHEETS

Clearwater Drive/Sawtooth Drive

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	4	0	2	0	1	0	1	0	3	68	0
Peak Hour Factor	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	0	2	0	1	0	1	0	3	76	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.4	7.2	7.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	67%	50%	1%
Vol Thru, %	96%	0%	0%	88%
Vol Right, %	0%	33%	50%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	71	6	2	116
LT Vol	3	4	1	1
Through Vol	68	0	0	102
RT Vol	0	2	1	13
Lane Flow Rate	80	7	2	130
Geometry Grp	1	1	1	1
Degree of Util (X)	0.09	0.008	0.003	0.143
Departure Headway (Hd)	4.055	4.23	4.1	3.943
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	882	834	859	910
Service Time	2.084	2.318	2.189	1.965
HCM Lane V/C Ratio	0.091	0.008	0.002	0.143
HCM Control Delay	7.5	7.4	7.2	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0	0	0.5

Intersection

Intersection Delay, s/veh
Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	1	102	13
Peak Hour Factor	0.92	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	1	115	15
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.6
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	4	0	1	0	1	0	12	0	1	68	0
Peak Hour Factor	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	0	1	0	1	0	13	0	1	76	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.5	6.9	7.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	80%	8%	15%
Vol Thru, %	99%	0%	0%	80%
Vol Right, %	0%	20%	92%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	69	5	13	128
LT Vol	1	4	1	19
Through Vol	68	0	0	102
RT Vol	0	1	12	7
Lane Flow Rate	78	6	15	144
Geometry Grp	1	1	1	1
Degree of Util (X)	0.088	0.007	0.016	0.161
Departure Headway (Hd)	4.08	4.467	3.878	4.024
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	875	806	929	892
Service Time	2.118	2.468	1.878	2.05
HCM Lane V/C Ratio	0.089	0.007	0.016	0.161
HCM Control Delay	7.5	7.5	6.9	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0	0	0.6

Intersection

Intersection Delay, s/veh
Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	19	102	7
Peak Hour Factor	0.92	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	21	115	8
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.8
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	4	0	2	0	1	0	1	0	3	69	0
Peak Hour Factor	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	0	2	0	1	0	1	0	3	78	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.4	7.2	7.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	67%	50%	1%
Vol Thru, %	96%	0%	0%	88%
Vol Right, %	0%	33%	50%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	72	6	2	117
LT Vol	3	4	1	1
Through Vol	69	0	0	103
RT Vol	0	2	1	13
Lane Flow Rate	81	7	2	131
Geometry Grp	1	1	1	1
Degree of Util (X)	0.091	0.008	0.003	0.144
Departure Headway (Hd)	4.056	4.234	4.104	3.945
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	883	833	859	910
Service Time	2.084	2.322	2.192	1.967
HCM Lane V/C Ratio	0.092	0.008	0.002	0.144
HCM Control Delay	7.5	7.4	7.2	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0	0	0.5

Intersection

Intersection Delay, s/veh
Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	1	103	13
Peak Hour Factor	0.92	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	1	116	15
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.6
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	4	0	1	0	1	0	12	0	1	69	0
Peak Hour Factor	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89	0.92	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	0	1	0	1	0	13	0	1	78	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.5	6.9	7.5
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	80%	8%	15%
Vol Thru, %	99%	0%	0%	80%
Vol Right, %	0%	20%	92%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	70	5	13	129
LT Vol	1	4	1	19
Through Vol	69	0	0	103
RT Vol	0	1	12	7
Lane Flow Rate	79	6	15	145
Geometry Grp	1	1	1	1
Degree of Util (X)	0.089	0.007	0.016	0.162
Departure Headway (Hd)	4.081	4.471	3.882	4.025
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	875	805	928	891
Service Time	2.118	2.472	1.882	2.051
HCM Lane V/C Ratio	0.09	0.007	0.016	0.163
HCM Control Delay	7.5	7.5	6.9	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0	0	0.6

