

# MARIN WOODS

Attachment 1.2:

Traffic Study submitted by

Applicant 09/27/2016



**MEMORANDUM**

To: Brad Gluth – City of Oak Harbor, Civil Engineer I  
 From: Matthew Palmer, PE *MJP*  
 Project: Marin Woods, GTC #15-266  
 City of Oak Harbor Level of Service and Access - Updated  
 Date: December 16, 2015

Gibson Traffic Consultants, Inc. (GTC) has been retained to provide a traffic impact memorandum to update the trip distribution and level of service for the proposed Marin Woods residential development. A site vicinity map is included in Figure 1.

The proposed development will still consist of 42 new single-family residential units. There is an existing single-family residence that will remain on the site. The development site is located on the northeast side of SW Swantown Rd opposite Fairway Lane. The site will no longer have access to SW Swantown Rd opposite Fairway Lane. It will now only have access to the city street system via SW Putnam Dr and SW Robertson Dr. The proposed future build-out is still anticipated to be completed and occupied by 2017; therefore, 2017 was used for future analysis to satisfy SEPA requirements. This is the same future year as identified in the August 2014 Traffic Impact Analysis.

**Trip Generation**

The trip generation calculations for the site are the same as in the original August 2014 TIA and are based on the latest edition of the Institute of Transportation Engineers’ (ITE) *Trip Generation, 9<sup>th</sup> Edition* (2012). ITE Land Use Code 210, single-family residential unit, was used for the trip generation calculations for the proposed use. The trip distribution is based on peak-hour turning movement counts, surrounding uses, and prior traffic studies completed in the site vicinity.

The development will generate 400 ADT with 31 AM peak-hour trips (8 inbound/23 outbound) and 42 PM peak-hour trips (26 inbound/16 outbound). A Trip Generation summary has been included in Table 1.

**Table 1: Trip Generation Summary**

Land Use	Units	Average Daily Trips	AM Peak-Hour Trips			PM Peak-Hour Trips		
			Inbound	Outbound	Total	Inbound	Outbound	Total
Single-Family (Total)	43 SFD	410	8	24	32	27	16	43
Single-Family (Credited)	-1 SFD	-10	0	-1	-1	-1	0	-1
<b>Total</b>	<b>42 SFD</b>	<b>400</b>	<b>8</b>	<b>23</b>	<b>31</b>	<b>26</b>	<b>16</b>	<b>42</b>

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**Trip Distribution**

Trip distribution and assignments for the updated Marin Woods development are based on existing counts, adjacent land uses, and previous traffic studies for residential developments in the site vicinity. The distribution has been adjusted to reflect no direct access to SW Swantown Rd. It is anticipated that 40% of the site traffic will travel along SW Swantown Rd, thirty percent to the east and five percent to the west. The five percent traveling to the west will utilize Loerland Dr to access SW Swantown Rd and the thirty percent to the east will utilize multiple local residential streets including SW Regency Dr. Approximately 50% of the site traffic will travel along Heller Road, thirty-five percent to the north and fifteen percent to the south. The remaining 20% will travel to and from the east along Whidbey Avenue. The PM peak-hour trip distribution is included in Figure 2.

**Existing LOS Analysis**

Existing traffic volumes during the PM peak-hour were collected by Idax Data at the study intersections on August 12, 2014 for the original August 2014 TIA. The existing turning movements are shown in Figure 3. The same study intersections are analyzed in this update as were previously analyzed in the original August 2014 TIA. The level of service analysis shows that the intersections all currently operate at level of service C or better. The existing level of service is summarized in Table 2. Note: The City of Oak Harbor has identified LOS D for city streets and LOS E as the acceptable level of service standard for the SR-20 corridor.

**Baseline 2017 LOS Analysis**

Baseline traffic volumes were factored by an annually compounding growth rate of 3% to achieve baseline 2017 (horizon planning year) conditions with background growth. This growth rate is conservatively high based on recent planning level analysis done for the City. The baseline 2017 turning movements are shown in Figure 4. The level of service analysis shows that the intersections all continue to operate at level of service D or better. The baseline 2017 level of service is summarized in Table 2.

### Future 2017 With Development LOS Analysis

The future 2017 with development volumes were calculated by adding the development trip assignments to the baseline 2017 turning movements. The future 2017 with development turning movements are shown in Figure 5. The level of service analysis shows that the intersections all will continue to operate at level of service D or better. The future 2017 with development level of service is summarized in Table 2.

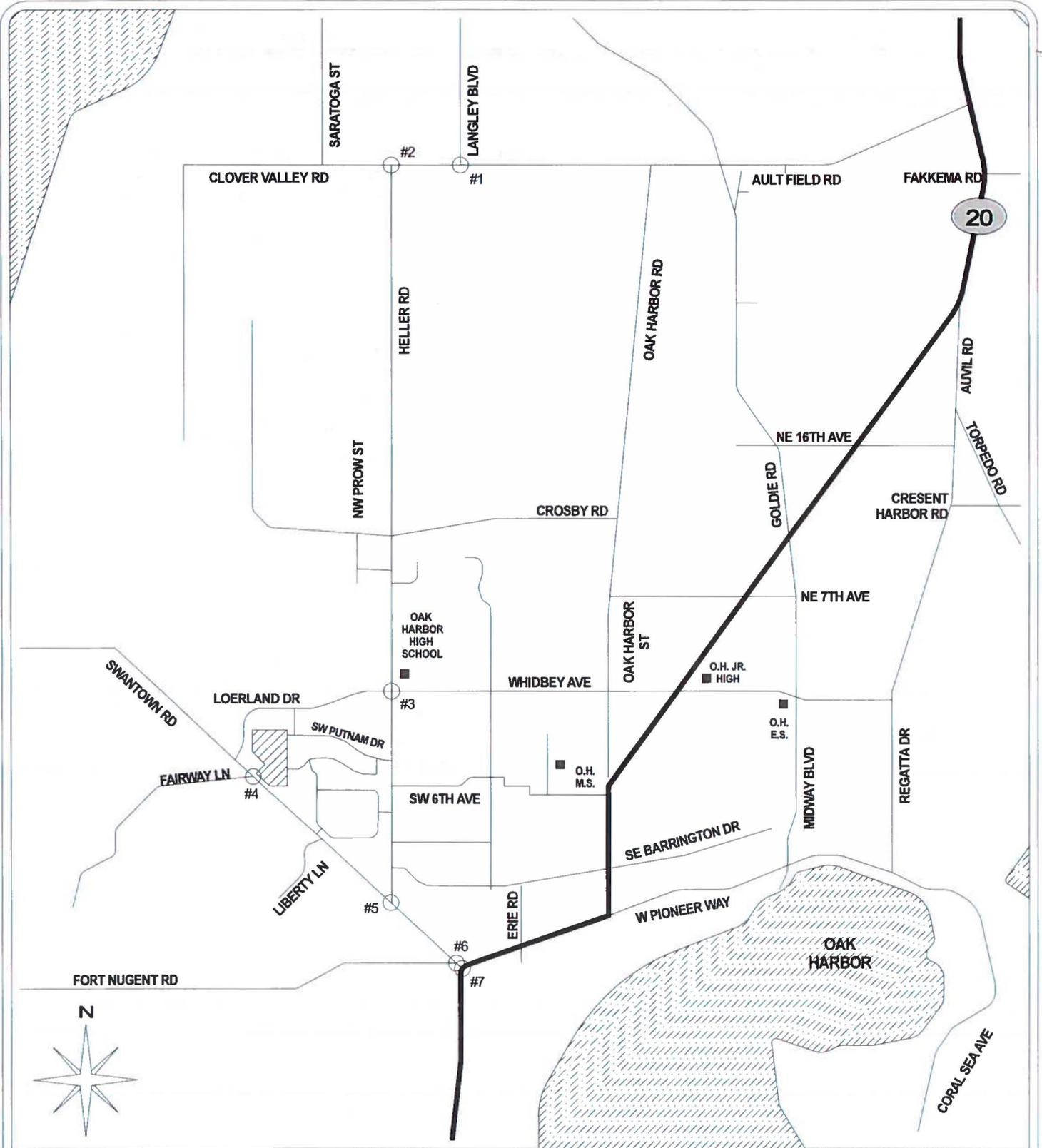
**Table 2: 2017 Future Level of Service Summary –PM Peak-Hour**

Intersections	Existing Conditions		2017 Future Conditions			
			without Development		with Development	
	LOS	Delay	LOS	Delay	LOS	Delay
1. Langley Blvd at Ault Field Rd	C	20.7 sec	C	21.9 sec	C	22.1 sec
2. Clover Valley Rd at Ault Field Rd	C	21.9 sec	D	28.0 sec	D	28.9 sec
3. Heller Rd at Whidbey Ave	B	15.7 sec	B	16.4 sec	B	16.8 sec
4. SW Swantown Rd at Fairway Lane	A	9.3 sec	A	9.4 sec	A	9.4 sec
5. Heller Rd at SW Swantown Rd	C	16.5 sec	C	19.4 sec	C	20.1 sec
6. SW Fort Nugent Ave at Swantown Rd	C	28.2 sec	C	30.1 sec	C	30.4 sec
7. SR-20 at Swantown Rd	B	15.8 sec	B	18.9 sec	B	19.0 sec

### Conclusions

The 42 new single-family residences in the Marin Woods development are anticipated to generate 400 new daily trips with 42 new PM peak-hour trips. All of the study intersection will operate at acceptable LOS D or better with the addition of development trips. The removal of the access to SW Swantown Road opposite from Fairway Lane will eliminate potential cut through traffic and would allow the existing single-family residence to remain.

Attachments (A-1 to A-52)



**GIBSON TRAFFIC CONSULTANTS**

**TRAFFIC IMPACT STUDY  
GTC #15-266**

MARIN WOODS  
(42 NEW SINGLE-FAMILY UNITS)

CITY OF OAK HARBOR

**LEGEND**



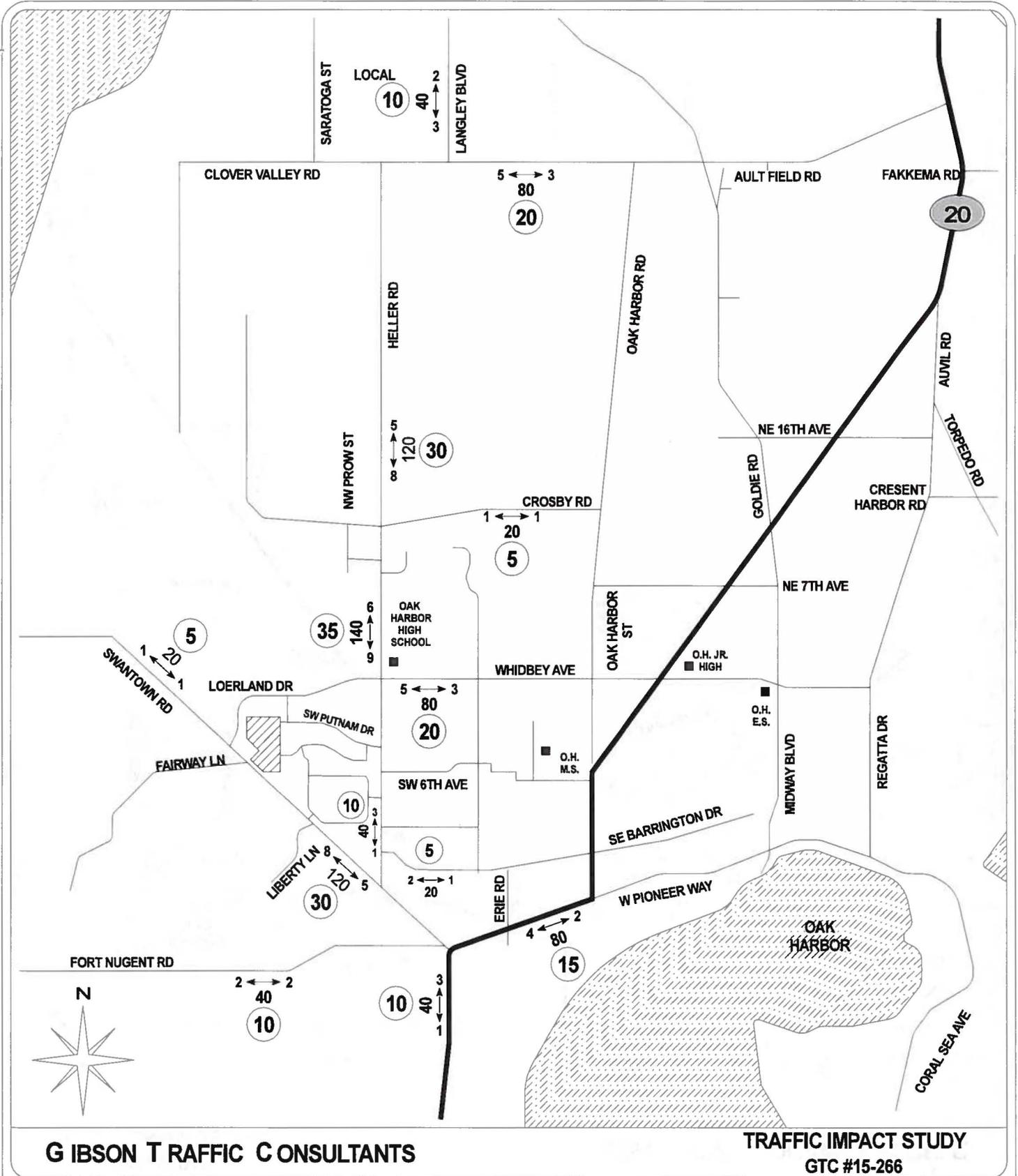
DEVELOPMENT SITE



STUDY INTERSECTION

**FIGURE 1**

**SITE VICINITY MAP**



MARIN WOODS  
(42 NEW SINGLE-FAMILY UNITS)

