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TRAFFIC IMPACT STUDY

TO: Dominic F. Mocerì
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FROM: Mohammad Lutfi, P.E., PTOE

DATE: April 2025

SUBJECT: **Eastport Village Development**
Orion Township, Oakland County
Traffic Impact Study (TIS)
AEW Project No. 0361-0091



Mohammad Lutfi

This memorandum presents the result of the Traffic Impact Study (TIS) for the proposed development in Orion Township, Michigan. The project includes a mix of single-family detached homes, townhomes, and retail space. The site is located on the east side of S. Broadway Street (M-24), between Glanworth Street and Heights Road. The study area and analyzed intersections are illustrated in **Figure 1** and **Figure 2**, respectively, below.

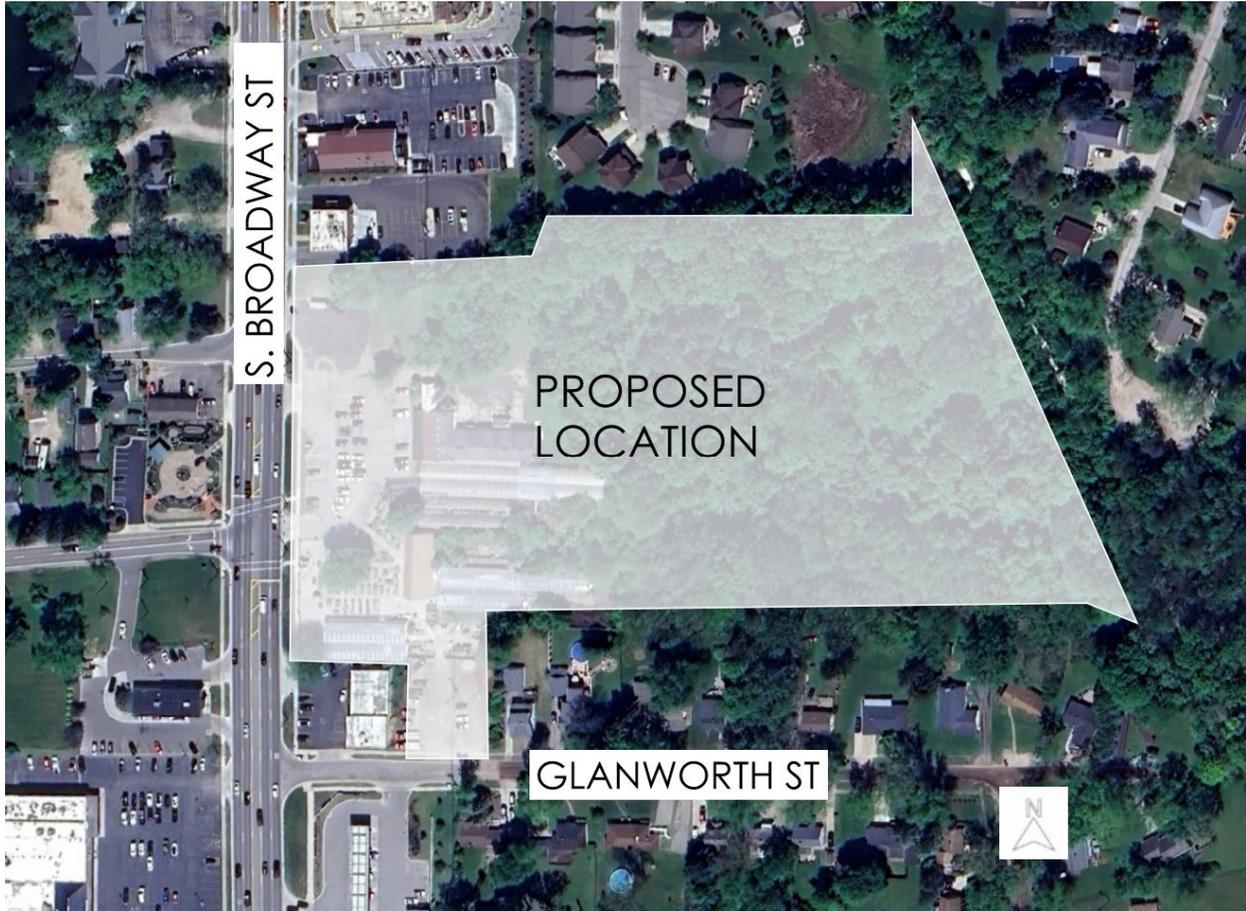


Figure 1 – Study Site

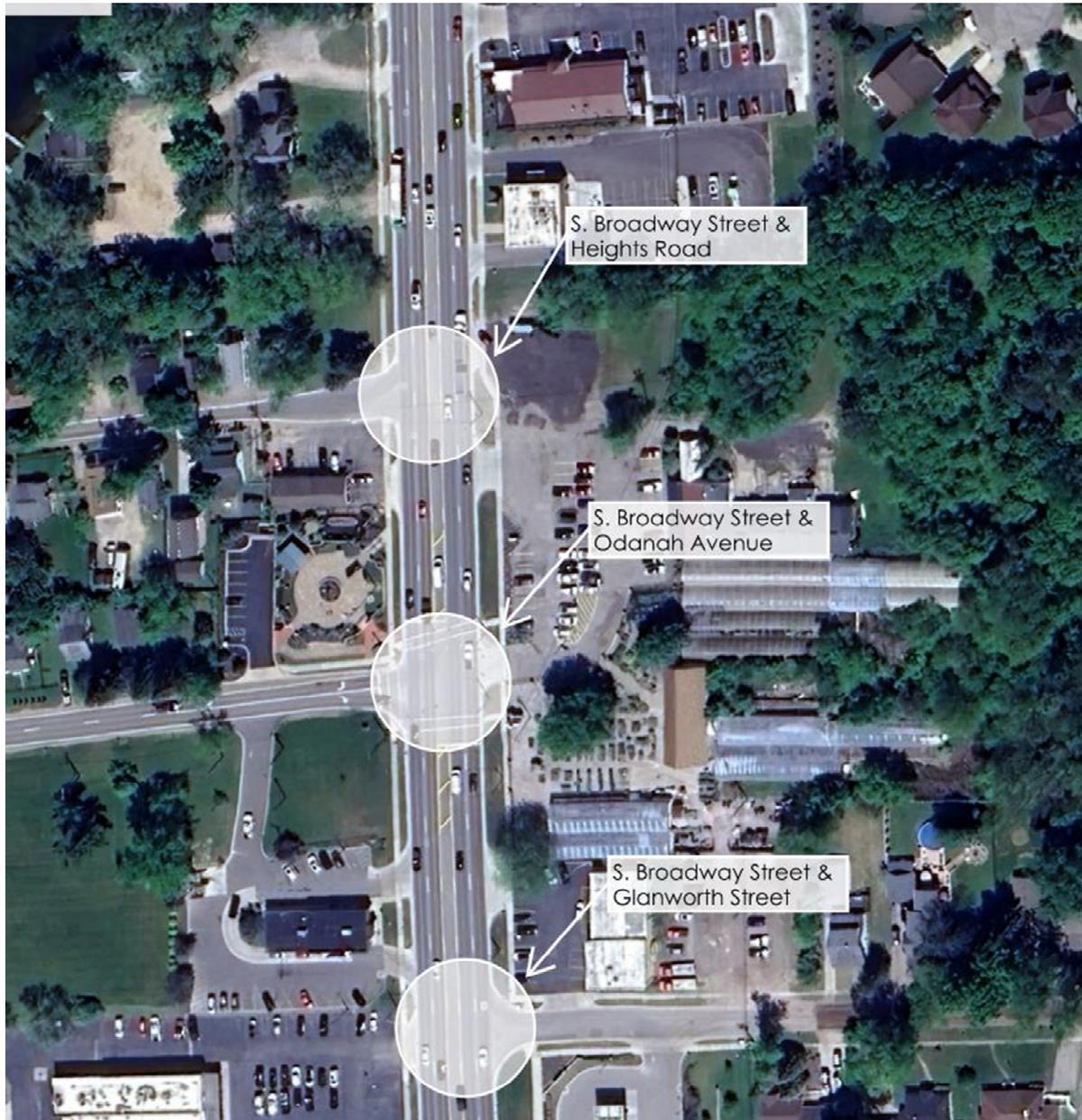


Figure 2 – Study Intersections

AEW understands that the purpose of this study is to provide a Traffic Impact Study (TIS) as requested by MDOT to determine the impact of the trips generated by the development on the adjacent roadway. The Eastport Village Development is a mixed-use project that encompasses an 8,400 square-foot strip retail plaza, alongside 48 single-family detached homes and 11 townhomes. The development is designed to offer both



AEW followed the Michigan Department of Transportation (MDOT) Geometric Design Guide for conducting a Traffic Impact Study.

The purpose of this study is to identify the potential traffic related impacts, if any, of the proposed development on the adjacent road network, including evaluating traffic operations at the proposed site driveways. Also, the study includes quantifying the existing traffic flow and identifying potential improvements to mitigate future traffic impacts, if any, due to the traffic generated by the new development.

Roadway Characteristics

Table 1- Roadway Characteristics present the functional classification, controlling jurisdiction, average daily traffic (ADT), posted speed and lane description for each of the study area roadways.

Table 1 – Roadway Characteristics

Road	Functional Classification	Controlling Jurisdiction	ADT	Posted Speed	Lane Description
S. Broadway Steet (M-24)	Other Principal Arterial	MDOT	41,992	35 MPH	4-lane roadway w/TWCL
Odanah Avenue	Major Collector	RCOC	3,839	35 MPH	1-way roadway
Heights Road	Major Collector	RCOC	3,202	35 MPH	1-way roadway

(Traffic Sources: 2023 MDOT Traffic Volumes Map and SEMCOG National Functional Classification Map)

Non-roadway Characteristics

There are currently existing sidewalks on S. Broadway (M-24). There are currently no public transit services within the study area along S. Broadway (M-24). The intersection of S. Broadway (M-24) and Odanah Avenue include pedestrian signals with push buttons and crosswalk.

Existing Traffic Conditions

Traffic counts were collected on Thursday, January 30th, 2025, for Odanah Avenue & S. Broadway Street and for Glanworth Street & S Broadway Street. Traffic count data was used from a prior count for the intersection of S Broadway & Heights Road. The data collected was utilized to conduct the traffic impact study analysis. The collected data can be found in **Appendix A**. 2025 Existing AM & PM Peak Hour Traffic Volumes are presented in **Figure 4** and Roadway Network Lane Configuration and Traffic Control is provided in **Figure 5**.

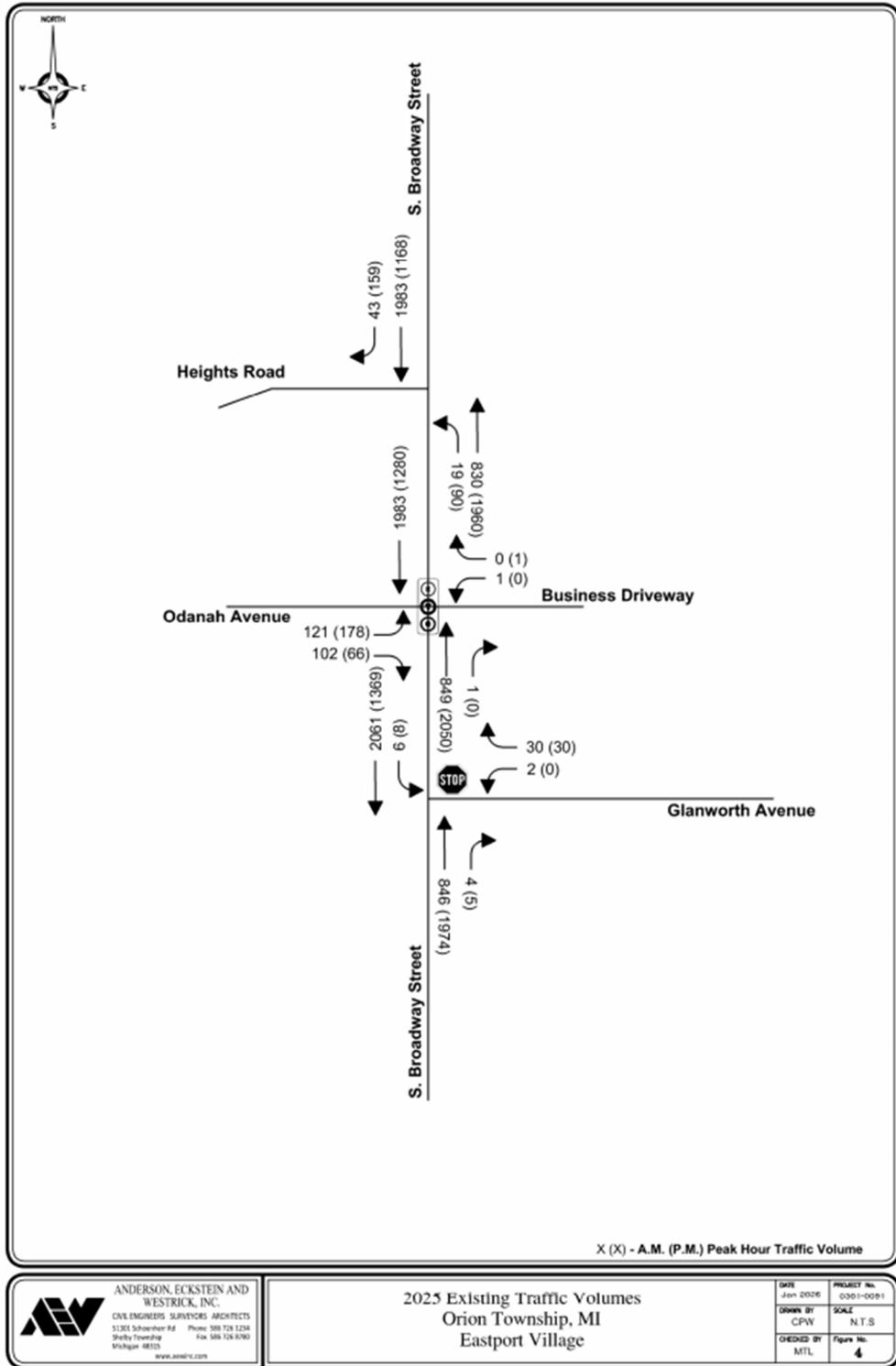


Figure 4 – 2025 Existing Peak Hour Volumes

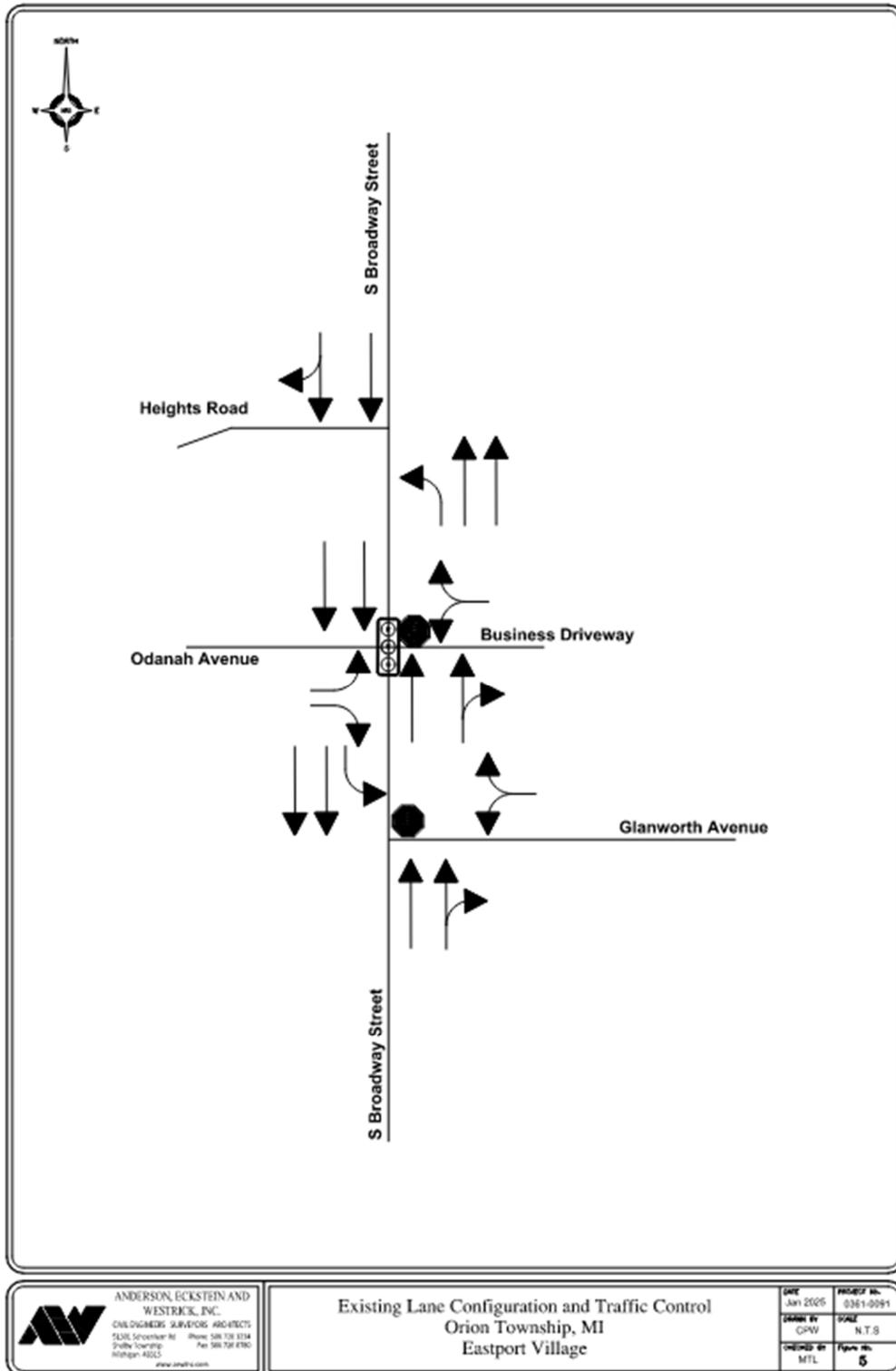


Figure 5 – Existing Lane Configuration & Traffic Control



Traffic Operations Analysis Methodology

Trafficware's Synchro 12 was used to perform intersection capacity analysis and assign Levels of Service (LOS) for the study intersections and lane group movements based on the Highway Capacity Manual, 7th Edition (HCM6) methodologies. LOS is a letter grade that describes traffic operations based on the amount of delay experienced by vehicles at an intersection, along an intersection approach (e.g., eastbound, westbound), or in a specific lane group (e.g., eastbound right turn, eastbound through-left). LOS can range from A-F with A representing the conditions in which vehicles experience the least amount of delay, and F representing the conditions in which vehicles experience the most delay. The LOS D is typically used as a threshold for "acceptable" operations and is sometimes described as being "near capacity". The LOS E is often described as operations "at capacity", while LOS F describes conditions "over capacity". Additionally, LOS for the stop-controlled intersections was reported by approach. **Table 2** provides information regarding the delay thresholds for LOS.

Table 2 – Level of Service Definitions and Criteria

Level-of-Service (LOS)	Signalized Intersections Delay (seconds)	Un-Signalized Intersections Delay (seconds)
A	< 10.0	< 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	> 80.0	> 50.0

Existing Level of Service

The collected peak hour intersection volumes, approach peak hour factors (PHF), truck percentages, and lane utilization factors were used for the Existing Condition analysis. The LOS analysis by intersection for the existing conditions is shown in **Table 3**. The existing conditions summary reports are provided in **Appendix B**.



Table 3 – 2025 Existing Condition LOS Intersection Analysis

Intersection & Control	Approach	Lane Group	2025 Existing (LOS)	
			AM-Peak LOS/Delay (s)	PM Peak LOS/Delay (s)
S. Broadway St & Odanah Ave Signalized	Northbound	2-Thru/Right	A/6.2	B/12.9
	Southbound	Thru	B/12.4	A/7.9
	Eastbound	Left	D/46.8	D/54.1
		Right	D/45.4	D/44.8
	Westbound	Left	D/40.6	D/40.6
		Right	A/0.0	A/0.0
	Intersection Overall			B/13.2
S. Broadway St & Heights Rd Unsignalized	Northbound	Left	A/0.0	A/0.0
		Thru	Free flow	Free flow
	Southbound	2-Thru/Right	Free flow	Free flow
	Intersection Overall			Free flow
S. Broadway St & Glanworth St Unsignalized	Northbound	2-Thru/Right	Free flow	Free flow
	Southbound	Left	A/9.9	C/18.4
		Thru	Free flow	Free flow
	Westbound	Left/Right	B/13.0	C/23.6
	Intersection Overall			B/11.5

The results of the existing condition analysis indicate that the study intersections overall and intersection movement levels of service currently operate at a LOS D or better.

Background Level of Service

To accurately evaluate the impact of the proposed development on the existing transportation network, current traffic volumes were projected to the anticipated opening year of 2030. This projection ensures that the traffic analysis reflects conditions at the time the development becomes operational.

