TRAFFIC IMPACT STUDY

For

SR Land Triangle Commercial
El Paso County, Colorado

October 2026

P262

Prepared for:

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26-082713

Traffic Engineer's Statement

The attached traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.

Brandon Wilson

_____ _____

Brandon Wilson, P.E. #68282 10/26/2026

Date

Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

_____ _____

James Morley Date
SR Land LLC
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I. Introduction

Project Overview

This traffic impact study is provided as a planning document and addresses the capacity, geometric, and control requirements associated with the development entitled SR Land Triangle Commercial. This analysis was prepared in accordance with Appendix B of the County's Engineering Criteria Manual (ECM)[1].

This proposed development consists of a rezone application to support commercial land uses. This development is located near the southeast corner of the intersection of Vollmer Road and Marksheffel Road in El Paso County, Colorado.

Study Area Boundaries

The study area to be examined in this analysis encompasses the area bounded by Black Forest Road east to Marksheffel Road, and from E Woodmen Road north to Vollmer Road as well as proposed site accesses.

Figure 1 illustrates location of the site and study intersections.

Site Description

8.8 acres per LOI & application

Land for the development is approximately 6 acres in size, vacant, and surrounded by a mix of commercial and residential land uses.

The proposed development will rezone the site to CC (Community Commercial), a zoning district intended to accommodate retail sales and service establishments that primarily service adjoining neighborhoods.

The proposed development is conceptual, and no specific land uses have been determined. However, for purposes of this analysis, there is assumed to be construction for approximately 23,500 square feet of retail plaza, a gas station supporting 14 vehicle fueling positions, an approximate 2,000 square foot coffee/donut shop with a drive-through window, and an approximate 2,000 square foot automated car wash with one car wash tunnel. It is to be noted that land use densities indicated were estimated based on a typical floor-area-ratio (FAR) of 0.2 in relation to the known acreage allocated to each land use at this time.

[1] El Paso County Engineering Criteria Manual, El Paso County, January 9, 2025.

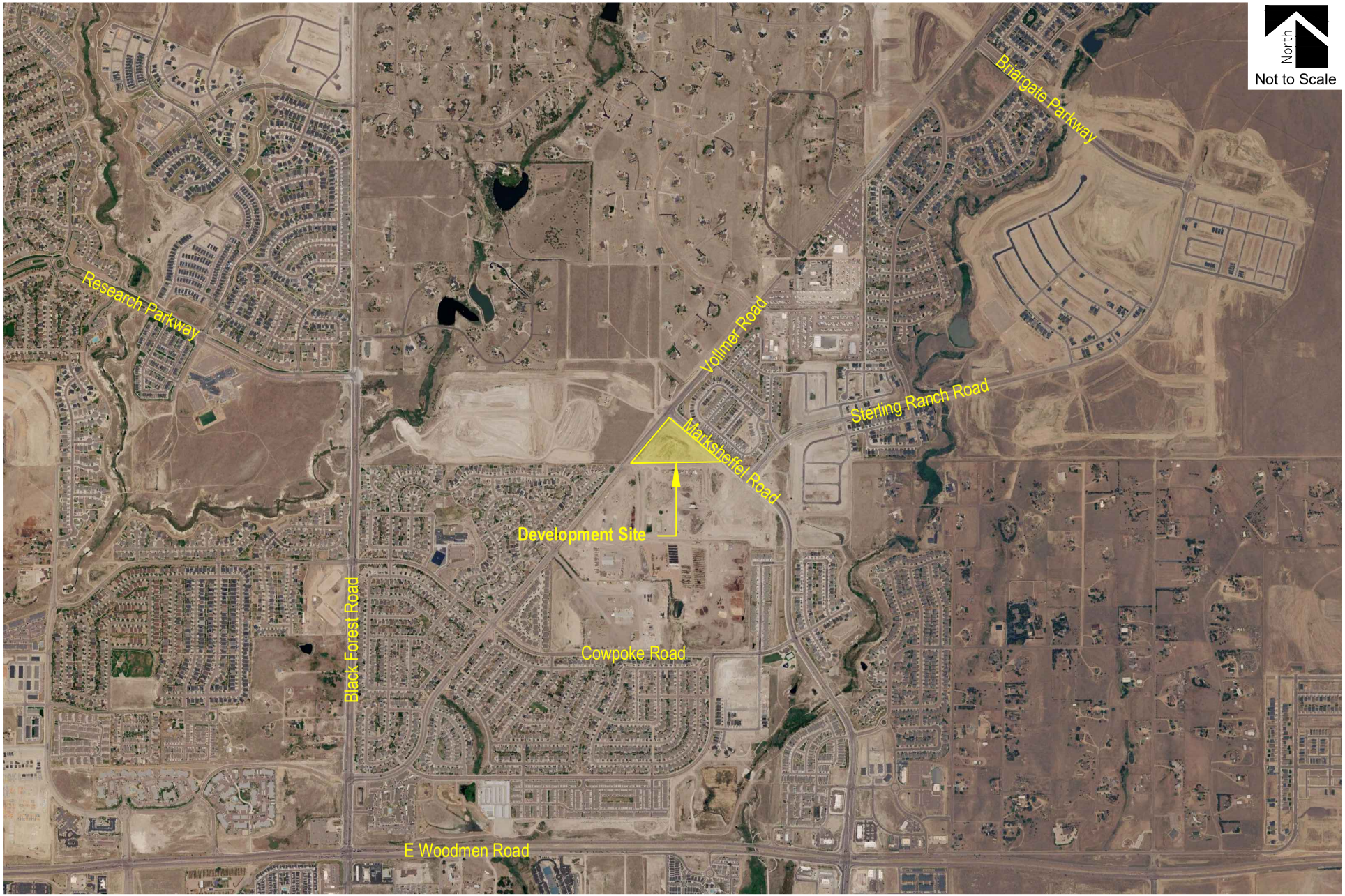
Proposed access to the development is provided at the following locations: one full-movement access onto Vollmer Road (referred to as Access A), one right-in/right-out access onto Vollmer Road (referred to as Access B), and one right-in/right-out access onto Marksheffel Road (referred to as Access C).

Additional access to specific development areas may be provided. However, given the conceptual nature of the site, these access locations are subject to change and therefore were not considered within this analysis. This provides for a conservative analysis.

For purposes of this study, it is anticipated that development construction would be completed by end of Year 2028.

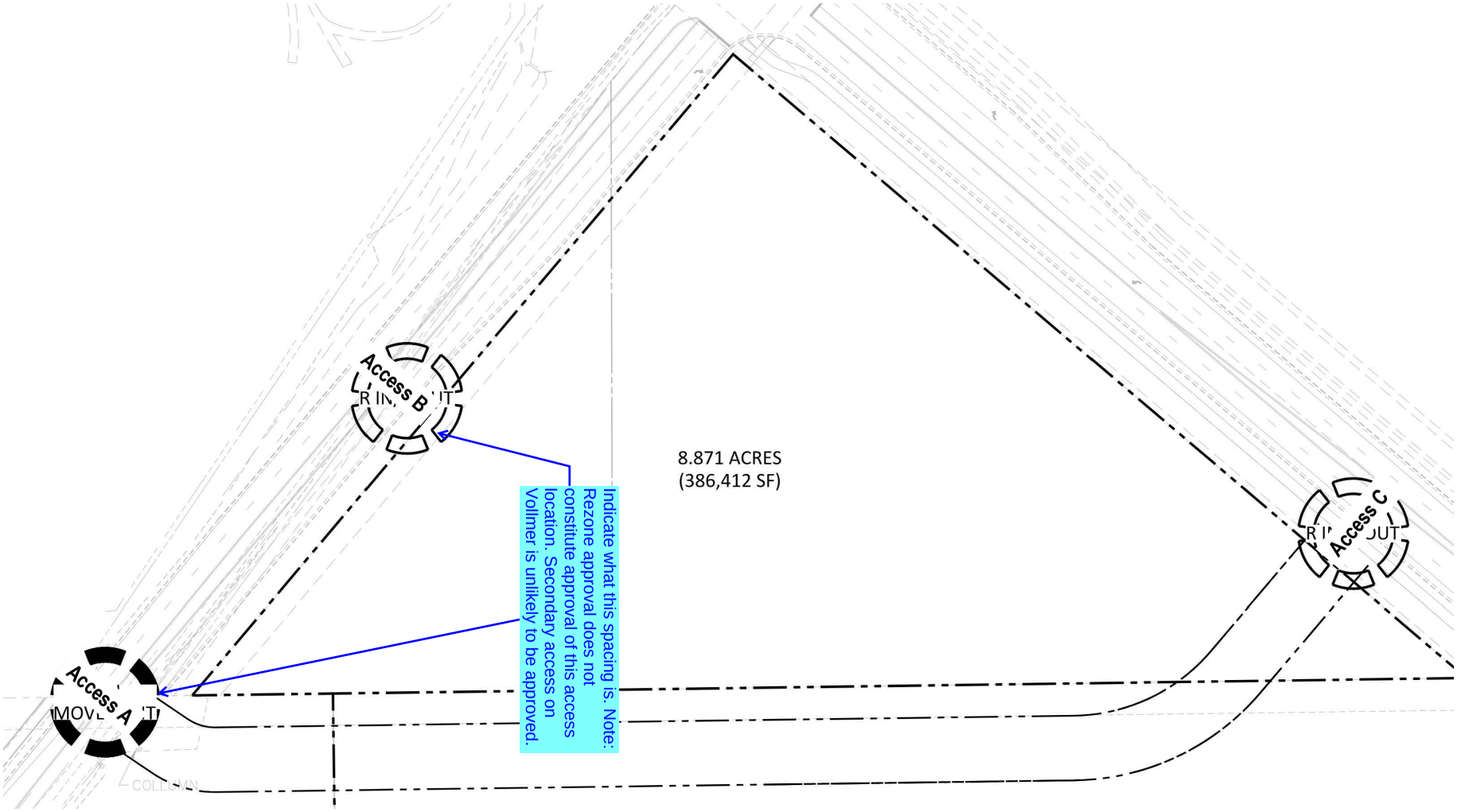
General site and access locations are shown on Figure 1.

A conceptual site plan, as prepared by N.E.S. Inc., is shown in Figure 2. This plan is provided for illustrative purposes only.


North
Not to Scale
Briargate Parkway
Research Parkway
Vollmer Road
Sterling Ranch Road
Marksheffel Road
Development Site
Black Forest Road
Cowpoke Road
E Woodmen Road

North

Not to Scale



Existing and Committed Surface Transportation Network

Within the study area, Vollmer Road and Marksheffel Road are the primary roadways that will accommodate traffic to and from the proposed development. The secondary roadways include Black Forest Road, E Woodmen Road, and Sterling Ranch Road. A brief description of each roadway based on El Paso County's Major Transportation Corridor Plan (MTCP)[2], the County's ECM, and the City of Colorado Springs' Major Thoroughfare Plan (MTP)[3], is provided below:

Vollmer Road is generally a north-south urban major collector roadway having four through lanes (two lanes in each direction) with a combination of shared and exclusive turn lanes at the intersections within the study area. Vollmer Road provides a posted speed limit of 35 MPH and currently ends at Black Forest Road.

45

Marksheffel Road is a northwest-southeast principal arterial roadway having four through lanes (two lanes in each direction) with exclusive turn lanes at the intersections within the study area. Marksheffel Road provides a posted speed limit of 35 MPH and currently ends at Vollmer Road.

urban minor arterial

Black Forest Road is a north-south principal arterial roadway providing four through lanes (two lanes in each direction) with exclusive turn lanes at the intersections within the study area. Black Forest Road provides a posted speed limit of 40 MPH.

50

E Woodmen Road is an east-west expressway roadway having six through lanes (three lanes in each direction) with exclusive turn lanes at the intersection within the study area. E Woodmen Road provides a posted speed limit of 45 MPH.

Urban Major collector with speed limit of 35 mph

Sterling Ranch Road is generally a north-south roadway having two through lanes (one lane in each direction) with a combination of shared and exclusive turn lanes at the intersections within the study area. Sterling Ranch Road is unclassified in the County's MTCP. However, per Section 2.2 of the County's ECM and the roadway's estimated cross-section, Sterling Ranch Road is assumed to be classified as an urban non-residential collector roadway and provides a posted speed limit of 25 MPH.

The study intersections of E Woodmen Road with Marksheffel Road and Black Forest Road, as well as the intersection of Black Forest Road with Vollmer Road, are signalized. All other study intersections operate under a stop-controlled condition. A stop-controlled intersection is defined as a roadway intersection where vehicle rights-of-way are controlled by one or more "STOP" signs.

[2] El Paso County Major Transportation Corridors Plan, Felsburg Holt & Ullevig, July 18, 2024.
[3] City of Colorado Springs Major Thoroughfare Plan, City of Colorado Springs, Department of Public Works, May 16, 2025.

Pursuant to the County's MTCP, the City of Colorado Springs' Black Forest Road Corridor Widening webpage, the Pikes Peak Rural Transportation Authority's (PPRTA) capital improvements projects lists, and consistent with previously approved traffic studies within the area, several improvements to the existing roadway network within the study area are planned for. Planned roadway improvements include:

- The extension of Marksheffel Road west of Vollmer Road

Planned intersection improvements include:

- Signalization of Vollmer Road and Marksheffel Road
- Signalization of Marksheffel Road and Sterling Ranch Road

In review of Section 16.0 of the City of Colorado Spring's Traffic Criteria Manual[4], it is understood that Marksheffel Road, Black Forest Road, and Vollmer Road have the potential to be widened to six through lanes (three lanes in each direction). However, for purposes of this analysis and to remain consistent with other traffic studies done in the area, it is assumed each roadway provides a maximum width of four through lanes.

[4] Engineering Criteria Manual, Section III: Traffic Criteria Manual, City of Colorado Springs City Engineering, July 2010.

II. Existing Traffic Conditions

Morning (AM) and afternoon (PM) peak hour traffic counts were collected at the following intersections:

- E Woodmen Road / Marksheffel Road
- E Woodmen Road / Black Forest Road
- Vollmer Road / Black Forest Road
- Vollmer Road / Marksheffel Road
- Marksheffel Road / Sterling Ranch Road

Average daily traffic (ADT) volumes were collected over a 24-hour period on Vollmer Road and Marksheffel Road. Counts were collected on Thursday, September 3, 2026, with AM peak hour counts being collected during the period of 8:00 a.m. to 9:00 a.m. and PM peak hour counts being collected during the period of 4:00 p.m. to 6:00 p.m.

Study area intersections and existing ADT's can be seen on Figure 3. Existing traffic volumes and intersection geometry are shown in Figure 4. Traffic count data is included for reference in Appendix A.

Existing signal timing parameters for the Black Road Forest intersections with E Woodmen Road and Vollmer Road, as well as the intersection of E Woodmen Road and Marksheffel Road, were obtained from the City of Colorado Springs and used throughout this study to the best extent possible in order to remain consistent with existing signal coordination plans. City signal timing information received is included for reference in Appendix A.

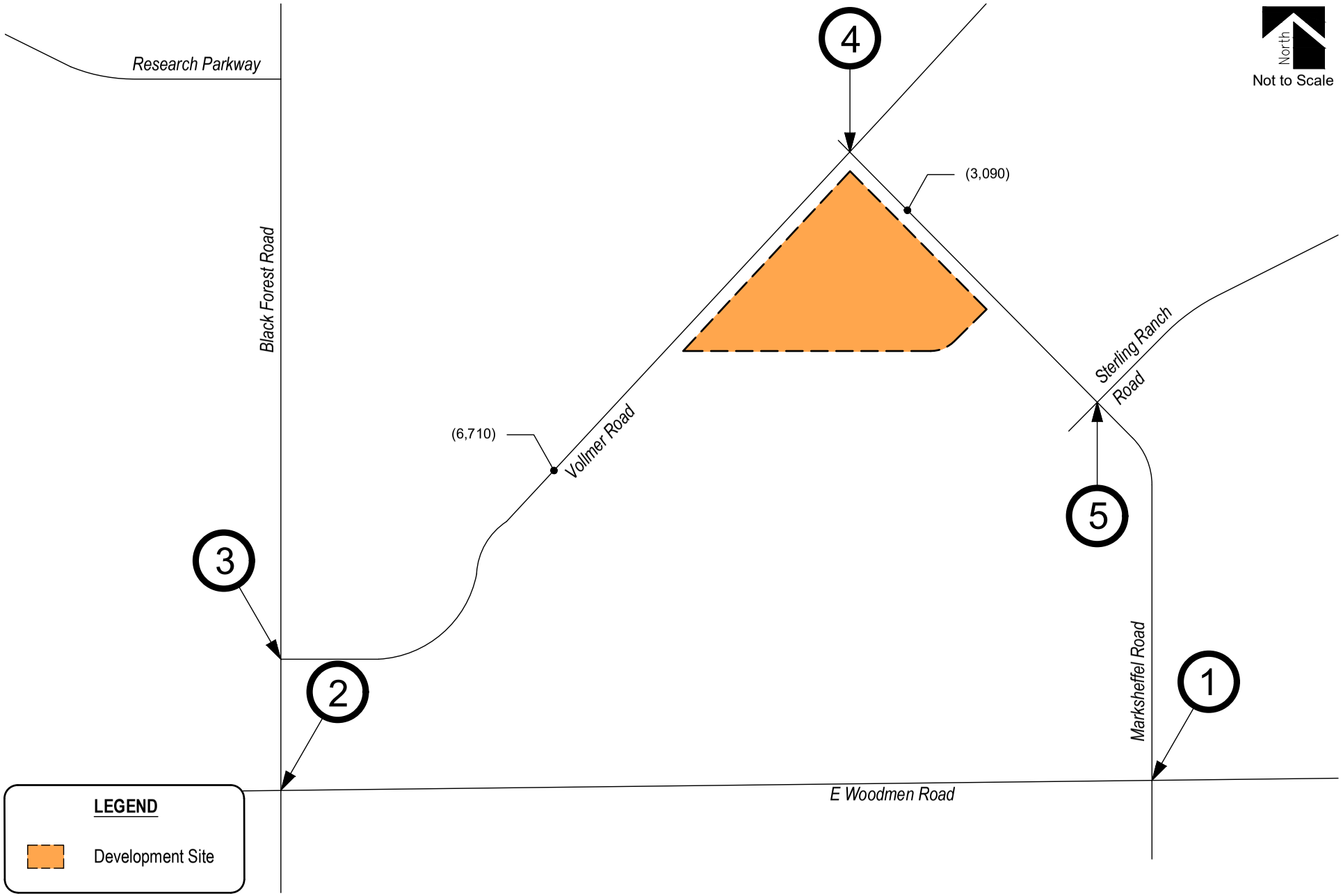
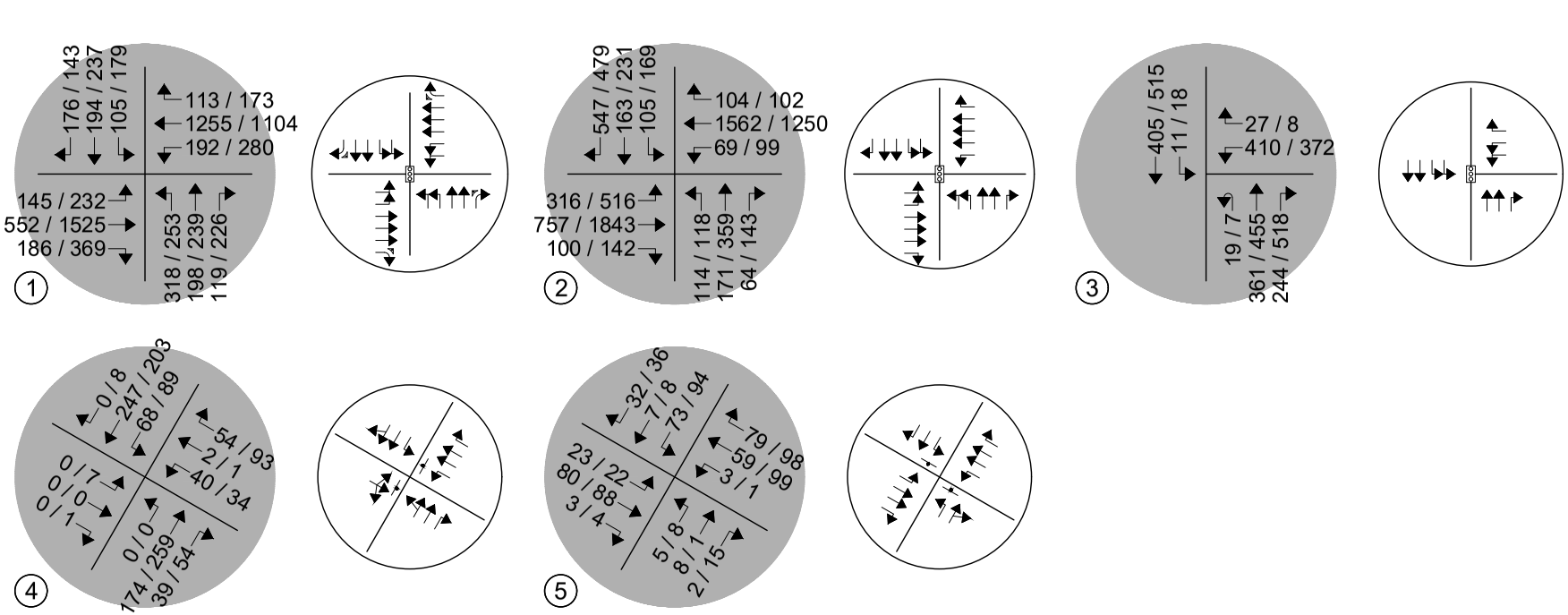


Figure 3
EXISTING TRAFFIC
(ADT) : Average Daily Traffic



LEGEND

Study Intersection Volumes

Study Intersection Lane Geometry

Figure 4
EXISTING TRAFFIC
Volumes & Intersection Geometry
AM / PM Peak Hour

Peak Hour Intersection Levels of Service – Existing Traffic

The Signalized and Unsignalized Intersection Analysis techniques, as published in the Highway Capacity Manual (HCM), 7th Edition, by the Transportation Research Board and as incorporated into the SYNCHRO computer program, were used to analyze the study intersections for existing and future traffic conditions. These nationally accepted techniques allow for the determination of intersection level of service (LOS) based on the congestion and delay of each traffic movement

Pursuant to Section B.4.1.A of the County's ECM, the design objective of each scenario of this study shall be level of service "D". Level of service is a method of measurement used by transportation professionals to quantify a driver's perception of travel conditions that include travel time, number of stops, and total amount of stopped delay experienced on a roadway network. The HCM categorizes level of service into a range from "A" which indicates little, if any, vehicle delay, to "F" which indicates a level of operation considered unacceptable to most drivers. These levels of service grades with brief descriptions of the operating condition, for unsignalized and signalized intersections, are included for reference in Appendix C and have been used throughout this study.

The level of service analyses results for existing conditions are summarized in Table 1.

Intersection capacity worksheets developed for this study are provided in Appendix D.

Table 1 – Intersection Capacity Analysis Summary – Existing Traffic

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Marksheffel Road / E Woodmen Road (Signalized)	C (29.5)	D (44.6)
E Woodmen Road / Black Forest Road (Signalized)	D (44.3)	D (42.7)
Black Forest Road / Vollmer Road (Signalized)	B (18.0)	B (14.7)
Marksheffel Road / Vollmer Road (Stop-Controlled)		
Eastbound Left, Through, and Right	A	C
Westbound Left	B	C
Westbound Through	B	C
Westbound Right	A	A
Northbound Left and Through	A	A
Southbound Left	A	A
Marksheffel Road / Sterling Ranch Road (Stop-Controlled)		
Eastbound Left	A	A
Westbound Left	A	A
Northbound Left, Through, and Right	B	C
Southbound Left	B	D
Southbound Through	B	B
Southbound Right	A	A

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
Stop-Controlled Intersection: Level of Service

Existing Traffic Analysis Results

Under existing conditions, operational analysis shows that all signalized intersections within the study area have overall operations at LOS D or better during the morning and afternoon peak traffic hours.

All stop-controlled intersections within the study area have turn movement operations at LOS B or better during the morning peak traffic hour and LOS D or better during the afternoon peak traffic hour.

III. Future Traffic Conditions Without Proposed Development

Background traffic is the traffic projected to be on area roadways without consideration of the proposed development. Background traffic includes traffic generated by development of vacant parcels in the area.

2045

To account for projected increases in background traffic for Years 2028 and 2025, a compounded annual growth rate was determined using population growth estimates provided by the Pikes Peak Area Council of Governments' (PPACG) 2050 Pikes Peak Region Long Range Transportation Plan[5], which anticipates a 20-year growth rate just over one percent. Therefore, in order to provide for a conservative analysis, a growth rate of two percent was applied to existing traffic volumes.

Background Traffic – Year 2028

To account for short-term projected traffic from adjacent developments not yet built, trip generations from the future adjacent Stonebridge project (located on the southwest corner of Vollmer Road and Marksheffel Road) was added. Additionally, due to ongoing development within the overall area, and for purposes of this analysis, Year 2028 total traffic projections illustrated within adjacent development traffic studies were used as a basis for modeling short-term background traffic conditions. This assumption includes build-out trips generated by future developments not yet built, including but not limited to:

- Sterling Ranch East Filing 3
- Sterling Ranch East Filing 5
- Sterling Ranch East Filing 7
- Sterling Ranch East Filing 8
- Schmidt Property Preliminary Plan

Pursuant to the committed area roadway improvements discussed in Section I, and to remain consistent with assumptions made in previous traffic reports within the area, Year 2028 analysis assumes that Marksheffel Road is extended west past Vollmer Road to intersect with the future Brush Top Road. Additionally, the intersection of Marksheffel Road and Vollmer Road is assumed to be signalized.

[5] Pikes Peak Region 2050 Long Range Transportation Plan, Pikes Peak Area Council of Governments, February 2025.

Background Traffic – Year 2045

Year 2045 background traffic conditions includes the aforementioned traffic studies, as well as the following traffic studies, for modeling long-term background traffic conditions. This assumption includes build-out trips generated by future developments not yet built, including but not limited to:

- Sterling Ranch East Phase 1
- Villages at Sterling Ranch
- Copper Chase at Sterling Ranch
- Sterling Ranch Filing 2
- Sterling Ranch Filing 3
- Sterling Ranch Filing 4
- Sterling Ranch Filing 5

The traffic studies for the proposed developments should be switched between 2028 and 2045, as those shown here are approved and being built, while the ones shown under 2028 have not even started construction.

In effort to accurately and conservatively reflect Year 2045 background traffic volumes for the intersections of Black Forest Road with Vollmer Road and E Woodmen Road, Year 2045 total traffic volumes shown within the Black Forest Road Widening Corridor Plan[6] were used as a basis for modeling Year 2045 background traffic conditions.

Year 2045 background traffic analysis assumes signalization of the intersection of Marksheffel Road and Sterling Ranch Road, as well as the extension of Marksheffel Road to intersect with Black Forest Road and align with Research Parkway, as described in Section I. Additionally, Vollmer Road is assumed to extend west of Black Forest Road in the long-term scenario.

The study area and projected short-term background ADT volumes are shown on Figure 5. Projected background intersection traffic volumes and intersection geometry for Year 2028 are shown in Figure 6.

The study area intersections and projected long-term background ADT volumes are shown in Figure 7. Projected background intersection traffic volumes and intersection geometry for Year 2045 are shown in Figure 8.

[6] Black Forest Road Widening Corridor Plan, AECOM, February 2020.

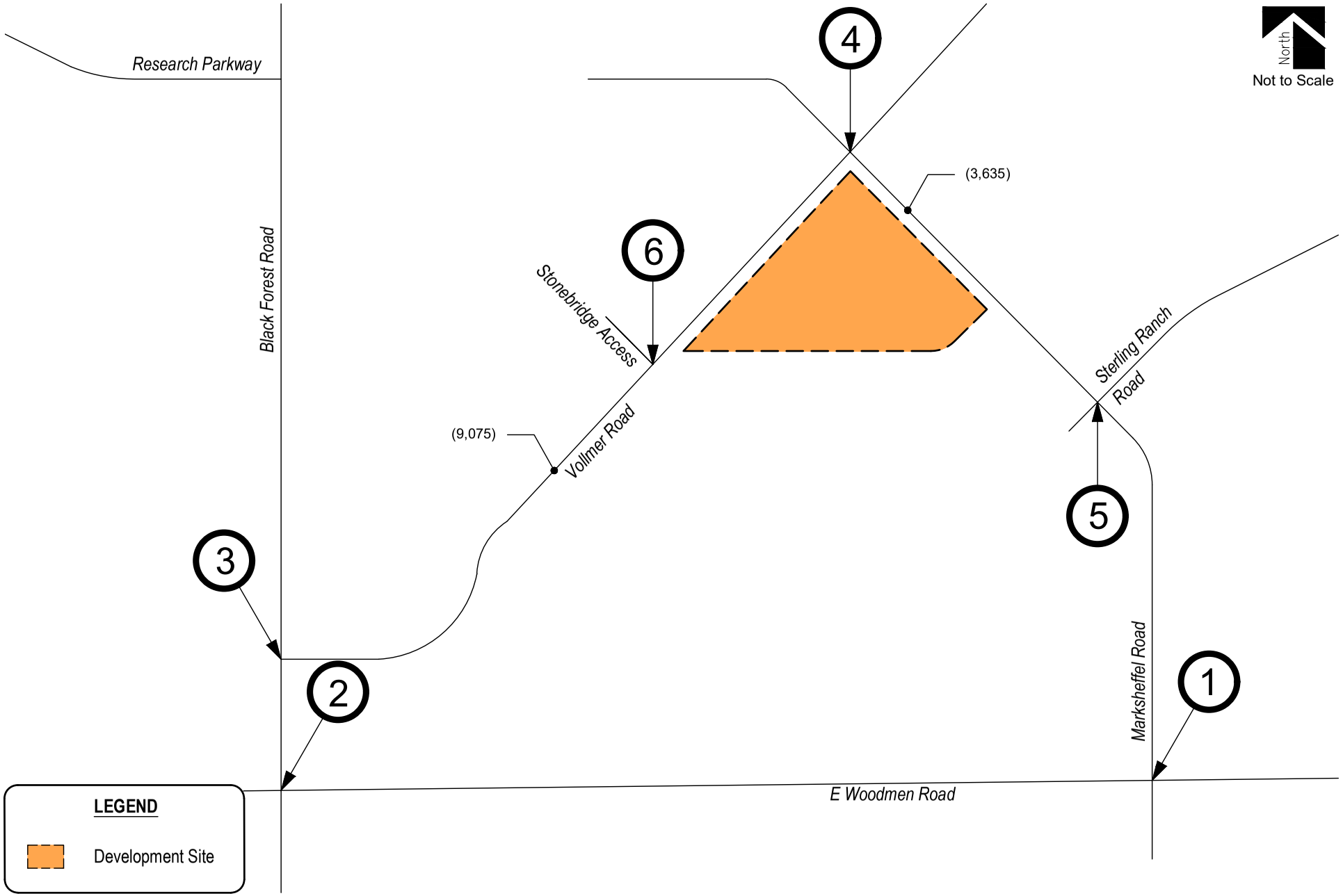


Figure 5
BACKGROUND TRAFFIC - YEAR 2028
(ADT) : Average Daily Traffic

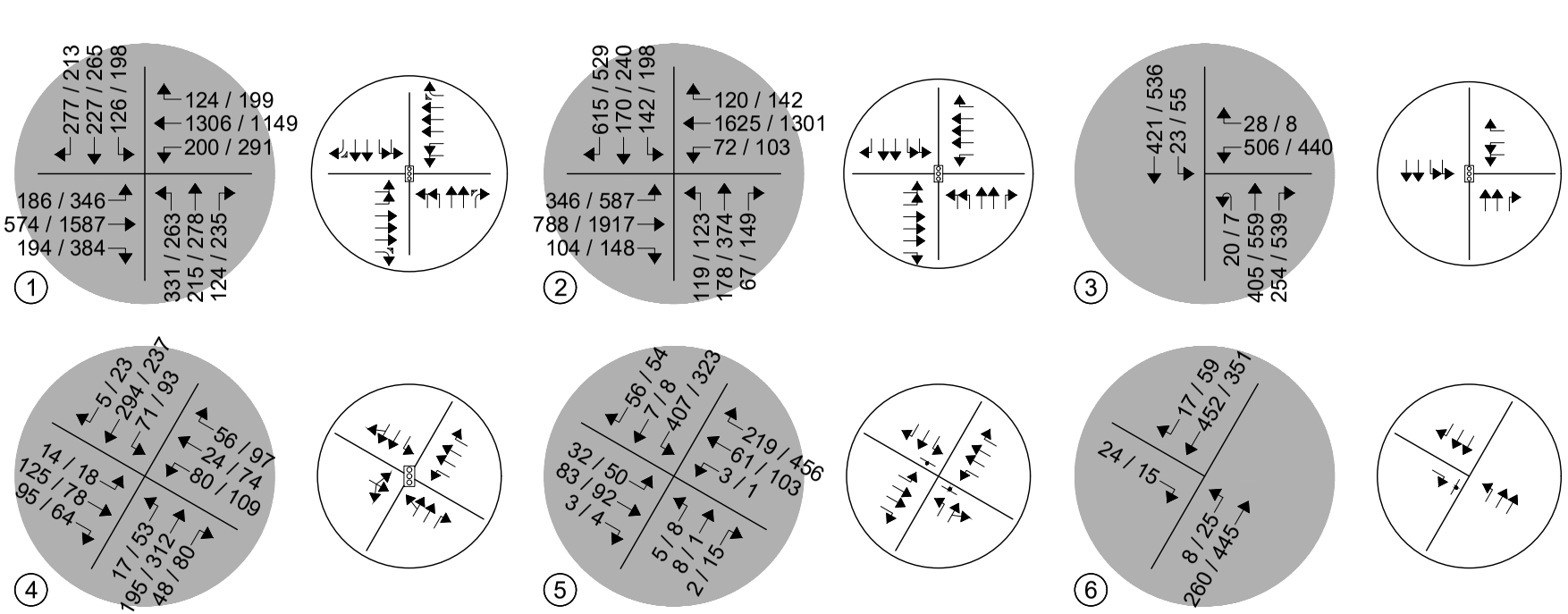


Figure 6
BACKGROUND TRAFFIC - YEAR 2028
Volumes & Intersection Geometry
AM / PM Peak Hour

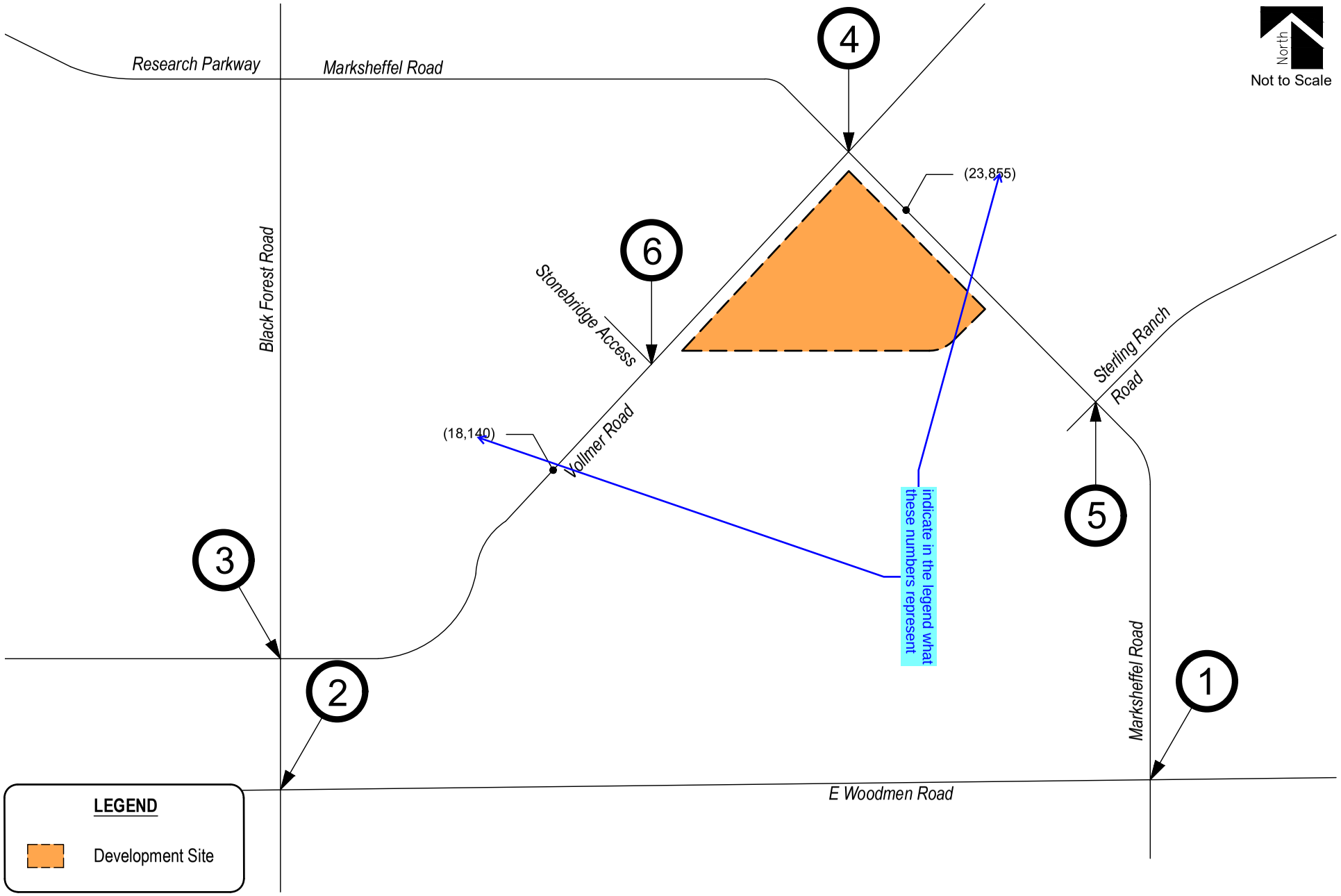


Figure 7
BACKGROUND TRAFFIC - YEAR 2045
(ADT) : Average Daily Traffic

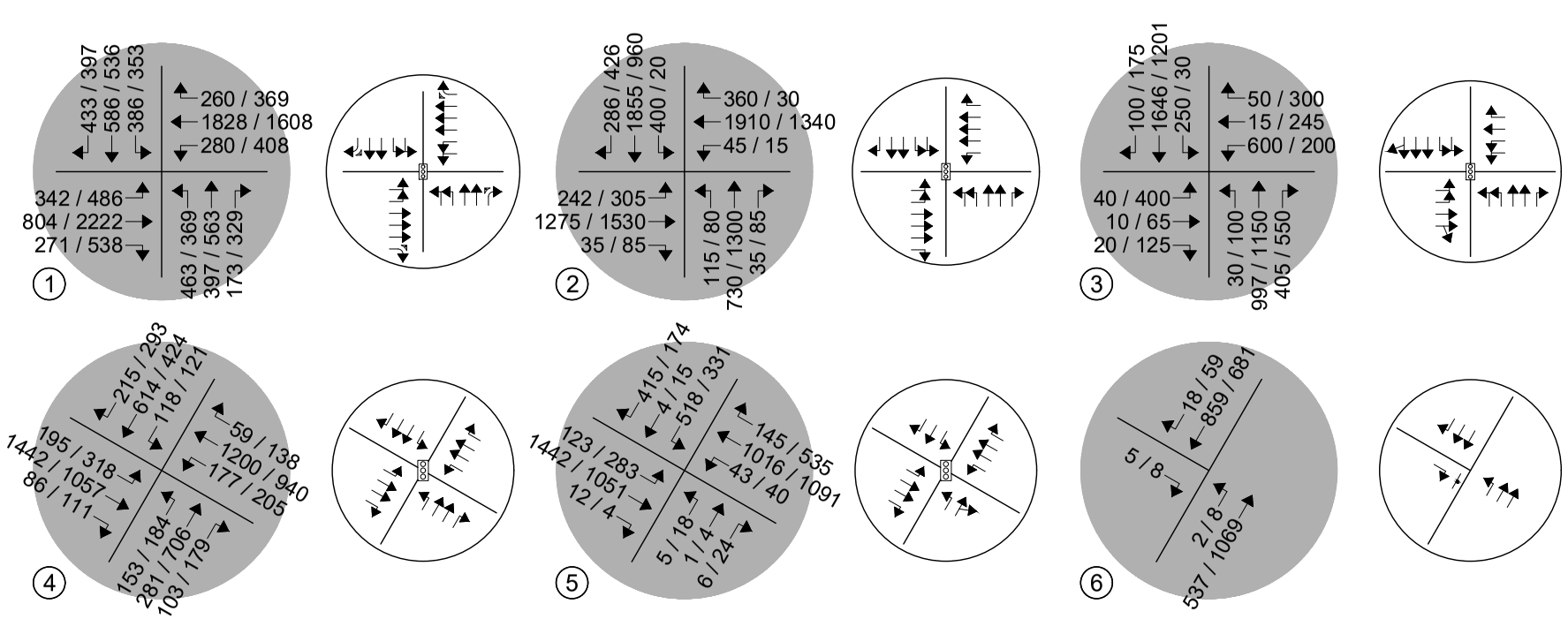


Figure 8
BACKGROUND TRAFFIC - YEAR 2045
Volumes & Intersection Geometry
AM / PM Peak Hour

Peak Hour Intersection Levels of Service – Background Traffic

As with existing traffic conditions, the operations of study intersections were analyzed under background conditions, without the proposed development, using the SYNCHRO computer program.

