



Memorandum

To: City of Lafayette **Date:** January 21, 2016
Attn: Tony Coe **Project:** Olympic Boulevard at Pleasant Hill Road Roundabout
From: Omni-Means/MTJ Engineering
Re: Roundabout Traffic Analysis Summary **Job No.:** 35-4300-01
File No.: C2052MEM002.DOCX
CC: James Hinkamp

As part of our Analysis/ Peer Review of the STANTEC corridor traffic studies and concepts for this project we completed an operational/capacity analysis for the proposed roundabout at Olympic Blvd / Pleasant Hill Road. This operational analysis and traffic planning work was intended to establish an understanding of the near-term and long-range operations with respect to necessary lane geometry to achieve desired operational levels of service (LOS) and effects on the existing cross section of the north leg of Pleasant Hill Road. Both Rodel v1.88 and Sidra Intersection 6.0 softwares were used on existing (2014) and long-range (2040) projected traffic volumes. Subsequently, based on public review of the preliminary layout proposal, additional iterations of analyses were required to identify impacts of different variations of lane geometries. This memorandum is intended to formally document the various analyses made and considered to date, leading to the City's selection of a preferred lane geometry to proceed to final design. Supporting calculation output together with relevant technical attachments previously presented in STANTEC's corridor study are included in the appendix to this memorandum for convenient reference.

RECAP OF EXISTING CONTROL OPERATIONS

The current intersection operates under all-way stop control and experiences noticeable congestion during peak hours, especially for the eastbound left-turn movement. Under projected 2040 traffic conditions, the intersection fails with significant overall delay and queuing. The intersection capacity analyses from STANTEC's Existing Conditions Report are summarized below:

Year	AM Peak		PM Peak	
	Avg Delay	Level of Service	Avg Delay	Level of Service
2014	30 sec. <i>(EB Left: 59 sec.)</i>	D <i>(EB left: F)</i>	23 sec.	D
2040	100 sec.	F	46 sec.	E

In reviewing the proposed intersection layout and lane geometry options, there was particular focus on pedestrian and bicycle operations. Pedestrian volumes within the project area are unavailable, but existing bicycle counts along Olympic Boulevard are available from the STANTEC report as summarized below:

	Eastbound Peak Hour	Westbound Peak Hour	Average Daily Traffic
AM Peak	4	3	54
PM Peak	5	3	

The STANTEC study did not project future volumes for bicycle travel in the project area. However, the Countywide Bicycle and Pedestrian Plan adopted in 2009 contains general statistics for bicycle travel within Lafayette, forecasting that bicycle commute would quadruple from 300 trips per day to 1,200 trips per day in 2035, using “order-of-magnitude estimates...based on limited data and research.” Applying this assumption would suggest that bicycle travel along the Olympic Boulevard corridor adjacent to the project intersection could be in the order of 30 trips during the peak hour and 200 total trips per day.

PROPOSED ROUNDABOUT- OPERATIONAL OBJECTIVES AND ANALYSIS FINDINGS

1. Design Goals: Match capacity to demand and avoid over-design

- a. Meet operational requirements and objectives that allow for safe operations for near to long-term traffic demand.
- b. Minimize entry lanes to the essential minimums to:
 1. simplify decision making,
 2. reduce conflict points,
 3. improve safety for all modes
- c. A compact design with a reduced footprint and cross-section widths provides opportunities for geometric modifications of existing conditions that would minimize impacts, associated right-of-way acquisition, and construction costs.

2. Intersection Capacity Analysis

There are two commonly-used computer software tools to analyze roundabout intersection capacity. Rodel incorporates ‘high definition’ queuing theory equations, which are important in analyzing situations at high vehicle/capacity (v/c) ratios. Rodel provides more accurate and stable predictions for Queuing and Delay. This is in sharp contrast to Highway Capacity Software and other programs that use ‘low definition’ queuing theory equations, as the low definition equations become unstable at v/c ratios above 0.85-0.90. This then often results in additional laneage to theoretically maintain acceptable levels of service (LOS) that is often not necessary in practice. Establishing this basis of information is important to this analysis, as the Rodel analysis of this roundabout shows a high v/c ratio (especially for the critical PM peak analysis period), but acceptable levels of Delay as a single-lane entry with “yield-right-turn” lanes for the southbound and westbound directions with heavy 2040 design year-traffic flows.

The software program SIDRA was also used to analyze the proposed roundabout LOS based on a “gap acceptance” model. SIDRA incorporates some moderate adjustments to capacity based on geometry and also includes the use of an "Environmental Factor" which can alter the results substantially. Because Sidra is a gap-based model, it tends to underestimate capacity at higher v/c ratios where driver behavior changes with regard to typical gap acceptance.

In the preliminary analyses, SIDRA was used as a confirmation of the Rodel output, and results from SIDRA tended to correlate well with the results from Rodel. For the purpose of



this documentation, results from the Rodel analyses only are reported below given its applicability to traffic conditions under high v/c ratios. Additional adjustments have also been made in the inputs to better reflect refinements in the intersection layout made to date, as well as traffic assumptions such as percent of trucks. Intersection levels of service are reported based on delay thresholds for unsignalized intersections per Highway Capacity Manual 2010.

TABLE 1
TRAFFIC OPERATIONS RESULTS FOR SINGLE LANE ENTRY ROUNDABOUT WITH SOUTHBOUND AND WESTBOUND YIELD-RIGHT-TURN LANES - EXISTING TRAFFIC CONDITIONS

Approach	AM / PM							
	Average Delay (sec)		Level of Service	V/C Ratio	15-min Avg Queue (ft)		95 th Percentile Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM
Southbound - Pleasant Hill Rd	5 s	6 s	A / A	0.42 / 0.43	13	16	26	41
Eastbound - Olympic Blvd	12 s	10 s	B / A	0.79 / 0.67	75	46	185	115
Westbound - Olympic Blvd	6 s	5 s	A / A	0.46 / 0.31	16	44	8	28
Intersection LOS	9 s	7 s	A / A					

TABLE 2
TRAFFIC OPERATIONS RESULTS FOR SINGLE LANE ENTRY ROUNDABOUT WITH SOUTHBOUND AND WESTBOUND YIELD-RIGHT-TURN LANES - 2040 TRAFFIC OPERATIONS

Approach	AM / PM							
	Average Delay (sec)		Level of Service	V/C Ratio	15 min Avg Queue (ft)		95 th Percentile Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM
Southbound - Pleasant Hill	7 s	7 s	A / A	0.45 / 0.46	20	25	50	60
Eastbound - Olympic Blvd	32 s	18 s	D / C	1.03 / 0.90	293	125	618	298
Westbound - Olympic Blvd	10 s	6 s	B / A	0.67 / 0.43	50	18	113	47
Intersection LOS	17 s	11 s	C / B					

To summarize, the analyses show that a single-lane roundabout with yield-right-turns in the southbound and westbound direction would operate with acceptable levels of service under both existing and projected 2040 traffic conditions. Particularly the roundabout would solve the existing congested conditions in the eastbound direction in the morning peak and expected overall intersection level-of-service failure under future traffic.

3. Geometric Sensitivity Analysis

In the City's review of the roundabout design, concerns were raised about pedestrian and bicycle operations at the new intersection, and those led to questions about how the roundabout would function without the yield-right-turn lanes. Additional analyses were prepared to illustrate those effects, as tabulated below. For reference, red text below corresponds to traffic conditions exceeding acceptable levels of service.



**TABLE 3
TRAFFIC OPERATIONS RESULTS FOR SINGLE LANE ENTRY ROUNDABOUT WITH NO RIGHT-TURN LANES - EXISTING TRAFFIC CONDITIONS**

Approach	AM / PM							
	Ave Delay (sec)		Level of Service	V/C Ratio	15 min Avg Queue (ft)		95 th Percentile Queue (ft)	
	AM	PM	AM / PM	AM / PM	AM	PM	AM	PM
Southbound - Pleasant Hill	8 s	13 s	A / B	0.63 / 0.82	38	88	97	208
Eastbound - Olympic Blvd	12 s	10 s	B / A	0.79 / 0.67	75	46	185	115
Westbound - Olympic Blvd	36 s	9 s	E / A	1.05 / 0.67	330	44	688	113
Intersection LOS	20 s	11 s	C / B					

**TABLE 4
TRAFFIC OPERATIONS RESULTS FOR SINGLE LANE ENTRY ROUNDABOUT WITH NO RIGHT-TURN LANES - 2040 TRAFFIC CONDITIONS**

Approach	AM / PM							
	Ave Delay (sec)		Level of Service	V/C Ratio	15 min Avg Queue (ft)		95 th Percentile Queue (ft)	
	AM	PM	AM / PM	AM / PM	AM	PM	AM	PM
Southbound - Pleasant Hill	10 s	15 s	B / C	0.71 / 0.85	54	97	133	225
Eastbound - Olympic Blvd	32 s	18 s	D / C	1.02 / 0.90	300	128	620	300
Westbound - Olympic Blvd	281 s	33 s	F / D	1.93 / 1.03	2950	292	5750	618
Intersection LOS	130 s	23 s	F / C					

The above results indicate that without the yield-right turns, the proposed roundabout would experience unstable and congested traffic flow in the westbound direction under existing traffic conditions in the morning peak. Traffic would be operating above lane capacity, with poor level of service and long queues. Under forecasted traffic conditions, the entire intersection would fail with LOS "F." The westbound movement, especially, would experience extremely high delays and very long queues.

Analyses were also done to test the effects of having the yield-right-turn lane in the westbound direction only. The results are tabulated below.