CITY OF OAK HARBOR

**LEGEND**

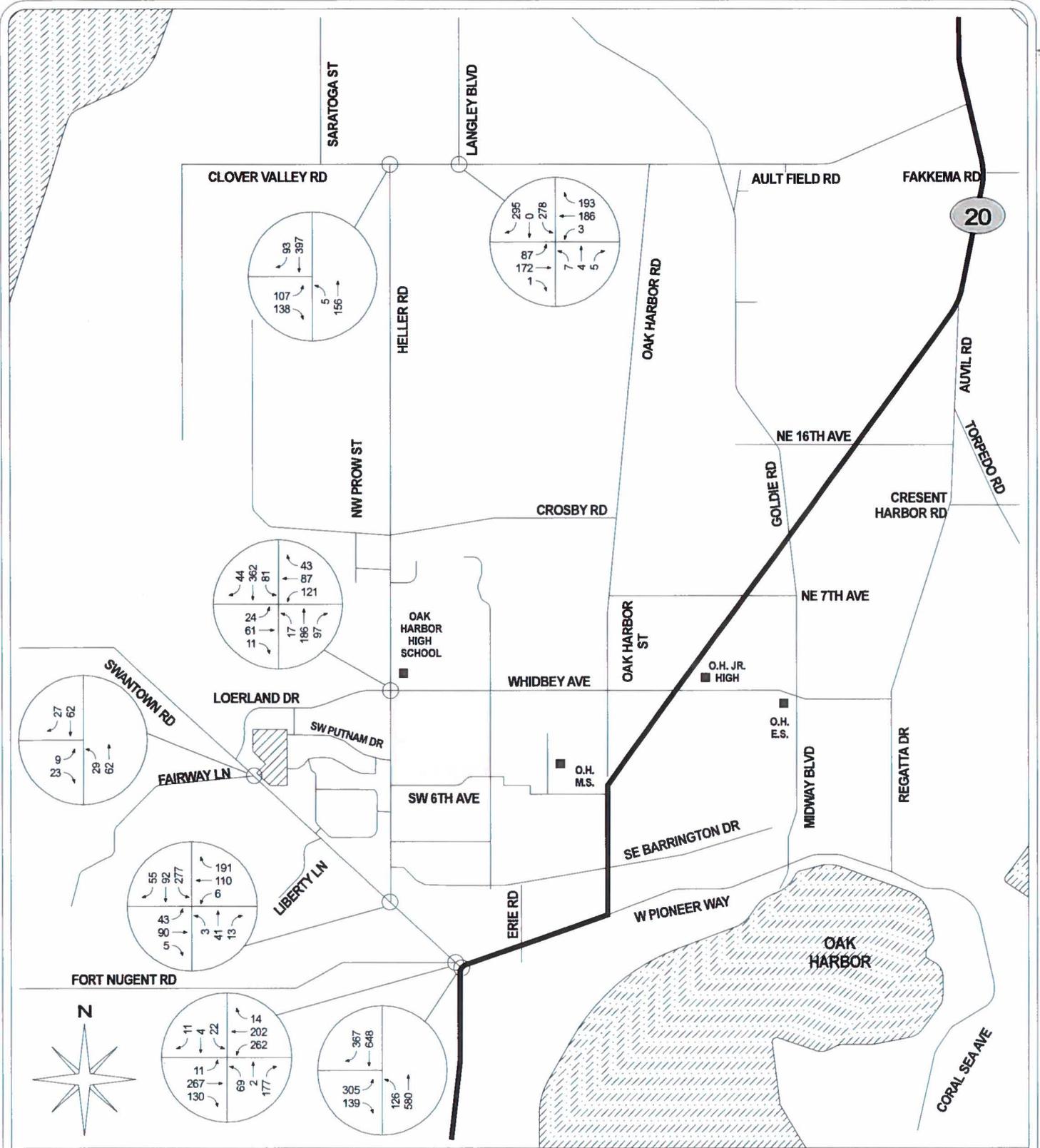
PM  $\longleftrightarrow$  PEAK  
AWDT

(25)

NEW SITE TRAFFIC  
(PEAK HOUR)

TRIP DISTRIBUTION %

**FIGURE 2**  
**DEVELOPMENT**  
**PM PEAK-HOUR**  
**TRIP DISTRIBUTION**



**G IBSON T RAFFIC C CONSULTANTS**

**TRAFFIC IMPACT STUDY**  
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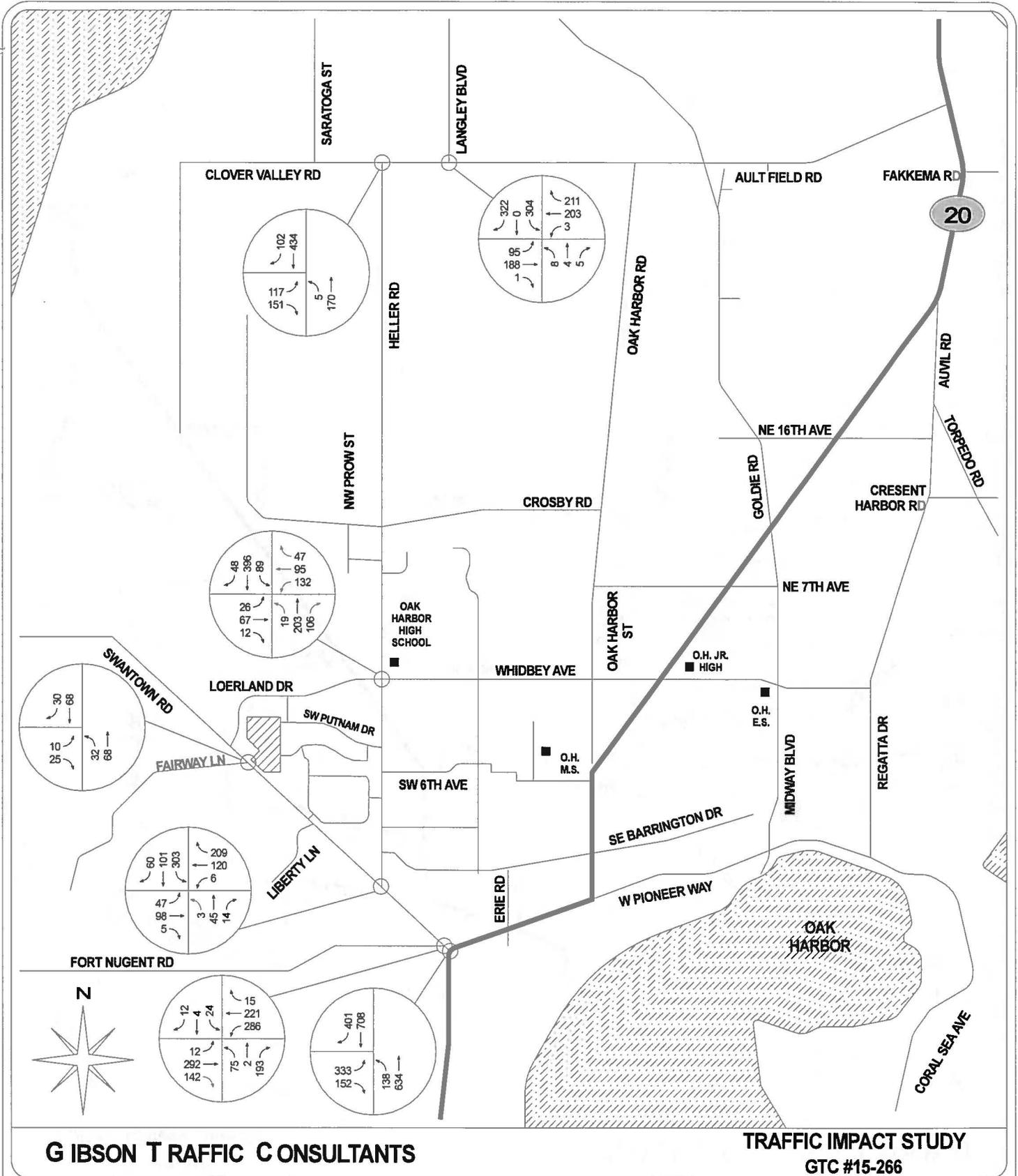
MARIN WOODS  
(42 NEW SINGLE-FAMILY UNITS)

**LEGEND**

200 → PM PEAK-HOUR  
TURNING MOVEMENT VOLUMES

CITY OF OAK HARBOR

**FIGURE 3**  
**EXISTING 2014**  
**PM PEAK-HOUR**  
**TURNING MOVEMENT**



MARIN WOODS  
(42 NEW SINGLE-FAMILY UNITS)

CITY OF OAK HARBOR

**LEGEND**

205 → PM PEAK-HOUR  
TURNING MOVEMENT VOLUMES

**FIGURE 4**  
**BASELINE 2017**  
**PM PEAK-HOUR**  
**TURNING MOVEMENTS**



Marin Woods  
GTC #15-266

Trip Generation for: **Weekday**  
(a.k.a.): **Average Weekday Daily Trips (AWDT)**

																			NET EXTERNAL TRIPS BY TYPE											
																			IN BOTH DIRECTIONS						DIRECTIONAL ASSIGNMENTS					
			Gross Trips				Internal Crossover		TOTAL	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW											
LAND USES	VARIABLE	ITE LU code	Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out										
Single-family Residential	43 units	210	9.52	50%	50%	409	0%	0	409	0%	0	0%	0	409	0	0	0	0	205	204										
Single-family Residential (Credited)	-1 units	210	9.52	50%	50%	-10	0%	0	-10	0%	0	0%	0	-10	0	0	0	0	-5	-5										
<b>Totals</b>						400		0	400		0		0	400	0	0	0	0	200	200										

Marin Woods  
GTC #15-266

**Trip Generation for: Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 7 and 9 AM**  
**(a.k.a.): Weekday AM Peak Hour**

LAND USES	VARIABLE	ITE LU code	NET EXTERNAL TRIPS BY TYPE																		
			Gross Trips						Internal Crossover		TOTAL	IN BOTH DIRECTIONS				DIRECTIONAL ASSIGNMENTS					
			Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	In+Out (Total)	% of Ext. Trips		In+Out (Total)	% of Ext. Trips	In+Out (Total)	NEW	PASS-BY		DIVERTED LINK		NEW	
Single-family Residential	43 units	210	0.75	25%	75%	32	0%	0	32	0%	0	0%	0	32	0	0	0	0	8	24	
Single-family Residential (Credited)	-1 units	210	0.75	25%	75%	-1	0%	0	-1	0%	0	0%	0	-1	0	0	0	0	0	-1	
<b>Totals</b>						31		0	31		0		0	31	0	0	0	0	8	23	

Marin Woods  
GTC #15-266

**Trip Generation for: Weekday, Peak Hour of Adjacent Street Traffic, One Hour between 4 and 6 PM**  
**(a.k.a.): Weekday PM Peak Hour**

LAND USES		VARIABLE	ITE LU code	NET EXTERNAL TRIPS BY TYPE																
				Gross Trips					Internal Crossover		IN BOTH DIRECTIONS				DIRECTIONAL ASSIGNMENTS					
				Trip Rate	% IN	% OUT	In+Out (Total)	% of Gross Trips	Trips In+Out (Total)	TOTAL In+Out (Total)	PASS-BY		DIVERTED LINK		NEW	PASS-BY		DIVERTED LINK		NEW
							% of Ext. Trips	In+Out (Total)	% of Ext. Trips	In+Out (Total)	In+Out (Total)	In	Out	In	Out	In	Out	In	Out	
Single-family Residential	43 units	210	1.00	63%	37%	43	0%	0	43	0%	0	0%	0	43	0	0	0	0	27	16
Single-family Residential (Credited)	-1 units	210	1.00	63%	37%	-1	0%	0	-1	0%	0	0%	0	-1	0	0	0	0	-1	0
<b>Totals</b>						42		0	42		0		0	42	0	0	0	0	26	16

Marin Woods  
GTC #15-266

AM Version

%	New ADT	New AM Peak Hour Trips		
		In	Out	Total
100%	400	8	23	31
1%	4.00	0.08	0.23	0.31
2%	8.00	0.16	0.46	0.62
3%	12.00	0.24	0.69	0.93
4%	15.99	0.32	0.92	1.24
5%	19.99	0.40	1.15	1.55
6%	23.99	0.48	1.38	1.86
7%	27.99	0.56	1.61	2.17
8%	31.99	0.64	1.84	2.48
9%	35.99	0.72	2.07	2.79
10%	39.98	0.80	2.30	3.10
11%	43.98	0.88	2.53	3.41
12%	47.98	0.96	2.76	3.72
13%	51.98	1.04	2.99	4.03
14%	55.98	1.12	3.22	4.34
15%	59.98	1.20	3.45	4.65
16%	63.97	1.28	3.68	4.96
17%	67.97	1.36	3.91	5.27
18%	71.97	1.44	4.14	5.58
19%	75.97	1.52	4.37	5.89
20%	79.97	1.60	4.60	6.20
21%	83.97	1.68	4.83	6.51
22%	87.96	1.76	5.06	6.82
23%	91.96	1.84	5.29	7.13
24%	95.96	1.92	5.52	7.44
25%	99.96	2.00	5.75	7.75
26%	103.96	2.08	5.98	8.06
27%	107.96	2.16	6.21	8.37
28%	111.96	2.24	6.44	8.68
29%	115.95	2.32	6.67	8.99
30%	119.95	2.40	6.90	9.30
31%	123.95	2.48	7.13	9.61
32%	127.95	2.56	7.36	9.92
33%	131.95	2.64	7.59	10.23
34%	135.95	2.72	7.82	10.54
35%	139.94	2.80	8.05	10.85
36%	143.94	2.88	8.28	11.16
37%	147.94	2.96	8.51	11.47
38%	151.94	3.04	8.74	11.78
39%	155.94	3.12	8.97	12.09
40%	159.94	3.20	9.20	12.40
41%	163.93	3.28	9.43	12.71
42%	167.93	3.36	9.66	13.02
43%	171.93	3.44	9.89	13.33
44%	175.93	3.52	10.12	13.64
45%	179.93	3.60	10.35	13.95
46%	183.93	3.68	10.58	14.26
47%	187.92	3.76	10.81	14.57
48%	191.92	3.84	11.04	14.88
49%	195.92	3.92	11.27	15.19
50%	199.92	4.00	11.50	15.50
51%	203.92	4.08	11.73	15.81
52%	207.92	4.16	11.96	16.12
53%	211.92	4.24	12.19	16.43
54%	215.91	4.32	12.42	16.74
55%	219.91	4.40	12.65	17.05
56%	223.91	4.48	12.88	17.36
57%	227.91	4.56	13.11	17.67
58%	231.91	4.64	13.34	17.98
59%	235.91	4.72	13.57	18.29
60%	239.90	4.80	13.80	18.60
61%	243.90	4.88	14.03	18.91
62%	247.90	4.96	14.26	19.22
63%	251.90	5.04	14.49	19.53
64%	255.90	5.12	14.72	19.84
65%	259.90	5.20	14.95	20.15
66%	263.89	5.28	15.18	20.46
67%	267.89	5.36	15.41	20.77
68%	271.89	5.44	15.64	21.08
69%	275.89	5.52	15.87	21.39
70%	279.89	5.60	16.10	21.70
71%	283.89	5.68	16.33	22.01
72%	287.88	5.76	16.56	22.32
73%	291.88	5.84	16.79	22.63
74%	295.88	5.92	17.02	22.94
75%	299.88	6.00	17.25	23.25
76%	303.88	6.08	17.48	23.56
77%	307.88	6.16	17.71	23.87
78%	311.88	6.24	17.94	24.18
79%	315.87	6.32	18.17	24.49
80%	319.87	6.40	18.40	24.80
81%	323.87	6.48	18.63	25.11
82%	327.87	6.56	18.86	25.42
83%	331.87	6.64	19.09	25.73
84%	335.87	6.72	19.32	26.04
85%	339.86	6.80	19.55	26.35
86%	343.86	6.88	19.78	26.66
87%	347.86	6.96	20.01	26.97
88%	351.86	7.04	20.24	27.28
89%	355.86	7.12	20.47	27.59
90%	359.86	7.20	20.70	27.90
91%	363.85	7.28	20.93	28.21
92%	367.85	7.36	21.16	28.52
93%	371.85	7.44	21.39	28.83
94%	375.85	7.52	21.62	29.14
95%	379.85	7.60	21.85	29.45
96%	383.85	7.68	22.08	29.76
97%	387.84	7.76	22.31	30.07
98%	391.84	7.84	22.54	30.38
99%	395.84	7.92	22.77	30.69
100%	399.84	8.00	23.00	31.00