The Southeast Michigan Council of Governments (SEMCOG) growth projections for the study area were utilized to determine an appropriate annual growth rate. Based on these projections, a compounded annual growth rate of 2.3% (growth factor of 1.023) was applied to the existing traffic volumes to estimate future baseline conditions.

In addition to natural growth, it is essential to consider background traffic generated by other planned or approved developments in the vicinity that are expected to be completed by 2030 or earlier. These developments contribute to the overall traffic network demand and must be included to ensure an accurate and comprehensive analysis.

Table 5 summarizes the expected trip generation from these background developments based on their respective traffic impact studies. These trips were incorporated into the projected traffic volumes and used to define the No-Build scenario. This scenario reflects future traffic conditions without-the 2030 Background Peak Hour Volumes including SEMCOG's growth rate and the trips from other developments are provided in **Figure 6**.



Table 5 – Trips from Other Developments

Development Name	Land Use Code	Independent Variable	AM Peak Hour			PM Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total
Mystic Cove	Multifamily Housing (Low Rise) - 220	44 Units	4	14	18	14	8	22
Broadway Center Provision	Marijuana Dispensary - 822	4,435 SF	24	23	47	42	42	84
Constellation Orion	Multifamily Housing (Low Rise) - 220	101 Units	5	16	21	17	10	27
Total Generated Trips			33	53	86	73	60	133

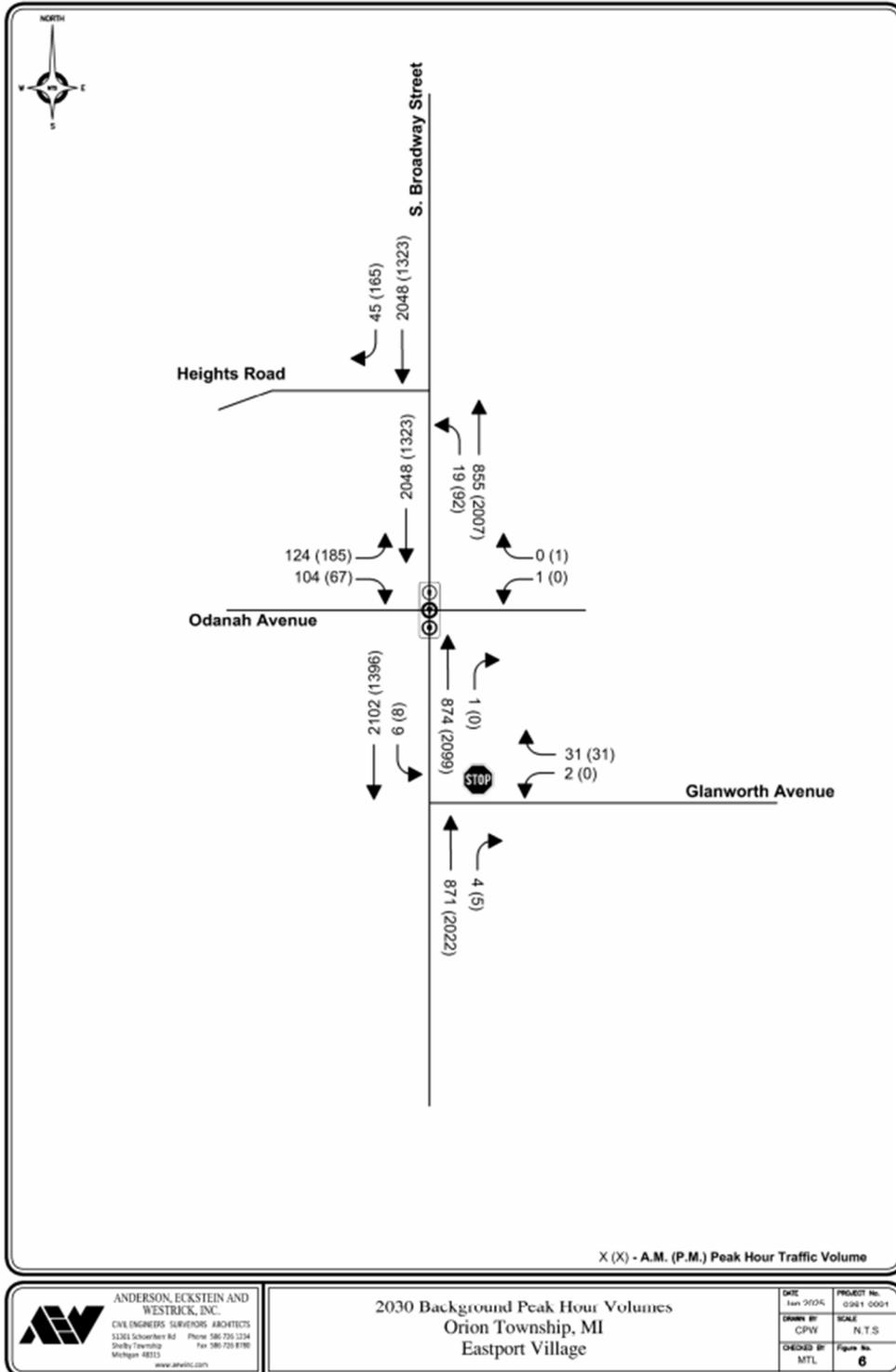


Figure 6 – 2030 Background Peak Hour Volume



Background Level of Service

The Existing LOS and Background Condition LOS is shown in **Table 4** below. The Background conditions summary reports are provided in **Appendix C** which shows the detailed Background conditions calculated in Synchro12 and SimTraffic12 using the 2030 background conditions traffic volumes.

Table 4 – 2030 Background LOS Peak Hour Analysis

Intersection & Control	Approach	Lane Group	2025 Existing (LOS)		2030 Background (LOS)	
			AM-Peak LOS/Delay (s)	PM Peak LOS/Delay (s)	AM-Peak LOS/Delay(s)	PM Peak LOS/Delay(s)
S. Broadway St & Odanah Ave Signalized	Northbound	2-Thru/Right	A/6.2	B/12.9	A/6.6	B/11.8
	Southbound	Thru	B/12.4	A/7.9	A/14.6	A/7.2
	Eastbound	Left	D/46.8	D/54.1	D/46.6	E/60.2
		Right	D/45.4	D/44.8	D/47.2	D/46.1
	Westbound	Left	D/40.6	D/40.6	D/40.4	D/43.2
		Right	A/0.0	A/0.0	A/0.0	A/0.0
Intersection Overall			B/13.2	B/13.9	B/14.7	B/13.3
S. Broadway St & Heights Rd Unsignalized	Northbound	Left	A/0.0	A/0.0	A/0.0	A/0.0
		2-Thru/Right	Free flow	Free flow	Free flow	Free flow
	Southbound	2-Thru/Right	Free flow	Free flow	Free flow	Free flow
	Intersection Overall			Free flow	Free flow	Free flow
S. Broadway St & Glanworth St Unsignalized	Northbound	2-Thru/Right	Free flow	Free flow	Free flow	Free flow
	Southbound	Left	A/9.9	C/18.4	A/10.0	C/19.1
		Thru	Free flow	Free flow	Free flow	Free flow
	Westbound	Left/Right	B/13.0	C/23.6	B/13.2	C/24.6
Intersection Overall			B/11.5	C/21.0	B/11.6	C/21.9

The results of the background condition analysis indicate that the level of service for the study intersection overall and individual intersection movements are anticipated to operate at a LOS D or better except for the following intersections/movements:

- Eastbound Odanah Ave – Left Turns (PM)

Build Trip Generation

The AM and PM peak hour vehicle trips that would be generated by the proposed development were forecasted based on the ITE Trip Generation Manual 11th Edition and engineering judgement. Land use codes 210 (Single-Family Detach Housing), 220 (Multifamily Housing Low-Rise), and 822 (Strip Retail Plaza <40) were selected. The development is estimated to generate 58 new trips in the AM Peak and 106 new trips in the PM peak. The detailed trip generated is shown in **Table 6**, below.



Table 6 – Proposed build Trip Generation

Land Use	Independent Variable	AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total
Single-Family Detached Housing (210)	48 Units	8	26	34	28	17	45
Multifamily Housing (Low-Rise) (220)	11 Units	1	3	4	4	2	6
Strip Retail Plaza (822)	8,400 SF	12	8	20	28	27	55
Total Generated Trips		21	37	58	60	46	106

The trip distribution was calculated based on the existing traffic patterns for the build condition. The trip distribution percentage can be found in **Figure 7**. The generated traffic was distributed throughout the roadway network in accordance with the calculated trip distribution. The resulting build conditions peak hour traffic volumes can be found in **Figure 8**.

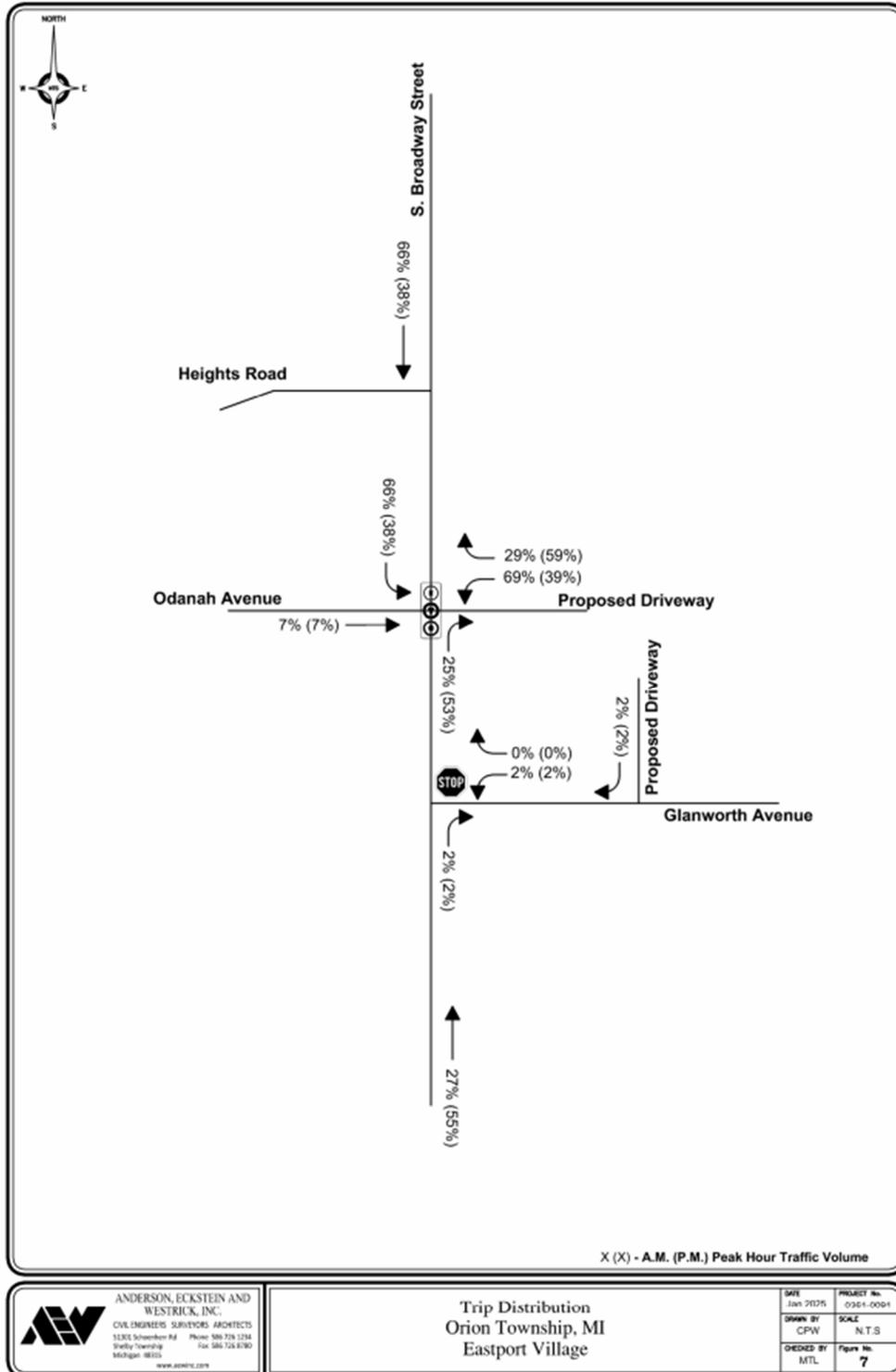
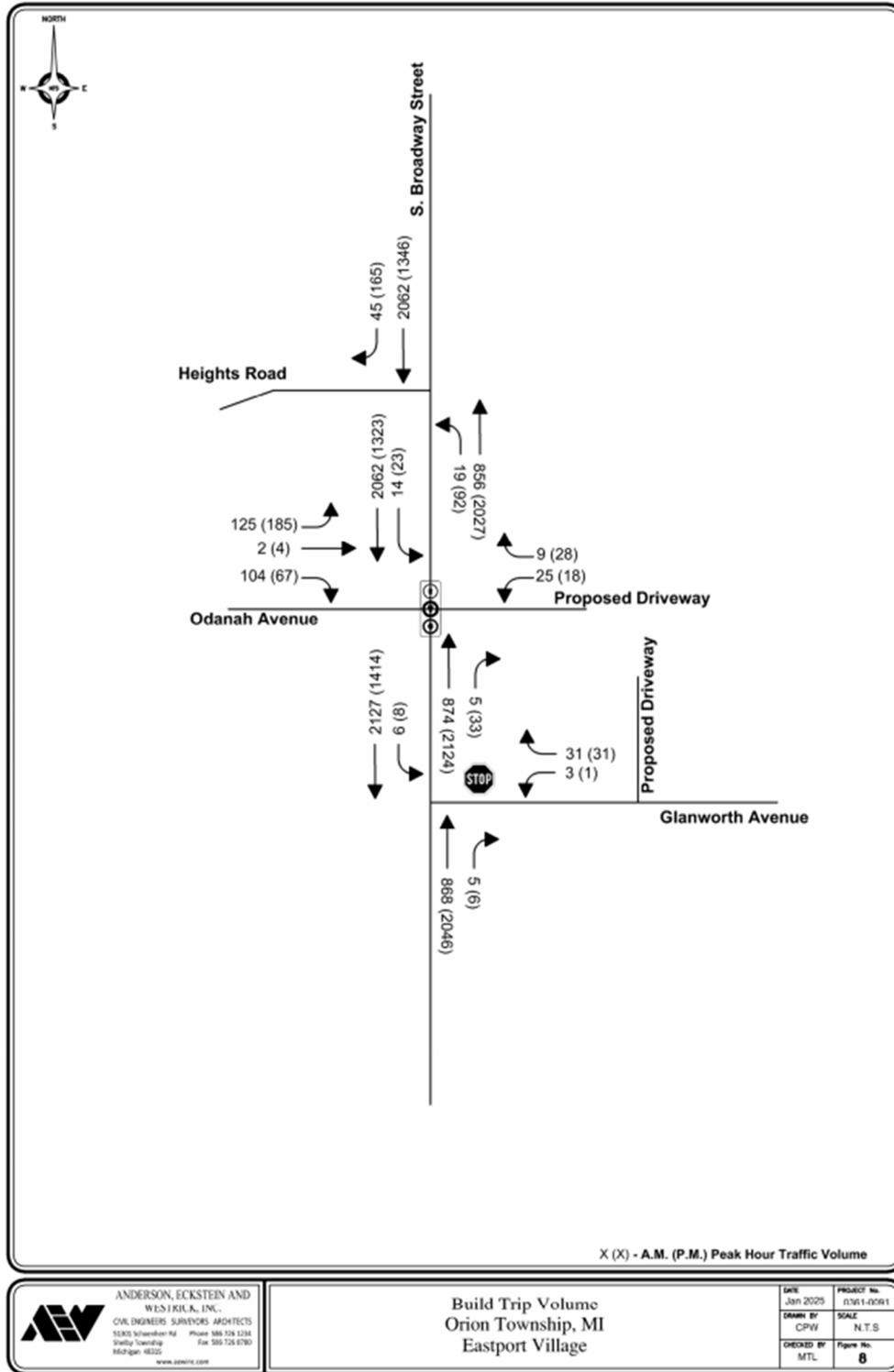


Figure 7 – Trip Distribution




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Build Trip Volume
 Orion Township, MI
 Eastport Village

DATE	PROJECT No.
Jan 2025	0301-0091
DRAWN BY	SCALE
CPW	N.T.S.
CHECKED BY	Figure No.
MTL	8



Traffic Signal Warrant Analysis and Westbound Approach Improvements

The intersection of S. Broadway (M-24) and Odanah Avenue is currently controlled by a traffic signal, with the westbound approach on Odanah Avenue regulated by a stop sign and a flashing red beacon. To accommodate the planned modernization of the traffic control signal system and meet operational standards, the westbound approach requires geometric improvements, specifically lane widening.

In accordance with the Michigan Manual on Uniform Traffic Control Devices (MMUTCD), traffic control signals shall only be installed or retained when one or more signal warrants are met, as determined through engineering studies. These warrants are based on factors including vehicular volumes, pedestrian activity, and crash history. If signal warrants are not satisfied, installation or continued use of a traffic signal is not justified.

Based on projected traffic volumes and estimated trip generation associated with future development in the vicinity, the intersection satisfies three MMUTCD signal warrants as detailed in **Table 8**. The satisfaction of multiple warrants indicates a continued operational need for signalized control at this location.

As such, the existing traffic signal system is warranted, and any modernization efforts must include the installation and maintenance of all associated signal heads, vehicle detection systems, signage, and pavement markings in compliance with MMUTCD requirements.

The proposed widening of the westbound approach is necessary to support the improved signal infrastructure, enhance capacity, and ensure compliance with current geometric design criteria. This modification will facilitate more efficient traffic flow and accommodate anticipated increases in traffic volume.



Table 8 – S. Broadway & Odanah Ave

Warrant		Warrant Met
Warrant 1: Eight-Hour Vehicular Volume	Condition A	No
	Condition B	Yes
	Combination of A & B	No
Warrant 2: Four-Hour Vehicular Volume		Yes
Warrant 3: Peak Hour		Yes
Warrant 4: Pedestrian Volume		No
Warrant 5: School Crossing		No
Warrant 6: Coordinated Signal System		No
Warrant 7: Crash Experience		No
Warrant 8: Roadway Network		No
Warrant 9: Intersection Near a Grade Crossing		No

Build Level of Service

The build conditions were implemented in Synchro12 and simulated using SimTraffic12. The LOS was calculated and presented below in Table 7. Table 7 also presents the Background Condition LOS for comparison. The full reports on the build conditions can be found in Appendix D.

Table 7 – Build Level of Service Peak Hour

Intersection & Control	Approach	Lane Group	2030 Background (LOS)		2030 Build (LOS)	
			AM-Peak LOS/Delay (s)	PM Peak LOS/Delay (s)	AM-Peak LOS/Delay(s)	PM Peak LOS/Delay(s)
S. Broadway St & Odanah Ave Signalized	Northbound	2-Thru/Right	A/6.6	B/11.8	A/6.5	B/12.5
	Southbound	Left	N/A	N/A	A/4.9	C/23.0
		2-Thru	B/14.6	A/7.2	B/14.4	A/7.2
	Eastbound	Left	D/46.6	E/60.2	D/44.3	E/59.8
		Thru/Right	D/47.2	D/46.1	D/44.5	D/46.3
	Westbound	Left	D/40.4	D/43.2	D/44.4	D/44.4
		Right	A/0.0	A/0.0	D/41.0	D/47.7
Intersection Overall			B/14.7	B/13.3	B/14.6	B/14.3
S. Broadway St & Heights Rd Unsignalized	Northbound	Left	A/0.0	A/0.0	A/0.0	A/0.0
		2-Thru/Right	Free flow	Free flow	Free flow	Free flow
	Southbound	2-Thru/Right	Free flow	Free flow	Free flow	Free flow
	Intersection Overall			Free flow	Free flow	Free flow
S. Broadway St & Glanworth St Unsignalized	Northbound	2-Thru/Right	Free flow	Free flow	Free flow	Free flow
	Southbound	Left	A/10.0	C/19.1	A/10.0	C/19.4
		Thru	Free flow	Free flow	Free flow	Free flow
	Westbound	Left/Right	B/13.2	C/24.6	B/13.1	D/26.3
	Intersection Overall			B/11.5	C/21.0	B/11.6



The results of the Build Condition analysis indicate that the study intersections overall and intersection movement levels of service will operate at a LOS D or better except for the following intersections/movements:

- Eastbound Odanah Ave – Left Turns (PM)

Crash Analysis

A crash analysis was conducted at the study intersections and the existing driveways. Five years of crash data were collected and reviewed. Traffic crash reports and summaries were obtained from the Transportation Improvement Association's Traffic Crash Analysis Tool (TCAT) website. A summary of crashes by type is provided in **Table 9**. Copies of crash report summaries can be found in **Appendix E**.



