

September 19, 2023

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## **RE: Rocky Mountain Rail Park Traffic Impact Study – North Area**

This memo updates the Rocky Mountain Rail Park (RMRP) Traffic Impact Study (TIS) – North Area performed by Matrix Design Group dated May 2023, which itself was an addendum to the RMRP Master Traffic Impact Study (MTIS) performed by Kimley-Horn dated January 2020. The RMRP TIS – North Area analyzed the development for the 2040 Horizon Year. City of Aurora staff have requested that the 2030 Buildout Year also be analyzed. This memo appends an analysis of the 2030 Background condition and the 2030 with Project condition for both the AM and PM peak periods to the end of the May 2023 memo.

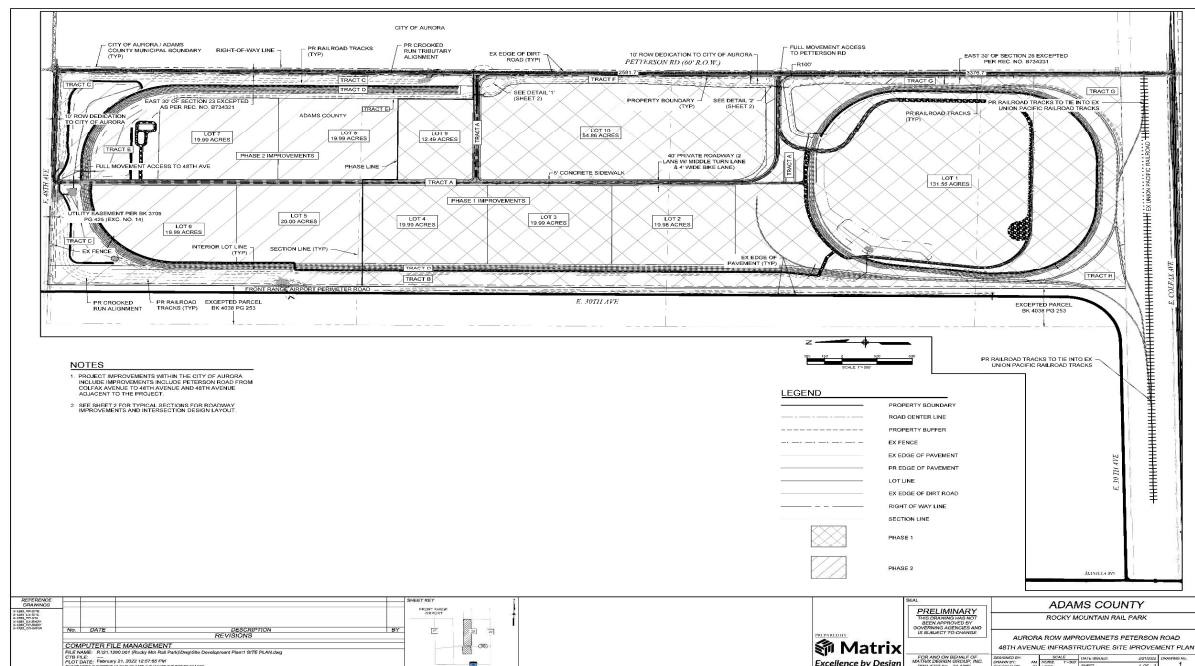
### **Memo Dated May 10, 2023:**

This memo serves as an addendum to the Rocky Mountain Rail Park (RMRP) Master Traffic Impact Study (MTIS) dated January 2020. The purpose of this addendum is to demonstrate the impact of the RMRP North Area on the adjacent roadways with new information regarding the proposed industrial park. Additionally, the MTIS did not reflect the details of the nearby development to the east of RMRP. This addendum will demonstrate impacts of both developments on the surrounding transportation system in the horizon year (2040). *The Northeast Area Transportation Study Refresh (NEATS)* demand model was used as the basis of both Rocky Mountain Rail Park (RMRP) MTIS. *Port Colorado - Subarea 6 TIS* was also used in this memo as the basis of 2040 background conditions.

## **Study Area**

Rocky Mountain Rail Park North is a proposed rail-served industrial park that will be located on the northwest corner of Colfax Avenue and Peterson Road in Adams County, Colorado. The proposed development is a 469-acre property that consists of an industrial park and a concrete and asphalt batch plant, while the entire project (north and south area) includes 691 acres of Industrial Park and Concrete Batch Plant. Figure 1 shows the RMRP North site plan.

*Figure 1- Rocky Mountain Rail Park North Site Plan*



## 2040 Background Conditions

The 2040 *Port Colorado-Subarea 6 TIS* (May 2022) and *RMRP MTIS* were used to capture the level of development in this time frame. The *NEATS Refresh* (2018) provides a travel demand model as well as future land use data for the study area and was used as the basis of these studies. To address the future conditions on the roadway network, Matrix used the combination of Adjusted *NEATS 2040* background traffic volumes, adjusted *Port Colorado-Subarea 6* background volumes, and *RMRP* South section traffic volumes as the 2040 background volumes. For more information see Appendix A – Traffic Counts. Figure 2 and Figure 3 Show the 2040 traffic conditions without the *RMRP* North Section, and without the adjacent development in AM and PM peak hours, respectively.

Figure 2- 2040 No Project Conditions (AM Peak Hour)

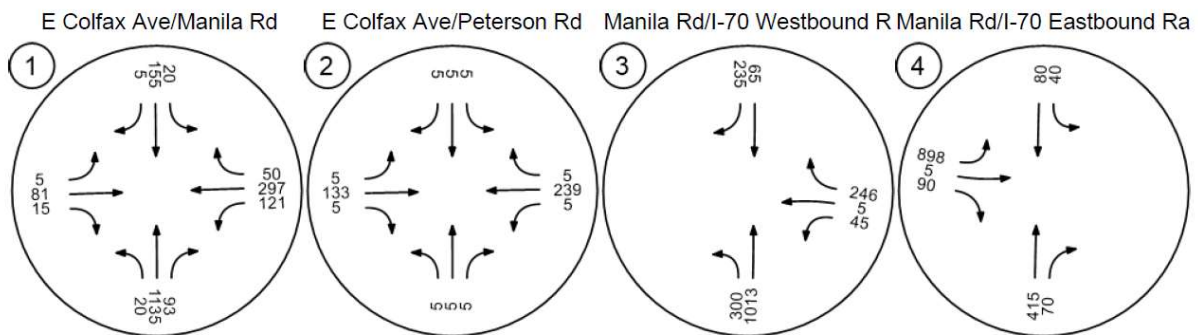




Figure 3- 2040 No Project Conditions (PM Peak Hour)

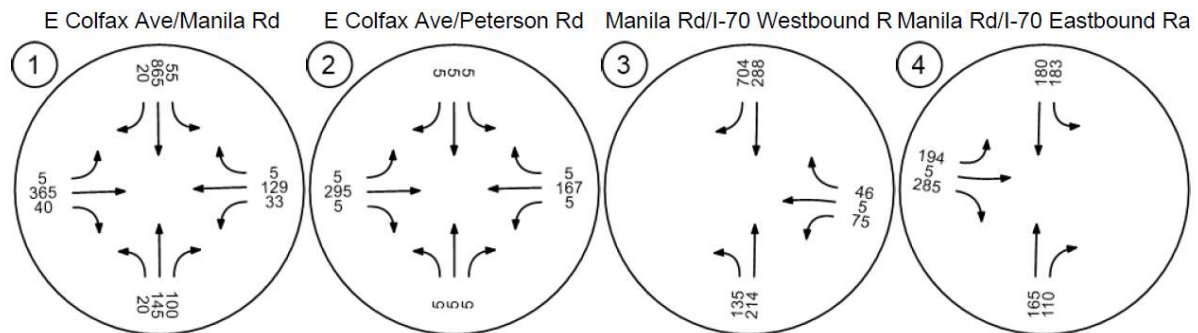


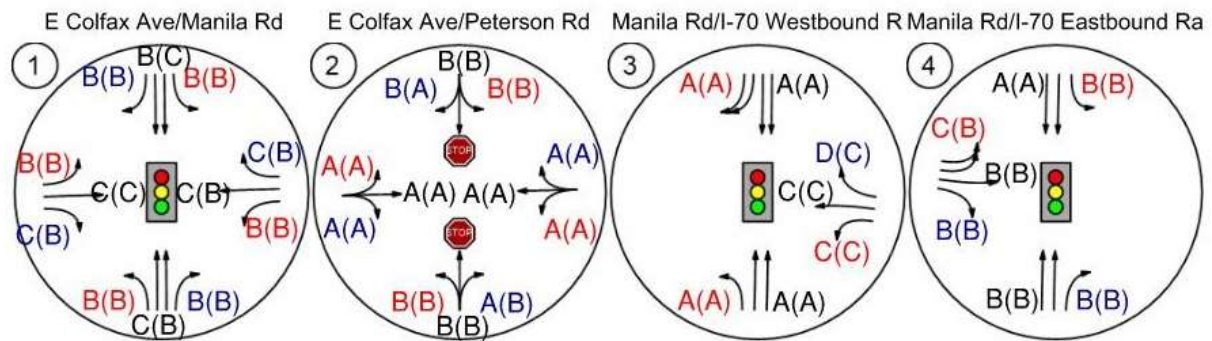


Figure 4- 2040 Background Daily Traffic Volumes



Intersection operations in the horizon background conditions are shown in Table 1 and Table 2. Intersection configurations and LOS for each movement are shown in Figure 5.

Figure 5- 2040 Background Intersection Configurations and LOS\*



Left-Turn LOS AM(PM)  
Thru-Lane LOS AM(PM)  
Right-Turn LOS AM(PM)

\*LOS for each movement was calculated based on the HCM 7<sup>th</sup> Edition.

Manilla Road was assumed to be a 4-lane roadway in this scenario based on the NEATS (2018) recommended roadway network in 2040.

Analysis of the intersections and roadways for horizon conditions with the volumes and configurations shown above results in the operations shown in Tables 1 and Table 2.

*Table 1- Horizon No Project Intersection Operations (AM Peak Hour)*

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	WB Thru	0.685	27.9	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	SB Thru	0.010	12.6	B
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Right	0.511	7.7	A
4	Manila Rd/I-70 Eastbound Ramp	Signalized	HCM 7th Edition	EB Left	0.549	21.0	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

*Table 2- Horizon No Project Intersection Operations (PM Peak Hour)*

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	EB Thru	0.644	25.8	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	NB Left	0.012	13.8	B
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Left	0.273	7.1	A
4	Manila Rd/I-70 Eastbound Ramp	Signalized	HCM 7th Edition	EB Right	0.284	12.9	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.



As shown in Table 1 and Table 2, all intersections operate at LOS D or better in the horizon background conditions. Recommended changes in the horizon year without the project are summarized below and also shown in Table 9.

#### Colfax Avenue/Manilla Road (#1)

- A traffic signal.
- A 460-ft northbound left-turn. Included a 435-ft deceleration lane and a 25-ft storage. A 162-ft taper lane is included within the deceleration lane.
- A 435-ft northbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.
- A 300-ft southbound left-turn. Included a 250-ft deceleration lane and a 50-ft storage. A 96-ft taper lane is included within the deceleration lane.
- A 600-ft eastbound right-turn deceleration lane. A 222-ft taper lane is included within the deceleration lane.
- A 720-ft westbound left-turn lane. Included a 600-ft deceleration lane and 121-ft storage. A 222-ft taper lane is included within the deceleration lane.
- A 600-ft westbound right-turn deceleration lane. A 222-ft taper lane is included within the deceleration lane.
- A 960-ft northbound acceleration lane. A 222-ft taper lane is included within the acceleration lane.

#### Manilla Road/I-70 Westbound Ramp (#3)

- A traffic signal.
- A 735-ft northbound left-turn. Included a 435-ft deceleration lane and a 300-ft storage. A 162-ft taper lane is included within the deceleration lane.
- Two 435-ft southbound right-turn deceleration lanes. A 162-ft taper lane is included within the deceleration lane.
- A 535-ft westbound left-turn. Included a 435-ft deceleration lane and a 100-ft storage. A 162-ft taper is included within the deceleration lane.
- A 435-ft westbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.

#### Manilla Road/I-70 Eastbound Ramp (#4)

- A traffic signal.
- A 435-ft northbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.
- A 620-ft southbound left-turn lane. Included a 435-ft deceleration lane and a 183-ft storage. A 162-ft taper lane is included within the deceleration lane. Since there is a geometry constraint for the entire improvement, it is up to the City of Aurora and CDOT to determine how to address this deficiency. Currently, less than 300 feet of the lane is available for the southbound left-turn at the I-70 underpass.
- Two 885-ft eastbound left-turn lanes. Included 435-ft deceleration lane and 449-ft storage. A 162-ft taper lane is included within the deceleration lane.
- A 435-ft eastbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.

The total turn lane is rounded to the nearest 5 ft.

#### **Trip Generation**

The developable area of the RMRP North Section consists of 131 Acres of Paving Operation Plant and 207.35 Acres of Industrial Park. To study the industrial park, it was assumed that there would be three employees per acre in this development. The size of the paving plants remained unchanged since the previous study; therefore the daily and peak hour trips were directly imported from RMRP MTIS for this development. Table 3 shows the trips that are expected to be generated by the RMRP north area in the horizon year.

Table 3 Rocky Mountain Rail Park North Area Trip Generation

Rocky Mountain Railpark North Area											
ITE Land Use and Code	Size	Units	Weekday			AM Peak Hour			PM Peak Hour		
			Total	Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting
130 - Industrial Park	622	Employee	2240	1120	1120	288	248	40	296	59	237
Paving Operation Plant - Truck Trips	131	Acres	534			44	22	22	44	22	22
Paving Operation Plant - Employees	131	Acres	150			50	50	0	50	0	50
Total			2924			382	320	62	390	81	309

For the sake of comparison, the trip generation table from the MTIS dated January 2020 containing both the north and south area of RMRP is shown in the table below.

Table 4 Rocky Mountain Rail Park (North & South Area) Trip Generation (MTIS 2020)

Land Use	Quantity	Units	Daily	AM			PM		
				In	Out	Total	In	Out	Total
North Section									
Industrial Park (130)	554	Employees	1,612	210	34	244	47	186	233
Paving Operation Plant (Client Data) - Truck Trips	131	Acres	534	22	22	44	22	22	44
Paving Operation Plant (Client Data) - Employees	131	Acres	150	50	0	50	0	50	50
North Section Total Trips			2,296	282	56	338	69	258	327
South Section									
Industrial Park (130)									
South Section Total Trips	300	Employees	874	114	18	132	25	101	126
Total Trips			3,170	396	74	470	94	359	453

Trip distributions and trip assignments in the MTIS were also used in this study and results are shown in Figure 6 and Figure 7.

In this report, Matrix studied two separate scenarios for the horizon year with the addition of the RMRP north area. One included the horizon background volumes plus the RMRP site trips but without the adjacent development. The other included horizon background volumes, with both RMRP and the adjacent development. Aggregating the background volumes with the RMRP site trips, but without the development to the east of the project resulted in Figure 8 and Figure 9.

Figure 6 – Rocky Mountain Project Trips (AM Peak Hour)

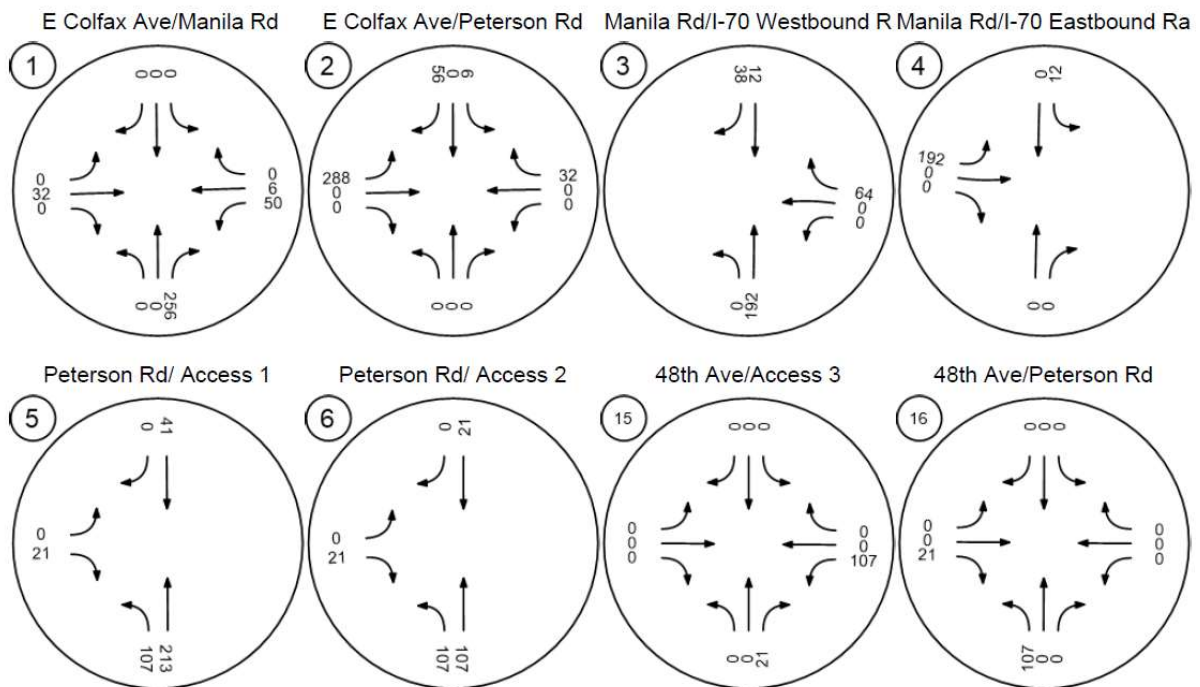
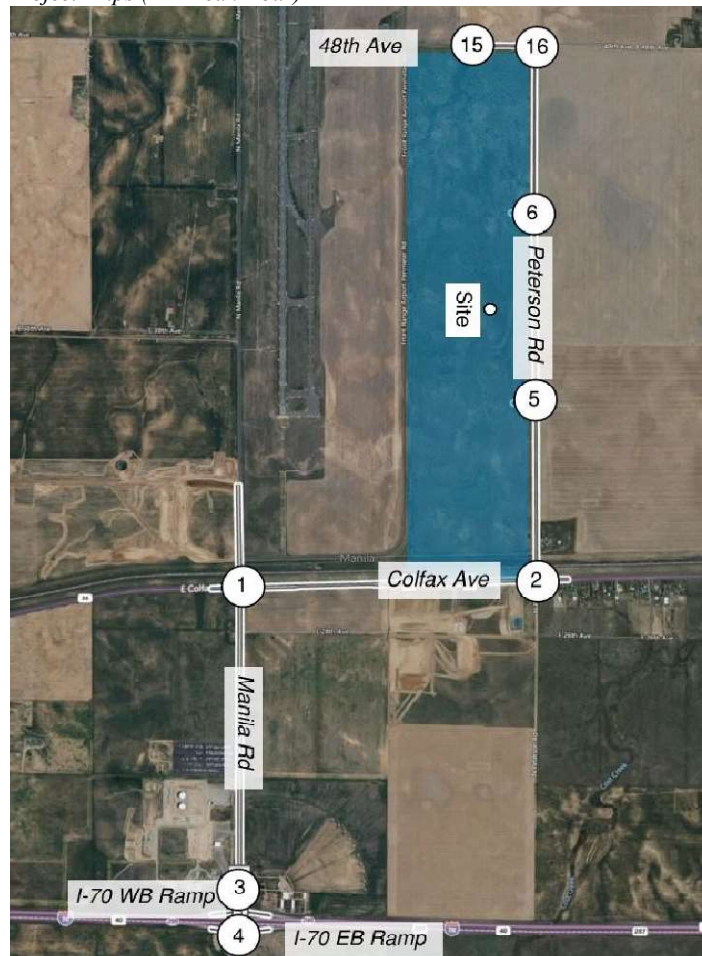




Figure 7 – Rocky Mountain Project Trips (PM Peak Hour)

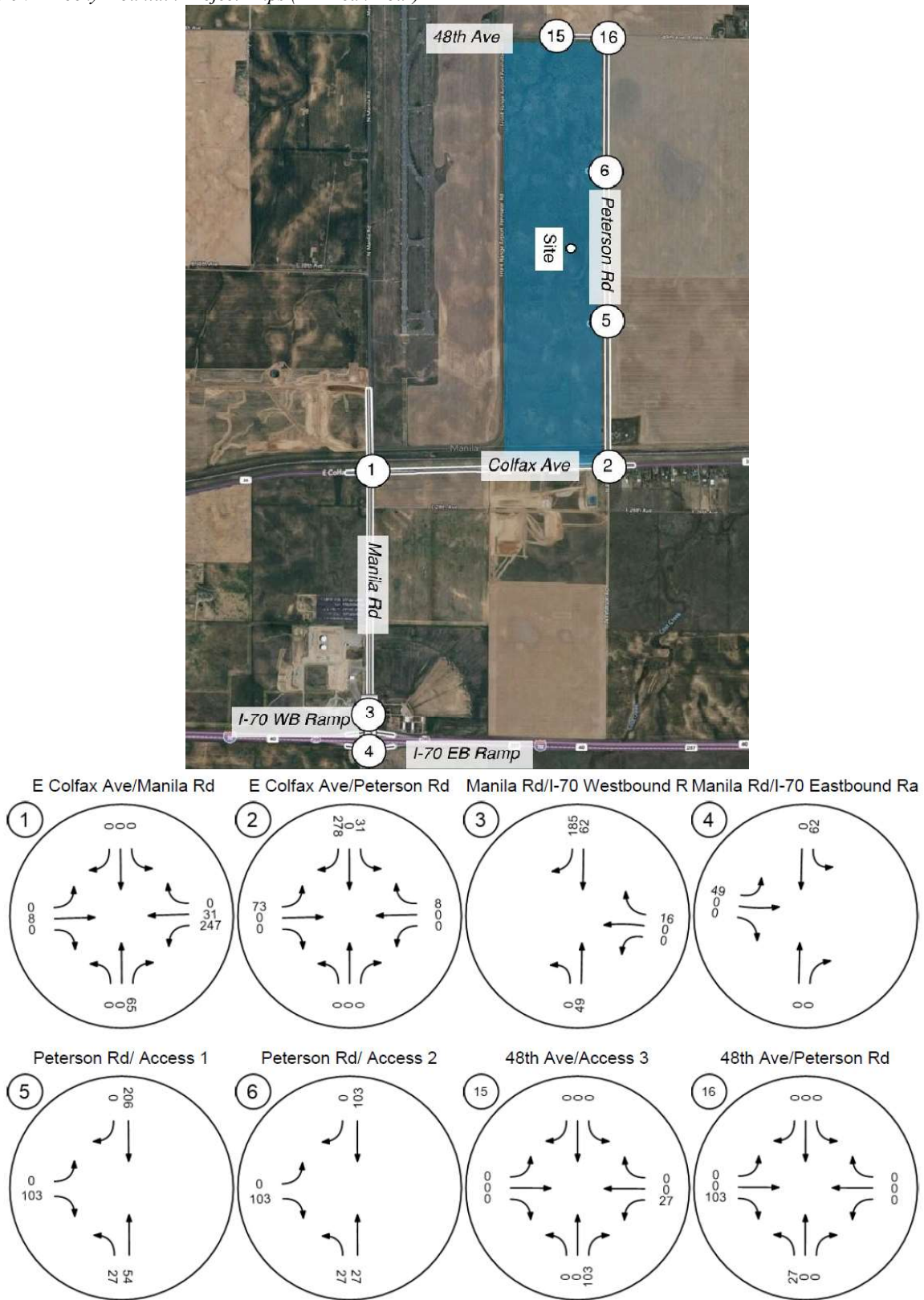


Figure 8- Horizon Total Conditions (AM Peak Hour) Without the Adjacent Development

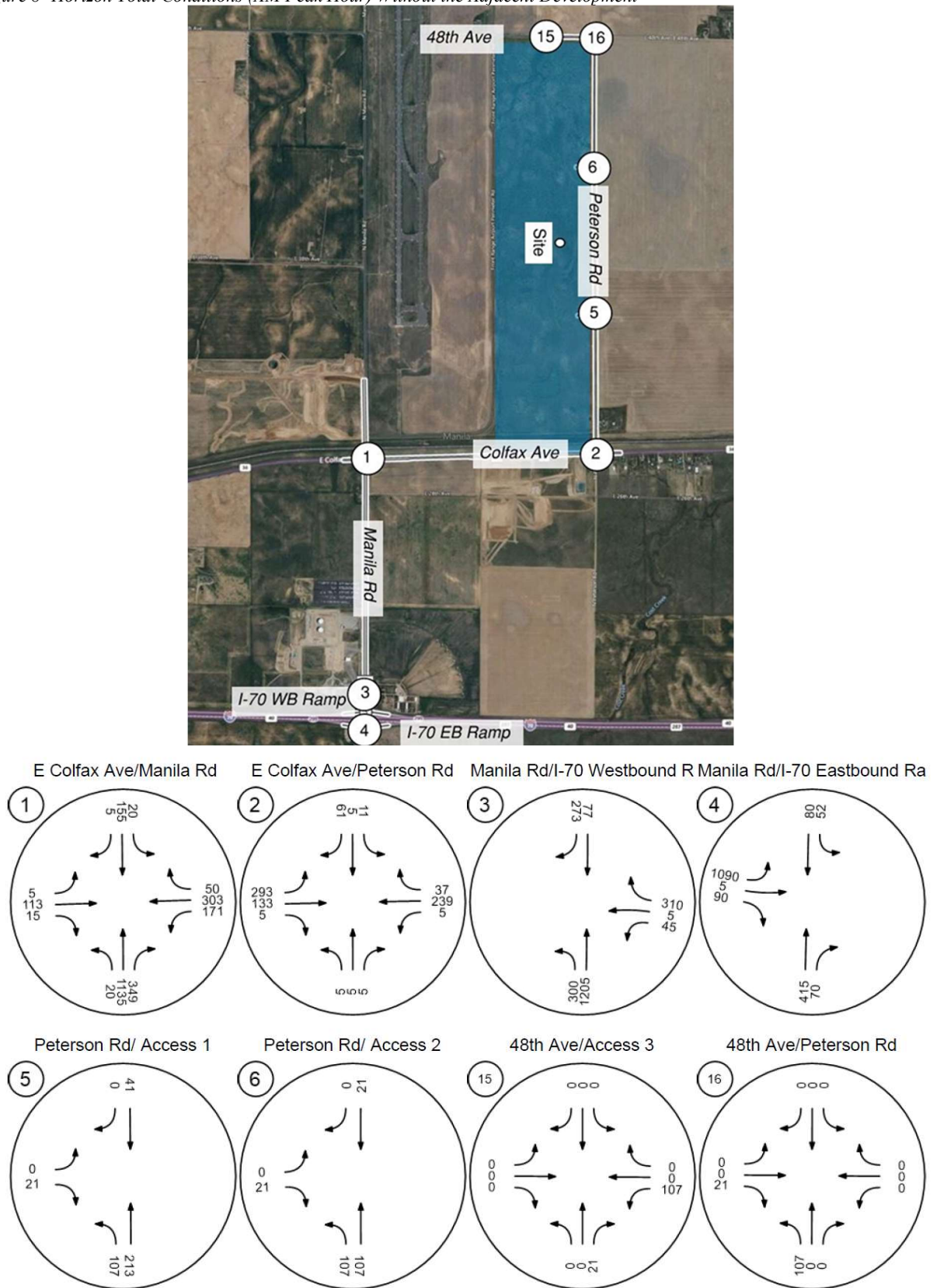


Figure 9- Horizon Total Conditions (PM Peak Hour) Without The Adjacent Development

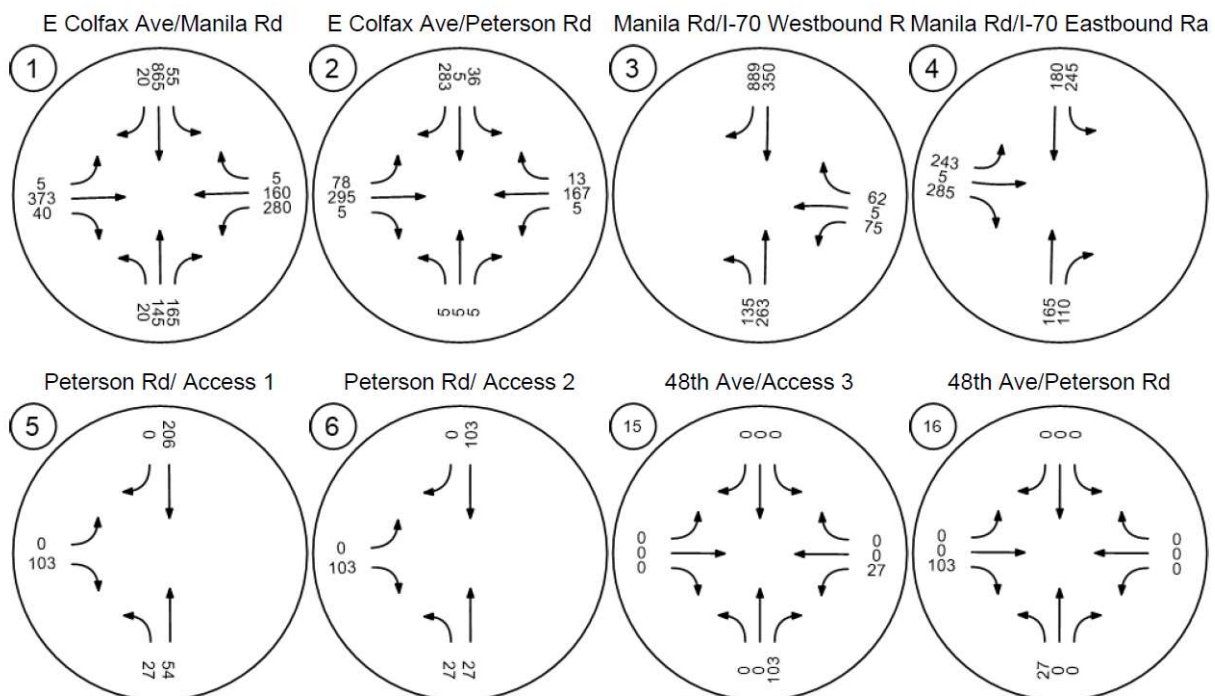


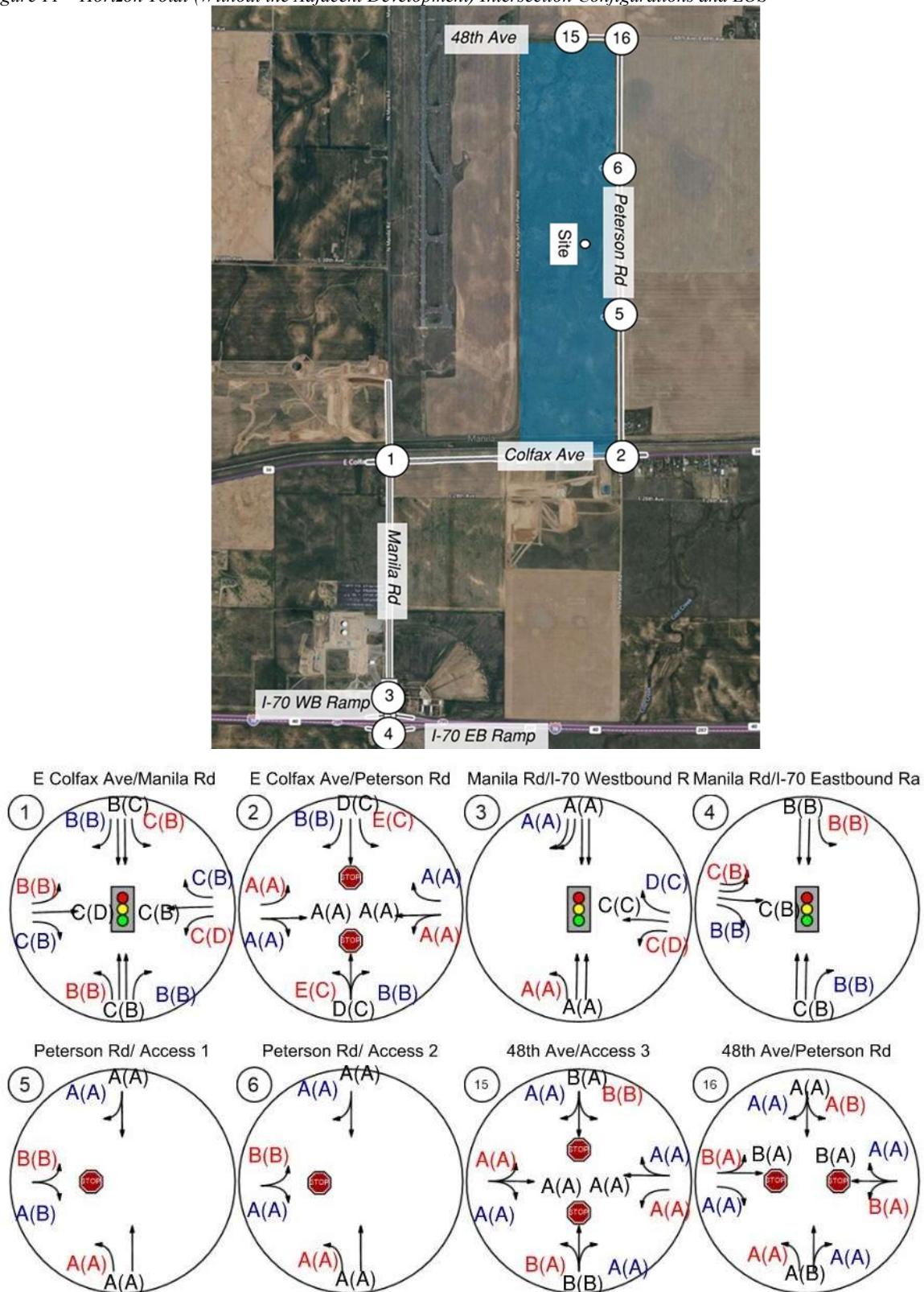


Figure 10- Horizon Total (Without the Adjacent Development) Daily Volumes



Turn lane configurations and movement's LOS are shown in Figure 11.

Figure 11 – Horizon Total (Without the Adjacent Development) Intersection Configurations and LOS\*



\*LOS for each movement was calculated based on the HCM 7<sup>th</sup> Edition.

Intersection operations with the addition of the projects (no adjacent development) are shown in Table 5 and Table 6.

*Table 5- Horizon Total Without the Adjacent Development Intersection Operations (AM Peak Hour)*

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	WB Thru	0.689	27.4	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	NB Left	0.043	37.6	E
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Right	0.615	9.4	A
4	Manila Rd/I-70 Eastbound Ramp	Signalized	HCM 7th Edition	EB Left	0.636	23.8	C
5	Peterson Rd/ Access 1	Two-way stop	HCM 7th Edition	EB Right	0.023	8.7	A
6	Peterson Rd/ Access 2	Two-way stop	HCM 7th Edition	EB Right	0.023	8.6	A
15	48th Ave/Access 3	Two-way stop	HCM 7th Edition	NB Right	0.021	8.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

*Table 6- Horizon Total Without the Adjacent Development Intersection Operations (PM Peak Hour)*

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	WB Left	0.759	30.9	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	NB Left	0.026	24.5	C
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Left	0.319	7.2	A
4	Manila Rd/I-70 Eastbound Ramp	Signalized	HCM 7th Edition	EB Right	0.310	14.3	B
5	Peterson Rd/ Access 1	Two-way stop	HCM 7th Edition	EB Right	0.143	10.4	B
6	Peterson Rd/ Access 2	Two-way stop	HCM 7th Edition	EB Right	0.123	9.5	A
15	48th Ave/Access 3	Two-way stop	HCM 7th Edition	NB Right	0.103	8.7	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.



As shown in Table 5, and Table 6 all intersections operate at an acceptable LOS except for the intersection of Colfax Avenue/Peterson Road. This intersection operates at LOS E during the AM peak hour. This is due to the northbound, and southbound left-turn movements at this stop-controlled intersection. Queue analysis for this intersection showed the 95th-percentile queue length will not exceed 7.35 ft for any movements. Additionally, this intersection was analyzed in Synchro. We increased the heavy vehicle percentage to 80 percent and increased the critical gap for permitted left-turn movement from 4.5 seconds to 8.5 seconds. Queue analysis showed the 95-percentile queue length will not exceed 39 feet for the eastbound left-turn movement. Assuming that the length of a truck is equivalent to the length of three passenger vehicles, the queue length is approximately half of a truck at the eastbound left-turn lane in the critical scenario. As shown in the recommendation section below, an 895-ft eastbound left-turn lane is recommended at this intersection. Since a traffic signal is not warranted at this intersection, we do not recommend a double eastbound left turn due to safety concerns between conflicting movements.

Given all other movements operate at an acceptable LOS (LOS D or better), and the queue length and turning volumes on the deficient movements and for eastbound left-turn movement are minor, no mitigation is recommended for this intersection. Traffic signal warrant analysis also proved that no warrant will be met at this intersection in the horizon year. This is under the assumption that the RMRP will be the only development on Peterson Road. Recommended improvements are listed below and shown in Table 10.

#### Colfax Avenue/Manilla Road (#1)

- A 160-ft extension of the westbound left turn.

#### Colfax Avenue/Peterson Road (#2)

- A 300-ft southbound left-turn lane. Included a 250-ft deceleration lane and a 50-ft storage lane. A 96-ft taper lane is included within the deceleration lane.
- A 250-ft southbound right-turn lane. A 96-ft taper lane is included within the deceleration lane.
- A 895-ft eastbound left-turn lane. Included a 600-ft deceleration lane and a 293-ft storage lane. A 222-ft taper lane is included within the deceleration lane.
- A 600-ft westbound right-turn deceleration lane. A 222-ft taper lane is included within the deceleration lane.
- A 960-ft southbound right-turn to the westbound acceleration lane. A 222-ft taper lane is included within the deceleration lane.

#### Manilla Road/I-70 Eastbound Ramp (#4)

- A 60-ft extension of the southbound left-turn.
- A 95-ft extension of eastbound left-turn lanes.

#### Peterson Road/ Access 1 (#5)

- A 355-ft northbound left-turn. Included a 250-ft deceleration lane and 107-ft storage. A 96-ft taper lane is included within the deceleration lane.

#### Peterson Road/ Access 2 (#6)

- A 355-ft northbound left-turn. Included a 250-ft deceleration lane and 107-ft storage. A 96-ft taper lane is included within the deceleration lane.

#### 48<sup>th</sup> Avenue/Access 3 (#15)

- A 355-ft westbound left-turn. Included a 250-ft deceleration lane and 107-ft storage. A 96-ft taper lane is included within the deceleration lane.

The total turn lane is rounded to the nearest 5 ft.

Finally, Matrix analyzed the horizon conditions with both the RMRP and Port CO Subarea 6. AM and PM peak hours volumes are shown in Figure 12 and Figure 13. Daily volumes are shown Figure 14. Intersection configurations and LOS for each movement are shown in Figure 15.

Figure 12- Horizon Total Conditions (AM Peak Hour)

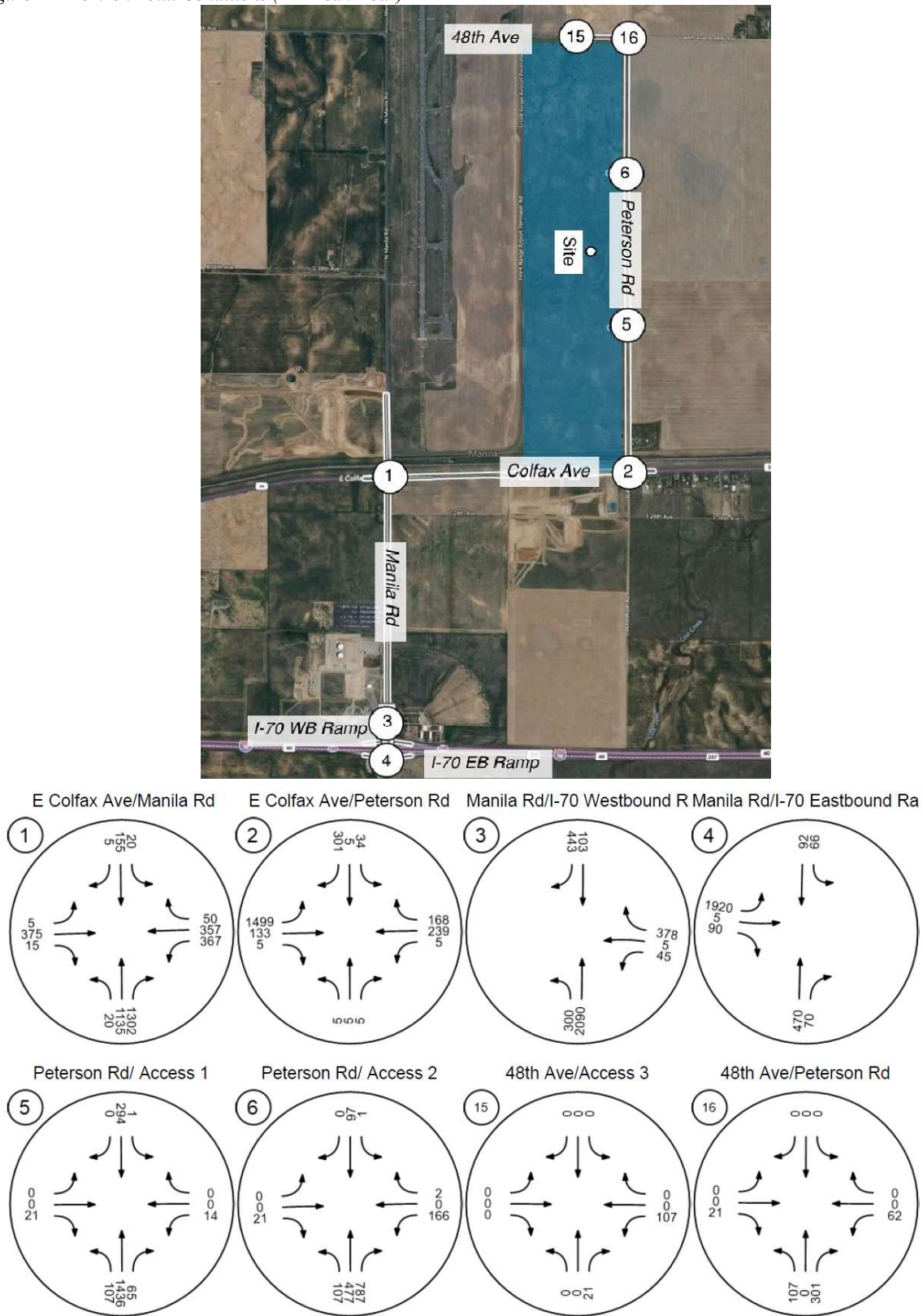


Figure 13- Horizon Total Conditions (PM Peak Hour)

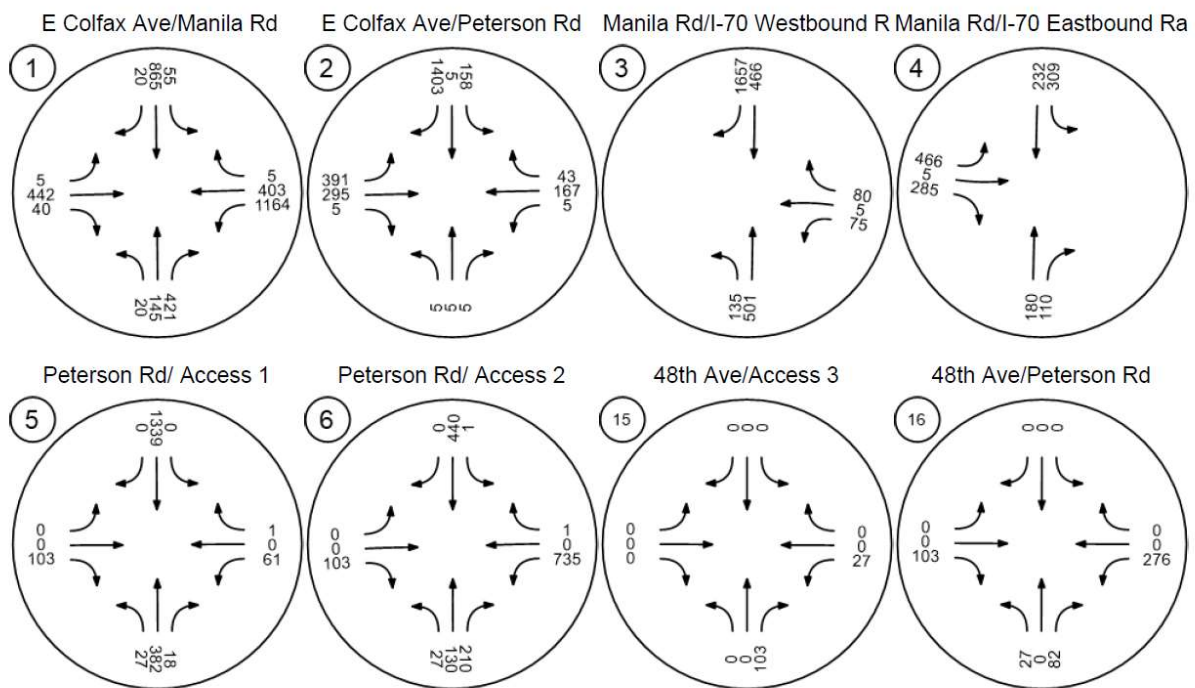
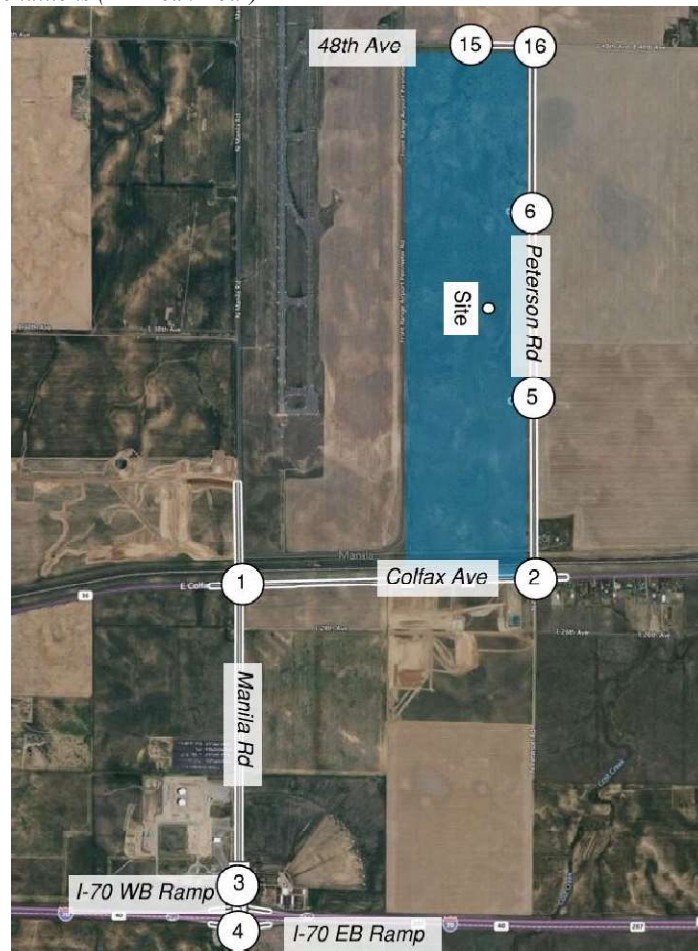
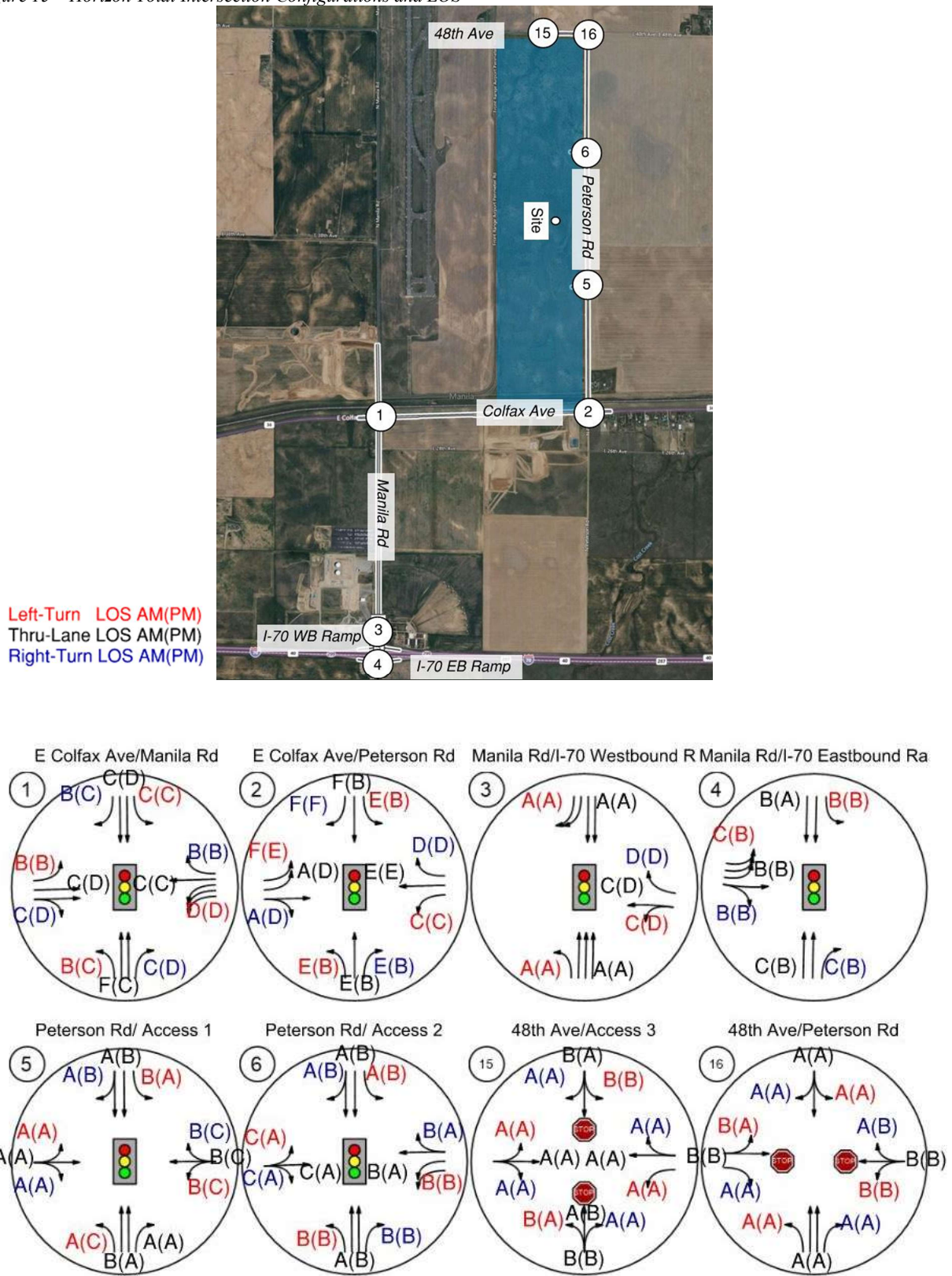




Figure 14- Horizon Total Daily Volumes



Figure 15 – Horizon Total Intersection Configurations and LOS\*



\*LOS for each movement was calculated based on the HCM 7<sup>th</sup> Edition.

Intersection operations with the addition of the projects are shown in Table 7 and Table 8.

Table 7- Horizon With Project Intersection Operations (AM Peak Hour)

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	WB Left	0.658	37.1	D
2	E Colfax Ave/Peterson Rd	Signalized	HCM 7th Edition	SB Right	0.866	79.9	E
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Right	0.672	9.6	A
4	Manila Rd/I-70 Eastbound Ramp	Signalized	HCM 7th Edition	NB Thru	0.669	24.5	C
5	Peterson Rd/ Access 1	Signalized	HCM 7th Edition	SB Left	0.583	11.1	B
6	Peterson Rd/ Access 2	Signalized	HCM 7th Edition	WB Left	0.391	11.3	B
15	48th Ave/Access 3	Two-way stop	HCM 7th Edition	NB Right	0.022	8.6	A
16	48th Ave/Peterson Rd	Two-way stop	HCM 7th Edition	WB Left	0.115	12.0	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Table 8- Horizon With Project Intersection Operations (PM Peak Hour)

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	EB Right	0.762	43.3	D
2	E Colfax Ave/Peterson Rd	Signalized	HCM 7th Edition	EB Left	0.819	62.0	E
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Left	0.453	7.2	A
4	Manila Rd/I-70 Eastbound Ramp	Signalized	HCM 7th Edition	EB Right	0.309	14.5	B
5	Peterson Rd/ Access 1	Signalized	HCM 7th Edition	WB Left	0.565	14.2	B
6	Peterson Rd/ Access 2	Signalized	HCM 7th Edition	NB Left	0.506	15.6	B
15	48th Ave/Access 3	Two-way stop	HCM 7th Edition	NB Right	0.108	8.9	A
16	48th Ave/Peterson Rd	Two-way stop	HCM 7th Edition	WB Left	0.389	12.6	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

As shown in Table 8 and Table 9, all intersections operate at an acceptable LOS in the horizon with project scenarios except for the intersection of Colfax Avenue /Peterson Road. This intersection operates



at LOS E during the AM and PM peak hours. For this intersection to operate at LOS D, an additional eastbound left-turn and a 180-ft receiving lane on the north leg are required in addition to the improvements listed below. These improvements are also summarized in Table 11. Project's fair share is shown in Table 12.

### **Horizon Total**

#### **Colfax Avenue/Manilla Road (#1)**

- A 600-ft shared eastbound thru and eastbound right-turn lane. A 660-ft receiving lane should be added to the end of the northbound right-turn acceleration lane on the west leg of the intersection. The Project share is calculated in Table 12.
- Three 990-ft westbound left-turn lanes. Included a 600-ft deceleration lane and 388-ft storage. A 222-ft taper lane is included within the deceleration lane.

#### **Colfax Avenue/Peterson Road (#2)**

- A 410-ft southbound left-turn. Included a 250-ft deceleration lane and a 158-ft storage lane. A 96-ft taper is included within the deceleration lane.
- Two 1350-ft eastbound left-turn lanes. Included 600-ft deceleration lane and 750-ft storage. 222-ft taper is included within the deceleration lane.

#### **Manilla Road/I-70 Eastbound Ramp (#4)**

- A 745-ft southbound left-turn lane. Included a 435-ft deceleration lane and a 309-ft storage. A 162-ft taper is included within the deceleration lane. Since there is a geometry constraint for the entire improvement, it is up to the City of Aurora and CDOT to determine how to address this deficiency. Currently, less than 300 feet of lane is available for the southbound left-turn at the I-70 underpass.
- Three 1075-ft eastbound left-turn lanes. Included 435-ft deceleration lane and 640-ft storage. A 162-ft taper is included within the deceleration lane.

The total turn lane is rounded to the nearest 5 ft.

### **Auxiliary Lane Evaluations**

The State Highway Access Code (SHAC) was used to determine the required turn lanes in the study area. Colfax Avenue is classified as a Rural Highway (R-B) in the SHAC and the speed limit on this road is 55 miles-per-hour (mph). Since Peterson Road best matches the Rural Highway access, we also assumed that this road would be an (R-B) access with a 30-mph speed limit. Turn lane evaluations for the RMRP North Area studied intersections are summarized in Table 9 for the horizon background conditions. Table 10 for the horizon total without the adjacent development and in Table 11 for the horizon total (with both developments) conditions. The total turn lane is rounded to the nearest 5 ft.