Marin Woods  
GTC #15-266

PM Version

%	New ADT	New PM Peak Hour Trips		
		In	Out	Total
100%	400	26	16	42
1%	4.00	0.26	0.16	0.42
2%	8.00	0.53	0.31	0.84
3%	12.00	0.79	0.47	1.26
4%	15.99	1.06	0.62	1.68
5%	19.99	1.32	0.78	2.10
6%	23.99	1.59	0.93	2.52
7%	27.99	1.85	1.09	2.94
8%	31.99	2.12	1.24	3.36
9%	35.99	2.38	1.40	3.78
10%	39.98	2.65	1.55	4.20
11%	43.98	2.91	1.71	4.62
12%	47.98	3.18	1.86	5.04
13%	51.98	3.44	2.02	5.46
14%	55.98	3.70	2.18	5.88
15%	59.98	3.97	2.33	6.30
16%	63.97	4.23	2.49	6.72
17%	67.97	4.50	2.64	7.14
18%	71.97	4.76	2.80	7.56
19%	75.97	5.03	2.95	7.98
20%	79.97	5.29	3.11	8.40
21%	83.97	5.56	3.26	8.82
22%	87.96	5.82	3.42	9.24
23%	91.96	6.09	3.57	9.66
24%	95.96	6.35	3.73	10.08
25%	99.96	6.62	3.89	10.50
26%	103.96	6.88	4.04	10.92
27%	107.96	7.14	4.20	11.34
28%	111.96	7.41	4.35	11.76
29%	115.95	7.67	4.51	12.18
30%	119.95	7.94	4.66	12.60
31%	123.95	8.20	4.82	13.02
32%	127.95	8.47	4.97	13.44
33%	131.95	8.73	5.13	13.86
34%	135.95	9.00	5.28	14.28
35%	139.94	9.26	5.44	14.70
36%	143.94	9.53	5.59	15.12
37%	147.94	9.79	5.75	15.54
38%	151.94	10.05	5.91	15.96
39%	155.94	10.32	6.06	16.38
40%	159.94	10.58	6.22	16.80
41%	163.93	10.85	6.37	17.22
42%	167.93	11.11	6.53	17.64
43%	171.93	11.38	6.68	18.06
44%	175.93	11.64	6.84	18.48
45%	179.93	11.91	6.99	18.90
46%	183.93	12.17	7.15	19.32
47%	187.92	12.44	7.30	19.74
48%	191.92	12.70	7.46	20.16
49%	195.92	12.97	7.61	20.58
50%	199.92	13.23	7.77	21.00
51%	203.92	13.49	7.93	21.42
52%	207.92	13.76	8.08	21.84
53%	211.92	14.02	8.24	22.26
54%	215.91	14.29	8.39	22.68
55%	219.91	14.55	8.55	23.10
56%	223.91	14.82	8.70	23.52
57%	227.91	15.08	8.86	23.94
58%	231.91	15.35	9.01	24.36
59%	235.91	15.61	9.17	24.78
60%	239.90	15.88	9.32	25.20
61%	243.90	16.14	9.48	25.62
62%	247.90	16.41	9.63	26.04
63%	251.90	16.67	9.79	26.46
64%	255.90	16.93	9.95	26.88
65%	259.90	17.20	10.10	27.30
66%	263.89	17.46	10.26	27.72
67%	267.89	17.73	10.41	28.14
68%	271.89	17.99	10.57	28.56
69%	275.89	18.26	10.72	28.98
70%	279.89	18.52	10.88	29.40
71%	283.89	18.79	11.03	29.82
72%	287.88	19.05	11.19	30.24
73%	291.88	19.32	11.34	30.66
74%	295.88	19.58	11.50	31.08
75%	299.88	19.85	11.66	31.50
76%	303.88	20.11	11.81	31.92
77%	307.88	20.37	11.97	32.34
78%	311.88	20.64	12.12	32.76
79%	315.87	20.90	12.28	33.18
80%	319.87	21.17	12.43	33.60
81%	323.87	21.43	12.59	34.02
82%	327.87	21.70	12.74	34.44
83%	331.87	21.96	12.90	34.86
84%	335.87	22.23	13.05	35.28
85%	339.86	22.49	13.21	35.70
86%	343.86	22.76	13.36	36.12
87%	347.86	23.02	13.52	36.54
88%	351.86	23.28	13.68	36.96
89%	355.86	23.55	13.83	37.38
90%	359.86	23.81	13.99	37.80
91%	363.85	24.08	14.14	38.22
92%	367.85	24.34	14.30	38.64
93%	371.85	24.61	14.45	39.06
94%	375.85	24.87	14.61	39.48
95%	379.85	25.14	14.76	39.90
96%	383.85	25.40	14.92	40.32
97%	387.84	25.67	15.07	40.74
98%	391.84	25.93	15.23	41.16
99%	395.84	26.20	15.38	41.58
100%	399.84	26.46	15.54	42.00

1 Langley Blvd @ Ault Field Rd

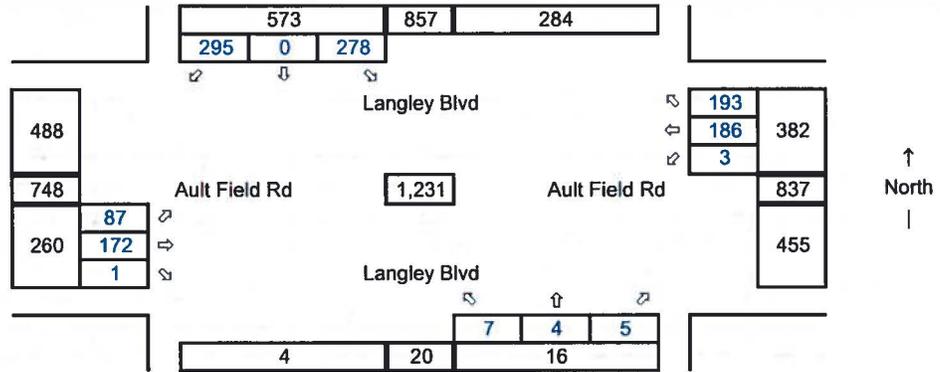
Synchro ID: 1

Existing

Average Weekday  
PM Peak Hour

Year: 8/12/14

Data Source: Idax Data



Future without Project

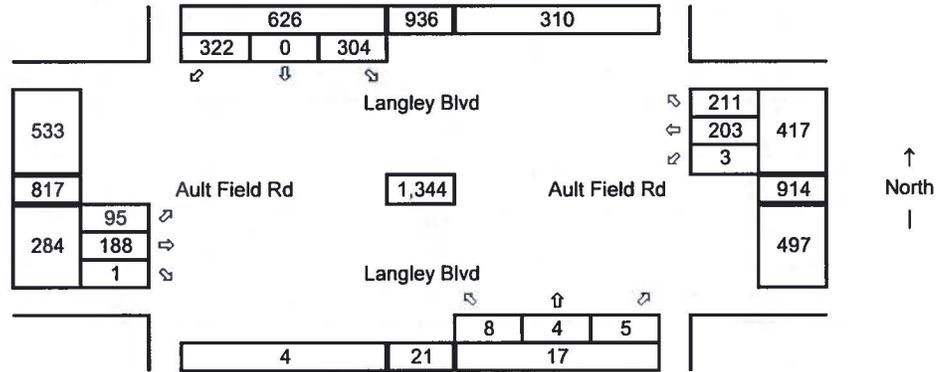
Average Weekday  
PM Peak Hour

Year: 2017

Growth Rate = 3.0%

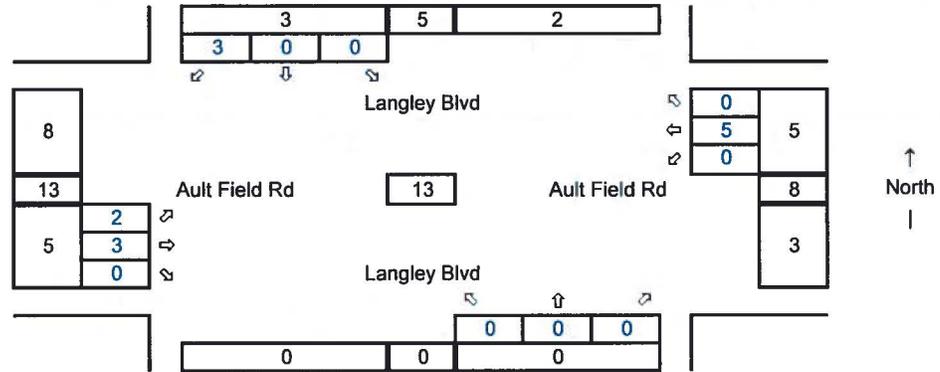
Years of Growth = 3

Total Growth = 1.0927



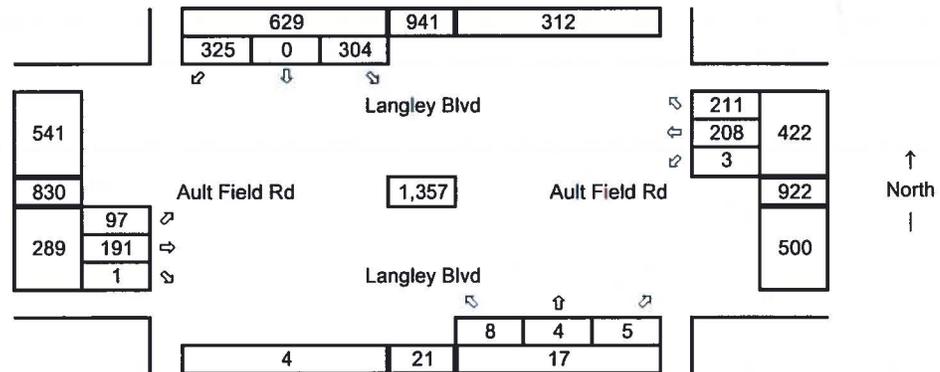
Total Project Trips

Average Weekday  
PM Peak Hour



Future with Project

Average Weekday  
PM Peak Hour



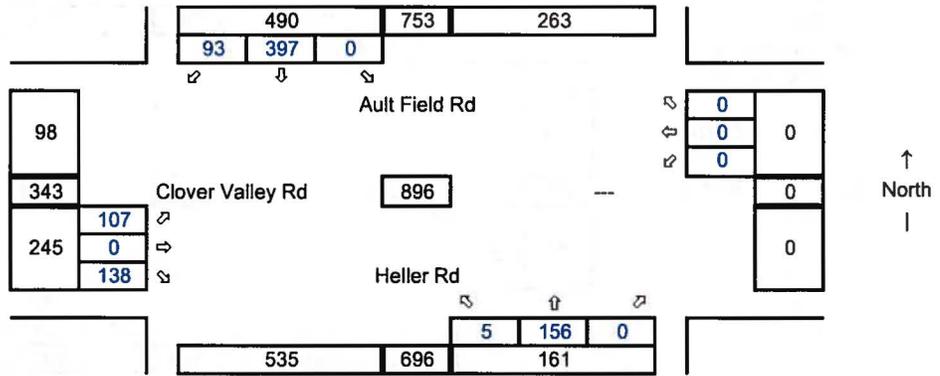
2 Clover Valley Rd @ Ault Field

Synchro ID: 2

Existing  
Average Weekday  
PM Peak Hour

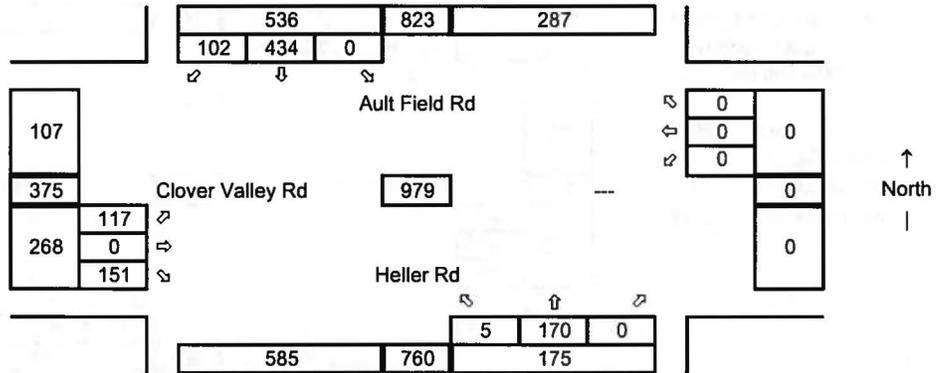
Year: 8/12/14

Data Source: Idax Data

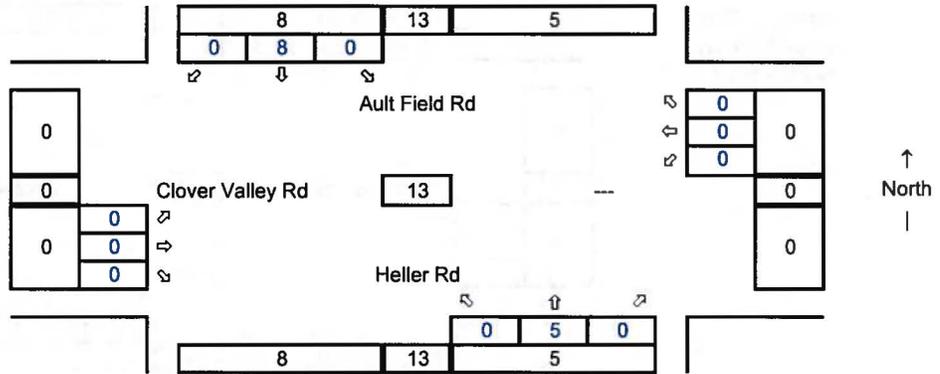


Future without Project  
Average Weekday  
PM Peak Hour

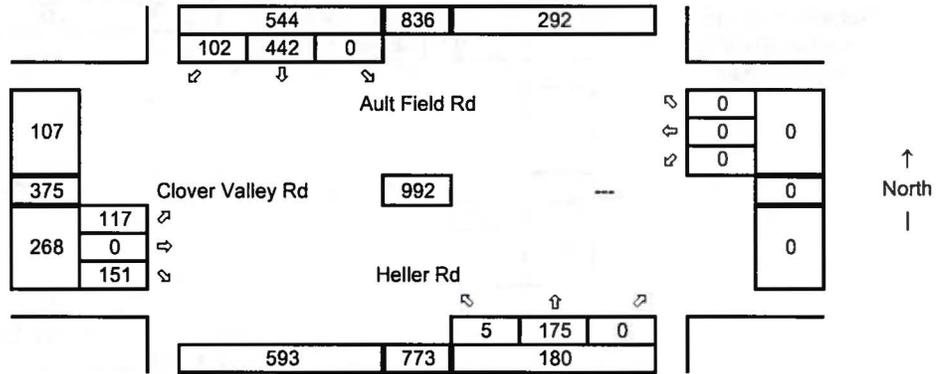
Year: 2017  
Growth Rate = 3.0%  
Years of Growth = 3  
Total Growth = 1.0927



