Updated Technical Memorandum

February 25, 2019

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Subject: Updated Traffic Impact Analysis Update for Intersection No. 15: Deschutes Road & Cedro Lane

1. Introduction

At the request of the County (Paul Hellman, Resource Management Director, email, September 28, 2018), this technical memorandum provides a focused update to the Level of Service (LOS) analysis provided in the Tierra Robles Traffic Impact Study (TIS). More specifically, this technical memorandum supplements the following documents:

A. Tierra Robles Traffic Impact Study, document *R987TS003*, dated May 2015.

B. Technical Memorandum "Supplemental Traffic Impact Analysis due to SB 1069 'Accessory Dwelling Units'", document *C987MEM006*, dated August 17, 2017.

The existing traffic counts used in the above-referenced TIS and Technical Memorandum were collected on February 6, 2013.

New existing traffic counts were collected by GHD at the intersection of Deschutes Road and Cedro Lane on May 24, 2017.

This technical memorandum presents the results of an updated traffic impact analysis for Intersection No. 15, Deschutes Road at Cedro Lane, using the updated existing traffic counts and assuming development of other potential projects in the cumulative conditions.

2. Updated Analysis

The following section presents the updated analysis for the intersection of Deschutes Road & Cedro Lane for the *Existing*, *Existing Plus Project*, *Year 2035 No Project*, and *Year 2035 Plus Project* conditions.

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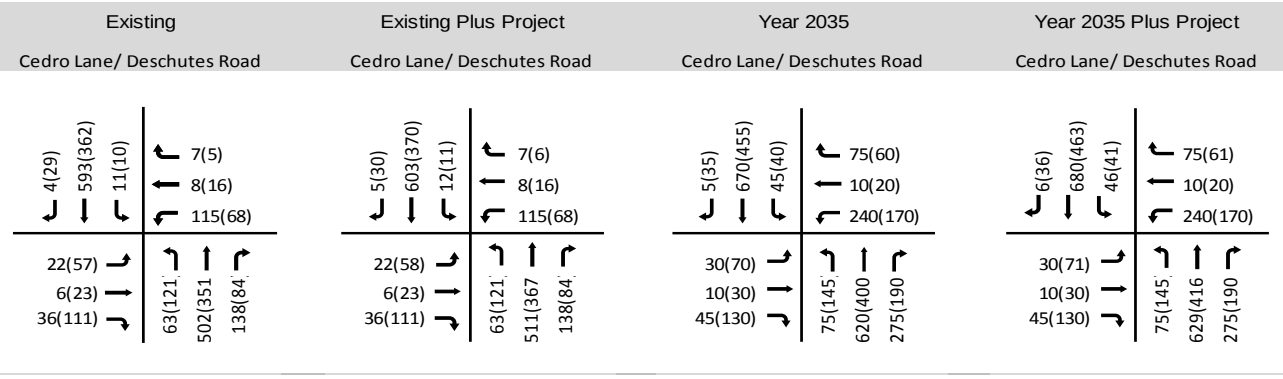
2.1 Updated Traffic Volumes

Figure 2.1 presents the updated volumes used in this analysis.

Figure 2.1: Turn Movement Volumes



Notes:
1. The vertical axis represents Deschutes Road with north to the top.
2. The horizontal axis represents the Cedro Lane intersection with west to the left.
3. 5 (6) = AM peak hour and (PM peak hour) volumes by movement.

Traffic volumes for this study were obtained from the Palo Cedro ARCO AM/PM Traffic Impact Study (prepared by GHD, October 25, 2017). These traffic volumes were originally part of a network that did not have any driveways or access between intersections, necessitating the volumes to be balanced so the number of vehicles exiting northbound from the downstream intersection (SR 44 WB Ramps/Deschutes Road) would match with the number of vehicles entering the study intersection (Cedro Lane/Deschutes Road) and vice versa in the southbound direction. Hence, the Existing volumes used in this analysis do not match the raw counts for a few of the turning movements.

2.2 Existing Traffic Operations

Existing AM and PM peak hour intersection traffic operations were quantified utilizing the May 24, 2017 existing traffic volumes and the existing intersection lane geometrics and control. **Table 2.1** contains a summary of the *Existing* intersection LOS conditions.

Table 2.1: Existing Conditions – Intersection Level of Service

				AM Peak Hour			PM Peak Hour		
#	Intersection	Control Type[1,2]	Target LOS	Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
15	**Deschutes Rd & Cedro Ln**	**AWSC**	**E**	**65.6**	**F**	**Yes**	20.2	C	-

Notes:
1. AWSC = All Way Stop Control
2. LOS = Delay based on average of all approaches for AWSC
3. Warrant = Based on California MUTCD Warrant 3

As presented in Table 2.1, the intersection of Deschutes Road and Cedro Lane is operating at an unacceptable level of service in the AM peak hour.

2.3 Existing Plus Project Traffic Operations

Existing Plus Project Conditions were simulated by superimposing traffic generated by the proposed project onto existing intersection and roadway traffic volumes. **Table 2.2** presents a summary of the intersection for the weekday AM and PM peak hour scenarios for the *Existing Plus Project* conditions.

Table 2.2: Existing Plus Project Conditions – Intersection Level of Service

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
15	**Deschutes Rd & Cedro Ln**	**AWSC**	**E**	**70.4**	**F**	**Yes**	22.1	C	-

Notes:
1. AWSC = All Way Stop Control
2. LOS = Delay based on average of all approaches for AWSC
3. Warrant = Based on California MUTCD Warrant 3

As presented in Table 2.2, the intersection of Deschutes Road and Cedro Lane is projected to operate at an unacceptable level of service in the AM peak hour.

2.4 Year 2035 No Project Volumes

The following methodology was used to derive the Year 2035 No Project Volumes for this analysis:

1. Year 2035 No Project traffic volumes were first derived using the Shasta County Regional Activity-based Travel Model (ShastaSIM).

2. ShastaSIM traffic volumes were then adjusted upward in consideration of the May 24, 2017 traffic counts. Based on the information provided in the National Cooperative Highway Research Program (NCHRP) report 765 titled “Analytical Travel Forecasting Approached for Project-Level Planning and Design”, two methods are typically used for forecasting: (1) Delta Method and (2) Factor Method. Consistent with the guidelines provided in the model documentation section of the ShastaSIM, the delta method was used to forecast the future traffic volumes. Under this method, the future forecasts were derived by adding the growth observed in the ShastaSIM for the base year (in this case year 2015) and forecast year (year 2035) to the existing traffic counts (year 2017).

3. Potential traffic volumes from the following potential projects were added (Each of these potential projects has either an entitlement application or pre-application submitted to Shasta County):

    - AM/PM Gas Station and Convenience Market on Skycrest Way
    - Dutch Bros Drive-Thru Coffee Shop on Cedro Lane
    - PACE 21,221 sqft Professional Office Building on Plaza Drive
    - Mini-Storage at 22049 Old Forty Four Drive

Year 2035 No Project peak hour intersection traffic operations were quantified by applying existing intersection lane geometrics and control and *Year 2035 No Project* intersection traffic volumes. **Table 2.3** presents the resulting *Year 2035 No Project* peak hour intersection LOS.

Table 2.3: Year 2035 No Project Conditions – Intersection Level of Service

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
15	Deschutes Rd & Cedro Ln	AWSC	E	165.2	F	Yes	55.7	F	Yes

Notes:
1. AWSC = All Way Stop Control
2. LOS = Delay based on average of all approaches for AWSC
3. Warrant = Based on California MUTCD Warrant 3

As presented in Table 2.3, the intersection of Deschutes Road and Cedro Lane is projected to operate at an unacceptable level of service in both the AM and PM peak hours.

2.5 Year 2035 Plus Project Traffic Operations

Year 2035 Plus Project conditions were simulated by superimposing the proposed project-generated traffic from the project on top of the *Year 2035 Base* traffic volumes. **Table 2.4** presents a summary of the intersection operations for the weekday AM and PM peak hour scenarios for the *Year 2035 Plus Project* conditions.