Table 9- Horizon Background Turn Lane Evaluations

ID	Intersection	Movement	# of Lanes	Access Category	Speed Limit (mph)	Turning Vol	Lane Width	SHAC	Deceleration	Storage	Taper Length
1	Manilla Rd/Colfax Ave	NBL	1	R-B	45	20	12	460	435	25	162
		NBR	1	R-B	45	100	12	435	435		162
		SBL	1	R-B	30	50	12	300	250	50	96
		SBR**	1	R-B	30	20	12	250	250		96
		EBL**	1	R-B	55	5	12	625	600	25	222
		EBR	1	R-B	55	40	12	600	600		222
		WBL	1	R-B	55	121	12	720	600	121	222
3	Manilla Rd/I-70 WB Ramp	WBR	1	R-B	55	50	12	600	600		222
		NBL	1	R-B	45	300	12	735	435	300	162
		SBR	2	R-B	45	704	12	435	435		162
		WBL	1	R-B	45	75	12	535	435	100	162
4	Manilla Rd/I-70 EB Ramp	WBR	1	R-B	45	246	12	435	435		162
		NBR	1	R-B	45	110	12	435	435		162
		SBL	1	R-B	45	183	12	620	435	183	162
		EBL	2	R-B	45	898	12	885	435	449	162
		EBR	1	R-B	45	285	12	435	435		162

\*Acceleration Lane

\*\*Turn lane was not warranted based on the SHAC

Table 10- Horizon Total (Without the Adjacent Development) Turn Lane Evaluations

ID	Intersection	Movement	# of Lanes	Access Category	Speed Limit (mph)	Turning Vol	Lane Width	SHAC	Deceleration	Storage	Taper Length
1	Colfax Ave/Manilla Rd	NBL	1	R-B	45	20	12	460	435	25	162
		NBR	1	R-B	45	349	12	435	435		162
		SBL	1	R-B	30	55	12	300	250	50	96
		SBR**	1	R-B	30	20	12	250	250		96
		EBL**	1	R-B	55	5	12	625	600	25	222
		EBR	1	R-B	55	40	12	600	600		222
		WBL	1	R-B	55	280	12	880	600	280	222
2	Colfax Ave/Peterson Rd	WBR	1	R-B	55	50	12	600	600		222
		SBL	1	R-B	30	36	12	300	250	50	96
		SBR	1	R-B	30	283	12	250	250		96
		EBL	1	R-B	55	293	12	895	600	293	222
3	Manilla Rd/I-70 WB Ramp	WBR	1	R-B	55	37	12	600	600		222
		SBR*	1	R-B	55	78	12	960			222
		NBL	1	R-B	45	300	12	735	435	300	162
		SBR	2	R-B	45	889	12	435	435		162
4	Manilla Rd/I-70 EB Ramp	WBL	1	R-B	45	75	12	535	435	100	162
		WBR	1	R-B	45	310	12	435	435		162
		NBR	1	R-B	45	110	12	435	435		162
		SBL	1	R-B	45	245	12	680	435	245	162
5	Peterson Rd/Access #1	EBL	2	R-B	45	1090	12	980	435	545	162
		EBR	1	R-B	45	285	12	435	435		162
6	Peterson Rd/Access #2	NBL	1	R-B	30	107	12	355	250	107	96
15	Peterson Rd/Access #3	WBL	1	R-B	30	107	12	355	250	107	96
16	48th Ave/Peterson Rd	NBL	1	R-B	30	107	12	355	250	107	96
		EBR	1	R-B	30	103	12	250	250		96

\*Acceleration Lane

\*\*Turn lane was not warranted based on the SHAC

Table 11-Horizon Total (With Both Developments) Turn Lane Evaluations

ID	Intersection	Movement	# of Lanes	Access Category	Speed Limit (mph)	Turning Vol	Lane Width	SHAC	Deceleration	Storage	Taper Length
1	Colfax Ave/Manilla Rd	NBL	1	R-B	45	20	12	460	435	25	162
		NBR	1	R-B	45	1302	12	435	435		162
		SBL	1	R-B	30	55	12	300	250	50	96
		SBR**	1	R-B	30	20	12	250	250		96
		EBL**	1	R-B	55	5	12	625	600	25	222
		EBR	1	R-B	55	40	12	600	600		222
		WBL	3	R-B	55	1164	12	990	600	388	222
2	Colfax Ave/Peterson Rd	WBR	1	R-B	55	50	12	600	600		222
		SBL	1	R-B	30	158	12	410	250	158	96
		SBR	1	R-B	30	1403	12	250	250		96
		EBL	2	R-B	55	1499	12	1350	600	750	222
3	Manilla Rd/I-70 WB Ramp	WBR	1	R-B	55	168	12	600	600		222
		NBL	1	R-B	45	300	12	735	435	300	162
		SBR	2	R-B	45	1657	12	435	435		162
		WBL	1	R-B	45	75	12	535	435	100	162
4	Manilla Rd/I-70 EB Ramp	WBR	1	R-B	45	378	12	435	435		162
		NBR	1	R-B	45	110	12	435	435		162
		SBL	1	R-B	45	309	12	745	435	309	162
		EBL	3	R-B	45	1920	12	1075	435	640	162
5	Peterson Rd/Access #1	EBR	1	R-B	45	285	12	435	435		162
		NBL	1	R-B	30	107	12	355	250	107	96
6	Peterson Rd/Access #2	NBL	1	R-B	30	107	12	355	250	107	96
15	Peterson Rd/Access #3	WBL	1	R-B	30	107	12	355	250	107	96
16	48th Ave/Peterson Rd	NBL	1	R-B	30	107	12	355	250	107	96
		EBR	1	R-B	30	103	12	250	250		96

\*Acceleration Lane

\*\*Turn lane was not warranted based on the SHAC

## Conclusion and Recommendations

In this memo, the traffic impact of Rocky Mountain Rail Park North Area on the adjacent network was analyzed. *NEATS (2018)*, *Port Colorado Subarea 6 (2022)*, and *Rocky Mountain Rail Park MTIS (2020)* were used to obtain lane configurations, and background volumes. RMRP North Area trips were then added to the background traffic and results showed all intersections and approaches operate at an acceptable LOS. Recommended turn lanes for the studied intersections are listed below:

## Horizon Background

### Colfax Avenue/Manilla Road (#1)

- A traffic Signal.
- A 460-ft northbound left-turn. Included a 435-ft deceleration lane and a 25-ft storage. A 162-ft taper lane is included within the deceleration lane.
- A 435-ft northbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.
- A 300-ft southbound left-turn. Included a 250-ft deceleration lane and a 50-ft storage. A 96-ft taper lane is included within the deceleration lane.
- A 600-ft eastbound right-turn deceleration lane. A 222-ft taper lane is included within the deceleration lane.
- 720-ft westbound left-turn lane. Included a 600-ft deceleration lane and 121-ft storage. A 222-ft taper lane is included within the deceleration lane.
- A 600-ft westbound right-turn deceleration lane. A 222-ft taper lane is included within the deceleration lane.
- A 960-ft northbound acceleration lane. A 222-ft taper lane is included within the acceleration lane.

### Manilla Road/I-70 Westbound Ramp (#3)

- A traffic Signal.
- A 735-ft northbound left-turn. Included a 435-ft deceleration lane and a 300-ft storage. 162-ft taper lane is included within the deceleration lane.



- Two 435-ft southbound right-turn deceleration lanes. A 162-ft taper lane is included within the deceleration lane.
- A 535-ft westbound left-turn. Included a 435-ft deceleration lane and a 100-ft storage. A 162-ft taper is included within the deceleration lane.
- A 435-ft westbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.

#### Manilla Road/I-70 Eastbound Ramp (#4)

- A traffic Signal.
- A 435-ft northbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.
- A 620-ft southbound left-turn lane. Included a 435-ft deceleration lane and a 183-ft storage. A 162-ft taper lane is included within the deceleration lane. Since there is a geometry constraint for the entire improvement, it is up to the City of Aurora and CDOT to determine how to address this deficiency. Currently, less than 300 feet of the lane is available for the southbound left-turn at the I-70 underpass.
- Two 885-ft eastbound left-turn lanes. Included 435-ft deceleration lane and 449-ft storage. A 162-ft taper lane is included within the deceleration lane.
- A 435-ft eastbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.

#### Horizon Total (Without the Adjacent Development)

##### Colfax Avenue/Manilla Road (#1)

- A 160-ft extension of the westbound left turn.

##### Colfax Avenue/Peterson Road (#2)

- A 300-ft southbound left-turn lane. Included a 250-ft deceleration lane and a 50-ft storage lane. A 96-ft taper lane is included within the deceleration lane.
- A 250-ft southbound right-turn lane. A 96-ft taper lane is included within the deceleration lane.
- A 895-ft eastbound left-turn lane. Included a 600-ft deceleration lane and a 293-ft storage lane. A 222-ft taper lane is included within the deceleration lane.
- A 600-ft westbound right-turn deceleration lane. A 222-ft taper lane is included within the deceleration lane.
- A 960-ft southbound right-turn to the westbound acceleration lane. A 222-ft taper lane is included within the deceleration lane.

##### Manilla Road/I-70 Eastbound Ramp (#4)

- A 60-ft extension of the southbound left-turn.
- 95-ft extension of eastbound left-turn lanes.

##### Peterson Road/ Access 1 (#5)

- A 355-ft northbound left-turn. Included a 250-ft deceleration lane and 107-ft storage. A 96-ft taper lane is included within the deceleration lane.

##### Peterson Road/ Access 2 (#6)

- A 355-ft northbound left-turn. Included a 250-ft deceleration lane and 107-ft storage. A 96-ft taper lane is included within the deceleration lane.

##### 48<sup>th</sup> Avenue/Access 3 (#15)

- A 355-ft westbound left-turn. Included a 250-ft deceleration lane and 107-ft storage. A 96-ft taper lane is included within the deceleration lane.

## Horizon Total

### Colfax Avenue/Manilla Road (#1)

- A 600-ft shared eastbound thru and eastbound right-turn lane. A 660-ft receiving lane should be added to the end of the northbound right-turn acceleration lane on the west leg of the intersection. The Project share is calculated in Table 9.
- Three 990-ft westbound left-turn lanes. Included a 600-ft deceleration lane and 388-ft storage. A 222-ft taper lane is included within the deceleration lane.

### Colfax Avenue/Peterson Road (#2)

- A 410-ft southbound left-turn. Included a 250-ft deceleration lane and a 158-ft storage lane. A 96-ft taper is included within the deceleration lane.
- Two 1350-ft eastbound left-turn lanes. Included 600-ft deceleration lane and 750-ft storage. 222-ft taper is included within the deceleration lane.

### Manilla Road/I-70 Eastbound Ramp (#4)

- A 745-ft southbound left-turn lane. Included a 435-ft deceleration lane and a 309-ft storage. A 162-ft taper is included within the deceleration lane. Since there is a geometry constraint for the entire improvement, it is up to the City of Aurora and CDOT to determine how to address this deficiency. Currently, less than 300 feet of lane is available for the southbound left-turn at the I-70 underpass.
- Three 1075-ft eastbound left-turn lanes. Included 435-ft deceleration lane and 640-ft storage. A 162-ft taper is included within the deceleration lane.

It is realized that the City of Aurora calculates the fair share based on the percentage of frontage ownership. However, as shown in both the horizon total without the Port Colorado Subarea 6, and horizon total scenarios, the number of traffic volumes that these two developments (RMRP and Port CO) are generating is greatly disproportional. The number of daily trips generated by the Port Colorado Subarea 6 is more than twice that of the Rocky Mountain Rail Park north and south areas combined. As a result, Matrix believes that fair share should be calculated based on the traffic volumes generated by each development. As a result, the project's fair share for the required improvement in horizon total conditions (with the adjacent development) was calculated and summarized in Table 12.

*Table 12-Rocky Mountain Rail Park Fair Share Calculations((Horizon Total)*

ID	Intersection	2040 Total AM	2040 Total PM	Site AM	Site PM	Existing AM	Existing PM	Fairshare AM	Fairshare PM	Fairshare(Weighted Average)
1	Colfax Ave/Manilla Rd	3806	3585	344	351	291	407	10.12%	11.04%	10.57%
2	Colfax Ave/Peterson Rd	2404	2487	382	390	228	344	18.54%	18.20%	18.37%
3	Manilla Rd/I-70 WB Ramp	3364	2919	306	312	232	200	9.67%	11.47%	10.51%
4	Manilla Rd/I-70 EB Ramp	2713	1587	204	111	215	314	8.50%	8.72%	8.58%
5	Peterson Rd/Access 1	1938	1931	382	390	0	0	19.71%	20.20%	19.95%
6	Peterson Rd/Access 2	1658	1647	256	260	0	0	15.44%	15.79%	15.61%
15	48th Ave/Access 3	128	130	128	130	0	0	100.00%	100.00%	100.00%

**End of Original Memorandum**

## 2030 Background Conditions

2030 Background volumes were based on the Port Colorado Subarea 6 TIS dated May 2022. The Subarea 6 TIS included the RMRP site trips in the background volumes. To obtain the 2030 background, site trips from the RMRP MTIS were deducted from the Subarea 6 TIS volumes so that what remains is 2030 background volumes that do not include either RMRP or Subarea 6 volumes. Where the arithmetic resulted in zero or negative trips, a value of 5 was used to provide a conservative evaluation. Background volumes are shown in Figure 16 and Figure 17. Figure 18 shows the background daily volumes.

Figure 16 – 2030 No Project (Background) Conditions (AM Peak Hour)

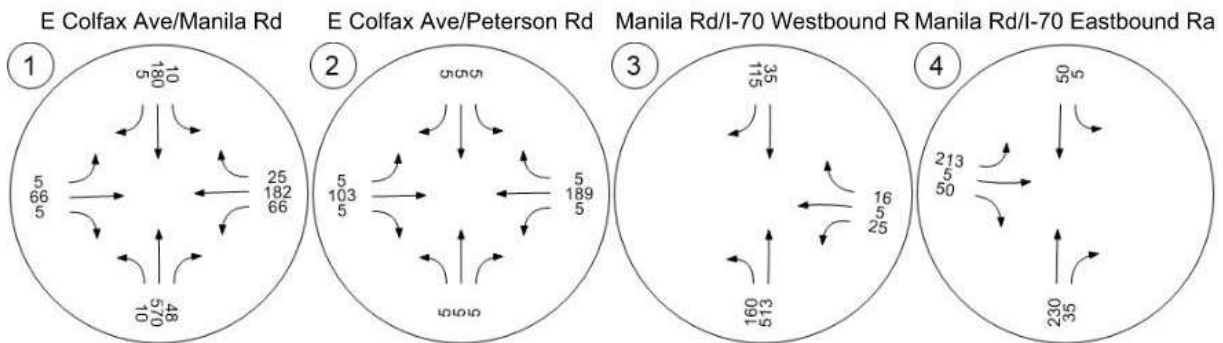




Figure 17 – 2030 No Project (Background) Conditions (PM Peak Hour)

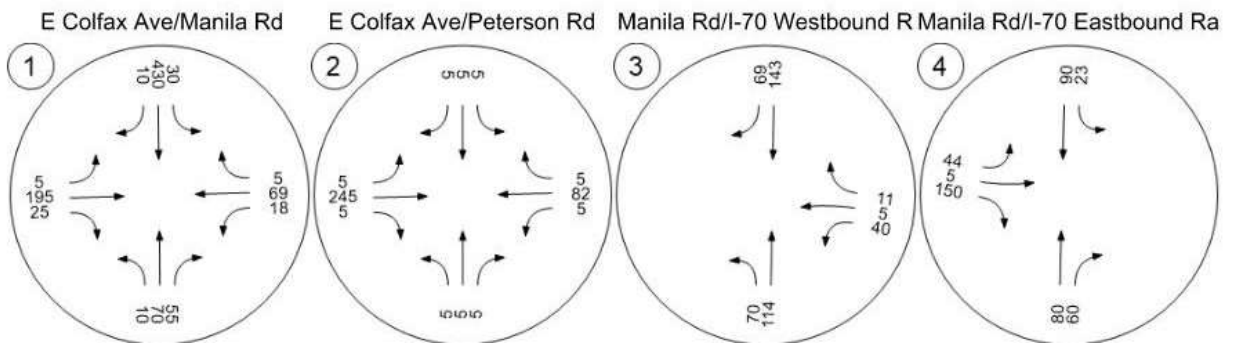


Figure 18 – 2030 Background Daily Volumes



Intersection operations in the 2030 background conditions are shown in Table 13 and Table 14. Intersection configurations and LOS for each movement are shown in Figure 19. The 2030 background condition was modeled with improvements that will be necessary with or without the RMRP development. The auxiliary lane evaluation was done in accordance with the State of Colorado State Highway Access Code (SHAC) to determine what improvements should be in place in the study area prior to buildout of either RMRP or Port CO Subarea 6. These improvements include:

#### Colfax Avenue/Manilla Road (#1)

- A traffic signal.
- A 460-ft northbound left-turn. Included a 435-ft deceleration lane and a 25-ft storage. A 162-ft taper lane is included within the deceleration lane.
- A 435-ft northbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.

- A 475-ft southbound left-turn. Included a 435-ft deceleration lane and a 40-ft storage. A 162-ft taper lane is included within the deceleration lane.
- A 600-ft eastbound right-turn deceleration lane. A 222-ft taper lane is included within the deceleration lane.
- A 700-ft westbound left-turn lane. Included a 600-ft deceleration lane and 100-ft storage. A 222-ft taper lane is included within the deceleration lane.
- A 600-ft westbound right-turn deceleration lane. A 222-ft taper lane is included within the deceleration lane.
- A 960-ft westbound acceleration lane. A 222-ft taper lane is included within the acceleration lane.

#### Manilla Road/I-70 Westbound Ramp (#3)

- A 595-ft northbound left-turn. Included a 435-ft deceleration lane and a 160-ft storage. A 162-ft taper lane is included within the deceleration lane.
- A 435-ft southbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.
- A 485-ft westbound left-turn. Included a 435-ft deceleration lane and a 50-ft storage. A 162-ft taper is included within the deceleration lane.

#### Manilla Road/I-70 Eastbound Ramp (#4)

- A 435-ft northbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.
- A 460-ft southbound left-turn lane. Included a 435-ft deceleration lane and a 25-ft storage. A 162-ft taper lane is included within the deceleration lane. Since there is a geometry constraint for the entire improvement, it is up to the City of Aurora and CDOT to determine how to address this deficiency. Currently, less than 300 feet of the lane is available for the southbound left-turn at the I-70 underpass.
- A 650-ft eastbound left-turn lane. Included 435-ft deceleration lane and 213-ft storage. A 162-ft taper lane is included within the deceleration lane.
- A 435-ft eastbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.
- A 960-ft southbound acceleration lane. A 222-ft taper lane is included within the acceleration lane.

The total turn lane is rounded to the nearest 5 ft.

Table 13 – 2030 No Project (Background) Intersection Operations (AM Peak Hour)  
Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	NB Thru	0.571	30.0	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	SB Thru	0.009	11.7	B
3	Manila Rd/I-70 Westbound Ramp	Two-way stop	HCM 7th Edition	WB Left	0.153	29.0	D
4	Manila Rd/I-70 Eastbound Ramp	Two-way stop	HCM 7th Edition	EB Left	0.397	15.1	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.



*Table 14 – 2030 No Project (Background) Intersection Operations (PM Peak Hour)*  
**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	SB Thru	0.435	26.1	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	NB Thru	0.010	12.1	B
3	Manila Rd/I-70 Westbound Ramp	Two-way stop	HCM 7th Edition	WB Left	0.096	13.9	B
4	Manila Rd/I-70 Eastbound Ramp	Two-way stop	HCM 7th Edition	EB Thru	0.009	11.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

As shown in Table 13 and Table 14, all intersections operate at LOS D or better in the 2030 background condition.

### Site Trips

Trip generation, distribution, and assignment are discussed earlier in the original addendum; Figure 6 and Figure 7 show the project site trips for the AM and PM peak hours, respectively.

### 2030 Total Conditions

The horizon year total conditions evaluated in this report the build scenario for RMRP and assumes that Port CO Subarea 6 has not been built yet. The results of this analysis will highlight which improvements will be necessary as a result of RMRP and which will be needed to accommodate traffic from Subarea 6. Figure 20 and Figure 21 show the 2030 Buildout Total Conditions (Without Subarea 6) for the AM and PM Peak Hours, respectively.

Figure 19 – 2030 Background Intersection Configurations and LOS

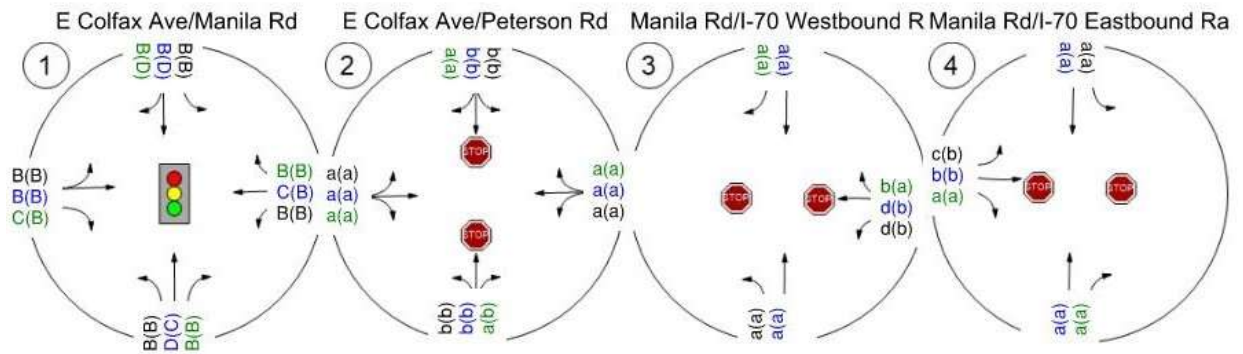
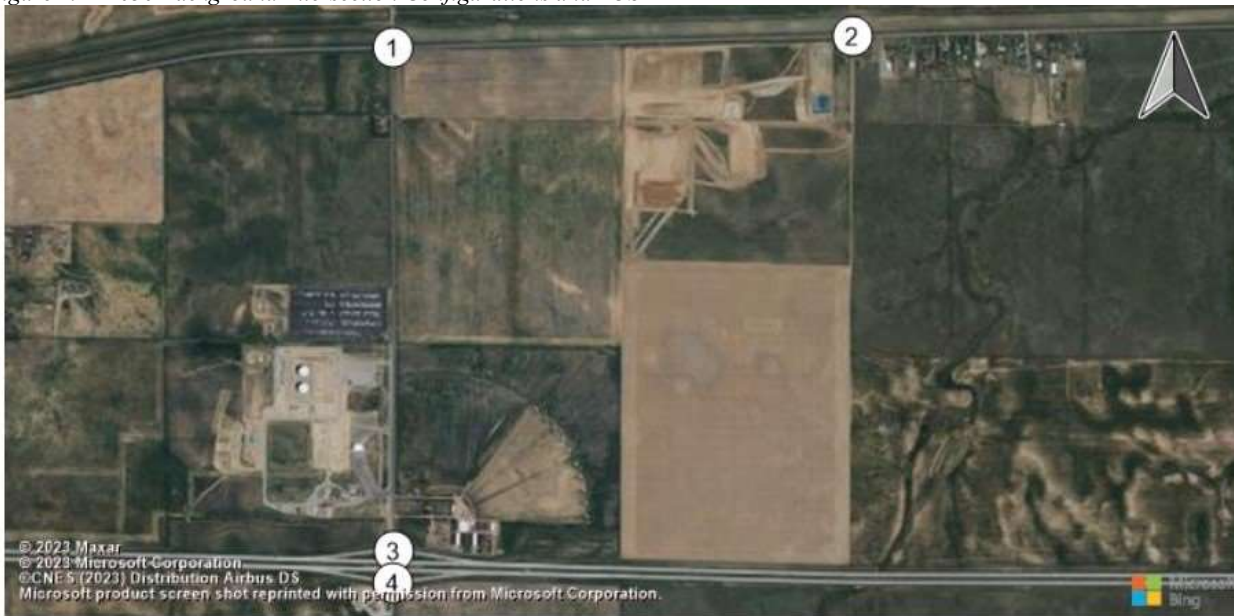


Figure 20 – 2030 Buildout Total Conditions Without Subarea 6 (AM Peak Hour)

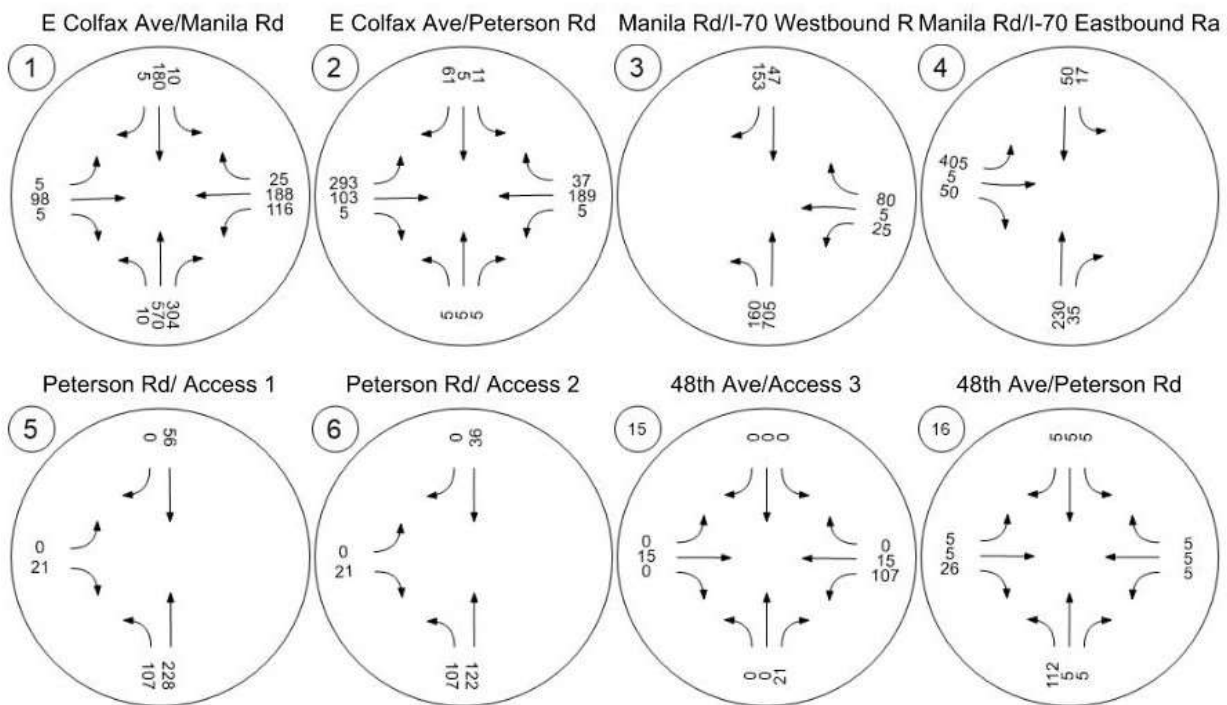




Figure 21 – 2030 Buildout Total Conditions Without Subarea 6 (PM Peak Hour)

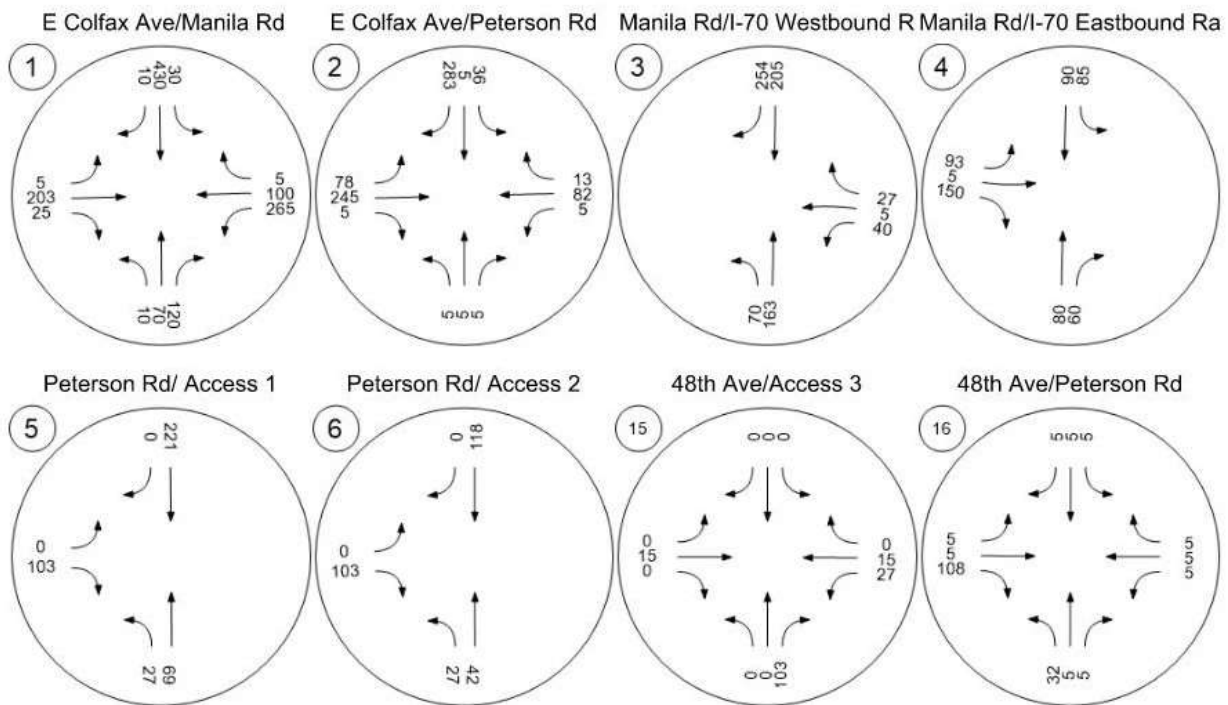


Figure 22 – 2030 Buildout Total Conditions Without Subarea 6 Daily Volumes



Intersection operations after buildout of RMRP (without buildout of Port CO Subarea 6) are shown in Table 15 and Table 16 for the AM and PM peak hours, respectively. Figure 23 shows the intersection configurations and LOS for the 2030 buildout conditions.

*Table 15 – 2030 Buildout Total Conditions Without Subarea 6 Intersection Operations (AM Peak Hour)*  
**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	NB Thru	0.608	27.7	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	NB Left	0.036	32.3	D
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Right	0.510	6.5	A
4	Manila Rd/I-70 Eastbound Ramp	Two-way stop	HCM 7th Edition	EB Left	0.792	31.7	D
5	Peterson Rd/ Access 1	Two-way stop	HCM 7th Edition	EB Right	0.024	8.9	A
6	Peterson Rd/ Access 2	Two-way stop	HCM 7th Edition	EB Right	0.023	8.7	A
15	48th Ave/Access 3	Two-way stop	HCM 7th Edition	NB Right	0.023	8.6	A
16	48th Ave/Peterson Rd	Two-way stop	HCM 7th Edition	WB Thru	0.009	11.6	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

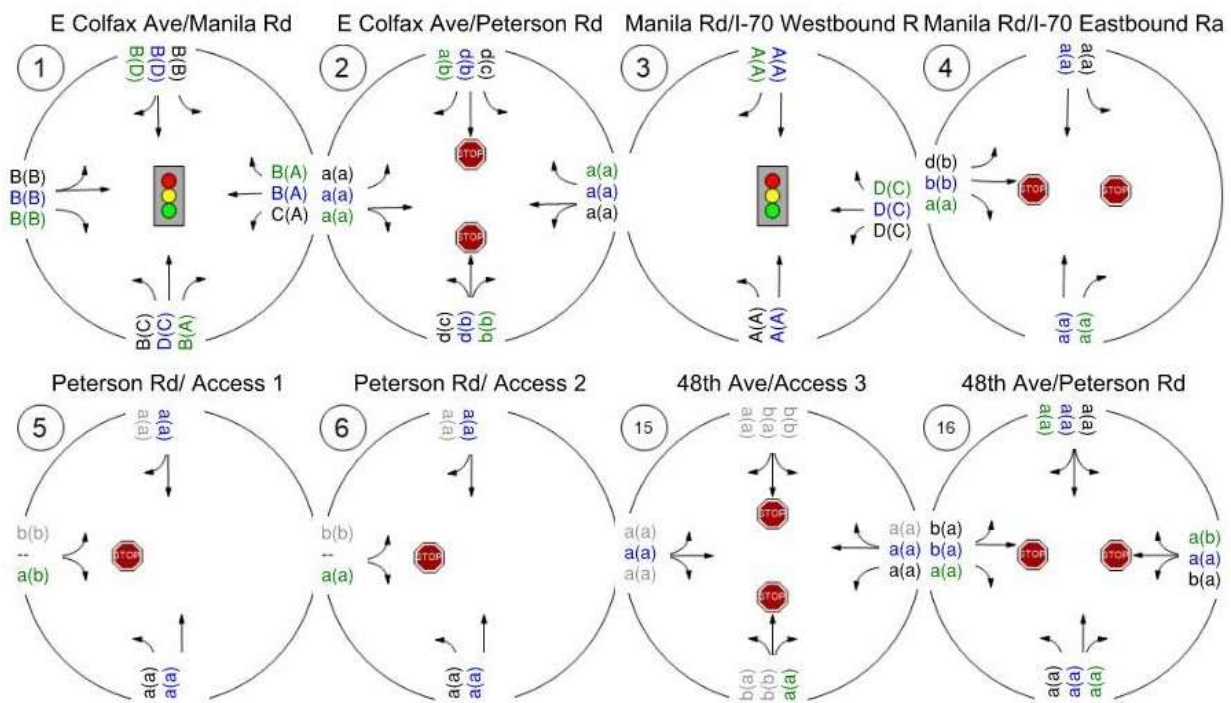
*Table 16 – 2030 Buildout Total Conditions Without Subarea 6 Intersection Operations (AM Peak Hour)*  
**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	SB Thru	0.595	28.2	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	NB Left	0.019	19.3	C
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Left	0.188	5.9	A
4	Manila Rd/I-70 Eastbound Ramp	Two-way stop	HCM 7th Edition	EB Left	0.205	14.2	B
5	Peterson Rd/ Access 1	Two-way stop	HCM 7th Edition	EB Right	0.148	10.6	B
6	Peterson Rd/ Access 2	Two-way stop	HCM 7th Edition	EB Right	0.128	9.7	A
15	48th Ave/Access 3	Two-way stop	HCM 7th Edition	NB Right	0.111	9.0	A
16	48th Ave/Peterson Rd	Two-way stop	HCM 7th Edition	WB Left	0.007	10.1	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.



Figure 23 – 2030 Buildout Total Conditions Without Subarea 6 Intersection Configurations and LOS



As shown in Table 15 and Table 16, all intersections operate at an acceptable LOS. Recommended improvements above what is recommended for the 2030 background (no build) conditions are listed below:

**Colfax Avenue/Manila Road (#1)**

- A 165-ft extension of the westbound left turn.

**Colfax Avenue/Peterson Road (#2)**

- A 300-ft southbound left-turn lane. Included a 250-ft deceleration lane and a 50-ft storage lane. A 96-ft taper lane is included within the deceleration lane.
- A 250-ft southbound right-turn lane. A 96-ft taper lane is included within the deceleration lane. The right turn lane is a free right turn that is connected to the right turn acceleration lane.
- A 895-ft eastbound left-turn lane. Included a 600-ft deceleration lane and a 293-ft storage lane. A 222-ft taper lane is included within the deceleration lane.
- A 600-ft westbound right-turn deceleration lane. A 222-ft taper lane is included within the deceleration lane.
- A 960-ft westbound acceleration lane. A 222-ft taper lane is included within the deceleration lane.

**Manila Road/I-70 Westbound Ramp (#3)**

- A 435-ft westbound right-turn deceleration lane. A 162-ft taper lane is included within the deceleration lane.

**Manila Road/I-70 Eastbound Ramp (#4)**

- A 75-ft extension of the southbound left-turn.
- A 190-ft extension of eastbound left-turn lanes.

**Peterson Road/ Access 1 (#5)**

- A 355-ft northbound left-turn. Included a 250-ft deceleration lane and 107-ft storage. A 96-ft taper lane is included within the deceleration lane.

**Peterson Road/ Access 2 (#6)**

- A 355-ft northbound left-turn. Included a 250-ft deceleration lane and 107-ft storage. A 96-ft taper lane is included within the deceleration lane.

**48th Avenue/Access 3 (#15)**

- A 355-ft westbound left-turn. Included a 250-ft deceleration lane and 107-ft storage. A 96-ft taper lane is included within the deceleration lane.

**48th Avenue/Peterson Road (#16)**

- A 360-ft northbound left turn. Included a 250-ft deceleration lane and 112-ft storage. A 96-ft taper lane is included within the deceleration lane.
- A 250-ft eastbound right-turn deceleration lane. A 96-ft taper lane is included within the deceleration lane.

The total turn lane is rounded to the nearest 5 ft.

**Auxiliary Lane Evaluations**

The methodology for determining turn lane requirements was discussed earlier in the original addendum. Below are the results of the analysis for turn lane requirements for the 2030 background conditions (Table 17) and for the 2030 total conditions (Table 18).

Table 17 – 2030 Background Turn Lane Evaluations

ID	Intersection	Movement	# of Lanes	Access Category	Speed Limit (mph)	Turning Vol	Lane Width	SHAC	Deceleration	Storage	Taper Length
1	Manilla Rd/Colfax Ave	NBL	1	R-B	45	10	12	460	435	25	162
		NBR	1	R-B	45	55	12	435	435		162
		SBL	1	R-B	45	30	12	475	435	40	162
		SBR	1	R-B	45	10	12	435	435		162
		EBL	1	R-B	55	5	12	625	600	25	222
		EBR	1	R-B	55	25	12	600	600		222
		WBL	1	R-B	55	66	12	700	600	100	222
3	Manilla Rd/I-70 WB Ramp	WBR	1	R-B	55	25	12	600	600		222
		NBL	1	R-B	45	160	12	595	435	160	162
		SBR	1	R-B	45	115	12	435	435		162
		WBL	1	R-B	45	40	12	485	435	50	162
4	Manilla Rd/I-70 EB Ramp	WBR	1	R-B	45	16	12	435	435		162
		NBR	1	R-B	45	60	12	435	435		162
		SBL	1	R-B	45	23	12	460	435	25	162
		EBL	1	R-B	45	213	12	650	435	213	162
		EBR	1	R-B	45	150	12	435	435		162

Turn lane was not warranted based on the SHAC

Table 18 – 2030 Total Without Subarea 6 Turn Lane Evaluations

ID	Intersection	Movement	# of Lanes	Access Category	Speed Limit (mph)	Turning Vol	Lane Width	SHAC	Deceleration	Storage	Taper Length
1	Manilla Rd/Colfax Ave	NBL	1	R-B	45	10	12	460	435	25	162
		NBR	1	R-B	45	304	12	435	435		162
		SBL	1	R-B	45	30	12	475	435	40	162
		SBR	1	R-B	45	10	12	435	435		162
		EBL	1	R-B	55	5	12	625	600	25	222
		EBR	1	R-B	55	25	12	600	600		222
		WBL	1	R-B	55	265	12	865	600	265	222
2	Colfax/Peterson	WBR	1	R-B	55	25	12	600	600		222
		NBL	1	R-B	30	5	12	275	250	25	96
		NBR	1	R-B	30	5	12	250	250		96
		SBL	1	R-B	30	36	12	300	250	50	96
		SBR	1	R-B	30	283	12	250	250		96
		EBL	1	R-B	55	293	12	895	600	293	222
		EBR	1	R-B	55	5	12	600	600		222
3	Manilla Rd/I-70 WB Ramp	WBL	1	R-B	55	5	12	625	600	25	222
		WBR	1	R-B	55	37	12	600	600		222
		NBL	1	R-B	45	160	12	595	435	160	162
		SBR	1	R-B	45	254	12	435	435		162
4	Manilla Rd/I-70 EB Ramp	WBL	1	R-B	45	40	12	485	435	50	162
		WBR	1	R-B	45	80	12	435	435		162
		NBR	1	R-B	45	60	12	435	435		162
		SBL	1	R-B	45	85	12	535	435	100	162
5	Peterson/Access 1	EBL	1	R-B	45	405	12	840	435	405	162
		EBR	1	R-B	45	150	12	435	435		162
6	Peterson/Access 2	NBL	1	R-B	30	107	12	355	250	107	96
15	48th/Access 3	NBL	1	R-B	30	107	12	355	250	107	96
16	48th/Peterson	WBL	1	R-B	30	112	12	360	250	112	96
		EBR	1	R-B	30	108	12	250	250		96



## Conclusions & Recommendations

Analysis of the 2030 background and total traffic (without Port CO Subarea 6 development) was performed to determine the extent that the Rocky Mountain Rail Park triggers improvements such as traffic signals, auxiliary deceleration/acceleration lanes, and dual turn lanes. The results of the operational analysis of the study intersections indicate that the Colfax/Manila intersection will require signalization whether or not the RMRP development is built. RMRP-generated traffic will only trigger Signal Warrants 2 and 3 of the MUTCD for the Manila/I-70 Westbound Ramp, and it is recommended that a traffic signal be constructed at this intersection. The intersection of Colfax/Peterson does not require dual eastbound left turn lanes or dual southbound right turn lanes as a result of RMRP traffic. Although the eastbound left AM volume at Manila/I-70 Eastbound Ramp exceeds the unofficial threshold of 300 vph for when dual left turn lanes are required, the intersection does not meet any signal warrants and the intersection does not experience an unacceptable LOS or excessive delay. It is strongly recommended that improving this movement be reserved for when the intersection meets signal warrants and not to install a traffic signal simply to accommodate dual left turn lanes. In 2030 conditions, RMRP triggers only two additional turn lanes on existing roadways and the extension of three turn lanes that are proposed due to background traffic.

Due to the size of this development in proportion to other planned developments in the area, Matrix strongly believes that the Fair Share analysis of the 2040 Horizon year conditions discussed in the original memorandum for RMRP – North Area is a better methodology for cost sharing amongst developments in this study area.

Please feel free to contact me if you have any questions at [Scott.Barnhart@matrixdesigngroup.com](mailto:Scott.Barnhart@matrixdesigngroup.com) or at (719) 575-0100.

Thank you.



Scott D. Barnhart, P.E., PTOE  
Executive Associate of Transportation Services

### Attachments:

- Appendix A – Traffic Counts
- Appendix B – Trip Generation Calculations
- Appendix C – Horizon Year Conditions Analyses
- Appendix D – Supplementary Documents
- Appendix E – Buildout Year Conditions Analyses

## **Appendix A – Traffic Counts**

Date Start: 23-Mar-22  
Site Code: 5  
Station ID: 5  
N MANILA RD N.O. I70 WB RAMPS

Start Time	23-Mar-22 Wed	NB	SB							Total
12:00 AM		9	3							12
01:00		2	4							6
02:00		6	4							10
03:00		9	2							11
04:00		15	5							20
05:00		32	29							61
06:00		89	48							137
07:00		45	66							111
08:00		54	43							97
09:00		38	30							68
10:00		35	45							80
11:00		39	54							93
12:00 PM		36	40							76
01:00		44	38							82
02:00		33	39							72
03:00		42	49							91
04:00		68	56							124
05:00		81	55							136
06:00		53	37							90
07:00		26	16							42
08:00		14	16							30
09:00		7	8							15
10:00		7	10							17
11:00		4	4							8
Total		788	701							1489
Percent		52.9%	47.1%							
AM Peak	-	06:00	07:00	-	-	-	-	-	-	06:00
Vol.	-	89	66	-	-	-	-	-	-	137
PM Peak	-	17:00	16:00	-	-	-	-	-	-	17:00
Vol.	-	81	56	-	-	-	-	-	-	136
Grand Total		788	701							1489
Percent		52.9%	47.1%							
ADT		ADT 1,489	AADT 1,489							



Date Start: 23-Mar-22  
Site Code: 6  
Station ID: 6  
COLFAX AVE E.O. MANILA RD

Start Time	23-Mar-22 Wed	EB	WB							Total
12:00 AM		12	6							18
01:00		9	5							14
02:00		10	8							18
03:00		14	13							27
04:00		19	29							48
05:00		26	70							96
06:00		71	105							176
07:00		114	114							228
08:00		98	96							194
09:00		89	84							173
10:00		93	89							182
11:00		90	85							175
12:00 PM		132	91							223
01:00		111	80							191
02:00		116	69							185
03:00		128	79							207
04:00		245	65							310
05:00		268	61							329
06:00		151	54							205
07:00		68	39							107
08:00		33	30							63
09:00		45	17							62
10:00		21	9							30
11:00		21	3							24
Total		1984	1301							3285
Percent		60.4%	39.6%							
AM Peak	-	07:00	07:00	-	-	-	-	-	-	07:00
Vol.	-	114	114	-	-	-	-	-	-	228
PM Peak	-	17:00	12:00	-	-	-	-	-	-	17:00
Vol.	-	268	91	-	-	-	-	-	-	329
Grand Total		1984	1301							3285
Percent		60.4%	39.6%							
ADT		ADT 3,285	AADT 3,285							



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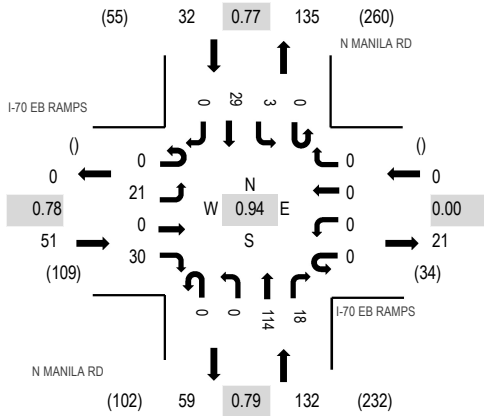
**Location:** 1 N MANILA RD & I-70 EB RAMPS AM

**Date:** Wednesday, March 23, 2022

**Peak Hour:** 07:15 AM - 08:15 AM

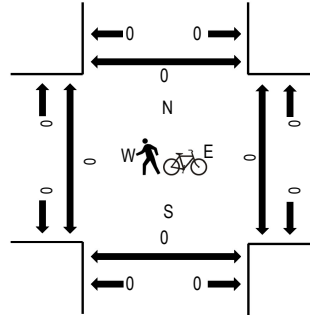
**Peak 15-Minutes:** 07:15 AM - 07:30 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	I-70 EB RAMPS Eastbound				I-70 EB RAMPS Westbound				N MANILA RD Northbound				N MANILA RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	6	0	2	0	0	0	0	0	0	27	2	0	0	5	0	42	206	0	0	0	0
7:15 AM	0	4	0	5	0	0	0	0	0	0	40	4	0	0	4	0	57	215	0	0	0	0
7:30 AM	0	4	0	6	0	0	0	0	0	0	32	5	0	1	7	0	55	212	0	0	0	0
7:45 AM	0	4	0	10	0	0	0	0	0	0	23	6	0	2	7	0	52	205	0	0	0	0
8:00 AM	0	9	0	9	0	0	0	0	0	0	19	3	0	0	11	0	51	190	0	0	0	0
8:15 AM	0	12	0	3	0	0	0	0	0	0	29	4	0	1	5	0	54		0	0	0	0
8:30 AM	0	9	0	13	0	0	0	0	0	0	20	2	0	0	4	0	48		1	0	0	0
8:45 AM	0	9	0	4	0	0	0	0	0	0	13	3	0	1	7	0	37		1	0	0	0
Count Total	0	57	0	52	0	0	0	0	0	0	203	29	0	5	50	0	396		2	0	0	0
Peak Hour	0	21	0	30	0	0	0	0	0	0	114	18	0	3	29	0	215		0	0	0	0



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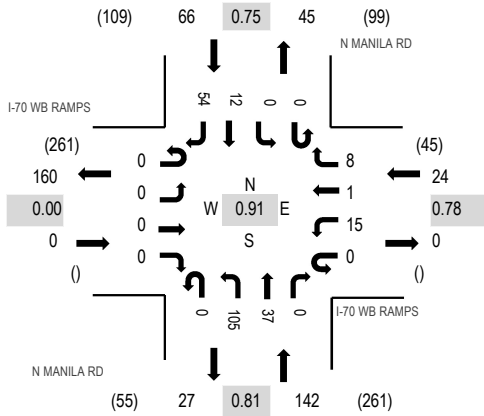
**Location:** 2 N MANILA RD & I-70 WB RAMPS AM

**Date:** Wednesday, March 23, 2022

**Peak Hour:** 07:00 AM - 08:00 AM

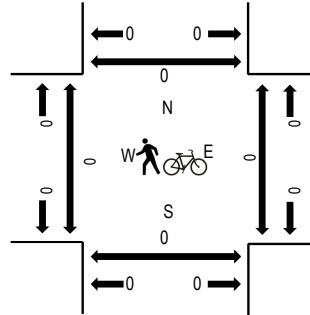
**Peak 15-Minutes:** 07:15 AM - 07:30 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	I-70 WB RAMPS Eastbound				I-70 WB RAMPS Westbound				N MANILA RD Northbound				N MANILA RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	0	0	0	3	1	1	0	25	10	0	0	0	2	16	58	232	0	0	0	0
7:15 AM	0	0	0	0	0	3	0	4	0	34	10	0	0	0	1	12	64	224	0	0	0	0
7:30 AM	0	0	0	0	0	3	0	1	0	26	10	0	0	0	5	17	62	215	0	0	0	0
7:45 AM	0	0	0	0	0	6	0	2	0	20	7	0	0	0	4	9	48	198	0	0	0	0
8:00 AM	0	0	0	0	0	4	0	1	0	16	12	0	0	0	6	11	50	183	0	0	0	0
8:15 AM	0	0	0	0	0	3	1	2	0	25	16	0	0	0	3	5	55		0	0	0	0
8:30 AM	0	0	0	0	0	2	1	3	0	18	11	0	0	0	2	8	45		0	0	0	0
8:45 AM	0	0	0	0	0	4	0	0	0	12	9	0	0	0	4	4	33		0	0	0	0
Count Total	0	0	0	0	0	28	3	14	0	176	85	0	0	0	27	82	415		0	0	0	0
Peak Hour	0	0	0	0	0	15	1	8	0	105	37	0	0	0	12	54	232		0	0	0	0





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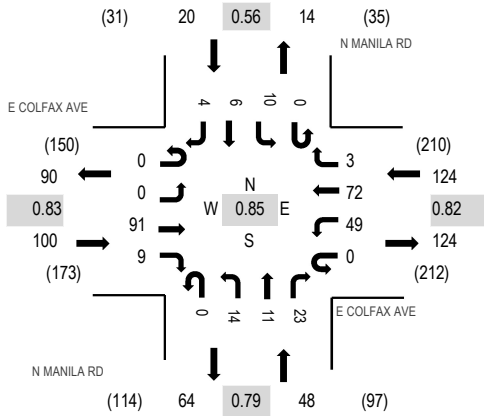
**Location:** 3 N MANILA RD & E COLFAX AVE AM

**Date:** Wednesday, March 23, 2022

**Peak Hour:** 07:15 AM - 08:15 AM

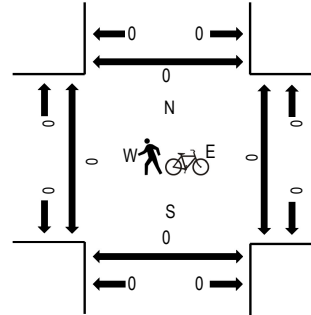
**Peak 15-Minutes:** 07:30 AM - 07:45 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	E COLFAX AVE Eastbound				E COLFAX AVE Westbound				N MANILA RD Northbound				N MANILA RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	9	1	0	18	9	1	0	1	2	6	0	0	2	0	49	267	0	0	0	0
7:15 AM	0	0	20	1	0	10	14	1	0	4	2	5	0	3	1	2	63	292	0	0	0	0
7:30 AM	0	0	25	2	0	14	20	0	0	5	1	10	0	3	4	2	86	286	0	0	0	0
7:45 AM	0	0	26	4	0	12	15	0	0	3	2	4	0	3	0	0	69	260	0	0	0	0
8:00 AM	0	0	20	2	0	13	23	2	0	2	6	4	0	1	1	0	74	244	0	0	0	0
8:15 AM	0	1	14	3	0	4	14	1	0	4	3	10	0	0	2	1	57		0	0	0	0
8:30 AM	0	2	18	2	0	7	15	0	0	4	4	4	0	1	3	0	60		0	0	0	0
8:45 AM	0	3	19	1	0	5	11	1	0	1	3	7	0	0	2	0	53		0	0	0	0
Count Total	0	6	151	16	0	83	121	6	0	24	23	50	0	11	15	5	511		0	0	0	0
Peak Hour	0	0	91	9	0	49	72	3	0	14	11	23	0	10	6	4	292		0	0	0	0



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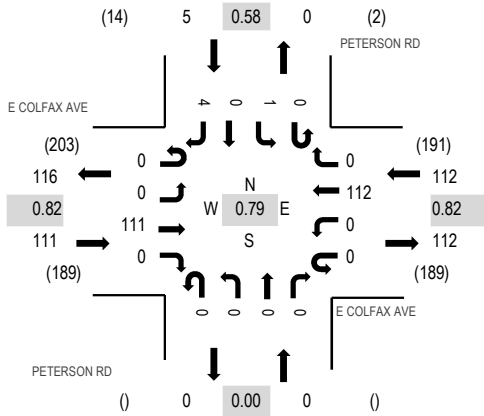
**Location:** 4 PETERSON RD & E COLFAX AVE AM

**Date:** Wednesday, March 23, 2022

**Peak Hour:** 07:15 AM - 08:15 AM

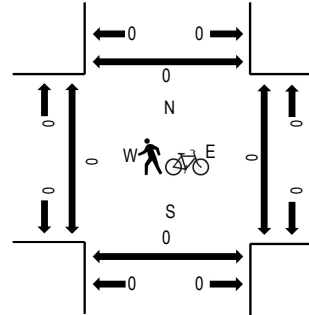
**Peak 15-Minutes:** 07:30 AM - 07:45 AM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	E COLFAX AVE				E COLFAX AVE				PETERSON RD				PETERSON RD				Total	Rolling Hour	Pedestrian Crossings				
	Eastbound				Westbound				Northbound				Southbound						West	East	South	North	
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right							
7:00 AM	0	0	10	0	0	0	27	0	0	0	0	0	0	0	0	0	3	40	212	0	0	0	0
7:15 AM	0	0	20	0	0	0	20	0	0	0	0	0	0	0	0	0	1	41	228	0	0	0	0
7:30 AM	0	0	35	0	0	0	34	0	0	0	0	0	0	1	0	2	72	228	0	0	0	0	
7:45 AM	0	0	32	0	0	0	27	0	0	0	0	0	0	0	0	0	59	200	0	0	0	0	
8:00 AM	0	0	24	0	0	0	31	0	0	0	0	0	0	0	0	1	56	182	0	0	0	0	
8:15 AM	0	0	24	0	0	0	15	0	0	0	0	0	0	0	0	2	41		0	0	0	0	
8:30 AM	0	0	21	0	0	0	19	1	0	0	0	0	0	0	0	3	44		0	0	0	0	
8:45 AM	0	1	22	0	0	0	17	0	0	0	0	0	0	0	0	1	41		0	0	0	0	
Count Total	0	1	188	0	0	0	190	1	0	0	0	0	0	1	0	13	394		0	0	0	0	
Peak Hour	0	0	111	0	0	0	112	0	0	0	0	0	0	1	0	4	228		0	0	0	0	

Interval Start Time	I-70 EB RAMPS				I-70 EB RAMPS				N MANILA RD				N MANILA RD				Total	Rolling Hour	Pedestrian Crossings			
	Eastbound				Westbound				Northbound				Southbound						West	East	South	North
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right						
4:00 PM	0	7	1	17	0	0	0	0	0	0	12	3	0	4	5	0	49	249	0	0	0	0
4:15 PM	0	10	1	18	0	0	0	0	0	0	17	4	0	0	9	0	59	272	0	0	0	0
4:30 PM	0	11	1	27	0	0	0	0	0	0	11	6	0	2	9	0	67	303	0	0	0	0
4:45 PM	0	19	2	22	0	0	0	0	0	0	10	5	0	2	14	0	74	304	0	0	0	0
5:00 PM	0	12	0	28	0	0	0	0	0	0	18	5	0	0	9	0	72	314	0	0	0	0
5:15 PM	0	17	1	34	0	0	0	0	0	0	17	13	0	3	5	0	90		0	0	0	0
5:30 PM	0	10	0	25	0	0	0	0	0	0	10	9	0	1	13	0	68		0	0	0	0
5:45 PM	0	13	0	24	0	0	0	0	0	0	18	13	0	2	14	0	84		0	0	0	0
Count Total	0	99	6	195	0	0	0	0	0	0	113	58	0	14	78	0	563		0	0	0	0
Peak Hour	0	52	1	111	0	0	0	0	0	0	63	40	0	6	41	0	314		0	0	0	0