Background traffic level of service analysis results for Year 2028 are listed in Table 2. Year 2045 operational results are summarized in Table 3.

Definitions of levels of service are given in Appendix C. Intersection capacity worksheets are provided in Appendix D.

Table 2 – Intersection Capacity Analysis Summary – Background Traffic – Year 2028

INTERSECTION LANE GROUPS	LEVEL OF SERVICE	
	AM PEAK HOUR	PM PEAK HOUR
Marksheffel Road / E Woodmen Road (Signalized)	C (30.5)	D (50.3)
E Woodmen Road / Black Forest Road (Signalized)	D (53.0)	D (52.5)
Black Forest Road / Vollmer Road (Signalized)	C (20.2)	B (16.4)
Marksheffel Road / Vollmer Road (Signalized)	C (27.5)	C (29.8)
Marksheffel Road / Sterling Ranch Road (Stop-Controlled)		
Eastbound Left	A	A
Westbound Left	A	A
Northbound Left, Through, and Right	B	B
Southbound Left	C	C
Southbound Through	B	B
Southbound Right	A	A
Vollmer Road / Stonebridge Access (Stop-Controlled)		
Eastbound Right	A	A
Northbound Left	A	A

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
Stop-Controlled Intersection: Level of Service

Background Traffic Analysis Results – Year 2028

Year 2028 background traffic analysis indicates that the signalized intersections within the study area are projected to operate with overall operations at LOS D or better during the morning and afternoon peak traffic hours.

The stop-controlled intersection of Marksheffel Road and Sterling Ranch Road is predicted to have turn movement operations at LOS C or better during the morning and afternoon peak traffic hours.

The stop-controlled intersection of Vollmer Road and Stonebridge Access is projected to have turn movement operations at LOS A during both the morning and afternoon peak traffic hours.

Table 3 – Intersection Capacity Analysis Summary – Background Traffic – Year 2045

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Marksheffel Road / E Woodmen Road (Signalized)	E (59.1)	E (79.1)
E Woodmen Road / Black Forest Road (Signalized)	F (128.4)	D (49.2)
Black Forest Road / Vollmer Road (Signalized)	C (26.5)	D (36.6)
Marksheffel Road / Vollmer Road (Signalized)	D (45.8)	D (46.0)
Marksheffel Road / Sterling Ranch Road (Signalized)	B (19.9)	C (22.5)
Vollmer Road / Stonebridge Access (Stop-Controlled) Eastbound Right Northbound Left	 B B	 B A

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
Stop-Controlled Intersection: Level of Service

Background Traffic Analysis Results – Year 2045

By Year 2045 and without the proposed development, the study intersection of Marksheffel Road and E Woodmen Road is expected to operate at LOS E during the morning and afternoon peak traffic hours. The LOS E operations are attributed to the through traffic volume along E Woodmen Road and its available capacity. To mitigate the poor operations anticipated, adjustments to signal timing splits and intersection geometry were considered. However, since the poor operations are due to the intersection being over-capacity, these mitigations were not found to provide acceptable levels of service. Considering how future traffic projections were determined by applying a conservative growth rate while also applying conservative assumptions to account for future adjacent development, LOS results are likely to be more acceptable than what is modeled for this scenario.

The signalized intersection of E Woodmen Road and Black Forest Road predicts overall operations at LOS F during the morning peak traffic hour and LOS D during the afternoon peak traffic hour. The LOS F operation is attributed to the through traffic volume along each approach. Potential mitigation includes the widening of Black Forest Road to its build-out cross-section accommodating six through lanes. This widening improvement is expected to allow for overall LOS E intersection operations during the morning peak traffic hour.

All other signalized intersections are projected to operate at LOS D or better during the morning and afternoon peak traffic hours.

The stop-controlled intersection of Vollmer Road and Stonebridge Access is anticipated to have turn movement operations at or better than LOS B during the morning and afternoon peak traffic hours.

IV. Proposed Project Traffic

Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation Manual, 12th Edition, were applied to the proposed land use in order to estimate average daily traffic (ADT), AM Peak Hour, and PM Peak Hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from a point of origin to a point of destination.

Due to the conceptual nature of the proposed development (as described in Section I), no specific land uses have been determined. As such, an FAR of 0.2 was applied to the commercial area. ITE land use codes 822 (Strip Retail Plaza), 927 (Coffee/Donut Shop with Drive-Through Window), 945 (Convenience Store/Gas Station), and 948 (Automated Car Wash) were used for estimating trip generation because of their conservative rates and best fit to the anticipated land use descriptions.

As actual land uses, densities, or site plans within the SR Land Triangle Commercial site become defined over time, it is expected that traffic generation characteristics considered within this study will need to be updated by more specific traffic analyses or studies to help assess if transportation improvements are needed to mitigate potential traffic impacts.

Trip generation rates used in this study are presented in Table 4.

Table 4 – Trip Generation Rates

ITE			TRIP GENERATION RATES						
			24	AM PEAK HOUR			PM PEAK HOUR		
CODE	LAND USE	UNIT	HOUR	ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
822	Strip Retail Plaza	KSF	54.45	2.16	1.77	3.93	3.15	3.15	6.29
937	Coffee/Donut Shop w/DTW	KSF	600.50	43.56	41.85	85.41	19.50	19.50	39.00
945	Convenience Store/Gas Station (GFA (5.5-10k))	VFP	203.35	11.61	11.61	23.21	10.54	10.54	21.08
948	Automated Car Wash	KSF	253.51	8.19	6.70	14.89	11.96	12.44	24.40

Key: KSF = Thousand Square Feet Gross Floor Area. VFP = Vehicle Fueling Positions.

Table 5 illustrates projected ADT, AM Peak Hour, and PM Peak Hour traffic volumes likely generated by the proposed development upon build-out.

Table 5 – Trip Generation Summary

ITE CODE	LAND USE	SIZE	TOTAL TRIPS GENERATED						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
822	Strip Retail Plaza	23.5 KSF	1,280	51	42	92	74	74	148
937	Coffee/Donut Shop w/DTW	2.0 KSF	1,201	87	84	171	39	39	78
945	Convenience Store/Gas Station (GFA (5.5-10k))	14 VFP	2,847	162	162	325	148	148	295
948	Automated Car Wash	2.0 KSF	507	16	13	30	24	25	49
		Total:	*5,834*	*317*	*301*	*618*	*284*	*285*	*570*

Key: KSF = Thousand Square Feet Gross Floor Area. VFP = Vehicle Fueling Positions.
Note: All data and calculations above are subject to being rounded to nearest value.

Upon build-out, Table 5 illustrates that the proposed development has the potential to generate approximately 5,834 daily vehicle trips with 618 of those occurring during the morning peak hour and 570 during the afternoon peak hour.

Adjustments to Trip Generation Rates

It is considered likely that a commercial development of this type will attract trips from within area land uses. Utilizing research obtained by the National Cooperative Highway Research Program (NCHRP), ITE created an estimation tool[7] for determining internal capture for commercial developments. Using NCHRP Report 684 methodology, it was determined that the proposed land uses have various internal capture percentages ranging from 5 to 41 percent. Using ITE's Trip Generation Handbook, 3rd Edition, it is determined that overall averages of approximately 13 percent of total AM peak hour trips and approximately 9 percent of total PM peak hour trips will be captured internally.

ITE's internal capture spreadsheets are provided for reference in Appendix B.

Table 6 illustrates projected ADT, AM Peak Hour, and PM Peak Hour traffic volumes likely generated by the proposed development upon build-out with reductions applied due to internal capture.

[7] NCHRP Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments, National Cooperative Highway Research Program, October 2010.

Table 6 – Trip Generation Summary with Reductions

ITE CODE	LAND USE	SIZE	TOTAL NEW TRIPS GENERATED						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
	Internal Capture Reduction:		*7%*	*5%*	*13%*	*9%*	*7%*	*4%*	*6%*
822	Strip Retail Plaza	23.5 KSF	1,187	48	36	84	69	71	140
	Internal Capture Reduction:		*29%*	*32%*	*14%*	*23%*	*28%*	*41%*	*35%*
937	Coffee/Donut Shop w/DTW	2.0 KSF	856	59	72	132	28	23	51
	Internal Capture Reduction:		*7%*	*5%*	*13%*	*9%*	*7%*	*4%*	*6%*
945	Convenience Store/Gas Station (GFA (5.5-10k))	14.0 VFP	2,640	154	141	296	137	142	279
	Internal Capture Reduction:		*7%*	*5%*	*13%*	*9%*	*7%*	*4%*	*6%*
948	Automated Car Wash	2.0 KSF	470	16	12	27	22	24	46
	Reduced Total:		*5,153*	*277*	*261*	*538*	*256*	*260*	*516*

Key: KSF = Thousand Square Feet Gross Floor Area. VFP = Vehicle Fueling Positions.
Note: All data and calculations above are subject to being rounded to nearest value.

Upon build-out and with consideration for internal capture trip reductions, Table 6 illustrates that the proposed development has the potential to generate approximately 5,153 daily trips with 538 of those occurring during the morning peak hour and 516 during the afternoon peak hour.

Trip Distribution

The overall directional distribution of site-generated traffic was determined based on the location of development site within the County, proposed and existing area land uses, allowed turning movements, and available roadway network.

Year 2028 and Year 2045 overall trip distribution patterns for the development are shown on Figure 9 and Figure 11, respectively.

Trip Assignment

Traffic assignment is how generated and distributed vehicle trips are expected to be loaded onto the available roadway network.

Applying trip distribution patterns to site-generated traffic provides the overall site-generated trip assignments for Year 2028 and Year 2045 as shown on Figure 10 and Figure 12, respectively.

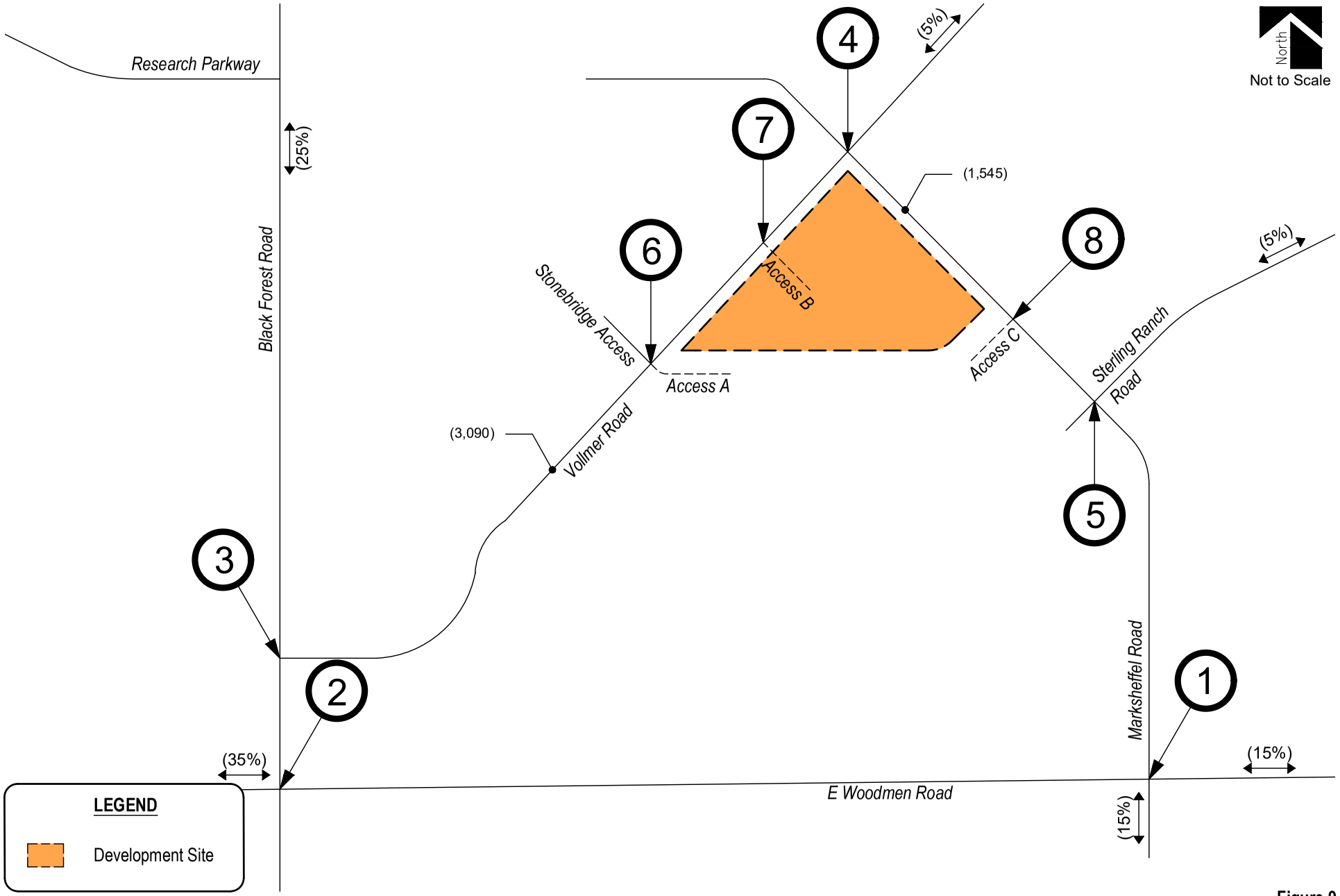


Figure 9
SITE DEVELOPMENT DISTRIBUTION - YEAR 2028
(%) : Overall
(ADT) : Average Daily Traffic

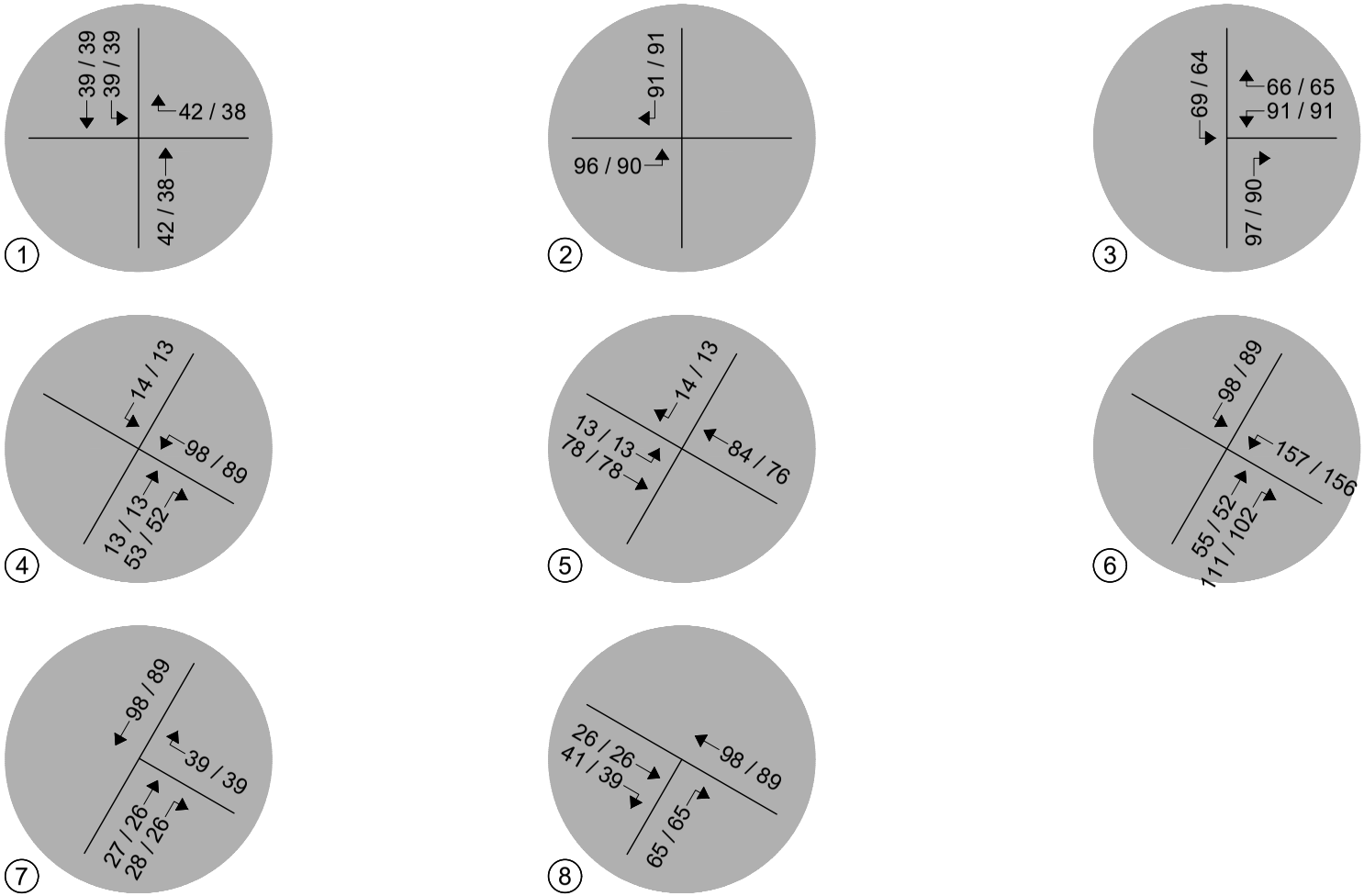


Figure 10
SITE-GENERATED TRIPS - YEAR 2028
AM / PM Peak Hour

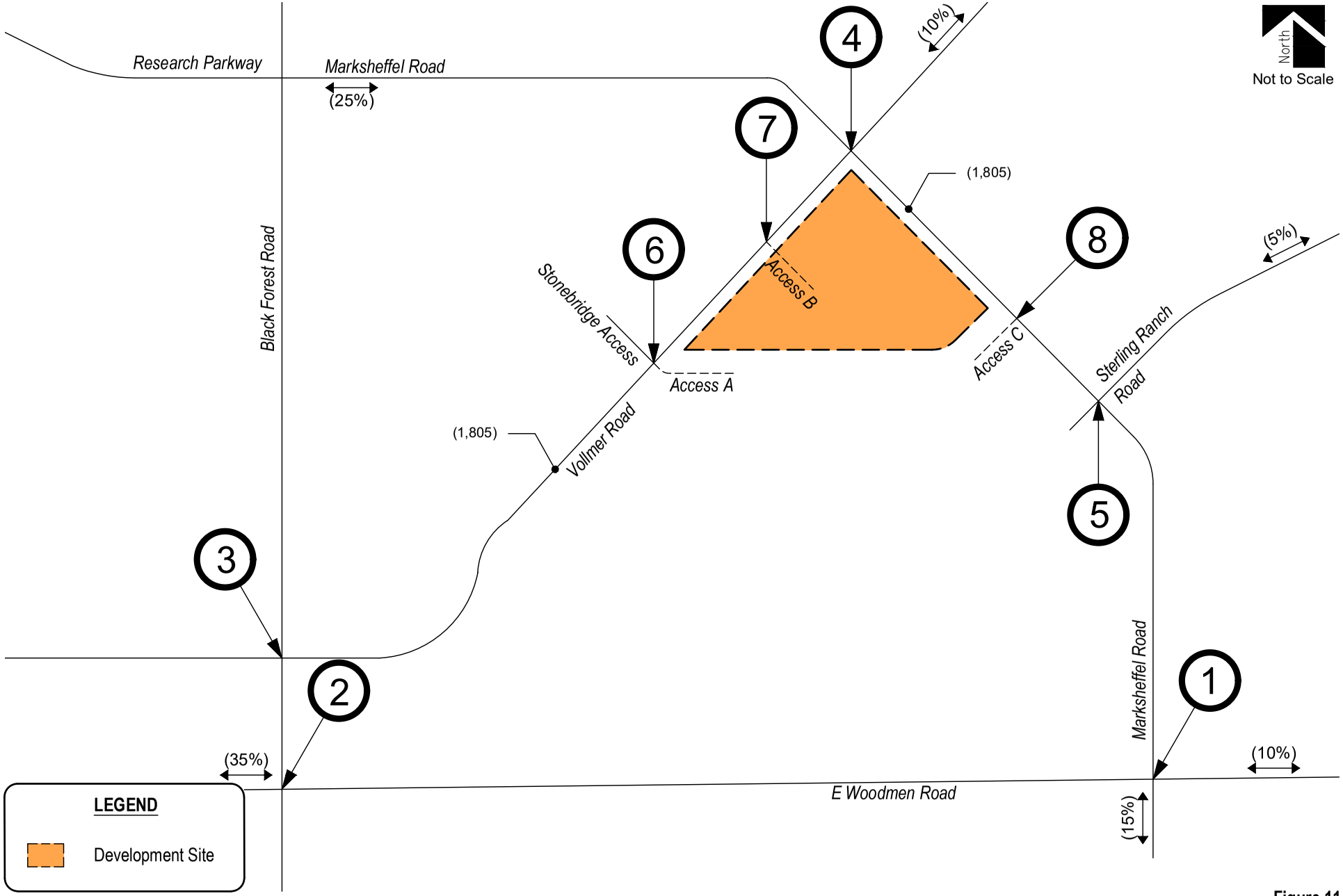
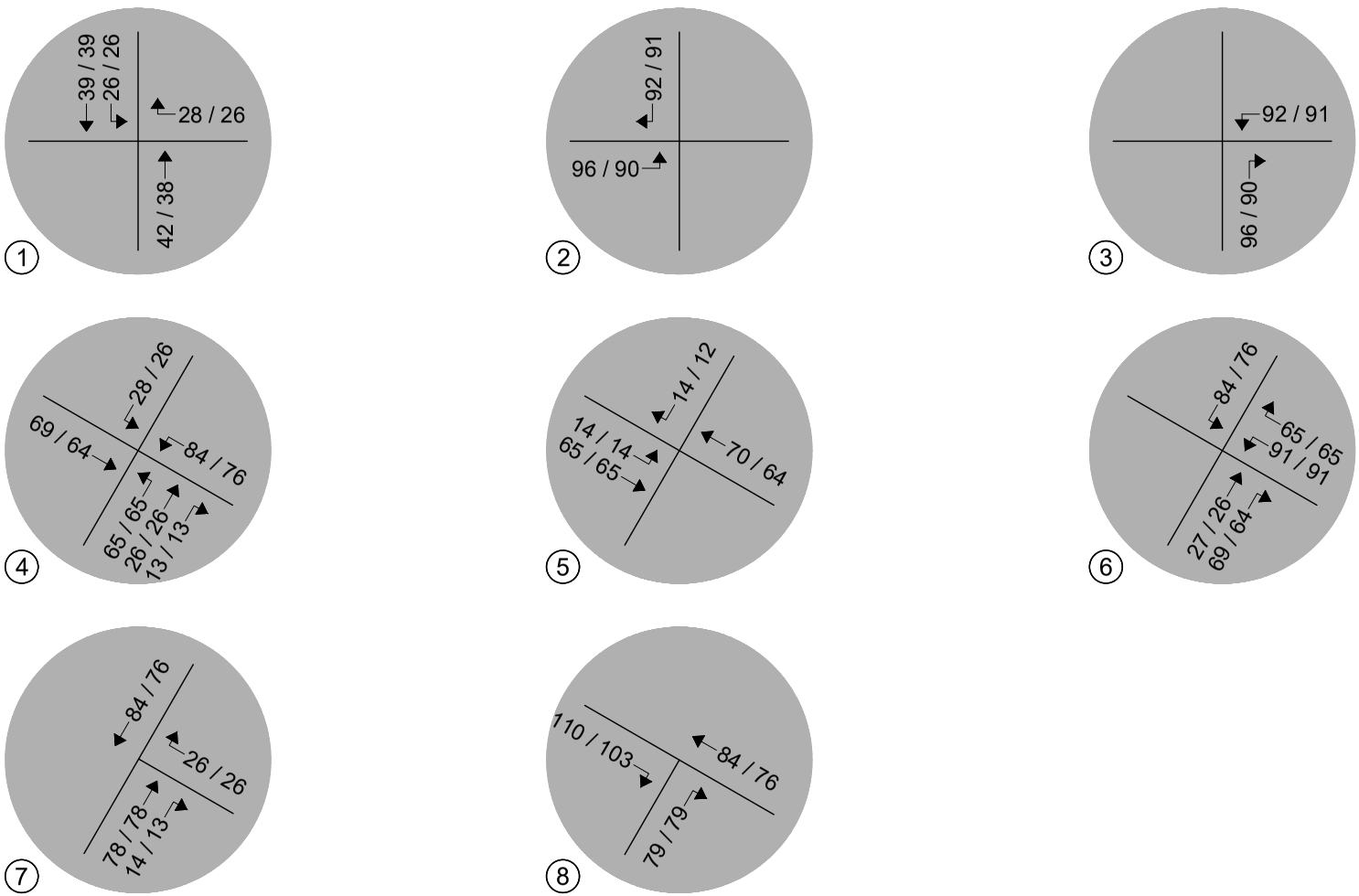


Figure 11
SITE DEVELOPMENT DISTRIBUTION - YEAR 2045
(%) : Overall
(ADT) : Average Daily Traffic


North
Not to Scale
39 / 39
26 / 26
28 / 26
42 / 38
1
92 / 91
96 / 90
2
92 / 91
96 / 90
3
28 / 26
69 / 64
84 / 76
65 / 65
26 / 26
13 / 13
4
14 / 12
14 / 14
65 / 65
70 / 64
5
84 / 76
65 / 65
91 / 91
27 / 26
69 / 64
6
84 / 76
26 / 26
78 / 78
14 / 13
7
110 / 103
84 / 76
79 / 79
8
LEGEND
Study Intersection Volumes

V. Future Traffic Conditions With Proposed Development

Total traffic is the traffic projected to be on area roadways with consideration of the proposed development. Total traffic includes background traffic projections for Years 2028 and 2045 with consideration of site-generated traffic. For analysis purposes, it was assumed that development construction would be completed by end of Year 2028.

Total Traffic Auxiliary Lane Analysis

Auxiliary lanes for site development access drives were evaluated and are to be based on the County's ECM.

An evaluation of auxiliary lane requirements, pursuant to Section 2.3.7 of the County's ECM, reveals how exclusive left turn lanes are required along minor arterial roadways and lower classifications if projected peak hour turning volumes meet or exceed 25 vehicles per hour. Additionally, right turn lanes are required along minor arterial roadways and lower classifications if projected peak hour turning volumes meet or exceed 50 vehicles per hour.

Considering the conceptual nature of this development and in effort to provide a conservative analysis, no auxiliary lanes are being recommended with this rezone application. As actual land uses, densities, or site plans within the SR Land Triangle Commercial site become defined over time, it is expected that traffic generation characteristics considered and recommendations within this study will need to be updated by more specific traffic analyses or studies to help assess if transportation improvements are needed to mitigate potential traffic impacts.

Pursuant to area roadway improvement discussions provided in Section III, Year 2028 and Year 2045 total traffic conditions assume no additional roadway improvements to accommodate regional transportation demands. Roadway improvements associated with site development are expected to be limited to site access and frontage as required by the governing agency.

Projected Year 2028 total traffic volumes and intersection geometry are shown in Figure 13 and Figure 14 respectively.

Figure 15 and Figure 16 shows projected total traffic volumes and intersection geometry for Year 2045, respectively.

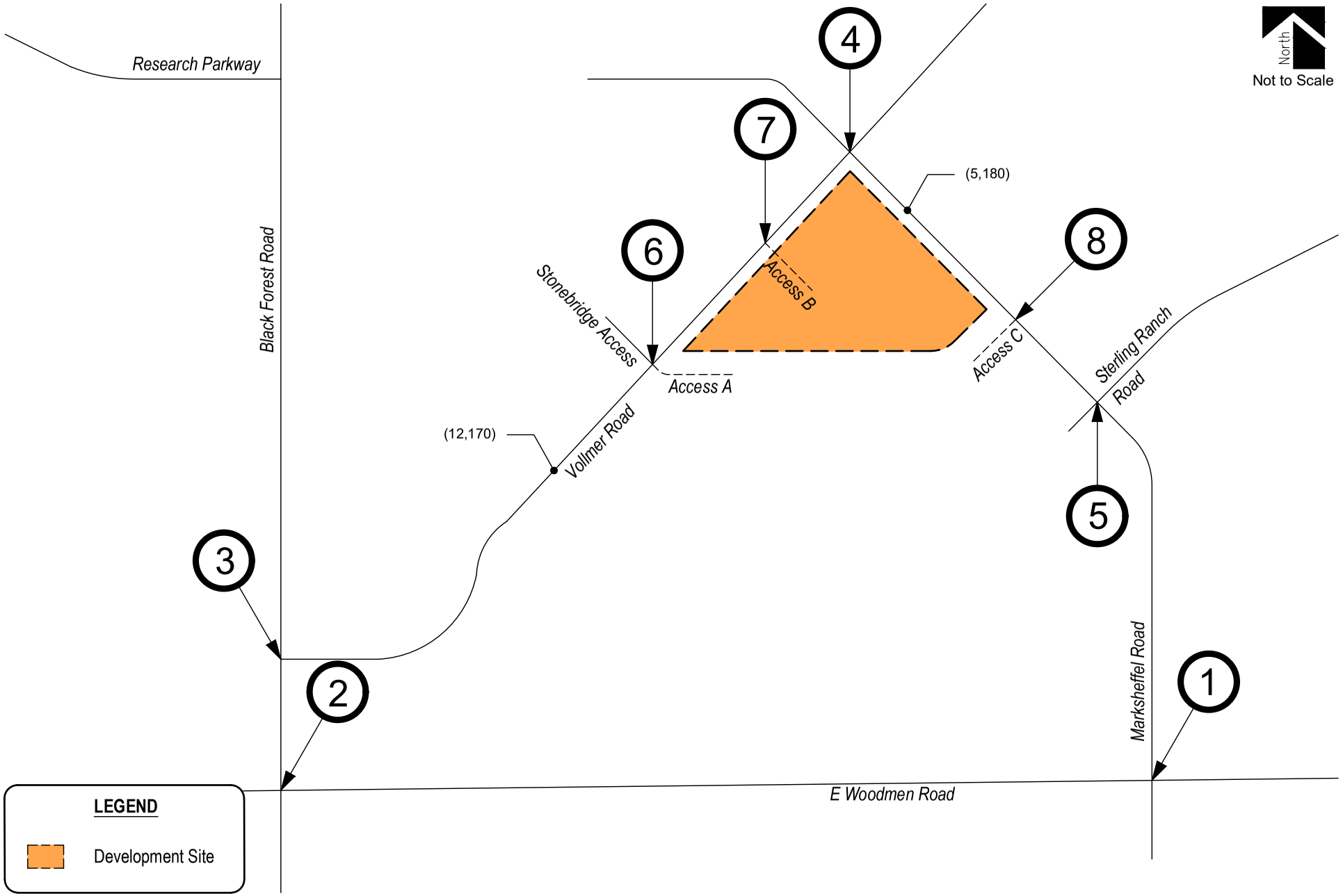


Figure 13
TOTAL TRAFFIC - YEAR 2028
(ADT) : Average Daily Traffic

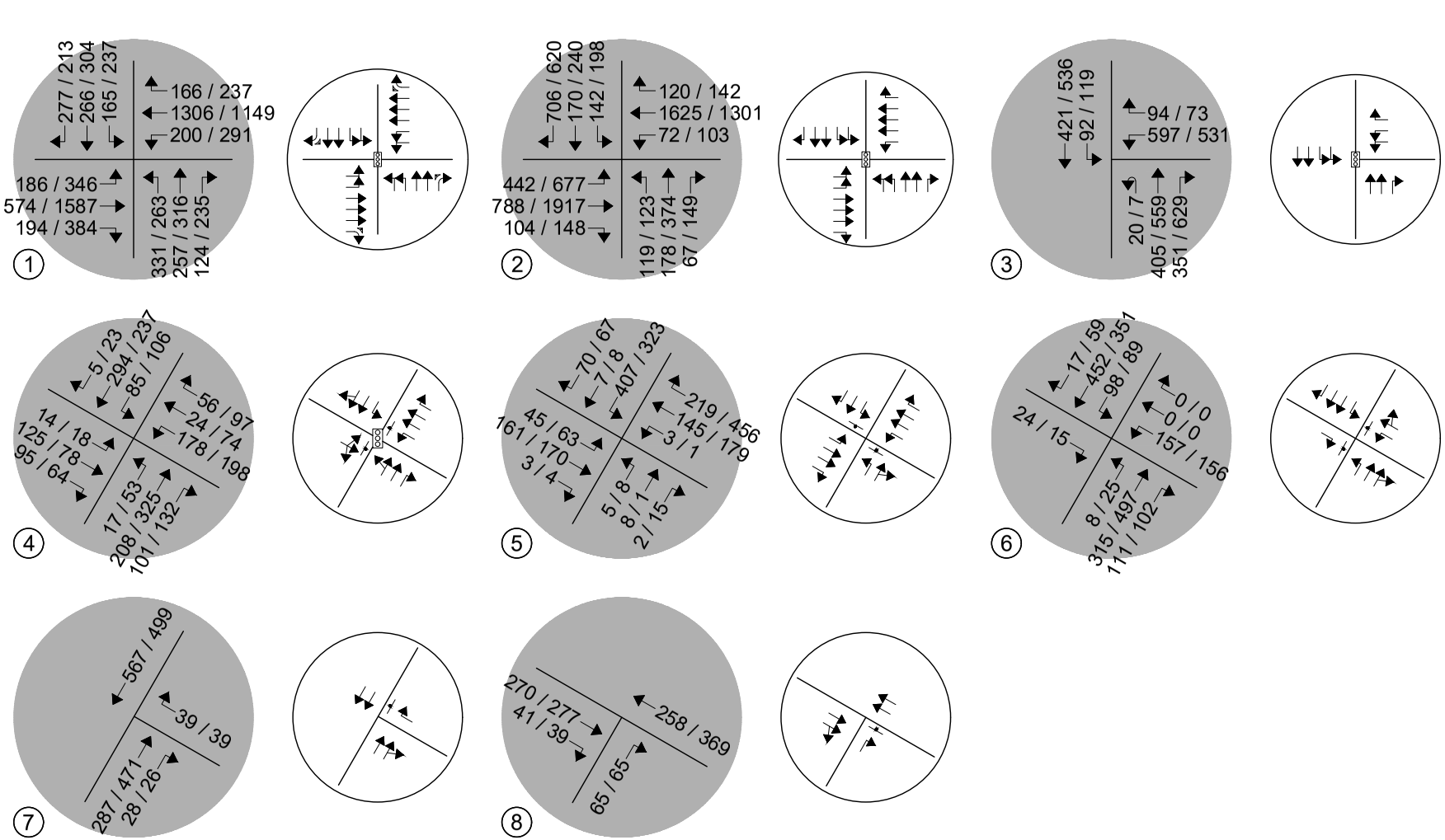


Figure 14
TOTAL TRAFFIC - YEAR 2028
Volumes & Intersection Geometry
AM / PM Peak Hour

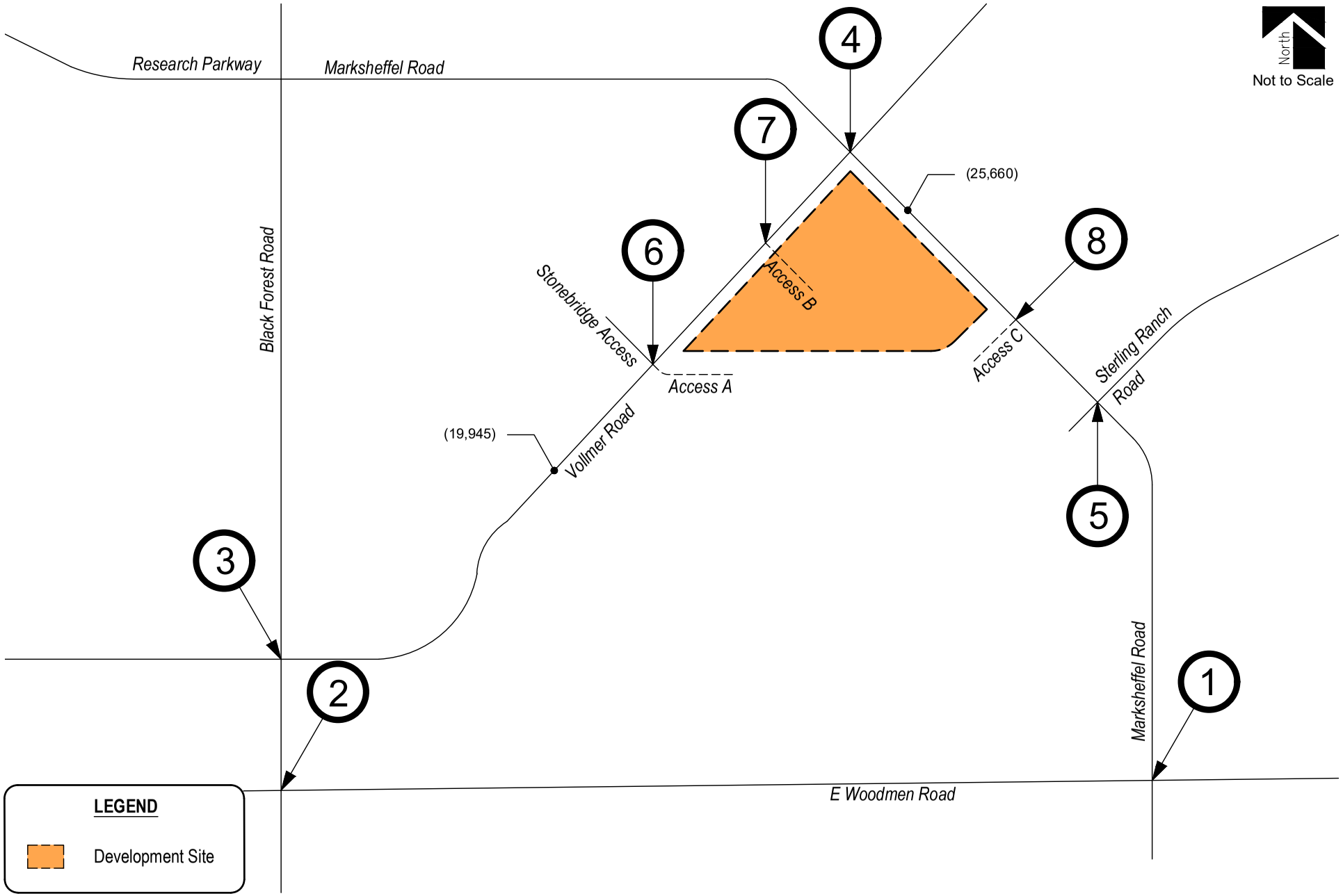


Figure 15
TOTAL TRAFFIC - YEAR 2045
(ADT) : Average Daily Traffic

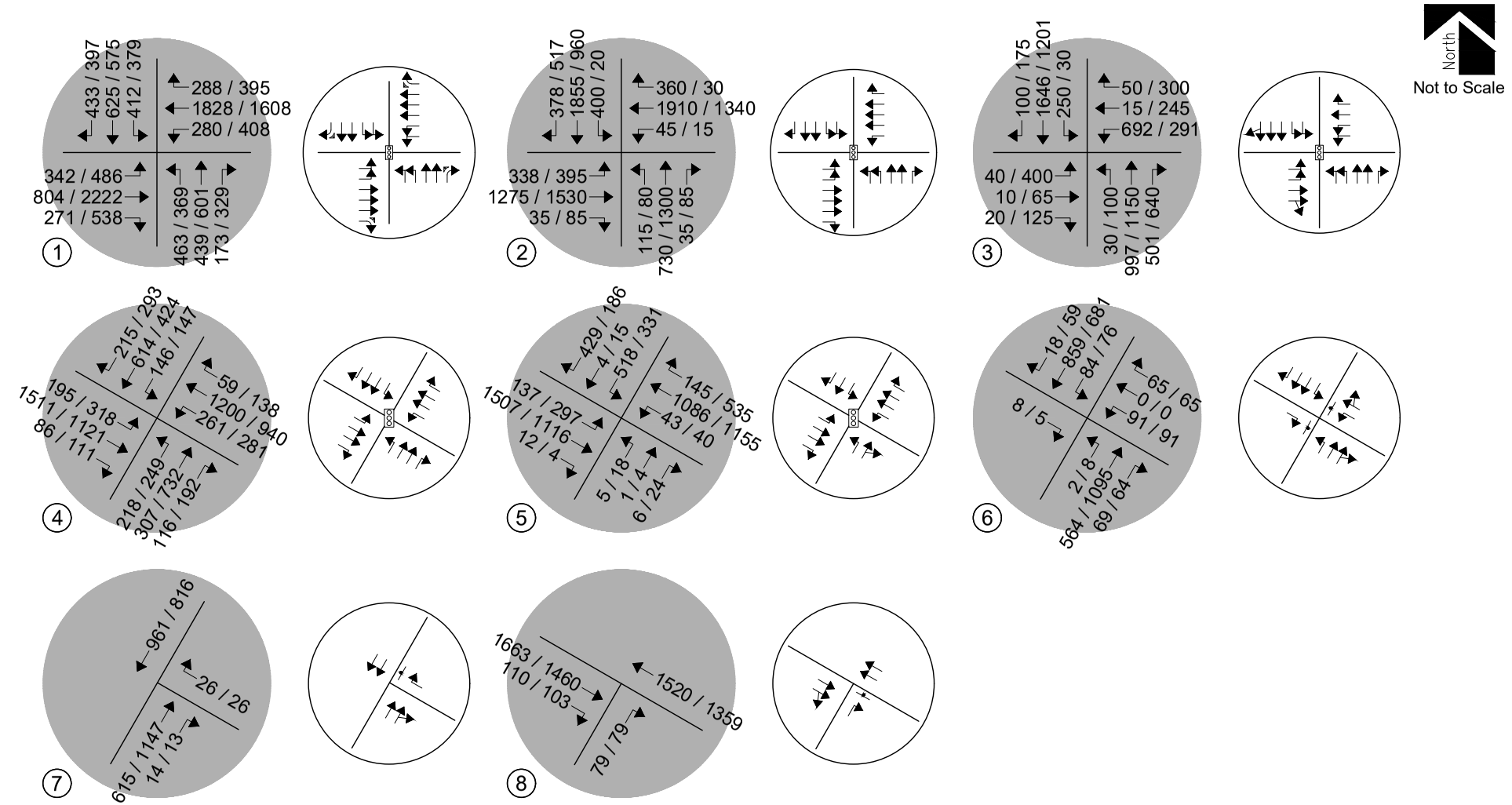


Figure 16
TOTAL TRAFFIC - YEAR 2045
(ADT) : Average Daily Traffic

Peak Hour Intersection Levels of Service – Total Traffic

As with background traffic, the operations of the study intersections were analyzed under projected total traffic conditions using the SYNCHRO computer program. The analyses and procedures were performed in accordance with the latest HCM and are based upon the worst-case conditions that occur during a typical weekday upon build-out of site development and analyzed land uses. Therefore, study intersections are likely to operate with traffic conditions better than those described within this study, which represent the peak hours of weekday operations only.

