

**FEASIBILITY STUDY:
MONROE STREET
INTERCHANGE**

MAY 2019

PID 105889
SYLVANIA, OHIO

PREPARED FOR:
CITY OF SYLVANIA
6730 MONROE STREET
SYLVANIA, OHIO 43560

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EXECUTIVE SUMMARY

Background

The US 23 & Monroe Street interchange serves as the primary access point onto a major freeway for Sylvania residents. With this interchange being the last along the freeway before entering the state of Michigan to the north, it is frequently used by residents of Michigan and Ohio. The City of Sylvania initiated this study due to the need to improve safety and congestion at the Monroe Street and US 23 interchange.

An Interchange Modification Study was performed previously for the I-475 and US 20 interchange. The study area also included the I-475 and US 23 interchange system along with the interchange of US 23 and Monroe Street (SR 51). Capacity analyses were completed for all interchanges located in the study area. The results of the capacity analyses indicated that deficiencies at the US 23 and Monroe Street interchange were present and the interchange was a high priority for need of improvement.

Purpose & Need

The purpose of this project is to improve traffic operations and enhance safety for motorized and non-motorized traffic at the US 23 and Monroe Street (SR 51) interchange and along the Monroe Street corridor. Existing geometric deficiencies, along with the growth in the surround area has degraded the operation and safety at the existing interchange and adjacent roadways.

Need Elements that support this purpose:

- From 2014-2016, 60 crashes at Monroe Street & Northbound US 23 Ramps and 44 crashes at Monroe Street & Southbound US 23 Ramps
- Inadequate signal spacing –all signals are spaced less than the required minimum of $\frac{1}{4}$ mile(1320 feet) and result in vehicular congestion and crashes
- Poor levels of service at several intersections results in traffic congestion and crashes
- Geometric deficiencies also contribute to crashes
- Incomplete pedestrian facilities does not support non motorist mobility

Study Overview

The process of this study included collaborative involvement with the design team, City of Sylvania, ODOT District 2, and stakeholders and residents located within the project area. The study was conducted following ODOT standards and practices of the Project Development Process. The following steps were taken in developing a preferred feasible alternative.

- Evaluation of Existing and No Build conditions
- Identification of deficiencies
- Performance of safety and operational analyses
- Development of alternatives
- Evaluation of best feasible alternatives
- Determination of preliminary planning level cost estimates
- Selection of preferred feasible alternative

Findings

Preliminary alternatives eliminated included: minor modifications to the existing interchange, Single Point Urban Interchange, Roundabouts, Tight Diamond Interchange, and a Diverging Diamond Interchange. These alternatives were eliminated due to the following reasons:

- Poor signal spacing
- Unacceptable intersection operations (poor levels of service)
- Right-of-Way impacts
- Bridge Impacts
- Impacts to Glasgow Road access

Two Feasible Alternatives (A and B) were carried forward for further evaluation and involved a hybrid configuration. Alternative A and Alternative B (presented in Figures ES-1 and ES-2) were able to address the existing safety concerns of the study area and accommodate the growth in future traffic conditions, while improving the performance of several surrounding intersections. In addition, four improvement options to the Glasgow Road intersection were evaluated along with a proposed widening of Monroe Street beginning at Harroun Road was also evaluated. The evaluations of the Glasgow Road Options and the Monroe Street widening were applicable to both of the Feasible Alternatives. The following feasible alternatives were evaluated.

Alternative A

- New northbound US 23 exit ramp splits vehicles turning left or right onto Monroe Street (SR 51) to be directed to two (2) separate intersections
- Northbound US 23 entrance ramp north of Monroe Street (SR 51) remains as existing
- Includes three (3) signalized intersections on Monroe Street (SR 51)

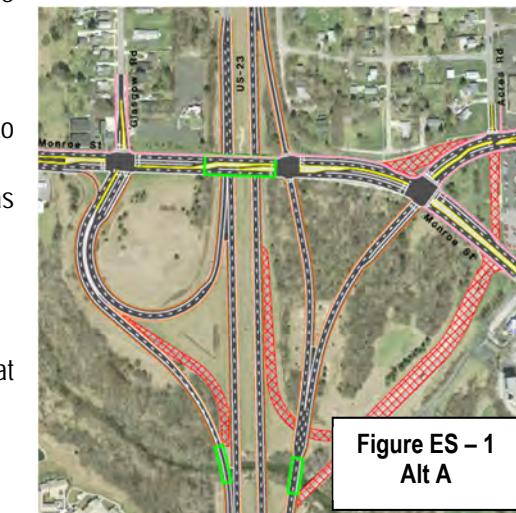


Figure ES - 1
Alt A

Alternative B

- New exit and entrance ramp are accessible from a single intersection at Monroe Street and West Alexis Road
- Northbound US 23 entrance ramp is converted to a loop ramp
- Includes two (2) signalized intersections on Monroe Street (SR 51)

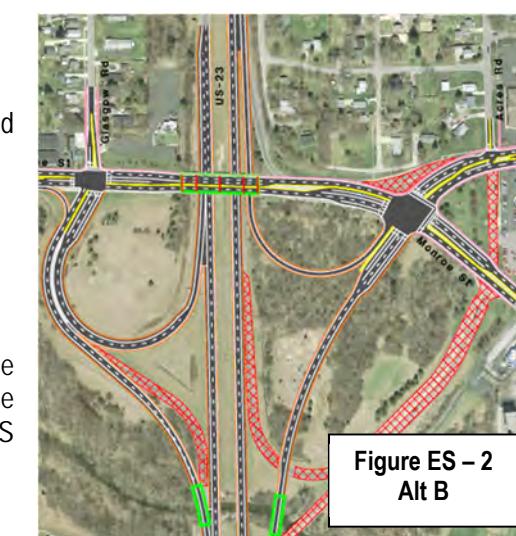


Figure ES - 2
Alt B

Glasgow Option 1

- No change to loop ramps, maintain existing Glasgow Road alignment

Glasgow Option 2

- Extend southbound loop ramp curvature and realign square to Glasgow Road

Glasgow Option 3

- Glasgow realigned to the west of existing approach

Glasgow Option 4

- Glasgow aligned to the east of existing approach

Monroe Street Widening

- Additional eastbound lane from west of the Harroun Road intersection all the way up to the intersection of Glasgow Road and Monroe Street, where the additional lane would develop into the eastbound right turn lane for the SB US 23 on ramp

Preferred Alternative

The determination of the Feasible Alternative is based on meeting the purpose and need of the project along with public input. Regarding safety, future capacity, and the existing deficiencies within the study area, Feasible Alternative B with Glasgow Option 1 addresses the purpose and needs of the project best. Additionally, Alternative B received higher public support than Alternative A.

Alternative B addresses the following concerns of the interchange:

- Reduces number of signalized intersections from four (4) intersections to two (2) and improves intersection spacing
- Improves capacity for the transportation network and improves operation for all project area signalized intersections
- Maintains the existing width of the Monroe Street Bridge that will be re-decked in 2021
- Addresses crash concerns by improving levels of service and ramp geometric deficiencies
- Has less complex on and off US 23 access than Alternative A

Glasgow Option 1 addresses the following concerns of the interchange:

- Improves ramp curvature while maintaining the existing alignment with Monroe Street

- Minimizes any right-of-way impacts to the properties adjacent to the intersection
- Minimizes any environmental impacts to the nearby floodplains and wetlands
- Maintains the existing signalized access to Glasgow Road
- Improves intersection safety by upgrading signal to include North/South split phasing

In addition, the improvements to widen Monroe Street beginning at Harroun Road are expected to improve the overall operation of several signalized intersections along Monroe Street. These improvements address the project purpose and need to improve safety and traffic operations.

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1.0 PROJECT INTRODUCTION

1.1 General

At the request of the City of Sylvania, the Mannik & Smith Group (MSG) has completed a feasibility study pertaining to improving the interchange of Monroe Street and US 23 located in Sylvania, Ohio. The improvement of this interchange is needed based on safety and traffic operational concerns. A feasibility study is necessary to document the existing conditions, identify needs, evaluate improvements, and provide cost estimates for the preferred improvements. The proposed project would focus on providing a traffic network that maintains efficient traffic operations through a 20 year horizon, as well as enhances the safety for both vehicular and non-motorized traffic. The objectives of the traffic study were to:

1. Gain an understanding of the characteristics of the existing transportation network within the immediate vicinity of the interchange;
2. Identify opportunities and challenges within the nearby transportation network as related to the proposed alternatives;
3. Project future traffic volumes and patterns near the interchange in coordination with Toledo Metropolitan Area Council of Governments (TMACOG);
4. Evaluate future traffic operations near the interchange;
5. Assess opportunities and challenges associated with the future transportation network and their relationship to the interchange;
6. Assess impacts to Monroe Street operations posed by reconfiguring the interchange;
7. Develop recommendations for the future transportation network to best serve its current users, future users, and the proposed interchange.

To meet these above-stated objectives, MSG performed the following:

- Safety Analysis – Collected most recent crash data and evaluated crash patterns to determine locations of safety concern
- Operational Analysis – Used traffic data collected to evaluate the existing operational conditions throughout the corridor
- Identification of Deficiencies – Reevaluated existing conditions of roads and ramp curvature within the project area to identify the need for improvements based upon failure to meet current design requirements
- Development and analysis of alternatives to address safety and operation concerns
- Identification of best feasible alternatives
- Develop preliminary planning level cost estimates

1.2 Project Study Area

The study area as presented in Figure 1.1, includes the US 23 and Monroe Street interchange located on the northeast side of the City of Sylvania. US 23, oriented north to south, connects travelers with the state of Michigan to the north and with the I-475 interchange to the south. The southbound US 23 ramp configuration consists of a typical loop configuration on the south side of Monroe Street that includes one off ramp and one on ramp. The northbound ramp configuration includes two on ramps, a slip ramp for westbound Monroe Street to the north and a loop ramp at the intersection of Monroe Street at Acres Road. The northbound off ramp is a typical deceleration ramp that joins the southeast on ramp at the intersection of Monroe Street. The Monroe Street interchange with US 23 serves as the primary access point onto a major freeway for Sylvania residents.

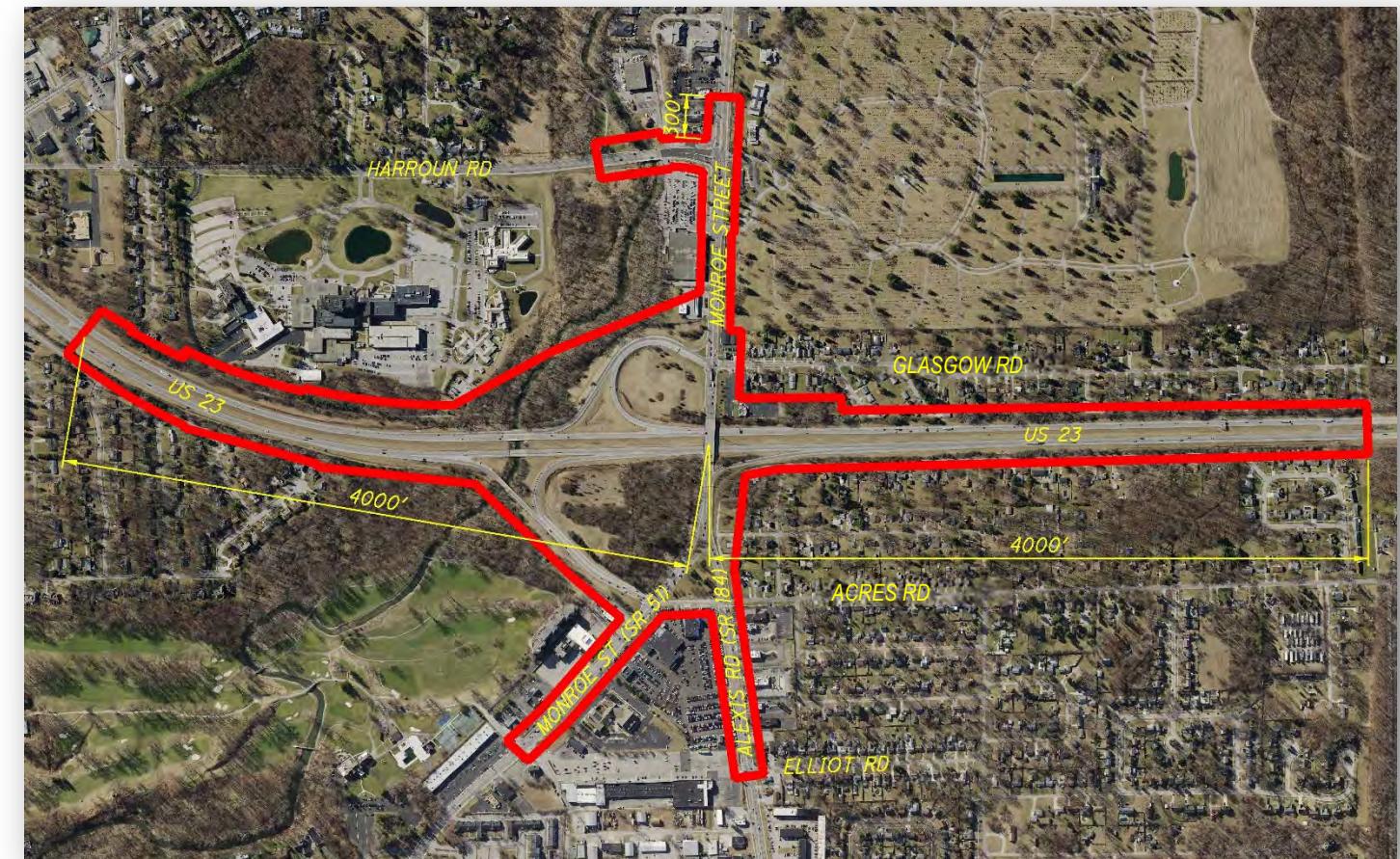


Figure 1.1 Project Study Area

1.3 Previous Studies

The following studies were previously performed within the project study area that reflected the need for a Feasibility Study. The studies, provided by ODOT and the City of Sylvania, were used to provide background information applicable to the proposed interchange alternatives considered in this study.

- In 2007 the *I-475 Strategic Plan* was completed. The purpose of this was to identify deficiencies and develop an overall strategy for the I-475/US 23 system around the Toledo metropolitan area to accommodate the transportation needs through the year 2035. The study evaluated several elements including safety, capacity analysis, accessibility and environmental concerns. The final recommended improvements were prioritized based on the magnitude of the 2035 congestion and the seriousness of the current safety problems at each location. The study identified the US 23 and Monroe Street (SR 51) interchange as requiring an interchange upgrade. Furthermore, this study identified the need for a third lane addition (in each direction) on US 23 from I-475 to Monroe Street (SR 51).
- An Interchange Modification Study was performed previously for the I-475/US 23 & US 20 interchange. The study area also included the I-475 and US-23 interchange system along with the interchange of US-23 and Monroe Street. Capacity and operational analyses were completed for all interchanges located in the study area under the 2035 No Build and Build conditions. Under both the No Build and Build conditions for the new I-475/US 23 & US 20 interchange, the capacity analyses indicated that deficiencies were expected at the interchange of US 23 and Monroe Street. The study identified that deficiencies were present on US 23 between I-475 and Monroe Street (SR 51) and was in need of a lane addition that was outside the scope of that project.
- A safety study was conducted on Monroe Street from Harroun Road to the Kroger Drive intersections in 2017. The study included traffic data for the intersection of Monroe Street and Harroun Road that was used in the completion of this study. The safety study included the changes at the following locations, of which will be included in the evaluation of this interchange study:
 - Monroe/Kroger Intersection
 - Upgrade traffic signal equipment & clearance intervals
 - Install emergency-vehicle preemption
 - Install pedestrian countdown timers and make pedestrian infrastructure ADA compliant (include continental style crosswalks)
 - Convert cemetery driver to right-in/right-out
 - Remove EB Monroe Street left turn lane
 - Install overhead lane use assemblies with trailblazers to US 23 interchange
 - Monroe/Harroun Intersection
 - Upgrade traffic signal equipment & clearance intervals
 - Install emergency-vehicle preemption
 - Install pedestrian countdown timers and make pedestrian infrastructure ADA compliant (include continental style crosswalks)
 - Align Harroun Road & cemetery legs to create zero-offset left turn lanes
 - Install left turn lane from cemetery
 - Extend WB Monroe Street left turn lanes
 - Install overhead lane use assemblies with trailblazers to US 23 interchange

1.4 Purpose and Need Statement

Project History

The City of Sylvania is conducting a Feasibility Study for the LUC US-23 11.75 project. The project involves engineering for a Feasibility Study for the reconstruction of the US-23 interchange with Monroe Street and Alexis Road in the City of Sylvania. This project involves the Planning (PL) and Preliminary Engineering (PE) phases of the PDP phased approach. The study area includes 1) US-23 interchange with Monroe Street and Alexis Road, 2) Monroe Street from Harroun Road to 0.25 miles east of Acres Road and 3) Alexis Road from Monroe Street to Elliott Drive.

Local land use and visioning documents that are relevant to the study area include the Codified Ordinances of Sylvania (2005), which is the City's Planning and Zoning Code; as well as the City of Sylvania, Ohio Land Use Plan (2010), which provides an overall context for development decisions on issues related to land use, transportation, and community facilities. Lucas County has a transportation plan created by the Toledo Metropolitan Area Council of Governments. This plan, On the Move 2007 2035 Transportation Plan (Updated in 2011), provides a program of transportation projects, initiatives, and policies that guide public investment over 28 years to enhance the regional transportation system.

The project is currently only funded through the Feasibility Study. Funding sources will be identified later in the Study, and the future schedule will be based on funding availability.

Purpose Statement

The purpose of this project is to improve existing facility deficiencies, existing and future safety and congestion concerns, and mitigate environmental impacts of any interchange improvements on nearby sensitive areas.

Need Elements

Crash rates at the on/off ramp intersections on Monroe Street are higher than those of nearby local intersections. Between 2014 and 2016, 44 crashes occurred at the southbound on and off Ramps, and 60 crashes occurred at the NB on and off Ramps. These two intersections account for 56 percent of the crashes within the Study Area. As such, safety is a primary concern for this feasibility study. In addition, four out of nine intersections in the study area are projected to drop to a Level of Service E or F by 2045, suggesting that congestion may become a major concern in the future. The ramp barrier on the northbound US-23 off Ramp to Monroe Street shows evidence of unreported crashes, which may indicate that the ramp curvature is creating a safety issue due to facility deficiencies.

Summary Statement

The purpose of this project is to improve existing facility deficiencies, existing and future safety and congestion concerns, and mitigate environmental impacts of any interchange improvements on nearby sensitive areas.

Logical Termini and Independent Utility

Logical termini are based on where the transportation problem begins and ends. Safety, congestion, and existing facility deficiencies are the primary needs in the study area. The logical termini are the two intersections with high crash rates and future level of service concerns at either end of the study area: Harroun Road marks the western terminus (with 16 crashes between 2014 and 2016 and a projected LOS D in 2045), and the southbound US-23 on and off Ramps mark the eastern terminus (with 60 crashes between 2014 and 2016 and a projected LOS D in 2045).

1.5 Area Planned Projects

Local projects that are planning to be constructed in the area prior to the opening year of this study must be taken into consideration in the planning of any improvements intended for the project area. The following projects intend to take place within the study area that could potentially influence design decisions.

Projects Programmed:

- US-23 Noise Wall (PID: 106931)
 - Currently in design
 - 2020 Construction
 - \$6 Million
- Monroe Street (SR 51) Bridge Deck Replacement (PID: 96010)
 - Currently in design
 - 2021 Construction
 - \$3 Million
- Alexis Road Safety Improvements (LUC-184-0.30, PID 107164) at Acres Road and Elliott Drive
 - Currently in design
 - 2020 Construction
 - \$0.5 Million
- Monroe Street & Harroun Road Safety Improvements (LUC-CR4-9.77, PID 109598)
 - 2019-2020 Design
 - 2022 Construction
 - \$2 Million

Projects Not Programmed:

- NB US 23 off Ramp Bridge Replacement (PID: 101333)
 - 2025 Construction (Estimated)
 - \$6 Million
- Sylvania River Trail (Phase Two)
 - Completed in 2018
 - \$2 Million

Figure 1.2 maps the locations of these future projects within the project study area.

Figure 1.2 Area Projects



Other projects immediately outside of the study area along the I-474 & US 23 corridor include:

- I-475/US 23 & Dorr Street (SR 246) Interchange
 - Currently in design
 - 2020 Expected Construction
- I-475/US 23 and Illinois Avenue (US 20A) Interchange
 - Currently in preliminary engineering

2.0 EXISTING TRANSPORTATION NETWORK

2.1 Existing Roadway Facilities

Vehicular access to the study area and circulation within the study area is provided by several roadways. These facilities range from freeways, to local roads that connect locations to a US freeway route. Further information regarding each of these roadways, including the roadway functional classification (i.e., arterial, collector, local road), configuration (divided/undivided), number of lanes, and Annual Average Daily Traffic (AADT) is provided in this section. The AADT reported for each roadway was obtained from the ODOT TIMS database. If the TIMS database did not include an AADT for a roadway then AADT's were determined using the collected traffic volume data. Traffic count data is provided in Appendix A for each of the study area intersections.



US 23

- Functional classification: Urban Freeway or Expressway
- Four (4) lane divided roadway
- AADT (2016): 60,207
- Posted Speed Limit : 65 MPH
- Maintenance jurisdiction: ODOT



SB US 23 On Ramp

- Functional classification: Urban Minor Collector
- One (1) lane, one (1) way roadway
- AADT (2016): 10,066
- Advisory Speed Limit: 30 MPH
- Maintenance jurisdiction: ODOT
- Has two points of access, a channelized eastbound right turn lane and a westbound left turn lane.
- Becomes a two (2) lane divided roadway with SB US 23 off Ramp prior to Monroe Street approach



SB US 23 Off Ramp

- Functional Classification: Urban Minor Collector
- One (1) lane, one (1) way roadway
- AADT (2016): 2,447
- No Posted Advisory Speed Limit
- Maintenance Jurisdiction: ODOT
- Becomes a three (3) lane divided roadway with SB US 23 on Ramp at Monroe Street approach



NB US 23 South On Ramp

- Functional classification: Urban Minor Collector
- One (1) lane, one (1) way roadway
- AADT (2016): 1,058
- No Posted Advisory Speed Limit
- Maintenance jurisdiction: ODOT
- Becomes a three (3) lane divided roadway with NB US 23 off Ramp at Monroe Street approach



NB US 23 Off Ramp

- Functional classification: Urban Principal Arterial
- One (1) lane, one (1) way roadway
- AADT (2016): 11,087
- Advisory Speed Limit: 35 MPH
- Maintenance jurisdiction: ODOT
- Becomes a two (2) lane divided roadway with NB US 23 on Ramp prior to Monroe Street approach



NB US 23 North On Ramp

- Functional Classification: Urban Principal Arterial
- One (1) lane, one (1) way roadway
- AADT (2016) 1,831
- No Posted Speed Limit
- Maintenance Jurisdiction: ODOT
- Only accessible from the westbound side of Monroe Street



Monroe Street

- Functional classification: Urban Principal Arterial east of SB US 23 Ramp, Urban Minor Arterial west of SB US 23 Ramp.
- Four (4) lane roadway divided by a TWTL
- AADT (2016): 34,876
- Posted Speed Limit: 35
- Maintenance jurisdiction: City of Sylvania



Harroun Road

- Functional classification: Urban Major Collector
- Four (4) lane undivided roadway, becomes 5 lane divided roadway at Monroe Street
- AADT (2016): 16,982
- Posted Speed Limit: 35 MPH
- Maintenance jurisdiction: City of Sylvania



Glasgow Road

- Functional classification: Urban Local Roadway
- Two (2) lane undivided roadway
- AADT (2017): 1,300
- Posted Speed Limit: 25 MPH
- Maintenance Jurisdiction: City of Sylvania
- No outlet road, ending at Michigan state line. Length is 4,015' and is likely the legacy condition from the interstate construction many decades ago



Alexis Road (SR 184)

- Functional classification: Urban Principal Arterial
- Four (4) lane roadway divided by a TWTL
- AADT (2016): 20,386
- Posted Speed Limit: 40 PMH
- Maintenance jurisdiction: City of Sylvania



Acres Road

- Functional classification: Urban Local Roadway north of Alexis Road, Urban Principal Arterial south of Alexis Road
- Two (2) lane, undivided roadway
- AADT (2016): 4,335
- Posted Speed Limit: 25 MPH
- Maintenance jurisdiction: City of Sylvania



Elliot Road

- Functional classification: Urban Local Roadway
- Two (2) lane, undivided roadway
- AADT (2016): 1,080
- Posted Speed Limit: 25 MPH
- Maintenance jurisdiction: City of Sylvania

2.2 Bridges

The existing condition of bridges, the location, and other factors must be considered to determine if additional improvements or redevelopments of these structures are feasible for the proposed alternatives. Further information on the existing condition of each of the bridges within the study area is described below. The information includes the bridge rating provided by ODOT. Detailed bridge inventory and inspection reports can be found in Appendix B.

Monroe Street (SR 51) Bridge

- Date Built 07/01/1960
- Rating: 7
- Scheduled for redecking in 2021 – PID 96010

NB US 23 Bridge

- Date Built: 07/01/1962
- Rating: 7
- Bridge repairs completed in 2017 – PID 106166

NB US 23 Off Ramp Bridge

- Date Built: 07/01/1962
- Rating: 5
- Scheduled for full replacement in 2025 – PID 101333

SB US 23 Bridge

- Date Built: 07/01/1962
- Rating: 6
- No scheduled improvements

With the condition of the existing bridges it is likely that the proposed alternatives will include a new bridge for the NB US 23 off Ramp Bridge that is in need of replacement. The benefit of this is that it will not put a restriction on developing a proposed alternative that can accommodate the existing structure, unlike the Monroe Street (SR 51) Bridge. The Monroe Street (SR 51) bridge crosses US 23 and is currently scheduled for a re-decking project to begin in 2021, prior to the Opening Day of this project. Careful consideration must be made with the proposed alternatives to evaluate if the existing structure can accommodate the future traffic conditions.

2.3 Area Land Uses

The project area includes several intersections adjacent to the interchange, and contains several different land uses throughout. The Monroe Street (SR 51) and Alexis Road (SR 184) corridors are densely populated with commercial and retail businesses, restaurants, and residential neighborhoods as well as a variety of uses. The surrounding land uses are illustrated in Figure 2.1, which include a hospital, golf course, and cemetery among several other types.

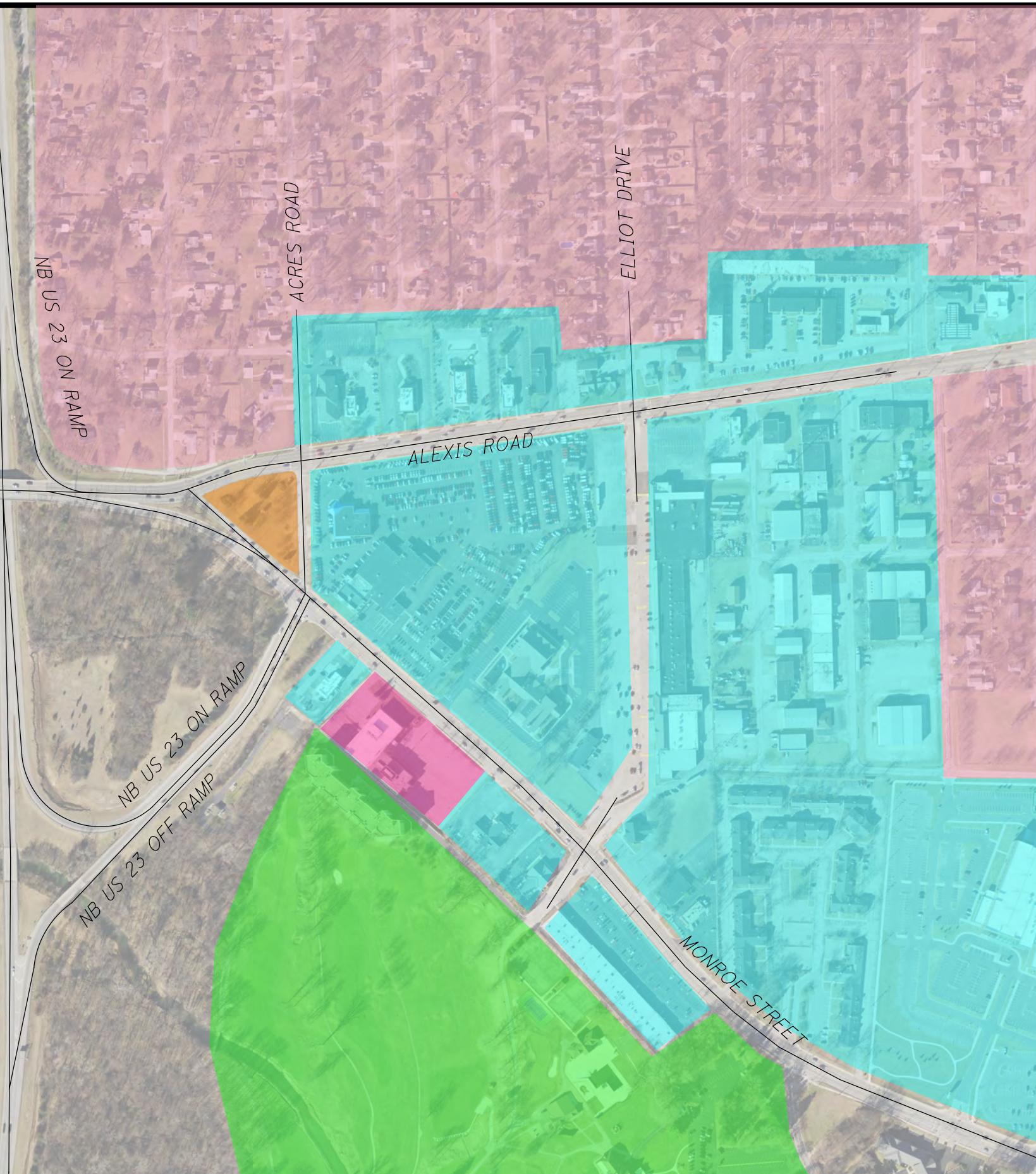
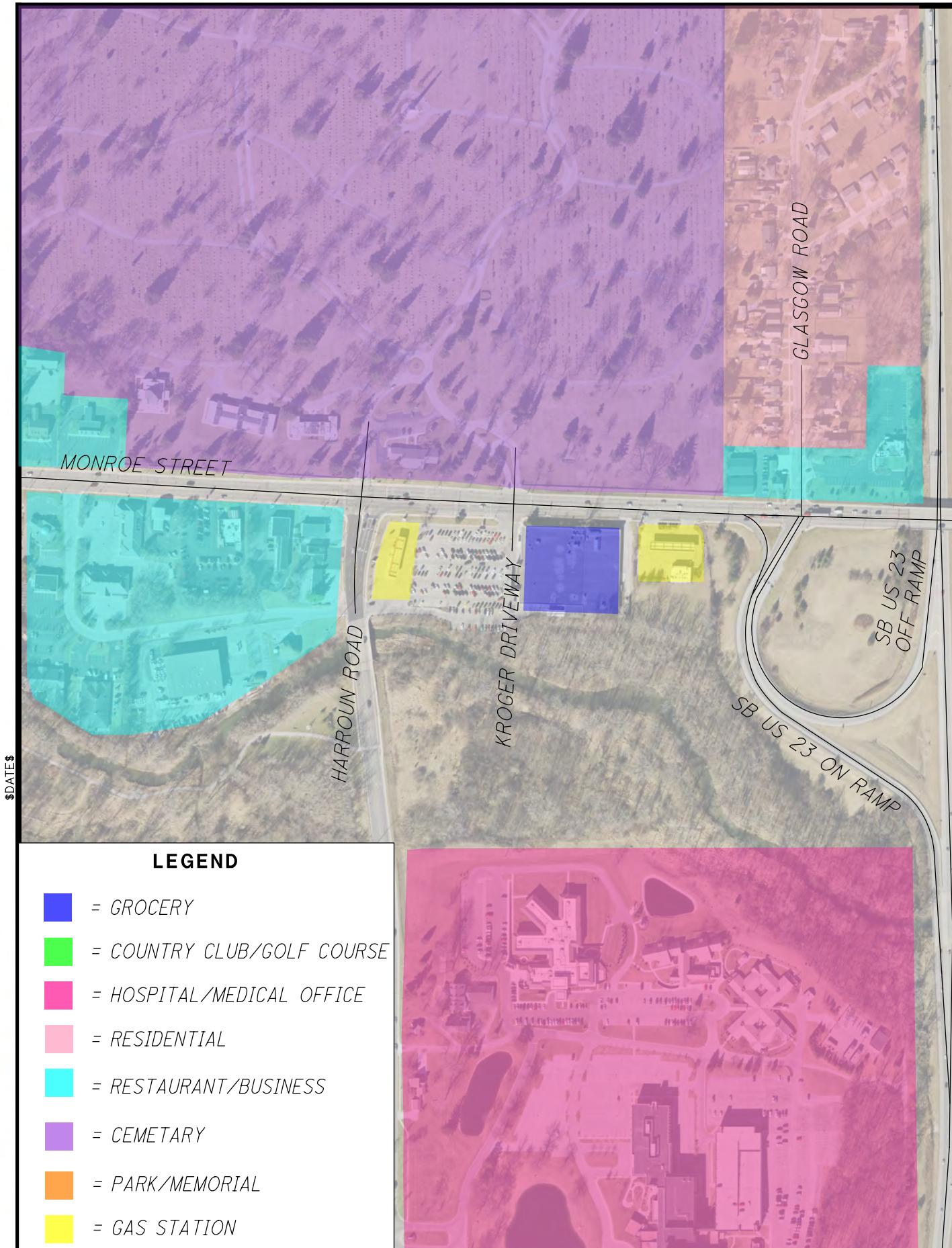


FIGURE 2.1
LAND USE MAP

2.4 Existing Traffic Patterns and Growth

Existing Traffic Data Collection

AM and PM peak period traffic counts were collected in December of 2016 and November of 2017. AM peak period counts were conducted from 7:00 to 9:00, while PM peak period counts were collected from 4:00 to 6:00. Counts during both periods included the classification of passenger cars, bicycles, pedestrians, and heavy vehicles. Existing AM and PM peak hour traffic counts are provided in Figure 2.2, with the traffic count reports provided in Appendix A.