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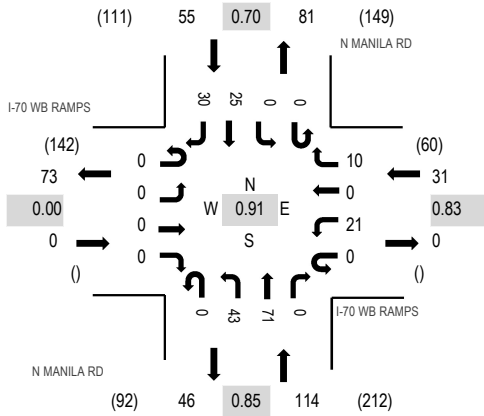
**Location:** 2 N MANILA RD & I-70 WB RAMPS PM

**Date:** Wednesday, March 23, 2022

**Peak Hour:** 05:00 PM - 06:00 PM

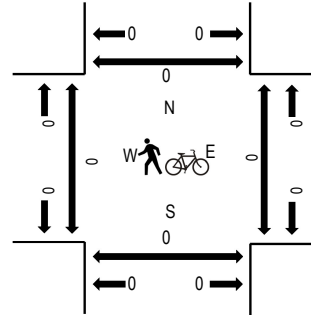
**Peak 15-Minutes:** 05:45 PM - 06:00 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	I-70 WB RAMPS Eastbound				I-70 WB RAMPS Westbound				N MANILA RD Northbound				N MANILA RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	0	0	0	4	0	1	0	7	12	0	0	0	6	14	44	183	0	0	0	0
4:15 PM	0	0	0	0	0	5	0	3	0	15	12	0	0	0	4	5	44	188	0	0	0	0
4:30 PM	0	0	0	0	0	4	0	2	0	10	12	0	0	0	6	9	43	197	0	0	0	0
4:45 PM	0	0	0	0	0	8	0	2	0	6	24	0	0	0	9	3	52	197	0	0	0	0
5:00 PM	0	0	0	0	0	6	0	2	0	14	16	0	0	0	2	9	49	200	0	0	0	0
5:15 PM	0	0	0	0	0	2	0	3	0	6	28	0	0	0	7	7	53		0	0	0	0
5:30 PM	0	0	0	0	0	8	0	2	0	9	11	0	0	0	6	7	43		0	0	0	0
5:45 PM	0	0	0	0	0	5	0	3	0	14	16	0	0	0	10	7	55		0	0	0	0
Count Total	0	0	0	0	0	42	0	18	0	81	131	0	0	0	50	61	383		0	0	0	0
Peak Hour	0	0	0	0	0	21	0	10	0	43	71	0	0	0	25	30	200		0	0	0	0



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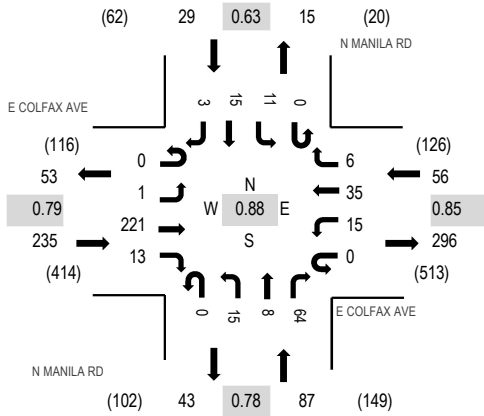
**Location:** 3 N MANILA RD & E COLFAX AVE PM

**Date:** Wednesday, March 23, 2022

**Peak Hour:** 04:45 PM - 05:45 PM

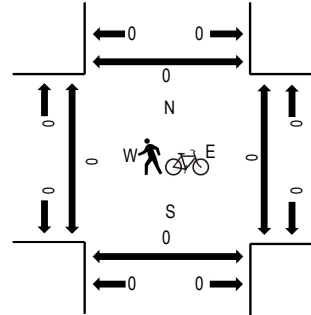
**Peak 15-Minutes:** 04:45 PM - 05:00 PM

### Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	E COLFAX AVE Eastbound				E COLFAX AVE Westbound				N MANILA RD Northbound				N MANILA RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	32	3	0	5	12	0	0	7	0	9	0	1	9	1	79	367	0	0	0	0
4:15 PM	0	0	41	4	0	5	12	0	0	1	1	11	0	2	3	0	80	377	0	0	0	0
4:30 PM	0	0	45	5	0	8	11	1	0	3	1	10	0	1	4	3	92	405	0	0	0	0
4:45 PM	0	0	71	3	0	3	8	0	0	3	2	21	0	1	4	0	116	407	0	0	0	0
5:00 PM	0	1	41	1	0	5	11	4	0	1	1	17	0	3	3	1	89	384	0	0	0	0
5:15 PM	0	0	56	6	0	4	9	1	0	9	5	14	0	2	2	0	108		0	0	0	0
5:30 PM	0	0	53	3	0	3	7	1	0	2	0	12	0	5	6	2	94		0	0	0	0
5:45 PM	0	0	47	2	0	5	10	1	0	3	1	15	0	3	6	0	93		0	0	0	0
Count Total	0	1	386	27	0	38	80	8	0	29	11	109	0	18	37	7	751		0	0	0	0
Peak Hour	0	1	221	13	0	15	35	6	0	15	8	64	0	11	15	3	407		0	0	0	0



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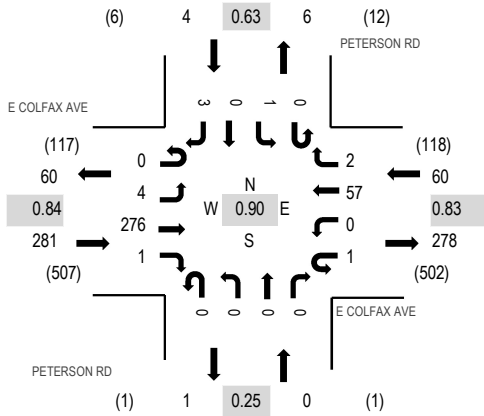
**Location:** 4 PETERSON RD & E COLFAX AVE PM

**Date:** Wednesday, March 23, 2022

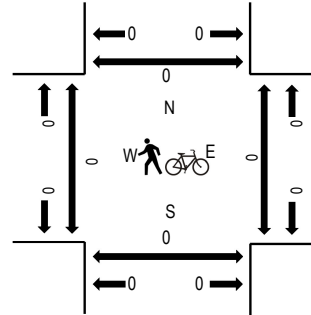
**Peak Hour:** 04:30 PM - 05:30 PM

**Peak 15-Minutes:** 04:45 PM - 05:00 PM

### Peak Hour - All Vehicles



### Peak Hour - Pedestrians/Bicycles on Crosswalk



### Traffic Counts

Interval Start Time	E COLFAX AVE Eastbound				E COLFAX AVE Westbound				PETERSON RD Northbound				PETERSON RD Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	46	0	0	0	16	0	0	0	0	0	0	0	0	0	62	307	0	0	0	0
4:15 PM	0	1	52	0	0	0	18	0	0	0	0	1	0	1	0	0	73	326	0	0	0	0
4:30 PM	0	1	53	1	0	0	19	0	0	0	0	0	0	0	0	2	76	345	0	0	0	0
4:45 PM	0	1	85	0	0	0	8	1	0	0	0	0	0	1	0	0	96	343	0	0	0	0
5:00 PM	0	2	58	0	1	0	19	0	0	0	0	0	0	0	0	1	81	325	0	0	0	0
5:15 PM	0	0	80	0	0	0	11	1	0	0	0	0	0	0	0	0	92		0	0	0	0
5:30 PM	0	2	62	0	0	0	9	0	0	0	0	0	0	1	0	0	74		0	0	0	0
5:45 PM	0	2	61	0	0	0	14	1	0	0	0	0	0	0	0	0	78		0	0	0	0
Count Total	0	9	497	1	1	0	114	3	0	0	0	1	0	3	0	3	632		0	0	0	0
Peak Hour	0	4	276	1	1	0	57	2	0	0	0	0	0	1	0	3	345		0	0	0	0



## **Appendix B – Trip Generation Calculations**

PROJECT DETAILS			
Project Name:	Rocky Mountain Rail Park	Type of Project:	
Project No:		City:	
Country:		Built-up Area(Sq.ft):	
Analyst Name:	Scott Barnhart	Clients Name:	
Date:	7/25/2022	ZIP/Postal Code:	
State/Province:		No. of Scenarios:	3
Analysis Region:			
SCENARIO SUMMARY			

Scenarios	Name	No. of Land Uses	Phases of Development	No. of Years to Project Traffic	User Group	Estimated New Vehicle Trips		
						Entry	Exit	Total
Scenario - 1	Weekday	1	1	0		1120	1120	2240
Scenario - 2	AM Peak Hour	1	1	0		248	40	288
Scenario - 3	PM Peak Hour	1	1	0		59	237	296

Scenario - 1

Scenario Name: Weekday

Dev. phase: 1

Analyst Note:

User Group:

No. of Years to Project 0

Traffic :

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
130 - Industrial Park	General Urban/Suburban	Employees	622	Weekday	Best Fit (LOG)	1120	1120	2240
Data Source: Trip Generation Manual, 11th Ed					Ln(T) =0.68Ln(X) + 3.34	50%	50%	

VEHICLE TO PERSON TRIP CONVERSION

BASELINE SITE VEHICLE CHARACTERISTICS:

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
130 - Industrial Park	100	100	1.4	1.4	50	50

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
130 - Industrial Park	1568	1568	0	0	1568	1568
	3136		0		3136	

INTERNAL VEHICLE TRIP REDUCTION

LAND USE GROUP ASSIGNMENT:

Land Use	Land Use Group
130 - Industrial Park	Others

BALANCED PERSON TRIPS:

INTERNAL PERSON TRIPS:

130 - Industrial Park

Internal Person Trips From	Entry	Exit	Total
Total Internal Person Trips	0	0	0

INTERNAL VEHICLE TRIPS AND CAPTURE:

130 - Industrial Park

Total Internal Person Trips	0	0	0
Vehicle Mode Share	100%	100%	-
Vehicle Occupancy	1.00	1.00	-
Total Vehicle Internal Trips	0	0	0
Total External Vehicle Trips	1120	1120	2240
Internal Vehicle Trip Capture	0%	0%	0%

PASS-BY VEHICLE TRIP REDUCTION

Land Use	External Vehicle Trips		Pass-by Vehicle Trip %		Pass-by Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
130 - Industrial Park	1120	1120	0.00%	0.00%	0	0

DIVERTED VEHICLE TRIP REDUCTION

Land Use	External Vehicle Trips		Diverted Vehicle Trip %		Diverted Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
130 - Industrial Park	1120	1120	0.00%	0.00%	0	0

EXTRA VEHICLE TRIP REDUCTION

Land Use	(External - (Pass-by + Diverted)) Vehicle Trips		Extra Vehicle Trip Reduction %		Extra Reduced Vehicle Trips	
	Entry	Exit	Entry (%)	Exit (%)	Entry	Exit
130 - Industrial Park	1120	1120	0.00%	0.00%	0	0

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
130 - Industrial Park	1120	1120	2240

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	1120	1120	2240
Internal Vehicle Trips	0	0	0
External Vehicle Trips	1120	1120	2240
Internal Vehicle Trip Capture	0%	0%	0%
Pass-by Vehicle Trips	0	0	0
Diverted Vehicle Trips	0	0	0
Extra Reduced Vehicle Trips	0	0	0
New Vehicle Trips	1120	1120	2240



Scenario - 2

Scenario Name: AM Peak Hour

Dev. phase: 1

Analyst Note:

User Group:

No. of Years to Project 0

Traffic :

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
130 - Industrial Park	General Urban/Suburban	Employees	622	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LOG)	248	40	288
Data Source: Trip Generation Manual, 11th Ed					Ln(T) =0.82Ln(X) + 0.39	86%	14%	

VEHICLE TO PERSON TRIP CONVERSION

BASELINE SITE VEHICLE CHARACTERISTICS:

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
130 - Industrial Park	100	100	1	1	86	14

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
130 - Industrial Park	248	40	0	0	248	40
	288		0		288	

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
130 - Industrial Park	248	40	288

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	248	40	288
External Vehicle Trips	248	40	288
New Vehicle Trips	248	40	288

Scenario - 3

Scenario Name: PM Peak Hour

User Group:

Dev. phase: 1

No. of Years to Project 0

Analyst Note:

Traffic :

Warning:

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method	Entry	Exit	Total
					Rate/Equation	Split%	Split%	
130 - Industrial Park	General Urban/Suburban	Employees	622	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LOG)	59	237	296
Data Source: Trip Generation Manual, 11th Ed					Ln(T) =0.74Ln(X) + 0.93	20%	80%	

VEHICLE TO PERSON TRIP CONVERSION

BASELINE SITE VEHICLE CHARACTERISTICS:

Land Use	Baseline Site Vehicle Mode Share		Baseline Site Vehicle Occupancy		Baseline Site Vehicle Directional Split	
	Entry (%)	Exit (%)	Entry	Exit	Entry (%)	Exit (%)
130 - Industrial Park	100	100	1	1	20	80

ESTIMATED BASELINE SITE PERSON TRIPS:

Land Use	Person Trips by Vehicle		Person Trips by Other Modes		Total Baseline Site Person Trips	
	Entry	Exit	Entry	Exit	Entry	Exit
130 - Industrial Park	59	237	0	0	59	237
	296		0		296	

NEW VEHICLE TRIPS

Land Use	New Vehicle Trips		
	Entry	Exit	Total
130 - Industrial Park	59	237	296

RESULTS

Site Totals	Entry	Exit	Total
Vehicle Trips Before Reduction	59	237	296
External Vehicle Trips	59	237	296
New Vehicle Trips	59	237	296

## **Appendix C – Horizon Year Conditions Analyses**



### Intersection Level Of Service Report

#### Intersection 1: E Colfax Ave/Manila Rd

Control Type:	Signalized	Delay (sec / veh):	27.9
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.685

#### Intersection Setup

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	625.0	100.0	600.0	650.0	100.0	100.0	100.0	100.0	600.0	770.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		



**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	20	1135	93	20	155	5	5	81	15	121	297	50
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	47	0	0	3	0	0	8	0	0	25
Total Hourly Volume [veh/h]	20	1135	46	20	155	2	5	81	7	121	297	25
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	5	308	13	5	42	1	1	22	2	33	81	7
Total Analysis Volume [veh/h]	22	1234	50	22	168	2	5	88	8	132	323	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi
Signal Group	3	8	1	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	5	5	10	0	5	10	0	5	10	0
Maximum Green [s]	30	30	30	30	30	0	10	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	43	13	9	43	0	9	25	0	13	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	21	0	0	22	0	0	14	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		Yes	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	48	42	42	48	42	42	34	23	23	34	30	30
g / C, Green / Cycle	0.53	0.46	0.46	0.53	0.46	0.46	0.38	0.25	0.25	0.38	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.02	0.45	0.04	0.05	0.06	0.00	0.01	0.06	0.01	0.12	0.22	0.02
s, saturation flow rate [veh/h]	973	2741	1224	421	2741	1224	837	1440	1224	1105	1440	1224
c, Capacity [veh/h]	591	1270	567	187	1270	567	279	361	307	486	474	403
d1, Uniform Delay [s]	10.12	23.58	13.52	19.53	13.81	12.99	18.98	26.90	25.43	19.25	26.13	20.73
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.11	0.50	0.50
l, Upstream Filtering 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
d2, Incremental Delay [s]	0.03	6.84	0.07	0.28	0.05	0.00	0.12	1.60	0.16	0.30	7.74	0.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression 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

**Lane Group Results**

X, volume / capacity	0.04	0.97	0.09	0.12	0.13	0.00	0.02	0.24	0.03	0.27	0.68	0.07
d, Delay for Lane Group [s/veh]	10.15	30.42	13.58	19.81	13.86	12.99	19.10	28.50	25.58	19.55	33.87	21.05
Lane Group LOS	B	C	B	B	B	B	B	C	C	B	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.19	12.25	0.52	0.20	0.89	0.02	0.07	1.54	0.13	1.72	6.33	0.39
50th-Percentile Queue Length [ft/ln]	4.66	306.3	13.09	4.91	22.23	0.50	1.67	38.52	3.30	42.96	158.3	9.71
95th-Percentile Queue Length [veh/ln]	0.34	18.00	0.94	0.35	1.60	0.04	0.12	2.77	0.24	3.09	10.46	0.70
95th-Percentile Queue Length [ft/ln]	8.38	449.9	23.57	8.84	40.02	0.90	3.01	69.33	5.94	77.33	261.5	17.48

**Movement, Approach, & Intersection Results**

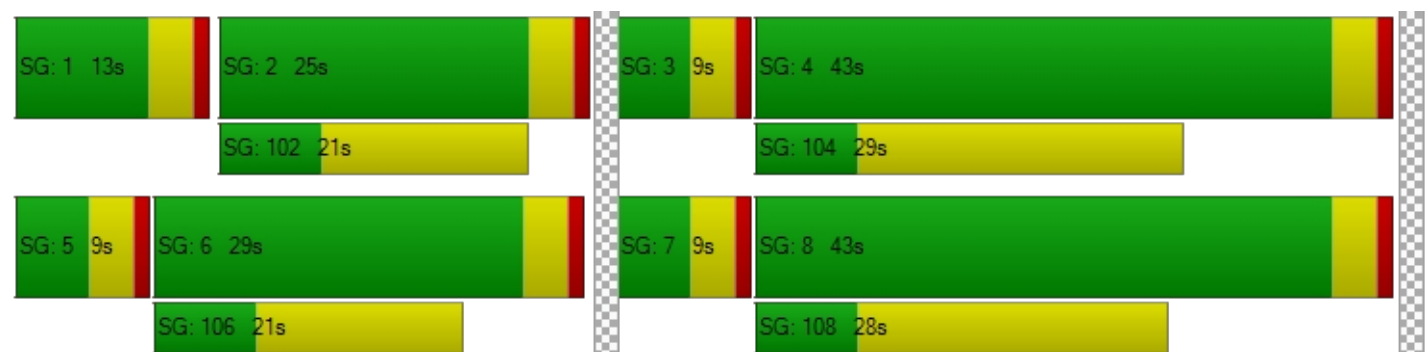
d_M, Delay for Movement [s/veh]	10.15	30.42	13.58	19.81	13.86	12.99	19.10	28.50	25.58	19.55	33.87	21.05
Movement LOS	B	C	B	B	B	B	B	C	C	B	C	C
d_A, Approach Delay [s/veh]	29.44			14.53			27.81			29.23		
Approach LOS	C			B			C			C		
d_I, Intersection Delay [s/veh]	27.93											
Intersection LOS	C											
Intersection V/C	0.685											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	34.67			34.67			34.67			34.67		
I_p,int, Pedestrian LOS Score for Intersection	2.977			2.821			2.362			2.500		
Crosswalk LOS	C			C			B			B		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	867			867			467			556		
d_b, Bicycle Delay [s]	14.45			14.45			26.45			23.47		
I_b,int, Bicycle LOS Score for Intersection	2.676			1.720			1.739			2.396		
Bicycle LOS	B			A			A			B		

**Sequence**

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-







### Intersection Level Of Service Report Intersection 2: E Colfax Ave/Peterson Rd

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 12.6  
Level Of Service: B  
Volume to Capacity (v/c): 0.010

#### Intersection Setup

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	5	5	5	5	133	5	5	239	5
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	5	5	5	5	5	5	133	5	5	239	5
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	1	1	1	1	1	1	1	36	1	1	65	1
Total Analysis Volume [veh/h]	5	5	5	5	5	5	5	145	5	5	260	5
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	12.54	12.59	9.39	12.54	12.60	10.09	8.00	0.00	0.00	7.72	0.00	0.00
Movement LOS	B	B	A	B	B	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.08	0.08	0.08	0.08	0.08	0.08	0.01	0.01	0.01	0.01	0.01	0.01
95th-Percentile Queue Length [ft/ln]	2.03	2.03	2.03	2.10	2.10	2.10	0.21	0.21	0.21	0.21	0.21	0.21
d_A, Approach Delay [s/veh]	11.50			11.74			0.26			0.14		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	0.94											
Intersection LOS	B											



### Intersection Level Of Service Report

#### Intersection 3: Manila Rd/I-70 Westbound Ramp

Control Type:	Signalized	Delay (sec / veh):	7.7
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.511

#### Intersection Setup

Name	Manila Rd			Manila Rd			Eastbound			Westbound Ramp		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	0	0	0	1	0	1
Entry Pocket Length [ft]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No						No		
Crosswalk	Yes			Yes			No			Yes		

**Volumes**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Base Volume Input [veh/h]	300	1013	0	0	65	235	0	0	0	45	5	246
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	118	0	0	0	0	0	123
Total Hourly Volume [veh/h]	300	1013	0	0	65	117	0	0	0	45	5	123
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	82	275	0	0	18	32	0	0	0	12	1	33
Total Analysis Volume [veh/h]	326	1101	0	0	71	127	0	0	0	49	5	134
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		



**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	1	6	0	0	2	0	0	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	0	10	0	0	0	0	0	10	0
Maximum Green [s]	30	30	0	0	30	0	0	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	9	41	0	0	32	0	0	0	0	0	29	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	21	0	0	0	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No						No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No						No	
Maximum Recall	No	No			No						No	
Pedestrian Recall	No	No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	C	R		L	C	R
C, Cycle Length [s]	70	70	70	70		70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00		4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
I2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00		2.00	2.00	2.00
g_i, Effective Green Time [s]	52	52	43	43		10	10	10
g / C, Green / Cycle	0.75	0.75	0.62	0.62		0.14	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.33	0.40	0.03	0.06		0.04	0.00	0.11
s, saturation flow rate [veh/h]	974	2741	2741	2166		1371	1440	1224
c, Capacity [veh/h]	855	2044	1688	1334		192	202	172
d1, Uniform Delay [s]	2.99	3.79	5.31	5.49		26.88	26.01	29.10
k, delay calibration	0.29	0.50	0.50	0.50		0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00
d2, Incremental Delay [s]	0.75	1.02	0.05	0.14		0.69	0.05	7.49
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00		1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.38	0.54	0.04	0.10		0.25	0.02	0.78
d, Delay for Lane Group [s/veh]	3.74	4.81	5.36	5.64		27.57	26.05	36.59
Lane Group LOS	A	A	A	A		C	C	D
Critical Lane Group	No	Yes	No	No		No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.77	1.56	0.15	0.29		0.74	0.07	2.44
50th-Percentile Queue Length [ft/ln]	19.19	38.92	3.82	7.22		18.53	1.81	61.06
95th-Percentile Queue Length [veh/ln]	1.38	2.80	0.27	0.52		1.33	0.13	4.40
95th-Percentile Queue Length [ft/ln]	34.53	70.06	6.87	12.99		33.35	3.25	109.9

**Movement, Approach, & Intersection Results**

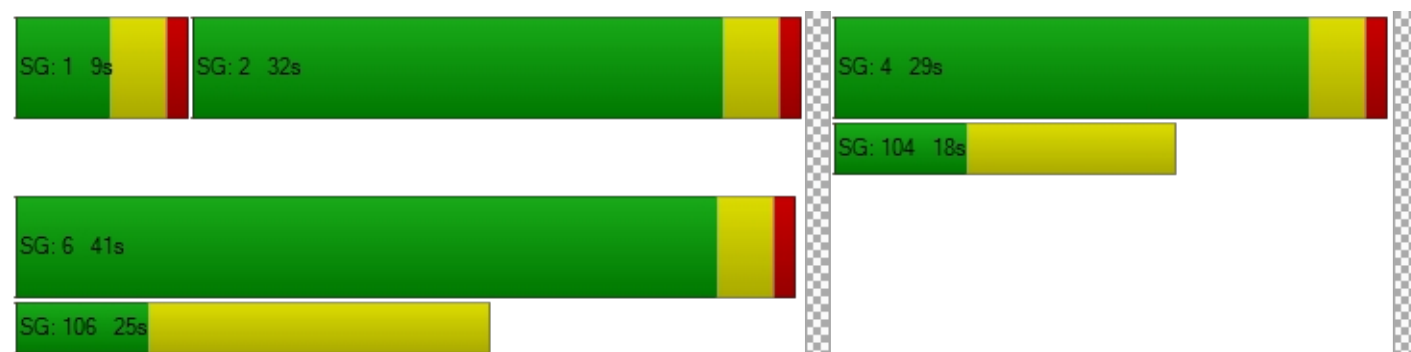
d_M, Delay for Movement [s/veh]	3.74	4.81	0.00	0.00	5.36	5.64	0.00	0.00	0.00	27.57	26.05	36.59
Movement LOS	A	A			A	A				C	C	D
d_A, Approach Delay [s/veh]	4.57			5.54			0.00			33.96		
Approach LOS	A			A			A			C		
d_I, Intersection Delay [s/veh]	7.72											
Intersection LOS	A											
Intersection V/C	0.511											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0		11.0		0.0		11.0					
M_corner, Corner Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
d_p, Pedestrian Delay [s]	24.89		24.89		0.00		24.89					
I_p,int, Pedestrian LOS Score for Intersection	2.739		3.015		0.000		2.202					
Crosswalk LOS	B		C		F		B					
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000		2000		2000		2000					
c_b, Capacity of the bicycle lane [bicycles/h]	1056		799		0		714					
d_b, Bicycle Delay [s]	7.80		12.63		35.03		14.49					
I_b,int, Bicycle LOS Score for Intersection	2.737		1.820		4.132		2.073					
Bicycle LOS	B		A		D		B					

**Sequence**

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	21.0
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.549

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↑↑↑			↑↑↑			↑↑↑					
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	2	0	1	0	0	0
Entry Pocket Length [ft]	100.0	100.0	435.0	620.0	100.0	100.0	885.0	100.0	435.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	415	70	40	80	0	898	5	90	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	35	0	0	0	0	0	45	0	0	0
Total Hourly Volume [veh/h]	0	415	35	40	80	0	898	5	45	0	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	113	10	11	22	0	244	1	12	0	0	0
Total Analysis Volume [veh/h]	0	451	38	43	87	0	976	5	49	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		



**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	5	10	0	0	10	0	0	0	0
Maximum Green [s]	0	30	0	10	30	0	0	30	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	29	0	9	38	0	0	32	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	14	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		Yes	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	C	R	L	C	L	C	R	
C, Cycle Length [s]	70	70	70	70	70	70	70	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
I2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	28	28	35	35	27	27	27	
g / C, Green / Cycle	0.40	0.40	0.50	0.50	0.39	0.39	0.39	
(v / s)_i Volume / Saturation Flow Rate	0.16	0.03	0.05	0.03	0.37	0.00	0.04	
s, saturation flow rate [veh/h]	2741	1224	795	2741	2663	1440	1224	
c, Capacity [veh/h]	1084	484	449	1357	1042	563	479	
d1, Uniform Delay [s]	15.35	13.23	9.81	9.25	20.53	13.05	13.55	
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	1.18	0.32	0.42	0.09	4.75	0.01	0.09	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

**Lane Group Results**

X, volume / capacity	0.42	0.08	0.10	0.06	0.94	0.01	0.10	
d, Delay for Lane Group [s/veh]	16.52	13.55	10.23	9.34	25.28	13.06	13.64	
Lane Group LOS	B	B	B	A	C	B	B	
Critical Lane Group	Yes	No	Yes	No	Yes	No	No	
50th-Percentile Queue Length [veh/ln]	2.57	0.39	0.36	0.33	7.61	0.05	0.47	
50th-Percentile Queue Length [ft/ln]	64.22	9.75	9.03	8.23	190.1	1.15	11.77	
95th-Percentile Queue Length [veh/ln]	4.62	0.70	0.65	0.59	12.13	0.08	0.85	
95th-Percentile Queue Length [ft/ln]	115.60	17.55	16.25	14.81	303.2	2.07	21.18	

**Movement, Approach, & Intersection Results**

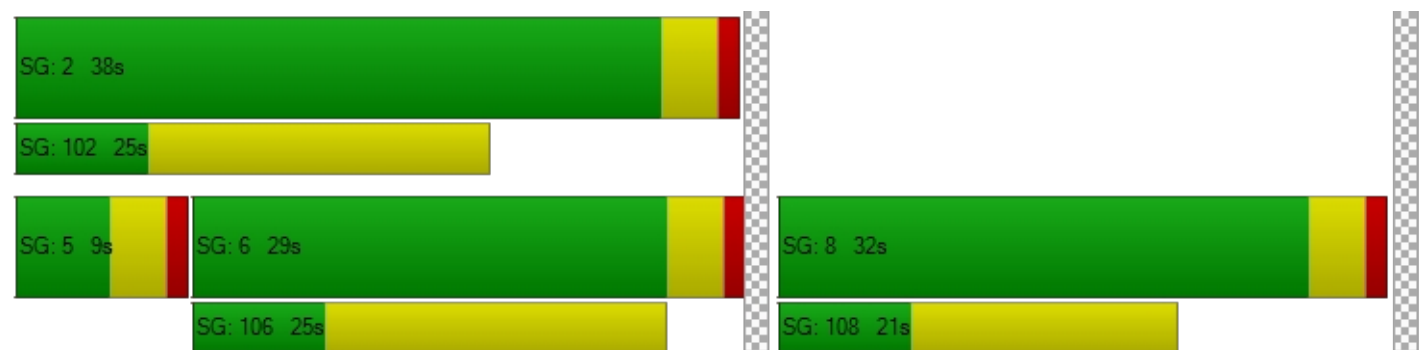
d_M, Delay for Movement [s/veh]	0.00	16.52	13.55	10.23	9.34	0.00	25.28	13.06	13.64	0.00	0.00	0.00
Movement LOS		B	B	B	A		C	B	B			
d_A, Approach Delay [s/veh]	16.29			9.63			24.67			0.00		
Approach LOS	B			A			C			A		
d_I, Intersection Delay [s/veh]	21.00											
Intersection LOS	C											
Intersection V/C	0.549											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	24.91			24.91			24.91			24.91		
I_p,int, Pedestrian LOS Score for Intersection	2.473			2.590			2.443			1.554		
Crosswalk LOS	B			B			B			A		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	713			970			799			0		
d_b, Bicycle Delay [s]	14.51			9.29			12.64			35.05		
I_b,int, Bicycle LOS Score for Intersection	1.992			1.667			3.333			4.132		
Bicycle LOS	A			A			C			D		

**Sequence**

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





## Signal Warrants Report For Intersection 2: E Colfax Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	249	143	15	15
2	242	139	15	15
3	237	136	14	14
4	222	127	13	13
5	197	113	12	12
6	194	112	12	12
7	192	110	12	12
8	174	100	11	11
9	172	99	10	10
10	169	97	10	10
11	147	84	9	9
12	137	79	8	8
13	134	77	8	8
14	100	57	6	6
15	100	57	6	6
16	70	40	4	4
17	40	23	2	2
18	40	23	2	2
19	22	13	1	1
20	12	7	1	1
21	7	4	0	0
22	2	1	0	0
23	2	1	0	0
24	2	1	0	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	392	1	15	No	No	No	No	No	No	No	No	No	No
2	1	381	1	15	No	No	No	No	No	No	No	No	No	No
3	1	373	1	14	No	No	No	No	No	No	No	No	No	No
4	1	349	1	13	No	No	No	No	No	No	No	No	No	No
5	1	310	1	12	No	No	No	No	No	No	No	No	No	No
6	1	306	1	12	No	No	No	No	No	No	No	No	No	No
7	1	302	1	12	No	No	No	No	No	No	No	No	No	No
8	1	274	1	11	No	No	No	No	No	No	No	No	No	No
9	1	271	1	10	No	No	No	No	No	No	No	No	No	No
10	1	266	1	10	No	No	No	No	No	No	No	No	No	No
11	1	231	1	9	No	No	No	No	No	No	No	No	No	No
12	1	216	1	8	No	No	No	No	No	No	No	No	No	No
13	1	211	1	8	No	No	No	No	No	No	No	No	No	No
14	1	157	1	6	No	No	No	No	No	No	No	No	No	No
15	1	157	1	6	No	No	No	No	No	No	No	No	No	No
16	1	110	1	4	No	No	No	No	No	No	No	No	No	No
17	1	63	1	2	No	No	No	No	No	No	No	No	No	No
18	1	63	1	2	No	No	No	No	No	No	No	No	No	No
19	1	35	1	1	No	No	No	No	No	No	No	No	No	No
20	1	19	1	1	No	No	No	No	No	No	No	No	No	No
21	1	11	1	0	No	No	No	No	No	No	No	No	No	No
22	1	3	1	0	No	No	No	No	No	No	No	No	No	No
23	1	3	1	0	No	No	No	No	No	No	No	No	No	No
24	1	3	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	11.5	11.7
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:02	0:02
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	15
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	422	422
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	





## Signal Warrants Report For Intersection 2: E Colfax Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	249	143	15	15
2	242	139	15	15
3	237	136	14	14
4	222	127	13	13
5	197	113	12	12
6	194	112	12	12
7	192	110	12	12
8	174	100	11	11
9	172	99	10	10
10	169	97	10	10
11	147	84	9	9
12	137	79	8	8
13	134	77	8	8
14	100	57	6	6
15	100	57	6	6
16	70	40	4	4
17	40	23	2	2
18	40	23	2	2
19	22	13	1	1
20	12	7	1	1
21	7	4	0	0
22	2	1	0	0
23	2	1	0	0
24	2	1	0	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	392	1	15	No	No	No	No	No	No	No	No	No	No
2	1	381	1	15	No	No	No	No	No	No	No	No	No	No
3	1	373	1	14	No	No	No	No	No	No	No	No	No	No
4	1	349	1	13	No	No	No	No	No	No	No	No	No	No
5	1	310	1	12	No	No	No	No	No	No	No	No	No	No
6	1	306	1	12	No	No	No	No	No	No	No	No	No	No
7	1	302	1	12	No	No	No	No	No	No	No	No	No	No
8	1	274	1	11	No	No	No	No	No	No	No	No	No	No
9	1	271	1	10	No	No	No	No	No	No	No	No	No	No
10	1	266	1	10	No	No	No	No	No	No	No	No	No	No
11	1	231	1	9	No	No	No	No	No	No	No	No	No	No
12	1	216	1	8	No	No	No	No	No	No	No	No	No	No
13	1	211	1	8	No	No	No	No	No	No	No	No	No	No
14	1	157	1	6	No	No	No	No	No	No	No	No	No	No
15	1	157	1	6	No	No	No	No	No	No	No	No	No	No
16	1	110	1	4	No	No	No	No	No	No	No	No	No	No
17	1	63	1	2	No	No	No	No	No	No	No	No	No	No
18	1	63	1	2	No	No	No	No	No	No	No	No	No	No
19	1	35	1	1	No	No	No	No	No	No	No	No	No	No
20	1	19	1	1	No	No	No	No	No	No	No	No	No	No
21	1	11	1	0	No	No	No	No	No	No	No	No	No	No
22	1	3	1	0	No	No	No	No	No	No	No	No	No	No
23	1	3	1	0	No	No	No	No	No	No	No	No	No	No
24	1	3	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	11.5	11.7
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:02	0:02
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	15
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	422	422
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



## Signal Warrants Report For Intersection 3: Manila Rd/I-70 Westbound Ramp

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	Yes
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	Yes

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	N	S	E
1	300	1313	296
2	291	1274	287
3	285	1247	281
4	267	1169	263
5	237	1037	234
6	234	1024	231
7	231	1011	228
8	210	919	207
9	207	906	204
10	204	893	201
11	177	775	175
12	165	722	163
13	162	709	160
14	120	525	118
15	120	525	118
16	84	368	83
17	48	210	47
18	48	210	47
19	27	118	27
20	15	66	15
21	9	39	9
22	3	13	3
23	3	13	3
24	3	13	3



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	4	1613	3	296	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	4	1565	3	287	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	4	1532	3	281	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	4	1436	3	263	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	4	1274	3	234	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	4	1258	3	231	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	4	1242	3	228	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	4	1129	3	207	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	4	1113	3	204	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	4	1097	3	201	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	4	952	3	175	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	4	887	3	163	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
13	4	871	3	160	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
14	4	645	3	118	No	No	No	Yes	No	No	Yes	Yes	No	No
15	4	645	3	118	No	No	No	Yes	No	No	Yes	Yes	No	No
16	4	452	3	83	No	No	No	No	No	No	No	No	No	No
17	4	258	3	47	No	No	No	No	No	No	No	No	No	No
18	4	258	3	47	No	No	No	No	No	No	No	No	No	No
19	4	145	3	27	No	No	No	No	No	No	No	No	No	No
20	4	81	3	15	No	No	No	No	No	No	No	No	No	No
21	4	48	3	9	No	No	No	No	No	No	No	No	No	No
22	4	16	3	3	No	No	No	No	No	No	No	No	No	No
23	4	16	3	3	No	No	No	No	No	No	No	No	No	No
24	4	16	3	3	No	No	No	No	No	No	No	No	No	No
Hours Met					10	13	13	15	11	13	15	15	13	11

## Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	116.2
Number of Lanes on Minor Street Approach	3
VehicleHours of Stopped Delay on Minor Approach (h:mm)	9:33
Delay Condition Met	Yes
Volume on Minor Street Approach During Same Hour	296
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	1909
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	Yes
<b>Warrant Met for Intersection</b>	<b>Yes</b>



## Signal Warrants Report For Intersection 4: Manila Rd/I-70 Eastbound Ramp

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	Yes
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	Yes

## Intersection Warrants Parameters

Major Approaches	W
Minor Approaches	N, S
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets	Minor Streets	
		N	S
1	993	120	485
2	963	116	470
3	943	114	461
4	884	107	432
5	784	95	383
6	775	94	378
7	765	92	373
8	695	84	340
9	685	83	335
10	675	82	330
11	586	71	286
12	546	66	267
13	536	65	262
14	397	48	194
15	397	48	194
16	278	34	136
17	159	19	78
18	159	19	78
19	89	11	44
20	50	6	24
21	30	4	15
22	10	1	5
23	10	1	5
24	10	1	5



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	4	993	3	485	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	4	963	3	470	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	4	943	3	461	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	4	884	3	432	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
5	4	784	3	383	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
6	4	775	3	378	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
7	4	765	3	373	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
8	4	695	3	340	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
9	4	685	3	335	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No
10	4	675	3	330	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No
11	4	586	3	286	No	Yes	Yes	Yes	No	No	No	Yes	No	No
12	4	546	3	267	No	Yes	Yes	Yes	No	No	No	Yes	No	No
13	4	536	3	262	No	Yes	Yes	Yes	No	No	No	Yes	No	No
14	4	397	3	194	No	No	No	Yes	No	No	No	No	No	No
15	4	397	3	194	No	No	No	Yes	No	No	No	No	No	No
16	4	278	3	136	No	No	No	No	No	No	No	No	No	No
17	4	159	3	78	No	No	No	No	No	No	No	No	No	No
18	4	159	3	78	No	No	No	No	No	No	No	No	No	No
19	4	89	3	44	No	No	No	No	No	No	No	No	No	No
20	4	50	3	24	No	No	No	No	No	No	No	No	No	No
21	4	30	3	15	No	No	No	No	No	No	No	No	No	No
22	4	10	3	5	No	No	No	No	No	No	No	No	No	No
23	4	10	3	5	No	No	No	No	No	No	No	No	No	No
24	4	10	3	5	No	No	No	No	No	No	No	No	No	No
Hours Met					10	13	13	15	3	7	10	13	8	4

## Warrant 3 Condition A

Orientation	N	S
Total Stopped Delay Per Vehicle on Minor Approach (s)	154.1	1277.8
Number of Lanes on Minor Street Approach	3	3
VehicleHours of Stopped Delay on Minor Approach (h:mm)	5:08	172:09
Delay Condition Met	Yes	Yes
Volume on Minor Street Approach During Same Hour	120	485
High Minor Volume Condition Met	No	Yes
Total Entering Volume on All Approaches During Same Hour	1598	1598
Number of Approaches on Intersection	3	3
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	Yes
<b>Warrant Met for Intersection</b>	<b>Yes</b>	





### Intersection Level Of Service Report

#### Intersection 1: E Colfax Ave/Manila Rd

Control Type:	Signalized	Delay (sec / veh):	25.8
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.644

#### Intersection Setup

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	625.0	100.0	600.0	650.0	100.0	100.0	100.0	100.0	600.0	720.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	20	145	100	55	865	20	5	365	40	33	129	5
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	50	0	0	10	0	0	20	0	0	3
Total Hourly Volume [veh/h]	20	145	50	55	865	10	5	365	20	33	129	2
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	5	39	14	15	235	3	1	99	5	9	35	1
Total Analysis Volume [veh/h]	22	158	54	60	940	11	5	397	22	36	140	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi
Signal Group	3	8	1	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	5	5	10	0	5	10	0	5	10	0
Maximum Green [s]	30	30	30	30	30	0	10	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	33	9	9	33	0	9	29	0	9	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	21	0	0	22	0	0	14	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		Yes	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	80	80	80	80	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	36	28	28	36	30	30	36	30	30	36	32	32
g / C, Green / Cycle	0.44	0.35	0.35	0.44	0.37	0.37	0.46	0.37	0.37	0.46	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.04	0.06	0.34	0.01	0.01	0.28	0.02	0.04	0.10	0.00
s, saturation flow rate [veh/h]	557	2741	1224	976	2741	1224	988	1440	1224	827	1440	1224
c, Capacity [veh/h]	218	952	425	513	1011	452	523	535	455	332	576	489
d1, Uniform Delay [s]	17.38	18.11	17.85	13.07	24.26	16.08	11.99	21.82	16.09	14.32	15.97	14.44
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.11	0.50	0.50
l, Upstream Filtering 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
d2, Incremental Delay [s]	0.20	0.08	0.13	0.10	4.44	0.02	0.03	8.97	0.20	0.14	1.00	0.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression 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

**Lane Group Results**

X, volume / capacity	0.10	0.17	0.13	0.12	0.93	0.02	0.01	0.74	0.05	0.11	0.24	0.00
d, Delay for Lane Group [s/veh]	17.58	18.19	17.98	13.17	28.69	16.11	12.02	30.79	16.29	14.46	16.97	14.46
Lane Group LOS	B	B	B	B	C	B	B	C	B	B	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.21	0.93	0.63	0.57	8.09	0.12	0.05	6.79	0.25	0.31	1.61	0.02
50th-Percentile Queue Length [ft/ln]	5.22	23.18	15.83	14.15	202.3	2.97	1.13	169.7	6.21	7.79	40.19	0.52
95th-Percentile Queue Length [veh/ln]	0.38	1.67	1.14	1.02	12.76	0.21	0.08	11.06	0.45	0.56	2.89	0.04
95th-Percentile Queue Length [ft/ln]	9.39	41.72	28.49	25.47	318.9	5.34	2.04	276.6	11.18	14.02	72.34	0.93

**Movement, Approach, & Intersection Results**

d_M, Delay for Movement [s/veh]	17.58	18.19	17.98	13.17	28.69	16.11	12.02	30.79	16.29	14.46	16.97	14.46
Movement LOS	B	B	B	B	C	B	B	C	B	B	B	B
d_A, Approach Delay [s/veh]	18.08			27.64			29.81			16.44		
Approach LOS	B			C			C			B		
d_I, Intersection Delay [s/veh]	25.85											
Intersection LOS	C											
Intersection V/C	0.644											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	29.77			29.77			29.77			29.77		
I_p,int, Pedestrian LOS Score for Intersection	2.855			2.753			2.445			2.492		
Crosswalk LOS	C			C			B			B		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	725			725			625			625		
d_b, Bicycle Delay [s]	16.27			16.27			18.92			18.92		
I_b,int, Bicycle LOS Score for Intersection	1.794			2.402			2.292			1.858		
Bicycle LOS	A			B			B			A		

**Sequence**

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





### Intersection Level Of Service Report

#### Intersection 2: E Colfax Ave/Peterson Rd

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 13.8  
 Level Of Service: B  
 Volume to Capacity (v/c): 0.012

#### Intersection Setup

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	5	5	5	5	295	5	5	167	5
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	5	5	5	5	5	5	295	5	5	167	5
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	1	1	1	1	1	1	1	80	1	1	45	1
Total Analysis Volume [veh/h]	5	5	5	5	5	5	5	321	5	5	182	5
Pedestrian Volume [ped/h]	0			0			0			0		



**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	13.83	13.70	10.55	13.79	13.68	9.64	7.80	0.00	0.00	8.17	0.00	0.00
Movement LOS	B	B	B	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.10	0.10	0.10	0.09	0.09	0.09	0.01	0.01	0.01	0.01	0.01	0.01
95th-Percentile Queue Length [ft/ln]	2.40	2.40	2.40	2.30	2.30	2.30	0.21	0.21	0.21	0.21	0.21	0.21
d_A, Approach Delay [s/veh]	12.69			12.37			0.12			0.21		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	0.82											
Intersection LOS	B											



### Intersection Level Of Service Report

#### Intersection 3: Manila Rd/I-70 Westbound Ramp

Control Type:	Signalized	Delay (sec / veh):	7.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.273

#### Intersection Setup

Name	Manila Rd			Manila Rd						Westbound Ramp		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	0	0	0	1	0	1
Entry Pocket Length [ft]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No						No		
Crosswalk	Yes			Yes			No			Yes		

**Volumes**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Base Volume Input [veh/h]	135	214	0	0	288	704	0	0	0	75	5	46
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	352	0	0	0	0	0	23
Total Hourly Volume [veh/h]	135	214	0	0	288	352	0	0	0	75	5	23
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	37	58	0	0	78	96	0	0	0	20	1	6
Total Analysis Volume [veh/h]	147	233	0	0	313	383	0	0	0	82	5	25
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	1	6	0	0	2	0	0	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	0	10	0	0	0	0	0	10	0
Maximum Green [s]	30	30	0	0	30	0	0	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	9	47	0	0	38	0	0	0	0	0	23	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	21	0	0	0	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No						No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No						No	
Maximum Recall	No	No			No						No	
Pedestrian Recall	No	No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	C	R		L	C	R
C, Cycle Length [s]	70	70	70	70		70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00		4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
I2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00		2.00	2.00	2.00
g_i, Effective Green Time [s]	53	53	44	44		9	9	9
g / C, Green / Cycle	0.76	0.76	0.63	0.63		0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.22	0.08	0.11	0.18		0.06	0.00	0.02
s, saturation flow rate [veh/h]	679	2741	2741	2166		1371	1440	1224
c, Capacity [veh/h]	625	2078	1733	1369		176	184	157
d1, Uniform Delay [s]	2.44	2.25	5.36	5.77		28.35	26.75	27.21
k, delay calibration	0.11	0.50	0.50	0.50		0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00
d2, Incremental Delay [s]	0.19	0.11	0.23	0.51		1.93	0.06	0.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00		1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.24	0.11	0.18	0.28		0.47	0.03	0.16
d, Delay for Lane Group [s/veh]	2.63	2.36	5.59	6.28		30.28	26.81	27.69
Lane Group LOS	A	A	A	A		C	C	C
Critical Lane Group	Yes	No	No	Yes		Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.22	0.18	0.69	0.93		1.32	0.07	0.38
50th-Percentile Queue Length [ft/ln]	5.51	4.41	17.15	23.20		33.09	1.84	9.51
95th-Percentile Queue Length [veh/ln]	0.40	0.32	1.24	1.67		2.38	0.13	0.68
95th-Percentile Queue Length [ft/ln]	9.91	7.93	30.88	41.76		59.56	3.32	17.11

**Movement, Approach, & Intersection Results**

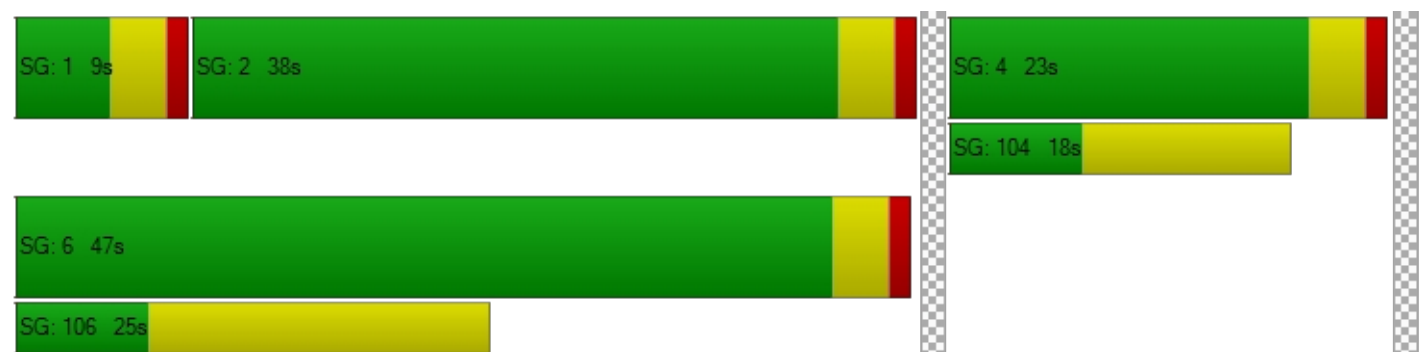
d_M, Delay for Movement [s/veh]	2.63	2.36	0.00	0.00	5.59	6.28	0.00	0.00	0.00	30.28	26.81	27.69
Movement LOS	A	A			A	A				C	C	C
d_A, Approach Delay [s/veh]	2.46			5.97			0.00			29.55		
Approach LOS	A			A			A			C		
d_I, Intersection Delay [s/veh]	7.07											
Intersection LOS	A											
Intersection V/C	0.273											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0		11.0		0.0		11.0	
M_corner, Corner Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00	
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00	
d_p, Pedestrian Delay [s]	24.89		24.89		0.00		24.89	
I_p,int, Pedestrian LOS Score for Intersection	2.513		3.264		0.000		2.003	
Crosswalk LOS	B		C		F		B	
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000		2000		2000		2000	
c_b, Capacity of the bicycle lane [bicycles/h]	1227		971		0		542	
d_b, Bicycle Delay [s]	5.23		9.28		35.03		18.61	
I_b,int, Bicycle LOS Score for Intersection	1.873		2.424		4.132		1.782	
Bicycle LOS	A		B		D		A	

**Sequence**

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-







**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	12.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.284

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	2	0	1	0	0	0
Entry Pocket Length [ft]	100.0	100.0	435.0	620.0	100.0	100.0	885.0	100.0	435.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	165	110	183	180	0	194	5	285	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	55	0	0	0	0	0	143	0	0	0
Total Hourly Volume [veh/h]	0	165	55	183	180	0	194	5	142	0	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	45	15	50	49	0	53	1	39	0	0	0
Total Analysis Volume [veh/h]	0	179	60	199	196	0	211	5	154	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	5	10	0	0	10	0	0	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	24	0	9	33	0	0	27	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	14	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	C	R	L	C	L	C	R	
C, Cycle Length [s]	61	61	61	61	61	61	61	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
I2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	20	20	29	29	23	23	23	
g / C, Green / Cycle	0.33	0.33	0.48	0.48	0.38	0.38	0.38	
(v / s)_i Volume / Saturation Flow Rate	0.07	0.05	0.20	0.07	0.08	0.00	0.13	
s, saturation flow rate [veh/h]	2741	1224	997	2741	2663	1440	1224	
c, Capacity [veh/h]	899	401	596	1303	1004	543	461	
d1, Uniform Delay [s]	14.74	14.49	9.91	9.04	12.85	11.88	13.54	
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.50	0.79	1.51	0.24	0.48	0.03	1.94	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

**Lane Group Results**

X, volume / capacity	0.20	0.15	0.33	0.15	0.21	0.01	0.33	
d, Delay for Lane Group [s/veh]	15.24	15.28	11.41	9.28	13.33	11.91	15.48	
Lane Group LOS	B	B	B	A	B	B	B	
Critical Lane Group	Yes	No	Yes	No	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	0.88	0.62	1.65	0.68	0.95	0.04	1.60	
50th-Percentile Queue Length [ft/ln]	21.91	15.61	41.18	16.95	23.63	1.08	40.01	
95th-Percentile Queue Length [veh/ln]	1.58	1.12	2.96	1.22	1.70	0.08	2.88	
95th-Percentile Queue Length [ft/ln]	39.44	28.09	74.12	30.51	42.54	1.94	72.01	

**Movement, Approach, & Intersection Results**

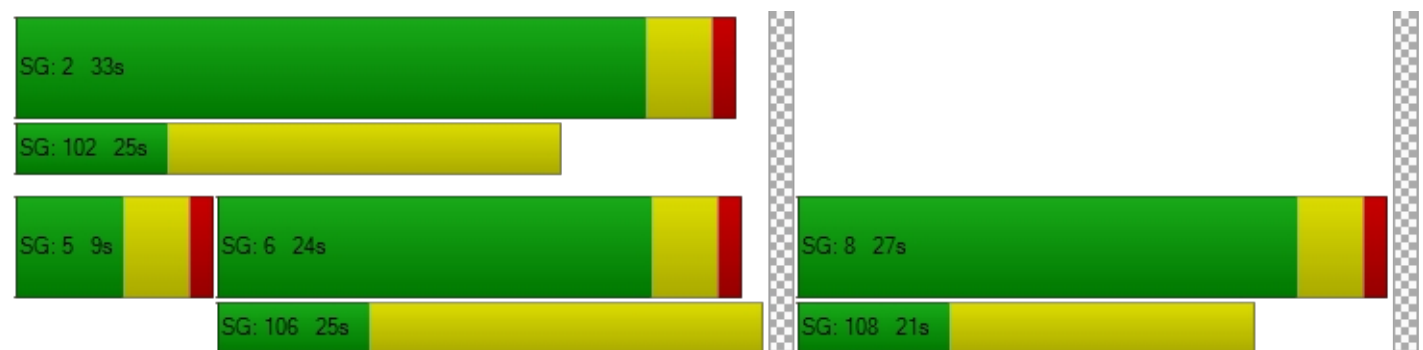
d_M, Delay for Movement [s/veh]	0.00	15.24	15.28	11.41	9.28	0.00	13.33	11.91	15.48	0.00	0.00	0.00
Movement LOS		B	B	B	A		B	B	B			
d_A, Approach Delay [s/veh]	15.25			10.36			14.21			0.00		
Approach LOS	B			B			B			A		
d_I, Intersection Delay [s/veh]	12.94											
Intersection LOS	B											
Intersection V/C	0.284											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	20.49			20.49			20.49			20.49		
I_p,int, Pedestrian LOS Score for Intersection	2.510			2.431			2.438			1.815		
Crosswalk LOS	B			B			B			A		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	656			951			754			0		
d_b, Bicycle Delay [s]	13.78			8.39			11.84			30.50		
I_b,int, Bicycle LOS Score for Intersection	1.802			1.885			2.406			4.132		
Bicycle LOS	A			A			B			D		

**Sequence**

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





## Signal Warrants Report For Intersection 2: E Colfax Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	177	305	15	15
2	172	296	15	15
3	168	290	14	14
4	158	271	13	13
5	140	241	12	12
6	138	238	12	12
7	136	235	12	12
8	124	214	11	11
9	122	210	10	10
10	120	207	10	10
11	104	180	9	9
12	97	168	8	8
13	96	165	8	8
14	71	122	6	6
15	71	122	6	6
16	50	85	4	4
17	28	49	2	2
18	28	49	2	2
19	16	27	1	1
20	9	15	1	1
21	5	9	0	0
22	2	3	0	0
23	2	3	0	0
24	2	3	0	0





## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	482	1	15	No	No	No	No	No	No	No	No	No	No
2	1	468	1	15	No	No	No	No	No	No	No	No	No	No
3	1	458	1	14	No	No	No	No	No	No	No	No	No	No
4	1	429	1	13	No	No	No	No	No	No	No	No	No	No
5	1	381	1	12	No	No	No	No	No	No	No	No	No	No
6	1	376	1	12	No	No	No	No	No	No	No	No	No	No
7	1	371	1	12	No	No	No	No	No	No	No	No	No	No
8	1	338	1	11	No	No	No	No	No	No	No	No	No	No
9	1	332	1	10	No	No	No	No	No	No	No	No	No	No
10	1	327	1	10	No	No	No	No	No	No	No	No	No	No
11	1	284	1	9	No	No	No	No	No	No	No	No	No	No
12	1	265	1	8	No	No	No	No	No	No	No	No	No	No
13	1	261	1	8	No	No	No	No	No	No	No	No	No	No
14	1	193	1	6	No	No	No	No	No	No	No	No	No	No
15	1	193	1	6	No	No	No	No	No	No	No	No	No	No
16	1	135	1	4	No	No	No	No	No	No	No	No	No	No
17	1	77	1	2	No	No	No	No	No	No	No	No	No	No
18	1	77	1	2	No	No	No	No	No	No	No	No	No	No
19	1	43	1	1	No	No	No	No	No	No	No	No	No	No
20	1	24	1	1	No	No	No	No	No	No	No	No	No	No
21	1	14	1	0	No	No	No	No	No	No	No	No	No	No
22	1	5	1	0	No	No	No	No	No	No	No	No	No	No
23	1	5	1	0	No	No	No	No	No	No	No	No	No	No
24	1	5	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	12.7	12.4
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:03	0:03
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	15
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	512	512
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