Table 2.4: Year 2035 Plus Project Conditions – Intersection Level of Service

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
15	Deschutes Rd & Cedro Ln	AWSC	E	171.3	F	Yes	61.8	F	Yes

Notes:
1. AWSC = All Way Stop Control
2. LOS = Delay based on average of all approaches for AWSC
3. Warrant = Based on California MUTCD Warrant 3

As presented in Table 2.4, the intersection of Deschutes Road and Cedro Lane is projected to operate at an unacceptable level of service in both the AM and PM peak hours.

3. Mitigations and Recommendations

This section presents recommended project-related mitigation measures at the study intersections. These measures were developed based on the findings from the analyses presented in prior sections of this report. The mitigations are provided for both *Existing Plus Project* and *Year 2035 Plus Project* Conditions separately, so it may be possible that the same mitigations at one location are applicable in both conditions.

3.1 Existing Plus Project Impacts

Table 3.1 presents the intersection projected to operate at unacceptable levels of service under *Existing Plus Project* conditions.

Table 3.1: Existing Plus Project Significant Impact Determination

AM Peak Hour									
#	Intersection	Control Type[1]	Target LOS	Existing LOS[2]	Existing Plus Project LOS[2]	Existing Delay (D1)	Existing Plus Project Delay (D2)	D2-D1	Significant Impact?
15	Deschutes Rd & Cedro Ln	AWSC	E	F	F	65.6	70.4	4.8	No

Notes:

1. AWSC = All Way Stop Control

2. LOS = Delay based on average of all approaches for AWSC

As presented in Table 3.1, no mitigations are required to reduce project impacts because project impacts were determined to be less than significant in the *Existing Plus Project* conditions.

3.2 Year 2035 Plus Project Impacts

Table 3.2 presents the intersection projected to operate at unacceptable levels of service for which the project will cause a significant impact under *Year 2035 Plus Project* conditions.

Table 3.2: Year 2035 Plus Project Significant Impact Determination

AM Peak Hour									
#	Intersection	Control Type[1]	Target LOS	Year 2035 LOS[2]	Year 2035 Plus Project LOS[2]	Year 2035 Delay (D1)	Year 2035 Plus Project Delay (D2)	D2-D1	Significant Impact?
15	**Deschutes Rd & Cedro Ln**	**AWSC**	**E**	**F**	**F**	**165.2**	**171.3**	**6.1**	**Yes**
PM Peak Hour									
#	Intersection	Control Type[1]	Target LOS	Year 2035 LOS[2]	Year 2035 Plus Project LOS[2]	Year 2035 Delay (D1)	Year 2035 Plus Project Delay (D2)	D2-D1	Significant Impact?
15	**Deschutes Rd & Cedro Ln**	**AWSC**	**E**	**F**	**F**	**55.7**	**61.8**	**6.1**	**Yes**

Notes:

1. AWSC = All Way Stop Control

2. LOS = Delay based on average of all approaches for AWSC

As presented in Table 3.2, mitigation is required to reduce project impacts because project impacts were determined to be significant in the *Year 2035 Plus Project* conditions.

3.3 Year 2035 Plus Project: Project Mitigation

The following improvements are proposed to provide acceptable operations at intersections where a project significant impact is identified.

Intersection 15: Deschutes Road and Cedro Lane

This all-way stop control (AWSC) intersection is projected to operate at an unacceptable LOS F during both AM and PM peak hours during *Year 2035* conditions. Although this intersection operates at an unacceptable LOS F in the "no project" condition, the proposed project creates a significant impact by causing the average delay to increase by more than 5 seconds per vehicle. The following improvements are proposed to mitigate the project impact to less than significant:

- Construct a new traffic signal, or
- Construct a single/multi-lane roundabout

3.3.1 Significance after Mitigation

Project mitigation is to construct the proposed improvements stated within the previous section. After mitigation, project generated impacts will be considered less than significant. **Table 3.3** presents the mitigated intersection LOS and delay assuming the stated improvements are implemented.

Table 3.3: Year 2035 Plus Project Mitigated Intersection Operations (Traffic Signal)

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour		PM Peak Hour	
				Delay	LOS	Delay	LOS
15	Deschutes Rd & Cedro Ln	Signal	E	12.2	B	13.4	B

Notes:

1. LOS = Delay based on average of all approaches for Signal

Note: If a modern roundabout is implemented as a mitigation, the average intersection delay would be less than for a signal.

4. Mitigation Trigger

The following methodology was utilized to determine the number of dwelling units that can be occupied before the mitigation is triggered and recommended within this memorandum:

- Convert the project traffic to Equivalent Dwelling Units (EDU's), based on the full build-out of 166 dwelling units.
- Perform *Year 2035 No Project* conditions analysis and *Year 2035 Plus Project* conditions analysis for 50% and 100% project build-out. The increase in delay is determined from *Year 2035 No Project* conditions to both the 50% and 100% build-out. A straight-line interpolation is then performed between the two delay increases to determine the EDU thresholds at which delays meet the significance trigger/threshold.

Year 2035 Plus Project conditions cause a significant impact at full build-out, so the project was reduced to determine the maximum number of dwelling units that can be constructed without causing the delay increase to exceed 5 seconds in the PM peak hour. **Table 4.1** presents a comparison of intersection delay for *Year 2035* build-out conditions.

Table 4.1: Year 2035 Conditions – Build-out Threshold

#	Intersection	Control Type	Year 2035 No Project		50% Project Buildout		Full Project Buildout		Increase in Delay to 50% Buildout		Increase in Delay to Full Buildout		EDU's that can be accomodated (w/o improvements)
			AM Pk Hr	PM Pk Hr	AM Pk Hr	PM Pk Hr	AM Pk Hr	PM Pk Hr	AM Pk Hr	PM Pk Hr	AM Pk Hr	PM Pk Hr	
15	Deschutes Rd & Cedro Ln	AWSC	165.2	55.7	168.1	58.9	171.3	61.8	2.9	3.2	6.1	6.1	134

As presented in Table 4.1, the dwelling unit threshold for *Year 2035 Plus Project* conditions is 134 single family dwelling units.

5. Fair Share Calculations

The theoretical fair-share of improvement cost percentages have been calculated based upon the proposed project's AM and PM peak hour traffic impacts. Fair-share calculations have been identified for all intersections with significant project impacts. Below is a listing of each of the study intersection's warranting mitigation and the proposed project's equitable share of these improvements. The proposed project's equitable share is calculated using the method for calculating equitable mitigation measures outlined in the Caltrans Guide for the Preparation of Traffic Impact Studies (State of California, DOT, June 2001), which is shown below:

P = T/(TB – TE) where,

- P = The equitable share for the project's traffic impact
- T = The vehicle trips generated by the project during the peak hour of adjacent State highway facility in vehicles per hour (vph).
- TB = The forecasted traffic volume on an impacted State highway facility at the time of general plan build-out (e.g. 20-year model or the furthest future model date feasible), vph.
- TE = The traffic volume existing on the impacted State highway facility plus other approved projects that will generate traffic that has yet to be constructed/opened, vph.

Note that the percent fair-share calculated using the above formula is reported to the nearest whole number. **Table 5.1** presents a summary of the delay and theoretical share for the proposed project.

Table 5.1: Summary of Fair Share Calculations

#	Intersection Name	Peak Hour	T	Tb	Te	P
15	Deschutes Rd & Cedro Lane	AM	21	2121	1505	3%
15	Deschutes Rd & Cedro Lane	PM	28	1773	1237	5%

As presented in Table 5.1, while the delay is worse in the AM peak hour, the PM peak hour has a larger share of the delay.

