BERGMANN
ARCHITECTS ENGINEERS PLANNERS

MEMO

To: Mr. David Hardin
Hillside Investment

From: Steven J. Russo, PE
Transportation Engineer

Date: October 4, 2019

Re: Rochester Hills Office Development
Traffic Impact Study (TIS)

INTRODUCTION

This memorandum presents the results of the Traffic Impact Study (TIS) for the proposed office development in the City of Rochester Hills, Oakland County, Michigan. The subject site is located on the south side of Hamlin Road approximately ¾ miles east of Squirrel Road and is currently vacant. The project will include construction of a 150,000 square feet (SF) professional office building with site access provided via two driveways to Hamlin Road. The study section of Hamlin Road is under City jurisdiction) and a TIS is required for site plan approval and permitting of site access.

The purpose of this TIS is to analyze traffic operations with and without the proposed development, in order to evaluate site access operations and identify any potential off-site impacts / required mitigation. In particular, access operations to Hamlin Road were analyzed to determine appropriate lane configurations to safely and efficiently process site traffic. Specifically, the Hamlin Road crossovers east and west of Rookery Drive, as well as the two proposed site access points, were evaluated for this TIS.

This TIS has been prepared in accordance with the methodologies and practices published by the Institute of Transportation Engineers (ITE). The zoning ordinances, guidelines, and standards of the City of Rochester Hills were referenced as applicable. Additionally, Bergmann solicited input regarding the scope of work from the City of Rochester Hills to gather understanding of what was required with respect to this TIS, which the City provided. This memorandum is intended for use by the City to guide decisions related to development project approvals, access permitting, and identifying future roadway improvements.

EXISTING CONDITIONS

This site is currently vacant and the proposed development project is subject to review by the City of Rochester Hills. Vehicle transportation for the facility will be provided via Hamlin Road. The study intersections are identified below and further details on the study network are summarized in **Table 1**.

Hamlin Road is a divided four-lane boulevard, with left-turning vehicles accommodated through multiple crossovers, where the crossovers themselves are stop-controlled while Hamlin Road is free-flowing. In particular, the crossovers which are expected to be used to access the new development are the crossovers to the east and west of Rookery Drive. The crossover which services vehicles entering the proposed development from the east is located approximately 125 feet west of Rookery Drive, and the crossover facilitating vehicles exiting to the west is located approximately 425 feet east of Rookery Drive. Drivers at the crossover west of Rookery Drive have the option to either turn left onto EB Hamlin Road, or they can continue south to access University Technology Park, an office building. Sidewalks are provided and continuous throughout the corridor, with no midblock / uncontrolled marked crosswalks. An overview of the site location is provided in the attached **Figure 1**.

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Table 1: Roadway Summary

Roadway Data	Hamlin Road
Functional Class	Minor Arterial
Direction	E-W
Speed Limit (mph)	45
Jurisdiction	City
Cross Section	4-Lane Divided
AADT	18,370
AM Peak Hour Volume	1,837
PM Peak Hour Volume	1,542

Existing weekday AM (7:00 to 9:00) and PM (4:00 to 6:00) turning movement counts for the study intersections were collected by Bergmann subconsultant Traffic Data Collection, LLC. These counts were collected at the study intersections on Thursday, September 26, 2019, during typical traffic conditions while schools were in session and avoiding adverse weather conditions. The weekday AM and PM peak hours of existing road traffic were identified at each of the individual study intersections. Thru traffic volumes were balanced upward across the network. In general, the existing peak hours were determined to occur between 7:30 to 8:30 AM and 4:30 to 5:30 PM. The existing peak hour traffic volumes are shown on the attached **Figure 2**.

The study intersections were modeled using Synchro traffic analysis software based on the existing intersection geometry and peak hour traffic volumes. Peak hour factors were modeled by intersection approach, with the exception of vehicles turning onto a median crossover, where the movement peak hour factor was used, as guidance from the Michigan Department of Transportation (MDOT) *Electronic Traffic Control Device Guidelines* suggests. Existing AM and PM peak hour vehicle delays and Levels of Service (LOS) were calculated based on the methodologies of the *Highway Capacity Manual, 6th Edition* (*HCM6*).

Typically, LOS D is considered acceptable, with LOS A representing minimal delay, and LOS F indicating failing conditions and/or volume exceeding capacity. Simulations of the study network were also observed using SimTraffic, in order to identify potential issues related to vehicle queuing, traffic flow between intersections, and the overall study network.

The SimTraffic model was calibrated based on the actual and simulated number of entering vehicles in accordance with the MDOT *Electronic Traffic Control Device Guidelines*. To complete this process, ten simulations of each peak period were performed and the average of the volumes for each turning movement was reported in the SimTraffic vehicles exited report. These volumes were then compared to actual traffic volumes collected at each intersection and considered validated when the field counts, and model results were within the greater of ±10 percent or ±20 vehicles.

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Table 2: Existing Traffic Conditions

Intersection	AM Peak Hour Approach	↰	↑	↱	PM Peak Hour Approach	↰	↑	↱
1. EB Hamlin Rd and WB to EB Hamlin Rd XO	XO	10.6 B	10.6 B	- -	XO	16.6 C	16.6 C	
Minor STOP	NB	0.0 A	- -	0.0 A	NB	13.7 B	- -	13.7 B
	EB	Free			EB	Free		
2. WB Hamlin Rd and EB to WB Hamlin Rd XO	XO	17.7 C	17.7 C	- -	XO	10.2 B	10.2 B	- -
Minor STOP	WB	Free			WB	Free		

The results of the existing conditions analysis, as summarized in **Table 2**, indicate that the study intersections currently operate at an acceptable level with all movements operating at a LOS C or better during both peak hours. Review of network simulations also indicates acceptable traffic operations during both peak periods with 95th percentile vehicle queue lengths for all movements calculated to be two vehicles or less as summarized in **Table 3**. These queues are accommodated by existing storage space.

Table 3: Existing Vehicle Queues

Intersection	Approach	AM Peak Hour				PM Peak Hour			
		Avg. Queue		95th Queue		Avg. Queue		95th Queue	
		Feet	Vehicles	Feet	Vehicles	Feet	Vehicles	Feet	Vehicles
1. EB Hamlin Rd and WB to EB Hamlin Rd XO	XO	24	1	45	2	8	1	29	1-2
	NB	0	0	0	0	9	1	26	1
2. WB Hamlin Rd and EB to WB Hamlin Rd XO	XO	0	0	6	1	7	1	29	1-2

1. Vehicle Queues calculated based on SimTraffic vehicle length of 25 feet.

BACKGROUND CONDITIONS

Traffic impact studies typically include an evaluation of traffic operations in the future as they would be without the proposed development. This "background" condition serves to identify any mitigation that may be required regardless of the project, and as a baseline for comparison of future buildout conditions. This scenario is comprised of existing traffic conditions plus ambient traffic growth.

An ambient growth factor is applied to existing traffic volumes to account for future projects in the study area and population increases, as well as growth in regular traffic volumes due to development projects outside the study area. In order to determine the applicable traffic growth rate for the existing traffic volumes to the 2021 buildout year, historical traffic volume data on Hamlin Road west of Adams Road was reviewed, showing traffic volumes on both EB and WB Hamlin Road declining in recent years. However, the Southeast Michigan Council of Governments (SEMCOG) forecasts annual growth rates of 0.25 percent in population and 0.30 percent growth in employment in the City of Rochester Hills during the study period. Therefore, an ambient background growth rate of 0.5 percent per year was utilized for

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this study. MDOT has consistently applied this growth rate for other projects in Southeast Michigan and across the State, and this rate was therefore applied to the 2019 traffic volumes for a period of two years. The resulting background peak hour traffic volumes are summarized on the attached **Figure 3**.

Background AM and PM peak hour vehicle delays and LOS were calculated based on the methodologies of the *HCM6* and are shown in **Table 4**. These calculations indicate all movements at the study intersections will continue to operate acceptably at a LOS C or better during both the AM and PM peak hours. Level of service ratings did not change for any approach or movement, and average delay per vehicle did not increase by more than a fifth of a second.

Table 4: Background Traffic Conditions

Intersection	AM Peak Hour Approach	↰	↑	↱	PM Peak Hour Approach	↰	↑	↱
1. EB Hamlin Rd and WB to EB Hamlin Rd XO	XO	10.7 B	10.7 B	- -	XO	16.8 C	16.8 C	- -
Minor STOP	NB	0.0 A	- -	0.0 A	NB	13.8 B	- -	13.8 B
	EB	Free			EB	Free		
2. WB Hamlin Rd and EB to WB Hamlin Rd XO	XO	17.8 C	17.8 C	- -	XO	10.2 B	10.2 B	- -
Minor STOP	WB	Free			WB	Free		

SITE TRIP GENERATION

The number of AM and PM peak hour vehicle trips that would be generated by the proposed development were forecast based on the rates and equations published by ITE in *Trip Generation, 10th Edition*. The site trip generation forecast for the proposed development is shown in **Table 5**.

Table 5: Site Trip Generation

Land Use	ITE Code	Amount	Units	Average Daily	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
Office	710	150,000	SF	1,571	144	23	167	27	140	167

The vehicle trips that would be generated by the proposed development were assigned to the study road network based on existing traffic patterns and ITE methodologies. These methods indicate that new site trips will enter the network in the direction of current traffic patterns and return to their direction of origin. Existing traffic patterns are assumed to accurately reflect the relationship between residential areas and employment centers in this region, as well as traffic flows specific to this site. Specifically, employee passenger car vehicle trips during the weekday AM and PM peaks are assumed to travel with a pattern that is gravitated towards entering the site in the morning and leaving the site in the evening. Given this, traffic volumes on the study road network indicate the directional distributions for site-generated traffic summarized in **Table 6**.

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Table 6: Site Trip Distribution

To/From	AM	PM
West	40%	40%
East	60%	60%
	100%	100%

The site-generated vehicle trips were assigned to the study road network based on this trip distribution pattern as shown on the attached **Figure 4**. The site-generated trips were added to the background traffic volumes to calculate the future peak hour traffic volumes shown on the attached **Figure 5**.

AUXILIARY LANE ANALYSIS

In order to determine the configuration of the proposed site driveways with Hamlin Road, warrants for right turn lanes were evaluated. According to City standards, the RCOC turn lane warrant criteria outlined in the *Permit Specifications and Guidelines* shall be utilized in order to determine where turn lanes are required. As no two-way traffic volumes have been collected on the study section of Hamlin Road in the past five years, the future 24-hour traffic volume was determined based on projected peak hour volumes along the study roadway. As a general rule of thumb, the peak hour traffic volumes along a roadway account for approximately 10% of the ADT. Evaluation of the forecast site traffic volume assignments versus 24-hour volumes on Hamlin Road indicate that a right turn lane is warranted at the west site driveway, while only a taper is warranted at the east site driveway. The applicable warrant evaluations are attached.

FUTURE TRAFFIC OPERATIONS

Future peak hour vehicle delays and LOS with the proposed development were calculated based on the existing lane configurations and traffic control, the proposed site access plan, and future traffic volumes. The results of the future conditions analysis are summarized in **Table 7.**

The results of this analysis indicate that all study intersection approaches and movements would continue to operate in a manner similar to background conditions. Comparison of background and future vehicle delays indicate little appreciable difference (less than two seconds per vehicle overall) in traffic operations at the study intersections, with no changes in existing level of service ratings at the approach and movement level. Therefore, this project would have no discernable impact on the adjacent road network.

Review of network simulations indicate that there will be increased queue length at crossover intersections, with both crossovers seeing average queue lengths of 36 feet (1-2 vehicles). Storage space at the existing crossovers is sufficient to handle the anticipated increases in traffic volumes during both the AM and PM peak periods.

At both proposed site driveways to Hamlin Road, network simulations indicate acceptable traffic operations during the AM peak hour with vehicles able to enter and exit the site with minimal delays. During the PM peak hour, exiting vehicles from both the proposed site driveways see an acceptable level of service of C, with average queue lengths of 8 feet (1 vehicle) at each site driveway.