### Intersection Level Of Service Report

#### Intersection 1: E Colfax Ave/Manila Rd

Control Type:	Signalized	Delay (sec / veh):	27.5
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.689

#### Intersection Setup

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	460.0	100.0	435.0	300.0	100.0	250.0	625.0	100.0	600.0	835.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	20	1135	93	20	155	5	5	81	15	121	297	50
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	256	0	0	0	0	32	0	50	6	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	175	0	0	3	0	0	8	0	0	25
Total Hourly Volume [veh/h]	20	1135	174	20	155	2	5	113	7	171	303	25
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	5	308	47	5	42	1	1	31	2	46	82	7
Total Analysis Volume [veh/h]	22	1234	189	22	168	2	5	123	8	186	329	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi
Signal Group	3	8	1	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	5	5	10	0	5	10	0	5	10	0
Maximum Green [s]	30	30	10	30	30	0	10	30	0	10	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	13	43	9	9	39	0	9	29	0	9	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	21	0	0	22	0	0	14	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		Yes	No		Yes	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	48	42	42	48	42	42	34	25	25	34	30	30
g / C, Green / Cycle	0.53	0.46	0.46	0.53	0.46	0.46	0.38	0.28	0.28	0.38	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.02	0.45	0.15	0.06	0.06	0.00	0.01	0.09	0.01	0.18	0.23	0.02
s, saturation flow rate [veh/h]	973	2741	1224	383	2741	1224	833	1440	1224	1051	1440	1224
c, Capacity [veh/h]	588	1268	566	185	1268	566	277	404	343	451	474	403
d1, Uniform Delay [s]	10.15	23.63	15.37	19.72	13.84	13.02	18.98	25.48	23.45	21.09	26.23	20.69
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering 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
d2, Incremental Delay [s]	0.03	7.01	0.34	0.28	0.05	0.00	0.12	1.94	0.13	2.77	8.11	0.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression 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

**Lane Group Results**

X, volume / capacity	0.04	0.97	0.33	0.12	0.13	0.00	0.02	0.30	0.02	0.41	0.69	0.07
d, Delay for Lane Group [s/veh]	10.18	30.64	15.71	20.01	13.89	13.02	19.10	27.42	23.58	23.85	34.34	21.01
Lane Group LOS	B	C	B	C	B	B	B	C	C	C	C	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.19	12.29	2.26	0.20	0.89	0.02	0.07	2.10	0.12	2.82	6.51	0.39
50th-Percentile Queue Length [ft/ln]	4.66	307.1	56.39	4.92	22.24	0.50	1.67	52.47	3.11	70.47	162.7	9.71
95th-Percentile Queue Length [veh/ln]	0.34	18.04	4.06	0.35	1.60	0.04	0.12	3.78	0.22	5.07	10.70	0.70
95th-Percentile Queue Length [ft/ln]	8.39	450.8	101.5	8.86	40.03	0.91	3.01	94.45	5.61	126.8	267.3	17.47

**Movement, Approach, & Intersection Results**

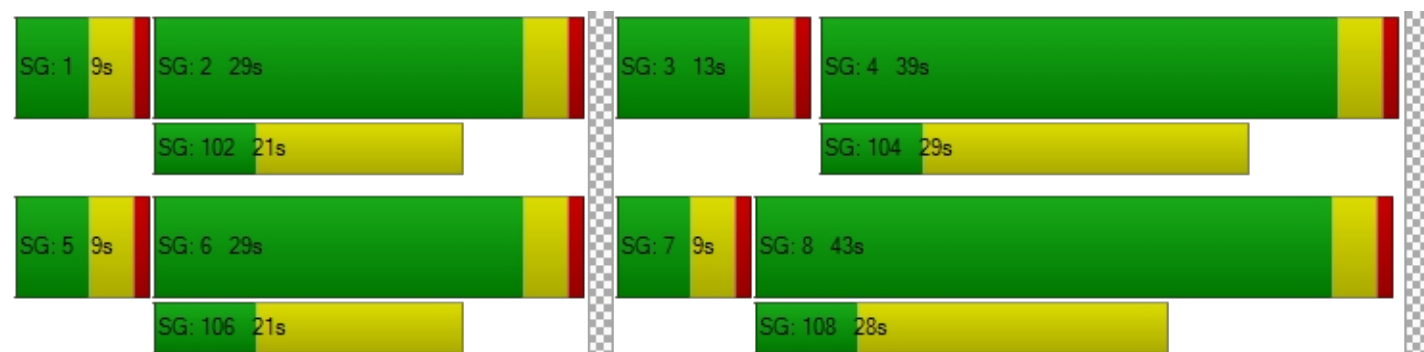
d_M, Delay for Movement [s/veh]	10.18	30.64	15.71	20.01	13.89	13.02	19.10	27.42	23.58	23.85	34.34	21.01
Movement LOS	B	C	B	C	B	B	B	C	C	C	C	C
d_A, Approach Delay [s/veh]	28.38			14.58			26.89			30.08		
Approach LOS	C			B			C			C		
d_I, Intersection Delay [s/veh]	27.54											
Intersection LOS	C											
Intersection V/C	0.689											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	34.67			34.67			34.67			34.67		
I_p,int, Pedestrian LOS Score for Intersection	3.266			2.821			2.381			2.662		
Crosswalk LOS	C			C			B			B		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	867			778			556			556		
d_b, Bicycle Delay [s]	14.45			16.81			23.47			23.47		
I_b,int, Bicycle LOS Score for Intersection	2.896			1.720			1.797			2.495		
Bicycle LOS	C			A			A			B		

**Sequence**

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





### Intersection Level Of Service Report

#### Intersection 2: E Colfax Ave/Peterson Rd

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 37.6  
 Level Of Service: E  
 Volume to Capacity (v/c): 0.043

#### Intersection Setup

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	1	0	0	0	0	1
Entry Pocket Length [ft]	100.0	100.0	100.0	300.0	100.0	250.0	895.0	100.0	100.0	100.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	960.0	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	5	5	5	5	133	5	5	239	5
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	6	0	56	288	0	0	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	5	5	11	5	61	293	133	5	5	239	37
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	1	1	1	3	1	17	80	36	1	1	65	10
Total Analysis Volume [veh/h]	5	5	5	12	5	66	318	145	5	5	260	40
Pedestrian Volume [ped/h]	0			0			0			0		



**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.04	0.03	0.01	0.09	0.03	0.09	0.27	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	37.56	31.84	11.03	35.16	29.56	10.37	9.24	0.00	0.00	7.72	0.00	0.00
Movement LOS	E	D	B	E	D	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.27	0.27	0.27	0.30	0.10	0.29	1.11	0.00	0.00	0.01	0.01	0.00
95th-Percentile Queue Length [ft/ln]	6.73	6.73	6.73	7.40	2.54	7.35	27.85	0.00	0.00	0.21	0.21	0.00
d_A, Approach Delay [s/veh]	26.81			15.11			6.28			0.13		
Approach LOS	D			C			A			A		
d_I, Intersection Delay [s/veh]	5.32											
Intersection LOS	E											



### Intersection Level Of Service Report

#### Intersection 3: Manila Rd/I-70 Westbound Ramp

Control Type:	Signalized	Delay (sec / veh):	9.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.615

#### Intersection Setup

Name	Manila Rd			Manila Rd						Westbound Ramp		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	0	0	0	1	0	1
Entry Pocket Length [ft]	735.0	100.0	100.0	100.0	100.0	435.0	100.0	100.0	100.0	535.0	100.0	435.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No						No		
Crosswalk	Yes			Yes			No			Yes		

**Volumes**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Base Volume Input [veh/h]	300	1013	0	0	65	235	0	0	0	45	5	246
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	192	0	0	12	38	0	0	0	0	0	64
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	137	0	0	0	0	0	155
Total Hourly Volume [veh/h]	300	1205	0	0	77	136	0	0	0	45	5	155
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	82	327	0	0	21	37	0	0	0	12	1	42
Total Analysis Volume [veh/h]	326	1310	0	0	84	148	0	0	0	49	5	168
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	1	6	0	0	2	0	0	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	0	10	0	0	0	0	0	10	0
Maximum Green [s]	30	30	0	0	30	0	0	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	9	41	0	0	32	0	0	0	0	0	29	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	21	0	0	0	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No						No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No						No	
Maximum Recall	No	No			No						No	
Pedestrian Recall	No	No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	C	R		L	C	R
C, Cycle Length [s]	70	70	70	70		70	70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00		4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
I2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00		2.00	2.00	2.00
g_i, Effective Green Time [s]	50	50	41	41		12	12	12
g / C, Green / Cycle	0.72	0.72	0.59	0.59		0.17	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.34	0.48	0.03	0.07		0.04	0.00	0.14
s, saturation flow rate [veh/h]	953	2741	2741	2166		1371	1440	1224
c, Capacity [veh/h]	812	1971	1615	1276		229	241	204
d1, Uniform Delay [s]	3.65	5.31	6.11	6.35		25.23	24.41	28.20
k, delay calibration	0.30	0.50	0.50	0.50		0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00
d2, Incremental Delay [s]	0.90	1.79	0.06	0.18		0.46	0.03	7.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00		1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.40	0.66	0.05	0.12		0.21	0.02	0.82
d, Delay for Lane Group [s/veh]	4.55	7.10	6.17	6.54		25.69	24.45	36.17
Lane Group LOS	A	A	A	A		C	C	D
Critical Lane Group	No	Yes	No	No		No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.01	2.87	0.20	0.38		0.71	0.07	3.05
50th-Percentile Queue Length [ft/ln]	25.36	71.71	5.12	9.58		17.68	1.73	76.26
95th-Percentile Queue Length [veh/ln]	1.83	5.16	0.37	0.69		1.27	0.12	5.49
95th-Percentile Queue Length [ft/ln]	45.64	129.08	9.21	17.24		31.82	3.11	137.2

**Movement, Approach, & Intersection Results**

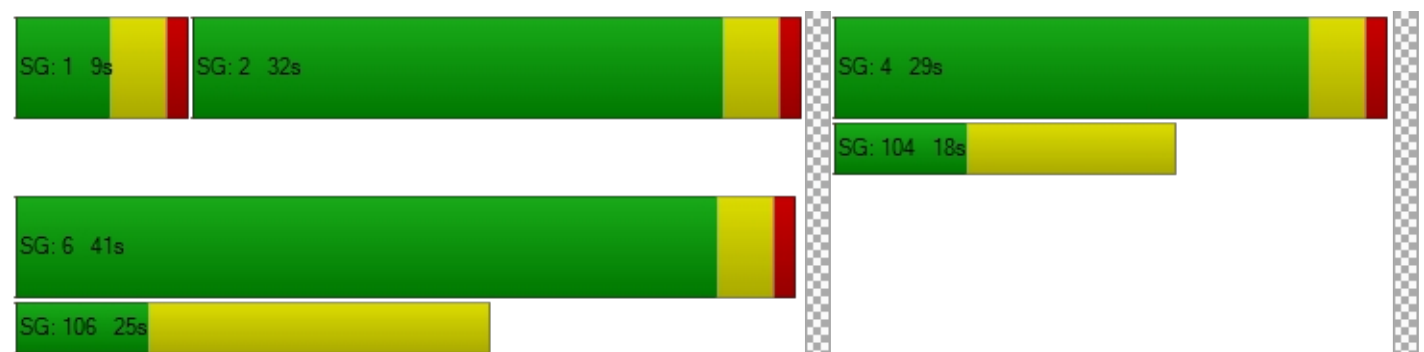
d_M, Delay for Movement [s/veh]	4.55	7.10	0.00	0.00	6.17	6.54	0.00	0.00	0.00	25.69	24.45	36.17
Movement LOS	A	A			A	A				C	C	D
d_A, Approach Delay [s/veh]	6.59			6.40			0.00			33.59		
Approach LOS	A			A			A			C		
d_I, Intersection Delay [s/veh]	9.44											
Intersection LOS	A											
Intersection V/C	0.615											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0		11.0		0.0		11.0					
M_corner, Corner Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
d_p, Pedestrian Delay [s]	24.89		24.89		0.00		24.89					
I_p,int, Pedestrian LOS Score for Intersection	2.804		3.122		0.000		2.269					
Crosswalk LOS	C		C		F		B					
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000		2000		2000		2000					
c_b, Capacity of the bicycle lane [bicycles/h]	1056		799		0		714					
d_b, Bicycle Delay [s]	7.80		12.63		35.03		14.49					
I_b,int, Bicycle LOS Score for Intersection	2.909		1.864		4.132		2.182					
Bicycle LOS	C		A		D		B					

**Sequence**

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	23.8
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.636

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	2	0	1	0	0	0
Entry Pocket Length [ft]	100.0	100.0	435.0	620.0	100.0	100.0	980.0	100.0	435.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	Yes			Yes			Yes			Yes		



**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	415	70	40	80	0	898	5	90	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	12	0	0	192	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	35	0	0	0	0	0	45	0	0	0
Total Hourly Volume [veh/h]	0	415	35	52	80	0	1090	5	45	0	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	113	10	14	22	0	296	1	12	0	0	0
Total Analysis Volume [veh/h]	0	451	38	57	87	0	1185	5	49	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	5	10	0	0	10	0	0	0	0
Maximum Green [s]	0	30	0	10	30	0	0	30	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	29	0	9	38	0	0	42	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	14	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		Yes	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	C	R	L	C	L	C	R	
C, Cycle Length [s]	80	80	80	80	80	80	80	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	27	27	35	35	37	37	37	
g / C, Green / Cycle	0.34	0.34	0.43	0.43	0.47	0.47	0.47	
(v / s)_i Volume / Saturation Flow Rate	0.16	0.03	0.07	0.03	0.44	0.00	0.04	
s, saturation flow rate [veh/h]	2741	1224	808	2741	2663	1440	1224	
c, Capacity [veh/h]	929	415	385	1193	1238	669	569	
d1, Uniform Delay [s]	20.93	18.05	14.06	13.19	20.64	11.50	11.93	
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	1.81	0.44	0.81	0.12	5.46	0.00	0.06	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

**Lane Group Results**

X, volume / capacity	0.49	0.09	0.15	0.07	0.96	0.01	0.09	
d, Delay for Lane Group [s/veh]	22.74	18.48	14.86	13.31	26.10	11.50	12.00	
Lane Group LOS	C	B	B	B	C	B	B	
Critical Lane Group	Yes	No	Yes	No	Yes	No	No	
50th-Percentile Queue Length [veh/ln]	3.42	0.51	0.66	0.45	10.55	0.05	0.47	
50th-Percentile Queue Length [ft/ln]	85.46	12.83	16.55	11.36	263.8	1.15	11.75	
95th-Percentile Queue Length [veh/ln]	6.15	0.92	1.19	0.82	15.88	0.08	0.85	
95th-Percentile Queue Length [ft/ln]	153.83	23.09	29.79	20.45	397.0	2.07	21.14	

**Movement, Approach, & Intersection Results**

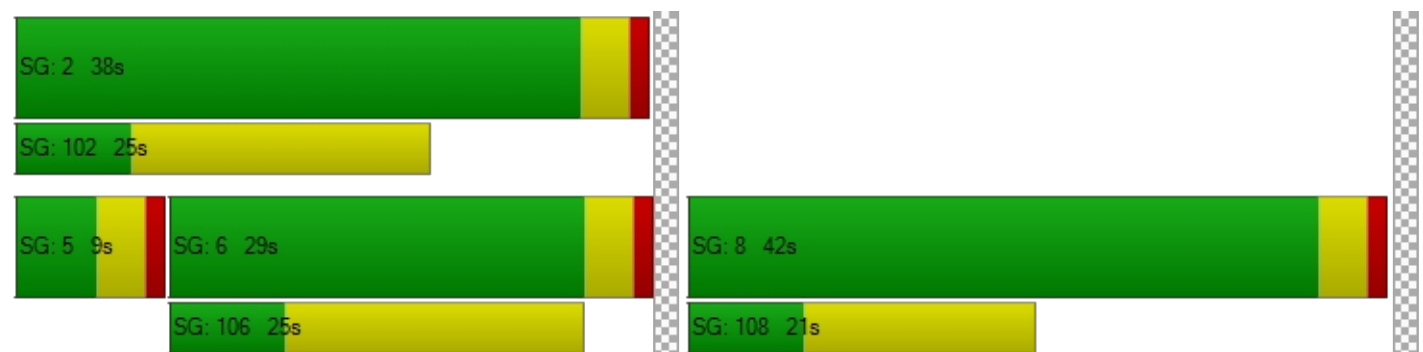
d_M, Delay for Movement [s/veh]	0.00	22.74	18.48	14.86	13.31	0.00	26.10	11.50	12.00	0.00	0.00	0.00
Movement LOS		C	B	B	B		C	B	B			
d_A, Approach Delay [s/veh]	22.41			13.92			25.49			0.00		
Approach LOS	C			B			C			A		
d_I, Intersection Delay [s/veh]	23.79											
Intersection LOS	C											
Intersection V/C	0.636											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	29.76			29.76			29.76			29.76		
I_p,int, Pedestrian LOS Score for Intersection	2.480			2.640			2.501			1.578		
Crosswalk LOS	B			B			B			A		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	625			850			950			0		
d_b, Bicycle Delay [s]	18.91			13.23			11.03			40.01		
I_b,int, Bicycle LOS Score for Intersection	1.992			1.678			3.678			4.132		
Bicycle LOS	A			A			D			D		

**Sequence**

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





### Intersection Level Of Service Report Intersection 5: Peterson Rd/ Access 1

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 8.7  
Level Of Service: A  
Volume to Capacity (v/c): 0.023

#### Intersection Setup

Name	Peterson Rd		Peterson Rd		Access 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	355.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

#### Volumes

Name	Peterson Rd		Peterson Rd		Access 1	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	16.00	16.00	16.00	16.00	16.00	16.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	107	213	41	0	0	21
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	107	213	41	0	0	21
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	58	11	0	0	6
Total Analysis Volume [veh/h]	116	232	45	0	0	23
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.00	0.02
d_M, Delay for Movement [s/veh]	7.64	0.00	0.00	0.00	12.90	8.74
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.26	0.00	0.00	0.00	0.07	0.07
95th-Percentile Queue Length [ft/ln]	6.38	0.00	0.00	0.00	1.79	1.79
d_A, Approach Delay [s/veh]	2.55		0.00		8.74	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.61					
Intersection LOS	A					



### Intersection Level Of Service Report Intersection 6: Peterson Rd/ Access 2

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 8.6  
Level Of Service: A  
Volume to Capacity (v/c): 0.023

#### Intersection Setup

Name	Peterson Rd		Peterson Rd		Access 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	355.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

#### Volumes

Name	Peterson Rd		Peterson Rd		Access 2	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	16.00	15.00	15.00	15.00	15.00	16.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	107	107	21	0	0	21
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	107	107	21	0	0	21
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	29	6	0	0	6
Total Analysis Volume [veh/h]	116	116	23	0	0	23
Pedestrian Volume [ped/h]	0		0		0	



**Intersection Settings**

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.00	0.02
d_M, Delay for Movement [s/veh]	7.59	0.00	0.00	0.00	11.53	8.63
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.25	0.00	0.00	0.00	0.07	0.07
95th-Percentile Queue Length [ft/ln]	6.25	0.00	0.00	0.00	1.74	1.74
d_A, Approach Delay [s/veh]	3.80		0.00		8.63	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	3.88					
Intersection LOS	A					



### Intersection Level Of Service Report Intersection 15: 48th Ave/Access 3

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 8.4  
Level Of Service: A  
Volume to Capacity (v/c): 0.021

#### Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+ +		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	1	0	0
Entry Pocket Length [ft]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	355.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name												
Base Volume Input [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	21	0	0	0	0	0	0	107	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	21	0	0	0	0	0	0	107	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	0	6	0	0	0	0	0	0	29	0	0
Total Analysis Volume [veh/h]	0	0	23	0	0	0	0	0	0	116	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00
d_M, Delay for Movement [s/veh]	10.44	10.88	8.39	10.58	10.80	8.32	7.22	0.00	0.00	7.39	0.00	0.00	
Movement LOS	B	B	A	B	B	A	A	A	A	A	A	A	
95th-Percentile Queue Length [veh/ln]	0.06	0.06	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	
95th-Percentile Queue Length [ft/ln]	1.62	1.62	1.62	0.00	0.00	0.00	0.00	0.00	0.00	5.77	0.00	0.00	
d_A, Approach Delay [s/veh]	8.39			9.90			2.41			7.39			
Approach LOS	A			A			A			A			
d_I, Intersection Delay [s/veh]	7.55												
Intersection LOS	A												



### Intersection Level Of Service Report Intersection 16: 48th Ave/Peterson Rd

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 8.4  
Level Of Service: A  
Volume to Capacity (v/c): 0.021

#### Intersection Setup

Name	Peterson Rd											
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0	0	0	1	0	0	0
Entry Pocket Length [ft]	355.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	250.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name	Peterson Rd											
Base Volume Input [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	107	0	0	0	0	0	0	0	21	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	107	0	0	0	0	0	0	0	21	0	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	29	0	0	0	0	0	0	0	6	0	0	0
Total Analysis Volume [veh/h]	116	0	0	0	0	0	0	0	23	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.39	0.00	0.00	7.22	0.00	0.00	10.36	10.80	8.39	10.58	10.80	8.32
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh/ln]	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	5.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.62	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	7.39			2.41			8.39			9.90		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	7.55											
Intersection LOS	A											



## Signal Warrants Report For Intersection 2: E Colfax Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	281	431	15	77
2	273	418	15	75
3	267	409	14	73
4	250	384	13	69
5	222	340	12	61
6	219	336	12	60
7	216	332	12	59
8	197	302	11	54
9	194	297	10	53
10	191	293	10	52
11	166	254	9	45
12	155	237	8	42
13	152	233	8	42
14	112	172	6	31
15	112	172	6	31
16	79	121	4	22
17	45	69	2	12
18	45	69	2	12
19	25	39	1	7
20	14	22	1	4
21	8	13	0	2
22	3	4	0	1
23	3	4	0	1
24	3	4	0	1



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	712	3	77	No	No	No	No	No	No	Yes	Yes	No	No
2	2	691	3	75	No	No	No	No	No	No	Yes	Yes	No	No
3	2	676	3	73	No	No	No	No	No	No	Yes	Yes	No	No
4	2	634	3	69	No	No	No	No	No	No	No	Yes	No	No
5	2	562	3	61	No	No	No	No	No	No	No	Yes	No	No
6	2	555	3	60	No	No	No	No	No	No	No	Yes	No	No
7	2	548	3	59	No	No	No	No	No	No	No	Yes	No	No
8	2	499	3	54	No	No	No	No	No	No	No	No	No	No
9	2	491	3	53	No	No	No	No	No	No	No	No	No	No
10	2	484	3	52	No	No	No	No	No	No	No	No	No	No
11	2	420	3	45	No	No	No	No	No	No	No	No	No	No
12	2	392	3	42	No	No	No	No	No	No	No	No	No	No
13	2	385	3	42	No	No	No	No	No	No	No	No	No	No
14	2	284	3	31	No	No	No	No	No	No	No	No	No	No
15	2	284	3	31	No	No	No	No	No	No	No	No	No	No
16	2	200	3	22	No	No	No	No	No	No	No	No	No	No
17	2	114	3	12	No	No	No	No	No	No	No	No	No	No
18	2	114	3	12	No	No	No	No	No	No	No	No	No	No
19	2	64	3	7	No	No	No	No	No	No	No	No	No	No
20	2	36	3	4	No	No	No	No	No	No	No	No	No	No
21	2	21	3	2	No	No	No	No	No	No	No	No	No	No
22	2	7	3	1	No	No	No	No	No	No	No	No	No	No
23	2	7	3	1	No	No	No	No	No	No	No	No	No	No
24	2	7	3	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	3	7	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	26.8	15.1
Number of Lanes on Minor Street Approach	1	3
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:06	0:19
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	77
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	804	804
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	





## Signal Warrants Report For Intersection 5: Peterson Rd/ Access 1

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	320	41	21
2	310	40	20
3	304	39	20
4	285	36	19
5	253	32	17
6	250	32	16
7	246	32	16
8	224	29	15
9	221	28	14
10	218	28	14
11	189	24	12
12	176	23	12
13	173	22	11
14	128	16	8
15	128	16	8
16	90	11	6
17	51	7	3
18	51	7	3
19	29	4	2
20	16	2	1
21	10	1	1
22	3	0	0
23	3	0	0
24	3	0	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	361	1	21	No	No	No	No	No	No	No	No	No	No
2	2	350	1	20	No	No	No	No	No	No	No	No	No	No
3	2	343	1	20	No	No	No	No	No	No	No	No	No	No
4	2	321	1	19	No	No	No	No	No	No	No	No	No	No
5	2	285	1	17	No	No	No	No	No	No	No	No	No	No
6	2	282	1	16	No	No	No	No	No	No	No	No	No	No
7	2	278	1	16	No	No	No	No	No	No	No	No	No	No
8	2	253	1	15	No	No	No	No	No	No	No	No	No	No
9	2	249	1	14	No	No	No	No	No	No	No	No	No	No
10	2	246	1	14	No	No	No	No	No	No	No	No	No	No
11	2	213	1	12	No	No	No	No	No	No	No	No	No	No
12	2	199	1	12	No	No	No	No	No	No	No	No	No	No
13	2	195	1	11	No	No	No	No	No	No	No	No	No	No
14	2	144	1	8	No	No	No	No	No	No	No	No	No	No
15	2	144	1	8	No	No	No	No	No	No	No	No	No	No
16	2	101	1	6	No	No	No	No	No	No	No	No	No	No
17	2	58	1	3	No	No	No	No	No	No	No	No	No	No
18	2	58	1	3	No	No	No	No	No	No	No	No	No	No
19	2	33	1	2	No	No	No	No	No	No	No	No	No	No
20	2	18	1	1	No	No	No	No	No	No	No	No	No	No
21	2	11	1	1	No	No	No	No	No	No	No	No	No	No
22	2	3	1	0	No	No	No	No	No	No	No	No	No	No
23	2	3	1	0	No	No	No	No	No	No	No	No	No	No
24	2	3	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.7
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:03
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	21
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	382
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>



## Signal Warrants Report For Intersection 6: Peterson Rd/ Access 2

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	214	21	21
2	208	20	20
3	203	20	20
4	190	19	19
5	169	17	17
6	167	16	16
7	165	16	16
8	150	15	15
9	148	14	14
10	146	14	14
11	126	12	12
12	118	12	12
13	116	11	11
14	86	8	8
15	86	8	8
16	60	6	6
17	34	3	3
18	34	3	3
19	19	2	2
20	11	1	1
21	6	1	1
22	2	0	0
23	2	0	0
24	2	0	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	235	1	21	No	No	No	No	No	No	No	No	No	No
2	2	228	1	20	No	No	No	No	No	No	No	No	No	No
3	2	223	1	20	No	No	No	No	No	No	No	No	No	No
4	2	209	1	19	No	No	No	No	No	No	No	No	No	No
5	2	186	1	17	No	No	No	No	No	No	No	No	No	No
6	2	183	1	16	No	No	No	No	No	No	No	No	No	No
7	2	181	1	16	No	No	No	No	No	No	No	No	No	No
8	2	165	1	15	No	No	No	No	No	No	No	No	No	No
9	2	162	1	14	No	No	No	No	No	No	No	No	No	No
10	2	160	1	14	No	No	No	No	No	No	No	No	No	No
11	2	138	1	12	No	No	No	No	No	No	No	No	No	No
12	2	130	1	12	No	No	No	No	No	No	No	No	No	No
13	2	127	1	11	No	No	No	No	No	No	No	No	No	No
14	2	94	1	8	No	No	No	No	No	No	No	No	No	No
15	2	94	1	8	No	No	No	No	No	No	No	No	No	No
16	2	66	1	6	No	No	No	No	No	No	No	No	No	No
17	2	37	1	3	No	No	No	No	No	No	No	No	No	No
18	2	37	1	3	No	No	No	No	No	No	No	No	No	No
19	2	21	1	2	No	No	No	No	No	No	No	No	No	No
20	2	12	1	1	No	No	No	No	No	No	No	No	No	No
21	2	7	1	1	No	No	No	No	No	No	No	No	No	No
22	2	2	1	0	No	No	No	No	No	No	No	No	No	No
23	2	2	1	0	No	No	No	No	No	No	No	No	No	No
24	2	2	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.6
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:03
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	21
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	256
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>



## Signal Warrants Report For Intersection 15: 48th Ave/Access 3

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	107	0	21	0
2	104	0	20	0
3	102	0	20	0
4	95	0	19	0
5	85	0	17	0
6	83	0	16	0
7	82	0	16	0
8	75	0	15	0
9	74	0	14	0
10	73	0	14	0
11	63	0	12	0
12	59	0	12	0
13	58	0	11	0
14	43	0	8	0
15	43	0	8	0
16	30	0	6	0
17	17	0	3	0
18	17	0	3	0
19	10	0	2	0
20	5	0	1	0
21	3	0	1	0
22	1	0	0	0
23	1	0	0	0
24	1	0	0	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	107	1	21	No	No	No	No	No	No	No	No	No	No
2	2	104	1	20	No	No	No	No	No	No	No	No	No	No
3	2	102	1	20	No	No	No	No	No	No	No	No	No	No
4	2	95	1	19	No	No	No	No	No	No	No	No	No	No
5	2	85	1	17	No	No	No	No	No	No	No	No	No	No
6	2	83	1	16	No	No	No	No	No	No	No	No	No	No
7	2	82	1	16	No	No	No	No	No	No	No	No	No	No
8	2	75	1	15	No	No	No	No	No	No	No	No	No	No
9	2	74	1	14	No	No	No	No	No	No	No	No	No	No
10	2	73	1	14	No	No	No	No	No	No	No	No	No	No
11	2	63	1	12	No	No	No	No	No	No	No	No	No	No
12	2	59	1	12	No	No	No	No	No	No	No	No	No	No
13	2	58	1	11	No	No	No	No	No	No	No	No	No	No
14	2	43	1	8	No	No	No	No	No	No	No	No	No	No
15	2	43	1	8	No	No	No	No	No	No	No	No	No	No
16	2	30	1	6	No	No	No	No	No	No	No	No	No	No
17	2	17	1	3	No	No	No	No	No	No	No	No	No	No
18	2	17	1	3	No	No	No	No	No	No	No	No	No	No
19	2	10	1	2	No	No	No	No	No	No	No	No	No	No
20	2	5	1	1	No	No	No	No	No	No	No	No	No	No
21	2	3	1	1	No	No	No	No	No	No	No	No	No	No
22	2	1	1	0	No	No	No	No	No	No	No	No	No	No
23	2	1	1	0	No	No	No	No	No	No	No	No	No	No
24	2	1	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.4	9.9
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:02	0:00
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	21	0
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	128	128
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



## Signal Warrants Report For Intersection 16: 48th Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	E, W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	N	S	E	W
1	0	107	0	21
2	0	104	0	20
3	0	102	0	20
4	0	95	0	19
5	0	85	0	17
6	0	83	0	16
7	0	82	0	16
8	0	75	0	15
9	0	74	0	14
10	0	73	0	14
11	0	63	0	12
12	0	59	0	12
13	0	58	0	11
14	0	43	0	8
15	0	43	0	8
16	0	30	0	6
17	0	17	0	3
18	0	17	0	3
19	0	10	0	2
20	0	5	0	1
21	0	3	0	1
22	0	1	0	0
23	0	1	0	0
24	0	1	0	0













## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	107	2	21	No	No	No	No	No	No	No	No	No	No
2	2	104	2	20	No	No	No	No	No	No	No	No	No	No
3	2	102	2	20	No	No	No	No	No	No	No	No	No	No
4	2	95	2	19	No	No	No	No	No	No	No	No	No	No
5	2	85	2	17	No	No	No	No	No	No	No	No	No	No
6	2	83	2	16	No	No	No	No	No	No	No	No	No	No
7	2	82	2	16	No	No	No	No	No	No	No	No	No	No
8	2	75	2	15	No	No	No	No	No	No	No	No	No	No
9	2	74	2	14	No	No	No	No	No	No	No	No	No	No
10	2	73	2	14	No	No	No	No	No	No	No	No	No	No
11	2	63	2	12	No	No	No	No	No	No	No	No	No	No
12	2	59	2	12	No	No	No	No	No	No	No	No	No	No
13	2	58	2	11	No	No	No	No	No	No	No	No	No	No
14	2	43	2	8	No	No	No	No	No	No	No	No	No	No
15	2	43	2	8	No	No	No	No	No	No	No	No	No	No
16	2	30	2	6	No	No	No	No	No	No	No	No	No	No
17	2	17	2	3	No	No	No	No	No	No	No	No	No	No
18	2	17	2	3	No	No	No	No	No	No	No	No	No	No
19	2	10	2	2	No	No	No	No	No	No	No	No	No	No
20	2	5	2	1	No	No	No	No	No	No	No	No	No	No
21	2	3	2	1	No	No	No	No	No	No	No	No	No	No
22	2	1	2	0	No	No	No	No	No	No	No	No	No	No
23	2	1	2	0	No	No	No	No	No	No	No	No	No	No
24	2	1	2	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	9.9	8.4
Number of Lanes on Minor Street Approach	1	2
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:00	0:02
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	0	21
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	128	128
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	

Intersection												
Int Delay, s/veh	6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	293	133	5	5	239	37	5	5	5	11	5	61
Future Vol, veh/h	293	133	5	5	239	37	5	5	5	11	5	61
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	895	-	-	-	-	600	-	-	-	300	-	250
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	80	20	20	20	20	80	20	20	20	20	20	20
Mvmt Flow	318	145	5	5	260	40	5	5	5	12	5	66
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	300	0	0	150	0	0	1110	1094	148	1059	1056	260
Stage 1	-	-	-	-	-	-	784	784	-	270	270	-
Stage 2	-	-	-	-	-	-	326	310	-	789	786	-
Critical Hdwy	4.9	-	-	4.3	-	-	7.3	6.7	6.4	7.3	6.7	6.4
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.7	-	6.3	5.7	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.7	-	6.3	5.7	-
Follow-up Hdwy	2.92	-	-	2.38	-	-	3.68	4.18	3.48	3.68	4.18	3.48
Pot Cap-1 Maneuver	923	-	-	1328	-	-	172	199	853	187	209	737
Stage 1	-	-	-	-	-	-	361	379	-	698	654	-
Stage 2	-	-	-	-	-	-	650	628	-	358	378	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	923	-	-	1328	-	-	111	130	853	132	136	737
Mov Cap-2 Maneuver	-	-	-	-	-	-	111	130	-	132	136	-
Stage 1	-	-	-	-	-	-	236	248	-	457	651	-
Stage 2	-	-	-	-	-	-	584	625	-	228	248	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	7.4			0.1			28.7			15.4		
HCM LOS							D			C		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2	SBLn3		
Capacity (veh/h)	168	923	-	-	1328	-	-	132	136	737		
HCM Lane V/C Ratio	0.097	0.345	-	-	0.004	-	-	0.091	0.04	0.09		
HCM Control Delay (s)	28.7	10.9	-	-	7.7	0	-	35	32.6	10.4		
HCM Lane LOS	D	B	-	-	A	A	-	E	D	B		
HCM 95th %tile Q(veh)	0.3	1.5	-	-	0	-	-	0.3	0.1	0.3		



**Intersection Level Of Service Report**  
**Intersection 1: E Colfax Ave/Manila Rd**

Control Type:	Signalized	Delay (sec / veh):	32.0
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.771

**Intersection Setup**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	460.0	100.0	435.0	300.0	100.0	250.0	625.0	100.0	600.0	885.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	20	145	100	55	865	20	5	365	40	33	129	5
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	65	0	0	0	0	8	0	247	31	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	83	0	0	10	0	0	20	0	0	3
Total Hourly Volume [veh/h]	20	145	82	55	865	10	5	373	20	280	160	2
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	5	39	22	15	235	3	1	101	5	76	43	1
Total Analysis Volume [veh/h]	22	158	89	60	940	11	5	405	22	304	174	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi
Signal Group	3	8	1	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	5	5	10	0	5	10	0	5	10	0
Maximum Green [s]	30	30	10	30	30	0	10	30	0	10	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	32	11	10	33	0	9	27	0	11	29	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	21	0	0	22	0	0	14	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		Yes	No		Yes	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	80	80	80	80	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	36	28	28	36	30	30	36	25	25	36	32	32
g / C, Green / Cycle	0.44	0.35	0.35	0.44	0.37	0.37	0.46	0.32	0.32	0.46	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.07	0.06	0.34	0.01	0.01	0.28	0.02	0.34	0.12	0.00
s, saturation flow rate [veh/h]	557	2741	1224	952	2741	1224	961	1440	1224	895	1440	1224
c, Capacity [veh/h]	218	952	425	504	1011	452	495	459	390	346	576	489
d1, Uniform Delay [s]	17.37	18.10	18.40	13.06	24.25	16.08	12.08	25.82	18.89	22.96	16.39	14.44
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering 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
d2, Incremental Delay [s]	0.20	0.08	0.24	0.10	4.44	0.02	0.04	20.94	0.28	25.78	1.35	0.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression 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

**Lane Group Results**

X, volume / capacity	0.10	0.17	0.21	0.12	0.93	0.02	0.01	0.88	0.06	0.88	0.30	0.00
d, Delay for Lane Group [s/veh]	17.57	18.18	18.64	13.17	28.69	16.10	12.11	46.76	19.17	48.74	17.74	14.45
Lane Group LOS	B	B	B	B	C	B	B	D	B	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.21	0.93	1.08	0.57	8.09	0.12	0.05	8.94	0.28	5.63	2.06	0.02
50th-Percentile Queue Length [ft/ln]	5.22	23.17	26.94	14.15	202.3	2.97	1.14	223.5	6.98	140.7	51.56	0.52
95th-Percentile Queue Length [veh/ln]	0.38	1.67	1.94	1.02	12.76	0.21	0.08	13.85	0.50	9.52	3.71	0.04
95th-Percentile Queue Length [ft/ln]	9.39	41.71	48.49	25.48	318.9	5.34	2.05	346.1	12.56	237.9	92.81	0.93

**Movement, Approach, & Intersection Results**

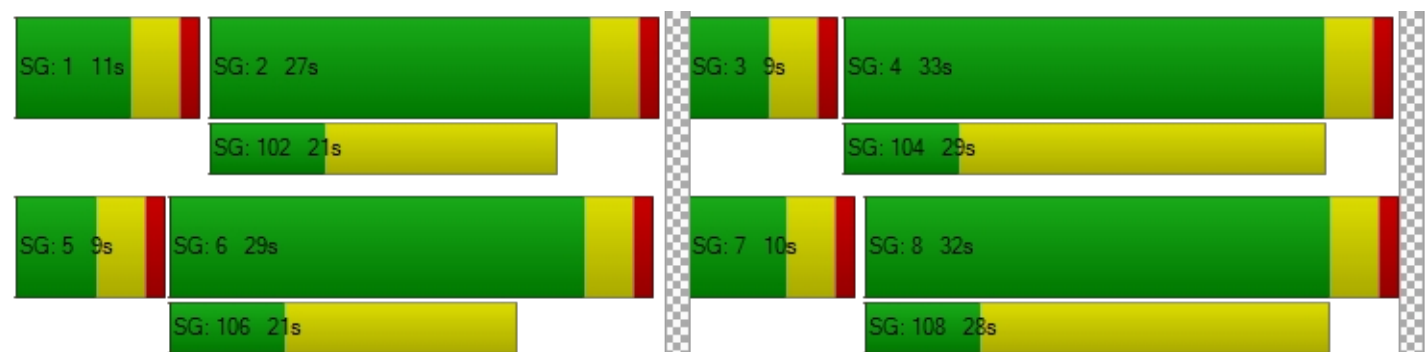
d_M, Delay for Movement [s/veh]	17.57	18.18	18.64	13.17	28.69	16.10	12.11	46.76	19.17	48.74	17.74	14.45
Movement LOS	B	B	B	B	C	B	B	D	B	D	B	B
d_A, Approach Delay [s/veh]	18.28			27.63			44.95			37.36		
Approach LOS	B			C			D			D		
d_I, Intersection Delay [s/veh]	32.03											
Intersection LOS	C											
Intersection V/C	0.771											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	29.76			29.76			29.76			29.76		
I_p,int, Pedestrian LOS Score for Intersection	3.128			2.753			2.464			2.661		
Crosswalk LOS	C			C			B			B		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	700			725			575			625		
d_b, Bicycle Delay [s]	16.91			16.26			20.31			18.91		
I_b,int, Bicycle LOS Score for Intersection	1.850			2.402			2.305			2.357		
Bicycle LOS	A			B			B			B		

**Sequence**

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-







### Intersection Level Of Service Report

#### Intersection 2: E Colfax Ave/Peterson Rd

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 24.5  
 Level Of Service: C  
 Volume to Capacity (v/c): 0.026

#### Intersection Setup

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+ +			+ +			+ +		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	1	0	0	0	0	1
Entry Pocket Length [ft]	100.0	100.0	100.0	300.0	100.0	250.0	895.0	100.0	100.0	100.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	960.0	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	5	5	5	5	295	5	5	167	5
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	31	0	278	73	0	0	0	0	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	5	5	36	5	283	78	295	5	5	167	13
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	1	1	1	10	1	77	21	80	1	1	45	4
Total Analysis Volume [veh/h]	5	5	5	39	5	308	85	321	5	5	182	14
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**


V/C, Movement V/C Ratio	0.03	0.02	0.01	0.13	0.02	0.38	0.07	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	24.53	16.94	10.93	18.44	16.33	12.06	8.02	0.00	0.00	8.17	0.00	0.00
Movement LOS	C	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.16	0.16	0.16	0.43	0.05	1.77	0.21	0.00	0.00	0.01	0.01	0.00
95th-Percentile Queue Length [ft/ln]	3.88	3.88	3.88	10.79	1.18	44.22	5.34	0.00	0.00	0.21	0.21	0.00
d_A, Approach Delay [s/veh]	17.47			12.83			1.66			0.20		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	5.62											
Intersection LOS	C											



**Intersection Level Of Service Report**  
**Intersection 3: Manila Rd/I-70 Westbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	7.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.315

**Intersection Setup**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	0	0	0	1	0	1
Entry Pocket Length [ft]	735.0	100.0	100.0	100.0	100.0	435.0	100.0	100.0	100.0	535.0	100.0	435.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No						No		
Crosswalk	Yes			Yes			No			Yes		

**Volumes**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Base Volume Input [veh/h]	135	214	0	0	288	704	0	0	0	75	5	46
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	49	0	0	62	185	0	0	0	0	0	16
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	445	0	0	0	0	0	31
Total Hourly Volume [veh/h]	135	263	0	0	350	444	0	0	0	75	5	31
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	37	71	0	0	95	121	0	0	0	20	1	8
Total Analysis Volume [veh/h]	147	286	0	0	380	483	0	0	0	82	5	34
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	1	6	0	0	2	0	0	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	0	10	0	0	0	0	0	10	0
Maximum Green [s]	30	30	0	0	30	0	0	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	9	57	0	0	48	0	0	0	0	0	23	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	18	0	0	21	0	0	0	0	0	11	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No						No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No						No	
Maximum Recall	No	No			No						No	
Pedestrian Recall	No	No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	C	R		L	C	R
C, Cycle Length [s]	80	80	80	80		80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00		4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
I2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00		2.00	2.00	2.00
g_i, Effective Green Time [s]	63	63	54	54		9	9	9
g / C, Green / Cycle	0.78	0.78	0.67	0.67		0.12	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.25	0.10	0.14	0.22		0.06	0.00	0.03
s, saturation flow rate [veh/h]	590	2741	2741	2166		1371	1440	1224
c, Capacity [veh/h]	557	2145	1840	1454		161	169	144
d1, Uniform Delay [s]	2.32	2.11	5.02	5.57		33.17	31.29	32.07
k, delay calibration	0.20	0.50	0.50	0.50		0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00
d2, Incremental Delay [s]	0.47	0.13	0.25	0.61		2.47	0.07	0.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00		1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.26	0.13	0.21	0.33		0.51	0.03	0.24
d, Delay for Lane Group [s/veh]	2.80	2.24	5.28	6.18		35.64	31.36	32.91
Lane Group LOS	A	A	A	A		D	C	C
Critical Lane Group	Yes	No	No	Yes		Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.28	0.24	0.89	1.28		1.57	0.09	0.62
50th-Percentile Queue Length [ft/ln]	7.02	5.99	22.14	32.02		39.28	2.18	15.48
95th-Percentile Queue Length [veh/ln]	0.51	0.43	1.59	2.31		2.83	0.16	1.11
95th-Percentile Queue Length [ft/ln]	12.63	10.78	39.86	57.63		70.71	3.93	27.86

**Movement, Approach, & Intersection Results**

d_M, Delay for Movement [s/veh]	2.80	2.24	0.00	0.00	5.28	6.18	0.00	0.00	0.00	35.64	31.36	32.91
Movement LOS	A	A			A	A				D	C	C
d_A, Approach Delay [s/veh]	2.43			5.79			0.00			34.69		
Approach LOS	A			A			A			C		
d_I, Intersection Delay [s/veh]	7.23											
Intersection LOS	A											
Intersection V/C	0.315											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0		11.0		0.0		11.0					
M_corner, Corner Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
d_p, Pedestrian Delay [s]	29.78		29.78		0.00		29.78					
I_p,int, Pedestrian LOS Score for Intersection	2.555		3.484		0.000		2.027					
Crosswalk LOS	B		C		F		B					
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000		2000		2000		2000					
c_b, Capacity of the bicycle lane [bicycles/h]	1324		1099		0		475					
d_b, Bicycle Delay [s]	4.57		8.11		40.02		23.28					
I_b,int, Bicycle LOS Score for Intersection	1.917		2.639		4.132		1.810					
Bicycle LOS	A		B		D		A					

**Sequence**

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	14.3
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.310

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	2	0	1	0	0	0
Entry Pocket Length [ft]	100.0	100.0	435.0	620.0	100.0	100.0	980.0	100.0	435.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	Yes			Yes			Yes			Yes		



**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	165	110	183	180	0	194	5	285	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	62	0	0	49	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	55	0	0	0	0	0	143	0	0	0
Total Hourly Volume [veh/h]	0	165	55	245	180	0	243	5	142	0	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	45	15	67	49	0	66	1	39	0	0	0
Total Analysis Volume [veh/h]	0	179	60	266	196	0	264	5	154	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	5	10	0	0	10	0	0	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	29	0	9	38	0	0	32	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	18	0	0	18	0	0	14	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	C	R	L	C	L	C	R	
C, Cycle Length [s]	70	70	70	70	70	70	70	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
I2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	25	25	34	34	28	28	28	
g / C, Green / Cycle	0.36	0.36	0.49	0.49	0.40	0.40	0.40	
(v / s)_i Volume / Saturation Flow Rate	0.07	0.05	0.27	0.07	0.10	0.00	0.13	
s, saturation flow rate [veh/h]	2741	1224	980	2741	2663	1440	1224	
c, Capacity [veh/h]	979	437	579	1332	1065	576	490	
d1, Uniform Delay [s]	15.47	15.21	12.10	9.97	13.99	12.64	14.41	
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.41	0.65	2.62	0.23	0.56	0.03	1.68	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	

**Lane Group Results**

X, volume / capacity	0.18	0.14	0.46	0.15	0.25	0.01	0.31	
d, Delay for Lane Group [s/veh]	15.89	15.86	14.72	10.20	14.54	12.67	16.09	
Lane Group LOS	B	B	B	B	B	B	B	
Critical Lane Group	Yes	No	Yes	No	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	0.98	0.69	2.77	0.79	1.37	0.05	1.78	
50th-Percentile Queue Length [ft/ln]	24.42	17.15	69.23	19.85	34.23	1.21	44.39	
95th-Percentile Queue Length [veh/ln]	1.76	1.24	4.98	1.43	2.46	0.09	3.20	
95th-Percentile Queue Length [ft/ln]	43.95	30.88	124.62	35.74	61.61	2.18	79.89	

**Movement, Approach, & Intersection Results**

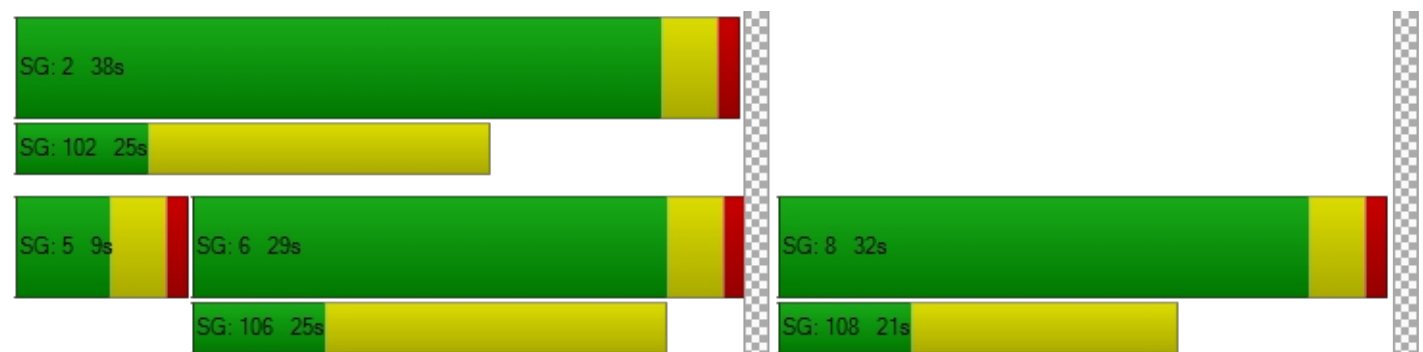
d_M, Delay for Movement [s/veh]	0.00	15.89	15.86	14.72	10.20	0.00	14.54	12.67	16.09	0.00	0.00	0.00
Movement LOS		B	B	B	B		B	B	B			
d_A, Approach Delay [s/veh]	15.88			12.80			15.08			0.00		
Approach LOS	B			B			B			A		
d_I, Intersection Delay [s/veh]	14.32											
Intersection LOS	B											
Intersection V/C	0.310											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	24.86			24.86			24.86			24.86		
I_p,int, Pedestrian LOS Score for Intersection	2.518			2.462			2.459			1.932		
Crosswalk LOS	B			B			B			A		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	714			971			800			0		
d_b, Bicycle Delay [s]	14.46			9.26			12.60			35.00		
I_b,int, Bicycle LOS Score for Intersection	1.802			1.941			2.494			4.132		
Bicycle LOS	A			A			B			D		

**Sequence**

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





### Intersection Level Of Service Report

#### Intersection 5: Peterson Rd/ Access 1

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 10.4  
 Level Of Service: B  
 Volume to Capacity (v/c): 0.143

#### Intersection Setup

Name	Peterson Rd		Peterson Rd		Access 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	355.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

#### Volumes

Name	Peterson Rd		Peterson Rd		Access 1	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	15.00	15.00	15.00	15.00	15.00	15.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	54	206	0	0	103
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	54	206	0	0	103
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	15	56	0	0	28
Total Analysis Volume [veh/h]	29	59	224	0	0	112
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.14
d_M, Delay for Movement [s/veh]	7.90	0.00	0.00	0.00	11.62	10.35
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.07	0.00	0.00	0.00	0.50	0.50
95th-Percentile Queue Length [ft/ln]	1.75	0.00	0.00	0.00	12.42	12.42
d_A, Approach Delay [s/veh]	2.60		0.00		10.35	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	3.28					
Intersection LOS	B					



### Intersection Level Of Service Report

#### Intersection 6: Peterson Rd/ Access 2

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 9.5  
 Level Of Service: A  
 Volume to Capacity (v/c): 0.123

#### Intersection Setup

Name	Peterson Rd		Peterson Rd		Access 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	355.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

#### Volumes

Name	Peterson Rd		Peterson Rd		Access 2	
Base Volume Input [veh/h]	0	0	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	15.00	15.00	15.00	15.00	15.00	15.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	27	103	0	0	103
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	27	103	0	0	103
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	7	28	0	0	28
Total Analysis Volume [veh/h]	29	29	112	0	0	112
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.12
d_M, Delay for Movement [s/veh]	7.62	0.00	0.00	0.00	10.39	9.53
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.06	0.00	0.00	0.00	0.42	0.42
95th-Percentile Queue Length [ft/ln]	1.59	0.00	0.00	0.00	10.52	10.52
d_A, Approach Delay [s/veh]	3.81		0.00		9.53	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.57					
Intersection LOS	A					





### Intersection Level Of Service Report

#### Intersection 15: 48th Ave/Access 3

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 8.7  
 Level Of Service: A  
 Volume to Capacity (v/c): 0.103

#### Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+ +		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	1	0	0
Entry Pocket Length [ft]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	355.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name												
Base Volume Input [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	103	0	0	0	0	0	0	27	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	103	0	0	0	0	0	0	27	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	0	28	0	0	0	0	0	0	7	0	0
Total Analysis Volume [veh/h]	0	0	112	0	0	0	0	0	0	29	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	9.29	9.78	8.70	9.74	9.40	8.32	7.22	0.00	0.00	7.26	0.00	0.00
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.34	0.34	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
95th-Percentile Queue Length [ft/ln]	8.61	8.61	8.61	0.00	0.00	0.00	0.00	0.00	0.00	1.36	0.00	0.00
d_A, Approach Delay [s/veh]	8.70			9.15			2.41			7.26		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	8.40											
Intersection LOS	A											



### Intersection Level Of Service Report Intersection 16: 48th Ave/Peterson Rd

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 8.7  
Level Of Service: A  
Volume to Capacity (v/c): 0.103

#### Intersection Setup

Name	Peterson Rd											
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0	0	0	1	0	0	0
Entry Pocket Length [ft]	355.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	250.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name	Peterson Rd											
Base Volume Input [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	0	0	0	0	0	0	0	103	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	0	0	0	0	0	0	0	103	0	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	7	0	0	0	0	0	0	0	28	0	0	0
Total Analysis Volume [veh/h]	29	0	0	0	0	0	0	0	112	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	7.22	0.00	0.00	8.91	9.40	8.70	9.74	9.40	8.32
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.61	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	7.26			2.41			8.70			9.15		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	8.40											
Intersection LOS	A											



## Signal Warrants Report For Intersection 2: E Colfax Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	185	378	15	324
2	179	367	15	314
3	176	359	14	308
4	165	336	13	288
5	146	299	12	256
6	144	295	12	253
7	142	291	12	249
8	130	265	11	227
9	128	261	10	224
10	126	257	10	220
11	109	223	9	191
12	102	208	8	178
13	100	204	8	175
14	74	151	6	130
15	74	151	6	130
16	52	106	4	91
17	30	60	2	52
18	30	60	2	52
19	17	34	1	29
20	9	19	1	16
21	6	11	0	10
22	2	4	0	3
23	2	4	0	3
24	2	4	0	3



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	563	3	324	No	Yes	Yes	Yes	No	No	No	Yes	Yes	No
2	2	546	3	314	No	Yes	Yes	Yes	No	No	No	Yes	Yes	No
3	2	535	3	308	No	Yes	Yes	Yes	No	No	No	Yes	Yes	No
4	2	501	3	288	No	Yes	Yes	Yes	No	No	No	No	Yes	No
5	2	445	3	256	No	No	Yes	Yes	No	No	No	No	No	No
6	2	439	3	253	No	No	Yes	Yes	No	No	No	No	No	No
7	2	433	3	249	No	No	Yes	Yes	No	No	No	No	No	No
8	2	395	3	227	No	No	No	Yes	No	No	No	No	No	No
9	2	389	3	224	No	No	No	Yes	No	No	No	No	No	No
10	2	383	3	220	No	No	No	Yes	No	No	No	No	No	No
11	2	332	3	191	No	No	No	No	No	No	No	No	No	No
12	2	310	3	178	No	No	No	No	No	No	No	No	No	No
13	2	304	3	175	No	No	No	No	No	No	No	No	No	No
14	2	225	3	130	No	No	No	No	No	No	No	No	No	No
15	2	225	3	130	No	No	No	No	No	No	No	No	No	No
16	2	158	3	91	No	No	No	No	No	No	No	No	No	No
17	2	90	3	52	No	No	No	No	No	No	No	No	No	No
18	2	90	3	52	No	No	No	No	No	No	No	No	No	No
19	2	51	3	29	No	No	No	No	No	No	No	No	No	No
20	2	28	3	16	No	No	No	No	No	No	No	No	No	No
21	2	17	3	10	No	No	No	No	No	No	No	No	No	No
22	2	6	3	3	No	No	No	No	No	No	No	No	No	No
23	2	6	3	3	No	No	No	No	No	No	No	No	No	No
24	2	6	3	3	No	No	No	No	No	No	No	No	No	No
Hours Met					0	4	7	10	0	0	0	3	4	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	17.5	12.8
Number of Lanes on Minor Street Approach	1	3
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:04	1:09
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	324
High Minor Volume Condition Met	No	Yes
Total Entering Volume on All Approaches During Same Hour	902	902
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