Appendix Index

1. May 24, 2017 Traffic Count Summary

2. Synchro LOS Worksheets

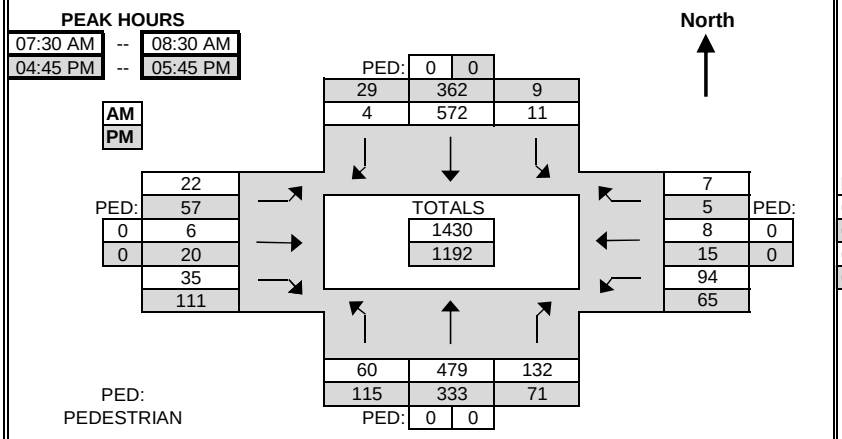
3. Traffic Signal Warrant Worksheets

1. May 24, 2017 Traffic Count Summary

INTERSECTION TURNING MOVEMENT TRAFFIC VOLUME SUMMARY

PROJECT NAME: Palo Cedro ARCO **SURVEY DATE:** 5/24/17 AM / 5/24/17 PM **FILE:** T2338TCS002.xlsx
PROJECT NO: 25-2457-02 **TC No:** **DAY OF WEEK:** Wednesday / Wednesday **SHEET:** Deschutes Rd-Cedro P
NB LEG: **SB LEG:** **EB LEG:** **WB LEG:**

PEAK HOUR TURNING VOLUMES



PEAK HOUR VOLUMES PER LEG

Intersection Totals

% Trucks	2.7	1.2
PHF	0.88	0.89

PHF	0.91	0.87	0.89	0.88
% Trck	2.9	1.0	3.3	0.5
VOL	587	400	508	395

	%				%	
PHF	Trck	VOL		VOL	Trck	PHF
0.86	0.0	72		109	2.8	0.83
0.81	0.6	159		85	3.5	0.69
0.93	0.0	63		149	0.7	0.59
0.87	0.5	188		100	3.0	0.76

VOL	701	538	671	519
% Trck	2.9	1.5	2.7	1.2
PHF	0.94	0.82	0.82	0.89

SUMMARY OF MORNING (AM) TRAFFIC VOLUMES

TIME PERIOD			NORTHBOUND						WESTBOUND						SOUTHBOUND						EASTBOUND						TOTAL VOLUMES	
			Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right			
From		To	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk
RAW SURVEY DATA																												
07:00 AM	--	07:15 AM	7		97	1	6	3	15				2		1		83	3	3	1	5		1		5		225	8
07:15 AM	--	07:30 AM	14		103	3	13	1	26	1	3	1	1		3		81	3	4		4		1		7		260	9
07:30 AM	--	07:45 AM	18		116	2	25		29		2		2		1		125		1		2		4		10		335	2
07:45 AM	--	08:00 AM	12		111	4	38		20	1	2				1		138	2			7		1		9		339	7
08:00 AM	--	08:15 AM	16		122	10	56		21	2	3		1		7		144	9	2		10				5		387	21
08:15 AM	--	08:30 AM	14		113	1	12	1	21		1		4		2		148	6	1		3		1		11		331	8
08:30 AM	--	08:45 AM	24		65	1	7		25		2		1		1		116	3	4		2	1	1		10		258	5
08:45 AM	--	09:00 AM	13		64	5	9		16	1	2		5		3		67	3	1		7		2		13		202	9
		TOTALS	118	0	791	27	166	5	173	5	15	1	16	0	19	0	902	29	16	1	40	1	11	0	70	0	2337	69
		PERCENT TRUCKS	0.0%		3.4%		3.0%		2.9%		6.7%		0.0%		0.0%		3.2%		6.3%		2.5%		0.0%		0.0%		3.0%	
HOURLY TOTALS																												
07:00 AM	--	08:00 AM	51	0	427	10	82	4	90	2	7	1	5	0	6	0	427	8	8	1	18	0	7	0	31	0	1159	26
07:15 AM	--	08:15 AM	60	0	452	19	132	1	96	4	10	1	4	0	12	0	488	14	7	0	23	0	6	0	31	0	1321	39
07:30 AM	--	08:30 AM	60	0	462	17	131	1	91	3	8	0	7	0	11	0	555	17	4	0	22	0	6	0	35	0	1392	38
07:45 AM	--	08:45 AM	66	0	411	16	113	1	87	3	8	0	6	0	11	0	546	20	7	0	22	1	3	0	35	0	1315	41
08:00 AM	--	09:00 AM	67	0	364	17	84	1	83	3	8	0	11	0	13	0	475	21	8	0	22	1	4	0	39	0	1178	43

SUMMARY OF AFTERNOON (PM) TRAFFIC VOLUMES

TIME PERIOD			NORTHBOUND						WESTBOUND						SOUTHBOUND						EASTBOUND						TOTAL VOLUMES	
			Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right			
From		To	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk	Car	Trk
RAW SURVEY DATA																												
04:00 PM	--	04:15 PM	24		79	8	9		21	1			4		8		89	2	6		9		5		13		267	11
04:15 PM	--	04:30 PM	39		80	3	18	2	12	3	7		2		1		87	4	5		12		8		29		300	12
04:30 PM	--	04:45 PM	27		99	2	21	1	17		3		2				76	1	1	1	4		6		30		286	5
04:45 PM	--	05:00 PM	30		81	1	14		15		5				1		86	1	4		15		2		28	1	281	3
05:00 PM	--	05:15 PM	25		66	1	20	1	7	2	2				3		82	1	7		11		6		23		252	5
05:15 PM	--	05:30 PM	33	1	90		21	1	16		4		3		3		86		11		15		8		25		315	2
05:30 PM	--	05:45 PM	26		94		13	1	24	1	4		2		2		104	2	7		16		4		34		330	4
05:45 PM	--	06:00 PM	30	3	92		15		13		4		3		3		52	2	3		12		5		24		256	5
		TOTALS	234	4	681	15	131	6	125	7	29	0	16	0	21	0	662	13	44	1	94	0	44	0	206	1	2287	47
		PERCENT TRUCKS	1.7%		2.2%		4.6%		5.6%		0.0%		0.0%		0.0%		2.0%		2.3%		0.0%		0.0%		0.5%		2.1%	
HOURLY TOTALS																												
04:00 PM	--	05:00 PM	120	0	339	14	62	3	65	4	15	0	8	0	10	0	338	8	16	1	40	0	21	0	100	1	1134	31
04:15 PM	--	05:15 PM	121	0	326	7	73	4	51	5	17	0	4	0	5	0	331	7	17	1	42	0	22	0	110	1	1119	25
04:30 PM	--	05:30 PM	115	1	336	4	76	3	55	2	14	0	5	0	7	0	330	3	23	1	45	0	22	0	106	1	1134	15
04:45 PM	--	05:45 PM	114	1	331	2	68	3	62	3	15	0	5	0	9	0	358	4	29	0	57	0	20	0	110	1	1178	14
05:00 PM	--	06:00 PM	114	4	342	1	69	3	60	3	14	0	8	0	11	0	324	5	28	0	54	0	23	0	106	0	1153	16

2. Synchro LOS Worksheets

Intersection	
Intersection Delay, s/veh	65.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	6	36	115	8	7	63	502	138	11	593	4
Future Vol, veh/h	22	6	36	115	8	7	63	502	138	11	593	4
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	25	7	41	131	9	8	72	570	157	13	674	5
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	13.4	18.4	99.8	41.6
HCM LOS	B	C	F	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	79%	0%	88%	100%	0%	0%
Vol Thru, %	0%	100%	0%	21%	0%	6%	0%	100%	98%
Vol Right, %	0%	0%	100%	0%	100%	5%	0%	0%	2%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	63	502	138	28	36	130	11	395	202
LT Vol	63	0	0	22	0	115	11	0	0
Through Vol	0	502	0	6	0	8	0	395	198
RT Vol	0	0	138	0	36	7	0	0	4
Lane Flow Rate	72	570	157	32	41	148	12	449	229
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.161	1.203	0.3	0.087	0.1	0.385	0.028	0.931	0.474
Departure Headway (Hd)	8.101	7.591	6.876	10.347	9.217	9.756	8.415	7.903	7.889
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	445	479	525	348	391	371	428	463	461
Service Time	5.817	5.306	4.591	8.047	6.917	7.456	6.115	5.603	5.589
HCM Lane V/C Ratio	0.162	1.19	0.299	0.092	0.105	0.399	0.028	0.97	0.497
HCM Control Delay	12.4	134.7	12.5	14	12.9	18.4	11.4	54.7	17.5
HCM Lane LOS	B	F	B	B	B	C	B	F	C
HCM 95th-tile Q	0.6	21.8	1.3	0.3	0.3	1.8	0.1	10.8	2.5