Total Project Trips  
Average Weekday  
PM Peak Hour

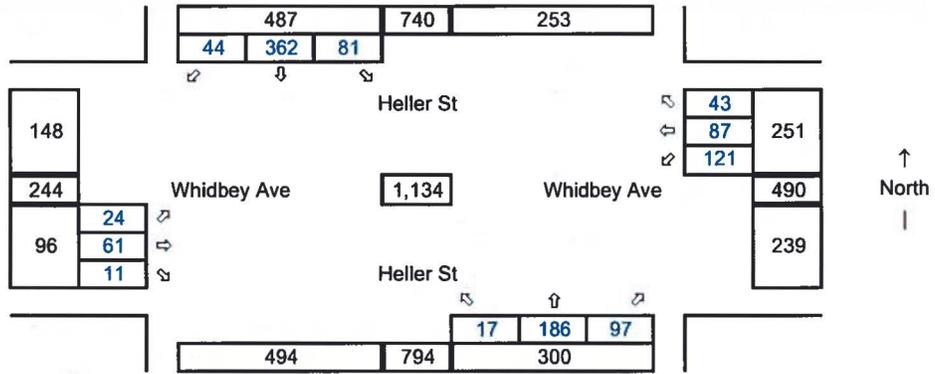


Future with Project  
Average Weekday  
PM Peak Hour

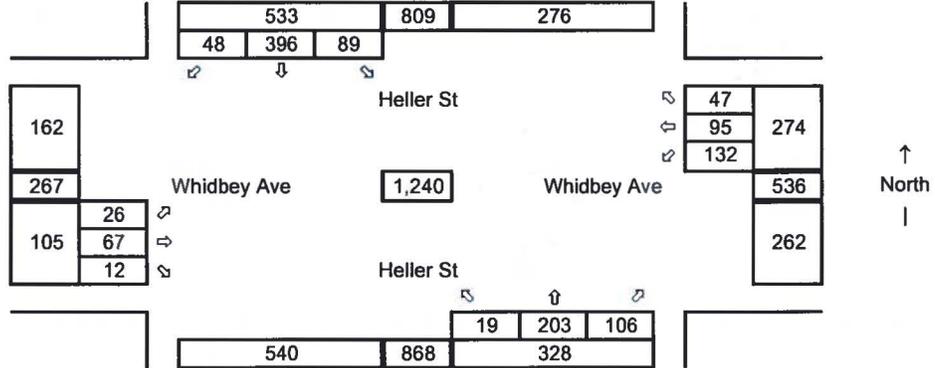


3 Heller St @ Whidbey Ave

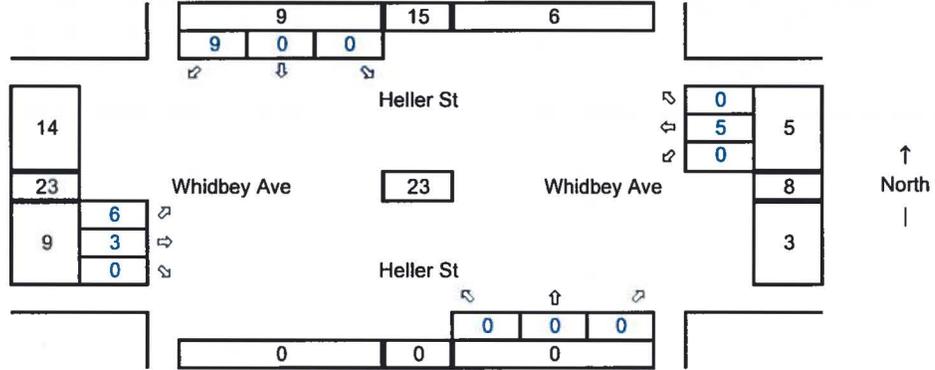
Synchro ID: 3  
**Existing**  
 Average Weekday  
 PM Peak Hour  
 Year: 8/12/14  
 Data Source: Idax Data



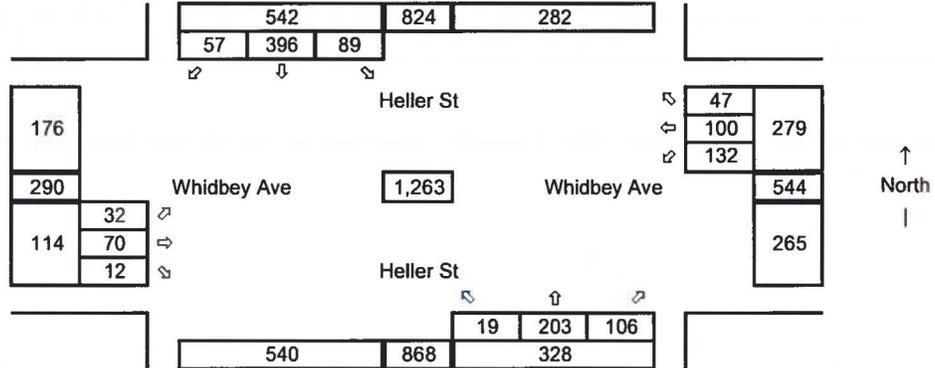
**Future without Project**  
 Average Weekday  
 PM Peak Hour  
 Year: 2017  
 Growth Rate = 3.0%  
 Years of Growth = 3  
 Total Growth = 1.0927



**Total Project Trips**  
 Average Weekday  
 PM Peak Hour



**Future with Project**  
 Average Weekday  
 PM Peak Hour



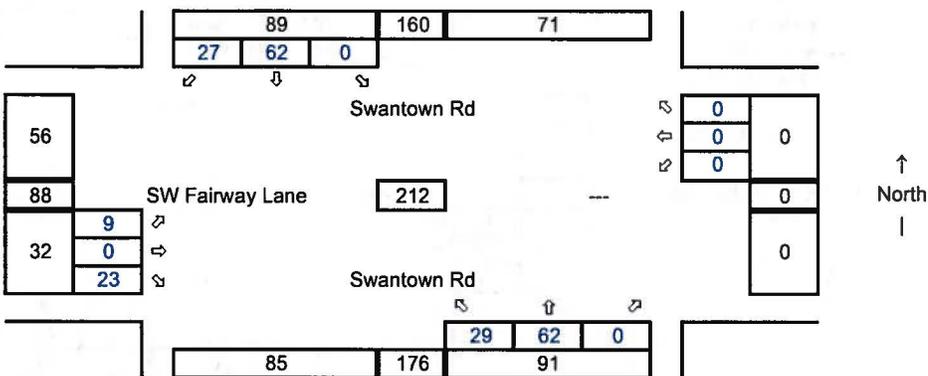
4 Swantown Rd @ Fairay Ln

Synchro ID: 4

**Existing**  
Average Weekday  
PM Peak Hour

Year: 8/12/14

Data Source: Idax Data



**Future without Project**

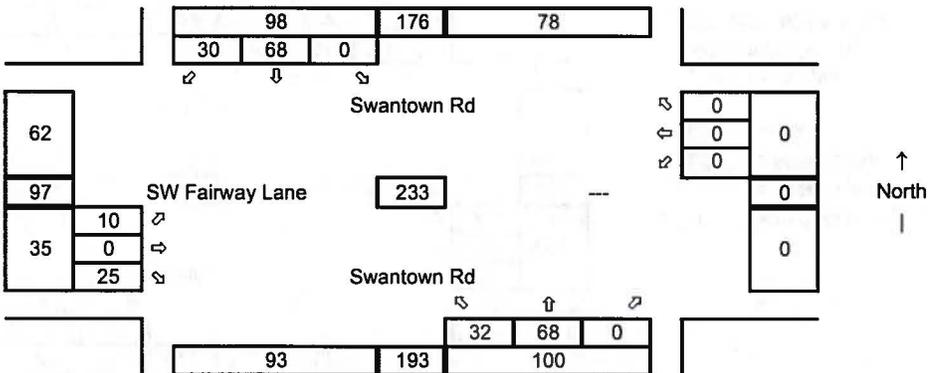
Average Weekday  
PM Peak Hour

Year: 2017

Growth Rate = 3.0%

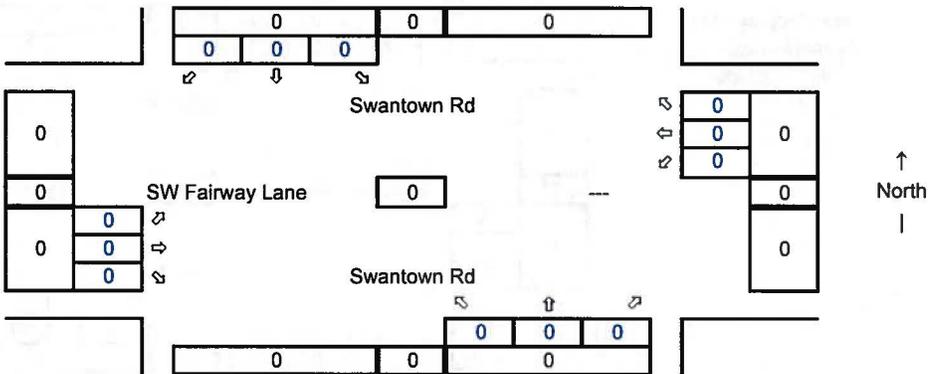
Years of Growth = 3

Total Growth = 1.0927



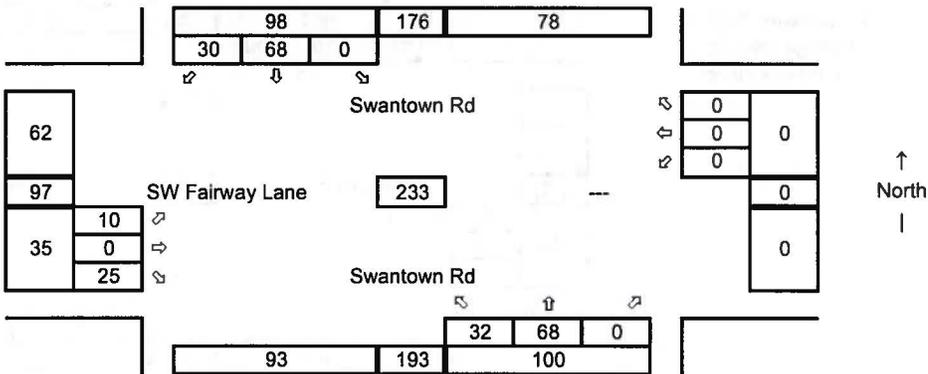
**Total Project Trips**

Average Weekday  
PM Peak Hour



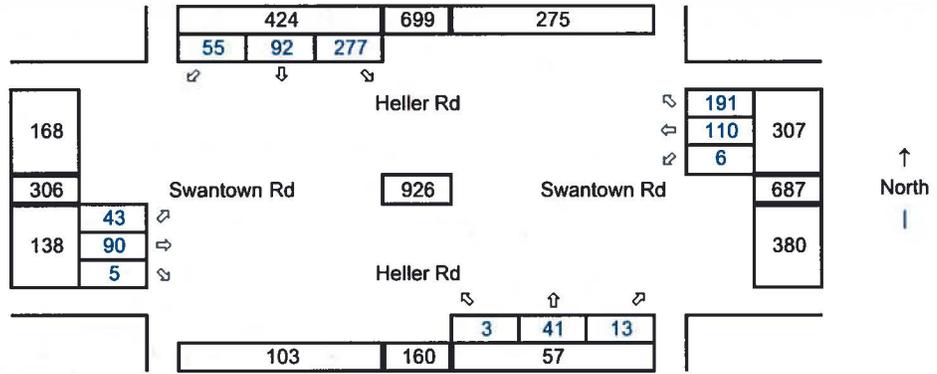
**Future with Project**

Average Weekday  
PM Peak Hour

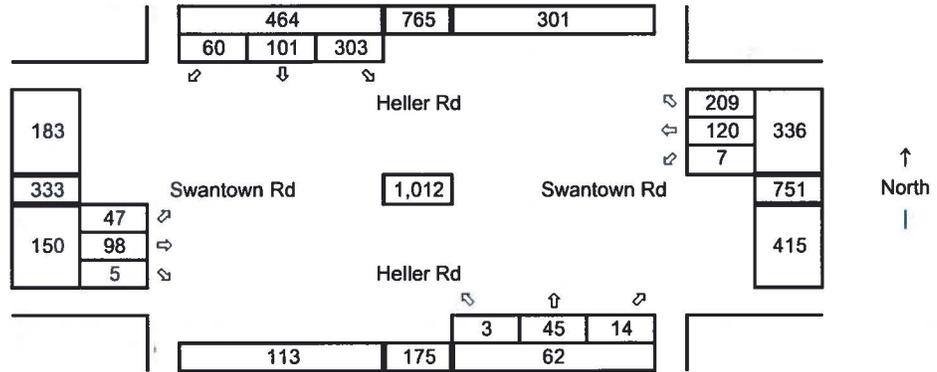


5 Heller Rd @ Swantown Rd

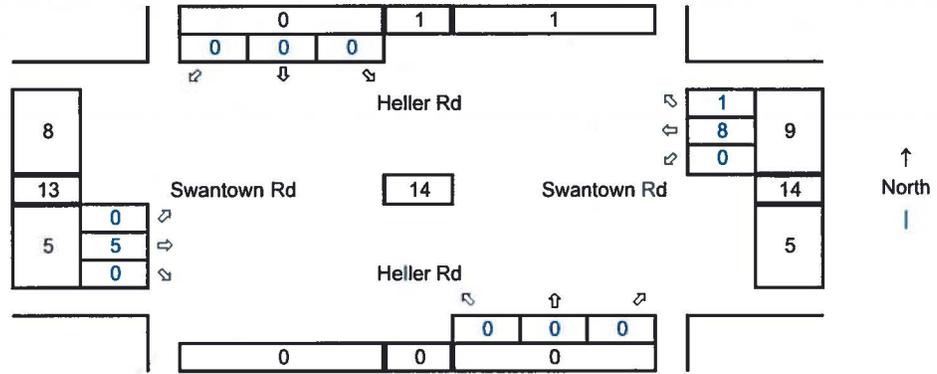
Synchro ID: 5  
**Existing**  
 Average Weekday  
 PM Peak Hour  
 Year: 8/12/14  
 Data Source: Idax Data



