April 19, 2019

Townsend Capital Partners, LLC
c/o Mr. Steve Monahan
Monahan Pacific
1101 Fifth Avenue, Suite 300
San Rafael, CA 94901

Focused Traffic Impact Analysis for the Cotati ALF Project

Dear Mr. Monahan;

As requested, W-Trans has prepared a focused traffic impact analysis for the proposed Cotati ALF Project. The study is consistent with standard traffic engineering techniques and abides by the standards set forth in the *Cotati General Plan*.

Project Description

The proposed project is to be located on the northwest corner of the Gravenstein Highway (SR 116)/Alder Avenue intersection in the City of Cotati. The purpose of this study was to evaluate potential traffic impacts associated with the proposed senior housing facility, and a 4,000 square foot marijuana dispensary, building on the previous study for another phase of the Cotati Village Project.

Ultimately, as identified in the *Cotati General Plan*, the current Alder Avenue connection to Gravenstein Highway will be closed and traffic re-oriented to a new signalized intersection to the west. It is understood that City staff has expressed a concern about the short-term operation of the Gravenstein Highway/Alder Avenue intersection with the addition of trips associated with the currently proposed phase of the project prior to completion of this planned improvement.

Study Area and Period

The study area includes the tee-intersection of Gravenstein Highway/Alder Avenue. The intersection is stop controlled on the Alder Avenue approach and has no marked crosswalks on any legs.

Alder Avenue is a two-lane roadway that runs north-south, bound by Blodgett Street on the north and Gravenstein Highway on the south. Within the project vicinity Alder Avenue is approximately 28 feet wide and has a posted speed limit of 35 miles per hour (mph).

Gravenstein Highway is a state route connecting US 101 in Cotati to SR 1 on the Sonoma Coast in Jenner. Within Cotati, Gravenstein Highway is currently a four-lane facility for one-quarter mile between Old Redwood Highway and Redwood Drive, transitioning to a two-lane highway to the west and along the frontage of the proposed project's site. The posted speed limit is 45 mph between Redwood Drive and the western city limit, including along the project frontage. On-street bicycle lanes and sidewalks exist on both sides of the street between Old Redwood Highway and Redwood Drive.

Vehicle operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or

school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward-bound commute.

Vehicle volumes were collected in the area in 2017. However, these were lower than the 2011 volumes reported for Gravenstein Highway/Alder Avenue in the *Cotati General Plan Draft Environmental Impact Report* (EIR). To be conservative, the 2011 volumes were used in this analysis for existing conditions.

Regulatory Framework

According to the *Cotati General Plan Policy C1 1.3*, the minimum acceptable Level of Service (LOS) standard for intersections is LOS D. At unsignalized intersections, levels of service shall be determined for both controlled movements and for the Intersection overall. A significant traffic-related impact would occur if implementation of the project would cause an intersection to operate below the General Plan's standard of LOS D, or LOS E for intersections within the boundaries of the Downtown Specific Plan.

At unsignalized intersections, controlled movements operating at LOS E or LOS F are allowable if 1) the intersection is projected to operate at LOS C or better overall, and 2) the projected traffic volume on the controlled movement is 30 vehicles or less per hour on approaches with single lanes, or on multi-lane approaches, 30 vehicles or less per hour on lanes serving left turns and through movements.

Existing Conditions

As indicated in the analysis prepared for the EIR supporting the *Cotati General Plan*, the intersection at Gravenstein Highway/Alder Avenue is currently operating acceptably during the morning and evening peak hours. These results are provided in Table 1 and copies of the LOS calculations for all evaluated scenarios are enclosed.

Table 1– Existing Peak Hour Intersection Levels of Service

Study Intersection ***Approach***	**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**
Gravenstein Hwy (SR 116)/Alder Ave	0.5	A	0.3	A
Southbound (Alder Ave) Approach	*12.8*	*B*	*19.0*	*C*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for the minor approach to a two-way stop-controlled intersection are indicated in *italics*

Baseline Conditions

Baseline operating conditions were assessed to reflect the addition of traffic associated with the previously studied phase of the Cotati Village Project that would be constructed and/or become operational before this project. Trip generation and distribution assumptions for the previously studied phase were based on the access study conducted for the Cotati Village Project in October 2015.