Intersection	
Intersection Delay, s/veh	20.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	57	23	111	68	16	5	121	351	84	10	362	29
Future Vol, veh/h	57	23	111	68	16	5	121	351	84	10	362	29
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	26	125	76	18	6	136	394	94	11	407	33
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	13.4	14.8	25.3	17.7
HCM LOS	B	B	D	C

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	71%	0%	76%	100%	0%	0%
Vol Thru, %	0%	100%	0%	29%	0%	18%	0%	100%	81%
Vol Right, %	0%	0%	100%	0%	100%	6%	0%	0%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	351	84	80	111	89	10	241	150
LT Vol	121	0	0	57	0	68	10	0	0
Through Vol	0	351	0	23	0	16	0	241	121
RT Vol	0	0	84	0	111	5	0	0	29
Lane Flow Rate	136	394	94	90	125	100	11	271	168
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.293	0.795	0.171	0.217	0.264	0.25	0.025	0.573	0.349
Departure Headway (Hd)	7.766	7.255	6.539	8.703	7.63	8.986	8.122	7.61	7.472
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	462	497	547	412	469	399	440	475	481
Service Time	5.522	5.011	4.295	6.476	5.402	6.763	5.885	5.373	5.234
HCM Lane V/C Ratio	0.294	0.793	0.172	0.218	0.267	0.251	0.025	0.571	0.349
HCM Control Delay	13.7	32.8	10.7	13.9	13.1	14.8	11.1	20.2	14.2
HCM Lane LOS	B	D	B	B	B	B	B	C	B
HCM 95th-tile Q	1.2	7.4	0.6	0.8	1.1	1	0.1	3.5	1.5

Intersection	
Intersection Delay, s/veh	70.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	6	36	115	8	7	63	511	138	12	603	5
Future Vol, veh/h	22	6	36	115	8	7	63	511	138	12	603	5
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	25	7	41	131	9	8	72	581	157	14	685	6
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	13.5	18.6	108	44
HCM LOS	B	C	F	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	79%	0%	88%	100%	0%	0%
Vol Thru, %	0%	100%	0%	21%	0%	6%	0%	100%	98%
Vol Right, %	0%	0%	100%	0%	100%	5%	0%	0%	2%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	63	511	138	28	36	130	12	402	206
LT Vol	63	0	0	22	0	115	12	0	0
Through Vol	0	511	0	6	0	8	0	402	201
RT Vol	0	0	138	0	36	7	0	0	5
Lane Flow Rate	72	581	157	32	41	148	14	457	234
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.162	1.231	0.301	0.088	0.1	0.387	0.03	0.948	0.485
Departure Headway (Hd)	8.14	7.629	6.914	10.43	9.299	9.829	8.457	7.945	7.928
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	442	482	522	346	388	368	426	461	456
Service Time	5.853	5.342	4.627	8.13	6.999	7.529	6.157	5.645	5.628
HCM Lane V/C Ratio	0.163	1.205	0.301	0.092	0.106	0.402	0.033	0.991	0.513
HCM Control Delay	12.4	145.6	12.6	14.1	13	18.6	11.4	58.3	17.9
HCM Lane LOS	B	F	B	B	B	C	B	F	C
HCM 95th-tile Q	0.6	23	1.3	0.3	0.3	1.8	0.1	11.3	2.6

Intersection	
Intersection Delay, s/veh	22.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	58	23	111	68	16	6	121	367	84	11	370	30
Future Vol, veh/h	58	23	111	68	16	6	121	367	84	11	370	30
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	65	26	125	76	18	7	136	412	94	12	416	34
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	13.7	15	28.8	18.4
HCM LOS	B	B	D	C

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	72%	0%	76%	100%	0%	0%
Vol Thru, %	0%	100%	0%	28%	0%	18%	0%	100%	80%
Vol Right, %	0%	0%	100%	0%	100%	7%	0%	0%	20%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	121	367	84	81	111	90	11	247	153
LT Vol	121	0	0	58	0	68	11	0	0
Through Vol	0	367	0	23	0	16	0	247	123
RT Vol	0	0	84	0	111	6	0	0	30
Lane Flow Rate	136	412	94	91	125	101	12	277	172
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.296	0.838	0.173	0.223	0.268	0.255	0.028	0.592	0.361
Departure Headway (Hd)	7.831	7.32	6.604	8.823	7.747	9.095	8.206	7.693	7.553
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	458	495	542	406	463	393	435	468	476
Service Time	5.592	5.08	4.364	6.598	5.521	6.877	5.973	5.46	5.32
HCM Lane V/C Ratio	0.297	0.832	0.173	0.224	0.27	0.257	0.028	0.592	0.361
HCM Control Delay	13.9	37.8	10.8	14.1	13.4	15	11.2	21.1	14.6
HCM Lane LOS	B	E	B	B	B	B	B	C	B
HCM 95th-tile Q	1.2	8.4	0.6	0.8	1.1	1	0.1	3.8	1.6

Intersection	
Intersection Delay, s/veh	165.2
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	10	45	240	10	75	75	620	275	45	670	5
Future Vol, veh/h	30	10	45	240	10	75	75	620	275	45	670	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	33	11	49	261	11	82	82	674	299	49	728	5
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	17.6	88.4	241.5	114.4
HCM LOS	C	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	75%	0%	74%	100%	0%	0%
Vol Thru, %	0%	100%	0%	25%	0%	3%	0%	100%	98%
Vol Right, %	0%	0%	100%	0%	100%	23%	0%	0%	2%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	620	275	40	45	325	45	447	228
LT Vol	75	0	0	30	0	240	45	0	0
Through Vol	0	620	0	10	0	10	0	447	223
RT Vol	0	0	275	0	45	75	0	0	5
Lane Flow Rate	82	674	299	43	49	353	49	486	248
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.221	1.729	0.708	0.143	0.146	1.007	0.134	1.26	0.643
Departure Headway (Hd)	10.284	9.758	9.023	13.401	12.257	11.609	10.825	10.299	10.283
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	351	377	404	269	294	314	333	354	355
Service Time	7.984	7.458	6.723	11.101	9.957	9.309	8.525	7.999	7.983
HCM Lane V/C Ratio	0.234	1.788	0.74	0.16	0.167	1.124	0.147	1.373	0.699
HCM Control Delay	15.9	362.2	30.8	18.3	17	88.4	15.2	167.7	29.8
HCM Lane LOS	C	F	D	C	C	F	C	F	D
HCM 95th-tile Q	0.8	39.7	5.3	0.5	0.5	11	0.5	19.7	4.2

Intersection	
Intersection Delay, s/veh	55.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	30	130	170	20	60	145	400	190	40	455	35
Future Vol, veh/h	70	30	130	170	20	60	145	400	190	40	455	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	76	33	141	185	22	65	158	435	207	43	495	38
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	20.2	46.9	79.3	42.6
HCM LOS	C	E	F	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	70%	0%	68%	100%	0%	0%
Vol Thru, %	0%	100%	0%	30%	0%	8%	0%	100%	81%
Vol Right, %	0%	0%	100%	0%	100%	24%	0%	0%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	400	190	100	130	250	40	303	187
LT Vol	145	0	0	70	0	170	40	0	0
Through Vol	0	400	0	30	0	20	0	303	152
RT Vol	0	0	190	0	130	60	0	0	35
Lane Flow Rate	158	435	207	109	141	272	43	330	203
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.444	1.161	0.509	0.339	0.399	0.805	0.124	0.895	0.543
Departure Headway (Hd)	10.137	9.612	8.876	11.727	10.627	11.053	10.733	10.206	10.068
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	355	378	405	309	341	329	336	356	361
Service Time	7.902	7.376	6.64	9.427	8.327	8.753	8.433	7.906	7.768
HCM Lane V/C Ratio	0.445	1.151	0.511	0.353	0.413	0.827	0.128	0.927	0.562
HCM Control Delay	20.8	128.4	20.5	20.3	20.2	46.9	14.9	57.6	24.1
HCM Lane LOS	C	F	C	C	C	E	B	F	C
HCM 95th-tile Q	2.2	17	2.8	1.5	1.9	6.7	0.4	8.8	3.1