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Table 7: Future Traffic Conditions

Intersection	AM Peak Hour Approach	↰	↑	↱	PM Peak Hour Approach	↰	↑	↱
1. EB Hamlin Rd and WB to EB Hamlin Rd XO Minor STOP	XO	11.5 B	11.5 B	- -	XO	17.2 C	17.2 C	- -
	NB	0.0 A	- -	0.0 A	NB	13.9 B	- -	13.9 B
	EB	Free			EB	Free		
2. WB Hamlin Rd and EB to WB Hamlin Rd XO Minor STOP	XO	19.7 C	19.7 C	- -	XO	11.1 B	11.1 B	- -
	WB	Free			WB	Free		
3. EB Hamlin Rd and West Site Drive Minor STOP	NB	9.2 A	- -	9.2 A	NB	15.3 C	- -	15.3 C
	EB	Free			EB	Free		
4. EB Hamlin Rd and East Site Drive Minor STOP	NB	9.2 A	- -	9.2 A	NB	15.4 C	- -	15.4 C
	EB	Free			EB	Free		

CONCLUSIONS

Based on the information outlined herein regarding the proposed development and resulting traffic operations, there would be no discernable impact to traffic operations on the adjacent road network. This conclusion is based on the following key items:

- All study intersection approaches and movements currently operate acceptably at a LOS C or better during both peak hours.
- Background conditions analyses indicate all study intersection approaches and movements will continue to operate acceptably at a LOS C or better during the peak hours.
- Future vehicle delays indicate little appreciable difference in traffic operations at the study intersections relative to background conditions. The average increase in delay is less than two seconds per vehicle, with no change in LOS for any approach or movement.
- A right-turn lane is warranted at the proposed west site driveway, and right-turn taper is warranted at the proposed east site driveway.

The referenced traffic data, calculations, and analysis results are attached. Please direct any questions regarding this memorandum to Bergmann.

Attached: Figures 1 – 5
Existing Traffic Volume Data
Synchro *HCM6* Calculations
Turn Lane Warrants

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Rochester Hills, MI

Figure 1
Study Area Map

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Figure 2
Existing 2019 Traffic Volumes

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-	No Scale	Oct '19

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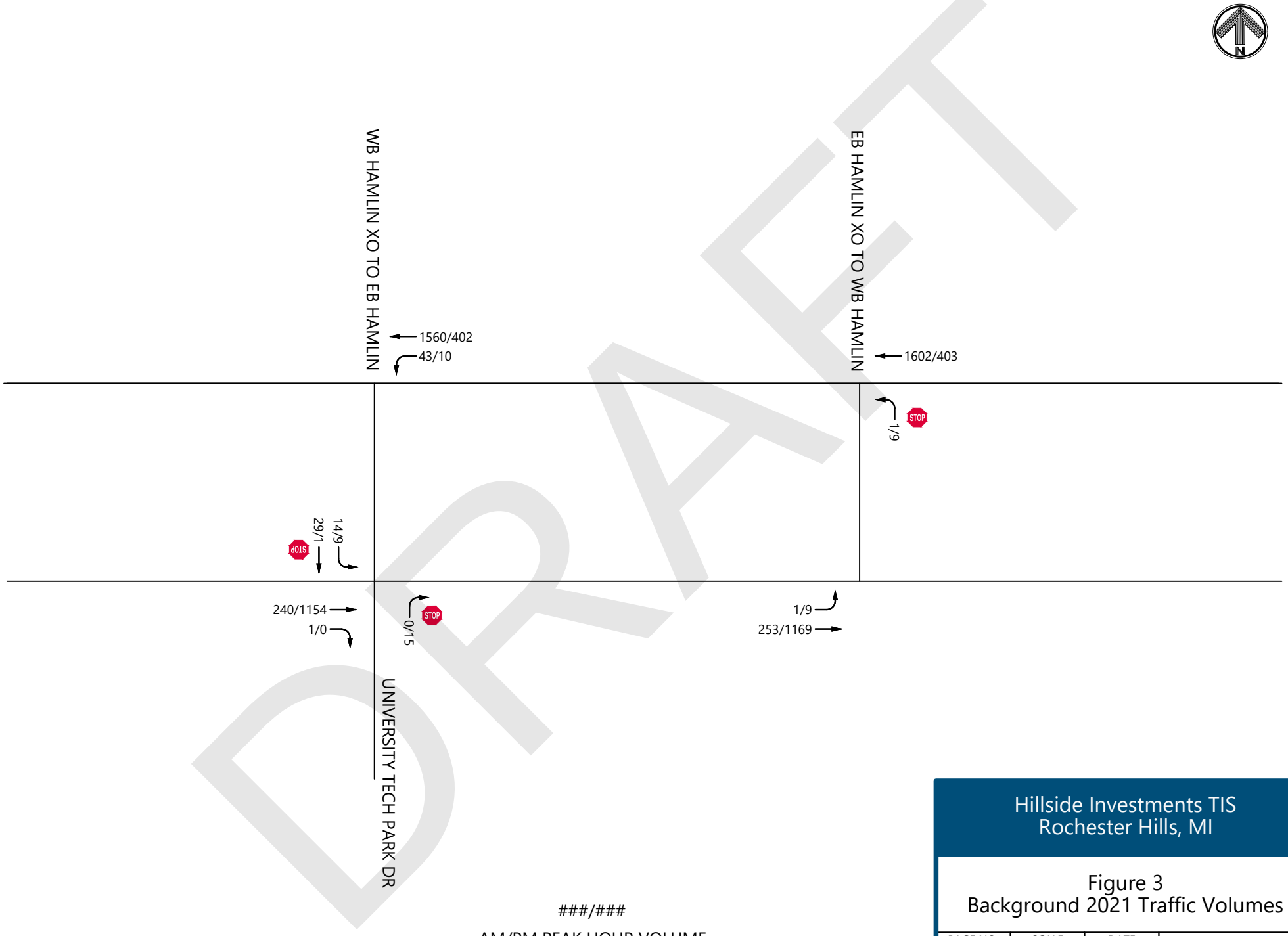

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Figure 3
Background 2021 Traffic Volumes

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-	No Scale	Oct '19

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Figure 4
Site Trip Generation

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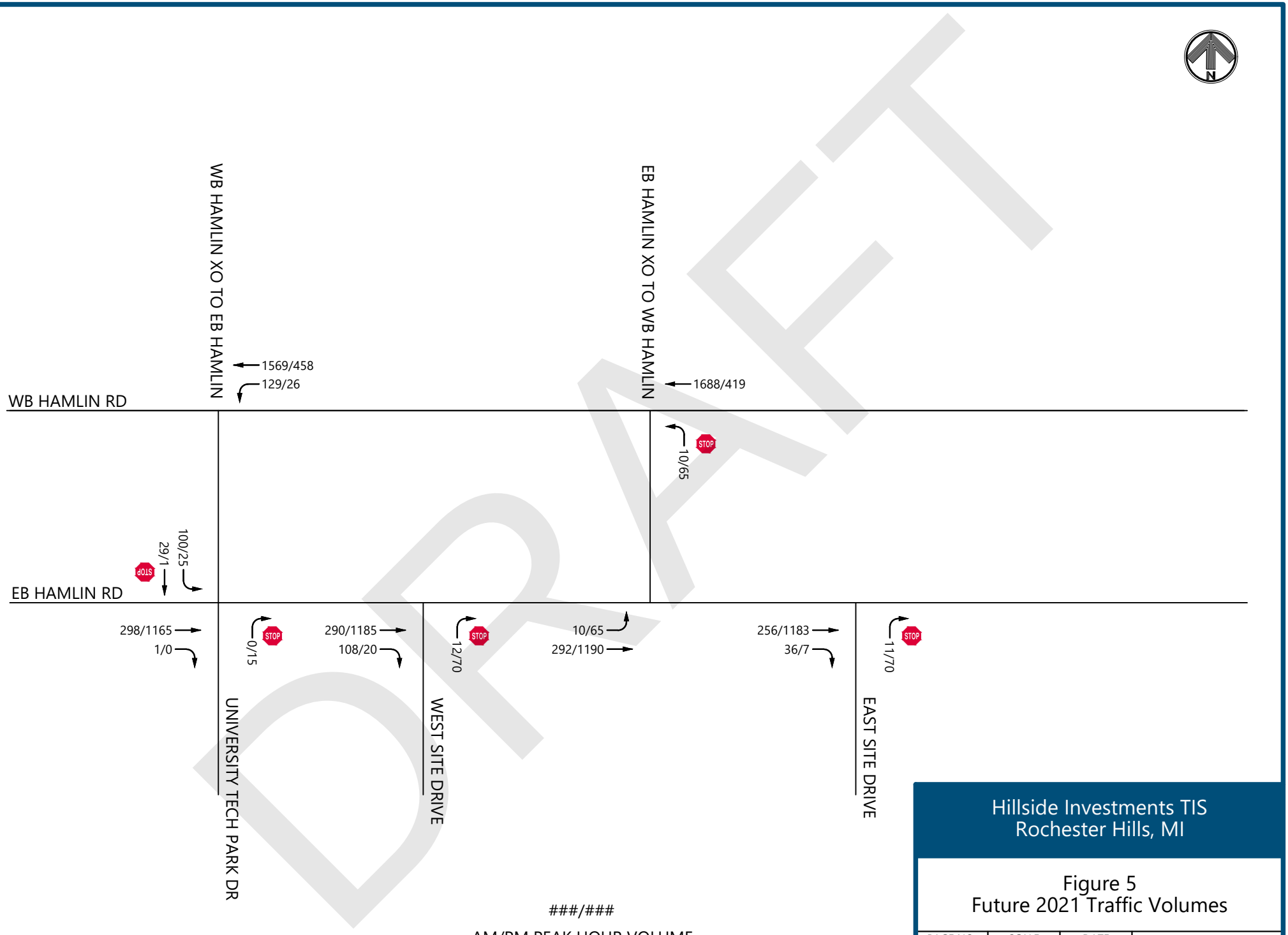

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Figure 5
Future 2021 Traffic Volumes

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Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

Traffic Study Performed For:

Bergmann

Project: Roch Hills Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather: Sunny/Cldy, Dry Deg's 70's
Count By Miovision Video VCU 3DQ NW

File Name : TMC_1 Hamlin_WB XO_W Rookery_9-26-19
Site Code : TMC_1
Start Date : 9/26/2019
Page No : 1

4 Hour video traffic study was conducted during typical weekday (Thursday) from 7:00 AM - 9:00 AM morning & 4:00 PM - 6:00 PM afternoon peak hours, while school was in session.