The projected traffic associated with the Cotati Village Project was added to the volumes analyzed in the Existing Conditions scenario to determine baseline volumes. Additionally, it is assumed that construction of the Cotati Village Project will include a new eastbound left-turn lane on SR 116, and separate southbound right-turn and left-turn lanes on Alder Avenue. Under these conditions, the study intersection is projected to continue operating acceptably at LOS C or better during the a.m. and p.m. peak hours. The resulting operating conditions are summarized in Table 2.

Table 2– Baseline Peak Hour Intersection Levels of Service

Study Intersection *Approach*	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
Gravenstein Hwy (SR 116)/Alder Ave	0.8	A	0.7	A
Southbound (Alder Ave) Approach	*12.9*	*B*	*21.0*	*C*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for the minor approach to a two-way stop-controlled intersection are indicated in *italics*

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 10th Edition, 2017 for "Congregate Care Facility" (ITE LU 253) and "Marijuana Dispensary" (ITE LU 882).

As indicated in Table 3, the proposed project is expected to generate an average of 1,264 trips per day, including 51 trips during the a.m. peak hour and 110 trips during the p.m. peak hour.

Table 3– Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Proposed											
Congregate Care Facility	125 du	2.02	253	0.07	9	5	4	0.18	23	12	11
Marijuana Dispensary	4 ksf	252.70	1,011	5.85	42	23	19	21.83	87	44	43
Total			**1,264**		**51**	**28**	**23**		**110**	**56**	**54**

Note: du = dwelling unit; ksf = 1,000 square feet

It is noted that the number of trips generated by the congregate care facility during peak hours is a substantially lower percentage of the daily trips than would be expected if this were a typical residential project. Of the daily trips to the facility, most are employees who work shifts that begin and/or end outside the peak periods, deliveries, and guests. The limited number of peak hour trips are associated with office staff who work more traditional hours, and given the relatively low number of such personnel, it is reasonable for the peak hour trip generation to be a small percentage of daily trips.

Trip Distribution

The pattern used to allocate new project trips to the street network was determined by reviewing existing turning movements at the study intersection, observations of neighborhood travel circulation, and knowledge of traffic patterns in the area and surrounding region. It is noted that for outbound trips many of the residents and some of the dispensary patrons would choose to travel a longer distance, going north to Helman Lane and south on Redwood Drive to make a protected left turn onto Gravenstein Highway at a signalized intersection. The applied distribution assumptions and resulting trips are shown in Table 4.

Table 4– Trip Distribution Assumptions				
Route	**Percent**	**Daily Trips**	**AM Trips**	**PM Trips**
Alder Ave (North of Ford Ln)	25%	316	13	28
Gravenstein Hwy (West of Alder Ave)	25%	316	13	28
Gravenstein Hwy (East of Alder Ave)	50%	632	25	54
TOTAL	**100%**	**1,264**	**51**	**110**

Baseline plus Project Conditions

Upon the addition of project-related traffic to baseline volumes, the study intersection is expected to operate acceptably overall at LOS A during both peak hours. The controlled approach on southbound Alder Avenue is expected to operate at LOS B during the a.m. peak hour and LOS D during the p.m. peak hour. These results are summarized in Table 5.

Table 5 – Baseline and Baseline plus Project Peak Hour Intersection Levels of Service

Study Intersection ***Approach***	**Baseline Conditions**				**Baseline plus Project**			
	AM Peak		**PM Peak**		**AM Peak**		**PM Peak**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
Gravenstein Hwy (SR 116)/Alder Ave	0.8	A	0.7	A	1.1	A	1.7	A
Southbound (Alder Ave) Approach	*12.9*	*B*	*21.0*	*C*	*13.7*	*B*	*28.3*	*D*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for the minor approach to a two-way stop-controlled intersection are indicated in *italics*

Finding – The study intersection is expected to continue operating acceptably upon the addition of project-generated traffic to Baseline Conditions, assuming planned improvements associated with The Village project.