Table 9 - Crash Data

Intersection	Crash Type	No. of Crashes	% of Crashes	K Crashes	A Crashes	B Crashes	% KAB
S Broadway Street & Heights Road	Single	2	8.0%	0	0	0	0%
	Head-On	1	4.0%	0	0	0	0%
	Head-On (LT)	0	0.0%	0	0	1	33.3%
	Angle	2	8.0%	0	0	0	0%
	Rear-End	14	56.0%	0	0	1	33.3%
	Read-End (LT)	1	4.0%	0	0	0	0%
	Rear-End (RT)	1	4.0%	0	0	0	0%
	Sideswipe (Same)	3	12.0%	0	0	1	33.3%
	Sideswipe (Opposite)	0	0.0%	0	0	0	0%
	Other	1	4.0%	0	0	0	0%
	Unknown	0	0.0%	0	0	0	0%
Total:		25	100%	0	0	3	100%
S Broadway Street & Glanworth Street	Single	1	10.0%	0	0	1	100%
	Head-On	0	0.0%	0	0	0	0%
	Head-On (LT)	0	0.0%	0	0	0	0%
	Angle	3	30.0%	0	0	0	0%
	Rear-End	6	60.0%	0	0	0	0%
	Read-End (LT)	0	0.0%	0	0	0	0%
	Rear-End (RT)	0	0.0%	0	0	0	0%
	Sideswipe (Same)	0	0.0%	0	0	0	0%
	Sideswipe (Opposite)	0	0.0%	0	0	0	0%
	Other	0	0.0%	0	0	0	0%
	Unknown	0	0.0%	0	0	0	0%
Total:		10	100%	0	0	3	100%
S Broadway Street & Odanah Avenue	Single	1	3.6%	0	0	1	25.0%
	Head-On	0	0.0%	0	0	0	0%
	Head-On (LT)	2	7.1%	0	0	0	0%
	Angle	2	7.1%	0	0	0	0%
	Rear-End	19	67.9%	0	0	3	75.0%
	Sideswipe (Same)	3	10.7%	0	0	0	0%
	Sideswipe (Opposite)	1	3.6%	0	0	0	0%
	Other	0	0.0%	0	0	0	0%
	Unknown	0	0.0%	0	0	0	0%
	Total:		28	100%	0	0	4

Note: KAB Crashes are fatal and severe crashes as noted by the KABCO scale: K= fatal crashes, A=incapacitating injury, B=non-incapacitating injury, C=possible injury, and O= no injury.



Queue Analysis

Table 10 and **Table 10.1** below highlights the queue analysis performed on all approaching directions to the intersection utilizing Synchro 12 and SimTraffic 12.

Table 10 – Queue Analysis

Intersection & Control	Approach	Lane Group	2025 Existing Conditions		2030 Background Conditions		2030 Build Conditions	
			AM Peak Queue Length (ft)	PM Peak Queue Length (ft)	AM Peak Queue Length (ft)	PM Peak Queue Length (ft)	AM Peak Queue Length (ft)	PM Peak Queue Length (ft)
S. Broadway St & Odanah Ave Signalized	Northbound	Thru	179	246	188	262	196	280
		Thru/Right	158	255	167	271	167	286
	Southbound	Left	N/A	N/A	N/A	N/A	37	57
		Thru	213	221	206	216	209	206
		Thru	224	196	223	201	223	198
	Eastbound	Left	151	224	155	213	169	259
		Thru/Right	140	98	142	93	126	74
	Westbound	Left	N/A	5	7	5	55	47
		Right	N/A	N/A	N/A	N/A	33	114
	Intersection Overall			178	178	155	180	135
S. Broadway St & Heights Rd Unsignalized	Northbound	Left	41	52	40	53	43	52
		Thru	179	156	30	152	47	149
		Thru	N/A	153	24	143	11	138
	Southbound	Thru	482	93	344	100	466	210
		Thru/Right	482	40	314	45	414	158
	Intersection Overall			296	99	150	99	196
S. Broadway St & Glanworth St Unsignalized	Northbound	Thru	12	267	24	270	21	401
		Thru/Right	N/A	217	N/A	213	16	342
	Southbound	Left	22	27	20	27	19	30
		Thru	N/A	19	50	19	41	40
		Thru	N/A	17	38	6	55	28
	Westbound	Left/Right	55	107	127	93	75	108
	Intersection Overall			30	109	52	105	38



Table 10.1 – Mitigation Queue Analysis

Intersection & Control	Approach	Lane Group	2030 Build Conditions		2030 Mitigation Conditions	
			AM Peak Queue Length (ft)	PM Peak Queue Length (ft)	AM Peak Queue Length (ft)	PM Peak Queue Length (ft)
S. Broadway St & Odanah Ave Signalized	Northbound	Thru	196	280	244	265
		Thru/Right	167	286	211	268
	Southbound	Left	37	57	38	69
		Thru	209	206	204	198
	Eastbound	Thru	223	198	207	202
		Left	169	259	153	251
	Westbound	Thru/Right	126	74	119	77
		Left	55	47	56	57
		Right	33	114	30	139
	Intersection Overall			135	169	140
S. Broadway St & Heights Rd Unsignalized	Northbound	Left	43	52	40	59
		Thru	47	149	35	188
		Thru	11	138	14	219
	Southbound	Thru	466	210	555	341
		Thru/Right	414	158	564	350
	Intersection Overall			196	141	242
S. Broadway St & Glanworth St Unsignalized	Northbound	Thru	21	401	42	644
		Thru/Right	16	342	N/A	648
	Southbound	Left	19	30	21	32
		Thru	41	40	29	10
		Thru	55	28	40	10
	Westbound	Left/Right	75	108	57	562
	Intersection Overall			38	158	38



Conclusion

- Traffic counts were taken on January 30, 2025, to obtain the existing conditions of the study site.
- The existing conditions were simulated in Synchro 12 and the level of service was calculated. The results of the existing condition analysis indicate that the study intersections overall and intersection movement levels of service currently operate at a LOS D or better.
- The background data was calculated by applying a growth rate of 1.023 to project the traffic volumes to the build-out year of 2030. The results of the background condition analysis indicate that the level of service for the study intersection overall and individual intersection movements are anticipated to operate at a LOS D or better except for the following intersections/movements:
 - Eastbound Odanah Ave – Left Turns (PM)
- The build data was simulated in Synchro12 and SimTraffic 12 with the trip distribution for entering and exiting the network based off the existing traffic patterns. The results of the build condition analysis indicate that the study intersection overall and intersection movement levels of service currently operate at a LOS D or better except for the following intersections/movements:
 - Eastbound Odanah Ave – Left Turns (PM))
- The proposed mitigation measures to be implemented as part of the development include the following:
 1. **Left-Turn Access:**

Southbound traffic on S. Broadway Street at Odanah Avenue will be permitted to make left turns into the proposed development, enhancing site accessibility.
 2. **Traffic Signal Modernization:**

The proposed widening of the westbound approach is necessary to support the improved signal infrastructure, enhance capacity, and ensure compliance with



current geometric design criteria. This modification will facilitate more efficient traffic flow and accommodate anticipated increases in traffic volume.

3. Eastbound Odanah Avenue Lane Modification:

The eastbound right-turn lane on Odanah Avenue will be reconfigured to allow both right-turn and through movements into the development, thereby improving traffic flow and access.

4. The results of the build mitigation condition analysis indicate that the study intersection overall and intersection movement levels of service currently operate at a LOS D or better

Table-11, Figure-9 and Figure-10 are below details. Copies of the summaries can be found in Appendix F.



Table 11 – LOS Mitigation

Intersection & Control	Approach	Lane Group	2030 Build (LOS)		2030 Mitigation (LOS)	
			AM-Peak LOS/Delay (s)	PM Peak LOS/Delay (s)	AM-Peak LOS/Delay(s)	PM Peak LOS/Delay(s)
S. Broadway St & Odanah Ave Signalized	Northbound	2-Thru/Right	A/6.5	B/12.5	A/5.5	C/20.9
	Southbound	Left	A/4.9	C/23.0	A/4.0	D/38.2
		2-Thru	B/14.4	A/7.2	B/11.5	B/12.2
	Eastbound	Left	D/44.3	E/59.8	D/51.4	D/54.7
		Thru/Right	D/44.5	D/46.3	D/52.3	D/47.7
	Westbound	Left	D/44.4	D/44.4	D/44.9	D/44.9
	Right	D/41.0	D/47.7	D/43.5	D/45.1	
	Intersection Overall		B/14.6	B/14.3	B/13.2	C/20.3
S. Broadway St & Heights Rd Unsignalized	Northbound	Left	A/0.0	A/0.0	A/0.0	A/0.0
		2-Thru/Right	Free flow	Free flow	Free flow	Free flow
	Southbound	2-Thru/Right	Free flow	Free flow	Free flow	Free flow
		Intersection Overall		Free flow	Free flow	Free flow
S. Broadway St & Glanworth St Unsignalized	Northbound	2-Thru/Right	Free flow	Free flow	Free flow	Free flow
	Southbound	Left	A/10.0	C/19.4	A/10.0	C/19.4
		Thru	Free flow	Free flow	Free flow	Free flow
	Westbound	Left/Right	B/13.1	D/26.3	B/13.0	D/26.3
		Intersection Overall		B/11.6	C/22.9	B/11.5

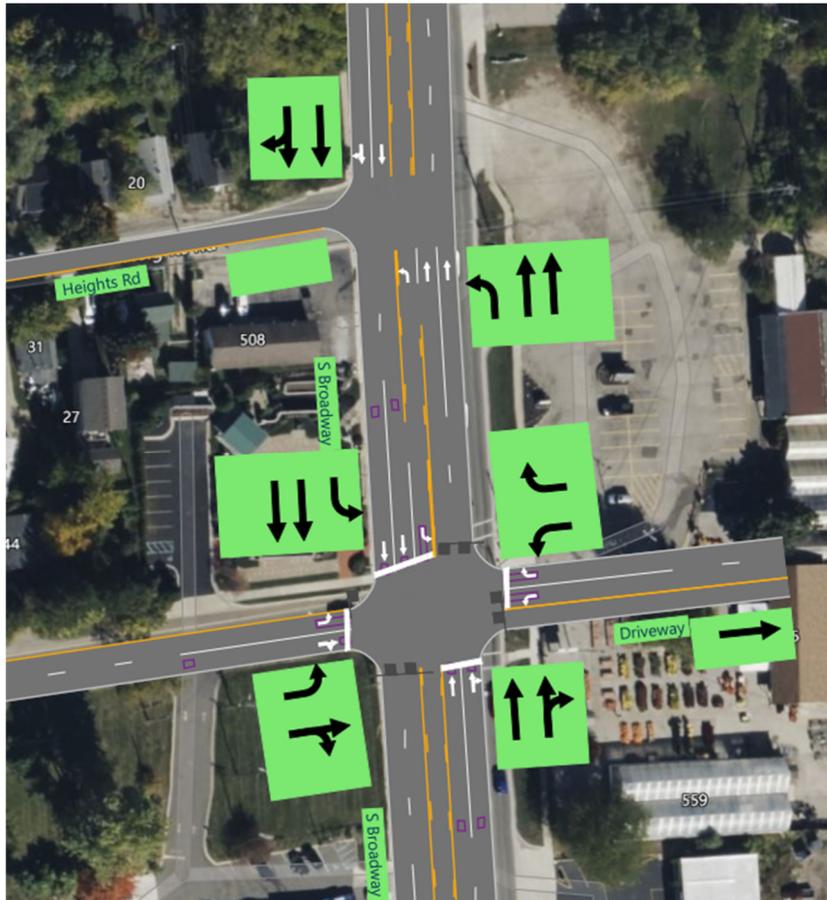


Figure 9 - Proposed Lane Configuration Mitigation

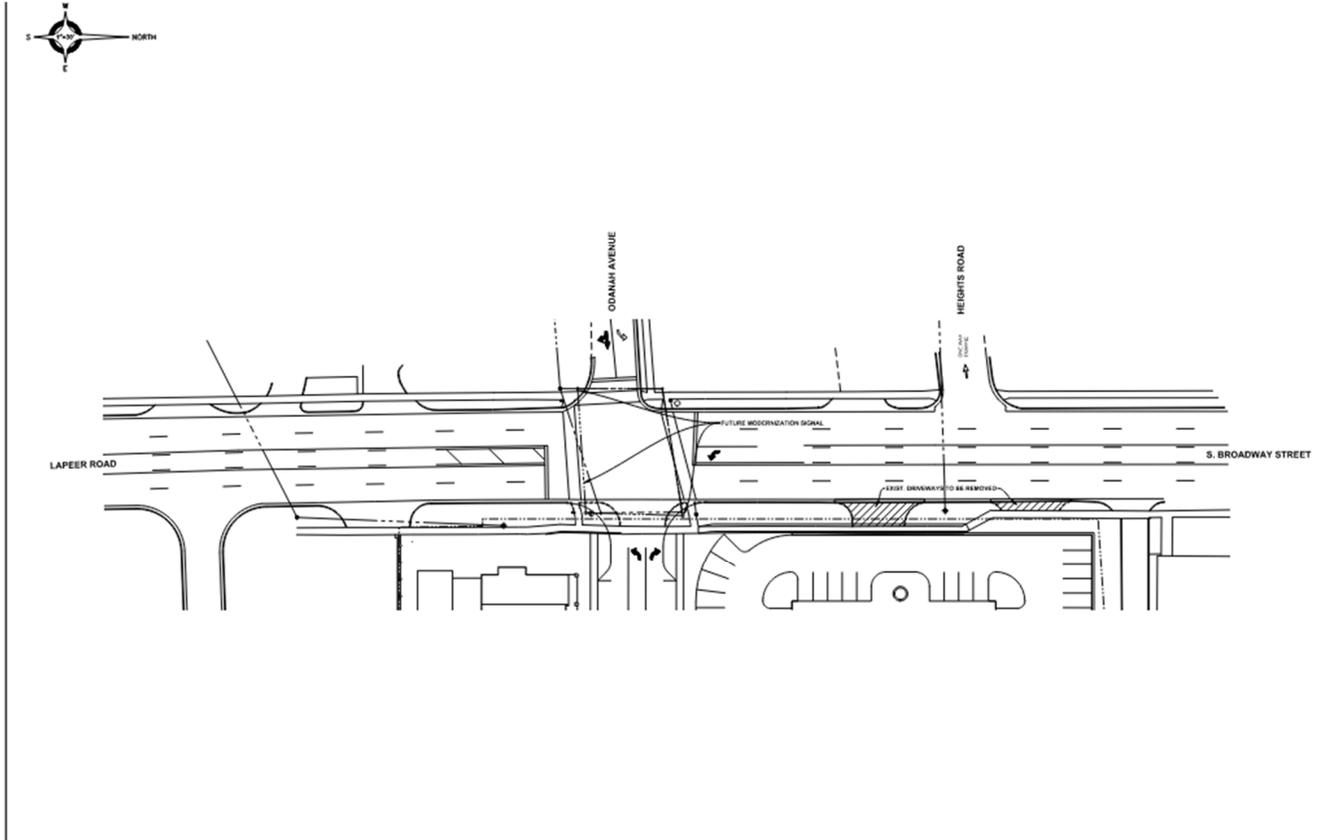


Figure 10 - Proposed Signal Modernization

APPENDIX A: EXISTING TRAFFIC DATA

**Lapeer Rd and Odanah Ave
Lake Orion Michigan
Thursday, January 30, 2025**

Time	Southbound Lapeer Rd						Westbound Driveway						Northbound Lapeer Rd						Eastbound Odanah Ave						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
12:00 AM	0	0	12	0	0	12	0	0	0	0	0	0	0	0	36	0	0	36	0	3	0	0	0	3	51
12:15 AM	0	0	6	0	0	6	0	0	0	0	0	0	0	0	32	0	0	32	0	2	0	1	0	3	41
12:30 AM	0	0	19	0	0	19	0	0	0	0	0	0	0	0	26	0	0	26	0	3	0	1	0	4	49
12:45 AM	0	0	6	0	0	6	0	0	0	0	0	0	0	0	14	0	0	14	0	1	0	0	0	1	21
Hourly Total	0	0	43	0	0	43	0	0	0	0	0	0	0	0	108	0	0	108	0	9	0	2	0	11	162
1:00 AM	0	0	17	0	0	17	0	0	0	0	0	0	0	0	30	0	0	30	0	0	0	0	0	0	47
1:15 AM	0	0	7	0	0	7	0	0	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	0	21
1:30 AM	0	0	17	0	0	17	0	0	0	0	0	0	0	0	18	0	0	18	0	0	0	0	0	0	35
1:45 AM	0	0	5	0	0	5	0	0	0	0	0	0	0	0	11	0	0	11	0	0	0	2	0	2	18
Hourly Total	0	0	46	0	0	46	0	0	0	0	0	0	0	0	73	0	0	73	0	0	0	2	0	2	121
2:00 AM	0	0	8	0	0	8	0	0	0	0	0	0	0	0	11	0	0	11	0	1	0	1	0	2	21
2:15 AM	0	0	11	0	0	11	0	0	0	0	0	0	0	0	10	0	0	10	0	0	0	1	1	1	22
2:30 AM	0	0	7	0	0	7	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	1	0	1	21
2:45 AM	0	0	10	0	0	10	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	1	0	1	24
Hourly Total	0	0	36	0	0	36	0	0	0	0	0	0	0	0	47	0	0	47	0	1	0	4	1	5	88
3:00 AM	0	0	16	0	0	16	0	0	0	0	0	0	0	0	7	0	0	7	0	0	0	0	1	0	23
3:15 AM	0	0	14	0	0	14	0	0	0	0	0	0	0	0	11	0	0	11	0	2	0	0	0	2	27
3:30 AM	0	0	23	0	0	23	0	0	0	1	0	1	0	0	11	0	0	11	0	0	0	0	0	0	35
3:45 AM	0	0	33	0	0	33	0	0	0	0	0	0	0	0	6	0	0	6	0	2	0	0	0	2	41
Hourly Total	0	0	86	0	0	86	0	0	0	1	0	1	0	0	35	0	0	35	0	4	0	0	1	4	126
4:00 AM	1	0	56	0	0	57	0	0	0	0	0	0	0	0	8	0	0	8	0	0	0	1	0	1	66
4:15 AM	0	0	75	0	0	75	0	0	0	0	0	0	0	0	6	0	0	6	0	0	0	1	0	1	82
4:30 AM	0	0	115	0	0	115	0	0	0	0	0	0	0	0	11	0	0	11	0	2	0	5	0	7	133
4:45 AM	0	0	162	0	0	162	0	0	0	1	0	1	0	0	17	0	0	17	0	3	0	1	0	4	184
Hourly Total	1	0	408	0	0	409	0	0	0	1	0	1	0	0	42	0	0	42	0	5	0	8	0	13	465
5:00 AM	0	0	157	0	0	157	0	0	0	0	0	0	0	0	19	0	0	19	0	4	0	4	0	8	184
5:15 AM	0	0	263	0	0	263	0	0	0	0	0	0	0	0	36	0	0	36	0	2	0	6	0	8	307
5:30 AM	0	0	335	0	0	335	0	0	0	0	0	0	0	0	42	0	0	42	0	6	0	10	0	16	393
5:45 AM	0	0	315	0	0	315	0	0	0	0	0	0	0	0	41	0	0	41	0	3	0	12	0	15	371
Hourly Total	0	0	1070	0	0	1070	0	0	0	0	0	0	0	0	138	0	0	138	0	15	0	32	0	47	1255
6:00 AM	0	0	362	0	0	362	0	0	0	0	0	0	0	0	47	0	0	47	0	7	0	10	0	17	426
6:15 AM	0	0	417	0	0	417	0	0	0	0	1	0	0	0	79	0	1	79	0	13	0	16	0	29	525
6:30 AM	0	0	484	0	0	484	0	0	0	0	0	0	0	0	81	0	1	81	0	12	0	9	0	21	586
6:45 AM	0	0	568	0	0	568	0	0	0	0	0	0	0	0	103	0	0	103	0	27	0	22	0	49	720
Hourly Total	0	0	1831	0	0	1831	0	0	0	0	1	0	0	0	310	0	2	310	0	59	0	57	0	116	2257
7:00 AM	0	0	522	0	0	522	0	0	0	0	0	0	0	0	121	0	0	121	0	27	0	21	0	48	691
7:15 AM	0	0	386	0	0	386	0	0	0	0	0	0	0	0	146	0	0	146	0	36	0	25	0	61	593
7:30 AM	0	0	448	0	0	448	0	0	0	0	0	0	0	0	189	0	0	189	0	21	0	12	1	33	670
7:45 AM	0	0	511	0	0	511	0	0	0	0	0	0	0	0	220	0	0	220	0	32	0	27	0	59	790
Hourly Total	0	0	1867	0	0	1867	0	0	0	0	0	0	0	0	676	0	0	676	0	116	0	85	1	201	2744