**TABLE 5
TRAFFIC OPERATIONS RESULTS FOR SINGLE LANE ENTRY ROUNDABOUT WITH YIELD-RIGHT-TURN LANE WESTBOUND ONLY - EXISTING TRAFFIC CONDITIONS**

Approach	AM / PM							
	Average Delay (sec)		Level of Service	V/C Ratio	15 min Avg Queue (ft)		95 th Percentile Queue (ft)	
	AM	PM	AM / PM	AM / PM	AM	PM	AM	PM
Southbound - Pleasant Hill	8 s	13 s	A / B	0.63 / 0.82	38	88	97	208
Eastbound - Olympic Blvd	12 s	10 s	B / A	0.79 / 0.67	75	46	185	115
Westbound - Olympic Blvd	6 s	5 s	A / A	0.46 / 0.31	16	44	8	28
Intersection LOS	9 s	9 s	A / A					



**TABLE 6
TRAFFIC OPERATIONS RESULTS FOR SINGLE LANE ENTRY ROUNDABOUT WITH YIELD-RIGHT-
TURN LANE WESTBOUND ONLY - 2040 TRAFFIC CONDITIONS**

Approach	AM / PM							
	Average Delay (sec)		Level of Service	V/C Ratio	15 min Avg Queue (ft)		95 th Percentile Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM
Southbound - Pleasant Hill	13 s	16 s	B / C	0.77 / 0.85	69	100	169	235
Eastbound - Olympic Blvd	32 s	18 s	D / C	1.02 / 0.89	293	125	618	298
Westbound - Olympic Blvd	10 s	6 s	B / A	0.67 / 0.43	50	18	113	47
Intersection LOS	18 s	14 s	C / B					

4. Traffic Volume Sensitivity Analysis

As reported previously to the City during the public review, the proposed roundabout could operate with acceptable level of service with a right-turn lane only in the westbound direction and without a southbound right turn. The southbound queues would be noticeably longer, but would not be considered unacceptable. In discussing this option, city staff and the review board also noted other background factors beyond basic capacity considerations that might affect southbound operations. These include:

- Cost of removing the existing roadway to implement a one-lane approach
- Potential impacts of merging auto traffic approaching the intersection
- Anecdotal accounts from long-time residents and frequent roadway users regarding queue spill-back resulting from traffic spikes occurring along the Olympic Boulevard and Reliez Station Road corridors to the south
- Reservations toward removing existing lane capacity and the associated future flexibility to deal with potentially accelerated traffic growth resulting from developments outside Lafayette boundaries and not within the City's control
- Lack of funding to reverse the capacity reduction if traffic growth occurs at a higher or more accelerated rate than projected

Regarding the concern about the adequacy of future traffic growth projections, staff would note that current projected traffic was derived by STANTEC in the corridor study using the countywide model developed by the Contra Costa Transportation Authority. The traffic figures derived from the model do assume certain re-distributions of traffic patterns based on the intensity of future development and where those growth potentials are geographically located. These redistributions cause certain turning movements to be less than existing traffic, while increasing others significantly, apparently as a result in potential shifts in travel patterns. Given the stated concerns, the proposed roundabout was subjected to a series of additional "stress tests" using a modified set of future traffic volumes. In the modified volumes, the overall total traffic growth is maintained to be the same as those projected from the forecast model; however, this growth is distributed amongst the turning movements at the project intersection in such a way that no individual movement would have a lower



volume compared to existing conditions. In this way, the travel patterns under future conditions would more closely approximate existing conditions, negating the shifts in behavior referenced above. As before, red text in the data below corresponds to unacceptable levels of service.

TABLE 7
TRAFFIC OPERATIONS RESULTS FOR SINGLE LANE ENTRY ROUNDABOUT WITH WESTBOUND AND SOUTHBOUND YIELD-RIGHT-TURN LANES - MODIFIED FUTURE TRAFFIC

Approach	AM / PM							
	Average Delay (sec)		Level of Service	V/C Ratio	15 min Avg Queue (ft)		95 th Percentile Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM
Southbound - Pleasant Hill	7 s	7 s	A / A	0.45 / 0.46	20	25	50	60
Eastbound - Olympic Blvd	32 s	15 s	D / C	1.03 / 0.86	295	108	623	273
Westbound - Olympic Blvd	12 s	8 s	B / A	0.71 / 0.53	50	31	125	88
Intersection LOS	18 s	11 s	C / B					

TABLE 8
TRAFFIC OPERATIONS RESULTS FOR SINGLE LANE ENTRY ROUNDABOUT WITH YIELD-RIGHT-TURN LANE WESTBOUND ONLY - MODIFIED FUTURE TRAFFIC

Approach	AM / PM							
	Average Delay (sec)		Level of Service	V/C Ratio	15 min Avg Queue (ft)		95 th Percentile Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM
Southbound - Pleasant Hill	20 s	19 s	C / C	0.90 / 0.89	133	125	306	288
Eastbound - Olympic Blvd	32 s	15 s	D / C	1.02 / 0.86	288	108	610	275
Westbound - Olympic Blvd	12 s	8 s	B / A	0.71 / 0.50	50	20	125	50
Intersection LOS	21 s	14 s	C / B					

TABLE 9
TRAFFIC OPERATIONS RESULTS FOR SINGLE LANE ENTRY ROUNDABOUT WITH NO RIGHT-TURN LANES - MODIFIED FUTURE TRAFFIC

Approach	AM / PM							
	Average Delay (sec)		Level of Service	V/C Ratio	15 min Avg Queue (ft)		95 th Percentile Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM
Southbound - Pleasant Hill	14 s	18 s	B / C	0.82 / 0.88	87	118	208	275
Eastbound - Olympic Blvd	32 s	15 s	D / C	1.03 / 0.86	300	108	620	250
Westbound - Olympic Blvd	355s	45 s	F / E	2.20 / 1.10	3650	417	7125	868
Intersection LOS	156 s	27 s	F / D					

As illustrated in Tables 7, 8 and 9 above, the results of stress-testing the roundabout with modified future volumes yields slightly worse delays and levels of service, but essentially results in the same conclusion about the feasibility of each design alternative. In summary, the design as proposed, with yield-right-turn lanes, will continue to operate efficiently at



acceptable levels of delay and service well into the future, even with very conservative assumptions about traffic growth. Omitting the right turn lane in the westbound direction is not feasible and not recommended. The roundabout could operate with acceptable levels of service without a southbound right turn, but the background factors and considerations beyond the capacity of the subject intersection, as previously discussed, would still apply.

SUMMARY

Based on the findings of the above described analysis, the proposed design (included in appendix) meets the operational requirements and objectives that allow for safe operations for the near and long-term traffic demand while also satisfying other considerations beyond basic capacity considerations. The design also incorporates shared use paths around the perimeter of the intersection as well as pedestrian crossings on each leg of the roundabout which will safely accommodate the anticipated volumes of pedestrians and bicyclists. These have been significantly augmented by a series of design measures adopted by the City, including but not limited to:

- High-visibility markings in bike transition zones approaching the roundabout
- Pavement marking to demarcate bicyclist's right-of-way in claiming a travel lane
- Reflective and/or lighted bollards and high-visibility crosswalk markings to delineate pedestrian crossing locations
- At-grade curb ramps
- Pedestrian-scale lighting
- Advanced warning measures such as rumble strips and optical bar striping

Together these measures aim to enhance the safety of pedestrians and bicyclists at the intersection by creating a roadway environment where the automobile drivers are aware of users of other travel modes and more inclined to respect their rights-of-way.



APPENDIX

Existing Daily Traffic and Intersection Turning Movement Counts (from STANTEC)

Projected 2040 Intersection Turning Volumes (from STANTEC)

Modified Projected 2040 Intersection Turning Volumes

Existing Intersection Level of Service Synchro Output (from STANTEC)

Future Intersection Level of Service (Existing Stop Controls) Synchro Output (from STANTEC)

Rodel v1.88 Roundabout Analysis Output Results

Intersection Layout and Lane Geometry Approved for Final Engineering



**Existing Daily Traffic and Intersection Turning Movement Counts
(from STANTEC)**

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

City of Lafayette
 All Vehicles on Unshifted
 Peds & Bikes on Bank 1
 Nothing on Bank 2

File Name : 14-7253-004 Pleasant Hill Road-Olympic Boulevard.ppd
 Date : 4/29/2014

Unshifted Count = All Vehicles

START TIME	Pleasant Hill Road Southbound						Olympic Boulevard Westbound						Olympic Oaks Drive Northbound						Olympic Boulevard Eastbound					
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
07:00	25	0	53	0	78	0	40	74	0	114	1	1	0	0	2	58	21	0	0	0	79	273	0	
07:15	37	0	56	0	93	0	73	86	0	159	0	2	0	0	2	84	35	0	0	0	119	373	0	
07:30	39	0	65	0	104	0	92	106	0	198	0	2	0	0	2	120	33	0	0	0	153	457	0	
07:45	51	1	87	0	139	0	95	120	0	215	1	6	2	0	9	117	53	0	0	0	170	533	0	
Total	152	1	261	0	414	0	300	386	0	686	2	11	2	0	15	379	142	0	0	0	521	1636	0	
08:00	57	1	81	0	139	0	62	94	0	156	1	4	0	0	5	128	71	0	0	0	199	499	0	
08:15	73	2	67	0	142	0	58	101	0	159	0	1	0	0	1	128	76	0	0	0	204	506	0	
08:30	82	0	74	0	156	0	50	84	0	134	1	1	0	0	2	130	62	0	0	0	192	484	0	
08:45	71	0	86	0	157	0	44	68	0	112	1	0	0	0	1	113	68	0	0	0	181	451	0	
Total	283	3	308	0	594	0	214	347	0	561	3	6	0	0	9	499	277	0	0	0	776	1940	0	
16:00	96	1	72	0	169	0	81	111	0	192	0	0	1	0	1	101	59	0	0	0	160	522	0	
16:15	74	1	90	0	165	0	48	88	0	136	0	0	1	0	1	80	41	1	0	0	122	424	0	
16:30	81	2	95	0	178	1	49	79	0	129	1	0	0	0	1	103	54	0	0	0	157	465	0	
16:45	95	0	85	0	180	0	49	77	0	126	0	1	0	0	1	95	56	0	0	0	151	458	0	
Total	346	4	342	0	692	1	227	355	0	583	1	1	2	0	4	379	210	1	0	0	590	1869	0	
17:00	105	4	92	0	201	0	53	80	0	133	0	1	0	0	1	101	52	0	0	0	153	488	0	
17:15	97	1	96	0	194	1	44	83	0	128	1	0	0	0	1	109	51	0	0	0	160	483	0	
17:30	96	4	113	0	213	0	48	80	0	128	0	2	1	0	3	88	57	0	0	0	145	489	0	
17:45	91	4	88	0	183	0	57	70	0	127	0	2	0	0	2	88	53	0	0	0	141	453	0	
Total	389	13	389	0	791	1	202	313	0	516	1	5	1	0	7	386	213	0	0	0	599	1913	0	
Grand Total	1170	21	1300	0	2491	2	943	1401	0	2346	7	23	5	0	35	1643	842	1	0	0	2486	7358	0	
Approch %	47.0%	0.8%	52.2%	0.0%	33.9%	0.1%	40.2%	59.7%	0.0%	31.9%	20.0%	65.7%	14.3%	0.0%	0.5%	66.1%	33.9%	0.0%	0.0%	0.0%	33.8%	100.0%	0	
Total %	15.9%	0.3%	17.7%	0.0%	33.9%	0.0%	12.8%	19.0%	0.0%	31.9%	0.1%	0.3%	0.1%	0.0%	0.5%	22.3%	11.4%	0.0%	0.0%	0.0%	33.8%	100.0%	0	