Recommendation – Should "The Village" project not move forward prior to this proposed project, the eastbound left-turn lane on SR 116 at Alder Avenue would still need to be installed. It is recommended that the traffic impact fees (TIF) owed for this project be applied to the construction of a left-turn pocket as this widening would otherwise be included as part of the City's longer-term plans to provide two lanes in each direction on SR 116. Should the cost of the turn lane exceed the project's TIF obligation, the excess cost would reasonably be borne by the City. Conversely, should the construction cost less than the TIF obligation, the difference would be paid to the City.

Cumulative Ten-Year Horizon Conditions

Conditions at a horizon ten years into the future were also evaluated. To achieve the 2029 horizon year volumes, the net 20-year change in volumes was calculated using existing p.m. peak hour volumes and those projected at buildout within the city limits as presented in the adopted *Cotati General Plan March 2015 Update*. Under future conditions, the Cotati General Plan indicates that the intersection of Gravenstein Highway/Alder Avenue will be eliminated and replaced with a new signalized intersection to the west, as noted in the Project Description. The planned future widening of SR 116 to provide two lanes in each direction and turn lanes is included in the City's Traffic Impact Fee, so funding is planned through this source. These improvements would expand upon the short-term widening recommended to provide an eastbound left-turn lane at Alder Avenue.

For purposes of this evaluation, volumes projected for the new North/South street were assumed to remain on Alder Avenue as it was further assumed the new north/south street would not yet be built. However, estimated traffic volumes utilizing the south leg of the new north/south street were not included as Alder Avenue/Gravenstein Highway does not have a south leg. Seventy percent of the changes in volumes between 2015, when the General Plan was adopted, and the 2035 horizon year were assumed to have occurred within the projected 10-year horizon of 2029. These volumes were further assumed to include the project as it is expected to be constructed and occupied within the ten-year period. These volumes were added to the existing volumes to derive volumes for the Ten-Year Horizon with Project scenario. The project trip generation was then deducted from the Ten-Year Horizon with Project volumes to derive the Ten-Year Horizon (without project) scenario.

As might be expected, with no changes to the intersection's geometry or controls other than the addition of a southbound right-turn lane and an eastbound left-turn lane as part of the Cotati Village Project, operation is anticipated to deteriorate significantly with the increase in traffic projected over the next ten years, with or without the Cotati ALF Project. In fact, the delays estimated for the southbound movement are well beyond what is reasonable and indicate that the theoretical results are unreliable.

If, however, the intersection was signalized, the intersection would be expected to operate acceptably at LOS B with or without the project volumes. These results are summarized in Table 6.

Table 6 – Ten-Year Horizon with and without Project PM Peak Hour Intersection Levels of Service

Study Intersection ***Approach***	**10-Year Horizon w/o Project**				**10-Year Horizon with Project**			
	Unsignalized		**Signalized**		**Unsignalized**		**Signalized**	
	Delay	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
Gravenstein Hwy (SR 116)/Alder Ave	**	F	15.5	B	**	F	19.8	B
Southbound (Alder Ave) Approach	**	*F*	*n/a*	*n/a*	**	*F*	*n/a*	*n/a*

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Results for the minor approach to a two-way stop-controlled intersection are indicated in *italics*; ** = delay exceeds 120 seconds

Findings – Operation of the study intersection is anticipated to deteriorate significantly with the increase in traffic projected over the next ten years, with or without the proposed project. Upon signalization, the study intersection is expected to operate acceptably at LOS B either with or without the project.

Conclusions and Recommendations

- The anticipated trip generation of the proposed project would result in an average of 1,264 new trips daily, with 51 trips added during the a.m. peak hour and 110 trips added during the p.m. peak hour.

- Under Baseline Conditions, with trips generated by the Cotati Village Project added to existing volumes, the study intersection is expected to continue operating acceptably both overall and on the southbound stop-controlled approach, assuming the addition of a southbound right-turn lane and eastbound left-turn lane provided by the Cotati Village Project.