Lake Orion Michigan
Thursday, January 30, 2025

Time	Southbound Lapeer Rd						Westbound Driveway						Northbound Lapeer Rd						Eastbound Odanah Ave						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
8:00 AM	0	0	446	0	0	446	0	0	0	0	0	0	0	0	205	0	0	205	0	33	0	24	0	57	708
8:15 AM	0	0	516	0	0	516	0	0	0	0	1	0	0	0	197	0	1	197	0	29	0	24	0	53	766
8:30 AM	0	0	510	0	0	510	0	1	0	0	0	1	0	0	227	1	1	228	0	27	0	27	0	54	793
8:45 AM	0	0	502	0	0	502	0	0	0	0	0	0	0	0	217	0	0	217	0	34	0	17	0	51	770
Hourly Total	0	0	1974	0	0	1974	0	1	0	0	1	1	0	0	846	1	2	847	0	123	0	92	0	215	3037
9:00 AM	0	0	340	0	0	340	0	0	0	0	0	0	0	0	203	0	0	203	0	30	1	17	0	48	591
9:15 AM	0	0	338	0	0	338	0	0	0	0	0	0	0	0	206	0	0	206	0	20	0	13	0	33	577
9:30 AM	0	0	380	0	0	380	0	0	0	0	0	0	0	0	205	0	0	205	0	32	0	16	1	48	633
9:45 AM	0	0	310	0	0	310	0	0	0	0	0	0	0	0	234	0	0	234	0	19	0	10	0	29	573
Hourly Total	0	0	1368	0	0	1368	0	0	0	0	0	0	0	0	848	0	0	848	0	101	1	56	1	158	2374
10:00 AM	0	0	304	0	0	304	0	0	0	0	0	0	0	0	205	0	0	205	0	22	0	13	0	35	544
10:15 AM	0	0	333	0	0	333	0	0	0	0	0	0	0	0	241	0	0	241	0	24	0	19	0	43	617
10:30 AM	0	0	316	0	0	316	0	0	0	0	0	0	0	0	275	0	0	275	0	35	0	13	0	48	639
10:45 AM	0	0	330	0	0	330	0	0	0	0	0	0	0	0	303	0	0	303	0	24	0	13	0	37	670
Hourly Total	0	0	1283	0	0	1283	0	0	0	0	0	0	0	0	1024	0	0	1024	0	105	0	58	0	163	2470
11:00 AM	0	0	304	0	0	304	0	1	0	0	0	1	0	0	321	1	0	322	0	24	0	20	0	44	671
11:15 AM	0	0	321	0	0	321	0	0	0	0	0	0	0	0	369	0	1	369	0	24	1	14	0	39	729
11:30 AM	0	0	294	0	0	294	0	0	0	0	0	0	0	0	315	0	0	315	0	25	0	17	1	42	651
11:45 AM	0	0	324	0	0	324	0	0	0	0	1	0	0	0	341	0	0	341	0	31	0	26	0	57	722
Hourly Total	0	0	1243	0	0	1243	0	1	0	0	1	1	0	0	1346	1	1	1347	0	104	1	77	1	182	2773
12:00 PM	0	0	241	0	0	241	0	1	0	0	1	1	0	0	341	1	0	342	0	33	0	16	0	49	633
12:15 PM	0	0	320	0	0	320	0	0	0	0	0	0	0	0	326	0	0	326	0	24	0	17	0	41	687
12:30 PM	0	0	342	0	0	342	0	0	0	1	0	1	0	0	292	0	0	292	0	39	0	12	0	51	686
12:45 PM	0	0	332	0	0	332	0	0	0	0	1	0	0	0	314	0	0	314	0	15	0	17	0	32	678
Hourly Total	0	0	1235	0	0	1235	0	1	0	1	1	2	0	0	1273	1	0	1274	0	111	0	62	0	173	2684
1:00 PM	0	0	290	0	0	290	0	0	0	0	0	0	0	0	293	1	0	294	0	21	0	18	0	39	623
1:15 PM	0	0	324	0	0	324	0	0	0	0	0	0	0	0	309	0	0	309	0	21	0	14	0	35	668
1:30 PM	0	0	265	0	0	265	0	0	0	0	0	0	0	0	292	0	0	292	0	28	0	21	0	49	606
1:45 PM	0	0	285	0	0	285	0	0	0	0	2	0	0	0	345	1	1	346	0	20	0	9	0	29	660
Hourly Total	0	0	1164	0	0	1164	0	0	0	0	2	0	0	0	1239	2	1	1241	0	90	0	62	0	152	2557
2:00 PM	0	0	282	0	0	282	0	0	0	0	0	0	0	0	365	0	0	365	0	27	0	12	0	39	686
2:15 PM	0	0	288	0	0	288	0	0	0	0	1	0	0	0	341	0	2	341	0	41	0	15	0	56	685
2:30 PM	0	0	294	0	0	294	0	0	0	0	0	0	0	0	453	0	0	453	0	27	1	13	0	41	788
2:45 PM	0	0	295	0	0	295	0	0	0	0	1	0	0	0	462	0	0	462	0	32	0	10	0	42	799
Hourly Total	0	0	1159	0	0	1159	0	0	0	0	2	0	0	0	1621	0	2	1621	0	127	1	50	0	178	2958
3:00 PM	0	0	309	0	0	309	0	0	0	0	1	0	0	0	425	0	0	425	0	36	0	22	0	58	792
3:15 PM	0	0	274	0	0	274	0	0	0	0	0	0	0	0	510	0	0	510	0	37	0	13	0	50	834
3:30 PM	0	1	318	0	0	319	0	0	0	0	0	0	0	0	474	0	0	474	0	31	0	16	0	47	840
3:45 PM	0	0	277	0	0	277	0	0	0	0	0	0	0	0	551	0	0	551	0	53	0	14	0	67	895
Hourly Total	0	1	1178	0	0	1179	0	0	0	0	1	0	0	0	1960	0	0	1960	0	157	0	65	0	222	3361

Lapeer Rd and Odanah Ave
Lake Orion Michigan

Thursday, January 30, 2025

Time	Southbound Lapeer Rd						Westbound Driveway						Northbound Lapeer Rd						Eastbound Odanah Ave						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
4:00 PM	0	0	323	0	0	323	0	0	0	0	0	0	0	0	505	0	0	505	0	45	0	16	0	61	889
4:15 PM	0	0	375	0	0	375	0	0	0	0	0	0	0	0	499	0	0	499	0	42	0	16	0	58	932
4:30 PM	0	0	305	0	0	305	0	0	0	0	0	0	0	0	495	0	0	495	0	38	0	20	0	58	858
4:45 PM	0	0	318	0	0	318	0	0	0	0	0	0	0	0	510	0	0	510	0	46	0	14	0	60	888
Hourly Total	0	0	1321	0	0	1321	0	0	0	0	0	0	0	0	2009	0	0	2009	0	171	0	66	0	237	3567
5:00 PM	0	0	326	0	0	326	0	0	0	0	1	0	0	0	483	0	0	483	0	38	0	19	0	57	866
5:15 PM	0	0	354	0	0	354	0	0	0	0	1	0	0	0	496	0	0	496	0	36	0	14	2	50	900
5:30 PM	0	0	306	0	1	306	0	0	0	0	2	0	0	0	468	0	1	468	0	39	0	16	0	55	829
5:45 PM	0	0	275	0	0	275	0	0	0	0	2	0	0	0	446	0	0	446	0	39	0	16	0	55	776
Hourly Total	0	0	1261	0	1	1261	0	0	0	0	6	0	0	0	1893	0	1	1893	0	152	0	65	2	217	3371
6:00 PM	0	0	292	0	0	292	0	0	0	0	0	0	0	0	464	0	3	464	0	32	0	7	0	39	795
6:15 PM	0	1	260	0	0	261	0	0	0	0	0	0	0	0	525	0	0	525	0	25	0	21	0	46	832
6:30 PM	0	0	222	0	0	222	0	0	0	0	0	0	0	0	409	0	1	409	0	25	0	19	0	44	675
6:45 PM	0	0	224	0	0	224	0	0	0	0	0	0	0	0	328	0	0	328	0	20	0	11	0	31	583
Hourly Total	0	1	998	0	0	999	0	0	0	0	0	0	0	0	1726	0	4	1726	0	102	0	58	0	160	2885
7:00 PM	0	0	239	0	0	239	0	0	0	0	0	0	0	0	287	0	0	287	0	29	0	10	0	39	565
7:15 PM	0	0	218	0	0	218	0	0	0	0	0	0	0	0	283	0	2	283	0	30	0	16	0	46	547
7:30 PM	0	0	199	0	0	199	0	0	0	0	0	0	0	0	246	0	0	246	0	23	0	8	0	31	476
7:45 PM	0	0	171	0	0	171	0	0	0	0	0	0	0	0	226	0	0	226	0	12	0	9	0	21	418
Hourly Total	0	0	827	0	0	827	0	0	0	0	0	0	0	0	1042	0	2	1042	0	94	0	43	0	137	2006
8:00 PM	0	0	142	0	0	142	0	0	0	0	0	0	0	0	227	0	0	227	0	18	0	6	1	24	393
8:15 PM	0	0	149	0	0	149	0	0	0	0	0	0	0	0	254	0	0	254	0	12	0	2	0	14	417
8:30 PM	0	0	161	0	0	161	0	0	0	0	0	0	0	0	212	0	0	212	0	7	0	6	0	13	386
8:45 PM	0	0	157	0	0	157	0	0	0	0	0	0	0	0	172	0	0	172	0	7	0	3	0	10	339
Hourly Total	0	0	609	0	0	609	0	0	0	0	0	0	0	0	865	0	0	865	0	44	0	17	1	61	1535
9:00 PM	0	0	121	0	0	121	0	0	0	0	0	0	0	0	194	0	0	194	0	8	0	2	0	10	325
9:15 PM	0	0	120	0	0	120	0	0	0	0	0	0	0	0	155	0	0	155	0	6	0	3	0	9	284
9:30 PM	0	0	116	0	0	116	0	0	0	0	0	0	0	0	131	0	1	131	0	6	0	1	1	7	254
9:45 PM	0	0	75	0	0	75	0	0	0	0	0	0	0	0	100	0	1	100	0	6	0	4	0	10	185
Hourly Total	0	0	432	0	0	432	0	0	0	0	0	0	0	0	580	0	2	580	0	26	0	10	1	36	1048
10:00 PM	0	0	63	0	0	63	0	0	0	0	0	0	0	0	119	0	0	119	0	4	0	4	1	8	190
10:15 PM	0	0	63	0	0	63	0	0	0	0	0	0	0	0	97	0	0	97	0	3	0	2	0	5	165
10:30 PM	0	0	59	0	0	59	0	0	0	0	0	0	0	0	75	0	0	75	0	5	0	5	0	10	144
10:45 PM	0	0	37	0	0	37	0	0	0	0	0	0	0	0	82	0	0	82	0	3	0	3	0	6	125
Hourly Total	0	0	222	0	0	222	0	0	0	0	0	0	0	0	373	0	0	373	0	15	0	14	1	29	624
11:00 PM	0	0	34	0	0	34	0	0	0	0	0	0	0	0	62	0	0	62	0	5	0	4	0	9	105
11:15 PM	0	0	32	0	0	32	0	0	0	0	0	0	0	0	54	0	0	54	0	2	0	0	0	2	88
11:30 PM	0	0	42	0	0	42	0	0	0	0	0	0	0	0	51	0	0	51	0	0	0	3	0	3	96
11:45 PM	0	0	37	0	0	37	0	0	0	0	0	0	0	0	45	0	0	45	0	0	0	0	0	0	82
Hourly Total	0	0	145	0	0	145	0	0	0	0	0	0	0	0	212	0	0	212	0	7	0	7	0	14	371
TOTAL	1	2	21806	0	1	21809	0	3	0	3	15	6	0	0	20286	5	17	20291	0	1738	3	992	10	2733	44839
Cars	1	2	21010	0	1	21013	0	3	0	2	15	5	0	0	19911	5	17	19916	0	1725	3	965	10	2693	43627
Heavy Vehicles	0	0	796	0	0	796	0	0	0	1	0	1	0	0	375	0	0	375	0	13	0	27	0	40	1212
Heavy Vehicle %	0.00%	0.00%	3.65%	0.00%	0.00%	3.65%	0.00%	0.00%	0.00%	33.33%	0.00%	16.67%	0.00%	0.00%	1.85%	0.00%	0.00%	1.85%	0.00%	0.75%	0.00%	2.72%	0.00%	1.46%	2.70%

Lapeer Rd and Odanah Ave

Lake Orion Michigan
Thursday, January 30, 2025

AM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
7:45 AM	0	0	511	0	0	511	0	0	0	0	0	0	0	0	220	0	0	220	0	32	0	27	0	59	790
8:00 AM	0	0	446	0	0	446	0	0	0	0	0	0	0	0	205	0	0	205	0	33	0	24	0	57	708
8:15 AM	0	0	516	0	0	516	0	0	0	0	1	0	0	0	197	0	1	197	0	29	0	24	0	53	766
8:30 AM	0	0	510	0	0	510	0	1	0	0	0	1	0	0	227	1	1	228	0	27	0	27	0	54	793
Peak Hour Total	0	0	1983	0	0	1983	0	1	0	0	1	1	0	0	849	1	2	850	0	121	0	102	0	223	3057
PHF	0.000	0.000	0.961	0.000	0.000	0.961	0.000	0.250	0.000	0.000	0.250	0.250	0.000	0.000	0.935	0.250	0.500	0.932	0.000	0.917	0.000	0.944	0.000	0.945	0.964
Heavy Vehicle %	0.00%	0.00%	4.79%	0.00%	0.00%	4.79%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.83%	0.00%	0.500	4.82%	0.00%	0.00%	0.00%	5.88%	0.00%	2.69%	4.65%

PM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach Total	
3:45 PM	0	0	277	0	0	277	0	0	0	0	0	0	0	0	551	0	0	551	0	53	0	14	0	67	895
4:00 PM	0	0	323	0	0	323	0	0	0	0	0	0	0	0	505	0	0	505	0	45	0	16	0	61	889
4:15 PM	0	0	375	0	0	375	0	0	0	0	0	0	0	0	499	0	0	499	0	42	0	16	0	58	932
4:30 PM	0	0	305	0	0	305	0	0	0	0	0	0	0	0	495	0	0	495	0	38	0	20	0	58	858
Peak Hour Total	0	0	1280	0	0	1280	0	0	0	0	0	0	0	0	2050	0	0	2050	0	178	0	66	0	244	3574
PHF	0.000	0.000	0.853	0.000	0.000	0.853	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.930	0.000	0.000	0.930	0.000	0.840	0.000	0.825	0.000	0.910	0.959
Heavy Vehicle %	0.00%	0.00%	2.27%	0.00%	0.00%	2.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.98%	0.00%	0.00%	0.98%	0.00%	0.00%	0.00%	1.52%	0.00%	0.41%	1.40%

Lapeer Rd					
Total Vehicles On Leg			43837		
Vehicles Entering Intersection		21809	Vehicles Exiting Intersection		22028
Southbound					
Cars	0	21010	2	1	1
Heavy	0	796	0	0	0
Total	0	21806	2	1	1
	R	T	L	U-TURN	PED

Odanah Ave	Total Vehicles on Leg 2733	Vehicles Entering Intersection 2733	Eastbound	Cars	Heavy	Total	PED
				10	0	10	U-TURN
				0	0	0	L
				1725	13	1738	T
				3	0	3	R
				965	27	992	

Total Volumes

Westbound	Cars	Heavy	Total	Vehicles Entering Intersection 6	Total Vehicles on Leg 16	Driveway	
	R	2	1				3
	T	0	0				0
	L	3	0				3
	U-TURN	0	0				0
	PED	15	0				15

	PED	U-TURN	L	T	R
Cars	17	0	0	19911	5
Heavy	0	0	0	375	0
Total	17	0	0	20286	5
Northbound					
Vehicles Entering Intersection			20291		
Vehicles Exiting Intersection			22801		
Total Vehicles On Leg			43092		

**Lapeer Rd and Glanworth St
Lake Orion Michigan
Thursday, January 30, 2025**

Time	Southbound Lapeer Rd						Westbound Glanworth St					Northbound Lapeer Rd					Eastbound Starbucks Exit					VEHICLE TOTAL			
	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight		Right	Crosswalk	Vehicle
7:00 AM	0	1	545	3	0	549	0	0	0	2	1	2	0	0	142	0	0	142	0	0	0	0	0	0	693
7:15 AM	0	2	411	2	0	415	0	0	0	0	0	0	0	0	157	0	0	157	0	0	0	0	0	0	572
7:30 AM	0	0	468	3	0	471	0	2	0	8	0	10	0	0	189	1	0	190	0	0	0	0	1	0	671
7:45 AM	0	3	530	3	0	536	0	1	0	6	0	7	0	2	227	2	0	231	0	0	0	0	0	0	774
Hourly Total	0	6	1954	11	0	1971	0	3	0	16	1	19	0	2	715	3	0	720	0	0	0	0	1	0	2710

**Lapeer Rd and Glanworth St
Lake Orion Michigan
Thursday, January 30, 2025**

Time	Southbound Lapeer Rd						Westbound Glanworth St					Northbound Lapeer Rd					Eastbound Starbucks Exit					VEHICLE TOTAL			
	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight		Right	Crosswalk	Vehicle
8:00 AM	0	2	476	5	0	483	0	0	0	11	0	11	0	2	201	1	0	204	0	0	0	1	0	1	699
8:15 AM	0	0	530	6	0	536	0	1	0	8	0	9	0	0	192	1	0	193	0	0	0	3	0	3	741
8:30 AM	0	1	525	5	0	531	0	0	0	5	0	5	0	1	226	0	0	227	0	1	0	0	0	1	764
8:45 AM	0	1	517	5	0	523	0	1	0	5	0	6	0	3	212	2	0	217	0	0	0	0	1	0	746
Hourly Total	0	4	2048	21	0	2073	0	2	0	29	0	31	0	6	831	4	0	841	0	1	0	4	1	5	2950
TOTAL	0	10	4002	32	0	4044	0	5	0	45	1	50	0	8	1546	7	0	1561	0	1	0	4	2	5	5660
Cars	0	9	3870	32	0	3911	0	5	0	44	1	49	0	8	1484	7	0	1499	0	1	0	4	2	5	5464
Heavy Vehicles	0	1	132	0	0	133	0	0	0	1	0	1	0	0	62	0	0	62	0	0	0	0	0	0	196
Heavy Vehicle %	0.00%	10.00%	3.30%	0.00%	0.00%	3.29%	0.00%	0.00%	0.00%	2.22%	0.00%	2.00%	0.00%	0.00%	4.01%	0.00%	0.00%	3.97%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.46%

**Lapeer Rd and Glanworth St
Lake Orion Michigan
Thursday, January 30, 2025
AM Peak Hour**

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	
7:45 AM	0	3	530	3	0	536	0	1	0	6	0	7	0	2	227	2	0	231	0	0	0	0	0	0	0
8:00 AM	0	2	476	5	0	483	0	0	0	11	0	11	0	2	201	1	0	204	0	0	0	1	0	1	699
8:15 AM	0	0	530	6	0	536	0	1	0	8	0	9	0	0	192	1	0	193	0	0	0	3	0	3	741
8:30 AM	0	1	525	5	0	531	0	0	0	5	0	5	0	1	226	0	0	227	0	1	0	0	0	1	764
Peak Hour Total	0	6	2061	19	0	2086	0	2	0	30	0	32	0	5	846	4	0	855	0	1	0	4	0	5	2978
PHF	0.000	0.500	0.972	0.792	0.000	0.973	0.000	0.500	0.000	0.682	0.000	0.727	0.000	0.625	0.932	0.500	0.000	0.925	0.000	0.250	0.000	0.333	0.000	0.417	0.962
Heavy Vehicle %	0.00%	0.00%	4.27%	0.00%		4.22%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	4.73%	0.00%		4.68%	0.00%	0.00%	0.00%	0.00%		0.00%	4.30%

Lapeer Rd						
Total Vehicles On Leg			5636			
Vehicles Entering Intersection			4044	Vehicles Exiting Intersection		1592
Southbound						
Cars	32	3870	9	0	0	
Heavy	0	132	1	0	0	
Total	32	4002	10	0	0	
R	T	L	U-TURN	PED		

Starbucks Exit	Total Vehicles on Leg 45	Vehicles Entering Intersection 5	Eastbound	Cars	Heavy	Total	PED
				2	0	2	U-TURN
				0	0	0	L
				1	0	1	T
				0	0	0	R
				4	0	4	

Total Volumes

R	T	L	U-TURN	PED	Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 50	Total Vehicles on Leg 67	Glanworth St
					44	1	45				
					0	0	0				
					5	0	5				
					0	0	0				
					1	0	1				

	PED	U-TURN	L	T	R	
Cars	0	0	8	1484	7	
Heavy	0	0	0	62	0	
Total	0	0	8	1546	7	
Northbound						
Vehicles Entering Intersection			1561	Vehicles Exiting Intersection		4011
Total Vehicles On Leg			5572			