Growth of Background Traffic Volumes

In addition to performing peak period traffic counts, a growth rate to project future traffic volumes was estimated using AADT values within the study area provided by TMACOG and a previous study, PID 88252. Based on this data, a future annual growth rate of 0.5 to 1 percent was used. The opening year of the project is assumed to be 2025 and the design year is assumed to be 2045. The 2025 and 2045 No Build traffic volumes will be used for the analysis of the proposed alternatives and are provided in Figures 2.3 to 2.6.

The following table includes the design criteria developed for traffic conditions and traffic projections.

Table 2.1 Design Designations

Design Criteria	US 23 NB On Ramp North of Monroe	US 23 NB On Ramp South of Monroe	US 23 NB Off Ramp	US 23 SB On Ramp	US 23 SB Off Ramp	Monroe Street		Alexis Road
	West of US 23	East of US 23						
AADT (2025)	2100	1200	11900	10800	2700	35200	21200	19900
AADT (2045)	2600	2300	15000	13700	3700	40600	24100	22700
DHV (2025)	210	120	1190	1080	270	3520	2120	1990
DHV (2045)	260	230	1500	1370	370	4060	2410	2270
Td (%)	1%	2%	1%	1%	2%	2%	1%	2%
T24 (%)	2%	3.3%	2%	2%	3.3%	3.3%	2%	3.3%

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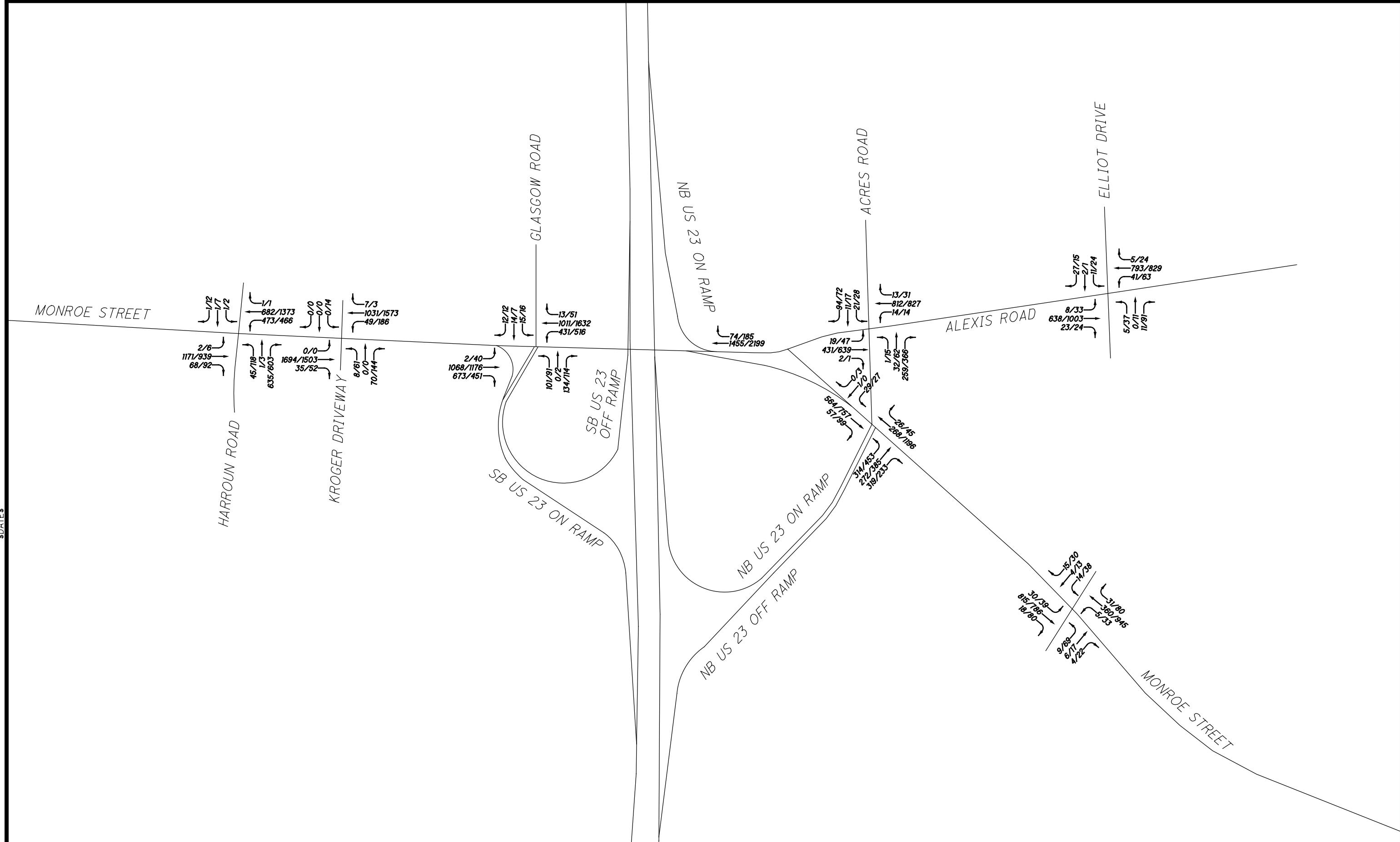


FIGURE 2.2
AM / PM EXISTING TRAFFIC VOLUMES



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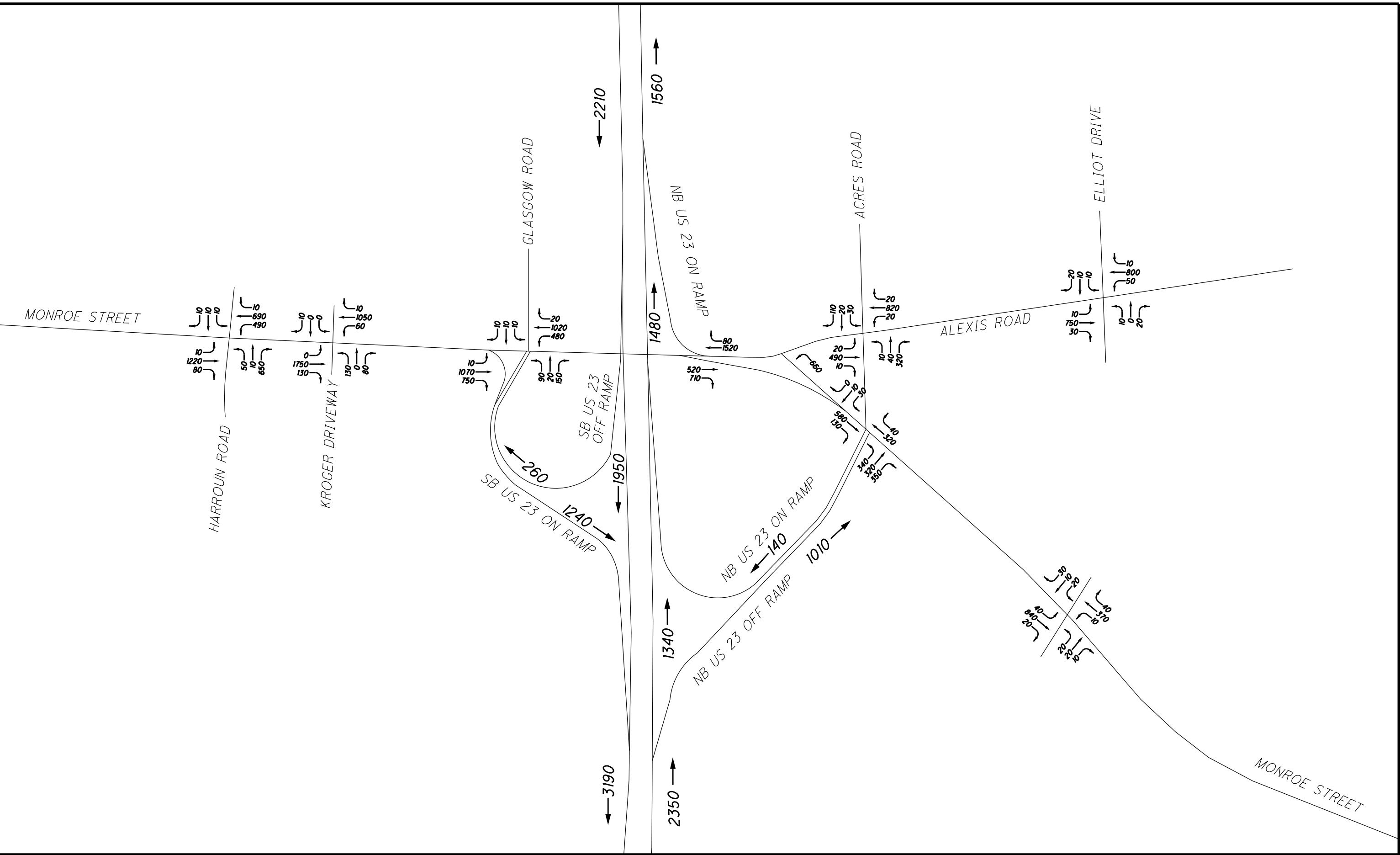
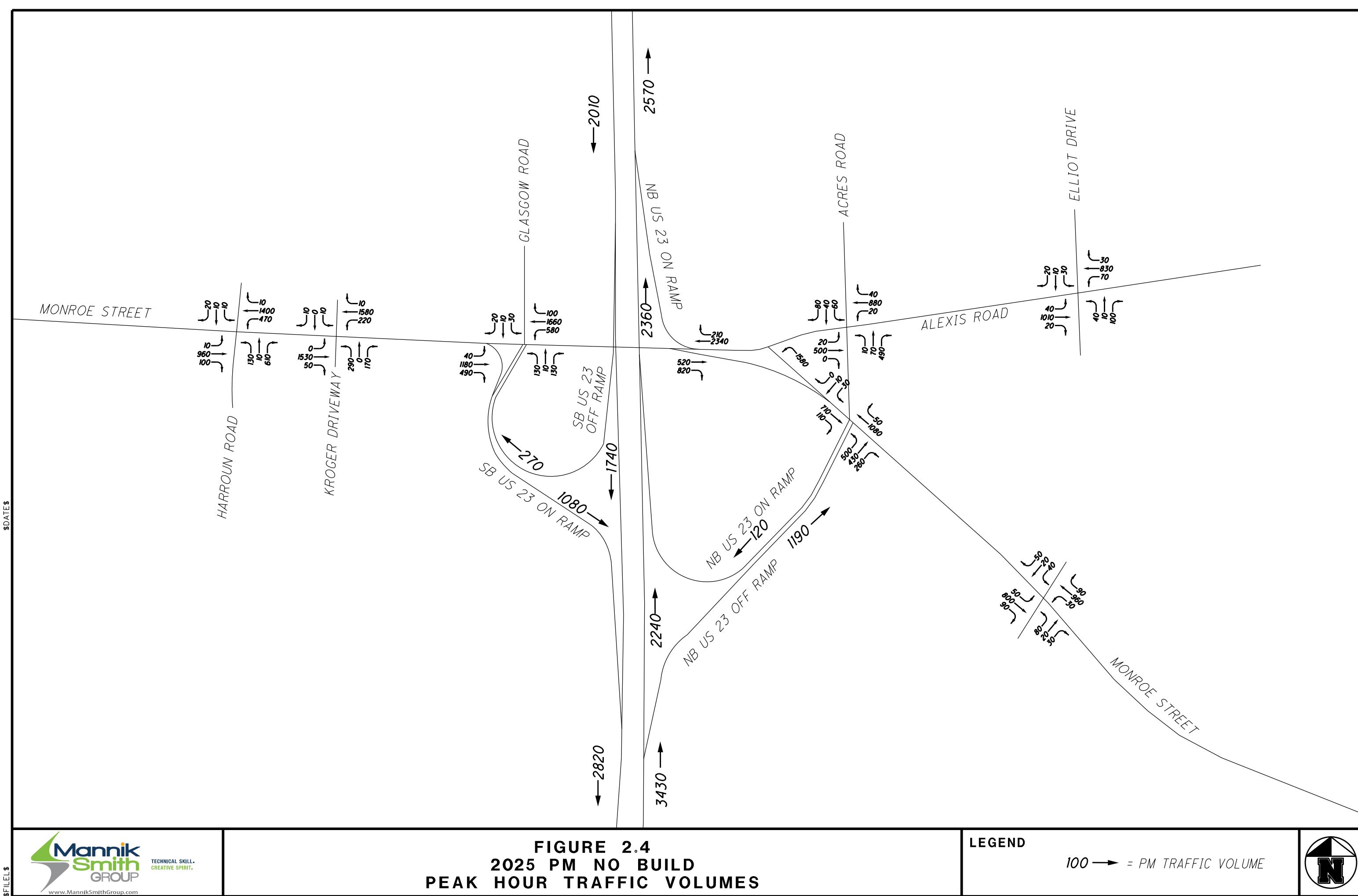
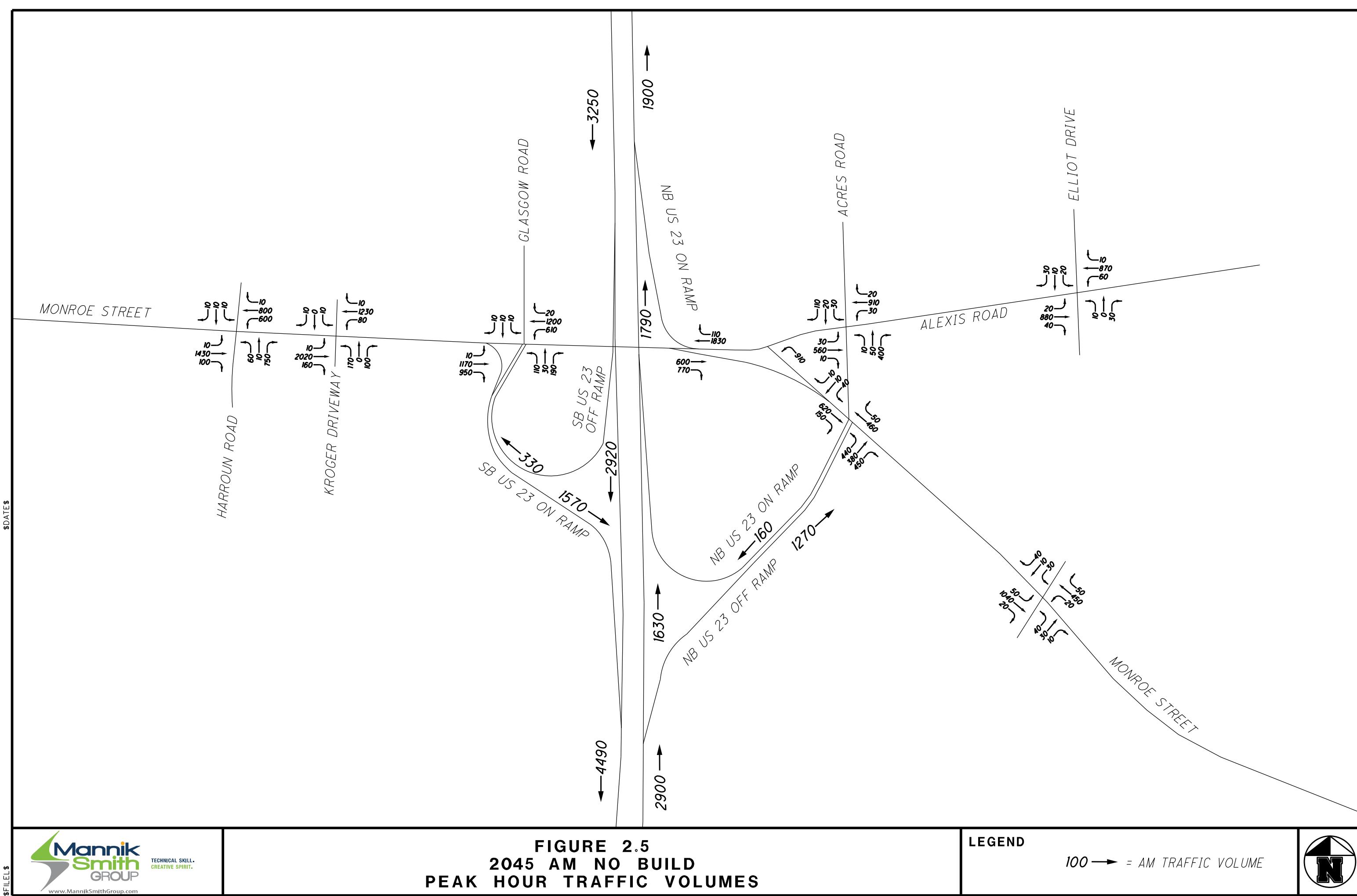
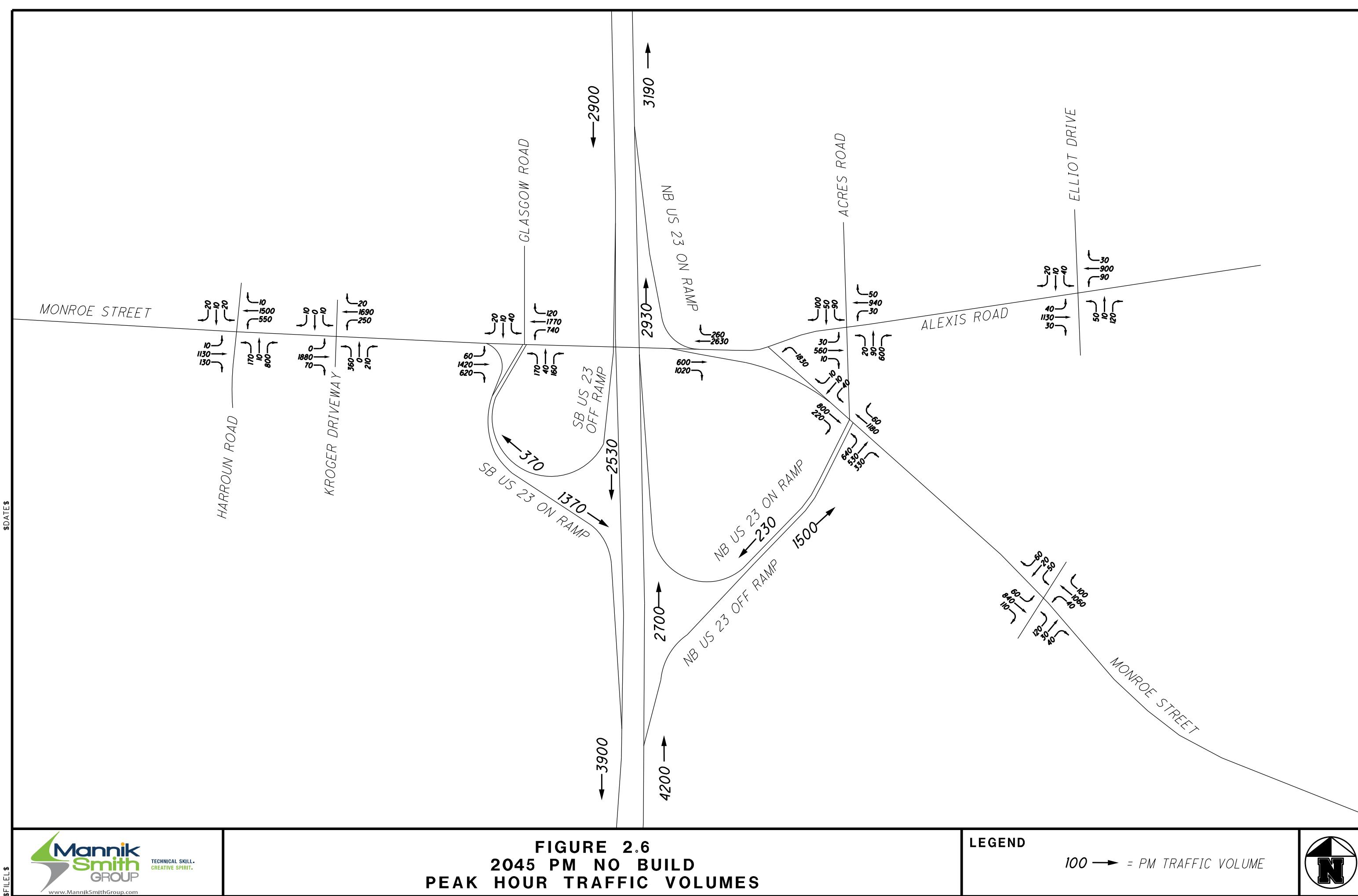


FIGURE 2.3
2025 AM NO BUILD
PEAK HOUR TRAFFIC VOLUMES









2.5 Crash Analysis

An evaluation of the crash data for the entire study area over the most recent three years (2014-2016) revealed 302 crashes. Crash Data was individually obtained for the 9 intersections and 5 ramps located in the study area. Crashes located within a 250-foot radius of the intersection were assigned to that intersection. Crashes assigned to a ramp were obtained by selecting the ramp area beginning and ending 250 feet away from the intersecting roadway. Of the 302 total crashes, 188 of the crashes occurred at one of the study intersections or on the ramps. Table 2.2 summarizes the number of crashes based upon severity for each of the study intersections and ramps.

Table 2.2 Crashes By Severity				
Intersection / Ramp	Crash Severity			Total Number of Crashes
	Injury Crashes	Property Damage Only (PDO) Crashes	Total Number of Crashes	
Monroe St. & Harroun Rd.	0	0%	16	100% 16
Monroe St. & Kroger Driveway	4	24%	13	76% 17
Monroe St & SB US23 Ramps/Glasgow Rd. *	17	39%	27	61% 44
Monroe St. & NB US23 On Ramp	0	0%	2	100% 2
Monroe & NB US23 Ramps/Acres Rd. *	12	20%	48	80% 60
Monroe St. & Tireman Driveway	2	29%	5	71% 7
Monroe St. & Alexis Rd.	6	67%	3	33% 9
Alexis Rd. & Acres Rd.	7	32%	15	68% 22
Alexis Rd. & Elliot Dr.	2	29%	5	71% 7
NB US 23 On Ramp Segment (North of Monroe St.)	0	0%	2	100% 2
NB US 23 Off Ramp Segment (South of Monroe St.)	0	0%	2	100% 2
NB US 23 On Ramp Segment (South of Monroe St.)	0	0%	0	0% 0
SB US 23 Off Ramp Segment (North of Monroe St.)	0	0%	0	0% 0
SB US 23 On Ramp Segment (South of Monroe St.)	0	0%	0	0% 0
Total	50	25%	138	75% 188

* Includes ramp crashes involving strikes to the barrier

Compared to the statewide average of 24.5%, the percentage of injury crashes 25% for this study area is slightly above average. Based upon the results shown in Table 2.2, the following intersections indicate locations in need of improvement, given the crash patterns.

- **Monroe Street and SB US 23 & Glasgow**
 - 44 crashes
- **Monroe Street (SR 51) & the NB US 23 Ramps/Acres Road**
 - 60 crashes
- **Monroe Street & the SB US 23 Ramps/Glasgow Road**
 - 39% Injury crashes
- **Monroe Street & Alexis Road**
 - 67% Injury crashes

Table 2.3 summarizes the crashes at each of the intersections or interchange ramps, based upon crash type. By evaluating crashes based upon crash type, conclusions can be made as to what traffic problems are occurring at the intersections.

Table 2.3 Crashes By Type

Intersection / Ramp	Crash Type										Total		
	Rear End	Angle	Sideswipe-Passing	Left Turn	Right Turn	Head On	Fixed Object	Pedalcycles	Parked Vehicle	Animal			
Monroe St. & Harroun Rd.	7	1	1	3	3	0	0	0	0	1	0	0	
Monroe St. & Kroger Driveway	7	2	2	5	1	0	0	0	0	0	0	17	
Monroe St & SB US23 Ramps/Glasgow Rd.	25	1	3	11	1	2	0	0	0	0	1	44	
Monroe St. & NB US23 On Ramp	0	0	1	1	0	0	0	0	0	0	0	2	
Monroe & NB US23 Ramps/Acres Rd.	38	6	6	4	0	0	3	0	1	1	1	60	
Monroe St. & Tireman Driveway	5	1	0	0	0	0	1	0	0	0	0	7	
Monroe St. & Alexis Rd.	5	0	4	0	0	0	0	0	0	0	0	9	
Alexis Rd. & Acres Rd.	11	5	2	3	1	0	0	0	0	0	0	22	
Alexis Rd. & Elliot Dr.	4	0	1	0	0	0	0	1	0	0	1	7	
NB US 23 On Ramp Segment (North of Monroe St.)	0	0	2	0	0	0	0	0	0	0	0	2	
NB US 23 Off Ramp Segment (South of Monroe St.)	1	0	0	0	0	0	1	0	0	0	0	2	
NB US 23 On Ramp Segment (South of Monroe St.)	0	0	0	0	0	0	0	0	0	0	0	0	
SB US 23 Off Ramp Segment (North of Monroe St.)	0	0	0	0	0	0	0	0	0	0	0	0	
SB US 23 On Ramp Segment (South of Monroe St.)	0	0	0	0	0	0	0	0	0	0	0	0	
Total	103	16	22	27	6	2	5	1	1	2	2	188	
Total Percentage	55%	9%	12%	14%	3%	1%	2.5%	0.5%	0.5%	1%	1%	0.5%	100%
Statewide Average Percentage (%)	25.7	15.0	9.1	4.0	-	0.6	18.0	0.6	6.7	8.7	4.5	-	

Based upon the results in Table 2.3, the following observations can be made:

- Monroe Street & SB US23 Ramps/Glasgow Road
 - 25 Rear end crashes – indicating an issue with traffic congestion
 - 11 Left turn crashes – resulting from the permitted left turn phase or the phase timing not being long enough for the number of vehicles coming off of US 23
 - 2 Head on crashes – indicates that vehicles are unaware that they are supposed to yield to vehicles going Northbound to Glasgow Road
- Monroe Street (SR51) & NB US23 Ramps/Acres Road
 - 25 Rear end crashes – indicating an issue with traffic congestion
- Rear end, left turn, sideswipe-passing, and head on crash percentages are significantly higher than the statewide averages

Both of these intersections are main access points on and off of US 23 and experience very high traffic volumes during the peak hours of the day. Given the crash data, it is evident that safety could be improved along the study area. Improvements can be recommended following the evaluation of the existing intersection operations, to determine which intersections are experiencing delays or not operating acceptably. Recommendations will most likely include updating traffic controls to improve timing and reduce congestion at the intersections.

2.6 History of Unreported Crashes

According to the crash data obtained from the ODOT TIMS website, no crashes occurred on the NB US 23 off Ramp to Monroe Street (SR 51) between the years 2014-2016. In a recent site visit in March 2018, several strikes along the ramp barrier wall were observed. The strike marks shown in Figure 2.7 along the barrier indicate that there have been unreported crashes or were reported as occurring at the Monroe Street (SR 51) and NB US 23 off ramp intersection.

Figure 2.7 Ramp Barrier Strikes



Although a safety issue is not evident on the interchange ramps based upon the crashes obtained from ODOT's GCAT tool, the strike marks observed on the northbound off ramp barrier are concerning. Modifications to the ramps should be considered because any improvements to the ramps provided by the proposed interchange alternatives could improve safety at the adjacent intersections as well.

2.7 Existing Pedestrian and Bicycle Facilities

Sidewalks are present throughout the study area and are continuous along the north and south sides of Monroe Street and Alexis Road with the exception of the Alexis Road and Monroe Street split. In order for pedestrians on the south side of Monroe to get to Alexis Road without walking in the path of traffic, they must cross to the north side at the Kroger and Monroe Street intersection. Pedestrians coming from the southeast end of Monroe Street to Alexis Road are forced to walk on the grass or in the roadway along the north side of the Monroe Street and Acres Road intersection where the sidewalk is discontinuous until they pass the car dealership driveway.

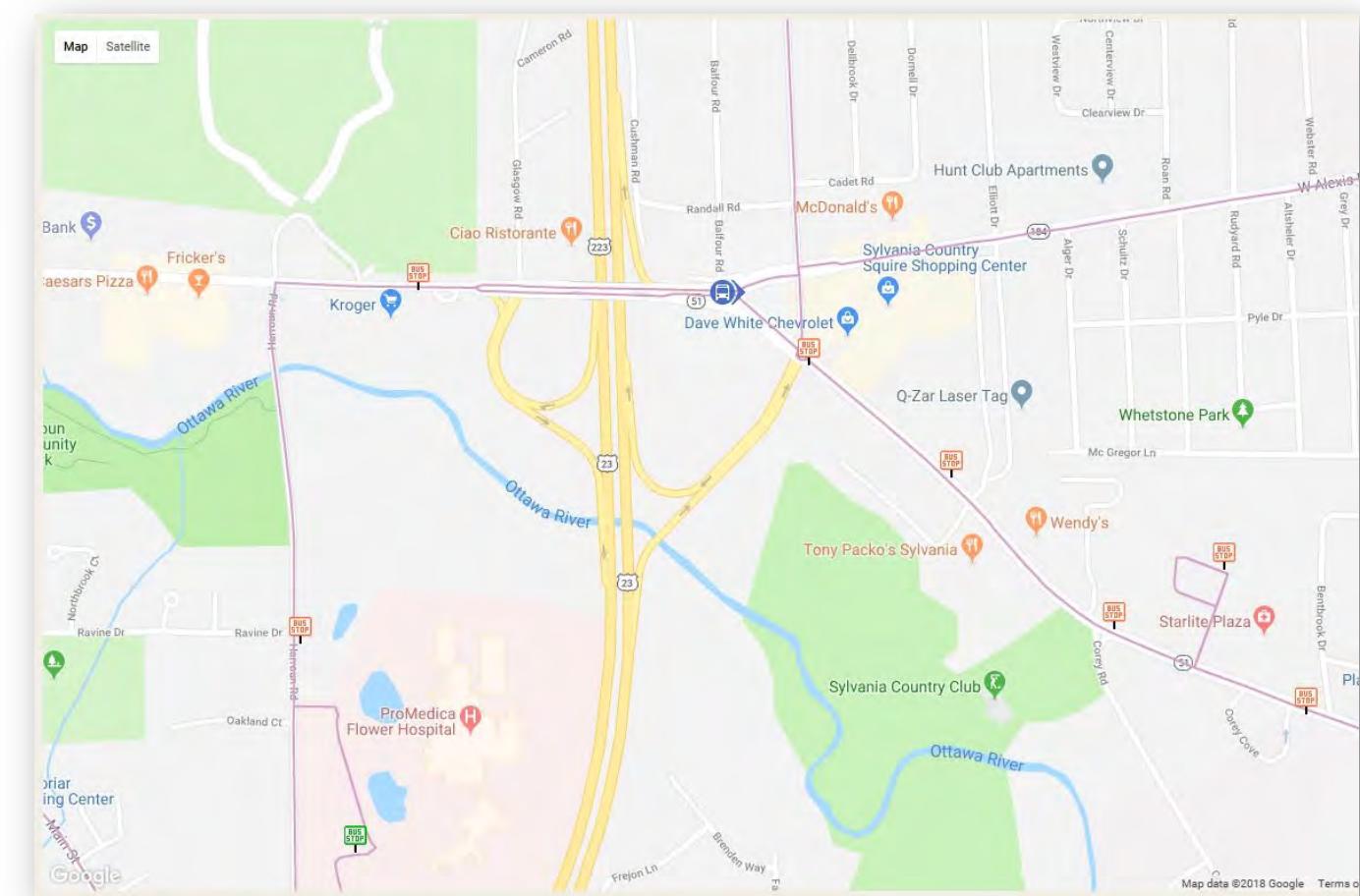
Crosswalks are present at every intersection, and pedestrian signals and push buttons are present at five (5) of the study area intersections. Bicycle facilities are not present in the roadways in the study area, which means cyclists are expected to share the roadway with motorized vehicles or travel along the discontinuous sidewalks.

2.8 Existing Transit Facilities

Existing public transit services within the study area include the Toledo Area Regional Transit Authority (TARTA) bus service. This bus service provides access to the study area from several locations around the City of Sylvania and Greater Toledo regions. Only one bus route travels through the study area with three designated stops within the study area. Figure 2.8 is a map of the TARTA bus route (shown in purple) that travels within the study area. The designated bus stops are located at the following locations:

- Monroe Street & Glasgow Road
- Monroe Street & Acres Road
- Monroe Street NW of Corey Road

Figure 2.8 TARTA Bus Route Map



2.9 Existing Traffic Operations

This study performed an analysis of traffic operations during the AM and PM peak hours for Existing (2017) conditions. The evaluations of existing traffic operations provide a baseline against which operations for future scenarios and alternatives can be compared. Operations were evaluated using Synchro 10 traffic analysis software. This software provides several measures of effectiveness (MOEs) for traffic operations based on traffic volume, roadway geometrics, and traffic control parameters and uses the Highway Capacity Manual methodology for determining intersection capacity and average vehicular delay in addition. The primary MOE for this study will be Level-of-Service (LOS). Synchro and SimTraffic summary reports are provided in Appendix C.