Intersection

Intersection Delay, s/veh
Intersection LOS

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	19	103	7
Peak Hour Factor	0.92	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	21	116	8
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.8
HCM LOS	A

Lane

APPENDIX F
INTERSECTION LEVEL OF SERVICE WORKSHEETS

Clearwater Drive/El Camino De Vida

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	3	0	3	0	8	0	13	0	5	56	10	0	31	55	10
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	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	0	3	0	9	0	14	0	5	61	11	0	34	60	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.2	7.1	7.4	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	50%	38%	32%
Vol Thru, %	79%	0%	0%	57%
Vol Right, %	14%	50%	62%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	71	6	21	96
LT Vol	5	3	8	31
Through Vol	56	0	0	55
RT Vol	10	3	13	10
Lane Flow Rate	77	7	23	104
Geometry Grp	1	1	1	1
Degree of Util (X)	0.086	0.007	0.025	0.117
Departure Headway (Hd)	3.993	4.065	3.957	4.045
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	895	868	893	886
Service Time	2.025	2.148	2.035	2.072
HCM Lane V/C Ratio	0.086	0.008	0.026	0.117
HCM Control Delay	7.4	7.2	7.1	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0	0.1	0.4

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	3	0	3	0	13	0	13	0	5	54	18	0	31	54	10
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	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	0	3	0	14	0	14	0	5	59	20	0	34	59	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.2	7.3	7.4	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	50%	50%	33%
Vol Thru, %	70%	0%	0%	57%
Vol Right, %	23%	50%	50%	11%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	77	6	26	95
LT Vol	5	3	13	31
Through Vol	54	0	0	54
RT Vol	18	3	13	10
Lane Flow Rate	84	7	28	103
Geometry Grp	1	1	1	1
Degree of Util (X)	0.092	0.007	0.032	0.116
Departure Headway (Hd)	3.945	4.077	4.06	4.059
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	906	865	870	882
Service Time	1.981	2.164	2.14	2.091
HCM Lane V/C Ratio	0.093	0.008	0.032	0.117
HCM Control Delay	7.4	7.2	7.3	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0	0.1	0.4

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	3	0	3	0	8	0	13	0	5	57	10	0	31	56	10
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	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	0	3	0	9	0	14	0	5	62	11	0	34	61	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.2	7.1	7.4	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	50%	38%	32%
Vol Thru, %	79%	0%	0%	58%
Vol Right, %	14%	50%	62%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	72	6	21	97
LT Vol	5	3	8	31
Through Vol	57	0	0	56
RT Vol	10	3	13	10
Lane Flow Rate	78	7	23	105
Geometry Grp	1	1	1	1
Degree of Util (X)	0.087	0.007	0.025	0.118
Departure Headway (Hd)	3.995	4.069	3.96	4.046
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	895	867	892	886
Service Time	2.027	2.151	2.039	2.072
HCM Lane V/C Ratio	0.087	0.008	0.026	0.119
HCM Control Delay	7.4	7.2	7.1	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0	0.1	0.4

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Vol, veh/h	0	3	0	3	0	13	0	13	0	5	55	18	0	31	55	10
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	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	3	0	3	0	14	0	14	0	5	60	20	0	34	60	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	7.2	7.3	7.4	7.6
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	50%	50%	32%
Vol Thru, %	71%	0%	0%	57%
Vol Right, %	23%	50%	50%	10%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	78	6	26	96
LT Vol	5	3	13	31
Through Vol	55	0	0	55
RT Vol	18	3	13	10
Lane Flow Rate	85	7	28	104
Geometry Grp	1	1	1	1
Degree of Util (X)	0.093	0.007	0.032	0.118
Departure Headway (Hd)	3.948	4.081	4.063	4.06
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	905	864	869	882
Service Time	1.985	2.169	2.146	2.091
HCM Lane V/C Ratio	0.094	0.008	0.032	0.118
HCM Control Delay	7.4	7.2	7.3	7.6
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.3	0	0.1	0.4