**Lapeer Rd and Glanworth St
Lake Orion Michigan
Thursday, January 30, 2025**

Time	Southbound Lapeer Rd						Westbound Glanworth St						Northbound Lapeer Rd						Eastbound Starbucks Exit						VEHICLE TOTAL
	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	
4:00 PM	3	1	329	4	0	337	0	0	0	7	0	7	0	1	501	1	0	503	0	0	0	1	0	1	848
4:15 PM	1	2	391	2	0	396	0	0	0	11	0	11	0	2	477	2	0	481	0	0	0	0	0	0	888
4:30 PM	1	2	321	4	0	328	0	0	0	3	1	3	0	0	489	1	0	490	0	0	0	0	0	0	821
4:45 PM	1	3	328	6	0	338	0	0	0	9	0	9	0	1	507	1	0	509	0	0	0	1	0	1	857
Hourly Total	6	8	1369	16	0	1399	0	0	0	30	1	30	0	4	1974	5	0	1983	0	0	0	2	0	2	3414
5:00 PM	1	3	343	3	0	350	0	1	0	7	1	8	0	0	486	2	0	488	0	0	0	1	0	1	847
5:15 PM	1	2	368	7	0	378	0	2	0	6	1	8	0	1	489	0	0	490	0	0	0	0	3	0	876
5:30 PM	1	1	319	5	0	326	0	0	0	5	2	5	0	1	463	0	0	464	0	0	0	1	0	1	796
5:45 PM	1	2	283	5	0	291	0	0	0	5	2	5	0	0	443	1	0	444	0	0	0	0	2	0	740
Hourly Total	4	8	1313	20	0	1345	0	3	0	23	6	26	0	2	1881	3	0	1886	0	0	0	2	5	2	3259
TOTAL	10	16	2682	36	0	2744	0	3	0	53	7	56	0	6	3855	8	0	3869	0	0	0	4	5	4	6673
Cars	10	16	2647	36	0	2709	0	3	0	53	7	56	0	6	3824	8	0	3838	0	0	0	4	5	4	6607
Heavy Vehicles	0	0	35	0	0	35	0	0	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	0	66
Heavy Vehicle %	0.00%	0.00%	1.30%	0.00%	0.00%	1.26%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.00%	0.00%	0.80%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.99%

**Lapeer Rd and Glanworth St
Lake Orion Michigan
Thursday, January 30, 2025
AM Peak Hour**

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	Vehicle Approach	
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PHF	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

PM Peak Hour

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	U Turns	Left Turns	Straight	Right	Crosswalk	Vehicle	
4:00 PM	3	1	329	4	0	337	0	0	0	7	0	7	0	1	501	1	0	503	0	0	0	1	0	1	848
4:15 PM	1	2	391	2	0	396	0	0	0	11	0	11	0	2	477	2	0	481	0	0	0	0	0	0	888
4:30 PM	1	2	321	4	0	328	0	0	0	3	1	3	0	0	489	1	0	490	0	0	0	0	0	0	821
4:45 PM	1	3	328	6	0	338	0	0	0	9	0	9	0	1	507	1	0	509	0	0	0	1	0	1	857
Peak Hour Total	6	8	1369	16	0	1399	0	0	0	30	1	30	0	4	1974	5	0	1983	0	0	0	2	0	2	3414
PHF	0.500	0.667	0.875	0.667	0.000	0.883	0.000	0.000	0.000	0.682	0.250	0.682	0.000	0.500	0.973	0.625	0.000	0.974	0.000	0.000	0.000	0.500	0.000	0.500	0.961
Heavy Vehicle %	0.00%	0.00%	1.61%	0.00%		1.57%	0.00%	0.00%	0.00%	0.00%		0.00%	0.00%	0.00%	1.06%	0.00%		1.06%	0.00%	0.00%	0.00%	0.00%		0.00%	1.26%

Lapeer Rd					
Total Vehicles On Leg			6662		
Vehicles Entering Intersection 2744			Vehicles Exiting Intersection 3918		
Southbound					
Cars	36	2647	16	10	0
Heavy	0	35	0	0	0
Total	36	2682	16	10	0
R	T	L	U-TURN	PED	

Starbucks Exit	Total Vehicles on Leg 46	Vehicles Entering Intersection 4	Eastbound	Cars	Heavy	Total	
				5	0	5	PED
				0	0	0	U-TURN
				0	0	0	L
				0	0	0	T
				4	0	4	R

Total Volumes

	Cars	Heavy	Total	Westbound	Vehicles Entering Intersection 56	Total Vehicles on Leg 80	Glanworth St	
	R	53	0					53
	T	0	0					0
	L	3	0					3
	U-TURN	0	0					0
	PED	7	0					7

	PED	U-TURN	L	T	R
Cars	0	0	6	3824	8
Heavy	0	0	0	31	0
Total	0	0	6	3855	8
Northbound					
Vehicles Entering Intersection 3669			Vehicles Exiting Intersection 2689		
Total Vehicles On Leg			6558		

APPENDIX B: EXISTING CONDITIONS

HCM Signalized Intersection Capacity Analysis

4: S Broadway & Odanah Ave/Driveway

04/27/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	0	102	1	0	0	0	849	1	0	1983	0
Future Volume (vph)	121	0	102	1	0	0	0	849	1	0	1983	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6		5.6	5.6				6.1			6.1	
Lane Util. Factor	1.00		1.00	1.00				0.95			0.95	
Frt	1.00		0.85	1.00				1.00			1.00	
Flt Protected	0.95		1.00	0.95				1.00			1.00	
Satd. Flow (prot)	1900		1604	1900				3617			3619	
Flt Permitted	0.95		1.00	0.95				1.00			1.00	
Satd. Flow (perm)	1900		1604	1900				3617			3619	
Peak-hour factor, PHF	0.92	0.92	0.94	0.25	0.92	0.92	0.92	0.94	0.25	0.92	0.96	0.92
Adj. Flow (vph)	132	0	109	4	0	0	0	903	4	0	2066	0
RTOR Reduction (vph)	0	0	23	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	132	0	86	4	0	0	0	907	0	0	2066	0
Heavy Vehicles (%)	0%	2%	6%	0%	2%	2%	2%	5%	2%	2%	5%	2%
Turn Type	Perm		Prot	D.Pm		custom		NA			NA	
Protected Phases			2					1			1	
Permitted Phases	2			2								
Actuated Green, G (s)	21.5		21.5	21.5				86.8			86.8	
Effective Green, g (s)	21.5		21.5	21.5				86.8			86.8	
Actuated g/C Ratio	0.18		0.18	0.18				0.72			0.72	
Clearance Time (s)	5.6		5.6	5.6				6.1			6.1	
Vehicle Extension (s)	3.0		3.0	3.0				3.0			3.0	
Lane Grp Cap (vph)	340		287	340				2616			2617	
v/s Ratio Prot			0.05					0.25			c0.57	
v/s Ratio Perm	c0.07			0.00								
v/c Ratio	0.39		0.30	0.01				0.35			0.79	
Uniform Delay, d1	43.4		42.7	40.5				6.1			10.7	
Progression Factor	1.00		1.00	1.00				1.00			1.00	
Incremental Delay, d2	3.3		2.7	0.1				0.1			1.7	
Delay (s)	46.8		45.4	40.6				6.2			12.4	
Level of Service	D		D	D				A			B	
Approach Delay (s/veh)		46.1			40.6			6.2			12.4	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			13.2								B	
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			120.0						11.7			
Intersection Capacity Utilization			74.5%								D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Glanworth St & S Broadway

03/10/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	2	30	846	4	6	2061
Future Volume (Veh/h)	2	30	846	4	6	2061
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.68	0.93	0.50	0.50	0.70
Hourly flow rate (vph)	4	44	910	8	12	2944
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)				277		
pX, platoon unblocked	0.29					
vC, conflicting volume	2410	459			918	
vC1, stage 1 conf vol	914					
vC2, stage 2 conf vol	1496					
vCu, unblocked vol	968	459			918	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	92			98	
cM capacity (veh/h)	232	554			752	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	48	607	311	12	1472	1472
Volume Left	4	0	0	12	0	0
Volume Right	44	0	8	0	0	0
cSH	497	1700	1700	752	1700	1700
Volume to Capacity	0.10	0.36	0.18	0.02	0.87	0.87
Queue Length 95th (ft)	8	0	0	1	0	0
Control Delay (s/veh)	13.0	0.0	0.0	9.9	0.0	0.0
Lane LOS	B			A		
Approach Delay (s/veh)	13.0	0.0			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			64.1%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

4: Odanah Ave/Driveway

04/27/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								 			 	
Traffic Volume (vph)	178	0	66	1	0	0	0	2050	0	0	1280	0
Future Volume (vph)	178	0	66	1	0	0	0	2050	0	0	1280	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6		5.6	5.6				6.1			6.1	
Lane Util. Factor	1.00		1.00	1.00				0.95			0.95	
Frt	1.00		0.85	1.00				1.00			1.00	
Flt Protected	0.95		1.00	0.95				1.00			1.00	
Satd. Flow (prot)	1900		1667	1900				3762			3725	
Flt Permitted	0.95		1.00	0.95				1.00			1.00	
Satd. Flow (perm)	1900		1667	1900				3762			3725	
Peak-hour factor, PHF	0.84	0.92	0.83	0.65	0.92	0.25	0.92	0.93	0.92	0.92	0.85	0.92
Adj. Flow (vph)	212	0	80	2	0	0	0	2204	0	0	1506	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	212	0	80	2	0	0	0	2204	0	0	1506	0
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	2%	0%	2%	0%
Turn Type	D.Pm		Prot	D.Pm		Prot		NA			NA	
Protected Phases			2			2		1			1	
Permitted Phases	2			2								
Actuated Green, G (s)	21.4		21.4	21.4				86.9			86.9	
Effective Green, g (s)	21.4		21.4	21.4				86.9			86.9	
Actuated g/C Ratio	0.18		0.18	0.18				0.72			0.72	
Clearance Time (s)	5.6		5.6	5.6				6.1			6.1	
Vehicle Extension (s)	3.0		3.0	3.0				3.0			3.0	
Lane Grp Cap (vph)	338		297	338				2724			2697	
v/s Ratio Prot			0.05					c0.59			0.40	
v/s Ratio Perm	c0.11			0.00								
v/c Ratio	0.63		0.27	0.01				0.81			0.56	
Uniform Delay, d1	45.6		42.6	40.6				11.0			7.7	
Progression Factor	1.00		1.00	1.00				1.00			1.00	
Incremental Delay, d2	8.5		2.2	0.0				1.9			0.3	
Delay (s)	54.1		44.8	40.6				12.9			7.9	
Level of Service	D		D	D				B			A	
Approach Delay (s/veh)		51.6			40.6			12.9			7.9	
Approach LOS		D			D			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			13.9					HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			120.0					Sum of lost time (s)		11.7		
Intersection Capacity Utilization			73.0%					ICU Level of Service		C		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis

7: S Broadway & Glanworth St

03/10/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↵		↑↑		↵	↑↑
Traffic Volume (veh/h)	0	30	1974	5	8	1369
Future Volume (Veh/h)	0	30	1974	5	8	1369
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.68	0.97	0.63	0.67	0.88
Hourly flow rate (vph)	0	44	2035	8	12	1556
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage (veh)			2			2
Upstream signal (ft)						275
pX, platoon unblocked	0.80					
vC, conflicting volume	2841	1022			2043	
vC1, stage 1 conf vol	2039					
vC2, stage 2 conf vol	802					
vCu, unblocked vol	2802	1022			2043	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	81			96	
cM capacity (veh/h)	85	237			280	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	44	1357	686	12	778	778
Volume Left	0	0	0	12	0	0
Volume Right	44	0	8	0	0	0
cSH	237	1700	1700	280	1700	1700
Volume to Capacity	0.19	0.80	0.40	0.04	0.46	0.46
Queue Length 95th (ft)	17	0	0	3	0	0
Control Delay (s/veh)	23.6	0.0	0.0	18.4	0.0	0.0
Lane LOS	C			C		
Approach Delay (s/veh)	23.6	0.0			0.1	
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			62.0%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: S Broadway & Glanworth St

03/10/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↵		↑↑		↵	↑↑
Traffic Volume (veh/h)	0	30	1974	5	8	1369
Future Volume (Veh/h)	0	30	1974	5	8	1369
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.68	0.97	0.63	0.67	0.88
Hourly flow rate (vph)	0	44	2035	8	12	1556
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage (veh)			2			2
Upstream signal (ft)						275
pX, platoon unblocked	0.80					
vC, conflicting volume	2841	1022			2043	
vC1, stage 1 conf vol	2039					
vC2, stage 2 conf vol	802					
vCu, unblocked vol	2802	1022			2043	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	81			96	
cM capacity (veh/h)	85	237			280	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	44	1357	686	12	778	778
Volume Left	0	0	0	12	0	0
Volume Right	44	0	8	0	0	0
cSH	237	1700	1700	280	1700	1700
Volume to Capacity	0.19	0.80	0.40	0.04	0.46	0.46
Queue Length 95th (ft)	17	0	0	3	0	0
Control Delay (s/veh)	23.6	0.0	0.0	18.4	0.0	0.0
Lane LOS	C			C		
Approach Delay (s/veh)	23.6	0.0			0.1	
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			62.0%	ICU Level of Service	B	
Analysis Period (min)			15			

Intersection: 4: S Broadway & Odanah Ave/Driveway

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	T	TR	T	T
Maximum Queue (ft)	168	179	197	187	200	206
Average Queue (ft)	85	76	107	75	185	167
95th Queue (ft)	151	140	179	158	213	224
Link Distance (ft)	255	255	217	217	179	179
Upstream Blk Time (%)		0	0	0	10	6
Queuing Penalty (veh)		0	0	0	104	59
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 6: S Broadway & Heights Rd

Movement	NB	NB	SB	SB
Directions Served	L	T	T	TR
Maximum Queue (ft)	41	69	392	346
Average Queue (ft)	15	5	120	69
95th Queue (ft)	41	34	278	223
Link Distance (ft)		179	482	482
Upstream Blk Time (%)			0	0
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)	20			
Storage Blk Time (%)	12			
Queuing Penalty (veh)	51			

Intersection: 7: Glanworth St & S Broadway

Movement	WB	NB	SB
Directions Served	LR	T	L
Maximum Queue (ft)	65	22	31
Average Queue (ft)	24	1	5
95th Queue (ft)	55	12	22
Link Distance (ft)	571	600	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			20
Storage Blk Time (%)			1
Queuing Penalty (veh)			11

Network Summary

Network wide Queuing Penalty: 225

Intersection: 4: Odanah Ave/Driveway

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	R	L	T	TR	T	T
Maximum Queue (ft)	258	112	10	226	243	197	195
Average Queue (ft)	128	50	0	212	201	148	112
95th Queue (ft)	224	98	5	246	255	221	196
Link Distance (ft)	255	255	77	215	215	181	181
Upstream Blk Time (%)	1			8	5	3	1
Queuing Penalty (veh)	0			85	54	18	3
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Heights Rd

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	60	202	230	121	91
Average Queue (ft)	35	52	37	27	7
95th Queue (ft)	52	156	153	93	40
Link Distance (ft)		181	181	482	482
Upstream Blk Time (%)		1	1		
Queuing Penalty (veh)		11	8		
Storage Bay Dist (ft)	20				
Storage Blk Time (%)	25	0			
Queuing Penalty (veh)	250	0			

Intersection: 7: S Broadway & Glanworth St

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (ft)	132	325	307	35	44	23
Average Queue (ft)	37	119	70	7	2	1
95th Queue (ft)	107	267	217	27	19	17
Link Distance (ft)	571	600	600		215	215
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				20		
Storage Blk Time (%)				5		
Queuing Penalty (veh)				37		

Network Summary

Network wide Queuing Penalty: 467

APPENDIX C: BACKGROUND CONDITIONS

HCM Signalized Intersection Capacity Analysis

4: S Broadway & Odanah Ave/Driveway

04/27/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	0	102	1	0	0	0	857	1	0	2008	0
Future Volume (vph)	122	0	102	1	0	0	0	857	1	0	2008	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.4		5.4	5.4				6.3			6.3	
Lane Util. Factor	1.00		1.00	1.00				0.95			0.95	
Frt	1.00		0.85	1.00				1.00			1.00	
Flt Protected	0.95		1.00	0.95				1.00			1.00	
Satd. Flow (prot)	1900		1604	1900				3619			3619	
Flt Permitted	0.95		1.00	0.95				1.00			1.00	
Satd. Flow (perm)	1900		1604	1900				3619			3619	
Peak-hour factor, PHF	0.94	0.94	0.94	0.65	0.92	0.92	0.94	0.94	0.94	0.95	0.95	0.95
Growth Factor (vph)	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%
Adj. Flow (vph)	132	0	111	2	0	0	0	930	1	0	2156	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	132	0	111	2	0	0	0	931	0	0	2156	0
Heavy Vehicles (%)	0%	2%	6%	0%	2%	2%	2%	5%	2%	2%	5%	2%
Turn Type	Perm		Prot	Perm		Perm		NA			NA	
Protected Phases			4					2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	21.6		21.6	21.6				86.7			86.7	
Effective Green, g (s)	21.6		21.6	21.6				86.7			86.7	
Actuated g/C Ratio	0.18		0.18	0.18				0.72			0.72	
Clearance Time (s)	5.4		5.4	5.4				6.3			6.3	
Vehicle Extension (s)	3.0		3.0	3.0				3.0			3.0	
Lane Grp Cap (vph)	342		288	342				2614			2614	
v/s Ratio Prot			0.07					0.26			c0.60	
v/s Ratio Perm	c0.07			0.00								
v/c Ratio	0.39		0.39	0.01				0.36			0.82	
Uniform Delay, d1	43.4		43.4	40.4				6.2			11.4	
Progression Factor	1.00		1.00	1.00				1.00			1.00	
Incremental Delay, d2	3.3		3.9	0.0				0.4			3.1	
Delay (s)	46.6		47.2	40.4				6.6			14.6	
Level of Service	D		D	D				A			B	
Approach Delay (s/veh)		46.9			40.4			6.6			14.6	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			14.7								B	
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			120.0							11.7		
Intersection Capacity Utilization			76.3%								D	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: Glanworth St & S Broadway

03/10/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	2	30	854	4	6	2061
Future Volume (Veh/h)	2	30	854	4	6	2061
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.68	0.93	0.50	0.50	0.70
Hourly flow rate (vph)	4	45	937	8	12	3003
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)				275		
pX, platoon unblocked	0.29					
vC, conflicting volume	2467	473	945			
vC1, stage 1 conf vol	941					
vC2, stage 2 conf vol	1526					
vCu, unblocked vol	1153	473	945			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	92	98			
cM capacity (veh/h)	223	543	734			
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	49	625	320	12	1502	1502
Volume Left	4	0	0	12	0	0
Volume Right	45	0	8	0	0	0
cSH	486	1700	1700	734	1700	1700
Volume to Capacity	0.10	0.37	0.19	0.02	0.88	0.88
Queue Length 95th (ft)	8	0	0	1	0	0
Control Delay (s/veh)	13.2	0.0	0.0	10.0	0.0	0.0
Lane LOS	B				A	
Approach Delay (s/veh)	13.2	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			65.2%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

7: Glanworth St & S Broadway

03/10/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	2	30	854	4	6	2061
Future Volume (Veh/h)	2	30	854	4	6	2061
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.68	0.93	0.50	0.50	0.70
Hourly flow rate (vph)	4	45	937	8	12	3003
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)				275		
pX, platoon unblocked	0.29					
vC, conflicting volume	2467	473	945			
vC1, stage 1 conf vol	941					
vC2, stage 2 conf vol	1526					
vCu, unblocked vol	1153	473	945			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	92	98			
cM capacity (veh/h)	223	543	734			
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	49	625	320	12	1502	1502
Volume Left	4	0	0	12	0	0
Volume Right	45	0	8	0	0	0
cSH	486	1700	1700	734	1700	1700
Volume to Capacity	0.10	0.37	0.19	0.02	0.88	0.88
Queue Length 95th (ft)	8	0	0	1	0	0
Control Delay (s/veh)	13.2	0.0	0.0	10.0	0.0	0.0
Lane LOS	B				A	
Approach Delay (s/veh)	13.2	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			65.2%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

4: Odanah Ave/Driveway

04/27/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	0	66	1	0	0	0	2058	0	0	1297	0
Future Volume (vph)	181	0	66	1	0	0	0	2058	0	0	1297	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6		5.6	5.6				6.1			6.1	
Lane Util. Factor	1.00		1.00	1.00				0.95			0.95	
Frt	1.00		0.85	1.00				1.00			1.00	
Flt Protected	0.95		1.00	0.95				1.00			1.00	
Satd. Flow (prot)	1900		1667	1900				3762			3725	
Flt Permitted	0.95		1.00	0.95				1.00			1.00	
Satd. Flow (perm)	1900		1667	1900				3762			3725	
Peak-hour factor, PHF	0.84	0.92	0.84	0.65	0.92	0.65	0.92	0.93	0.92	0.92	0.85	0.92
Growth Factor (vph)	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%
Adj. Flow (vph)	220	0	80	2	0	0	0	2257	0	0	1556	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	220	0	80	2	0	0	0	2257	0	0	1556	0
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	1%	2%	0%	2%	0%
Turn Type	Perm		Perm	Perm		Perm		NA			NA	
Protected Phases								2			6	
Permitted Phases	4		4	8		8						
Actuated Green, G (s)	18.2		18.2	18.2				90.1			90.1	
Effective Green, g (s)	18.2		18.2	18.2				90.1			90.1	
Actuated g/C Ratio	0.15		0.15	0.15				0.75			0.75	
Clearance Time (s)	5.6		5.6	5.6				6.1			6.1	
Vehicle Extension (s)	3.0		3.0	3.0				3.0			3.0	
Lane Grp Cap (vph)	288		252	288				2824			2796	
v/s Ratio Prot								c0.60			0.42	
v/s Ratio Perm	c0.12		0.05	0.00								
v/c Ratio	0.76		0.32	0.01				0.80			0.56	
Uniform Delay, d1	48.8		45.4	43.2				9.3			6.4	
Progression Factor	1.00		1.00	1.00				1.00			1.00	
Incremental Delay, d2	11.4		0.7	0.0				2.5			0.8	
Delay (s)	60.2		46.1	43.2				11.8			7.2	
Level of Service	E		D	D				B			A	
Approach Delay (s/veh)		56.5			43.2			11.8			7.2	
Approach LOS		E			D			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			13.3					HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			120.0					Sum of lost time (s)		11.7		
Intersection Capacity Utilization			74.6%					ICU Level of Service		D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