- With project volumes added to the Baseline Conditions, and assuming the addition of an eastbound left-turn lane and a southbound right turn lane, the study intersection is expected to continue operating acceptably both overall and on the southbound stop-controlled approach.

- Under Cumulative Ten-Year Horizon Conditions and assuming the planned new north-south street has not yet been constructed, signalization of Gravenstein Highway/Alder Avenue will be necessary for the intersection to operate acceptably, with or without the proposed project.

- The proposed project can reasonably be expected to have a less-than-significant impact on traffic operation at the intersection of Gravenstein Highway/Alder Avenue.

- The project should pay traffic impact fees as a proportional share contribution toward the installation of planned future improvements to Gravenstein Highway, construction of the new north-south street and a new signal at Gravenstein Highway and either Alder Avenue or the new north-south street.

- Should the eastbound left-turn lane at Alder Avenue not be constructed by The Village project, the TIF funds applicable to this project should be allocated to provide the left-turn pocket on Gravenstein Highway.

We hope this information will be of use to you as you continue forward with the project. Thank you for giving W-Trans the opportunity to provide these services. Please call if you have any questions.

Sincerely,

Kevin Carstens, PE
Associate Engineer

Dalene J. Whitlock, PE, PTOE
Senior Principal

DJW/krc/COT091.L2

Enclosure: Level of Service Calculations

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	12	404	336	5	11	11
Future Vol, veh/h	12	404	336	5	11	11
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	100	100	100	100	100	100
Heavy Vehicles, %	2	6	6	2	2	2
Mvmt Flow	12	404	336	5	11	11

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	341	0	-	0	767	339
Stage 1	-	-	-	-	339	-
Stage 2	-	-	-	-	428	-
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	1218	-	-	-	370	703
Stage 1	-	-	-	-	722	-
Stage 2	-	-	-	-	657	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1218	-	-	-	365	703
Mov Cap-2 Maneuver	-	-	-	-	365	-
Stage 1	-	-	-	-	713	-
Stage 2	-	-	-	-	657	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1218	-	-	-	481
HCM Lane V/C Ratio	0.01	-	-	-	0.046
HCM Control Delay (s)	8	0	-	-	12.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	573	787	9	5	13
Future Vol, veh/h	8	573	787	9	5	13
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	100	100	100	100	100	100
Heavy Vehicles, %	2	6	6	2	2	2
Mvmt Flow	8	573	787	9	5	13

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	796	0	-	0	1381	792
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	589	-
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	826	-	-	-	159	389
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	554	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	826	-	-	-	157	389
Mov Cap-2 Maneuver	-	-	-	-	157	-
Stage 1	-	-	-	-	440	-
Stage 2	-	-	-	-	554	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	19
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	826	-	-	-	276
HCM Lane V/C Ratio	0.01	-	-	-	0.065
HCM Control Delay (s)	9.4	0	-	-	19
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	26	404	336	15	16	18
Future Vol, veh/h	26	404	336	15	16	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	210	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	6	2	2	2
Mvmt Flow	26	404	336	15	16	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	351	0	-	0	800	344
Stage 1	-	-	-	-	344	-
Stage 2	-	-	-	-	456	-
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	1208	-	-	-	354	699
Stage 1	-	-	-	-	718	-
Stage 2	-	-	-	-	638	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1208	-	-	-	346	699
Mov Cap-2 Maneuver	-	-	-	-	346	-
Stage 1	-	-	-	-	702	-
Stage 2	-	-	-	-	638	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1208	-	-	-	346	699
HCM Lane V/C Ratio	0.022	-	-	-	0.046	0.026
HCM Control Delay (s)	8	-	-	-	15.9	10.3
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	13	573	787	18	16	27
Future Vol, veh/h	13	573	787	18	16	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	210	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	6	2	2	2
Mvmt Flow	13	573	787	18	16	27