Total traffic level of service analysis results for Years 2028 and 2045 are summarized in Table 7 and Table 8, respectively.

Definitions of levels of service are given in Appendix C. Intersection capacity worksheets are provided in Appendix D.

Table 7 – Intersection Capacity Analysis Summary – Total Traffic – Year 2028

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Marksheffel Road / E Woodmen Road (Signalized)	C (31.2)	D (51.1)
E Woodmen Road / Black Forest Road (Signalized)	E (69.9)	E (65.4)
Black Forest Road / Vollmer Road (Signalized)	C (23.0)	B (20.3)
Marksheffel Road / Vollmer Road (Signalized)	C (26.2)	C (28.7)
Marksheffel Road / Sterling Ranch Road (Stop-Controlled)		
Eastbound Left	A	A
Westbound Left	A	A
Northbound Left, Through, and Right	B	B
Southbound Left	E	D
Southbound Through	B	B
Southbound Right	A	A
Vollmer Road / Stonebridge Access / Access A (Stop-Controlled)		
Eastbound Right	A	A
Westbound Left	F	F
Westbound Through and Right	A	A
Northbound Left	A	A
Southbound Left	A	A
Vollmer Road / Access B (Stop-Controlled)		
Westbound Right	A	B
Marksheffel Road / Access C (Stop-Controlled)		
Northbound Right	A	A

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
Stop-Controlled Intersection: Level of Service

Table 8 – Intersection Capacity Analysis Summary – Total Traffic – Year 2045

INTERSECTION LANE GROUPS	LEVEL OF SERVICE AM PEAK HOUR	 PM PEAK HOUR
Marksheffel Road / E Woodmen Road (Signalized)	E (61.9)	F (85.3)
E Woodmen Road / Black Forest Road (Signalized)	F (139.3)	E (56.3)
Black Forest Road / Vollmer Road (Signalized)	C (29.3)	D (36.0)
Marksheffel Road / Vollmer Road (Signalized)	E (63.2)	D (54.4)
Marksheffel Road / Sterling Ranch Road (Signalized)	C (21.6)	C (24.4)
Vollmer Road / Stonebridge Access / Access A (Stop-Controlled)		
Eastbound Right	B	B
Westbound Left	F	F
Westbound Through and Right	B	B
Northbound Left	B	A
Southbound Left	A	B
Vollmer Road / Access B (Stop-Controlled)		
Westbound Right	B	B
Marksheffel Road / Access C (Stop-Controlled)		
Northbound Right	C	C

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
Stop-Controlled Intersection: Level of Service

Total Traffic Analysis Results Upon Development Build-Out

Table 8 illustrates how, by Year 2045 and upon development build-out, the signalized intersection of Marksheffel Road and E Woodmen Road continues to project LOS E operations during the morning peak traffic hour and LOS F operations during the afternoon peak traffic hour. As discussed previously, potential mitigations regarding modifications to signal timing splits and intersection geometry were considered. However, these poor operations are attributed to the intersection being over-capacity. It is important to note that these poor operations are also anticipated during background conditions, with no considerations to the development, and were determined by applying a conservative growth rate while applying conservative assumptions to account for nearby development. Therefore, it is likely these operations will be more acceptable than what is modeled in this scenario.

The signalized intersection of E Woodmen Road and Black Forest Road is predicted to provide overall operations at LOS F during the morning peak traffic hour and LOS E during the afternoon peak traffic hour. The LOS F and E operations are attributed to the through traffic volume along each approach as well as the eastbound left turn movement volume along E Woodmen Road. Potential mitigation includes the widening of Black Forest Road to its build-out cross-section accommodating six through lanes. This widening improvement is expected to allow for overall LOS E intersection operations during the morning peak traffic hour.

The signalized intersection of Marksheffel Road and Vollmer Road is anticipated to provide overall operations at LOS E during the morning peak traffic hour and LOS D during the afternoon peak traffic hour. The LOS E operation is attributed to the through traffic volume along Vollmer Road as well as the turning movements along Marksheffel Road. It is important to note this development is conceptual and provides a conservative analysis in its assumptions. As actual land uses, densities, or site plans within the development become defined over time, it is expected that traffic generation characteristics considered will need to be updated by more specific traffic analyses or studies to help assess if transportation improvements are needed to mitigate potential traffic impacts.

All other signalized intersections are projected to provide overall operations at or better than LOS C during the morning peak traffic hour and LOS D during the afternoon peak traffic hour.

The stop-controlled intersection of Vollmer Road and Access A anticipates turn movement operations at LOS B or better during the morning and afternoon peak traffic hours. Exceptions include the westbound left turn movement which operate at LOS F during both peak traffic hours. The LOS F operations are attributed to the through traffic volume along Vollmer Road. In order to successfully mitigate the additional delay forecasted for the westbound approach, traffic signal control is one possible solution. However, a traffic signal warrant analysis was not performed in this submittal stage. Other alternatives may include expanding the ROW along Vollmer Road to allow for a left turn acceleration lane.

All other stop-controlled intersections anticipate turn movement operations at LOS C or better during the morning and afternoon peak traffic hours.

These intersection operations are similar to background conditions.

VI. Project Impacts

It is emphasized that the analyses and procedures described in this study were performed in accordance with the latest HCM and are based upon the worst-case conditions that occur during a typical weekday upon build-out of site development and analyzed land uses. Therefore, study intersections are likely to operate with traffic conditions better than those described within this study, which represent the peak hours of weekday operations only.

Queue Length Analysis

Was there a reason short term was not analyzed as well?

Queue lengths for the study intersections were analyzed using Year 2045 background and total traffic conditions. The analysis yields estimate of 95th percentile queue lengths, which have only a five percent probability of being exceeded during the analysis time period. An average vehicle length of 25 feet was assumed. Queue lengths were modeled and are included with the Synchro worksheets in Appendix D.

In general, auxiliary lane lengths are recommended to accommodate the County's minimum turn lane lengths or accommodate long-term 95th percentile vehicle queues, whichever is greater.

Table 8 summarizes the 95th percentile queue results in comparison to the projected storage requirements for turn movements within study area for Year 2045.

Table 9 – Turn Lane Queues and Storage Requirements – Year 2045

Intersection	Turn Movement		Existing Turn Lane Length (feet)	Background 2045		Total 2045		Recommended Turn Lane Length (feet)
				AM Peak Hour (feet)	PM Peak Hour (feet)	AM Peak Hour (feet)	PM Peak Hour (feet)	
Signalized Intersections								
E Woodmen Road / Marksheffel Road	EB	L	265' x2	245'	334'	245'	334'	265' x2
		T	-	148'	883'	148'	883'	-
		R	400'	0'	0'	0'	0'	400'
	WB	L	225' x2	154'	318'	154'	318'	225' x2
		T	-	677'	527'	677'	527'	-
		R	350'	0'	0'	0'	0'	350'
	NB	L	385' x2	315'	308'	315'	308'	385' x2
		T	-	215'	425'	258'	462'	-
		R	375'	0'	0'	0'	0'	375'
	SB	L	235' x2	232'	293'	256'	319'	235' x2
		T	-	382'	398'	417'	436'	-
		R	240'	0'	0'	0'	0'	240'
E Woodmen Road / Black Forest Road	EB	L	500' x2	216'	231'	307'	322'	500' x2
		T	-	393'	519'	393'	519'	-
		R	710'	0'	21'	0'	21'	710'
	WB	L	200'	38'	18'	38'	18'	200'
		T	-	675'	491'	675'	491'	-
		R	245'	160'	0'	160'	0'	245'
	NB	L	195' x2	111'	69'	111'	69'	195' x2
		T	-	343'	774'	343'	774'	-
		R	180'	0'	0'	0'	0'	180'
	SB	L	235' x2	154'	8'	140'	9'	235' x2
		T	-	1224'	510'	1220'	531'	-
		R	410'	188'	411'	264'	519'	520'
Black Forest Road / Vollmer Road	EB	L	-	35'	256'	35'	256'	130' x2
		T,R	-	21'	85'	21'	76'	-
	WB	L	210' x2	297'	241'	388'	204'	210' x2
		T	-	28'	318'	28'	318'	-
		R	-	0'	296'	0'	296'	300'
	NB	L	-	15'	44'	13'	43'	195'
		T	-	418'	577'	391'	549'	-
		R	585'	149'	314'	40'	433'	585'
	SB	L	260' x2	151'	31'	151'	31'	260' x2
		T,R	-	481'	415'	481'	415'	-
Marksheffel Road / Vollmer Road	EB	L	-	226'	400'	226'	399'	200' x2
		T	-	741'	505'	800'	550'	-
		R	-	12'	36'	12'	36'	235'
	WB	L	410'	208'	243'	376'	411'	410'
		T	-	590'	523'	591'	523'	-
		R	205'	15'	104'	10'	95'	205'
	NB	L	-	195'	189'	321'	289'	290'
		T	-	150'	426'	163'	452'	-
		R	-	35'	60'	47'	62'	155'
	SB	L	245'	117'	152'	143'	210'	245'
		T	-	370'	235'	370'	235'	-
		R	-	107'	88'	115'	99'	155'

Note: Turn Lane Length does not include taper length.
Key: x2 = Dual Turn Lanes.

Table 8 (Cont'd) – Turn lane Queues and Storage Requirements – Year 2045

Intersection	Turn Movement		Existing Turn Lane Length (feet)	Background 2045		Total 2045		Recommended Turn Lane Length (feet)
				AM Peak Hour (feet)	PM Peak Hour (feet)	AM Peak Hour (feet)	PM Peak Hour (feet)	
Signalized Intersections								
Marksheffel Road / Sterling Ranch Road	EB	L	250'	12'	230'	34'	244'	250'
		T	-	303'	80'	421'	112'	-
		R	190'	0'	0'	0'	0'	190'
	WB	L	230'	30'	27'	30'	27'	230'
		T	-	400'	541'	439'	624'	-
		R	230'	32'	180'	32'	205'	230'
	NB	L	-	11'	31'	11'	31'	115'
		T,R	-	17'	34'	17'	34'	-
	SB	L	345'	292'	189'	292'	189'	345'
		T	-	12'	30'	12'	30'	-
		R	300'	352'	62'	384'	64'	385'
Stop-Controlled Intersections								
Vollmer Road / Stonebridge Access / Access A	EB	R	-	0'	0'	0'	0'	-
	WB	L	-	-	-	145'	263'	-
		T,R	-	-	-	10'	15'	-
	NB	L	-	0'	0'	0'	0'	155'
		T,R	-	-	-	0'	0'	-
	SB	L	-	-	-	8'	13'	155'
		T	-	0'	0'	0'	0'	-
		R	-	0'	0'	0'	0'	155'
Vollmer Road / Access B	WB	R	-	-	-	3'	5'	-
	NB	T,R	-	-	-	0'	0'	-
	SB	T	-	-	-	0'	0'	-
Marksheffel Road / Access C	EB	T,R	-	-	-	0'	0'	-
	WB	T	-	-	-	0'	0'	-
	NB	R	-	-	-	35'	28'	-

Note: Turn Lane Length does not include taper length.

As Table 9 shows, the majority of turn lane lengths have sufficient storage to accommodate future traffic volumes. However, at the Marksheffel Road and Sterling Ranch Road intersection, significant queuing was indicated for the southbound right turn movement. The greatest queue length occurs during the morning peak traffic hour. However, significant queuing exists during background traffic conditions without consideration of the proposed development.

Not sure this is accurate if there are 2 intersections operating below LOS of D

Development Impacts

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create minimal negative impact to traffic operations for the existing and surrounding roadway system upon roadway and intersection control improvements assumed within this analysis. With all conservative assumptions defined in this analysis, the study intersections are projected to operate at future levels of service comparable to background traffic conditions.

Doesn't seem like a valid statement when some turning movements range from 20% to doubling what the background traffic is to total traffic.

Recommended Improvements

Roadway and intersection improvement recommendations were assessed pursuant to roadway descriptions discussed in Section I, projected peak hour traffic volumes, level of service results, projected 95th percentile queue lengths, and per requirements defined within the County's ECM.

Considering the conceptual nature of this development and how total traffic conditions are comparable to background traffic conditions, no improvements are currently being recommended with this rezone application.

Include some sort of statement that this will be continued to be looked at as uses become more defined with later submittals, etc.

As actual land uses, densities, or site plans within the SR Land Triangle Commercial site become defined over time, it is expected that traffic generation characteristics and recommendations considered within this study will need to be updated by more specific traffic analyses or studies to help assess if transportation improvements are needed to mitigate potential traffic impacts.

VII. Conclusion

This traffic impact study addressed the capacity, geometric, and control requirements associated with the development entitled SR Land Triangle Commercial. This proposed commercial development consisted of conceptual land uses including various commercial businesses. The development is located near the southeast corner of Vollmer Road and Marksheffel Road in El Paso County, Colorado.

The study area to be examined in this analysis encompassed the area bounded by Black Forest Road east to Marksheffel Road, and from E Woodmen Road north to Vollmer Road as well as the proposed site accesses.

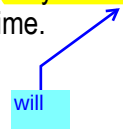
Analysis was conducted for critical AM Peak Hour and PM Peak Hour traffic operations for existing traffic conditions, Year 2028 and Year 2045 background traffic conditions, and Year 2028 and Year 2045 total traffic conditions.

Analysis of existing traffic conditions indicates that all signalized intersections operate under LOS D or better conditions during their respective peak hour periods, while all stop-controlled intersections operate with turn movements at or better than LOS B or better during their respective peak traffic periods.

Under Year 2028 and 2045 background traffic conditions, operational analysis shows that all signalized intersections are projected to operate with LOS E or better operations during peak traffic periods. Exceptions include the intersection of E Woodmen Road and Black Forest Road, which projects LOS F during the morning peak traffic hour. All stop-controlled intersections anticipate turn movement operations at or better than LOS B during their respective peak traffic periods.

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create minimal negative impact to traffic operations for the existing and surrounding roadway system upon roadway and intersection control improvements assumed within this analysis. With all conservative assumptions defined in this analysis, the study intersections are projected to operate at future levels of service comparable to Year 2045 background traffic conditions. Proposed site accesses have long-term operations at LOS C or better during peak traffic periods and upon build-out. Exceptions include the westbound left turn movement at the intersection of Vollmer Road and Access A.

It is reemphasized that analyses provided throughout this study reflect conceptual land uses and densities per the concept plan shown in Figure 2. As such, it is expected that analyses and assumptions considered throughout this study may need to be reevaluated once actual land uses, densities, and site plans become defined over time.



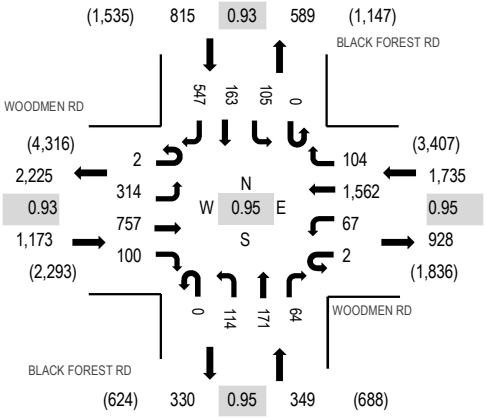
APPENDIX A

Traffic Count Data
Signal Timing Information

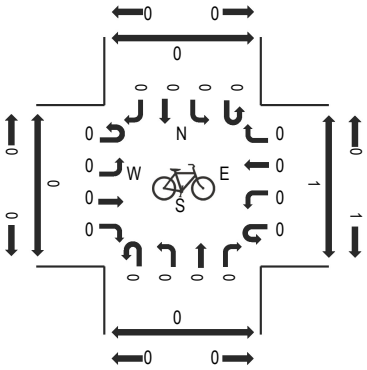
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 BLACK FOREST RD & WOODMEN RD AM
Date: Thursday, September 3, 2026
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

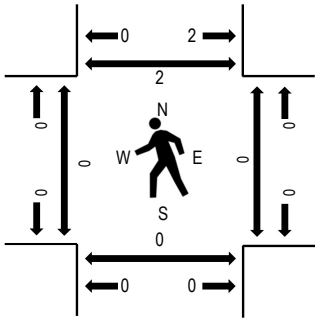
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

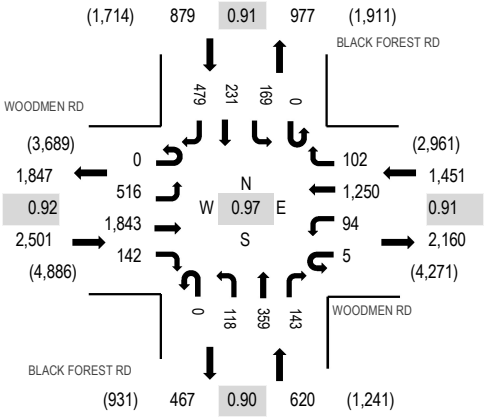
Traffic Counts - Motorized Vehicles

Interval Start Time	WOODMEN RD Eastbound				WOODMEN RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	3	50	121	17	2	18	374	30	0	27	25	1	0	18	27	118	831	3,944	0	0	0	0
7:15 AM	1	68	169	24	1	10	424	25	0	19	37	15	0	29	39	147	1,008	4,072	0	0	0	2
7:30 AM	0	75	191	19	1	20	419	26	0	33	37	18	0	23	31	140	1,033	4,027	0	0	0	0
7:45 AM	1	90	203	36	0	15	376	33	0	33	53	12	0	35	50	135	1,072	4,065	0	0	0	0
8:00 AM	0	81	194	21	0	22	343	20	0	29	44	19	0	18	43	125	959	3,979	0	0	0	0
8:15 AM	1	86	180	18	1	16	367	30	0	32	40	19	0	29	37	107	963		0	0	0	0
8:30 AM	0	84	212	25	0	24	383	33	0	31	37	27	0	31	42	142	1,071		0	0	0	0
8:45 AM	1	81	217	24	1	15	356	22	0	33	40	27	0	22	31	116	986		0	1	0	0
Count Total	7	615	1,487	184	6	140	3,042	219	0	237	313	138	0	205	300	1,030	7,923		0	1	0	2
Peak Hour	2	314	757	100	2	67	1,562	104	0	114	171	64	0	105	163	547	4,072		0	0	0	2

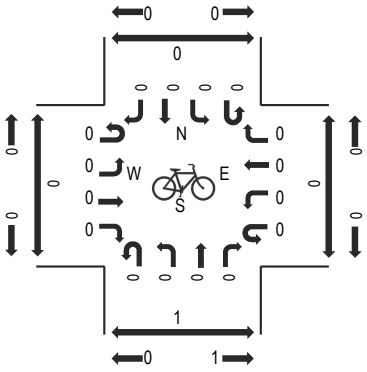
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 1 BLACK FOREST RD & WOODMEN RD PM
Date: Thursday, September 3, 2026
Peak Hour: 04:30 PM - 05:30 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

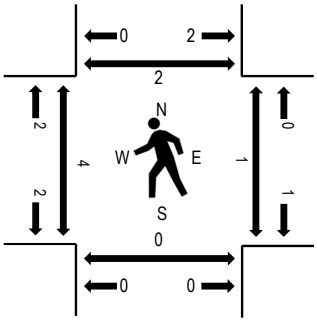
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

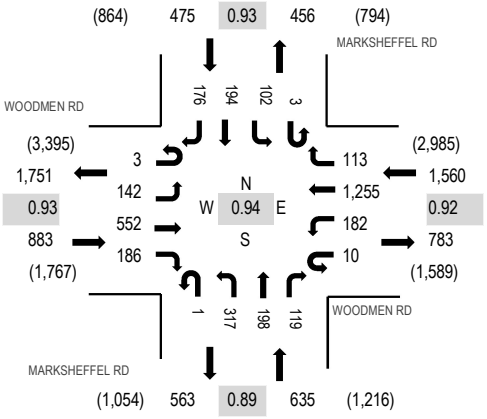
Traffic Counts - Motorized Vehicles

Interval Start Time	WOODMEN RD Eastbound				WOODMEN RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	1	112	431	40	3	24	326	40	0	24	79	39	0	47	57	122	1,345	5,417	0	0	0	0
4:15 PM	0	123	413	32	1	25	326	30	0	47	80	50	0	47	55	118	1,347	5,439	0	0	0	0
4:30 PM	0	133	484	27	3	21	366	27	0	30	86	28	0	31	40	133	1,409	5,451	2	0	0	0
4:45 PM	0	126	454	38	0	26	272	21	0	24	104	42	0	39	57	113	1,316	5,443	0	1	0	2
5:00 PM	0	140	434	37	1	21	315	34	0	27	82	34	0	45	63	134	1,367	5,385	2	0	0	0
5:15 PM	0	117	471	40	1	26	297	20	0	37	87	39	0	54	71	99	1,359		0	0	0	0
5:30 PM	0	145	509	37	0	26	331	29	0	18	83	37	0	48	45	93	1,401		0	0	0	0
5:45 PM	0	105	403	34	0	39	289	21	0	36	87	41	0	42	50	111	1,258		0	0	0	0
Count Total	1	1,001	3,599	285	9	208	2,522	222	0	243	688	310	0	353	438	923	10,802		4	1	0	2
Peak Hour	0	516	1,843	142	5	94	1,250	102	0	118	359	143	0	169	231	479	5,451		4	1	0	2

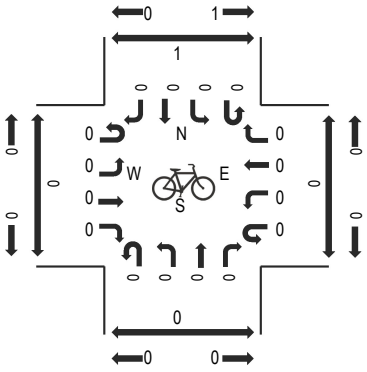
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 MARKSHEFFEL RD & WOODMEN RD AM
Date: Thursday, September 3, 2026
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

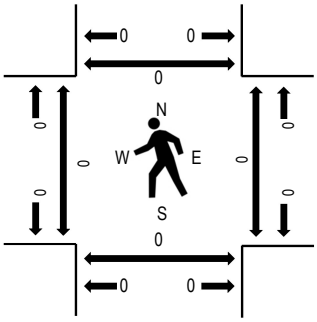
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

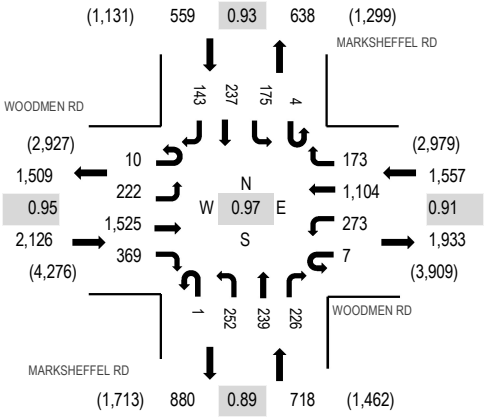
Traffic Counts - Motorized Vehicles

Interval Start Time	WOODMEN RD Eastbound				WOODMEN RD Westbound				MARKSHEFFEL RD Northbound				MARKSHEFFEL RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	18	99	36	2	38	320	10	0	62	23	27	0	20	35	38	728	3,421	0	0	0	0
7:15 AM	0	24	124	59	0	38	349	22	1	65	41	32	0	21	51	45	872	3,553	0	0	0	0
7:30 AM	0	42	135	43	4	38	348	39	0	94	59	34	1	25	42	41	945	3,523	0	0	0	0
7:45 AM	0	34	145	46	5	45	286	33	0	79	58	24	1	25	49	46	876	3,473	0	0	0	0
8:00 AM	3	42	148	38	1	61	272	19	0	79	40	29	1	31	52	44	860	3,411	0	0	0	0
8:15 AM	4	36	153	39	2	44	263	11	0	107	51	36	0	25	38	33	842		0	0	0	1
8:30 AM	3	40	177	38	1	46	296	24	0	99	43	20	0	21	49	38	895		0	0	0	0
8:45 AM	1	32	168	40	5	63	280	20	0	51	30	32	0	18	25	49	814		1	0	0	1
Count Total	11	268	1,149	339	20	373	2,414	178	1	636	345	234	3	186	341	334	6,832		1	0	0	2
Peak Hour	3	142	552	186	10	182	1,255	113	1	317	198	119	3	102	194	176	3,553		0	0	0	0

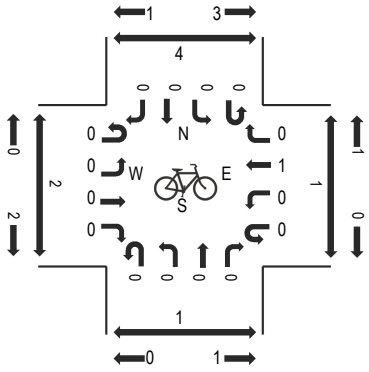
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 2 MARKSHEFFEL RD & WOODMEN RD PM
Date: Thursday, September 3, 2026
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

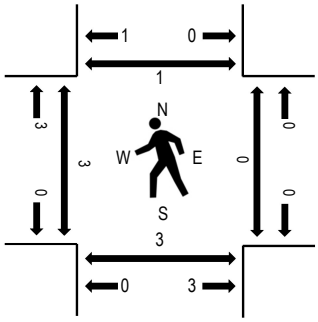
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

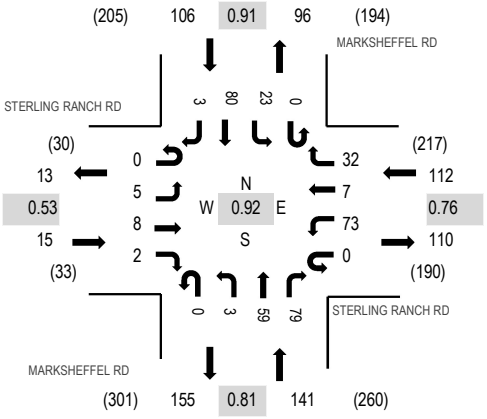
Traffic Counts - Motorized Vehicles

Interval Start Time	WOODMEN RD Eastbound				WOODMEN RD Westbound				MARKSHEFFEL RD Northbound				MARKSHEFFEL RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	1	65	401	72	13	51	261	35	2	62	65	78	2	48	45	39	1,240	4,921	0	0	0	0
4:15 PM	2	52	360	105	1	63	278	38	0	73	67	61	0	50	55	41	1,246	4,960	3	0	3	0
4:30 PM	2	45	409	73	2	85	292	47	0	60	69	53	2	27	59	42	1,267	4,920	0	0	0	0
4:45 PM	1	61	384	85	0	57	230	54	0	58	46	44	1	57	67	23	1,168	4,907	0	0	0	0
5:00 PM	5	64	372	106	4	68	304	34	1	61	57	68	1	41	56	37	1,279	4,927	0	0	0	1
5:15 PM	3	46	370	114	1	74	226	31	1	51	68	65	0	40	63	53	1,206		0	1	0	0
5:30 PM	6	72	398	96	2	49	254	54	1	65	58	59	0	33	69	38	1,254		2	0	0	0
5:45 PM	3	76	347	80	2	62	275	32	1	50	56	62	1	57	53	31	1,188		0	0	0	0
Count Total	23	481	3,041	731	25	509	2,120	325	6	480	486	490	7	353	467	304	9,848		5	1	3	1
Peak Hour	10	222	1,525	369	7	273	1,104	173	1	252	239	226	4	175	237	143	4,960		3	0	3	1

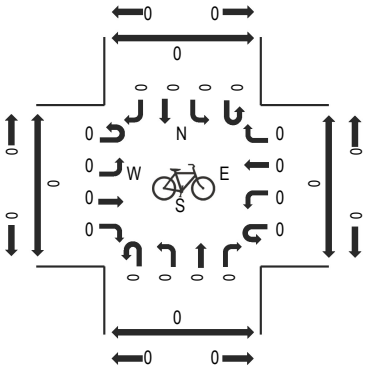
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 3 MARKSHEFFEL RD & STERLING RANCH RD AM
Date: Thursday, September 3, 2026
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:30 AM - 07:45 AM

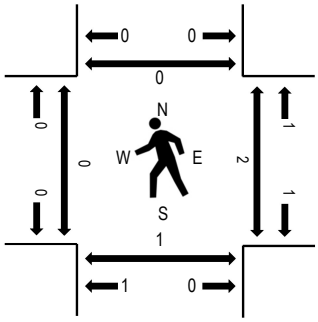
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

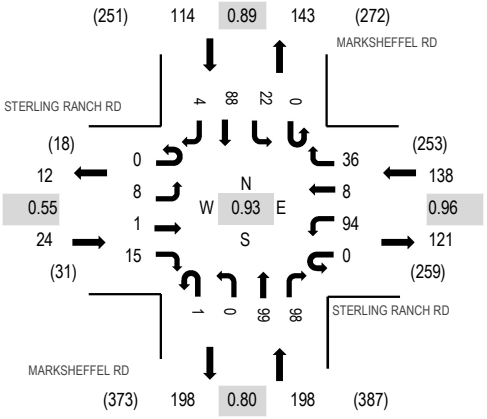
Traffic Counts - Motorized Vehicles

Interval Start Time	STERLING RANCH RD Eastbound				STERLING RANCH RD Westbound				MARKSHEFFEL RD Northbound				MARKSHEFFEL RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	1	8	0	0	15	0	4	0	2	7	8	0	5	14	3	67	362	1	0	0	0
7:15 AM	0	2	1	1	0	18	2	8	0	1	11	18	0	3	26	0	91	374	0	1	0	0
7:30 AM	0	1	1	1	0	25	2	10	0	0	20	16	0	4	21	1	102	364	0	0	0	0
7:45 AM	0	0	3	0	0	17	1	8	0	1	15	28	0	9	19	1	102	363	0	0	1	0
8:00 AM	0	2	3	0	0	13	2	6	0	1	13	17	0	7	14	1	79	353	0	1	0	0
8:15 AM	0	1	1	1	0	17	3	9	0	0	20	10	0	4	14	1	81		0	0	0	0
8:30 AM	0	0	3	0	0	23	2	6	0	0	24	14	0	9	17	3	101		0	0	0	0
8:45 AM	0	2	0	1	0	19	2	5	0	1	18	15	1	3	25	0	92		0	1	0	0
Count Total	0	9	20	4	0	147	14	56	0	6	128	126	1	44	150	10	715		1	3	1	0
Peak Hour	0	5	8	2	0	73	7	32	0	3	59	79	0	23	80	3	374		0	2	1	0

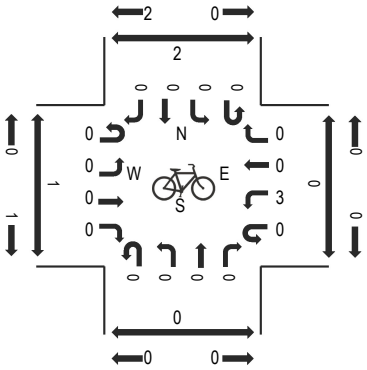
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 3 MARKSHEFFEL RD & STERLING RANCH RD PM
Date: Thursday, September 3, 2026
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

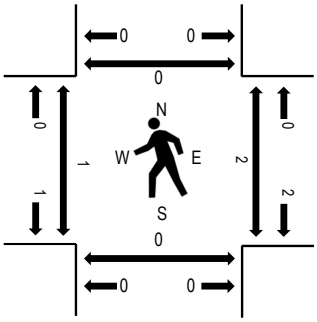
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

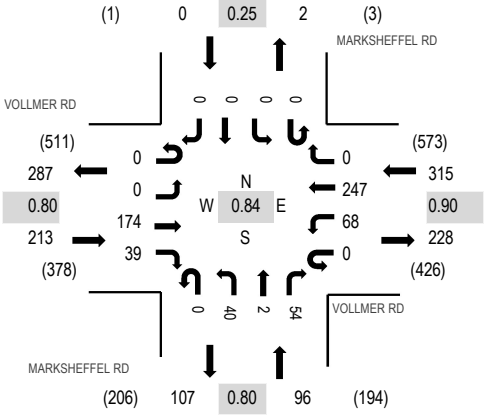
Traffic Counts - Motorized Vehicles

Interval Start Time	STERLING RANCH RD Eastbound				STERLING RANCH RD Westbound				MARKSHEFFEL RD Northbound				MARKSHEFFEL RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	1	0	2	0	15	1	9	0	0	27	32	0	12	28	0	127	472	0	0	0	0
4:15 PM	0	0	1	1	0	15	1	10	1	0	18	21	1	10	26	0	105	472	0	0	1	0
4:30 PM	0	0	1	0	0	23	2	5	0	1	31	24	0	12	23	1	123	473	0	0	1	0
4:45 PM	0	5	1	5	0	30	1	5	0	0	16	24	0	7	22	1	117	474	0	0	0	0
5:00 PM	0	2	0	2	0	21	1	12	0	0	32	31	0	4	21	1	127	450	0	0	0	0
5:15 PM	0	1	0	1	0	24	2	10	1	0	28	14	0	6	18	1	106		0	2	0	0
5:30 PM	0	0	0	7	0	19	4	9	0	0	23	29	0	5	27	1	124		1	0	0	0
5:45 PM	0	0	0	1	0	23	0	11	0	0	16	18	0	7	17	0	93		1	0	0	0
Count Total	0	9	3	19	0	170	12	71	2	1	191	193	1	63	182	5	922		2	2	2	0
Peak Hour	0	8	1	15	0	94	8	36	1	0	99	98	0	22	88	4	474		1	2	0	0

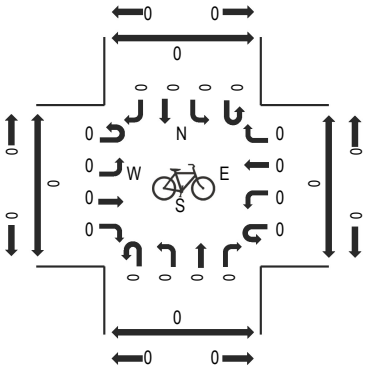
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 4 MARKSHEFFEL RD & VOLLMER RD AM
Date: Thursday, September 3, 2026
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

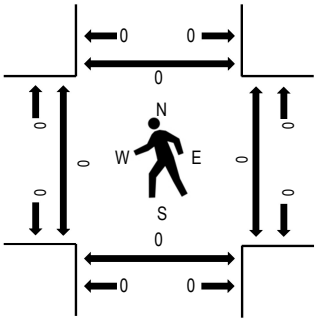
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

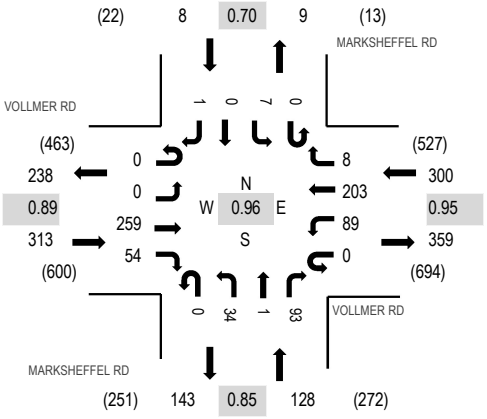
Traffic Counts - Motorized Vehicles

Interval Start Time	VOLLMER RD Eastbound				VOLLMER RD Westbound				MARKSHEFFEL RD Northbound				MARKSHEFFEL RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00 AM	0	1	20	9	0	14	48	0	0	5	0	7	0	0	0	0	104	578	1	0	0	0
7:15 AM	0	0	27	4	0	24	62	0	0	7	1	8	0	0	0	0	133	624	0	0	0	0
7:30 AM	0	0	30	10	0	17	64	0	0	13	1	20	0	0	0	0	155	610	0	0	0	0
7:45 AM	0	0	59	14	0	16	72	0	0	14	0	11	0	0	0	0	186	608	0	0	0	0
8:00 AM	0	0	58	11	0	11	49	0	0	6	0	15	0	0	0	0	150	568	0	0	0	0
8:15 AM	0	0	33	7	0	11	39	0	0	10	0	19	0	0	0	0	119		0	0	0	0
8:30 AM	0	0	40	11	0	16	54	0	0	10	0	21	0	0	1	0	153		0	0	0	0
8:45 AM	0	0	40	4	0	26	50	0	0	8	0	18	0	0	0	0	146		0	0	0	0
Count Total	0	1	307	70	0	135	438	0	0	73	2	119	0	0	1	0	1,146		1	0	0	0
Peak Hour	0	0	174	39	0	68	247	0	0	40	2	54	0	0	0	0	624		0	0	0	0

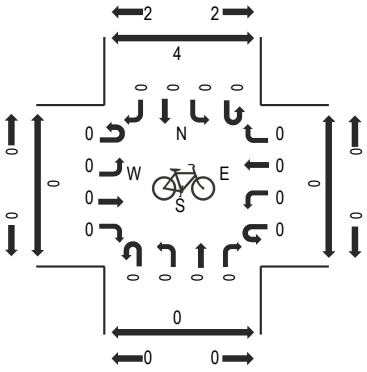
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 4 MARKSHEFFEL RD & VOLLMER RD PM
Date: Thursday, September 3, 2026
Peak Hour: 04:00 PM - 05:00 PM
Peak 15-Minutes: 04:30 PM - 04:45 PM

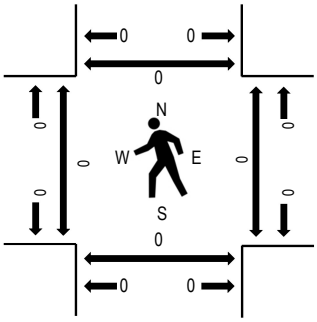
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

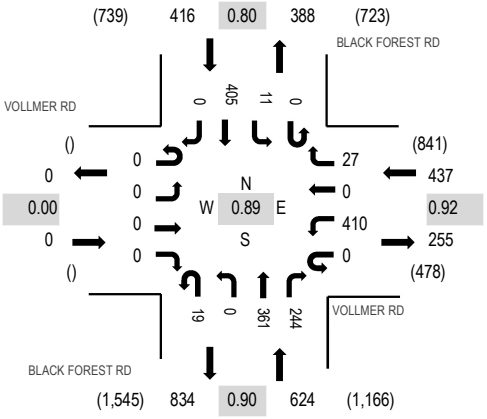
Traffic Counts - Motorized Vehicles

Interval Start Time	VOLLMER RD Eastbound				VOLLMER RD Westbound				MARKSHEFFEL RD Northbound				MARKSHEFFEL RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	0	60	16	0	24	52	3	0	9	0	26	0	2	0	0	192	749	0	0	0	0
4:15 PM	0	0	64	13	0	25	46	2	0	9	0	22	0	4	0	0	185	743	0	0	0	0
4:30 PM	0	0	71	17	0	18	53	2	0	6	0	26	0	1	0	1	195	719	0	0	0	0
4:45 PM	0	0	64	8	0	22	52	1	0	10	1	19	0	0	0	0	177	693	0	0	0	0
5:00 PM	0	0	61	13	0	12	54	0	0	16	0	27	0	1	1	1	186	672	0	0	0	0
5:15 PM	0	1	54	9	0	13	37	1	0	15	1	25	0	0	3	2	161		0	0	0	0
5:30 PM	0	0	74	8	0	19	32	0	0	13	1	17	0	0	5	0	169		0	0	0	0
5:45 PM	0	0	61	6	0	18	41	0	0	14	0	15	0	0	1	0	156		0	0	0	0
Count Total	0	1	509	90	0	151	367	9	0	92	3	177	0	8	10	4	1,421		0	0	0	0
Peak Hour	0	0	259	54	0	89	203	8	0	34	1	93	0	7	0	1	749		0	0	0	0