Important things to know about Level-of-Service (LOS):

- LOS provides a letter grade for traffic operations based on the amount of delay experienced at an intersection, along an intersection approach (i.e., eastbound, westbound), or for an intersection lane group.
- LOS can range from A-F, with A representing conditions in which vehicles experience the least amount of delay and F representing conditions in which vehicles experience the most delay.
- LOS values from A to D typically represent favorable traffic operations, while LOS values E and F typically represent unfavorable traffic operations. When LOS values are E and F, changes to traffic control or roadway geometry are typically considered to improve traffic operations.
- A list of delay thresholds for LOS is provided in Table 2.4.
- Overall intersection LOS and delay is displayed in Table 2.5. Overall LOS grades are not provided for un-signalized Two-Way Stop-Controlled (TWSC) and One-Way Stop-Controlled (OWSC) intersections, but instead the worst performing controlled lane group is presented.

The results in Table 2.5 indicate that under the Existing (2017) conditions, the adjacent intersections could potentially be impacted by an increase of traffic associated with the projects opening and design year, as a few intersections within the study area operate at LOS D currently. The intersection of US 23 SB on/off, Monroe Street and Glasgow Road, along with the intersection of Monroe Street (SR 51) and Alexis Road (SR 184), are on the higher end of an LOS D already, and with an addition of traffic for the opening and design year of the project, are likely to degrade to at least and LOS E.

Table 2.4 Level-of-Service (Delay) Thresholds

Level-of-Service (LOS)	Signalized Delay (seconds)	Un-Signalized Delay (seconds)
A	0.0 – 10.0	0.0 – 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

Table 2.5 Existing Conditions Level-of-Service (Delay)

Location	Traffic Control	Existing (2017)	
		AM Peak	PM Peak
Monroe Street & Harroun Road	Signal	C (24.0)	B (19.2)
Monroe Street & Kroger Driveway	Signal	A (2.4)	A (8.7)
Monroe Street & Glasgow Road/SB US 23 Ramps	Signal	D (53.6)	C (33.2)
Monroe Street & Alexis Road	Signal	A (7.6)	D (53.6)
Monroe Street & NB US 23 Ramps/Acres Road	Signal	C (24.0)	D (45.7)
Monroe Street & Tireman Driveway	Signal	A (3.3)	A (7.1)
Alexis Road & Acres Road	Signal	A (8.9)	B (13.1)
Alexis Road & Elliot Drive	Signal	A (9.0)	A (5.7)

2.9.2 Capacity

Under the existing conditions, the operational analysis does not reflect a capacity issue. However with the projected growth in traffic, capacity is expected to be exceeded. With the capacity exceeded, operational failure is expected to occur. Table 2.6 summarizes the Level of Service results for the Opening Year (2025) and Design Year (2045) traffic conditions under the No Build scenario. The No Build condition evaluates the existing transportation network with the expected future traffic conditions.

Table 2.6 No Build Operations - Level-of-Service (Delay)

Location	Traffic Control	No Build 2025		No Build 2045	
		AM Peak	PM Peak	AM Peak	PM Peak
Alternative 1: No Build Future Conditions					
Monroe Street & Harroun Road	Signal	C (33.2)	C (20.3)	D (51.5)	D (39.0)
Monroe Street & Kroger Driveway	Signal	B (13.4)	C (25.7)	D (38.3)	E (61.2)
Monroe Street & Glasgow Road/SB US 23 Ramps	Signal	E (68.9)	D (45.9)	F (118.2)	F (113.9)
Monroe Street & Alexis Road	Signal	B (12.4)	D (51.6)	B (15.7)	E (62.2)
Monroe Street & NB US 23 Ramps/Acres Road	Signal	C (30.0)	D (35.6)	E (63.2)	E (62.4)
Monroe Street & Tireman Driveway	Signal	A (3.9)	A (7.7)	A (6.7)	B (10.1)
Alexis Road & Acres Road	Signal	B (12.3)	B (11.1)	B (11.5)	B (12.1)
Alexis Road & Elliot Drive	Signal	A (5.1)	A (6.3)	A (6.9)	A (7.4)

The results shown in the table validate that capacity deficiencies are present with the existing interchange configuration. The existing interchange does not have the ability to withhold the amount of traffic expected for the Opening and Design years. One (1) of the intersections is expected to fail by the Opening Year (2025), and four (4) of the intersections are expected to be failing by the Design Year (2045). The analysis results clearly indicate that without any type of roadway or intersection improvements, the interchange will not operate efficiently.

2.9.3 Queuing

Queuing occurs when vehicles begin to build up waiting for the opportunity to complete their desired movement at an intersection. To evaluate this, the 95th percentile queue length from the SimTraffic report is reviewed in comparison with the existing available storage. When queue lengths are significantly larger than the available storage length, it indicates a need for intersection improvements. Table 2.7 summarizes the queuing issues resulting from the No Build conditions for the following locations.

Table 2.7 No Build Queuing Analysis

Location	Lane or Movement	Existing Available Storage (FT)	No Build 2025		Build 2045	
			AM Peak	PM Peak	AM Peak	PM Peak
Monroe Street & Glasgow Road/SB US 23 Ramps	WBL	480	642	604	576	646
	EBL	115	67	141	58	155
Monroe Street & Alexis Road	EBT	395	340	204	374	234
	WBT	600	700	679	703	676
Monroe Street & NB US 23 Ramps/Acres Road	NBL	750	526	769	676	815
	NBL	210	313	233	298	281
Alexis Road & Acres Road	SB	310	70	115	92	109
	EBL	60	56	47	66	52
	NBR	100	98	94	94	93
	WBL	140	131	112	150	127

It can be concluded that several movements are expected to experience queuing issues under the future conditions. The Monroe Street weave with Alexis Road in particular is indicating that improvements will be needed before the Opening Year of 2025. The NB US 23 off Ramp also reflects that the amount of left turns on that approach exceed the available storage. Given the expected queuing for the future conditions, the Monroe Street

& Alexis Road weave configuration along with the Northbound US 23 ramps and intersection with Monroe will require modifications to be able to accommodate the future traffic demands.

2.9.4 Geometric Deficiencies

Geometric deficiencies include design elements such as roadway alignments and ramp curvatures that do not meet current design standards, which results in a significant safety concern. Several geometric deficiencies are present in along the corridor in addition to the interchange.

In regards to the ramp deficiencies, the following information details the geometric design issues, based upon the 1962 original roadway plans:

Ramps not meeting current design condition for curvature:

- Northbound US 23 off Ramp
- Northbound US 23 South on Ramp
- Southbound US 23 on Ramp
- Southbound US 23 off Ramp

Along the Monroe Street corridor the following deficiencies are present:

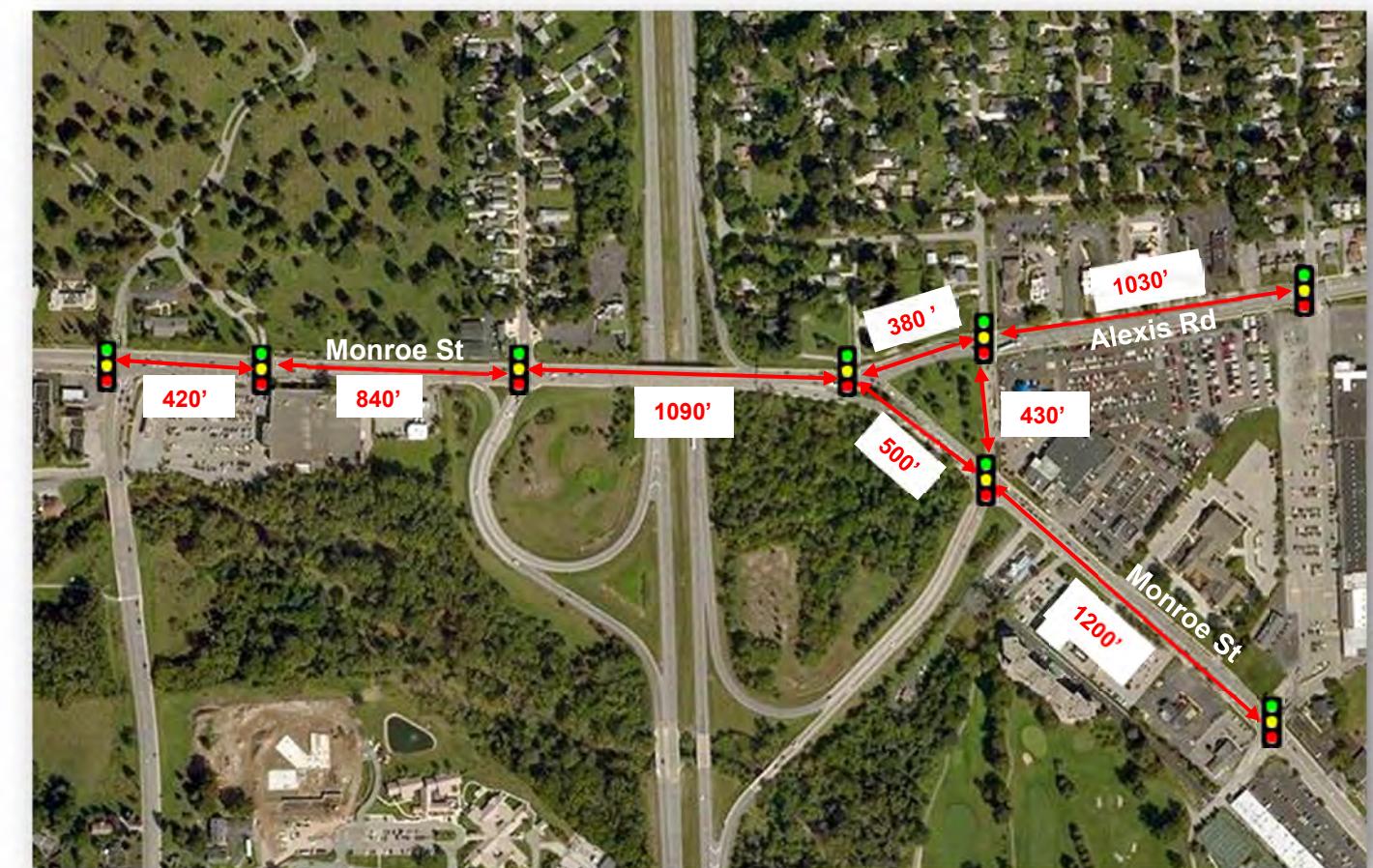
SB US-23 Ramps & Monroe Street/Glasgow Road

- The northbound and southbound approaches are not aligned at a right angle to Monroe Street creating a deflection through the intersection

2.9.5 Signal Spacing

Adequate signal spacing plays a vital role in the efficient operation of a major corridor or interchange. Traffic signals located close together can lead to heavy congestion, special signal timing requirements, and delayed progression for drivers travelling through the corridor. According to ODOT's Traffic Engineering Manual, traffic signals should be spaced at least one quarter mile (1320 feet) apart. The existing condition of the interchange includes several signal spacing deficiencies. Figure 2.9 details the signal spacing deficiencies present along the Monroe Street corridor.

Figure 2.9 Signal Spacing within Study Area



Given these conditions, it is evident that signal spacing needs to be improved throughout the corridor. Improving the signal spacing will most likely be done by reducing the number of signalized intersections. With the proposed improvements intersection relocations are possible but must also take into consideration potential right-of-way impacts. Reducing the number of signalized intersections has the ability to improve the signal spacing issue without impacting access to the surrounding businesses and residents.

2.10 Interchange and Corridor Deficiencies

Several deficiencies currently exist within the interchange area. These include deficiencies such as safety, level of service, geometric design, and bridge conditions. Figure 2.10 illustrates some of the existing deficiencies along the corridor and interchange ramps.



3.0 PROPOSED ALTERNATIVES

Several proposed alternatives have been evaluated to determine which will improve operations at the existing intersections and minimize impacts to the area while accounting for future traffic volumes. Impacts to existing bridges, roadway access, signal spacing and right-of-way are taken into consideration when evaluating each of the proposed alternatives.

3.1 Description of Alternatives Considered

The seven alternatives described below are the proposed interchange configurations considered for this study. After coordination with the City of Sylvania as well as ODOT District 2 to review the initial alternatives, two alternatives were selected to be carried forward throughout this study and analyzed to compare the future traffic operations conditions. Table 3.1 describes the alternatives considered, and the reasons the alternative was eliminated from consideration.

Table 3.1 Description of Considered Alternatives

Alternative #	Alternative Name	Description	Reason for Elimination
Alt 1	No Build	<ul style="list-style-type: none"> • Retain Existing Conditions 	Carried forward as No Build Alternative
Alt 2a	Single Point Urban Interchange Offset	<ul style="list-style-type: none"> • 2 ramps north of Monroe and 2 ramps south of Monroe with on and off access to US 23 in both directions • Monroe Street alignment proposed to be offset to the south • Will require construction of 2 new bridges • Will require removal of the signal at the Glasgow Road intersection forty-five 	<ul style="list-style-type: none"> • Failing operation • Bridge impacts • Impact to Glasgow Road access
Alt 2b	Single Point Urban Interchange Aligned	<ul style="list-style-type: none"> • Same modifications as Alternative 2a • Will maintain existing alignment with Monroe Street • Will require the construction of 2 new bridges • Will require widening of the Monroe Street bridge from 5 to 6 lanes • Will require removal of the signal at the Glasgow Road intersection 	<ul style="list-style-type: none"> • Failing operation • Bridge impacts • Impact to Glasgow Road access
Alt 3a	Roundabout Wide	<ul style="list-style-type: none"> • Two roundabouts one of which will be located at the Monroe Street & Glasgow/SB US 23 Ramps intersection and will be aligned with the existing roadways • Second roundabout will be located just southeast of the point where Monroe Street meets Alexis Road and will continue with the existing Monroe alignment to the east • South leg of Acres Road along with the west leg of Alexis Road is expected to be removed • South leg of the roundabout will remain an on and off ramp for NB US 23 but will consist of new curvature further north of the existing ramp • NB US 23 On ramp located north of Monroe Street to be removed 	<ul style="list-style-type: none"> • Failing operation • Right-of-Way Impacts
Alt 3b	Roundabout Bow-Tie	<ul style="list-style-type: none"> • Two roundabouts aligned with the existing Monroe Street and interstate ramps • New ramps will have minimal curvature, similar to a basic tight diamond configuration • Alexis Road & Monroe Street will be stop controlled at Alexis Road with Monroe Street flowing freely 	<ul style="list-style-type: none"> • Failing operation • Right-of-Way Impacts
Alt 4	Tight Urban Diamond Interchange	<ul style="list-style-type: none"> • Basic on and off ramp for both directions of US 23 with minimal curvature • Will require two new bridges to be constructed • Will result in the loss of the traffic signal at the Glasgow intersection 	<ul style="list-style-type: none"> • Bridge impacts • Impact to Glasgow Road access • Failing operation • Poor Signal Spacing
Alt 5a	Hybrid Loop Diamond	<ul style="list-style-type: none"> • West loop for SB US23 is maintained • Includes a tight diamond where the NB US 23 off ramp will align with the existing NB US 23 on ramp on the north side of Monroe Street • To the east of the modified ramp, eastbound vehicles will split to either go eastbound on Alexis Road or southeast bound on Monroe Street • The intersection of Acres and Alexis Road will be expanded and remain signalized • Traffic travelling northwest bound along Monroe Street will be directed north to the Alexis Road and Acres Road intersection 	<ul style="list-style-type: none"> • Poor Signal Spacing • Poor Operation • Bridge Impacts
Alt 5b	Hybrid Loop Diamond	<ul style="list-style-type: none"> • West loop for SB US23 is maintained • Same east ramp alignment as alternative 5A • East of the interchange, weave is eliminated and Monroe Street will curve to the southeast • Acres Road signal will be removed and the north leg of Acres Road will be converted into a right in/right out only access • Alexis Road will end at Monroe Street creating a 3 leg, signalized T-intersection 	<ul style="list-style-type: none"> • Poor Signal Spacing • Poor Operation • Bridge Impacts
Alt 5c	Hybrid Loop Diamond	<ul style="list-style-type: none"> • West loop for SB US23 is maintained • Same east ramp configuration as Alternatives 5A and 5B • East of the NB US 23 Ramps, all Monroe Street traffic is routed through the expanded intersection at Acres and Alexis Road • The east signalized intersection will have Monroe Street as the south and west leg, with Acres being the north leg, and Alexis Road being the east leg • Alexis Road will end and become Monroe Street west of the intersection 	<ul style="list-style-type: none"> • Poor Signal Spacing • Poor Operation • Bridge Impacts
Alt 5d	Hybrid Loop Diamond	<ul style="list-style-type: none"> • West loop for SB US23 is maintained • NB US 23 off ramp is split in two directions where the left turning vehicles form a tight diamond with the NB US 23 on ramp north of Monroe Street • The right turning vehicles coming from the off ramp will be directed to the signalized four leg intersection of Monroe Street and Alexis Road, where Alexis Road will end at Monroe Street • Acres Road signal will be removed and the north leg of Acres Road will become a right in/right out only access 	Carried forward as Feasible Alternative A
Alt 6	Diverging Diamond Interchange	<ul style="list-style-type: none"> • Diverting left turning vehicles from the off ramps into the nearside travel lane, and diverting right turning vehicles to channelized right turn lanes outside of the interchange • Will require widening of Monroe Street bridge 	<ul style="list-style-type: none"> • Failing operation • Right-of-Way Impacts
Alt 7	Folded Interchange	<ul style="list-style-type: none"> • Maintain the west interchange loop • Improve the SB US 23 on ramp alignment with Glasgow Road • Modify the east interchange ramp to include a large four leg intersection that intersects Monroe Street with Alexis Road and the NB on and off Ramp • Two signalized intersections 	Carried forward as Feasible Alternative B

3.2 Feasible Alternatives

The alternatives being carried forward as feasible alternatives will include Alternative 5d, further referred to as Feasible Alternative A and Alternative 7, further referred to as Feasible Alternative B. These alternatives are detailed below and illustrated in Figures 3.1 and 3.2.

- **Feasible Alternative A - Hybrid Loop Diamond Interchange**

- Improvements to the SB 23 on ramp curvature
- East loop will be modified to include a tight diamond configuration where the NB US 23 off ramp left turns will intersect Monroe
- EB Monroe Street widened from West of Harroun Rd to the Glasgow/SB US 23 intersection
- Acres Road intersection is expected to be modified to be an unsignalized right in/right out intersection
- Figure 3.1 is a detailed exhibit showing the proposed improvements for the Hybrid Loop alternative

- **Feasible Alternative B – Folded Interchange**

- West loop will be maintained with improvements to the SB US 23 on ramp curvature
- NB US 23 on and off ramps will intersect with Monroe Street and Alexis Road creating a large four leg intersection
- Reduces the number of signalized intersections to 2 signalized intersections
- EB Monroe Street widened from West of Harroun Rd to the Glasgow/SB US 23 intersection
- Acres Road intersection to be an unsignalized right in/right out intersection
- Figure 3.2 is a detailed exhibit showing the proposed improvements for the Folded Interchange alternative

With the two feasible alternatives, modifications to the interchange ramps are proposed to meet the necessary requirements defined in the ODOT Location and Design Manual (L&D) Manual. The following table details the design criteria for each of the modified ramps for both feasible alternatives.

Table 3.2 Interchange Ramp Design Criteria

Interchange Ramp	Alternative A		Alternative B	
	Design Speed	Radius	Design Speed	Radius
SB US-23 On Ramp	30 mph	275'	30 mph	288'
SB US-23 Off Ramp	30 mph	235'	30 mph	250'
NB US-23 On Ramp	60 mph	2,534'	30 mph	232'
NB US-23 Off Ramp	35 mph	1,012'	50 mph	1,500'

Figure 3.1

**Alt A, Option 1
LUC US-23 11.75
Interchange Study**

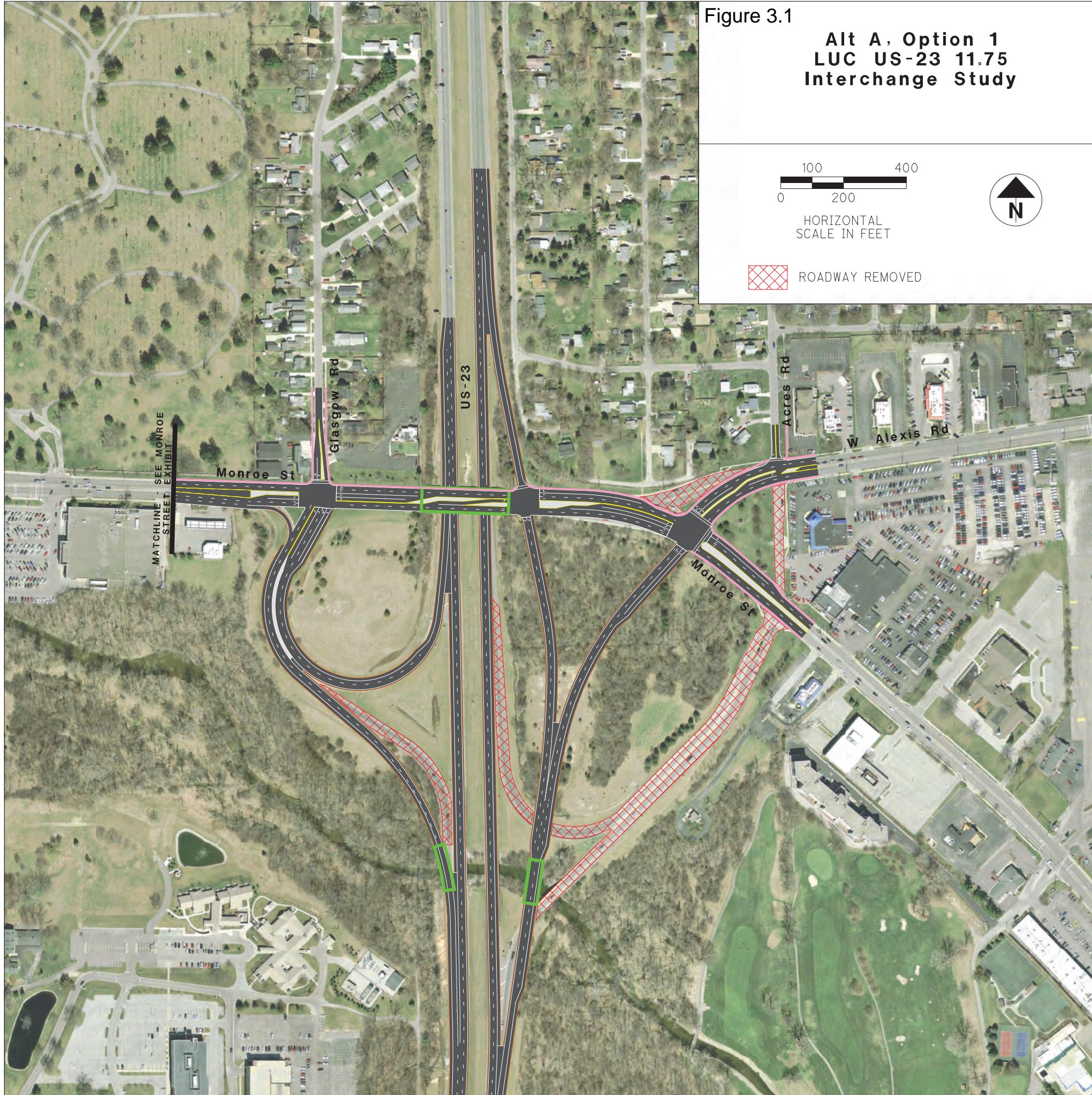
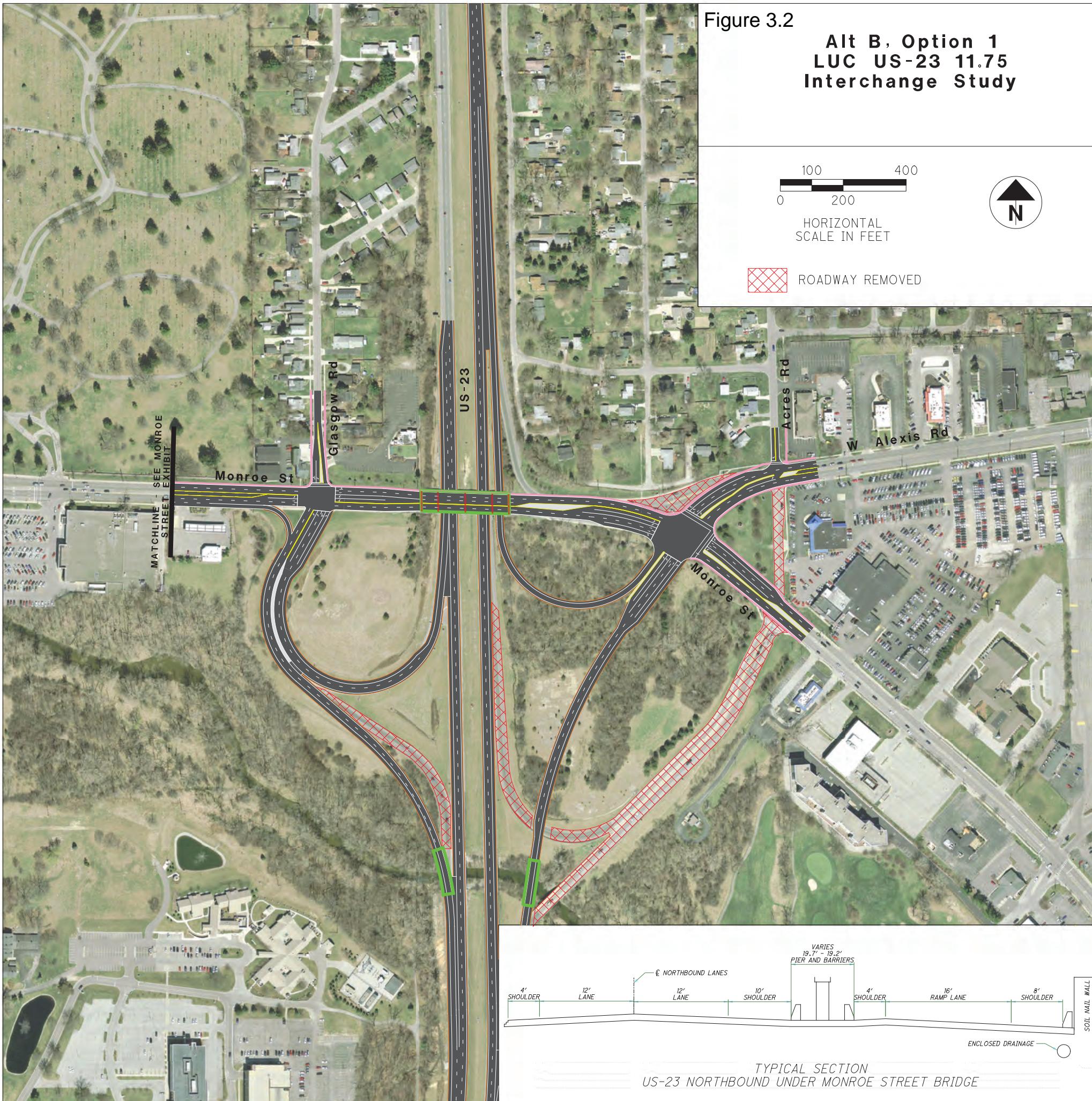


Figure 3.2

**Alt B, Option 1
LUC US-23 11.75
Interchange Study**



3.3 Glasgow Road & SB US 23 Ramp Improvements

In addition to the feasible alternative configurations, four separate schematics have been developed for the Glasgow Road intersection, all of which are applicable to both Feasible Alternatives A and B. The Glasgow Road alternatives are detailed below.

- **Glasgow Option 1**
 - No change to loop ramps, maintain existing Glasgow alignment.
- **Glasgow Option 2**
 - Extend SB loop ramp curvature and realign square to Glasgow Road
- **Glasgow Option 3**
 - Glasgow realigned to the west of existing approach
- **Glasgow Option 4**
 - Glasgow aligned to the east of existing approach

The four Glasgow Road scenarios were developed to address issues with ramp curvature while minimizing right-of-way impacts. The four scenarios are illustrated in Figure 3.3.

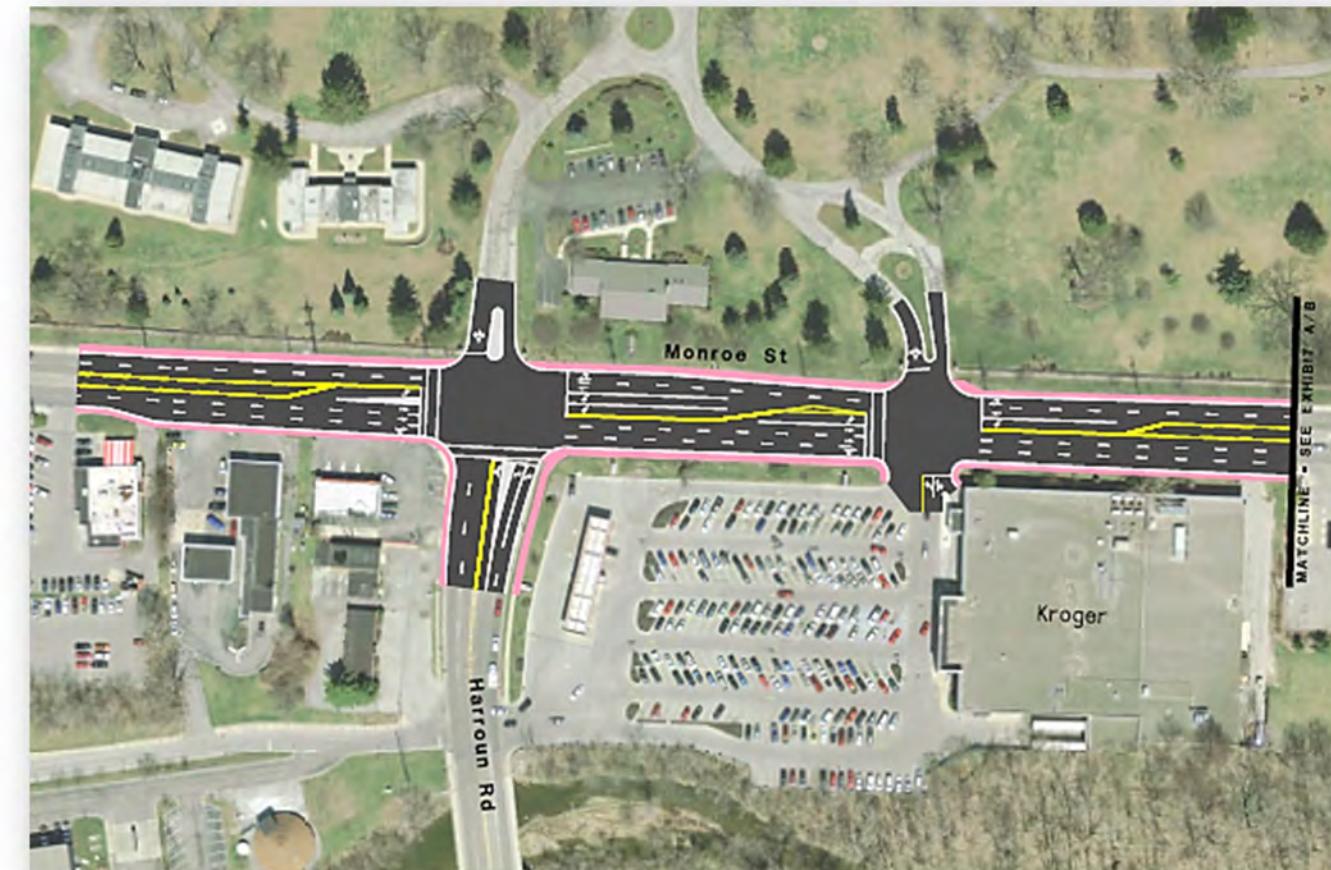
Figure 3.3 Glasgow Options 1-4



3.4 Monroe Street Improvements

After discussion with local officials, congestion and delay issues were a subject of concern at the intersection of Harroun Road and Monroe Street. As a part of this project, improvements to this intersection would be facilitated to ensure the best possible performance for the interchange. The proposed improvements along Monroe Street are shown in Figure 3.4. These improvements would include an additional eastbound lane from west of the Harroun Road intersection to the intersection of US 23, Monroe Street (SR 51) and Glasgow Road.

Figure 3.4 Monroe Street Improvements



Sidewalk proposed along both sides of the road in this section of Monroe Street. The sidewalk on the south side of Monroe Street is expected to be relocated as part of the roadway widening.

3.5 Acres Road Access

Acres Road at Alexis Road (SR 184) is an existing signalized 4-leg intersection to the east of the Monroe Street and US 23 interchange. Prior to the public meeting, under both of the feasible alternatives, Acres Road was proposed to be under a one way stop control, with the north leg being the stop controlled approach with right-in, right-out only access. With the proposed configuration, southbound left turns onto Alexis Road (SR 184) and eastbound left turns onto Acres Road would be prohibited. The southbound left turning vehicles would be required to use the signalized intersection of Elliot Drive and Alexis Road (SR 184) to travel east on Alexis Road (SR 184). The eastbound left turning vehicles would also be required to use the Elliot Drive and Alexis Road (SR 184) signal to access the adjacent neighborhood and Michigan cut through.