ALL TRAFFIC DATA

(916) 771-8700

orders@atdtraffic.com

City of Lafayette
 All Vehicles on Unshifted
 Peds & Bikes on Bank 1
 Nothing on Bank 2

File Name : 14-7253-004 Pleasant Hill Road-Olympic Boulevard.ppd
 Date : 4/29/2014

Unshifted Count = All Vehicles

AM PEAK HOUR	Pleasant Hill Road Southbound				Olympic Boulevard Westbound				Olympic Oaks Drive Northbound				Olympic Boulevard Eastbound								
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
07:45	51	1	87	0	139	0	95	120	0	215	1	6	2	0	9	117	53	0	0	170	533
08:00	57	1	81	0	139	0	62	94	0	156	1	4	0	0	5	128	71	0	0	199	499
08:15	73	2	67	0	142	0	58	101	0	159	0	1	0	0	1	128	76	0	0	204	506
08:30	82	0	74	0	156	0	50	84	0	134	1	1	0	0	2	130	62	0	0	192	484
Total Volume	263	4	309	0	576	0	265	399	0	664	3	12	2	0	17	503	262	0	0	765	2022
% App Total	45.7%	0.7%	53.6%	0.0%	.923	0.0%	39.9%	60.1%	0.0%	.772	17.6%	70.6%	11.8%	0.0%	.472	65.8%	34.2%	0.0%	0.0%	.938	.948
PHF	.802	.500	.888	.000	.923	.000	.697	.831	.000	.772	.750	.500	.250	.000	.472	.967	.862	.000	.000	.938	.948

PM PEAK HOUR	Pleasant Hill Road Southbound				Olympic Boulevard Westbound				Olympic Oaks Drive Northbound				Olympic Boulevard Eastbound								
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
16:45	95	0	85	0	180	0	49	77	0	126	0	1	0	0	1	95	56	0	0	151	458
17:00	105	4	92	0	201	0	53	80	0	133	0	1	0	0	1	101	52	0	0	153	488
17:15	97	1	96	0	194	1	44	83	0	128	1	0	0	0	1	109	51	0	0	160	483
17:30	96	4	113	0	213	0	48	80	0	128	0	2	1	0	3	88	57	0	0	145	489
Total Volume	393	9	386	0	788	1	194	320	0	515	1	4	1	0	6	393	216	0	0	609	1918
% App Total	49.9%	1.1%	49.0%	0.0%	.925	0.2%	37.7%	62.1%	0.0%	.968	16.7%	66.7%	16.7%	0.0%	.500	64.5%	35.5%	0.0%	0.0%	.952	.981
PHF	.936	.563	.854	.000	.925	.250	.915	.964	.000	.968	.250	.500	.250	.000	.500	.901	.947	.000	.000	.952	.981

Class Report - Prepared by: NDS/ATD

Olympic Boulevard west of Pleasant Hill Road
 Lafayette
 Project #:14-7254-002e

Date: 4/29/2014 TUESDAY

West Bound, East Bound

Begin Time	Cars & Bikes	2 Axle Pasngr	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>5 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Total
12:00 AM	0	6	3	0	0	0	0	0	0	0	0	0	0	9
12:15 AM	0	9	0	0	0	0	0	0	0	0	0	0	0	9
12:30 AM	0	4	1	0	0	0	0	0	0	0	0	0	0	5
12:45 AM	0	5	0	0	0	0	0	0	0	0	0	0	0	5
Hour Total	0	24	4	0	0	0	0	0	0	0	0	0	0	28
1:00 AM	0	4	1	0	0	0	0	0	0	0	0	0	0	5
1:15 AM	0	4	0	0	0	0	0	0	0	0	0	0	0	4
1:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2
1:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hour Total	0	10	1	0	0	0	0	0	0	0	0	0	0	11
2:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
2:15 AM	0	3	1	0	0	0	0	0	0	0	0	0	0	4
2:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
2:45 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Hour Total	0	8	1	0	0	0	0	0	0	0	0	0	0	9
3:00 AM	0	4	1	0	0	0	0	0	0	0	0	0	0	5
3:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2
3:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
3:45 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3
Hour Total	0	10	1	0	0	0	0	0	0	0	0	0	0	11
4:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3
4:15 AM	0	6	1	0	0	0	0	0	0	0	0	0	0	7
4:30 AM	0	9	2	0	0	0	0	0	0	0	0	0	0	11
4:45 AM	0	5	3	0	0	0	0	0	0	0	0	0	0	8
Hour Total	0	23	6	0	0	0	0	0	0	0	0	0	0	29
5:00 AM	0	15	3	0	0	0	0	0	0	0	0	0	0	18
5:15 AM	0	15	1	0	0	0	0	0	0	0	0	0	0	16
5:30 AM	0	18	5	0	0	0	0	0	0	0	0	0	0	23
5:45 AM	0	25	4	0	0	0	0	0	0	0	0	0	0	29
Hour Total	0	73	13	0	0	0	0	0	0	0	0	0	0	86
6:00 AM	0	28	1	0	0	0	0	0	0	0	0	0	0	29
6:15 AM	0	42	8	0	0	0	0	0	0	0	0	0	0	50
6:30 AM	2	74	14	0	0	0	0	0	0	0	0	0	0	90
6:45 AM	0	87	16	0	0	0	0	0	0	0	0	0	0	103
Hour Total	2	231	39	0	0	0	0	0	0	0	0	0	0	272
7:00 AM	0	152	16	0	0	1	0	0	0	0	0	0	0	169
7:15 AM	0	217	27	0	4	0	0	0	0	0	0	0	0	248
7:30 AM	1	295	30	0	0	0	0	0	1	0	0	0	0	327
7:45 AM	1	275	44	0	2	2	0	3	2	0	0	0	0	329
Hour Total	2	939	117	0	6	3	0	3	3	0	0	0	0	1073

8:00 AM	3	273	39	2	2	1	2	3	1	0	1	0	0	327
8:15 AM	2	275	51	0	4	1	1	1	4	0	0	0	0	339
8:30 AM	0	261	49	0	3	4	0	0	2	0	0	0	0	319
8:45 AM	2	259	39	0	0	0	0	0	0	0	0	0	0	300
Hour Total	7	1068	178	2	9	6	3	4	7	0	1	0	0	1285
9:00 AM	0	207	28	0	2	1	0	0	0	0	0	0	0	238
9:15 AM	1	204	32	0	1	0	0	0	0	0	0	0	0	238
9:30 AM	1	159	36	0	1	0	0	0	0	0	0	0	0	197
9:45 AM	1	183	28	0	0	0	0	0	1	0	0	0	0	213
Hour Total	3	753	124	0	4	1	0	0	1	0	0	0	0	886
10:00 AM	2	144	25	0	1	0	0	0	0	0	0	0	0	172
10:15 AM	1	144	24	2	3	0	0	0	0	0	0	0	0	174
10:30 AM	0	160	29	0	4	0	0	0	0	0	0	0	0	193
10:45 AM	2	165	35	0	2	1	0	0	0	0	1	0	0	206
Hour Total	5	613	113	2	10	1	0	0	0	0	1	0	0	745
11:00 AM	2	176	31	0	0	0	0	0	0	0	0	0	0	209
11:15 AM	0	177	38	0	2	0	0	2	0	0	0	0	0	219
11:30 AM	1	189	33	0	6	0	0	0	0	0	0	0	0	229
11:45 AM	1	181	30	0	0	1	0	0	0	0	0	0	0	213
Hour Total	4	723	132	0	8	1	0	2	0	0	0	0	0	870
12:00 PM	1	169	31	0	0	0	0	1	0	0	0	0	0	202
12:15 PM	0	195	39	0	2	1	0	0	0	0	0	0	0	237
12:30 PM	0	183	28	0	4	1	0	0	0	0	0	0	0	216
12:45 PM	2	218	35	0	2	0	0	1	0	0	0	0	0	258
Hour Total	3	765	133	0	8	2	0	2	0	0	0	0	0	913
1:00 PM	2	161	32	0	0	0	0	0	0	0	1	0	0	196
1:15 PM	0	212	40	0	1	1	0	0	0	0	0	0	0	254
1:30 PM	0	173	26	0	4	0	0	1	0	0	0	0	0	204
1:45 PM	1	172	36	0	1	0	0	0	0	0	0	0	0	210
Hour Total	3	718	134	0	6	1	0	1	0	0	1	0	0	864
2:00 PM	0	165	40	3	1	0	0	0	1	0	0	0	0	210
2:15 PM	1	239	37	0	0	0	0	0	0	0	0	0	0	277
2:30 PM	0	256	34	0	0	0	0	0	0	0	0	0	0	290
2:45 PM	2	261	43	0	1	2	0	0	0	0	1	0	0	310
Hour Total	3	921	154	3	2	2	0	0	1	0	1	0	0	1087
3:00 PM	0	263	45	0	2	0	2	1	0	0	0	0	0	313
3:15 PM	0	254	37	1	3	0	0	1	2	0	1	0	0	299
3:30 PM	0	240	52	0	0	1	2	3	0	0	0	0	0	298
3:45 PM	0	260	39	0	2	3	0	0	0	0	0	0	0	304
Hour Total	0	1017	173	1	7	4	4	5	2	0	1	0	0	1214