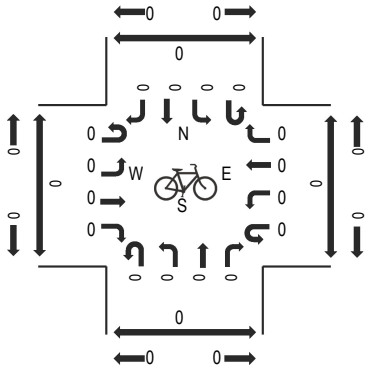
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 5 BLACK FOREST RD & VOLLMER RD AM
Date: Thursday, September 3, 2026
Peak Hour: 07:15 AM - 08:15 AM
Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - Motorized Vehicles



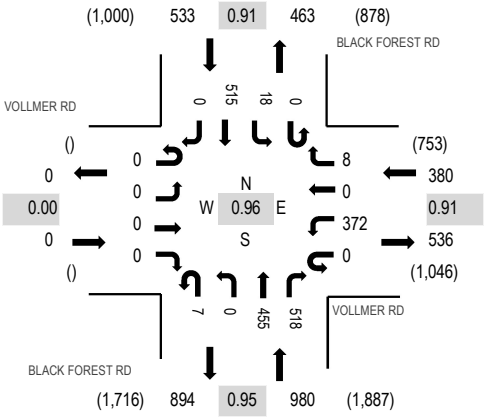
Peak Hour - Bicycles


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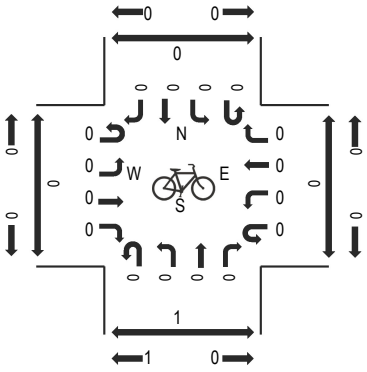
ALL TRAFFIC DATA SERVICES
(303) 216-2439
www.alltrafficdata.net

Location: 5 BLACK FOREST RD & VOLLMER RD PM
Date: Thursday, September 3, 2026
Peak Hour: 04:15 PM - 05:15 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

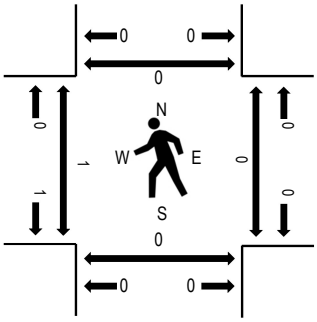
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	VOLLMER RD Eastbound				VOLLMER RD Westbound				BLACK FOREST RD Northbound				BLACK FOREST RD Southbound					Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00 PM	0	0	0	0	0	104	0	4	3	0	127	102	0	4	115	0	459	1,861	1	0	0	0
4:15 PM	0	0	0	0	0	102	0	2	2	0	108	115	0	8	128	0	465	1,893	0	0	0	0
4:30 PM	0	0	0	0	0	83	0	2	0	0	122	136	0	3	138	0	484	1,868	0	0	0	0
4:45 PM	0	0	0	0	0	97	0	1	3	0	104	139	0	4	105	0	453	1,837	1	0	0	0
5:00 PM	0	0	0	0	0	90	0	3	2	0	121	128	0	3	144	0	491	1,779	0	0	0	0
5:15 PM	0	0	0	0	0	86	0	4	1	0	103	117	0	5	124	0	440		0	0	0	0
5:30 PM	0	0	0	0	0	72	0	3	1	0	100	155	0	4	118	0	453		0	0	0	0
5:45 PM	0	0	0	0	0	98	0	2	6	0	72	120	0	3	94	0	395		0	0	0	0
Count Total	0	0	0	0	0	732	0	21	18	0	857	1,012	0	34	966	0	3,640		2	0	0	0
Peak Hour	0	0	0	0	0	372	0	8	7	0	455	518	0	18	515	0	1,893		1	0	0	0

All Traffic Data Services

6 - VOLLMER RD WEST OF MARKSHEFFEL RD

Time	EB	WB	Total
9/3/2026	6	4	10
9/3/2026 12:15:00 AM	1	2	3
9/3/2026 12:30:00 AM	1	1	2
9/3/2026 12:45:00 AM	4	0	4
9/3/2026 1:00:00 AM	3	0	3
9/3/2026 1:15:00 AM	3	0	3
9/3/2026 1:30:00 AM	1	2	3
9/3/2026 1:45:00 AM	2	2	4
9/3/2026 2:00:00 AM	0	1	1
9/3/2026 2:15:00 AM	1	1	2
9/3/2026 2:30:00 AM	0	0	0
9/3/2026 2:45:00 AM	0	0	0
9/3/2026 3:00:00 AM	1	5	6
9/3/2026 3:15:00 AM	0	1	1
9/3/2026 3:30:00 AM	1	3	4
9/3/2026 3:45:00 AM	1	2	3
9/3/2026 4:00:00 AM	1	2	3
9/3/2026 4:15:00 AM	2	5	7
9/3/2026 4:30:00 AM	1	7	8
9/3/2026 4:45:00 AM	0	7	7
9/3/2026 5:00:00 AM	3	5	8
9/3/2026 5:15:00 AM	1	10	11
9/3/2026 5:30:00 AM	1	20	21
9/3/2026 5:45:00 AM	3	19	22
9/3/2026 6:00:00 AM	9	17	26
9/3/2026 6:15:00 AM	11	37	48
9/3/2026 6:30:00 AM	24	49	73
9/3/2026 6:45:00 AM	18	64	82
9/3/2026 7:00:00 AM	30	53	83
9/3/2026 7:15:00 AM	31	69	100
9/3/2026 7:30:00 AM	40	77	117
9/3/2026 7:45:00 AM	73	86	159
9/3/2026 8:00:00 AM	69	55	124
9/3/2026 8:15:00 AM	40	49	89
9/3/2026 8:30:00 AM	51	64	115
9/3/2026 8:45:00 AM	44	58	102
9/3/2026 9:00:00 AM	50	71	121
9/3/2026 9:15:00 AM	55	71	126
9/3/2026 9:30:00 AM	59	64	123
9/3/2026 9:45:00 AM	51	74	125
9/3/2026 10:00:00 AM	61	50	111
9/3/2026 10:15:00 AM	56	52	108
9/3/2026 10:30:00 AM	54	68	122
9/3/2026 10:45:00 AM	54	57	111
9/3/2026 11:00:00 AM	59	40	99
9/3/2026 11:15:00 AM	43	66	109
9/3/2026 11:30:00 AM	60	45	105
9/3/2026 11:45:00 AM	45	61	106
Total	1,124	1,496	2,620
Percentage	42.9%	57.1%	
Peak Hour	7:45 AM	7:15 AM	7:15 AM
Volume	233	287	500
PHF	0.798	0.834	0.786

All Traffic Data Services

6 - VOLLMER RD WEST OF MARKSHEFFEL RD

Time	EB	WB	Total
9/3/2026 12:00:00 PM	64	65	129
9/3/2026 12:15:00 PM	46	45	91
9/3/2026 12:30:00 PM	55	64	119
9/3/2026 12:45:00 PM	52	50	102
9/3/2026 1:00:00 PM	65	43	108
9/3/2026 1:15:00 PM	51	62	113
9/3/2026 1:30:00 PM	55	45	100
9/3/2026 1:45:00 PM	58	43	101
9/3/2026 2:00:00 PM	60	41	101
9/3/2026 2:15:00 PM	53	54	107
9/3/2026 2:30:00 PM	50	81	131
9/3/2026 2:45:00 PM	48	85	133
9/3/2026 3:00:00 PM	88	62	150
9/3/2026 3:15:00 PM	86	48	134
9/3/2026 3:30:00 PM	89	44	133
9/3/2026 3:45:00 PM	68	55	123
9/3/2026 4:00:00 PM	76	61	137
9/3/2026 4:15:00 PM	77	55	132
9/3/2026 4:30:00 PM	88	60	148
9/3/2026 4:45:00 PM	72	62	134
9/3/2026 5:00:00 PM	74	71	145
9/3/2026 5:15:00 PM	64	54	118
9/3/2026 5:30:00 PM	82	45	127
9/3/2026 5:45:00 PM	67	55	122
9/3/2026 6:00:00 PM	74	37	111
9/3/2026 6:15:00 PM	65	46	111
9/3/2026 6:30:00 PM	45	39	84
9/3/2026 6:45:00 PM	63	29	92
9/3/2026 7:00:00 PM	47	40	87
9/3/2026 7:15:00 PM	47	28	75
9/3/2026 7:30:00 PM	41	35	76
9/3/2026 7:45:00 PM	47	29	76
9/3/2026 8:00:00 PM	38	21	59
9/3/2026 8:15:00 PM	41	15	56
9/3/2026 8:30:00 PM	35	17	52
9/3/2026 8:45:00 PM	41	22	63
9/3/2026 9:00:00 PM	22	10	32
9/3/2026 9:15:00 PM	27	7	34
9/3/2026 9:30:00 PM	14	11	25
9/3/2026 9:45:00 PM	15	6	21
9/3/2026 10:00:00 PM	14	5	19
9/3/2026 10:15:00 PM	10	5	15
9/3/2026 10:30:00 PM	14	8	22
9/3/2026 10:45:00 PM	3	6	9
9/3/2026 11:00:00 PM	8	0	8
9/3/2026 11:15:00 PM	5	3	8
9/3/2026 11:30:00 PM	6	3	9
9/3/2026 11:45:00 PM	5	3	8
Total	2,315	1,775	4,090
Percentage	56.6%	43.4%	
Peak Hour	3:00 PM	2:15 PM	4:15 PM
Volume	331	282	559
PHF	0.930	0.829	0.944
Grand Total	3,439	3,271	6,710
Percentage	51.3%	48.7%	

All Traffic Data Services

7 - MARKSHEFFEL RD SOUTH OF VOLLMER RD

Time	NB	SB	Total
9/3/2026	1	1	2
9/3/2026 12:15:00 AM	1	0	1
9/3/2026 12:30:00 AM	1	2	3
9/3/2026 12:45:00 AM	2	0	2
9/3/2026 1:00:00 AM	0	2	2
9/3/2026 1:15:00 AM	0	0	0
9/3/2026 1:30:00 AM	1	1	2
9/3/2026 1:45:00 AM	0	0	0
9/3/2026 2:00:00 AM	0	0	0
9/3/2026 2:15:00 AM	0	0	0
9/3/2026 2:30:00 AM	0	0	0
9/3/2026 2:45:00 AM	0	0	0
9/3/2026 3:00:00 AM	2	0	2
9/3/2026 3:15:00 AM	1	0	1
9/3/2026 3:30:00 AM	0	2	2
9/3/2026 3:45:00 AM	0	1	1
9/3/2026 4:00:00 AM	1	1	2
9/3/2026 4:15:00 AM	1	2	3
9/3/2026 4:30:00 AM	1	1	2
9/3/2026 4:45:00 AM	2	0	2
9/3/2026 5:00:00 AM	3	0	3
9/3/2026 5:15:00 AM	2	2	4
9/3/2026 5:30:00 AM	4	5	9
9/3/2026 5:45:00 AM	7	4	11
9/3/2026 6:00:00 AM	5	9	14
9/3/2026 6:15:00 AM	6	8	14
9/3/2026 6:30:00 AM	5	21	26
9/3/2026 6:45:00 AM	15	17	32
9/3/2026 7:00:00 AM	12	23	35
9/3/2026 7:15:00 AM	16	28	44
9/3/2026 7:30:00 AM	34	27	61
9/3/2026 7:45:00 AM	25	30	55
9/3/2026 8:00:00 AM	21	22	43
9/3/2026 8:15:00 AM	29	18	47
9/3/2026 8:30:00 AM	31	28	59
9/3/2026 8:45:00 AM	26	30	56
9/3/2026 9:00:00 AM	22	29	51
9/3/2026 9:15:00 AM	20	26	46
9/3/2026 9:30:00 AM	34	29	63
9/3/2026 9:45:00 AM	22	30	52
9/3/2026 10:00:00 AM	21	28	49
9/3/2026 10:15:00 AM	25	22	47
9/3/2026 10:30:00 AM	31	18	49
9/3/2026 10:45:00 AM	24	33	57
9/3/2026 11:00:00 AM	18	21	39
9/3/2026 11:15:00 AM	18	30	48
9/3/2026 11:30:00 AM	15	30	45
9/3/2026 11:45:00 AM	33	24	57
Total	538	605	1,143
Percentage	47.1%	52.9%	
Peak Hour	7:30 AM	8:45 AM	8:45 AM
Volume	109	114	216
PHF	0.801	0.950	0.857

All Traffic Data Services

7 - MARKSHEFFEL RD SOUTH OF VOLLMER RD

Time	NB	SB	Total
9/3/2026 12:00:00 PM	25	42	67
9/3/2026 12:15:00 PM	22	18	40
9/3/2026 12:30:00 PM	23	28	51
9/3/2026 12:45:00 PM	41	25	66
9/3/2026 1:00:00 PM	30	26	56
9/3/2026 1:15:00 PM	33	27	60
9/3/2026 1:30:00 PM	19	31	50
9/3/2026 1:45:00 PM	23	30	53
9/3/2026 2:00:00 PM	21	28	49
9/3/2026 2:15:00 PM	24	26	50
9/3/2026 2:30:00 PM	28	16	44
9/3/2026 2:45:00 PM	35	25	60
9/3/2026 3:00:00 PM	29	42	71
9/3/2026 3:15:00 PM	29	32	61
9/3/2026 3:30:00 PM	30	50	80
9/3/2026 3:45:00 PM	32	33	65
9/3/2026 4:00:00 PM	35	40	75
9/3/2026 4:15:00 PM	31	38	69
9/3/2026 4:30:00 PM	32	35	67
9/3/2026 4:45:00 PM	30	30	60
9/3/2026 5:00:00 PM	43	26	69
9/3/2026 5:15:00 PM	41	25	66
9/3/2026 5:30:00 PM	31	32	63
9/3/2026 5:45:00 PM	29	25	54
9/3/2026 6:00:00 PM	31	23	54
9/3/2026 6:15:00 PM	18	30	48
9/3/2026 6:30:00 PM	19	14	33
9/3/2026 6:45:00 PM	16	24	40
9/3/2026 7:00:00 PM	28	15	43
9/3/2026 7:15:00 PM	19	18	37
9/3/2026 7:30:00 PM	17	28	45
9/3/2026 7:45:00 PM	17	14	31
9/3/2026 8:00:00 PM	12	15	27
9/3/2026 8:15:00 PM	8	6	14
9/3/2026 8:30:00 PM	9	7	16
9/3/2026 8:45:00 PM	8	8	16
9/3/2026 9:00:00 PM	8	7	15
9/3/2026 9:15:00 PM	6	11	17
9/3/2026 9:30:00 PM	8	4	12
9/3/2026 9:45:00 PM	3	7	10
9/3/2026 10:00:00 PM	5	6	11
9/3/2026 10:15:00 PM	4	4	8
9/3/2026 10:30:00 PM	5	1	6
9/3/2026 10:45:00 PM	4	1	5
9/3/2026 11:00:00 PM	1	1	2
9/3/2026 11:15:00 PM	1	4	5
9/3/2026 11:30:00 PM	1	0	1
9/3/2026 11:45:00 PM	2	3	5
Total	966	981	1,947
Percentage	49.6%	50.4%	
Peak Hour	4:30 PM	3:30 PM	3:30 PM
Volume	146	161	289
PHF	0.849	0.805	0.903
Grand Total	1,504	1,586	3,090
Percentage	48.7%	51.3%	

Intersection 608 at Black Forrest Rd and Vollmer Rd - Timing table, page 1

Page 1	Phases											
	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	4	10	4	4	4	10	4	4	0	0	0	0
Passage Time I	1.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0	0.0	0.0	0.0	0.0
Passage Time II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green I	10	30	10	30	10	30	10	30	0	0	0	0
Max Green II	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Clearance	3.0	5.5	3.0	5.5	3.0	5.5	3.0	5.5	0.0	0.0	0.0	0.0
Red Clearance	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0
Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0	0	0	0	0
Time Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Cars Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0
Min Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Green Time	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert Time	0.0	5.0	0.0	5.0	0.0	5.0	0.0	5.0	0.0	0.0	0.0	0.0
Advance Walk Time	0	0	0	0	0	0	0	0	0	0	0	0
Walk Time	0	7	0	7	0	7	0	7	0	0	0	0
Pedestrian Clearance	0	30	0	34	0	30	0	34	0	0	0	0
Handicap Walk	0	0	0	0	0	0	0	0	0	0	0	0
Handicap Ped Clearance	0	0	0	0	0	0	0	0	0	0	0	0
Black Forrest Rd	X	X			X	X						
Vollmer Rd			X	X			X	X				
Compass Direction	S	N	W	E	N	S	E	W				
Through, Turn or XPed	Left,prt	Thru	Left,prt	Thru	Left,prt	Thru	Left,prt	Thru				

Intersection 608 at Black Forrest Rd and Vollmer Rd - Sequence table, page 1

Page 1	Ring 1 Phases				Ring 2 Phases				Ring 3 Phases			
	1	2	3	4	5	6	7	8	9	10	11	12
State 1	Vehicle				Vehicle							
Barrier 1												
State 2		V & P				V & P						
Barrier 2	XXXXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXXXX							
State 3			Vehicle				Vehicle					
Barrier 3												
State 4				V & P				V & P				
Barrier 4	XXXXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXXXX							
State 5												
Barrier 5												
State 6												
Barrier 6												
State 7												
Barrier 7												
State 8												
Barrier 8												
State 9												
Barrier 9												
State 10												
Barrier 10												
State 11												
Barrier 11												
State 12												
Barrier 12												

Intersection 608 at Black Forrest Rd and Vollmer Rd - Phases control table, page 1

Page 1	Vehicle Phases 111 123456789012		Ped Phases 111 123456789012
Min Recalls		Ped Recalls	
Max Recalls	2 6	Handicap Ped Recalls	
Recall If Maxed		Soft Ped Recalls	
Dual Entry	3 8	Don't Recall (FDW Offset)	2 4 6 8
Do Not Skip		Allow Walk Reduction	
Simultaneous Gap Out		Hold In Walk	
Restricted Phases		Allow Ped Re-service	2 6
Sequential Initial Timing		Rest In Walk	No
Max Timer Starts For Call			
Reduction Starts For Call			
Red To Avoid Left Turn Trap			
Rest In Red	No		

Intersection 608 at Black Forrest Rd and Vollmer Rd - Coordination table, plans 1-2

	_____111	Cycle Length	138			Alternate	Alternate	Alternate
Plan 1	123456789012	Offset 1	17	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	132	1	15	0	0.0	14
Phases	2 6	Offset 3	0	2	73	0	0.0	84
Secondary		Offset 4	0	3	32	0	0.0	36
Coordinated		Relative Secondary Offset	0	4	18	0	0.0	15
Phases		Permissive Period	Auto	5	15	0	0.0	14
Extra Time		Max Cycle Addition	34	6	73	0	0.0	84
Phases		Max Cycle Subtraction	34	7	15	0	0.0	14
Additional		Coord Actuated Period	0	8	35	0	0.0	36
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0
	_____111	Cycle Length	110			Alternate	Alternate	Alternate
Plan 2	123456789012	Offset 1	90	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	12	0	0.0	11
Phases	2 6	Offset 3	0	2	48	0	0.0	53
Secondary		Offset 4	0	3	30	0	0.0	33
Coordinated		Relative Secondary Offset	0	4	20	0	0.0	18
Phases		Permissive Period	Auto	5	12	0	0.0	11
Extra Time		Max Cycle Addition	27	6	48	0	0.0	53
Phases		Max Cycle Subtraction	27	7	12	0	0.0	11
Additional		Coord Actuated Period	0	8	38	0	0.0	40
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0

Intersection 608 at Black Forrest Rd and Vollmer Rd - Coordination table, plans 3-4

	_____111	Cycle Length	110			Alternate	Alternate	Alternate
Plan 3	123456789012	Offset 1	54	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	12	0	0.0	11
Phases	2 6	Offset 3	0	2	50	0	0.0	55
Secondary		Offset 4	0	3	30	0	0.0	33
Coordinated		Relative Secondary Offset	0	4	18	0	0.0	15
Phases		Permissive Period	Auto	5	12	0	0.0	11
Extra Time		Max Cycle Addition	27	6	50	0	0.0	55
Phases		Max Cycle Subtraction	27	7	12	0	0.0	11
Additional		Coord Actuated Period	0	8	36	0	0.0	38
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0
	_____111	Cycle Length	120			Alternate	Alternate	Alternate
Plan 4	123456789012	Offset 1	60	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	14	0	0.0	13
Phases	2 6	Offset 3	0	2	56	0	0.0	63
Secondary		Offset 4	0	3	28	0	0.0	31
Coordinated		Relative Secondary Offset	0	4	22	0	0.0	20
Phases		Permissive Period	Auto	5	14	0	0.0	13
Extra Time		Max Cycle Addition	30	6	56	0	0.0	63
Phases		Max Cycle Subtraction	30	7	15	0	0.0	14
Additional		Coord Actuated Period	0	8	35	0	0.0	36
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0

Intersection 608 at Black Forrest Rd and Vollmer Rd - Coordination table, plans 5-6

	_____111	Cycle Length	110			Alternate	Alternate	Alternate
Plan 5	123456789012	Offset 1	0	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	13	0	0.0	12
Phases	2 6	Offset 3	0	2	44	0	0.0	48
Secondary		Offset 4	0	3	36	0	0.0	41
Coordinated		Relative Secondary Offset	0	4	17	0	0.0	14
Phases		Permissive Period	Auto	5	13	0	0.0	12
Extra Time		Max Cycle Addition	27	6	44	0	0.0	48
Phases	3	Max Cycle Subtraction	27	7	17	0	0.0	17
Additional		Coord Actuated Period	0	8	36	0	0.0	38
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0
	_____111	Cycle Length	90			Alternate	Alternate	Alternate
Plan 6	123456789012	Offset 1	0	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	12	0	0.0	11
Phases	2 6	Offset 3	0	2	33	0	0.0	34
Secondary		Offset 4	0	3	21	0	0.0	22
Coordinated		Relative Secondary Offset	0	4	24	0	0.0	23
Phases		Permissive Period	Auto	5	12	0	0.0	11
Extra Time		Max Cycle Addition	22	6	33	0	0.0	34
Phases		Max Cycle Subtraction	22	7	12	0	0.0	11
Additional		Coord Actuated Period	0	8	33	0	0.0	34
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0

Intersection 608 at Black Forrest Rd and Vollmer Rd - Schedule table, events 1-25

Event	Ena-		Event Parameters		Start					Duration	Stop		Repetition		
Num	bled	Event Type	Param 1	Param 2	Mon	Day	Hour	Min	Sec	Minutes	Mon	Day	Repeat	Intervals	Priority
1	Yes	Run Plan	Plan 2	Ofst #1	1	1	05	00	00	300	12	31	Weekly	_MTWTF_	Low
2	Yes	Run Plan	Plan 3	Ofst #1	1	1	10	00	00	240	12	31	Weekly	_MTWTF_	Low
3	Yes	Run Plan	Plan 4	Ofst #1	1	1	14	00	00	480	12	31	Weekly	_MTWTF	Very Low
4	Yes	Run Plan	Plan 5	Ofst #1	1	1	10	00	00	600	12	31	Weekly	S S	Low
5	Yes	Run Plan	Plan 6	Ofst #1	1	1	06	00	00	240	12	31	Weekly	S S	Medium
6	Yes	Run Plan	Plan 6	Ofst #1	1	1	18	00	00	240	12	31	Weekly	S S	Medium
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															

Intersection 531 at Woodmen Rd and Black Forrest Rd - Timing table, page 1

Page 1	Phases											
	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	4	15	4	10	4	15	4	10	0	0	0	0
Passage Time I	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0
Passage Time II	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green I	15	40	15	40	20	40	15	40	0	0	0	0
Max Green II	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Clearance	3.0	4.5	3.0	4.0	3.0	4.5	3.0	4.0	0.0	0.0	0.0	0.0
Red Clearance	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0
Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0	0	0	0	0
Time Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Cars Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0
Min Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Green Time	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advance Walk Time	0	0	0	0	0	0	0	0	0	0	0	0
Walk Time	0	7	0	7	0	7	0	7	0	0	0	0
Pedestrian Clearance	0	25	0	25	0	25	0	25	0	0	0	0
Handicap Walk	0	0	0	0	0	0	0	0	0	0	0	0
Handicap Ped Clearance	0	0	0	0	0	0	0	0	0	0	0	0
Woodmen Rd	X	X			X	X						
Black Forrest Rd			X	X			X	X				
Compass Direction	W	E	S	N	E	W	N	S				
Through, Turn or XPed	Left,prt	Thru	Left,p/p	Thru	Left,prt	Thru	Left,prt	Thru				

Intersection 531 at Woodmen Rd and Black Forrest Rd - Sequence table, page 1

Page 1	Ring 1 Phases				Ring 2 Phases				Ring 3 Phases			
	1	2	3	4	5	6	7	8	9	10	11	12
State 1	Vehicle				Vehicle							
Barrier 1												
State 2		V & P				V & P						
Barrier 2	XXXXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXXXX							
State 3			Vehicle				Vehicle					
Barrier 3												
State 4				V & P				V & P				
Barrier 4	XXXXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXXXX							
State 5												
Barrier 5												
State 6												
Barrier 6												
State 7												
Barrier 7												
State 8												
Barrier 8												
State 9												
Barrier 9												
State 10												
Barrier 10												
State 11												
Barrier 11												
State 12												
Barrier 12												

Intersection 531 at Woodmen Rd and Black Forrest Rd - Phases control table, page 1

Page 1	Vehicle Phases 111 123456789012		Ped Phases 111 123456789012
Min Recalls		Ped Recalls	
Max Recalls	2 6	Handicap Ped Recalls	
Recall If Maxed		Soft Ped Recalls	
Dual Entry	4 8	Don't Recall (FDW Offset)	2 4 6 8
Do Not Skip		Allow Walk Reduction	
Simultaneous Gap Out		Hold In Walk	
Restricted Phases		Allow Ped Re-service	2 6
Sequential Initial Timing		Rest In Walk	No
Max Timer Starts For Call			
Reduction Starts For Call			
Red To Avoid Left Turn Trap			
Rest In Red	No		

Intersection 531 at Woodmen Rd and Black Forrest Rd - Coordination table, plans 1-2

	_____111	Cycle Length	138			Alternate	Alternate	Alternate
Plan 1	123456789012	Offset 1	31	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	68	1	22	0	0.0	23
Phases	2 6	Offset 3	0	2	68	0	0.0	79
Secondary		Offset 4	0	3	20	0	0.0	21
Coordinated		Relative Secondary Offset	0	4	28	0	0.0	30
Phases		Permissive Period	Auto	5	22	0	0.0	23
Extra Time		Max Cycle Addition	34	6	68	0	0.0	79
Phases		Max Cycle Subtraction	34	7	20	0	0.0	21
Additional		Coord Actuated Period	0	8	28	0	0.0	30
Max Recalls	5	Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0
	_____111	Cycle Length	110			Alternate	Alternate	Alternate
Plan 2	123456789012	Offset 1	98	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	20	0	0.0	21
Phases	2 6	Offset 3	0	2	47	0	0.0	52
Secondary		Offset 4	0	3	15	0	0.0	14
Coordinated		Relative Secondary Offset	0	4	28	0	0.0	30
Phases		Permissive Period	Auto	5	20	0	0.0	21
Extra Time		Max Cycle Addition	27	6	47	0	0.0	52
Phases		Max Cycle Subtraction	27	7	15	0	0.0	14
Additional		Coord Actuated Period	0	8	28	0	0.0	30
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0

Intersection 531 at Woodmen Rd and Black Forrest Rd - Coordination table, plans 3-4

	_____111	Cycle Length	110			Alternate	Alternate	Alternate
Plan 3	123456789012	Offset 1	64	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	18	0	0.0	18
Phases	2 6	Offset 3	0	2	48	0	0.0	54
Secondary		Offset 4	0	3	15	0	0.0	14
Coordinated		Relative Secondary Offset	0	4	29	0	0.0	31
Phases		Permissive Period	Auto	5	22	0	0.0	23
Extra Time		Max Cycle Addition	27	6	44	0	0.0	49
Phases		Max Cycle Subtraction	27	7	15	0	0.0	14
Additional		Coord Actuated Period	0	8	29	0	0.0	31
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0
	_____111	Cycle Length	120			Alternate	Alternate	Alternate
Plan 4	123456789012	Offset 1	78	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	20	0	0.0	21
Phases	2 6	Offset 3	0	2	55	0	0.0	62
Secondary		Offset 4	0	3	17	0	0.0	17
Coordinated		Relative Secondary Offset	0	4	28	0	0.0	30
Phases		Permissive Period	Auto	5	27	0	0.0	29
Extra Time		Max Cycle Addition	30	6	48	0	0.0	54
Phases	5	Max Cycle Subtraction	30	7	17	0	0.0	17
Additional		Coord Actuated Period	0	8	28	0	0.0	30
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0

Intersection 531 at Woodmen Rd and Black Forrest Rd - Coordination table, plans 5-6

	_____111	Cycle Length	120			Alternate	Alternate	Alternate
Plan 5	123456789012	Offset 1	110	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	15	0	0.0	14
Phases	2 6	Offset 3	0	2	60	0	0.0	69
Secondary		Offset 4	0	3	15	0	0.0	14
Coordinated		Relative Secondary Offset	0	4	30	0	0.0	32
Phases		Permissive Period	Auto	5	27	0	0.0	29
Extra Time		Max Cycle Addition	30	6	48	0	0.0	54
Phases		Max Cycle Subtraction	30	7	15	0	0.0	14
Additional		Coord Actuated Period	0	8	30	0	0.0	32
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0
	_____111	Cycle Length	90			Alternate	Alternate	Alternate
Plan 6	123456789012	Offset 1	0	Phases	Splits	Mins	Passages	Maxes
Coordinated		Offset 2	0	1	15	0	0.0	14
Phases	2 6	Offset 3	0	2	38	0	0.0	41
Secondary		Offset 4	0	3	15	0	0.0	14
Coordinated		Relative Secondary Offset	0	4	22	9	0.0	22
Phases		Permissive Period	Auto	5	15	0	0.0	14
Extra Time		Max Cycle Addition	22	6	38	0	0.0	41
Phases		Max Cycle Subtraction	22	7	15	0	0.0	14
Additional		Coord Actuated Period	0	8	22	9	0.0	22
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0.0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0.0	0
		Big Bang Ped Recovery	No	11	0	0	0.0	0
		Min Lagging Left Split	0%	12	0	0	0.0	0

Intersection 531 at Woodmen Rd and Black Forrest Rd - Schedule table, events 1-25

Event	Ena-		Event Parameters		Start					Duration	Stop		Repetition		
Num	bled	Event Type	Param 1	Param 2	Mon	Day	Hour	Min	Sec	Minutes	Mon	Day	Repeat	Intervals	Priority
1	Yes	Run Plan	Plan 2	Ofst #1	1	1	05	00	00	300	12	31	Weekly	_MTWTF_	Low
2	Yes	Run Plan	Plan 3	Ofst #1	1	1	10	00	00	240	12	31	Weekly	_MTWTF_	Low
3	Yes	Run Plan	Plan 4	Ofst #1	1	1	14	00	00	480	12	31	Weekly	_MTWTF	Very Low
4	Yes	Run Plan	Plan 5	Ofst #1	1	1	10	00	00	600	12	31	Weekly	S S	Low
5	Yes	Run Plan	Plan 6	Ofst #1	1	1	06	00	00	240	12	31	Weekly	S S	Medium
6	Yes	Run Plan	Plan 6	Ofst #1	1	1	18	00	00	240	12	31	Weekly	S S	Medium
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															

Intersection 532 at Woodmen Rd and Marksheffel Rd - Timing table, page 1

Page 1	Phases											
	1	2	3	4	5	6	7	8	9	10	11	12
Min Green	4	10	4	4	4	10	4	4	0	0	0	0
Passage Time I	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0
Passage Time II	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0.0	0.0	0.0	0.0
Max Green I	25	40	20	40	25	40	20	40	0	0	0	0
Max Green II	0	0	0	0	0	0	0	0	0	0	0	0
Yellow Clearance	5.5	5.5	3.0	5.5	3.0	5.5	3.0	5.5	0.0	0.0	0.0	0.0
Red Clearance	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	0.0	0.0	0.0
Added Initial	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Added Initial	0	0	0	0	0	0	0	0	0	0	0	0
Time Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Cars Before Reduction	0	0	0	0	0	0	0	0	0	0	0	0
Time To Reduce	0	0	0	0	0	0	0	0	0	0	0	0
Min Passage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Green Time	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert Time	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advance Walk Time	0	0	0	0	0	0	0	0	0	0	0	0
Walk Time	0	7	0	7	0	7	0	7	0	0	0	0
Pedestrian Clearance	0	32	0	38	0	32	0	38	0	0	0	0
Handicap Walk	0	0	0	0	0	0	0	0	0	0	0	0
Handicap Ped Clearance	0	0	0	0	0	0	0	0	0	0	0	0
Woodmen Rd	X	X			X	X						
Marksheffel Rd			X	X			X	X				
Compass Direction	W	E	S	N	E	W	N	S				
Through, Turn or XPed	Left,prt	Thru	Left,prt	Thru	Left,prt	Thru	Left,prt	Thru				

Intersection 532 at Woodmen Rd and Marksheffel Rd - Sequence table, page 1

Page 1	Ring 1 Phases				Ring 2 Phases				Ring 3 Phases			
	1	2	3	4	5	6	7	8	9	10	11	12
State 1					Vehicle							
Barrier 1												
State 2		V & P				V & P						
Barrier 2												
State 3	Vehicle											
Barrier 3	XXXXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXXXX							
State 4			Vehicle				Vehicle					
Barrier 4												
State 5				V & P				V & P				
Barrier 5	XXXXXXXXXXXXXXXXXXXXXX				XXXXXXXXXXXXXXXXXXXXXX							
State 6												
Barrier 6												
State 7												
Barrier 7												
State 8												
Barrier 8												
State 9												
Barrier 9												
State 10												
Barrier 10												
State 11												
Barrier 11												
State 12												
Barrier 12												

Intersection 532 at Woodmen Rd and Marksheffel Rd - Phases control table, page 1

Page 1	Vehicle Phases 111 123456789012		Ped Phases 111 123456789012
Min Recalls		Ped Recalls	
Max Recalls	2 6	Handicap Ped Recalls	
Recall If Maxed		Soft Ped Recalls	
Dual Entry	4 8	Don't Recall (FDW Offset)	2 4 6 8
Do Not Skip		Allow Walk Reduction	
Simultaneous Gap Out		Hold In Walk	
Restricted Phases	1 5	Allow Ped Re-service	2 6
Sequential Initial Timing		Rest In Walk	No
Max Timer Starts For Call			
Reduction Starts For Call			
Red To Avoid Left Turn Trap			
Rest In Red	No		

Intersection 532 at Woodmen Rd and Marksheffel Rd - Beacons control table, page 1

Page 1			
Output 1		Output 2	
Parent Type	Phase	Parent Type	None
Parent Reference	6	Parent Reference	1
Time Before Yellow	6.8	Time Before Yellow	0.0
Active All During Parent	Yes	Active All During Parent	No
Time During Parent	0	Time During Parent	0
Time After Parent	4	Time After Parent	0
Output 3		Output 4	
Parent Type	None	Parent Type	None
Parent Reference	1	Parent Reference	1
Time Before Yellow	0.0	Time Before Yellow	0.0
Active All During Parent	No	Active All During Parent	No
Time During Parent	0	Time During Parent	0
Time After Parent	0	Time After Parent	0
Output 5		Output 6	
Parent Type	None	Parent Type	None
Parent Reference	1	Parent Reference	1
Time Before Yellow	0.0	Time Before Yellow	0.0
Active All During Parent	No	Active All During Parent	No
Time During Parent	0	Time During Parent	0
Time After Parent	0	Time After Parent	0

Intersection 532 at Woodmen Rd and Marksheffel Rd - Coordination table, plans 1-2

Plan 1	111 123456789012	Cycle Length	138	Phases	Splits	Alternate Mins	Alternate Walks	Alternate Maxes
Coordinated		Offset 1	100					
Phases	2 6	Offset 2	2	1	25	0	0	24
Secondary		Offset 3	0	2	54	0	0	60
Coordinated		Offset 4	0	3	21	0	0	22
Phases		Relative Secondary Offset	0	4	38	0	0	40
Extra Time		Permissive Period	Auto	5	17	0	0	17
Phases		Max Cycle Addition	34	6	62	0	0	70
Additional		Max Cycle Subtraction	34	7	32	0	0	36
Max Recalls	1	Coord Actuated Period	0	8	27	0	0	26
Units	Seconds	Top Of Cycle Green Point	End	9	0	0	0	0
		Big Bang Preempt Recvry	No	10	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0
Plan 2	111 123456789012	Cycle Length	110	Phases	Splits	Alternate Mins	Alternate Walks	Alternate Maxes
Coordinated		Offset 1	76					
Phases	2 6	Offset 2	2	1	27	0	0	26
Secondary		Offset 3	0	2	32	0	0	33
Coordinated		Offset 4	0	3	16	0	0	16
Phases		Relative Secondary Offset	0	4	35	0	0	36
Extra Time		Permissive Period	Auto	5	15	0	0	14
Phases		Max Cycle Addition	27	6	44	0	0	48
Additional		Max Cycle Subtraction	27	7	25	0	0	27
Max Recalls	1	Coord Actuated Period	0	8	26	0	0	25
Units	Seconds	Top Of Cycle Green Point	End	9	0	0	0	0
		Big Bang Preempt Recvry	No	10	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0

Intersection 532 at Woodmen Rd and Marksheffel Rd - Coordination table, plans 3-4

	111	Cycle Length	110			Alternate	Alternate	Alternate
Plan 3	123456789012	Offset 1	12	Phases	Splits	Mins	Walks	Maxes
Coordinated		Offset 2	0	1	27	0	0	26
Phases	2 6	Offset 3	0	2	32	0	0	33
Secondary		Offset 4	0	3	15	0	0	14
Coordinated		Relative Secondary Offset	0	4	36	0	0	38
Phases		Permissive Period	Auto	5	17	0	0	17
Extra Time		Max Cycle Addition	27	6	42	0	0	45
Phases		Max Cycle Subtraction	27	7	25	0	0	27
Additional		Coord Actuated Period	0	8	26	0	0	25
Max Recalls	1	Top Of Cycle Green Point	End	9	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0
	111	Cycle Length	120			Alternate	Alternate	Alternate
Plan 4	123456789012	Offset 1	26	Phases	Splits	Mins	Walks	Maxes
Coordinated		Offset 2	0	1	24	0	0	23
Phases	2 6	Offset 3	0	2	45	0	0	49
Secondary		Offset 4	0	3	15	0	0	14
Coordinated		Relative Secondary Offset	0	4	36	0	0	38
Phases		Permissive Period	Auto	5	17	0	0	17
Extra Time		Max Cycle Addition	30	6	52	0	0	58
Phases		Max Cycle Subtraction	30	7	27	0	0	29
Additional		Coord Actuated Period	0	8	24	0	0	23
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0

Intersection 532 at Woodmen Rd and Marksheffel Rd - Coordination table, plans 5-6

	111	Cycle Length	120					
Plan 5	123456789012	Offset 1	58	Phases	Splits	Alternate Mins	Alternate Walks	Alternate Maxes
Coordinated		Offset 2	0	1	24	0	0	23
Phases	2 6	Offset 3	0	2	45	0	0	49
Secondary		Offset 4	0	3	15	0	0	14
Coordinated		Relative Secondary Offset	0	4	36	0	0	38
Phases		Permissive Period	Auto	5	17	0	0	17
Extra Time		Max Cycle Addition	30	6	52	0	0	58
Phases		Max Cycle Subtraction	30	7	27	0	0	29
Additional		Coord Actuated Period	0	8	24	0	0	23
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0
	111	Cycle Length	90					
Plan 6	123456789012	Offset 1	0	Phases	Splits	Alternate Mins	Alternate Walks	Alternate Maxes
Coordinated		Offset 2	0	1	21	0	0	19
Phases	2 6	Offset 3	0	2	29	0	0	29
Secondary		Offset 4	0	3	15	0	0	14
Coordinated		Relative Secondary Offset	0	4	25	0	0	24
Phases		Permissive Period	Auto	5	17	0	0	17
Extra Time		Max Cycle Addition	22	6	33	0	0	34
Phases		Max Cycle Subtraction	22	7	20	0	0	21
Additional		Coord Actuated Period	0	8	20	0	0	18
Max Recalls		Top Of Cycle Green Point	End	9	0	0	0	0
Units	Seconds	Big Bang Preempt Recvry	No	10	0	0	0	0
		Big Bang Ped Recovery	No	11	0	0	0	0
		Min Lagging Left Split	0%	12	0	0	0	0

Intersection 532 at Woodmen Rd and Marksheffel Rd - Schedule table, events 1-25

Event Num	Enabled	Event Type	Event Parameters		Start					Duration	Stop		Repetition		Priority
			Param 1	Param 2	Mon	Day	Hour	Min	Sec	Minutes	Mon	Day	Repeat	Intervals	
1	Yes	Run Plan	Plan 2	Ofst #1	1	1	05	00	00	300	12	31	Weekly	MTWTF	Low
2	Yes	Run Plan	Plan 3	Ofst #1	1	1	10	00	00	240	12	31	Weekly	MTWTF	Low
3	Yes	Run Plan	Plan 4	Ofst #1	1	1	14	00	00	480	12	31	Weekly	MTWTF	Very Low
4	Yes	Run Plan	Plan 5	Ofst #1	1	1	10	00	00	600	12	31	Weekly	S S	Low
5	Yes	Run Plan	Plan 6	Ofst #1	1	1	06	00	00	240	12	31	Weekly	S S	Medium
6	Yes	Run Plan	Plan 6	Ofst #1	1	1	18	00	00	240	12	31	Weekly	S S	Medium
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															

APPENDIX B

Internal Capture Worksheets

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	SR Land Triangle Commercial	**Organization:**	SM ROCHA, LLC
Project Location:	SEC Vollmer & Marksheffel	**Performed By:**	LO
Scenario Description:		**Date:**	10/12/2026
Analysis Year:		**Checked By:**	BW
Analysis Period:	**AM Street Peak Hour**	**Date:**	10/12/2026

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822,945,948	31	KSF	446	229	217
Restaurant	937	2	KSF	171	87	84
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses[2]				0		
				617	316	301

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		28	0	0	0
Restaurant	0	12		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	617	316	301
Internal Capture Percentage	13%	13%	13%
External Vehicle-Trips[5]	537	276	261
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	5%	13%
Restaurant	32%	14%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	SR Land Triangle Commercial
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	229	229	1.00	217	217
Restaurant	1.00	87	87	1.00	84	84
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	63		28	0	30	0
Restaurant	26	12		0	3	3
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		73	20	0	0	0
Retail	0		44	0	0	0
Restaurant	0	18		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	39	17	0		0
Hotel	0	9	5	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	12	217	229	217	0	0
Restaurant	28	59	87	59	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	28	189	217	189	0	0
Restaurant	12	72	84	72	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	SR Land Triangle Commercial	**Organization:**	SM ROCHA, LLC
Project Location:	SEC Vollmer & Marksheffel	**Performed By:**	LO
Scenario Description:		**Date:**	10/12/2026
Analysis Year:		**Checked By:**	BW
Analysis Period:	**PM Street Peak Hour**	**Date:**	10/12/2026

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	822,945,948	31	KSF	493	246	247
Restaurant	937	2	KSF	78	39	39
Cinema/Entertainment				0		
Residential				0		
Hotel				0		
All Other Land Uses[2]				0		
				571	285	286

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		11	0	0	0
Restaurant	0	16		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	571	285	286
Internal Capture Percentage	9%	9%	9%
External Vehicle-Trips[5]	517	258	259
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	7%	4%
Restaurant	28%	41%
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	SR Land Triangle Commercial
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	246	246	1.00	247	247
Restaurant	1.00	39	39	1.00	39	39
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	5		72	10	64	12
Restaurant	1	16		3	7	3
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		20	1	0	0	0
Retail	0		11	0	0	0
Restaurant	0	123		0	0	0
Cinema/Entertainment	0	10	1		0	0
Residential	0	25	5	0		0
Hotel	0	5	2	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	16	230	246	230	0	0
Restaurant	11	28	39	28	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	11	236	247	236	0	0
Restaurant	16	23	39	23	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

APPENDIX C

Level of Service Definitions

The following information is referenced from the Highway Capacity Manual: A Guide for Multimodal Mobility Analysis, 7th Edition, Transportation Research Board, 2022: Chapter 19 – Signalized Intersections.