Intersection	
Intersection Delay, s/veh	171.3
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	10	45	240	10	75	75	629	275	46	680	6
Future Vol, veh/h	30	10	45	240	10	75	75	629	275	46	680	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	33	11	49	261	11	82	82	684	299	50	739	7
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	17.7	89.3	250.6	119.5
HCM LOS	C	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	75%	0%	74%	100%	0%	0%
Vol Thru, %	0%	100%	0%	25%	0%	3%	0%	100%	97%
Vol Right, %	0%	0%	100%	0%	100%	23%	0%	0%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	629	275	40	45	325	46	453	233
LT Vol	75	0	0	30	0	240	46	0	0
Through Vol	0	629	0	10	0	10	0	453	227
RT Vol	0	0	275	0	45	75	0	0	6
Lane Flow Rate	82	684	299	43	49	353	50	493	253
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.221	1.757	0.71	0.143	0.146	1.009	0.137	1.28	0.656
Departure Headway (Hd)	10.317	9.792	9.056	13.472	12.328	11.699	10.857	10.331	10.312
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	351	376	401	268	293	314	333	355	354
Service Time	8.017	7.492	6.756	11.172	10.028	9.399	8.557	8.031	8.012
HCM Lane V/C Ratio	0.234	1.819	0.746	0.16	0.167	1.124	0.15	1.389	0.715
HCM Control Delay	15.9	374.5	31.1	18.4	17.1	89.3	15.3	175.6	30.7
HCM Lane LOS	C	F	D	C	C	F	C	F	D
HCM 95th-tile Q	0.8	40.7	5.4	0.5	0.5	11	0.5	20.4	4.4

Intersection	
Intersection Delay, s/veh	61.8
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	71	30	130	170	20	61	145	416	190	41	463	36
Future Vol, veh/h	71	30	130	170	20	61	145	416	190	41	463	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	77	33	141	185	22	66	158	452	207	45	503	39
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	20.5	48.1	91.3	44.8
HCM LOS	C	E	F	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	70%	0%	68%	100%	0%	0%
Vol Thru, %	0%	100%	0%	30%	0%	8%	0%	100%	81%
Vol Right, %	0%	0%	100%	0%	100%	24%	0%	0%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	416	190	101	130	251	41	309	190
LT Vol	145	0	0	71	0	170	41	0	0
Through Vol	0	416	0	30	0	20	0	309	154
RT Vol	0	0	190	0	130	61	0	0	36
Lane Flow Rate	158	452	207	110	141	273	45	336	207
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.446	1.214	0.512	0.344	0.401	0.811	0.127	0.912	0.555
Departure Headway (Hd)	10.188	9.662	8.927	11.855	10.753	11.172	10.82	10.293	10.154
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	353	375	403	305	336	327	333	356	358
Service Time	7.961	7.436	6.699	9.555	8.453	8.872	8.52	7.993	7.854
HCM Lane V/C Ratio	0.448	1.205	0.514	0.361	0.42	0.835	0.135	0.944	0.578
HCM Control Delay	21	148	20.8	20.6	20.5	48.1	15.1	61.1	24.8
HCM Lane LOS	C	F	C	C	C	E	C	F	C
HCM 95th-tile Q	2.2	18.8	2.8	1.5	1.9	6.8	0.4	9.2	3.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	10	45	240	10	75	75	629	275	46	680	6
Future Volume (veh/h)	30	10	45	240	10	75	75	629	275	46	680	6
Number	5	2	12	1	6	16	3	8	18	7	4	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1710	1845	1845	1710	1845	1900	1660	1845	1845	1660	1845	1900
Adj Flow Rate, veh/h	33	11	49	261	11	82	82	684	299	50	739	7
Adj No. of Lanes	0	1	1	0	1	0	1	1	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	0	248	307	0	25	186	99	883	568	70	1637	16
Arrive On Green	0.00	0.13	0.13	0.00	0.13	0.13	0.06	0.48	0.48	0.04	0.46	0.46
Sat Flow, veh/h	0	1845	1550	0	186	1384	1581	1845	1560	1581	3557	34
Grp Volume(v), veh/h	0	11	49	0	0	93	82	684	299	50	364	382
Grp Sat Flow(s),veh/h/ln	0	1845	1550	0	0	1570	1581	1845	1560	1581	1752	1839
Q Serve(g_s), s	0.0	0.2	0.9	0.0	0.0	1.9	1.8	10.8	9.3	1.1	5.0	5.0
Cycle Q Clear(g_c), s	0.0	0.2	0.9	0.0	0.0	1.9	1.8	10.8	9.3	1.1	5.0	5.0
Prop In Lane	0.00		1.00	0.00		0.88	1.00		1.00	1.00		0.02
Lane Grp Cap(c), veh/h	0	248	307	0	0	211	99	883	568	70	806	846
V/C Ratio(X)	0.00	0.04	0.16	0.00	0.00	0.44	0.83	0.77	0.53	0.72	0.45	0.45
Avail Cap(c_a), veh/h	0	843	807	0	0	717	316	1475	1068	181	1251	1313
HCM 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
Upstream Filter(I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	13.2	11.7	0.0	0.0	13.9	16.2	7.6	23.1	16.5	6.4	6.4
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.0	1.4	15.5	1.5	0.8	13.0	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.4	0.0	0.0	0.9	1.2	5.7	4.1	0.7	2.4	2.5
LnGrp Delay(d),s/veh	0.0	13.3	11.9	0.0	0.0	15.4	31.7	9.0	23.8	29.5	6.8	6.8
LnGrp LOS		B	B			B	C	A	C	C	A	A
Approach Vol, veh/h		60			93			1065			796	
Approach Delay, s/veh		12.1			15.4			14.9			8.3	
Approach LOS		B			B			B			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	0.0	8.7	6.2	20.1	0.0	8.7	5.5	20.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	16.0	16.0	7.0	25.0	16.0	16.0	4.0	28.0
Max Q Clear Time (g_c+I1), s	0.0	2.9	3.8	7.0	0.0	3.9	3.1	12.8
Green Ext Time (p_c), s	0.0	0.1	0.1	2.8	0.0	0.2	0.0	4.0

Intersection Summary	
HCM 2010 Ctrl Delay	12.2
HCM 2010 LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	71	30	130	170	20	61	145	416	190	41	463	36
Future Volume (veh/h)	71	30	130	170	20	61	145	416	190	41	463	36
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.98	1.00		0.99	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1710	1863	1863	1710	1863	1900	1676	1863	1863	1676	1863	1900
Adj Flow Rate, veh/h	77	33	141	185	22	66	158	452	207	45	503	39
Adj No. of Lanes	0	1	1	0	1	0	1	1	1	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	298	454	0	65	195	205	753	428	66	1057	82
Arrive On Green	0.00	0.16	0.16	0.00	0.16	0.16	0.13	0.40	0.40	0.04	0.32	0.32
Sat Flow, veh/h	0	1863	1568	0	406	1219	1597	1863	1574	1597	3328	257
Grp Volume(v), veh/h	0	33	141	0	0	88	158	452	207	45	267	275
Grp Sat Flow(s),veh/h/ln	0	1863	1568	0	0	1625	1597	1863	1574	1597	1770	1816
Q Serve(g_s), s	0.0	0.5	2.1	0.0	0.0	1.5	2.9	5.8	7.4	0.8	3.7	3.7
Cycle Q Clear(g_c), s	0.0	0.5	2.1	0.0	0.0	1.5	2.9	5.8	7.4	0.8	3.7	3.7
Prop In Lane	0.00		1.00	0.00		0.75	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	0	298	454	0	0	260	205	753	428	66	562	577
V/C Ratio(X)	0.00	0.11	0.31	0.00	0.00	0.34	0.77	0.60	0.48	0.68	0.47	0.48
Avail Cap(c_a), veh/h	0	979	1028	0	0	961	892	2203	1653	315	1453	1491
HCM 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
Upstream Filter(I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	10.9	8.5	0.0	0.0	11.4	12.8	7.1	33.3	14.4	8.3	8.4
Incr Delay (d2), s/veh	0.0	0.2	0.4	0.0	0.0	0.8	6.0	0.8	0.8	11.4	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	1.0	0.0	0.0	0.7	1.6	3.0	3.3	0.6	1.9	1.9
LnGrp Delay(d),s/veh	0.0	11.1	8.9	0.0	0.0	12.1	18.9	7.9	34.1	25.8	9.0	9.0
LnGrp LOS		B	A			B	B	A	C	C	A	A
Approach Vol, veh/h		174			88			817			587	
Approach Delay, s/veh		9.3			12.1			16.7			10.3	
Approach LOS		A			B			B			B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.3	16.3	0.0	8.9	7.9	13.7	0.0	8.9
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	6.0	36.0	6.0	16.0	17.0	25.0	4.0	18.0
Max Q Clear Time (g_c+I1), s	2.8	9.4	0.0	4.1	4.9	5.7	0.0	3.5
Green Ext Time (p_c), s	0.0	2.8	0.0	0.5	0.4	2.0	0.0	0.2