Throughout public involvement, a significant amount of objections to this improvement were received from residents. Given the overwhelming response of objections, modifications had to be made to the recommended improvements at this intersection. The newly proposed alternative improvements include the following changes:

- Traffic signal removed
- Left in access permitted
- Stop controlled right out access only at Acres Road
- Indirect left out of Acres provided by signalized U-turn movement

With this alternative, residents will be able to enter Acres Road from each direction, however residents wanting to go east on Alexis Road (SR 184) will be required to either exit the neighborhood at the signalized intersection of Elliot Street & Monroe Street to the east, or be required to turn right out of Acres Road and proceed to make a U-turn at the signalized intersection of Alexis Road (SR 184) & Monroe Street. With these changes to the improvements, the impacts to the adjacent neighborhood traffic along with the impacts to emergency vehicle response times will be eliminated.

Figure 3.5 illustrates the revised configuration based on public input for Alexis Road (SR 184) & Acres Road that is applicable to both Alternative A and B improvements.

Figure 3.5 Acres Road Access Exhibit



3.6 Proposed Pedestrian Facilities

Under the recommended alternatives, improvements to pedestrian facilities are expected to be included in feasible alternative. In an effort to improve walkability throughout the corridor, while maintaining safety for pedestrians, sidewalks will be provided along certain portions of the corridor.

The following facilities will be provided with the proposed alternatives:

Sidewalks

- West of the Monroe Street & Glasgow Road intersection will remain as existing with sidewalk on both sides
- From Glasgow Road to Alexis Road (SR184) along Monroe Street (SR 51), sidewalk is proposed only on the north side of the road to reduce crossing at interchange ramps
- On Alexis Road (SR184) and Monroe Street (SR 51), southeast of Alexis Road (SR 184), sidewalk is proposed on both sides of the road
- Decorative railing along the bridge crossing US-23 to separate pedestrians from the roadway is proposed

Crosswalks are proposed to be provided at the following locations:

SB US 23, Monroe Street (SR 51) and Glasgow Road

- North approach only (crossing Glasgow Road)

NB US 23, Monroe Street (SR 51) and Alexis Road (SR 184)

- North and east approaches

4.0 PROPOSED TRAFFIC OPERATIONS

4.1 Opening Year and Design Year Intersection Traffic Operations

The proposed traffic analyses for this study will evaluate two (2) traffic scenarios during the AM and PM peak hours for each of the feasible alternatives. Traffic operations for these scenarios are summarized in Table 4.1 and 4.2. The scenarios include the Opening Year of 2025 projected traffic operations and the Design Year of 2045 projected traffic operations.

Intersection Level of Service (LOS) values for the No Build future conditions operations are illustrated in both tables. The No Build future condition is used as a base comparison model to compare to the alternatives to determine how each improves or degrades traffic operations. Tables 4.1 and 4.2 summarize the Level of Service results for the Opening Year (2025) and Design Year (2045) traffic conditions under the proposed interchange configurations, Alternative A and Alternative B respectively. Detailed Synchro reports for the Build conditions can be found in Appendix C.

The analysis of Feasible Alternative A and Feasible Alternative B include separate intersections that were analyzed due to the proposed improvements to the interchange. For this reason, each of the alternatives Level of Service operations are reported separately and only the operation at the intersections adjacent to the interchange are comparable to the No Build conditions for both alternatives. It should be noted that under the proposed Build condition for both alternatives, the intersection of Alexis Road (SR 184) & Acres Road is an unsignalized intersection. The LOS reported at this location under the Build condition is the movement that is experiencing the highest delay.

Provided the results in the tables, the following conclusions were made for each alternative.

Feasible Alternative A

- All intersections operate with acceptable Levels of Service (LOS) under the 2025 and 2045 conditions
- SB US 23 off Ramp LOS improves from an LOS F in the AM and PM 2045 No Build condition to an LOS B, and an LOS C in the AM and PM 2045 Build condition
- NB US 23 off Ramp LOS improves from an LOS E in the PM 2045 No Build condition to an LOS D in the PM 2045 Build condition

Feasible Alternative B

- All intersections operate with acceptable Levels of Service (LOS) under the 2025 and 2045 conditions
- SB US 23 off Ramp LOS improves from an LOS F in the 2045 No Build condition to an LOS B in the 2045 Build condition
- Monroe Street and NB US 23 Ramps intersection is expected to improve from LOS E to an LOS D in the 2045 PM conditions

Table 4.1 Feasible Alternative A Intersection Operations - Level-of-Service (Delay)

Location	Traffic Control	No Build 2025		No Build 2045		Build 2025		Build 2045	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
(Alternative 5d: Hybrid Loop)									
Monroe Street & Harroun Road	Cycle Length	90	90	90	90	90	90	100	120
Monroe Street & Kroger Driveway	Signal	C	C	D	D	C	B	C	C
Monroe Street & Glasgow Road/SB US 23 Ramps	Signal	B	C	D	E	A	B	B	C
Monroe Street & NB US 23 Ramp for westbound Monroe Street traffic	Signal	E	D	F	F	B	C	B	C
Monroe Street & Alexis Road/NB US 23 Ramp for eastbound Monroe Street traffic	Signal	-	-	-	-	B	C	B	D
Alexis Road & Acres Road	Stop Controlled	C	D	E	E	C	C	C	D
Alexis Road & Elliot Drive	Signal	B	B	B	B	B	B	B	C
Monroe Street & Tireman Driveway	Signal	A	A	A	A	A	A	A	B

Table 4.2 Feasible Alternative B Intersection Operations - Level-of-Service (Delay)

Location	Traffic Control	No Build 2025		No Build 2045		Build 2025		Build 2045	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
(Alternative 7: Folded Interchange)									
Monroe Street & Harroun Road	Cycle Length	90	90	90	90	90	115	90	130
Monroe Street & Kroger Driveway	Signal	C	C	D	D	C	C	C	C
Monroe Street & Glasgow Road/SB US 23 Ramps	Signal	B	C	D	E	A	C	A	C
Monroe Street & Alexis Road/NB US 23 Ramps	Signal	E	D	F	F	B	B	B	B
Alexis Road & Acres Road	Stop Controlled	C	D	E	E	C	D	C	D
Alexis Road & Elliot Drive	Signal	B	B	B	B	B	B	B	C
Monroe Street & Tireman Driveway	Signal	A	A	A	A	A	A	A	B

4.2 Opening Year and Design Year Freeway Traffic Operations

Ramp operational analyses were conducted using Highway Capacity Software (HCS) version 7.4 to evaluate merge and diverge conditions on US 23. Table 4.3 details the freeway operation for the No Build and Build conditions for Feasible Alternative A and Table 4.4 summarizes the freeway operation for the No Build and Build conditions for Feasible Alternative B. The two feasible alternatives are primarily the same evaluation, however Alternative A has the NB US-23 on ramp north of Monroe Street whereas Alternative B has the NB US-23 on ramp south of Monroe Street. Other than this difference they produce the same results.

Table 4.3 Feasible Alternative A - Ramp Operation

Location	No Build 2025		No Build 2045		Build 2025		Build 2045	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
SB US-23 On Ramp	D	C	F	F	D	C	F	F
SB US-23 Off Ramp	B	B	D	C	B	B	D	C
NB US-23 On Ramp (North of Monroe St)	B	C	B	D	B	C	B	D
NB US-23 On Ramp (South of Monroe St)	B	C	C	D	-	-	-	-
NB US-23 Off Ramp	B	C	B	C	B	C	B	C

Table 4.4 Feasible Alternative B - Ramp Operation

Location	No Build 2025		No Build 2045		Build 2025		Build 2045	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
SB US-23 On Ramp	D	C	F	F	D	C	F	F
SB US-23 Off Ramp	B	B	D	C	B	B	D	C
NB US-23 On Ramp (North of Monroe St)	B	C	B	D	-	-	-	-
NB US-23 On Ramp (South of Monroe St)	B	C	C	D	B	C	B	C
NB US-23 Off Ramp	B	C	B	C	B	C	B	C

From the results of the ramp analyses, a Level of Service (LOS) F is present for the US-23 SB on ramp in the Build condition of both feasible alternatives. However, the unacceptable LOS is expected to occur in the No Build condition as well, indicating that the existing freeway at the merge location for the SB on ramp is expected to exceed capacity for the 2045 traffic conditions. As discussed in Section 1.3, the 2007 *I-475 Strategic Plan* identified a need for a third lanes addition on US 23 from I-475/US 23 to Monroe Street (SR 51). If a third lane is not constructed, ramp metering may be required for the southbound on ramp. Detailed HCS reports can be found in Appendix D.

5.0 COMPARISON OF FEASIBLE ALTERNATIVES

The feasible alternatives were evaluated based upon the following criteria:

- Safety
- Traffic Operations
- Right-of-Way Impacts
- Environmental Impacts
- Structures Assessment
- Design Geometrics
- Construction Cost

Figure 5.1 summarizes how each of the feasible alternatives scored for the evaluated criteria.

Figure 5.1 Comparison of Alternatives

Score	Evaluation Criteria	No Build Condition	Feasible Alternative A Hybrid Loop	Feasible Alternative B Folded Intersection	Glasgow Improvements *				Monroe Street Widening *	
					* Common to Both Alternatives A & B					
					Option 1	Option 2	Option 3	Option 4		
Good	Safety									
	Traffic Operations									
	Right-of-Way Impacts									
	Environmental Impacts									
	Structures Assessment				N/A	N/A	N/A	N/A	N/A	
	Design Geometrics									
	Construction Cost	N/A	\$10,340,000	\$9,590,000	\$3,810,000	\$4,900,000	\$4,370,000	\$3,230,000	\$470,000	

5.2 Safety

This category evaluates the expected safety benefit the alternatives have the potential to deliver. Based upon the existing crash patterns safety improvements will have to be made to the interchange, regardless of the feasible alternative that is selected. Both alternatives perform better than the No Build alternative because both are expected to improve the existing ramp curvature deficiencies located in the study area. The No Build has a lot of crashes as a result of traffic congestion and a significant amount of weaving traffic between the interchange ramps and Monroe Street & Alexis Road. Feasible Alternative A eliminates the Monroe Street/Alexis Road weave but will not improve crashes caused by congestion as a result of the close signal spacing. Feasible Alternative B also eliminates the Monroe Street/Alexis Road weave and reduces the number of signalized intersections from four intersections to two intersections, along with improving the spacing between those signals, which in turn should reduce the number of congestion related crashes. Although both alternatives improve safety, Alternative B could be considered slightly more improved over Alternative A due to improved signal spacing.

5.3 Traffic Operations

This category evaluates the anticipated improvement in the vehicular traffic operations for each alternative. Using the Synchro and SimTraffic analysis, the LOS for each intersection along the project can be identified and compared against the other alternative. The better the operations, and the greater number of improved intersections, the better the rating given to the alternative in this category. Feasible Alternatives A and B both effectively address the capacity and traffic operation deficiencies present in the No Build alternative.

5.4 Right-of-Way Impacts

The objective when developing feasible alternatives is to minimize temporary and permanent right-of-way impacts. Right-of-way impacts are to be expected with either of the feasible alternatives given the size and area occupied by the existing interchange. However, the right-of-way impacts for the feasible alternatives are not expected to be substantial, as a majority of the interchange construction will occur in existing right-of way. Impacts are expected for the feasible alternatives but differ based upon the alternative. Detailed impacts in right-of-way are described below in Table 5.2, for each of the feasible alternatives.

Table 5.2 Alternatives Evaluation of Right-of-Way Impact	
Feasible Alternative	Right-of-Way Impact
Alternative A	<ul style="list-style-type: none">Impact to James Seney Triangle Park located at Monroe Street (SR 51) and Alexis Road (SR 184)Very minor impacts at Glasgow Road may be necessary for sidewalk and signal polesVery minor impacts at Acres Road may be necessary for sidewalk
Alternative B	<ul style="list-style-type: none">Impact to James Seney Triangle Park located at Monroe Street (SR 51) and Alexis Road (SR 184)Very minor impacts at Glasgow Road may be necessary for sidewalk and signal polesVery minor impacts at Acres Road may be necessary for sidewalk

5.5 Environmental Impacts

A preliminary environmental overview was conducted as part of this study. If the project advances to design a full environmental assessment would be required consistent with the National Environmental Policy Act (NEPA) would be required. The project area is located just north of the Ottawa River, which can introduce some areas of concern in terms of environmental impacts. Figure 5.2 is an environmental resource map. Given the proposed alternatives, the potential of environmental impact to the area is expected to be minimal.

Parks and Recreation – Based upon a review of property ownership information and discussion with local officials, one park along with a recreational bike trail is located within the proposed project area. The bike trail is not expected to be impacted, however the northbound US23 off ramp bridge replacement will have to account for the bike trail passing below the bridge. The park that lies within the study area is James Seney Park memorial. Although referred to as a park, it does not serve as a recreational park, but instead it is a memorial. It is expected to be impacted with both feasible alternatives and local officials have stated that there is no opposition to the relocation of the memorial and this should not be considered a significant impact.

Public Facilities – Based upon a review of property ownership information and discussion with local officials, Toledo Memorial Park & Cemetery, Flower Hospital Campus, and Olivet Christian Nursey School are located within the proposed project area. Both alternatives will require right-of-way from these properties for the realignment of the US-23 on and off ramps and the Harroun Road intersection.

Ecological Resources – Based upon available mapping, National Wetland Inventory Wetlands and the Ottawa River are located within the proposed project area. With the project area located along the Ottawa River, the potential of impacts to the river and wetlands is likely. These impacts will be a result of the US 23 ramp realignments and bridge replacements.

Floodplains – A number of regulated floodplains and wetlands are located within the proposed project area. With the project area located along the Ottawa River, the potential of impacts to floodplains is likely. These impacts will be a result of the US 23 ramp realignments and bridge replacements.

Noise and Air Quality – Residences are located within 500 feet of Alexis Road and the proposed project area corridor. The proposed project will add capacity to the neighborhood streets surrounding Acres Road, however, it is anticipated that this will be a minor increase in capacity and should not increase noise along those streets. A noise analysis will not be required for the project given that a noise analysis was previously performed for the proposed noise wall expected to be constructed by the opening year. Should a Noise Analysis be required, noise impacts would be similar regardless of the alternative selected.

Hazardous Materials – A number of gas stations, oil change facilities and a tire facility are located within the project area. Automotive maintenance and fuel storage/dispensing facilities have the potential to contaminate the surrounding soils and groundwater with petroleum hydrocarbons and volatile organic compounds.

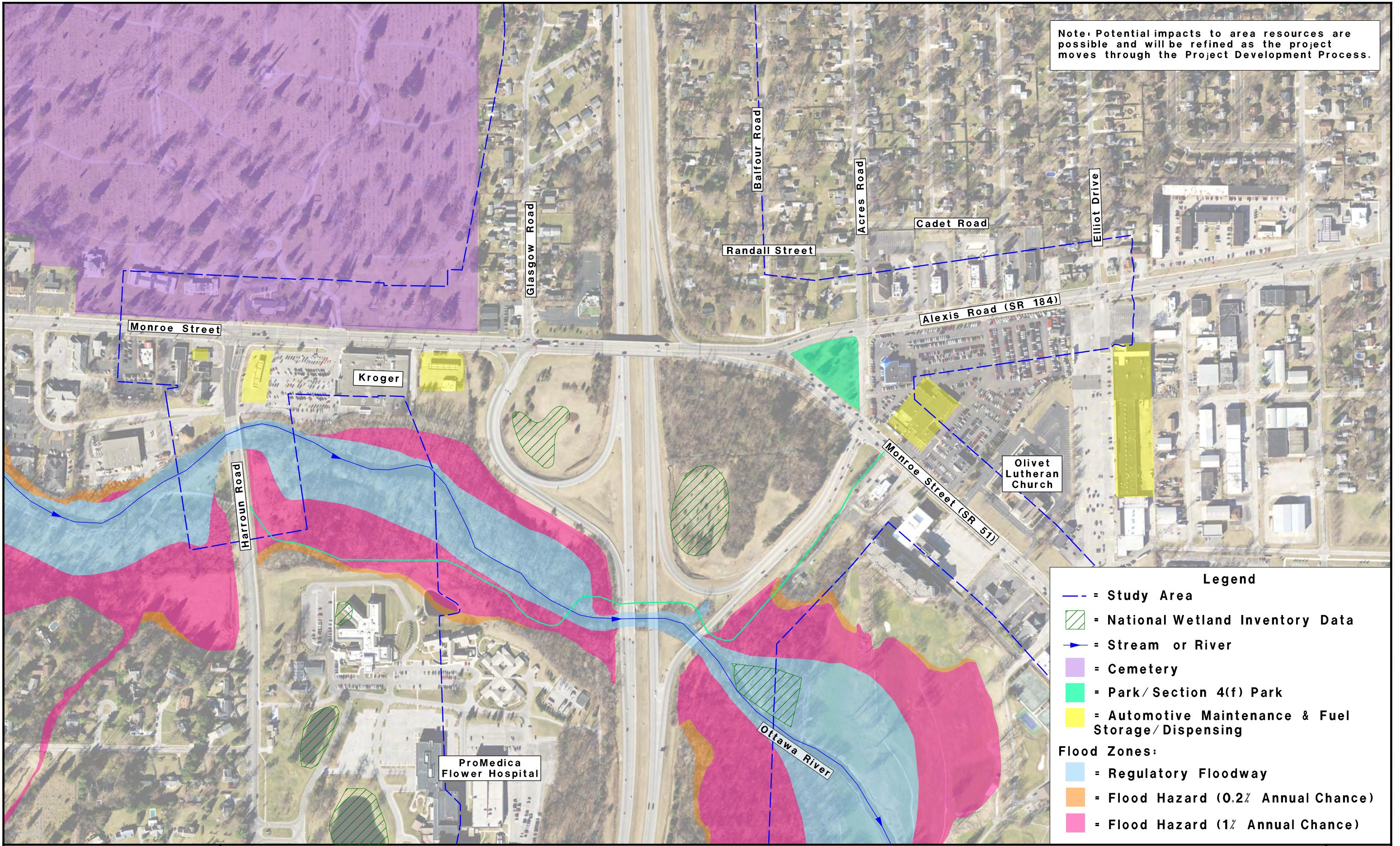


FIGURE 5.2
ENVIRONMENTAL RESOURCES

5.6 Structures Assessment

Due to the proposed interchange modifications, several bridges in the study area are likely to be impacted by both of the Feasible Alternatives. The following list states which bridges will be impacted and how severe of an impact each of the feasible alternatives will have on the existing structures in the study area:

Feasible Alternative A

- Monroe Street Bridge – Will require widening on opening day
- NB off Ramp Bridge – Full replacement
- NB US 23 Ramp Bridge – No impact
- SB US 23 Ramp Bridge – Full replacement or widening

Feasible Alternative B

- Monroe Street Bridge – Bridge widening not required, retaining system required to provide a full acceleration lane for the northbound on ramp under the bridge
- NB off Ramp Bridge – Full replacement
- NB US 23 Ramp Bridge – No impact
- SB US 23 Ramp Bridge – Full replacement or widening

5.7 Preliminary Construction Cost

The cost, conducted for anticipated construction in 2025, associated with each of the feasible alternatives plays a very large role in determining which of the feasible alternatives is more suitable. Appendix E includes a detailed breakdown of the cost assessment for Alternative A, Alternative B, each of the Glasgow Road improvement scenarios, and the Monroe Street widening improvements. The preliminary cost of each of the alternatives is listed as follows:

Table 5.3 Preliminary Cost Estimate (2025)

	Alternative A				Alternative B			
Interchange Alternative	\$15,430,000				\$13,970,000			
Monroe Street Improvements	\$630,000				\$630,000			
Glasgow Options	1	2	3	4	1	2	3	4
	\$5,490,000	\$7,010,000	\$6,930,000	\$5,570,000	\$5,490,000	\$7,010,000	\$6,930,000	\$5,570,000
Combined Total	\$21,550,000	\$23,070,000	\$22,990,000	\$21,630,000	\$20,090,000	\$21,610,000	\$21,530,000	\$20,170,000
Preliminary Engineering and Environmental (15%)	\$3,232,500	\$3,460,500	\$3,448,500	\$3,244,500	\$3,013,500	\$3,241,500	\$3,229,500	\$3,025,500
Final Engineering (5%)	\$1,077,500	\$1,153,500	\$1,149,500	\$1,081,500	\$1,004,500	\$1,080,500	\$1,076,500	\$1,008,500
Right-of-Way (budgetary)	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000
Construction Engineering & Inspection (15%)	\$3,232,500	\$3,460,500	\$3,448,500	\$3,244,500	\$3,013,500	\$3,241,500	\$3,229,500	\$3,025,500
Total	\$29,592,500	\$31,644,500	\$31,536,500	\$29,700,500	\$27,621,500	\$29,673,500	\$29,565,500	\$27,729,500

Of the feasible alternatives, the most cost efficient would be Feasible Alternative B with Glasgow Option 1. Feasible Alternative B also has the ability to be broken up into separate phases over several years which provides greater opportunity to obtain federal funding. It also reduces the number of signalized intersections that will require maintenance at the City's expense from four (4) intersections to two (2) intersections.

6.0 PROJECT FUNDING

The critical element to any recommended improvements is to secure funding sources to design and construct the facilities being proposed. The City of Sylvania is encouraged to continue working with other governmental agencies to assist in securing funding sources to improve the safety and operations of this critical interchange area and arterial roadways. Key partners to explore funding options include ODOT, TMACOG, and the Lucas County TID (Transportation Improvement District). Potential funding programs and sources to consider for the improvements include:

- Highway Safety Improvement Program (HSIP) – Coordinate with ODOT
- Safe Routes to School Program (SRTS) – Coordinate with ODOT
- Urban Paving Program – Coordinate with ODOT
- State Infrastructure Bank (SIB) Programs – Coordinate with ODOT
- Surface Transportation Block Grant Program (STBGP) – Coordinate with TMACOG
- Congestion Mitigation Air Quality (CMAQ) – Coordinate with TMACOG
- Transportation Alternatives Program (TAP) – Coordinate with TMACOG
- Ohio Public Works Commission (OPWC) – Coordinate with OPWC District 12
- Ohio Department of Natural Resources (ODNR) Various programs – Coordinate with ODNR

The programs listed above are the most likely funding sources to pursue for various types of improvements that are recommended. Another potential funding source would be the USDOT Better Utilizing Investments to Leverage Development (BUILD) Transportation Grants program. The BUILD program is highly competitive and funding applications are very detailed documents to prepare. Another funding consideration is to explore possible public-private partnerships. Two potential private partners given their local use of the Monroe Street corridor would be ProMedica and Kroger.

The recommended project(s) for improving the US 23 interchange and the Monroe Street corridor should be requested to be part of the TMACOG Long Range Transportation Plan (currently being updated in 2018/2019). Having the project recommendations listed in the long range plan or in local transportation plans often adds beneficial ranking points in competitive grant programs.

7.0 PROJECT PHASING

The interchange improvement has the potential to be built in multiple construction phases. Building the interchange in several phases will minimize the number of road detours or closures as a result of the whole interchange being under reconstruction. With completing a project of this magnitude in separate phases, it allows for a better maintenance of traffic, as well as introduces drivers to the changes of the interchange in a slower manner.

Three potential phases are expected for the interchange project. The sections of the interchange that reflect the most prominent issues would be completed first. Those phases include the following:

- Phase 1 – Northbound on/off Ramps Improvements along with Acres Road Improvements
 - The initial phase would include the construction of the east side of the interchange where the US 23 NB traffic is entering and exiting the roadway network. The most prominent issues with the interchange exist on the east side therefore completing this side first will alleviate those issues as quickly as possible.
- Phase 2 – Southbound on/off Ramps Improvements
 - The second phase would include the construction of the west side of the interchange where the US 23 southbound traffic is entering and exiting the roadway network.
- Phase 3 – Monroe Street Widening Improvements
 - The final phase would include the construction of the additional eastbound lane from Harroun Road to the southbound US-23 on ramp. This is likely to be the last phase of construction given that it is adjacent to the interchange and will need to remain open and operating as the other phases are constructed. Also, with this phase of construction a road closure may not be necessary.

8.0 PUBLIC INVOLVEMENT

Public involvement is an important effort in project development. It creates a clear understanding of the project needs and identified conclusions among the project team and stakeholders. This was done by performing and reviewing the following public involvement activities:

1. Public Involvement Opportunity Flyers – posted at strategically chosen locations where it is intended to inform the largest number of community members about the Interchange Study and process.
2. Press Release – posted in the local newspaper prior to the public involvement meeting that includes a project schedule, contact information, and information about the upcoming public involvement meeting.
3. City and ODOT Meetings – held throughout the project's process, with the City and ODOT to obtain comments and feedback regarding planning, preliminary alternatives, and feasibility.
4. Public Involvement Meeting – gives the public the opportunity to interact with the project team, learn about the proposed changes, and give input on the plan in an open house format, public meeting.
5. Public Comment Submissions – gives the public the opportunity to voice their concerns about the project and document their preference of the proposed alternatives. Comments were received prior to the public meeting, at the meeting, and following the meeting. Comment forms were collected at the public meeting as well as with accepting comments by email, mail, and online submission.
6. Public Comment Response Letters – gives the project team the opportunity to clarify any questions or concerns that stakeholders have regarding the proposed alternatives. The project team responds to each public comment that is submitted.

These activities ensure that all stakeholders and public interests are sufficiently considered in any key decisions and are kept up to date in the project development process. The Public Involvement document details the steps taken in the Public Involvement process along with the documented feedback received by the public.

9.0 CONCLUSIONS AND RECOMMENDATIONS

Based upon the evaluation of each of the Feasible Alternatives, one Feasible Alternative is preferred. Regarding safety, future capacity, and the existing deficiencies within the study area, Feasible Alternative B with Glasgow Option 1 addresses the needs of the interchange best.

Alternative B addresses the following concerns of the interchange:

- Number of signalized intersections is reduced from three (3) intersections to two (2).
- Capacity operation will be improved for the transportation network and all intersections are expected to operate at an acceptable Level of Service (A-D)
- Maintains the existing width of the Monroe Street Bridge that will be re-decked in 2021.
- Improves navigability and beautification of the interchange by centralizing US-23 access points to one intersection each for NB and SB US-23
- The single access point to Monroe Street from Glasgow Road will be maintained.
- The SB US-23 ramp curvature will be improved to a safer design speed
- The NB US-23 on ramp will be converted to a loop ramp with a sufficient curvature and design speed.
- Delay at Acres Road will be minimized by removing the traffic signal and eliminating the NB approach.

Glasgow Option 1 addresses the following concerns of the interchange:

- Improves ramp curvature while maintaining the existing alignment with Monroe Street
- Minimizes any right-of-way impacts to the properties adjacent to the intersection
- Minimizes any environmental impacts to the nearby floodplains and wetlands
- Maintains the existing access to Glasgow Road

In addition, the improvements to widen Monroe Street beginning at Harroun Road are expected to improve the overall operation of several signalized intersections along Monroe Street. These improvements will ensure that the entire interchange is operating as efficiently as possible.

Appendix A: **TRAFFIC COUNTS**

Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive

Columbus, Ohio, United States 43229
614 656 2419 dlaurent@cmtran.com

Count Name: Monroe+St+at+Harroun+Rd TMC
Site Code:
Start Date: 08/23/2017
Page No: 1

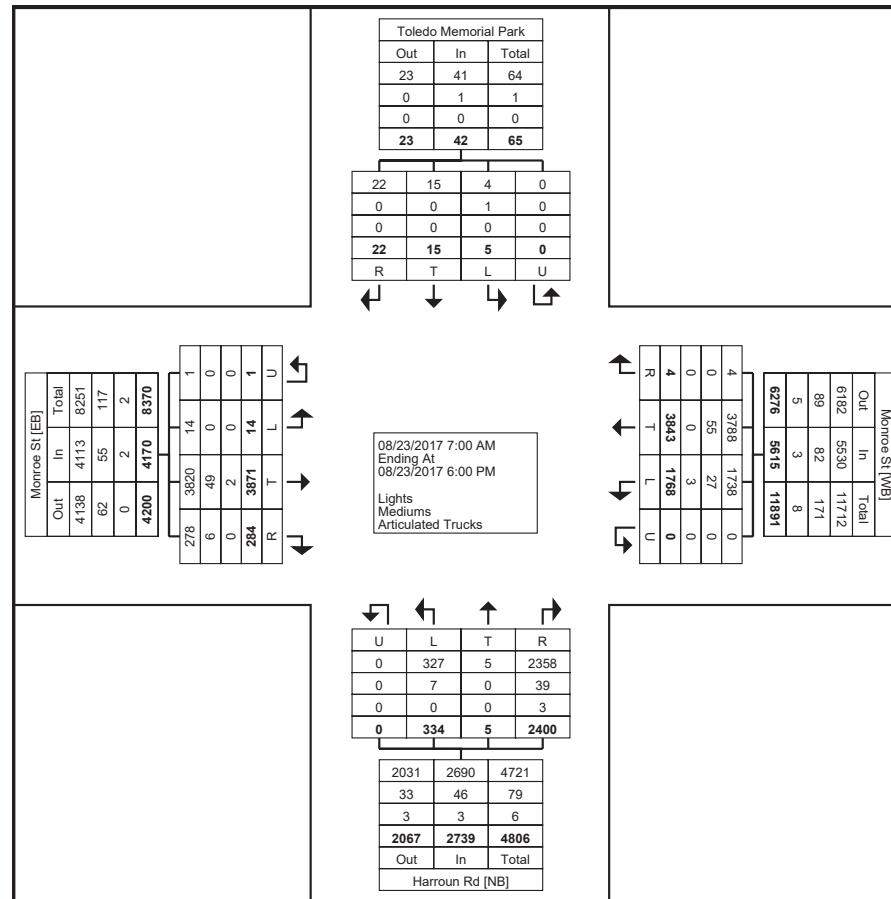
Turning Movement Data

Start Time	Toledo Memorial Park					Monroe St				Harroun Rd				Monroe St				Int. Total			
	Southbound					Westbound				Northbound				Eastbound							
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	
7:00 AM	0	0	0	0	0	0	133	76	0	209	82	0	2	0	84	11	211	0	0	222	515
7:15 AM	0	0	0	0	0	0	147	100	0	247	163	0	11	0	174	13	288	0	0	301	722
7:30 AM	0	0	0	0	0	0	155	113	0	268	166	0	15	0	181	18	346	0	1	365	814
7:45 AM	0	0	0	0	0	0	180	132	0	312	158	0	12	0	170	18	300	2	0	320	802
Hourly Total	0	0	0	0	0	0	615	421	0	1036	569	0	40	0	609	60	1145	2	1	1208	2853
8:00 AM	1	1	0	0	2	0	200	128	0	328	148	0	7	0	155	19	237	0	0	256	741
8:15 AM	0	0	0	0	0	1	154	113	0	268	135	0	15	0	150	19	209	0	0	228	646
8:30 AM	0	0	0	0	0	0	160	93	0	253	118	0	21	0	139	26	184	1	0	211	603
8:45 AM	3	1	0	0	4	1	171	87	0	259	123	1	14	0	138	25	228	2	0	255	656
Hourly Total	4	2	0	0	6	2	685	421	0	1108	524	1	57	0	582	89	858	3	0	950	2646
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
4:00 PM	3	1	1	0	5	0	315	120	0	435	158	1	26	0	185	12	260	0	0	272	897
4:15 PM	0	4	0	0	4	0	253	105	0	358	208	0	39	0	247	11	220	2	0	233	842
4:30 PM	2	0	0	0	2	1	303	134	0	438	195	0	25	0	220	12	225	0	0	237	897
4:45 PM	5	0	1	0	6	0	359	129	0	488	150	2	45	0	197	23	222	1	0	246	937
Hourly Total	10	5	2	0	17	1	1230	488	0	1719	711	3	135	0	849	58	927	3	0	988	3573
5:00 PM	1	3	0	0	4	0	287	92	0	379	143	0	22	0	165	22	245	2	0	269	817
5:15 PM	4	2	1	0	7	1	388	132	0	521	138	0	21	0	159	27	232	2	0	261	948
5:30 PM	2	2	0	0	4	0	339	113	0	452	172	1	30	0	203	20	240	1	0	261	920
5:45 PM	1	1	2	0	4	0	299	101	0	400	143	0	29	0	172	8	224	1	0	233	809
Hourly Total	8	8	3	0	19	1	1313	438	0	1752	596	1	102	0	699	77	941	6	0	1024	3494
Grand Total	22	15	5	0	42	4	3843	1768	0	5615	2400	5	334	0	2739	284	3871	14	1	4170	12566
Approach %	52.4	35.7	11.9	0.0	-	0.1	68.4	31.5	0.0	-	87.6	0.2	12.2	0.0	-	6.8	92.8	0.3	0.0	-	-
Total %	0.2	0.1	0.0	0.0	0.3	0.0	30.6	14.1	0.0	44.7	19.1	0.0	2.7	0.0	21.8	2.3	30.8	0.1	0.0	33.2	-
Lights	22	15	4	0	41	4	3788	1738	0	5530	2358	5	327	0	2690	278	3820	14	1	4113	12374
% Lights	100.0	100.0	80.0	-	97.6	100.0	98.6	98.3	-	98.5	98.3	100.0	97.9	-	98.2	97.9	98.7	100.0	100.0	98.6	98.5
Mediums	0	0	1	0	1	0	55	27	0	82	39	0	7	0	46	6	49	0	0	55	184
% Mediums	0.0	0.0	20.0	-	2.4	0.0	1.4	1.5	-	1.5	1.6	0.0	2.1	-	1.7	2.1	1.3	0.0	0.0	1.3	1.5
Articulated Trucks	0	0	0	0	0	0	0	3	0	3	3	0	0	0	3	0	2	0	0	2	8
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	0.2	-	0.1	0.1	0.0	0.0	-	0.1	0.0	0.1	0.0	0.0	0.0	0.1