Motorized Vehicle Level of Service (LOS) for Signalized Intersections

Levels of service are defined to represent reasonable ranges in control delay.

LOS A Describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

LOS B Describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

LOS C Describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

LOS D Describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

LOS E Describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

LOS F Describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio[a]	
	$v/c \leq 1.0$	$v/c > 1.0$
≤ 10	A	F
> 10 – 20	B	F
> 20 – 35	C	F
> 35 – 55	D	F
> 55 – 80	E	F
> 80	F	F

Note: [a] For approach-based and intersectionwide assessments, LOS is defined solely by control delay.

The following information is referenced from the Highway Capacity Manual: A Guide for Multimodal Mobility Analysis, 7th Edition, Transportation Research Board, 2022: Chapter 20 – Two-Way Stop-Controlled Intersections, Chapter 21 – All-Way Stop-Controlled Intersections, and Chapter 22 - Roundabouts.

Motorized Vehicle Level of Service (LOS) for Unsignalized & Roundabout Intersections

LOS is a quantitative stratification of performance measure(s) representing quality of service. Quality of service describes how well a transportation facility or service operates from a traveler's perspective. LOS is measured on an A – F scale, with LOS A representing the best operating conditions from a traveler's perspective.

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio[a]	
	$v/c \leq 1.0$	$v/c > 1.0$
0 – 10	A	F
> 10 – 15	B	F
> 15 – 25	C	F
> 25 – 35	D	F
> 35 – 50	E	F
> 50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

[a] For approaches and intersectionwide assessment, LOS is defined solely by control delay.

APPENDIX D

Capacity Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	552	186	192	1255	113	318	198	119	105	194	176
Future Volume (vph)	145	552	186	192	1255	113	318	198	119	105	194	176
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			342			342			342			342
Lane Group Flow (vph)	158	600	202	209	1364	123	346	215	129	114	211	191
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	15.0	32.0		27.0	44.0		25.0	35.0		16.0	26.0	
Total Split (%)	13.6%	29.1%		24.5%	40.0%		22.7%	31.8%		14.5%	23.6%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	10.4	24.5	110.0	30.0	46.6	110.0	16.2	19.1	110.0	8.9	11.9	110.0
Actuated g/C Ratio	0.09	0.22	1.00	0.27	0.42	1.00	0.15	0.17	1.00	0.08	0.11	1.00
v/c Ratio	0.49	0.53	0.13	0.22	0.63	0.08	0.69	0.35	0.08	0.41	0.55	0.12
Control Delay (s/veh)	57.6	26.8	0.2	33.3	27.9	0.1	51.6	40.8	0.1	52.1	51.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	57.6	26.8	0.2	33.3	27.9	0.1	51.6	40.8	0.1	52.1	51.9	0.2
LOS	E	C	A	C	C	A	D	D	A	D	D	A
Approach Delay (s/veh)		26.3			26.6			38.6			32.8	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	59	63	0	59	277	0	122	72	0	40	76	0
Queue Length 95th (ft)	96	98	0	101	384	0	165	103	0	69	113	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	344	1132	1583	935	2154	1583	624	884	1583	343	595	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.53	0.13	0.22	0.63	0.08	0.55	0.24	0.08	0.33	0.35	0.12

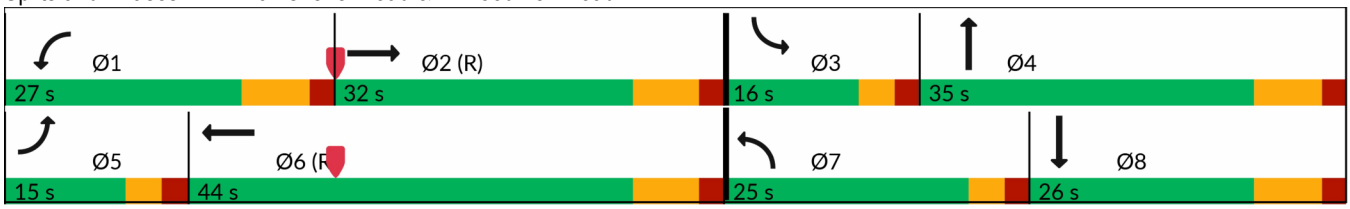
Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 76 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay (s/veh): 29.5	Intersection LOS: C
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	316	757	100	69	1562	104	114	171	64	105	163	547
Future Volume (vph)	316	757	100	69	1562	104	114	171	64	105	163	547
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.635		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	2295	3539	1583
Satd. Flow (RTOR)			129			129			134			279
Lane Group Flow (vph)	343	823	109	75	1698	113	124	186	70	114	177	595
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	20.0	47.0	47.0	20.0	47.0	47.0	15.0	28.0	28.0	15.0	28.0	28.0
Total Split (%)	18.2%	42.7%	42.7%	18.2%	42.7%	42.7%	13.6%	25.5%	25.5%	13.6%	25.5%	25.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	14.3	47.7	47.7	10.0	41.2	41.2	8.9	24.1	24.1	32.0	23.1	23.1
Actuated g/C Ratio	0.13	0.43	0.43	0.09	0.37	0.37	0.08	0.22	0.22	0.29	0.21	0.21
v/c Ratio	0.77	0.37	0.14	0.47	0.89	0.17	0.45	0.24	0.16	0.15	0.24	1.08
Control Delay (s/veh)	58.5	22.7	3.1	41.6	50.7	13.7	53.2	36.8	0.7	18.6	26.6	77.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	58.5	22.7	3.1	41.6	50.7	13.7	53.2	36.8	0.7	18.6	26.6	77.3
LOS	E	C	A	D	D	B	D	D	A	B	C	E
Approach Delay (s/veh)		30.6			48.2			35.5			59.6	
Approach LOS		C			D			D			E	
Queue Length 50th (ft)	123	148	0	54	478	25	44	58	0	15	30	~278
Queue Length 95th (ft)	174	197	26	m74	#534	m73	74	93	0	37	68	#583
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	468	2206	759	241	1904	673	312	774	451	815	743	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.37	0.14	0.31	0.89	0.17	0.40	0.24	0.16	0.14	0.24	1.08

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 98 (89%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

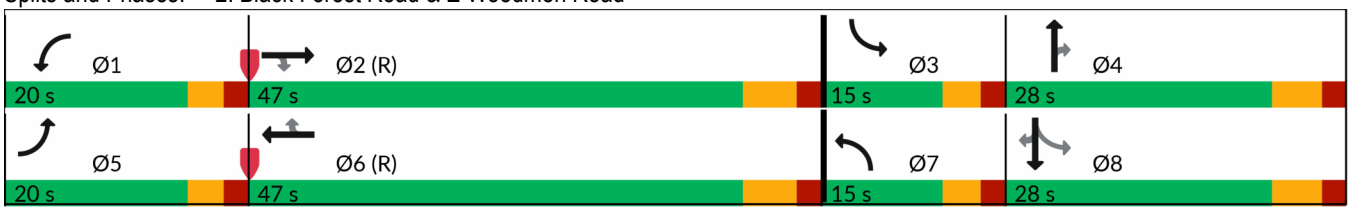
Intersection Signal Delay (s/veh): 44.3	Intersection LOS: D
Intersection Capacity Utilization 82.0%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	410	0	27	19	0	361	244	11	405
Future Volume (vph)	0	0	0	410	0	27	19	0	361	244	11	405
Satd. Flow (prot)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Flt Permitted				0.950				0.950			0.950	
Satd. Flow (perm)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Satd. Flow (RTOR)						483				265		
Lane Group Flow (vph)	0	0	0	446	0	29	0	21	392	265	12	440
Turn Type	Prot			Prot		Perm	Prot	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		5	5	2		1	6
Permitted Phases						8				2		
Detector Phase	7	4		3	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	9.0	17.5	17.5	9.0	17.5
Total Split (s)	12.0	20.0		30.0	38.0	38.0	12.0	12.0	48.0	48.0	12.0	48.0
Total Split (%)	10.9%	18.2%		27.3%	34.5%	34.5%	10.9%	10.9%	43.6%	43.6%	10.9%	43.6%
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	3.0	5.5	5.5	3.0	5.5
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)				19.4		16.9		6.9	75.7	75.7	5.9	72.8
Actuated g/C Ratio				0.18		0.15		0.06	0.69	0.69	0.05	0.66
v/c Ratio				0.74		0.04		0.19	0.16	0.23	0.07	0.19
Control Delay (s/veh)				50.2		0.1		75.7	0.6	0.5	49.9	8.9
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)				50.2		0.1		75.7	0.6	0.5	49.9	8.9
LOS				D		A		E	A	A	D	A
Approach Delay (s/veh)					47.2				2.9			10.0
Approach LOS					D				A			A
Queue Length 50th (ft)				157		0		16	2	0	4	48
Queue Length 95th (ft)				203		0		m34	6	m0	14	113
Internal Link Dist (ft)		100			374				923			1202
Turn Bay Length (ft)				210				50		585	260	
Base Capacity (vph)				780		788		120	2436	1172	218	2341
Starvation Cap Reductn				0		0		0	0	0	0	0
Spillback Cap Reductn				0		0		0	0	0	0	0
Storage Cap Reductn				0		0		0	0	0	0	0
Reduced v/c Ratio				0.57		0.04		0.18	0.16	0.23	0.06	0.19

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 90 (82%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Satd. Flow (prot)	1863
Flt Permitted	
Satd. Flow (perm)	1863
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	17.5
Total Split (s)	48.0
Total Split (%)	43.6%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

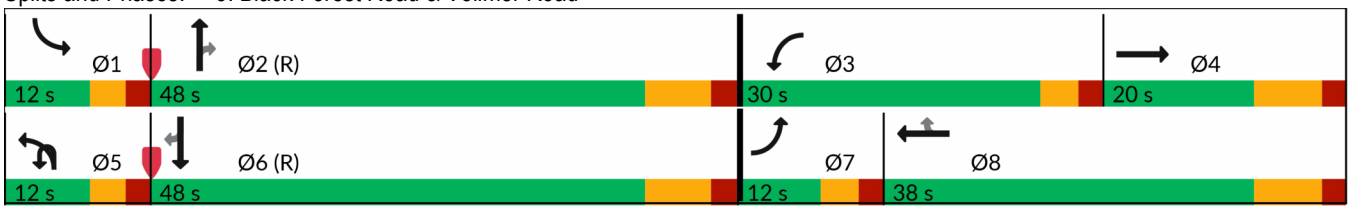
Intersection Summary

Maximum v/c Ratio: 0.74

Intersection Signal Delay (s/veh): 18.0	Intersection LOS: B
Intersection Capacity Utilization 40.0%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



Intersection	
Int Delay, s/veh	2.6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	40	2	54	0	174	39	68	247	0
Future Vol, veh/h	0	0	0	40	2	54	0	174	39	68	247	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	410	-	205	-	-	250	245	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	43	2	59	0	189	42	74	268	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	512	648	134	471	605	95	268	0	0	232	0	0
Stage 1	416	416	-	189	189	-	-	-	-	-	-	-
Stage 2	96	232	-	282	416	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	445	388	890	476	410	944	1292	-	-	1333	-	-
Stage 1	584	590	-	794	743	-	-	-	-	-	-	-
Stage 2	900	712	-	701	590	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	392	366	890	449	387	944	1292	-	-	1333	-	-
Mov Cap-2 Maneuver	392	366	-	449	387	-	-	-	-	-	-	-
Stage 1	552	557	-	794	743	-	-	-	-	-	-	-
Stage 2	842	712	-	662	557	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	0	11.18	0	1.7
HCM LOS	A	B		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	NWLn2	NWLn3	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1292	-	-	449	387	944	-	1333	-	-
HCM Lane V/C Ratio	-	-	-	0.097	0.006	0.062	-	0.055	-	-
HCM Ctrl Dly (s/v)	0	-	-	13.9	14.3	9.1	0	7.9	-	-
HCM Lane LOS	A	-	-	B	B	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0.2	-	0.2	-	-

Intersection	
Int Delay, s/veh	3.9

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	23	80	3	3	59	79	5	8	2	73	7	32
Future Vol, veh/h	23	80	3	3	59	79	5	8	2	73	7	32
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	250	-	190	230	-	230	-	-	-	345	-	300
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	25	87	3	3	64	86	5	9	2	79	8	35

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	150	0	0	90	0	0	179	293	43	168	211	32
Stage 1	-	-	-	-	-	-	137	137	-	71	71	-
Stage 2	-	-	-	-	-	-	42	157	-	98	140	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1429	-	-	1503	-	-	766	616	1017	779	685	1034
Stage 1	-	-	-	-	-	-	852	782	-	931	835	-
Stage 2	-	-	-	-	-	-	967	767	-	898	780	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1429	-	-	1503	-	-	718	604	1017	752	672	1034
Mov Cap-2 Maneuver	-	-	-	-	-	-	718	604	-	752	672	-
Stage 1	-	-	-	-	-	-	837	769	-	929	834	-
Stage 2	-	-	-	-	-	-	924	765	-	870	766	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	1.64	0.16	10.45	9.86
HCM LOS			B	A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1	SWLn2	SWLn3
Capacity (veh/h)	676	1503	-	-	1429	-	-	752	672	1034
HCM Lane V/C Ratio	0.024	0.002	-	-	0.017	-	-	0.106	0.011	0.034
HCM Ctrl Dly (s/v)	10.5	7.4	-	-	7.6	-	-	10.4	10.4	8.6
HCM Lane LOS	B	A	-	-	A	-	-	B	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.4	0	0.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	232	1525	369	280	1104	173	253	239	226	179	237	143
Future Volume (vph)	232	1525	369	280	1104	173	253	239	226	179	237	143
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			337			245			246			245
Lane Group Flow (vph)	252	1658	401	304	1200	188	275	260	246	195	258	155
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	17.0	45.0		24.0	52.0		27.0	36.0		15.0	24.0	
Total Split (%)	14.2%	37.5%		20.0%	43.3%		22.5%	30.0%		12.5%	20.0%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	13.4	37.5	120.0	26.1	52.7	120.0	14.9	19.1	120.0	9.8	14.0	120.0
Actuated g/C Ratio	0.11	0.31	1.00	0.22	0.44	1.00	0.12	0.16	1.00	0.08	0.12	1.00
v/c Ratio	0.66	1.04	0.25	0.41	0.54	0.12	0.65	0.46	0.16	0.70	0.63	0.10
Control Delay (s/veh)	50.7	76.1	0.2	43.7	26.9	0.2	57.1	47.5	0.2	67.6	57.1	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	50.7	76.1	0.2	43.7	26.9	0.2	57.1	47.5	0.2	67.6	57.1	0.1
LOS	D	E	A	D	C	A	E	D	A	E	E	A
Approach Delay (s/veh)		60.2			27.0			36.0			45.9	
Approach LOS		E			C			D			D	
Queue Length 50th (ft)	106	~498	0	106	252	0	107	98	0	78	103	0
Queue Length 95th (ft)	m122	#598	m0	163	333	0	148	132	0	#120	144	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	392	1589	1583	747	2234	1583	629	840	1583	286	493	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	1.04	0.25	0.41	0.54	0.12	0.44	0.31	0.16	0.68	0.52	0.10

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 26 (22%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay (s/veh): 44.6	Intersection LOS: D
Intersection Capacity Utilization 74.1%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	516	1843	142	99	1250	102	118	359	143	169	231	479
Future Volume (vph)	516	1843	142	99	1250	102	118	359	143	169	231	479
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.367		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1326	3539	1583
Satd. Flow (RTOR)			154			164			168			301
Lane Group Flow (vph)	561	2003	154	108	1359	111	128	390	155	184	251	521
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	27.0	55.0	55.0	20.0	48.0	48.0	17.0	28.0	28.0	17.0	28.0	28.0
Total Split (%)	22.5%	45.8%	45.8%	16.7%	40.0%	40.0%	14.2%	23.3%	23.3%	14.2%	23.3%	23.3%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	21.6	52.7	52.7	12.1	43.2	43.2	9.7	22.7	22.7	33.9	23.0	23.0
Actuated g/C Ratio	0.18	0.44	0.44	0.10	0.36	0.36	0.08	0.19	0.19	0.28	0.19	0.19
v/c Ratio	0.91	0.90	0.20	0.61	0.74	0.16	0.46	0.58	0.36	0.34	0.37	0.95
Control Delay (s/veh)	67.9	38.4	4.1	51.6	50.7	15.0	57.8	48.2	7.5	22.9	33.0	40.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	67.9	38.4	4.1	51.6	50.7	15.0	57.8	48.2	7.5	22.9	33.0	40.7
LOS	E	D	A	D	D	B	E	D	A	C	C	D
Approach Delay (s/veh)		42.6			48.2			40.7			35.3	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	224	539	0	77	319	10	50	146	0	29	66	163
Queue Length 95th (ft)	#322	#682	42	138	455	71	81	204	49	69	144	#482
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	629	2233	781	221	1830	674	343	684	441	608	687	550
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.90	0.20	0.49	0.74	0.16	0.37	0.57	0.35	0.30	0.37	0.95

Intersection Summary

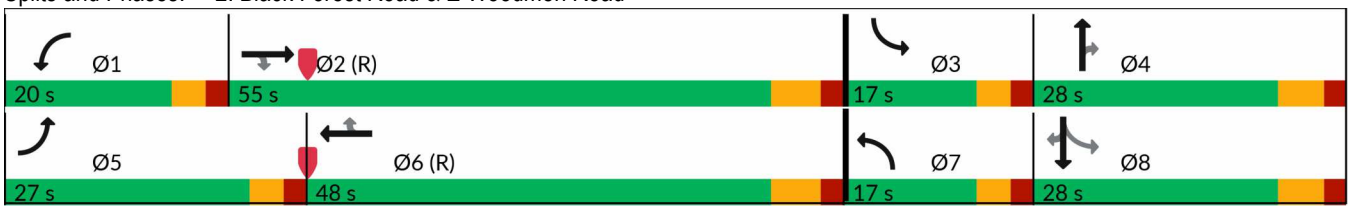
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 78 (65%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay (s/veh): 42.7	Intersection LOS: D
Intersection Capacity Utilization 74.6%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	372	0	8	7	0	455	518	18	515
Future Volume (vph)	0	0	0	372	0	8	7	0	455	518	18	515
Satd. Flow (prot)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Flt Permitted				0.950				0.950			0.950	
Satd. Flow (perm)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Satd. Flow (RTOR)						465				563		
Lane Group Flow (vph)	0	0	0	404	0	9	0	8	495	563	20	560
Turn Type	Prot			Prot		Perm	Prot	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		5	5	2		1	6
Permitted Phases						8				2		
Detector Phase	7	4		3	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	9.0	17.5	17.5	9.0	17.5
Total Split (s)	15.0	22.0		28.0	35.0	35.0	14.0	14.0	56.0	56.0	14.0	56.0
Total Split (%)	12.5%	18.3%		23.3%	29.2%	29.2%	11.7%	11.7%	46.7%	46.7%	11.7%	46.7%
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	3.0	5.5	5.5	3.0	5.5
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)				19.1		16.6		6.2	83.7	83.7	6.2	86.0
Actuated g/C Ratio				0.16		0.14		0.05	0.70	0.70	0.05	0.72
v/c Ratio				0.74		0.01		0.09	0.20	0.44	0.11	0.22
Control Delay (s/veh)				56.6		0.0		79.7	0.5	2.6	55.3	6.8
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)				56.6		0.0		79.7	0.5	2.6	55.3	6.8
LOS				E		A		E	A	A	E	A
Approach Delay (s/veh)					55.4				2.2			8.5
Approach LOS					E				A			A
Queue Length 50th (ft)				157		0		7	4	23	7	63
Queue Length 95th (ft)				206		0		m11	m4	m59	21	134
Internal Link Dist (ft)		100			374				923			1202
Turn Bay Length (ft)				210				50		585	260	
Base Capacity (vph)				657		721		132	2468	1274	257	2535
Starvation Cap Reductn				0		0		0	0	0	0	0
Spillback Cap Reductn				0		0		0	0	0	0	0
Storage Cap Reductn				0		0		0	0	0	0	0
Reduced v/c Ratio				0.61		0.01		0.06	0.20	0.44	0.08	0.22

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 60 (50%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Satd. Flow (prot)	1863
Flt Permitted	
Satd. Flow (perm)	1863
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	17.5
Total Split (s)	56.0
Total Split (%)	46.7%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

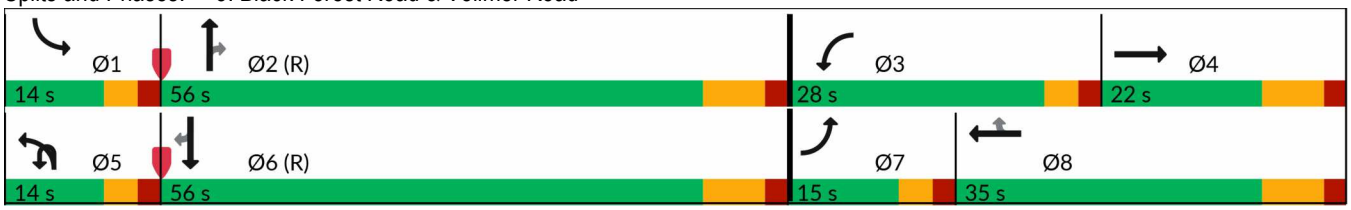
Intersection Summary

Maximum v/c Ratio: 0.74

Intersection Signal Delay (s/veh): 14.7	Intersection LOS: B
Intersection Capacity Utilization 45.8%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



Intersection	
Int Delay, s/veh	3.1

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	7	0	1	34	1	93	0	259	54	89	203	8
Future Vol, veh/h	7	0	1	34	1	93	0	259	54	89	203	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	410	-	205	-	-	250	245	-	-
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	1	37	1	101	0	282	59	97	221	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	560	759	115	585	704	141	229	0	0	340	0	0
Stage 1	418	418	-	282	282	-	-	-	-	-	-	-
Stage 2	141	340	-	304	423	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	411	335	916	394	360	881	1336	-	-	1216	-	-
Stage 1	583	589	-	702	677	-	-	-	-	-	-	-
Stage 2	847	638	-	681	586	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	334	308	916	362	331	881	1336	-	-	1216	-	-
Mov Cap-2 Maneuver	334	308	-	362	331	-	-	-	-	-	-	-
Stage 1	536	542	-	702	677	-	-	-	-	-	-	-
Stage 2	749	638	-	626	539	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	15.16	11.37	0	2.44
HCM LOS	C	B		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	NWLn2	NWLn3	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1336	-	-	362	331	881	363	1216	-	-
HCM Lane V/C Ratio	-	-	-	0.102	0.003	0.115	0.024	0.08	-	-
HCM Ctrl Dly (s/v)	0	-	-	16.1	15.9	9.6	15.2	8.2	-	-
HCM Lane LOS	A	-	-	C	C	A	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0.4	0.1	0.3	-	-

Intersection	
Int Delay, s/veh	12

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	22	88	4	1	99	98	0	259	54	89	203	8
Future Vol, veh/h	22	88	4	1	99	98	0	259	54	89	203	8
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	250	-	190	230	-	230	-	-	-	345	-	300
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	96	4	1	108	107	0	282	59	97	221	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	214	0	0	100	0	0	310	360	48	346	258	54
Stage 1	-	-	-	-	-	-	143	143	-	110	110	-
Stage 2	-	-	-	-	-	-	166	216	-	236	148	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1353	-	-	1490	-	-	620	566	1011	584	645	1002
Stage 1	-	-	-	-	-	-	845	777	-	884	804	-
Stage 2	-	-	-	-	-	-	819	723	-	746	774	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1353	-	-	1490	-	-	395	555	1011	269	633	1002
Mov Cap-2 Maneuver	-	-	-	-	-	-	395	555	-	269	633	-
Stage 1	-	-	-	-	-	-	830	763	-	883	803	-
Stage 2	-	-	-	-	-	-	589	722	-	435	760	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	1.49	0.04	18.46	17.13
HCM LOS			C	C

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1	SWLn2	SWLn3
Capacity (veh/h)	602	1490	-	-	1353	-	-	269	633	1002
HCM Lane V/C Ratio	0.565	0.001	-	-	0.018	-	-	0.36	0.348	0.009
HCM Ctrl Dly (s/v)	18.5	7.4	-	-	7.7	-	-	25.8	13.7	8.6
HCM Lane LOS	C	A	-	-	A	-	-	D	B	A
HCM 95th %tile Q(veh)	3.5	0	-	-	0.1	-	-	1.6	1.6	0

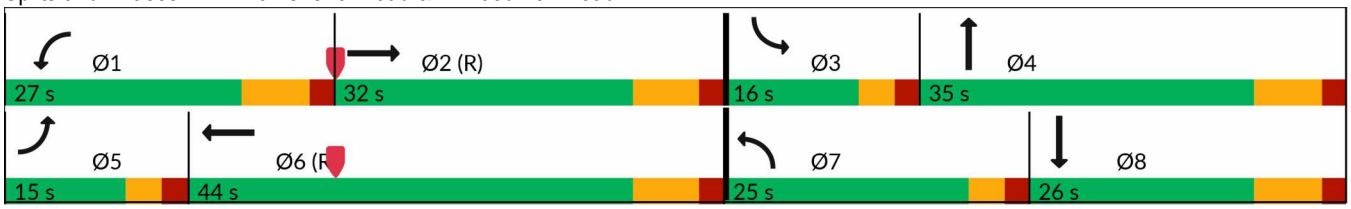
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	574	194	200	1306	124	331	215	124	126	227	277
Future Volume (vph)	186	574	194	200	1306	124	331	215	124	126	227	277
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			342			342			342			342
Lane Group Flow (vph)	202	624	211	217	1420	135	360	234	135	137	247	301
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	15.0	32.0		27.0	44.0		25.0	35.0		16.0	26.0	
Total Split (%)	13.6%	29.1%		24.5%	40.0%		22.7%	31.8%		14.5%	23.6%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	11.2	24.5	110.0	28.5	44.4	110.0	16.5	20.0	110.0	9.4	13.0	110.0
Actuated g/C Ratio	0.10	0.22	1.00	0.26	0.40	1.00	0.15	0.18	1.00	0.09	0.12	1.00
v/c Ratio	0.58	0.55	0.13	0.24	0.69	0.09	0.70	0.36	0.09	0.47	0.59	0.19
Control Delay (s/veh)	59.2	28.2	0.2	34.7	30.6	0.1	51.8	40.2	0.1	52.9	51.7	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	59.2	28.2	0.2	34.7	30.6	0.1	51.8	40.2	0.1	52.9	51.7	0.3
LOS	E	C	A	C	C	A	D	D	A	D	D	A
Approach Delay (s/veh)		28.5			28.8			38.5			29.3	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	76	69	0	63	307	0	127	78	0	48	90	0
Queue Length 95th (ft)	117	111	0	105	406	0	172	110	0	80	128	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	357	1132	1583	890	2051	1583	624	884	1583	343	595	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.55	0.13	0.24	0.69	0.09	0.58	0.26	0.09	0.40	0.42	0.19

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 76 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay (s/veh): 30.5	Intersection LOS: C
Intersection Capacity Utilization 67.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	346	788	104	72	1625	120	119	178	67	142	170	615
Future Volume (vph)	346	788	104	72	1625	120	119	178	67	142	170	615
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.630		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	2277	3539	1583
Satd. Flow (RTOR)			129			129			134			276
Lane Group Flow (vph)	376	857	113	78	1766	130	129	193	73	154	185	668
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	20.0	47.0	47.0	20.0	47.0	47.0	15.0	28.0	28.0	15.0	28.0	28.0
Total Split (%)	18.2%	42.7%	42.7%	18.2%	42.7%	42.7%	13.6%	25.5%	25.5%	13.6%	25.5%	25.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	14.6	47.6	47.6	10.2	40.9	40.9	9.0	23.3	23.3	32.7	23.0	23.0
Actuated g/C Ratio	0.13	0.43	0.43	0.09	0.37	0.37	0.08	0.21	0.21	0.30	0.21	0.21
v/c Ratio	0.82	0.39	0.15	0.48	0.93	0.19	0.46	0.26	0.17	0.20	0.25	1.22
Control Delay (s/veh)	62.2	23.0	3.4	40.9	52.4	14.1	53.5	37.6	1.0	19.1	26.8	130.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	62.2	23.0	3.4	40.9	52.4	14.1	53.5	37.6	1.0	19.1	26.8	130.5
LOS	E	C	A	D	D	B	D	D	A	B	C	F
Approach Delay (s/veh)		32.3			49.4			36.0			94.4	
Approach LOS		C			D			D			F	
Queue Length 50th (ft)	136	156	0	55	496	33	45	61	0	26	38	~469
Queue Length 95th (ft)	#206	206	29	m71	#570	m78	77	96	2	m41	m60	#704
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	468	2199	757	241	1889	669	312	750	441	809	741	549
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.39	0.15	0.32	0.93	0.19	0.41	0.26	0.17	0.19	0.25	1.22

Intersection Summary

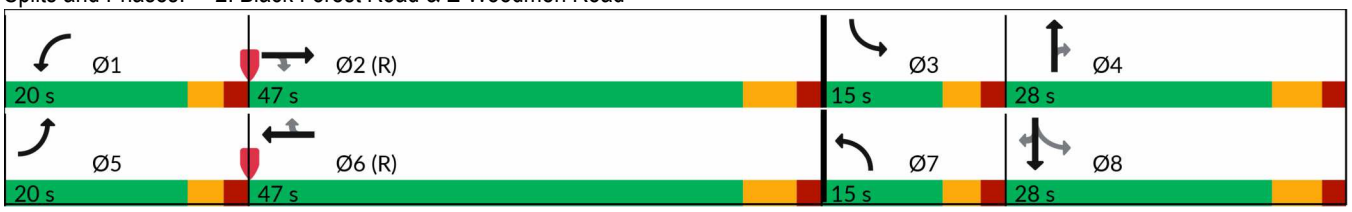
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 98 (89%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.22

Intersection Signal Delay (s/veh): 53.0	Intersection LOS: D
Intersection Capacity Utilization 87.5%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	506	0	28	20	0	405	254	23	421
Future Volume (vph)	0	0	0	506	0	28	20	0	405	254	23	421
Satd. Flow (prot)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	1863	1863	0	3433	1863	1583	0	1863	3539	1583	3433	3539
Satd. Flow (RTOR)						450				276		
Lane Group Flow (vph)	0	0	0	550	0	30	0	22	440	276	25	458
Turn Type	Prot			Prot		Perm	custom	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8			5	2		1	6
Permitted Phases						8	5			2		
Detector Phase	7	4		3	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	9.0	17.5	17.5	9.0	17.5
Total Split (s)	12.0	20.0		30.0	38.0	38.0	12.0	12.0	48.0	48.0	12.0	48.0
Total Split (%)	10.9%	18.2%		27.3%	34.5%	34.5%	10.9%	10.9%	43.6%	43.6%	10.9%	43.6%
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	3.0	5.5	5.5	3.0	5.5
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)				22.1		19.6		7.9	68.4	68.4	6.3	69.4
Actuated g/C Ratio				0.20		0.18		0.07	0.62	0.62	0.06	0.63
v/c Ratio				0.80		0.05		0.16	0.20	0.25	0.13	0.21
Control Delay (s/veh)				51.0		0.1		72.2	1.2	0.7	50.3	10.5
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)				51.0		0.1		72.2	1.2	0.7	50.3	10.5
LOS				D		A		E	A	A	D	B
Approach Delay (s/veh)					48.4				3.1			12.5
Approach LOS					D				A			B
Queue Length 50th (ft)				193		0		17	5	0	8	56
Queue Length 95th (ft)				250		0		m30	m7	m0	23	125
Internal Link Dist (ft)		100			374				923			1202
Turn Bay Length (ft)				210				50		585	260	
Base Capacity (vph)				780		764		141	2199	1088	220	2232
Starvation Cap Reductn				0		0		0	0	0	0	0
Spillback Cap Reductn				0		0		0	0	0	0	0
Storage Cap Reductn				0		0		0	0	0	0	0
Reduced v/c Ratio				0.71		0.04		0.16	0.20	0.25	0.11	0.21

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 90 (82%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Satd. Flow (prot)	1863
Flt Permitted	
Satd. Flow (perm)	1863
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	17.5
Total Split (s)	48.0
Total Split (%)	43.6%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

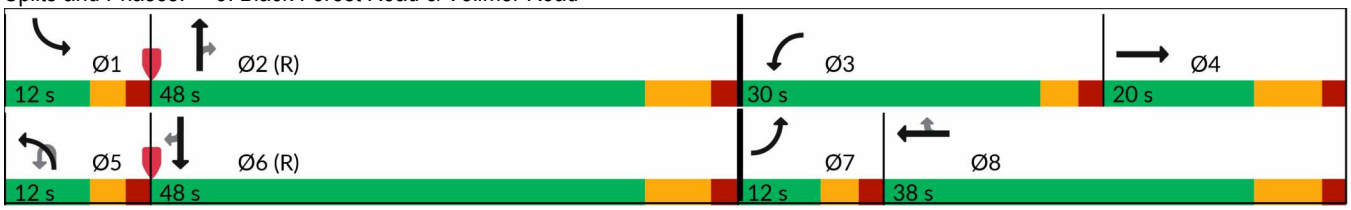
Intersection Summary

Maximum v/c Ratio: 0.80

Intersection Signal Delay (s/veh): 20.2	Intersection LOS: C
Intersection Capacity Utilization 43.6%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



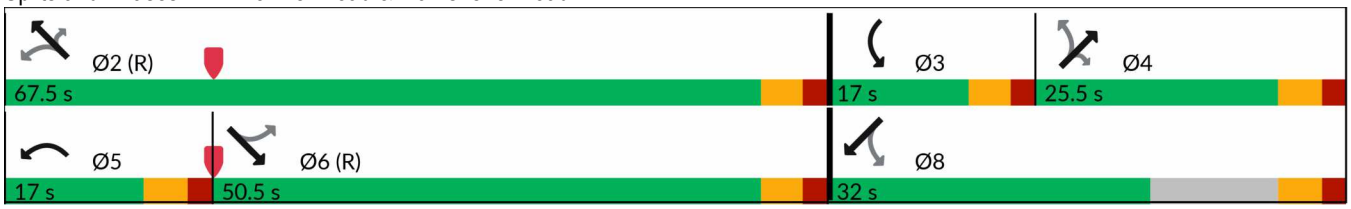
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	14	125	95	80	24	56	17	195	48	71	294	5
Future Volume (vph)	14	125	95	80	24	56	17	195	48	71	294	5
Satd. Flow (prot)	0	1755	0	1770	1863	1583	0	3525	1583	1770	3532	0
Flt Permitted		0.988		0.543				0.897		0.386		
Satd. Flow (perm)	0	1739	0	1011	1863	1583	0	3175	1583	719	3532	0
Satd. Flow (RTOR)		38				79			134		1	
Lane Group Flow (vph)	0	254	0	87	26	61	0	230	52	77	325	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		6		5	2			4		3	8	
Permitted Phases	6			2		2	4		4	8		
Detector Phase	6	6		5	2	2	4	4	4	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	
Total Split (s)	50.5	50.5		17.0	67.5	67.5	25.5	25.5	25.5	17.0	32.0	
Total Split (%)	45.9%	45.9%		15.5%	61.4%	61.4%	23.2%	23.2%	23.2%	15.5%	29.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5		5.5	5.5	5.5		5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max		None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)		62.4		73.2	73.2	73.2		13.5	13.5	25.8	25.8	
Actuated g/C Ratio		0.57		0.67	0.67	0.67		0.12	0.12	0.23	0.23	
v/c Ratio		0.25		0.12	0.02	0.06		0.59	0.17	0.30	0.39	
Control Delay (s/veh)		13.5		8.5	8.3	1.4		51.7	1.1	34.0	35.5	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay (s/veh)		13.5		8.5	8.3	1.4		51.7	1.1	34.0	35.5	
LOS		B		A	A	A		D	A	C	D	
Approach Delay (s/veh)		13.5			6.0			42.4			35.2	
Approach LOS		B			A			D			D	
Queue Length 50th (ft)		80		21	6	0		83	0	43	101	
Queue Length 95th (ft)		156		48	19	12		121	0	78	132	
Internal Link Dist (ft)		227			1317			857			1094	
Turn Bay Length (ft)				410		205			250	245		
Base Capacity (vph)		1002		752	1240	1080		577	397	278	1188	
Starvation Cap Reductn		0		0	0	0		0	0	0	0	
Spillback Cap Reductn		0		0	0	0		0	0	0	0	
Storage Cap Reductn		0		0	0	0		0	0	0	0	
Reduced v/c Ratio		0.25		0.12	0.02	0.06		0.40	0.13	0.28	0.27	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 27.5	Intersection LOS: C
Intersection Capacity Utilization 50.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Vollmer Road & Marksheffel Road