4:00 PM	4	259	54	0	1	1	0	0	0	0	0	0	0	319
4:15 PM	1	239	37	0	0	0	0	0	0	0	0	0	0	277
4:30 PM	1	254	42	0	0	1	0	0	0	0	0	0	0	298
4:45 PM	2	247	41	0	1	0	0	0	0	0	0	0	0	291
Hour Total	8	999	174	0	2	2	0	0	0	0	0	0	0	1185
5:00 PM	1	254	32	0	1	0	0	0	0	0	0	0	0	288
5:15 PM	0	272	29	0	0	0	0	0	0	0	0	0	0	301
5:30 PM	1	260	33	0	0	0	0	0	0	0	0	0	0	294
5:45 PM	4	254	21	1	1	1	0	0	0	0	0	0	0	282
Hour Total	6	1040	115	1	2	1	0	0	0	0	0	0	0	1165
6:00 PM	0	212	29	1	0	0	0	0	0	0	0	0	0	242
6:15 PM	2	212	21	0	0	0	0	1	0	0	0	0	0	236
6:30 PM	0	227	22	0	1	0	0	3	0	0	0	0	0	253
6:45 PM	0	222	24	0	0	0	0	1	0	0	0	0	0	247
Hour Total	2	873	96	1	1	0	0	5	0	0	0	0	0	978
7:00 PM	0	177	12	0	0	0	0	0	0	0	0	0	0	189
7:15 PM	0	194	11	0	0	0	0	0	0	0	0	0	0	205
7:30 PM	2	145	9	0	0	0	0	0	0	0	0	0	0	156
7:45 PM	1	147	7	0	0	0	0	0	0	0	0	0	0	155
Hour Total	3	663	39	0	0	0	0	0	0	0	0	0	0	705
8:00 PM	0	102	9	0	0	0	0	0	0	0	0	0	0	111
8:15 PM	0	102	6	0	0	0	0	0	0	0	0	0	0	108
8:30 PM	0	120	7	0	0	0	0	0	0	0	0	0	0	127
8:45 PM	0	105	7	0	0	0	0	0	0	0	0	0	0	112
Hour Total	0	429	29	0	0	0	0	0	0	0	0	0	0	458
9:00 PM	0	114	5	0	0	0	0	0	0	0	0	0	0	119
9:15 PM	0	69	10	0	0	0	0	0	0	0	0	0	0	79
9:30 PM	0	55	4	0	0	0	0	0	0	0	0	0	0	59
9:45 PM	0	64	6	0	0	0	0	0	0	0	0	0	0	70
Hour Total	0	302	25	0	0	0	0	0	0	0	0	0	0	327
10:00 PM	1	43	5	0	0	0	0	0	2	0	0	0	0	51
10:15 PM	0	35	3	0	0	0	0	0	0	0	0	0	0	38
10:30 PM	0	37	1	0	0	0	0	0	1	0	0	0	0	39
10:45 PM	1	20	1	0	0	0	0	0	0	0	0	0	0	22
Hour Total	2	135	10	0	0	0	0	0	3	0	0	0	0	150
11:00 PM	0	16	2	0	0	0	0	0	0	0	0	0	0	18
11:15 PM	0	20	0	0	0	0	0	0	0	0	0	0	0	20
11:30 PM	0	11	1	0	0	0	0	0	0	0	0	0	0	12
11:45 PM	0	11	1	0	0	0	0	0	0	0	0	0	0	12
Hour Total	0	58	4	0	0	0	0	0	0	0	0	0	0	62
Totals	53	12395	1815	10	65	24	7	22	17	0	5	0	0	14413
Percent	0.4%	86.0%	12.6%	0.1%	0.5%	0.2%	0.0%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	

Class Report - Prepared by: NDS/ATD

Olympic Boulevard west of Pleasant Hill Road
 Lafayette
 Project #:14-7254-002e

Date: 4/30/2014 WEDNESDAY

West Bound, East Bound

Begin Time	Cars & Bikes	2 Axle Pasngr	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>5 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Total
12:00 AM	0	12	1	0	0	0	0	0	0	0	0	0	0	13
12:15 AM	0	8	2	0	0	0	0	0	0	0	0	0	0	10
12:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2
12:45 AM	0	1	1	0	0	0	0	0	0	0	0	0	0	2
Hour Total	0	23	4	0	0	0	0	0	0	0	0	0	0	27
1:00 AM	0	9	0	0	0	0	0	0	0	0	0	0	0	9
1:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3
1:30 AM	0	4	1	0	0	0	0	0	0	0	0	0	0	5
1:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Hour Total	0	17	1	0	0	0	0	0	0	0	0	0	0	18
2:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
2:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3
2:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
2:45 AM	0	4	0	0	0	0	0	0	0	0	0	0	0	4
Hour Total	0	9	0	0	0	0	0	0	0	0	0	0	0	9
3:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3
3:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Hour Total	0	6	0	0	0	0	0	0	0	0	0	0	0	6
4:00 AM	0	4	1	0	0	0	0	0	0	0	0	0	0	5
4:15 AM	0	5	1	0	0	0	0	0	0	0	0	0	0	6
4:30 AM	1	6	1	0	0	0	0	0	0	0	0	0	0	8
4:45 AM	0	10	3	0	0	0	0	0	0	0	0	0	0	13
Hour Total	1	25	6	0	0	0	0	0	0	0	0	0	0	32
5:00 AM	0	15	5	0	0	0	0	0	0	0	0	0	0	20
5:15 AM	0	16	0	0	0	0	0	0	0	0	0	0	0	16
5:30 AM	0	29	4	0	2	0	0	0	0	0	0	0	0	35
5:45 AM	0	36	8	0	0	0	0	0	0	0	0	0	0	44
Hour Total	0	96	17	0	2	0	0	0	0	0	0	0	0	115
6:00 AM	0	37	2	0	0	1	0	0	0	0	0	0	0	40
6:15 AM	0	49	7	0	0	0	0	0	0	0	0	0	0	56
6:30 AM	1	66	9	0	0	0	0	0	0	0	0	0	0	76
6:45 AM	0	83	27	0	0	0	0	0	0	0	0	0	0	110
Hour Total	1	235	45	0	0	1	0	0	0	0	0	0	0	282
7:00 AM	0	121	24	0	0	0	0	1	0	0	0	0	0	146
7:15 AM	1	180	44	0	1	2	0	0	0	0	0	0	0	228
7:30 AM	0	277	30	0	2	1	0	0	0	0	0	0	0	310
7:45 AM	1	287	40	0	2	3	0	1	0	0	0	0	0	334
Hour Total	2	865	138	0	5	6	0	2	0	0	0	0	0	1018

8:00 AM	1	299	57	2	6	0	0	0	0	0	0	0	0	365
8:15 AM	1	228	57	1	2	1	0	1	0	0	1	0	0	292
8:30 AM	1	288	47	0	2	2	0	0	0	0	0	0	0	340
8:45 AM	2	301	52	0	2	0	0	1	0	0	1	0	0	359
Hour Total	5	1116	213	3	12	3	0	2	0	0	2	0	0	1356
9:00 AM	1	277	46	0	4	1	0	0	0	0	0	0	0	329
9:15 AM	0	189	46	0	1	3	0	1	0	0	0	0	0	240
9:30 AM	0	194	28	0	2	2	0	0	0	0	0	0	0	226
9:45 AM	2	170	24	0	2	0	0	0	0	0	0	0	0	198
Hour Total	3	830	144	0	9	6	0	1	0	0	0	0	0	993
10:00 AM	0	162	39	0	3	0	0	0	0	0	0	0	0	204
10:15 AM	1	157	34	0	0	0	0	0	0	0	0	0	0	192
10:30 AM	2	165	34	0	2	1	0	0	0	0	0	0	0	204
10:45 AM	0	148	39	0	2	2	0	0	0	0	0	0	0	191
Hour Total	3	632	146	0	7	3	0	0	0	0	0	0	0	791
11:00 AM	0	143	32	1	2	0	0	0	0	0	0	0	0	178
11:15 AM	0	169	44	1	1	0	0	0	0	0	0	0	0	215
11:30 AM	0	185	39	0	3	0	0	0	0	0	0	0	0	227
11:45 AM	0	208	40	0	3	2	0	0	0	0	0	0	0	253
Hour Total	0	705	155	2	9	2	0	0	0	0	0	0	0	873
12:00 PM	1	158	26	0	4	1	0	0	0	0	0	0	0	190
12:15 PM	1	167	35	0	5	3	0	1	0	0	0	0	0	212
12:30 PM	2	172	29	0	4	0	0	0	0	0	0	0	0	207
12:45 PM	0	176	27	0	0	0	0	0	0	0	0	0	0	203
Hour Total	4	673	117	0	13	4	0	1	0	0	0	0	0	812
1:00 PM	1	192	38	1	1	0	0	0	0	0	0	0	0	233
1:15 PM	0	188	42	0	2	1	0	0	1	0	0	0	0	234
1:30 PM	1	188	29	1	3	5	0	0	1	0	0	0	0	228
1:45 PM	2	187	36	0	1	2	0	0	0	0	0	0	0	228
Hour Total	4	755	145	2	7	8	0	0	2	0	0	0	0	923
2:00 PM	0	205	39	0	5	2	0	0	0	0	0	0	0	251
2:15 PM	1	251	42	0	1	3	0	1	0	0	0	0	0	299
2:30 PM	3	260	45	0	1	1	0	0	0	0	0	0	0	310
2:45 PM	2	279	40	0	4	3	0	1	1	0	0	0	0	330
Hour Total	6	995	166	0	11	9	0	2	1	0	0	0	0	1190
3:00 PM	0	236	44	2	2	3	0	1	0	0	0	0	0	288
3:15 PM	1	227	52	0	3	3	2	0	1	0	0	0	0	289
3:30 PM	0	266	47	0	0	1	0	0	0	0	0	0	0	314
3:45 PM	1	260	50	0	0	1	0	0	0	0	0	0	0	312
Hour Total	2	989	193	2	5	8	2	1	1	0	0	0	0	1203