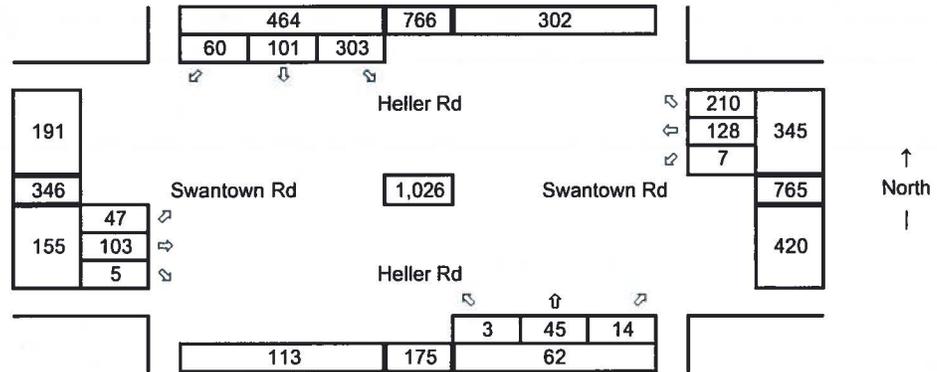
**Future without Project**  
 Average Weekday  
 PM Peak Hour  
 Year: 2017  
 Growth Rate = 3.0%  
 Years of Growth = 3  
 Total Growth = 1.0927



**Total Project Trips**  
 Average Weekday  
 PM Peak Hour



**Future with Project**  
 Average Weekday  
 PM Peak Hour



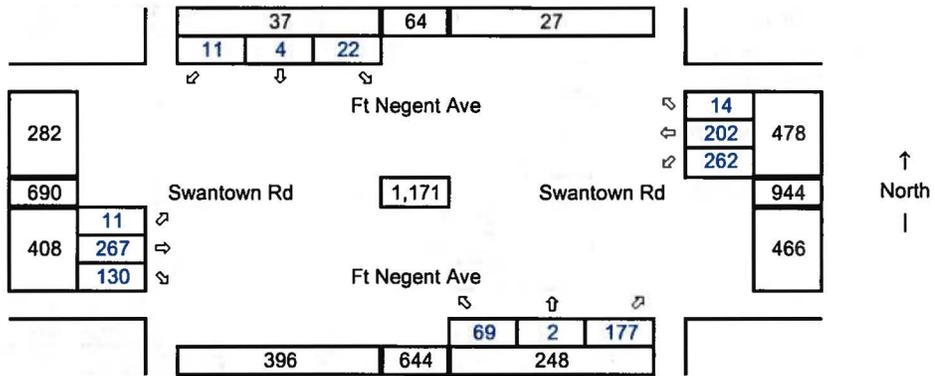
6 Ft Nugent @ Swantown Rd

Synchro ID: 6

**Existing**  
Average Weekday  
PM Peak Hour

Year: 8/12/14

Data Source: Idax Data



**Future without Project**

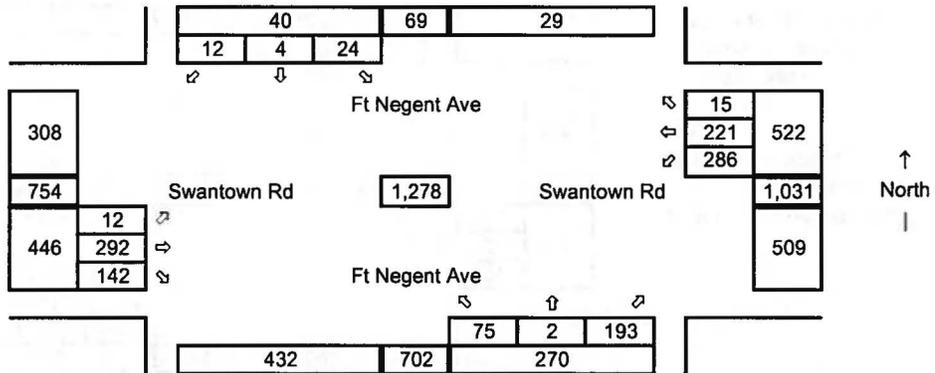
Average Weekday  
PM Peak Hour

Year: 2017

Growth Rate = 3.0%

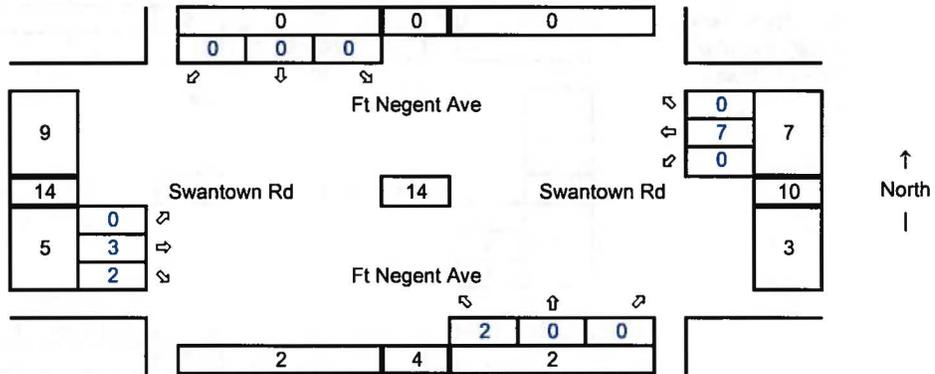
Years of Growth = 3

Total Growth = 1.0927



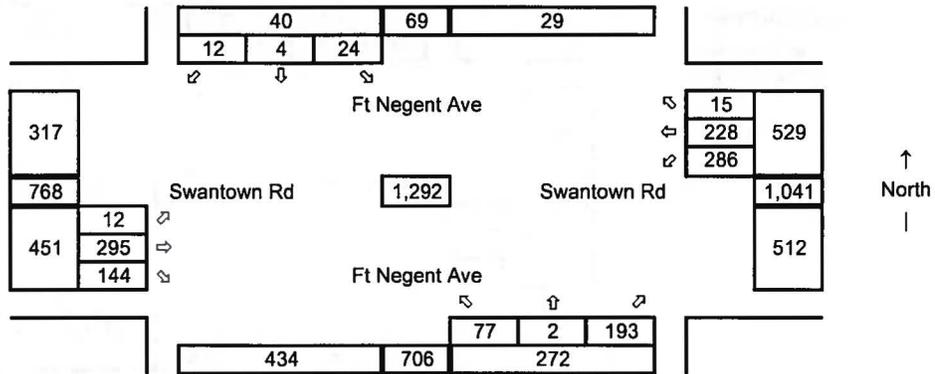
**Total Project Trips**

Average Weekday  
PM Peak Hour



**Future with Project**

Average Weekday  
PM Peak Hour



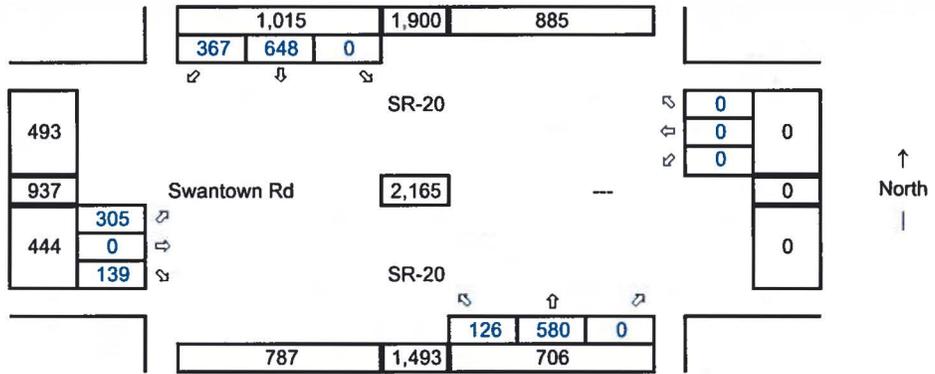
7 SR-20 @ Swantown Rd

Synchro ID: 7

**Existing**  
Average Weekday  
PM Peak Hour

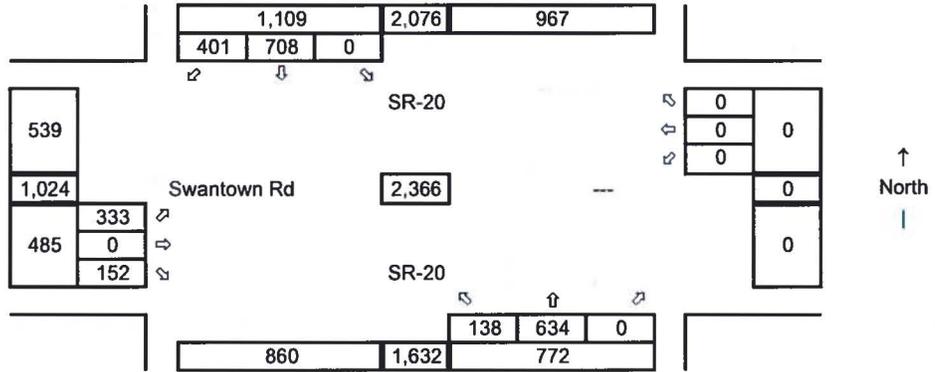
Year: 8/12/14

Data Source: Idax Data

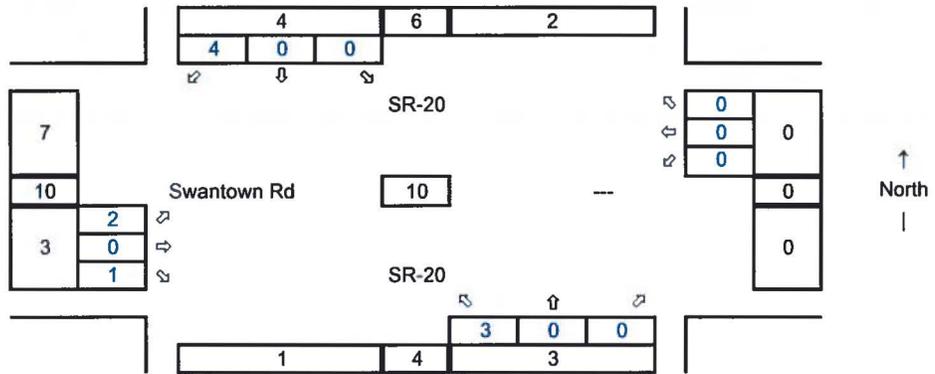


**Future without Project**  
Average Weekday  
PM Peak Hour

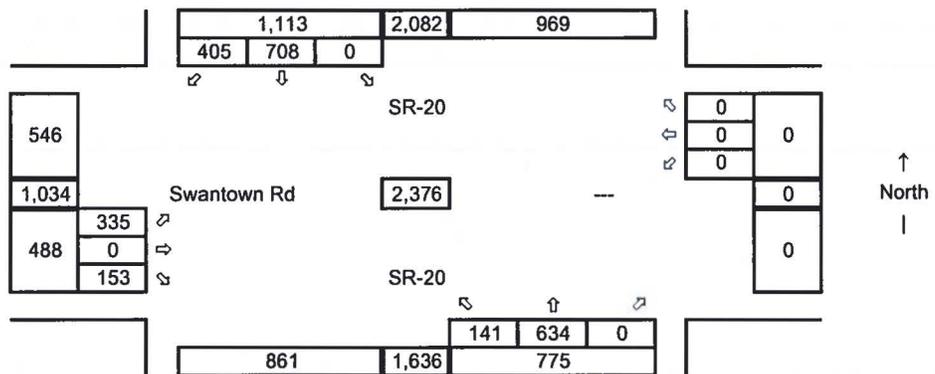
Year: 2017  
Growth Rate = 3.0%  
Years of Growth = 3  
Total Growth = 1.0927



**Total Project Trips**  
Average Weekday  
PM Peak Hour



**Future with Project**  
Average Weekday  
PM Peak Hour



H:\2014\14-175\Synchro\Existing.syn  
 1: Ault Field Rd & Langley Blvd

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	172	1	3	186	193	7	4	5	278	0	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	70		0	50		150	0		0	0		50
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr		0.999				0.850		0.960				0.850
Flt Protected	0.950			0.950				0.977			0.950	
Satd. Flow (prot)	1787	1879	0	1787	1881	1599	0	1764	0	0	1787	1599
Flt Permitted	0.950			0.950				0.408			0.746	
Satd. Flow (perm)	1787	1879	0	1787	1881	1599	0	737	0	0	1403	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						210		5				195
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		394			528			211			618	
Travel Time (s)		9.0			12.0			4.8			14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	95	187	1	3	202	210	8	4	5	302	0	321
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	188	0	3	202	210	0	17	0	0	302	321
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.0	20.0		8.0	20.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (s)	14.0	27.0		8.0	21.0	21.0	20.0	20.0		35.0	35.0	35.0
Total Split (%)	15.6%	30.0%		8.9%	23.3%	23.3%	22.2%	22.2%		38.9%	38.9%	38.9%
Maximum Green (s)	10.0	23.0		4.0	17.0	17.0	16.0	16.0		31.0	31.0	31.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5

GTC (MJP)

Existing 2014

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 1: Ault Field Rd & Langley Blvd

Marin Woods (14-175)