Groups Printed- Pass Cars - Single Units - Heavy Trucks

	Hamlin WB > EB XO Southbound					EB Hamlin Road Westbound					Univeristy Tech. Park Northbound					EB Hamlin Road Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	4	4	0	8	0	0	0	0	0	0	0	0	0	0	1	38	0	0	39	47
07:15 AM	0	3	2	0	5	0	0	0	0	0	0	0	0	0	0	0	57	0	0	57	62
07:30 AM	0	4	4	0	8	0	0	0	0	0	0	0	0	0	0	0	57	0	0	57	65
07:45 AM	0	7	4	0	11	0	0	0	0	0	0	0	0	0	0	0	66	0	0	66	77
Total	0	18	14	0	32	0	0	0	0	0	0	0	0	0	0	1	218	0	0	219	251
08:00 AM	0	7	2	0	9	0	0	0	0	0	0	0	0	0	0	0	50	0	0	50	59
08:15 AM	0	11	4	0	15	0	0	0	0	0	0	0	0	0	0	1	65	0	0	66	81
08:30 AM	0	4	3	0	7	0	0	0	0	0	0	0	0	0	0	0	49	0	0	49	56
08:45 AM	0	2	2	0	4	0	0	0	0	0	1	0	0	0	1	0	52	0	0	52	57
Total	0	24	11	0	35	0	0	0	0	0	1	0	0	0	1	1	216	0	0	217	253
*** BREAK ***																					
04:00 PM	0	0	1	0	1	0	0	0	0	0	2	0	0	0	2	0	282	0	0	282	285
04:15 PM	0	0	4	0	4	0	0	0	0	0	0	0	0	0	0	0	265	0	0	265	269
04:30 PM	0	0	2	0	2	0	0	0	0	0	8	0	0	0	8	0	309	0	0	309	319
04:45 PM	0	0	4	0	4	0	0	0	0	0	3	0	0	0	3	0	228	0	0	228	235
Total	0	0	11	0	11	0	0	0	0	0	13	0	0	0	13	0	1084	0	0	1084	1108
05:00 PM	0	1	2	0	3	0	0	0	0	0	2	0	0	0	2	0	300	0	0	300	305
05:15 PM	0	0	1	0	1	0	0	0	0	0	2	0	0	0	2	0	306	0	0	306	309
05:30 PM	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	1	268	0	0	269	271
05:45 PM	0	0	1	0	1	0	0	0	0	0	6	0	0	0	6	0	189	0	0	189	196
Total	0	2	4	0	6	0	0	0	0	0	11	0	0	0	11	1	1063	0	0	1064	1081
Grand Total	0	44	40	0	84	0	0	0	0	0	25	0	0	0	25	3	2581	0	0	2584	2693
Apprch %	0	52.4	47.6	0		0	0	0	0		100	0	0	0		0.1	99.9	0	0		
Total %	0	1.6	1.5	0	3.1	0	0	0	0	0	0.9	0	0	0	0.9	0.1	95.8	0	0	96	
Pass Cars	0	43	40	0	83	0	0	0	0	0	24	0	0	0	24	3	2564	0	0	2567	2674
% Pass Cars	0	97.7	100	0	98.8	0	0	0	0	0	96	0	0	0	96	100	99.3	0	0	99.3	99.3
Single Units	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	12	0	0	12	14
% Single Units	0	2.3	0	0	1.2	0	0	0	0	0	4	0	0	0	4	0	0.5	0	0	0.5	0.5
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	5
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.2	0.2

TDC Traffic Comments: Non-signalized intersection. Video VCU camera was located within NE intersection quadrant. Traffic study was performed for City of Rochester Hills Traffic Impact Study for Bergmann.

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Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

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Bergmann

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Weather: Sunny/Cldy, Dry Deg's 70's
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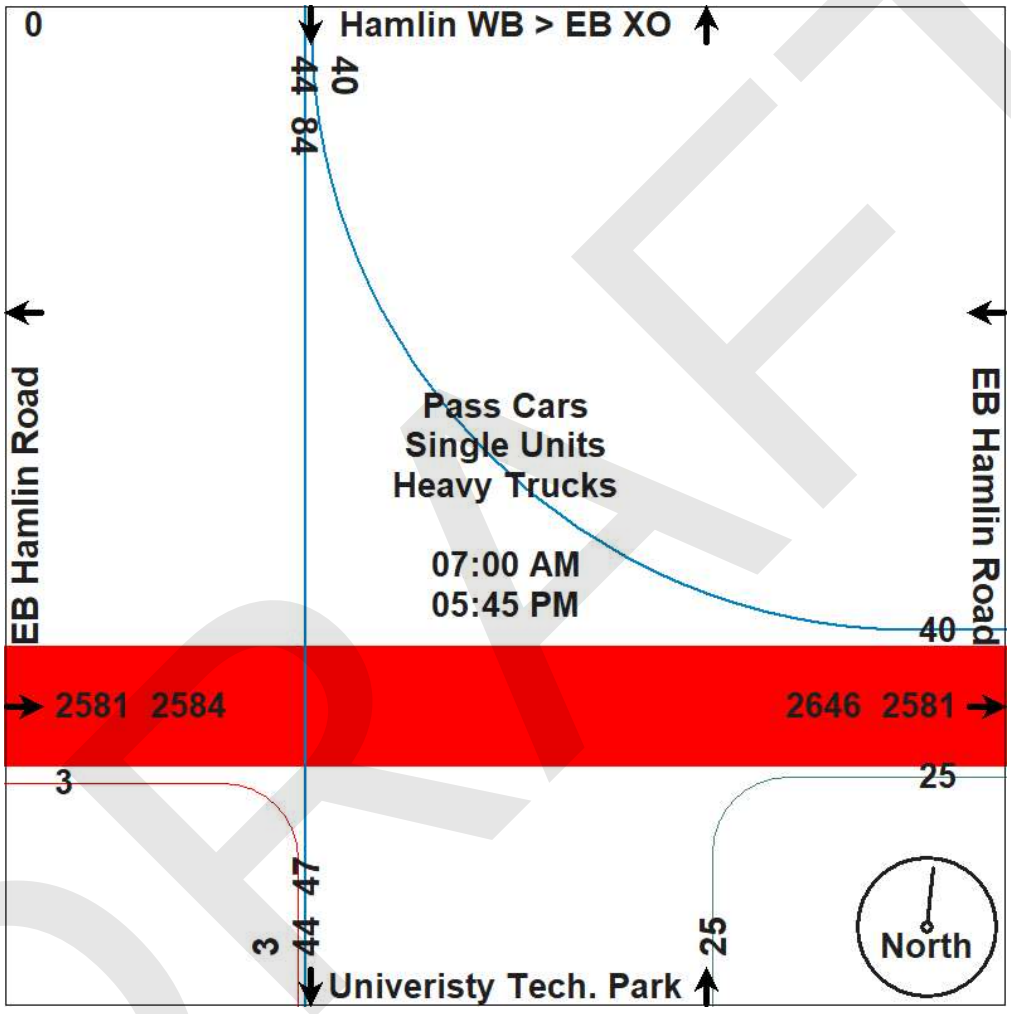
File Name : TMC_1 Hamlin_WB XO_W Rookery_9-26-19
Site Code : TMC_1
Start Date : 9/26/2019
Page No : 2



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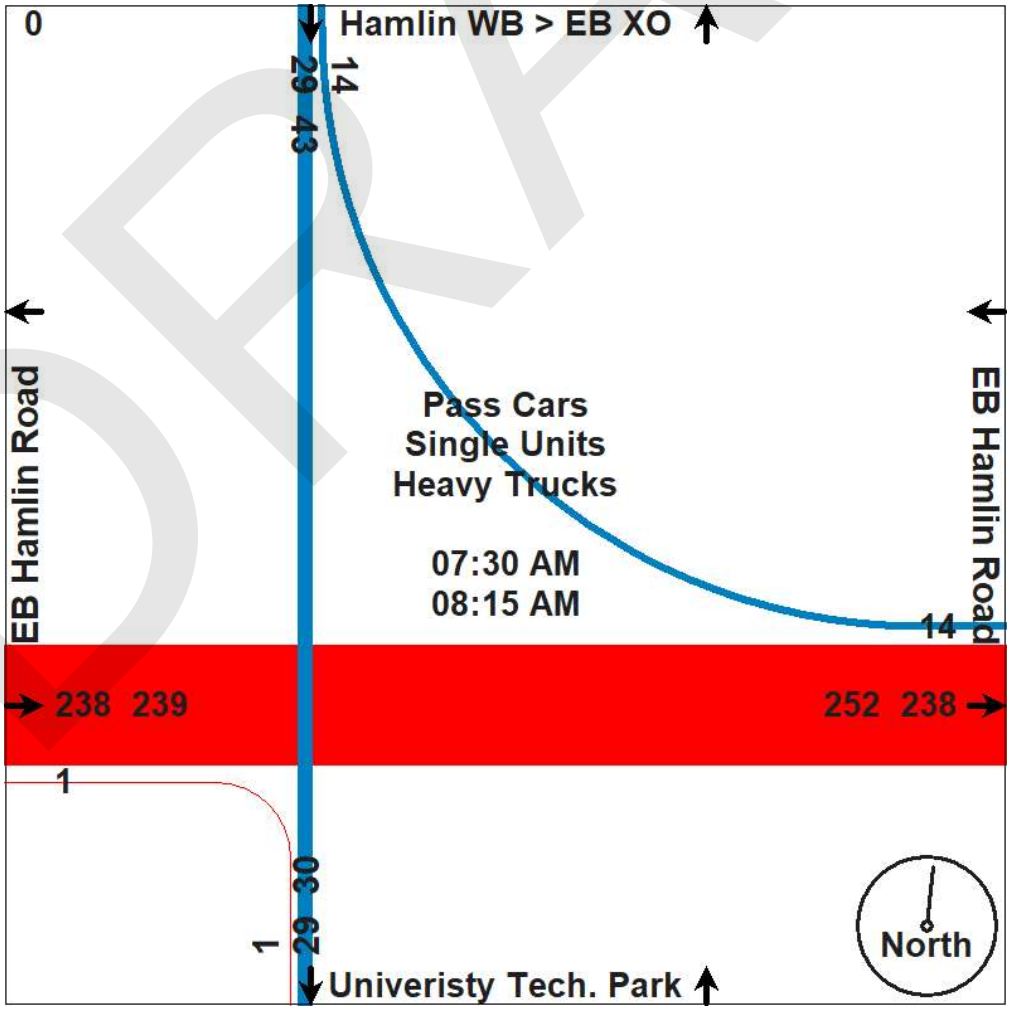
	Hamlin WB > EB XO Southbound				EB Hamlin Road Westbound				Univeristy Tech. Park Northbound				EB Hamlin Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	4	**4**	8	0	0	0	0	0	0	0	0	0	57	0	57	65
07:45 AM	0	7	4	11	0	0	0	0	0	0	0	0	0	**66**	0	**66**	77
08:00 AM	0	7	2	9	0	0	0	0	0	0	0	0	0	50	0	50	59
08:15 AM	0	**11**	4	**15**	0	0	0	0	0	0	0	0	**1**	65	0	66	**81**
Total Volume	0	29	14	43	0	0	0	0	0	0	0	0	1	238	0	239	282
% App. Total	0	67.4	32.6		0	0	0		0	0	0		0.4	99.6	0		
PHF	.000	.659	.875	.717	.000	.000	.000	.000	.000	.000	.000	.000	.250	.902	.000	.905	.870
Pass Cars	0	29	14	43	0	0	0	0	0	0	0	0	1	232	0	233	276
% Pass Cars	0	100	100	100	0	0	0	0	0	0	0	0	100	97.5	0	97.5	97.9
Single Units	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
% Single Units	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	0	1.3	1.1
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1.3	0	1.3	1.1