## Signal Warrants Report For Intersection 5: Peterson Rd/ Access 1

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	81	206	103
2	79	200	100
3	77	196	98
4	72	183	92
5	64	163	81
6	63	161	80
7	62	159	79
8	57	144	72
9	56	142	71
10	55	140	70
11	48	122	61
12	45	113	57
13	44	111	56
14	32	82	41
15	32	82	41
16	23	58	29
17	13	33	16
18	13	33	16
19	7	19	9
20	4	10	5
21	2	6	3
22	1	2	1
23	1	2	1
24	1	2	1



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	287	1	103	No	No	No	No	No	No	No	No	No	No
2	2	279	1	100	No	No	No	No	No	No	No	No	No	No
3	2	273	1	98	No	No	No	No	No	No	No	No	No	No
4	2	255	1	92	No	No	No	No	No	No	No	No	No	No
5	2	227	1	81	No	No	No	No	No	No	No	No	No	No
6	2	224	1	80	No	No	No	No	No	No	No	No	No	No
7	2	221	1	79	No	No	No	No	No	No	No	No	No	No
8	2	201	1	72	No	No	No	No	No	No	No	No	No	No
9	2	198	1	71	No	No	No	No	No	No	No	No	No	No
10	2	195	1	70	No	No	No	No	No	No	No	No	No	No
11	2	170	1	61	No	No	No	No	No	No	No	No	No	No
12	2	158	1	57	No	No	No	No	No	No	No	No	No	No
13	2	155	1	56	No	No	No	No	No	No	No	No	No	No
14	2	114	1	41	No	No	No	No	No	No	No	No	No	No
15	2	114	1	41	No	No	No	No	No	No	No	No	No	No
16	2	81	1	29	No	No	No	No	No	No	No	No	No	No
17	2	46	1	16	No	No	No	No	No	No	No	No	No	No
18	2	46	1	16	No	No	No	No	No	No	No	No	No	No
19	2	26	1	9	No	No	No	No	No	No	No	No	No	No
20	2	14	1	5	No	No	No	No	No	No	No	No	No	No
21	2	8	1	3	No	No	No	No	No	No	No	No	No	No
22	2	3	1	1	No	No	No	No	No	No	No	No	No	No
23	2	3	1	1	No	No	No	No	No	No	No	No	No	No
24	2	3	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	10.4
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:17
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	103
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	390
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>





## Signal Warrants Report For Intersection 6: Peterson Rd/ Access 2

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	54	103	103
2	52	100	100
3	51	98	98
4	48	92	92
5	43	81	81
6	42	80	80
7	42	79	79
8	38	72	72
9	37	71	71
10	37	70	70
11	32	61	61
12	30	57	57
13	29	56	56
14	22	41	41
15	22	41	41
16	15	29	29
17	9	16	16
18	9	16	16
19	5	9	9
20	3	5	5
21	2	3	3
22	1	1	1
23	1	1	1
24	1	1	1



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	157	1	103	No	No	No	No	No	No	No	No	No	No
2	2	152	1	100	No	No	No	No	No	No	No	No	No	No
3	2	149	1	98	No	No	No	No	No	No	No	No	No	No
4	2	140	1	92	No	No	No	No	No	No	No	No	No	No
5	2	124	1	81	No	No	No	No	No	No	No	No	No	No
6	2	122	1	80	No	No	No	No	No	No	No	No	No	No
7	2	121	1	79	No	No	No	No	No	No	No	No	No	No
8	2	110	1	72	No	No	No	No	No	No	No	No	No	No
9	2	108	1	71	No	No	No	No	No	No	No	No	No	No
10	2	107	1	70	No	No	No	No	No	No	No	No	No	No
11	2	93	1	61	No	No	No	No	No	No	No	No	No	No
12	2	87	1	57	No	No	No	No	No	No	No	No	No	No
13	2	85	1	56	No	No	No	No	No	No	No	No	No	No
14	2	63	1	41	No	No	No	No	No	No	No	No	No	No
15	2	63	1	41	No	No	No	No	No	No	No	No	No	No
16	2	44	1	29	No	No	No	No	No	No	No	No	No	No
17	2	25	1	16	No	No	No	No	No	No	No	No	No	No
18	2	25	1	16	No	No	No	No	No	No	No	No	No	No
19	2	14	1	9	No	No	No	No	No	No	No	No	No	No
20	2	8	1	5	No	No	No	No	No	No	No	No	No	No
21	2	5	1	3	No	No	No	No	No	No	No	No	No	No
22	2	2	1	1	No	No	No	No	No	No	No	No	No	No
23	2	2	1	1	No	No	No	No	No	No	No	No	No	No
24	2	2	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	9.5
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:16
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	103
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	260
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>



## Signal Warrants Report For Intersection 15: 48th Ave/Access 3

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	27	0	103	0
2	26	0	100	0
3	26	0	98	0
4	24	0	92	0
5	21	0	81	0
6	21	0	80	0
7	21	0	79	0
8	19	0	72	0
9	19	0	71	0
10	18	0	70	0
11	16	0	61	0
12	15	0	57	0
13	15	0	56	0
14	11	0	41	0
15	11	0	41	0
16	8	0	29	0
17	4	0	16	0
18	4	0	16	0
19	2	0	9	0
20	1	0	5	0
21	1	0	3	0
22	0	0	1	0
23	0	0	1	0
24	0	0	1	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	27	1	103	No	No	No	No	No	No	No	No	No	No
2	2	26	1	100	No	No	No	No	No	No	No	No	No	No
3	2	26	1	98	No	No	No	No	No	No	No	No	No	No
4	2	24	1	92	No	No	No	No	No	No	No	No	No	No
5	2	21	1	81	No	No	No	No	No	No	No	No	No	No
6	2	21	1	80	No	No	No	No	No	No	No	No	No	No
7	2	21	1	79	No	No	No	No	No	No	No	No	No	No
8	2	19	1	72	No	No	No	No	No	No	No	No	No	No
9	2	19	1	71	No	No	No	No	No	No	No	No	No	No
10	2	18	1	70	No	No	No	No	No	No	No	No	No	No
11	2	16	1	61	No	No	No	No	No	No	No	No	No	No
12	2	15	1	57	No	No	No	No	No	No	No	No	No	No
13	2	15	1	56	No	No	No	No	No	No	No	No	No	No
14	2	11	1	41	No	No	No	No	No	No	No	No	No	No
15	2	11	1	41	No	No	No	No	No	No	No	No	No	No
16	2	8	1	29	No	No	No	No	No	No	No	No	No	No
17	2	4	1	16	No	No	No	No	No	No	No	No	No	No
18	2	4	1	16	No	No	No	No	No	No	No	No	No	No
19	2	2	1	9	No	No	No	No	No	No	No	No	No	No
20	2	1	1	5	No	No	No	No	No	No	No	No	No	No
21	2	1	1	3	No	No	No	No	No	No	No	No	No	No
22	2	0	1	1	No	No	No	No	No	No	No	No	No	No
23	2	0	1	1	No	No	No	No	No	No	No	No	No	No
24	2	0	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.7	9.2
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:14	0:00
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	103	0
High Minor Volume Condition Met	Yes	No
Total Entering Volume on All Approaches During Same Hour	130	130
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



## Signal Warrants Report For Intersection 16: 48th Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	E, W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	N	S	E	W
1	0	27	0	103
2	0	26	0	100
3	0	26	0	98
4	0	24	0	92
5	0	21	0	81
6	0	21	0	80
7	0	21	0	79
8	0	19	0	72
9	0	19	0	71
10	0	18	0	70
11	0	16	0	61
12	0	15	0	57
13	0	15	0	56
14	0	11	0	41
15	0	11	0	41
16	0	8	0	29
17	0	4	0	16
18	0	4	0	16
19	0	2	0	9
20	0	1	0	5
21	0	1	0	3
22	0	0	0	1
23	0	0	0	1
24	0	0	0	1



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	27	2	103	No	No	No	No	No	No	No	No	No	No
2	2	26	2	100	No	No	No	No	No	No	No	No	No	No
3	2	26	2	98	No	No	No	No	No	No	No	No	No	No
4	2	24	2	92	No	No	No	No	No	No	No	No	No	No
5	2	21	2	81	No	No	No	No	No	No	No	No	No	No
6	2	21	2	80	No	No	No	No	No	No	No	No	No	No
7	2	21	2	79	No	No	No	No	No	No	No	No	No	No
8	2	19	2	72	No	No	No	No	No	No	No	No	No	No
9	2	19	2	71	No	No	No	No	No	No	No	No	No	No
10	2	18	2	70	No	No	No	No	No	No	No	No	No	No
11	2	16	2	61	No	No	No	No	No	No	No	No	No	No
12	2	15	2	57	No	No	No	No	No	No	No	No	No	No
13	2	15	2	56	No	No	No	No	No	No	No	No	No	No
14	2	11	2	41	No	No	No	No	No	No	No	No	No	No
15	2	11	2	41	No	No	No	No	No	No	No	No	No	No
16	2	8	2	29	No	No	No	No	No	No	No	No	No	No
17	2	4	2	16	No	No	No	No	No	No	No	No	No	No
18	2	4	2	16	No	No	No	No	No	No	No	No	No	No
19	2	2	2	9	No	No	No	No	No	No	No	No	No	No
20	2	1	2	5	No	No	No	No	No	No	No	No	No	No
21	2	1	2	3	No	No	No	No	No	No	No	No	No	No
22	2	0	2	1	No	No	No	No	No	No	No	No	No	No
23	2	0	2	1	No	No	No	No	No	No	No	No	No	No
24	2	0	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	9.2	8.7
Number of Lanes on Minor Street Approach	1	2
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:00	0:14
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	0	103
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	130	130
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



### Intersection Level Of Service Report

#### Intersection 1: E Colfax Ave/Manila Rd

Control Type:	Signalized	Delay (sec / veh):	37.1
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.658

#### Intersection Setup

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	460.0	100.0	435.0	300.0	100.0	250.0	625.0	100.0	600.0	990.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	2
Exit Pocket Length [ft]	0.00	0.00	550.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1620.
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	20	1135	1046	20	155	5	5	343	15	317	351	50
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	256	0	0	0	0	32	0	50	6	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	651	0	0	3	0	0	8	0	0	25
Total Hourly Volume [veh/h]	20	1135	651	20	155	2	5	375	7	367	357	25
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	5	308	177	5	42	1	1	102	2	100	97	7
Total Analysis Volume [veh/h]	22	1234	708	22	168	2	5	408	8	399	388	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		



**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi	Protec	Permi	Permi
Signal Group	3	8	1	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	5	5	10	0	5	10	0	5	10	0
Maximum Green [s]	30	30	30	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	46	30	9	46	0	9	25	0	30	46	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	21	0	0	14	0	0	34	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	51	44	44	51	44	44	51	34	34	13	46	46
g / C, Green / Cycle	0.46	0.40	0.40	0.46	0.40	0.40	0.46	0.31	0.31	0.12	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.02	0.41	0.29	0.07	0.06	0.00	0.01	0.13	0.13	0.09	0.24	0.02
s, saturation flow rate [veh/h]	1082	3046	2407	311	3046	1360	868	1600	1589	4438	1600	1360
c, Capacity [veh/h]	553	1229	972	159	1229	549	347	501	498	511	675	574
d1, Uniform Delay [s]	16.22	32.80	27.71	25.70	20.70	19.59	17.60	29.82	29.83	47.31	24.25	18.74
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering 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
d2, Incremental Delay [s]	0.03	12.81	1.07	0.39	0.05	0.00	0.08	2.53	2.56	2.63	3.53	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression 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

**Lane Group Results**

X, volume / capacity	0.04	1.00	0.73	0.14	0.14	0.00	0.01	0.42	0.42	0.78	0.57	0.05
d, Delay for Lane Group [s/veh]	16.25	45.61	28.78	26.09	20.75	19.59	17.67	32.35	32.39	49.94	27.79	18.90
Lane Group LOS	B	F	C	C	C	B	B	C	C	D	C	B
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.29	17.28	7.49	0.30	1.31	0.03	0.07	4.42	4.41	3.49	7.66	0.40
50th-Percentile Queue Length [ft/ln]	7.28	431.9	187.1	7.60	32.75	0.74	1.73	110.5	110.1	87.19	191.4	10.02
95th-Percentile Queue Length [veh/ln]	0.52	24.16	11.97	0.55	2.36	0.05	0.12	7.87	7.85	6.28	12.20	0.72
95th-Percentile Queue Length [ft/ln]	13.10	603.9	299.3	13.68	58.94	1.34	3.12	196.7	196.2	156.9	304.9	18.04

**Movement, Approach, & Intersection Results**

d_M, Delay for Movement [s/veh]	16.25	45.61	28.78	26.09	20.75	19.59	17.67	32.37	32.39	49.94	27.79	18.90
Movement LOS	B	F	C	C	C	B	B	C	C	D	C	B
d_A, Approach Delay [s/veh]	39.22			21.35			32.19			38.35		
Approach LOS	D			C			C			D		
d_I, Intersection Delay [s/veh]	37.12											
Intersection LOS	D											
Intersection V/C	0.658											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	44.55			44.55			44.55			44.55		
I_p,int, Pedestrian LOS Score for Intersection	4.246			2.832			2.542			3.371		
Crosswalk LOS	D			C			B			C		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	764			764			382			764		
d_b, Bicycle Delay [s]	21.02			21.02			36.01			21.02		
I_b,int, Bicycle LOS Score for Intersection	3.717			1.720			1.914			2.944		
Bicycle LOS	D			A			A			C		

**Sequence**

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





### Intersection Level Of Service Report

#### Intersection 2: E Colfax Ave/Peterson Rd

Control Type:	Signalized	Delay (sec / veh):	79.9
Analysis Method:	HCM 7th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.866

#### Intersection Setup

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	100.0	100.0	250.0	410.0	100.0	250.0	1350.	100.0	100.0	625.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	0	0	0	2	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	190.0	0.00	0.00	960.0	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	28	5	245	1211	133	5	5	239	136
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	6	0	56	288	0	0	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	151	0	0	3	0	0	84
Total Hourly Volume [veh/h]	5	5	2	34	5	150	1499	133	2	5	239	84
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	1	1	1	9	1	41	407	36	1	1	65	23
Total Analysis Volume [veh/h]	5	5	2	37	5	163	1629	145	2	5	260	91
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	170
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	ProtP	Permi	Permi	Protec	Permi	Permi	ProtP	Permi	Permi
Signal Group	3	8	0	7	4	4	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	10	5	10	0	5	10	0
Maximum Green [s]	10	30	0	10	30	30	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	38	0	9	38	38	98	71	0	52	25	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	7	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	24	24	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	Yes	No		Yes	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	R	L	C	L	C	R
C, Cycle Length [s]	170	170	170	170	170	170	170	170	170	170	170
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00
I2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	19	11	11	19	14	14	94	138	73	45	45
g / C, Green / Cycle	0.11	0.06	0.06	0.11	0.08	0.08	0.55	0.81	0.43	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.01	0.00	0.00	0.03	0.07	0.07	0.61	0.10	0.00	0.18	0.07
s, saturation flow rate [veh/h]	937	1440	1224	1084	1235	1224	2663	1436	1143	1440	1224
c, Capacity [veh/h]	95	92	78	173	102	101	1471	1165	496	382	324
d1, Uniform Delay [s]	67.64	74.73	74.59	69.05	76.81	76.83	38.06	3.38	28.06	56.02	49.59
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.14	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.23	0.24	0.13	0.61	15.39	15.69	51.79	0.22	0.01	9.45	2.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.05	0.05	0.03	0.21	0.83	0.83	1.11	0.13	0.01	0.68	0.28
d, Delay for Lane Group [s/veh]	67.87	74.97	74.72	69.66	92.21	92.52	89.85	3.60	28.07	65.48	51.74
Lane Group LOS	E	E	E	E	F	F	F	A	C	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.20	0.21	0.09	1.52	4.09	4.08	38.67	0.87	0.12	10.74	3.21
50th-Percentile Queue Length [ft/ln]	5.06	5.34	2.14	38.12	102.3	101.8	966.75	21.86	2.90	268.5	80.29
95th-Percentile Queue Length [veh/ln]	0.36	0.38	0.15	2.74	7.37	7.34	53.03	1.57	0.21	16.12	5.78
95th-Percentile Queue Length [ft/ln]	9.10	9.61	3.85	68.62	184.1	183.3	1325.81	39.34	5.22	402.9	144.5

**Movement, Approach, & Intersection Results**

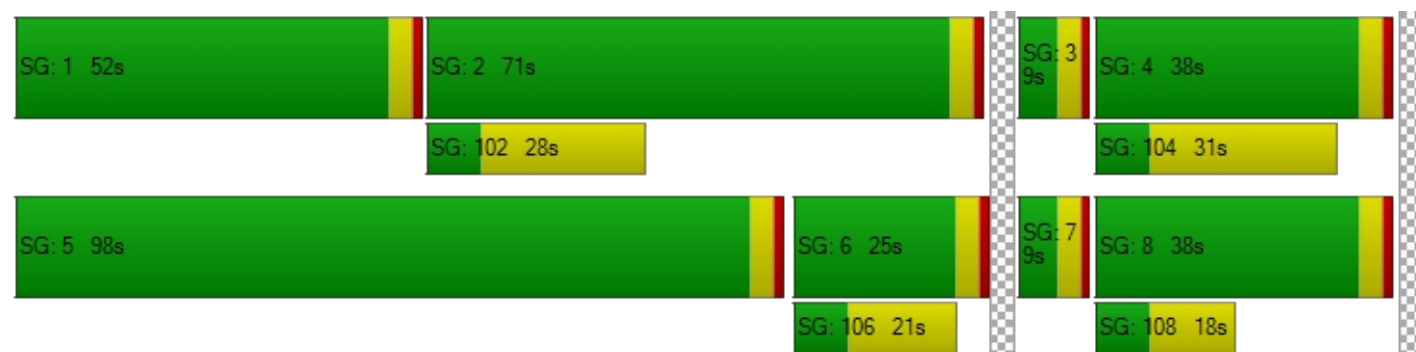
d_M, Delay for Movement [s/veh]	67.87	74.97	74.72	69.66	92.21	92.37	89.85	3.60	3.60	28.07	65.48	51.74
Movement LOS	E	E	E	E	F	F	F	A	A	C	E	D
d_A, Approach Delay [s/veh]	71.97			88.26			82.71			61.44		
Approach LOS	E			F			F			E		
d_I, Intersection Delay [s/veh]	79.92											
Intersection LOS	E											
Intersection V/C	0.866											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	74.36			74.36			74.36			74.36		
I_p,int, Pedestrian LOS Score for Intersection	2.174			3.140			3.178			2.680		
Crosswalk LOS	B			C			C			B		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	400			400			788			247		
d_b, Bicycle Delay [s]	54.40			54.40			31.20			65.30		
I_b,int, Bicycle LOS Score for Intersection	1.584			2.147			4.495			2.286		
Bicycle LOS	A			B			E			B		

**Sequence**

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-










### Intersection Level Of Service Report

#### Intersection 3: Manila Rd/I-70 Westbound Ramp

Control Type:	Signalized	Delay (sec / veh):	9.6
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.672

#### Intersection Setup

Name	Manila Rd			Manila Rd			Eastbound			Westbound Ramp		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	0	0	0	0	0	1
Entry Pocket Length [ft]	735.0	100.0	100.0	100.0	100.0	435.0	100.0	100.0	100.0	100.0	100.0	435.0
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	550.0	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No						No		
Crosswalk	Yes			Yes			No			Yes		

**Volumes**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Base Volume Input [veh/h]	300	1898	0	0	91	405	0	0	0	45	5	314
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	192	0	0	12	38	0	0	0	0	0	64
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	222	0	0	0	0	0	189
Total Hourly Volume [veh/h]	300	2090	0	0	103	221	0	0	0	45	5	189
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	82	568	0	0	28	60	0	0	0	12	1	51
Total Analysis Volume [veh/h]	326	2272	0	0	112	240	0	0	0	49	5	205
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	1	6	0	0	2	0	0	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	0	10	0	0	0	0	0	10	0
Maximum Green [s]	30	30	0	0	30	0	0	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	9	46	0	0	37	0	0	0	0	0	24	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	21	0	0	26	0	0	0	0	0	9	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No						No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No						No	
Maximum Recall	No	No			No						No	
Pedestrian Recall	No	No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	C	R		C	R
C, Cycle Length [s]	70	70	70	70		70	70
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00		4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00		0.00	0.00
I2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00		2.00	2.00
g_i, Effective Green Time [s]	49	49	40	40		13	13
g / C, Green / Cycle	0.71	0.71	0.58	0.58		0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.34	0.52	0.04	0.10		0.04	0.15
s, saturation flow rate [veh/h]	973	4358	3046	2407		1530	1360
c, Capacity [veh/h]	815	3074	1754	1386		276	245
d1, Uniform Delay [s]	3.89	6.36	6.55	7.01		24.41	27.73
k, delay calibration	0.29	0.50	0.50	0.50		0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00		1.00	1.00
d2, Incremental Delay [s]	0.86	1.64	0.07	0.27		0.34	7.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00		0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00		1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00		1.00	1.00

**Lane Group Results**

X, volume / capacity	0.40	0.74	0.06	0.17		0.20	0.84
d, Delay for Lane Group [s/veh]	4.75	7.99	6.62	7.28		24.75	35.05
Lane Group LOS	A	A	A	A		C	D
Critical Lane Group	No	Yes	No	No		No	Yes
50th-Percentile Queue Length [veh/ln]	1.09	3.88	0.29	0.67		0.76	3.66
50th-Percentile Queue Length [ft/ln]	27.22	96.98	7.22	16.87		18.96	91.39
95th-Percentile Queue Length [veh/ln]	1.96	6.98	0.52	1.21		1.36	6.58
95th-Percentile Queue Length [ft/ln]	49.00	174.56	12.99	30.37		34.12	164.50

**Movement, Approach, & Intersection Results**

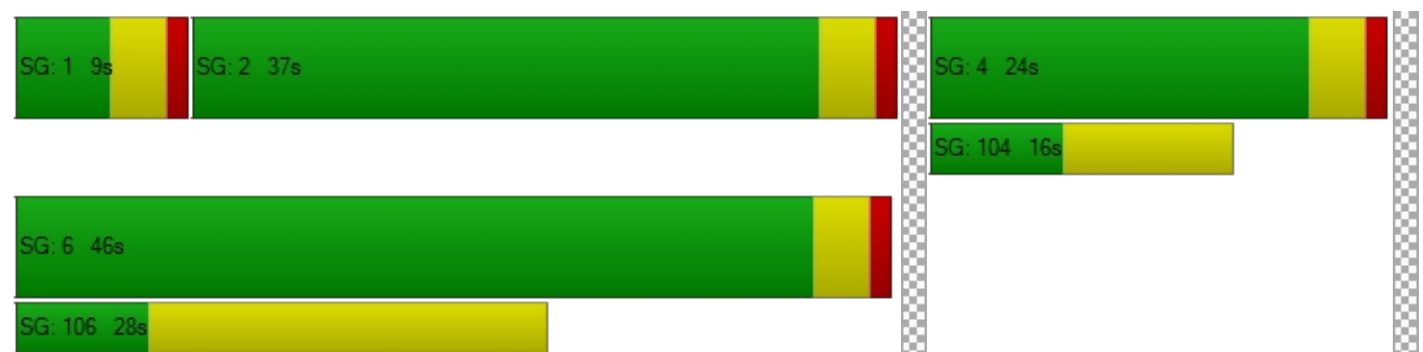
d_M, Delay for Movement [s/veh]	4.75	7.99	0.00	0.00	6.62	7.28	0.00	0.00	0.00	24.75	24.75	35.05
Movement LOS	A	A			A	A				C	C	D
d_A, Approach Delay [s/veh]	7.58			7.07			0.00			32.90		
Approach LOS	A			A			A			C		
d_I, Intersection Delay [s/veh]	9.57											
Intersection LOS	A											
Intersection V/C	0.672											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0		11.0		0.0		11.0					
M_corner, Corner Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
d_p, Pedestrian Delay [s]	24.89		24.89		0.00		24.89					
I_p,int, Pedestrian LOS Score for Intersection	3.112		3.573		0.000		2.188					
Crosswalk LOS	C		D		F		B					
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000		2000		2000		2000					
c_b, Capacity of the bicycle lane [bicycles/h]	1199		942		0		571					
d_b, Bicycle Delay [s]	5.62		9.80		35.03		17.89					
I_b,int, Bicycle LOS Score for Intersection	2.989		2.033		4.132		2.299					
Bicycle LOS	C		B		D		B					

**Sequence**

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	24.5
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.669

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.0	100.0	435.0	745.0	100.0	100.0	1075.	100.0	435.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	470	70	54	92	0	1728	5	90	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	12	0	0	192	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	35	0	0	0	0	0	45	0	0	0
Total Hourly Volume [veh/h]	0	470	35	66	92	0	1920	5	45	0	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	128	10	18	25	0	522	1	12	0	0	0
Total Analysis Volume [veh/h]	0	511	38	72	100	0	2087	5	49	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	5	10	0	0	10	0	0	0	0
Maximum Green [s]	0	30	0	10	30	0	0	30	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	32	0	9	41	0	0	49	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	19	0	0	22	0	0	14	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		Yes	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0



**Lane Group Calculations**

Lane Group	C	R	L	C	L	C	
C, Cycle Length [s]	90	90	90	90	90	90	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
I2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	29	29	38	38	44	44	
g / C, Green / Cycle	0.33	0.33	0.42	0.42	0.49	0.49	
(v / s)_i Volume / Saturation Flow Rate	0.17	0.03	0.08	0.03	0.47	0.04	
s, saturation flow rate [veh/h]	3046	1360	865	3046	4438	1379	
c, Capacity [veh/h]	995	444	377	1274	2188	680	
d1, Uniform Delay [s]	24.49	20.97	16.88	15.74	21.82	12.03	
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	1.89	0.38	1.13	0.12	3.19	0.05	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

**Lane Group Results**

X, volume / capacity	0.51	0.09	0.19	0.08	0.95	0.08	
d, Delay for Lane Group [s/veh]	26.38	21.34	18.01	15.86	25.01	12.08	
Lane Group LOS	C	C	B	B	C	B	
Critical Lane Group	Yes	No	Yes	No	Yes	No	
50th-Percentile Queue Length [veh/ln]	4.54	0.59	1.00	0.62	13.49	0.56	
50th-Percentile Queue Length [ft/ln]	113.54	14.79	24.98	15.61	337.20	13.97	
95th-Percentile Queue Length [veh/ln]	8.04	1.07	1.80	1.12	19.51	1.01	
95th-Percentile Queue Length [ft/ln]	200.91	26.63	44.97	28.10	487.78	25.15	

**Movement, Approach, & Intersection Results**

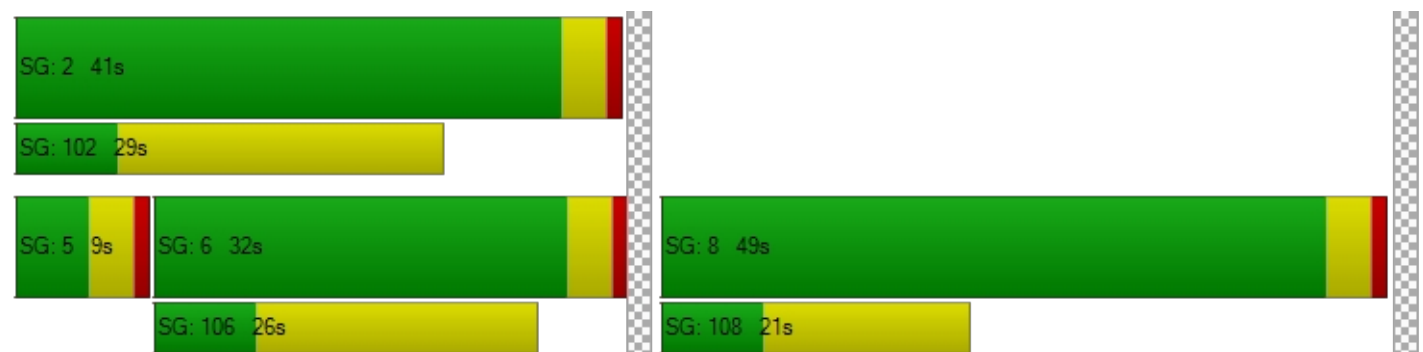
d_M, Delay for Movement [s/veh]	0.00	26.38	21.34	18.01	15.86	0.00	25.01	12.08	12.08	0.00	0.00	0.00
Movement LOS		C	C	B	B		C	B	B			
d_A, Approach Delay [s/veh]	26.03			16.76			24.69			0.00		
Approach LOS	C			B			C			A		
d_I, Intersection Delay [s/veh]	24.47											
Intersection LOS	C											
Intersection V/C	0.669											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	34.66			34.66			34.66			34.66		
I_p,int, Pedestrian LOS Score for Intersection	2.501			2.902			2.727			1.605		
Crosswalk LOS	B			C			B			A		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	622			823			1000			0		
d_b, Bicycle Delay [s]	21.34			15.59			11.24			44.98		
I_b,int, Bicycle LOS Score for Intersection	2.041			1.702			5.167			4.132		
Bicycle LOS	B			A			F			D		

**Sequence**

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





**Intersection Level Of Service Report**  
**Intersection 5: Peterson Rd/ Access 1**

Control Type: Signalized  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 11.1  
Level Of Service: B  
Volume to Capacity (v/c): 0.583

**Intersection Setup**

Name	Peterson Rd			Peterson Rd			Access 1					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	0	0	0	0	0	0
Entry Pocket Length [ft]	355.0	100.0	250.0	250.0	100.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	1	0	0	1	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	49.21	0.00	0.00	100.0	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd			Peterson Rd			Access 1					
Base Volume Input [veh/h]	0	1223	65	1	253	0	0	0	0	14	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	107	213	0	0	41	0	0	0	21	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	21	0	0	0
Total Hourly Volume [veh/h]	107	1436	65	1	294	0	0	0	0	14	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	29	390	18	0	80	0	0	0	0	4	0	0
Total Analysis Volume [veh/h]	116	1561	71	1	320	0	0	0	0	15	0	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	0	10	0	0	10	0	0	10	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	44	0	0	44	0	0	16	0	0	16	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	7	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	C	C	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	40	40	40	40	40	40	12	12
g / C, Green / Cycle	0.67	0.67	0.67	0.67	0.67	0.67	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.14	0.57	0.06	0.00	0.11	0.11	0.00	0.01
s, saturation flow rate [veh/h]	816	2741	1224	237	1440	1440	1440	1138
c, Capacity [veh/h]	603	1828	816	166	960	960	348	348
d1, Uniform Delay [s]	5.83	7.74	3.54	19.64	3.75	3.75	0.00	19.41
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.71	5.33	0.21	0.07	0.37	0.37	0.00	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.19	0.85	0.09	0.01	0.17	0.17	0.00	0.04
d, Delay for Lane Group [s/veh]	6.54	13.07	3.75	19.71	4.12	4.12	0.00	19.65
Lane Group LOS	A	B	A	B	A	A	A	B
Critical Lane Group	No	Yes	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.65	6.20	0.25	0.01	0.58	0.58	0.00	0.18
50th-Percentile Queue Length [ft/ln]	16.23	154.9	6.22	0.34	14.52	14.52	0.00	4.53
95th-Percentile Queue Length [veh/ln]	1.17	10.28	0.45	0.02	1.05	1.05	0.00	0.33
95th-Percentile Queue Length [ft/ln]	29.22	256.9	11.20	0.61	26.13	26.13	0.00	8.15

**Movement, Approach, & Intersection Results**

d_M, Delay for Movement [s/veh]	6.54	13.07	3.75	19.71	4.12	4.12	0.00	0.00	0.00	19.65	19.65	19.65
Movement LOS	A	B	A	B	A	A	A	A	A	B	B	B
d_A, Approach Delay [s/veh]	12.26			4.17			0.00			19.65		
Approach LOS	B			A			A			B		
d_I, Intersection Delay [s/veh]	11.07											
Intersection LOS	B											
Intersection V/C	0.583											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	9.0			9.0			9.0			9.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	21.68			21.68			21.68			21.68		
I_p,int, Pedestrian LOS Score for Intersection	2.797			2.739			1.957			1.739		
Crosswalk LOS	C			B			A			A		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1333			1333			400			400		
d_b, Bicycle Delay [s]	3.33			3.33			19.20			19.20		
I_b,int, Bicycle LOS Score for Intersection	3.002			1.824			1.594			1.584		
Bicycle LOS	C			A			A			A		

**Sequence**

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





### Intersection Level Of Service Report

#### Intersection 6: Peterson Rd/ Access 2

Control Type: Signalized  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 11.3  
 Level Of Service: B  
 Volume to Capacity (v/c): 0.391

#### Intersection Setup

Name	Peterson Rd			Peterson Rd			Access 2					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	1	0	0	1	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	190.0	0.00	0.00	100.0	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		



**Volumes**

Name	Peterson Rd			Peterson Rd			Access 2					
Base Volume Input [veh/h]	0	370	787	1	76	0	0	0	0	166	0	2
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	107	107	0	0	21	0	0	0	21	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	394	0	0	0	0	0	11	0	0	1
Total Hourly Volume [veh/h]	107	477	393	1	97	0	0	0	10	166	0	1
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	29	130	107	0	26	0	0	0	3	45	0	0
Total Analysis Volume [veh/h]	116	518	427	1	105	0	0	0	11	180	0	1
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	0	10	0	0	10	0	0	10	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	35	0	0	35	0	0	25	0	0	25	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	17	0	0	9	0	0	7	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	C	C	R	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	31	31	31	31	31	21	21	21
g / C, Green / Cycle	0.52	0.52	0.52	0.52	0.52	0.52	0.35	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.11	0.17	0.31	0.03	0.03	0.00	0.01	0.08	0.00
s, saturation flow rate [veh/h]	1103	3046	1360	1592	1456	1360	1360	2331	1360
c, Capacity [veh/h]	634	1574	703	883	752	703	536	846	476
d1, Uniform Delay [s]	9.56	8.44	10.22	7.26	7.26	0.00	12.78	13.79	12.68
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.64	0.56	3.88	0.14	0.17	0.00	0.07	0.57	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.18	0.33	0.61	0.06	0.07	0.00	0.02	0.21	0.00
d, Delay for Lane Group [s/veh]	10.20	9.00	14.10	7.40	7.43	0.00	12.85	14.36	12.69
Lane Group LOS	B	A	B	A	A	A	B	B	B
Critical Lane Group	No	No	Yes	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.89	1.74	3.98	0.33	0.31	0.00	0.10	0.85	0.01
50th-Percentile Queue Length [ft/ln]	22.29	43.41	99.43	8.27	7.66	0.00	2.47	21.14	0.23
95th-Percentile Queue Length [veh/ln]	1.61	3.13	7.16	0.60	0.55	0.00	0.18	1.52	0.02
95th-Percentile Queue Length [ft/ln]	40.13	78.13	178.9	14.89	13.79	0.00	4.44	38.06	0.41

**Movement, Approach, & Intersection Results**

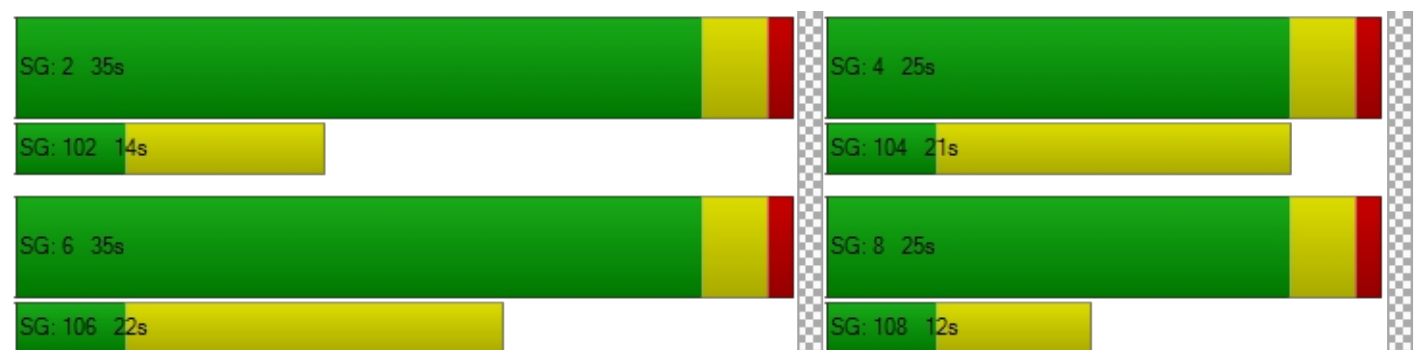
d_M, Delay for Movement [s/veh]	10.20	9.00	14.10	7.40	7.41	0.00	12.85	12.85	12.85	14.36	12.69	12.69
Movement LOS	B	A	B	A	A	A	B	B	B	B	B	B
d_A, Approach Delay [s/veh]	11.19			7.41			12.85			14.35		
Approach LOS	B			A			B			B		
d_I, Intersection Delay [s/veh]	11.33											
Intersection LOS	B											
Intersection V/C	0.391											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	9.0			9.0			9.0			9.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	21.68			21.68			21.68			21.68		
I_p,int, Pedestrian LOS Score for Intersection	3.536			2.535			1.943			2.359		
Crosswalk LOS	D			B			A			B		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1033			1033			700			700		
d_b, Bicycle Delay [s]	7.01			7.01			12.68			12.68		
I_b,int, Bicycle LOS Score for Intersection	2.760			1.647			1.596			1.860		
Bicycle LOS	C			A			A			A		

**Sequence**

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





### Intersection Level Of Service Report

#### Intersection 15: 48th Ave/Access 3

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 8.6  
 Level Of Service: A  
 Volume to Capacity (v/c): 0.022

#### Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+ +		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	1	0	0
Entry Pocket Length [ft]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	355.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name												
Base Volume Input [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	21	0	0	0	0	0	0	107	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	21	0	0	0	0	0	0	107	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	0	6	0	0	0	0	0	0	29	0	0
Total Analysis Volume [veh/h]	0	0	23	0	0	0	0	0	0	116	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
d_M, Delay for Movement [s/veh]	10.76	11.19	8.56	10.91	11.11	8.48	7.38	0.00	0.00	7.58	0.00	0.00
Movement LOS	B	B	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.70	1.70	1.70	0.00	0.00	0.00	0.00	0.00	0.00	6.22	0.00	0.00
d_A, Approach Delay [s/veh]	8.56			10.17			2.46			7.58		
Approach LOS	A			B			A			A		
d_I, Intersection Delay [s/veh]	7.74											
Intersection LOS	A											



### Intersection Level Of Service Report Intersection 16: 48th Ave/Peterson Rd

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 12.0  
Level Of Service: B  
Volume to Capacity (v/c): 0.115

#### Intersection Setup

Name	Peterson Rd											
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	0	0	1	0	0	0
Entry Pocket Length [ft]	355.0	100.0	250.0	100.0	100.0	100.0	100.0	100.0	250.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name	Peterson Rd											
Base Volume Input [veh/h]	0	0	301	0	0	0	0	0	0	62	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	107	0	0	0	0	0	0	0	21	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	107	0	301	0	0	0	0	0	21	62	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	29	0	82	0	0	0	0	0	6	17	0	0
Total Analysis Volume [veh/h]	116	0	327	0	0	0	0	0	23	67	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.12	0.00	0.00
d_M, Delay for Movement [s/veh]	7.60	0.00	0.00	8.25	0.00	0.00	10.94	14.76	8.58	12.00	12.03	9.30
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh/ln]	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.39	0.39	0.39
95th-Percentile Queue Length [ft/ln]	6.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.71	9.71	9.71	9.71
d_A, Approach Delay [s/veh]	1.99			2.75			8.58			12.00		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	3.53											
Intersection LOS	B											





## Signal Warrants Report For Intersection 15: 48th Ave/Access 3

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	107	0	21	0
2	104	0	20	0
3	102	0	20	0
4	95	0	19	0
5	85	0	17	0
6	83	0	16	0
7	82	0	16	0
8	75	0	15	0
9	74	0	14	0
10	73	0	14	0
11	63	0	12	0
12	59	0	12	0
13	58	0	11	0
14	43	0	8	0
15	43	0	8	0
16	30	0	6	0
17	17	0	3	0
18	17	0	3	0
19	10	0	2	0
20	5	0	1	0
21	3	0	1	0
22	1	0	0	0
23	1	0	0	0
24	1	0	0	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	107	1	21	No	No	No	No	No	No	No	No	No	No
2	2	104	1	20	No	No	No	No	No	No	No	No	No	No
3	2	102	1	20	No	No	No	No	No	No	No	No	No	No
4	2	95	1	19	No	No	No	No	No	No	No	No	No	No
5	2	85	1	17	No	No	No	No	No	No	No	No	No	No
6	2	83	1	16	No	No	No	No	No	No	No	No	No	No
7	2	82	1	16	No	No	No	No	No	No	No	No	No	No
8	2	75	1	15	No	No	No	No	No	No	No	No	No	No
9	2	74	1	14	No	No	No	No	No	No	No	No	No	No
10	2	73	1	14	No	No	No	No	No	No	No	No	No	No
11	2	63	1	12	No	No	No	No	No	No	No	No	No	No
12	2	59	1	12	No	No	No	No	No	No	No	No	No	No
13	2	58	1	11	No	No	No	No	No	No	No	No	No	No
14	2	43	1	8	No	No	No	No	No	No	No	No	No	No
15	2	43	1	8	No	No	No	No	No	No	No	No	No	No
16	2	30	1	6	No	No	No	No	No	No	No	No	No	No
17	2	17	1	3	No	No	No	No	No	No	No	No	No	No
18	2	17	1	3	No	No	No	No	No	No	No	No	No	No
19	2	10	1	2	No	No	No	No	No	No	No	No	No	No
20	2	5	1	1	No	No	No	No	No	No	No	No	No	No
21	2	3	1	1	No	No	No	No	No	No	No	No	No	No
22	2	1	1	0	No	No	No	No	No	No	No	No	No	No
23	2	1	1	0	No	No	No	No	No	No	No	No	No	No
24	2	1	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.6	10.2
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:02	0:00
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	21	0
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	128	128
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



## Signal Warrants Report For Intersection 16: 48th Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	E, W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	N	S	E	W
1	0	408	62	21
2	0	396	60	20
3	0	388	59	20
4	0	363	55	19
5	0	322	49	17
6	0	318	48	16
7	0	314	48	16
8	0	286	43	15
9	0	282	43	14
10	0	277	42	14
11	0	241	37	12
12	0	224	34	12
13	0	220	33	11
14	0	163	25	8
15	0	163	25	8
16	0	114	17	6
17	0	65	10	3
18	0	65	10	3
19	0	37	6	2
20	0	20	3	1
21	0	12	2	1
22	0	4	1	0
23	0	4	1	0
24	0	4	1	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	4	408	1	62	No	No	No	No	No	No	No	No	No	No
2	4	396	1	60	No	No	No	No	No	No	No	No	No	No
3	4	388	1	59	No	No	No	No	No	No	No	No	No	No
4	4	363	1	55	No	No	No	No	No	No	No	No	No	No
5	4	322	1	49	No	No	No	No	No	No	No	No	No	No
6	4	318	1	48	No	No	No	No	No	No	No	No	No	No
7	4	314	1	48	No	No	No	No	No	No	No	No	No	No
8	4	286	1	43	No	No	No	No	No	No	No	No	No	No
9	4	282	1	43	No	No	No	No	No	No	No	No	No	No
10	4	277	1	42	No	No	No	No	No	No	No	No	No	No
11	4	241	1	37	No	No	No	No	No	No	No	No	No	No
12	4	224	1	34	No	No	No	No	No	No	No	No	No	No
13	4	220	1	33	No	No	No	No	No	No	No	No	No	No
14	4	163	1	25	No	No	No	No	No	No	No	No	No	No
15	4	163	1	25	No	No	No	No	No	No	No	No	No	No
16	4	114	1	17	No	No	No	No	No	No	No	No	No	No
17	4	65	1	10	No	No	No	No	No	No	No	No	No	No
18	4	65	1	10	No	No	No	No	No	No	No	No	No	No
19	4	37	1	6	No	No	No	No	No	No	No	No	No	No
20	4	20	1	3	No	No	No	No	No	No	No	No	No	No
21	4	12	1	2	No	No	No	No	No	No	No	No	No	No
22	4	4	1	1	No	No	No	No	No	No	No	No	No	No
23	4	4	1	1	No	No	No	No	No	No	No	No	No	No
24	4	4	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	12	8.6
Number of Lanes on Minor Street Approach	1	2
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:12	0:03
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	62	21
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	491	491
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



### Intersection Level Of Service Report

#### Intersection 1: E Colfax Ave/Manila Rd

Control Type:	Signalized	Delay (sec / veh):	43.3
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.762

#### Intersection Setup

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Entry Pocket Length [ft]	460.0	100.0	435.0	300.0	100.0	250.0	625.0	100.0	600.0	990.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	2
Exit Pocket Length [ft]	0.00	0.00	550.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1620.
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	20	145	356	55	865	20	5	434	40	917	372	5
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	65	0	0	0	0	8	0	247	31	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	211	0	0	10	0	0	20	0	0	3
Total Hourly Volume [veh/h]	20	145	210	55	865	10	5	442	20	1164	403	2
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	5	39	57	15	235	3	1	120	5	316	110	1
Total Analysis Volume [veh/h]	22	158	228	60	940	11	5	480	22	1265	438	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	ProtP	Permi	Permi	ProtP	Permi	Permi	Protec	Permi	Permi
Signal Group	3	8	1	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	5	5	10	0	5	10	0	5	10	0
Maximum Green [s]	30	30	30	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	42	39	9	42	0	9	30	0	39	60	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	31	0	0	21	0	0	14	0	0	34	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	R	L	C	C	L	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	46	37	37	46	39	39	66	27	27	35	62	62
g / C, Green / Cycle	0.38	0.31	0.31	0.38	0.32	0.32	0.55	0.23	0.23	0.29	0.51	0.51
(v / s)_i Volume / Saturation Flow Rate	0.04	0.05	0.17	0.06	0.31	0.01	0.01	0.16	0.16	0.29	0.27	0.00
s, saturation flow rate [veh/h]	608	3046	1360	948	3046	1360	842	1600	1575	4438	1600	1360
c, Capacity [veh/h]	162	943	421	409	988	441	408	366	360	1294	822	699
d1, Uniform Delay [s]	29.27	30.18	34.37	24.16	39.60	27.60	13.88	42.37	42.40	42.11	19.52	14.19
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering 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
d2, Incremental Delay [s]	0.38	0.08	1.09	0.16	6.00	0.02	0.05	10.19	10.44	7.47	2.47	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression 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

**Lane Group Results**

X, volume / capacity	0.14	0.17	0.54	0.15	0.95	0.02	0.01	0.69	0.69	0.98	0.53	0.00
d, Delay for Lane Group [s/veh]	29.65	30.26	35.46	24.33	45.60	27.62	13.93	52.56	52.85	49.58	21.98	14.20
Lane Group LOS	C	C	D	C	D	C	B	D	D	D	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.40	1.63	5.45	1.09	13.70	0.21	0.06	7.54	7.48	12.45	7.92	0.03
50th-Percentile Queue Length [ft/ln]	9.97	40.76	136.2	27.17	342.4	5.32	1.52	188.5	186.9	311.2	197.9	0.65
95th-Percentile Queue Length [veh/ln]	0.72	2.93	9.28	1.96	19.77	0.38	0.11	12.05	11.96	18.24	12.53	0.05
95th-Percentile Queue Length [ft/ln]	17.94	73.36	231.9	48.91	494.1	9.58	2.73	301.1	299.0	455.8	313.2	1.16



**Movement, Approach, & Intersection Results**

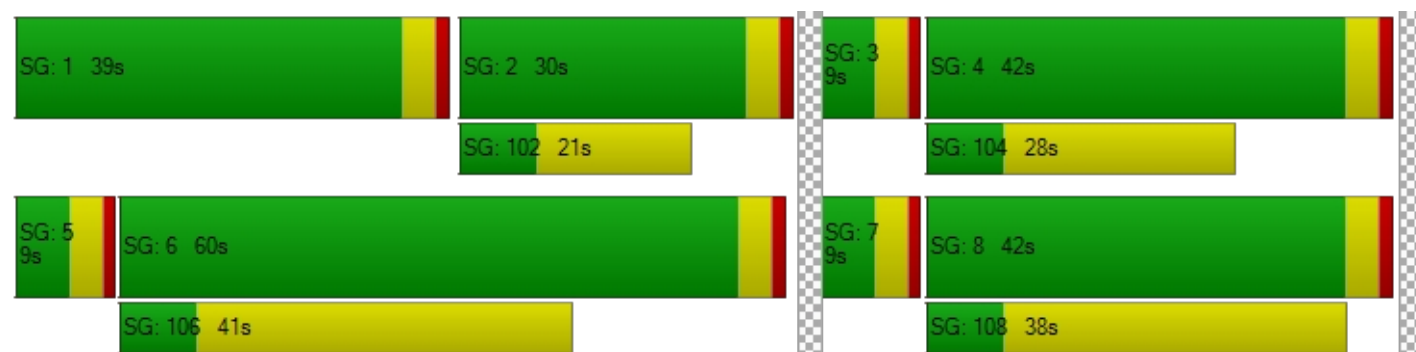
d_M, Delay for Movement [s/veh]	29.65	30.26	35.46	24.33	45.60	27.62	13.93	52.70	52.85	49.58	21.98	14.20
Movement LOS	C	C	D	C	D	C	B	D	D	D	C	B
d_A, Approach Delay [s/veh]	33.13			44.14			52.32			42.45		
Approach LOS	C			D			D			D		
d_I, Intersection Delay [s/veh]	43.25											
Intersection LOS	D											
Intersection V/C	0.762											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	49.51			49.51			49.51			49.51		
I_p,int, Pedestrian LOS Score for Intersection	3.507			2.774			2.713			3.372		
Crosswalk LOS	D			C			B			C		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	633			633			433			933		
d_b, Bicycle Delay [s]	28.02			28.02			36.82			17.07		
I_b,int, Bicycle LOS Score for Intersection	2.070			2.402			1.994			4.378		
Bicycle LOS	B			B			A			E		

**Sequence**

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





**Intersection Level Of Service Report**  
**Intersection 2: E Colfax Ave/Peterson Rd**

Control Type:	Signalized	Delay (sec / veh):	55.5
Analysis Method:	HCM 7th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.819

**Intersection Setup**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	↵↵			↵↵			↵↵↵			↵↵		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	1	0	0	1	0	1
Entry Pocket Length [ft]	275.0	100.0	250.0	410.0	100.0	250.0	1350.	100.0	100.0	625.0	100.0	600.0
No. of Lanes in Exit Pocket	0	0	0	0	0	2	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	190.0	0.00	0.00	960.0	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	127	5	1125	318	295	5	5	167	35
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	31	0	278	73	0	0	0	0	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	702	0	0	3	0	0	22
Total Hourly Volume [veh/h]	5	5	2	158	5	701	391	295	2	5	167	21
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	1	1	1	43	1	190	106	80	1	1	45	6
Total Analysis Volume [veh/h]	5	5	2	172	5	762	425	321	2	5	182	23
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	ProtP	Permi	Permi	Protec	Permi	Permi	ProtP	Permi	Permi
Signal Group	3	8	0	7	4	5	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	5	5	10	0	5	10	0
Maximum Green [s]	30	30	0	30	30	30	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	63	0	18	72	24	24	40	0	9	25	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	24	0	0	21	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	R	L	C	L	C	R
C, Cycle Length [s]	130	130	130	130	130	130	130	130	130	130	130
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	77	64	64	77	72	72	20	40	45	21	21
g / C, Green / Cycle	0.59	0.49	0.49	0.59	0.55	0.55	0.15	0.31	0.35	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.01	0.00	0.00	0.14	0.00	0.56	0.14	0.20	0.01	0.11	0.02
s, saturation flow rate [veh/h]	634	1600	1360	1250	1600	1360	2959	1598	943	1600	1360
c, Capacity [veh/h]	451	786	668	813	887	754	455	495	251	260	221
d1, Uniform Delay [s]	10.89	16.85	16.83	12.23	12.95	28.97	54.34	38.80	29.72	51.46	46.39
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.49	0.11	0.50	0.11	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.01	0.00	0.00	0.13	0.00	35.03	9.19	6.54	0.03	14.62	0.95
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.01	0.01	0.00	0.21	0.01	1.01	0.93	0.65	0.02	0.70	0.10
d, Delay for Lane Group [s/veh]	10.90	16.86	16.83	12.36	12.95	64.00	63.53	45.34	29.75	66.08	47.33
Lane Group LOS	B	B	B	B	B	F	E	D	C	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.06	0.08	0.03	2.33	0.07	29.65	7.17	9.37	0.10	6.44	0.67
50th-Percentile Queue Length [ft/ln]	1.52	1.95	0.78	58.18	1.67	741.2	179.14	234.18	2.51	161.1	16.80
95th-Percentile Queue Length [veh/ln]	0.11	0.14	0.06	4.19	0.12	38.94	11.56	14.39	0.18	10.61	1.21
95th-Percentile Queue Length [ft/ln]	2.73	3.52	1.41	104.7	3.01	973.4	288.89	359.67	4.52	265.1	30.24

**Movement, Approach, & Intersection Results**

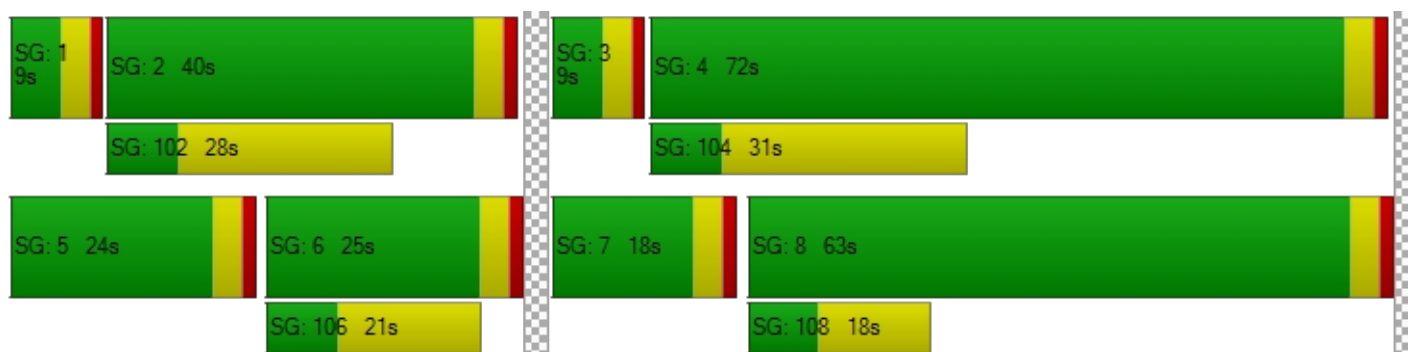
d_M, Delay for Movement [s/veh]	10.90	16.86	16.83	12.36	12.95	64.00	63.53	45.34	45.34	29.75	66.08	47.33
Movement LOS	B	B	B	B	B	F	E	D	D	C	E	D
d_A, Approach Delay [s/veh]	14.37			54.27			55.68			63.16		
Approach LOS	B			D			E			E		
d_I, Intersection Delay [s/veh]	55.55											
Intersection LOS	E											
Intersection V/C	0.819											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	54.47			54.47			54.47			54.47		
I_p,int, Pedestrian LOS Score for Intersection	2.163			3.905			3.185			2.734		
Crosswalk LOS	B			D			C			B		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	908			1046			554			323		
d_b, Bicycle Delay [s]	19.39			14.78			33.98			45.70		
I_b,int, Bicycle LOS Score for Intersection	1.584			4.267			2.799			1.942		
Bicycle LOS	A			E			C			A		