7: S Broadway & Glanworth St

03/10/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑↑		↙	↑↑
Traffic Volume (veh/h)	0	30	1982	5	8	1369
Future Volume (Veh/h)	0	30	1982	5	8	1369
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.68	0.97	0.63	0.67	0.88
Hourly flow rate (vph)	0	45	2084	8	12	1587
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)				285		
pX, platoon unblocked	0.79					
vC, conflicting volume	2906	1046			2092	
vC1, stage 1 conf vol	2088					
vC2, stage 2 conf vol	818					
vCu, unblocked vol	2880	1046			2092	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	80			96	
cM capacity (veh/h)	80	228			268	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	45	1389	703	12	794	794
Volume Left	0	0	0	12	0	0
Volume Right	45	0	8	0	0	0
cSH	228	1700	1700	268	1700	1700
Volume to Capacity	0.20	0.82	0.41	0.04	0.47	0.47
Queue Length 95th (ft)	18	0	0	4	0	0
Control Delay (s/veh)	24.6	0.0	0.0	19.1	0.0	0.0
Lane LOS	C		C			
Approach Delay (s/veh)	24.6	0.0	0.1			
Approach LOS	C					
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	63.2%		ICU Level of Service		B	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

7: S Broadway & Glanworth St

03/10/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑↑		↘	↑↑
Traffic Volume (veh/h)	0	30	1982	5	8	1369
Future Volume (Veh/h)	0	30	1982	5	8	1369
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.68	0.97	0.63	0.67	0.88
Hourly flow rate (vph)	0	45	2084	8	12	1587
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (ft)						285
pX, platoon unblocked	0.79					
vC, conflicting volume	2906	1046			2092	
vC1, stage 1 conf vol	2088					
vC2, stage 2 conf vol	818					
vCu, unblocked vol	2880	1046			2092	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	80			96	
cM capacity (veh/h)	80	228			268	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	45	1389	703	12	794	794
Volume Left	0	0	0	12	0	0
Volume Right	45	0	8	0	0	0
cSH	228	1700	1700	268	1700	1700
Volume to Capacity	0.20	0.82	0.41	0.04	0.47	0.47
Queue Length 95th (ft)	18	0	0	4	0	0
Control Delay (s/veh)	24.6	0.0	0.0	19.1	0.0	0.0
Lane LOS	C			C		
Approach Delay (s/veh)	24.6	0.0			0.1	
Approach LOS	C					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			63.2%	ICU Level of Service	B	
Analysis Period (min)			15			

Intersection: 4: S Broadway & Odanah Ave/Driveway

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	R	L	T	TR	T	T
Maximum Queue (ft)	169	158	15	214	196	205	219
Average Queue (ft)	90	79	1	112	79	188	172
95th Queue (ft)	155	142	7	188	167	206	223
Link Distance (ft)	255	255	77	216	216	181	181
Upstream Blk Time (%)				0	0	11	7
Queuing Penalty (veh)				1	0	118	76
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: S Broadway & Heights Rd

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	41	66	46	389	366
Average Queue (ft)	16	3	2	151	106
95th Queue (ft)	40	30	24	344	314
Link Distance (ft)		181	181	482	482
Upstream Blk Time (%)				1	0
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)	20				
Storage Blk Time (%)	16				
Queuing Penalty (veh)	72				

Intersection: 7: Glanworth St & S Broadway

Movement	WB	NB	SB	SB	SB
Directions Served	LR	T	L	T	T
Maximum Queue (ft)	113	46	27	96	74
Average Queue (ft)	33	3	4	4	3
95th Queue (ft)	127	24	20	50	38
Link Distance (ft)	559	599		216	216
Upstream Blk Time (%)				0	0
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)			20		
Storage Blk Time (%)			1		
Queuing Penalty (veh)			7		

Network Summary

Network wide Queuing Penalty: 275

Intersection: 4: Odanah Ave/Driveway

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	R	L	T	TR	T	T
Maximum Queue (ft)	256	117	6	254	259	197	197
Average Queue (ft)	127	49	0	226	216	157	119
95th Queue (ft)	213	93	5	262	271	216	201
Link Distance (ft)	447	447	117	227	227	178	178
Upstream Blk Time (%)				8	5	3	1
Queuing Penalty (veh)				85	56	21	5
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 6: Heights Rd

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	51	194	195	162	100
Average Queue (ft)	34	53	37	31	8
95th Queue (ft)	53	152	143	100	45
Link Distance (ft)		178	178	482	482
Upstream Blk Time (%)		1	0		
Queuing Penalty (veh)		6	2		
Storage Bay Dist (ft)	20				
Storage Blk Time (%)	27	0			
Queuing Penalty (veh)	277	0			

Intersection: 7: S Broadway & Glanworth St

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (ft)	121	343	272	34	33	8
Average Queue (ft)	34	122	72	7	2	0
95th Queue (ft)	93	270	213	27	19	6
Link Distance (ft)	373	599	599		227	227
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)				20		
Storage Blk Time (%)				6		
Queuing Penalty (veh)				41		

Network Summary

Network wide Queuing Penalty: 493

APPENDIX D: BUILD CONDITIONS

HCM Signalized Intersection Capacity Analysis

4: S Broadway & Odanah Ave/Driveway

04/27/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	2	104	25	0	9	0	874	5	14	2048	0
Future Volume (vph)	125	2	104	25	0	9	0	874	5	14	2048	0
Ideal Flow (vphp)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6	5.6		5.6		5.6		6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00		1.00		0.95		1.00	0.95	
Frt	1.00	0.85		1.00		0.85		1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1900	1609		1863		1667		3617		1863	3619	
Flt Permitted	0.95	1.00		0.65		1.00		1.00		0.28	1.00	
Satd. Flow (perm)	1900	1609		1279		1667		3617		556	3619	
Peak-hour factor, PHF	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.94	0.94	0.95	0.95	0.92
Adj. Flow (vph)	133	2	111	27	0	10	0	930	5	15	2156	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	133	113	0	27	0	10	0	935	0	15	2156	0
Heavy Vehicles (%)	0%	6%	6%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Turn Type	Perm	NA		Perm		Perm		NA		Perm	NA	
Protected Phases		4						2				6
Permitted Phases	4			8		8				6		
Actuated Green, G (s)	21.4	21.4		21.4		21.4		86.9		86.9	86.9	
Effective Green, g (s)	21.4	21.4		21.4		21.4		86.9		86.9	86.9	
Actuated g/C Ratio	0.18	0.18		0.18		0.18		0.72		0.72	0.72	
Clearance Time (s)	5.6	5.6		5.6		5.6		6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	338	286		228		297		2619		402	2620	
v/s Ratio Prot		c0.07						0.26			c0.60	
v/s Ratio Perm	0.07			0.02		0.01				0.03		
v/c Ratio	0.39	0.40		0.12		0.03		0.36		0.04	0.82	
Uniform Delay, d1	43.6	43.6		41.4		40.8		6.2		4.7	11.3	
Progression Factor	1.00	1.00		1.00		1.00		1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.9		1.1		0.2		0.4		0.2	3.1	
Delay (s)	44.3	44.5		42.4		41.0		6.5		4.9	14.4	
Level of Service	D	D		D		D		A		A	B	
Approach Delay (s/veh)		44.4			42.0			6.5			14.3	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			14.6								HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			120.0							11.7		
Intersection Capacity Utilization			76.8%								ICU Level of Service	D
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis

7: Glanworth St & S Broadway

03/11/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	2	31	868	5	6	2127
Future Volume (Veh/h)	2	31	868	5	6	2127
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.50	0.68	0.93	0.50	0.50	0.70
Hourly flow rate (vph)	4	46	933	10	12	3039
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)				289		
pX, platoon unblocked	0.36					
vC, conflicting volume	2482		472		943	
vC1, stage 1 conf vol	938					
vC2, stage 2 conf vol	1544					
vCu, unblocked vol	1567		472		943	
tC, single (s)	6.8		6.9		4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5		3.3		2.2	
p0 queue free %	98		92		98	
cM capacity (veh/h)	243		544		736	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	50	622	321	12	1520	1520
Volume Left	4	0	0	12	0	0
Volume Right	46	0	10	0	0	0
cSH	495	1700	1700	736	1700	1700
Volume to Capacity	0.10	0.37	0.19	0.02	0.89	0.89
Queue Length 95th (ft)	8	0	0	1	0	0
Control Delay (s/veh)	13.1	0.0	0.0	10.0	0.0	0.0
Lane LOS	B			A		
Approach Delay (s/veh)	13.1	0.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	0.2					
Intersection Capacity Utilization	65.9%			ICU Level of Service		C
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

7: Glanworth St & S Broadway

03/11/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	2	31	868	5	6	2127
Future Volume (Veh/h)	2	31	868	5	6	2127
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.68	0.93	0.50	0.50	0.70
Hourly flow rate (vph)	4	46	933	10	12	3039
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage (veh)			2			2
Upstream signal (ft)						289
pX, platoon unblocked	0.36					
vC, conflicting volume	2482	472			943	
vC1, stage 1 conf vol	938					
vC2, stage 2 conf vol	1544					
vCu, unblocked vol	1567	472			943	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	92			98	
cM capacity (veh/h)	243	544			736	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	50	622	321	12	1520	1520
Volume Left	4	0	0	12	0	0
Volume Right	46	0	10	0	0	0
cSH	495	1700	1700	736	1700	1700
Volume to Capacity	0.10	0.37	0.19	0.02	0.89	0.89
Queue Length 95th (ft)	8	0	0	1	0	0
Control Delay (s/veh)	13.1	0.0	0.0	10.0	0.0	0.0
Lane LOS	B			A		
Approach Delay (s/veh)	13.1	0.0			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			65.9%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

4: Odanah Ave/Driveway

04/27/2025

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	182	4	67	18	0	28	0	2124	33	23	1323	0		
Future Volume (vph)	182	4	67	18	0	28	0	2124	33	23	1323	0		
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000		
Total Lost time (s)	5.6	5.6		5.6		5.6		6.1		6.1	6.1			
Lane Util. Factor	1.00	1.00		1.00		1.00		0.95		1.00	0.95			
Frt	1.00	0.86		1.00		0.85		1.00		1.00	1.00			
Flt Protected	0.95	1.00		0.95		1.00		1.00		0.95	1.00			
Satd. Flow (prot)	1900	1684		1900		1700		3753		1900	3725			
Flt Permitted	0.95	1.00		0.70		1.00		1.00		0.04	1.00			
Satd. Flow (perm)	1900	1684		1404		1700		3753		89	3725			
Peak-hour factor, PHF	0.84	0.83	0.84	0.65	0.92	0.65	0.92	0.93	0.92	0.85	0.85	0.92		
Adj. Flow (vph)	217	5	80	28	0	43	0	2284	36	27	1556	0		
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0		
Lane Group Flow (vph)	217	85	0	28	0	43	0	2320	0	27	1556	0		
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%	0%	1%	2%	0%	2%	0%		
Turn Type	Perm	NA		Perm		Perm		NA		Perm	NA			
Protected Phases		4						2				6		
Permitted Phases	4			8		8				6				
Actuated Green, G (s)	18.1	18.1		18.1		18.1		90.2		90.2	90.2			
Effective Green, g (s)	18.1	18.1		18.1		18.1		90.2		90.2	90.2			
Actuated g/C Ratio	0.15	0.15		0.15		0.15		0.75		0.75	0.75			
Clearance Time (s)	5.6	5.6		5.6		5.6		6.1		6.1	6.1			
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0		3.0	3.0			
Lane Grp Cap (vph)	286	254		211		256		2821		66	2799			
v/s Ratio Prot		0.05						c0.62			0.42			
v/s Ratio Perm	c0.11			0.02		0.03				0.30				
v/c Ratio	0.76	0.33		0.13		0.17		0.82		0.41	0.56			
Uniform Delay, d1	48.9	45.6		44.1		44.4		9.7		5.3	6.4			
Progression Factor	1.00	1.00		1.00		1.00		1.00		1.00	1.00			
Incremental Delay, d2	11.0	0.8		0.3		0.3		2.9		17.7	0.8			
Delay (s)	59.8	46.3		44.4		44.7		12.5		23.0	7.2			
Level of Service	E	D		D		D		B		C	A			
Approach Delay (s/veh)		56.0			44.6			12.5			7.4			
Approach LOS		E			D			B			A			
Intersection Summary														
HCM 2000 Control Delay (s/veh)			14.3									HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio			0.81											
Actuated Cycle Length (s)			120.0								11.7			
Intersection Capacity Utilization			84.9%										ICU Level of Service	E
Analysis Period (min)			15											
c	Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis

7: S Broadway & Glanworth St

03/11/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↕↔		↔	↕↕
Traffic Volume (veh/h)	1	31	2046	6	8	1414
Future Volume (Veh/h)	1	31	2046	6	8	1414
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.68	0.97	0.63	0.67	0.88
Hourly flow rate (vph)	1	46	2109	10	12	1607
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh			2			2
Upstream signal (ft)						294
pX, platoon unblocked	0.76					
vC, conflicting volume	2942	1060			2119	
vC1, stage 1 conf vol	2114					
vC2, stage 2 conf vol	828					
vCu, unblocked vol	2923	1060			2119	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	79			95	
cM capacity (veh/h)	78	224			261	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	47	1406	713	12	804	804
Volume Left	1	0	0	12	0	0
Volume Right	46	0	10	0	0	0
cSH	215	1700	1700	261	1700	1700
Volume to Capacity	0.22	0.83	0.42	0.05	0.47	0.47
Queue Length 95th (ft)	20	0	0	4	0	0
Control Delay (s/veh)	26.3	0.0	0.0	19.4	0.0	0.0
Lane LOS	D			C		
Approach Delay (s/veh)	26.3	0.0			0.1	
Approach LOS	D					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			63.9%	ICU Level of Service	B	
Analysis Period (min)			15			

Intersection: 4: S Broadway & Odanah Ave/Driveway

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	R	T	TR	L	T	T
Maximum Queue (ft)	173	146	66	44	224	212	53	209	212
Average Queue (ft)	100	69	21	9	115	78	9	184	172
95th Queue (ft)	169	126	55	33	196	167	37	209	223
Link Distance (ft)	496	496	167	167	228	228		176	176
Upstream Blk Time (%)					0	0		13	10
Queuing Penalty (veh)					1	0		140	103
Storage Bay Dist (ft)							50		
Storage Blk Time (%)							0	25	
Queuing Penalty (veh)							0	4	

Intersection: 6: S Broadway & Heights Rd

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	40	89	16	454	434
Average Queue (ft)	17	8	1	210	155
95th Queue (ft)	43	47	11	466	414
Link Distance (ft)		176	176	482	482
Upstream Blk Time (%)				3	2
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)	20				
Storage Blk Time (%)	18				
Queuing Penalty (veh)	78				

Intersection: 7: Glanworth St & S Broadway

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (ft)	86	34	22	25	44	134
Average Queue (ft)	25	2	1	3	3	6
95th Queue (ft)	75	21	16	19	41	55
Link Distance (ft)	601	599	599		228	228
Upstream Blk Time (%)					0	
Queuing Penalty (veh)					0	
Storage Bay Dist (ft)				20		
Storage Blk Time (%)				0		
Queuing Penalty (veh)				4		

Network Summary

Network wide Queuing Penalty: 330

Intersection: 4: Odanah Ave/Driveway

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	R	T	TR	L	T	T
Maximum Queue (ft)	258	86	64	154	260	264	74	185	196
Average Queue (ft)	153	37	16	29	231	220	21	147	123
95th Queue (ft)	259	74	47	114	280	286	57	206	198
Link Distance (ft)	248	248	170	170	235	235		171	171
Upstream Blk Time (%)	3			0	10	7		5	2
Queuing Penalty (veh)	0			0	103	78		31	14
Storage Bay Dist (ft)							50		
Storage Blk Time (%)							6	18	
Queuing Penalty (veh)							45	4	

Intersection: 6: Heights Rd

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	52	186	212	402	352
Average Queue (ft)	35	51	33	58	28
95th Queue (ft)	52	149	138	210	158
Link Distance (ft)		171	171	477	477
Upstream Blk Time (%)		1	1	0	0
Queuing Penalty (veh)		7	6	0	0
Storage Bay Dist (ft)	20				
Storage Blk Time (%)	27	0			
Queuing Penalty (veh)	280	0			

Intersection: 7: S Broadway & Glanworth St

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (ft)	150	520	476	38	89	47
Average Queue (ft)	39	156	118	8	4	2
95th Queue (ft)	108	401	342	30	40	28
Link Distance (ft)	563	598	598		235	235
Upstream Blk Time (%)		1	0		0	
Queuing Penalty (veh)		0	0		0	
Storage Bay Dist (ft)				20		
Storage Blk Time (%)				7		
Queuing Penalty (veh)				49		

Network Summary

Network wide Queuing Penalty: 617

APPENDIX E: TRAFFIC CRASH DATA



Transportation Improvement Association

Crash Detail for 1/1/2020 - 12/31/2024

Criteria: WHERE A.AGENCY_ID = 14 AND A.GeoCoords.STIntersects (GEOMETRY::STGeomFromWKB(GEOGRAPHY::STPointFromText('POINT(-83.2390854974089

#1 Location: S LAPEER (6.73) 16 feet Nof GLANWORTH Crash ID: 2200217
Date: 01/18/2021 Day: Mon Hour: 4pm Weather: rain Roadway: wet Light: day
Injy K: 0 Injy A: 0 Injy B: 0 Injy C: 0 Injy 0: 2 How: angle
CVT: Orion Twp Area: w/i intersection HBD: N Drugs: N Complaint #: 210011086
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 NW right turn veh in transpt none none none failed to yield car lftfront
2 NE change lanes veh in transpt none none none none car ctrfront

UD10: 2200217

#2 Location: GLANWORTH (0.004) 22 feet Eof W LAPEER RD Crash ID: 2420806
Date: 10/18/2021 Day: Mon Hour: 10a Weather: clear Roadway: dry Light: day
Injy K: 0 Injy A: 0 Injy B: 0 Injy C: 0 Injy 0: 2 How: rr-end
CVT: Orion Twp Area: straight HBD: N Drugs: N Complaint #: 210216827
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 W backing veh in transpt none none none imprp backing car ctrrear
2 W stop on road veh in transpt none none none none car ctrfront

UD10: 2420806

#3 Location: NB LAPEER (6.732) 26 feet Nof GLANWORTH Crash ID: 2524812
Date: 01/30/2022 Day: Sun Hour: 1pm Weather: cloudy Roadway: dry Light: day
Injy K: 0 Injy A: 0 Injy B: 0 Injy C: 0 Injy 0: 2 How: rr-end
CVT: Orion Twp Area: straight HBD: N Drugs: N Complaint #: 220020832
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 N change lanes veh in transpt none none none unable to stop car rtfrent
2 N slow/stop on rd veh in transpt none none none none car lftrear

UD10: 2524812

#4 Location: S LAPEER (6.734) 37 feet Sof ODANAH RD Crash ID: 2574622
Date: 04/19/2022 Day: Tue Hour: 6pm Weather: clear Roadway: dry Light: day
Injy K: 0 Injy A: 0 Injy B: 0 Injy C: 0 Injy 0: 2 How: rr-end
CVT: Orion Twp Area: inter other HBD: N Drugs: N Complaint #: 220082076
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 N go straight veh in transpt none none none unable to stop car ctrfront
2 N slow/stop on rd veh in transpt none none none none car ctrrear

UD10: 2574622



#5 Location: S LAPEER (6.718) 48 feet Sof GLANWORTH ST **Crash ID:** 2625846
Date: 06/21/2022 **Day:** Tue **Hour:** 2pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 220135056

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	cross ctrline	none	none	none	failed to yield	car	lftfront
2	S	stop on road	veh in transpt	none	none	none	none	car	rtside

UD10: [2625846](#)

#6 Location: S LAPEER (6.734) 37 feet Nof GLANWORTH **Crash ID:** 2794676
Date: 01/02/2023 **Day:** Mon **Hour:** 1pm **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 230001060