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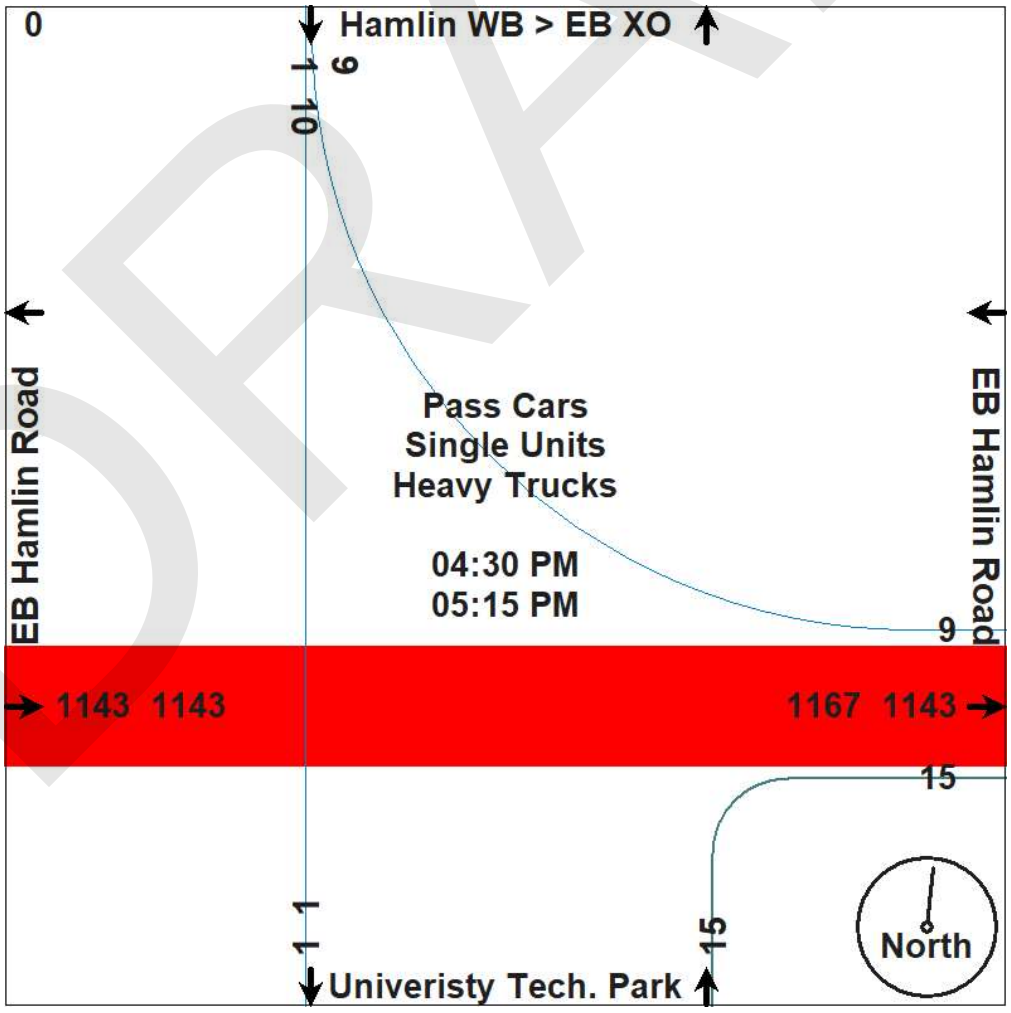
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	2	2	0	0	0	0	**8**	0	0	**8**	0	**309**	0	**309**	**319**
04:45 PM	0	0	**4**	**4**	0	0	0	0	3	0	0	3	0	228	0	228	235
05:00 PM	0	**1**	2	3	0	0	0	0	2	0	0	2	0	300	0	300	305
05:15 PM	0	0	1	1	0	0	0	0	2	0	0	2	0	306	0	306	309
Total Volume	0	1	9	10	0	0	0	0	15	0	0	15	0	1143	0	1143	1168
% App. Total	0	10	90		0	0	0		100	0	0		0	100	0		
PHF	.000	.250	.563	.625	.000	.000	.000	.000	.469	.000	.000	.469	.000	.925	.000	.925	.915
Pass Cars	0	1	9	10	0	0	0	0	15	0	0	15	0	1140	0	1140	1165
% Pass Cars	0	100	100	100	0	0	0	0	100	0	0	100	0	99.7	0	99.7	99.7
Single Units	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
% Single Units	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0.2	0.2
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
% Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0.1



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Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

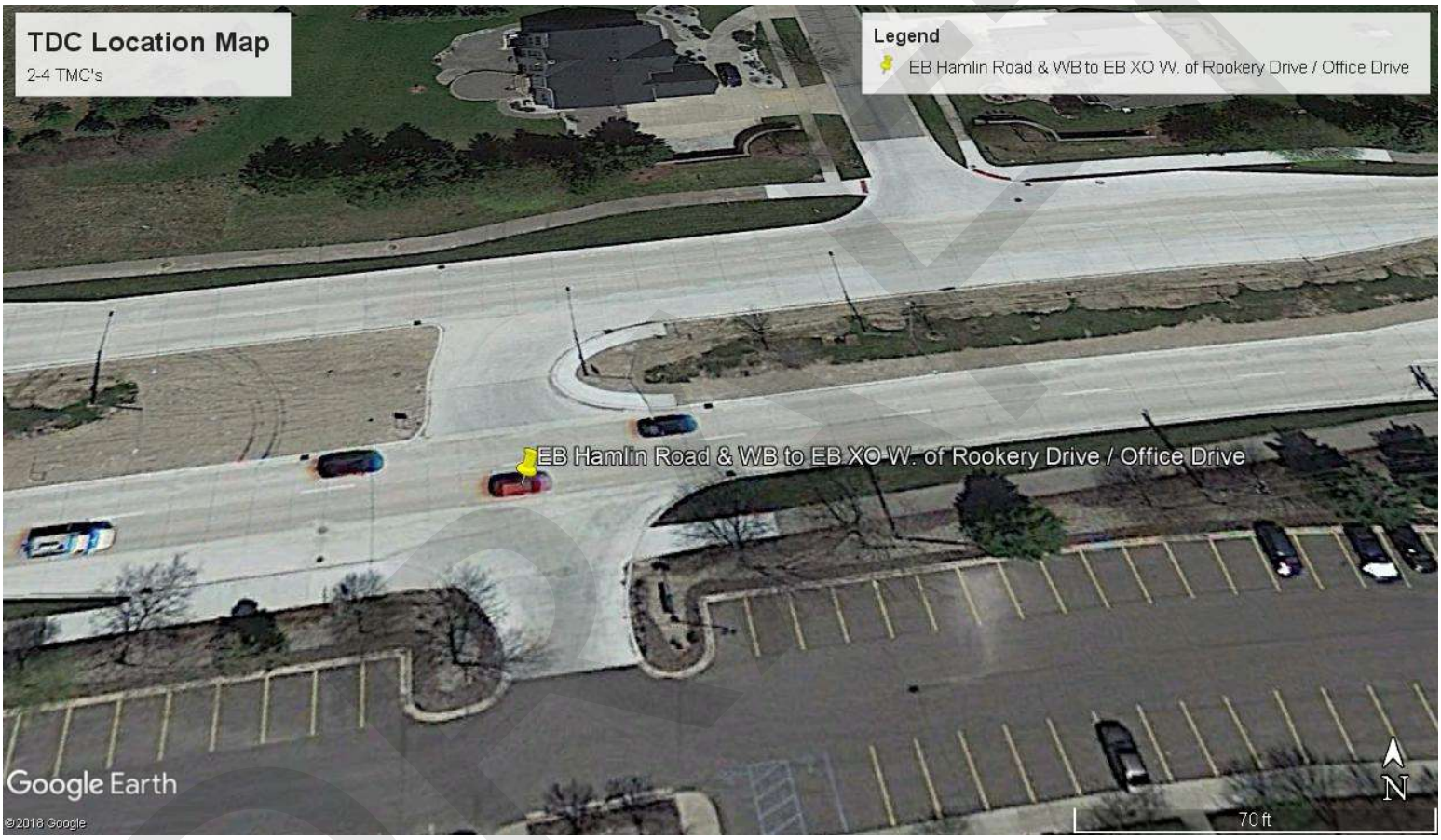
Traffic Study Performed For:

Bergmann

Project: Roch Hills Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather: Sunny/Cldy, Dry Deg's 70's
Count By Miovision Video VCU 3DQ NW

File Name : TMC_1 Hamlin_WB XO_W Rookery_9-26-19
Site Code : TMC_1
Start Date : 9/26/2019
Page No : 5

Aerial Photo



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Phone: 586.786-5407

Traffic Study Performed For:

Bergmann

Project: Roch Hills Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather: Sunny/Cldy, Dry Deg's 70's
Count By Miovision Video VCU 34N NE

File Name : TMC_2 Hamlin_EB XO_E Rookery_9-26-19
Site Code : TMC_2
Start Date : 9/26/2019
Page No : 1

4 Hour video traffic study was conducted during typical weekday (Thursday) from 7:00 AM - 9:00 AM morning & 4:00 PM - 6:00 PM afternoon peak hours, while school was in session.

Groups Printed- Pass Cars - Single Units - Heavy Trucks

	WB Hamlin Road Westbound				EB>WB XO_E Hamlin Northbound				WB Hamlin Road Eastbound				
Start Time	Thru	Left	Peds	App. Total	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Int. Total
07:00 AM	233	0	0	233	0	0	0	0	0	0	0	0	233
07:15 AM	342	0	0	342	0	1	0	1	0	0	0	0	343
07:30 AM	445	0	0	445	0	0	0	0	0	0	0	0	445
07:45 AM	416	0	0	416	0	0	0	0	0	0	0	0	416
Total	1436	0	0	1436	0	1	0	1	0	0	0	0	1437
08:00 AM	374	0	0	374	0	0	0	0	0	0	0	0	374
08:15 AM	351	0	0	351	0	1	0	1	0	0	0	0	352
08:30 AM	309	0	0	309	0	1	0	1	0	0	0	0	310
08:45 AM	229	0	0	229	0	1	0	1	0	0	0	0	230
Total	1263	0	0	1263	0	3	0	3	0	0	0	0	1266
*** BREAK ***													
04:00 PM	82	0	0	82	0	3	0	3	0	0	0	0	85
04:15 PM	70	0	0	70	0	3	0	3	0	0	0	0	73
04:30 PM	74	0	0	74	0	5	0	5	0	0	0	0	79
04:45 PM	95	0	0	95	0	5	0	5	0	0	0	0	100
Total	321	0	0	321	0	16	0	16	0	0	0	0	337
05:00 PM	117	0	0	117	0	0	0	0	0	0	0	0	117
05:15 PM	98	0	0	98	0	2	0	2	0	0	0	0	100
05:30 PM	89	0	0	89	0	2	0	2	0	0	0	0	91
05:45 PM	84	0	0	84	0	5	0	5	0	0	0	0	89
Total	388	0	0	388	0	9	0	9	0	0	0	0	397
Grand Total	3408	0	0	3408	0	29	0	29	0	0	0	0	3437
Apprch %	100	0	0		0	100	0		0	0	0		
Total %	99.2	0	0	99.2	0	0.8	0	0.8	0	0	0	0	
Pass Cars	3387	0	0	3387	0	28	0	28	0	0	0	0	3415
% Pass Cars	99.4	0	0	99.4	0	96.6	0	96.6	0	0	0	0	99.4
Single Units	18	0	0	18	0	0	0	0	0	0	0	0	18
% Single Units	0.5	0	0	0.5	0	0	0	0	0	0	0	0	0.5
Heavy Trucks	3	0	0	3	0	1	0	1	0	0	0	0	4
% Heavy Trucks	0.1	0	0	0.1	0	3.4	0	3.4	0	0	0	0	0.1

TDC Traffic Comments: Non-signalized "T" intersection. Video VCU camera was located within NE intersection quadrant. Traffic study was performed for City of Rochester Hills Traffic Impact Study for Bergmann.