Intersection Summary	
HCM 2010 Ctrl Delay	13.4
HCM 2010 LOS	B

Intersection	
Intersection Delay, s/veh	168.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	10	45	240	10	75	75	624	275	46	675	6
Future Vol, veh/h	30	10	45	240	10	75	75	624	275	46	675	6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	33	11	49	261	11	82	82	678	299	50	734	7
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	17.7	89.2	245.7	116.9
HCM LOS	C	F	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	75%	0%	74%	100%	0%	0%
Vol Thru, %	0%	100%	0%	25%	0%	3%	0%	100%	97%
Vol Right, %	0%	0%	100%	0%	100%	23%	0%	0%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	624	275	40	45	325	46	450	231
LT Vol	75	0	0	30	0	240	46	0	0
Through Vol	0	624	0	10	0	10	0	450	225
RT Vol	0	0	275	0	45	75	0	0	6
Lane Flow Rate	82	678	299	43	49	353	50	489	251
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.221	1.742	0.709	0.143	0.146	1.009	0.137	1.27	0.651
Departure Headway (Hd)	10.304	9.779	9.044	13.44	12.296	11.658	10.843	10.316	10.297
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	351	380	404	269	293	314	333	357	354
Service Time	8.004	7.479	6.744	11.14	9.996	9.358	8.543	8.016	7.997
HCM Lane V/C Ratio	0.234	1.784	0.74	0.16	0.167	1.124	0.15	1.37	0.709
HCM Control Delay	15.9	367.9	31	18.4	17.1	89.2	15.3	171.7	30.3
HCM Lane LOS	C	F	D	C	C	F	C	F	D
HCM 95th-tile Q	0.8	40.1	5.3	0.5	0.5	11	0.5	20.1	4.4

Intersection	
Intersection Delay, s/veh	58.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	70	30	130	170	20	61	145	408	190	41	459	35
Future Vol, veh/h	70	30	130	170	20	61	145	408	190	41	459	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	76	33	141	185	22	66	158	443	207	45	499	38
Number of Lanes	0	1	1	0	1	0	1	1	1	1	2	0

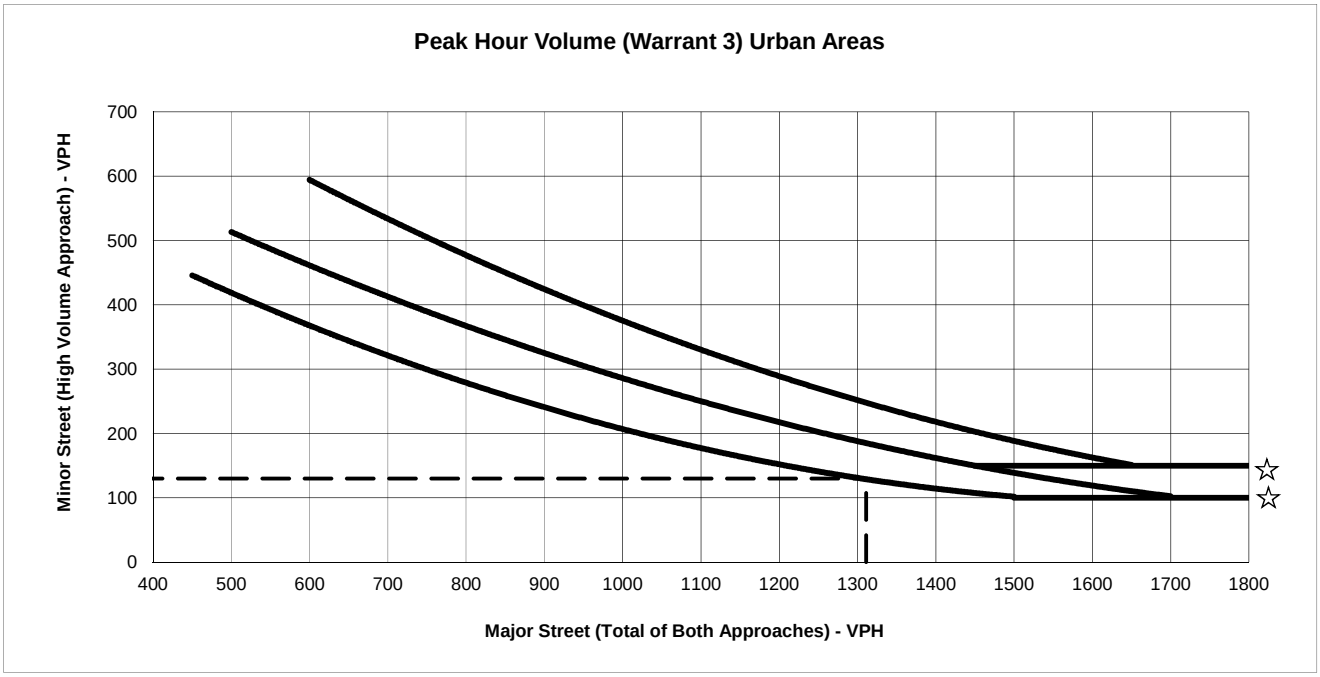
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	1	2
HCM Control Delay	20.4	47.7	85.5	43.9
HCM LOS	C	E	F	E

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	70%	0%	68%	100%	0%	0%
Vol Thru, %	0%	100%	0%	30%	0%	8%	0%	100%	81%
Vol Right, %	0%	0%	100%	0%	100%	24%	0%	0%	19%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	145	408	190	100	130	251	41	306	188
LT Vol	145	0	0	70	0	170	41	0	0
Through Vol	0	408	0	30	0	20	0	306	153
RT Vol	0	0	190	0	130	61	0	0	35
Lane Flow Rate	158	443	207	109	141	273	45	333	204
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.446	1.189	0.511	0.34	0.401	0.81	0.127	0.905	0.549
Departure Headway (Hd)	10.176	9.651	8.915	11.802	10.701	11.117	10.783	10.256	10.119
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	355	377	405	307	339	327	335	356	360
Service Time	7.939	7.413	6.677	9.502	8.401	8.817	8.483	7.956	7.819
HCM Lane V/C Ratio	0.445	1.175	0.511	0.355	0.416	0.835	0.134	0.935	0.567
HCM Control Delay	20.9	138.6	20.7	20.5	20.4	47.7	15	59.7	24.5
HCM Lane LOS	C	F	C	C	C	E	B	F	C
HCM 95th-tile Q	2.2	18	2.8	1.5	1.9	6.8	0.4	9	3.2