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	805	0	-	0	1395	796
Stage 1	-	-	-	-	796	-
Stage 2	-	-	-	-	599	-
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	819	-	-	-	156	387
Stage 1	-	-	-	-	444	-
Stage 2	-	-	-	-	549	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	819	-	-	-	154	387
Mov Cap-2 Maneuver	-	-	-	-	154	-
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	549	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	21
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	819	-	-	-	154	387
HCM Lane V/C Ratio	0.016	-	-	-	0.104	0.07
HCM Control Delay (s)	9.5	-	-	-	31.1	15
HCM Lane LOS	A	-	-	-	D	C
HCM 95th %tile Q(veh)	0	-	-	-	0.3	0.2

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	33	404	336	29	27	24
Future Vol, veh/h	33	404	336	29	27	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	210	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	6	2	2	2
Mvmt Flow	33	404	336	29	27	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	365	0	-	0	821	351
Stage 1	-	-	-	-	351	-
Stage 2	-	-	-	-	470	-
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	1194	-	-	-	344	692
Stage 1	-	-	-	-	713	-
Stage 2	-	-	-	-	629	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1194	-	-	-	334	692
Mov Cap-2 Maneuver	-	-	-	-	334	-
Stage 1	-	-	-	-	693	-
Stage 2	-	-	-	-	629	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1194	-	-	-	334	692
HCM Lane V/C Ratio	0.028	-	-	-	0.081	0.035
HCM Control Delay (s)	8.1	-	-	-	16.7	10.4
HCM Lane LOS	A	-	-	-	C	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3	0.1

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	573	787	46	42	41
Future Vol, veh/h	27	573	787	46	42	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	210	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	6	2	2	2
Mvmt Flow	27	573	787	46	42	41

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	833	0	-	0	1437	810
Stage 1	-	-	-	-	810	-
Stage 2	-	-	-	-	627	-
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	800	-	-	-	147	380
Stage 1	-	-	-	-	438	-
Stage 2	-	-	-	-	532	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	800	-	-	-	142	380
Mov Cap-2 Maneuver	-	-	-	-	142	-
Stage 1	-	-	-	-	423	-
Stage 2	-	-	-	-	532	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	28.3
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	800	-	-	-	142	380
HCM Lane V/C Ratio	0.034	-	-	-	0.296	0.108
HCM Control Delay (s)	9.7	-	-	-	40.7	15.6
HCM Lane LOS	A	-	-	-	E	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2	0.4

Intersection	
Int Delay, s/veh	152.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	826	1025	99	256	94
Future Vol, veh/h	23	826	1025	99	256	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	210	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	6	2	2	2
Mvmt Flow	23	826	1025	99	256	94

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1124	0	-	0	1947	1075
Stage 1	-	-	-	-	1075	-
Stage 2	-	-	-	-	872	-
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	621	-	-	-	~ 71	267
Stage 1	-	-	-	-	328	-
Stage 2	-	-	-	-	409	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	621	-	-	-	~ 68	267
Mov Cap-2 Maneuver	-	-	-	-	~ 68	-
Stage 1	-	-	-	-	316	-
Stage 2	-	-	-	-	409	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	$ 1009.2
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	621	-	-	-	68	267
HCM Lane V/C Ratio	0.037	-	-	-	3.765	0.352
HCM Control Delay (s)	11	-	-	-	$ 1370.4	25.6
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.1	-	-	-	27	1.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	826	1025	99	256	94
Future Volume (veh/h)	23	826	1025	99	256	94
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1792	1798	1900	1863	1863
Adj Flow Rate, veh/h	23	826	1025	99	256	94
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	6	6	6	2	2
Cap, veh/h	188	1254	1130	109	312	279
Arrive On Green	0.70	0.70	0.70	0.70	0.18	0.18
Sat Flow, veh/h	499	1792	1615	156	1774	1583
Grp Volume(v), veh/h	23	826	0	1124	256	94
Grp Sat Flow(s),veh/h/ln	499	1792	0	1771	1774	1583
Q Serve(g_s), s	2.9	18.6	0.0	37.7	10.0	3.8
Cycle Q Clear(g_c), s	40.6	18.6	0.0	37.7	10.0	3.8
Prop In Lane	1.00			0.09	1.00	1.00
Lane Grp Cap(c), veh/h	188	1254	0	1239	312	279
V/C Ratio(X)	0.12	0.66	0.00	0.91	0.82	0.34
Avail Cap(c_a), veh/h	264	1526	0	1508	479	427
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.6	6.1	0.0	8.9	28.7	26.1
Incr Delay (d2), s/veh	0.3	0.8	0.0	7.3	6.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	9.2	0.0	20.3	5.5	1.7
LnGrp Delay(d),s/veh	25.9	6.8	0.0	16.2	35.2	26.8
LnGrp LOS	C	A		B	D	C
Approach Vol, veh/h		849	1124		350	
Approach Delay, s/veh		7.3	16.2		33.0	
Approach LOS		A	B		C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				55.0		17.2		55.0
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				61.5		19.5		61.5
Max Q Clear Time (g_c+I1), s				42.6		12.0		39.7
Green Ext Time (p_c), s				6.4		0.7		10.8