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Traffic Data Collection, LLC

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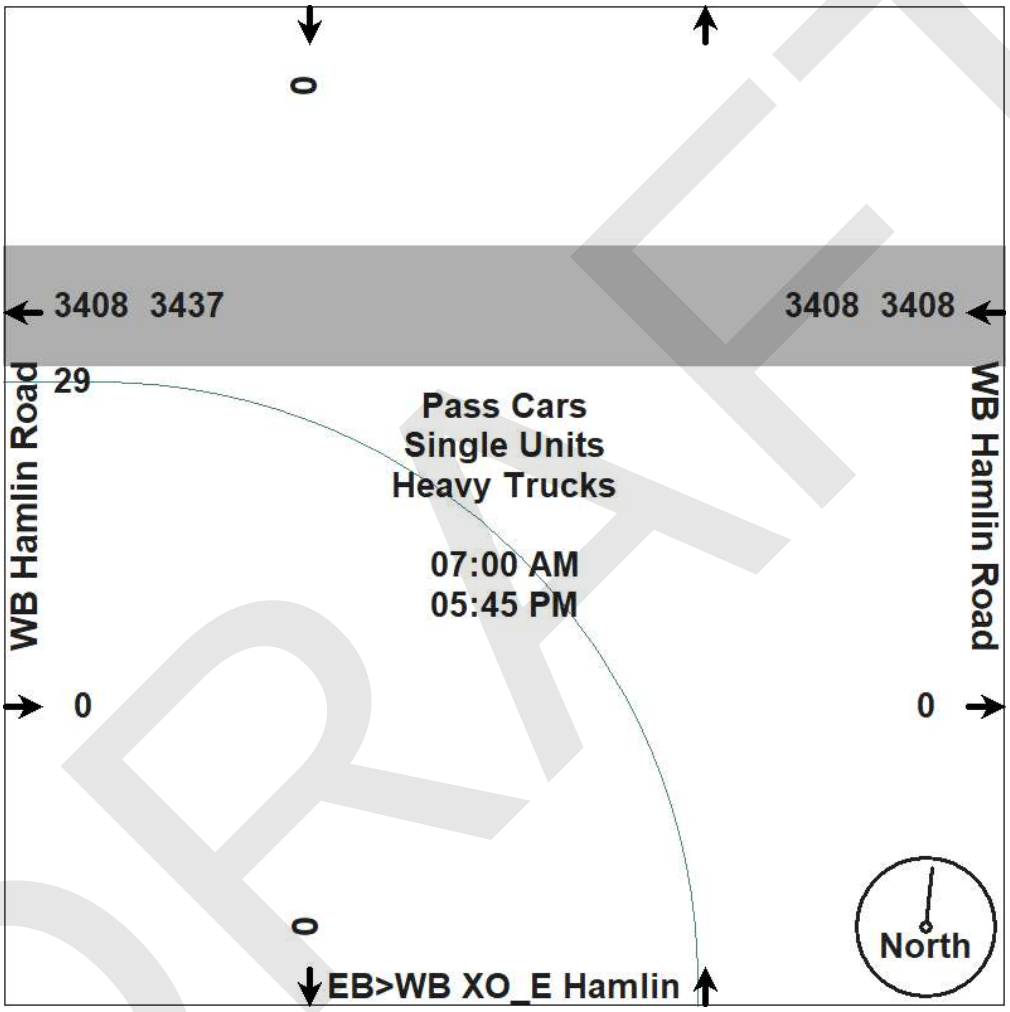
Phone: 586.786-5407

Traffic Study Performed For:

Bergmann

Project: Roch Hills Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather: Sunny/Cldy, Dry Deg's 70's
Count By Miovision Video VCU 34N NE

File Name : TMC_2 Hamlin_EB XO_E Rookery_9-26-19
Site Code : TMC_2
Start Date : 9/26/2019
Page No : 2



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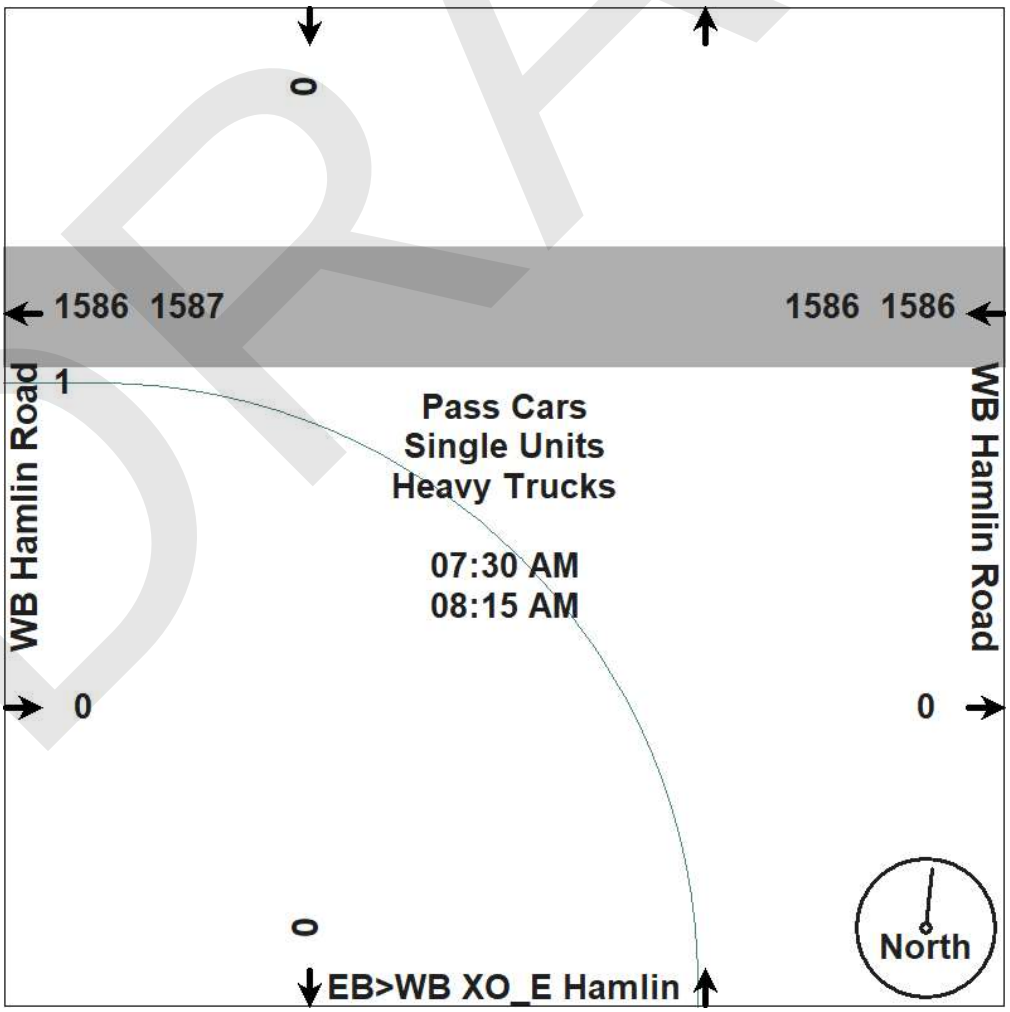
Traffic Study Performed For:

Bergmann

Project: Roch Hills Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather: Sunny/Cldy, Dry Deg's 70's
Count By Miovision Video VCU 34N NE

File Name : TMC_2 Hamlin_EB XO_E Rookery_9-26-19
Site Code : TMC_2
Start Date : 9/26/2019
Page No : 3

	WB Hamlin Road Westbound			EB>WB XO_E Hamlin Northbound			WB Hamlin Road Eastbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	**445**	0	**445**	0	0	0	0	0	0	**445**
07:45 AM	416	0	416	0	0	0	0	0	0	416
08:00 AM	374	0	374	0	0	0	0	0	0	374
08:15 AM	351	0	351	0	**1**	**1**	0	0	0	352
Total Volume	1586	0	1586	0	1	1	0	0	0	1587
% App. Total	100	0		0	100		0	0		
PHF	.891	.000	.891	.000	.250	.250	.000	.000	.000	.892
Pass Cars	1580	0	1580	0	1	1	0	0	0	1581
% Pass Cars	99.6	0	99.6	0	100	100	0	0	0	99.6
Single Units	5	0	5	0	0	0	0	0	0	5
% Single Units	0.3	0	0.3	0	0	0	0	0	0	0.3
Heavy Trucks	1	0	1	0	0	0	0	0	0	1
% Heavy Trucks	0.1	0	0.1	0	0	0	0	0	0	0.1



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Phone: 586.786-5407

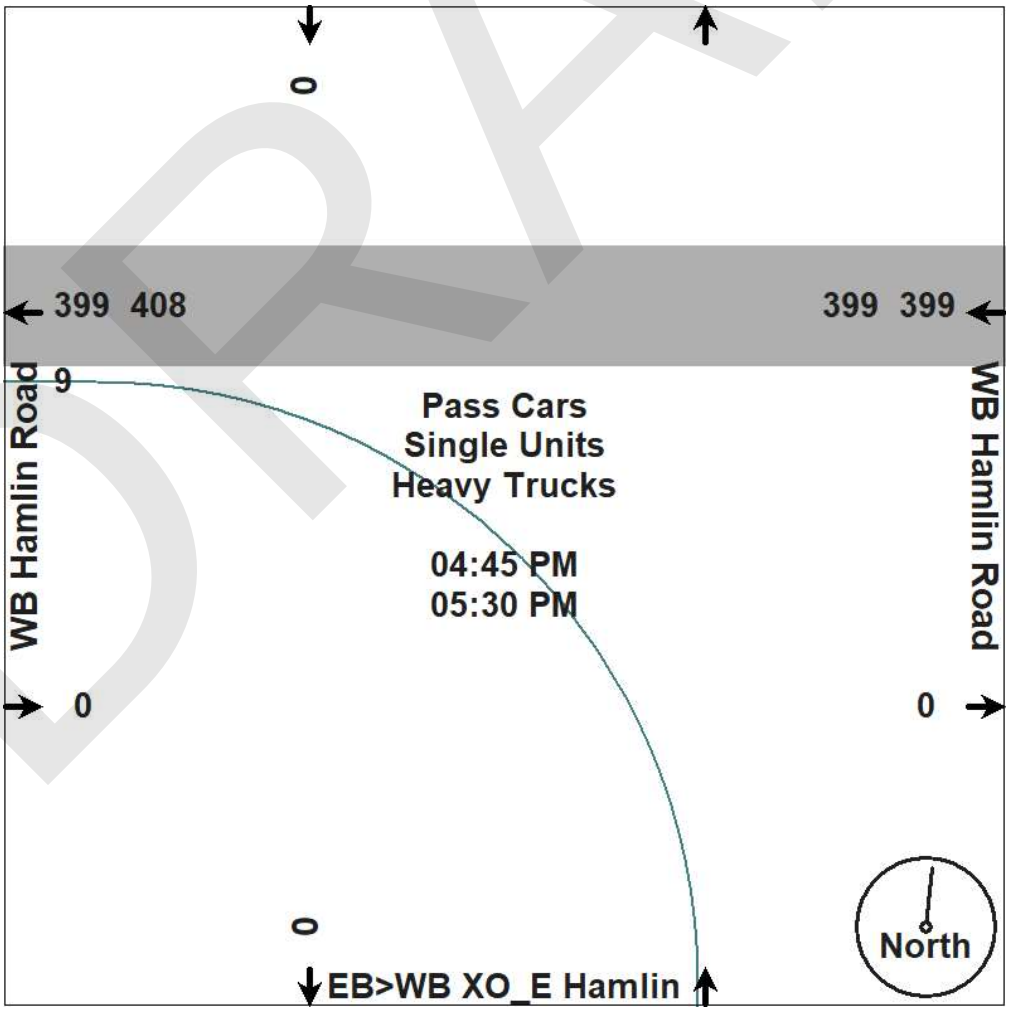
Traffic Study Performed For:

Bergmann

Project: Roch Hills Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather: Sunny/Cldy, Dry Deg's 70's
Count By Miovision Video VCU 34N NE

File Name : TMC_2 Hamlin_EB XO_E Rookery_9-26-19
Site Code : TMC_2
Start Date : 9/26/2019
Page No : 4

	WB Hamlin Road Westbound			EB>WB XO_E Hamlin Northbound			WB Hamlin Road Eastbound			
Start Time	Thru	Left	App. Total	Right	Left	App. Total	Right	Thru	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	95	0	95	0	**5**	**5**	0	0	0	100
05:00 PM	**117**	0	**117**	0	0	0	0	0	0	**117**
05:15 PM	98	0	98	0	2	2	0	0	0	100
05:30 PM	89	0	89	0	2	2	0	0	0	91
Total Volume	399	0	399	0	9	9	0	0	0	408
% App. Total	100	0		0	100		0	0		
PHF	.853	.000	.853	.000	.450	.450	.000	.000	.000	.872
Pass Cars	395	0	395	0	8	8	0	0	0	403
% Pass Cars	99.0	0	99.0	0	88.9	88.9	0	0	0	98.8
Single Units	4	0	4	0	0	0	0	0	0	4
% Single Units	1.0	0	1.0	0	0	0	0	0	0	1.0
Heavy Trucks	0	0	0	0	1	1	0	0	0	1
% Heavy Trucks	0	0	0	0	11.1	11.1	0	0	0	0.2



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Traffic Data Collection, LLC

www:tdccounts.com

Phone: 586.786-5407

Traffic Study Performed For:

Bergmann

Project: Roch Hills Traffic Impact Study
Study:4 Hr. Video Turning Movement Count
Weather: Sunny/Cldy, Dry Deg's 70's
Count By Miovision Video VCU 34N NE

File Name : TMC_2 Hamlin_EB XO_E Rookery_9-26-19
Site Code : TMC_2
Start Date : 9/26/2019
Page No : 5

Aerial Photo

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Level of Service Criteria for Two-Way-Stop-Controlled Intersections

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio	
	≤ 1.0	> 1.0
≤10	A	F
>10-15	B	F
>15-25	C	F
>25-35	D	F
>35-50	E	F
>50	F	F

LOS for TWSC intersection is determined by the computed or measured control delay. For motor vehicles, LOS is determined for each minor-street movement (or shared movement), as well as the major-street left turns. LOS is not defined for the intersection as a whole or for major-street approaches for three primary reasons: (a) major street through vehicles are assumed to experience zero delay; (b) the disproportionate number of major-street through vehicles at a typical TWSC intersection skews the weighted average of all movements, resulting in very low overall average delay for all vehicles; and (c) the resulting low delay can mask LOS deficiencies of minor movements. LOS F is assigned to a movement if its volume-to-capacity ratio exceeds 1.0, regardless of the control delay.