4:00 PM	2	265	53	0	1	1	0	0	0	0	0	0	0	322
4:15 PM	2	257	44	0	0	0	0	0	0	0	0	0	0	303
4:30 PM	3	237	39	0	1	3	0	0	0	0	0	0	0	283
4:45 PM	1	263	32	1	1	1	0	0	0	0	0	0	0	299
Hour Total	8	1022	168	1	3	5	0	0	0	0	0	0	0	1207
5:00 PM	2	277	42	0	0	0	0	0	0	0	0	0	0	321
5:15 PM	0	276	41	0	0	0	0	1	0	0	0	0	0	318
5:30 PM	3	262	21	0	0	0	0	1	0	0	0	0	0	287
5:45 PM	2	258	30	1	0	0	0	2	0	0	0	0	0	293
Hour Total	7	1073	134	1	0	0	0	4	0	0	0	0	0	1219
6:00 PM	1	260	21	0	0	0	0	0	0	0	1	0	0	283
6:15 PM	0	226	21	0	0	0	0	0	0	0	0	0	0	247
6:30 PM	1	213	17	0	0	0	0	0	0	0	0	0	0	231
6:45 PM	2	207	26	0	0	0	0	1	0	0	0	0	0	236
Hour Total	4	906	85	0	0	0	0	1	0	0	1	0	0	997
7:00 PM	1	186	17	0	0	0	0	0	0	0	0	0	0	204
7:15 PM	0	177	13	1	0	0	0	0	0	0	0	0	0	191
7:30 PM	0	132	26	0	0	0	0	0	0	0	0	0	0	158
7:45 PM	2	113	20	0	0	0	0	0	0	0	0	0	0	135
Hour Total	3	608	76	1	0	0	0	0	0	0	0	0	0	688
8:00 PM	0	111	11	0	0	0	0	0	0	0	0	0	0	122
8:15 PM	0	96	14	0	0	0	0	0	0	0	0	0	0	110
8:30 PM	0	85	7	0	0	0	0	0	0	0	0	0	0	92
8:45 PM	0	95	9	0	0	0	0	0	0	0	0	0	0	104
Hour Total	0	387	41	0	0	0	0	0	0	0	0	0	0	428
9:00 PM	0	88	7	0	0	0	0	0	0	0	0	0	0	95
9:15 PM	0	91	5	0	0	0	0	0	0	0	0	0	0	96
9:30 PM	0	72	5	0	0	0	0	0	0	0	0	0	0	77
9:45 PM	0	91	11	0	0	0	0	0	0	0	0	0	0	102
Hour Total	0	342	28	0	0	0	0	0	0	0	0	0	0	370
10:00 PM	0	61	3	0	0	0	0	0	0	0	0	0	0	64
10:15 PM	0	52	3	0	0	0	0	0	0	0	0	0	0	55
10:30 PM	0	41	4	0	0	0	0	0	0	0	0	0	0	45
10:45 PM	0	25	2	0	1	0	0	0	0	0	0	0	0	28
Hour Total	0	179	12	0	1	0	0	0	0	0	0	0	0	192
11:00 PM	0	23	9	0	0	0	0	0	0	0	0	0	0	32
11:15 PM	0	17	3	0	0	0	0	0	0	0	0	0	0	20
11:30 PM	0	14	1	0	0	0	0	0	0	0	0	0	0	15
11:45 PM	0	9	4	0	0	0	0	0	0	0	0	0	0	13
Hour Total	0	63	17	0	0	0	0	0	0	0	0	0	0	80
Totals	53	12551	2051	12	84	55	2	14	4	0	3	0	0	14829
Percent	0.4%	84.6%	13.8%	0.1%	0.6%	0.4%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	

Class Report - Prepared by: NDS/ATD

Olympic Boulevard west of Pleasant Hill Road
 Lafayette
 Project #:14-7254-002e

Date: 5/1/2014

THURSDAY

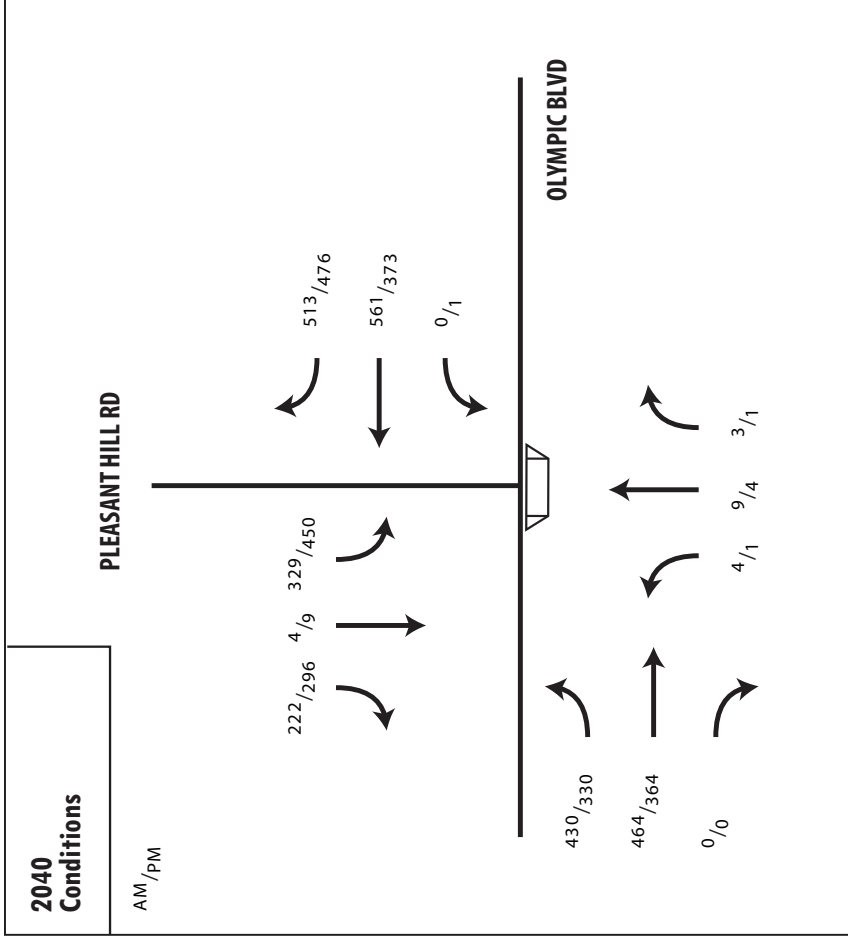
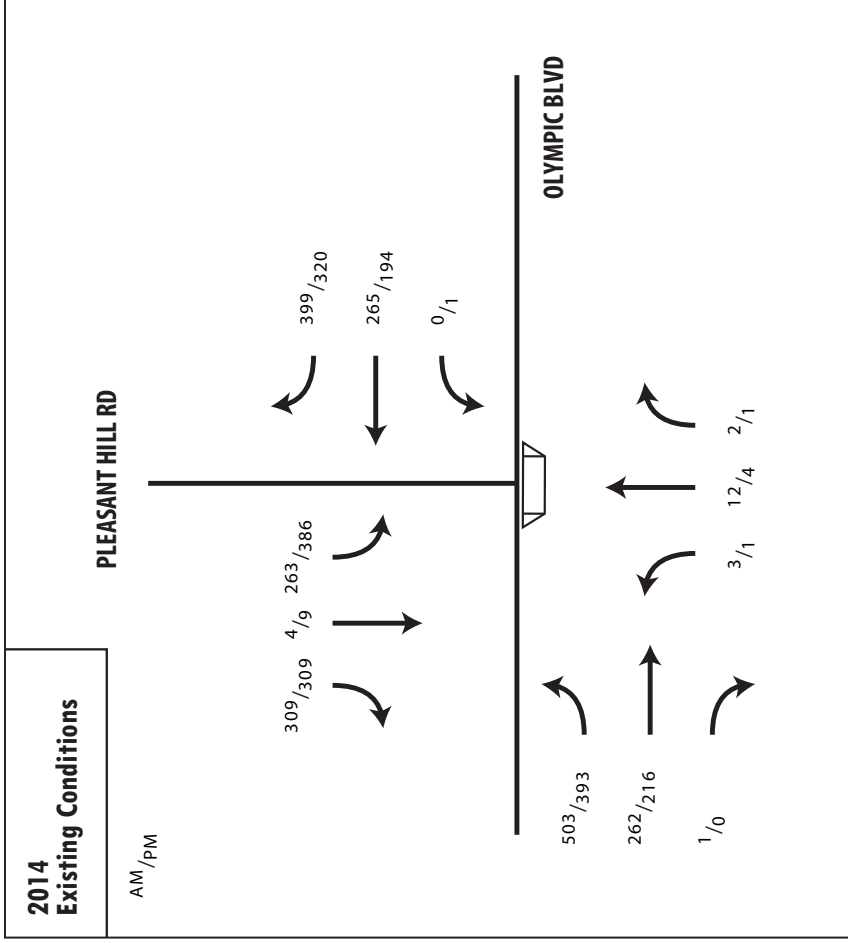
West Bound, East Bound