**Sequence**

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





**Intersection Level Of Service Report**  
**Intersection 3: Manila Rd/I-70 Westbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	7.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.453

**Intersection Setup**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	0	0	0	0	0	1
Entry Pocket Length [ft]	735.0	100.0	100.0	100.0	100.0	435.0	100.0	100.0	100.0	100.0	100.0	435.0
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	550.0	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No						No		
Crosswalk	Yes			Yes			No			Yes		

**Volumes**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Base Volume Input [veh/h]	135	452	0	0	404	1472	0	0	0	75	5	64
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	49	0	0	62	185	0	0	0	0	0	16
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	829	0	0	0	0	0	40
Total Hourly Volume [veh/h]	135	501	0	0	466	828	0	0	0	75	5	40
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	37	136	0	0	127	225	0	0	0	20	1	11
Total Analysis Volume [veh/h]	147	545	0	0	507	900	0	0	0	82	5	43
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		



**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	1	6	0	0	2	0	0	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	0	10	0	0	0	0	0	10	0
Maximum Green [s]	30	30	0	0	30	0	0	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	9	87	0	0	78	0	0	0	0	0	23	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	21	0	0	26	0	0	0	0	0	9	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No						No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No						No	
Maximum Recall	No	No			No						No	
Pedestrian Recall	No	No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	C	R		C	R
C, Cycle Length [s]	110	110	110	110		110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00		4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00		0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00		2.00	2.00
g_i, Effective Green Time [s]	92	92	83	83		10	10
g / C, Green / Cycle	0.84	0.84	0.76	0.76		0.09	0.09
(v / s)_i Volume / Saturation Flow Rate	0.35	0.13	0.17	0.37		0.06	0.03
s, saturation flow rate [veh/h]	418	4358	3046	2407		1528	1360
c, Capacity [veh/h]	426	3651	2303	1819		137	122
d1, Uniform Delay [s]	1.89	1.66	3.93	5.23		48.34	47.07
k, delay calibration	0.50	0.50	0.50	0.50		0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00		1.00	1.00
d2, Incremental Delay [s]	2.21	0.09	0.22	0.96		4.82	1.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00		0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00		1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00		1.00	1.00

**Lane Group Results**

X, volume / capacity	0.35	0.15	0.22	0.49		0.64	0.35
d, Delay for Lane Group [s/veh]	4.10	1.74	4.15	6.20		53.16	48.80
Lane Group LOS	A	A	A	A		D	D
Critical Lane Group	Yes	No	No	Yes		Yes	No
50th-Percentile Queue Length [veh/ln]	0.49	0.32	1.25	3.03		2.48	1.17
50th-Percentile Queue Length [ft/ln]	12.18	7.94	31.26	75.80		62.10	29.15
95th-Percentile Queue Length [veh/ln]	0.88	0.57	2.25	5.46		4.47	2.10
95th-Percentile Queue Length [ft/ln]	21.93	14.28	56.26	136.43		111.77	52.47

**Movement, Approach, & Intersection Results**

d_M, Delay for Movement [s/veh]	4.10	1.74	0.00	0.00	4.15	6.20	0.00	0.00	0.00	53.16	53.16	48.80
Movement LOS	A	A			A	A				D	D	D
d_A, Approach Delay [s/veh]	2.24			5.46			0.00			51.72		
Approach LOS	A			A			A			D		
d_I, Intersection Delay [s/veh]	7.16											
Intersection LOS	A											
Intersection V/C	0.453											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0		11.0		0.0		11.0					
M_corner, Corner Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00		0.00		0.00		0.00					
d_p, Pedestrian Delay [s]	44.55		44.55		0.00		44.55					
I_p,int, Pedestrian LOS Score for Intersection	2.775		4.381		0.000		1.864					
Crosswalk LOS	C		E		F		A					
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000		2000		2000		2000					
c_b, Capacity of the bicycle lane [bicycles/h]	1509		1346		0		345					
d_b, Bicycle Delay [s]	3.31		5.89		55.00		37.64					
I_b,int, Bicycle LOS Score for Intersection	1.940		3.404		4.132		1.840					
Bicycle LOS	A		C		D		A					

**Sequence**

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	14.5
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.309

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.0	100.0	435.0	745.0	100.0	100.0	1075.0	100.0	435.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No					
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	180	110	247	232	0	417	5	285	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	62	0	0	49	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	55	0	0	0	0	0	143	0	0	0
Total Hourly Volume [veh/h]	0	180	55	309	232	0	466	5	142	0	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	49	15	84	63	0	127	1	39	0	0	0
Total Analysis Volume [veh/h]	0	196	60	336	252	0	507	5	154	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	70
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	ProtP	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	5	10	0	0	10	0	0	0	0
Maximum Green [s]	0	30	0	30	30	0	0	30	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	30	0	9	39	0	0	31	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	0	19	0	0	22	0	0	14	0	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No				
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		No		No	No			No				
Maximum Recall		No		No	No			No				
Pedestrian Recall		No		No	No			No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	C	R	L	C	L	C	
C, Cycle Length [s]	70	70	70	70	70	70	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	26	26	35	35	27	27	
g / C, Green / Cycle	0.37	0.37	0.50	0.50	0.39	0.39	
(v / s)_i Volume / Saturation Flow Rate	0.06	0.04	0.31	0.08	0.11	0.12	
s, saturation flow rate [veh/h]	3046	1360	1074	3046	4438	1366	
c, Capacity [veh/h]	1131	505	642	1523	1712	527	
d1, Uniform Delay [s]	14.78	14.47	12.20	9.54	14.91	14.95	
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.33	0.48	3.04	0.23	0.44	1.47	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	

**Lane Group Results**

X, volume / capacity	0.17	0.12	0.52	0.17	0.30	0.30	
d, Delay for Lane Group [s/veh]	15.11	14.95	15.24	9.77	15.35	16.42	
Lane Group LOS	B	B	B	A	B	B	
Critical Lane Group	Yes	No	Yes	No	No	Yes	
50th-Percentile Queue Length [veh/ln]	1.03	0.65	3.49	0.99	1.80	1.85	
50th-Percentile Queue Length [ft/ln]	25.76	16.34	87.24	24.72	44.97	46.13	
95th-Percentile Queue Length [veh/ln]	1.85	1.18	6.28	1.78	3.24	3.32	
95th-Percentile Queue Length [ft/ln]	46.37	29.41	157.03	44.50	80.94	83.04	

**Movement, Approach, & Intersection Results**

d_M, Delay for Movement [s/veh]	0.00	15.11	14.95	15.24	9.77	0.00	15.35	16.42	16.42	0.00	0.00	0.00
Movement LOS		B	B	B	A		B	B	B			
d_A, Approach Delay [s/veh]	15.07			12.90			15.61			0.00		
Approach LOS	B			B			B			A		
d_I, Intersection Delay [s/veh]	14.46											
Intersection LOS	B											
Intersection V/C	0.309											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	24.86			24.86			24.86			24.86		
I_p,int, Pedestrian LOS Score for Intersection	2.532			2.649			2.518			2.053		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	743			1000			771			0		
d_b, Bicycle Delay [s]	13.83			8.75			13.21			35.00		
I_b,int, Bicycle LOS Score for Intersection	1.816			2.045			2.894			4.132		
Bicycle LOS	A			B			C			D		

**Sequence**

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-







### Intersection Level Of Service Report

#### Intersection 5: Peterson Rd/ Access 1

Control Type: Signalized  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 14.2  
 Level Of Service: B  
 Volume to Capacity (v/c): 0.565

#### Intersection Setup

Name	Peterson Rd			Peterson Rd			Access 1					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	1	0	0	0	0	0	0
Entry Pocket Length [ft]	355.0	100.0	250.0	250.0	100.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	1	0	0	1	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	190.0	0.00	0.00	190.0	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd			Peterson Rd			Access 1					
Base Volume Input [veh/h]	0	328	18	0	1133	0	0	0	0	61	0	1
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	54	0	0	206	0	0	0	103	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	103	0	0	0
Total Hourly Volume [veh/h]	27	382	18	0	1339	0	0	0	0	61	0	1
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	7	104	5	0	364	0	0	0	0	17	0	0
Total Analysis Volume [veh/h]	29	415	20	0	1455	0	0	0	0	66	0	1
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	0	10	0	0	10	0	0	10	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	64	0	0	64	0	0	26	0	0	26	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	7	0	0	7	0	0	17	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	C	C	C
C, Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	60	60	60	60	60	60	22	22
g / C, Green / Cycle	0.67	0.67	0.67	0.67	0.67	0.67	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.10	0.15	0.02	0.00	0.51	0.51	0.00	0.06
s, saturation flow rate [veh/h]	281	2741	1224	734	1440	1440	1440	1118
c, Capacity [veh/h]	166	1828	816	509	960	960	392	353
d1, Uniform Delay [s]	24.30	5.89	5.08	0.00	10.11	10.11	0.00	27.07
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.30	0.29	0.06	0.00	5.58	5.58	0.00	1.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.18	0.23	0.02	0.00	0.76	0.76	0.00	0.19
d, Delay for Lane Group [s/veh]	26.60	6.18	5.14	0.00	15.69	15.69	0.00	28.26
Lane Group LOS	C	A	A	A	B	B	A	C
Critical Lane Group	No	No	No	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.57	1.41	0.12	0.00	9.50	9.50	0.00	1.25
50th-Percentile Queue Length [ft/ln]	14.37	35.14	3.08	0.00	237.5	237.5	0.00	31.23
95th-Percentile Queue Length [veh/ln]	1.03	2.53	0.22	0.00	14.56	14.56	0.00	2.25
95th-Percentile Queue Length [ft/ln]	25.87	63.26	5.55	0.00	363.9	363.9	0.00	56.21

**Movement, Approach, & Intersection Results**

d_M, Delay for Movement [s/veh]	26.60	6.18	5.14	0.00	15.69	15.69	0.00	0.00	0.00	28.26	28.26	28.26
Movement LOS	C	A	A	A	B	B	A	A	A	C	C	C
d_A, Approach Delay [s/veh]	7.41			15.69			0.00			28.26		
Approach LOS	A			B			A			C		
d_I, Intersection Delay [s/veh]	14.18											
Intersection LOS	B											
Intersection V/C	0.565											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	9.0			9.0			9.0			9.0		
M_corner, Corner Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	36.45			36.45			36.45			36.45		
I_p,int, Pedestrian LOS Score for Intersection	2.888			2.758			1.968			1.759		
Crosswalk LOS	C			C			A			A		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1333			1333			489			489		
d_b, Bicycle Delay [s]	5.00			5.00			25.69			25.69		
I_b,int, Bicycle LOS Score for Intersection	1.942			2.760			1.730			1.670		
Bicycle LOS	A			C			A			A		

**Sequence**

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





### Intersection Level Of Service Report

#### Intersection 6: Peterson Rd/ Access 2

Control Type:	Signalized	Delay (sec / veh):	15.6
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.506

#### Intersection Setup

Name	Peterson Rd			Peterson Rd			Access 2			38th Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	0	0	0	1	0	0
Entry Pocket Length [ft]	355.0	100.0	250.0	250.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	1	0	0	1	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	190.0	0.00	0.00	100.0	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd			Peterson Rd			Access 2			38th Ave		
Base Volume Input [veh/h]	0	103	210	1	337	0	0	0	0	735	0	1
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	27	0	0	103	0	0	0	103	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	105	0	0	0	0	0	52	0	0	1
Total Hourly Volume [veh/h]	27	130	105	1	440	0	0	0	51	735	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	7	35	29	0	120	0	0	0	14	200	0	0
Total Analysis Volume [veh/h]	29	141	114	1	478	0	0	0	55	799	0	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing major street [ped/h]	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing minor street [ped/h]	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi	Permi
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	10	0	0	10	0	0	10	0	0	10	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	27	0	0	27	0	0	33	0	0	33	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	17	0	0	9	0	0	7	0	0	16	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0



**Lane Group Calculations**

Lane Group	L	C	R	L	C	C	C	L	C
C, Cycle Length [s]	60	60	60	60	60	60	60	60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
I1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00	0.00
I2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	23	23	23	23	23	29	29	29
g / C, Green / Cycle	0.38	0.38	0.38	0.38	0.38	0.38	0.48	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.04	0.05	0.08	0.00	0.15	0.15	0.04	0.36	0.00
s, saturation flow rate [veh/h]	784	3046	1360	962	1600	1600	1360	2240	1600
c, Capacity [veh/h]	309	1168	521	428	613	613	717	1079	773
d1, Uniform Delay [s]	17.91	11.96	12.45	13.88	13.41	13.41	8.35	12.56	0.00
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.60	0.21	0.96	0.01	1.86	1.86	0.21	4.57	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.09	0.12	0.22	0.00	0.39	0.39	0.08	0.74	0.00
d, Delay for Lane Group [s/veh]	18.51	12.17	13.42	13.89	15.27	15.27	8.55	17.14	0.00
Lane Group LOS	B	B	B	B	B	B	A	B	A
Critical Lane Group	No	No	No	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.35	0.58	1.06	0.01	2.39	2.39	0.37	4.27	0.00
50th-Percentile Queue Length [ft/ln]	8.63	14.52	26.49	0.24	59.86	59.86	9.24	106.72	0.00
95th-Percentile Queue Length [veh/ln]	0.62	1.05	1.91	0.02	4.31	4.31	0.67	7.66	0.00
95th-Percentile Queue Length [ft/ln]	15.54	26.14	47.68	0.43	107.7	107.7	16.64	191.43	0.00

**Movement, Approach, & Intersection Results**

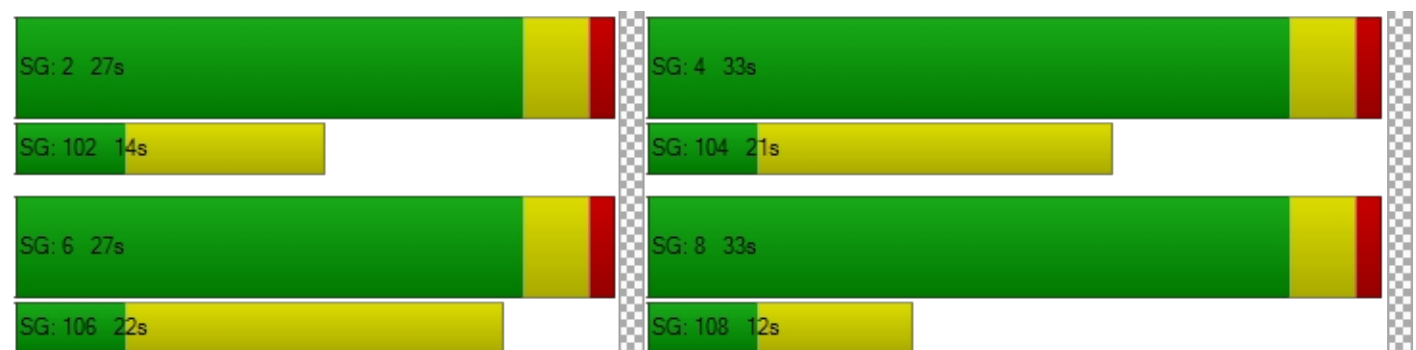
d_M, Delay for Movement [s/veh]	18.51	12.17	13.42	13.89	15.27	15.27	8.55	8.55	8.55	17.14	0.00	0.00
Movement LOS	B	B	B	B	B	B	A	A	A	B	A	A
d_A, Approach Delay [s/veh]	13.32			15.27			8.55			17.14		
Approach LOS	B			B			A			B		
d_I, Intersection Delay [s/veh]	15.62											
Intersection LOS	B											
Intersection V/C	0.506											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	9.0			9.0			9.0			9.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	21.68			21.68			21.68			21.68		
I_p,int, Pedestrian LOS Score for Intersection	4.008			2.534			1.877			2.363		
Crosswalk LOS	D			B			A			B		
s_b, Saturation Flow Rate of the bicycle lane [bicycles/h]	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	767			767			967			967		
d_b, Bicycle Delay [s]	11.41			11.41			8.01			8.01		
I_b,int, Bicycle LOS Score for Intersection	1.881			1.955			1.736			2.880		
Bicycle LOS	A			A			A			C		

**Sequence**

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-





### Intersection Level Of Service Report

#### Intersection 15: 48th Ave/Access 3

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 8.9  
 Level Of Service: A  
 Volume to Capacity (v/c): 0.108

#### Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+ +		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	1	0	0
Entry Pocket Length [ft]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	355.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name												
Base Volume Input [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	103	0	0	0	0	0	0	27	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	103	0	0	0	0	0	0	27	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	0	0	28	0	0	0	0	0	0	7	0	0
Total Analysis Volume [veh/h]	0	0	112	0	0	0	0	0	0	29	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	9.52	10.01	8.90	10.00	9.59	8.48	7.38	0.00	0.00	7.43	0.00	0.00
Movement LOS	A	B	A	B	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.36	0.36	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00
95th-Percentile Queue Length [ft/ln]	9.08	9.08	9.08	0.00	0.00	0.00	0.00	0.00	0.00	1.47	0.00	0.00
d_A, Approach Delay [s/veh]	8.90			9.36			2.46			7.43		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	8.60											
Intersection LOS	A											



### Intersection Level Of Service Report Intersection 16: 48th Ave/Peterson Rd

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 12.6  
Level Of Service: B  
Volume to Capacity (v/c): 0.389

#### Intersection Setup

Name	Peterson Rd											
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	0	0	0	1	0	0	0
Entry Pocket Length [ft]	355.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	250.0	100.0	100.0	100.0
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

#### Volumes

Name	Peterson Rd											
Base Volume Input [veh/h]	0	0	82	0	0	0	0	0	0	276	0	0
Base Volume Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	0	0	0	0	0	0	0	103	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	0	82	0	0	0	0	0	103	276	0	0
Peak Hour Factor	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920	0.920
Other Adjustment Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Total 15-Minute Volume [veh/h]	7	0	22	0	0	0	0	0	28	75	0	0
Total Analysis Volume [veh/h]	29	0	89	0	0	0	0	0	112	300	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.39	0.00	0.00
d_M, Delay for Movement [s/veh]	7.45	0.00	0.00	7.60	0.00	0.00	9.16	10.22	8.93	12.61	12.57	11.44
Movement LOS	A	A	A	A	A	A	A	B	A	B	B	B
95th-Percentile Queue Length [veh/ln]	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.37	1.85	1.85	1.85
95th-Percentile Queue Length [ft/ln]	1.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.14	46.30	46.30	46.30
d_A, Approach Delay [s/veh]	1.83			2.53			8.93			12.61		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	9.43											
Intersection LOS	B											



## Signal Warrants Report For Intersection 15: 48th Ave/Access 3

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	27	0	103	0
2	26	0	100	0
3	26	0	98	0
4	24	0	92	0
5	21	0	81	0
6	21	0	80	0
7	21	0	79	0
8	19	0	72	0
9	19	0	71	0
10	18	0	70	0
11	16	0	61	0
12	15	0	57	0
13	15	0	56	0
14	11	0	41	0
15	11	0	41	0
16	8	0	29	0
17	4	0	16	0
18	4	0	16	0
19	2	0	9	0
20	1	0	5	0
21	1	0	3	0
22	0	0	1	0
23	0	0	1	0
24	0	0	1	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	27	1	103	No	No	No	No	No	No	No	No	No	No
2	2	26	1	100	No	No	No	No	No	No	No	No	No	No
3	2	26	1	98	No	No	No	No	No	No	No	No	No	No
4	2	24	1	92	No	No	No	No	No	No	No	No	No	No
5	2	21	1	81	No	No	No	No	No	No	No	No	No	No
6	2	21	1	80	No	No	No	No	No	No	No	No	No	No
7	2	21	1	79	No	No	No	No	No	No	No	No	No	No
8	2	19	1	72	No	No	No	No	No	No	No	No	No	No
9	2	19	1	71	No	No	No	No	No	No	No	No	No	No
10	2	18	1	70	No	No	No	No	No	No	No	No	No	No
11	2	16	1	61	No	No	No	No	No	No	No	No	No	No
12	2	15	1	57	No	No	No	No	No	No	No	No	No	No
13	2	15	1	56	No	No	No	No	No	No	No	No	No	No
14	2	11	1	41	No	No	No	No	No	No	No	No	No	No
15	2	11	1	41	No	No	No	No	No	No	No	No	No	No
16	2	8	1	29	No	No	No	No	No	No	No	No	No	No
17	2	4	1	16	No	No	No	No	No	No	No	No	No	No
18	2	4	1	16	No	No	No	No	No	No	No	No	No	No
19	2	2	1	9	No	No	No	No	No	No	No	No	No	No
20	2	1	1	5	No	No	No	No	No	No	No	No	No	No
21	2	1	1	3	No	No	No	No	No	No	No	No	No	No
22	2	0	1	1	No	No	No	No	No	No	No	No	No	No
23	2	0	1	1	No	No	No	No	No	No	No	No	No	No
24	2	0	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.9	9.4
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:15	0:00
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	103	0
High Minor Volume Condition Met	Yes	No
Total Entering Volume on All Approaches During Same Hour	130	130
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	





## Signal Warrants Report For Intersection 16: 48th Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	E, W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	N	S	E	W
1	0	109	276	103
2	0	106	268	100
3	0	104	262	98
4	0	97	246	92
5	0	86	218	81
6	0	85	215	80
7	0	84	213	79
8	0	76	193	72
9	0	75	190	71
10	0	74	188	70
11	0	64	163	61
12	0	60	152	57
13	0	59	149	56
14	0	44	110	41
15	0	44	110	41
16	0	31	77	29
17	0	17	44	16
18	0	17	44	16
19	0	10	25	9
20	0	5	14	5
21	0	3	8	3
22	0	1	3	1
23	0	1	3	1
24	0	1	3	1



## Warrant Analysis by Hour

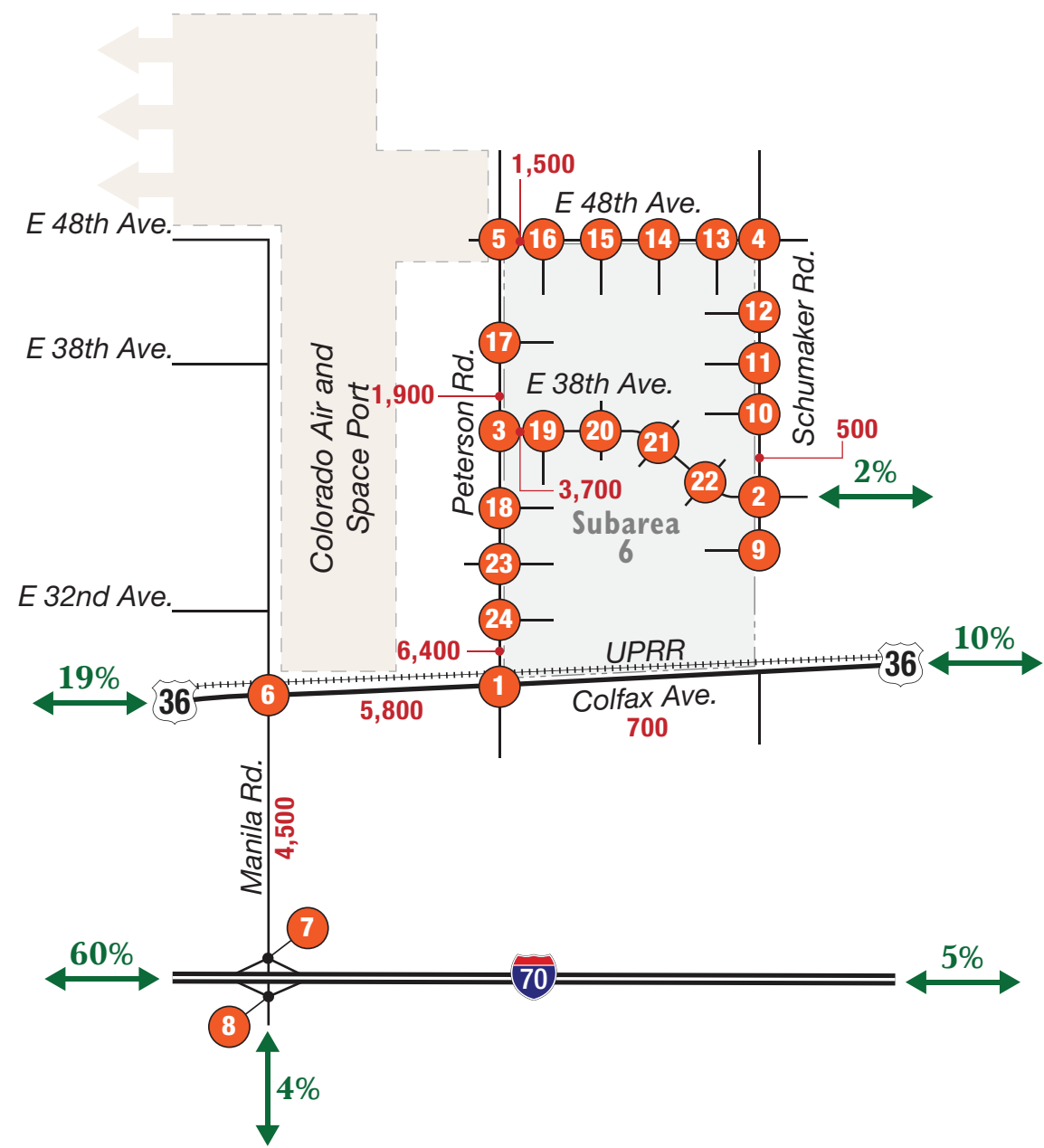
Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	4	109	1	276	No	No	No	No	No	No	No	No	No	No
2	4	106	1	268	No	No	No	No	No	No	No	No	No	No
3	4	104	1	262	No	No	No	No	No	No	No	No	No	No
4	4	97	1	246	No	No	No	No	No	No	No	No	No	No
5	4	86	1	218	No	No	No	No	No	No	No	No	No	No
6	4	85	1	215	No	No	No	No	No	No	No	No	No	No
7	4	84	1	213	No	No	No	No	No	No	No	No	No	No
8	4	76	1	193	No	No	No	No	No	No	No	No	No	No
9	4	75	1	190	No	No	No	No	No	No	No	No	No	No
10	4	74	1	188	No	No	No	No	No	No	No	No	No	No
11	4	64	1	163	No	No	No	No	No	No	No	No	No	No
12	4	60	1	152	No	No	No	No	No	No	No	No	No	No
13	4	59	1	149	No	No	No	No	No	No	No	No	No	No
14	4	44	1	110	No	No	No	No	No	No	No	No	No	No
15	4	44	1	110	No	No	No	No	No	No	No	No	No	No
16	4	31	1	77	No	No	No	No	No	No	No	No	No	No
17	4	17	1	44	No	No	No	No	No	No	No	No	No	No
18	4	17	1	44	No	No	No	No	No	No	No	No	No	No
19	4	10	1	25	No	No	No	No	No	No	No	No	No	No
20	4	5	1	14	No	No	No	No	No	No	No	No	No	No
21	4	3	1	8	No	No	No	No	No	No	No	No	No	No
22	4	1	1	3	No	No	No	No	No	No	No	No	No	No
23	4	1	1	3	No	No	No	No	No	No	No	No	No	No
24	4	1	1	3	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	12.6	8.9
Number of Lanes on Minor Street Approach	1	2
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:58	0:15
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	276	103
High Minor Volume Condition Met	Yes	No
Total Entering Volume on All Approaches During Same Hour	488	488
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	

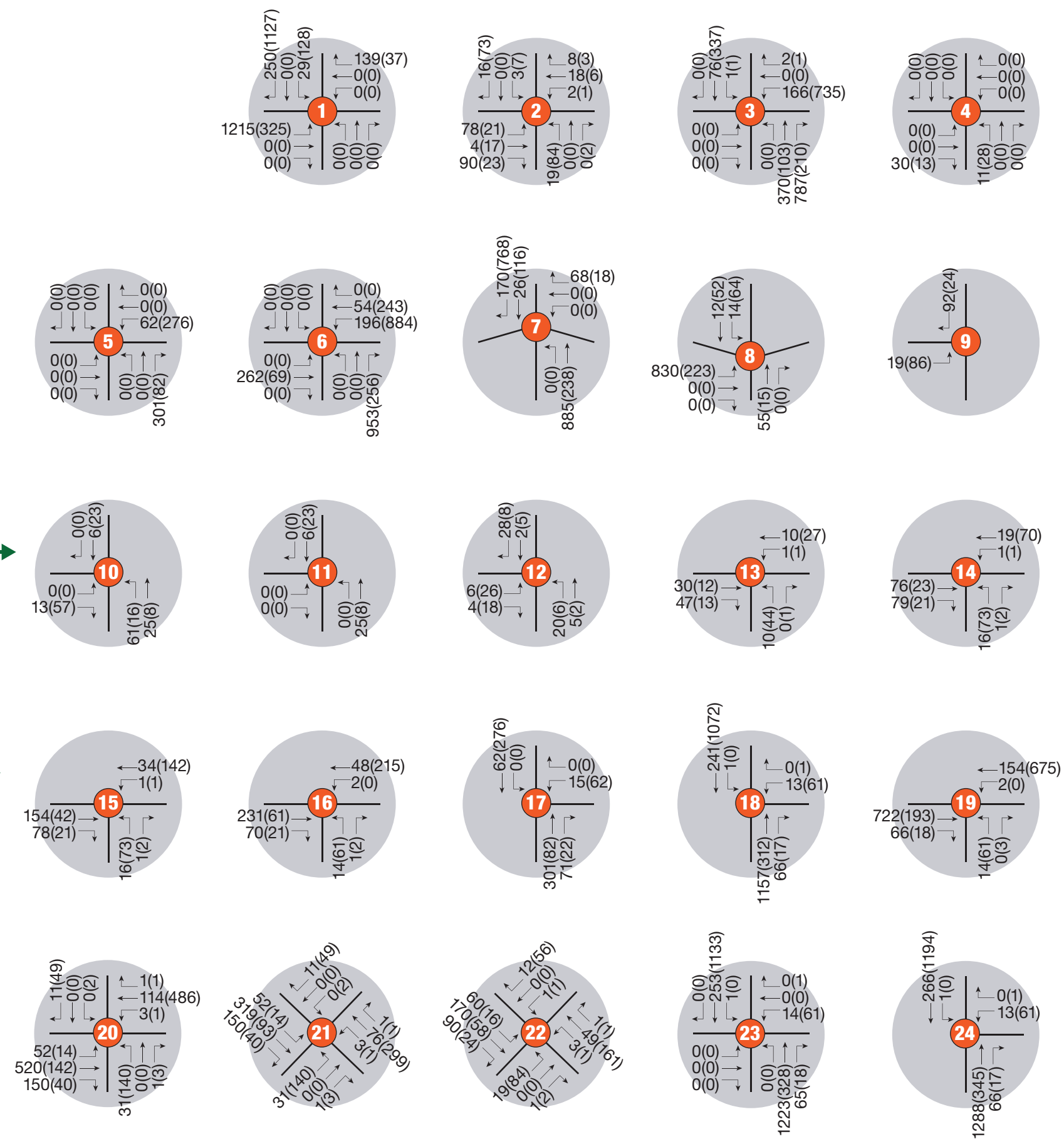
## **Appendix D – Supplementary Document**

KEY MAP



LEGEND

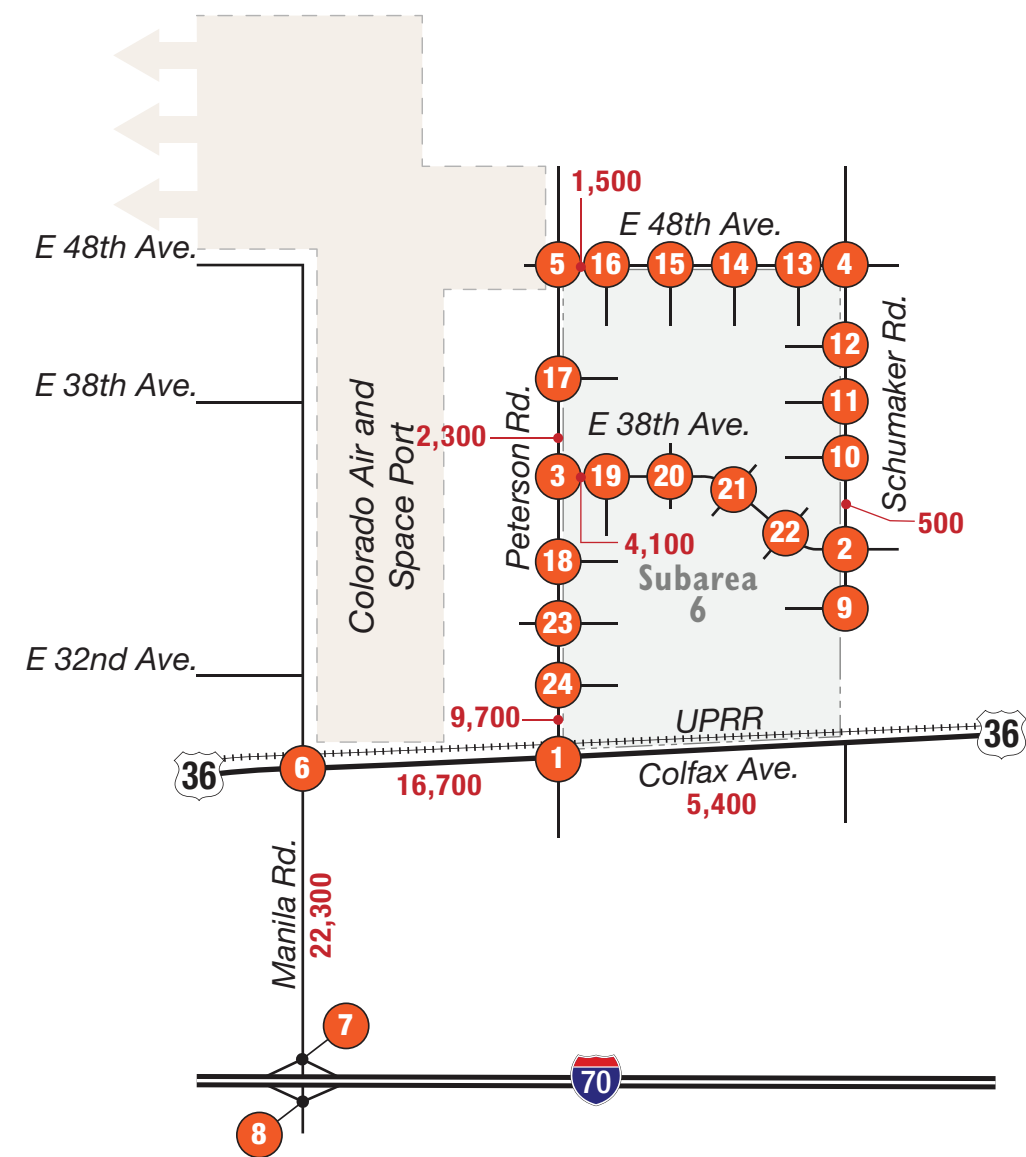
- xxx(xxx) = AM(PM) Peak Hour Traffic Volumes
- XXXX = Daily Traffic Volumes
- XX% = Site Trip Distribution



NOTE: Drawing Not to Scale

**FIGURE 4**  
**Site Generated Volumes**  
**and Distribution Percentage**  
Port Colorado - PA-6 UPDATE | 21-358-01 | 1/19/22

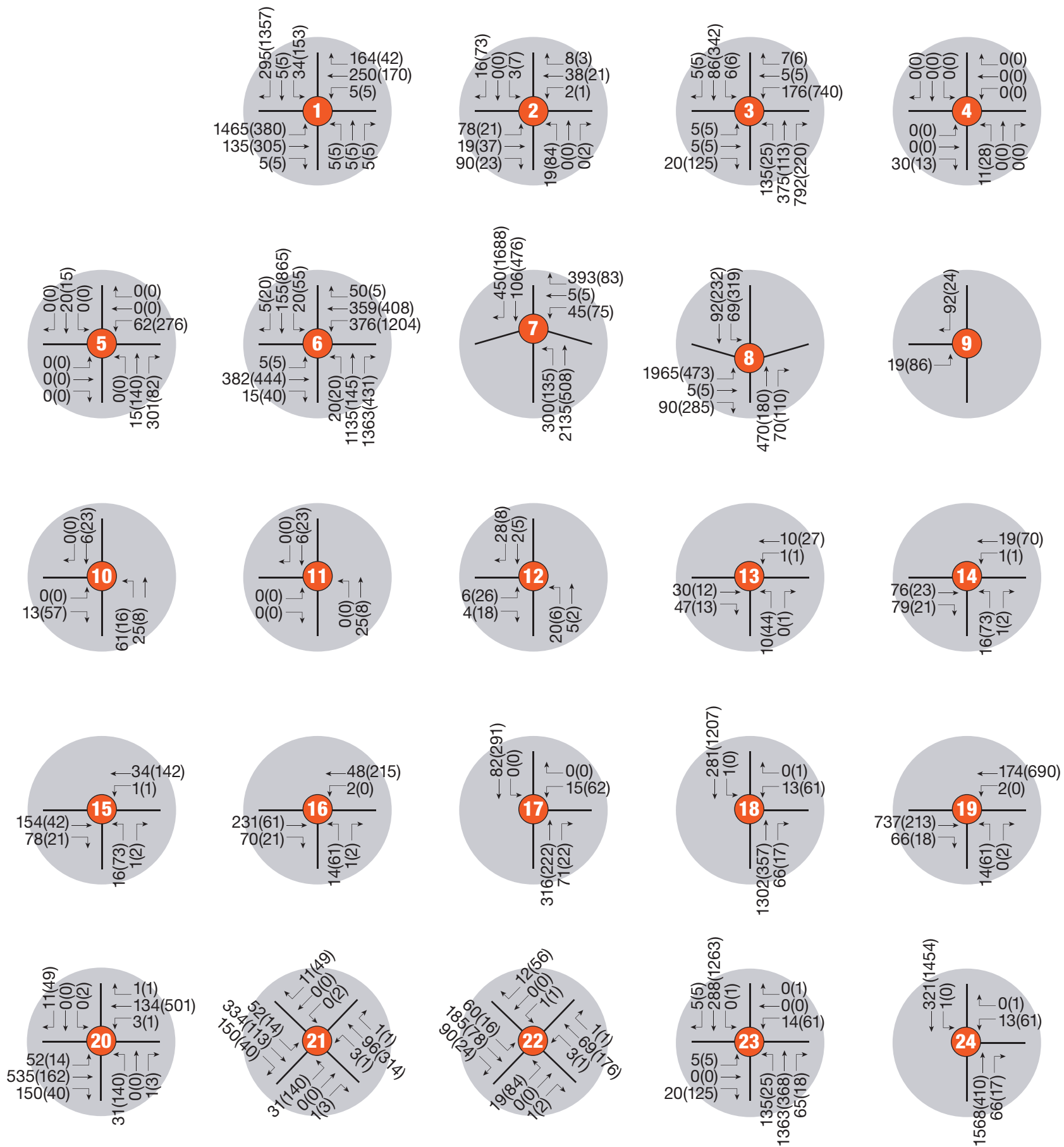
KEY MAP



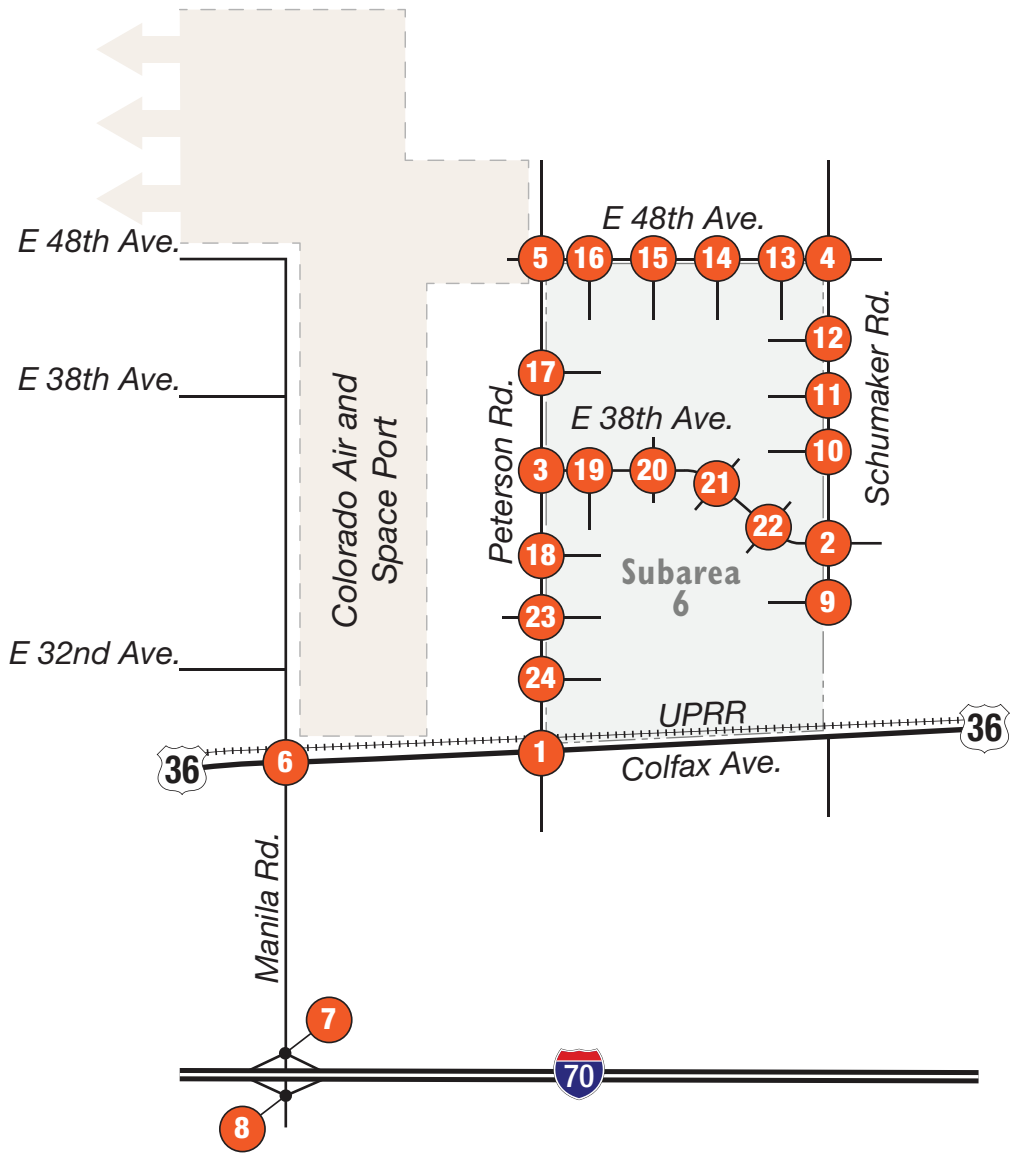
LEGEND

xxx(xxx) = AM(PM) Peak Hour Traffic Volumes  
XXXX = Daily Traffic Volumes

NOTE: Drawing Not to Scale



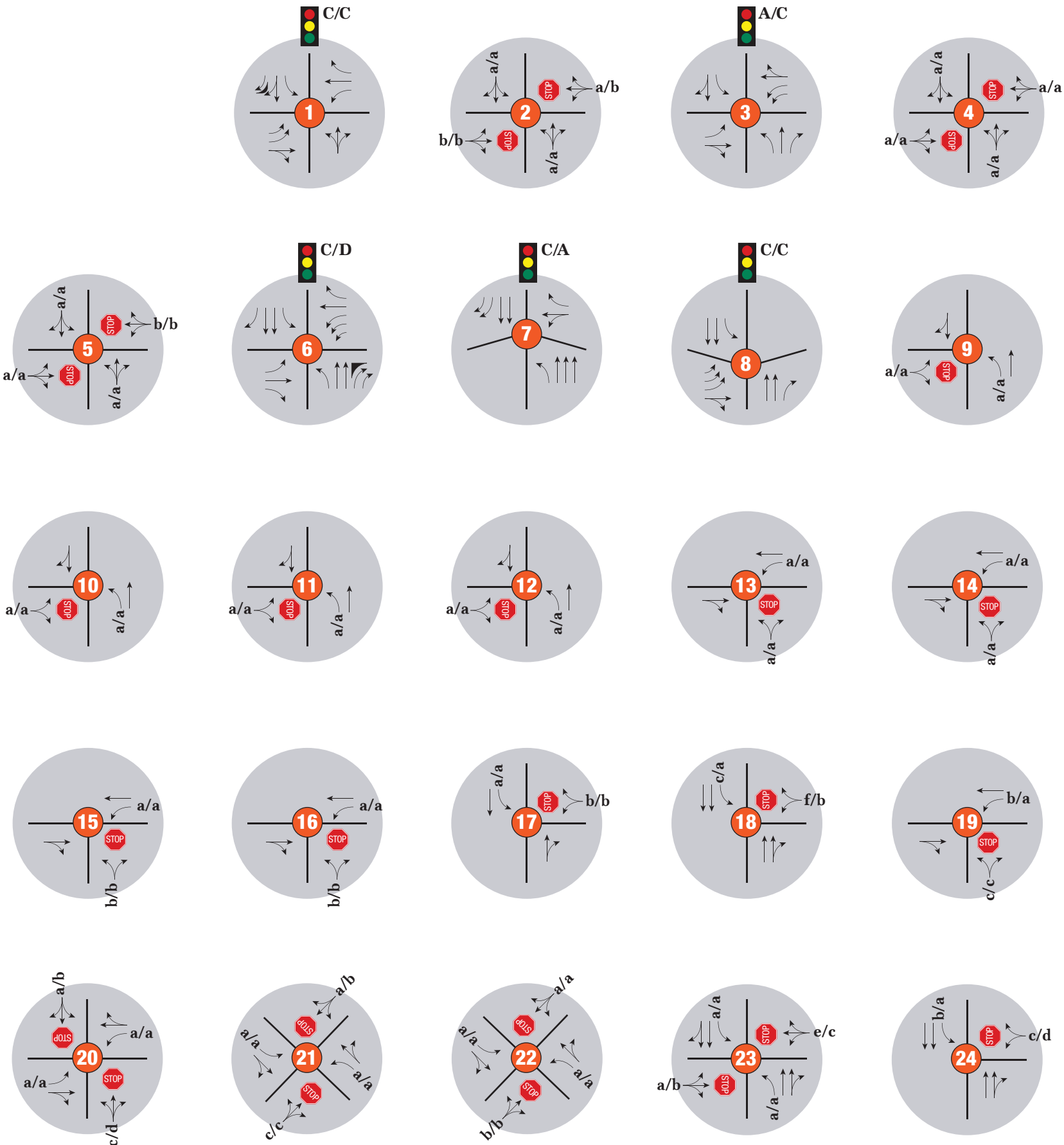
# KEY MAP



## LEGEND

- x/x = AM/PM Unsignalized Intersection Level of Service
- X/X = AM/PM Signalized Intersection Level of Service
- ↗ = Lane Assignment
- STOP = Stop Sign
- 🚦 = Traffic Signal

NOTE: Drawing Not to Scale



## **Appendix E – Buildout Year Conditions Analyses**

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Rocky Mountain Rail Park TIS

Vistro File: R:\...\2023-09-17 Rocky Mountain Rail Park  
TIS.vistro

Scenario 7 2030 AM

Report File: R:\...\2030 Background AM\_20230918.pdf

9/18/2023

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	NB Thru	0.571	30.0	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	SB Thru	0.009	11.7	B
3	Manila Rd/I-70 Westbound Ramp	Two-way stop	HCM 7th Edition	WB Left	0.153	29.0	D
4	Manila Rd/I-70 Eastbound Ramp	Two-way stop	HCM 7th Edition	EB Left	0.397	15.1	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**  
**Intersection 1: E Colfax Ave/Manila Rd**

Control Type:	Signalized	Delay (sec / veh):	30.0
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.571

**Intersection Setup**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	0	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	10	570	48	10	180	5	5	66	5	66	182	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	24	0	0	3	0	0	3	0	0	13
Total Hourly Volume [veh/h]	10	570	24	10	180	2	5	66	2	66	182	12
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	155	7	3	49	1	1	18	1	18	49	3
Total Analysis Volume [veh/h]	11	620	26	11	196	2	5	72	2	72	198	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	5	10	0
Maximum Green [s]	10	30	0	10	30	0	10	30	0	10	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	37	0	9	37	0	9	22	0	12	25	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	14	0	0	11	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	Yes	No		Yes	No		Yes	No		Yes	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	C	R	L	C	R
C, Cycle Length [s]	80	80	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	0.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	38	33	33	38	33	34	23	34	25	25
g / C, Green / Cycle	0.47	0.41	0.41	0.47	0.41	0.43	0.29	0.43	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.01	0.39	0.02	0.01	0.12	0.05	0.00	0.06	0.12	0.01
s, saturation flow rate [veh/h]	1055	1600	1360	741	1597	1407	1360	1134	1600	1360
c, Capacity [veh/h]	543	656	558	228	655	650	387	429	501	426
d1, Uniform Delay [s]	11.43	22.73	14.19	16.87	15.89	13.96	20.51	18.14	21.55	19.07
k, delay calibration	0.11	0.34	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.01	18.39	0.03	0.09	0.26	0.37	0.02	0.18	2.33	0.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.02	0.94	0.05	0.05	0.30	0.12	0.01	0.17	0.40	0.03
d, Delay for Lane Group [s/veh]	11.45	41.12	14.22	16.95	16.15	14.33	20.54	18.32	23.88	19.20
Lane Group LOS	B	D	B	B	B	B	C	B	C	B
Critical Lane Group	No	Yes	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.09	13.02	0.26	0.10	2.20	0.77	0.03	0.84	2.86	0.16
50th-Percentile Queue Length [ft/ln]	2.31	325.46	6.46	2.39	55.11	19.35	0.66	21.08	71.60	4.08
95th-Percentile Queue Length [veh/ln]	0.17	18.94	0.47	0.17	3.97	1.39	0.05	1.52	5.16	0.29
95th-Percentile Queue Length [ft/ln]	4.15	473.39	11.63	4.30	99.21	34.83	1.19	37.94	128.88	7.35

**Movement, Approach, & Intersection Results**

d_M, Delay for Movement [s/veh]	11.45	41.12	14.22	16.95	16.15	16.15	14.33	14.33	20.54	18.32	23.88	19.20
Movement LOS	B	D	B	B	B	B	B	B	C	B	C	B
d_A, Approach Delay [s/veh]	39.56			16.19			14.49			22.25		
Approach LOS	D			B			B			C		
d_I, Intersection Delay [s/veh]	29.98											
Intersection LOS	C											
Intersection V/C	0.571											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	29.77			29.77			29.77			29.77		
I_p,int, Pedestrian LOS Score for Intersection	2.709			2.554			2.121			2.341		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	825			825			750			525		
d_b, Bicycle Delay [s]	13.82			13.82			15.64			21.77		
I_b,int, Bicycle LOS Score for Intersection	2.683			1.909			1.695			2.048		
Bicycle LOS	B			A			A			B		

**Sequence**





Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report**  
**Intersection 2: E Colfax Ave/Peterson Rd**

Control Type:	Two-way stop	Delay (sec / veh):	11.7
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

**Intersection Setup**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	960.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	5	5	5	5	103	5	5	189	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	5	5	5	5	5	5	103	5	5	189	5
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	1	1	1	1	1	28	1	1	51	1
Total Analysis Volume [veh/h]	5	5	5	5	5	5	5	112	5	5	205	5
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	11.53	11.73	9.18	11.55	11.74	9.71	7.86	0.00	0.00	7.64	0.00	0.00
Movement LOS	B	B	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.07	0.07	0.07	0.07	0.01	0.01	0.01	0.01	0.01	0.01
95th-Percentile Queue Length [ft/ln]	1.81	1.81	1.81	1.87	1.87	1.87	0.21	0.21	0.21	0.21	0.21	0.21
d_A, Approach Delay [s/veh]	10.81			11.00			0.32			0.18		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	1.10											
Intersection LOS	B											



**Intersection Level Of Service Report**  
**Intersection 3: Manila Rd/I-70 Westbound Ramp**

Control Type:	Two-way stop	Delay (sec / veh):	29.0
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.153

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound			Westbound Ramp		
Approach	Northbound			Southbound						Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	550.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound			Westbound Ramp		
Base Volume Input [veh/h]	160	513	0	0	35	115	0	0	0	25	5	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	160	513	0	0	35	115	0	0	0	25	5	16
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	139	0	0	10	31	0	0	0	7	1	4
Total Analysis Volume [veh/h]	174	558	0	0	38	125	0	0	0	27	5	17
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.13	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.03	0.03
d_M, Delay for Movement [s/veh]	8.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.04	25.86	12.93
Movement LOS	A	A			A	A				D	D	B
95th-Percentile Queue Length [veh/ln]	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.53	0.20	0.20
95th-Percentile Queue Length [ft/ln]	11.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.17	4.96	4.96
d_A, Approach Delay [s/veh]	1.94			0.00			0.00			23.13		
Approach LOS	A			A			A			C		
d_I, Intersection Delay [s/veh]	2.70											
Intersection LOS	D											

**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Two-way stop	Delay (sec / veh):	15.1
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.397

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	230	35	5	50	0	213	5	50	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	230	35	5	50	0	213	5	50	0	0	0
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	63	10	1	14	0	58	1	14	0	0	0
Total Analysis Volume [veh/h]	0	250	38	5	54	0	232	5	54	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

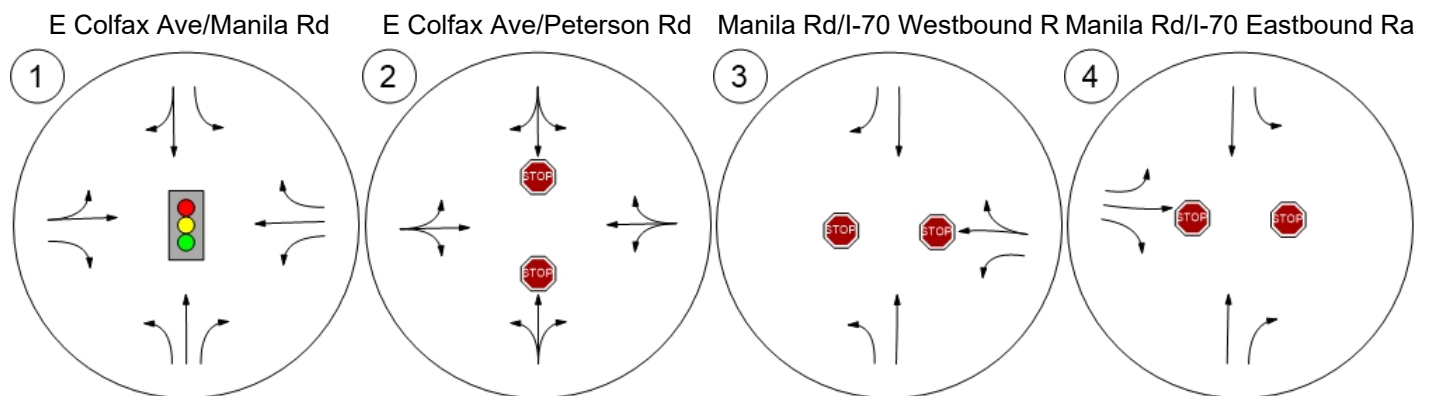
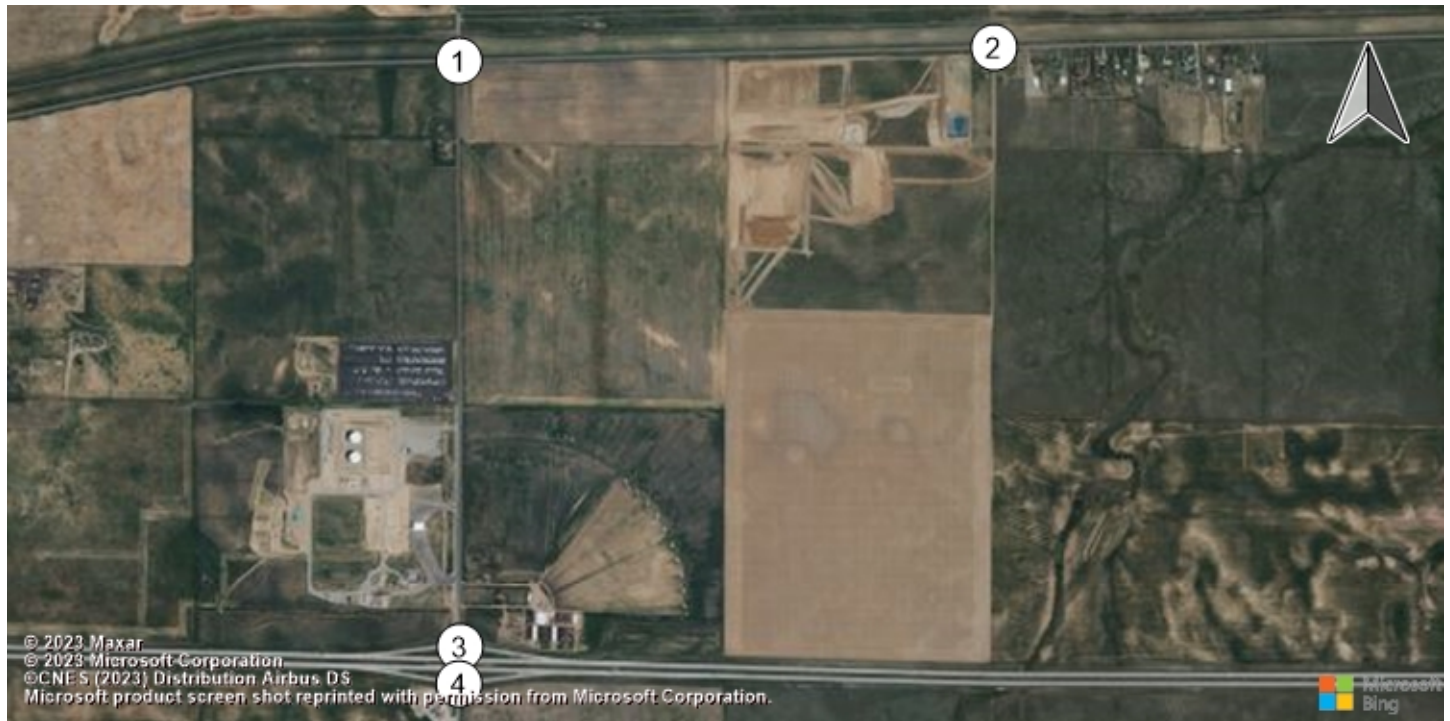
**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