APPENDIX G
INTERSECTION LEVEL OF SERVICE WORKSHEETS

Trinity Drive/El Camino De Vida

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	29	4	0	15	0	2	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	55	55	55	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	53	7	0	27	0	4	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	60	0	0	87	87	56	87	91	27
Stage 1	-	-	-	-	-	-	60	60	-	27	27	-
Stage 2	-	-	-	-	-	-	27	27	-	60	64	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1587	-	-	1544	-	-	899	803	1011	899	799	1048
Stage 1	-	-	-	-	-	-	951	845	-	990	873	-
Stage 2	-	-	-	-	-	-	990	873	-	951	842	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1544	-	-	898	802	1011	898	798	1048
Mov Cap-2 Maneuver	-	-	-	-	-	-	898	802	-	898	798	-
Stage 1	-	-	-	-	-	-	950	844	-	989	873	-
Stage 2	-	-	-	-	-	-	990	873	-	950	841	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	9	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	898	1587	-	-	1544	-	-	-
HCM Lane V/C Ratio	0.004	0.001	-	-	-	-	-	-
HCM Control Delay (s)	9	7.3	0	-	0	-	-	0
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	9	29	4	0	15	0	2	0	0	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	55	55	55	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	53	7	0	27	0	4	0	0	0	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	60	0	0	121	116	56	116	120	27
Stage 1	-	-	-	-	-	-	89	89	-	27	27	-
Stage 2	-	-	-	-	-	-	32	27	-	89	93	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1587	-	-	1544	-	-	854	774	1011	861	770	1048
Stage 1	-	-	-	-	-	-	918	821	-	990	873	-
Stage 2	-	-	-	-	-	-	984	873	-	918	818	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1544	-	-	840	766	1011	854	762	1048
Mov Cap-2 Maneuver	-	-	-	-	-	-	840	766	-	854	762	-
Stage 1	-	-	-	-	-	-	909	813	-	980	873	-
Stage 2	-	-	-	-	-	-	975	873	-	909	810	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0	9.3	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	840	1587	-	-	1544	-	-	1048
HCM Lane V/C Ratio	0.004	0.01	-	-	-	-	-	0.009
HCM Control Delay (s)	9.3	7.3	0	-	0	-	-	8.5
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	1	29	4	0	15	0	2	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	55	55	55	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	2	53	7	0	27	0	4	0	0	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	60	0	0	87	87	56	87	91	27
Stage 1	-	-	-	-	-	-	60	60	-	27	27	-
Stage 2	-	-	-	-	-	-	27	27	-	60	64	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1587	-	-	1544	-	-	899	803	1011	899	799	1048
Stage 1	-	-	-	-	-	-	951	845	-	990	873	-
Stage 2	-	-	-	-	-	-	990	873	-	951	842	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1544	-	-	898	802	1011	898	798	1048
Mov Cap-2 Maneuver	-	-	-	-	-	-	898	802	-	898	798	-
Stage 1	-	-	-	-	-	-	950	844	-	989	873	-
Stage 2	-	-	-	-	-	-	990	873	-	950	841	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	9	0
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	898	1587	-	-	1544	-	-	-
HCM Lane V/C Ratio	0.004	0.001	-	-	-	-	-	-
HCM Control Delay (s)	9	7.3	0	-	0	-	-	0
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Vol, veh/h	9	29	4	0	15	0	2	0	0	0	0	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	55	55	55	55	55	55	55	55	55	55	55	55
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	16	53	7	0	27	0	4	0	0	0	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	27	0	0	60	0	0	121	116	56	116	120	27
Stage 1	-	-	-	-	-	-	89	89	-	27	27	-
Stage 2	-	-	-	-	-	-	32	27	-	89	93	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1587	-	-	1544	-	-	854	774	1011	861	770	1048
Stage 1	-	-	-	-	-	-	918	821	-	990	873	-
Stage 2	-	-	-	-	-	-	984	873	-	918	818	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1587	-	-	1544	-	-	840	766	1011	854	762	1048
Mov Cap-2 Maneuver	-	-	-	-	-	-	840	766	-	854	762	-
Stage 1	-	-	-	-	-	-	909	813	-	980	873	-
Stage 2	-	-	-	-	-	-	975	873	-	909	810	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0	9.3	8.5
HCM LOS			A	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	840	1587	-	-	1544	-	-	1048
HCM Lane V/C Ratio	0.004	0.01	-	-	-	-	-	0.009
HCM Control Delay (s)	9.3	7.3	0	-	0	-	-	8.5
HCM Lane LOS	A	A	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