Begin Time	Cars & 2 Axle			West Bound, East Bound											Total
	Bikes	Pasngr	Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>5 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi		
12:00 AM	0	6	2	0	0	0	0	0	0	0	0	0	0	8	
12:15 AM	0	11	0	0	0	0	0	0	0	0	0	0	0	11	
12:30 AM	0	8	0	0	0	0	0	0	0	0	0	0	0	8	
12:45 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3	
Hour Total	0	28	2	0	0	0	0	0	0	0	0	0	0	30	
1:00 AM	0	4	1	0	0	0	0	0	0	0	0	0	0	5	
1:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	0	2	
1:30 AM	0	6	0	0	0	0	0	0	0	0	0	0	0	6	
1:45 AM	0	5	0	0	0	0	0	0	0	0	0	0	0	5	
Hour Total	0	17	1	0	0	0	0	0	0	0	0	0	0	18	
2:00 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3	
2:15 AM	0	2	0	0	1	0	0	0	0	0	0	0	0	3	
2:30 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	3	
2:45 AM	0	1	1	0	0	0	0	0	0	0	0	0	0	2	
Hour Total	0	9	1	0	1	0	0	0	0	0	0	0	0	11	
3:00 AM	0	5	0	0	0	0	0	0	0	0	0	0	0	5	
3:15 AM	0	3	1	0	0	0	0	0	0	0	0	0	0	4	
3:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45 AM	0	6	0	0	0	0	0	0	0	0	0	0	0	6	
Hour Total	0	14	1	0	0	0	0	0	0	0	0	0	0	15	
4:00 AM	0	2	1	0	0	0	0	0	0	0	0	0	0	3	
4:15 AM	0	5	0	0	0	0	0	0	0	0	0	0	0	5	
4:30 AM	0	8	1	0	0	0	0	0	0	0	0	0	0	9	
4:45 AM	0	9	2	0	0	0	0	0	0	0	0	0	0	11	
Hour Total	0	24	4	0	0	0	0	0	0	0	0	0	0	28	
5:00 AM	0	8	6	0	0	0	0	0	0	0	0	0	0	14	
5:15 AM	0	17	3	0	0	0	0	0	0	0	0	0	0	20	
5:30 AM	1	33	1	0	0	0	0	0	0	0	0	0	0	35	
5:45 AM	0	32	6	0	0	3	0	0	0	0	0	0	0	41	
Hour Total	1	90	16	0	0	3	0	0	0	0	0	0	0	110	
6:00 AM	0	32	7	0	1	0	0	0	0	0	0	0	0	40	
6:15 AM	0	36	12	0	1	1	0	0	0	0	0	0	0	50	
6:30 AM	0	71	11	0	1	0	0	0	0	0	0	0	0	83	
6:45 AM	0	92	14	0	0	0	0	0	0	0	0	0	0	106	
Hour Total	0	231	44	0	3	1	0	0	0	0	0	0	0	279	
7:00 AM	0	112	15	0	1	3	0	1	0	0	0	0	0	132	
7:15 AM	1	176	42	0	2	0	0	0	0	0	0	0	0	221	
7:30 AM	1	239	45	1	5	0	0	0	0	0	0	0	0	291	
7:45 AM	2	259	57	1	0	0	4	0	3	0	0	0	0	326	
Hour Total	4	786	159	2	8	3	4	1	3	0	0	0	0	970	

8:00 AM	0	265	45	0	2	3	1	2	1	0	0	0	0	319
8:15 AM	2	263	34	0	2	2	0	0	0	0	0	0	0	303
8:30 AM	1	250	43	2	4	1	0	0	1	0	1	0	0	303
8:45 AM	2	223	43	1	1	0	2	1	1	0	1	0	0	275
Hour Total	5	1001	165	3	9	6	3	3	3	0	2	0	0	1200
9:00 AM	0	196	36	1	1	0	0	0	0	0	0	0	0	234
9:15 AM	1	190	29	0	1	1	0	1	0	0	0	0	0	223
9:30 AM	0	172	36	0	2	1	0	0	0	0	0	0	0	211
9:45 AM	0	194	40	0	0	1	0	0	0	0	1	0	0	236
Hour Total	1	752	141	1	4	3	0	1	0	0	1	0	0	904
10:00 AM	2	155	27	0	4	1	0	0	0	0	0	0	0	189
10:15 AM	0	161	31	0	0	0	0	0	0	0	0	0	0	192
10:30 AM	3	153	27	0	1	1	0	0	0	0	0	0	0	185
10:45 AM	1	170	33	0	1	2	0	0	0	0	0	0	0	207
Hour Total	6	639	118	0	6	4	0	0	0	0	0	0	0	773
11:00 AM	1	173	32	0	3	1	0	0	0	0	0	0	0	210
11:15 AM	0	167	34	0	5	3	0	1	0	0	0	0	0	210
11:30 AM	0	181	39	0	3	1	0	0	0	0	0	0	0	224
11:45 AM	0	182	31	1	1	1	0	0	0	0	0	0	0	216
Hour Total	1	703	136	1	12	6	0	1	0	0	0	0	0	860
12:00 PM	2	176	40	0	1	1	0	0	0	0	0	0	0	220
12:15 PM	1	164	35	0	1	3	0	0	0	0	0	0	0	204
12:30 PM	0	155	30	0	0	2	0	0	0	0	0	0	0	187
12:45 PM	2	177	36	0	3	0	0	1	1	0	0	0	0	220
Hour Total	5	672	141	0	5	6	0	1	1	0	0	0	0	831
1:00 PM	0	199	46	0	0	1	0	0	1	0	0	0	0	247
1:15 PM	0	157	29	0	2	1	0	0	0	0	0	0	0	189
1:30 PM	1	150	47	0	2	3	0	0	0	0	0	0	0	203
1:45 PM	0	173	26	0	2	1	0	0	0	0	0	0	0	202
Hour Total	1	679	148	0	6	6	0	0	1	0	0	0	0	841
2:00 PM	0	205	35	2	3	2	0	0	0	0	0	0	0	247
2:15 PM	3	236	40	0	0	1	0	0	1	0	0	0	0	281
2:30 PM	1	233	35	0	3	2	0	0	0	0	0	0	0	274
2:45 PM	1	262	55	0	2	1	0	1	1	0	0	0	0	323
Hour Total	5	936	165	2	8	6	0	1	2	0	0	0	0	1125
3:00 PM	1	274	41	0	1	2	0	0	0	0	0	0	0	319
3:15 PM	3	268	55	1	3	5	0	2	1	0	0	0	0	338
3:30 PM	0	249	58	0	4	0	0	0	0	0	1	0	0	312
3:45 PM	3	250	38	0	0	0	0	0	0	0	0	0	0	291
Hour Total	7	1041	192	1	8	7	0	2	1	0	1	0	0	1260

4:00 PM	0	207	34	0	2	0	0	1	0	0	0	0	0	244
4:15 PM	1	244	58	0	0	1	0	0	0	0	0	0	0	304
4:30 PM	2	243	42	0	2	0	0	0	0	0	0	0	0	289
4:45 PM	1	284	36	0	0	0	0	0	0	0	0	0	0	321
Hour Total	4	978	170	0	4	1	0	1	0	0	0	0	0	1158
5:00 PM	2	246	24	0	0	0	0	0	0	0	0	0	0	272
5:15 PM	1	271	36	0	0	0	0	0	0	0	0	0	0	308
5:30 PM	2	273	29	0	0	0	0	0	0	0	0	0	0	304
5:45 PM	2	255	26	0	0	0	0	0	0	0	0	0	0	283
Hour Total	7	1045	115	0	0	0	0	0	0	0	0	0	0	1167
6:00 PM	1	230	17	0	0	0	0	0	0	0	0	0	0	248
6:15 PM	1	187	21	0	1	0	0	0	0	0	0	0	0	210
6:30 PM	0	217	21	0	0	0	0	0	0	0	0	0	0	238
6:45 PM	0	216	15	0	0	0	0	0	0	0	0	0	0	231
Hour Total	2	850	74	0	1	0	0	0	0	0	0	0	0	927
7:00 PM	2	182	17	0	0	0	0	0	0	0	0	0	0	201
7:15 PM	1	167	12	0	0	0	0	0	0	0	0	0	0	180
7:30 PM	0	128	9	0	0	1	0	0	0	0	0	0	0	138
7:45 PM	0	121	18	0	0	0	0	0	0	0	0	0	0	139
Hour Total	3	598	56	0	0	1	0	0	0	0	0	0	0	658
8:00 PM	1	121	9	0	0	0	0	0	0	0	0	0	0	131
8:15 PM	1	119	6	0	0	0	0	0	0	0	0	0	0	126
8:30 PM	1	92	7	0	0	0	0	0	0	0	0	0	0	100
8:45 PM	0	93	6	0	0	0	0	0	0	0	0	0	0	99
Hour Total	3	425	28	0	0	0	0	0	0	0	0	0	0	456
9:00 PM	0	94	11	0	0	0	0	0	0	0	0	0	0	105
9:15 PM	0	99	7	0	0	0	0	0	0	0	0	0	0	106
9:30 PM	0	88	9	0	0	0	0	0	0	0	0	0	0	97
9:45 PM	1	72	3	0	0	0	0	0	0	0	0	0	0	76
Hour Total	1	353	30	0	0	0	0	0	0	0	0	0	0	384
10:00 PM	0	65	3	0	0	0	0	0	0	0	0	0	0	68
10:15 PM	0	35	4	0	0	0	0	0	0	0	0	0	0	39
10:30 PM	0	32	0	0	0	0	0	0	0	0	0	0	0	32
10:45 PM	0	33	5	0	0	0	0	0	0	0	0	0	0	38
Hour Total	0	165	12	0	0	0	0	0	0	0	0	0	0	177
11:00 PM	0	26	3	0	0	0	0	0	0	0	0	0	0	29
11:15 PM	0	17	2	0	1	0	0	0	0	0	0	0	0	20
11:30 PM	0	17	3	0	1	0	0	0	0	0	0	0	0	21
11:45 PM	0	12	2	0	0	0	0	0	0	0	0	0	0	14
Hour Total	0	72	10	0	2	0	0	0	0	0	0	0	0	84
Totals	56	12108	1929	10	77	53	7	11	11	0	4	0	0	14266
Percent	0.4%	84.9%	13.5%	0.1%	0.5%	0.4%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	

Projected 2040 Intersection Turning Volumes (from STANTEC)