Carpenter Marty (CM) Transportation Inc.
6612 Singletree Drive

Columbus, Ohio, United States 43229
614 656 2419 dlaurent@cmtran.com

Count Name: Monroe+St+at+Harroun+Rd TMC
Site Code:
Start Date: 08/23/2017
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Turning Movement Data Plot

Carpenter Marty (CM) Transportation Inc.
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Count Name: Monroe+St+at+Harroun+Rd TMC
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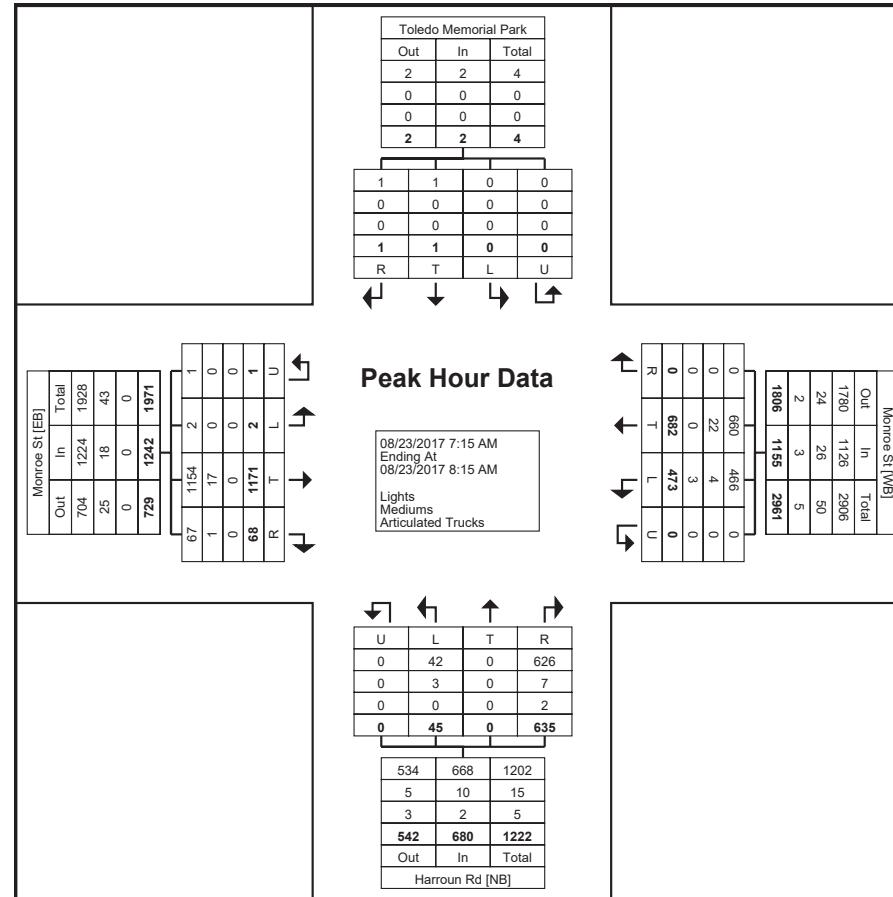
Turning Movement Peak Hour Data (7:15 AM)

Start Time	Toledo Memorial Park Southbound					Monroe St Westbound				Harroun Rd Northbound				Monroe St Eastbound				Int. Total			
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru				
7:15 AM	0	0	0	0	0	0	147	100	0	247	163	0	11	0	174	13	288	0	0	301	722
7:30 AM	0	0	0	0	0	0	155	113	0	268	166	0	15	0	181	18	346	0	1	365	814
7:45 AM	0	0	0	0	0	0	180	132	0	312	158	0	12	0	170	18	300	2	0	320	802
8:00 AM	1	1	0	0	2	0	200	128	0	328	148	0	7	0	155	19	237	0	0	256	741
Total	1	1	0	0	2	0	682	473	0	1155	635	0	45	0	680	68	1171	2	1	1242	3079
Approach %	50.0	50.0	0.0	0.0	-	0.0	59.0	41.0	0.0	-	93.4	0.0	6.6	0.0	-	5.5	94.3	0.2	0.1	-	-
Total %	0.0	0.0	0.0	0.0	0.1	0.0	22.2	15.4	0.0	37.5	20.6	0.0	1.5	0.0	22.1	2.2	38.0	0.1	0.0	40.3	-
PHF	0.250	0.250	0.000	0.000	0.250	0.000	0.853	0.896	0.000	0.880	0.956	0.000	0.750	0.000	0.939	0.895	0.846	0.250	0.250	0.851	0.946
Lights	1	1	0	0	2	0	660	466	0	1126	626	0	42	0	668	67	1154	2	1	1224	3020
% Lights	100.0	100.0	-	-	100.0	-	96.8	98.5	-	97.5	98.6	-	93.3	-	98.2	98.5	98.5	100.0	100.0	98.6	98.1
Mediums	0	0	0	0	0	0	22	4	0	26	7	0	3	0	10	1	17	0	0	18	54
% Mediums	0.0	0.0	-	-	0.0	-	3.2	0.8	-	2.3	1.1	-	6.7	-	1.5	1.5	1.5	0.0	0.0	1.4	1.8
Articulated Trucks	0	0	0	0	0	0	0	3	0	3	2	0	0	0	2	0	0	0	0	0	5
% Articulated Trucks	0.0	0.0	-	-	0.0	-	0.0	0.6	-	0.3	0.3	-	0.0	-	0.3	0.0	0.0	0.0	0.0	0.0	0.2

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Count Name: Monroe+St+at+Harroun+Rd TMC
Site Code:
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Turning Movement Peak Hour Data Plot (7:15 AM)

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Count Name: Monroe+St+at+Harroun+Rd TMC
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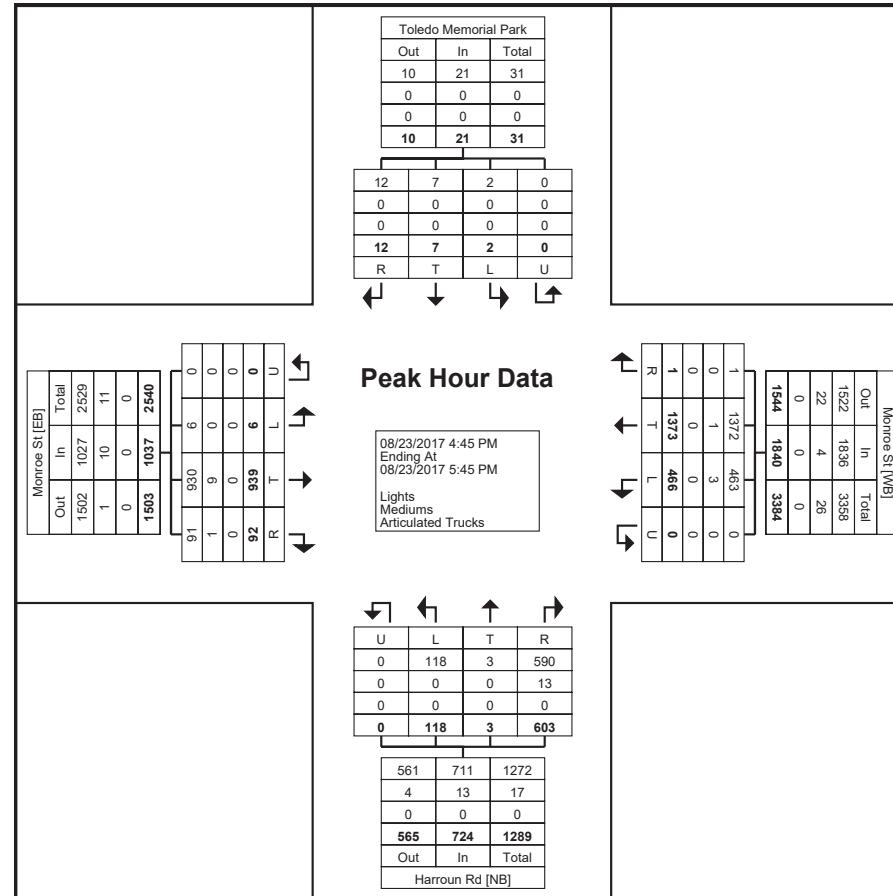
Turning Movement Peak Hour Data (4:45 PM)

Start Time	Toledo Memorial Park Southbound					Monroe St Westbound				Harroun Rd Northbound				Monroe St Eastbound				Int. Total			
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru				
4:45 PM	5	0	1	0	6	0	359	129	0	488	150	2	45	0	197	23	222	1	0	246	937
5:00 PM	1	3	0	0	4	0	287	92	0	379	143	0	22	0	165	22	245	2	0	269	817
5:15 PM	4	2	1	0	7	1	388	132	0	521	138	0	21	0	159	27	232	2	0	261	948
5:30 PM	2	2	0	0	4	0	339	113	0	452	172	1	30	0	203	20	240	1	0	261	920
Total	12	7	2	0	21	1	1373	466	0	1840	603	3	118	0	724	92	939	6	0	1037	3622
Approach %	57.1	33.3	9.5	0.0	-	0.1	74.6	25.3	0.0	-	83.3	0.4	16.3	0.0	-	8.9	90.5	0.6	0.0	-	-
Total %	0.3	0.2	0.1	0.0	0.6	0.0	37.9	12.9	0.0	50.8	16.6	0.1	3.3	0.0	20.0	2.5	25.9	0.2	0.0	28.6	-
PHF	0.600	0.583	0.500	0.000	0.750	0.250	0.885	0.883	0.000	0.883	0.876	0.375	0.656	0.000	0.892	0.852	0.958	0.750	0.000	0.964	0.955
Lights	12	7	2	0	21	1	1372	463	0	1836	590	3	118	0	711	91	930	6	0	1027	3595
% Lights	100.0	100.0	100.0	-	100.0	100.0	99.9	99.4	-	99.8	97.8	100.0	100.0	-	98.2	98.9	99.0	100.0	-	99.0	99.3
Mediums	0	0	0	0	0	0	1	3	0	4	13	0	0	0	13	1	9	0	0	10	27
% Mediums	0.0	0.0	0.0	-	0.0	0.0	0.1	0.6	-	0.2	2.2	0.0	0.0	-	1.8	1.1	1.0	0.0	-	1.0	0.7
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	

Carpenter Marty (CM) Transportation Inc.
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Count Name: Monroe+St+at+Harroun+Rd TMC
Site Code:
Start Date: 08/23/2017
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Turning Movement Peak Hour Data Plot (4:45 PM)



Mannik & Smith Group (OH)
1800 Indian Wood Circle

Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Monroe St. & Kroger Driveway
Site Code:
Start Date: 11/29/2017
Page No: 1

Turning Movement Data

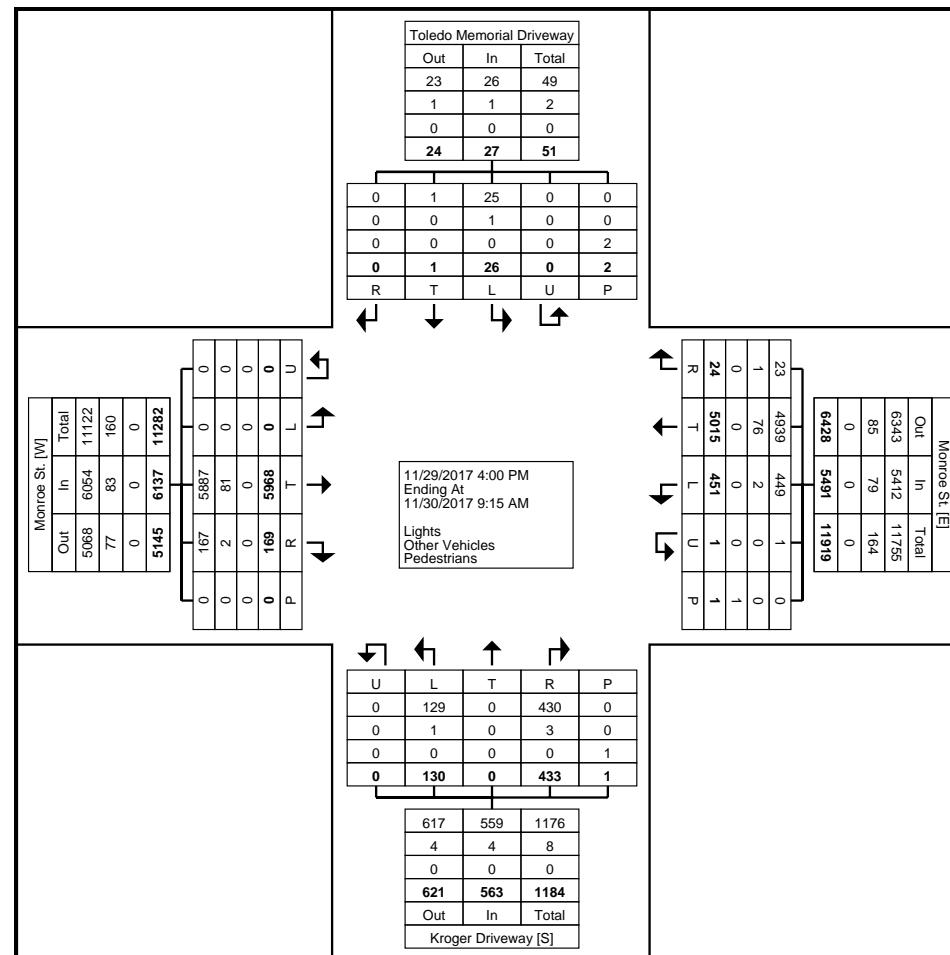
Start Time	Toledo Memorial Driveway						Monroe St.						Grocery Store Driveway						Monroe St.						Int. Total	
	Southbound						Westbound						Northbound						Eastbound							
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
4:00 PM	0	0	2	0	0	2	1	359	39	1	0	400	48	0	10	0	0	58	19	399	0	0	0	418	878	
4:15 PM	0	0	4	0	1	4	5	387	35	0	0	427	35	0	13	0	0	48	11	385	0	0	0	396	875	
4:30 PM	0	0	7	0	0	7	2	368	40	0	0	410	35	0	12	0	0	47	18	408	0	0	0	426	890	
4:45 PM	0	0	6	0	1	6	1	388	53	0	1	442	28	0	15	0	0	43	13	347	0	0	0	360	851	
Hourly Total	0	0	19	0	2	19	9	1502	167	1	1	1679	146	0	50	0	0	196	61	1539	0	0	0	1600	3494	
5:00 PM	0	0	1	0	0	1	0	388	37	0	0	425	43	0	13	0	0	56	12	379	0	0	0	391	873	
5:15 PM	0	0	0	0	0	0	0	429	56	0	0	485	38	0	21	0	0	59	9	369	0	0	0	378	922	
5:30 PM	0	0	0	0	0	0	0	378	47	0	0	425	31	0	16	0	1	47	10	376	0	0	0	386	858	
5:45 PM	0	0	1	0	0	1	0	329	45	0	0	374	37	0	15	0	0	52	13	320	0	0	0	333	760	
Hourly Total	0	0	2	0	0	2	0	1524	185	0	0	1709	149	0	65	0	1	214	44	1444	0	0	0	1488	3413	
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
7:00 AM	0	0	0	0	0	0	0	220	7	0	0	227	14	0	0	0	0	14	5	290	0	0	0	295	536	
7:15 AM	0	0	0	0	0	0	0	245	10	0	0	255	19	0	0	0	0	19	8	395	0	0	0	403	677	
7:30 AM	0	0	0	0	0	0	1	211	11	0	0	223	17	0	2	0	0	19	9	511	0	0	0	520	762	
7:45 AM	0	0	0	0	0	0	3	310	11	0	0	324	21	0	4	0	0	25	12	423	0	0	0	435	784	
Hourly Total	0	0	0	0	0	0	4	986	39	0	0	1029	71	0	6	0	0	77	34	1619	0	0	0	1653	2759	
8:00 AM	0	0	0	0	0	0	3	265	17	0	0	285	13	0	2	0	0	15	6	365	0	0	0	371	671	
8:15 AM	0	0	2	0	0	2	3	275	14	0	0	292	15	0	2	0	0	17	8	324	0	0	0	332	643	
8:30 AM	0	1	2	0	0	3	4	229	20	0	0	253	15	0	3	0	0	18	8	349	0	0	0	357	631	
8:45 AM	0	0	1	0	0	1	1	234	9	0	0	244	24	0	2	0	0	26	8	327	0	0	0	335	606	
Hourly Total	0	1	5	0	0	6	11	1003	60	0	0	1074	67	0	9	0	0	76	30	1365	0	0	0	1395	2551	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	
Grand Total	0	1	26	0	2	27	24	5015	451	1	1	5491	433	0	130	0	1	563	169	5968	0	0	0	6137	12218	
Approach %	0.0	3.7	96.3	0.0	-	-	0.4	91.3	8.2	0.0	-	-	76.9	0.0	23.1	0.0	-	-	2.8	97.2	0.0	0.0	-	-	-	
Total %	0.0	0.0	0.2	0.0	-	0.2	0.2	41.0	3.7	0.0	-	44.9	3.5	0.0	1.1	0.0	-	4.6	1.4	48.8	0.0	0.0	-	50.2	-	
Lights	0	1	25	0	-	26	23	4939	449	1	-	5412	430	0	129	0	-	559	167	5887	0	0	-	6054	12051	
% Lights	-	100.0	96.2	-	-	96.3	95.8	98.5	99.6	100.0	-	98.6	99.3	-	99.2	-	-	99.3	98.8	98.6	-	-	-	98.6	98.6	
Other Vehicles	0	0	1	0	-	1	1	76	2	0	-	79	3	0	1	0	-	4	2	81	0	0	-	83	167	
% Other Vehicles	-	0.0	3.8	-	-	3.7	4.2	1.5	0.4	0.0	-	1.4	0.7	-	0.8	-	-	0.7	1.2	1.4	-	-	-	1.4	1.4	
Pedestrians	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	0	-		
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-		



Mannik & Smith Group (OH)
1800 Indian Wood Circle

Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manknsmithgroup.com

Count Name: Monroe St. & Kroger Driveway
Site Code:
Start Date: 11/29/2017
Page No: 2



Turning Movement Data Plot



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(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Monroe St. & Kroger Driveway
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Page No: 3

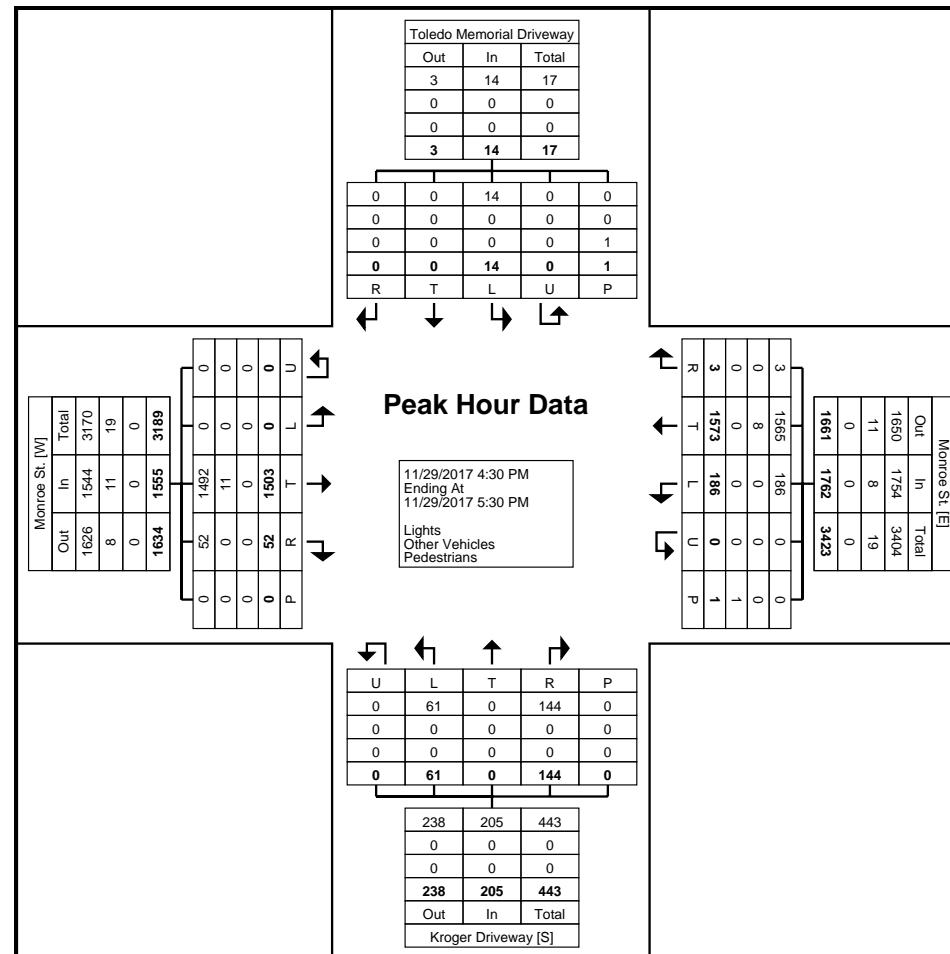
Turning Movement Peak Hour Data (4:30 PM)



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Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Monroe St. & Kroger Driveway
Site Code:
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Turning Movement Peak Hour Data Plot (4:30 PM)



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Count Name: Monroe St. & Kroger Driveway
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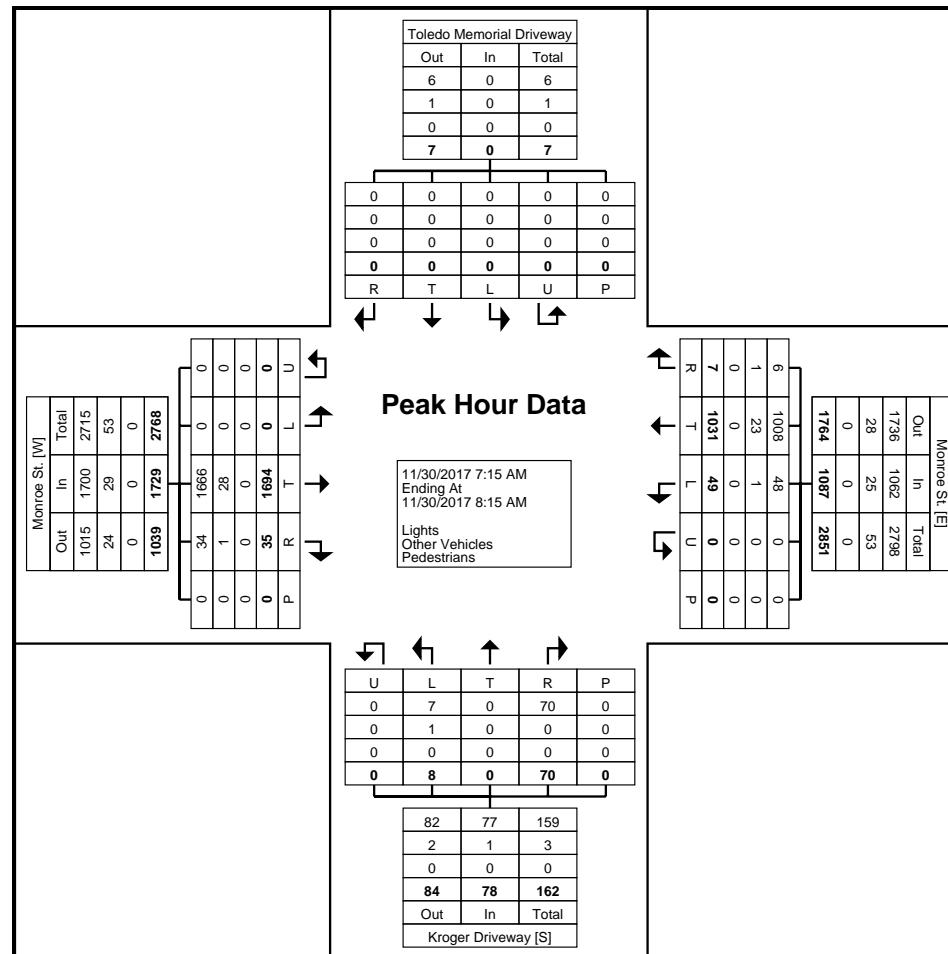
Turning Movement Peak Hour Data (7:15 AM)



Mannik & Smith Group (OH)
1800 Indian Wood Circle

Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Monroe St. & Kroger Driveway
Site Code:
Start Date: 11/29/2017
Page No: 6



Turning Movement Peak Hour Data Plot (7:15 AM)



Mannik & Smith Group (OH)
1800 Indian Wood Circle

Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Monroe St. & SB US 23 On & Off
Ramp
Site Code:
Start Date: 11/29/2017
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Turning Movement Data

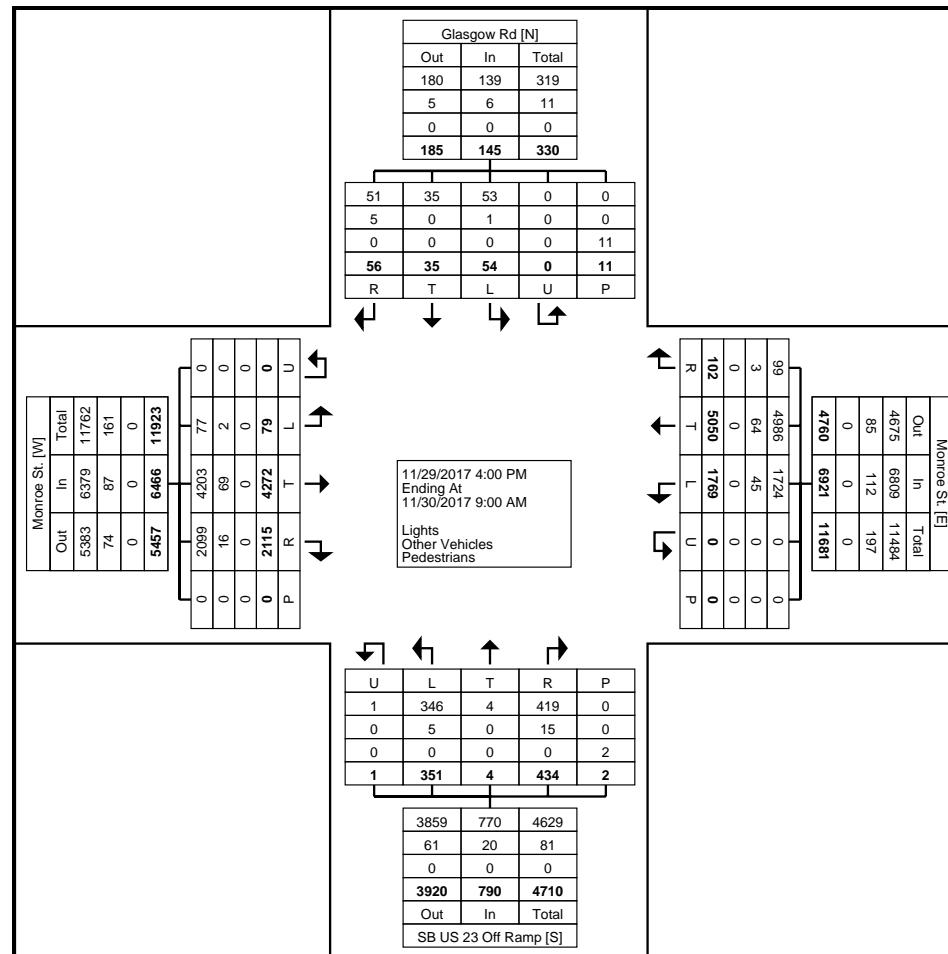
Start Time	Glasgow Rd Southbound						Monroe St. Westbound						SB US 23 Off Ramp Northbound						Monroe St. Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:00 PM	8	2	3	0	0	13	9	375	112	0	0	496	24	0	25	0	0	49	117	323	6	0	0	446	1004
4:15 PM	3	3	3	0	2	9	9	391	102	0	0	502	23	1	15	0	0	39	113	332	7	0	0	452	1002
4:30 PM	1	2	0	0	2	3	5	376	102	0	0	483	36	0	23	0	0	59	110	305	9	0	0	424	969
4:45 PM	2	1	1	0	1	4	9	420	109	0	0	538	22	0	27	0	0	49	113	301	7	0	0	421	1012
Hourly Total	14	8	7	0	5	29	32	1562	425	0	0	2019	105	1	90	0	0	196	453	1261	29	0	0	1743	3987
5:00 PM	2	1	3	0	2	6	15	392	134	0	0	541	24	0	31	1	0	56	124	282	12	0	0	418	1021
5:15 PM	5	5	6	0	2	16	10	438	143	0	0	591	32	1	20	0	0	53	115	276	11	0	0	402	1062
5:30 PM	3	0	6	0	0	9	17	382	130	0	0	529	36	1	13	0	0	50	99	317	10	0	0	426	1014
5:45 PM	4	0	6	0	0	10	8	337	104	0	0	449	28	1	19	0	0	48	90	268	9	0	0	367	874
Hourly Total	14	6	21	0	4	41	50	1549	511	0	0	2110	120	3	83	1	0	207	428	1143	42	0	0	1613	3971
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Hourly 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	
7:00 AM	5	1	4	0	0	10	2	197	99	0	0	298	18	0	11	0	0	29	134	150	2	0	0	286	623
7:15 AM	2	1	3	0	1	6	2	260	103	0	0	365	15	0	23	0	0	38	188	194	2	0	0	384	793
7:30 AM	5	5	2	0	0	12	1	198	114	0	0	313	32	0	24	0	1	56	206	300	1	0	0	507	888
7:45 AM	4	5	7	0	0	16	5	295	119	0	0	419	39	0	29	0	0	68	169	296	1	0	0	466	969
Hourly Total	16	12	16	0	1	44	10	950	435	0	0	1395	104	0	87	0	1	191	697	940	6	0	0	1643	3273
8:00 AM	3	1	4	0	1	8	4	256	92	0	0	352	34	0	19	0	0	53	141	245	0	0	0	386	799
8:15 AM	0	3	2	0	0	5	3	262	106	0	0	371	29	0	29	0	1	58	157	227	0	0	0	384	818
8:30 AM	4	2	0	0	0	6	2	241	101	0	0	344	23	0	26	0	0	49	130	199	1	0	0	330	729
8:45 AM	5	3	4	0	0	12	1	230	99	0	0	330	19	0	17	0	0	36	109	257	1	0	0	367	745
Hourly Total	12	9	10	0	1	31	10	989	398	0	0	1397	105	0	91	0	1	196	537	928	2	0	0	1467	3091
Grand Total	56	35	54	0	11	145	102	5050	1769	0	0	6921	434	4	351	1	2	790	2115	4272	79	0	0	6466	14322
Approach %	38.6	24.1	37.2	0.0	-	-	1.5	73.0	25.6	0.0	-	-	54.9	0.5	44.4	0.1	-	-	32.7	66.1	1.2	0.0	-	-	-
Total %	0.4	0.2	0.4	0.0	-	1.0	0.7	35.3	12.4	0.0	-	48.3	3.0	0.0	2.5	0.0	-	5.5	14.8	29.8	0.6	0.0	-	45.1	-
Lights	51	35	53	0	-	139	99	4986	1724	0	-	6809	419	4	346	1	-	770	2099	4203	77	0	-	6379	14097
% Lights	91.1	100.0	98.1	-	-	95.9	97.1	98.7	97.5	-	-	98.4	96.5	100.0	98.6	100.0	-	97.5	99.2	98.4	97.5	-	-	98.7	98.4
Other Vehicles	5	0	1	0	-	6	3	64	45	0	-	112	15	0	5	0	-	20	16	69	2	0	-	87	225
% Other Vehicles	8.9	0.0	1.9	-	-	4.1	2.9	1.3	2.5	-	-	1.6	3.5	0.0	1.4	0.0	-	2.5	0.8	1.6	2.5	-	-	1.3	1.6
Pedestrians	-	-	-	-	-	11	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	0	-	
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	



Mannik & Smith Group (OH)
1800 Indian Wood Circle

Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Monroe St. & SB US 23 On & Off
Ramp
Site Code:
Start Date: 11/29/2017
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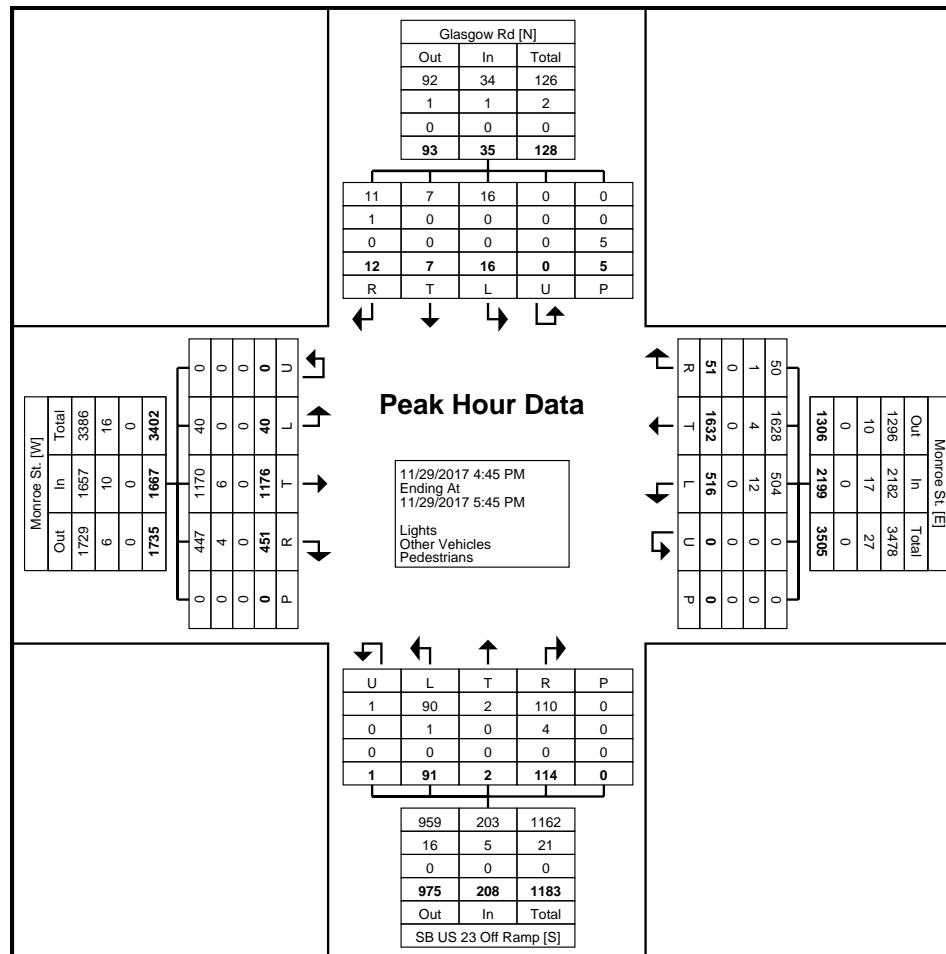
Turning Movement Peak Hour Data (4:45 PM)