Intersection Summary	
HCM 2010 Ctrl Delay	15.5
HCM 2010 LOS	B

Intersection	
Int Delay, s/veh	200.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	37	826	1025	127	282	108
Future Vol, veh/h	37	826	1025	127	282	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	210	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	6	6	2	2	2
Mvmt Flow	37	826	1025	127	282	108

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1152	0	-	0	1989	1089
Stage 1	-	-	-	-	1089	-
Stage 2	-	-	-	-	900	-
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	606	-	-	-	~ 67	262
Stage 1	-	-	-	-	323	-
Stage 2	-	-	-	-	397	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	606	-	-	-	~ 63	262
Mov Cap-2 Maneuver	-	-	-	-	~ 63	-
Stage 1	-	-	-	-	303	-
Stage 2	-	-	-	-	397	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	$ 1234.7
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	606	-	-	-	63	262
HCM Lane V/C Ratio	0.061	-	-	-	4.476	0.412
HCM Control Delay (s)	11.3	-	-	-	$ 1696.8	28
HCM Lane LOS	B	-	-	-	F	D
HCM 95th %tile Q(veh)	0.2	-	-	-	30.8	1.9

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	37	826	1025	127	282	108
Future Volume (veh/h)	37	826	1025	127	282	108
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1792	1800	1900	1863	1863
Adj Flow Rate, veh/h	37	826	1025	127	282	108
Adj No. of Lanes	1	1	1	0	1	1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	6	6	6	2	2
Cap, veh/h	160	1260	1105	137	330	294
Arrive On Green	0.70	0.70	0.70	0.70	0.19	0.19
Sat Flow, veh/h	486	1792	1571	195	1774	1583
Grp Volume(v), veh/h	37	826	0	1152	282	108
Grp Sat Flow(s),veh/h/ln	486	1792	0	1766	1774	1583
Q Serve(g_s), s	5.7	20.6	0.0	45.2	12.5	4.8
Cycle Q Clear(g_c), s	50.9	20.6	0.0	45.2	12.5	4.8
Prop In Lane	1.00			0.11	1.00	1.00
Lane Grp Cap(c), veh/h	160	1260	0	1241	330	294
V/C Ratio(X)	0.23	0.66	0.00	0.93	0.86	0.37
Avail Cap(c_a), veh/h	187	1360	0	1339	427	381
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.0	6.6	0.0	10.3	31.9	28.8
Incr Delay (d2), s/veh	0.7	1.0	0.0	10.9	12.6	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	10.2	0.0	25.2	7.3	2.2
LnGrp Delay(d),s/veh	32.8	7.7	0.0	21.2	44.6	29.6
LnGrp LOS	C	A		C	D	C
Approach Vol, veh/h		863	1152		390	
Approach Delay, s/veh		8.7	21.2		40.4	
Approach LOS		A	C		D	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6		8
Phs Duration (G+Y+Rc), s				61.5		19.6		61.5
Change Period (Y+Rc), s				4.5		4.5		4.5
Max Green Setting (Gmax), s				61.5		19.5		61.5
Max Q Clear Time (g_c+I1), s				52.9		14.5		47.2
Green Ext Time (p_c), s				4.1		0.6		8.6

Intersection Summary		
HCM 2010 Ctrl Delay		19.8
HCM 2010 LOS		B