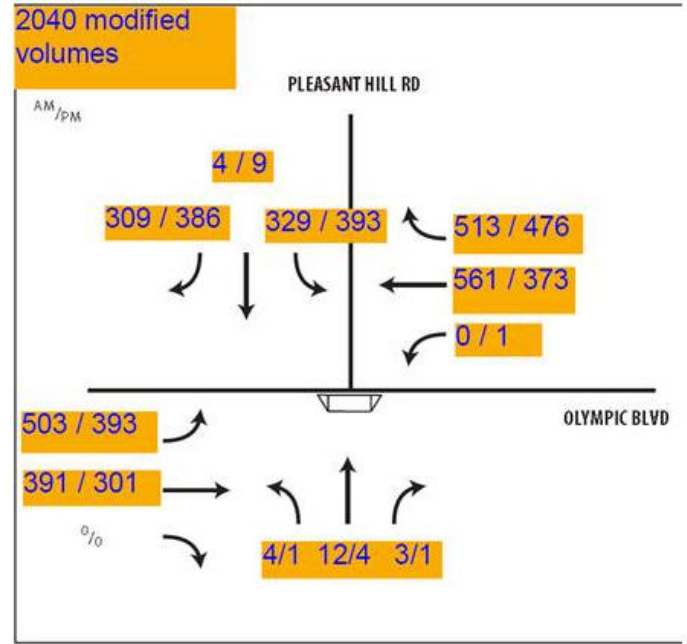
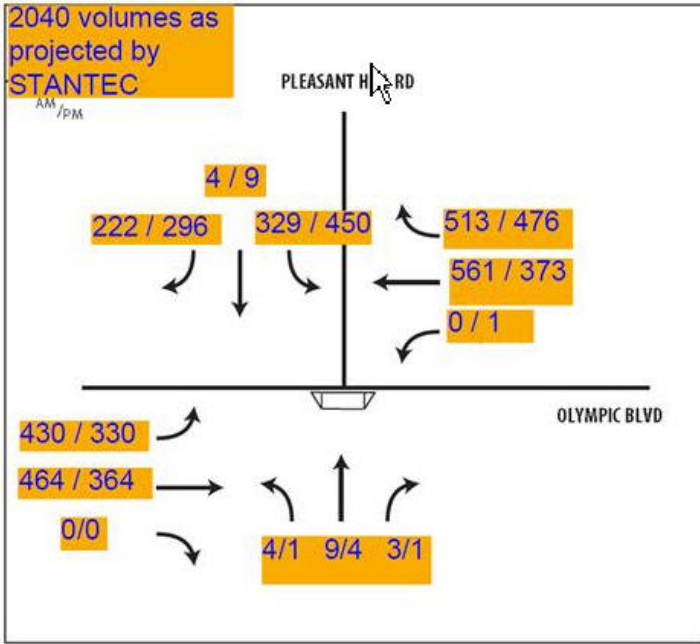


Source: Stantec traffic study

Modified Projected 2040 Intersection Turning Volumes

Traffic Volume Sensitivity Analysis























Modified Projected 2040 Intersection Turning Volumes



**Existing Intersection Level of Service Synchro Output (from
STANTEC)**























HCM Unsignalized Intersection Capacity Analysis
 1: Olympic Drive & Pleasant Hill Rd.

7/23/2014

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Sign Control	Stop			Stop			Stop			Stop					
Volume (vph)	503	262	0	0	265	399	3	12	2	263	4	309			
Peak Hour Factor	0.94	0.94	0.94	0.77	0.77	0.77	0.47	0.47	0.47	0.92	0.92	0.92			
Hourly flow rate (vph)	535	279	0	0	344	518	6	26	4	286	4	336			
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2	SB 3						
Volume Total (vph)	535	279	0	344	518	36	286	4	336						
Volume Left (vph)	535	0	0	0	0	6	286	0	0						
Volume Right (vph)	0	0	0	0	518	4	0	0	336						
Hadj (s)	0.53	0.03	0.00	0.03	-0.67	0.00	0.53	0.03	-0.67						
Departure Headway (s)	7.1	6.6	7.1	7.1	3.2	8.5	8.0	7.5	3.2						
Degree Utilization, x	1.06	0.51	0.00	0.68	0.46	0.09	0.64	0.01	0.30						
Capacity (veh/h)	512	536	504	491	1116	379	437	462	1113						
Control Delay (s)	82.3	15.2	8.9	22.7	7.7	12.3	23.0	9.4	6.4						
Approach Delay (s)	59.3		13.7			12.3	14.0								
Approach LOS	F		B			B	B								
Intersection Summary															
Delay			29.6												
Level of Service			D												
Intersection Capacity Utilization			79.7%				ICU Level of Service				D				
Analysis Period (min)			15												

HCM Unsignalized Intersection Capacity Analysis
 1: Olympic Drive & Pleasant Hill Rd.

7/23/2014






















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	393	216	0	1	194	320	1	4	1	393	9	386
Peak Hour Factor	0.94	0.94	0.94	0.77	0.77	0.77	0.47	0.47	0.47	0.92	0.92	0.92
Hourly flow rate (vph)	418	230	0	1	252	416	2	9	2	427	10	420
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2	SB 3			
Volume Total (vph)	418	230	1	252	416	13	427	10	420			
Volume Left (vph)	418	0	1	0	0	2	427	0	0			
Volume Right (vph)	0	0	0	0	416	2	0	0	420			
Hadj (s)	0.53	0.03	0.53	0.03	-0.67	-0.03	0.53	0.03	-0.67			
Departure Headway (s)	7.4	6.9	8.0	7.5	3.2	8.3	7.6	7.1	3.2			
Degree Utilization, x	0.86	0.44	0.00	0.52	0.37	0.03	0.90	0.02	0.37			
Capacity (veh/h)	478	507	433	455	1114	397	467	487	1114			
Control Delay (s)	40.3	14.1	9.8	17.3	6.9	11.5	47.5	9.1	6.9			
Approach Delay (s)	31.0		10.8			11.5	27.1					
Approach LOS	D		B			B	D					
Intersection Summary												
Delay			23.2									
Level of Service			C									
Intersection Capacity Utilization			76.8%		ICU Level of Service				D			
Analysis Period (min)			15									

**Future Intersection Level of Service (Existing Stop Controls) Synchro
Output (from STANTEC)**

HCM Unsignalized Intersection Capacity Analysis

1: Olympic Drive & Pleasant Hill Rd.























7/30/2014

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Sign Control	Stop			Stop				Stop		Stop					
Volume (vph)	430	464	0	0	561	513	4	9	3	329	4	222			
Peak Hour Factor	0.94	0.94	0.94	0.77	0.77	0.77	0.47	0.47	0.47	0.92	0.92	0.92			
Hourly flow rate (vph)	457	494	0	0	729	666	9	19	6	358	4	241			
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2	SB 3						
Volume Total (vph)	457	494	0	729	666	34	358	4	241						
Volume Left (vph)	457	0	0	0	0	9	358	0	0						
Volume Right (vph)	0	0	0	0	666	6	0	0	241						
Hadj (s)	0.53	0.03	0.00	0.03	-0.67	-0.03	0.53	0.03	-0.67						
Departure Headway (s)	7.9	7.4	7.7	7.7	3.2	9.7	8.5	8.0	3.2						
Degree Utilization, x	1.00	1.01	0.00	1.57	0.59	0.09	0.84	0.01	0.21						
Capacity (veh/h)	457	494	463	469	1118	353	358	440	1122						
Control Delay (s)	70.2	70.6	9.5	283.7	9.5	13.6	41.8	9.9	5.9						
Approach Delay (s)	70.4		152.8			13.6	27.2								
Approach LOS	F		F			B	D								
Intersection Summary															
Delay			99.5												
Level of Service			F												
Intersection Capacity Utilization			96.7%				ICU Level of Service				F				
Analysis Period (min)			15												

HCM Unsignalized Intersection Capacity Analysis

1: Olympic Drive & Pleasant Hill Rd.

7/30/2014

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Sign Control	Stop			Stop			Stop			Stop					
Volume (vph)	330	364	0	1	373	476	1	4	1	450	9	296			
Peak Hour Factor	0.94	0.94	0.94	0.77	0.77	0.77	0.47	0.47	0.47	0.92	0.92	0.92			
Hourly flow rate (vph)	351	387	0	1	484	618	2	9	2	489	10	322			
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2	SB 3						
Volume Total (vph)	351	387	1	484	618	13	489	10	322						
Volume Left (vph)	351	0	1	0	0	2	489	0	0						
Volume Right (vph)	0	0	0	0	618	2	0	0	322						
Hadj (s)	0.53	0.03	0.53	0.03	-0.67	-0.03	0.53	0.03	-0.67						
Departure Headway (s)	8.1	7.6	8.2	7.7	3.2	9.6	8.2	7.7	3.2						
Degree Utilization, x	0.79	0.82	0.00	1.03	0.55	0.03	1.11	0.02	0.29						
Capacity (veh/h)	437	466	432	472	1117	361	429	461	1112						
Control Delay (s)	34.6	35.9	10.0	77.5	8.8	13.0	102.9	9.6	6.3						
Approach Delay (s)	35.2		39.0			13.0		63.9							
Approach LOS	E		E			B		F							
Intersection Summary															
Delay			45.5												
Level of Service			E												
Intersection Capacity Utilization			86.9%				ICU Level of Service				E				
Analysis Period (min)			15												

Rodel v1.88 Roundabout Analysis Output Results

RODEL 2014

RODEL 2014 - SINGLE LANE ENTRY - (NO RT LANES)									
SINGLE LANE ENTRY	Approach	AM / PM							
		Ave Delay (sec)		Level of Service	V/C Ratio	15 min Ave Q (ft)		95% Queue (ft)	
		AM	PM	AM / PM	AM / PM	AM	PM	AM	PM
	Southbound - Pleasant Hill	8 s	13 s	A / B	0.63 / 0.82	38	88	97	208
Eastbound - Olympic Blvd	12 s	10 s	B / A	0.79 / 0.67	75	46	185	115	
Westbound - Olympic Blvd	36 s	9 s	E / A	1.05 / 0.67	330	44	688	113	
Intersection Delay & LOS	20s / 11 s		C / B						

Notes:

RODEL 2014 - SINGLE LANE WITH WB YIELD RT LANE									
WB YIELD RT LANE	Approach	AM / PM							
		Average Delay (sec)		Level of Service	V/C Ratio	15 min Ave Q (ft)		95% Queue (ft)	
		AM	PM	AM / PM	AM / PM	AM	PM	AM	PM
	Southbound - Pleasant Hill	8 s	13 s	A / B	0.63 / 0.82	38	88	97	208
Eastbound - Olympic Blvd	12 s	10 s	B / A	0.79 / 0.67	75	46	185	115	
Westbound - Olympic Blvd	6 s	5 s	A / A	0.46 / 0.31	16	44	8	28	
Intersection Delay & LOS	9 s / 9 s		A / A						