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Count Name: Monroe St. & SB US 23 On & Off
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Start Date: 11/29/2017
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Turning Movement Peak Hour Data (7:30 AM)

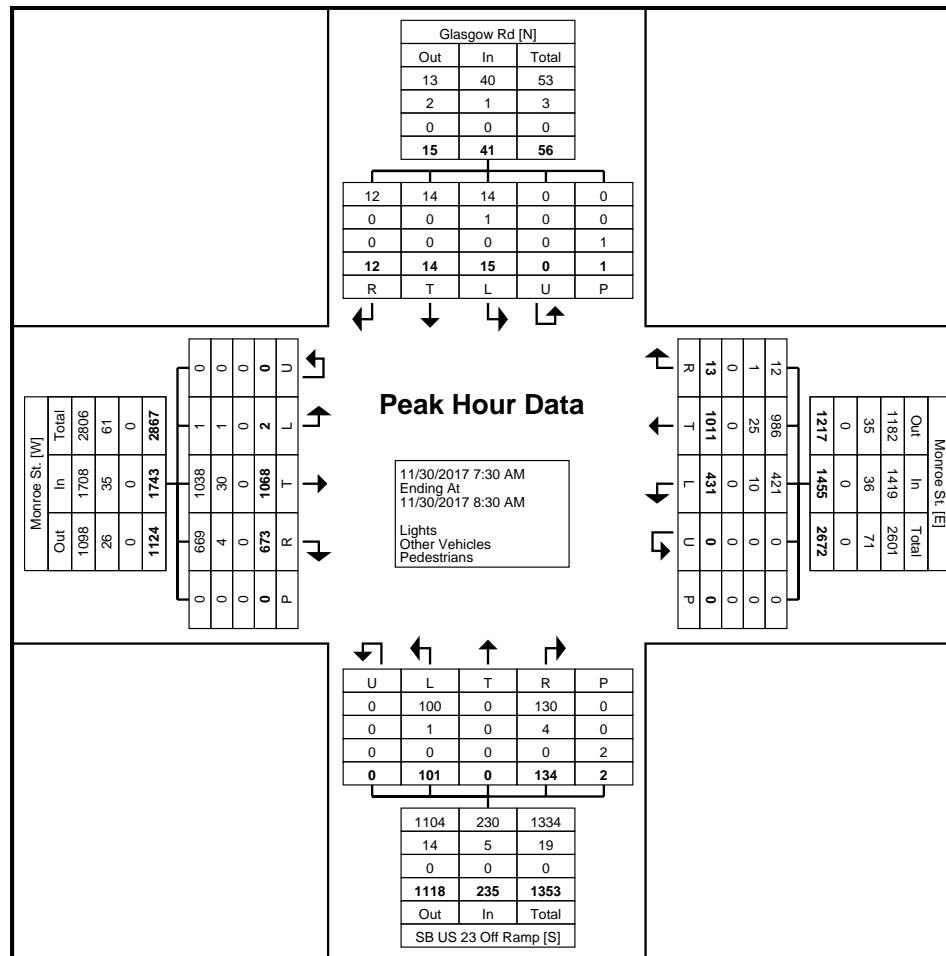
Start Time	Glasgow Rd Southbound						Monroe St. Westbound						SB US 23 Off Ramp Northbound						Monroe St. Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	5	5	2	0	0	12	1	198	114	0	0	313	32	0	24	0	1	56	206	300	1	0	0	507	888
7:45 AM	4	5	7	0	0	16	5	295	119	0	0	419	39	0	29	0	0	68	169	296	1	0	0	466	969
8:00 AM	3	1	4	0	1	8	4	256	92	0	0	352	34	0	19	0	0	53	141	245	0	0	0	386	799
8:15 AM	0	3	2	0	0	5	3	262	106	0	0	371	29	0	29	0	1	58	157	227	0	0	0	384	818
Total	12	14	15	0	1	41	13	1011	431	0	0	1455	134	0	101	0	2	235	673	1068	2	0	0	1743	3474
Approach %	29.3	34.1	36.6	0.0	-	-	0.9	69.5	29.6	0.0	-	-	57.0	0.0	43.0	0.0	-	-	38.6	61.3	0.1	0.0	-	-	-
Total %	0.3	0.4	0.4	0.0	-	1.2	0.4	29.1	12.4	0.0	-	41.9	3.9	0.0	2.9	0.0	-	6.8	19.4	30.7	0.1	0.0	-	50.2	-
PHF	0.600	0.700	0.536	0.000	-	0.641	0.650	0.857	0.905	0.000	-	0.868	0.859	0.000	0.871	0.000	-	0.864	0.817	0.890	0.500	0.000	-	0.859	0.896
Lights	12	14	14	0	-	40	12	986	421	0	-	1419	130	0	100	0	-	230	669	1038	1	0	-	1708	3397
% Lights	100.0	100.0	93.3	-	-	97.6	92.3	97.5	97.7	-	-	97.5	97.0	-	99.0	-	-	97.9	99.4	97.2	50.0	-	-	98.0	97.8
Other Vehicles	0	0	1	0	-	1	1	25	10	0	-	36	4	0	1	0	-	5	4	30	1	0	-	35	77
% Other Vehicles	0.0	0.0	6.7	-	-	2.4	7.7	2.5	2.3	-	-	2.5	3.0	-	1.0	-	-	2.1	0.6	2.8	50.0	-	-	2.0	2.2
Pedestrians	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	0	-	
% Pedestrians	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	



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Page No: 6



Turning Movement Peak Hour Data Plot (7:30 AM)



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Count Name: Monroe & NB US 23 On Ramp
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Turning Movement Data

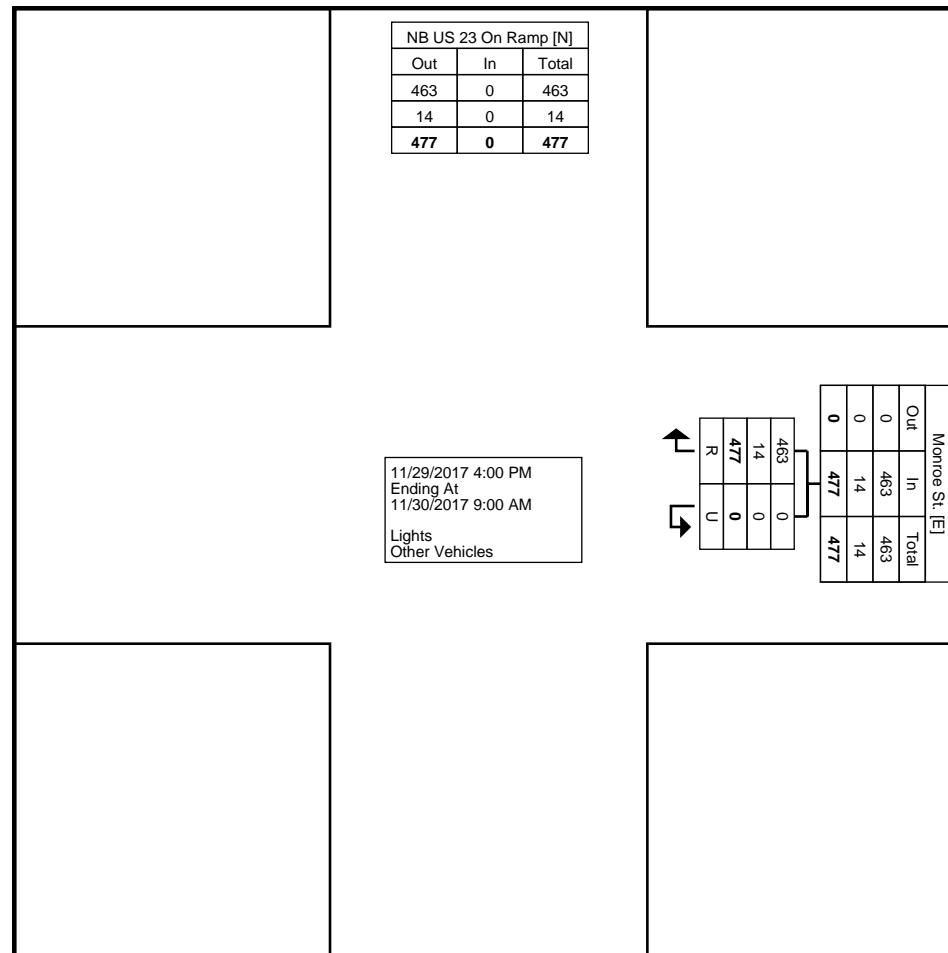
Start Time	Right	U-Turn	App. Total	Int. Total
	Monroe St. Westbound			
4:00 PM	40	0	40	40
4:15 PM	41	0	41	41
4:30 PM	43	0	43	43
4:45 PM	40	0	40	40
Hourly Total	164	0	164	164
5:00 PM	51	0	51	51
5:15 PM	49	0	49	49
5:30 PM	45	0	45	45
5:45 PM	33	0	33	33
Hourly Total	178	0	178	178
*** BREAK ***	-	-	-	-
7:00 AM	16	0	16	16
7:15 AM	26	0	26	26
7:30 AM	16	0	16	16
7:45 AM	16	0	16	16
Hourly Total	74	0	74	74
8:00 AM	16	0	16	16
8:15 AM	19	0	19	19
8:30 AM	12	0	12	12
8:45 AM	14	0	14	14
Hourly Total	61	0	61	61
Grand Total	477	0	477	477
Approach %	100.0	0.0	-	-
Total %	100.0	0.0	100.0	-
Lights	463	0	463	463
% Lights	97.1	-	97.1	97.1
Other Vehicles	14	0	14	14
% Other Vehicles	2.9	-	2.9	2.9



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Count Name: Monroe & NB US 23 On Ramp
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Page No: 3

Turning Movement Peak Hour Data (4:45 PM)

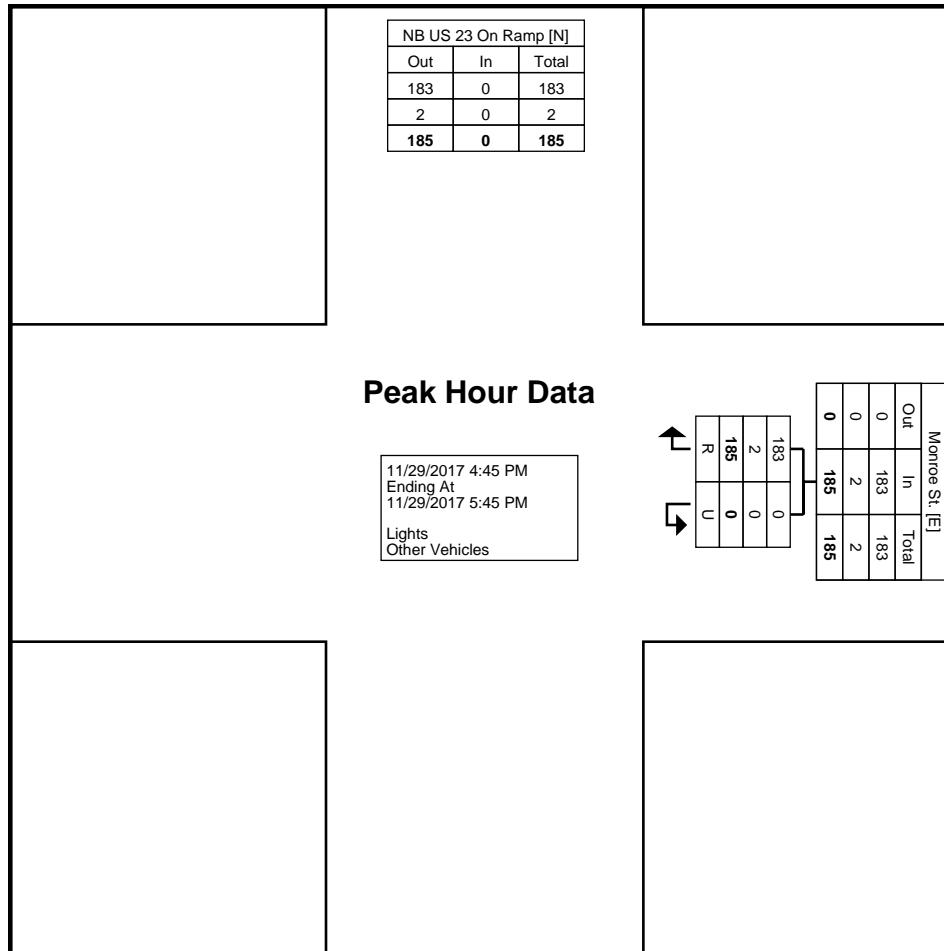
Start Time	Monroe St. Westbound			Int. Total
	Right	U-Turn	App. Total	
4:45 PM	40	0	40	40
5:00 PM	51	0	51	51
5:15 PM	49	0	49	49
5:30 PM	45	0	45	45
Total	185	0	185	185
Approach %	100.0	0.0	-	-
Total %	100.0	0.0	100.0	-
PHF	0.907	0.000	0.907	0.907
Lights	183	0	183	183
% Lights	98.9	-	98.9	98.9
Other Vehicles	2	0	2	2
% Other Vehicles	1.1	-	1.1	1.1



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Count Name: Monroe & NB US 23 On Ramp
Site Code:
Start Date: 11/29/2017
Page No: 5

Turning Movement Peak Hour Data (7:00 AM)

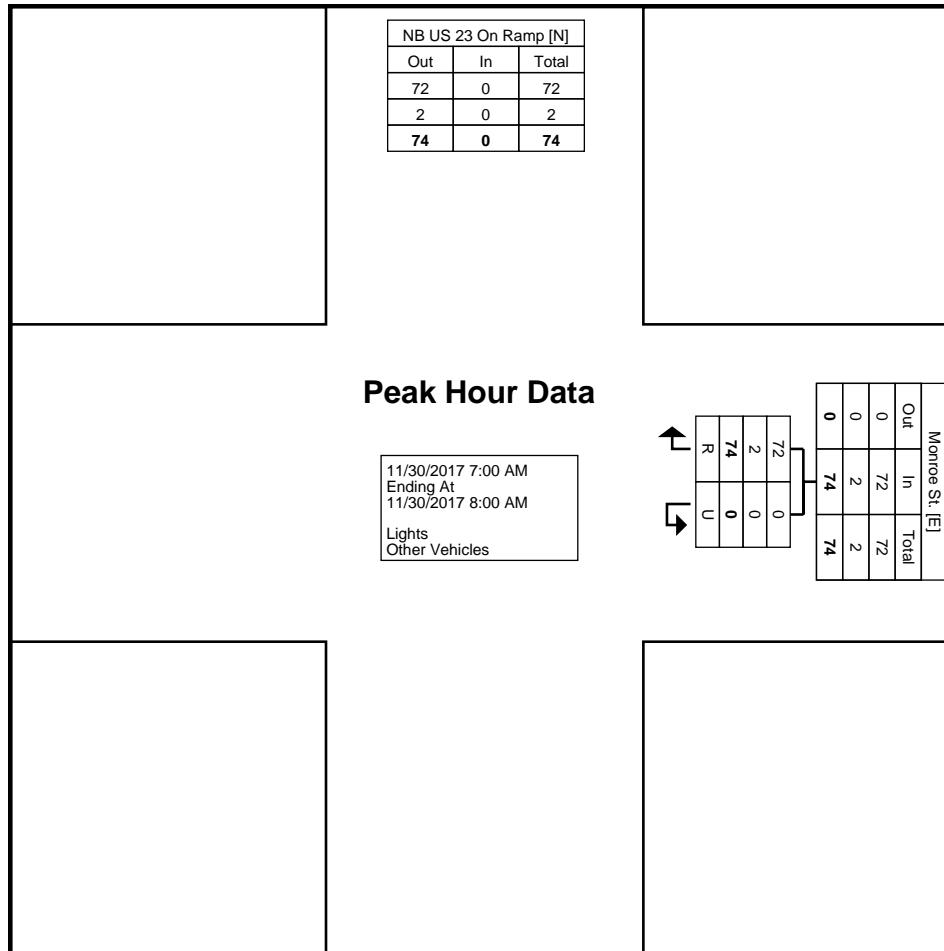
Start Time	Right	Monroe St. Westbound	U-Turn	App. Total	Int. Total
7:00 AM	16		0	16	16
7:15 AM	26		0	26	26
7:30 AM	16		0	16	16
7:45 AM	16		0	16	16
Total	74		0	74	74
Approach %	100.0		0.0	-	-
Total %	100.0		0.0	100.0	-
PHF	0.712		0.000	0.712	0.712
Lights	72		0	72	72
% Lights	97.3		-	97.3	97.3
Other Vehicles	2		0	2	2
% Other Vehicles	2.7		-	2.7	2.7



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Count Name: Monroe Street & US23 Off Ramp
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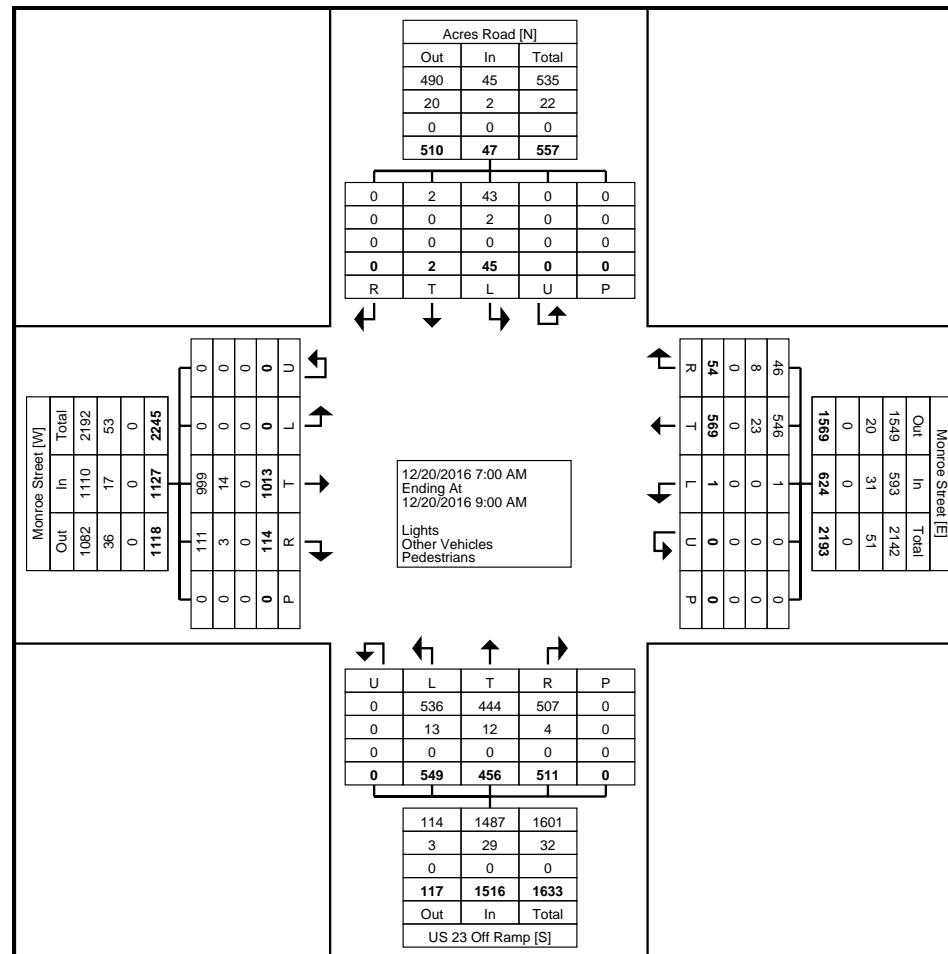
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Count Name: Monroe Street & US23 Off Ramp
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Count Name: Monroe Street & US23 Off Ramp
Site Code:
Start Date: 12/20/2016
Page No: 3

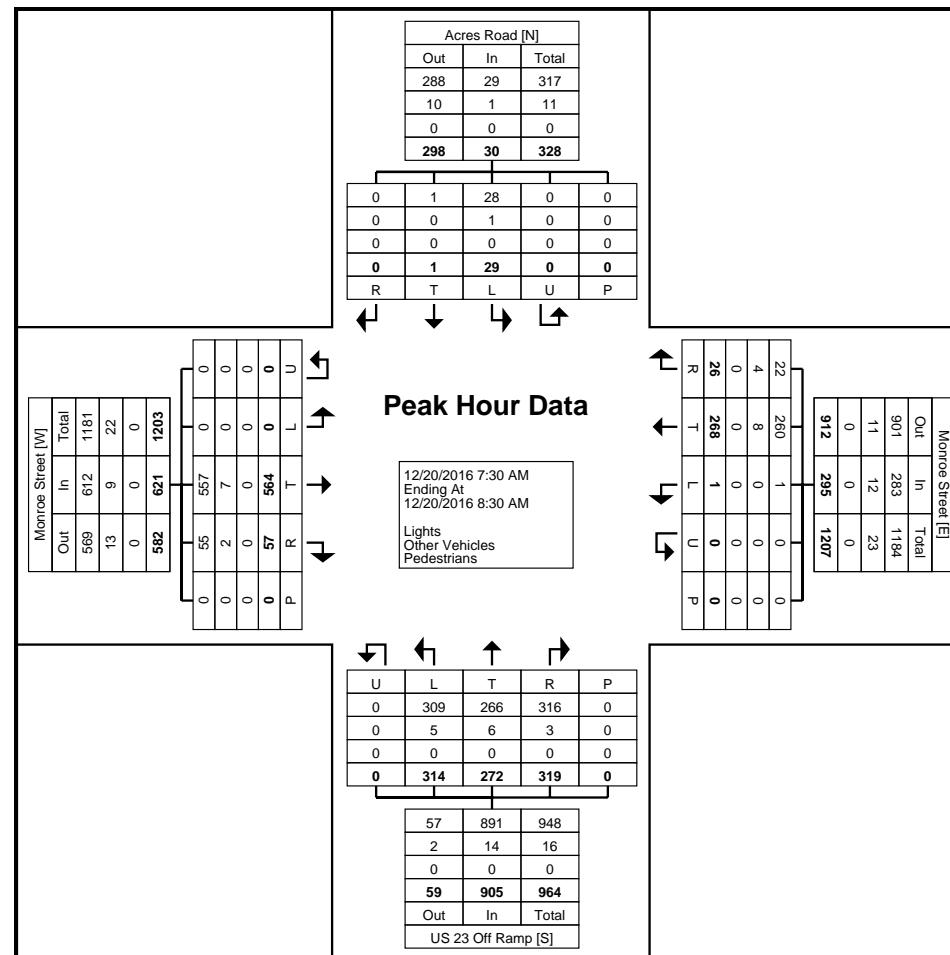
Turning Movement Peak Hour Data (7:30 AM)



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(419) 891-2222 ncarter@manknsmithgroup.com

Count Name: Monroe Street & US23 Off Ramp
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Count Name: 23 Off Ramp & Monroe
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Turning Movement Data

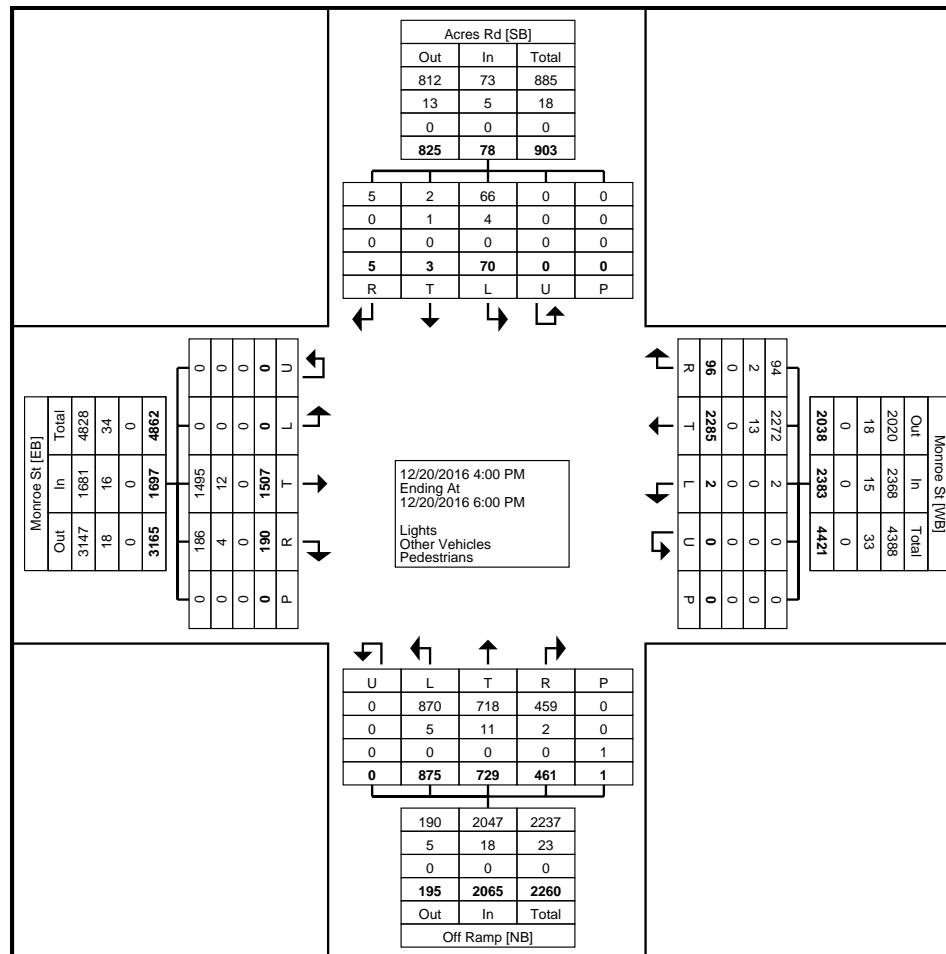
Start Time	Acres Rd Southbound						Monroe St Westbound						Off Ramp Northbound						Monroe St Eastbound						Int. Total	
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total		
4:00 PM	1	2	6	0	0	9	11	259	0	0	0	270	64	90	101	0	1	255	29	184	0	0	0	213	747	
4:15 PM	0	1	15	0	0	16	10	293	0	0	0	303	60	91	96	0	0	247	23	207	0	0	0	230	796	
4:30 PM	1	0	12	0	0	13	13	290	1	0	0	304	48	94	99	0	0	241	24	183	0	0	0	207	765	
4:45 PM	0	0	5	0	0	5	13	297	0	0	0	310	62	100	108	0	0	270	25	202	0	0	0	227	812	
Hourly Total	2	3	38	0	0	43	47	1139	1	0	0	1187	234	375	404	0	1	1013	101	776	0	0	0	877	3120	
5:00 PM	0	0	11	0	0	11	15	292	0	0	0	307	51	96	113	0	0	260	23	180	0	0	0	203	781	
5:15 PM	2	0	3	0	0	5	6	309	0	0	0	315	68	105	103	0	0	276	25	187	0	0	0	212	808	
5:30 PM	1	0	8	0	0	9	11	298	1	0	0	310	52	84	129	0	0	265	26	188	0	0	0	214	798	
5:45 PM	0	0	10	0	0	10	17	247	0	0	0	264	56	69	126	0	0	251	15	176	0	0	0	191	716	
Hourly Total	3	0	32	0	0	35	49	1146	1	0	0	1196	227	354	471	0	0	1052	89	731	0	0	0	820	3103	
Grand Total	5	3	70	0	0	78	96	2285	2	0	0	2383	461	729	875	0	1	2065	190	1507	0	0	0	1697	6223	
Approach %	6.4	3.8	89.7	0.0	-	-	4.0	95.9	0.1	0.0	-	-	22.3	35.3	42.4	0.0	-	-	11.2	88.8	0.0	0.0	-	-	-	
Total %	0.1	0.0	1.1	0.0	-	1.3	1.5	36.7	0.0	0.0	-	-	38.3	7.4	11.7	14.1	0.0	-	33.2	3.1	24.2	0.0	0.0	-	27.3	-
Lights	5	2	66	0	-	73	94	2272	2	0	-	2368	459	718	870	0	-	2047	186	1495	0	0	-	1681	6169	
% Lights	100.0	66.7	94.3	-	-	93.6	97.9	99.4	100.0	-	-	99.4	99.6	98.5	99.4	-	-	99.1	97.9	99.2	-	-	-	99.1	99.1	
Other Vehicles	0	1	4	0	-	5	2	13	0	0	-	15	2	11	5	0	-	18	4	12	0	0	-	16	54	
% Other Vehicles	0.0	33.3	5.7	-	-	6.4	2.1	0.6	0.0	-	-	0.6	0.4	1.5	0.6	-	-	0.9	2.1	0.8	-	-	-	0.9	0.9	
Pedestrians	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-	-	0	-		
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-		



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Count Name: 23 Off Ramp & Monroe
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Turning Movement Data Plot



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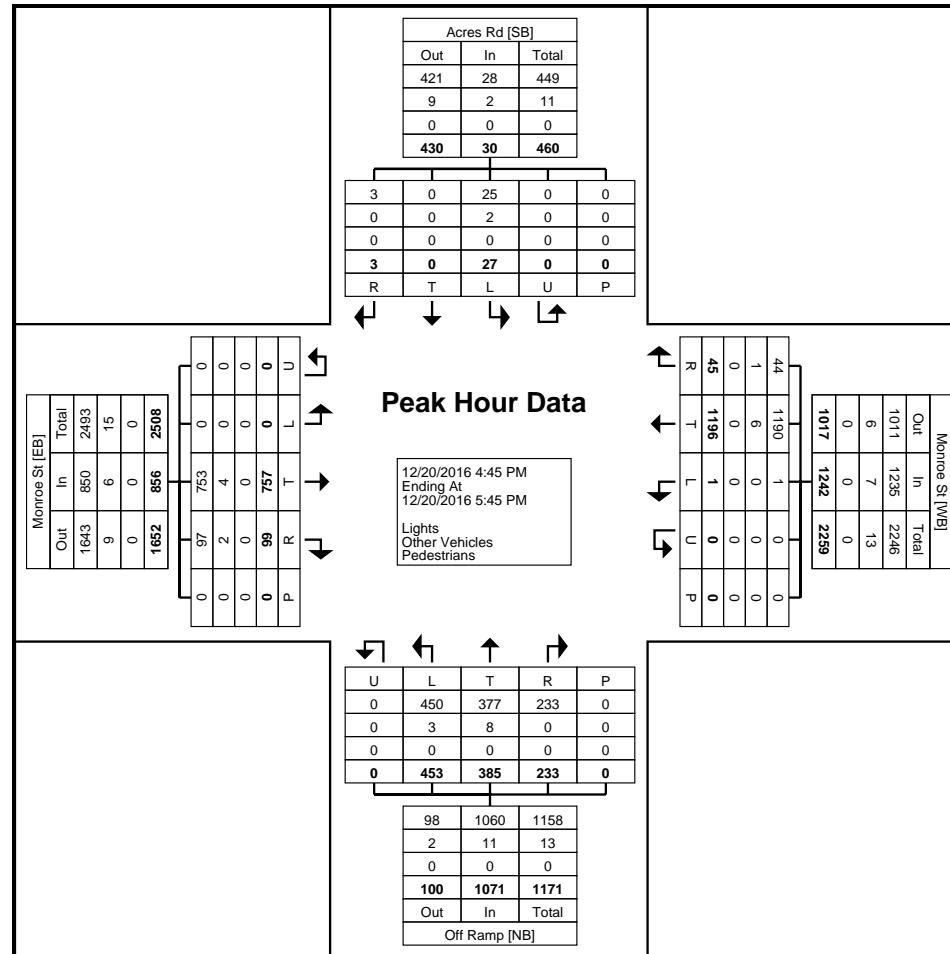
Turning Movement Peak Hour Data (4:45 PM)