3. Traffic Signal Warrant Worksheets

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



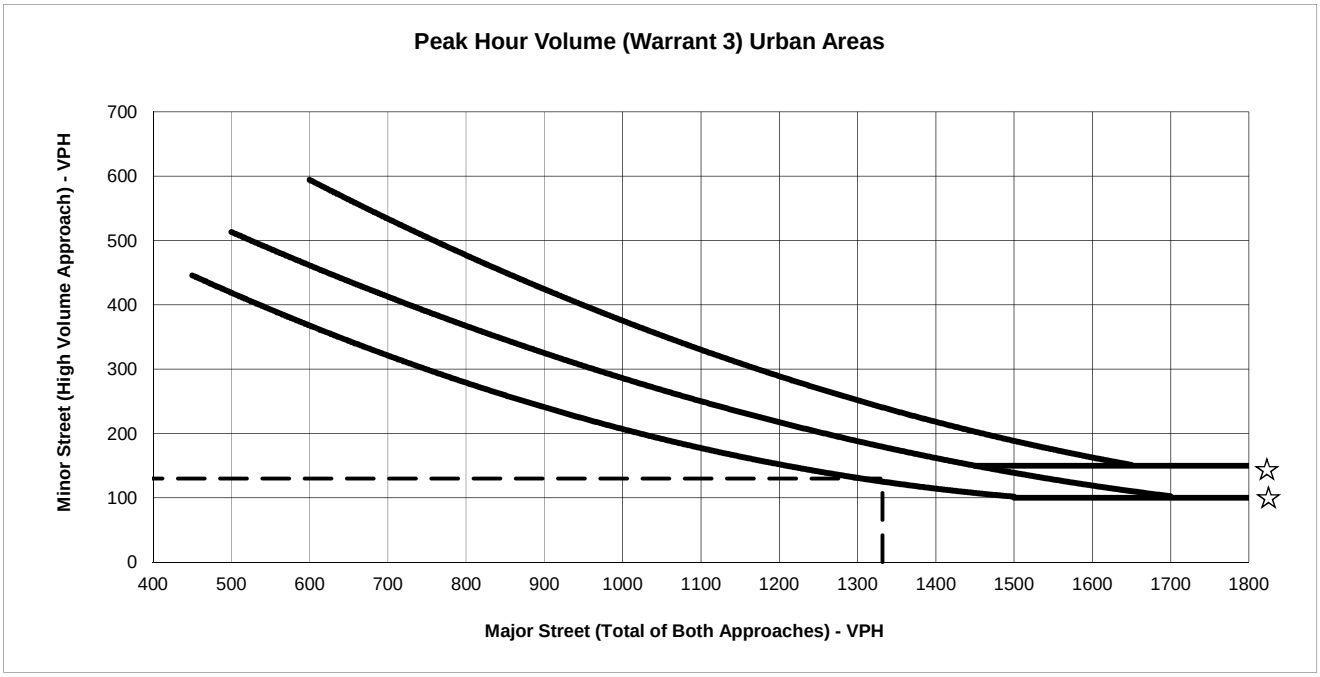
☆ NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Existing AM

		Number of Lanes
Major Approach	Deschutes Rd	
Minor Approach	Cedro Rd	
Major St. Volume:	1311	
Minor St. Volume:	130	
Warrant Met?:	Yes	

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

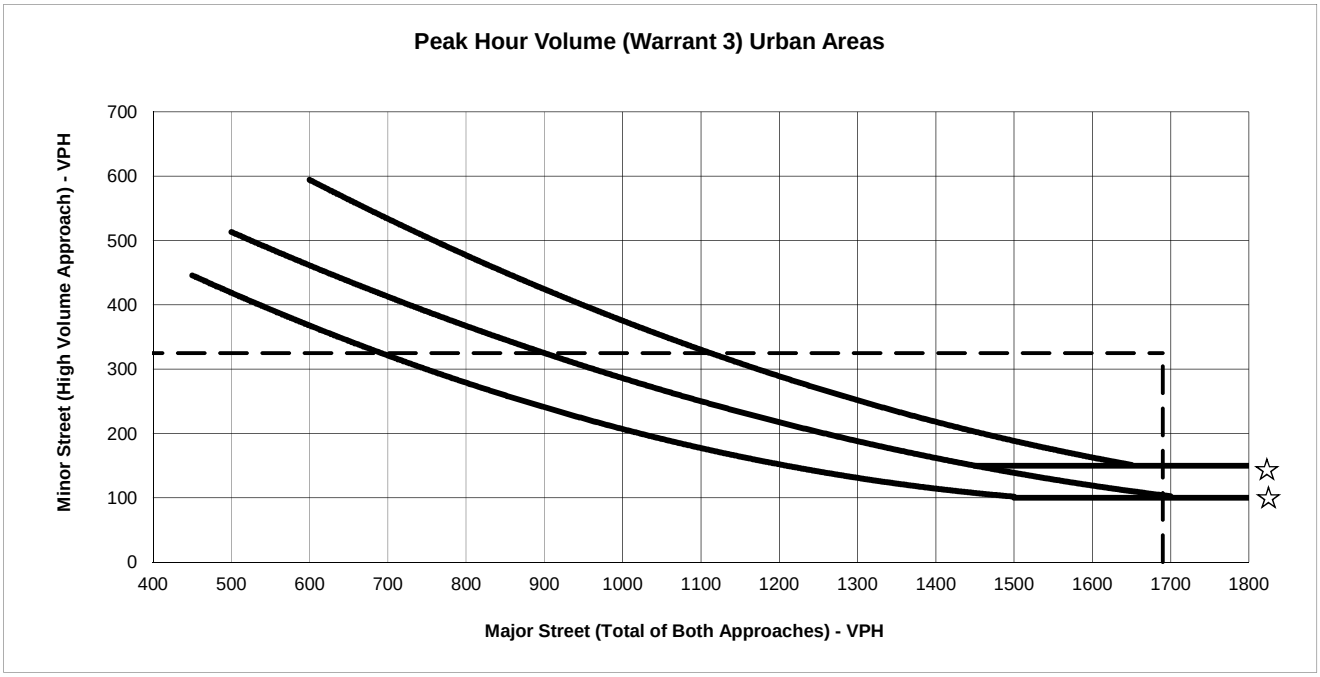
Existing Plus Project AM

Number of Lanes

Major Approach	Deschutes Rd
Minor Approach	Cedro Rd
Major St. Volume:	1332
Minor St. Volume:	130
Warrant Met?:	Yes

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



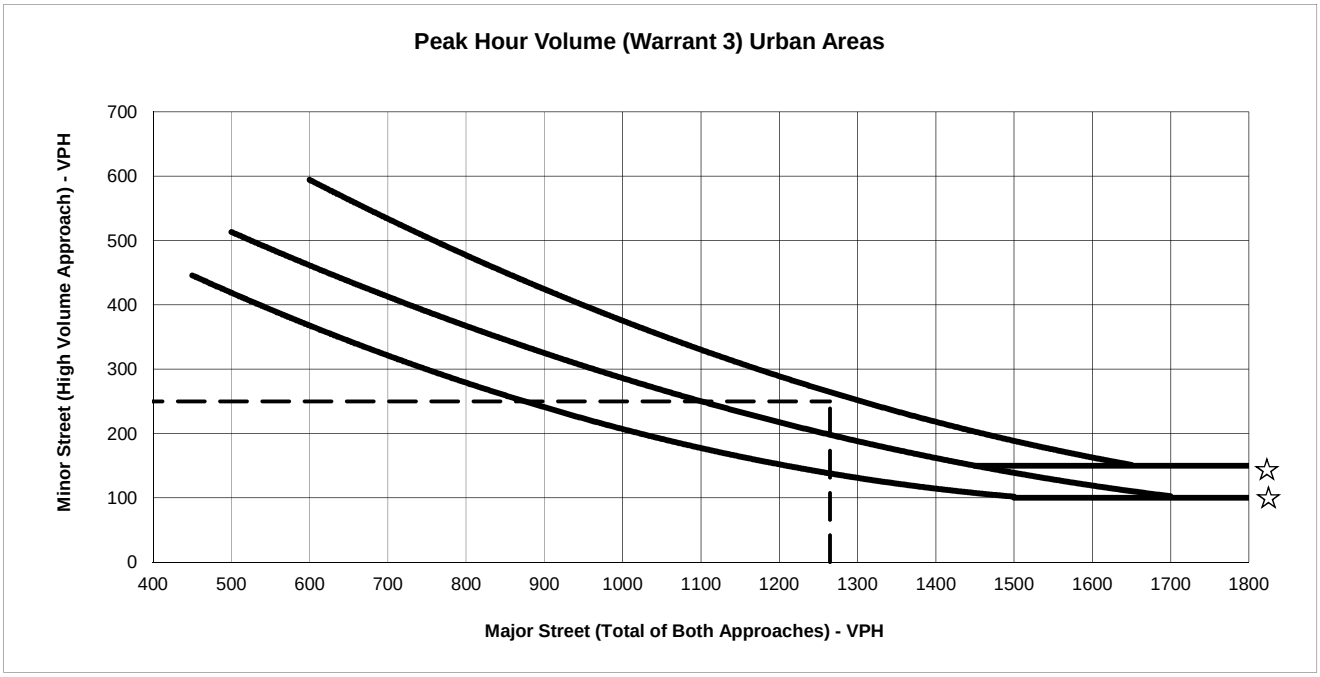
☆ NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Year 2035 AM