Notes

RODEL 2014 - SINGLE LANE WITH WB & SB YIELD RT LANE									
WB & SB YIELD RT LANE	Approach	AM / PM							
		Average Delay (sec)		Level of Service	V/C Ratio	15 min Ave Q (ft)		95% Queue (ft)	
		AM	PM	AM/PM	AM/PM	AM	PM	AM	PM
	Southbound - Pleasant Hill	5 s	6 s	A / A	0.42 / 0.43	13	16	26	41
Eastbound - Olympic Blvd	12 s	10 s	B / A	0.79 / 0.67	75	46	185	115	
Westbound - Olympic Blvd	6 s	5 s	A / A	0.46 / 0.31	16	44	8	28	
Intersection Delay & LOS	9 s / 7s		A / A						

Notes:

Level of Service (LOS) delay based on HCM 2010 Un-Signalized

Truck: 1.5% SB and WB, 1% EB

Intersection traffic volumes and PHF factors from Stantec Synchro Analysis , PHF SB = 0.85; EB = 0.92; WB = 0.94

Intersection analyzed with 50% Confidence Level

RODEL 2040

RODEL 2040 - SINGLE LANE ENTRY - (NO RT LANES)									
SINGLE LANE ENTRY	Approach	AM / PM							
		Ave Delay (sec)		Level of Service	V/C Ratio	15 min Ave Q (ft)		95% Queue (ft)	
	AM	PM	AM / PM	AM / PM	AM	PM	AM	PM	
	Southbound - Pleasant Hill	10 s	15 s	B / C	0.71 / 0.85	54	97	133	225
Eastbound - Olympic Blvd	32 s	18 s	D / C	1.02 / 0.90	300	128	620	300	
Westbound - Olympic Blvd	281 s	33 s	F / D	1.93 / 1.03	2950	292	5750	618	
Intersection Delay & LOS	130 s / 23 s		F / C						

Notes:

RODEL 2040 - SINGLE LANE WITH <u>WB YIELD RT LANE</u>									
WB YIELD RT LANE	Approach	AM / PM							
		Average Delay (sec)		Level of Service	V/C Ratio	15 min Ave Q (ft)		95% Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM	
	Southbound - Pleasant Hill	13 s	16 s	B / C	0.77 / 0.85	69	100	169	235
Eastbound - Olympic Blvd	32 s	18 s	D / C	1.02 / 0.89	293	125	618	298	
Westbound - Olympic Blvd	10 s	6 s	B / A	0.67 / 0.43	50	18	113	47	
Intersection Delay & LOS	18 s / 14 s		C / B						

Notes

RODEL 2040 - SINGLE LANE WITH <u>WB & SB YIELD RT LANE</u>									
WB & SB YIELD RT LANE	Approach	AM / PM							
		Average Delay (sec)		Level of Service	V/C Ratio	15 min Ave Q (ft)		95% Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM	
	Southbound - Pleasant Hill	7 s	7 s	A / A	0.45 / 0.46	20	25	50	60
Eastbound - Olympic Blvd	32 s	18 s	D / C	1.03 / 0.90	293	125	618	298	
Westbound - Olympic Blvd	10 s	6 s	B / A	0.67 / 0.43	50	18	113	47	
Intersection Delay & LOS	17 s / 11 s		C / B						

Notes:

Level of Service (LOS) delay based on HCM 2010 Un-Signalized

Truck: 1.5% SB and WB, 1% EB

Intersection traffic volumes and PHF factors from Stantec Synchro Analysis , PHF SB = 0.85; EB = 0.92; WB = 0.94

Intersection analyzed with 50% Confidence Level

RODEL 2040 - "Modified" flows (Jan 20th 2016)

RODEL 2040 - SINGLE LANE ENTRY - (NO RT LANES)									
SINGLE LANE ENTRY	Approach	AM / PM							
		Ave Delay (sec)		Level of Service	V/C Ratio	15 min Ave Q (ft)		95% Queue (ft)	
	AM	PM	AM / PM	AM / PM	AM	PM	AM	PM	
	Southbound - Pleasant Hill	14 s	18 s	B / C	0.82 / 0.88	87	118	208	275
Eastbound - Olympic Blvd	32 s	15 s	D / C	1.03 / 0.86	300	108	620	250	
Westbound - Olympic Blvd	355 s	45 s	F / E	2.20 / 1.10	3650	417	7125	868	
Intersection Delay & LOS		156 s / 27 s		F / D					

Notes:

RODEL 2040 - SINGLE LANE WITH WB YIELD RT LANE									
WB YIELD RT LANE	Approach	AM / PM							
		Average Delay (sec)		Level of Service	V/C Ratio	15 min Ave Q (ft)		95% Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM	
	Southbound - Pleasant Hill	20 s	19 s	C / C	0.90 / 0.89	133	125	306	288
Eastbound - Olympic Blvd	32 s	15 s	D / C	1.02 / 0.86	288	108	610	275	
Westbound - Olympic Blvd	12 s	8 s	B / A	0.71 / 0.50	50	20	125	50	
Intersection Delay & LOS		21 s / 14s		C / B					

Notes

RODEL 2040 - SINGLE LANE WITH WB & SB YIELD RT LANE									
WB & SB YIELD RT LANE	Approach	AM / PM							
		Average Delay (sec)		Level of Service	V/C Ratio	15 min Ave Q (ft)		95% Queue (ft)	
	AM	PM	AM/PM	AM/PM	AM	PM	AM	PM	
	Southbound - Pleasant Hill	7 s	7 s	A / A	0.45 / 0.46	20	25	50	60
Eastbound - Olympic Blvd	32 s	15 s	D / C	1.03 / 0.86	295	108	623	273	
Westbound - Olympic Blvd	12 s	8 s	B / A	0.71 / 0.53	50	31	125	88	
Intersection Delay & LOS		18 s / 11s		C / B					

Notes:

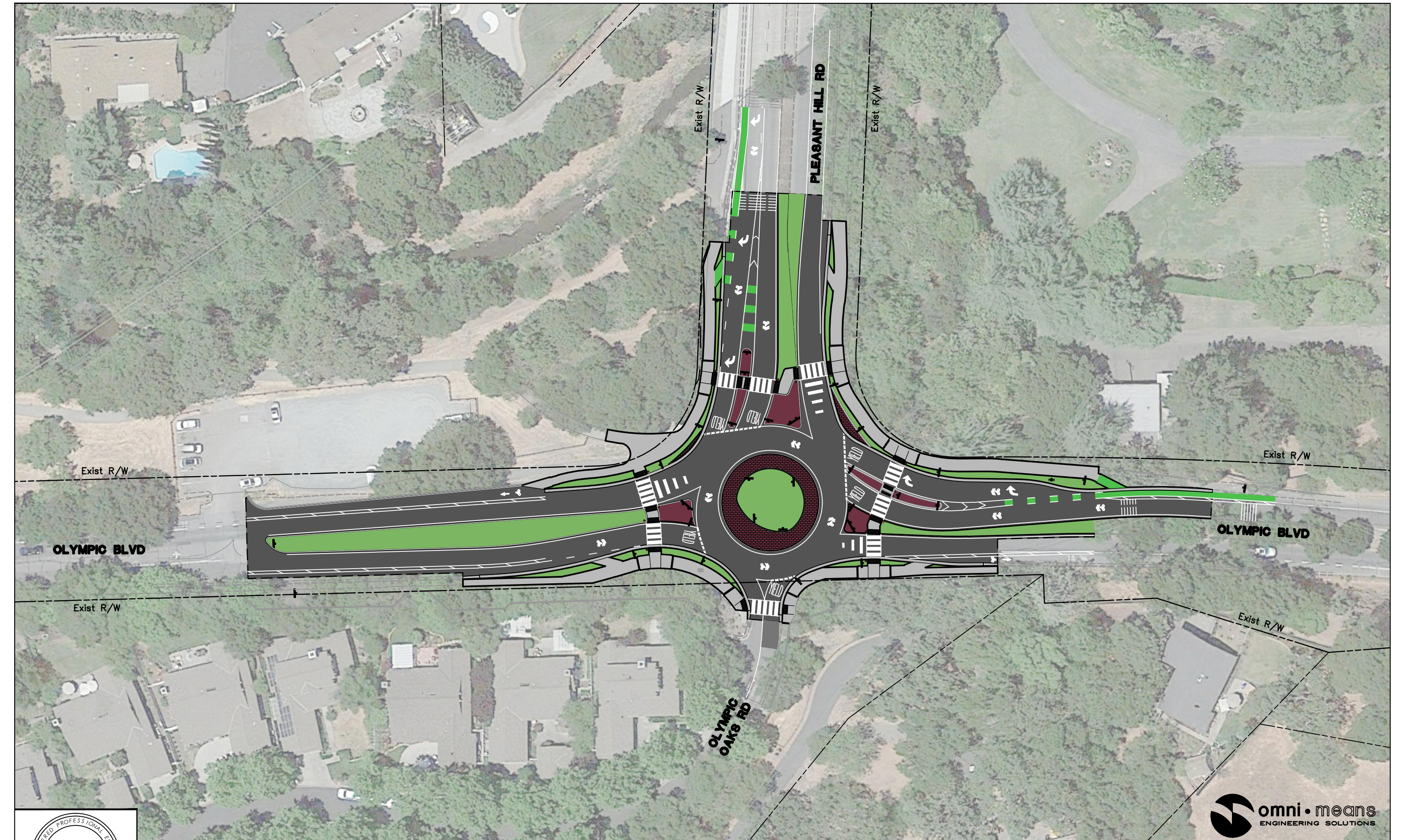
Level of Service (LOS) delay based on HCM 2010 Un-Signalized

Truck: 1.5% SB and WB, 1% EB

Intersection traffic volumes and PHF factors from Stantec Synchro Analysis , PHF SB = 0.85; EB = 0.92; WB = 0.94

Intersection analyzed with 50% Confidence Level

**Intersection Layout and Lane Geometry Approved for Final
Engineering**



REVISIONS			
NO.	DESCRIPTION	DATE	BY

DRAWN BY: DWW DATE: 12-22-2015
 DESIGNED BY: DWW DATE: 12-22-2015
 CHECKED BY: RGB DATE: 12-22-2015



CITY OF LAFAYETTE

PLEASANT HILL RD & OLYMPIC BLVD
ROUNDAABOUT
COLORIED LAYOUT



SCALE	DATE: JANUARY, 2016
HORIZ. 1" = 30'	CAD FILE: 2052EX0010.dwg
VERT. NONE	DRAWING NO. X-XX
SHEET NO. EX-1 OF 00	