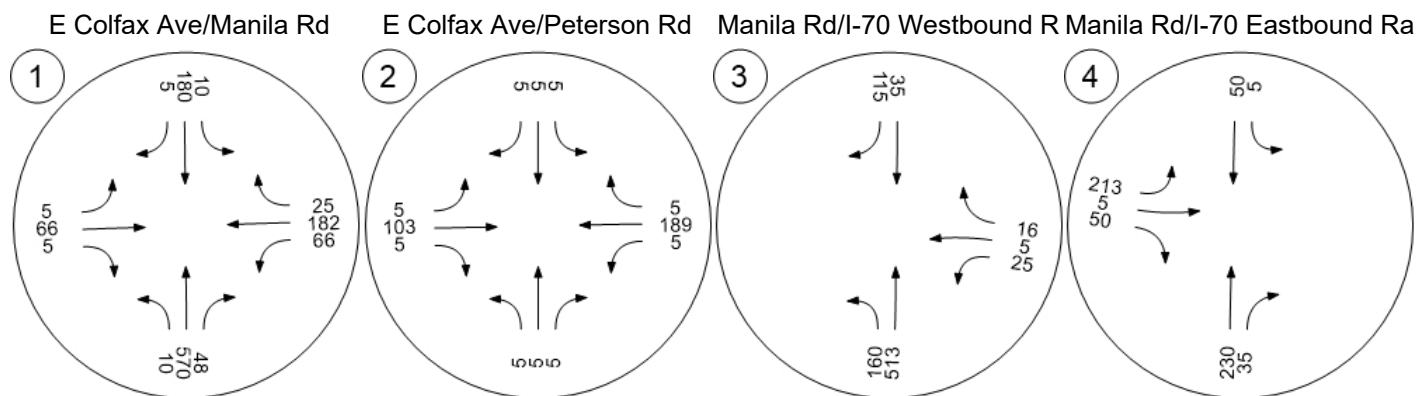
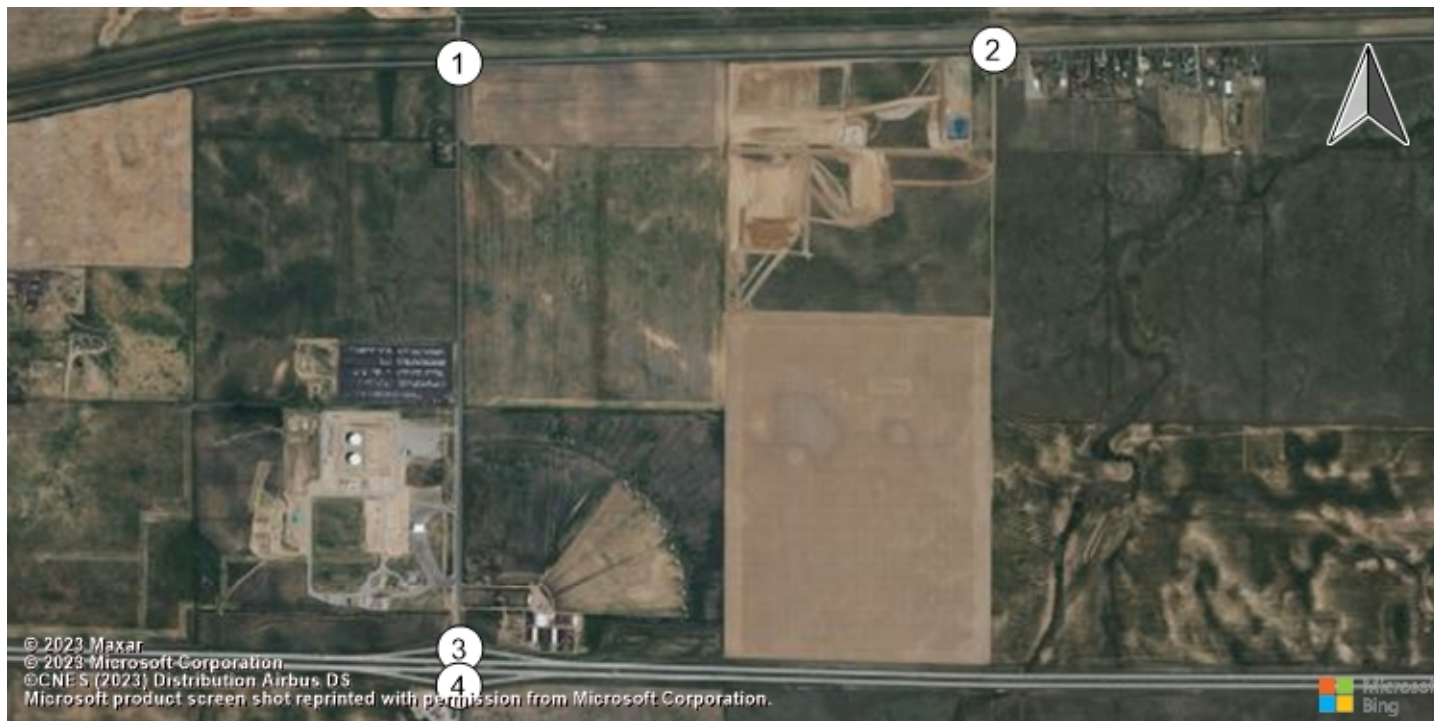
**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.01	0.06	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	8.07	0.00	0.00	15.14	11.70	8.95	0.00	0.00	0.00
Movement LOS		A	A	A	A		C	B	A			
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.01	0.00	0.00	1.89	0.03	0.18	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.32	0.00	0.00	47.26	0.70	4.44	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			0.68			13.93			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	6.42											
Intersection LOS	C											

## Lane Configuration and Traffic Control



## Traffic Volume - Future Total Volume



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## Signal Warrants Report For Intersection 1: E Colfax Ave/Manila Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	Yes

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	273	76	628	195
2	265	74	609	189
3	259	72	597	185
4	243	68	559	174
5	216	60	496	154
6	213	59	490	152
7	210	59	484	150
8	191	53	440	137
9	188	52	433	135
10	186	52	427	133
11	161	45	371	115
12	150	42	345	107
13	147	41	339	105
14	109	30	251	78
15	109	30	251	78
16	76	21	176	55
17	44	12	100	31
18	44	12	100	31
19	25	7	57	18
20	14	4	31	10
21	8	2	19	6
22	3	1	6	2
23	3	1	6	2
24	3	1	6	2



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	349	1	628	No	No	No	Yes	No	No	No	No	Yes	Yes
2	1	339	1	609	No	No	No	Yes	No	No	No	No	Yes	Yes
3	1	331	1	597	No	No	No	Yes	No	No	No	No	Yes	Yes
4	1	311	1	559	No	No	No	Yes	No	No	No	No	Yes	Yes
5	1	276	1	496	No	No	No	No	No	No	No	No	Yes	Yes
6	1	272	1	490	No	No	No	No	No	No	No	No	Yes	Yes
7	1	269	1	484	No	No	No	No	No	No	No	No	Yes	Yes
8	1	244	1	440	No	No	No	No	No	No	No	No	Yes	Yes
9	1	240	1	433	No	No	No	No	No	No	No	No	Yes	Yes
10	1	238	1	427	No	No	No	No	No	No	No	No	Yes	Yes
11	1	206	1	371	No	No	No	No	No	No	No	No	Yes	Yes
12	1	192	1	345	No	No	No	No	No	No	No	No	Yes	Yes
13	1	188	1	339	No	No	No	No	No	No	No	No	Yes	No
14	1	139	1	251	No	No	No	No	No	No	No	No	Yes	No
15	1	139	1	251	No	No	No	No	No	No	No	No	Yes	No
16	1	97	1	176	No	No	No	No	No	No	No	No	No	No
17	1	56	1	100	No	No	No	No	No	No	No	No	No	No
18	1	56	1	100	No	No	No	No	No	No	No	No	No	No
19	1	32	1	57	No	No	No	No	No	No	No	No	No	No
20	1	18	1	31	No	No	No	No	No	No	No	No	No	No
21	1	10	1	19	No	No	No	No	No	No	No	No	No	No
22	1	4	1	6	No	No	No	No	No	No	No	No	No	No
23	1	4	1	6	No	No	No	No	No	No	No	No	No	No
24	1	4	1	6	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	4	0	0	0	0	15	12

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	255.5	18.3
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	44:34	0:59
Delay Condition Met	Yes	No
Volume on Minor Street Approach During Same Hour	628	195
High Minor Volume Condition Met	Yes	Yes
Total Entering Volume on All Approaches During Same Hour	1172	1172
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	Yes	No
<b>Warrant Met for Intersection</b>	<b>Yes</b>	

## Signal Warrants Report For Intersection 2: E Colfax Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	199	113	15	15
2	193	110	15	15
3	189	107	14	14
4	177	101	13	13
5	157	89	12	12
6	155	88	12	12
7	153	87	12	12
8	139	79	11	11
9	137	78	10	10
10	135	77	10	10
11	117	67	9	9
12	109	62	8	8
13	107	61	8	8
14	80	45	6	6
15	80	45	6	6
16	56	32	4	4
17	32	18	2	2
18	32	18	2	2
19	18	10	1	1
20	10	6	1	1
21	6	3	0	0
22	2	1	0	0
23	2	1	0	0
24	2	1	0	0

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	312	1	15	No	No	No	No	No	No	No	No	No	No
2	1	303	1	15	No	No	No	No	No	No	No	No	No	No
3	1	296	1	14	No	No	No	No	No	No	No	No	No	No
4	1	278	1	13	No	No	No	No	No	No	No	No	No	No
5	1	246	1	12	No	No	No	No	No	No	No	No	No	No
6	1	243	1	12	No	No	No	No	No	No	No	No	No	No
7	1	240	1	12	No	No	No	No	No	No	No	No	No	No
8	1	218	1	11	No	No	No	No	No	No	No	No	No	No
9	1	215	1	10	No	No	No	No	No	No	No	No	No	No
10	1	212	1	10	No	No	No	No	No	No	No	No	No	No
11	1	184	1	9	No	No	No	No	No	No	No	No	No	No
12	1	171	1	8	No	No	No	No	No	No	No	No	No	No
13	1	168	1	8	No	No	No	No	No	No	No	No	No	No
14	1	125	1	6	No	No	No	No	No	No	No	No	No	No
15	1	125	1	6	No	No	No	No	No	No	No	No	No	No
16	1	88	1	4	No	No	No	No	No	No	No	No	No	No
17	1	50	1	2	No	No	No	No	No	No	No	No	No	No
18	1	50	1	2	No	No	No	No	No	No	No	No	No	No
19	1	28	1	1	No	No	No	No	No	No	No	No	No	No
20	1	16	1	1	No	No	No	No	No	No	No	No	No	No
21	1	9	1	0	No	No	No	No	No	No	No	No	No	No
22	1	3	1	0	No	No	No	No	No	No	No	No	No	No
23	1	3	1	0	No	No	No	No	No	No	No	No	No	No
24	1	3	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	10.8	11
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:02	0:02
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	15
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	342	342
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	

## Signal Warrants Report For Intersection 3: Manila Rd/I-70 Westbound Ramp

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	N	S	E
1	150	673	46
2	146	653	45
3	143	639	44
4	134	599	41
5	119	532	36
6	117	525	36
7	116	518	35
8	105	471	32
9	103	464	32
10	102	458	31
11	89	397	27
12	83	370	25
13	81	363	25
14	60	269	18
15	60	269	18
16	42	188	13
17	24	108	7
18	24	108	7
19	14	61	4
20	8	34	2
21	5	20	1
22	2	7	0
23	2	7	0
24	2	7	0

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	823	1	46	No	No	No	No	No	No	No	Yes	No	No
2	1	799	1	45	No	No	No	No	No	No	No	Yes	No	No
3	1	782	1	44	No	No	No	No	No	No	No	Yes	No	No
4	1	733	1	41	No	No	No	No	No	No	No	No	No	No
5	1	651	1	36	No	No	No	No	No	No	No	No	No	No
6	1	642	1	36	No	No	No	No	No	No	No	No	No	No
7	1	634	1	35	No	No	No	No	No	No	No	No	No	No
8	1	576	1	32	No	No	No	No	No	No	No	No	No	No
9	1	567	1	32	No	No	No	No	No	No	No	No	No	No
10	1	560	1	31	No	No	No	No	No	No	No	No	No	No
11	1	486	1	27	No	No	No	No	No	No	No	No	No	No
12	1	453	1	25	No	No	No	No	No	No	No	No	No	No
13	1	444	1	25	No	No	No	No	No	No	No	No	No	No
14	1	329	1	18	No	No	No	No	No	No	No	No	No	No
15	1	329	1	18	No	No	No	No	No	No	No	No	No	No
16	1	230	1	13	No	No	No	No	No	No	No	No	No	No
17	1	132	1	7	No	No	No	No	No	No	No	No	No	No
18	1	132	1	7	No	No	No	No	No	No	No	No	No	No
19	1	75	1	4	No	No	No	No	No	No	No	No	No	No
20	1	42	1	2	No	No	No	No	No	No	No	No	No	No
21	1	25	1	1	No	No	No	No	No	No	No	No	No	No
22	1	9	1	0	No	No	No	No	No	No	No	No	No	No
23	1	9	1	0	No	No	No	No	No	No	No	No	No	No
24	1	9	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	3	0	0

## Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	26.7
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:20
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	46
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	869
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

## Signal Warrants Report For Intersection 4: Manila Rd/I-70 Eastbound Ramp

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	N	S	W
1	55	265	268
2	53	257	260
3	52	252	255
4	49	236	239
5	43	209	212
6	43	207	209
7	42	204	206
8	39	186	188
9	38	183	185
10	37	180	182
11	32	156	158
12	30	146	147
13	30	143	145
14	22	106	107
15	22	106	107
16	15	74	75
17	9	42	43
18	9	42	43
19	5	24	24
20	3	13	13
21	2	8	8
22	1	3	3
23	1	3	3
24	1	3	3

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	320	1	268	No	No	No	Yes	No	No	No	No	No	No
2	1	310	1	260	No	No	No	Yes	No	No	No	No	No	No
3	1	304	1	255	No	No	No	Yes	No	No	No	No	No	No
4	1	285	1	239	No	No	No	Yes	No	No	No	No	No	No
5	1	252	1	212	No	No	No	No	No	No	No	No	No	No
6	1	250	1	209	No	No	No	No	No	No	No	No	No	No
7	1	246	1	206	No	No	No	No	No	No	No	No	No	No
8	1	225	1	188	No	No	No	No	No	No	No	No	No	No
9	1	221	1	185	No	No	No	No	No	No	No	No	No	No
10	1	217	1	182	No	No	No	No	No	No	No	No	No	No
11	1	188	1	158	No	No	No	No	No	No	No	No	No	No
12	1	176	1	147	No	No	No	No	No	No	No	No	No	No
13	1	173	1	145	No	No	No	No	No	No	No	No	No	No
14	1	128	1	107	No	No	No	No	No	No	No	No	No	No
15	1	128	1	107	No	No	No	No	No	No	No	No	No	No
16	1	89	1	75	No	No	No	No	No	No	No	No	No	No
17	1	51	1	43	No	No	No	No	No	No	No	No	No	No
18	1	51	1	43	No	No	No	No	No	No	No	No	No	No
19	1	29	1	24	No	No	No	No	No	No	No	No	No	No
20	1	16	1	13	No	No	No	No	No	No	No	No	No	No
21	1	10	1	8	No	No	No	No	No	No	No	No	No	No
22	1	4	1	3	No	No	No	No	No	No	No	No	No	No
23	1	4	1	3	No	No	No	No	No	No	No	No	No	No
24	1	4	1	3	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	4	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	15.5
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	1:09
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	268
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	588
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

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Rocky Mountain Rail Park TIS

Vistro File: R:\...\2023-09-17 Rocky Mountain Rail Park  
TIS.vistro

Scenario 8 2030 PM

Report File: R:\...\2030 Background PM\_20230918.pdf

9/18/2023

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	SB Thru	0.435	26.1	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	NB Thru	0.010	12.1	B
3	Manila Rd/I-70 Westbound Ramp	Two-way stop	HCM 7th Edition	WB Left	0.096	13.9	B
4	Manila Rd/I-70 Eastbound Ramp	Two-way stop	HCM 7th Edition	EB Thru	0.009	11.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**  
**Intersection 1: E Colfax Ave/Manila Rd**

Control Type:	Signalized	Delay (sec / veh):	26.1
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.435

**Intersection Setup**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	0	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	2
Exit Pocket Length [ft]	0.00	0.00	550.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1620.00
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	10	70	55	30	430	10	5	195	25	18	69	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	28	0	0	5	0	0	13	0	0	3
Total Hourly Volume [veh/h]	10	70	27	30	430	5	5	195	12	18	69	2
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	19	7	8	117	1	1	53	3	5	19	1
Total Analysis Volume [veh/h]	11	76	29	33	467	5	5	212	13	20	75	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	3	8	1	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	5	5	10	0	5	10	0	5	10	0
Maximum Green [s]	10	30	10	10	30	0	10	30	0	10	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	18	36	9	10	28	0	9	25	0	9	25	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	14	0	0	11	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	Yes	No		Yes	No		Yes	No		Yes	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	C	R	L	C	R
C, Cycle Length [s]	80	80	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	0.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	31	24	24	31	26	41	34	41	32	32
g / C, Green / Cycle	0.39	0.30	0.30	0.39	0.32	0.51	0.42	0.51	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.01	0.05	0.02	0.03	0.30	0.14	0.01	0.02	0.05	0.00
s, saturation flow rate [veh/h]	862	1600	1360	1166	1597	1521	1360	989	1600	1360
c, Capacity [veh/h]	238	486	413	543	515	853	574	527	641	545
d1, Uniform Delay [s]	18.42	20.37	19.82	15.43	26.06	11.32	13.51	13.43	15.09	14.40
k, delay calibration	0.11	0.11	0.11	0.11	0.19	0.50	0.50	0.11	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.08	0.15	0.07	0.05	11.33	0.72	0.07	0.03	0.37	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.05	0.16	0.07	0.06	0.92	0.25	0.02	0.04	0.12	0.00
d, Delay for Lane Group [s/veh]	18.50	20.51	19.89	15.48	37.40	12.04	13.58	13.46	15.46	14.41
Lane Group LOS	B	C	B	B	D	B	B	B	B	B
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.12	0.97	0.36	0.35	9.33	2.01	0.13	0.18	0.80	0.02
50th-Percentile Queue Length [ft/ln]	2.92	24.27	9.03	8.67	233.13	50.30	3.18	4.57	19.93	0.51
95th-Percentile Queue Length [veh/ln]	0.21	1.75	0.65	0.62	14.33	3.62	0.23	0.33	1.44	0.04
95th-Percentile Queue Length [ft/ln]	5.26	43.69	16.26	15.61	358.34	90.54	5.73	8.22	35.88	0.92

**Movement, Approach, & Intersection Results**

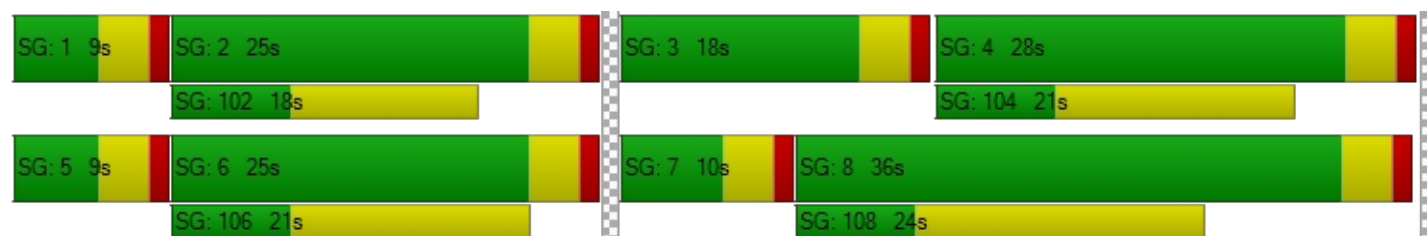
d_M, Delay for Movement [s/veh]	18.50	20.51	19.89	15.48	37.40	37.40	12.04	12.04	13.58	13.46	15.46	14.41
Movement LOS	B	C	B	B	D	D	B	B	B	B	B	B
d_A, Approach Delay [s/veh]	20.17			35.97			12.13			15.03		
Approach LOS	C			D			B			B		
d_I, Intersection Delay [s/veh]	26.11											
Intersection LOS	C											
Intersection V/C	0.435											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	29.77			29.77			29.77			29.77		
I_p,int, Pedestrian LOS Score for Intersection	2.675			2.658			2.300			2.586		
Crosswalk LOS	B			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	800			600			750			525		
d_b, Bicycle Delay [s]	14.41			19.61			15.64			21.77		
I_b,int, Bicycle LOS Score for Intersection	1.797			2.401			1.961			1.725		
Bicycle LOS	A			B			A			A		

**Sequence**





Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report**  
**Intersection 2: E Colfax Ave/Peterson Rd**

Control Type:	Two-way stop	Delay (sec / veh):	12.1
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.010

**Intersection Setup**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	960.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	5	5	5	5	245	5	5	82	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	5	5	5	5	5	5	245	5	5	82	5
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	1	1	1	1	1	67	1	1	22	1
Total Analysis Volume [veh/h]	5	5	5	5	5	5	5	266	5	5	89	5
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	11.94	12.10	10.11	11.93	12.09	9.07	7.59	0.00	0.00	8.02	0.00	0.00
Movement LOS	B	B	B	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.08	0.08	0.08	0.08	0.08	0.08	0.01	0.01	0.01	0.01	0.01	0.01
95th-Percentile Queue Length [ft/ln]	1.99	1.99	1.99	1.88	1.88	1.88	0.21	0.21	0.21	0.21	0.21	0.21
d_A, Approach Delay [s/veh]	11.38			11.03			0.14			0.40		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	1.02											
Intersection LOS	B											



**Intersection Level Of Service Report**  
**Intersection 3: Manila Rd/I-70 Westbound Ramp**

Control Type:	Two-way stop	Delay (sec / veh):	13.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.096

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound			Westbound Ramp		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound			Westbound Ramp		
Base Volume Input [veh/h]	70	114	0	0	143	69	0	0	0	40	5	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	70	114	0	0	143	69	0	0	0	40	5	11
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	31	0	0	39	19	0	0	0	11	1	3
Total Analysis Volume [veh/h]	76	124	0	0	155	75	0	0	0	43	5	12
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance				No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.01	0.01
d_M, Delay for Movement [s/veh]	8.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.91	13.78	9.23
Movement LOS	A	A			A	A				B	B	A
95th-Percentile Queue Length [veh/ln]	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	0.08	0.08
95th-Percentile Queue Length [ft/ln]	4.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.93	1.97	1.97
d_A, Approach Delay [s/veh]	3.08			0.00			0.00			12.96		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	2.84											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Two-way stop	Delay (sec / veh):	11.3
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	80	60	23	90	0	44	5	150	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	80	60	23	90	0	44	5	150	0	0	0
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	22	16	6	24	0	12	1	41	0	0	0
Total Analysis Volume [veh/h]	0	87	65	25	98	0	48	5	163	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

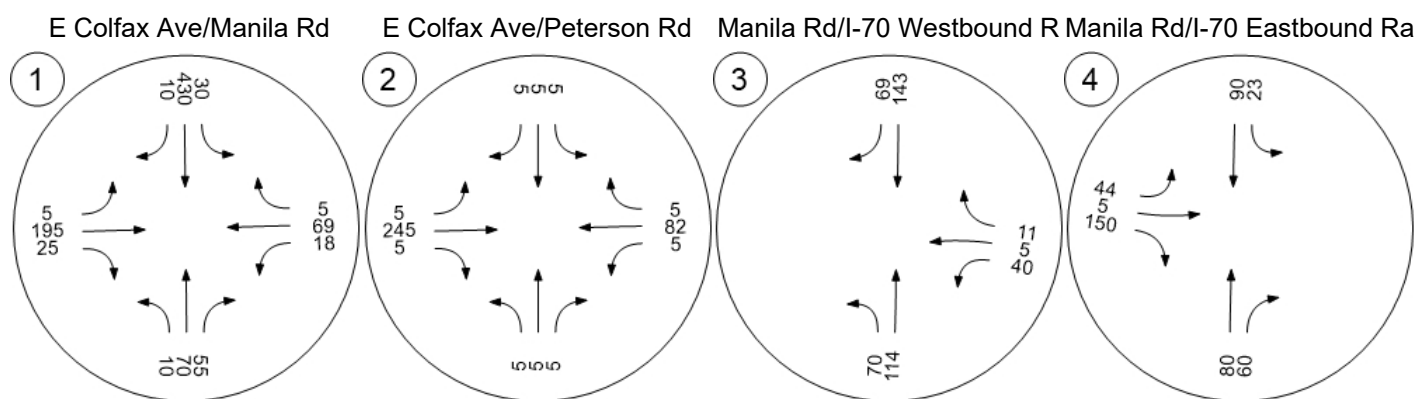
**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.02	0.00	0.00	0.08	0.01	0.18	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	7.77	0.00	0.00	11.10	11.34	9.81	0.00	0.00	0.00
Movement LOS		A	A	A	A		B	B	A			
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.06	0.00	0.00	0.24	0.03	0.65	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	1.44	0.00	0.00	6.08	0.66	16.23	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			1.58			10.13			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	4.85											
Intersection LOS	B											

## Traffic Volume - Future Total Volume



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## Signal Warrants Report For Intersection 1: E Colfax Ave/Manila Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	Yes
#3	Peak Hour	Yes

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	92	225	135	470
2	89	218	131	456
3	87	214	128	447
4	82	200	120	418
5	73	178	107	371
6	72	176	105	367
7	71	173	104	362
8	64	158	95	329
9	63	155	93	324
10	63	153	92	320
11	54	133	80	277
12	51	124	74	259
13	50	122	73	254
14	37	90	54	188
15	37	90	54	188
16	26	63	38	132
17	15	36	22	75
18	15	36	22	75
19	8	20	12	42
20	5	11	7	24
21	3	7	4	14
22	1	2	1	5
23	1	2	1	5
24	1	2	1	5

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	317	1	470	No	No	No	Yes	No	No	No	No	Yes	Yes
2	1	307	1	456	No	No	No	Yes	No	No	No	No	Yes	Yes
3	1	301	1	447	No	No	No	Yes	No	No	No	No	Yes	Yes
4	1	282	1	418	No	No	No	Yes	No	No	No	No	Yes	Yes
5	1	251	1	371	No	No	No	No	No	No	No	No	Yes	Yes
6	1	248	1	367	No	No	No	No	No	No	No	No	Yes	Yes
7	1	244	1	362	No	No	No	No	No	No	No	No	Yes	Yes
8	1	222	1	329	No	No	No	No	No	No	No	No	Yes	No
9	1	218	1	324	No	No	No	No	No	No	No	No	Yes	No
10	1	216	1	320	No	No	No	No	No	No	No	No	Yes	No
11	1	187	1	277	No	No	No	No	No	No	No	No	Yes	No
12	1	175	1	259	No	No	No	No	No	No	No	No	Yes	No
13	1	172	1	254	No	No	No	No	No	No	No	No	Yes	No
14	1	127	1	188	No	No	No	No	No	No	No	No	No	No
15	1	127	1	188	No	No	No	No	No	No	No	No	No	No
16	1	89	1	132	No	No	No	No	No	No	No	No	No	No
17	1	51	1	75	No	No	No	No	No	No	No	No	No	No
18	1	51	1	75	No	No	No	No	No	No	No	No	No	No
19	1	28	1	42	No	No	No	No	No	No	No	No	No	No
20	1	16	1	24	No	No	No	No	No	No	No	No	No	No
21	1	10	1	14	No	No	No	No	No	No	No	No	No	No
22	1	3	1	5	No	No	No	No	No	No	No	No	No	No
23	1	3	1	5	No	No	No	No	No	No	No	No	No	No
24	1	3	1	5	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	4	0	0	0	0	13	7

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	27.4	63.7
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	1:01	8:18
Delay Condition Met	No	Yes
Volume on Minor Street Approach During Same Hour	135	470
High Minor Volume Condition Met	Yes	Yes
Total Entering Volume on All Approaches During Same Hour	922	922
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	Yes
<b>Warrant Met for Intersection</b>	<b>Yes</b>	



## Signal Warrants Report For Intersection 2: E Colfax Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	92	255	15	15
2	89	247	15	15
3	87	242	14	14
4	82	227	13	13
5	73	201	12	12
6	72	199	12	12
7	71	196	12	12
8	64	179	11	11
9	63	176	10	10
10	63	173	10	10
11	54	150	9	9
12	51	140	8	8
13	50	138	8	8
14	37	102	6	6
15	37	102	6	6
16	26	71	4	4
17	15	41	2	2
18	15	41	2	2
19	8	23	1	1
20	5	13	1	1
21	3	8	0	0
22	1	3	0	0
23	1	3	0	0
24	1	3	0	0

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	347	1	15	No	No	No	No	No	No	No	No	No	No
2	1	336	1	15	No	No	No	No	No	No	No	No	No	No
3	1	329	1	14	No	No	No	No	No	No	No	No	No	No
4	1	309	1	13	No	No	No	No	No	No	No	No	No	No
5	1	274	1	12	No	No	No	No	No	No	No	No	No	No
6	1	271	1	12	No	No	No	No	No	No	No	No	No	No
7	1	267	1	12	No	No	No	No	No	No	No	No	No	No
8	1	243	1	11	No	No	No	No	No	No	No	No	No	No
9	1	239	1	10	No	No	No	No	No	No	No	No	No	No
10	1	236	1	10	No	No	No	No	No	No	No	No	No	No
11	1	204	1	9	No	No	No	No	No	No	No	No	No	No
12	1	191	1	8	No	No	No	No	No	No	No	No	No	No
13	1	188	1	8	No	No	No	No	No	No	No	No	No	No
14	1	139	1	6	No	No	No	No	No	No	No	No	No	No
15	1	139	1	6	No	No	No	No	No	No	No	No	No	No
16	1	97	1	4	No	No	No	No	No	No	No	No	No	No
17	1	56	1	2	No	No	No	No	No	No	No	No	No	No
18	1	56	1	2	No	No	No	No	No	No	No	No	No	No
19	1	31	1	1	No	No	No	No	No	No	No	No	No	No
20	1	18	1	1	No	No	No	No	No	No	No	No	No	No
21	1	11	1	0	No	No	No	No	No	No	No	No	No	No
22	1	4	1	0	No	No	No	No	No	No	No	No	No	No
23	1	4	1	0	No	No	No	No	No	No	No	No	No	No
24	1	4	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	11.4	11
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:02	0:02
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	15
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	377	377
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	

## Signal Warrants Report For Intersection 3: Manila Rd/I-70 Westbound Ramp

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	E
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	N	S	E
1	212	184	56
2	206	178	54
3	201	175	53
4	189	164	50
5	167	145	44
6	165	144	44
7	163	142	43
8	148	129	39
9	146	127	39
10	144	125	38
11	125	109	33
12	117	101	31
13	114	99	30
14	85	74	22
15	85	74	22
16	59	52	16
17	34	29	9
18	34	29	9
19	19	17	5
20	11	9	3
21	6	6	2
22	2	2	1
23	2	2	1
24	2	2	1

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	396	1	56	No	No	No	No	No	No	No	No	No	No
2	1	384	1	54	No	No	No	No	No	No	No	No	No	No
3	1	376	1	53	No	No	No	No	No	No	No	No	No	No
4	1	353	1	50	No	No	No	No	No	No	No	No	No	No
5	1	312	1	44	No	No	No	No	No	No	No	No	No	No
6	1	309	1	44	No	No	No	No	No	No	No	No	No	No
7	1	305	1	43	No	No	No	No	No	No	No	No	No	No
8	1	277	1	39	No	No	No	No	No	No	No	No	No	No
9	1	273	1	39	No	No	No	No	No	No	No	No	No	No
10	1	269	1	38	No	No	No	No	No	No	No	No	No	No
11	1	234	1	33	No	No	No	No	No	No	No	No	No	No
12	1	218	1	31	No	No	No	No	No	No	No	No	No	No
13	1	213	1	30	No	No	No	No	No	No	No	No	No	No
14	1	159	1	22	No	No	No	No	No	No	No	No	No	No
15	1	159	1	22	No	No	No	No	No	No	No	No	No	No
16	1	111	1	16	No	No	No	No	No	No	No	No	No	No
17	1	63	1	9	No	No	No	No	No	No	No	No	No	No
18	1	63	1	9	No	No	No	No	No	No	No	No	No	No
19	1	36	1	5	No	No	No	No	No	No	No	No	No	No
20	1	20	1	3	No	No	No	No	No	No	No	No	No	No
21	1	12	1	2	No	No	No	No	No	No	No	No	No	No
22	1	4	1	1	No	No	No	No	No	No	No	No	No	No
23	1	4	1	1	No	No	No	No	No	No	No	No	No	No
24	1	4	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	E
Total Stopped Delay Per Vehicle on Minor Approach (s)	13.4
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:12
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	56
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	452
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

## Signal Warrants Report For Intersection 4: Manila Rd/I-70 Eastbound Ramp

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	N	S	W
1	113	140	199
2	110	136	193
3	107	133	189
4	101	125	177
5	89	111	157
6	88	109	155
7	87	108	153
8	79	98	139
9	78	97	137
10	77	95	135
11	67	83	117
12	62	77	109
13	61	76	107
14	45	56	80
15	45	56	80
16	32	39	56
17	18	22	32
18	18	22	32
19	10	13	18
20	6	7	10
21	3	4	6
22	1	1	2
23	1	1	2
24	1	1	2

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	1	253	1	199	No	No	No	No	No	No	No	No	No	No
2	1	246	1	193	No	No	No	No	No	No	No	No	No	No
3	1	240	1	189	No	No	No	No	No	No	No	No	No	No
4	1	226	1	177	No	No	No	No	No	No	No	No	No	No
5	1	200	1	157	No	No	No	No	No	No	No	No	No	No
6	1	197	1	155	No	No	No	No	No	No	No	No	No	No
7	1	195	1	153	No	No	No	No	No	No	No	No	No	No
8	1	177	1	139	No	No	No	No	No	No	No	No	No	No
9	1	175	1	137	No	No	No	No	No	No	No	No	No	No
10	1	172	1	135	No	No	No	No	No	No	No	No	No	No
11	1	150	1	117	No	No	No	No	No	No	No	No	No	No
12	1	139	1	109	No	No	No	No	No	No	No	No	No	No
13	1	137	1	107	No	No	No	No	No	No	No	No	No	No
14	1	101	1	80	No	No	No	No	No	No	No	No	No	No
15	1	101	1	80	No	No	No	No	No	No	No	No	No	No
16	1	71	1	56	No	No	No	No	No	No	No	No	No	No
17	1	40	1	32	No	No	No	No	No	No	No	No	No	No
18	1	40	1	32	No	No	No	No	No	No	No	No	No	No
19	1	23	1	18	No	No	No	No	No	No	No	No	No	No
20	1	13	1	10	No	No	No	No	No	No	No	No	No	No
21	1	7	1	6	No	No	No	No	No	No	No	No	No	No
22	1	2	1	2	No	No	No	No	No	No	No	No	No	No
23	1	2	1	2	No	No	No	No	No	No	No	No	No	No
24	1	2	1	2	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	10.9
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:36
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	199
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	452
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

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Rocky Mountain Rail Park TIS

Vistro File: R:\...\2023-09-17 Rocky Mountain Rail Park  
TIS.vistro

Scenario 9 2030 with Project AM

Report File: R:\...\2030 with Project AM\_20230918a.pdf

9/18/2023

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	NB Thru	0.608	27.7	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	NB Left	0.036	32.3	D
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Right	0.510	6.5	A
4	Manila Rd/I-70 Eastbound Ramp	Two-way stop	HCM 7th Edition	EB Left	0.792	31.7	D
5	Peterson Rd/ Access 1	Two-way stop	HCM 7th Edition	EB Right	0.024	8.9	A
6	Peterson Rd/ Access 2	Two-way stop	HCM 7th Edition	EB Right	0.023	8.7	A
15	48th Ave/Access 3	Two-way stop	HCM 7th Edition	NB Right	0.023	8.6	A
16	48th Ave/Peterson Rd	Two-way stop	HCM 7th Edition	WB Thru	0.009	11.6	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.



**Intersection Level Of Service Report**  
**Intersection 1: E Colfax Ave/Manila Rd**

Control Type:	Signalized	Delay (sec / veh):	27.7
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.608

**Intersection Setup**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	0	0	1	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	10	570	48	10	180	5	5	66	5	66	182	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	256	0	0	0	0	32	0	50	6	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	152	0	0	3	0	0	3	0	0	13
Total Hourly Volume [veh/h]	10	570	152	10	180	2	5	98	2	116	188	12
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	155	41	3	49	1	1	27	1	32	51	3
Total Analysis Volume [veh/h]	11	620	165	11	196	2	5	107	2	126	204	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

### Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

### Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	3	8	0	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	0	5	10	0	5	10	0	5	10	0
Maximum Green [s]	10	30	0	10	30	0	10	30	0	10	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	37	0	9	37	0	9	25	0	9	25	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	17	0	0	14	0	0	11	0	0	14	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	Yes	No		Yes	No		Yes	No		Yes	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

### Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	R	L	C	C	R	L	C	R
C, Cycle Length [s]	80	80	80	80	80	80	80	80	80	80
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	0.00	2.00	0.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	38	33	33	38	33	34	25	34	25	25
g / C, Green / Cycle	0.48	0.41	0.41	0.48	0.41	0.42	0.31	0.42	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.01	0.39	0.12	0.02	0.12	0.08	0.00	0.11	0.13	0.01
s, saturation flow rate [veh/h]	1056	1600	1360	668	1597	1431	1360	1099	1600	1360
c, Capacity [veh/h]	542	660	561	223	659	664	421	447	495	421
d1, Uniform Delay [s]	11.34	22.61	15.76	16.94	15.81	14.46	19.17	18.16	21.94	19.33
k, delay calibration	0.11	0.35	0.11	0.11	0.11	0.50	0.50	0.32	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.01	17.77	0.29	0.09	0.25	0.55	0.02	1.00	2.53	0.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.02	0.94	0.29	0.05	0.30	0.17	0.00	0.28	0.41	0.03
d, Delay for Lane Group [s/veh]	11.36	40.38	16.05	17.03	16.06	15.01	19.19	19.16	24.47	19.46
Lane Group LOS	B	D	B	B	B	B	B	B	C	B
Critical Lane Group	No	Yes	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.09	12.89	1.83	0.10	2.20	1.16	0.03	1.66	3.00	0.16
50th-Percentile Queue Length [ft/ln]	2.29	322.20	45.78	2.38	54.91	29.07	0.63	41.40	74.89	4.11
95th-Percentile Queue Length [veh/ln]	0.17	18.78	3.30	0.17	3.95	2.09	0.05	2.98	5.39	0.30
95th-Percentile Queue Length [ft/ln]	4.13	469.39	82.41	4.28	98.84	52.33	1.13	74.53	134.80	7.41

**Movement, Approach, & Intersection Results**

d_M, Delay for Movement [s/veh]	11.36	40.38	16.05	17.03	16.06	16.06	15.01	15.01	19.19	19.16	24.47	19.46
Movement LOS	B	D	B	B	B	B	B	B	B	B	C	B
d_A, Approach Delay [s/veh]	34.93			16.11			15.08			22.33		
Approach LOS	C			B			B			C		
d_I, Intersection Delay [s/veh]	27.74											
Intersection LOS	C											
Intersection V/C	0.608											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	29.82			29.82			29.82			29.82		
I_p,int, Pedestrian LOS Score for Intersection	3.062			2.604			2.146			2.503		
Crosswalk LOS	C			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	824			824			749			524		
d_b, Bicycle Delay [s]	13.86			13.86			15.68			21.81		
I_b,int, Bicycle LOS Score for Intersection	3.124			1.909			1.753			2.147		
Bicycle LOS	C			A			A			B		

**Sequence**





Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report**  
**Intersection 2: E Colfax Ave/Peterson Rd**

Control Type:	Two-way stop	Delay (sec / veh):	32.3
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.036

**Intersection Setup**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	960.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	5	5	5	5	103	5	5	189	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	6	0	56	288	0	0	0	0	32
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	5	5	11	5	61	293	103	5	5	189	37
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	1	3	1	17	80	28	1	1	51	10
Total Analysis Volume [veh/h]	5	5	5	12	5	66	318	112	5	5	205	40
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.04	0.03	0.01	0.08	0.03	0.08	0.26	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	32.31	28.08	10.37	30.27	26.25	9.96	8.98	0.00	0.00	7.64	0.00	0.00
Movement LOS	D	D	B	D	D	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.23	0.23	0.23	0.25	0.09	0.27	1.04	0.00	0.00	0.01	0.01	0.00
95th-Percentile Queue Length [ft/ln]	5.76	5.76	5.76	6.23	2.20	6.80	26.12	0.00	0.00	0.21	0.21	0.00
d_A, Approach Delay [s/veh]	23.59			13.88			6.56			0.15		
Approach LOS	C			B			A			A		
d_I, Intersection Delay [s/veh]	5.62											
Intersection LOS	D											

**Intersection Level Of Service Report**  
**Intersection 3: Manila Rd/I-70 Westbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	6.5
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.510

**Intersection Setup**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	1	0	0	0	1	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No						No		
Crosswalk	Yes			Yes			No			Yes		



**Volumes**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Base Volume Input [veh/h]	160	513	0	0	35	115	0	0	0	25	5	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	192	0	0	12	38	0	0	0	0	0	64
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	77	0	0	0	0	0	40
Total Hourly Volume [veh/h]	160	705	0	0	47	76	0	0	0	25	5	40
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	192	0	0	13	21	0	0	0	7	1	11
Total Analysis Volume [veh/h]	174	766	0	0	51	83	0	0	0	27	5	43
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

### Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

### Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	0	10	0	0	0	0	0	10	0
Maximum Green [s]	10	30	0	0	30	0	0	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	31	69	0	0	38	0	0	0	0	0	21	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	21	0	0	26	0	0	0	0	0	9	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No						No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	Yes	No			No						No	
Maximum Recall	No	No			No						No	
Pedestrian Recall	No	No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

### Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	C	R		L	C	R
C, Cycle Length [s]	90	90	90	90		90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00		4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00		2.00	2.00	2.00
g_i, Effective Green Time [s]	73	73	65	65		9	9	9
g / C, Green / Cycle	0.82	0.82	0.72	0.72		0.09	0.09	0.09
(v / s)_i Volume / Saturation Flow Rate	0.16	0.48	0.03	0.06		0.02	0.00	0.03
s, saturation flow rate [veh/h]	1117	1600	1600	1360		1524	1600	1360
c, Capacity [veh/h]	1008	1306	1146	974		145	152	129
d1, Uniform Delay [s]	1.73	2.92	3.74	3.85		37.51	36.96	38.05
k, delay calibration	0.11	0.50	0.50	0.50		0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00
d2, Incremental Delay [s]	0.08	1.94	0.07	0.17		0.62	0.09	1.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00		0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00		1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.17	0.59	0.04	0.09		0.19	0.03	0.33
d, Delay for Lane Group [s/veh]	1.81	4.86	3.81	4.02		38.13	37.05	39.55
Lane Group LOS	A	A	A	A		D	D	D
Critical Lane Group	No	Yes	No	No		No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.22	2.20	0.21	0.36		0.57	0.10	0.93
50th-Percentile Queue Length [ft/ln]	5.57	55.02	5.20	8.91		14.19	2.57	23.27
95th-Percentile Queue Length [veh/ln]	0.40	3.96	0.37	0.64		1.02	0.18	1.68
95th-Percentile Queue Length [ft/ln]	10.03	99.04	9.36	16.04		25.54	4.62	41.88

**Movement, Approach, & Intersection Results**

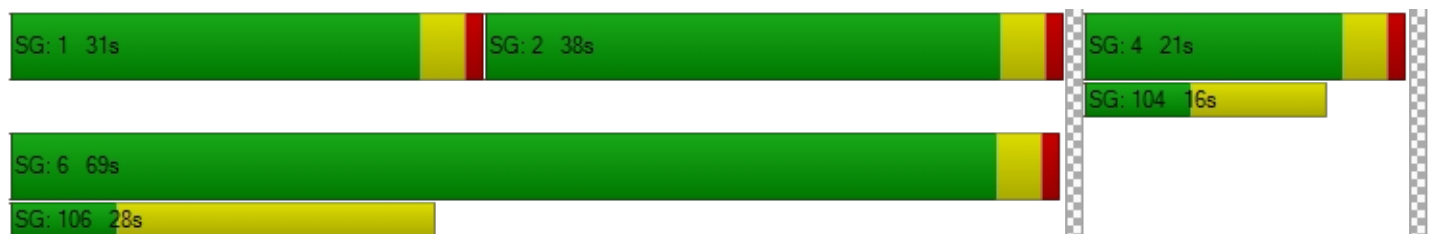
d_M, Delay for Movement [s/veh]	1.81	4.86	0.00	0.00	3.81	4.02	0.00	0.00	0.00	38.13	37.05	39.55
Movement LOS	A	A			A	A				D	D	D
d_A, Approach Delay [s/veh]	4.29			3.94			0.00			38.87		
Approach LOS	A			A			A			D		
d_I, Intersection Delay [s/veh]	6.51											
Intersection LOS	A											
Intersection V/C	0.510											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			0.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	34.66			34.66			0.00			34.66		
I_p,int, Pedestrian LOS Score for Intersection	2.436			2.628			0.000			2.216		
Crosswalk LOS	B			B			F			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1445			756			0			378		
d_b, Bicycle Delay [s]	3.47			17.42			44.99			29.60		
I_b,int, Bicycle LOS Score for Intersection	3.111			1.908			4.132			1.749		
Bicycle LOS	C			A			D			A		

**Sequence**

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Two-way stop	Delay (sec / veh):	31.7
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.792

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	1	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	230	35	5	50	0	213	5	50	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	12	0	0	192	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	230	35	17	50	0	405	5	50	0	0	0
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	63	10	5	14	0	110	1	14	0	0	0
Total Analysis Volume [veh/h]	0	250	38	18	54	0	440	5	54	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0




**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.02	0.00	0.00	0.79	0.01	0.06	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	8.10	0.00	0.00	31.73	12.01	8.95	0.00	0.00	0.00
Movement LOS		A	A	A	A		D	B	A			
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.05	0.00	0.00	7.51	0.03	0.18	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	1.16	0.00	0.00	187.71	0.73	4.44	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			2.03			29.07			0.00		
Approach LOS	A			A			D			A		
d_I, Intersection Delay [s/veh]	17.06											
Intersection LOS	D											

**Intersection Level Of Service Report**  
**Intersection 5: Peterson Rd/ Access 1**

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.024

**Intersection Setup**

Name	Peterson Rd		Peterson Rd		Access 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

**Volumes**

Name	Peterson Rd		Peterson Rd		Access 1	
Base Volume Input [veh/h]	0	15	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	107	213	41	0	0	21
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	107	228	56	0	0	21
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	62	15	0	0	6
Total Analysis Volume [veh/h]	116	248	61	0	0	23
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.00	0.02
d_M, Delay for Movement [s/veh]	7.73	0.00	0.00	0.00	13.38	8.86
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.26	0.00	0.00	0.00	0.07	0.07
95th-Percentile Queue Length [ft/ln]	6.59	0.00	0.00	0.00	1.85	1.85
d_A, Approach Delay [s/veh]	2.46		0.00		8.86	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.46					
Intersection LOS	A					






**Intersection Level Of Service Report**  
**Intersection 6: Peterson Rd/ Access 2**

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 8.7  
Level Of Service: A  
Volume to Capacity (v/c): 0.023

**Intersection Setup**

Name	Peterson Rd		Peterson Rd		Access 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

**Volumes**

Name	Peterson Rd		Peterson Rd		Access 2	
Base Volume Input [veh/h]	0	15	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	107	107	21	0	0	21
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	107	122	36	0	0	21
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	33	10	0	0	6
Total Analysis Volume [veh/h]	116	133	39	0	0	23
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**





V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.00	0.02
d_M, Delay for Movement [s/veh]	7.67	0.00	0.00	0.00	11.96	8.75
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.26	0.00	0.00	0.00	0.07	0.07
95th-Percentile Queue Length [ft/ln]	6.45	0.00	0.00	0.00	1.79	1.79
d_A, Approach Delay [s/veh]	3.57		0.00		8.75	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	3.51					
Intersection LOS	A					

**Intersection Level Of Service Report**  
**Intersection 15: 48th Ave/Access 3**

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 8.6  
Level Of Service: A  
Volume to Capacity (v/c): 0.023

**Intersection Setup**

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name												
Base Volume Input [veh/h]	0	0	0	0	0	0	0	15	0	0	15	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	21	0	0	0	0	0	0	107	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	21	0	0	0	0	15	0	107	15	0
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	6	0	0	0	0	4	0	29	4	0
Total Analysis Volume [veh/h]	0	0	23	0	0	0	0	16	0	116	16	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**





V/C, Movement V/C Ratio	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
d_M, Delay for Movement [s/veh]	11.06	11.46	8.64	11.22	11.38	8.55	7.41	0.00	0.00	7.62	0.00	0.00
Movement LOS	B	B	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00
95th-Percentile Queue Length [ft/ln]	1.74	1.74	1.74	0.00	0.00	0.00	0.00	0.00	0.00	6.31	0.00	0.00
d_A, Approach Delay [s/veh]	8.64			10.38			0.00			6.69		
Approach LOS	A			B			A			A		
d_I, Intersection Delay [s/veh]	6.33											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 16: 48th Ave/Peterson Rd**

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 11.6  
Level Of Service: B  
Volume to Capacity (v/c): 0.009

**Intersection Setup**

Name	Peterson Rd											
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd											
Base Volume Input [veh/h]	5	5	5	5	5	5	5	5	5	5	5	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	107	0	0	0	0	0	0	0	21	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	112	5	5	5	5	5	5	5	26	5	5	5
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	30	1	1	1	1	1	1	1	7	1	1	1
Total Analysis Volume [veh/h]	122	5	5	5	5	5	5	5	28	5	5	5
Pedestrian Volume [ped/h]	0			0			0			0		

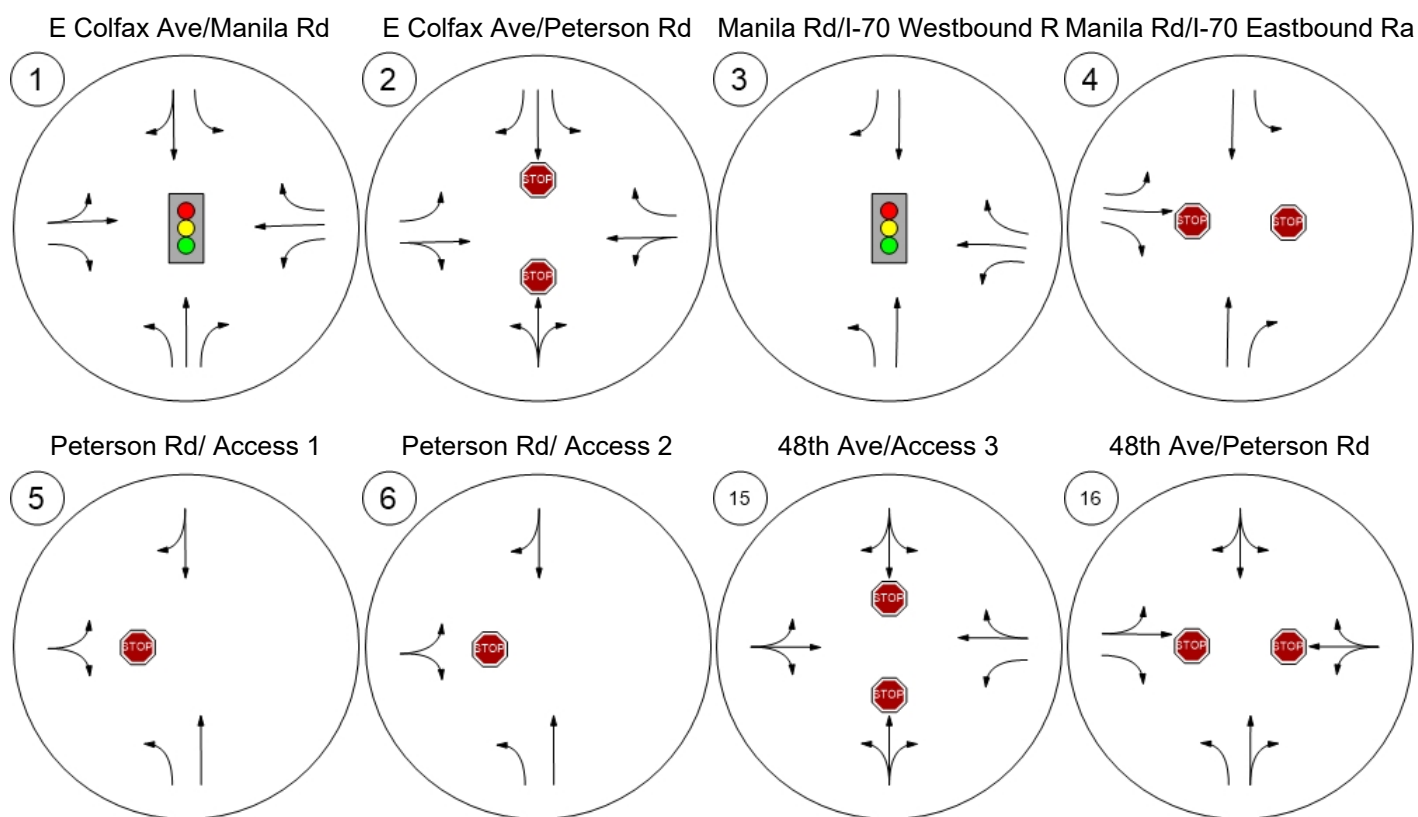
**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