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	lftfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [2794676](#)

#7 Location: GLANWORTH (0.005) 26 feet Eof LAPEER **Crash ID:** 2943565
Date: 07/07/2023 **Day:** Fri **Hour:** 11p **Weather:** clear **Roadway:** dry **Light:** dark/unltd
Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 0 **Injy 0:** 0 **How:** single
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 230167511

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	pedestrian	none	none	none	unknown	uncoded	none
2	E	playing in rdwy	veh in transpt	none	none	none	none	uncoded	none

UD10: [2943565](#)

#8 Location: S LAPEER (6.73) 16 feet Sof HEIGHTS RD **Crash ID:** 2972540
Date: 08/16/2023 **Day:** Wed **Hour:** 4pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 230204034

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	right turn	veh in transpt	none	none	none	carels driving	car	lftfront
2	SW	go straight	veh in transpt	none	none	none	none	car	rtrear

UD10: [2972540](#)

Crash Type

Count	Type
0	uncoded
1	single
0	head-on
0	head-on/lt
3	angle
6	rr-end
0	rr-end/lt
0	rr-end/rt
0	ss-same
0	ss-opp
0	back
0	other
0	unknown
Totals	10

Lighting Conditions

Count	Type
0	uncoded
9	day
0	dawn
0	dusk
0	dark/ltd
1	dark/unltd
0	other
0	unknown
Totals	10

Weather Conditions

Count	Type
0	uncoded
5	clear
4	cloudy
0	fog
1	rain
0	snow
0	wind
0	sleet/hail
0	blowing snow
0	blowing sand
0	smoke
0	unknown
Totals	10

Road Condition

Count	Type
0	uncoded
8	dry
2	wet
0	ice
0	snow
0	mud
0	slush
0	debris
0	water
0	sand
0	oily
0	other
0	unknown
Totals	10

Crashes by Month

Count	Type
3	January
0	February
0	March
1	April
0	May
1	June
1	July
1	August
0	September
2	October
0	November
1	December
Totals	10

Hazardous Action

Count	Type
10	none
0	speeding
0	spd too slow
4	failed to yield
0	disrgd traffic cntrl
0	wrong way
0	left of center
0	imprp passing
0	imprp lane use
0	imprp turn
0	imprp/no signal
1	imprp backing
3	unable to stop
0	other
1	unknown
0	reckls driving
1	carels driving
Totals	20

Unit Type

Count	Type
0	Bicyclist
0	Engineer
19	Vehicle
1	Pedestrian
Totals	20

Crashes by Year

Count	Type
2	2021
3	2022
5	2023
Totals	10

Crash Severity

	Fatal	A	B	C	No Injy	Total
Persons	0	0	1	1	0	2
Crashes	0	0	1	1	8	10

Alcohol in Crashes

	Fatal	A	B	C	PDO	Total
Drinking	0	0	0	0	0	0
Not Drinking	0	0	1	1	8	10
Totals	0	0	1	1	8	10

Crashes per Hour by Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
12a-1a	0	0	0	0	0	0	0	0
1a-2a	0	0	0	0	0	0	0	0
2a-3a	0	0	0	0	0	0	0	0
3a-4a	0	0	0	0	0	0	0	0
4a-5a	0	0	0	0	0	0	0	0
5a-6a	0	0	0	0	0	0	0	0
6a-7a	0	0	0	0	0	0	0	0
7a-8a	0	0	0	0	0	0	0	0
8a-9a	0	0	0	0	0	0	0	0
9a-10a	0	0	0	1	0	0	0	1
10a-11a	0	1	0	0	0	0	0	1
11a-12p	0	0	0	0	0	0	0	0
12p-1p	0	0	0	0	0	0	0	0
1p-2p	1	1	0	0	0	0	0	2
2p-3p	0	0	1	0	0	0	0	1
3p-4p	0	0	0	0	0	0	0	0
4p-5p	0	1	0	1	0	0	0	2
5p-6p	0	0	0	0	0	0	1	1
6p-7p	0	0	1	0	0	0	0	1
7p-8p	0	0	0	0	0	0	0	0
8p-9p	0	0	0	0	0	0	0	0
9p-10p	0	0	0	0	0	0	0	0
10p-11p	0	0	0	0	0	0	0	0
11p-12a	0	0	0	0	0	1	0	1
Totals	1	3	2	2	0	1	1	10



Transportation Improvement Association

Crash Detail for 1/1/2020 - 12/31/2024

Criteria: WHERE A.AGENCY_ID = 14 AND A.GeoCoords.STIntersects (GEOMETRY::STGeomFromWKB(GEOGRAPHY::STPointFromText('POINT(83.2391956278812 4

#1 Location: S BROADWAY 9M-240 (6.839) 74 feet Sof HEIGHTS RD Crash ID: 2009736
Date: 02/09/2020 Day: Sun Hour: 12p Weather: cloudy Roadway: dry Light: day
Injy K: 0 Injy A: 0 Injy B: 0 Injy C: 0 Injy 0: 8 How: ss-same
CVT: Lake Orion Area: driveway HBD: N Drugs: N Complaint #: 200000523
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 S change lanes veh in transpt none none none none unknown car rtrear
2 S change lanes veh in transpt none none none none unknown car lftfront

UD10: 2009736

#2 Location: S LAPEER (6.821) 21 feet Sof HEIGHTS RD Crash ID: 1972621
Date: 02/14/2020 Day: Fri Hour: 5pm Weather: cloudy Roadway: dry Light: dusk
Injy K: 0 Injy A: 0 Injy B: 1 Injy C: 0 Injy 0: 2 How: head-on
CVT: Orion Twp Area: inter other HBD: N Drugs: N Complaint #: 200032598
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 N go straight veh in transpt none none none none other car ctrfront
2 S stop on road veh in transpt none none none none none pickup ctrfront

UD10: 1972621

#3 Location: S BROADWAY (6.833) 42 feet Nof HEIGHTS RD Crash ID: 1982838
Date: 03/04/2020 Day: Wed Hour: 4pm Weather: clear Roadway: dry Light: day
Injy K: 0 Injy A: 0 Injy B: 0 Injy C: 2 Injy 0: 2 How: rr-end
CVT: Lake Orion Area: inter other HBD: N Drugs: N Complaint #: 200046066
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 N go straight veh in transpt none none none none unable to stop car ctrfront
2 N slow/stop on rd veh in transpt none none none none none car ctrear

UD10: 1982838

#4 Location: S LAPEER (6.826) 5 feet Nof HEIGHTS RD Crash ID: 2021409
Date: 05/29/2020 Day: Fri Hour: 7pm Weather: clear Roadway: dry Light: day
Injy K: 0 Injy A: 0 Injy B: 1 Injy C: 0 Injy 0: 1 How: ss-same
CVT: Lake Orion Area: w/i intersection HBD: N Drugs: N Complaint #: 200108587
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 S passing veh in transpt none none none none imprp passing motorcycle lftside
2 S right turn veh in transpt none none none none none car rtside

UD10: 2021409



#5 Location: LAPEER (6.819) 32 feet Sof HEIGHTS RD **Crash ID:** 2069517
Date: 08/04/2020 **Day:** Tue **Hour:** 2pm **Weather:** rain **Roadway:** wet **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 200156063

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	pickup	ctrear

UD10: [2069517](#)

#6 Location: S LAPEER (6.816) 50 feet Sof HEIGHTS RD **Crash ID:** 2164741
Date: 12/03/2020 **Day:** Thu **Hour:** 4pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 1 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 200240626

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrear

UD10: [2164741](#)

#7 Location: S LAPEER (6.829) 21 feet Nof HEIGHTS RD **Crash ID:** 2273253
Date: 05/03/2021 **Day:** Mon **Hour:** 3pm **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** rr-end
CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 210086820

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	stop on road	veh in transpt	none	none	none	none	car	rtrear
2	S	go straight	veh in transpt	none	none	none	unknown	car	none

UD10: [2273253](#)

#8 Location: S BROADWAY (6.84) 79 feet Nof HEIGHTS RD **Crash ID:** 2334616
Date: 07/21/2021 **Day:** Wed **Hour:** 5pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210003220

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [2334616](#)



#9 Location: S LAPEER (6.827) 10 feet Nof HEIGHTS RD **Crash ID:** 2408171
Date: 10/10/2021 **Day:** Sun **Hour:** 4pm **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210210923

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrear

UD10: [2408171](#)

#10 Location: S LAPEER (6.827) 10 feet Nof HEIGHTS RD **Crash ID:** 2429956
Date: 10/26/2021 **Day:** Tue **Hour:** 5pm **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end/rt
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210223488

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	SW	right turn	veh in transpt	none	none	none	none	car	rtrear

UD10: [2429956](#)

#11 Location: S BROADWAY (6.844) 100 feet Nof HEIGHTS RD **Crash ID:** 2420838
Date: 10/27/2021 **Day:** Wed **Hour:** 1am **Weather:** clear **Roadway:** dry **Light:** dark/ltd
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** single
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 210004855

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	animal	none	none	none	none	car	lftfront

UD10: [2420838](#)

#12 Location: S BROADWAY (6.844) 100 feet Nof HEIGHTS RD **Crash ID:** 2571651
Date: 04/13/2022 **Day:** Wed **Hour:** 3pm **Weather:** rain **Roadway:** wet **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 220001510

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrear
3	N	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [2571651](#)



#13 Location: SB S BROADWAY (6.829) 21 feet Nof HEIGHTS RD **Crash ID:** 2641952
Date: 07/15/2022 **Day:** Fri **Hour:** 5pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 220002883

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [2641952](#)

#14 Location: SB LAPEER (6.81) 79 feet Sof N HEIGHTS RD **Crash ID:** 2659694
Date: 08/09/2022 **Day:** Tue **Hour:** 11a **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 220003249

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unknown	pickup	lftfront
2	S	go straight	veh in transpt	none	none	none	unknown	car	rtrear

UD10: [2659694](#)

#15 Location: LAPEER (6.827) 10 feet Eof E HEIGHTS RD RD **Crash ID:** 2702360
Date: 09/26/2022 **Day:** Mon **Hour:** 8am **Weather:** rain **Roadway:** wet **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 220216086

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	go straight	veh in transpt	none	none	none	none	car	ctrear

UD10: [2702360](#)

#16 Location: LAPEER (6.811) 75 feet Sof HEIGHTS RD **Crash ID:** 2704994
Date: 10/02/2022 **Day:** Sun **Hour:** 2pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** other
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 220221027

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	cargo fall	none	none	none	none	car	ctrfront
2	S	go straight	equip fail	none	none	none	other	car	none

UD10: [2704994](#)



#17 Location: SB S BROADWAY (6.844) 100 feet Nof W HEIGHTS RD **Crash ID:** 2860007
Date: 03/23/2023 **Day:** Thu **Hour:** 8am **Weather:** rain **Roadway:** wet **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 230001137

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrear

UD10: [2860007](#)

#18 Location: S BROADWAY (6.839) 74 feet Sof CONVERSE CT **Crash ID:** 2885522
Date: 05/01/2023 **Day:** Mon **Hour:** 4pm **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 230001694

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	imprp lane use	pickup	lftfront
2	W	go straight	veh in transpt	none	none	none	none	car	rtside

UD10: [2885522](#)

#19 Location: BROADWAY (6.842) 90 feet Nof HEIGHTS RD **Crash ID:** 2972567
Date: 08/19/2023 **Day:** Sat **Hour:** 9am **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** single
CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 230206648

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	avoid veh-ft/bk	curb	none	none	none	none	car	rffront

UD10: [2972567](#)

#20 Location: S LAPEER (6.844) 100 feet Nof HEIGHTS ROAD **Crash ID:** 3105982
Date: 01/10/2024 **Day:** Wed **Hour:** 4pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 0 **Injy 0:** 1 **How:** rr-end
CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 240008668

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [3105982](#)



#21 Location: HEIGHTS (2.057) 45 feet Wof S LAPEER RD **Crash ID:** 3107485
Date: 01/12/2024 **Day:** Fri **Hour:** 4pm **Weather:** blowing snow **Roadway:** slush **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end/lt
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 240010656

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	loss of control	none	none	none	unable to stop	truck/bus	rtfront
2	E	stop on road	veh in transpt	none	none	none	none	truck/bus	ctrear

UD10: [3107485](#)

#22 Location: S LAPEER (6.822) 15 feet Sof HEIGHTS RD **Crash ID:** 3124310
Date: 02/02/2024 **Day:** Fri **Hour:** 3pm **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** rr-end
CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 240029679

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	multiple
3	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrear

UD10: [3124310](#)

#23 Location: LAPEER (6.825) 0 feet Xof HEIGHTS RD **Crash ID:** 3152972
Date: 03/12/2024 **Day:** Tue **Hour:** 4pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 240065456

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	go straight	veh in transpt	none	none	none	none	pickup	ctrear

UD10: [3152972](#)

#24 Location: S BROADWAY (6.829) 20 feet Nof HEIGHTS RD **Crash ID:** 3288982
Date: 09/03/2024 **Day:** Tue **Hour:** 4pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 4 **How:** rr-end
CVT: Lake Orion **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 240002070

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	none
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [3288982](#)

Crash Type

Count	Type
0	uncoded
2	single
1	head-on
0	head-on/lt
2	angle
14	rr-end
1	rr-end/lt
1	rr-end/rt
3	ss-same
0	ss-opp
0	back
1	other
0	unknown
Totals	25

Lighting Conditions

Count	Type
0	uncoded
23	day
0	dawn
1	dusk
1	dark/ltd
0	dark/unltd
0	other
0	unknown
Totals	25

Weather Conditions

Count	Type
0	uncoded
12	clear
8	cloudy
0	fog
4	rain
0	snow
0	wind
0	sleet/hail
1	blowing snow
0	blowing sand
0	smoke
0	unknown
Totals	25

Road Condition

Count	Type
0	uncoded
20	dry
4	wet
0	ice
0	snow
0	mud
1	slush
0	debris
0	water
0	sand
0	oily
0	other
0	unknown
Totals	25

Crashes by Month

Count	Type
2	January
3	February
3	March
1	April
3	May
0	June
2	July
3	August
2	September
4	October
0	November
2	December
Totals	25

Hazardous Action

Count	Type
25	none
0	speeding
0	spd too slow
1	failed to yield
0	disrgd traffic cntrl
0	wrong way
0	left of center
1	imprp passing
1	imprp lane use
0	imprp turn
0	imprp/no signal
0	imprp backing
15	unable to stop
2	other
5	unknown
0	reckls driving
0	carels driving
Totals	50

Unit Type

Count	Type
0	Bicyclist
0	Engineer
50	Vehicle
0	Pedestrian
Totals	50

Crashes by Year

Count	Type
6	2020
5	2021
5	2022
3	2023
6	2024
Totals	25

Crash Severity

	Fatal	A	B	C	No Injy	Total
Persons	0	0	3	3	0	6
Crashes	0	0	3	2	20	25

Alcohol in Crashes

	Fatal	A	B	C	PDO	Total
Drinking	0	0	0	0	0	0
Not Drinking	0	0	3	2	20	25
Totals	0	0	3	2	20	25

Crashes per Hour by Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
12a-1a	0	0	0	0	0	0	0	0
1a-2a	0	0	0	1	0	0	0	1
2a-3a	0	0	0	0	0	0	0	0
3a-4a	0	0	0	0	0	0	0	0
4a-5a	0	0	0	0	0	0	0	0
5a-6a	0	0	0	0	0	0	0	0
6a-7a	0	0	0	0	0	0	0	0
7a-8a	0	0	0	0	0	0	0	0
8a-9a	0	1	0	0	1	0	0	2
9a-10a	0	0	0	0	0	0	1	1
10a-11a	0	0	0	0	0	0	0	0
11a-12p	0	0	1	0	0	0	0	1
12p-1p	2	0	0	0	0	0	0	2
1p-2p	0	0	0	0	0	0	0	0
2p-3p	1	0	1	0	0	0	0	2
3p-4p	0	1	0	1	0	1	0	3
4p-5p	1	1	2	2	1	1	0	8
5p-6p	0	0	1	1	0	2	0	4
6p-7p	0	0	0	0	0	0	0	0
7p-8p	0	0	0	0	0	1	0	1
8p-9p	0	0	0	0	0	0	0	0
9p-10p	0	0	0	0	0	0	0	0
10p-11p	0	0	0	0	0	0	0	0
11p-12a	0	0	0	0	0	0	0	0
Totals	4	3	5	5	2	5	1	25



Transportation Improvement Association

Crash Detail for 1/1/2020 - 12/31/2024

Criteria: WHERE A.AGENCY_ID = 14 AND A.GeoCoords.STIntersects (GEOMETRY::STGeomFromWKB(GEOGRAPHY::STPointFromText('POINT(-83.2391427543014

#1 Location: S LAPEER (6.775) 32 feet Sof ODANAH Crash ID: 1932845
Date: 01/07/2020 Day: Tue Hour: 5pm Weather: clear Roadway: dry Light: dark/ltd
Injy K: 0 Injy A: 0 Injy B: 0 Injy C: 0 Injy 0: 2 How: rr-end
CVT: Orion Twp Area: inter other HBD: N Drugs: N Complaint #: 200004501
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 N go straight veh in transpt none none none none unable to stop car ctrfront
2 N slow/stop on rd veh in transpt none none none none none car ctrear
UD10: 1932845

#2 Location: S LAPEER (6.772) 48 feet Sof ODANAH Crash ID: 2008664
Date: 05/09/2020 Day: Sat Hour: 3pm Weather: clear Roadway: dry Light: day
Injy K: 0 Injy A: 0 Injy B: 0 Injy C: 1 Injy 0: 3 How: rr-end
CVT: Orion Twp Area: straight HBD: N Drugs: N Complaint #: 200094013
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 S go straight veh in transpt none none none none unable to stop car ctrfront
2 S go straight veh in transpt none none none none none car ctrear
3 S slow/stop on rd veh in transpt none none none none none car ctrear
UD10: 2008664

#3 Location: LAPEER (6.775) 32 feet Sof ODANAH ST Crash ID: 2022619
Date: 06/02/2020 Day: Tue Hour: 12p Weather: clear Roadway: dry Light: day
Injy K: 0 Injy A: 0 Injy B: 0 Injy C: 2 Injy 0: 1 How: rr-end
CVT: Orion Twp Area: inter other HBD: N Drugs: N Complaint #: 200111158
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 N go straight veh in transpt none none none none unable to stop car ctrfront
2 N stop on road veh in transpt none none none none none car ctrear
UD10: 2022619

#4 Location: ODANAH (0.219) 0 feet Nof S LAPEER RD Crash ID: 2079569
Date: 08/19/2020 Day: Wed Hour: 3pm Weather: clear Roadway: dry Light: day
Injy K: 0 Injy A: 0 Injy B: 2 Injy C: 0 Injy 0: 0 How: rr-end
CVT: Orion Twp Area: straight HBD: N Drugs: N Complaint #: 200167197
Unit# Veh Dir Action Prior Event 1 Event 2 Event 3 Event 4 Haz Action Veh Type Damage
1 N go straight veh in transpt none none none none unable to stop car ctrfront
2 N slow/stop on rd veh in transpt none none none none none car ctrear
UD10: 2079569



#5 Location: LAPEER (6.783) 10 feet Nof ODANA ST **Crash ID:** 2102649
Date: 09/16/2020 **Day:** Wed **Hour:** 7am **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 200186557

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrear

UD10: [2102649](#)

#6 Location: LAPEER (6.787) 32 feet Nof ODANA ST **Crash ID:** 2205811
Date: 01/26/2021 **Day:** Tue **Hour:** 8am **Weather:** snow **Roadway:** snow **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210016414

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	pickup	ctrear

UD10: [2205811](#)

#7 Location: S LAPEER (6.785) 21 feet Nof ODANA ST **Crash ID:** 2239377
Date: 03/12/2021 **Day:** Fri **Hour:** 8pm **Weather:** clear **Roadway:** dry **Light:** dark/unltd
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** Y **Drugs:** N **Complaint #:** 210049412

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [2239377](#)

#8 Location: ODANA (0.211) 42 feet Wof S LAPEER RD **Crash ID:** 2316659
Date: 06/22/2021 **Day:** Tue **Hour:** 8pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** Y **Drugs:** N **Complaint #:** 210125921

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	E	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrear

UD10: [2316659](#)



#9 Location: S LAPEER (6.785) 21 feet Nof ODANAHAVE **Crash ID:** 2378761
Date: 09/08/2021 **Day:** Wed **Hour:** 8am **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210186140

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrear

UD10: [2378761](#)

#10 Location: S LAPEER (6.787) 30 feet Nof ODANAHA **Crash ID:** 2414456
Date: 10/13/2021 **Day:** Wed **Hour:** 12p **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 1 **How:** ss-same
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210213135

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	carels driving	car	none
2	S	stop on road	veh in transpt	none	none	none	none	pickup	rtside

UD10: [2414456](#)

#11 Location: S BROADWAY (6.785) 20 feet Nof ODANAHA **Crash ID:** 2427232
Date: 10/22/2021 **Day:** Fri **Hour:** 4pm **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 210220474