The LOS criteria for TWSC intersections differ somewhat from the criteria used for signalized intersections, primarily because user perceptions differ among transportation facility types. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable than they are at signals.

Source: Highway Capacity Manual, 6th Edition. Transportation Research Board, National Research Council.

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Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱						↱		↰	
Traffic Vol, veh/h	0	238	1	0	0	0	0	0	0	14	29	0
Future Vol, veh/h	0	238	1	0	0	0	0	0	0	14	29	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	92	92	92	92	92	92	72	72	72
Heavy Vehicles, %	0	3	0	2	2	2	2	2	2	0	0	0
Mvmt Flow	0	262	1	0	0	0	0	0	0	19	40	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	131	131	263	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	131	263	-
Critical Hdwy	-	-	-	-	-	6.94	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	-	-	-	-	-	3.32	3.5	4	-
Pot Cap-1 Maneuver	0	-	-	0	0	894	834	646	0
Stage 1	0	-	-	0	0	-	-	-	0
Stage 2	0	-	-	0	0	-	865	694	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	894	834	646	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	834	646	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	865	694	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	10.6
HCM LOS		A	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	-	-	-	697
HCM Lane V/C Ratio	-	-	-	0.086
HCM Control Delay (s)	0	-	-	10.6
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.3

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Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↰	
Traffic Vol, veh/h	0	0	0	1586	1	0
Future Vol, veh/h	0	0	0	1586	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	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	89	89	60	60
Heavy Vehicles, %	2	2	0	0	0	0
Mvmt Flow	0	0	0	1782	2	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	891	-
Stage 1	-	-	0	-
Stage 2	-	-	891	-
Critical Hdwy	-	-	6.8	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.8	-
Follow-up Hdwy	-	-	3.5	-
Pot Cap-1 Maneuver	0	-	286	0
Stage 1	0	-	-	0
Stage 2	0	-	366	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	286	-
Mov Cap-2 Maneuver	-	-	286	-
Stage 1	-	-	-	-
Stage 2	-	-	366	-

Approach	WB	NB
HCM Control Delay, s	0	17.7
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	WBT
Capacity (veh/h)	286	-
HCM Lane V/C Ratio	0.006	-
HCM Control Delay (s)	17.7	-
HCM Lane LOS	C	-
HCM 95th %tile Q(veh)	0	-

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Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱						↱		↰	
Traffic Vol, veh/h	0	1143	0	0	0	0	0	0	15	9	1	0
Future Vol, veh/h	0	1143	0	0	0	0	0	0	15	9	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	92	92	92	60	60	60	63	63	63
Heavy Vehicles, %	0	0	0	2	2	2	0	0	0	0	0	0
Mvmt Flow	0	1229	0	0	0	0	0	0	25	14	2	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	615	615	1229	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	615	1229	-
Critical Hdwy	-	-	-	-	-	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	-	-	-	-	-	3.3	3.5	4	-
Pot Cap-1 Maneuver	0	-	-	0	0	439	379	179	0
Stage 1	0	-	-	0	0	-	-	-	0
Stage 2	0	-	-	0	0	-	450	252	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	439	357	179	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	357	179	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	424	252	-

Approach	EB	NB	SB
HCM Control Delay, s	0	13.7	16.6
HCM LOS		B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	439	-	-	325
HCM Lane V/C Ratio	0.057	-	-	0.049
HCM Control Delay (s)	13.7	-	-	16.6
HCM Lane LOS	B	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	0.2

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Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↰	
Traffic Vol, veh/h	0	0	0	399	9	0
Future Vol, veh/h	0	0	0	399	9	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	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	85	85	60	60
Heavy Vehicles, %	2	2	0	1	11	0
Mvmt Flow	0	0	0	469	15	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	235	-
Stage 1	-	-	0	-
Stage 2	-	-	235	-
Critical Hdwy	-	-	7.02	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	6.02	-
Follow-up Hdwy	-	-	3.61	-
Pot Cap-1 Maneuver	0	-	708	0
Stage 1	0	-	-	0
Stage 2	0	-	756	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	708	-
Mov Cap-2 Maneuver	-	-	708	-
Stage 1	-	-	-	-
Stage 2	-	-	756	-

Approach	WB	NB
HCM Control Delay, s	0	10.2
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	WBT
Capacity (veh/h)	708	-
HCM Lane V/C Ratio	0.021	-
HCM Control Delay (s)	10.2	-
HCM Lane LOS	B	-
HCM 95th %tile Q(veh)	0.1	-

DRAFT

1: University Tech Park Drive/WB to EB Hamlin Rd XO W. of Rookery Dr & EB Hamlin Rd Performance b

Movement	EBT	EBR	SBL	SBT	All
Vehicles Exited	231	2	13	34	280
Hourly Exit Rate	231	2	13	34	280
Input Volume	238	1	14	29	282
% of Volume	97	200	95	117	99

2: EB to WB Hamlin Rd XO E. of Rookery Dr & WB Hamlin Rd Performance by movement

Movement	WBT	NBL	All
Vehicles Exited	1597	1	1598
Hourly Exit Rate	1597	1	1598
Input Volume	1586	1	1588
% of Volume	101	80	101

3: WB to EB Hamlin Rd XO W. of Rookery Dr & WB Hamlin Rd Performance by movement

Movement	WBL	WBT	All
Vehicles Exited	47	1552	1599
Hourly Exit Rate	47	1552	1599
Input Volume	43	1548	1590
% of Volume	110	100	101

4: EB Hamlin Rd & EB to WB Hamlin Rd XO E. of Rookery Dr Performance by movement

Movement	EBL	EBT	All
Vehicles Exited	0	245	245
Hourly Exit Rate	0	245	245
Input Volume	1	252	253
% of Volume	0	97	97

Total Network Performance

Vehicles Exited	1833
Hourly Exit Rate	1833
Input Volume	5538
% of Volume	33

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Intersection: 1: University Tech Park Drive/WB to EB Hamlin Rd XO W. of Rookery Dr & EB Hamlin Rd

Movement	SB
Directions Served	LT
Maximum Queue (ft)	44
Average Queue (ft)	24
95th Queue (ft)	45
Link Distance (ft)	12
Upstream Blk Time (%)	3
Queuing Penalty (veh)	2
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: EB to WB Hamlin Rd XO E. of Rookery Dr & WB Hamlin Rd

Movement	NB
Directions Served	L
Maximum Queue (ft)	14
Average Queue (ft)	0
95th Queue (ft)	6
Link Distance (ft)	6
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: WB to EB Hamlin Rd XO W. of Rookery Dr & WB Hamlin Rd

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

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Intersection: 4: EB Hamlin Rd & EB to WB Hamlin Rd XO E. of Rookery Dr

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 2

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1: University Tech Park Drive/WB to EB Hamlin Rd XO W. of Rookery Dr & EB Hamlin Rd Performance b

Movement	EBT	NBR	SBL	SBT	All
Vehicles Exited	1128	17	8	1	1154
Hourly Exit Rate	1128	17	8	1	1154
Input Volume	1143	15	9	1	1168
% of Volume	99	111	91	80	99

2: EB to WB Hamlin Rd XO E. of Rookery Dr & WB Hamlin Rd Performance by movement

Movement	WBT	NBL	All
Vehicles Exited	398	8	406
Hourly Exit Rate	398	8	406
Input Volume	399	9	408
% of Volume	100	89	99

3: WB to EB Hamlin Rd XO W. of Rookery Dr & WB Hamlin Rd Performance by movement

Movement	WBL	WBT	All
Vehicles Exited	9	398	407
Hourly Exit Rate	9	398	407
Input Volume	10	400	410
% of Volume	90	100	99

4: EB Hamlin Rd & EB to WB Hamlin Rd XO E. of Rookery Dr Performance by movement

Movement	EBL	EBT	All
Vehicles Exited	8	1147	1155
Hourly Exit Rate	8	1147	1155
Input Volume	9	1160	1170
% of Volume	89	99	99

Total Zone Performance

Vehicles Exited	4
Hourly Exit Rate	4
Input Volume	3155
% of Volume	0

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Intersection: 1: University Tech Park Drive/WB to EB Hamlin Rd XO W. of Rookery Dr & EB Hamlin Rd

Movement	NB	SB
Directions Served	R	LT
Maximum Queue (ft)	29	36
Average Queue (ft)	9	8
95th Queue (ft)	26	29
Link Distance (ft)	387	12
Upstream Blk Time (%)		2
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: EB to WB Hamlin Rd XO E. of Rookery Dr & WB Hamlin Rd

Movement	NB
Directions Served	L
Maximum Queue (ft)	42
Average Queue (ft)	7
95th Queue (ft)	29
Link Distance (ft)	6
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: WB to EB Hamlin Rd XO W. of Rookery Dr & WB Hamlin Rd

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

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Intersection: 4: EB Hamlin Rd & EB to WB Hamlin Rd XO E. of Rookery Dr

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Zone Summary

Zone wide Queuing Penalty: 0

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Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱						↱		↰	
Traffic Vol, veh/h	0	240	1	0	0	0	0	0	0	14	29	0
Future Vol, veh/h	0	240	1	0	0	0	0	0	0	14	29	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	92	92	92	92	92	92	72	72	72
Heavy Vehicles, %	0	3	0	2	2	2	2	2	2	0	0	0
Mvmt Flow	0	264	1	0	0	0	0	0	0	19	40	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	132	132	265	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	132	265	-
Critical Hdwy	-	-	-	-	-	6.94	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	-	-	-	-	-	3.32	3.5	4	-
Pot Cap-1 Maneuver	0	-	-	0	0	893	832	644	0
Stage 1	0	-	-	0	0	-	-	-	0
Stage 2	0	-	-	0	0	-	864	693	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	893	832	644	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	832	644	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	864	693	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	10.7
HCM LOS		A	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	-	-	-	695
HCM Lane V/C Ratio	-	-	-	0.086
HCM Control Delay (s)	0	-	-	10.7
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.3

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Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	1602	1	0
Future Vol, veh/h	0	0	0	1602	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	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	89	89	60	60
Heavy Vehicles, %	2	2	0	0	0	0
Mvmt Flow	0	0	0	1800	2	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	900	-
Stage 1	-	-	0	-
Stage 2	-	-	900	-
Critical Hdwy	-	-	6.8	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.8	-
Follow-up Hdwy	-	-	3.5	-
Pot Cap-1 Maneuver	0	-	282	0
Stage 1	0	-	-	0
Stage 2	0	-	362	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	282	-
Mov Cap-2 Maneuver	-	-	282	-
Stage 1	-	-	-	-
Stage 2	-	-	362	-

Approach	WB	NB
HCM Control Delay, s	0	17.8
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	WBT
Capacity (veh/h)	282	-
HCM Lane V/C Ratio	0.006	-
HCM Control Delay (s)	17.8	-
HCM Lane LOS	C	-
HCM 95th %tile Q(veh)	0	-