APPENDIX H
INTERSECTION LEVEL OF SERVICE WORKSHEETS

El Cerro Drive/Sawtooth Drive

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	2	8	37	3	18	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	9	40	3	20	40

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	121	42	0	0	43	0
Stage 1	42	-	-	-	-	-
Stage 2	79	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	874	1029	-	-	1566	-
Stage 1	980	-	-	-	-	-
Stage 2	944	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	863	1029	-	-	1566	-
Mov Cap-2 Maneuver	863	-	-	-	-	-
Stage 1	980	-	-	-	-	-
Stage 2	932	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	2.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	991	1566	-
HCM Lane V/C Ratio	-	-	0.011	0.012	-
HCM Control Delay (s)	-	-	8.7	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Vol, veh/h	2	8	37	3	18	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	9	40	3	20	40

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	121	42	0	0	43	0
Stage 1	42	-	-	-	-	-
Stage 2	79	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	874	1029	-	-	1566	-
Stage 1	980	-	-	-	-	-
Stage 2	944	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	863	1029	-	-	1566	-
Mov Cap-2 Maneuver	863	-	-	-	-	-
Stage 1	980	-	-	-	-	-
Stage 2	932	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.7	0	2.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	991	1566	-
HCM Lane V/C Ratio	-	-	0.011	0.012	-
HCM Control Delay (s)	-	-	8.7	7.3	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