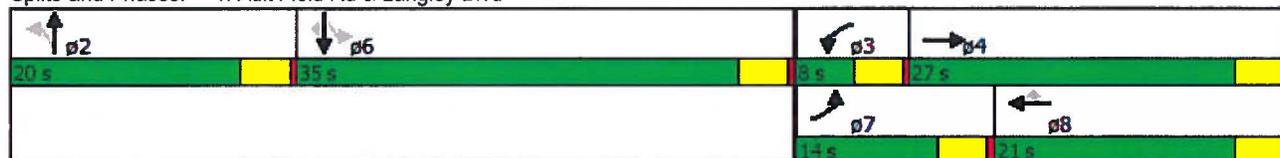
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	Min
Walk Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0	0	0		0	0	0
Act Effct Green (s)	8.7	20.9		4.4	12.6	12.6		7.2			19.8	19.8
Actuated g/C Ratio	0.14	0.33		0.07	0.20	0.20		0.12			0.32	0.32
v/c Ratio	0.38	0.30		0.02	0.53	0.43		0.19			0.68	0.50
Control Delay	34.8	19.0		36.3	31.6	7.6		32.6			28.7	10.8
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	34.8	19.0		36.3	31.6	7.6		32.6			28.7	10.8
LOS	C	B		D	C	A		C			C	B
Approach Delay		24.3			19.5			32.6			19.5	
Approach LOS		C			B			C			B	
Queue Length 50th (ft)	34	47		1	71	0		4			101	36
Queue Length 95th (ft)	94	137		10	162	54		26			208	111
Internal Link Dist (ft)		314			448			131			538	
Turn Bay Length (ft)	70			50		150						50
Base Capacity (vph)	316	816		126	566	628		212			770	965
Starvation Cap Reductn	0	0		0	0	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	0.30	0.23		0.02	0.36	0.33		0.08			0.39	0.33

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 62.4  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.68  
 Intersection Signal Delay: 20.7  
 Intersection Capacity Utilization 46.7%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service A

Splits and Phases: 1: Ault Field Rd & Langley Blvd



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 2: Heller Rd & Clover Valley Rd

Marin Woods (14-175)

Intersection

Int Delay, s/veh                      6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	107	138	5	156	397	93
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	-	110	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	122	157	6	177	451	106

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	693	504	557	0	-	0
Stage 1	504	-	-	-	-	-
Stage 2	189	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	411	570	1019	-	-	-
Stage 1	609	-	-	-	-	-
Stage 2	846	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	409	570	1019	-	-	-
Mov Cap-2 Maneuver	409	-	-	-	-	-
Stage 1	609	-	-	-	-	-
Stage 2	841	-	-	-	-	-

Approach	EB		NB		SB
HCM Control Delay, s	21.9		0.3		0
HCM LOS	C				

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1019	-	486	-	-
HCM Lane V/C Ratio	0.006	-	0.573	-	-
HCM Control Delay (s)	8.6	-	21.9	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	3.5	-	-

H:\2014\14-175\Synchro\Existing.syn  
 3: Heller Rd & Whidbey Ave

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	61	11	121	87	43	17	186	97	81	362	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.951			0.949			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1818	0	1770	1771	0	1770	1768	0	1770	1833	0
Flt Permitted	0.669			0.505			0.481			0.491		
Satd. Flow (perm)	1246	1818	0	941	1771	0	896	1768	0	915	1833	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			26			37			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		352			424			639			566	
Travel Time (s)		8.0			9.6			14.5			12.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	64	12	127	92	45	18	196	102	85	381	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	76	0	127	137	0	18	298	0	85	427	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA										
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	8.0	20.0		8.0	20.0		8.0	20.0		8.0	20.0	
Total Split (s)	8.0	22.0		13.0	27.0		8.0	44.0		11.0	47.0	
Total Split (%)	8.9%	24.4%		14.4%	30.0%		8.9%	48.9%		12.2%	52.2%	
Maximum Green (s)	4.0	18.0		9.0	23.0		4.0	40.0		7.0	43.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	

GTC (MJP)

Existing 2014

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 3: Heller Rd & Whidbey Ave

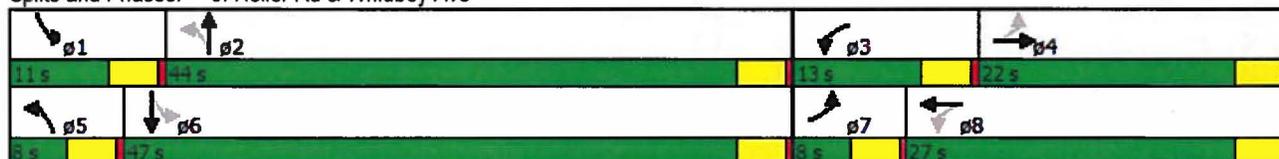
Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	11.6	8.4		18.6	15.5		47.0	43.9		52.0	49.3	
Actuated g/C Ratio	0.15	0.11		0.24	0.20		0.60	0.56		0.66	0.62	
v/c Ratio	0.12	0.38		0.41	0.37		0.03	0.30		0.13	0.37	
Control Delay	23.5	35.5		27.7	25.4		6.5	11.3		6.6	10.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.5	35.5		27.7	25.4		6.5	11.3		6.6	10.4	
LOS	C	D		C	C		A	B		A	B	
Approach Delay		32.5			26.5			11.0			9.8	
Approach LOS		C			C			B			A	
Queue Length 50th (ft)	9	32		50	44		3	73		14	88	
Queue Length 95th (ft)	27	72		94	102		11	136		34	203	
Internal Link Dist (ft)		272			344			559			486	
Turn Bay Length (ft)	150			150			100			100		
Base Capacity (vph)	209	422		323	536		578	1000		678	1148	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.18		0.39	0.26		0.03	0.30		0.13	0.37	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 78.9  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.41  
 Intersection Signal Delay: 15.7  
 Intersection Capacity Utilization 49.0%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 3: Heller Rd & Whidbey Ave



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 4: Swantown Rd & SW Fairway Ln

Marin Woods (14-175)

Intersection

Int Delay, s/veh 2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	9	23	29	62	62	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	25	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	12	30	38	81	81	35

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	254	98	116
Stage 1	98	-	-
Stage 2	156	-	-
Critical Hdwy	6.44	6.24	4.14
Critical Hdwy Stg 1	5.44	-	-
Critical Hdwy Stg 2	5.44	-	-
Follow-up Hdwy	3.536	3.336	2.236
Pot Cap-1 Maneuver	730	953	1460
Stage 1	921	-	-
Stage 2	867	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	710	953	1460
Mov Cap-2 Maneuver	710	-	-
Stage 1	921	-	-
Stage 2	844	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.3	2.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1460	-	710	953	-	-
HCM Lane V/C Ratio	0.026	-	0.016	0.031	-	-
HCM Control Delay (s)	7.5	0	10.2	8.9	-	-
HCM Lane LOS	A	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

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 5: SW Heller St & Swantown Rd

Marin Woods (14-175)

Intersection

Int Delay, s/veh 8.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	43	90	5	6	110	191	3	41	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	80	-	-	0	-	65	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	46	96	5	6	117	203	3	44	14

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	117	0	0	101	0	0	398	320	98
Stage 1	-	-	-	-	-	-	190	190	-
Stage 2	-	-	-	-	-	-	208	130	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1471	-	-	1491	-	-	562	597	958
Stage 1	-	-	-	-	-	-	812	743	-
Stage 2	-	-	-	-	-	-	794	789	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1471	-	-	1491	-	-	446	576	958
Mov Cap-2 Maneuver	-	-	-	-	-	-	446	576	-
Stage 1	-	-	-	-	-	-	787	720	-
Stage 2	-	-	-	-	-	-	649	786	-

Approach	EB		WB		NB
HCM Control Delay, s	2.3		0.1		11.4
HCM LOS					B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	623	1471	-	-	1491	-	-	548	671
HCM Lane V/C Ratio	0.097	0.031	-	-	0.004	-	-	0.538	0.233
HCM Control Delay (s)	11.4	7.5	-	-	7.4	-	-	18.9	12
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	3.2	0.9

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5: SW Heller St & Swantown Rd

Marin Woods (14-175)

Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	277	92	55
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	130	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	94	94	94
Heavy Vehicles, %	2	2	2
Mvmt Flow	295	98	59

Major/Minor	Minor2		
Conflicting Flow All	349	323	117
Stage 1	130	130	-
Stage 2	219	193	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	606	595	935
Stage 1	874	789	-
Stage 2	783	741	-
Platoon blocked, %			
Mov Cap-1 Maneuver	548	574	935
Mov Cap-2 Maneuver	548	574	-
Stage 1	847	786	-
Stage 2	702	718	-

Approach	SB
HCM Control Delay, s	16.5
HCM LOS	C

Minor Lane/Major Mvmt

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 6: Ft Nugent Ave & Swantown Rd

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	267	130	262	202	14	69	2	177	22	4	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		100	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr't		0.952			0.996				0.850		0.961	
Flt Protected		0.999			0.973			0.954			0.971	
Satd. Flow (prot)	0	3366	0	0	3430	0	0	1777	1583	0	1738	0
Flt Permitted		0.999			0.973			0.954			0.971	
Satd. Flow (perm)	0	3366	0	0	3430	0	0	1777	1583	0	1738	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87			3				182		11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		293			426			229			268	
Travel Time (s)		6.7			9.7			5.2			6.1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	11	275	134	270	208	14	71	2	182	23	4	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	420	0	0	492	0	0	73	182	0	38	0
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		Split	NA	Perm	Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases									2			
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0	20.0	20.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0		20.0	20.0	20.0	20.0	20.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%		25.0%	25.0%	25.0%	25.0%	25.0%	
Maximum Green (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	

GTC (MJP)

Existing 2014

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 6: Ft Nugent Ave & Swantown Rd

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0	
Total Lost Time (s)		4.0			4.0			4.0	4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)		12.8			14.5			16.1	16.1		16.1	
Actuated g/C Ratio		0.17			0.19			0.21	0.21		0.21	
v/c Ratio		0.66			0.74			0.19	0.38		0.10	
Control Delay		28.3			36.5			27.7	7.3		21.0	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		28.3			36.5			27.7	7.3		21.0	
LOS		C			D			C	A		C	
Approach Delay		28.3			36.5			13.1			21.0	
Approach LOS		C			D			B			C	
Queue Length 50th (ft)		78			114			29	0		10	
Queue Length 95th (ft)		124			173			66	50		36	
Internal Link Dist (ft)		213			346			149			188	
Turn Bay Length (ft)									100			
Base Capacity (vph)		784			732			378	480		378	
Starvation Cap Reductn		0			0			0	0		0	
Spillback Cap Reductn		0			0			0	0		0	
Storage Cap Reductn		0			0			0	0		0	
Reduced v/c Ratio		0.54			0.67			0.19	0.38		0.10	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 75.5  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.74  
 Intersection Signal Delay: 28.2  
 Intersection Capacity Utilization 45.1%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service A

Splits and Phases: 6: Ft Nugent Ave & Swantown Rd



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 7: SR-20 & Swantown Rd

Marin Woods (14-175)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	305	139	126	580	648	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	65			150
Storage Lanes	1	1	1			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Flt Permitted	0.950		0.162			
Satd. Flow (perm)	1770	1583	302	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		146				143
Link Speed (mph)	30			30	30	
Link Distance (ft)	532			356	246	
Travel Time (s)	12.1			8.1	5.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	321	146	133	611	682	386
Shared Lane Traffic (%)						
Lane Group Flow (vph)	321	146	133	611	682	386
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (ft)	20	20	20	100	100	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	20	6	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)				94	94	
Detector 2 Size(ft)				6	6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4	2			Free
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	
Total Split (s)	32.0	32.0	13.0	68.0	55.0	
Total Split (%)	32.0%	32.0%	13.0%	68.0%	55.0%	
Maximum Green (s)	28.0	28.0	9.0	64.0	51.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	

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 7: SR-20 & Swantown Rd

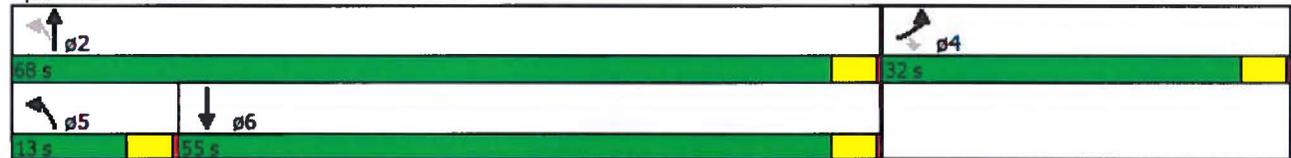
Marin Woods (14-175)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	19.1	19.1	43.7	43.7	34.2	71.7
Actuated g/C Ratio	0.27	0.27	0.61	0.61	0.48	1.00
v/c Ratio	0.68	0.28	0.36	0.54	0.77	0.24
Control Delay	35.0	6.6	9.0	10.2	23.9	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	6.6	9.0	10.2	23.9	0.4
LOS	C	A	A	B	C	A
Approach Delay	26.1			10.0	15.4	
Approach LOS	C			B	B	
Queue Length 50th (ft)	132	0	21	131	253	0
Queue Length 95th (ft)	275	45	53	274	463	0
Internal Link Dist (ft)	452			276	166	
Turn Bay Length (ft)			65			150
Base Capacity (vph)	771	772	389	1586	1355	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.19	0.34	0.39	0.50	0.24

Intersection Summary

Area Type: Other  
 Cycle Length: 100  
 Actuated Cycle Length: 71.7  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.77  
 Intersection Signal Delay: 15.8  
 Intersection Capacity Utilization 68.0%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service C

Splits and Phases: 7: SR-20 & Swantown Rd



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1: Ault Field Rd & Langley Blvd

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	95	188	1	3	203	211	8	4	5	304	0	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	70		0	50		150	0		0	0		50
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.962				0.850
Flt Protected	0.950			0.950				0.976			0.950	
Satd. Flow (prot)	1787	1879	0	1787	1881	1599	0	1766	0	0	1787	1599
Flt Permitted	0.950			0.950				0.405			0.746	
Satd. Flow (perm)	1787	1879	0	1787	1881	1599	0	733	0	0	1403	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						229		5				194
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		394			528			211			618	
Travel Time (s)		9.0			12.0			4.8			14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	103	204	1	3	221	229	9	4	5	330	0	350
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	205	0	3	221	229	0	18	0	0	330	350
Number of Detectors	1	2		1	2	1	1	2		1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100	20	20	100		20	100	20
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	6	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.0	20.0		8.0	20.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (s)	14.0	27.0		8.0	21.0	21.0	20.0	20.0		35.0	35.0	35.0
Total Split (%)	15.6%	30.0%		8.9%	23.3%	23.3%	22.2%	22.2%		38.9%	38.9%	38.9%
Maximum Green (s)	10.0	23.0		4.0	17.0	17.0	16.0	16.0		31.0	31.0	31.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5

GTC (MJP)

Baseline 2017

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1: Ault Field Rd & Langley Blvd

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	Min
Walk Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0	0	0		0	0	0
Act Efect Green (s)	9.0	21.7		4.4	13.2	13.2		7.4			21.5	21.5
Actuated g/C Ratio	0.14	0.33		0.07	0.20	0.20		0.11			0.33	0.33
v/c Ratio	0.42	0.33		0.02	0.58	0.45		0.21			0.71	0.53
Control Delay	37.0	20.1		37.3	33.7	7.6		34.1			30.2	12.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	37.0	20.1		37.3	33.7	7.6		34.1			30.2	12.0
LOS	D	C		D	C	A		C			C	B
Approach Delay		25.8			20.6			34.1			20.8	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	40	57		1	86	0		5			120	48
Queue Length 95th (ft)	101	149		10	178	57		27			233	131
Internal Link Dist (ft)		314			448			131			538	
Turn Bay Length (ft)	70			50		150						50
Base Capacity (vph)	303	795		121	543	625		203			739	934
Starvation Cap Reductn	0	0		0	0	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	0.34	0.26		0.02	0.41	0.37		0.09			0.45	0.37