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Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱						↱		↰	
Traffic Vol, veh/h	0	1154	0	0	0	0	0	0	15	9	1	0
Future Vol, veh/h	0	1154	0	0	0	0	0	0	15	9	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	92	92	92	60	60	60	63	63	63
Heavy Vehicles, %	0	0	0	2	2	2	0	0	0	0	0	0
Mvmt Flow	0	1241	0	0	0	0	0	0	25	14	2	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	621	621	1241	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	621	1241	-
Critical Hdwy	-	-	-	-	-	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	-	-	-	-	-	3.3	3.5	4	-
Pot Cap-1 Maneuver	0	-	-	0	0	435	376	176	0
Stage 1	0	-	-	0	0	-	-	-	0
Stage 2	0	-	-	0	0	-	446	249	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	435	355	176	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	355	176	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	420	249	-

Approach	EB	NB	SB
HCM Control Delay, s	0	13.8	16.8
HCM LOS		B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	435	-	-	322
HCM Lane V/C Ratio	0.057	-	-	0.049
HCM Control Delay (s)	13.8	-	-	16.8
HCM Lane LOS	B	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	0.2

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Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↰	
Traffic Vol, veh/h	0	0	0	403	9	0
Future Vol, veh/h	0	0	0	403	9	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	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	85	85	60	60
Heavy Vehicles, %	2	2	0	1	11	0
Mvmt Flow	0	0	0	474	15	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	237	-
Stage 1	-	-	0	-
Stage 2	-	-	237	-
Critical Hdwy	-	-	7.02	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	6.02	-
Follow-up Hdwy	-	-	3.61	-
Pot Cap-1 Maneuver	0	-	706	0
Stage 1	0	-	-	0
Stage 2	0	-	754	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	706	-
Mov Cap-2 Maneuver	-	-	706	-
Stage 1	-	-	-	-
Stage 2	-	-	754	-

Approach	WB	NB
HCM Control Delay, s	0	10.2
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	WBT
Capacity (veh/h)	706	-
HCM Lane V/C Ratio	0.021	-
HCM Control Delay (s)	10.2	-
HCM Lane LOS	B	-
HCM 95th %tile Q(veh)	0.1	-

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Intersection: 1: University Tech Park Drive/WB to EB Hamlin Rd XO W. of Rookery Dr & EB Hamlin Rd

Movement	NB	SB
Directions Served	R	LT
Maximum Queue (ft)	28	34
Average Queue (ft)	11	8
95th Queue (ft)	33	29
Link Distance (ft)	469	12
Upstream Blk Time (%)		2
Queuing Penalty (veh)		0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: EB to WB Hamlin Rd XO E. of Rookery Dr & WB Hamlin Rd

Movement	NB
Directions Served	L
Maximum Queue (ft)	54
Average Queue (ft)	9
95th Queue (ft)	35
Link Distance (ft)	6
Upstream Blk Time (%)	1
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: WB to EB Hamlin Rd XO W. of Rookery Dr & WB Hamlin Rd

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

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Intersection: 4: EB Hamlin Rd & EB to WB Hamlin Rd XO E. of Rookery Dr

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Zone Summary

Zone wide Queuing Penalty: 0

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1: University Tech Park Drive/WB to EB Hamlin Rd XO W. of Rookery Dr & EB Hamlin Rd Performance b

Movement	EBT	EBR	SBL	SBT	All
Vehicles Exited	233	2	12	34	281
Hourly Exit Rate	233	2	12	34	281
Input Volume	240	1	14	29	284
% of Volume	97	200	87	117	99

2: EB to WB Hamlin Rd XO E. of Rookery Dr & WB Hamlin Rd Performance by movement

Movement	WBT	NBL	All
Vehicles Exited	1617	1	1618
Hourly Exit Rate	1617	1	1618
Input Volume	1602	1	1603
% of Volume	101	80	101

3: WB to EB Hamlin Rd XO W. of Rookery Dr & WB Hamlin Rd Performance by movement

Movement	WBL	WBT	All
Vehicles Exited	46	1573	1619
Hourly Exit Rate	46	1573	1619
Input Volume	43	1563	1606
% of Volume	108	101	101

4: EB Hamlin Rd & EB to WB Hamlin Rd XO E. of Rookery Dr Performance by movement

Movement	EBL	EBT	All
Vehicles Exited	0	246	246
Hourly Exit Rate	0	246	246
Input Volume	1	254	255
% of Volume	0	97	96

Total Zone Performance

Vehicles Exited	4
Hourly Exit Rate	4
Input Volume	3748
% of Volume	0

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Intersection: 1: University Tech Park Drive/WB to EB Hamlin Rd XO W. of Rookery Dr & EB Hamlin Rd

Movement	SB
Directions Served	LT
Maximum Queue (ft)	46
Average Queue (ft)	24
95th Queue (ft)	45
Link Distance (ft)	12
Upstream Blk Time (%)	3
Queuing Penalty (veh)	2
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: EB to WB Hamlin Rd XO E. of Rookery Dr & WB Hamlin Rd

Movement	NB
Directions Served	L
Maximum Queue (ft)	11
Average Queue (ft)	0
95th Queue (ft)	6
Link Distance (ft)	6
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: WB to EB Hamlin Rd XO W. of Rookery Dr & WB Hamlin Rd

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

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Intersection: 4: EB Hamlin Rd & EB to WB Hamlin Rd XO E. of Rookery Dr

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Zone Summary

Zone wide Queuing Penalty: 2

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Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱						↱		↰	
Traffic Vol, veh/h	0	298	1	0	0	0	0	0	0	100	29	0
Future Vol, veh/h	0	298	1	0	0	0	0	0	0	100	29	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	92	92	92	92	92	92	72	72	72
Heavy Vehicles, %	0	3	0	2	2	2	2	2	2	0	0	0
Mvmt Flow	0	327	1	0	0	0	0	0	0	139	40	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	164	164	328	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	164	328	-
Critical Hdwy	-	-	-	-	-	6.94	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	-	-	-	-	-	3.32	3.5	4	-
Pot Cap-1 Maneuver	0	-	-	0	0	852	791	594	0
Stage 1	0	-	-	0	0	-	-	-	0
Stage 2	0	-	-	0	0	-	828	651	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	852	791	594	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	791	594	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	828	651	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	11.5
HCM LOS		A	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	-	-	-	736
HCM Lane V/C Ratio	-	-	-	0.243
HCM Control Delay (s)	0	-	-	11.5
HCM Lane LOS	A	-	-	B
HCM 95th %tile Q(veh)	-	-	-	1

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Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↰	
Traffic Vol, veh/h	0	0	0	1688	10	0
Future Vol, veh/h	0	0	0	1688	10	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	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	89	89	60	60
Heavy Vehicles, %	2	2	0	0	0	0
Mvmt Flow	0	0	0	1897	17	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	949	-
Stage 1	-	-	0	-
Stage 2	-	-	949	-
Critical Hdwy	-	-	6.8	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	5.8	-
Follow-up Hdwy	-	-	3.5	-
Pot Cap-1 Maneuver	0	-	262	0
Stage 1	0	-	-	0
Stage 2	0	-	341	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	262	-
Mov Cap-2 Maneuver	-	-	262	-
Stage 1	-	-	-	-
Stage 2	-	-	341	-

Approach	WB	NB
HCM Control Delay, s	0	19.7
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	WBT
Capacity (veh/h)	262	-
HCM Lane V/C Ratio	0.064	-
HCM Control Delay (s)	19.7	-
HCM Lane LOS	C	-
HCM 95th %tile Q(veh)	0.2	-

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Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	290	108	0	0	0	12
Future Vol, veh/h	290	108	0	0	0	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	92	92	92	92
Heavy Vehicles, %	2	0	2	2	0	0
Mvmt Flow	319	119	0	0	0	13

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	160
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	6.9
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.3
Pot Cap-1 Maneuver	-	-		0	863
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	863
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	9.2
HCM LOS		A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	863	-	-
HCM Lane V/C Ratio	0.015	-	-
HCM Control Delay (s)	9.2	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

DRAFT

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	256	36	0	0	0	11
Future Vol, veh/h	256	36	0	0	0	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	92	92	92	92
Heavy Vehicles, %	2	0	2	2	0	0
Mvmt Flow	281	40	0	0	0	12

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	161
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	6.9
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.3
Pot Cap-1 Maneuver	-	-		0	862
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	862
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	9.2
HCM LOS		A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	862	-	-
HCM Lane V/C Ratio	0.014	-	-
HCM Control Delay (s)	9.2	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0	-	-

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Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱						↱		↰	
Traffic Vol, veh/h	0	1165	0	0	0	0	0	0	15	25	1	0
Future Vol, veh/h	0	1165	0	0	0	0	0	0	15	25	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	50	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	16983	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	92	92	92	60	60	60	63	63	63
Heavy Vehicles, %	0	0	0	2	2	2	0	0	0	0	0	0
Mvmt Flow	0	1253	0	0	0	0	0	0	25	40	2	0

Major/Minor	Major1			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	627	627	1253	-
Stage 1	-	-	-	-	-	-	0	0	-
Stage 2	-	-	-	-	-	-	627	1253	-
Critical Hdwy	-	-	-	-	-	6.9	7.5	6.5	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-
Follow-up Hdwy	-	-	-	-	-	3.3	3.5	4	-
Pot Cap-1 Maneuver	0	-	-	0	0	431	372	174	0
Stage 1	0	-	-	0	0	-	-	-	0
Stage 2	0	-	-	0	0	-	443	246	0
Platoon blocked, %		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	431	350	174	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	350	174	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	417	246	-

Approach	EB	NB	SB
HCM Control Delay, s	0	13.9	17.2
HCM LOS		B	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	SBLn1
Capacity (veh/h)	431	-	-	337
HCM Lane V/C Ratio	0.058	-	-	0.122
HCM Control Delay (s)	13.9	-	-	17.2
HCM Lane LOS	B	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	0.4

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Intersection	
Int Delay, s/veh	2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				↑↑	↰	
Traffic Vol, veh/h	0	0	0	419	65	0
Future Vol, veh/h	0	0	0	419	65	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	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	85	85	60	60
Heavy Vehicles, %	2	2	0	1	11	0
Mvmt Flow	0	0	0	493	108	0

Major/Minor	Major2		Minor1	
Conflicting Flow All	-	-	247	-
Stage 1	-	-	0	-
Stage 2	-	-	247	-
Critical Hdwy	-	-	7.02	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	6.02	-
Follow-up Hdwy	-	-	3.61	-
Pot Cap-1 Maneuver	0	-	695	0
Stage 1	0	-	-	0
Stage 2	0	-	745	0
Platoon blocked, %		-		
Mov Cap-1 Maneuver	-	-	695	-
Mov Cap-2 Maneuver	-	-	695	-
Stage 1	-	-	-	-
Stage 2	-	-	745	-

Approach	WB	NB
HCM Control Delay, s	0	11.1
HCM LOS		B

Minor Lane/Major Mvmt	NBLn1	WBT
Capacity (veh/h)	695	-
HCM Lane V/C Ratio	0.156	-
HCM Control Delay (s)	11.1	-
HCM Lane LOS	B	-
HCM 95th %tile Q(veh)	0.6	-

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Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1185	20	0	0	0	70
Future Vol, veh/h	1185	20	0	0	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	75	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	92	92	92	92
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	1274	22	0	0	0	76

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	637
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	6.9
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.3
Pot Cap-1 Maneuver	-	-		0	425
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	425
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	15.3
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	425	-	-
HCM Lane V/C Ratio	0.179	-	-
HCM Control Delay (s)	15.3	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.6	-	-

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Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1183	7	0	0	0	70
Future Vol, veh/h	1183	7	0	0	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Stop	Stop	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	16983	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	93	93	92	92	92	92
Heavy Vehicles, %	0	0	2	2	0	0
Mvmt Flow	1272	8	0	0	0	76

Major/Minor	Major1			Minor1	
Conflicting Flow All	0	0		-	640
Stage 1	-	-		-	-
Stage 2	-	-		-	-
Critical Hdwy	-	-		-	6.9
Critical Hdwy Stg 1	-	-		-	-
Critical Hdwy Stg 2	-	-		-	-
Follow-up Hdwy	-	-		-	3.3
Pot Cap-1 Maneuver	-	-		0	423
Stage 1	-	-		0	-
Stage 2	-	-		0	-
Platoon blocked, %	-	-			
Mov Cap-1 Maneuver	-	-		-	423
Mov Cap-2 Maneuver	-	-		-	-
Stage 1	-	-		-	-
Stage 2	-	-		-	-