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [2427232](#)

#12 Location: SB LAPEER (6.777) 20 feet Sof NE ODANAHA **Crash ID:** 2487062
Date: 12/14/2021 **Day:** Tue **Hour:** 9am **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** head-on/lt
CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 210260689

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	NW	left turn	veh in transpt	none	none	none	failed to yield	car	lftfront
2	S	go straight	veh in transpt	none	none	none	none	pickup	lftrear

UD10: [2487062](#)



#13 Location: ODANAH (0.218) 5 feet Wof S LAPEER RD **Crash ID:** 2570113
Date: 04/16/2022 **Day:** Sat **Hour:** 4pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 3 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 220079707

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	start on rdwy	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	E	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [2570113](#)

#14 Location: S LAPEER (6.777) 20 feet Sof ODANAH ST **Crash ID:** 2709443
Date: 10/07/2022 **Day:** Fri **Hour:** 5pm **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 220225466

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	stop on road	veh in transpt	none	none	none	none	car	lftrear
2	N	slow/stop on rd	veh in transpt	none	none	none	unable to stop	pickup	rtrfront

UD10: [2709443](#)

#15 Location: LAPEER (6.783) 11 feet Nof ODANAH AVE **Crash ID:** 2928409
Date: 06/23/2023 **Day:** Fri **Hour:** 9am **Weather:** rain **Roadway:** wet **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 2 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 230154556

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	slow/stop on rd	veh in transpt	none	none	none	unable to stop	car	lftfront
2	S	stop on road	veh in transpt	none	none	none	none	car	lftrear

UD10: [2928409](#)

#16 Location: S LAPEER (6.781) 0 feet Xof ODANAH **Crash ID:** 2943002
Date: 07/13/2023 **Day:** Thu **Hour:** 5am **Weather:** rain **Roadway:** wet **Light:** dawn
Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 0 **Injy 0:** 1 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 230172196

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [2943002](#)



#17 Location: S LAPEER (6.785) 21 feet Nof ODANAH **Crash ID:** 2956406
Date: 07/29/2023 **Day:** Sat **Hour:** 2pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 2 **Injy C:** 0 **Injy 0:** 0 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 230187390

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	go straight	veh parked	none	none	none	unable to stop	car	ctrfront
2	S	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [2956406](#)

#18 Location: S LAPEER (6.769) 63 feet Sof ODANAH AVE **Crash ID:** 2957272
Date: 07/31/2023 **Day:** Mon **Hour:** 12p **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** angle
CVT: Orion Twp **Area:** inter driveway **HBD:** N **Drugs:** N **Complaint #:** 230188958

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	enter rdwy	veh in transpt	none	none	none	failed to yield	car	lftfront
2	S	go straight	veh in transpt	none	none	none	none	car	rtside

UD10: [2957272](#)

#19 Location: LAPEER (6.787) 200 feet Sof HEIGHTS **Crash ID:** 3011289
Date: 09/28/2023 **Day:** Thu **Hour:** 12p **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** head-on/lt
CVT: Orion Twp **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 230244030

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	left turn	veh in transpt	none	none	none	failed to yield	car	rtrear
2	SE	go straight	veh in transpt	none	none	none	none	car	ctrfront

UD10: [3011289](#)

#20 Location: ODANAH (0.205) 75 feet Wof LAPEER RD **Crash ID:** 3166894
Date: 04/01/2024 **Day:** Mon **Hour:** 8am **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 240083055

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	change lanes	veh in transpt	none	none	none	failed to yield	car	rtfront
2	E	go straight	veh in transpt	none	none	none	none	car	lftside

UD10: [3166894](#)



#21 Location: ODANAH (0.219) 10 feet Wof S BROADWAY ST **Crash ID:** 3198222
Date: 05/13/2024 **Day:** Mon **Hour:** 3pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 240121866

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	veh in transpt	none	none	none	unable to stop	pickup	ctrfront
2	E	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [3198222](#)

#22 Location: ODANAH (0.217) 10 feet Wof S LAPEER RD **Crash ID:** 3199044
Date: 05/14/2024 **Day:** Tue **Hour:** 8pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** Y **Drugs:** N **Complaint #:** 240123038

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	E	stop on road	veh in transpt	none	none	none	none	car	ctrear

UD10: [3199044](#)

#23 Location: ODANAH (0.215) 20 feet Wof S LAPEER RD **Crash ID:** 3210854
Date: 05/27/2024 **Day:** Mon **Hour:** 12p **Weather:** cloudy **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 1 **Injy C:** 0 **Injy 0:** 0 **How:** single
CVT: Orion Twp **Area:** w/i intersection **HBD:** N **Drugs:** N **Complaint #:** 240134690

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	E	right turn	pedestrian	none	none	none	failed to yield	pickup	rffront
2		crossing at inter	veh in transpt	none	none	none	none	uncoded	none

UD10: [3210854](#)

#24 Location: NB LAPEER (6.783) 10 feet Wof ODANAH AVE **Crash ID:** 3220073
Date: 06/09/2024 **Day:** Sun **Hour:** 8am **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 1 **Injy 0:** 1 **How:** angle
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 240146586

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	disrgd traffic cntrl	car	ctrfront
2	E	go straight	veh in transpt	none	none	none	none	car	rtside

UD10: [3220073](#)



#25 Location: LAPEER (6.77) 60 feet Sof ODANHA ST **Crash ID:** 3238304
Date: 07/02/2024 **Day:** Tue **Hour:** 1pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-same
CVT: Orion Twp **Area:** driveway **HBD:** N **Drugs:** N **Complaint #:** 240166469

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	S	change lanes	veh in transpt	none	none	none	other	car	rtside
2	S	start on rdwy	veh in transpt	none	none	none	none	car	lffront

UD10: [3238304](#)

#26 Location: LAPEER (6.777) 20 feet Sof ODANAHA ST **Crash ID:** 3242477
Date: 07/08/2024 **Day:** Mon **Hour:** 1pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** inter other **HBD:** N **Drugs:** N **Complaint #:** 240171165

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	start on rdwy	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	start on rdwy	veh in transpt	none	none	none	none	car	ctrear

UD10: [3242477](#)

#27 Location: ODANAH (0.204) 80 feet Wof S LAPEER RD **Crash ID:** 3379416
Date: 11/25/2024 **Day:** Mon **Hour:** 11a **Weather:** cloudy **Roadway:** wet **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** ss-opp
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 240291657

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	W	go straight	veh in transpt	none	none	none	wrong way	car	lffront
2	E	stop on road	veh in transpt	none	none	none	none	car	lffront

UD10: [3379416](#)

#28 Location: LAPEER (6.779) 10 feet Sof ODANAH AVE **Crash ID:** 3390464
Date: 12/13/2024 **Day:** Fri **Hour:** 1pm **Weather:** clear **Roadway:** dry **Light:** day
Injy K: 0 **Injy A:** 0 **Injy B:** 0 **Injy C:** 0 **Injy 0:** 2 **How:** rr-end
CVT: Orion Twp **Area:** straight **HBD:** N **Drugs:** N **Complaint #:** 240306644

Unit#	Veh Dir	Action Prior	Event 1	Event 2	Event 3	Event 4	Haz Action	Veh Type	Damage
1	N	go straight	veh in transpt	none	none	none	unable to stop	car	ctrfront
2	N	slow/stop on rd	veh in transpt	none	none	none	none	car	ctrear

UD10: [3390464](#)

Crash Type

Count	Type
0	uncoded
1	single
0	head-on
2	head-on/lt
2	angle
19	rr-end
0	rr-end/lt
0	rr-end/rt
3	ss-same
1	ss-opp
0	back
0	other
0	unknown
Totals	28

Lighting Conditions

Count	Type
0	uncoded
25	day
1	dawn
0	dusk
1	dark/ltd
1	dark/unltd
0	other
0	unknown
Totals	28

Weather Conditions

Count	Type
0	uncoded
20	clear
5	cloudy
0	fog
2	rain
1	snow
0	wind
0	sleet/hail
0	blowing snow
0	blowing sand
0	smoke
0	unknown
Totals	28

Road Condition

Count	Type
0	uncoded
24	dry
3	wet
0	ice
1	snow
0	mud
0	slush
0	debris
0	water
0	sand
0	oily
0	other
0	unknown
Totals	28

Crashes by Month

Count	Type
2	January
0	February
1	March
2	April
4	May
4	June
5	July
1	August
3	September
3	October
1	November
2	December
Totals	28

Hazardous Action

Count	Type
29	none
0	speeding
0	spd too slow
5	failed to yield
1	disrgd traffic cntrl
1	wrong way
0	left of center
0	imprp passing
0	imprp lane use
0	imprp turn
0	imprp/no signal
0	imprp backing
19	unable to stop
1	other
0	unknown
0	reckls driving
1	carels driving
Totals	57

Unit Type

Count	Type
0	Bicyclist
0	Engineer
56	Vehicle
1	Pedestrian
Totals	57

Crashes by Year

Count	Type
5	2020
7	2021
2	2022
5	2023
9	2024
Totals	28

Crash Severity

	Fatal	A	B	C	No Injy	Total
Persons	0	0	6	6	0	12
Crashes	0	0	4	4	20	28

Alcohol in Crashes

	Fatal	A	B	C	PDO	Total
Drinking	0	0	0	0	3	3
Not Drinking	0	0	4	4	17	25
Totals	0	0	4	4	20	28

Crashes per Hour by Day

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Total
12a-1a	0	0	0	0	0	0	0	0
1a-2a	0	0	0	0	0	0	0	0
2a-3a	0	0	0	0	0	0	0	0
3a-4a	0	0	0	0	0	0	0	0
4a-5a	0	0	0	0	0	0	0	0
5a-6a	0	0	0	0	1	0	0	1
6a-7a	0	0	0	0	0	0	0	0
7a-8a	0	0	0	1	0	0	0	1
8a-9a	1	1	1	1	0	0	0	4
9a-10a	0	0	1	0	0	1	0	2
10a-11a	0	0	0	0	0	0	0	0
11a-12p	0	1	0	0	0	0	0	1
12p-1p	0	2	1	1	1	0	0	5
1p-2p	0	1	1	0	0	1	0	3
2p-3p	0	0	0	0	0	0	1	1
3p-4p	0	1	0	1	0	0	1	3
4p-5p	0	0	0	0	0	1	1	2
5p-6p	0	0	1	0	0	1	0	2
6p-7p	0	0	0	0	0	0	0	0
7p-8p	0	0	0	0	0	0	0	0
8p-9p	0	0	2	0	0	1	0	3
9p-10p	0	0	0	0	0	0	0	0
10p-11p	0	0	0	0	0	0	0	0
11p-12a	0	0	0	0	0	0	0	0
Totals	1	6	7	4	2	5	3	28

APPENDIX F: MITIGATION CONDITIONS

HCM Signalized Intersection Capacity Analysis

4: S Broadway & Odanah Ave/Driveway

04/27/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	2	104	25	0	9	0	874	5	14	2048	0
Future Volume (vph)	125	2	104	25	0	9	0	874	5	14	2048	0
Ideal Flow (vphp)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6	5.6		5.6		5.6		6.1		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00		1.00		0.95		1.00	0.95	
Frt	1.00	0.85		1.00		0.85		1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1900	1609		1863		1667		3610		1863	3619	
Flt Permitted	0.95	1.00		0.64		1.00		1.00		0.28	1.00	
Satd. Flow (perm)	1900	1609		1254		1667		3610		555	3619	
Peak-hour factor, PHF	0.94	0.94	0.94	0.65	0.92	0.65	0.92	0.94	0.25	0.96	0.96	0.92
Adj. Flow (vph)	133	2	111	38	0	14	0	930	20	15	2133	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	133	113	0	38	0	14	0	950	0	15	2133	0
Heavy Vehicles (%)	0%	6%	6%	2%	2%	2%	2%	5%	2%	2%	5%	2%
Turn Type	Perm	NA		Perm		Prot		NA		Perm	NA	
Protected Phases		4				8		2			6	
Permitted Phases	4			8		8				6		
Actuated Green, G (s)	18.4	18.4		18.4		18.4		89.9		90.0	90.0	
Effective Green, g (s)	18.4	18.4		18.4		18.4		89.9		90.0	90.0	
Actuated g/C Ratio	0.15	0.15		0.15		0.15		0.75		0.75	0.75	
Clearance Time (s)	5.6	5.6		5.6		5.6		6.1		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	291	246		192		255		2704		416	2714	
v/s Ratio Prot		c0.07				0.01		0.26			c0.59	
v/s Ratio Perm	0.07			0.03						0.03		
v/c Ratio	0.46	0.46		0.20		0.05		0.35		0.04	0.79	
Uniform Delay, d1	46.3	46.3		44.4		43.4		5.1		3.9	9.1	
Progression Factor	1.00	1.00		1.00		1.00		1.00		1.00	1.00	
Incremental Delay, d2	5.1	6.1		0.5		0.1		0.4		0.2	2.4	
Delay (s)	51.4	52.3		44.9		43.5		5.5		4.0	11.5	
Level of Service	D	D		D		D		A		A	B	
Approach Delay (s/veh)		51.8			44.5			5.5			11.5	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay (s/veh)	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.7
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

7: Glanworth St & S Broadway

03/11/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	2	31	868	5	6	2127
Future Volume (Veh/h)	2	31	868	5	6	2127
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.50	0.68	0.93	0.50	0.50	0.70
Hourly flow rate (vph)	4	46	933	10	12	3039
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh	2			2		
Upstream signal (ft)				289		
pX, platoon unblocked	0.41					
vC, conflicting volume	2482	472			943	
vC1, stage 1 conf vol	938					
vC2, stage 2 conf vol	1544					
vCu, unblocked vol	1749	472			943	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	92			98	
cM capacity (veh/h)	256	544			736	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	50	622	321	12	1520	1520
Volume Left	4	0	0	12	0	0
Volume Right	46	0	10	0	0	0
cSH	499	1700	1700	736	1700	1700
Volume to Capacity	0.10	0.37	0.19	0.02	0.89	0.89
Queue Length 95th (ft)	8	0	0	1	0	0
Control Delay (s/veh)	13.0	0.0	0.0	10.0	0.0	0.0
Lane LOS	B			A		
Approach Delay (s/veh)	13.0	0.0			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			65.9%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

4: Odanah Ave/Driveway

04/25/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	4	67	18	0	28	0	2124	33	23	1323	0
Future Volume (vph)	185	4	67	18	0	28	0	2124	33	23	1323	0
Ideal Flow (vphpl)	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Total Lost time (s)	5.6	5.6		5.6		5.6		6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00		1.00		1.00		0.95		1.00	0.95	
Frt	1.00	0.86		1.00		0.85		1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1900	1684		1900		1700		3753		1900	3725	
Flt Permitted	0.95	1.00		0.95		1.00		1.00		0.05	1.00	
Satd. Flow (perm)	1900	1684		1900		1700		3753		93	3725	
Peak-hour factor, PHF	0.84	0.83	0.83	0.65	0.65	0.65	0.92	0.93	0.92	0.92	0.85	0.92
Adj. Flow (vph)	220	5	81	28	0	43	0	2284	36	25	1556	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	220	86	0	28	0	43	0	2320	0	25	1556	0
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%	0%	1%	2%	0%	2%	0%
Turn Type	Perm	NA		Prot		Prot		NA		Perm	NA	
Protected Phases		4!		8!		8		2			6	
Permitted Phases	4			8		8				6		
Actuated Green, G (s)	22.4	22.4		22.4		22.4		85.9		85.9	85.9	
Effective Green, g (s)	22.4	22.4		22.4		22.4		85.9		85.9	85.9	
Actuated g/C Ratio	0.19	0.19		0.19		0.19		0.72		0.72	0.72	
Clearance Time (s)	5.6	5.6		5.6		5.6		6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	354	314		354		317		2686		66	2666	
v/s Ratio Prot		0.05		0.01		0.03		c0.62			0.42	
v/s Ratio Perm	c0.12									0.27		
v/c Ratio	0.62	0.27		0.08		0.14		0.86		0.38	0.58	
Uniform Delay, d1	44.9	41.8		40.3		40.7		12.7		6.6	8.3	
Progression Factor	1.00	1.00		1.00		1.00		1.00		1.00	1.00	
Incremental Delay, d2	8.0	2.1		0.1		0.2		4.0		15.7	0.9	
Delay (s)	52.9	44.0		40.4		40.9		16.7		22.4	9.3	
Level of Service	D	D		D		D		B		C	A	
Approach Delay (s/veh)		50.4			40.7			16.7			9.5	
Approach LOS		D			D			B			A	

Intersection Summary

HCM 2000 Control Delay (s/veh)	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.7
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

7: S Broadway & Glanworth St

04/24/2025

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (veh/h)	1	31	2046	6	8	1414
Future Volume (Veh/h)	1	31	2046	6	8	1414
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.68	0.97	0.63	0.67	0.88
Hourly flow rate (vph)	1	46	2109	10	12	1607
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)				294		
pX, platoon unblocked	0.66					
vC, conflicting volume	2942	1060			2119	
vC1, stage 1 conf vol	2114					
vC2, stage 2 conf vol	828					
vCu, unblocked vol	2911	1060			2119	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	79			95	
cM capacity (veh/h)	78	224			261	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	47	1406	713	12	804	804
Volume Left	1	0	0	12	0	0
Volume Right	46	0	10	0	0	0
cSH	215	1700	1700	261	1700	1700
Volume to Capacity	0.22	0.83	0.42	0.05	0.47	0.47
Queue Length 95th (ft)	20	0	0	4	0	0
Control Delay (s/veh)	26.3	0.0	0.0	19.4	0.0	0.0
Lane LOS	D			C		
Approach Delay (s/veh)	26.3	0.0			0.1	
Approach LOS	D					
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	63.9%		ICU Level of Service		B	
Analysis Period (min)	15					

Intersection: 4: S Broadway & Odanah Ave/Driveway

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	R	T	TR	L	T	T
Maximum Queue (ft)	176	143	68	39	241	223	64	214	218
Average Queue (ft)	88	66	22	8	162	126	11	188	192
95th Queue (ft)	153	119	56	30	244	211	38	204	207
Link Distance (ft)	496	496	167	167	228	228		176	176
Upstream Blk Time (%)					1	0		33	34
Queuing Penalty (veh)					5	0		346	349
Storage Bay Dist (ft)							50		
Storage Blk Time (%)							1	40	
Queuing Penalty (veh)							7	6	

Intersection: 6: S Broadway & Heights Rd

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	40	69	20	538	536
Average Queue (ft)	14	6	1	493	487
95th Queue (ft)	40	35	14	555	564
Link Distance (ft)		176	176	482	482
Upstream Blk Time (%)				42	38
Queuing Penalty (veh)				0	0
Storage Bay Dist (ft)	20				
Storage Blk Time (%)	17				
Queuing Penalty (veh)	72				

Intersection: 7: Glanworth St & S Broadway

Movement	WB	NB	SB	SB	SB
Directions Served	LR	T	L	T	T
Maximum Queue (ft)	74	79	31	41	77
Average Queue (ft)	22	6	4	1	3
95th Queue (ft)	57	42	21	29	40
Link Distance (ft)	601	599		228	228
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			20		
Storage Blk Time (%)			1		
Queuing Penalty (veh)			8		

Network Summary

Network wide Queuing Penalty: 793

Intersection: 4: Odanah Ave/Driveway

Movement	EB	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	R	T	TR	L	T	T
Maximum Queue (ft)	251	77	57	139	265	268	69	198	202
Average Queue (ft)	145	33	17	22	246	246	26	175	170
95th Queue (ft)	227	66	46	88	254	257	69	189	212
Link Distance (ft)	248	248	170	170	235	235		171	171
Upstream Blk Time (%)	1			0	40	40		20	12
Queuing Penalty (veh)	0			0	412	411		135	83
Storage Bay Dist (ft)							50		
Storage Blk Time (%)							17	37	
Queuing Penalty (veh)							109	8	

Intersection: 6: Heights Rd

Movement	NB	NB	NB	SB	SB
Directions Served	L	T	T	T	TR
Maximum Queue (ft)	59	188	219	341	350
Average Queue (ft)	36	67	57	181	119
95th Queue (ft)	54	184	186	347	313
Link Distance (ft)		171	171	477	477
Upstream Blk Time (%)		1	1	2	1
Queuing Penalty (veh)		16	8	0	0
Storage Bay Dist (ft)	20				
Storage Blk Time (%)	31	0			
Queuing Penalty (veh)	312	0			

Intersection: 7: S Broadway & Glanworth St

Movement	WB	NB	NB	SB	SB	SB
Directions Served	LR	T	TR	L	T	T
Maximum Queue (ft)	562	644	648	32	10	10
Average Queue (ft)	389	616	616	7	0	0
95th Queue (ft)	647	631	630	27	8	7
Link Distance (ft)	563	598	598		235	235
Upstream Blk Time (%)	29	59	56			
Queuing Penalty (veh)	0	0	0			
Storage Bay Dist (ft)				20		
Storage Blk Time (%)				6		
Queuing Penalty (veh)				40		

Network Summary

Network wide Queuing Penalty: 1534