Intersection	
Int Delay, s/veh	9.4

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	32	83	3	3	61	219	5	8	2	407	7	56
Future Vol, veh/h	32	83	3	3	61	219	5	8	2	407	7	56
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	250	-	190	230	-	230	-	-	-	345	-	300
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	35	90	3	3	66	238	5	9	2	442	8	61

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	304	0	0	93	0	0	203	471	45	192	236	33
Stage 1	-	-	-	-	-	-	160	160	-	73	73	-
Stage 2	-	-	-	-	-	-	43	311	-	119	163	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1253	-	-	1499	-	-	737	490	1015	751	664	1033
Stage 1	-	-	-	-	-	-	826	765	-	928	834	-
Stage 2	-	-	-	-	-	-	965	657	-	873	762	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1253	-	-	1499	-	-	665	475	1015	714	644	1033
Mov Cap-2 Maneuver	-	-	-	-	-	-	665	475	-	714	644	-
Stage 1	-	-	-	-	-	-	803	743	-	926	832	-
Stage 2	-	-	-	-	-	-	898	655	-	837	741	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	2.16	0.08	11.51	16.71
HCM LOS			B	C

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1	SWLn2	SWLn3
Capacity (veh/h)	570	1499	-	-	1253	-	-	714	644	1033
HCM Lane V/C Ratio	0.029	0.002	-	-	0.028	-	-	0.62	0.012	0.059
HCM Ctrl Dly (s/v)	11.5	7.4	-	-	8	-	-	17.9	10.7	8.7
HCM Lane LOS	B	A	-	-	A	-	-	C	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	4.3	0	0.2

Intersection	
Int Delay, s/veh	0.4

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	0	24	8	260	452	17
Future Vol, veh/h	0	24	8	260	452	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	9	283	491	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	246	510	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	755	1052	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	755	1052	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	SE	NE	SW
HCM Ctrl Dly, s/v	9.94	0.25	0
HCM LOS	A		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1052	-	755	-	-
HCM Lane V/C Ratio	0.008	-	0.035	-	-
HCM Ctrl Dly (s/v)	8.5	-	9.9	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	346	1587	384	291	1149	199	263	278	235	198	265	213
Future Volume (vph)	346	1587	384	291	1149	199	263	278	235	198	265	213
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			337			245			255			245
Lane Group Flow (vph)	376	1725	417	316	1249	216	286	302	255	215	288	232
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	17.0	45.0		24.0	52.0		27.0	36.0		15.0	24.0	
Total Split (%)	14.2%	37.5%		20.0%	43.3%		22.5%	30.0%		12.5%	20.0%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	18.7	37.5	120.0	24.7	46.0	120.0	15.3	20.4	120.0	9.9	15.0	120.0
Actuated g/C Ratio	0.16	0.31	1.00	0.21	0.38	1.00	0.13	0.17	1.00	0.08	0.13	1.00
v/c Ratio	0.70	1.09	0.26	0.45	0.64	0.14	0.66	0.50	0.16	0.76	0.65	0.15
Control Delay (s/veh)	51.0	92.2	0.2	45.6	32.4	0.2	57.0	47.2	0.2	71.5	56.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	51.0	92.2	0.2	45.6	32.4	0.2	57.0	47.2	0.2	71.5	56.9	0.2
LOS	D	F	A	D	C	A	E	D	A	E	E	A
Approach Delay (s/veh)		70.8			30.8			36.3			43.3	
Approach LOS		E			C			D			D	
Queue Length 50th (ft)	157	~540	0	112	297	0	111	114	0	86	115	0
Queue Length 95th (ft)	m#202	m#591	m0	172	350	0	153	148	0	#142	157	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	536	1589	1583	707	1949	1583	629	840	1583	286	501	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	1.09	0.26	0.45	0.64	0.14	0.45	0.36	0.16	0.75	0.57	0.15

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 26 (22%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

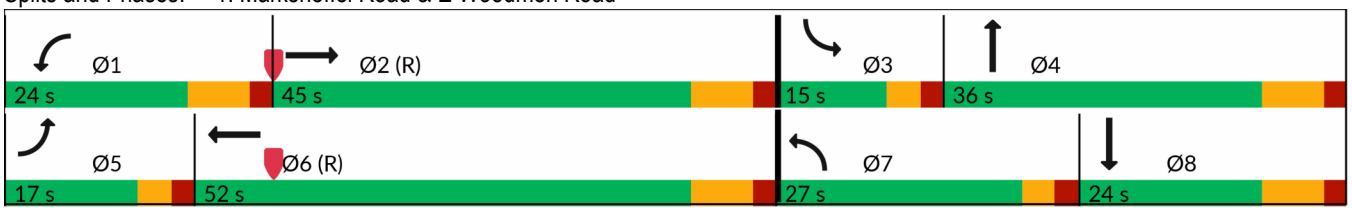
Intersection Signal Delay (s/veh): 50.3	Intersection LOS: D
Intersection Capacity Utilization 76.7%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	587	1917	148	103	1301	142	123	374	149	198	240	529
Future Volume (vph)	587	1917	148	103	1301	142	123	374	149	198	240	529
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.350		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1265	3539	1583
Satd. Flow (RTOR)			161			164			168			297
Lane Group Flow (vph)	638	2084	161	112	1414	154	134	407	162	215	261	575
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	27.0	55.0	55.0	20.0	48.0	48.0	17.0	28.0	28.0	17.0	28.0	28.0
Total Split (%)	22.5%	45.8%	45.8%	16.7%	40.0%	40.0%	14.2%	23.3%	23.3%	14.2%	23.3%	23.3%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	22.0	51.2	51.2	12.3	41.5	41.5	9.9	23.5	23.5	35.6	24.1	24.1
Actuated g/C Ratio	0.18	0.43	0.43	0.10	0.35	0.35	0.08	0.20	0.20	0.30	0.20	0.20
v/c Ratio	1.01	0.96	0.21	0.62	0.80	0.24	0.48	0.59	0.36	0.38	0.37	1.04
Control Delay (s/veh)	88.1	46.2	4.1	48.9	64.9	24.4	58.0	48.2	8.2	22.9	32.8	61.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	88.1	46.2	4.1	48.9	64.9	24.4	58.0	48.2	8.2	22.9	32.8	61.7
LOS	F	D	A	D	E	C	E	D	A	C	C	E
Approach Delay (s/veh)		53.1			60.1			40.8			46.6	
Approach LOS		D			E			D			D	
Queue Length 50th (ft)	~267	578	0	80	418	45	52	155	0	35	70	~235
Queue Length 95th (ft)	#391	#730	43	m135	471	111	84	213	55	m73	m136	#584
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	629	2168	767	221	1758	654	343	692	445	608	711	555
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.96	0.21	0.51	0.80	0.24	0.39	0.59	0.36	0.35	0.37	1.04

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 78 (65%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

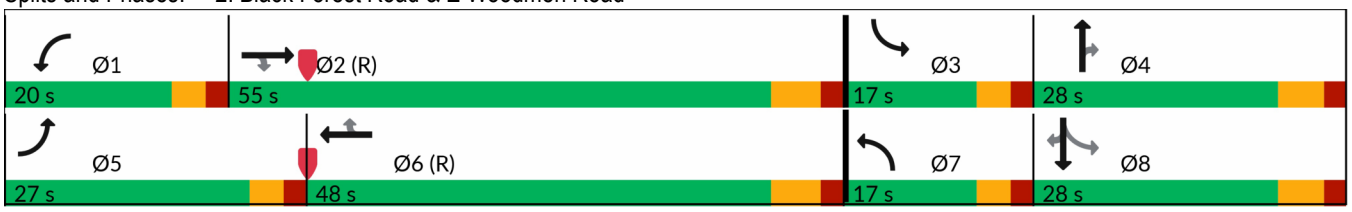
Intersection Signal Delay (s/veh): 52.5	Intersection LOS: D
Intersection Capacity Utilization 77.5%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	440	0	8	7	0	559	539	55	536
Future Volume (vph)	0	0	0	440	0	8	7	0	559	539	55	536
Satd. Flow (prot)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Flt Permitted				0.950				0.950			0.950	
Satd. Flow (perm)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Satd. Flow (RTOR)						415				586		
Lane Group Flow (vph)	0	0	0	478	0	9	0	8	608	586	60	583
Turn Type	Prot			Prot		Perm	Prot	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		5	5	2		1	6
Permitted Phases						8				2		
Detector Phase	7	4		3	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	9.0	17.5	17.5	9.0	17.5
Total Split (s)	15.0	22.0		28.0	35.0	35.0	14.0	14.0	56.0	56.0	14.0	56.0
Total Split (%)	12.5%	18.3%		23.3%	29.2%	29.2%	11.7%	11.7%	46.7%	46.7%	11.7%	46.7%
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	3.0	5.5	5.5	3.0	5.5
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)				20.8		18.3		6.2	76.3	76.3	7.5	84.2
Actuated g/C Ratio				0.17		0.15		0.05	0.64	0.64	0.06	0.70
v/c Ratio				0.80		0.02		0.09	0.27	0.48	0.28	0.23
Control Delay (s/veh)				58.5		0.0		78.0	0.6	2.5	56.6	7.4
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)				58.5		0.0		78.0	0.6	2.5	56.6	7.4
LOS				E		A		E	A	A	E	A
Approach Delay (s/veh)					57.4				2.0			12.0
Approach LOS					E				A			B
Queue Length 50th (ft)				186		0		7	6	26	23	73
Queue Length 95th (ft)				244		0		m11	m5	m52	46	140
Internal Link Dist (ft)		100			374				923			1202
Turn Bay Length (ft)				210				50		585	260	
Base Capacity (vph)				657		682		132	2251	1220	259	2483
Starvation Cap Reductn				0		0		0	0	0	0	0
Spillback Cap Reductn				0		0		0	0	0	0	0
Storage Cap Reductn				0		0		0	0	0	0	0
Reduced v/c Ratio				0.73		0.01		0.06	0.27	0.48	0.23	0.23

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 60 (50%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Satd. Flow (prot)	1863
Flt Permitted	
Satd. Flow (perm)	1863
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	17.5
Total Split (s)	56.0
Total Split (%)	46.7%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

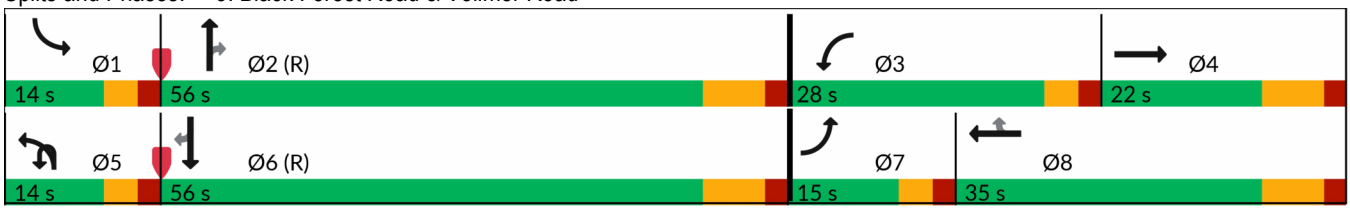
Intersection Summary

Maximum v/c Ratio: 0.80

Intersection Signal Delay (s/veh): 16.4	Intersection LOS: B
Intersection Capacity Utilization 48.0%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



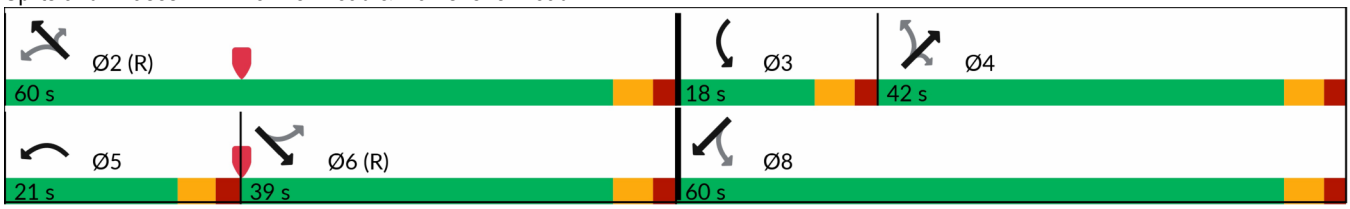
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	18	78	64	109	74	97	53	312	80	93	237	23
Future Volume (vph)	18	78	64	109	74	97	53	312	80	93	237	23
Satd. Flow (prot)	0	1752	0	1770	1863	1583	0	3514	1583	1770	3493	0
Flt Permitted		0.969		0.588				0.839		0.267		
Satd. Flow (perm)	0	1708	0	1095	1863	1583	0	2969	1583	497	3493	0
Satd. Flow (RTOR)		28				105			123		11	
Lane Group Flow (vph)	0	175	0	118	80	105	0	397	87	101	283	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		6		5	2			4		3	8	
Permitted Phases	6			2		2	4		4	8		
Detector Phase	6	6		5	2	2	4	4	4	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	
Total Split (s)	39.0	39.0		21.0	60.0	60.0	42.0	42.0	42.0	18.0	60.0	
Total Split (%)	32.5%	32.5%		17.5%	50.0%	50.0%	35.0%	35.0%	35.0%	15.0%	50.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5		5.5	5.5	5.5		5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max		None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)		57.3		71.9	71.9	71.9		21.3	21.3	37.1	37.1	
Actuated g/C Ratio		0.48		0.60	0.60	0.60		0.18	0.18	0.31	0.31	
v/c Ratio		0.21		0.17	0.07	0.11		0.75	0.23	0.38	0.26	
Control Delay (s/veh)		18.0		12.3	11.8	2.7		56.0	3.8	33.0	29.5	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay (s/veh)		18.0		12.3	11.8	2.7		56.0	3.8	33.0	29.5	
LOS		B		B	B	A		E	A	C	C	
Approach Delay (s/veh)		18.0			8.8			46.6			30.4	
Approach LOS		B			A			D			C	
Queue Length 50th (ft)		65		38	25	0		157	0	58	83	
Queue Length 95th (ft)		133		77	55	27		203	20	94	110	
Internal Link Dist (ft)		227			1317			857			1094	
Turn Bay Length (ft)				410		205			250	245		
Base Capacity (vph)		829		743	1116	990		903	567	286	1592	
Starvation Cap Reductn		0		0	0	0		0	0	0	0	
Spillback Cap Reductn		0		0	0	0		0	0	0	0	
Storage Cap Reductn		0		0	0	0		0	0	0	0	
Reduced v/c Ratio		0.21		0.16	0.07	0.11		0.44	0.15	0.35	0.18	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay (s/veh): 29.8	Intersection LOS: C
Intersection Capacity Utilization 50.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Vollmer Road & Marksheffel Road



Intersection	
Int Delay, s/veh	6.6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	50	92	4	1	103	456	8	1	15	323	8	54
Future Vol, veh/h	50	92	4	1	103	456	8	1	15	323	8	54
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	250	-	190	230	-	230	-	-	-	345	-	300
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	54	100	4	1	112	496	9	1	16	351	9	59

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	608	0	0	104	0	0	271	818	50	273	327	56
Stage 1	-	-	-	-	-	-	209	209	-	114	114	-
Stage 2	-	-	-	-	-	-	62	610	-	159	213	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	967	-	-	1485	-	-	660	309	1008	657	590	999
Stage 1	-	-	-	-	-	-	774	728	-	878	800	-
Stage 2	-	-	-	-	-	-	941	483	-	827	725	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	967	-	-	1485	-	-	577	291	1008	608	556	999
Mov Cap-2 Maneuver	-	-	-	-	-	-	577	291	-	608	556	-
Stage 1	-	-	-	-	-	-	730	687	-	878	800	-
Stage 2	-	-	-	-	-	-	876	483	-	767	684	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	3.06	0.01	10	17.17
HCM LOS			B	C

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1	SWLn2	SWLn3
Capacity (veh/h)	746	1485	-	-	967	-	-	608	556	999
HCM Lane V/C Ratio	0.035	0.001	-	-	0.056	-	-	0.578	0.016	0.059
HCM Ctrl Dly (s/v)	10	7.4	-	-	8.9	-	-	18.7	11.6	8.8
HCM Lane LOS	B	A	-	-	A	-	-	C	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.2	-	-	3.7	0	0.2

Intersection	
Int Delay, s/veh	0.4

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	0	15	25	445	351	59
Future Vol, veh/h	0	15	25	445	351	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	16	27	484	382	64

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	191	446	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	819	1111	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	819	1111	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	SE	NE	SW
HCM Ctrl Dly, s/v	9.49	0.44	0
HCM LOS	A		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1111	-	819	-	-
HCM Lane V/C Ratio	0.024	-	0.02	-	-
HCM Ctrl Dly (s/v)	8.3	-	9.5	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	342	804	271	280	1828	260	463	397	173	386	586	433
Future Volume (vph)	342	804	271	280	1828	260	463	397	173	386	586	433
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			295			218			218			411
Lane Group Flow (vph)	372	874	295	304	1987	283	503	432	188	420	637	471
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	16.0	40.4		23.3	47.7		20.0	25.3		21.0	26.3	
Total Split (%)	14.5%	36.7%		21.2%	43.4%		18.2%	23.0%		19.1%	23.9%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	11.0	32.9	110.0	15.8	40.2	110.0	15.0	18.1	110.0	15.7	18.8	110.0
Actuated g/C Ratio	0.10	0.30	1.00	0.14	0.37	1.00	0.14	0.16	1.00	0.14	0.17	1.00
v/c Ratio	1.08	0.57	0.19	0.62	1.07	0.18	1.07	0.74	0.12	0.86	1.05	0.30
Control Delay (s/veh)	118.6	26.1	0.2	50.3	76.6	0.2	108.5	52.6	0.2	63.9	96.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	118.6	26.1	0.2	50.3	76.6	0.2	108.5	52.6	0.2	63.9	96.2	0.5
LOS	F	C	A	D	E	A	F	D	A	E	F	A
Approach Delay (s/veh)		43.5			65.1			68.9			57.8	
Approach LOS		D			E			E			E	
Queue Length 50th (ft)	~160	101	0	107	~579	0	~207	157	0	153	~263	0
Queue Length 95th (ft)	m#245	148	m0	154	#677	0	#315	215	0	#232	#382	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	343	1520	1583	493	1858	1583	468	582	1583	499	604	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.58	0.19	0.62	1.07	0.18	1.07	0.74	0.12	0.84	1.05	0.30

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 76 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

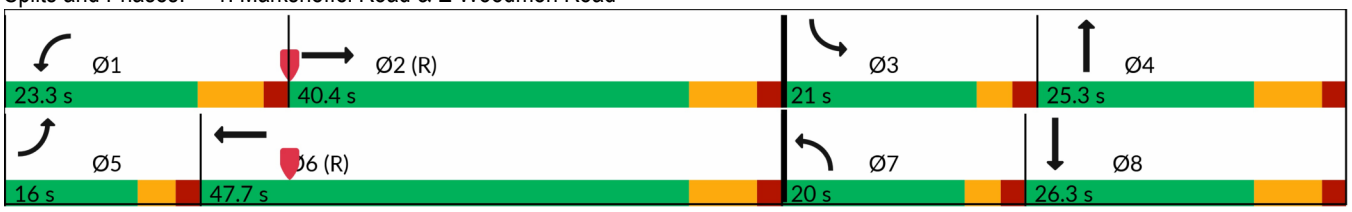
Intersection Signal Delay (s/veh): 59.1	Intersection LOS: E
Intersection Capacity Utilization 95.3%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	242	1275	35	45	1910	360	115	730	35	400	1855	286
Future Volume (vph)	242	1275	35	45	1910	360	115	730	35	400	1855	286
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.155		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	560	3539	1583
Satd. Flow (RTOR)			179			235			183			134
Lane Group Flow (vph)	263	1386	38	49	2076	391	125	793	38	435	2016	311
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	11.0	43.0	43.0	9.0	41.0	41.0	9.0	39.0	39.0	19.0	49.0	49.0
Total Split (%)	10.0%	39.1%	39.1%	8.2%	37.3%	37.3%	8.2%	35.5%	35.5%	17.3%	44.5%	44.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	6.0	38.3	38.3	4.0	34.5	34.5	4.0	34.1	34.1	53.0	43.0	43.0
Actuated g/C Ratio	0.05	0.35	0.35	0.04	0.31	0.31	0.04	0.31	0.31	0.48	0.39	0.39
v/c Ratio	1.41	0.78	0.06	0.77	1.30	0.60	1.01	0.72	0.06	0.72	1.46	0.44
Control Delay (s/veh)	250.4	36.4	0.2	70.6	167.0	16.7	136.7	38.6	0.2	23.8	238.4	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	250.4	36.4	0.2	70.6	167.0	16.7	136.7	38.6	0.2	23.8	238.4	18.1
LOS	F	D	A	E	F	B	F	D	A	C	F	B
Approach Delay (s/veh)		69.0			141.8			49.9			179.8	
Approach LOS		E			F			D			F	
Queue Length 50th (ft)	~130	332	0	33	~723	161	~47	268	0	115	~1078	123
Queue Length 95th (ft)	#216	393	0	m38	m#675	m160	#111	343	0	m154	#1224	m188
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	187	1770	667	64	1594	657	124	1095	616	635	1383	700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.78	0.06	0.77	1.30	0.60	1.01	0.72	0.06	0.69	1.46	0.44

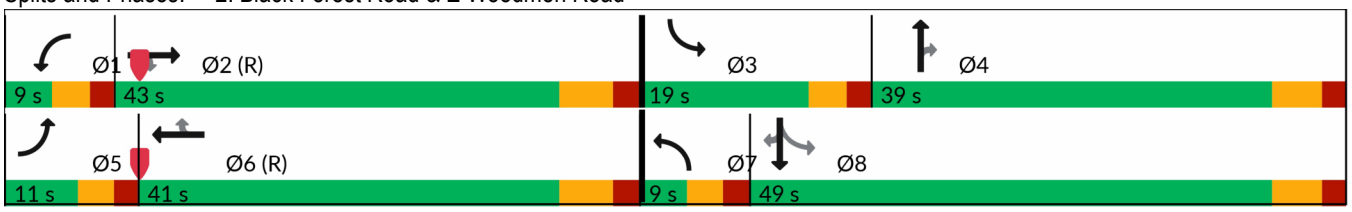
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 98 (89%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.46

Intersection Signal Delay (s/veh): 128.4	Intersection LOS: F
Intersection Capacity Utilization 117.2%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	10	20	600	15	50	30	997	405	250	1646	100
Future Volume (vph)	40	10	20	600	15	50	30	997	405	250	1646	100
Satd. Flow (prot)	3433	3185	0	3433	1863	1583	3433	3539	1583	3433	5040	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3185	0	3433	1863	1583	3433	3539	1583	3433	5040	0
Satd. Flow (RTOR)		22				193			440		11	
Lane Group Flow (vph)	43	33	0	652	16	54	33	1084	440	272	1898	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	17.5	17.5	9.0	17.5	
Total Split (s)	9.0	11.5		31.0	33.5	33.5	9.0	50.5	50.5	17.0	58.5	
Total Split (%)	8.2%	10.5%		28.2%	30.5%	30.5%	8.2%	45.9%	45.9%	15.5%	53.2%	
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	4.0	4.6		24.4	23.4	23.4	4.7	49.4	49.4	11.8	60.8	
Actuated g/C Ratio	0.04	0.04		0.22	0.21	0.21	0.04	0.45	0.45	0.11	0.55	
v/c Ratio	0.35	0.21		0.86	0.04	0.11	0.23	0.68	0.46	0.74	0.68	
Control Delay (s/veh)	59.6	30.5		53.1	33.0	0.5	64.9	17.7	5.8	60.7	21.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	59.6	30.5		53.1	33.0	0.5	64.9	17.7	5.8	60.7	21.4	
LOS	E	C		D	C	A	E	B	A	E	C	
Approach Delay (s/veh)		46.9			48.7			15.4			26.4	
Approach LOS		D			D			B			C	
Queue Length 50th (ft)	15	4		228	9	0	10	362	108	98	414	
Queue Length 95th (ft)	35	21		297	28	0	m15	m418	m149	#151	481	
Internal Link Dist (ft)		345			374			923			1202	
Turn Bay Length (ft)	200			210			200		585	260		
Base Capacity (vph)	124	154		811	440	521	145	1590	953	377	2790	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.35	0.21		0.80	0.04	0.10	0.23	0.68	0.46	0.72	0.68	

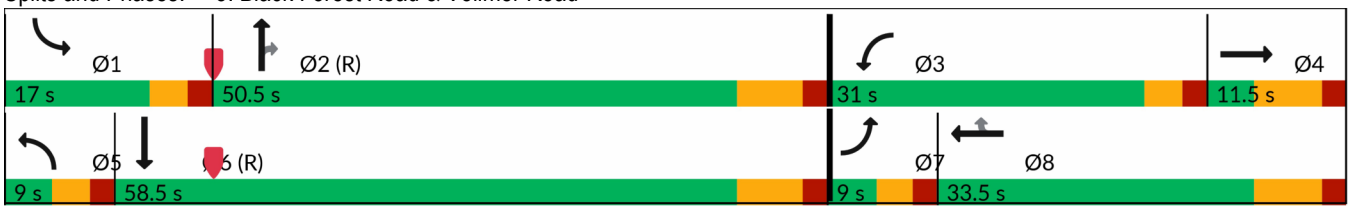
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 90 (82%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay (s/veh): 26.5	Intersection LOS: C
Intersection Capacity Utilization 77.8%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	195	1442	86	177	1200	59	153	281	103	118	614	215
Future Volume (vph)	195	1442	86	177	1200	59	153	281	103	118	614	215
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.080			0.084			0.200			0.435		
Satd. Flow (perm)	149	3539	1583	156	3539	1583	373	3539	1583	810	3539	1583
Satd. Flow (RTOR)			134			134			134			182
Lane Group Flow (vph)	212	1567	93	192	1304	64	166	305	112	128	667	234
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
Total Split (s)	17.3	55.5	55.5	14.4	52.6	52.6	12.9	25.1	25.1	15.0	27.2	27.2
Total Split (%)	15.7%	50.5%	50.5%	13.1%	47.8%	47.8%	11.7%	22.8%	22.8%	13.6%	24.7%	24.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	61.4	50.0	50.0	56.4	47.5	47.5	27.4	20.0	20.0	30.8	21.7	21.7
Actuated g/C Ratio	0.56	0.45	0.45	0.51	0.43	0.43	0.25	0.18	0.18	0.28	0.20	0.20
v/c Ratio	0.85	0.97	0.12	0.91	0.85	0.08	0.89	0.47	0.28	0.42	0.96	0.51
Control Delay (s/veh)	54.2	47.1	1.4	66.0	40.3	5.5	75.8	43.3	6.3	32.6	69.0	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	54.2	47.1	1.4	66.0	40.3	5.5	75.8	43.3	6.3	32.6	69.0	14.7
LOS	D	D	A	E	D	A	E	D	A	C	E	B
Approach Delay (s/veh)		45.6			42.0			45.4			52.1	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	97	564	0	103	386	1	90	104	0	68	251	31
Queue Length 95th (ft)	#226	#741	12	m#208	590	m15	#195	150	35	117	#370	107
Internal Link Dist (ft)		227			1317			828			1094	
Turn Bay Length (ft)	200		200	410		205	200		250	245		200
Base Capacity (vph)	257	1608	792	210	1528	760	186	644	397	312	698	458
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.97	0.12	0.91	0.85	0.08	0.89	0.47	0.28	0.41	0.96	0.51

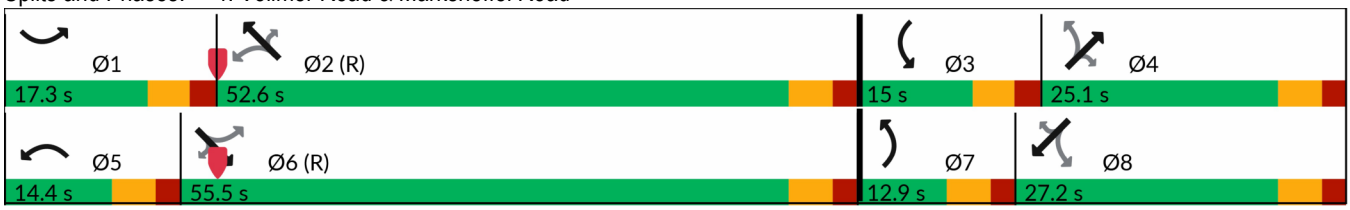
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay (s/veh): 45.8	Intersection LOS: D
Intersection Capacity Utilization 93.4%	ICU Level of Service F
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Vollmer Road & Marksheffel Road



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	123	1442	12	43	1016	145	5	1	6	518	4	415
Future Volume (vph)	123	1442	12	43	1016	145	5	1	6	518	4	415
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1619	0	3433	1863	1583
Flt Permitted	0.155			0.071						0.950		
Satd. Flow (perm)	289	3539	1583	132	3539	1583	1863	1619	0	3433	1863	1583
Satd. Flow (RTOR)			169			169		7				212
Lane Group Flow (vph)	134	1567	13	47	1104	158	5	8	0	563	4	451
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					4
Detector Phase	5	2	2	1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	10.0		20.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	10.0	15.0		25.0	15.0	15.0
Total Split (s)	14.0	59.0	59.0	10.0	55.0	55.0	10.0	15.0		26.0	31.0	31.0
Total Split (%)	12.7%	53.6%	53.6%	9.1%	50.0%	50.0%	9.1%	13.6%		23.6%	28.2%	28.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	71.4	64.6	64.6	66.3	60.3	60.3	7.0	10.0		23.6	24.6	24.6
Actuated g/C Ratio	0.65	0.59	0.59	0.60	0.55	0.55	0.06	0.09		0.21	0.22	0.22
v/c Ratio	0.45	0.75	0.01	0.28	0.57	0.17	0.04	0.05		0.77	0.01	0.87
Control Delay (s/veh)	12.3	7.1	0.0	12.9	19.1	2.6	38.2	28.4		48.4	31.5	39.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	12.3	7.1	0.0	12.9	19.1	2.6	38.2	28.4		48.4	31.5	39.6
LOS	B	A	A	B	B	A	D	C		D	C	D
Approach Delay (s/veh)		7.5			16.9			32.2			44.4	
Approach LOS		A			B			C			D	
Queue Length 50th (ft)	8	54	0	10	256	0	4	1		191	2	172
Queue Length 95th (ft)	m12	m303	m0	30	400	32	11	17		#292	12	#352
Internal Link Dist (ft)		1317			521			378			673	
Turn Bay Length (ft)	250		190	230		230	200			345		300
Base Capacity (vph)	311	2076	998	168	1939	944	114	153		741	454	546
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.43	0.75	0.01	0.28	0.57	0.17	0.04	0.05		0.76	0.01	0.83

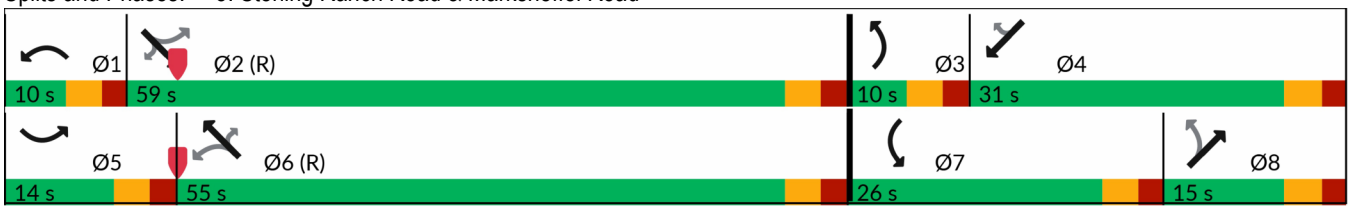
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 25 (23%), Referenced to phase 2:SETL and 6:NWTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay (s/veh): 19.9	Intersection LOS: B
Intersection Capacity Utilization 78.0%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Sterling Ranch Road & Marksheffel Road



Intersection	
Int Delay, s/veh	0.1

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	0	5	2	537	859	18
Future Vol, veh/h	0	5	2	537	859	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	5	2	584	934	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	467	953	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	543	717	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	543	717	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	SE	NE	SW
HCM Ctrl Dly, s/v	11.7	0.04	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	717	-	543	-	-
HCM Lane V/C Ratio	0.003	-	0.01	-	-
HCM Ctrl Dly (s/v)	10	-	11.7	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	486	2222	538	408	1608	369	369	563	329	353	536	397
Future Volume (vph)	486	2222	538	408	1608	369	369	563	329	353	536	397
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			337			282			358			379
Lane Group Flow (vph)	528	2415	585	443	1748	401	401	612	358	384	583	432
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	24.0	58.0		21.0	55.0		16.0	25.0		16.0	25.0	
Total Split (%)	20.0%	48.3%		17.5%	45.8%		13.3%	20.8%		13.3%	20.8%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	19.0	50.5	120.0	13.5	47.5	120.0	11.0	17.5	120.0	11.0	17.5	120.0
Actuated g/C Ratio	0.16	0.42	1.00	0.11	0.40	1.00	0.09	0.15	1.00	0.09	0.15	1.00
v/c Ratio	0.97	1.13	0.37	1.15	0.87	0.25	1.28	1.19	0.23	1.22	1.13	0.27
Control Delay (s/veh)	88.8	90.9	0.6	139.7	39.1	0.4	190.7	146.3	0.3	170.9	126.8	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	88.8	90.9	0.6	139.7	39.1	0.4	190.7	146.3	0.3	170.9	126.8	0.4
LOS	F	F	A	F	D	A	F	F	A	F	F	A
Approach Delay (s/veh)		75.7			50.3			121.2			99.9	
Approach LOS		E			D			F			F	
Queue Length 50th (ft)	223	~788	0	~210	457	0	~205	~305	0	~191	~280	0
Queue Length 95th (ft)	m#334	#883	0	#318	527	0	#308	#425	0	#293	#398	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	543	2139	1583	386	2012	1583	314	516	1583	314	516	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	1.13	0.37	1.15	0.87	0.25	1.28	1.19	0.23	1.22	1.13	0.27

Intersection Summary

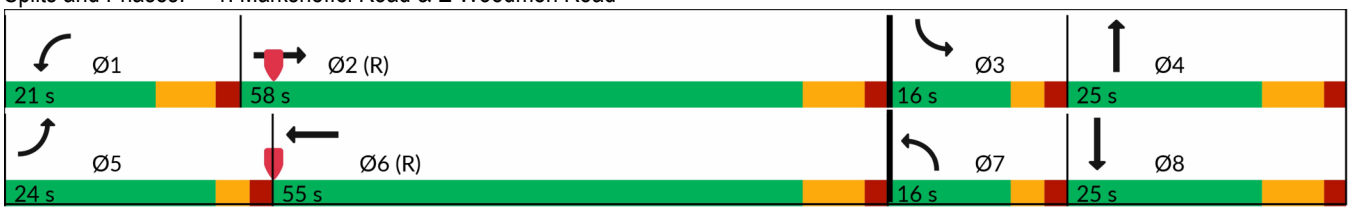
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 26 (22%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.28

Intersection Signal Delay (s/veh): 79.1	Intersection LOS: E
Intersection Capacity Utilization 103.1%	ICU Level of Service G
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	305	1530	85	15	1340	30	80	1300	85	20	960	426
Future Volume (vph)	305	1530	85	15	1340	30	80	1300	85	20	960	426
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.085		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	307	3539	1583
Satd. Flow (RTOR)			118			164			168			171
Lane Group Flow (vph)	332	1663	92	16	1457	33	87	1413	92	22	1043	463
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	17.0	50.0	50.0	9.0	42.0	42.0	10.0	52.0	52.0	9.0	51.0	51.0
Total Split (%)	14.2%	41.7%	41.7%	7.5%	35.0%	35.0%	8.3%	43.3%	43.3%	7.5%	42.5%	42.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	12.0	48.9	48.9	4.0	35.5	35.5	5.0	49.6	49.6	50.0	45.0	45.0
Actuated g/C Ratio	0.10	0.41	0.41	0.03	0.30	0.30	0.04	0.41	0.41	0.42	0.38	0.38
v/c Ratio	0.97	0.80	0.13	0.27	0.97	0.06	0.61	0.97	0.12	0.09	0.79	0.66
Control Delay (s/veh)	95.2	35.7	2.7	49.7	68.7	0.1	74.7	52.0	0.3	17.3	41.5	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	95.2	35.7	2.7	49.7	68.7	0.1	74.7	52.0	0.3	17.3	41.5	31.1
LOS	F	D	A	D	E	A	E	D	A	B	D	C
Approach Delay (s/veh)		43.7			67.0			50.3			38.0	
Approach LOS		D			E			D			D	
Queue Length 50th (ft)	136	393	0	13	447	0	35	~633	0	6	443	282
Queue Length 95th (ft)	#231	519	21	m18	m#491	m0	#69	#774	0	m8	510	411
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	343	2072	714	59	1504	583	143	1462	752	232	1327	700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.80	0.13	0.27	0.97	0.06	0.61	0.97	0.12	0.09	0.79	0.66

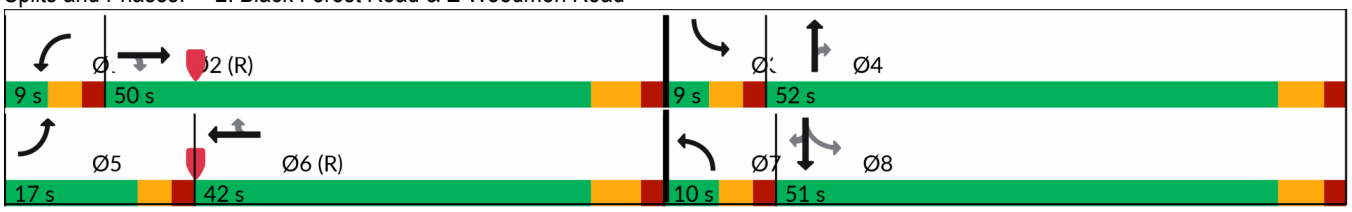
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 78 (65%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay (s/veh): 49.2	Intersection LOS: D
Intersection Capacity Utilization 85.1%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	400	65	125	440	245	300	100	1150	550	30	1201	175
Future Volume (vph)	400	65	125	440	245	300	100	1150	550	30	1201	175
Satd. Flow (prot)	3433	3189	0	3433	1863	1583	3433	3539	1583	3433	4989	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3189	0	3433	1863	1583	3433	3539	1583	3433	4989	0
Satd. Flow (RTOR)		82				132			515		27	
Lane Group Flow (vph)	435	207	0	478	266	326	109	1250	598	33	1495	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	17.5	17.5	9.0	17.5	
Total Split (s)	23.0	24.4		29.0	30.4	30.4	11.0	57.6	57.6	9.0	55.6	
Total Split (%)	19.2%	20.3%		24.2%	25.3%	25.3%	9.2%	48.0%	48.0%	7.5%	46.3%	
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	17.6	17.1		21.2	20.7	20.7	6.7	56.3	56.3	4.8	50.1	
Actuated g/C Ratio	0.15	0.14		0.18	0.17	0.17	0.06	0.47	0.47	0.04	0.42	
v/c Ratio	0.87	0.40		0.79	0.83	0.85	0.57	0.75	0.59	0.24	0.71	
Control Delay (s/veh)	68.2	30.2		57.1	69.2	49.3	58.0	24.2	12.4	60.9	31.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	68.2	30.2		57.1	69.2	49.3	58.0	24.2	12.4	60.9	31.2	
LOS	E	C		E	E	D	E	C	B	E	C	
Approach Delay (s/veh)		55.9			57.7			22.4			31.9	
Approach LOS		E			E			C			C	
Queue Length 50th (ft)	173	45		186	200	151	40	551	276	13	356	
Queue Length 95th (ft)	#256	85		241	#318	#296	m44	m577	m314	31	415	
Internal Link Dist (ft)		285			374			923			1202	
Turn Bay Length (ft)	200			210			200		585	260		
Base Capacity (vph)	514	535		686	355	408	190	1659	1015	136	2096	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.85	0.39		0.70	0.75	0.80	0.57	0.75	0.59	0.24	0.71	