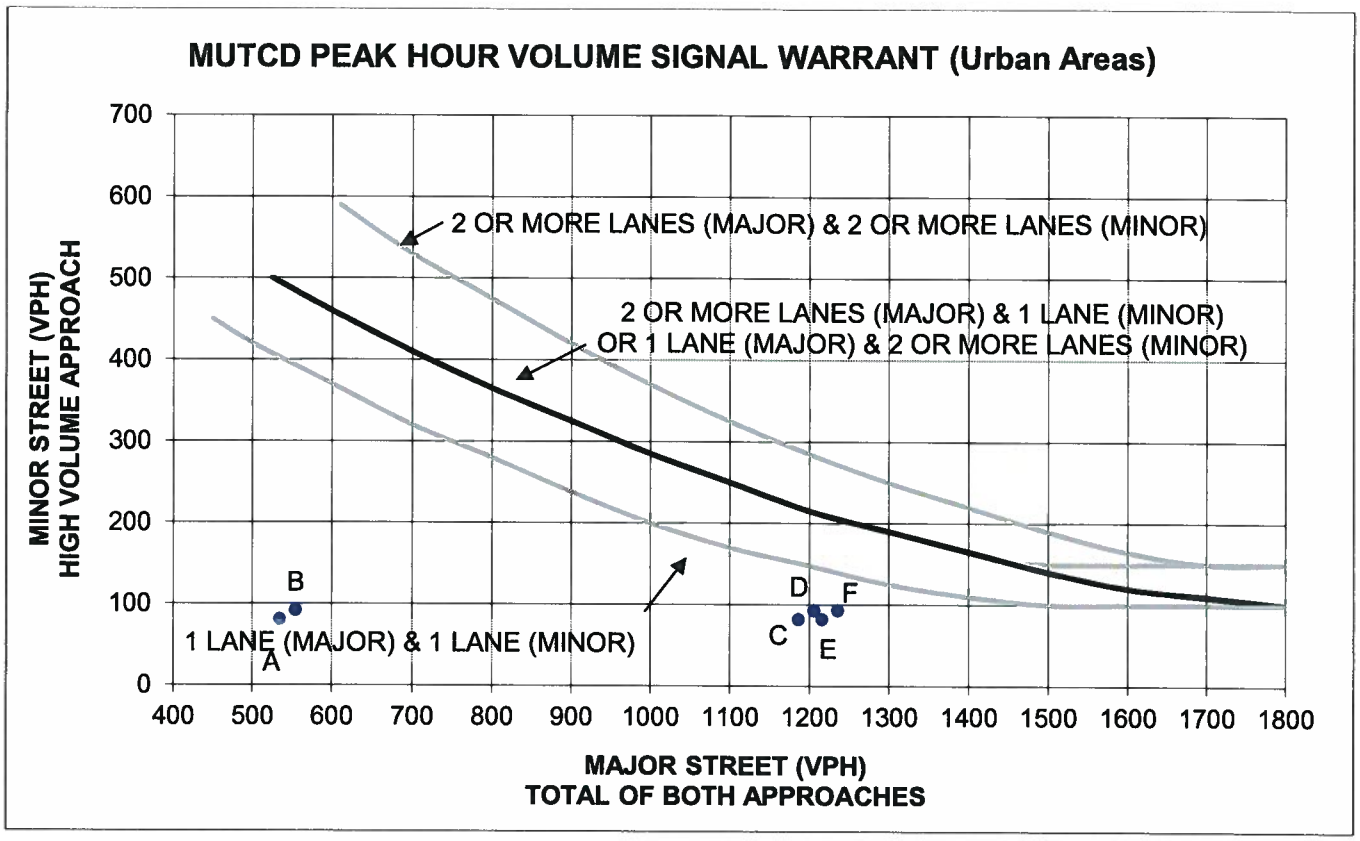
APPENDIX I
APPROVED DEVELOPMENT

APPROVED DEVELOPMENT PROJECTS

Project Name	Location	Project Description		Daily Trips	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
1 Fairfield Inn & Suites Marriot Hotel	380 Gateway Drive	Hotel	81 rooms	723	31	23	54	28	29	57
2 Community Food Bank of San Benito County	172 McCloskey Road	Office	3,072 SF	34	4	1	5	1	4	5
		Warehouse	10,560 SF	38	2	1	3	1	2	3
3 1980 Airway Drive	1980 Airway Drive	Industrial	15,600 SF	109	12	2	14	2	13	15
		Mech. Shop/Office	6,250 Sf	69	9	1	10	2	7	9
4 North Florida Development (Ladd Lane)	W/o Ladd Lane, at Hillock Drive	Medical Office/Retail	12,420 SF	449	24	6	30	12	32	44
		Retail	20,500 SF	909	67	73	140	25	31	56
		Apartments	63 Units	419	6	26	32	25	14	39
		Courtyard Units	25 Units	238	5	14	19	16	9	25
		Single Family	13 Units	124	3	7	10	8	5	13
5 Airport Business Park	Flynn Rd, betweeen SR 25 and San Felipe Rd	Industrial	12,100 SF	84	10	1	11	1	11	12
6 Hollister Business Park	Fallon Rd	Warehouse	49,569 SF	176	12	3	15	4	12	16
7 Legacy Guerra (Lowes Project -190 Hillcreset Rd)	W/o Hwy 25 bypass between Meridian St and Hillcrest Rd	Home Impr	150,000 SF	4,611	128	96	224	172	178	350
		Commercial	100,480 SF	4,290	60	36	96	179	194	373
		Apartments	120 Units	798	12	49	61	48	26	74
8 Cerrato Estates	Between Meridian St and Hillcrest Rd, w/o Memorial Drive	Residential	241 Units	2,294	45	136	181	152	89	241
9 Villages Brigantino	North of Brigantino Drive	Residential	154 Units	1,466	29	87	116	97	57	154
10 CSDC	Westside Blvd between 4th Street and South Street	Apartments	15 Units	100	2	6	8	6	3	9
11 Pacific West Communities	NE corner of Miller Rd/San Juan Rd	Apartments	57 Units	379	6	23	29	23	12	35
12 Valles	E/o Cushman Street, S/o Nash Rd	Apartments	50 Units	333	5	21	26	20	11	31
13 Silver Oaks	W/o Valley View, s/o Hazel Hawkins Hospital, e/o Airline, n/o Valle Way	Senior Apartments	170 Units	585	11	21	32	23	16	39
14 Braer	N/w of San Benito St/South St	Apartments	6 Units	40	1	2	3	3	1	4
15 Eden West	Between Apricot KLn, Line St, Steinbeck Dr, and Cannery Row	Residential	55 Units	524	10	31	41	35	20	55