Approach	EB	NB
HCM Control Delay, s	0	15.4
HCM LOS		C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR
Capacity (veh/h)	423	-	-
HCM Lane V/C Ratio	0.18	-	-
HCM Control Delay (s)	15.4	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.6	-	-

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Intersection: 1: University Tech Park Drive/WB to EB Hamlin Rd XO W. of Rookery Dr & EB Hamlin Rd

Movement	SB
Directions Served	LT
Maximum Queue (ft)	58
Average Queue (ft)	36
95th Queue (ft)	54
Link Distance (ft)	12
Upstream Blk Time (%)	10
Queuing Penalty (veh)	14
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: EB to WB Hamlin Rd XO E. of Rookery Dr & WB Hamlin Rd

Movement	NB
Directions Served	L
Maximum Queue (ft)	36
Average Queue (ft)	8
95th Queue (ft)	31
Link Distance (ft)	5
Upstream Blk Time (%)	3
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: West Site Drive & EB Hamlin Rd

Movement	NB
Directions Served	R
Maximum Queue (ft)	31
Average Queue (ft)	8
95th Queue (ft)	26
Link Distance (ft)	271
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

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Intersection: 4: East Site Drive & EB Hamlin Rd

Movement	NB
Directions Served	R
Maximum Queue (ft)	30
Average Queue (ft)	8
95th Queue (ft)	30
Link Distance (ft)	238
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: WB to EB Hamlin Rd XO W. of Rookery Dr & WB Hamlin Rd

Movement	WB
Directions Served	L
Maximum Queue (ft)	23
Average Queue (ft)	1
95th Queue (ft)	12
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	200
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: EB Hamlin Rd & EB to WB Hamlin Rd XO E. of Rookery Dr

Movement	EB
Directions Served	L
Maximum Queue (ft)	6
Average Queue (ft)	0
95th Queue (ft)	4
Link Distance (ft)	75
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 14

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Intersection: 1: University Tech Park Drive/WB to EB Hamlin Rd XO W. of Rookery Dr & EB Hamlin Rd

Movement	NB	SB
Directions Served	R	LT
Maximum Queue (ft)	40	50
Average Queue (ft)	11	19
95th Queue (ft)	34	46
Link Distance (ft)	467	12
Upstream Blk Time (%)		7
Queuing Penalty (veh)		2
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: EB to WB Hamlin Rd XO E. of Rookery Dr & WB Hamlin Rd

Movement	NB
Directions Served	L
Maximum Queue (ft)	86
Average Queue (ft)	33
95th Queue (ft)	68
Link Distance (ft)	6
Upstream Blk Time (%)	4
Queuing Penalty (veh)	3
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: West Site Drive & EB Hamlin Rd

Movement	NB
Directions Served	R
Maximum Queue (ft)	69
Average Queue (ft)	27
95th Queue (ft)	53
Link Distance (ft)	271
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

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Intersection: 4: East Site Drive & EB Hamlin Rd

Movement	NB
Directions Served	R
Maximum Queue (ft)	54
Average Queue (ft)	31
95th Queue (ft)	53
Link Distance (ft)	288
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: WB to EB Hamlin Rd XO W. of Rookery Dr & WB Hamlin Rd

Movement	WB
Directions Served	L
Maximum Queue (ft)	5
Average Queue (ft)	0
95th Queue (ft)	0
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	200
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 8: EB Hamlin Rd & EB to WB Hamlin Rd XO E. of Rookery Dr

Movement	EB
Directions Served	L
Maximum Queue (ft)	9
Average Queue (ft)	0
95th Queue (ft)	6
Link Distance (ft)	73
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 6

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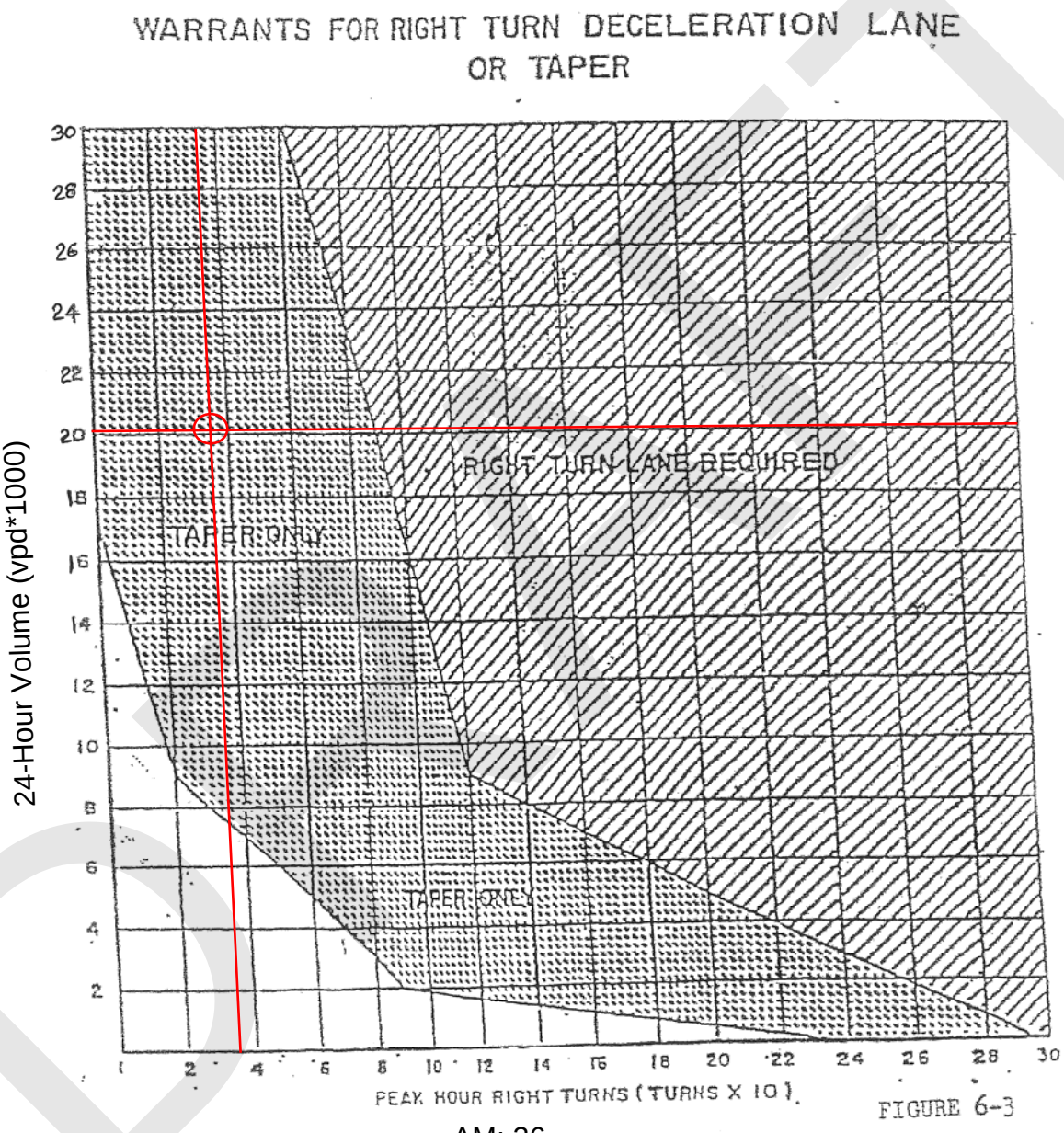
FIGURE 6-3

HAMLIN ROAD & E. SITE DRIVE RIGHT-TURN LANE WARRANT

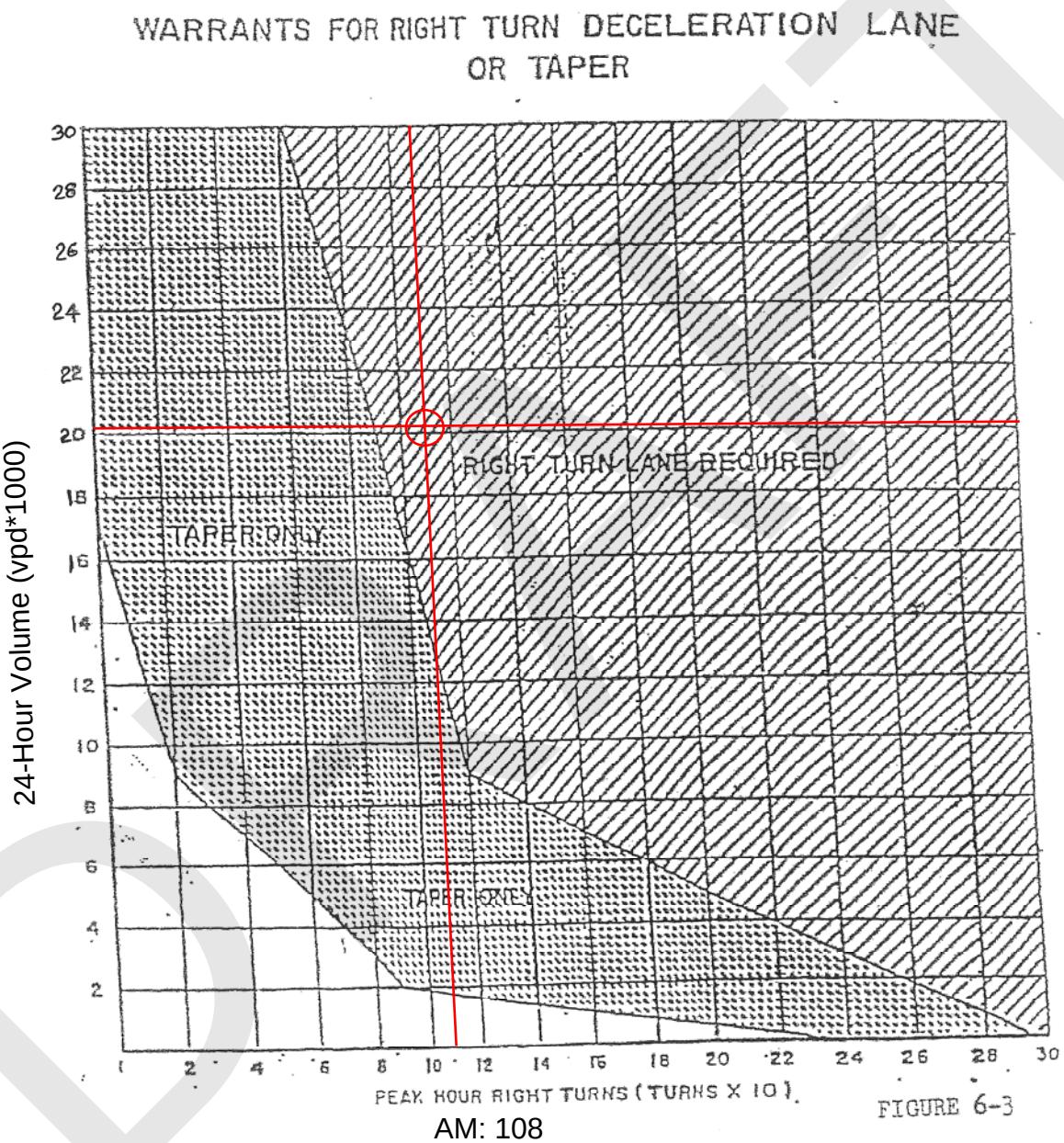


AM: 36

2019 PEAK = 1,837
+ 0.5% per year growth to 2021 = 1,855
\ 10% K-factor = 18,550
+ 1,572 new daily trips
= 20,122 2021 ADT

FIGURE 6-3

HAMLIN ROAD & W. SITE DRIVE RIGHT-TURN LANE WARRANT



AM: 108

2019 PEAK = 1,837
+ 0.5% per year growth to 2021 = 1,855
\ 10% K-factor = 18,550
+ 1,572 new daily trips
= 20,122 2021 ADT