		Number of Lanes
Major Approach	Deschutes Rd	
Minor Approach	Cedro Rd	
Major St. Volume:	1690	
Minor St. Volume:	325	
Warrant Met?:	Yes	

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



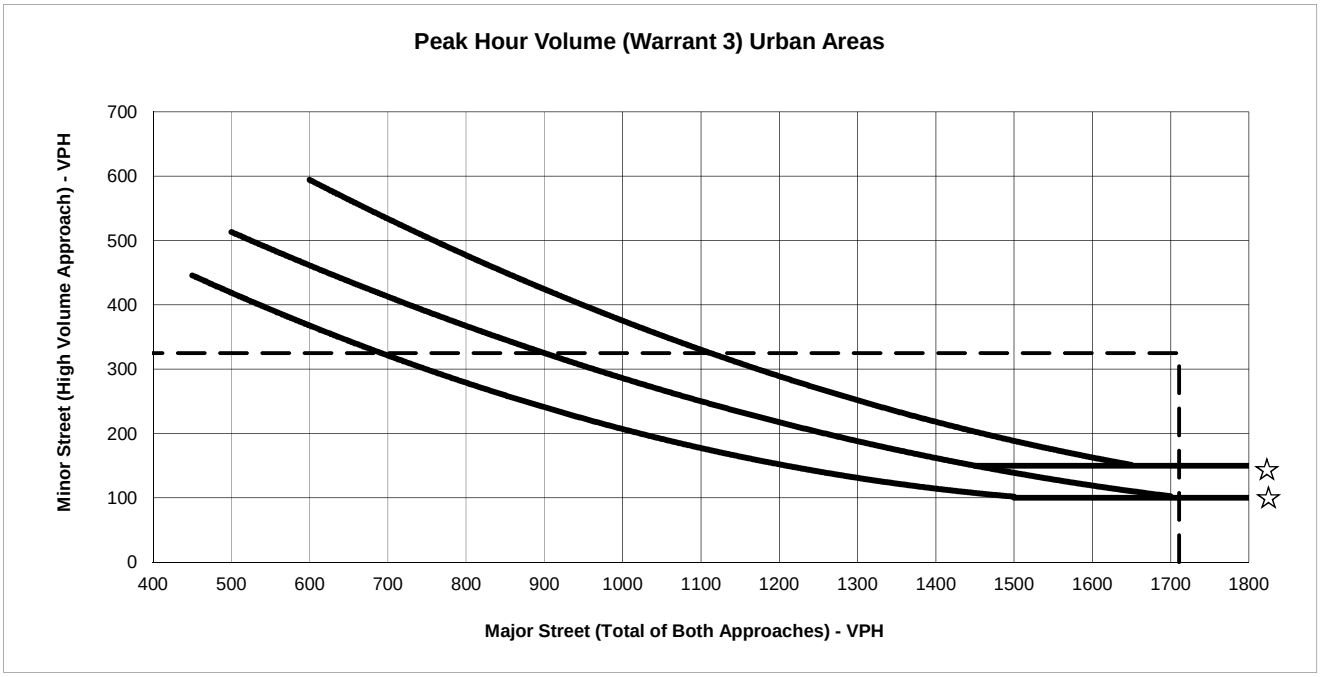
☆ NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Year 2035 PM

		Number of Lanes
Major Approach	Deschutes Rd	
Minor Approach	Cedro Rd	
Major St. Volume:	1265	
Minor St. Volume:	250	
Warrant Met?:	Yes	

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



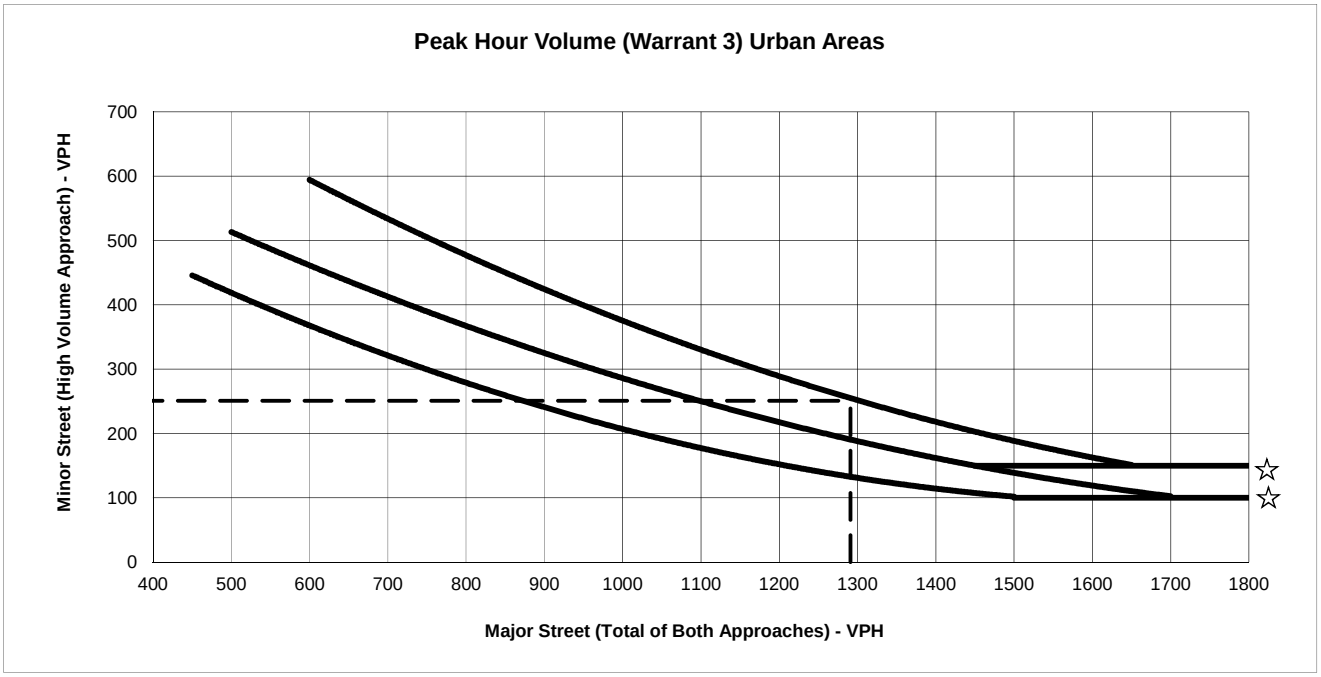
☆ NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Year 2035 Plus Project AM

		Number of Lanes
Major Approach	Deschutes Rd	
Minor Approach	Cedro Rd	
Major St. Volume:	1711	
Minor St. Volume:	325	
Warrant Met?:	Yes	

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
500	420	500	505	500	N/A
600	360	600	460	600	590
700	325	700	420	700	540
800	285	800	360	800	475
900	245	900	325	900	425
1000	200	1000	285	1000	370
1100	175	1100	250	1100	340
1200	150	1200	220	1200	285
1300	130	1300	190	1300	250
1400	120	1400	155	1400	220
1500	100	1500	145	1500	180
1600	100	1600	120	1600	170
1700	100	1700	100	1650	150
1800	100	1800	100	1800	150

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ NOTE:
150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Year 2035 Plus Project PM

		Number of Lanes
Major Approach	Deschutes Rd	
Minor Approach	Cedro Rd	
Major St. Volume:	1291	
Minor St. Volume:	251	
Warrant Met?:	Yes	