Intersection Summary

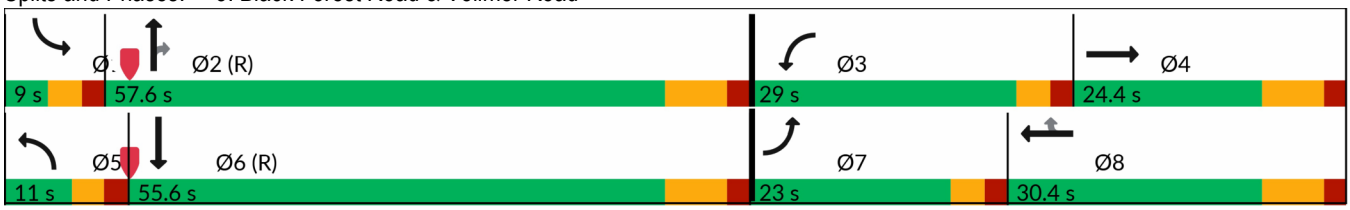
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 60 (50%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay (s/veh): 36.6	Intersection LOS: D
Intersection Capacity Utilization 80.3%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	318	1057	111	205	940	138	184	706	179	121	424	293
Future Volume (vph)	318	1057	111	205	940	138	184	706	179	121	424	293
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.085			0.115			0.251			0.167		
Satd. Flow (perm)	158	3539	1583	214	3539	1583	468	3539	1583	311	3539	1583
Satd. Flow (RTOR)			123			173			195			309
Lane Group Flow (vph)	346	1149	121	223	1022	150	200	767	195	132	461	318
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
Total Split (s)	27.0	54.0	54.0	19.0	46.0	46.0	17.3	34.0	34.0	13.0	29.7	29.7
Total Split (%)	22.5%	45.0%	45.0%	15.8%	38.3%	38.3%	14.4%	28.3%	28.3%	10.8%	24.8%	24.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	68.0	49.6	49.6	54.6	41.7	41.7	39.6	28.0	28.0	31.4	23.9	23.9
Actuated g/C Ratio	0.57	0.41	0.41	0.46	0.35	0.35	0.33	0.23	0.23	0.26	0.20	0.20
v/c Ratio	0.94	0.79	0.17	0.84	0.83	0.23	0.72	0.93	0.38	0.77	0.65	0.57
Control Delay (s/veh)	67.5	35.6	4.4	56.2	59.4	21.9	45.1	63.5	7.3	58.8	49.2	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	67.5	35.6	4.4	56.2	59.4	21.9	45.1	63.5	7.3	58.8	49.2	9.4
LOS	E	D	A	E	E	C	D	E	A	E	D	A
Approach Delay (s/veh)		40.1			54.9			50.9			36.7	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	217	414	0	176	449	57	115	311	0	73	176	6
Queue Length 95th (ft)	#400	505	36	m#243	523	m104	#189	#426	60	#152	235	88
Internal Link Dist (ft)		227			1317			864			1094	
Turn Bay Length (ft)				410		205	200		250	245		
Base Capacity (vph)	378	1462	726	273	1228	662	283	840	524	172	713	565
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.79	0.17	0.82	0.83	0.23	0.71	0.91	0.37	0.77	0.65	0.56

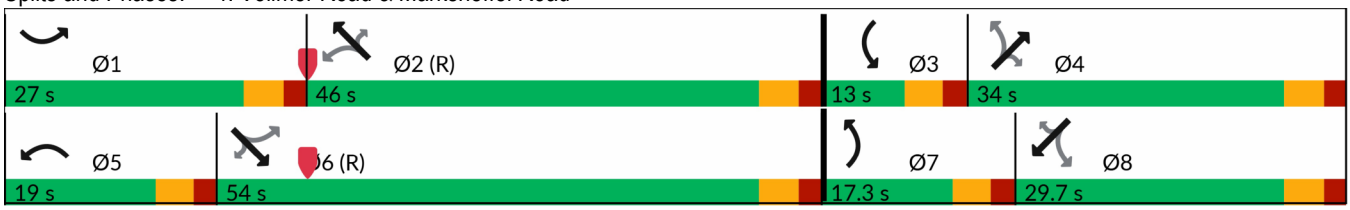
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay (s/veh): 46.0	Intersection LOS: D
Intersection Capacity Utilization 88.2%	ICU Level of Service E
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Vollmer Road & Marksheffel Road



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	283	1051	4	40	1091	535	18	4	24	331	15	174
Future Volume (vph)	283	1051	4	40	1091	535	18	4	24	331	15	174
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1621	0	3433	1863	1583
Flt Permitted	0.095			0.223			0.747			0.950		
Satd. Flow (perm)	177	3539	1583	415	3539	1583	1391	1621	0	3433	1863	1583
Satd. Flow (RTOR)			155			469		26				189
Lane Group Flow (vph)	308	1142	4	43	1186	582	20	30	0	360	16	189
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					4
Detector Phase	5	2	2	1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	10.0		20.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	10.0	15.0		25.0	15.0	15.0
Total Split (s)	28.0	70.0	70.0	10.0	52.0	52.0	10.0	15.0		25.0	30.0	30.0
Total Split (%)	23.3%	58.3%	58.3%	8.3%	43.3%	43.3%	8.3%	12.5%		20.8%	25.0%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	81.0	72.8	72.8	62.0	56.7	56.7	11.0	10.0		20.0	25.0	25.0
Actuated g/C Ratio	0.68	0.61	0.61	0.52	0.47	0.47	0.09	0.08		0.17	0.21	0.21
v/c Ratio	0.82	0.53	0.00	0.16	0.71	0.58	0.14	0.19		0.63	0.04	0.39
Control Delay (s/veh)	60.8	4.1	0.0	11.9	30.5	8.2	35.9	24.1		52.1	37.3	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	60.8	4.1	0.0	11.9	30.5	8.2	35.9	24.1		52.1	37.3	8.2
LOS	E	A	A	B	C	A	D	C		D	D	A
Approach Delay (s/veh)		16.1			22.9			28.9			37.0	
Approach LOS		B			C			C			D	
Queue Length 50th (ft)	161	50	0	12	435	57	11	3		137	9	0
Queue Length 95th (ft)	m230	80	m0	27	541	180	31	34		189	30	62
Internal Link Dist (ft)		1317			521			378			673	
Turn Bay Length (ft)	250		190	230		230				345		300
Base Capacity (vph)	424	2147	1021	274	1672	995	143	158		572	419	502
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.73	0.53	0.00	0.16	0.71	0.58	0.14	0.19		0.63	0.04	0.38

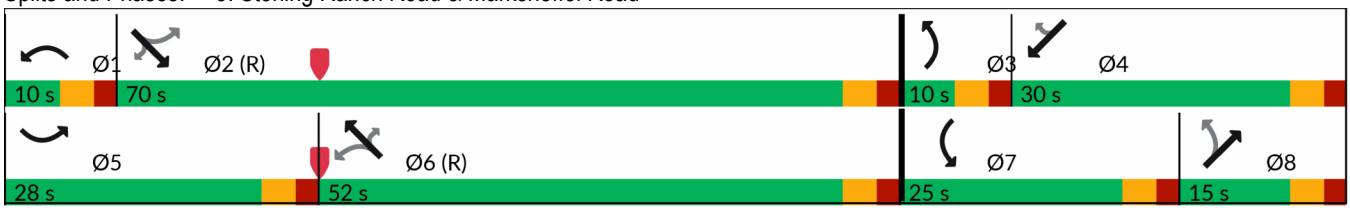
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 25 (21%), Referenced to phase 2:SETL and 6:NWTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay (s/veh): 22.5	Intersection LOS: C
Intersection Capacity Utilization 74.4%	ICU Level of Service D
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Sterling Ranch Road & Marksheffel Road



Intersection	
Int Delay, s/veh	0.1

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	0	8	8	1069	681	59
Future Vol, veh/h	0	8	8	1069	681	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	100	-	-	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	9	9	1162	740	64

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	370	804	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	627	816	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	627	816	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	SE	NE	SW
HCM Ctrl Dly, s/v	10.82	0.07	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	816	-	627	-	-
HCM Lane V/C Ratio	0.011	-	0.014	-	-
HCM Ctrl Dly (s/v)	9.5	-	10.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	574	194	200	1306	166	331	257	124	165	266	277
Future Volume (vph)	186	574	194	200	1306	166	331	257	124	165	266	277
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			342			342			342			342
Lane Group Flow (vph)	202	624	211	217	1420	180	360	279	135	179	289	301
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	15.0	32.0		27.0	44.0		25.0	35.0		16.0	26.0	
Total Split (%)	13.6%	29.1%		24.5%	40.0%		22.7%	31.8%		14.5%	23.6%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	10.8	24.5	110.0	27.3	43.4	110.0	16.5	20.6	110.0	10.2	14.2	110.0
Actuated g/C Ratio	0.10	0.22	1.00	0.25	0.39	1.00	0.15	0.19	1.00	0.09	0.13	1.00
v/c Ratio	0.60	0.55	0.13	0.25	0.71	0.11	0.70	0.42	0.09	0.56	0.63	0.19
Control Delay (s/veh)	61.0	28.1	0.2	35.9	31.5	0.1	51.8	40.6	0.1	54.9	51.5	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	61.0	28.1	0.2	35.9	31.5	0.1	51.8	40.6	0.1	54.9	51.5	0.3
LOS	E	C	A	D	C	A	D	D	A	D	D	A
Approach Delay (s/veh)		28.8			28.9			38.7			32.3	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	76	69	0	64	313	0	127	94	0	63	105	0
Queue Length 95th (ft)	117	111	0	107	406	0	172	126	0	101	145	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	347	1132	1583	851	2008	1583	624	884	1583	343	595	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.55	0.13	0.25	0.71	0.11	0.58	0.32	0.09	0.52	0.49	0.19

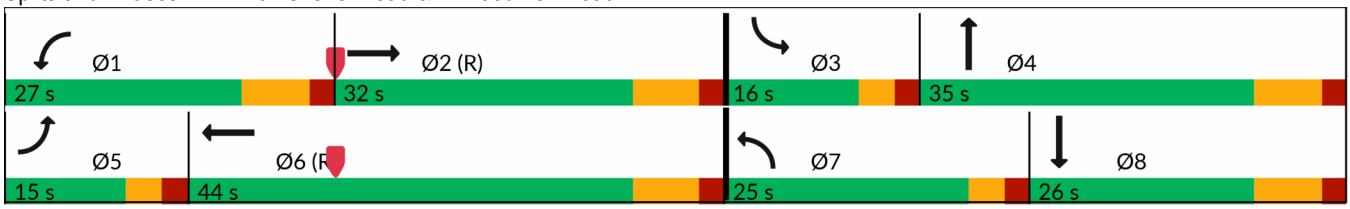
Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 76 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay (s/veh): 31.2	Intersection LOS: C
Intersection Capacity Utilization 68.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	442	788	104	72	1625	120	119	178	67	142	170	706
Future Volume (vph)	442	788	104	72	1625	120	119	178	67	142	170	706
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.630		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	2277	3539	1583
Satd. Flow (RTOR)			129			129			134			276
Lane Group Flow (vph)	480	857	113	78	1766	130	129	193	73	154	185	767
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	20.0	47.0	47.0	20.0	47.0	47.0	15.0	28.0	28.0	15.0	28.0	28.0
Total Split (%)	18.2%	42.7%	42.7%	18.2%	42.7%	42.7%	13.6%	25.5%	25.5%	13.6%	25.5%	25.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	15.0	47.6	47.6	10.2	40.5	40.5	9.0	23.3	23.3	32.7	23.0	23.0
Actuated g/C Ratio	0.14	0.43	0.43	0.09	0.37	0.37	0.08	0.21	0.21	0.30	0.21	0.21
v/c Ratio	1.03	0.39	0.15	0.48	0.94	0.20	0.46	0.26	0.17	0.20	0.25	1.40
Control Delay (s/veh)	95.5	23.0	3.4	40.3	53.0	14.0	53.5	37.6	1.0	18.6	25.7	206.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	95.5	23.0	3.4	40.3	53.0	14.0	53.5	37.6	1.0	18.6	25.7	206.2
LOS	F	C	A	D	D	B	D	D	A	B	C	F
Approach Delay (s/veh)		45.5			49.9			36.0			149.9	
Approach LOS		D			D			D			F	
Queue Length 50th (ft)	~189	156	0	55	496	34	45	61	0	24	34	~617
Queue Length 95th (ft)	#295	206	29	m69	#570	m77	77	96	2	m34	m48	m#837
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	468	2199	757	241	1872	664	312	750	441	809	741	549
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.39	0.15	0.32	0.94	0.20	0.41	0.26	0.17	0.19	0.25	1.40

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 98 (89%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.40

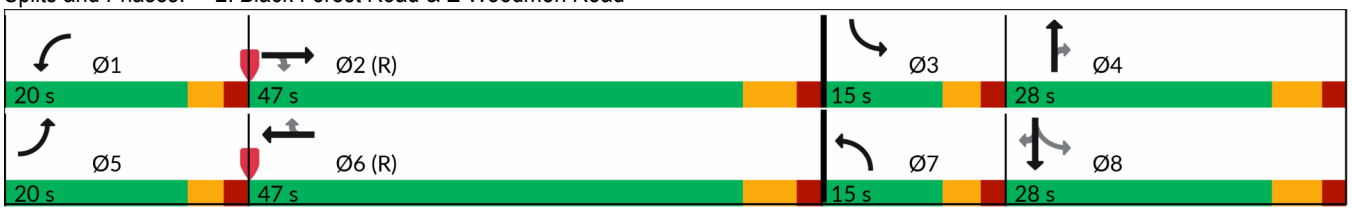
Intersection Signal Delay (s/veh): 69.9	Intersection LOS: E
Intersection Capacity Utilization 93.1%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	597	0	94	20	0	405	351	92	421
Future Volume (vph)	0	0	0	597	0	94	20	0	405	351	92	421
Satd. Flow (prot)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Flt Permitted				0.950							0.950	
Satd. Flow (perm)	1863	1863	0	3433	1863	1583	0	1863	3539	1583	3433	3539
Satd. Flow (RTOR)						450				382		
Lane Group Flow (vph)	0	0	0	649	0	102	0	22	440	382	100	458
Turn Type	Prot			Prot		Perm	custom	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8			5	2		1	6
Permitted Phases						8	5			2		
Detector Phase	7	4		3	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	9.0	17.5	17.5	9.0	17.5
Total Split (s)	12.0	20.0		30.0	38.0	38.0	12.0	12.0	48.0	48.0	12.0	48.0
Total Split (%)	10.9%	18.2%		27.3%	34.5%	34.5%	10.9%	10.9%	43.6%	43.6%	10.9%	43.6%
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	3.0	5.5	5.5	3.0	5.5
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)				23.8		21.3		7.9	60.1	60.1	8.6	67.6
Actuated g/C Ratio				0.22		0.19		0.07	0.55	0.55	0.08	0.61
v/c Ratio				0.87		0.15		0.16	0.23	0.37	0.37	0.21
Control Delay (s/veh)				55.2		0.5		71.5	2.0	2.3	51.8	11.0
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)				55.2		0.5		71.5	2.0	2.3	51.8	11.0
LOS				E		A		E	A	A	D	B
Approach Delay (s/veh)					47.8				3.9			18.3
Approach LOS					D				A			B
Queue Length 50th (ft)				229		0		0	7	7	35	61
Queue Length 95th (ft)				#315		0		m27	m16	m22	62	125
Internal Link Dist (ft)		100			374				923			1202
Turn Bay Length (ft)				210				50		585	260	
Base Capacity (vph)				780		764		141	1933	1038	271	2175
Starvation Cap Reductn				0		0		0	0	0	0	0
Spillback Cap Reductn				0		0		0	0	0	0	0
Storage Cap Reductn				0		0		0	0	0	0	0
Reduced v/c Ratio				0.83		0.13		0.16	0.23	0.37	0.37	0.21

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 90 (82%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Satd. Flow (prot)	1863
Flt Permitted	
Satd. Flow (perm)	1863
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	17.5
Total Split (s)	48.0
Total Split (%)	43.6%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

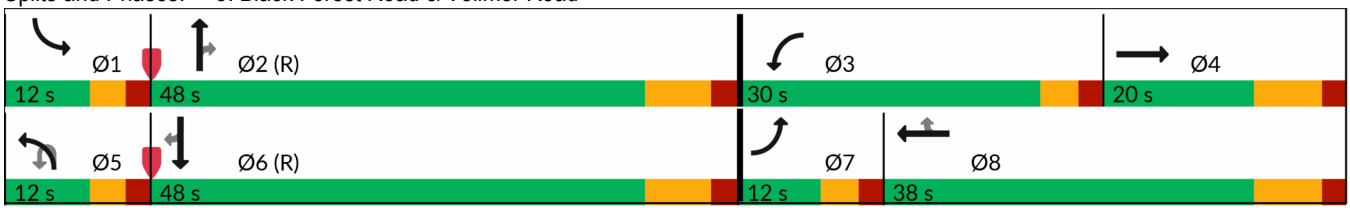
Intersection Summary

Maximum v/c Ratio: 0.87

Intersection Signal Delay (s/veh): 23.0	Intersection LOS: C
Intersection Capacity Utilization 48.7%	ICU Level of Service A
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



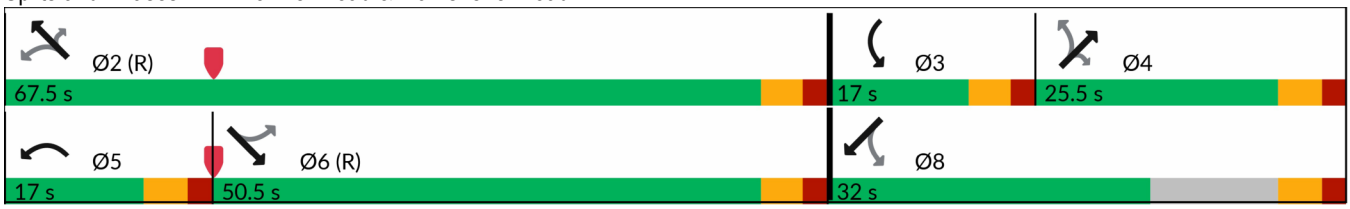
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	14	125	95	178	24	56	17	208	101	85	294	5
Future Volume (vph)	14	125	95	178	24	56	17	208	101	85	294	5
Satd. Flow (prot)	0	1755	0	1770	1863	1583	0	3525	1583	1770	3532	0
Flt Permitted		0.988		0.529				0.901		0.372		
Satd. Flow (perm)	0	1739	0	985	1863	1583	0	3189	1583	693	3532	0
Satd. Flow (RTOR)		38				79			134		1	
Lane Group Flow (vph)	0	254	0	193	26	61	0	244	110	92	325	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		6		5	2			4		3	8	
Permitted Phases	6			2		2	4		4	8		
Detector Phase	6	6		5	2	2	4	4	4	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	
Total Split (s)	50.5	50.5		17.0	67.5	67.5	25.5	25.5	25.5	17.0	32.0	
Total Split (%)	45.9%	45.9%		15.5%	61.4%	61.4%	23.2%	23.2%	23.2%	15.5%	29.1%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5		5.5	5.5	5.5		5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max		None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)		56.6		72.5	72.5	72.5		13.9	13.9	26.5	26.5	
Actuated g/C Ratio		0.51		0.66	0.66	0.66		0.13	0.13	0.24	0.24	
v/c Ratio		0.28		0.27	0.02	0.06		0.61	0.35	0.35	0.38	
Control Delay (s/veh)		16.1		9.6	8.7	1.5		51.8	7.4	34.6	34.7	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay (s/veh)		16.1		9.6	8.7	1.5		51.8	7.4	34.6	34.7	
LOS		B		A	A	A		D	A	C	C	
Approach Delay (s/veh)		16.1			7.7			38.0			34.7	
Approach LOS		B			A			D			C	
Queue Length 50th (ft)		87		52	6	0		88	0	51	99	
Queue Length 95th (ft)		170		97	19	12		127	34	89	131	
Internal Link Dist (ft)		227			695			374			1094	
Turn Bay Length (ft)				410		205			250	245		
Base Capacity (vph)		912		735	1227	1069		579	397	280	1188	
Starvation Cap Reductn		0		0	0	0		0	0	0	0	
Spillback Cap Reductn		0		0	0	0		0	0	0	0	
Storage Cap Reductn		0		0	0	0		0	0	0	0	
Reduced v/c Ratio		0.28		0.26	0.02	0.06		0.42	0.28	0.33	0.27	

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay (s/veh): 26.2	Intersection LOS: C
Intersection Capacity Utilization 55.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Vollmer Road & Marksheffel Road



Intersection	
Int Delay, s/veh	14.8

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	45	161	3	3	145	219	5	8	2	407	7	70
Future Vol, veh/h	45	161	3	3	145	219	5	8	2	407	7	70
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	250	-	190	230	-	230	-	-	-	345	-	300
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	49	175	3	3	158	238	5	9	2	442	8	76

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	396	0	0	178	0	0	362	675	88	354	440	79
Stage 1	-	-	-	-	-	-	273	273	-	164	164	-
Stage 2	-	-	-	-	-	-	89	402	-	190	276	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	1159	-	-	1395	-	-	569	374	953	577	509	966
Stage 1	-	-	-	-	-	-	710	683	-	822	761	-
Stage 2	-	-	-	-	-	-	908	599	-	794	680	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1159	-	-	1395	-	-	493	357	953	537	487	966
Mov Cap-2 Maneuver	-	-	-	-	-	-	493	357	-	537	487	-
Stage 1	-	-	-	-	-	-	680	654	-	820	760	-
Stage 2	-	-	-	-	-	-	826	597	-	749	652	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	1.77	0.06	13.63	31.56
HCM LOS			B	D

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1	SWLn2	SWLn3
Capacity (veh/h)	433	1395	-	-	1159	-	-	537	487	966
HCM Lane V/C Ratio	0.038	0.002	-	-	0.042	-	-	0.824	0.016	0.079
HCM Ctrl Dly (s/v)	13.6	7.6	-	-	8.2	-	-	35.8	12.5	9
HCM Lane LOS	B	A	-	-	A	-	-	E	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	8.3	0	0.3

Intersection	
Int Delay, s/veh	10.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	0	0	24	157	0	0	8	315	111	98	452	17
Future Vol, veh/h	0	0	24	157	0	0	8	315	111	98	452	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	0	-	-	100	-	-	100	-	100
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	26	171	0	0	9	342	121	107	491	18

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	246	879	1143	232	510	0	0	463	0	0
Stage 1	-	-	-	420	420	-	-	-	-	-	-	-
Stage 2	-	-	-	459	723	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	755	242	199	771	1052	-	-	1095	-	-
Stage 1	0	0	-	581	588	-	-	-	-	-	-	-
Stage 2	0	0	-	552	429	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	755	209	178	771	1052	-	-	1095	-	-
Mov Cap-2 Maneuver	-	-	-	209	178	-	-	-	-	-	-	-
Stage 1	-	-	-	577	583	-	-	-	-	-	-	-
Stage 2	-	-	-	481	387	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	9.94	70.48	0.16	1.49
HCM LOS	A	F		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	NWLn2	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1052	-	-	209	-	755	1095	-	-
HCM Lane V/C Ratio	0.008	-	-	0.816	-	0.035	0.097	-	-
HCM Ctrl Dly (s/v)	8.5	-	-	70.5	0	9.9	8.6	-	-
HCM Lane LOS	A	-	-	F	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	5.9	-	0.1	0.3	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	39	287	28	0	567
Future Vol, veh/h	0	39	287	28	0	567
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	42	312	30	0	616

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	171	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	843	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	843	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	NW	NE	SW
HCM Ctrl Dly, s/v	9.5	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWT
Capacity (veh/h)	-	-	843	-
HCM Lane V/C Ratio	-	-	0.05	-
HCM Ctrl Dly (s/v)	-	-	9.5	-
HCM Lane LOS	-	-	A	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	1

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	270	41	0	258	0	65
Future Vol, veh/h	270	41	0	258	0	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	293	45	0	280	0	71

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	169
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	845
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	845
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	SE	NW	NE
HCM Ctrl Dly, s/v	0	0	9.65
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWT	SET	SER
Capacity (veh/h)	845	-	-	-
HCM Lane V/C Ratio	0.084	-	-	-
HCM Ctrl Dly (s/v)	9.6	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	346	1587	384	291	1149	237	263	316	235	237	304	213
Future Volume (vph)	346	1587	384	291	1149	237	263	316	235	237	304	213
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			337			253			255			245
Lane Group Flow (vph)	376	1725	417	316	1249	258	286	343	255	258	330	232
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	17.0	45.0		24.0	52.0		27.0	36.0		15.0	24.0	
Total Split (%)	14.2%	37.5%		20.0%	43.3%		22.5%	30.0%		12.5%	20.0%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	18.1	37.5	120.0	23.6	45.5	120.0	15.3	21.4	120.0	10.0	16.1	120.0
Actuated g/C Ratio	0.15	0.31	1.00	0.20	0.38	1.00	0.13	0.18	1.00	0.08	0.13	1.00
v/c Ratio	0.73	1.09	0.26	0.47	0.65	0.16	0.66	0.55	0.16	0.90	0.70	0.15
Control Delay (s/veh)	52.5	92.1	0.2	46.8	32.8	0.2	57.0	47.4	0.2	87.9	57.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	52.5	92.1	0.2	46.8	32.8	0.2	57.0	47.4	0.2	87.9	57.5	0.2
LOS	D	F	A	D	C	A	E	D	A	F	E	A
Approach Delay (s/veh)		71.0			30.6			36.9			50.9	
Approach LOS		E			C			D			D	
Queue Length 50th (ft)	157	~540	0	114	297	0	111	130	0	105	132	0
Queue Length 95th (ft)	m#205	m#591	m0	173	350	0	153	167	0	#185	179	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	517	1589	1583	676	1929	1583	629	840	1583	286	511	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	1.09	0.26	0.47	0.65	0.16	0.45	0.41	0.16	0.90	0.65	0.15

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 26 (22%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.09

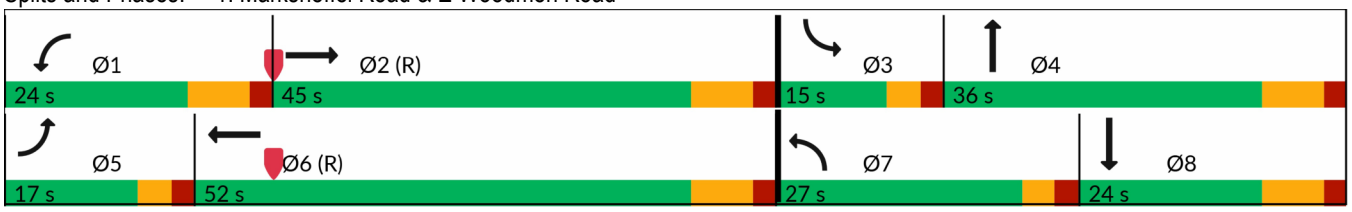
Intersection Signal Delay (s/veh): 51.1	Intersection LOS: D
Intersection Capacity Utilization 77.8%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	677	1917	148	103	1301	142	123	374	149	198	240	620
Future Volume (vph)	677	1917	148	103	1301	142	123	374	149	198	240	620
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.350		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	1265	3539	1583
Satd. Flow (RTOR)			161			164			168			297
Lane Group Flow (vph)	736	2084	161	112	1414	154	134	407	162	215	261	674
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	27.0	55.0	55.0	20.0	48.0	48.0	17.0	28.0	28.0	17.0	28.0	28.0
Total Split (%)	22.5%	45.8%	45.8%	16.7%	40.0%	40.0%	14.2%	23.3%	23.3%	14.2%	23.3%	23.3%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	22.0	51.2	51.2	12.3	41.5	41.5	9.9	23.5	23.5	35.6	24.1	24.1
Actuated g/C Ratio	0.18	0.43	0.43	0.10	0.35	0.35	0.08	0.20	0.20	0.30	0.20	0.20
v/c Ratio	1.17	0.96	0.21	0.62	0.80	0.24	0.48	0.59	0.36	0.38	0.37	1.21
Control Delay (s/veh)	136.0	46.2	4.1	48.7	65.9	24.7	58.0	48.2	8.2	21.8	31.3	126.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	136.0	46.2	4.1	48.7	65.9	24.7	58.0	48.2	8.2	21.8	31.3	126.6
LOS	F	D	A	D	E	C	E	D	A	C	C	F
Approach Delay (s/veh)		66.1			61.0			40.8			85.4	
Approach LOS		E			E			D			F	
Queue Length 50th (ft)	~355	578	0	80	418	45	52	155	0	34	67	~449
Queue Length 95th (ft)	#478	#730	43	m133	471	m110	84	213	55	m60	m114	m#725
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	629	2168	767	221	1758	654	343	692	445	608	711	555
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.17	0.96	0.21	0.51	0.80	0.24	0.39	0.59	0.36	0.35	0.37	1.21

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 78 (65%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.21

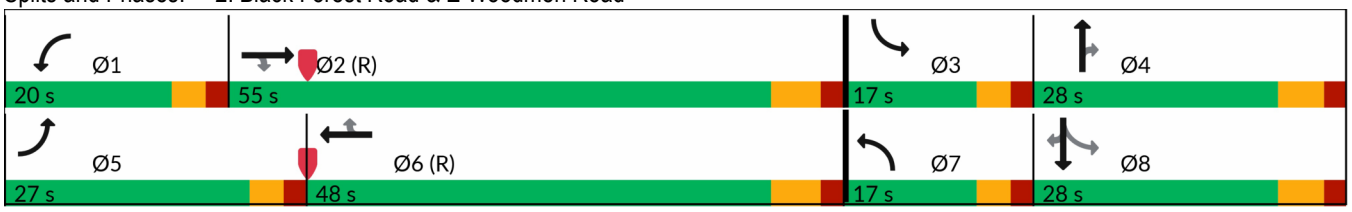
Intersection Signal Delay (s/veh): 65.4	Intersection LOS: E
Intersection Capacity Utilization 81.6%	ICU Level of Service D
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	0	0	0	531	0	73	7	0	559	629	119	536
Future Volume (vph)	0	0	0	531	0	73	7	0	559	629	119	536
Satd. Flow (prot)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Flt Permitted				0.950				0.950			0.950	
Satd. Flow (perm)	1863	1863	0	3433	1863	1583	0	1770	3539	1583	3433	3539
Satd. Flow (RTOR)						415				684		
Lane Group Flow (vph)	0	0	0	577	0	79	0	8	608	684	129	583
Turn Type	Prot			Prot		Perm	Prot	Prot	NA	Perm	Prot	NA
Protected Phases	7	4		3	8		5	5	2		1	6
Permitted Phases						8				2		
Detector Phase	7	4		3	8	8	5	5	2	2	1	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	9.0	17.5	17.5	9.0	17.5
Total Split (s)	15.0	22.0		28.0	35.0	35.0	14.0	14.0	56.0	56.0	14.0	56.0
Total Split (%)	12.5%	18.3%		23.3%	29.2%	29.2%	11.7%	11.7%	46.7%	46.7%	11.7%	46.7%
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	3.0	5.5	5.5	3.0	5.5
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5		5.0	7.5	7.5	5.0	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)				22.5		20.0		6.2	70.2	70.2	9.8	82.6
Actuated g/C Ratio				0.19		0.17		0.05	0.59	0.59	0.08	0.69
v/c Ratio				0.90		0.13		0.09	0.29	0.57	0.46	0.24
Control Delay (s/veh)				65.8		0.4		76.4	0.8	4.6	57.4	7.9
Queue Delay				0.0		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)				65.8		0.4		76.4	0.8	4.6	57.4	7.9
LOS				E		A		E	A	A	E	A
Approach Delay (s/veh)					57.9				3.2			16.8
Approach LOS					E				A			B
Queue Length 50th (ft)				229		0		7	6	99	51	76
Queue Length 95th (ft)				#324		0		m10	m5	m96	81	140
Internal Link Dist (ft)		100			374				923			1202
Turn Bay Length (ft)				210				50		585	260	
Base Capacity (vph)				657		682		132	2070	1210	294	2435
Starvation Cap Reductn				0		0		0	0	0	0	0
Spillback Cap Reductn				0		0		0	0	0	0	0
Storage Cap Reductn				0		0		0	0	0	0	0
Reduced v/c Ratio				0.88		0.12		0.06	0.29	0.57	0.44	0.24

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 60 (50%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated



Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Satd. Flow (prot)	1863
Flt Permitted	
Satd. Flow (perm)	1863
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	Perm
Protected Phases	
Permitted Phases	6
Detector Phase	6
Switch Phase	
Minimum Initial (s)	10.0
Minimum Split (s)	17.5
Total Split (s)	56.0
Total Split (%)	46.7%
Yellow Time (s)	5.5
All-Red Time (s)	2.0
Lost Time Adjust (s)	0.0
Total Lost Time (s)	7.5
Lead/Lag	Lag
Lead-Lag Optimize?	Yes
Recall Mode	C-Max
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay (s/veh)	
Queue Delay	
Total Delay (s/veh)	
LOS	
Approach Delay (s/veh)	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

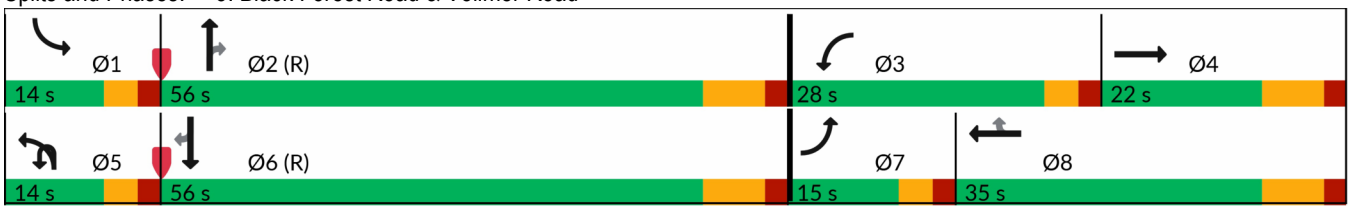
Intersection Summary

Maximum v/c Ratio: 0.90

Intersection Signal Delay (s/veh): 20.3	Intersection LOS: C
Intersection Capacity Utilization 52.8%	ICU Level of Service A
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



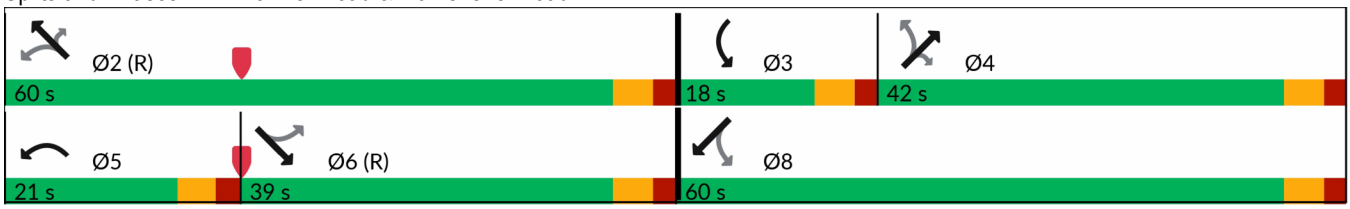
Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	18	78	64	198	74	97	53	325	132	106	237	23
Future Volume (vph)	18	78	64	198	74	97	53	325	132	106	237	23
Satd. Flow (prot)	0	1752	0	1770	1863	1583	0	3514	1583	1770	3493	0
Flt Permitted		0.968		0.576				0.841		0.262		
Satd. Flow (perm)	0	1706	0	1073	1863	1583	0	2976	1583	488	3493	0
Satd. Flow (RTOR)		28				105			143		11	
Lane Group Flow (vph)	0	175	0	215	80	105	0	411	143	115	283	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	
Protected Phases		6		5	2			4		3	8	
Permitted Phases	6			2		2	4		4	8		
Detector Phase	6	6		5	2	2	4	4	4	3	8	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	10.5	10.5		10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	
Total Split (s)	39.0	39.0		21.0	60.0	60.0	42.0	42.0	42.0	18.0	60.0	
Total Split (%)	32.5%	32.5%		17.5%	50.0%	50.0%	35.0%	35.0%	35.0%	15.0%	50.0%	
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.5		5.5	5.5	5.5		5.5	5.5	5.5	5.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max		None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)		52.6		70.8	70.8	70.8		22.0	22.0	38.2	38.2	
Actuated g/C Ratio		0.44		0.59	0.59	0.59		0.18	0.18	0.32	0.32	
v/c Ratio		0.23		0.30	0.07	0.11		0.76	0.35	0.43	0.25	
Control Delay (s/veh)		21.1		14.0	12.4	2.9		55.4	8.6	33.2	28.6	
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay (s/veh)		21.1		14.0	12.4	2.9		55.4	8.6	33.2	28.6	
LOS		C		B	B	A		E	A	C	C	
Approach Delay (s/veh)		21.1			10.7			43.3			29.9	
Approach LOS		C			B			D			C	
Queue Length 50th (ft)		70		75	26	0		163	0	65	82	
Queue Length 95th (ft)		147		137	57	27		207	53	102	107	
Internal Link Dist (ft)		227			715			380			1094	
Turn Bay Length (ft)				410		205			250	245		
Base Capacity (vph)		763		725	1098	976		905	581	288	1592	
Starvation Cap Reductn		0		0	0	0		0	0	0	0	
Spillback Cap Reductn		0		0	0	0		0	0	0	0	
Storage Cap Reductn		0		0	0	0		0	0	0	0	
Reduced v/c Ratio		0.23		0.30	0.07	0.11		0.45	0.25	0.40	0.18	

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay (s/veh): 28.7	Intersection LOS: C
Intersection Capacity Utilization 56.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Vollmer Road & Marksheffel Road



Intersection	
Int Delay, s/veh	9.6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	63	170	4	1	179	456	8	1	15	323	8	67
Future Vol, veh/h	63	170	4	1	179	456	8	1	15	323	8	67
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	250	-	190	230	-	230	-	-	-	345	-	300
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	68	185	4	1	195	496	9	1	16	351	9	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	690	0	0	189	0	0	426	1014	92	427	523	97
Stage 1	-	-	-	-	-	-	322	322	-	197	197	-
Stage 2	-	-	-	-	-	-	104	692	-	230	326	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	900	-	-	1382	-	-	513	237	947	512	457	940
Stage 1	-	-	-	-	-	-	664	650	-	786	737	-
Stage 2	-	-	-	-	-	-	891	443	-	752	647	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	900	-	-	1382	-	-	428	219	947	462	422	940
Mov Cap-2 Maneuver	-	-	-	-	-	-	428	219	-	462	422	-
Stage 1	-	-	-	-	-	-	614	600	-	786	736	-
Stage 2	-	-	-	-	-	-	811	443	-	682	598	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	2.48	0.01	11.12	28.95
HCM LOS			B	D

Minor Lane/Major Mvmt	NELn1	NWL	NWT	NWR	SEL	SET	SER	SWLn1	SWLn2	SWLn3
Capacity (veh/h)	614	1382	-	-	900	-	-	462	422	940
HCM Lane V/C Ratio	0.042	0.001	-	-	0.076	-	-	0.759	0.021	0.077
HCM Ctrl Dly (s/v)	11.1	7.6	-	-	9.3	-	-	33.4	13.7	9.2
HCM Lane LOS	B	A	-	-	A	-	-	D	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.2	-	-	6.5	0.1	0.3

Intersection	
Int Delay, s/veh	18.6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	0	0	15	156	0	0	25	497	102	89	351	59
Future Vol, veh/h	0	0	15	156	0	0	25	497	102	89	351	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	0	-	-	100	-	-	100	-	100
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	16	170	0	0	27	540	111	97	382	64

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	191	1034	1289	326	446	0	0	651	0	0
Stage 1	-	-	-	650	650	-	-	-	-	-	-	-
Stage 2	-	-	-	384	639	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	819	186	162	670	1111	-	-	931	-	-
Stage 1	0	0	-	424	463	-	-	-	-	-	-	-
Stage 2	0	0	-	610	469	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	819	~ 160	142	670	1111	-	-	931	-	-
Mov Cap-2 Maneuver	-	-	-	~ 160	142	-	-	-	-	-	-	-
Stage 1	-	-	-	414	452	-	-	-	-	-	-	-
Stage 2	-	-	-	536	420	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	9.49	146.32	0.33	1.66
HCM LOS	A	F		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	NWLn2	SELn1	SWL	SWT	SWR
Capacity (veh/h)	1111	-	-	160	-	819	931	-	-
HCM Lane V/C Ratio	0.024	-	-	1.062	-	0.02	0.104	-	-
HCM Ctrl Dly (s/v)	8.3	-	-	146.3	0	9.5	9.3	-	-
HCM Lane LOS	A	-	-	F	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	8.6	-	0.1	0.3	-	-

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

Intersection	
Int Delay, s/veh	0.4

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	39	471	26	0	499
Future Vol, veh/h	0	39	471	26	0	499
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	42	512	28	0	542

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	270	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	728	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	728	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	NW	NE	SW
HCM Ctrl Dly, s/v	10.25	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWT
Capacity (veh/h)	-	-	728	-
HCM Lane V/C Ratio	-	-	0.058	-
HCM Ctrl Dly (s/v)	-	-	10.3	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.8

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	277	39	0	369	0	65
Future Vol, veh/h	277	39	0	369	0	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	301	42	0	401	0	71

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	172
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	842
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	842
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	SE	NW	NE
HCM Ctrl Dly, s/v	0	0	9.67
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWT	SET	SER
Capacity (veh/h)	842	-	-	-
HCM Lane V/C Ratio	0.084	-	-	-
HCM Ctrl Dly (s/v)	9.7	-	-	-
HCM Lane LOS	A	-	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	342	804	271	280	1828	288	463	439	173	412	625	433
Future Volume (vph)	342	804	271	280	1828	288	463	439	173	412	625	433
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			295			218			218			411
Lane Group Flow (vph)	372	874	295	304	1987	313	503	477	188	448	679	471
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	16.0	40.4		23.3	47.7		20.0	25.3		21.0	26.3	
Total Split (%)	14.5%	36.7%		21.2%	43.4%		18.2%	23.0%		19.1%	23.9%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	11.0	32.9	110.0	15.8	40.2	110.0	15.0	17.8	110.0	16.0	18.8	110.0
Actuated g/C Ratio	0.10	0.30	1.00	0.14	0.37	1.00	0.14	0.16	1.00	0.15	0.17	1.00
v/c Ratio	1.08	0.57	0.19	0.62	1.07	0.20	1.07	0.83	0.12	0.90	1.12	0.30
Control Delay (s/veh)	118.5	26.1	0.2	50.3	76.6	0.3	108.5	58.4	0.2	68.7	117.9	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	118.5	26.1	0.2	50.3	76.6	0.3	108.5	58.4	0.2	68.7	117.9	0.5
LOS	F	C	A	D	E	A	F	E	A	E	F	A
Approach Delay (s/veh)		43.4			64.3			70.6			69.5	
Approach LOS		D			E			E			E	
Queue Length 50th (ft)	~159	101	0	107	~579	0	~207	176	0	164	~296	0
Queue Length 95th (ft)	m#245	148	m0	154	#677	0	#315	#258	0	#256	#417	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	343	1520	1583	493	1858	1583	468	573	1583	499	604	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.58	0.19	0.62	1.07	0.20	1.07	0.83	0.12	0.90	1.12	0.30