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 65.1  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.71  
 Intersection Signal Delay: 21.9  
 Intersection Capacity Utilization 49.5%  
 Analysis Period (min) 15

Intersection LOS: C  
 ICU Level of Service A

Splits and Phases: 1: Ault Field Rd & Langley Blvd



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 2: Heller Rd & Clover Valley Rd

Marin Woods (14-175)

Intersection

Int Delay, s/veh 7.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	117	151	5	170	434	102
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	-	110	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	133	172	6	193	493	116

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	756	551	609	0	-	0
Stage 1	551	-	-	-	-	-
Stage 2	205	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	377	536	974	-	-	-
Stage 1	579	-	-	-	-	-
Stage 2	832	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	375	536	974	-	-	-
Mov Cap-2 Maneuver	375	-	-	-	-	-
Stage 1	579	-	-	-	-	-
Stage 2	827	-	-	-	-	-

Approach	EB		NB		SB
HCM Control Delay, s	28		0.2		0
HCM LOS	D				

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	974	-	451	-	-
HCM Lane V/C Ratio	0.006	-	0.675	-	-
HCM Control Delay (s)	8.7	-	28	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	4.9	-	-

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3: Heller Rd & Whidbey Ave

Marin Woods (14-175)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	67	12	132	95	47	19	203	106	89	396	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.951			0.948			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1820	0	1770	1771	0	1770	1766	0	1770	1833	0
Flt Permitted	0.662			0.485			0.446			0.467		
Satd. Flow (perm)	1233	1820	0	903	1771	0	831	1766	0	870	1833	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			26			38			9	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		352			424			639			566	
Travel Time (s)		8.0			9.6			14.5			12.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	27	71	13	139	100	49	20	214	112	94	417	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	84	0	139	149	0	20	326	0	94	468	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	8.0	20.0		8.0	20.0		8.0	20.0		8.0	20.0	
Total Split (s)	8.0	22.0		13.0	27.0		8.0	44.0		11.0	47.0	
Total Split (%)	8.9%	24.4%		14.4%	30.0%		8.9%	48.9%		12.2%	52.2%	
Maximum Green (s)	4.0	18.0		9.0	23.0		4.0	40.0		7.0	43.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	

GTC (MJP)

Baseline 2017

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3: Heller Rd & Whidbey Ave

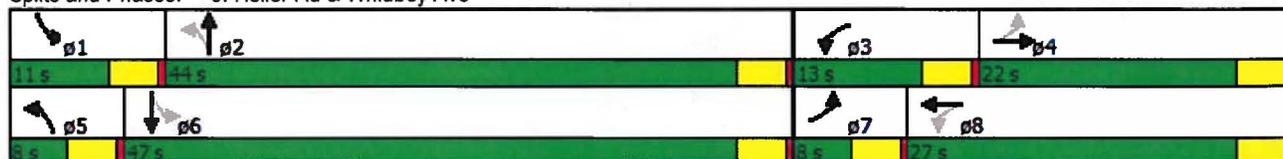
Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	11.4	8.6		19.0	15.9		46.6	43.5		51.5	48.9	
Actuated g/C Ratio	0.14	0.11		0.24	0.20		0.59	0.55		0.65	0.62	
v/c Ratio	0.13	0.41		0.45	0.39		0.04	0.33		0.15	0.41	
Control Delay	23.5	36.5		28.4	26.0		6.7	11.9		6.8	11.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.5	36.5		28.4	26.0		6.7	11.9		6.8	11.1	
LOS	C	D		C	C		A	B		A	B	
Approach Delay		33.3			27.2			11.6			10.4	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	10	36		56	49		3	83		16	101	
Queue Length 95th (ft)	29	78		102	110		12	153		37	231	
Internal Link Dist (ft)		272			344			559			486	
Turn Bay Length (ft)	150			150			100			100		
Base Capacity (vph)	205	423		322	536		538	989		648	1138	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.13	0.20		0.43	0.28		0.04	0.33		0.15	0.41	

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 78.9  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.45  
 Intersection Signal Delay: 16.4  
 Intersection Capacity Utilization 52.0%  
 Analysis Period (min) 15  
 Intersection LOS: B  
 ICU Level of Service A

Splits and Phases: 3: Heller Rd & Whidbey Ave



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**4: Swantown Rd & SW Fairway Ln**

Marin Woods (14-175)

**Intersection**

Int Delay, s/veh                    2.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Vol, veh/h	10	25	32	68	68	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	25	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	4	4	4	4	4	4
Mvmt Flow	13	32	42	88	88	39

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	279	108	127
Stage 1	108	-	-
Stage 2	171	-	-
Critical Hdwy	6.44	6.24	4.14
Critical Hdwy Stg 1	5.44	-	-
Critical Hdwy Stg 2	5.44	-	-
Follow-up Hdwy	3.536	3.336	2.236
Pot Cap-1 Maneuver	707	940	1447
Stage 1	911	-	-
Stage 2	854	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	685	940	1447
Mov Cap-2 Maneuver	685	-	-
Stage 1	911	-	-
Stage 2	828	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	2.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1447	-	685	940	-	-
HCM Lane V/C Ratio	0.029	-	0.019	0.035	-	-
HCM Control Delay (s)	7.6	0	10.4	9	-	-
HCM Lane LOS	A	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	0.1	-	-

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5: SW Heller St & Swantown Rd

Marin Woods (14-175)

## Intersection

Int Delay, s/veh 10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Vol, veh/h	47	98	5	7	120	209	3	45	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None
Storage Length	80	-	-	0	-	65	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	104	5	7	128	222	3	48	15

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	128	0	0	110	0	0	435	350	107
Stage 1	-	-	-	-	-	-	207	207	-
Stage 2	-	-	-	-	-	-	228	143	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318
Pot Cap-1 Maneuver	1458	-	-	1480	-	-	531	574	947
Stage 1	-	-	-	-	-	-	795	731	-
Stage 2	-	-	-	-	-	-	775	779	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1458	-	-	1480	-	-	408	552	947
Mov Cap-2 Maneuver	-	-	-	-	-	-	408	552	-
Stage 1	-	-	-	-	-	-	768	706	-
Stage 2	-	-	-	-	-	-	618	775	-

Approach	EB		WB		NB
HCM Control Delay, s	2.4		0.2		11.8
HCM LOS					B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	598	1458	-	-	1480	-	-	515	647
HCM Lane V/C Ratio	0.11	0.034	-	-	0.005	-	-	0.626	0.265
HCM Control Delay (s)	11.8	7.6	-	-	7.4	-	-	23	12.6
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	4.3	1.1

GTC (MJP)

Baseline 2017

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5: SW Heller St & Swantown Rd

Marin Woods (14-175)

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Intersection

Int Delay, s/veh

Movement	SBL	SBT	SBR
Vol, veh/h	303	101	60
Conflicting Peds, #/hr	0	0	0
Sign Control	Stop	Stop	Stop
RT Channelized	-	-	None
Storage Length	130	-	-
Veh in Median Storage, #	-	0	-
Grade, %	-	0	-
Peak Hour Factor	94	94	94
Heavy Vehicles, %	2	2	2
Mvmt Flow	322	107	64

Major/Minor	Minor2		
Conflicting Flow All	381	353	128
Stage 1	143	143	-
Stage 2	238	210	-
Critical Hdwy	7.12	6.52	6.22
Critical Hdwy Stg 1	6.12	5.52	-
Critical Hdwy Stg 2	6.12	5.52	-
Follow-up Hdwy	3.518	4.018	3.318
Pot Cap-1 Maneuver	577	572	922
Stage 1	860	779	-
Stage 2	765	728	-
Platoon blocked, %			
Mov Cap-1 Maneuver	515	550	922
Mov Cap-2 Maneuver	515	550	-
Stage 1	831	775	-
Stage 2	678	703	-

Approach	SB
HCM Control Delay, s	19.4
HCM LOS	C

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Minor Lane/Major Mvmt

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6: Ft Nugent Ave & Swantown Rd

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	292	142	286	221	15	75	2	193	24	4	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		100	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.952			0.996				0.850		0.960	
Flt Protected		0.999			0.973			0.954			0.970	
Satd. Flow (prot)	0	3366	0	0	3430	0	0	1777	1583	0	1735	0
Flt Permitted		0.999			0.973			0.954			0.970	
Satd. Flow (perm)	0	3366	0	0	3430	0	0	1777	1583	0	1735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		86			3				199		12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		293			426			229			268	
Travel Time (s)		6.7			9.7			5.2			6.1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	12	301	146	295	228	15	77	2	199	25	4	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	459	0	0	538	0	0	79	199	0	41	0
Number of Detectors	1	2		1	2		1	2	1	1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6		20	6		20	6	20	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Split	NA		Split	NA		Split	NA	Perm	Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases									2			
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0	20.0	20.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0		20.0	20.0	20.0	20.0	20.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%		25.0%	25.0%	25.0%	25.0%	25.0%	
Maximum Green (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	

GTC (MJP)

Baseline 2017

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 6: Ft Nugent Ave & Swantown Rd

Marin Woods (14-175)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0	
Total Lost Time (s)		4.0			4.0			4.0	4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effct Green (s)		13.4			15.1			16.0	16.0		16.0	
Actuated g/C Ratio		0.17			0.20			0.21	0.21		0.21	
v/c Ratio		0.70			0.79			0.21	0.41		0.11	
Control Delay		30.1			39.4			28.2	7.3		21.1	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		30.1			39.4			28.2	7.3		21.1	
LOS		C			D			C	A		C	
Approach Delay		30.1			39.4			13.2			21.1	
Approach LOS		C			D			B			C	
Queue Length 50th (ft)		89			130			32	0		12	
Queue Length 95th (ft)		138			#205			70	53		38	
Internal Link Dist (ft)		213			346			149			188	
Turn Bay Length (ft)									100			
Base Capacity (vph)		773			720			372	488		372	
Starvation Cap Reductn		0			0			0	0		0	
Spillback Cap Reductn		0			0			0	0		0	
Storage Cap Reductn		0			0			0	0		0	
Reduced v/c Ratio		0.59			0.75			0.21	0.41		0.11	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 76.6  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.79  
 Intersection Signal Delay: 30.1  
 Intersection Capacity Utilization 47.7%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service A  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 6: Ft Nugent Ave & Swantown Rd



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 7: SR-20 & Swantown Rd

Marin Woods (14-175)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	333	152	138	634	708	401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	65			150
Storage Lanes	1	1	1			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Flt Permitted	0.950		0.114			
Satd. Flow (perm)	1770	1583	212	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		160				143
Link Speed (mph)	30			30	30	
Link Distance (ft)	532			356	246	
Travel Time (s)	12.1			8.1	5.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	351	160	145	667	745	422
Shared Lane Traffic (%)						
Lane Group Flow (vph)	351	160	145	667	745	422
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (ft)	20	20	20	100	100	20
Trailing Detector (ft)	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0
Detector 1 Size(ft)	20	20	20	6	6	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(ft)				94	94	
Detector 2 Size(ft)				6	6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	pm+pt	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4	2			Free
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	
Total Split (s)	32.0	32.0	13.0	68.0	55.0	
Total Split (%)	32.0%	32.0%	13.0%	68.0%	55.0%	
Maximum Green (s)	28.0	28.0	9.0	64.0	51.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	

GTC (MJP)

Baseline 2017

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7: SR-20 & Swantown Rd

Marin Woods (14-175)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	20.8	20.8	50.8	50.8	37.7	80.1
Actuated g/C Ratio	0.26	0.26	0.63	0.63	0.47	1.00
v/c Ratio	0.76	0.30	0.47	0.56	0.85	0.27
Control Delay	41.2	6.4	13.2	11.1	29.8	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.2	6.4	13.2	11.1	29.8	0.4
LOS	D	A	B	B	C	A
Approach Delay	30.3			11.5	19.1	
Approach LOS	C			B	B	
Queue Length 50th (ft)	164	0	26	171	315	0
Queue Length 95th (ft)	304	47	69	313	535	0
Internal Link Dist (ft)	452			276	166	
Turn Bay Length (ft)			65			150
Base Capacity (vph)	656	687	320	1492	1258	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.23	0.45	0.45	0.59	0.27

Intersection Summary

Area Type: Other  
 Cycle Length: 100  
 Actuated Cycle Length: 80.1  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 18.9  
 Intersection Capacity Utilization 73.4%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service D

Splits and Phases: 7: SR-20 & Swantown Rd



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1: Ault Field Rd & Langley Blvd

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	191	1	3	208	211	8	4	5	304	0	325
Future Volume (vph)	97	191	1	3	208	211	8	4	5	304	0	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	70		0	50		150	0		0	0		50
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction		0.999				0.850		0.962				0.850
Flt Protected	0.950			0.950				0.976			0.950	
Satd. Flow (prot)	1787	1879	0	1787	1881	1599	0	1766	0	0	1787	1599
Flt Permitted	0.950			0.950				0.405			0.746	
Satd. Flow (perm)	1787	1879	0	1787	1881	1599	0	733	0	0	1403	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						229		5				196
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		394			528			211			618	
Travel Time (s)		9.0			12.0			4.8			14.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Adj. Flow (vph)	105	208	1	3	226	229	9	4	5	330	0	353
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	209	0	3	226	229	0	18	0	0	330	353
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		6
Detector Phase	7	4		3	8	8	2	2		6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	8.0	20.0		8.0	20.0	20.0	20.0	20.0		20.0	20.0	20.0
Total Split (s)	14.0	27.0		8.0	21.0	21.0	20.0	20.0		35.0	35.0	35.0
Total Split (%)	15.6%	30.0%		8.9%	23.3%	23.3%	22.2%	22.2%		38.9%	38.9%	38.9%
Maximum Green (s)	10.0	23.0		4.0	17.0	17.0	16.0	16.0		31.0	31.0	31.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	0.5	0.5		0.5	0.5	0.5	0.5	0.5		0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	Min
Walk Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0	0	0		0	0	0
Act Effect Green (s)	9.0	21.8		4.4	13.3	13.3		7.4			21.5	21.5
Actuated g/C Ratio	0.14	0.33		0.07	0.20	0.20		0.11			0.33	0.33
v/c Ratio	0.43	0.33		0.02	0.59	0.45		0.21			0.71	0.54
Control Delay	37.2	20.2		37.3	34.0	7.6		34.2			30.3	12.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0