16 Rajkovich	W/o San Benito St and Cienega Rd	Residential	81 Units	771	15	46	61	51	30	81
		Apartments	100 Units	665	10	41	51	40	22	62
17 Coria	W/o Westside Blvd at Jan Avenue	Residential	7 Units	67	1	4	5	4	3	7
18 Hillview 2	Buena Vista Rd, w/o Ranchito Dr	Residential	30 Units	286	6	17	23	19	11	30
19 Award Homes	W/o Fairview, s/o St. Benedict's Church, e/o Calistoga Dr	Residential	567 Units	5,398	106	319	425	357	210	567
		Apartments	100 Units	665	10	41	51	40	22	62
20 Givson/Sunnyslope	Between sr 25 and Black Forest	Residential	29 Units	276	6	16	22	18	11	29
21 Las Brisas 7	N/o Sunnuyslope, E and W of Clearview along Marily Ct and McDonald Ct	Residential	3 Units	29	1	1	2	2	1	3
22 Las Brisas 8	N/o Sunnyslope, E and W of Clearview along Marily Ct and McDonald Ct	Residential	11 Units	105	2	6	8	7	4	11
23 Santana Ranch	E/o Fairview Rd from Hillcrest to Sunnyslope	Net Trips		13,273	401	767	1,168	864	607	1,471
1,092 residential, 800 student elementary school										
65,000 sf commercial										
24 Fairview Corners Residential	N/E Corners of Fairview Rd and Airline Hwy	Single Family	220 Units	2,094	41	124	165	139	81	220
25 Creekside 5 & 6	Los Altos Dr, south of Hillcrest	Residential	14 Lots	133	3	8	11	9	5	14
26 Humboldt West	Southside/Airline	Residential	16 Lots	152	3	9	12	10	6	16
27 Easde	Southside/Airline	Residential	5 Lots	48	1	3	4	3	2	5
28 Don Marcus	Santa Ana Valley Road	Residential	4 Lots	38	1	2	3	3	1	4
29 VLM/Mendonsa	Santa Ana Valley Road	Residential	3 Lots	29	1	1	2	2	1	3
30 Chamber's Equestrian Center	SR 25 and Shore Rd	Horse Show		-	-	-	-	-	-	-

APPENDIX J
SIGNAL WARRANT WORKSHEET

Intersection #2 - Clearwater Dr / Hillcrest Rd



Scenario	Hillcrest East/West	Clearwater North/South	Warrant Met?
A. Existing PM	535	81	No
B. Existing + Proj PM	555	92	No
C. Background PM	1186	82	No
D. Back + Proj PM	1206	93	No
E. Cumul. WO Project PM	1216	82	No
F. Cumul. W Project PM	1236	93	No

Notes:

1. 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 approaching with one lane.

2. Bold line applies to intersection geometry.