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 76 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

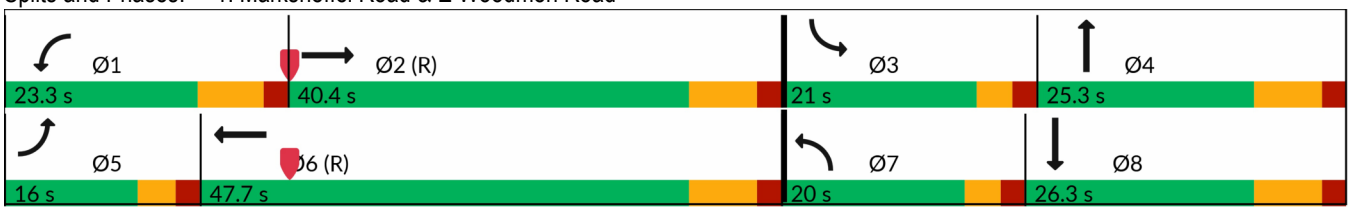
Intersection Signal Delay (s/veh): 61.9	Intersection LOS: E
Intersection Capacity Utilization 96.4%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	338	1275	35	45	1910	360	115	730	35	400	1855	378
Future Volume (vph)	338	1275	35	45	1910	360	115	730	35	400	1855	378
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.155		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	560	3539	1583
Satd. Flow (RTOR)			179			235			183			134
Lane Group Flow (vph)	367	1386	38	49	2076	391	125	793	38	435	2016	411
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	11.0	43.0	43.0	9.0	41.0	41.0	9.0	39.0	39.0	19.0	49.0	49.0
Total Split (%)	10.0%	39.1%	39.1%	8.2%	37.3%	37.3%	8.2%	35.5%	35.5%	17.3%	44.5%	44.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	6.0	38.3	38.3	4.0	34.5	34.5	4.0	34.1	34.1	53.0	43.0	43.0
Actuated g/C Ratio	0.05	0.35	0.35	0.04	0.31	0.31	0.04	0.31	0.31	0.48	0.39	0.39
v/c Ratio	1.96	0.78	0.06	0.77	1.30	0.60	1.01	0.72	0.06	0.72	1.46	0.59
Control Delay (s/veh)	480.4	36.4	0.2	70.6	167.0	16.7	136.7	38.6	0.2	23.5	238.5	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	480.4	36.4	0.2	70.6	167.0	16.7	136.7	38.6	0.2	23.5	238.5	22.6
LOS	F	D	A	E	F	B	F	D	A	C	F	C
Approach Delay (s/veh)		126.6			141.8			49.9			174.8	
Approach LOS		F			F			D			F	
Queue Length 50th (ft)	~210	332	0	33	~723	161	~47	268	0	111	~1078	172
Queue Length 95th (ft)	#307	393	0	m38	m#675	m160	#111	343	0	m140	m#1220	m264
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	187	1770	667	64	1594	657	124	1095	616	635	1383	700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.96	0.78	0.06	0.77	1.30	0.60	1.01	0.72	0.06	0.69	1.46	0.59

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 98 (89%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.96

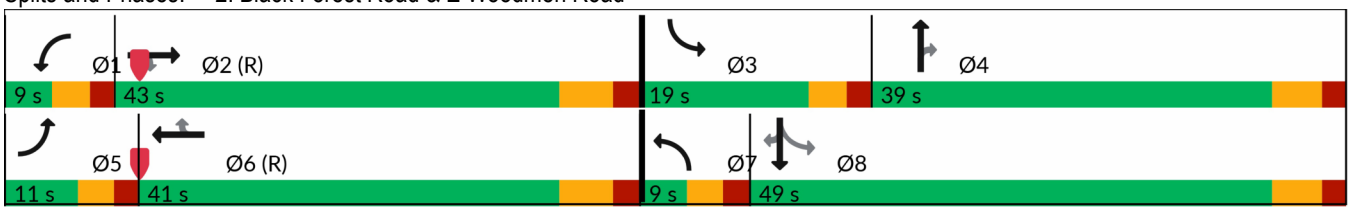
Intersection Signal Delay (s/veh): 139.3	Intersection LOS: F
Intersection Capacity Utilization 119.9%	ICU Level of Service H
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	10	20	692	15	50	30	997	201	250	1646	100
Future Volume (vph)	40	10	20	692	15	50	30	997	201	250	1646	100
Satd. Flow (prot)	3433	3185	0	3433	1863	1583	3433	3539	1583	3433	5040	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3185	0	3433	1863	1583	3433	3539	1583	3433	5040	0
Satd. Flow (RTOR)		22				193			243		11	
Lane Group Flow (vph)	43	33	0	752	16	54	33	1084	218	272	1898	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	17.5	17.5	9.0	17.5	
Total Split (s)	9.0	11.5		31.0	33.5	33.5	9.0	50.5	50.5	17.0	58.5	
Total Split (%)	8.2%	10.5%		28.2%	30.5%	30.5%	8.2%	45.9%	45.9%	15.5%	53.2%	
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	4.0	4.3		25.7	24.7	24.7	4.7	48.1	48.1	11.8	59.5	
Actuated g/C Ratio	0.04	0.04		0.23	0.22	0.22	0.04	0.44	0.44	0.11	0.54	
v/c Ratio	0.35	0.23		0.94	0.04	0.11	0.23	0.70	0.26	0.74	0.69	
Control Delay (s/veh)	59.6	30.9		61.7	32.9	0.4	64.6	15.7	3.7	60.7	22.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	59.6	30.9		61.7	32.9	0.4	64.6	15.7	3.7	60.7	22.1	
LOS	E	C		E	C	A	E	B	A	E	C	
Approach Delay (s/veh)		47.1			57.1			14.9			26.9	
Approach LOS		D			E			B			C	
Queue Length 50th (ft)	15	4		273	9	0	10	368	38	98	414	
Queue Length 95th (ft)	35	21		#388	28	0	m13	m391	m40	#151	481	
Internal Link Dist (ft)		345			374			923			1202	
Turn Bay Length (ft)	200			210			200		585	260		
Base Capacity (vph)	124	146		811	440	521	145	1548	829	377	2731	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.35	0.23		0.93	0.04	0.10	0.23	0.70	0.26	0.72	0.69	

Intersection Summary

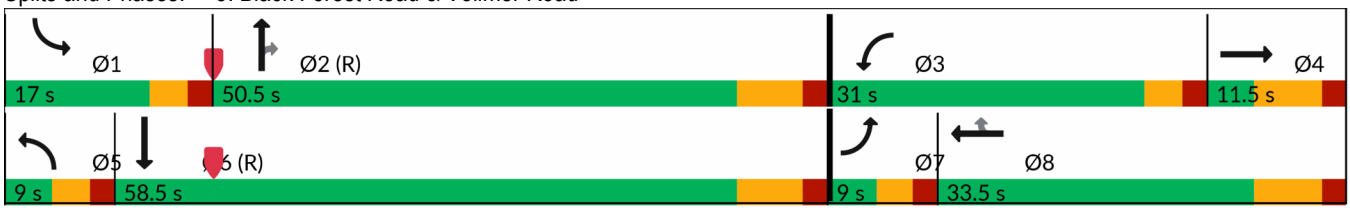
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 90 (82%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay (s/veh): 29.3	Intersection LOS: C
Intersection Capacity Utilization 80.4%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	195	1511	86	261	1200	59	218	307	116	146	614	215
Future Volume (vph)	195	1511	86	261	1200	59	218	307	116	146	614	215
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.080			0.084			0.202			0.394		
Satd. Flow (perm)	149	3539	1583	156	3539	1583	376	3539	1583	734	3539	1583
Satd. Flow (RTOR)			134			134			134			172
Lane Group Flow (vph)	212	1642	93	284	1304	64	237	334	126	159	667	234
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
Total Split (s)	17.3	55.5	55.5	14.4	52.6	52.6	12.9	25.1	25.1	15.0	27.2	27.2
Total Split (%)	15.7%	50.5%	50.5%	13.1%	47.8%	47.8%	11.7%	22.8%	22.8%	13.6%	24.7%	24.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	61.4	50.0	50.0	56.4	47.5	47.5	27.2	19.8	19.8	31.0	21.7	21.7
Actuated g/C Ratio	0.56	0.45	0.45	0.51	0.43	0.43	0.25	0.18	0.18	0.28	0.20	0.20
v/c Ratio	0.85	1.02	0.12	1.35	0.85	0.08	1.27	0.52	0.32	0.54	0.96	0.52
Control Delay (s/veh)	54.2	58.3	1.4	206.4	43.1	5.6	187.3	44.3	8.3	36.4	69.0	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	54.2	58.3	1.4	206.4	43.1	5.6	187.3	44.3	8.3	36.4	69.0	16.3
LOS	D	E	A	F	D	A	F	D	A	D	E	B
Approach Delay (s/veh)		55.2			69.7			86.4			52.5	
Approach LOS		E			E			F			D	
Queue Length 50th (ft)	97	~660	0	~224	430	1	~163	115	0	86	251	37
Queue Length 95th (ft)	#226	#800	12	m#376	591	m10	#321	163	47	143	#370	115
Internal Link Dist (ft)		227			729			374			1094	
Turn Bay Length (ft)	200		200	410		205	200		250	245		200
Base Capacity (vph)	257	1608	792	210	1528	760	187	637	395	297	698	450
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	1.02	0.12	1.35	0.85	0.08	1.27	0.52	0.32	0.54	0.96	0.52

Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.35

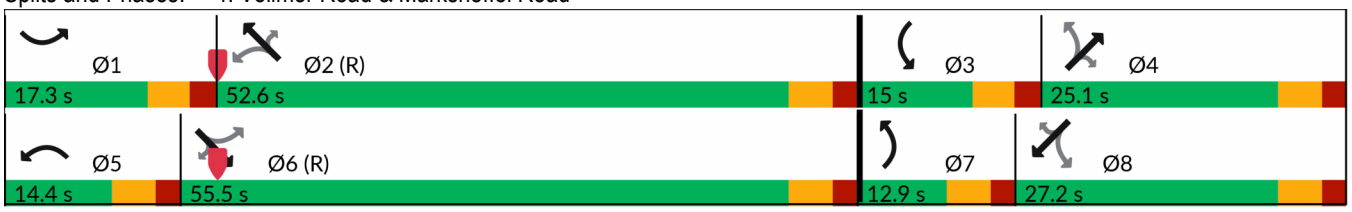
Intersection Signal Delay (s/veh): 63.2	Intersection LOS: E
Intersection Capacity Utilization 103.6%	ICU Level of Service G
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Vollmer Road & Marksheffel Road



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	137	1507	12	43	1086	145	5	1	6	518	4	429
Future Volume (vph)	137	1507	12	43	1086	145	5	1	6	518	4	429
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1619	0	3433	1863	1583
Flt Permitted	0.125			0.073						0.950		
Satd. Flow (perm)	233	3539	1583	136	3539	1583	1863	1619	0	3433	1863	1583
Satd. Flow (RTOR)			169			169		7				205
Lane Group Flow (vph)	149	1638	13	47	1180	158	5	8	0	563	4	466
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					4
Detector Phase	5	2	2	1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	10.0		20.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	10.0	15.0		25.0	15.0	15.0
Total Split (s)	14.0	59.0	59.0	10.0	55.0	55.0	10.0	15.0		26.0	31.0	31.0
Total Split (%)	12.7%	53.6%	53.6%	9.1%	50.0%	50.0%	9.1%	13.6%		23.6%	28.2%	28.2%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	70.4	63.2	63.2	64.5	58.5	58.5	7.0	10.0		24.9	25.9	25.9
Actuated g/C Ratio	0.64	0.57	0.57	0.59	0.53	0.53	0.06	0.09		0.23	0.24	0.24
v/c Ratio	0.56	0.81	0.01	0.28	0.63	0.17	0.04	0.05		0.72	0.01	0.88
Control Delay (s/veh)	23.2	10.0	0.0	13.3	21.3	2.7	38.2	28.4		45.5	30.8	41.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	23.2	10.0	0.0	13.3	21.3	2.7	38.2	28.4		45.5	30.8	41.2
LOS	C	B	A	B	C	A	D	C		D	C	D
Approach Delay (s/veh)		11.1			18.9			32.2			43.5	
Approach LOS		B			B			C			D	
Queue Length 50th (ft)	20	78	0	11	303	0	4	1		185	2	186
Queue Length 95th (ft)	m34	m421	m0	30	439	32	11	17		#292	12	#384
Internal Link Dist (ft)		508			521			378			673	
Turn Bay Length (ft)	250		190	230		230	200			345		300
Base Capacity (vph)	279	2032	981	168	1881	920	114	153		784	468	551
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.53	0.81	0.01	0.28	0.63	0.17	0.04	0.05		0.72	0.01	0.85

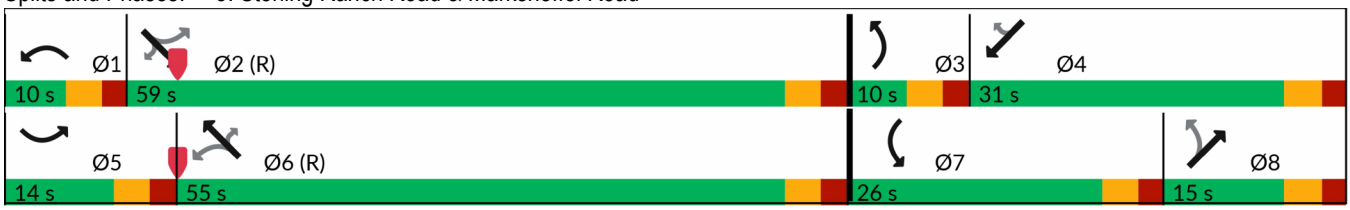
Intersection Summary
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 25 (23%), Referenced to phase 2:SETL and 6:NWTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay (s/veh): 21.6	Intersection LOS: C
Intersection Capacity Utilization 79.8%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Sterling Ranch Road & Marksheffel Road



Intersection	
Int Delay, s/veh	8.6

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	0	0	5	91	0	65	2	564	69	84	859	18
Future Vol, veh/h	0	0	5	91	0	65	2	564	69	84	859	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	0	-	-	100	-	-	100	-	100
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	5	99	0	71	2	613	75	91	934	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	467	1304	1791	344	953	0	0	688	0	0
Stage 1	-	-	-	655	655	-	-	-	-	-	-	-
Stage 2	-	-	-	649	1136	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	543	118	80	652	717	-	-	902	-	-
Stage 1	0	0	-	421	461	-	-	-	-	-	-	-
Stage 2	0	0	-	425	275	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	543	105	72	652	717	-	-	902	-	-
Mov Cap-2 Maneuver	-	-	-	105	72	-	-	-	-	-	-	-
Stage 1	-	-	-	420	459	-	-	-	-	-	-	-
Stage 2	-	-	-	378	247	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	11.7	91.64	0.03	0.83
HCM LOS	B	F		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	NWLn2	SELn1	SWL	SWT	SWR
Capacity (veh/h)	717	-	-	105	652	543	902	-	-
HCM Lane V/C Ratio	0.003	-	-	0.946	0.108	0.01	0.101	-	-
HCM Ctrl Dly (s/v)	10	-	-	149.1	11.2	11.7	9.4	-	-
HCM Lane LOS	B	-	-	F	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	5.8	0.4	0	0.3	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	26	615	14	0	961
Future Vol, veh/h	0	26	615	14	0	961
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	28	668	15	0	1045

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	342	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	654	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	654	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	NW	NE	SW
HCM Ctrl Dly, s/v	10.75	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWT
Capacity (veh/h)	-	-	654	-
HCM Lane V/C Ratio	-	-	0.043	-
HCM Ctrl Dly (s/v)	-	-	10.8	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.6

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	1663	110	0	1520	0	79
Future Vol, veh/h	1663	110	0	1520	0	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1808	120	0	1652	0	86

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	964
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	255
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	255
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	SE	NW	NE
HCM Ctrl Dly, s/v	0	0	26.07
HCM LOS			D

Minor Lane/Major Mvmt	NELn1	NWT	SET	SER
Capacity (veh/h)	255	-	-	-
HCM Lane V/C Ratio	0.336	-	-	-
HCM Ctrl Dly (s/v)	26.1	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	1.4	-	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	486	2222	538	408	1608	395	369	601	329	379	575	397
Future Volume (vph)	486	2222	538	408	1608	395	369	601	329	379	575	397
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	3539	1583	3433	3539	1583
Satd. Flow (RTOR)			337			302			358			379
Lane Group Flow (vph)	528	2415	585	443	1748	429	401	653	358	412	625	432
Turn Type	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free	Prot	NA	Free
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			Free			Free			Free			Free
Detector Phase	5	2		1	6		7	4		3	8	
Switch Phase												
Minimum Initial (s)	4.0	10.0		4.0	10.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	9.0	17.5		11.5	17.5		9.0	11.5		9.0	11.5	
Total Split (s)	24.0	58.0		21.0	55.0		16.0	25.0		16.0	25.0	
Total Split (%)	20.0%	48.3%		17.5%	45.8%		13.3%	20.8%		13.3%	20.8%	
Yellow Time (s)	3.0	5.5		5.5	5.5		3.0	5.5		3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.0	7.5		7.5	7.5		5.0	7.5		5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Recall Mode	None	C-Max		Max	C-Max		None	None		None	None	
Act Effct Green (s)	19.0	50.5	120.0	13.5	47.5	120.0	11.0	17.5	120.0	11.0	17.5	120.0
Actuated g/C Ratio	0.16	0.42	1.00	0.11	0.40	1.00	0.09	0.15	1.00	0.09	0.15	1.00
v/c Ratio	0.97	1.13	0.37	1.15	0.87	0.27	1.28	1.27	0.23	1.31	1.21	0.27
Control Delay (s/veh)	88.8	90.9	0.6	139.7	39.1	0.4	190.7	176.2	0.3	203.9	155.6	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	88.8	90.9	0.6	139.7	39.1	0.4	190.7	176.2	0.3	203.9	155.6	0.4
LOS	F	F	A	F	D	A	F	F	A	F	F	A
Approach Delay (s/veh)		75.7			49.8			135.7			123.5	
Approach LOS		E			D			F			F	
Queue Length 50th (ft)	223	~788	0	~210	457	0	~205	~340	0	~214	~316	0
Queue Length 95th (ft)	m#334	#883	0	#318	527	0	#308	#462	0	#319	#436	0
Internal Link Dist (ft)		909			581			468			410	
Turn Bay Length (ft)	265		400	225		350	385		375	250		240
Base Capacity (vph)	543	2139	1583	386	2012	1583	314	516	1583	314	516	1583
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	1.13	0.37	1.15	0.87	0.27	1.28	1.27	0.23	1.31	1.21	0.27

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 26 (22%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.31

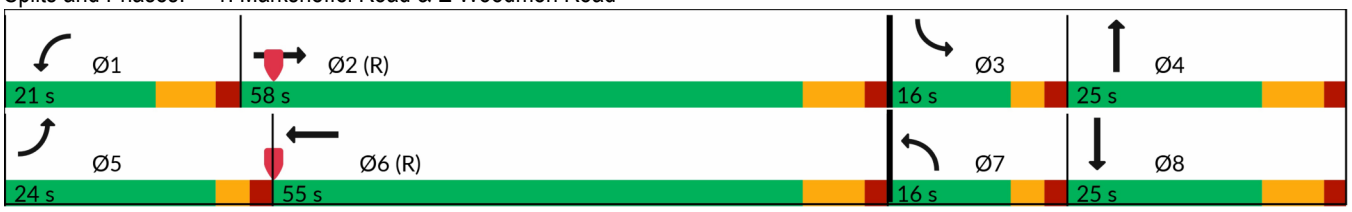
Intersection Signal Delay (s/veh): 85.3	Intersection LOS: F
Intersection Capacity Utilization 104.9%	ICU Level of Service G
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Marksheffel Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	395	1530	85	15	1340	30	80	1300	85	20	960	517
Future Volume (vph)	395	1530	85	15	1340	30	80	1300	85	20	960	517
Satd. Flow (prot)	3433	5085	1583	1770	5085	1583	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.085		
Satd. Flow (perm)	3433	5085	1583	1770	5085	1583	3433	3539	1583	307	3539	1583
Satd. Flow (RTOR)			118			164			168			171
Lane Group Flow (vph)	429	1663	92	16	1457	33	87	1413	92	22	1043	562
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	4.0	15.0	15.0	4.0	15.0	15.0	4.0	10.0	10.0	4.0	10.0	10.0
Minimum Split (s)	9.0	21.5	21.5	9.0	21.5	21.5	9.0	16.0	16.0	9.0	16.0	16.0
Total Split (s)	17.0	50.0	50.0	9.0	42.0	42.0	10.0	52.0	52.0	9.0	51.0	51.0
Total Split (%)	14.2%	41.7%	41.7%	7.5%	35.0%	35.0%	8.3%	43.3%	43.3%	7.5%	42.5%	42.5%
Yellow Time (s)	3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.0	6.5	6.5	5.0	6.5	6.5	5.0	6.0	6.0	5.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	12.0	48.9	48.9	4.0	35.5	35.5	5.0	49.6	49.6	50.0	45.0	45.0
Actuated g/C Ratio	0.10	0.41	0.41	0.03	0.30	0.30	0.04	0.41	0.41	0.42	0.38	0.38
v/c Ratio	1.25	0.80	0.13	0.27	0.97	0.06	0.61	0.97	0.12	0.09	0.79	0.80
Control Delay (s/veh)	178.9	35.7	2.7	49.7	68.7	0.1	74.7	52.0	0.3	18.8	45.3	42.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	178.9	35.7	2.7	49.7	68.7	0.1	74.7	52.0	0.3	18.8	45.3	42.5
LOS	F	D	A	D	E	A	E	D	A	B	D	D
Approach Delay (s/veh)		62.4			67.0			50.3			43.9	
Approach LOS		E			E			D			D	
Queue Length 50th (ft)	~217	393	0	13	447	0	35	~633	0	6	459	407
Queue Length 95th (ft)	#322	519	21	m18	m#491	m0	#69	#774	0	m9	531	m519
Internal Link Dist (ft)		1108			5481			547			923	
Turn Bay Length (ft)	500		710	200		245	195		180	235		410
Base Capacity (vph)	343	2072	714	59	1504	583	143	1462	752	232	1327	700
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.25	0.80	0.13	0.27	0.97	0.06	0.61	0.97	0.12	0.09	0.79	0.80

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 78 (65%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.25

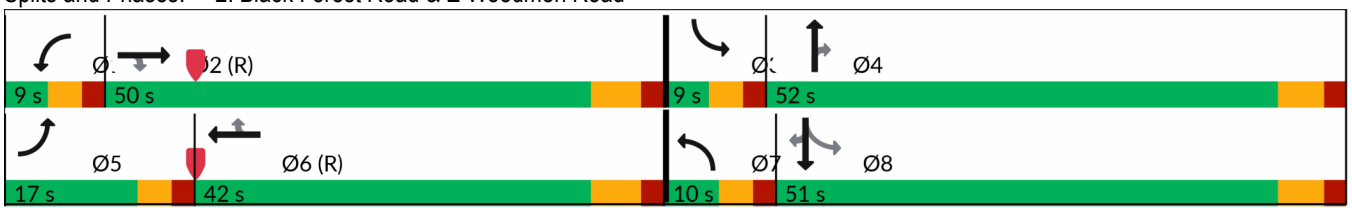
Intersection Signal Delay (s/veh): 56.3	Intersection LOS: E
Intersection Capacity Utilization 87.7%	ICU Level of Service E
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Black Forest Road & E Woodmen Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	400	65	125	291	245	300	100	1150	640	30	1201	175
Future Volume (vph)	400	65	125	291	245	300	100	1150	640	30	1201	175
Satd. Flow (prot)	3433	3189	0	3433	1863	1583	3433	3539	1583	3433	4989	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3189	0	3433	1863	1583	3433	3539	1583	3433	4989	0
Satd. Flow (RTOR)		80				132			599		27	
Lane Group Flow (vph)	435	207	0	316	266	326	109	1250	696	33	1495	0
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			
Detector Phase	7	4		3	8	8	5	2	2	1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	10.0	10.0	4.0	10.0	
Minimum Split (s)	9.0	11.5		9.0	11.5	11.5	9.0	17.5	17.5	9.0	17.5	
Total Split (s)	23.0	35.4		18.0	30.4	30.4	11.0	57.6	57.6	9.0	55.6	
Total Split (%)	19.2%	29.5%		15.0%	25.3%	25.3%	9.2%	48.0%	48.0%	7.5%	46.3%	
Yellow Time (s)	3.0	5.5		3.0	5.5	5.5	3.0	5.5	5.5	3.0	5.5	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	7.5		5.0	7.5	7.5	5.0	7.5	7.5	5.0	7.5	
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	
Act Effct Green (s)	17.6	25.3		12.9	20.7	20.7	6.7	56.3	56.3	4.8	50.1	
Actuated g/C Ratio	0.15	0.21		0.11	0.17	0.17	0.06	0.47	0.47	0.04	0.42	
v/c Ratio	0.87	0.28		0.86	0.83	0.85	0.57	0.75	0.66	0.24	0.71	
Control Delay (s/veh)	68.2	24.3		74.6	69.2	49.3	58.2	22.5	13.0	60.9	31.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay (s/veh)	68.2	24.3		74.6	69.2	49.3	58.2	22.5	13.0	60.9	31.2	
LOS	E	C		E	E	D	E	C	B	E	C	
Approach Delay (s/veh)		54.0			63.9			21.1			31.9	
Approach LOS		D			E			C			C	
Queue Length 50th (ft)	173	42		127	200	151	40	551	430	13	356	
Queue Length 95th (ft)	#256	76		#204	#318	#296	m43	m549	m433	31	415	
Internal Link Dist (ft)		285			374			923			1202	
Turn Bay Length (ft)	200			210			200		585	260		
Base Capacity (vph)	514	802		371	355	408	190	1659	1060	136	2096	
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.85	0.26		0.85	0.75	0.80	0.57	0.75	0.66	0.24	0.71	

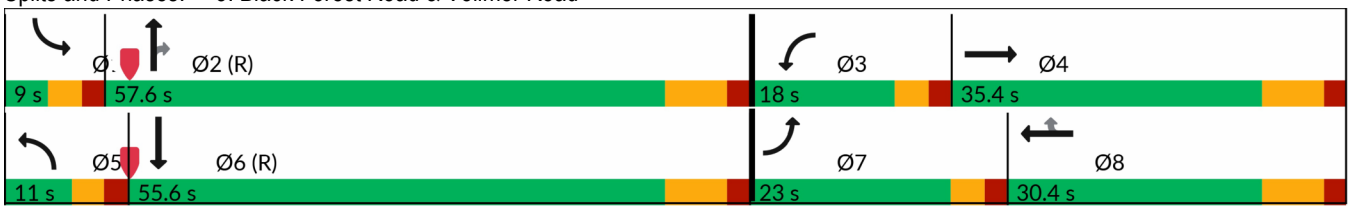
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 60 (50%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay (s/veh): 36.0	Intersection LOS: D
Intersection Capacity Utilization 80.3%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Black Forest Road & Vollmer Road



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	318	1121	111	281	940	138	249	732	192	147	424	293
Future Volume (vph)	318	1121	111	281	940	138	249	732	192	147	424	293
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.086			0.097			0.252			0.165		
Satd. Flow (perm)	160	3539	1583	181	3539	1583	469	3539	1583	307	3539	1583
Satd. Flow (RTOR)			123			173			209			298
Lane Group Flow (vph)	346	1218	121	305	1022	150	271	796	209	160	461	318
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6		6	2		2	4		4	8		8
Detector Phase	1	6	6	5	2	2	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
Total Split (s)	27.0	54.0	54.0	19.0	46.0	46.0	17.3	34.0	34.0	13.0	29.7	29.7
Total Split (%)	22.5%	45.0%	45.0%	15.8%	38.3%	38.3%	14.4%	28.3%	28.3%	10.8%	24.8%	24.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (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
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	67.3	48.5	48.5	54.7	41.2	41.2	40.3	28.5	28.5	31.7	24.2	24.2
Actuated g/C Ratio	0.56	0.40	0.40	0.46	0.34	0.34	0.34	0.24	0.24	0.26	0.20	0.20
v/c Ratio	0.94	0.85	0.17	1.17	0.84	0.23	0.95	0.95	0.39	0.93	0.65	0.57
Control Delay (s/veh)	67.4	39.5	4.4	136.7	59.9	21.6	76.2	66.0	7.3	86.1	48.8	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	67.4	39.5	4.4	136.7	59.9	21.6	76.2	66.0	7.3	86.1	48.8	10.4
LOS	E	D	A	F	E	C	E	E	A	F	D	B
Approach Delay (s/veh)		42.7			71.9			58.5			42.2	
Approach LOS		D			E			E			D	
Queue Length 50th (ft)	216	452	0	~244	449	58	164	326	0	90	176	13
Queue Length 95th (ft)	#399	550	36	m#411	523	m95	#289	#452	62	#210	235	99
Internal Link Dist (ft)		227			723			430			1094	
Turn Bay Length (ft)				410		205	200		250	245		
Base Capacity (vph)	378	1430	713	261	1213	656	285	840	535	172	713	557
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.85	0.17	1.17	0.84	0.23	0.95	0.95	0.39	0.93	0.65	0.57

Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NWTL and 6:SETL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.17

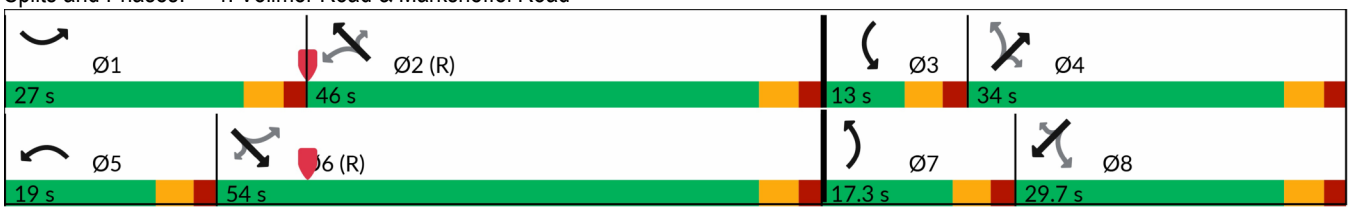
Intersection Signal Delay (s/veh): 54.4	Intersection LOS: D
Intersection Capacity Utilization 93.3%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Vollmer Road & Marksheffel Road



Lane Group	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (vph)	297	1116	4	40	1155	535	18	4	24	331	15	186
Future Volume (vph)	297	1116	4	40	1155	535	18	4	24	331	15	186
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1621	0	3433	1863	1583
Flt Permitted	0.073			0.200			0.747			0.950		
Satd. Flow (perm)	136	3539	1583	373	3539	1583	1391	1621	0	3433	1863	1583
Satd. Flow (RTOR)			155			443		26				202
Lane Group Flow (vph)	323	1213	4	43	1255	582	20	30	0	360	16	202
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8					4
Detector Phase	5	2	2	1	6	6	3	8		7	4	4
Switch Phase												
Minimum Initial (s)	5.0	15.0	15.0	5.0	15.0	15.0	5.0	10.0		20.0	10.0	10.0
Minimum Split (s)	10.0	20.0	20.0	10.0	20.0	20.0	10.0	15.0		25.0	15.0	15.0
Total Split (s)	28.0	70.0	70.0	10.0	52.0	52.0	10.0	15.0		25.0	30.0	30.0
Total Split (%)	23.3%	58.3%	58.3%	8.3%	43.3%	43.3%	8.3%	12.5%		20.8%	25.0%	25.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)	81.0	72.8	72.8	61.3	56.0	56.0	11.0	10.0		20.0	25.0	25.0
Actuated g/C Ratio	0.68	0.61	0.61	0.51	0.47	0.47	0.09	0.08		0.17	0.21	0.21
v/c Ratio	0.89	0.56	0.00	0.17	0.76	0.60	0.14	0.19		0.63	0.04	0.41
Control Delay (s/veh)	69.6	5.7	0.0	12.3	32.6	9.4	35.9	24.1		52.1	37.3	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	69.6	5.7	0.0	12.3	32.6	9.4	35.9	24.1		52.1	37.3	8.2
LOS	E	A	A	B	C	A	D	C		D	D	A
Approach Delay (s/veh)		19.1			24.9			28.9			36.3	
Approach LOS		B			C			C			D	
Queue Length 50th (ft)	186	84	0	12	484	75	11	3		137	9	0
Queue Length 95th (ft)	m244	m112	m0	27	#624	205	31	34		189	30	64
Internal Link Dist (ft)		514			521			378			673	
Turn Bay Length (ft)	250		190	230		230				345		300
Base Capacity (vph)	405	2147	1021	251	1651	974	143	158		572	419	512
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.80	0.56	0.00	0.17	0.76	0.60	0.14	0.19		0.63	0.04	0.39

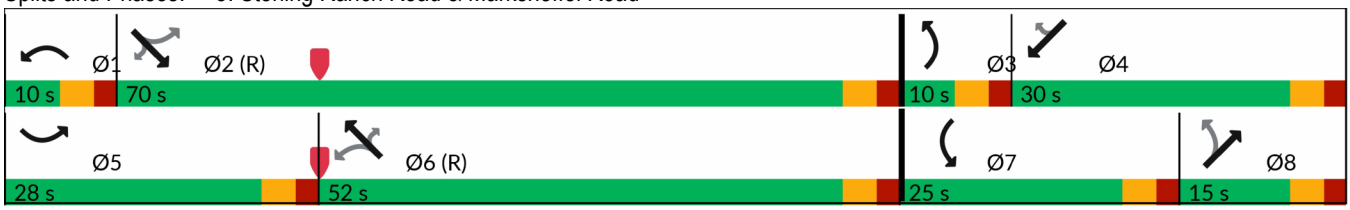
Intersection Summary
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 25 (21%), Referenced to phase 2:SETL and 6:NWTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay (s/veh): 24.4	Intersection LOS: C
Intersection Capacity Utilization 77.0%	ICU Level of Service D
Analysis Period (min) 15	

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Sterling Ranch Road & Marksheffel Road



Intersection	
Int Delay, s/veh	34.3

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Vol, veh/h	0	0	5	91	0	65	8	1095	64	76	681	59
Future Vol, veh/h	0	0	5	91	0	65	8	1095	64	76	681	59
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	0	-	-	100	-	-	100	-	100
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, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	5	99	0	71	9	1190	70	83	740	64

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	370	1778	2212	630	804	0	0	1260	0	0
Stage 1	-	-	-	1242	1242	-	-	-	-	-	-	-
Stage 2	-	-	-	535	970	-	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	0	0	627	~ 52	43	424	816	-	-	548	-	-
Stage 1	0	0	-	185	245	-	-	-	-	-	-	-
Stage 2	0	0	-	497	330	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	627	~ 43	37	424	816	-	-	548	-	-
Mov Cap-2 Maneuver	-	-	-	~ 43	37	-	-	-	-	-	-	-
Stage 1	-	-	-	183	242	-	-	-	-	-	-	-
Stage 2	-	-	-	418	280	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Ctrl Dly, s/v	10.79	$ 464.68	0.06	1.19
HCM LOS	B	F		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	NWLn2	SELn1	SWL	SWT	SWR
Capacity (veh/h)	816	-	-	43	424	627	548	-	-
HCM Lane V/C Ratio	0.011	-	-	2.28	0.166	0.009	0.151	-	-
HCM Ctrl Dly (s/v)	9.5	-	-	$ 785.8	15.2	10.8	12.7	-	-
HCM Lane LOS	A	-	-	F	C	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	10.5	0.6	0	0.5	-	-

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

Intersection	
Int Delay, s/veh	0.2

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	0	26	1147	13	0	816
Future Vol, veh/h	0	26	1147	13	0	816
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	28	1247	14	0	887

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	630	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	424	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	424	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	NW	NE	SW
HCM Ctrl Dly, s/v	14.09	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NET	NER	NWLn1	SWT
Capacity (veh/h)	-	-	424	-
HCM Lane V/C Ratio	-	-	0.067	-
HCM Ctrl Dly (s/v)	-	-	14.1	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.6

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	1460	103	0	1359	0	79
Future Vol, veh/h	1460	103	0	1359	0	79
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1587	112	0	1477	0	86

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	849
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	304
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	304
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	SE	NW	NE
HCM Ctrl Dly, s/v	0	0	21.43
HCM LOS			C

Minor Lane/Major Mvmt	NELn1	NWT	SET	SER
Capacity (veh/h)	304	-	-	-
HCM Lane V/C Ratio	0.282	-	-	-
HCM Ctrl Dly (s/v)	21.4	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	1.1	-	-	-

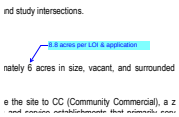
V1_ TIS.pdf Markup Summary

CDurham (18)

P262

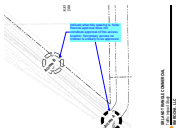
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Date: 11/20/2026 1:54:42 PM
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P262



Subject: Callout
Page Label: 5
Author: CDurham
Date: 11/20/2026 1:55:50 PM
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Color:
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Space:

8.8 acres per LOI & application



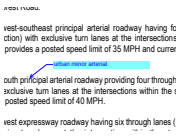
Subject: Callout
Page Label: 8
Author: CDurham
Date: 11/20/2026 3:01:10 PM
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Indicate what this spacing is. Note: Rezone approval does not constitute approval of this access location. Secondary access on Vollmer is unlikely to be approved.

45

Subject: Text Box
Page Label: 9
Author: CDurham
Date: 11/20/2026 2:01:57 PM
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45



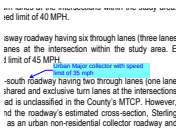
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urban minor arterial

50

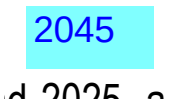
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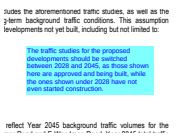
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Author: CDurham
Date: 11/20/2026 2:05:08 PM
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Urban Major collector with speed limit of 35 mph



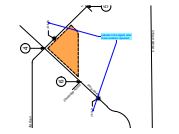
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2045



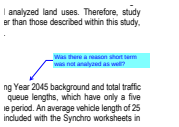
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Page Label: 17
Author: CDurham
Date: 11/20/2026 2:11:15 PM
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The traffic studies for the proposed developments should be switched between 2028 and 2045, as those shown here are approved and being built, while the ones shown under 2028 have not even started construction.



Subject: Callout
Page Label: 20
Author: CDurham
Date: 11/20/2026 2:22:50 PM
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indicate in the legend what these numbers represent



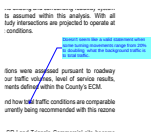
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Date: 11/20/2026 2:45:21 PM
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Was there a reason short term was not analyzed as well?



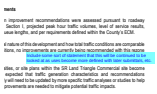
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Author: CDurham
Date: 11/20/2026 2:53:56 PM
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total traffic conditions are comparable to background traffic conditions



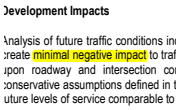
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Page Label: 42
Author: CDurham
Date: 11/20/2026 2:56:24 PM
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Color:
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Doesn't seem like a valid statement when some turning movements range from 20% to doubling what the background traffic is to total traffic.



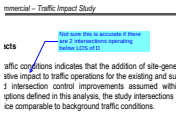
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Author: CDurham
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Include some sort of statement that this will be continued to be looked at as uses become more defined with later submittals, etc.



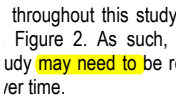
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Date: 11/20/2026 2:57:18 PM
Status:
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Space:

minimal negative impact



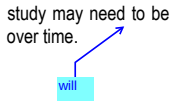
Subject: Callout
Page Label: 42
Author: CDurham
Date: 11/20/2026 2:57:52 PM
Status:
Color:
Layer:
Space:

Not sure this is accurate if there are 2 intersections operating below LOS of D



Subject: Highlight
Page Label: 43
Author: CDurham
Date: 11/20/2026 2:59:00 PM
Status:
Color:
Layer:
Space:

may need to



Subject: Callout
Page Label: 43
Author: CDurham
Date: 11/20/2026 2:59:11 PM
Status:
Color:
Layer:
Space:

will