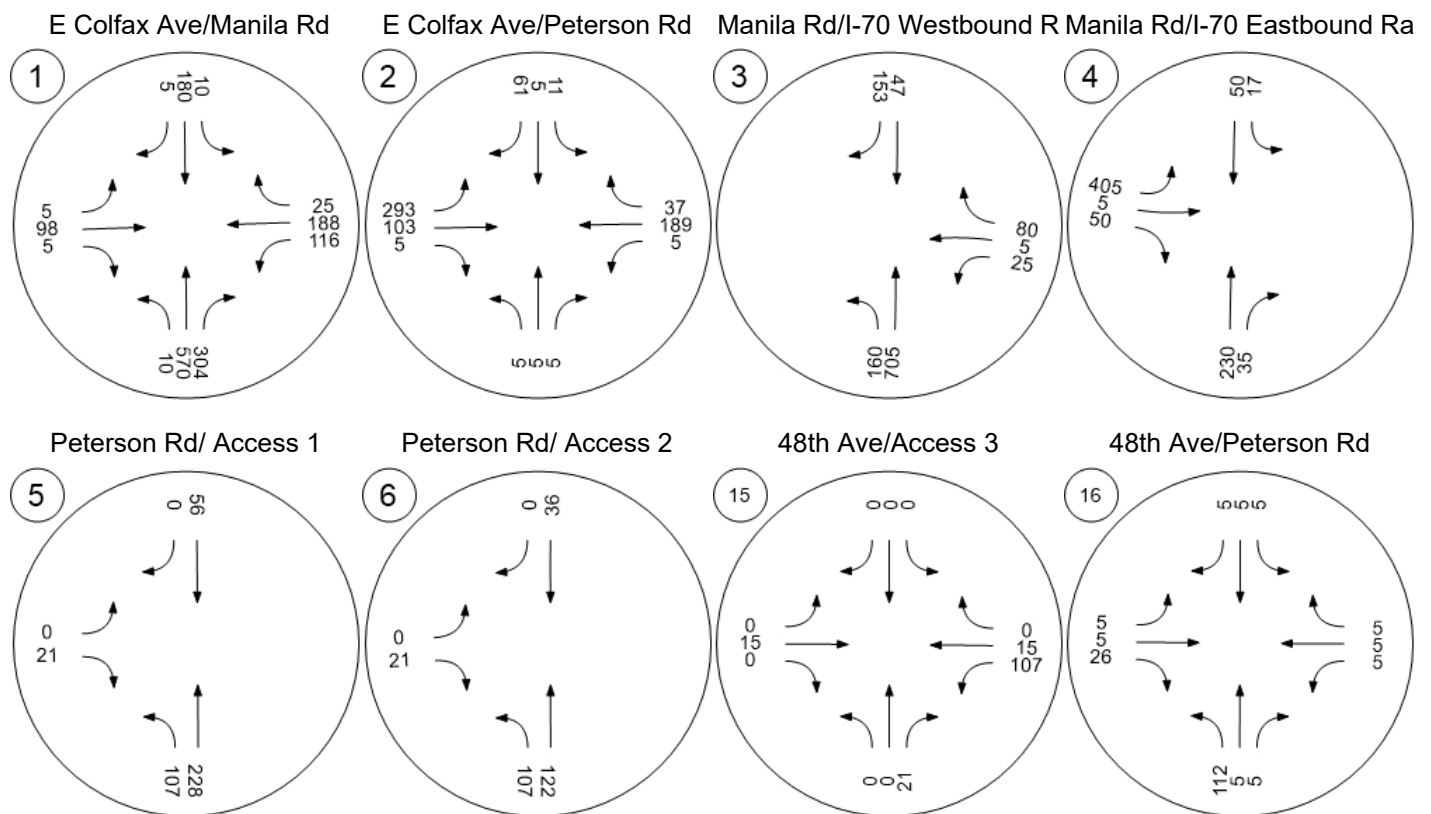
V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	7.61	0.00	0.00	7.41	0.00	0.00	11.30	11.60	8.61	11.58	11.62	8.64
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh/ln]	0.27	0.00	0.00	0.01	0.01	0.01	0.05	0.05	0.08	0.07	0.07	0.07
95th-Percentile Queue Length [ft/ln]	6.63	0.00	0.00	0.23	0.23	0.23	1.34	1.34	2.11	1.75	1.75	1.75
d_A, Approach Delay [s/veh]	7.04			2.47			9.36			10.61		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	7.40											
Intersection LOS	B											

## Lane Configuration and Traffic Control





## Traffic Volume - Future Total Volume





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## Signal Warrants Report For Intersection 2: E Colfax Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	231	401	15	77
2	224	389	15	75
3	219	381	14	73
4	206	357	13	69
5	182	317	12	61
6	180	313	12	60
7	178	309	12	59
8	162	281	11	54
9	159	277	10	53
10	157	273	10	52
11	136	237	9	45
12	127	221	8	42
13	125	217	8	42
14	92	160	6	31
15	92	160	6	31
16	65	112	4	22
17	37	64	2	12
18	37	64	2	12
19	21	36	1	7
20	12	20	1	4
21	7	12	0	2
22	2	4	0	1
23	2	4	0	1
24	2	4	0	1

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	632	3	77	No	No	No	No	No	No	Yes	Yes	No	No
2	2	613	3	75	No	No	No	No	No	No	No	Yes	No	No
3	2	600	3	73	No	No	No	No	No	No	No	Yes	No	No
4	2	563	3	69	No	No	No	No	No	No	No	Yes	No	No
5	2	499	3	61	No	No	No	No	No	No	No	No	No	No
6	2	493	3	60	No	No	No	No	No	No	No	No	No	No
7	2	487	3	59	No	No	No	No	No	No	No	No	No	No
8	2	443	3	54	No	No	No	No	No	No	No	No	No	No
9	2	436	3	53	No	No	No	No	No	No	No	No	No	No
10	2	430	3	52	No	No	No	No	No	No	No	No	No	No
11	2	373	3	45	No	No	No	No	No	No	No	No	No	No
12	2	348	3	42	No	No	No	No	No	No	No	No	No	No
13	2	342	3	42	No	No	No	No	No	No	No	No	No	No
14	2	252	3	31	No	No	No	No	No	No	No	No	No	No
15	2	252	3	31	No	No	No	No	No	No	No	No	No	No
16	2	177	3	22	No	No	No	No	No	No	No	No	No	No
17	2	101	3	12	No	No	No	No	No	No	No	No	No	No
18	2	101	3	12	No	No	No	No	No	No	No	No	No	No
19	2	57	3	7	No	No	No	No	No	No	No	No	No	No
20	2	32	3	4	No	No	No	No	No	No	No	No	No	No
21	2	19	3	2	No	No	No	No	No	No	No	No	No	No
22	2	6	3	1	No	No	No	No	No	No	No	No	No	No
23	2	6	3	1	No	No	No	No	No	No	No	No	No	No
24	2	6	3	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	1	4	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	23.6	13.9
Number of Lanes on Minor Street Approach	1	3
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:05	0:17
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	77
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	724	724
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	

## Signal Warrants Report For Intersection 4: Manila Rd/I-70 Eastbound Ramp

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	N	S	W
1	67	265	460
2	65	257	446
3	64	252	437
4	60	236	409
5	53	209	363
6	52	207	359
7	52	204	354
8	47	186	322
9	46	183	317
10	46	180	313
11	40	156	271
12	37	146	253
13	36	143	248
14	27	106	184
15	27	106	184
16	19	74	129
17	11	42	74
18	11	42	74
19	6	24	41
20	3	13	23
21	2	8	14
22	1	3	5
23	1	3	5
24	1	3	5

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	332	3	460	No	No	No	No	No	No	No	No	No	No
2	2	322	3	446	No	No	No	No	No	No	No	No	No	No
3	2	316	3	437	No	No	No	No	No	No	No	No	No	No
4	2	296	3	409	No	No	No	No	No	No	No	No	No	No
5	2	262	3	363	No	No	No	No	No	No	No	No	No	No
6	2	259	3	359	No	No	No	No	No	No	No	No	No	No
7	2	256	3	354	No	No	No	No	No	No	No	No	No	No
8	2	233	3	322	No	No	No	No	No	No	No	No	No	No
9	2	229	3	317	No	No	No	No	No	No	No	No	No	No
10	2	226	3	313	No	No	No	No	No	No	No	No	No	No
11	2	196	3	271	No	No	No	No	No	No	No	No	No	No
12	2	183	3	253	No	No	No	No	No	No	No	No	No	No
13	2	179	3	248	No	No	No	No	No	No	No	No	No	No
14	2	133	3	184	No	No	No	No	No	No	No	No	No	No
15	2	133	3	184	No	No	No	No	No	No	No	No	No	No
16	2	93	3	129	No	No	No	No	No	No	No	No	No	No
17	2	53	3	74	No	No	No	No	No	No	No	No	No	No
18	2	53	3	74	No	No	No	No	No	No	No	No	No	No
19	2	30	3	41	No	No	No	No	No	No	No	No	No	No
20	2	16	3	23	No	No	No	No	No	No	No	No	No	No
21	2	10	3	14	No	No	No	No	No	No	No	No	No	No
22	2	4	3	5	No	No	No	No	No	No	No	No	No	No
23	2	4	3	5	No	No	No	No	No	No	No	No	No	No
24	2	4	3	5	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	29.1
Number of Lanes on Minor Street Approach	3
VehicleHours of Stopped Delay on Minor Approach (h:mm)	3:42
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	460
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	792
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

## Signal Warrants Report For Intersection 5: Peterson Rd/ Access 1

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	335	56	21
2	325	54	20
3	318	53	20
4	298	50	19
5	265	44	17
6	261	44	16
7	258	43	16
8	234	39	15
9	231	39	14
10	228	38	14
11	198	33	12
12	184	31	12
13	181	30	11
14	134	22	8
15	134	22	8
16	94	16	6
17	54	9	3
18	54	9	3
19	30	5	2
20	17	3	1
21	10	2	1
22	3	1	0
23	3	1	0
24	3	1	0

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	391	1	21	No	No	No	No	No	No	No	No	No	No
2	2	379	1	20	No	No	No	No	No	No	No	No	No	No
3	2	371	1	20	No	No	No	No	No	No	No	No	No	No
4	2	348	1	19	No	No	No	No	No	No	No	No	No	No
5	2	309	1	17	No	No	No	No	No	No	No	No	No	No
6	2	305	1	16	No	No	No	No	No	No	No	No	No	No
7	2	301	1	16	No	No	No	No	No	No	No	No	No	No
8	2	273	1	15	No	No	No	No	No	No	No	No	No	No
9	2	270	1	14	No	No	No	No	No	No	No	No	No	No
10	2	266	1	14	No	No	No	No	No	No	No	No	No	No
11	2	231	1	12	No	No	No	No	No	No	No	No	No	No
12	2	215	1	12	No	No	No	No	No	No	No	No	No	No
13	2	211	1	11	No	No	No	No	No	No	No	No	No	No
14	2	156	1	8	No	No	No	No	No	No	No	No	No	No
15	2	156	1	8	No	No	No	No	No	No	No	No	No	No
16	2	110	1	6	No	No	No	No	No	No	No	No	No	No
17	2	63	1	3	No	No	No	No	No	No	No	No	No	No
18	2	63	1	3	No	No	No	No	No	No	No	No	No	No
19	2	35	1	2	No	No	No	No	No	No	No	No	No	No
20	2	20	1	1	No	No	No	No	No	No	No	No	No	No
21	2	12	1	1	No	No	No	No	No	No	No	No	No	No
22	2	4	1	0	No	No	No	No	No	No	No	No	No	No
23	2	4	1	0	No	No	No	No	No	No	No	No	No	No
24	2	4	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.9
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:03
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	21
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	412
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

## Signal Warrants Report For Intersection 6: Peterson Rd/ Access 2

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	229	36	21
2	222	35	20
3	218	34	20
4	204	32	19
5	181	28	17
6	179	28	16
7	176	28	16
8	160	25	15
9	158	25	14
10	156	24	14
11	135	21	12
12	126	20	12
13	124	19	11
14	92	14	8
15	92	14	8
16	64	10	6
17	37	6	3
18	37	6	3
19	21	3	2
20	11	2	1
21	7	1	1
22	2	0	0
23	2	0	0
24	2	0	0



## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	265	1	21	No	No	No	No	No	No	No	No	No	No
2	2	257	1	20	No	No	No	No	No	No	No	No	No	No
3	2	252	1	20	No	No	No	No	No	No	No	No	No	No
4	2	236	1	19	No	No	No	No	No	No	No	No	No	No
5	2	209	1	17	No	No	No	No	No	No	No	No	No	No
6	2	207	1	16	No	No	No	No	No	No	No	No	No	No
7	2	204	1	16	No	No	No	No	No	No	No	No	No	No
8	2	185	1	15	No	No	No	No	No	No	No	No	No	No
9	2	183	1	14	No	No	No	No	No	No	No	No	No	No
10	2	180	1	14	No	No	No	No	No	No	No	No	No	No
11	2	156	1	12	No	No	No	No	No	No	No	No	No	No
12	2	146	1	12	No	No	No	No	No	No	No	No	No	No
13	2	143	1	11	No	No	No	No	No	No	No	No	No	No
14	2	106	1	8	No	No	No	No	No	No	No	No	No	No
15	2	106	1	8	No	No	No	No	No	No	No	No	No	No
16	2	74	1	6	No	No	No	No	No	No	No	No	No	No
17	2	43	1	3	No	No	No	No	No	No	No	No	No	No
18	2	43	1	3	No	No	No	No	No	No	No	No	No	No
19	2	24	1	2	No	No	No	No	No	No	No	No	No	No
20	2	13	1	1	No	No	No	No	No	No	No	No	No	No
21	2	8	1	1	No	No	No	No	No	No	No	No	No	No
22	2	2	1	0	No	No	No	No	No	No	No	No	No	No
23	2	2	1	0	No	No	No	No	No	No	No	No	No	No
24	2	2	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.7
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:03
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	21
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	286
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

## Signal Warrants Report For Intersection 15: 48th Ave/Access 3

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	122	15	21	0
2	118	15	20	0
3	116	14	20	0
4	109	13	19	0
5	96	12	17	0
6	95	12	16	0
7	94	12	16	0
8	85	11	15	0
9	84	10	14	0
10	83	10	14	0
11	72	9	12	0
12	67	8	12	0
13	66	8	11	0
14	49	6	8	0
15	49	6	8	0
16	34	4	6	0
17	20	2	3	0
18	20	2	3	0
19	11	1	2	0
20	6	1	1	0
21	4	0	1	0
22	1	0	0	0
23	1	0	0	0
24	1	0	0	0

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	137	1	21	No	No	No	No	No	No	No	No	No	No
2	2	133	1	20	No	No	No	No	No	No	No	No	No	No
3	2	130	1	20	No	No	No	No	No	No	No	No	No	No
4	2	122	1	19	No	No	No	No	No	No	No	No	No	No
5	2	108	1	17	No	No	No	No	No	No	No	No	No	No
6	2	107	1	16	No	No	No	No	No	No	No	No	No	No
7	2	106	1	16	No	No	No	No	No	No	No	No	No	No
8	2	96	1	15	No	No	No	No	No	No	No	No	No	No
9	2	94	1	14	No	No	No	No	No	No	No	No	No	No
10	2	93	1	14	No	No	No	No	No	No	No	No	No	No
11	2	81	1	12	No	No	No	No	No	No	No	No	No	No
12	2	75	1	12	No	No	No	No	No	No	No	No	No	No
13	2	74	1	11	No	No	No	No	No	No	No	No	No	No
14	2	55	1	8	No	No	No	No	No	No	No	No	No	No
15	2	55	1	8	No	No	No	No	No	No	No	No	No	No
16	2	38	1	6	No	No	No	No	No	No	No	No	No	No
17	2	22	1	3	No	No	No	No	No	No	No	No	No	No
18	2	22	1	3	No	No	No	No	No	No	No	No	No	No
19	2	12	1	2	No	No	No	No	No	No	No	No	No	No
20	2	7	1	1	No	No	No	No	No	No	No	No	No	No
21	2	4	1	1	No	No	No	No	No	No	No	No	No	No
22	2	1	1	0	No	No	No	No	No	No	No	No	No	No
23	2	1	1	0	No	No	No	No	No	No	No	No	No	No
24	2	1	1	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.6	10.4
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:03	0:00
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	21	0
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	158	158
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	

## Signal Warrants Report For Intersection 16: 48th Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	E, W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	N	S	E	W
1	15	122	15	36
2	15	118	15	35
3	14	116	14	34
4	13	109	13	32
5	12	96	12	28
6	12	95	12	28
7	12	94	12	28
8	11	85	11	25
9	10	84	10	25
10	10	83	10	24
11	9	72	9	21
12	8	67	8	20
13	8	66	8	19
14	6	49	6	14
15	6	49	6	14
16	4	34	4	10
17	2	20	2	6
18	2	20	2	6
19	1	11	1	3
20	1	6	1	2
21	0	4	0	1
22	0	1	0	0
23	0	1	0	0
24	0	1	0	0

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	137	2	36	No	No	No	No	No	No	No	No	No	No
2	2	133	2	35	No	No	No	No	No	No	No	No	No	No
3	2	130	2	34	No	No	No	No	No	No	No	No	No	No
4	2	122	2	32	No	No	No	No	No	No	No	No	No	No
5	2	108	2	28	No	No	No	No	No	No	No	No	No	No
6	2	107	2	28	No	No	No	No	No	No	No	No	No	No
7	2	106	2	28	No	No	No	No	No	No	No	No	No	No
8	2	96	2	25	No	No	No	No	No	No	No	No	No	No
9	2	94	2	25	No	No	No	No	No	No	No	No	No	No
10	2	93	2	24	No	No	No	No	No	No	No	No	No	No
11	2	81	2	21	No	No	No	No	No	No	No	No	No	No
12	2	75	2	20	No	No	No	No	No	No	No	No	No	No
13	2	74	2	19	No	No	No	No	No	No	No	No	No	No
14	2	55	2	14	No	No	No	No	No	No	No	No	No	No
15	2	55	2	14	No	No	No	No	No	No	No	No	No	No
16	2	38	2	10	No	No	No	No	No	No	No	No	No	No
17	2	22	2	6	No	No	No	No	No	No	No	No	No	No
18	2	22	2	6	No	No	No	No	No	No	No	No	No	No
19	2	12	2	3	No	No	No	No	No	No	No	No	No	No
20	2	7	2	2	No	No	No	No	No	No	No	No	No	No
21	2	4	2	1	No	No	No	No	No	No	No	No	No	No
22	2	1	2	0	No	No	No	No	No	No	No	No	No	No
23	2	1	2	0	No	No	No	No	No	No	No	No	No	No
24	2	1	2	0	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	10.6	9.4
Number of Lanes on Minor Street Approach	1	2
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:02	0:05
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	36
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	188	188
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	

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Rocky Mountain Rail Park TIS

Vistro File: R:\...\2023-09-17 Rocky Mountain Rail Park  
TIS.vistro

Scenario 10 2030 with Project PM

Report File: R:\...\2030 with Project PM\_20230918a.pdf

9/18/2023

**Intersection Analysis Summary**

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	E Colfax Ave/Manila Rd	Signalized	HCM 7th Edition	SB Thru	0.595	28.2	C
2	E Colfax Ave/Peterson Rd	Two-way stop	HCM 7th Edition	NB Left	0.019	19.3	C
3	Manila Rd/I-70 Westbound Ramp	Signalized	HCM 7th Edition	WB Left	0.188	5.9	A
4	Manila Rd/I-70 Eastbound Ramp	Two-way stop	HCM 7th Edition	EB Left	0.205	14.2	B
5	Peterson Rd/ Access 1	Two-way stop	HCM 7th Edition	EB Right	0.148	10.6	B
6	Peterson Rd/ Access 2	Two-way stop	HCM 7th Edition	EB Right	0.128	9.7	A
15	48th Ave/Access 3	Two-way stop	HCM 7th Edition	NB Right	0.111	9.0	A
16	48th Ave/Peterson Rd	Two-way stop	HCM 7th Edition	WB Left	0.007	10.1	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

**Intersection Level Of Service Report**  
**Intersection 1: E Colfax Ave/Manila Rd**

Control Type:	Signalized	Delay (sec / veh):	28.2
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.595

**Intersection Setup**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	0	0	1	1	0	1
Entry Pocket Length [ft]	460.00	100.00	435.00	100.00	100.00	250.00	100.00	100.00	600.00	990.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	1	0	0	0	0	0	0	0	0	2
Exit Pocket Length [ft]	0.00	0.00	550.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1620.00
Speed [mph]	45.00			45.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		



**Volumes**

Name	Manila Rd			Manila Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	10	70	55	30	430	10	5	195	25	18	69	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	65	0	0	0	0	8	0	247	31	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	60	0	0	5	0	0	13	0	0	3
Total Hourly Volume [veh/h]	10	70	60	30	430	5	5	203	12	265	100	2
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	19	16	8	117	1	1	55	3	72	27	1
Total Analysis Volume [veh/h]	11	76	65	33	467	5	5	221	13	288	109	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

### Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

### Phasing & Timing

Control Type	ProtPer	Permiss	Unsigna	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss	ProtPer	Permiss	Permiss
Signal Group	3	8	1	7	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	10	5	5	10	0	5	10	0	5	10	0
Maximum Green [s]	30	30	10	30	30	0	10	30	0	10	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	9	36	16	13	40	0	9	25	0	16	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	21	0	0	14	0	0	14	0	0	21	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		Yes	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

### Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	L	C	C	R	L	C	R
C, Cycle Length [s]	90	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	0.00	2.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	34	27	34	29	48	33	48	39	39
g / C, Green / Cycle	0.38	0.30	0.38	0.32	0.53	0.36	0.53	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.01	0.05	0.03	0.30	0.14	0.01	0.29	0.07	0.00
s, saturation flow rate [veh/h]	860	1600	1189	1597	1587	1360	981	1600	1360
c, Capacity [veh/h]	208	481	514	509	929	492	510	693	589
d1, Uniform Delay [s]	21.49	23.13	17.92	29.70	11.41	18.54	19.20	15.52	14.48
k, delay calibration	0.11	0.11	0.11	0.22	0.50	0.50	0.50	0.50	0.50
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.10	0.15	0.05	13.92	0.62	0.10	4.46	0.48	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

**Lane Group Results**

X, volume / capacity	0.05	0.16	0.06	0.93	0.24	0.03	0.56	0.16	0.00
d, Delay for Lane Group [s/veh]	21.59	23.28	17.97	43.62	12.04	18.64	23.67	16.00	14.49
Lane Group LOS	C	C	B	D	B	B	C	B	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	0.14	1.13	0.41	10.99	2.17	0.17	3.99	1.28	0.02
50th-Percentile Queue Length [ft/ln]	3.48	28.25	10.31	274.73	54.34	4.26	99.84	32.01	0.55
95th-Percentile Queue Length [veh/ln]	0.25	2.03	0.74	16.43	3.91	0.31	7.19	2.30	0.04
95th-Percentile Queue Length [ft/ln]	6.26	50.86	18.55	410.64	97.80	7.68	179.71	57.62	0.99

**Movement, Approach, & Intersection Results**

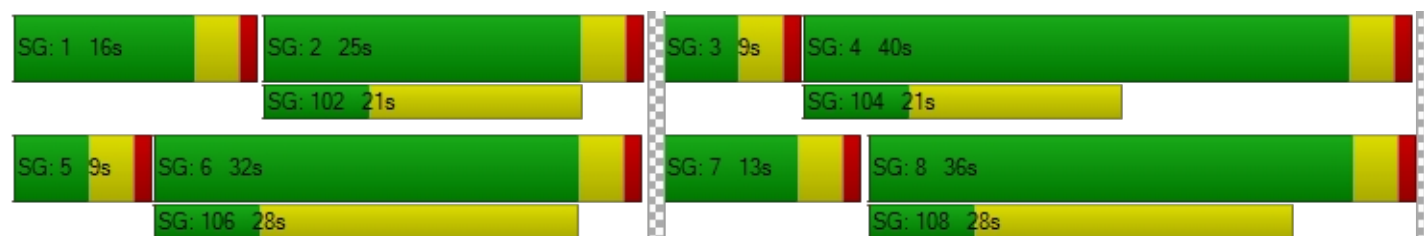
d_M, Delay for Movement [s/veh]	21.59	23.28	0.00	17.97	43.62	43.62	12.04	12.04	18.64	23.67	16.00	14.49
Movement LOS	C	C		B	D	D	B	B	B	C	B	B
d_A, Approach Delay [s/veh]	23.07			41.95			12.40			21.53		
Approach LOS	C			D			B			C		
d_I, Intersection Delay [s/veh]	28.24											
Intersection LOS	C											
Intersection V/C	0.595											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			11.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	34.70			34.70			34.70			34.70		
I_p,int, Pedestrian LOS Score for Intersectio	3.074			2.677			2.325			2.667		
Crosswalk LOS	C			B			B			B		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	711			800			822			622		
d_b, Bicycle Delay [s]	18.71			16.22			15.63			21.38		
I_b,int, Bicycle LOS Score for Intersection	1.703			2.401			1.975			2.223		
Bicycle LOS	A			B			A			B		

**Sequence**





Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report**  
**Intersection 2: E Colfax Ave/Peterson Rd**

Control Type:	Two-way stop	Delay (sec / veh):	19.3
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.019

**Intersection Setup**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	1	0	1	1	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	1	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	960.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd			Peterson Rd			E Colfax Ave			E Colfax Ave		
Base Volume Input [veh/h]	5	5	5	5	5	5	5	245	5	5	82	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	31	0	278	73	0	0	0	0	8
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	5	5	36	5	283	78	245	5	5	82	13
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	1	10	1	77	21	67	1	1	22	4
Total Analysis Volume [veh/h]	5	5	5	39	5	308	85	266	5	5	89	14
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No			
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.02	0.01	0.01	0.10	0.01	0.33	0.06	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	19.28	14.60	10.32	15.24	14.19	10.85	7.77	0.00	0.00	8.02	0.00	0.00
Movement LOS	C	B	B	C	B	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.12	0.12	0.12	0.33	0.04	1.48	0.20	0.00	0.00	0.01	0.01	0.00
95th-Percentile Queue Length [ft/ln]	3.03	3.03	3.03	8.26	0.96	36.93	4.90	0.00	0.00	0.21	0.21	0.00
d_A, Approach Delay [s/veh]	14.73			11.39			1.86			0.37		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	5.93											
Intersection LOS	C											

**Intersection Level Of Service Report**  
**Intersection 3: Manila Rd/I-70 Westbound Ramp**

Control Type:	Signalized	Delay (sec / veh):	5.9
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.188

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound			Westbound Ramp		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	1	0	0	0	0	0	1
Entry Pocket Length [ft]	735.00	100.00	100.00	100.00	100.00	435.00	100.00	100.00	100.00	100.00	100.00	435.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	45.00			45.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No						No		
Crosswalk	Yes			Yes			No			Yes		

**Volumes**

Name	Manila Rd			Manila Rd						Westbound Ramp		
Base Volume Input [veh/h]	70	114	0	0	143	69	0	0	0	40	5	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	2.00	2.00	20.00	20.00	2.00	2.00	2.00	20.00	20.00	20.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	49	0	0	62	185	0	0	0	0	0	16
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	127	0	0	0	0	0	14
Total Hourly Volume [veh/h]	70	163	0	0	205	127	0	0	0	40	5	13
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	44	0	0	56	35	0	0	0	11	1	4
Total Analysis Volume [veh/h]	76	177	0	0	223	138	0	0	0	43	5	14
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		



**Intersection Settings**

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

**Phasing & Timing**

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	0	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	10	0	0	10	0	0	0	0	0	10	0
Maximum Green [s]	30	30	0	0	30	0	0	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	9	41	0	0	32	0	0	0	0	0	19	0
Vehicle Extension [s]	3.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	14	0	0	0	0	0	7	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No						No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No			No						No	
Maximum Recall	No	No			No						No	
Pedestrian Recall	No	No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering 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

**Exclusive Pedestrian Phase**

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

**Lane Group Calculations**

Lane Group	L	C	C	R		C	R
C, Cycle Length [s]	60	60	60	60		60	60
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00		4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00		0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00		2.00	2.00
g_i, Effective Green Time [s]	46	46	38	38		7	7
g / C, Green / Cycle	0.76	0.76	0.63	0.63		0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.08	0.11	0.14	0.10		0.03	0.01
s, saturation flow rate [veh/h]	955	1600	1600	1360		1531	1360
c, Capacity [veh/h]	834	1212	1006	855		168	149
d1, Uniform Delay [s]	2.02	1.99	4.81	4.61		24.61	24.09
k, delay calibration	0.11	0.50	0.50	0.50		0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00		1.00	1.00
d2, Incremental Delay [s]	0.05	0.25	0.51	0.40		0.92	0.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00		0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00		1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00		1.00	1.00

**Lane Group Results**

X, volume / capacity	0.09	0.15	0.22	0.16		0.29	0.09
d, Delay for Lane Group [s/veh]	2.06	2.25	5.32	5.02		25.54	24.36
Lane Group LOS	A	A	A	A		C	C
Critical Lane Group	Yes	No	Yes	No		Yes	No
50th-Percentile Queue Length [veh/ln]	0.05	0.18	0.82	0.50		0.64	0.18
50th-Percentile Queue Length [ft/ln]	1.21	4.48	20.39	12.38		15.93	4.52
95th-Percentile Queue Length [veh/ln]	0.09	0.32	1.47	0.89		1.15	0.33
95th-Percentile Queue Length [ft/ln]	2.18	8.06	36.69	22.28		28.68	8.14

**Movement, Approach, & Intersection Results**

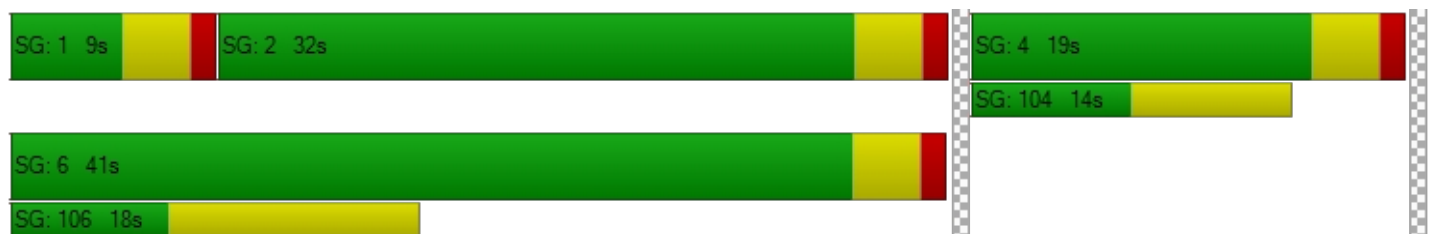
d_M, Delay for Movement [s/veh]	2.06	2.25	0.00	0.00	5.32	5.02	0.00	0.00	0.00	25.54	25.54	24.36
Movement LOS	A	A			A	A				C	C	C
d_A, Approach Delay [s/veh]	2.19			5.21			0.00			25.27		
Approach LOS	A			A			A			C		
d_I, Intersection Delay [s/veh]	5.92											
Intersection LOS	A											
Intersection V/C	0.188											

**Other Modes**

g_Walk,mi, Effective Walk Time [s]	11.0			11.0			0.0			11.0		
M_corner, Corner Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft <sup>2</sup> /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	20.05			20.05			0.00			20.05		
I_p,int, Pedestrian LOS Score for Intersection	2.171			2.543			0.000			1.749		
Crosswalk LOS	B			B			F			A		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1232			932			0			499		
d_b, Bicycle Delay [s]	4.43			8.57			30.04			16.91		
I_b,int, Bicycle LOS Score for Intersection	1.977			2.365			4.132			1.685		
Bicycle LOS	A			B			D			A		

**Sequence**

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



**Intersection Level Of Service Report**  
**Intersection 4: Manila Rd/I-70 Eastbound Ramp**

Control Type:	Two-way stop	Delay (sec / veh):	14.2
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.205

**Intersection Setup**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	1	0	0	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	435.00	745.00	100.00	100.00	100.00	100.00	435.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Manila Rd			Manila Rd			Eastbound Ramp					
Base Volume Input [veh/h]	0	80	60	23	90	0	44	5	150	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	20.00	20.00	20.00	20.00	2.00	20.00	20.00	20.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	62	0	0	49	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	80	60	85	90	0	93	5	150	0	0	0
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	22	16	23	24	0	25	1	41	0	0	0
Total Analysis Volume [veh/h]	0	87	65	92	98	0	101	5	163	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**




V/C, Movement V/C Ratio	0.00	0.00	0.00	0.07	0.00	0.00	0.21	0.01	0.18	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	0.00	0.00	0.00	7.92	0.00	0.00	14.20	13.00	9.81	0.00	0.00	0.00
Movement LOS		A	A	A	A		B	B	A			
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.22	0.00	0.00	0.76	0.03	0.65	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	5.58	0.00	0.00	19.09	0.83	16.23	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00			3.83			11.52			0.00		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	6.26											
Intersection LOS	B											

**Intersection Level Of Service Report**  
**Intersection 5: Peterson Rd/ Access 1**

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 10.6  
 Level Of Service: B  
 Volume to Capacity (v/c): 0.148

**Intersection Setup**

Name	Peterson Rd		Peterson Rd		Access 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

**Volumes**

Name	Peterson Rd		Peterson Rd		Access 1	
Base Volume Input [veh/h]	0	15	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	54	206	0	0	103
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	69	221	0	0	103
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	19	60	0	0	28
Total Analysis Volume [veh/h]	29	75	240	0	0	112
Pedestrian Volume [ped/h]	0		0		0	

**Intersection Settings**

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**




V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.15
d_M, Delay for Movement [s/veh]	8.00	0.00	0.00	0.00	12.03	10.58
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh/ln]	0.07	0.00	0.00	0.00	0.52	0.52
95th-Percentile Queue Length [ft/ln]	1.81	0.00	0.00	0.00	12.95	12.95
d_A, Approach Delay [s/veh]	2.23		0.00		10.58	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	3.11					
Intersection LOS	B					

**Intersection Level Of Service Report**  
**Intersection 6: Peterson Rd/ Access 2**

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 9.7  
 Level Of Service: A  
 Volume to Capacity (v/c): 0.128

**Intersection Setup**

Name	Peterson Rd		Peterson Rd		Access 2	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

**Volumes**

Name	Peterson Rd		Peterson Rd		Access 2	
Base Volume Input [veh/h]	0	15	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	27	103	0	0	103
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	42	118	0	0	103
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	11	32	0	0	28
Total Analysis Volume [veh/h]	29	46	128	0	0	112
Pedestrian Volume [ped/h]	0		0		0	



**Intersection Settings**

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

**Movement, Approach, & Intersection Results**





V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.13
d_M, Delay for Movement [s/veh]	7.72	0.00	0.00	0.00	10.72	9.71
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh/ln]	0.07	0.00	0.00	0.00	0.44	0.44
95th-Percentile Queue Length [ft/ln]	1.64	0.00	0.00	0.00	10.95	10.95
d_A, Approach Delay [s/veh]	2.98		0.00		9.71	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.16					
Intersection LOS	A					

**Intersection Level Of Service Report**  
**Intersection 15: 48th Ave/Access 3**

Control Type: Two-way stop  
Analysis Method: HCM 7th Edition  
Analysis Period: 15 minutes

Delay (sec / veh): 9.0  
Level Of Service: A  
Volume to Capacity (v/c): 0.111

**Intersection Setup**

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name												
Base Volume Input [veh/h]	0	0	0	0	0	0	0	15	0	0	15	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	103	0	0	0	0	0	0	27	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	103	0	0	0	0	15	0	27	15	0
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	28	0	0	0	0	4	0	7	4	0
Total Analysis Volume [veh/h]	0	0	112	0	0	0	0	16	0	29	16	0
Pedestrian Volume [ped/h]	0			0			0			0		

**Intersection Settings**

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**





V/C, Movement V/C Ratio	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	9.74	10.23	8.99	10.27	9.79	8.55	7.41	0.00	0.00	7.46	0.00	0.00
Movement LOS	A	B	A	B	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.37	0.37	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00
95th-Percentile Queue Length [ft/ln]	9.29	9.29	9.29	0.00	0.00	0.00	0.00	0.00	0.00	1.49	0.00	0.00
d_A, Approach Delay [s/veh]	8.99			9.54			0.00			4.81		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	7.07											
Intersection LOS	A											

**Intersection Level Of Service Report**  
**Intersection 16: 48th Ave/Peterson Rd**

Control Type: Two-way stop  
 Analysis Method: HCM 7th Edition  
 Analysis Period: 15 minutes

Delay (sec / veh): 10.1  
 Level Of Service: B  
 Volume to Capacity (v/c): 0.007

**Intersection Setup**

Name	Peterson Rd											
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0	0	0	1	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

**Volumes**

Name	Peterson Rd											
Base Volume Input [veh/h]	5	5	5	5	5	5	5	5	5	5	5	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	27	0	0	0	0	0	0	0	103	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	5	5	5	5	5	5	5	108	5	5	5
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	1	1	1	1	1	1	1	29	1	1	1
Total Analysis Volume [veh/h]	35	5	5	5	5	5	5	5	117	5	5	5
Pedestrian Volume [ped/h]	0			0			0			0		

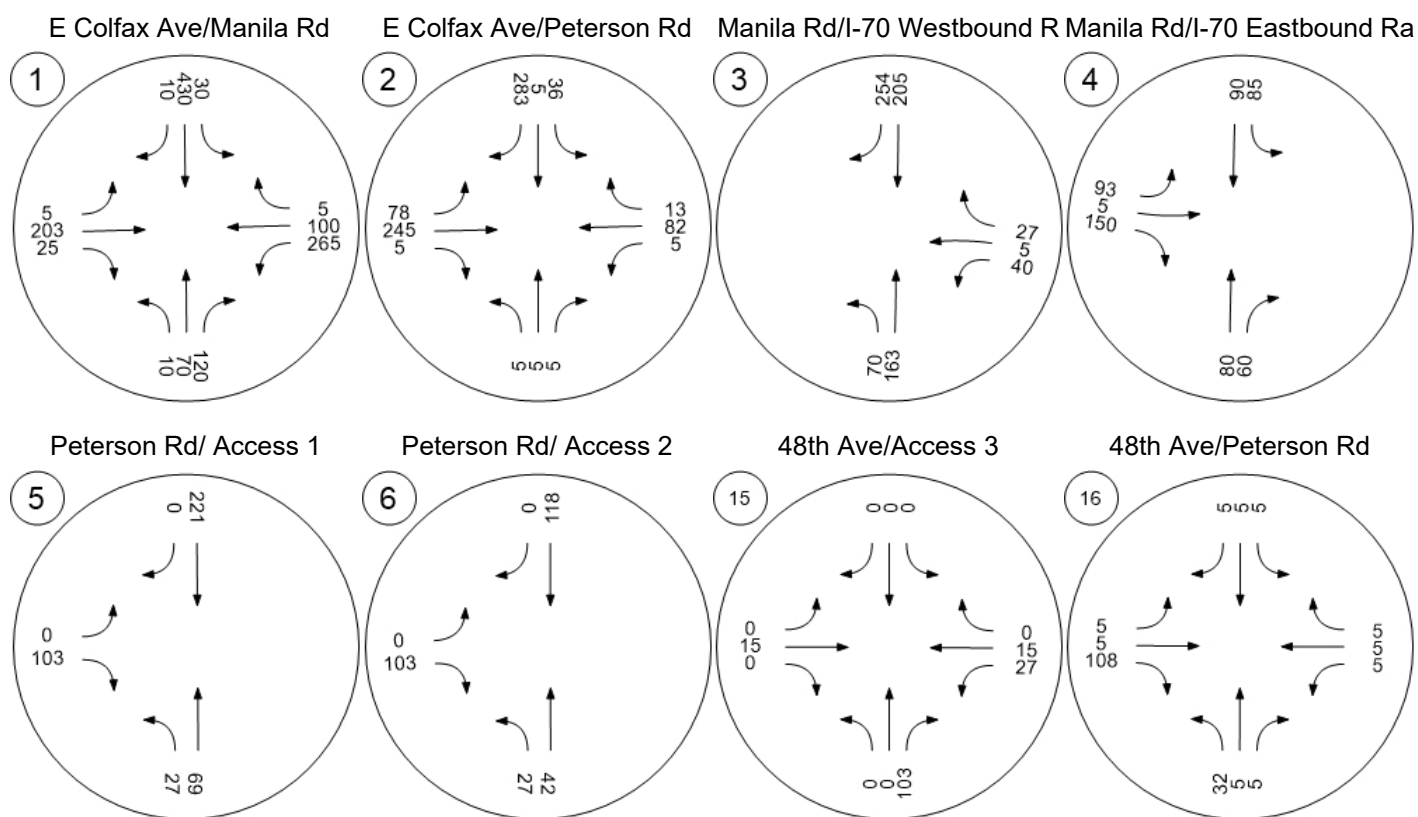
**Intersection Settings**

Priority Scheme	Free	Free	Stop	Stop
Flared Lane				No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

**Movement, Approach, & Intersection Results**

V/C, Movement V/C Ratio	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.11	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	7.46	0.00	0.00	7.41	0.00	0.00	9.51	9.93	8.97	10.07	9.95	8.60
Movement LOS	A	A	A	A	A	A	A	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	0.07	0.00	0.00	0.01	0.01	0.01	0.04	0.04	0.39	0.06	0.06	0.06
95th-Percentile Queue Length [ft/ln]	1.79	0.00	0.00	0.23	0.23	0.23	0.98	0.98	9.64	1.42	1.42	1.42
d_A, Approach Delay [s/veh]	5.80			2.47			9.03			9.54		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	7.86											
Intersection LOS	B											

## Traffic Volume - Future Total Volume



## Signal Warrants Report For Intersection 2: E Colfax Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	Yes
Population < 10,000	No
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	100	328	15	324
2	97	318	15	314
3	95	312	14	308
4	89	292	13	288
5	79	259	12	256
6	78	256	12	253
7	77	253	12	249
8	70	230	11	227
9	69	226	10	224
10	68	223	10	220
11	59	194	9	191
12	55	180	8	178
13	54	177	8	175
14	40	131	6	130
15	40	131	6	130
16	28	92	4	91
17	16	52	2	52
18	16	52	2	52
19	9	30	1	29
20	5	16	1	16
21	3	10	0	10
22	1	3	0	3
23	1	3	0	3
24	1	3	0	3

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	428	3	324	No	No	Yes	Yes	No	No	No	No	Yes	No
2	2	415	3	314	No	No	No	Yes	No	No	No	No	Yes	No
3	2	407	3	308	No	No	No	Yes	No	No	No	No	Yes	No
4	2	381	3	288	No	No	No	Yes	No	No	No	No	No	No
5	2	338	3	256	No	No	No	Yes	No	No	No	No	No	No
6	2	334	3	253	No	No	No	No	No	No	No	No	No	No
7	2	330	3	249	No	No	No	No	No	No	No	No	No	No
8	2	300	3	227	No	No	No	No	No	No	No	No	No	No
9	2	295	3	224	No	No	No	No	No	No	No	No	No	No
10	2	291	3	220	No	No	No	No	No	No	No	No	No	No
11	2	253	3	191	No	No	No	No	No	No	No	No	No	No
12	2	235	3	178	No	No	No	No	No	No	No	No	No	No
13	2	231	3	175	No	No	No	No	No	No	No	No	No	No
14	2	171	3	130	No	No	No	No	No	No	No	No	No	No
15	2	171	3	130	No	No	No	No	No	No	No	No	No	No
16	2	120	3	91	No	No	No	No	No	No	No	No	No	No
17	2	68	3	52	No	No	No	No	No	No	No	No	No	No
18	2	68	3	52	No	No	No	No	No	No	No	No	No	No
19	2	39	3	29	No	No	No	No	No	No	No	No	No	No
20	2	21	3	16	No	No	No	No	No	No	No	No	No	No
21	2	13	3	10	No	No	No	No	No	No	No	No	No	No
22	2	4	3	3	No	No	No	No	No	No	No	No	No	No
23	2	4	3	3	No	No	No	No	No	No	No	No	No	No
24	2	4	3	3	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	1	5	0	0	0	0	3	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	14.7	11.4
Number of Lanes on Minor Street Approach	1	3
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:03	1:01
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	324
High Minor Volume Condition Met	No	Yes
Total Entering Volume on All Approaches During Same Hour	767	767
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



## Signal Warrants Report For Intersection 4: Manila Rd/I-70 Eastbound Ramp

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	N	S	W
1	175	140	248
2	170	136	241
3	166	133	236
4	156	125	221
5	138	111	196
6	137	109	193
7	135	108	191
8	122	98	174
9	121	97	171
10	119	95	169
11	103	83	146
12	96	77	136
13	95	76	134
14	70	56	99
15	70	56	99
16	49	39	69
17	28	22	40
18	28	22	40
19	16	13	22
20	9	7	12
21	5	4	7
22	2	1	2
23	2	1	2
24	2	1	2

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	315	3	248	No	No	No	No	No	No	No	No	No	No
2	2	306	3	241	No	No	No	No	No	No	No	No	No	No
3	2	299	3	236	No	No	No	No	No	No	No	No	No	No
4	2	281	3	221	No	No	No	No	No	No	No	No	No	No
5	2	249	3	196	No	No	No	No	No	No	No	No	No	No
6	2	246	3	193	No	No	No	No	No	No	No	No	No	No
7	2	243	3	191	No	No	No	No	No	No	No	No	No	No
8	2	220	3	174	No	No	No	No	No	No	No	No	No	No
9	2	218	3	171	No	No	No	No	No	No	No	No	No	No
10	2	214	3	169	No	No	No	No	No	No	No	No	No	No
11	2	186	3	146	No	No	No	No	No	No	No	No	No	No
12	2	173	3	136	No	No	No	No	No	No	No	No	No	No
13	2	171	3	134	No	No	No	No	No	No	No	No	No	No
14	2	126	3	99	No	No	No	No	No	No	No	No	No	No
15	2	126	3	99	No	No	No	No	No	No	No	No	No	No
16	2	88	3	69	No	No	No	No	No	No	No	No	No	No
17	2	50	3	40	No	No	No	No	No	No	No	No	No	No
18	2	50	3	40	No	No	No	No	No	No	No	No	No	No
19	2	29	3	22	No	No	No	No	No	No	No	No	No	No
20	2	16	3	12	No	No	No	No	No	No	No	No	No	No
21	2	9	3	7	No	No	No	No	No	No	No	No	No	No
22	2	3	3	2	No	No	No	No	No	No	No	No	No	No
23	2	3	3	2	No	No	No	No	No	No	No	No	No	No
24	2	3	3	2	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	11.5
Number of Lanes on Minor Street Approach	3
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:47
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	248
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	563
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

## Signal Warrants Report For Intersection 5: Peterson Rd/ Access 1

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	Yes
Warrant Factor	70%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	96	221	103
2	93	214	100
3	91	210	98
4	85	197	92
5	76	175	81
6	75	172	80
7	74	170	79
8	67	155	72
9	66	152	71
10	65	150	70
11	57	130	61
12	53	122	57
13	52	119	56
14	38	88	41
15	38	88	41
16	27	62	29
17	15	35	16
18	15	35	16
19	9	20	9
20	5	11	5
21	3	7	3
22	1	2	1
23	1	2	1
24	1	2	1

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	317	1	103	No	No	No	No	No	No	No	No	No	No
2	2	307	1	100	No	No	No	No	No	No	No	No	No	No
3	2	301	1	98	No	No	No	No	No	No	No	No	No	No
4	2	282	1	92	No	No	No	No	No	No	No	No	No	No
5	2	251	1	81	No	No	No	No	No	No	No	No	No	No
6	2	247	1	80	No	No	No	No	No	No	No	No	No	No
7	2	244	1	79	No	No	No	No	No	No	No	No	No	No
8	2	222	1	72	No	No	No	No	No	No	No	No	No	No
9	2	218	1	71	No	No	No	No	No	No	No	No	No	No
10	2	215	1	70	No	No	No	No	No	No	No	No	No	No
11	2	187	1	61	No	No	No	No	No	No	No	No	No	No
12	2	175	1	57	No	No	No	No	No	No	No	No	No	No
13	2	171	1	56	No	No	No	No	No	No	No	No	No	No
14	2	126	1	41	No	No	No	No	No	No	No	No	No	No
15	2	126	1	41	No	No	No	No	No	No	No	No	No	No
16	2	89	1	29	No	No	No	No	No	No	No	No	No	No
17	2	50	1	16	No	No	No	No	No	No	No	No	No	No
18	2	50	1	16	No	No	No	No	No	No	No	No	No	No
19	2	29	1	9	No	No	No	No	No	No	No	No	No	No
20	2	16	1	5	No	No	No	No	No	No	No	No	No	No
21	2	10	1	3	No	No	No	No	No	No	No	No	No	No
22	2	3	1	1	No	No	No	No	No	No	No	No	No	No
23	2	3	1	1	No	No	No	No	No	No	No	No	No	No
24	2	3	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	10.6
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:18
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	103
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	420
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

## Signal Warrants Report For Intersection 6: Peterson Rd/ Access 2

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	69	118	103
2	67	114	100
3	66	112	98
4	61	105	92
5	55	93	81
6	54	92	80
7	53	91	79
8	48	83	72
9	48	81	71
10	47	80	70
11	41	70	61
12	38	65	57
13	37	64	56
14	28	47	41
15	28	47	41
16	19	33	29
17	11	19	16
18	11	19	16
19	6	11	9
20	3	6	5
21	2	4	3
22	1	1	1
23	1	1	1
24	1	1	1

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	187	1	103	No	No	No	No	No	No	No	No	No	No
2	2	181	1	100	No	No	No	No	No	No	No	No	No	No
3	2	178	1	98	No	No	No	No	No	No	No	No	No	No
4	2	166	1	92	No	No	No	No	No	No	No	No	No	No
5	2	148	1	81	No	No	No	No	No	No	No	No	No	No
6	2	146	1	80	No	No	No	No	No	No	No	No	No	No
7	2	144	1	79	No	No	No	No	No	No	No	No	No	No
8	2	131	1	72	No	No	No	No	No	No	No	No	No	No
9	2	129	1	71	No	No	No	No	No	No	No	No	No	No
10	2	127	1	70	No	No	No	No	No	No	No	No	No	No
11	2	111	1	61	No	No	No	No	No	No	No	No	No	No
12	2	103	1	57	No	No	No	No	No	No	No	No	No	No
13	2	101	1	56	No	No	No	No	No	No	No	No	No	No
14	2	75	1	41	No	No	No	No	No	No	No	No	No	No
15	2	75	1	41	No	No	No	No	No	No	No	No	No	No
16	2	52	1	29	No	No	No	No	No	No	No	No	No	No
17	2	30	1	16	No	No	No	No	No	No	No	No	No	No
18	2	30	1	16	No	No	No	No	No	No	No	No	No	No
19	2	17	1	9	No	No	No	No	No	No	No	No	No	No
20	2	9	1	5	No	No	No	No	No	No	No	No	No	No
21	2	6	1	3	No	No	No	No	No	No	No	No	No	No
22	2	2	1	1	No	No	No	No	No	No	No	No	No	No
23	2	2	1	1	No	No	No	No	No	No	No	No	No	No
24	2	2	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	9.7
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:16
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	103
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	290
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
<b>Warrant Met for Intersection</b>	<b>No</b>

## Signal Warrants Report For Intersection 15: 48th Ave/Access 3

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	S, N
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	S	N
1	42	15	103	0
2	41	15	100	0
3	40	14	98	0
4	37	13	92	0
5	33	12	81	0
6	33	12	80	0
7	32	12	79	0
8	29	11	72	0
9	29	10	71	0
10	29	10	70	0
11	25	9	61	0
12	23	8	57	0
13	23	8	56	0
14	17	6	41	0
15	17	6	41	0
16	12	4	29	0
17	7	2	16	0
18	7	2	16	0
19	4	1	9	0
20	2	1	5	0
21	1	0	3	0
22	0	0	1	0
23	0	0	1	0
24	0	0	1	0

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	57	1	103	No	No	No	No	No	No	No	No	No	No
2	2	56	1	100	No	No	No	No	No	No	No	No	No	No
3	2	54	1	98	No	No	No	No	No	No	No	No	No	No
4	2	50	1	92	No	No	No	No	No	No	No	No	No	No
5	2	45	1	81	No	No	No	No	No	No	No	No	No	No
6	2	45	1	80	No	No	No	No	No	No	No	No	No	No
7	2	44	1	79	No	No	No	No	No	No	No	No	No	No
8	2	40	1	72	No	No	No	No	No	No	No	No	No	No
9	2	39	1	71	No	No	No	No	No	No	No	No	No	No
10	2	39	1	70	No	No	No	No	No	No	No	No	No	No
11	2	34	1	61	No	No	No	No	No	No	No	No	No	No
12	2	31	1	57	No	No	No	No	No	No	No	No	No	No
13	2	31	1	56	No	No	No	No	No	No	No	No	No	No
14	2	23	1	41	No	No	No	No	No	No	No	No	No	No
15	2	23	1	41	No	No	No	No	No	No	No	No	No	No
16	2	16	1	29	No	No	No	No	No	No	No	No	No	No
17	2	9	1	16	No	No	No	No	No	No	No	No	No	No
18	2	9	1	16	No	No	No	No	No	No	No	No	No	No
19	2	5	1	9	No	No	No	No	No	No	No	No	No	No
20	2	3	1	5	No	No	No	No	No	No	No	No	No	No
21	2	1	1	3	No	No	No	No	No	No	No	No	No	No
22	2	0	1	1	No	No	No	No	No	No	No	No	No	No
23	2	0	1	1	No	No	No	No	No	No	No	No	No	No
24	2	0	1	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	S	N
Total Stopped Delay Per Vehicle on Minor Approach (s)	9	9.5
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:15	0:00
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	103	0
High Minor Volume Condition Met	Yes	No
Total Entering Volume on All Approaches During Same Hour	160	160
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	



## Signal Warrants Report For Intersection 16: 48th Ave/Peterson Rd

## Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

## Intersection Warrants Parameters

Major Approaches	N, S
Minor Approaches	E, W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

## Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	N	S	E	W
1	15	42	15	118
2	15	41	15	114
3	14	40	14	112
4	13	37	13	105
5	12	33	12	93
6	12	33	12	92
7	12	32	12	91
8	11	29	11	83
9	10	29	10	81
10	10	29	10	80
11	9	25	9	70
12	8	23	8	65
13	8	23	8	64
14	6	17	6	47
15	6	17	6	47
16	4	12	4	33
17	2	7	2	19
18	2	7	2	19
19	1	4	1	11
20	1	2	1	6
21	0	1	0	4
22	0	0	0	1
23	0	0	0	1
24	0	0	0	1

## Warrant Analysis by Hour

Hour	Major Streets		Minor Street		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	57	2	118	No	No	No	No	No	No	No	No	No	No
2	2	56	2	114	No	No	No	No	No	No	No	No	No	No
3	2	54	2	112	No	No	No	No	No	No	No	No	No	No
4	2	50	2	105	No	No	No	No	No	No	No	No	No	No
5	2	45	2	93	No	No	No	No	No	No	No	No	No	No
6	2	45	2	92	No	No	No	No	No	No	No	No	No	No
7	2	44	2	91	No	No	No	No	No	No	No	No	No	No
8	2	40	2	83	No	No	No	No	No	No	No	No	No	No
9	2	39	2	81	No	No	No	No	No	No	No	No	No	No
10	2	39	2	80	No	No	No	No	No	No	No	No	No	No
11	2	34	2	70	No	No	No	No	No	No	No	No	No	No
12	2	31	2	65	No	No	No	No	No	No	No	No	No	No
13	2	31	2	64	No	No	No	No	No	No	No	No	No	No
14	2	23	2	47	No	No	No	No	No	No	No	No	No	No
15	2	23	2	47	No	No	No	No	No	No	No	No	No	No
16	2	16	2	33	No	No	No	No	No	No	No	No	No	No
17	2	9	2	19	No	No	No	No	No	No	No	No	No	No
18	2	9	2	19	No	No	No	No	No	No	No	No	No	No
19	2	5	2	11	No	No	No	No	No	No	No	No	No	No
20	2	3	2	6	No	No	No	No	No	No	No	No	No	No
21	2	1	2	4	No	No	No	No	No	No	No	No	No	No
22	2	0	2	1	No	No	No	No	No	No	No	No	No	No
23	2	0	2	1	No	No	No	No	No	No	No	No	No	No
24	2	0	2	1	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

## Warrant 3 Condition A

Orientation	E	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	9.5	9
Number of Lanes on Minor Street Approach	1	2
VehicleHours of Stopped Delay on Minor Approach (h:mm)	0:02	0:17
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	118
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	190	190
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
<b>Warrant Met for Intersection</b>	<b>No</b>	