GTC (MJP)

Future 2017 With Development

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1: Ault Field Rd & Langley Blvd

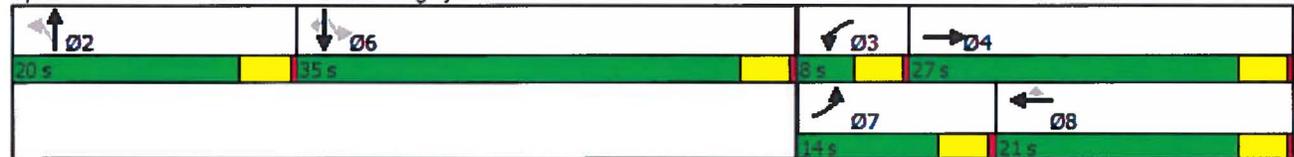
Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	37.2	20.2		37.3	34.0	7.6		34.2			30.3	12.0
LOS	D	C		D	C	A		C			C	B
Approach Delay		25.9			20.8			34.2			20.8	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	42	58		1	88	0		5			121	49
Queue Length 95th (ft)	103	152		10	181	57		27			233	133
Internal Link Dist (ft)		314			448			131			538	
Turn Bay Length (ft)	70			50		150						50
Base Capacity (vph)	303	795		121	542	624		202			737	933
Starvation Cap Reductn	0	0		0	0	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	0.35	0.26		0.02	0.42	0.37		0.09			0.45	0.38

Intersection Summary

Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 65.2  
 Natural Cycle: 70  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.71  
 Intersection Signal Delay: 22.1  
 Intersection Capacity Utilization 49.8%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service A

Splits and Phases: 1: Ault Field Rd & Langley Blvd



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 2: Heller Rd & Clover Valley Rd

Marin Woods (14-175)

Intersection

Int Delay, s/veh 7.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Traffic Vol, veh/h	117	151	5	175	442	102
Future Vol, veh/h	117	151	5	175	442	102
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	-	110	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	1	1	1	1	1	1
Mvmt Flow	133	172	6	199	502	116

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	770	560	618	0	-	0
Stage 1	560	-	-	-	-	-
Stage 2	210	-	-	-	-	-
Critical Hdwy	6.41	6.21	4.11	-	-	-
Critical Hdwy Stg 1	5.41	-	-	-	-	-
Critical Hdwy Stg 2	5.41	-	-	-	-	-
Follow-up Hdwy	3.509	3.309	2.209	-	-	-
Pot Cap-1 Maneuver	370	530	967	-	-	-
Stage 1	574	-	-	-	-	-
Stage 2	827	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	368	530	967	-	-	-
Mov Cap-2 Maneuver	368	-	-	-	-	-
Stage 1	574	-	-	-	-	-
Stage 2	822	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	28.9	0.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	967	-	445	-	-
HCM Lane V/C Ratio	0.006	-	0.684	-	-
HCM Control Delay (s)	8.7	-	28.9	-	-
HCM Lane LOS	A	-	D	-	-
HCM 95th %tile Q(veh)	0	-	5.1	-	-

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3: Heller Rd & Whidbey Ave

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	70	12	132	100	47	19	203	106	89	396	57
Future Volume (vph)	32	70	12	132	100	47	19	203	106	89	396	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	150		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.978			0.952			0.948			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1822	0	1770	1773	0	1770	1766	0	1770	1827	0
Flt Permitted	0.659			0.473			0.441			0.468		
Satd. Flow (perm)	1228	1822	0	881	1773	0	821	1766	0	872	1827	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			25			38			11	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		352			424			639			566	
Travel Time (s)		8.0			9.6			14.5			12.9	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	34	74	13	139	105	49	20	214	112	94	417	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	87	0	139	154	0	20	326	0	94	477	0
Turn Type	pm+pt	NA										
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	8.0	20.0		8.0	20.0		8.0	20.0		8.0	20.0	
Total Split (s)	8.0	22.0		13.0	27.0		8.0	44.0		11.0	47.0	
Total Split (%)	8.9%	24.4%		14.4%	30.0%		8.9%	48.9%		12.2%	52.2%	
Maximum Green (s)	4.0	18.0		9.0	23.0		4.0	40.0		7.0	43.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5		3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5		0.5	0.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes										
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Walk Time (s)		5.0			5.0			5.0			5.0	
Flash Dont Walk (s)		11.0			11.0			11.0			11.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	11.5	8.7		19.1	14.5		46.5	43.4		51.4	48.7	
Actuated g/C Ratio	0.15	0.11		0.24	0.18		0.59	0.55		0.65	0.62	
v/c Ratio	0.17	0.42		0.45	0.45		0.04	0.33		0.15	0.42	
Control Delay	24.0	36.7		28.4	28.6		6.7	12.0		6.9	11.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.0	36.7		28.4	28.6		6.7	12.0		6.9	11.3	

GTC (MJP)

Future 2017 With Development

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3: Heller Rd & Whidbey Ave

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	D		C	C		A	B		A	B	
Approach Delay		33.1			28.5			11.7			10.5	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	13	37		56	59		3	84		16	104	
Queue Length 95th (ft)	34	80		102	114		12	154		38	238	
Internal Link Dist (ft)		272			344			559			486	
Turn Bay Length (ft)	150			150			100			100		
Base Capacity (vph)	206	424		320	537		531	987		648	1132	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.21		0.43	0.29		0.04	0.33		0.15	0.42	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 78.9

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 16.8

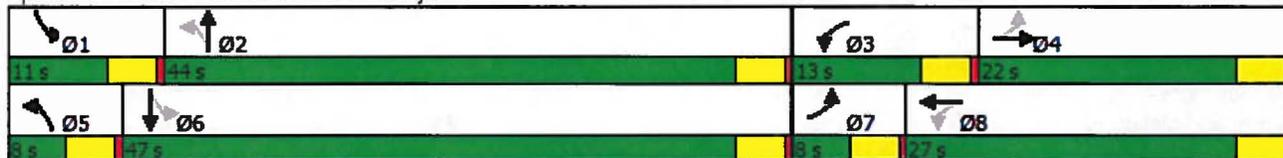
Intersection Capacity Utilization 52.7%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service A

Splits and Phases: 3: Heller Rd & Whidbey Ave



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 4: Swantown Rd & SW Fairway Ln

Marin Woods (14-175)

Intersection

Int Delay, s/veh 2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	10	0	25	0	0	0	32	68	0	0	68	30
Future Vol, veh/h	10	0	25	0	0	0	32	68	0	0	68	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	25	-	0	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	92	77	92	92	92	77	77	92	92	77	77
Heavy Vehicles, %	4	2	4	2	2	2	4	4	2	2	4	4
Mvmt Flow	13	0	32	0	0	0	42	88	0	0	88	39

Major/Minor	Minor2			Major1			Major2		
Conflicting Flow All	279	279	108	127	0	0	88	0	0
Stage 1	108	108	-	-	-	-	-	-	-
Stage 2	171	171	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.52	6.24	4.14	-	-	4.12	-	-
Critical Hdwy Stg 1	5.44	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	5.44	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.018	3.336	2.236	-	-	2.218	-	-
Pot Cap-1 Maneuver	707	629	940	1447	-	-	1508	-	-
Stage 1	911	806	-	-	-	-	-	-	-
Stage 2	854	757	-	-	-	-	-	-	-
Platoon blocked, %									
Mov Cap-1 Maneuver	685	0	940	1447	-	-	1508	-	-
Mov Cap-2 Maneuver	685	0	-	-	-	-	-	-	-
Stage 1	911	0	-	-	-	-	-	-	-
Stage 2	828	0	-	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	2.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	SBL	SBT	SBR
Capacity (veh/h)	1447	-	-	685	940	1508	-	-
HCM Lane V/C Ratio	0.029	-	-	0.019	0.035	-	-	-
HCM Control Delay (s)	7.6	0	-	10.4	9	0	-	-
HCM Lane LOS	A	A	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0	-	-

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 5: SW Heller St & Swantown Rd

Marin Woods (14-175)

Intersection

Int Delay, s/veh 10.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	47	103	5	7	128	210	3	45	14	303	101	60
Future Vol, veh/h	47	103	5	7	128	210	3	45	14	303	101	60
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									
Storage Length	80	-	-	0	-	65	-	-	-	130	-	-
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	50	110	5	7	136	223	3	48	15	322	107	64

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	136	0	0	115	0	0	449	363	112	395	366	136
Stage 1	-	-	-	-	-	-	212	212	-	151	151	-
Stage 2	-	-	-	-	-	-	237	151	-	244	215	-
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	1448	-	-	1474	-	-	520	565	941	565	562	913
Stage 1	-	-	-	-	-	-	790	727	-	851	772	-
Stage 2	-	-	-	-	-	-	766	772	-	760	725	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1448	-	-	1474	-	-	398	543	941	503	540	913
Mov Cap-2 Maneuver	-	-	-	-	-	-	398	543	-	503	540	-
Stage 1	-	-	-	-	-	-	763	702	-	822	768	-
Stage 2	-	-	-	-	-	-	610	768	-	673	700	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.3	0.2	11.9	20.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	589	1448	-	-	1474	-	-	503	637
HCM Lane V/C Ratio	0.112	0.035	-	-	0.005	-	-	0.641	0.269
HCM Control Delay (s)	11.9	7.6	-	-	7.5	-	-	24.1	12.7
HCM Lane LOS	B	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	4.5	1.1

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Future 2017 With Development

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6: Ft Nugent Ave & Swantown Rd

Marin Woods (14-175)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	295	144	286	228	15	77	2	193	24	4	12
Future Volume (vph)	12	295	144	286	228	15	77	2	193	24	4	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		100	0		0
Storage Lanes	0		0	0		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.952			0.996				0.850		0.960	
Flt Protected		0.999			0.974			0.954			0.970	
Satd. Flow (prot)	0	3366	0	0	3433	0	0	1777	1583	0	1735	0
Flt Permitted		0.999			0.974			0.954			0.970	
Satd. Flow (perm)	0	3366	0	0	3433	0	0	1777	1583	0	1735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87			3				199		12	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		293			426			229			268	
Travel Time (s)		6.7			9.7			5.2			6.1	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	12	304	148	295	235	15	79	2	199	25	4	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	464	0	0	545	0	0	81	199	0	41	0
Turn Type	Split	NA		Split	NA		Split	NA	Perm	Split	NA	
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases									2			
Detector Phase	4	4		8	8		2	2	2	6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0	20.0	20.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0		20.0	20.0	20.0	20.0	20.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%		25.0%	25.0%	25.0%	25.0%	25.0%	
Maximum Green (s)	16.0	16.0		16.0	16.0		16.0	16.0	16.0	16.0	16.0	
Yellow Time (s)	3.5	3.5		3.5	3.5		3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5		0.5	0.5		0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)		0.0			0.0			0.0	0.0		0.0	
Total Lost Time (s)		4.0			4.0			4.0	4.0		4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	
Act Effect Green (s)		13.4			15.2			16.0	16.0		16.0	
Actuated g/C Ratio		0.17			0.20			0.21	0.21		0.21	
v/c Ratio		0.70			0.80			0.22	0.41		0.11	
Control Delay		30.3			39.8			28.3	7.3		21.1	
Queue Delay		0.0			0.0			0.0	0.0		0.0	
Total Delay		30.3			39.8			28.3	7.3		21.1	

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 6: Ft Nugent Ave & Swantown Rd

Marin Woods (14-175)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			D			C	A		C	
Approach Delay		30.3			39.8			13.4			21.1	
Approach LOS		C			D			B			C	
Queue Length 50th (ft)		90			132			33	0		12	
Queue Length 95th (ft)		140			#210			72	53		38	
Internal Link Dist (ft)		213			346			149			188	
Turn Bay Length (ft)									100			
Base Capacity (vph)		772			720			371	488		372	
Starvation Cap Reductn		0			0			0	0		0	
Spillback Cap Reductn		0			0			0	0		0	
Storage Cap Reductn		0			0			0	0		0	
Reduced v/c Ratio		0.60			0.76			0.22	0.41		0.11	

Intersection Summary

Area Type: Other  
 Cycle Length: 80  
 Actuated Cycle Length: 76.7  
 Natural Cycle: 80  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 30.4  
 Intersection Capacity Utilization 47.9%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Intersection LOS: C  
 ICU Level of Service A

Splits and Phases: 6: Ft Nugent Ave & Swantown Rd



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 7: SR-20 & Swantown Rd

Marin Woods (14-175)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	335	153	141	634	708	405
Future Volume (vph)	335	153	141	634	708	405
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	65			150
Storage Lanes	1	1	1			1
Taper Length (ft)	25		25			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1863	1583
Flt Permitted	0.950		0.114			
Satd. Flow (perm)	1770	1583	212	1863	1863	1583
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		161				144
Link Speed (mph)	30			30	30	
Link Distance (ft)	532			356	246	
Travel Time (s)	12.1			8.1	5.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	353	161	148	667	745	426
Shared Lane Traffic (%)						
Lane Group Flow (vph)	353	161	148	667	745	426
Turn Type	Prot	Perm	pm+pt	NA	NA	Free
Protected Phases	4		5	2	6	
Permitted Phases		4	2			Free
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	
Total Split (s)	32.0	32.0	13.0	68.0	55.0	
Total Split (%)	32.0%	32.0%	13.0%	68.0%	55.0%	
Maximum Green (s)	28.0	28.0	9.0	64.0	51.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	Min	Min	
Walk Time (s)	5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effect Green (s)	20.9	20.9	50.9	50.9	37.7	80.3
Actuated g/C Ratio	0.26	0.26	0.63	0.63	0.47	1.00
v/c Ratio	0.77	0.30	0.48	0.57	0.85	0.27
Control Delay	41.3	6.4	13.6	11.2	29.9	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	6.4	13.6	11.2	29.9	0.4

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Future 2017 With Development

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7: SR-20 & Swantown Rd

Marin Woods (14-175)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	D	A	B	B	C	A
Approach Delay	30.4			11.6	19.1	
Approach LOS	C			B	B	
Queue Length 50th (ft)	166	0	27	171	316	0
Queue Length 95th (ft)	305	47	71	313	535	0
Internal Link Dist (ft)	452			276	166	
Turn Bay Length (ft)			65			150
Base Capacity (vph)	654	687	319	1489	1255	1583
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.23	0.46	0.45	0.59	0.27

Intersection Summary

Area Type: Other  
 Cycle Length: 100  
 Actuated Cycle Length: 80.3  
 Natural Cycle: 60  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 19.0  
 Intersection Capacity Utilization 73.6%  
 Analysis Period (min) 15

Intersection LOS: B  
 ICU Level of Service D

Splits and Phases: 7: SR-20 & Swantown Rd