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Count Name: Alexis & Acres
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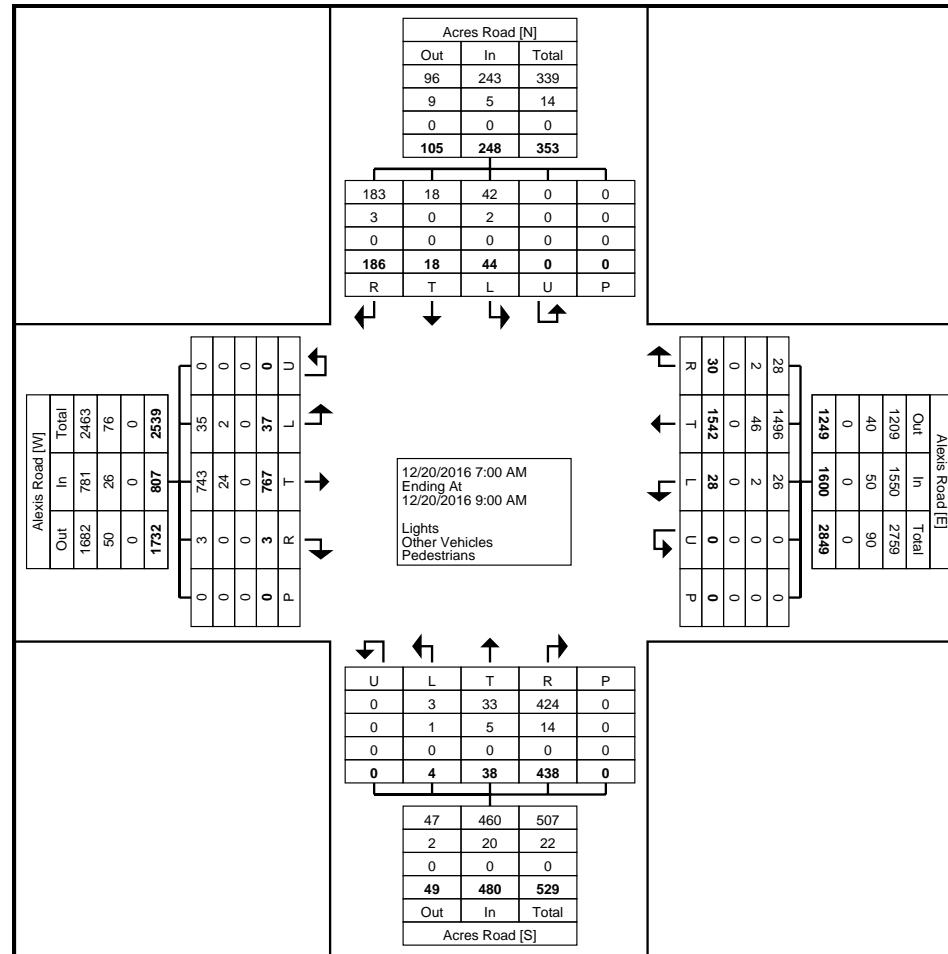
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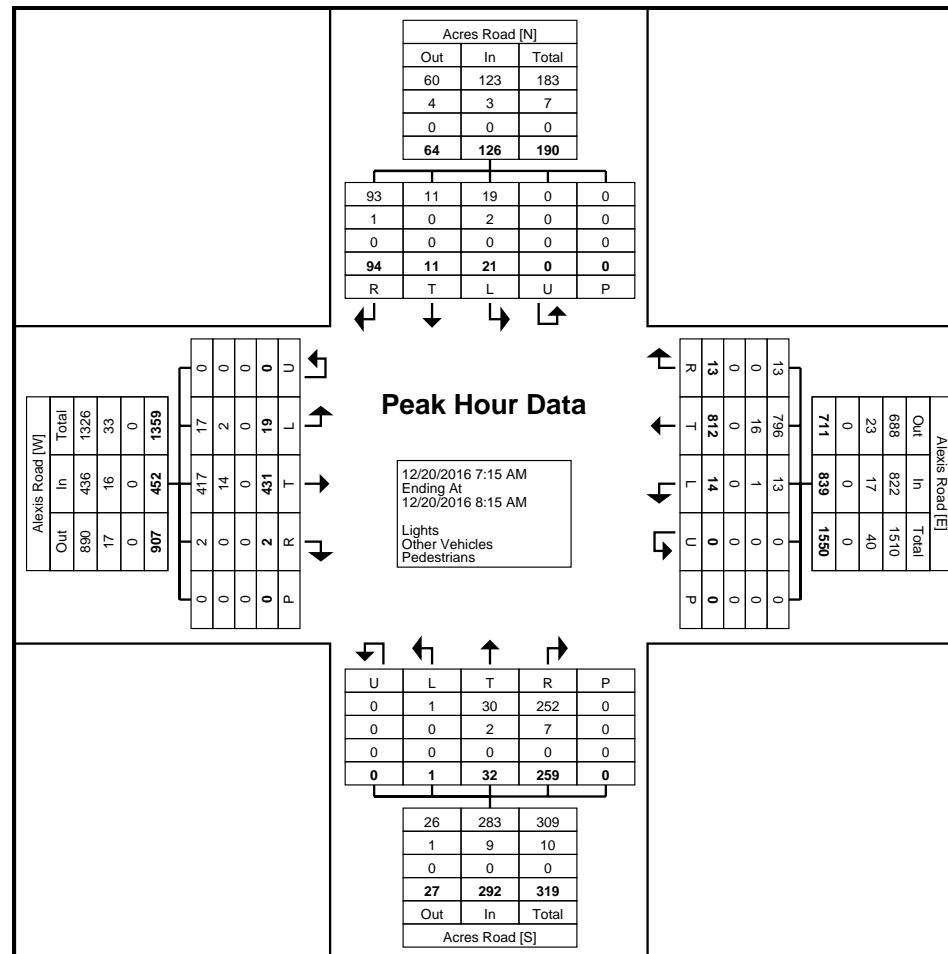
Turning Movement Peak Hour Data (7:15 AM)



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Count Name: Alexis & Acres Rd
Site Code:
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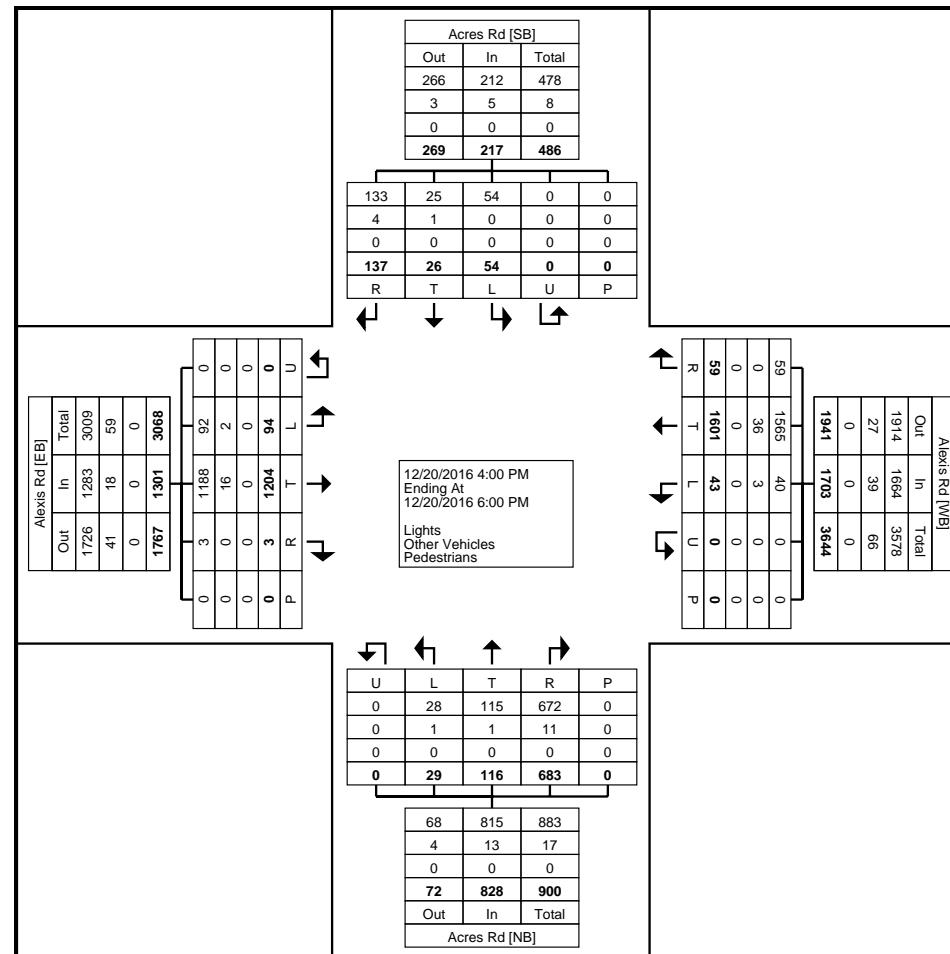
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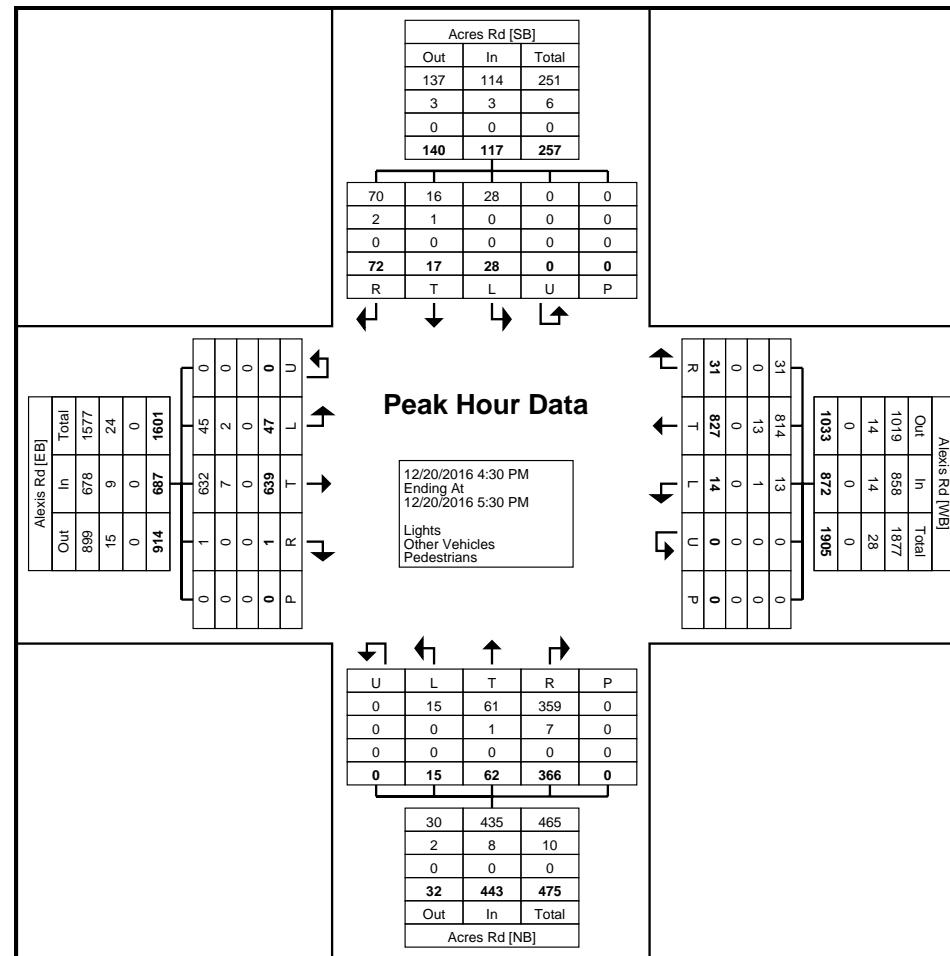
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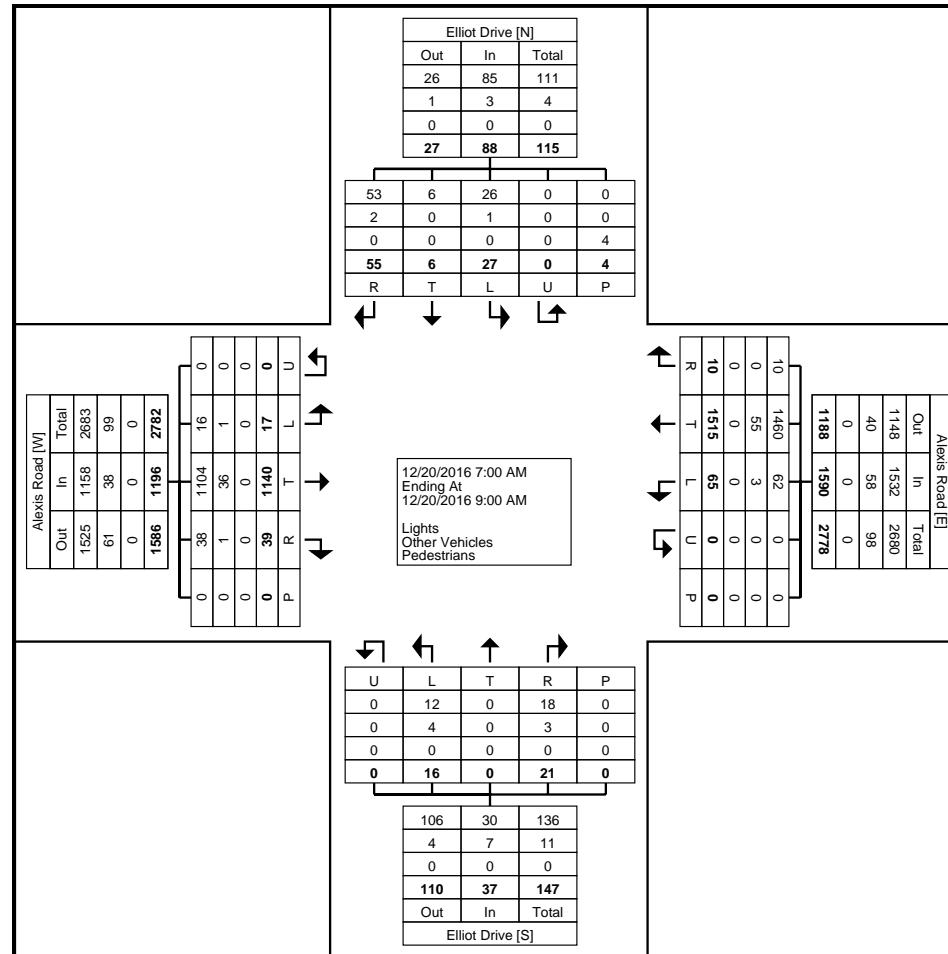
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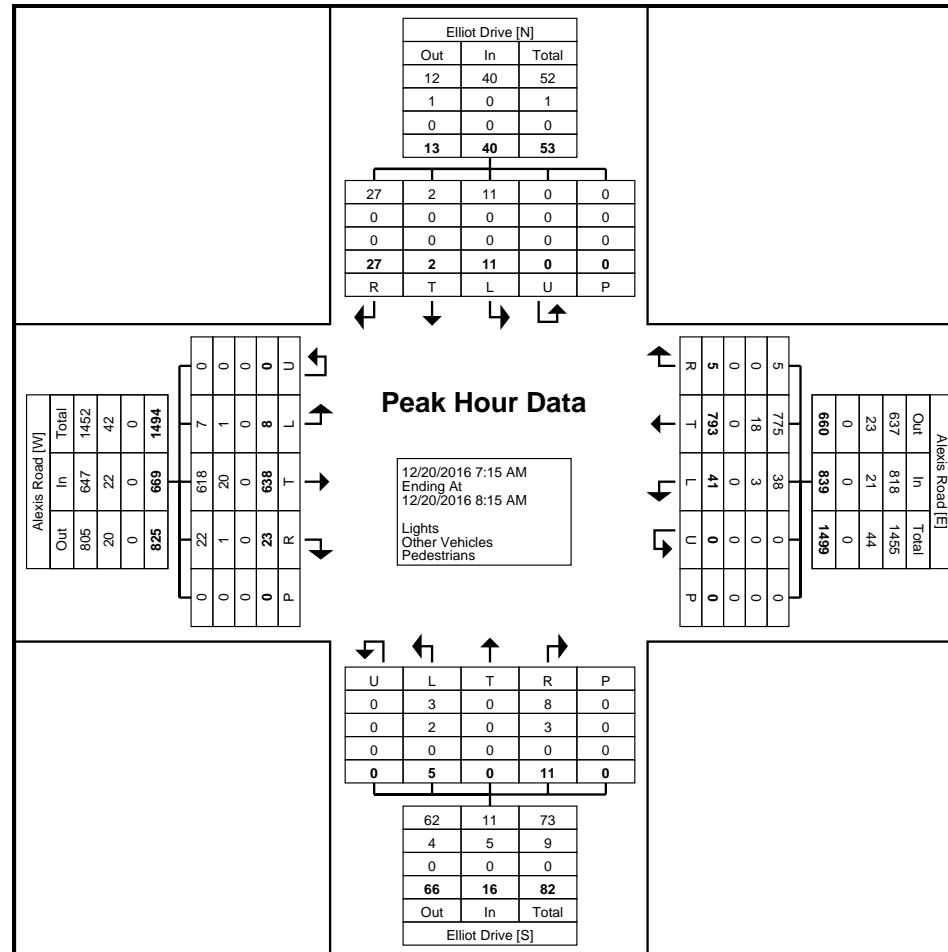
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Count Name: Alexis & Elliot Dr
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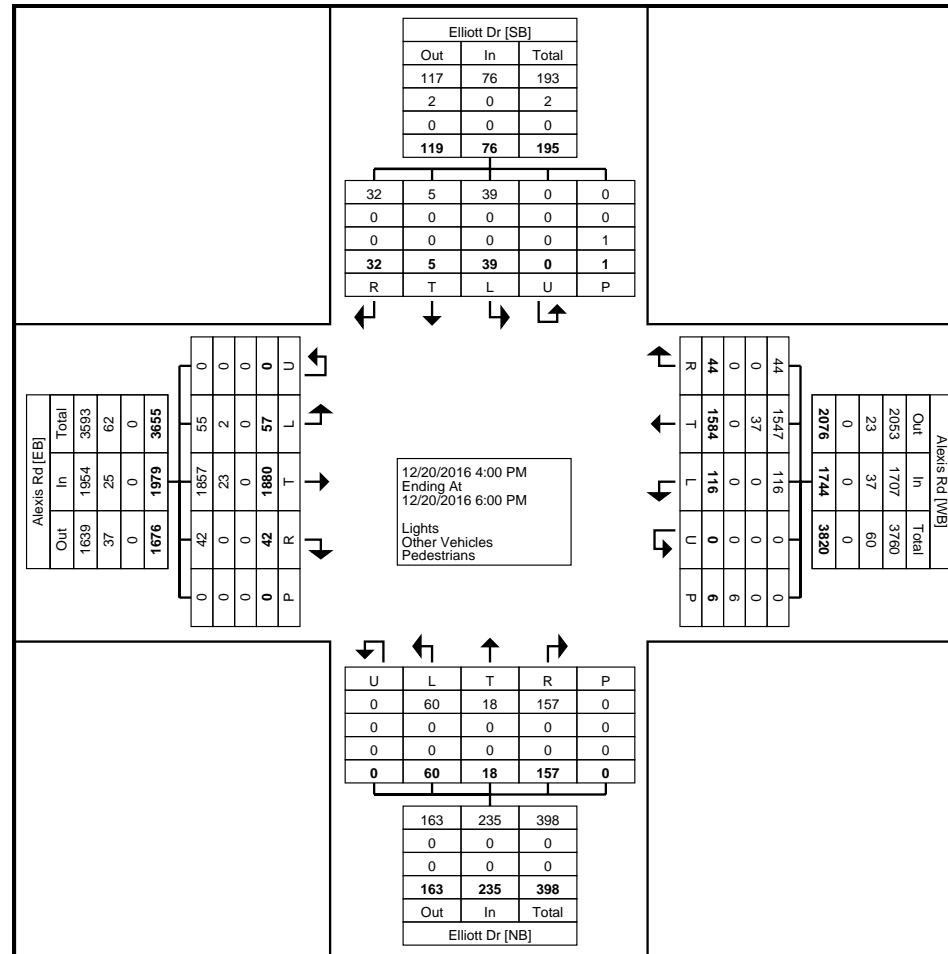
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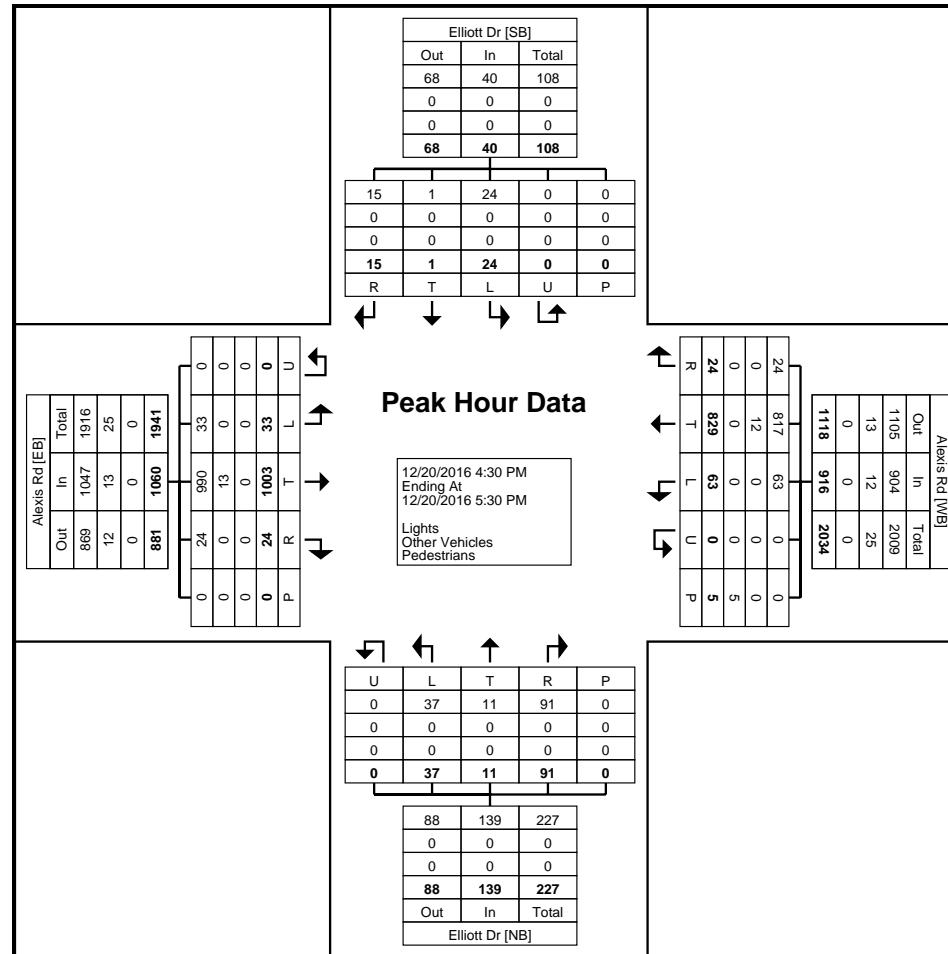
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Mannik & Smith Group (OH)
1800 Indian Wood Circle

Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Tireman/Fairways Drives &
Monroe St
Site Code:
Start Date: 11/29/2017
Page No: 1

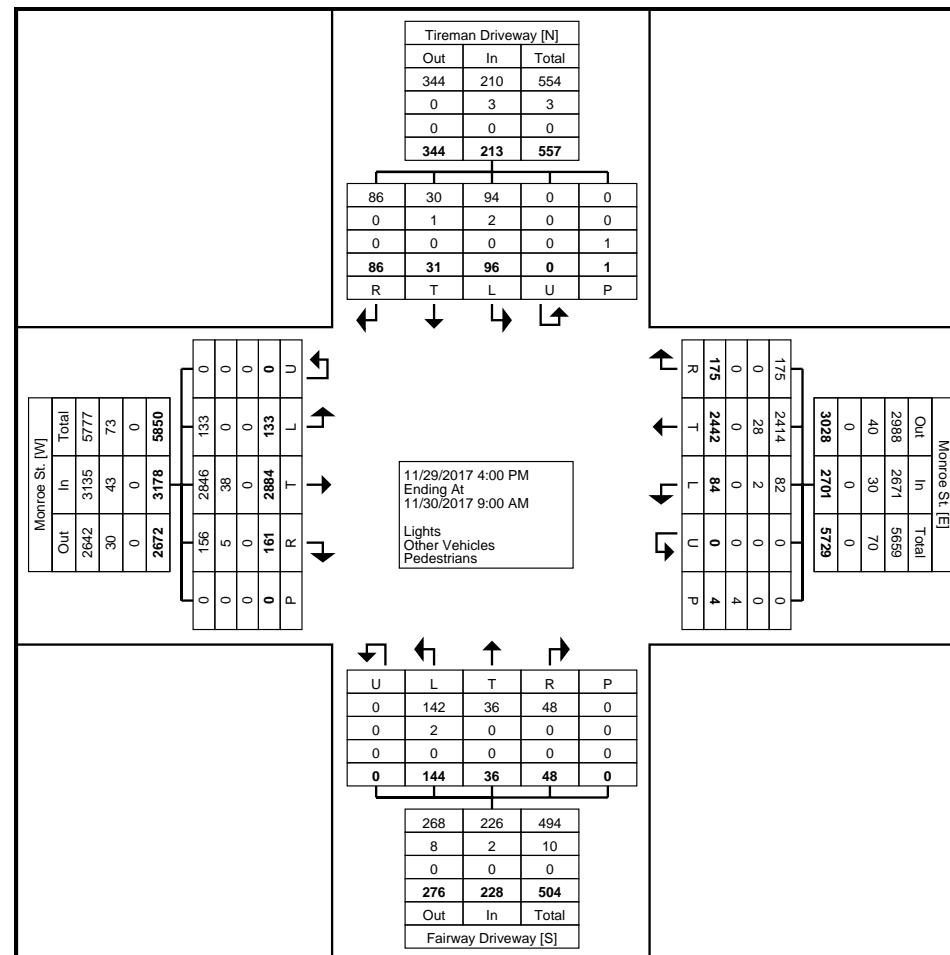
Turning Movement Data



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Count Name: Tireman/Fairways Drives &
Monroe St
Site Code:
Start Date: 11/29/2017
Page No: 2



Turning Movement Data Plot



Mannik & Smith Group (OH)
1800 Indian Wood Circle

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(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Tireman/Fairways Drives &
Monroe St
Site Code:
Start Date: 11/29/2017
Page No: 3

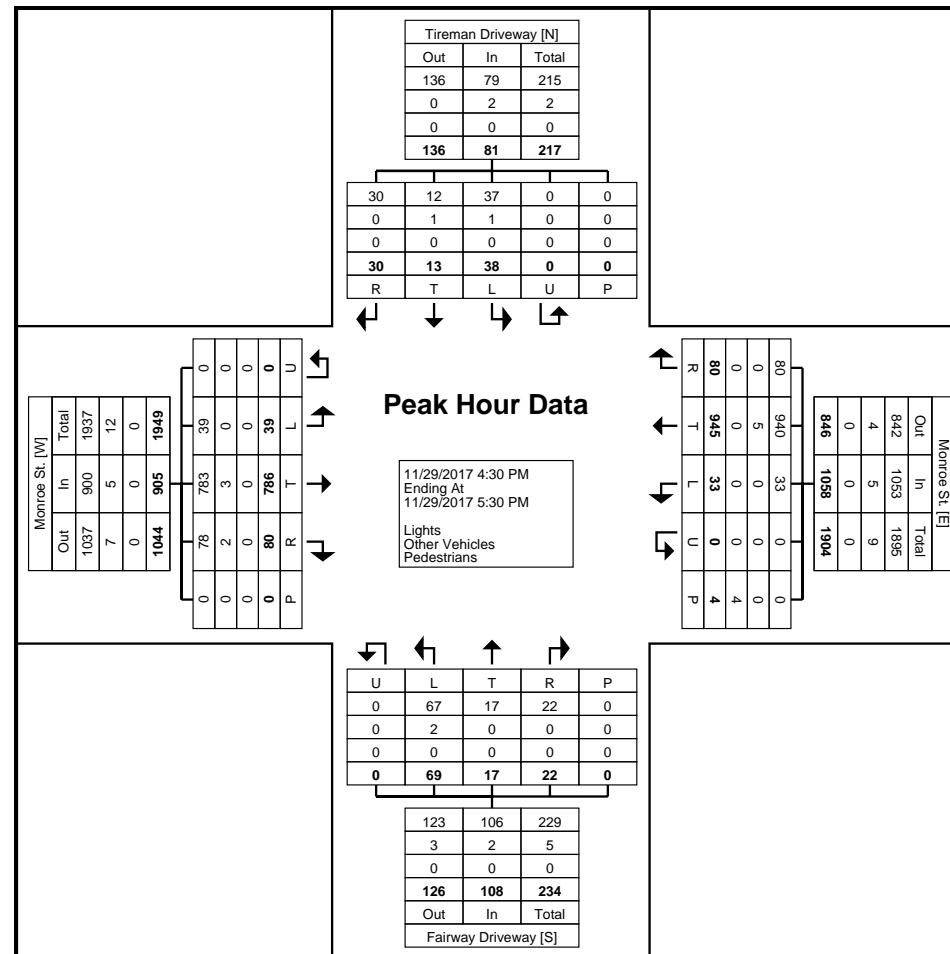
Turning Movement Peak Hour Data (4:30 PM)



Mannik & Smith Group (OH)
1800 Indian Wood Circle

Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Tireman/Fairways Drives &
Monroe St
Site Code:
Start Date: 11/29/2017
Page No: 4



Turning Movement Peak Hour Data Plot (4:30 PM)



Mannik & Smith Group (OH)
1800 Indian Wood Circle

Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Tireman/Fairways Drives &
Monroe St
Site Code:
Start Date: 11/29/2017
Page No: 5

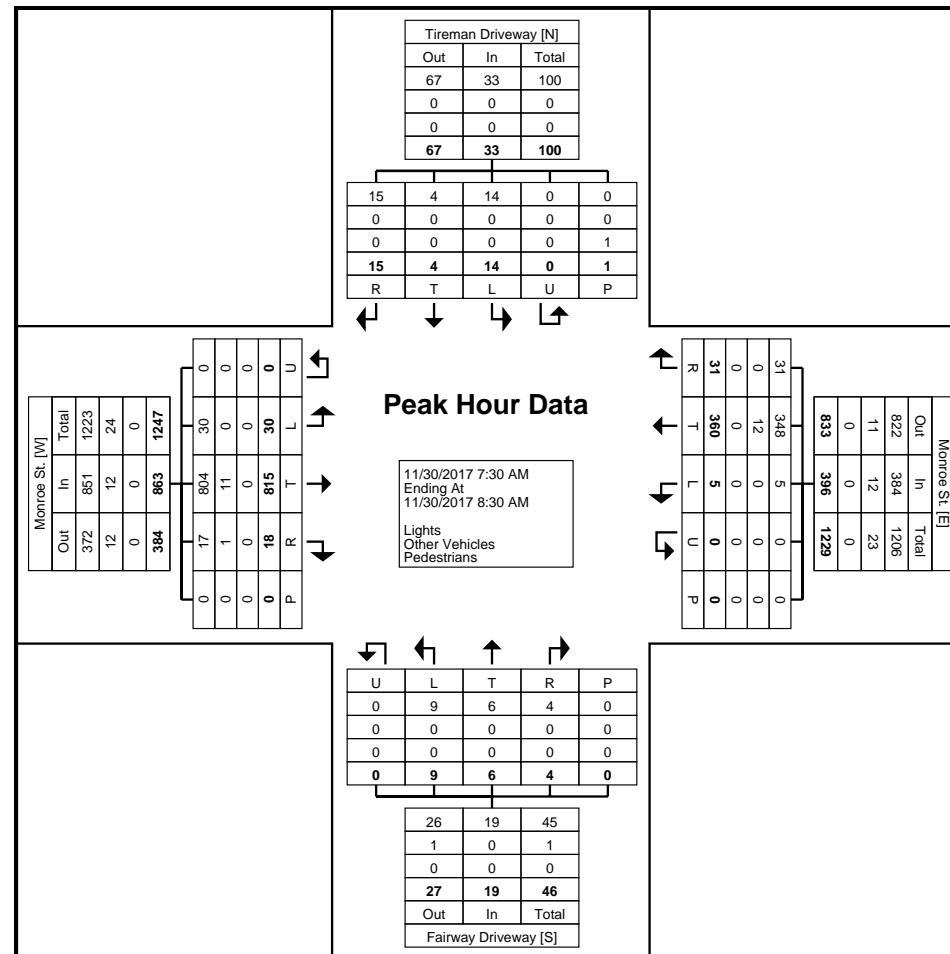
Turning Movement Peak Hour Data (7:30 AM)



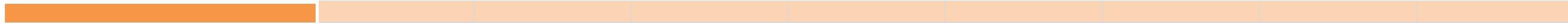
Mannik & Smith Group (OH)
1800 Indian Wood Circle

Maumee, Ohio, United States 43537
(419) 891-2222 ncarter@manniksmithgroup.com

Count Name: Tireman/Fairways Drives &
Monroe St
Site Code:
Start Date: 11/29/2017
Page No: 6



Turning Movement Peak Hour Data Plot (7:30 AM)



Appendix B: BRIDGE REPORTS

(203) Bridge (Dedicated) Name:

Structure File Number: 4801261

Sufficiency Rating: 083.5 Deficiency Rating:

BRIDGE INVENTORY AND APPRAISAL

Inventory Bridge Number: LUC 00023 11650 L

OTTAWA RIVER

Bridge Status: Active

(2) District: 02	(3) County: 48-LUCAS	(9) Location: Us-23 Sb Over Ottawa R.	(7) Facility Carried: Us 23
(4) FIPS Code: LUC-M-76022-SYLVANIA	Owner: OHIO DEPT OF TRANSPORTATION	(208) Route On Bridge: State (Odot) (Toll Free)	(207) Route Under Bridge: Non Highway Traffic On Bridge (I.E.
(102) Direction of Traffic: 1 - 1-Way Traffic	(103) Temporary Structure:	(110) Designated National Network: Not National Network	(101) Parallel: L
		(42A) Type Serv: (On): Highway	(42B) Type Serv (Under): Waterway
INVENTORY ROUTE DATA			
(5A) Route On/Under: 1 - Route Carried "On" The Structure	(45) Main Spans Number: 3	(43) Type: Concrete/Slab/Continuous	
(5B) Hwy Sys: 2 - U.S. Numbered Highway	(46) Approach Spans Nbr: 0	(44) Type: None/None/None	
(5D) Route No: 00023 (5E) Dir: Not Applic (5C) Des: Mainline	(307) Total Spans: 3	(48) Max Span: 40.0 Ft	(49) Overall Leng: 106.0 Ft
(6) Feature Int: Ottawa River		SUBSTRUCTURE	
(200) CL: 11650 (201) Spec Des:L (209) Interstate Mile:	Abut-Rear (532) Matl: Concrete	(531) Type: Stub - Capped Pile (Single Row Piles)	(533) Fnd: Steel H Piles (Hp 12 X 53)
(29) Avg. Daily Traffic(ADT): 29,405 (30) ADT Year: 2010	Abut-Fwd (527) Matl: Concrete	(526) Type: Stub - Capped Pile <small>(Single Row Piles)</small>	(528) Fnd: Steel H Piles (Hp 12 X 53)
(235) Truck Traf: 7,150 (210) Corridor: Y (104) NHS: nhs bridge - 1	Pier-Pred (535) Matl: Concrete	(534) Type: Gravity	(536) Fnd: None (Such As Most Culverts)
(26) Functional Class: urban - principal (100) Strahnt: Strahnet Non-Interstate			
INTERSECTED ROUTE DATA			
(370A) Record Type: (370B) Hwy Sys:	(663) Stream Velocity: 00000 fps	(113) Scour: Action Is Required To Protect Exposed Fo	
(370D) Route No: (370E) Dir: (370C) Des:	(92B) Underwater Inspection: N Freq:	(655) Chan Prot: Stone	
(373) Feature Int:	(387) Special Desig:	(93B) Date of last Underwater Insp:	(657) Drainage Area: 147 Sq Mi
(382) CL: 0000 (371) Interstate Mile:	(380) ADT Year:		
(379) Avg. Daily Traffic(ADT):	(384) Corridor: (378) NHS: Non-Nhs Bridge - 0		
(381) Truck Traf:	(386) Strahnt:		
CLEARANCE ON THE BRIDGE		CLEARANCE UNDER THE BRIDGE	
Min. Hriz on Bridge: (335) NC: 0.0 Ft (47) Card: 39.5 Ft	Min. Horiz Under Clear: (326) NC: 0.0 Ft	(325) Card: 0.0 Ft	
(53) Prac Max Vert On Brg: 9999.9 Ft	(328) Prac Max Vrt Under Clear: 0.0 Ft		
Min Vrt Clr On Brg: (336) NC: 0.0 Ft (10) Card: 9999.9 Ft	Min Vert Under Clear: (327) NC: 0.0 Ft	(54) Card: 0.0 Ft	
Min Latl Clr: (338) Right NC: 0.0 Ft (337) Right Card: 0.0 Ft	Min Lat Under Clear: (329) Right NC: 0.0 Ft	(55) Right Card: 0.0 Ft	
(340) Left NC: 0.0 Ft (339) Left Card: 0.0 Ft	(330) Left NC: 0.0 Ft	(56) Left Card: 0.0 Ft	
STRUCTURE INFORMATION		LOAD RATING INFORMATION	
(19) Bypass Length: 1.0 Miles	(31) Design Load: HS20	(71) Waterway Adequacy: 6 Equal to present minimum criteria	
(16) Latitude: 41 Deg 42 Min 42.67 Sec (17) Longitude: 83 Deg 41 Min 18.41 Sec	(64) Opr Rat Fact/Ton: 1.159	(72) Approach Alignment: 8 Equal to present desirable criteria	
(20) Toll: On Free Road, The Structure Is Toll Free	(66) Inv Rat Fact/Ton: 0.694	(67) Calc Str Appraisal: 5 - Somewhat better than minimum adequacy	
(263) Date Built: 7/1/1962 (264) Major Reconstruction Date:	(734) Ohio Percent of Legal Load: 150	(68) Calc Deck Geometry: 6 - Equal to present minimum criteria	
(28A) No. Lanes On: 2 (28B) No. Lanes Under: 0	(704) Year of Rating: 2015 (708) Rate Soft: Aashto Brr (Virtis)	(69) Calc Underclearance: N - Not Applicable	
(301) Horiz Curve: (34) Skew: 0 Deg	(63) Opr Rat Method: Load Factor Rating (Lfr) Reported By Rf		
(32) App. Rdw Width: 38 Ft (51) Brg. Rdw Width: 39.6 Ft	(65) Inv Rat Method: Load Factor Rating (Lfr) Reported By Rf		
(52) Deck Width: 72.4 Ft (424) Deck Area: 7676 Sq. Ft	Load Rater: (705) Andrea (706) Parks (707) PE#: 54304		
(406) Median Type: None/Non Barrier/No Joint		APPROACH INFORMATION	
(33) Bridge Median: No Median	(401) Approach Guardrail: Steel Beam		
Sidewalks: (50A) Left 0.0 Ft (50B) Right 0.0 Ft	(403) Approach Pavement: Concrete	(402) Grade: Good	
Type Curb or Sidewalk:	(575) Culvert Type: Not A Culvert Or Rigid Frame	(578) Length: 0.0 Ft	
(427) Left Matl: None (428) Type: None Or N/A (Rr, Pedestrian, Etc.)	(580) Depth of Fill: 0.0 Ft	(582) Headwalls: None Or Not Applicable (Not A Culvert)	
(429) Right Matl: None (430) Type: None Or N/A (Rr, Pedestrian, Etc.)			
(35) Flared: 0 (408) Composite: U - Not Applicable		GENERAL INFORMATION	
(407) Railing: 42" Deflector Type Parapet (Single Slope)	(475) Main Member: Slab	(477) Moment Plate:	
(409) Deck Drainage: Other (Natural-Off The Bridge Ends)	(414) Expansion Joint: None		
	(453) Bearing Devices: None		
	(38) Navigation: 0	(39) Nav Vert Clr: 0.0 Ft	(40) Nav Horiz Clear: 0.0 Ft

<p>(203) Bridge (Dedicated) Name: Structure File Number: 4801261 Sufficiency Rating: 083.5 Deficiency Rating:</p> <p>(107) Deck Type: Reinforced Concrete Deck Protection: (108B) External: None (108C) Internal: Not Applicable (Applies Only To Bridges) (108A) Wearing Surface: Micro-Silica Modified Concrete - Overlay (423) Thickness: 2.2 in (422) Date of Wearing Surface: 8/1/2010 (547) Slope Protection: Stone (No. 1 Aggregate)</p>		<p>BRIDGE INVENTORY AND APPRAISAL Inventory Bridge Number: LUC 00023 11650 L OTTAWA RIVER</p> <p>(92C) Spec Insp: N Freq: 0 (93C) Special Inspection Date: (92A) Fracture Critical Insp: N Freq: 0 (93A) Fracture Critical Feature Inspection Date: (474) Main Structure System: Not Applicable (I.E. Culvert, Beam, Slab (487) Structural Steel Memb: None (482) Paint: None Or Not Applicable (483) PCS Date: 8/1/2010 (426) Bridge Railing Steel: N</p>			<p>Report Date: 8/3/2017</p> <p>Bridge Status: Active</p>
GENERAL INFORMATION (CONTINUED)		ORIGINAL PLANS INFORMATION			
<p>(37) Hist Significance: Not Eligible (112) NBIS: Y (842) Hist/Designer: None N/A (827) Hist Build Year: (828) Hist Type: (98A) Border Bridge State: (98B) Border Bridge Resp: (99) Border Bridge SFN:</p>		<p>(250) Fabricator: (249) Contractor: GROVES & SONS (248) Ohio Original Construction Project No: 081460 (252) Microfilm Reel: LUC011 (251) Standard Drawing: Aperture Cards: (246) Orig: Y (247) Repair: Y (245) Fabr: N</p>			
PROPOSED IMPROVEMENTS		<p>(114) Future ADT (On Bridge): 40814 (115) Year of Future ADT: 2033</p>			<p>(709) Rating Source: 1 Plan Information Available For Load Rati</p>
INSPECTION SUMMARY		SURVEY ITEMS			
<p>(58) Deck: 7 (59) Superstructure: 7 (60) Substructure: 7 (62) Culvert: N (61) Channel: 7 (C6) Approaches: 6 General Appraisal: 7 (41) Operational Status: A (90) Inspection date: 2/2/2017 (91) Desig Insp Freq: 12 Mos</p>		<p>(36A) Railings: Meets Acceptable Standards (36B) Transitions: Meets Acceptable Standards (36C) Guardrail: Meets Acceptable Standards (36D) Guardrail Ends: Meets Acceptable Standards (219) Temporary Barrier: N (223) Temporary Shoring: N (224) Temporary Sub Decking: N</p>			<p>UTILITIES</p> <p>(265) Electric Line: U (266) Gas Line: U (269) Sanitary Sewer: U (267) Telephone Line: U (268) TV Cable: U (270) Water Line: U (271) Other Utilities: U</p> <p>SPECIAL FEATURES</p> <p>(283) Lighting: N (431) Fence: N (433) Glare-Screen: N (436) Splash-Guard: N (459) Catwalks: N (271) Other-Feat: U (279) Signs-On: N (281) Signs-Under: N (432) Fence-Ht on Bridge: 0.0 FT (434) Noise Barrier Walls: N</p>
<p>(253) SFNs Replacing this retired bridge: (255) SFNs That were replaced by this bridge:</p>		<p>Insp 1st: 1 - Ohio State Transportation Department 2nd: 3rd: (21) Major Maint 1st: 1 - Ohio State Transportation Department 2nd: 3rd: (225) Routine Maint 1st: 3 - County Agency 2nd: 3rd:</p>			

**STATE OF OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE INSPECTION REPORT**

STRUCTURE FILE NUMBER: 4801261	LUC CO	00023 Route	11650 SLM	LUC-M-76022-SYLVANIA FIPS	DATE BUILT 07/01/1962
District 02	CONCRETE/SLAB/CONTINUOUS			Type of Service	1 15 OTTAWA RIVER
					L SD LUC

DECK

1. Floor	Out/Out 72.4 1-REINFORCED CONCRETE	1	2. Wearing Surface C-MICRO-SILICA MODIFIED CONCRETE -	THICK= 2.2	1
3. Curbs, Sidewalks & Walkways	N-NONE N-NONE		4. Median	W.S. Date = 08/01/2010 0-NO MEDIAN	
5. Railing	I-42" DEFLECTOR TYPE PARAPET (SINGLE SI OPF)		6. Drainage	0-OTHER (NATURAL-OFF THE BRIDGE ENDS)	
7. Expansion Joints	N-NONE		8. SUMMARY	Deck Area: 7,676	7

SUPERSTRUCTURE

9. Alignment of Members	MAX.SPAN.LENGTH = 40	10. Beams/Girders/Slab C-SLAB	1
11. Diaphragms or Cross Frames	TOT.LGTH = 106	12. Joist/Stringers	
13. Floorbeams		14. Floorbeam Connections	
15. Verticals		16. Diagonals	
17. End posts		18. Upper Chord	
19. Lower Chord		20. Gusset Plates	
21. Lateral Bracing		22. Sway Bracing	
23. Portals		24. Bearing Devices N-NONE N-NONE	
25. Arch		26. Arch Columns or Hangers	
27. Spandrel Walls		28. Protective Coating System (PCS) TYPE: NNONE OR NOT APPLICABLE DATE = 08/01/2010	2
29. Pins/Hangers/Hinges ADT: 29,405 TRUCK: 7,150 YEAR: 2010		30. Fatigue Prone Detail (E & E')	
31. Live Load Response (E or S)	S	32. SUMMARY	7

SUBSTRUCTURE

33. Abutments	2-CONCRETE 2-CONCRETE	34. Abutment Seats PIERS=	# OF SPANS=3
35. Piers	TYPE = 2-CONCRETE	36. Pier Seats	
37. Backwalls		38. Wingwalls ABUTMENT:=STEEL H PILES (HP 12 X 53)/STEEL H PILES (HP 12 X 53)	
39. Fenders and Dolphins		40. Scour (Insp Type - 1, 2, 3) 4-ACTION IS REQUIRED TO PROTECT EXPOSED FO	
41. Slope Protection	2-STONE (NO. 1 AGGREGATE)	42. SUMMARY	DIVE DT= N/A

CULVERTS

43. General		44. Alignment	
45. Shape		46. Seams	
47. Headwalls or Endwalls		48. Scour (Insp Type - 1, 2, 3)	
49. Abutments		50. SUMMARY	N

CHANNEL

51. Alignment		52. Protection	2-STONE
53. Hydraulic Opening		54. SUMMARY	7

APPROACHES

55. Pavement	1-CONCRETE	56. Approach Slabs	
57. Guardrail	1-STEEL BEAM	58. Relief Joint	2
59. Embankment	BRDG.WIDTH=39.6	60. SUMMARY	PCT.LEGAL= 150

GENERAL

61. Navigation Lights		62. Warning Signs ROUTINE.RESP: 3-COUNTY AGENCY MAINT.RESP: 1-OHIO STATE TRANSPORTATION	1
63. Sign Supports	MVC ON=9999 UND=0000	64. Utilities	
65. Vertical Clearance (1, 2-change, N)		66. General Appraisal & Operational Status	7 A

67. INSPECTED BY

Print First & Last Name	PE Number	DW Initial	Print First & Last Name	45.046 PE Number	JB Initial
Inspected Date: 2/2/2017		1 1 1 1		Reviewed Date: 6/19/2017	
69. Survey (1, 0, N)					

(203) Bridge (Dedicated) Name:

Structure File Number: 4801296

Sufficiency Rating: 094.2 Deficiency Rating:

BRIDGE INVENTORY AND APPRAISAL

Inventory Bridge Number: LUC 00023 11650 R

OTTAWA RIVER

Bridge Status: Active

(2) District: 02	(3) County: 48-LUCAS	(9) Location: Us-23 Nb Over Ottawa R.	(7) Facility Carried: Us 23
(4) FIPS Code: LUC-M-76022-SYLVANIA	Owner: OHIO DEPT OF TRANSPORTATION	(208) Route On Bridge: State (Odot) (Toll Free)	(207) Route Under Bridge: Non Highway Traffic On Bridge (I.E.
(102) Direction of Traffic: 1 - 1-Way Traffic	(103) Temporary Structure:	(110) Designated National Network: Not National Network	(101) Parallel: R
		(42A) Type Serv: (On): Highway	(42B) Type Serv (Under): Waterway
INVENTORY ROUTE DATA			
(5A) Route On/Under: 1 - Route Carried "On" The Structure		(45) Main Spans Number: 3	(43) Type: Concrete/Slab/Continuous
(5B) Hwy Sys: 2 - U.S. Numbered Highway		(46) Approach Spans Nbr: 0	(44) Type: None/None/None
(5D) Route No: 00023 (5E) Dir: Not Applic (5C) Des: Mainline		(307) Total Spans: 3	(48) Max Span: 40.0 Ft (49) Overall Leng: 106.0 Ft
(6) Feature Int: Ottawa River		SUBSTRUCTURE	
(200) CL: 11650 (201) Spec Des:R	(209) Interstate Mile:	Abut-Rear (532) Matl: Concrete	(531) Type: Stub - Capped Pile (Single Row Piles) (533) Fnd: Steel H Piles (Other Size)
(29) Avg. Daily Traffic(ADT): 29,405	(30) ADT Year: 2010	Abut-Fwd (527) Matl: Concrete	(526) Type: Stub - Capped Pile (Single Row Piles) (528) Fnd: Steel H Piles (Other Size)
(235) Truck Traf: 7,150 (210) Corridor: Y	(104) NHS: nhs bridge - 1	Pier-Pred (535) Matl: Concrete	(534) Type: Gravity (536) Fnd: None (Such As Most Culverts)
(26) Functional Class: urban - principal	(100) Strahnt: Strahnet Non-Interstate		
INTERSECTED ROUTE DATA			
(370A) Record Type:	(370B) Hwy Sys:	(663) Stream Velocity: 00000 fps	(113) Scour: Scour Within Limits Of Footing Or Piles.
(370D) Route No: (370E) Dir:	(370C) Des:	(92B) Underwater Inspection: N Freq:	(655) Chan Prot: Other (Grass, Bushes, Trees)
(373) Feature Int:		(93B) Date of last Underwater Insp:	(657) Drainage Area: 147 Sq Mi
(382) CL: 0000 (371) Interstate Mile:	(387) Special Desig:		
(379) Avg. Daily Traffic(ADT):	(380) ADT Year:		
(381) Truck Traf:	(384) Corridor:		
(375) Functional Class:	(378) NHS: Non-Nhs Bridge - 0 (386) Strahnt:		
CLEARANCE ON THE BRIDGE		CLEARANCE UNDER THE BRIDGE	
Min. Hriz on Bridge: (335) NC: 0.0 Ft	(47) Card: 39.5 Ft	Min. Horiz Under Clear: (326) NC: 0.0 Ft	(325) Card: 0.0 Ft
(53) Prac Max Vert On Brg: 9999.9 Ft		(328) Prac Max Vrt Under Clear: 0.0 Ft	
Min Vrt Clr On Brg: (336) NC: 0.0 Ft	(10) Card: 9999.9 Ft	Min Vert Under Clear: (327) NC: 0.0 Ft	(54) Card: 0.0 Ft
Min Latl Clr: (338) Right NC: 0.0 Ft	(337) Right Card: 0.0 Ft	Min Lat Under Clear: (329) Right NC: 0.0 Ft	(55) Right Card: 0.0 Ft
	(340) Left NC: 0.0 Ft (339) Left Card: 0.0 Ft	(330) Left NC: 0.0 Ft	(56) Left Card: 0.0 Ft
STRUCTURE INFORMATION		LOAD RATING INFORMATION	
(19) Bypass Length: 1.0 Miles		(31) Design Load: HS20	(71) Waterway Adequacy: 8 Equal to present desirable criteria
(16) Latitude: 41 Deg 42 Min 42.71 Sec (17) Longitude: 83 Deg 41 Min 16.92 Sec		(64) Opr Rat Fact/Ton: 1.250	(72) Approach Alignment: 8 Equal to present desirable criteria
(20) Toll: On Free Road, The Structure Is Toll Free		(66) Inv Rat Fact/Ton: 1.000	(67) Calc Str Appraisal: 6 - Equal to present minimum criteria
(263) Date Built: 7/1/1962 (264) Major Reconstruction Date:		(734) Ohio Percent of Legal Load: 150	(68) Calc Deck Geometry: 6 - Equal to present minimum criteria
(28A) No. Lanes On: 2 (28B) No. Lanes Under: 0		(704) Year of Rating: 1973 (708) Rate Soft: Bars	(69) Calc Underclearance: N - Not Applicable
(301) Horiz Curve:	(34) Skew: 0 Deg	(63) Opr Rat Method: Allowable Stress (As) Rating Reported By	
(32) App. Rdw Width: 38 Ft (51) Brdg. Rdw Width: 39.6 Ft		(65) Inv Rat Method: Allowable Stress (As) Rating Reported By	
(52) Deck Width: 44.3 Ft (424) Deck Area: 4691 Sq. Ft		Load Rater: (705) (706) (707) PE#: 0	
(406) Median Type: None/Non Barrier/No Joint		APPROACH INFORMATION	
(33) Bridge Median: No Median		(401) Approach Guardrail: Steel Beam	
Sidewalks: (50A) Left 2.0 Ft (50B) Right 2.0 Ft		(403) Approach Pavement: Bituminous	(402) Grade: Good
Type Curb or Sidewalk:			
(427) Left Matl: Concrete (428) Type: Safety Curb (2' Or Less Width)		(575) Culvert Type: Not A Culvert Or Rigid Frame	(578) Length: 0.0 Ft
(429) Right Matl: Concrete (430) Type: Safety Curb (2' Or Less Width)		(580) Depth of Fill: 0.0 Ft	(582) Headwalls: None Or Not Applicable (Not A Culvert)
(35) Flared: 0 (408) Composite: U - Not Applicable		CULVERT INFORMATION	
(407) Railing: Reinforced Concrete Safety Curb And Para			
(409) Deck Drainage: Scuppers And Downspouts			
		(475) Main Member: Slab	(477) Moment Plate:
		(414) Expansion Joint: None	
		(453) Bearing Devices: None	
		(38) Navigation: 0	(39) Nav Vert Clr: 0.0 Ft (40) Nav Horiz Clear: 0.0 Ft
GENERAL INFORMATION			

<p>(203) Bridge (Dedicated) Name: Structure File Number: 4801296 Sufficiency Rating: 094.2 Deficiency Rating:</p> <p>(107) Deck Type: Reinforced Concrete Deck Protection: (108B) External: Not Applicable (Only For Bridges For No Internal: Not Applicable (Applies Only To Bridges (108A) Wearing Surface: Latex Modified Concrete (Lmc) - Overlay (423) Thickness: 1.2 in (422) Date of Wearing Surface: (547) Slope Protection: Stone (No. 1 Aggregate)</p>		<p>BRIDGE INVENTORY AND APPRAISAL</p> <p>Inventory Bridge Number: LUC 00023 11650 R OTTAWA RIVER</p>			<p>Report Date: 8/3/2017</p> <p>Bridge Status: Active</p>
<p>GENERAL INFORMATION (CONTINUED)</p> <p>(37) Hist Significance: Not Eligible (112) NBIS: Y (842) Hist/Designer: None N/A (827) Hist Build Year: (828) Hist Type: (98A) Border Bridge State: (98B) Border Bridge Resp: (99) Border Bridge SFN:</p>		<p>(92C) Spec Insp: N Freq: 0 (93C) Special Inspection Date: (92A) Fracture Critical Insp: N Freq: 0 (93A) Fracture Critical Feature Inspection Date: (474) Main Structure System: Not Applicable (I.E. Culvert, Beam, Slab (487) Structural Steel Memb: None (482) Paint: None Or Not Applicable (483) PCS Date:</p>			
<p>PROPOSED IMPROVEMENTS</p> <p>(114) Future ADT (On Bridge): 40814 (115) Year of Future ADT: 2033</p>		<p>ORIGINAL PLANS INFORMATION</p> <p>(250) Fabricator: (249) Contractor: GROVES & SONS (248) Ohio Original Construction Project No: 081460 (252) Microfilm Reel: LUC011 (251) Standard Drawing: Aperture Cards: (246) Orig: Y (247) Repair: Y (245) Fabr: N</p>			
<p>INSPECTION SUMMARY</p> <p>(58) Deck: 6 (59) Superstructure: 6 (60) Substructure: 6 (62) Culvert: N (61) Channel: 7 (C6) Approaches: 4 General Appraisal: 6 (41) Operational Status: A (90) Inspection date: 2/3/2017 (91) Desig Insp Freq: 12 Mos</p>		<p>UTILITIES</p> <p>(265) Electric Line: U (266) Gas Line: U (269) Sanitary Sewer: U (267) Telephone Line: U (268) TV Cable: U (270) Water Line: U (271) Other Utilities: U</p>			<p>SPECIAL FEATURES</p> <p>(283) Lighting: N (431) Fence: N (433) Glare-Screen: N (436) Splash-Guard: N (459) Catwalks: N (271) Other-Feat: U (279) Signs-On: N (281) Signs-Under: N (432) Fence-Ht on Bridge: 0.0 FT (434) Noise Barrier Walls: N</p>
<p>(253) SFNs Replacing this retired bridge: (255) SFNs That were replaced by this bridge:</p>		<p>Insp 1st: 1 - Ohio State Transportation Department 2nd: 3rd: (21) Major Maint 1st: 1 - Ohio State Transportation Department 2nd: 3rd: (225) Routine Maint 1st: 3 - County Agency 2nd: 3rd:</p>			

**STATE OF OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE INSPECTION REPORT**

STRUCTURE FILE NUMBER:	4801296	LUC CO	00023 Route	11650 SLM	LUC-M-76022-SYLVANIA FIPS	DATE BUILT	07/01/1962
District	<u>02</u>	<u>CONCRETE/SLAB/CONTINUOUS</u>		Type of Service	1 15 OTTAWA RIVER	R SD	<u>LUC</u>

DECK

1. Floor	Out/Out 44.3 1-REINFORCED CONCRETE	1	2. Wearing Surface 3-LATEX MODIFIED CONCRETE (LMC) -	THCK= 1.2	1
3. Curbs, Sidewalks & Walkways	1-CONCRETE 1-CONCRETE		4. Median	W.S. Date = 0-NO MEDIAN	
5. Railing	3-REINFORCED CONCRETE SAFETY CURB AND PARA		6. Drainage 3-SCUPPERS AND DOWNSPOUTS		
7. Expansion Joints	N-NONE		8. SUMMARY Deck Area: 4,691		6

SUPERSTRUCTURE

9. Alignment of Members	MAX.SPAN.LENGTH = 40	10. Beams/Girders/Slab C-SLAB	2
11. Diaphragms or Cross Frames	TOT.LGTH = 106	12. Joist/Stringers	
13. Floorbeams		14. Floorbeam Connections	
15. Verticals		16. Diagonals	
17. End posts		18. Upper Chord	
19. Lower Chord		20. Gusset Plates	
21. Lateral Bracing		22. Sway Bracing	
23. Portals		24. Bearing Devices N-NONE N-NONE	
25. Arch		26. Arch Columns or Hangers	
27. Spandrel Walls		28. Protective Coating System (PCS) TYPE: NNONE OR NOT APPLICABLE DATE =	
29. Pins/Hangers/Hinges ADT: 29,405 TRUCK: 7,150 YEAR: 2010		30. Fatigue Prone Detail (E & E')	
31. Live Load Response (E or S)	S	32. SUMMARY	6

SUBSTRUCTURE

33. Abutments	2-CONCRETE 2-CONCRETE	PIERS=	# OF SPANS=3
35. Piers	TYPE = 2-CONCRETE	1	36. Pier Seats
37. Backwalls		38. Wingwalls ABUTMENT:=STEEL H PILES (OTHER SIZE)/STEEL H PILES (OTHER SIZE)	
39. Fenders and Dolphins		40. Scour (Insp Type - 1, 2, 3) 5-SCOUR WITHIN LIMITS OF FOOTING OR PILES.	
41. Slope Protection	2-STONE (NO. 1 AGGREGATE)	42. SUMMARY	DIVE DT= N/A 6

CULVERTS

43. General		44. Alignment	
45. Shape		46. Seams	
47. Headwalls or Endwalls		48. Scour (Insp Type - 1, 2, 3)	
49. Abutments		50. SUMMARY	N

CHANNEL

51. Alignment		52. Protection 0-OTHER (GRASS, BUSHES, TREES)	
53. Hydraulic Opening		54. SUMMARY	7

APPROACHES

55. Pavement	2-BITUMINOUS	56. Approach Slabs	
57. Guardrail	1-STEEL BEAM	58. Relief Joint	
59. Embankment	BRDG.WIDTH=39.6	60. SUMMARY	PCT.LEGAL= 150 4

GENERAL

61. Navigation Lights		62. Warning Signs ROUTINE.RESP: 3-COUNTY AGENCY MAINT.RESP: 1-OHIO STATE TRANSPORTATION DEPARTMENT	1
63. Sign Supports	MVC ON=9999 UND=0000	64. Utilities	
65. Vertical Clearance (1, 2-change, N)		66. General Appraisal & Operational Status	6 A

67. INSPECTED BY

Print First & Last Name	PE Number	DW Initial	Print First & Last Name	45.046 PE Number	JB Initial
Inspected Date: 2/3/2017		0 0 1 1		Reviewed Date: 6/19/2017	
69. Survey (1, 0, N)					

(203) Bridge (Dedicated) Name:

Structure File Number: 4805224

Sufficiency Rating: 091.0 Deficiency Rating: FO

BRIDGE INVENTORY AND APPRAISAL

Inventory Bridge Number: LUC 00051 12850 L

US 23 & SR 51 SB

Bridge Status: Active

(2) District: 02	(3) County: 48-LUCAS	(9) Location: Monroe Sr-51 Over Us-23	(7) Facility Carried: Monroe Street
(4) FIPS Code: LUC-M-76022-SYLVANIA	Owner: OHIO DEPT OF TRANSPORTATION	(208) Route On Bridge: State (Odot) (Toll Free)	(207) Route Under Bridge: State (Odot) (Toll Free)
(102) Direction of Traffic: 1 - 1-Way Traffic	(103) Temporary Structure:	(110) Designated National Network: Not National Network	(101) Parallel: L
		(42A) Type Serv: (On): Overpass Structure At An Interchange	(42B) Type Serv (Under): Highway, With Or W/Out Pedestrian
INVENTORY ROUTE DATA			
(5A) Route On/Under: 1 - Route Carried "On" The Structure	(45) Main Spans Number: 4	(43) Type: Steel/Beam/Continuous	
(5B) Hwy Sys: 3 - State Highway	(46) Approach Spans Nbr: 0	(44) Type: None/None/None	
(5D) Route No: 00051 (5E) Dir: Not Applic (5C) Des: Mainline	(307) Total Spans: 4	(48) Max Span: 87.0 Ft	(49) Overall Leng: 280.0 Ft
(6) Feature Int: Us 23 & Sr 51 Sb		SUBSTRUCTURE	
(200) CL: 12850 (201) Spec Des:L (209) Interstate Mile:	Abut-Rear (532) Matl: Concrete	(531) Type: Stub - Capped Pile (Single Row Piles)	(533) Fnd: Unknown
(29) Avg. Daily Traffic(ADT): 898 (30) ADT Year: 2015	Abut-Fwd (527) Matl: Concrete	(526) Type: Stub - Capped Pile ^(Single Row Piles)	(528) Fnd: Unknown
(235) Truck Traf: 59 (210) Corridor: N (104) NHS: nhs bridge - 1	Pier-Pred (535) Matl: Concrete	(534) Type: Capped Column	(536) Fnd: Unknown
(26) Functional Class: urban - other principal (100) Strahnt: Not Strahnet			
INTERSECTED ROUTE DATA			
(370A) Record Type: 2 Single Route Goes "U" (370B) Hwy Sys: U.S. Numbered Highway	(663) Stream Velocity: 00000 fps	(113) Scour: Bridge Not Over Waterway.	
(370D) Route No: 00023 (370E) Dir: (370C) Des: 1 MAINLINE			
(373) Feature Int: Sr 51 Sb			
(382) CL: 1188 (371) Interstate Mile: (387) Special Desig:	(92B) Underwater Inspection: N Freq:	(655) Chan Prot: Not Applicable	
(379) Avg. Daily Traffic(ADT): 37,585 (380) ADT Year: 2015			
(381) Truck Traf: 6527 (384) Corridor: N (378) NHS: Non-Nhs Bridge - 0	(93B) Date of last Underwater Insp:	(657) Drainage Area: 000 Sq Mi	
(375) Functional Class: Urban - Principal (386) Strahnt: Strahnet Non-Interstate			
CLEARANCE ON THE BRIDGE		CLEARANCE UNDER THE BRIDGE	
Min. Hriz on Bridge: (335) NC: 26.0 Ft (47) Card: 26.0 Ft	Min. Horiz Under Clear: (326) NC: 83.5 Ft	(325) Card: 83.5 Ft	
(53) Prac Max Vert On Brdg: 9999.9 Ft	(328) Prac Max Vrt Under Clear: 14.8 Ft		
Min Vrt Clr On Brdg: (336) NC: 0.0 Ft (10) Card: 9999.9 Ft	Min Vert Under Clear: (327) NC: 14.6 Ft	(54) Card: 14.8 Ft	
Min Latl Clr: (338) Right NC: 0.0 Ft (337) Right Card: 0.0 Ft	Min Lat Under Clear: (329) Right NC: 14.1 Ft	(55) Right Card: 39.0 Ft	
(340) Left NC: 0.0 Ft (339) Left Card: 0.0 Ft	(330) Left NC: 33.5 Ft	(56) Left Card: 39.0 Ft	
STRUCTURE INFORMATION		LOAD RATING INFORMATION	
(19) Bypass Length: 0.0 Miles	(31) Design Load: H20	(71) Waterway Adequacy: N Not Applicable	
(16) Latitude: 41 Deg 42 Min 55.89 Sec (17) Longitude: 83 Deg 41 Min 16.12 Sec	(64) Opr Rat Fact/Ton: 1.250	(72) Approach Alignment: 8 Equal to present desirable criteria	
(20) Toll: On Free Road, The Structure Is Toll Free	(66) Inv Rat Fact/Ton: 1.000	(67) Calc Str Appraisal: 7 - Better than present minimum criteria	
(263) Date Built: 7/1/1960 (264) Major Reconstruction Date:	(734) Ohio Percent of Legal Load: 150	(68) Calc Deck Geometry: 4 - Meets minimum tolerable limits	
(28A) No. Lanes On: 4 (28B) No. Lanes Under: 4	(704) Year of Rating: 1973 (708) Rate Soft: Bars	(69) Calc Underclearance: 3 - Intolerable - high priority of corrective	
(301) Horiz Curve: (34) Skew: 3 Deg	(63) Opr Rat Method: Allowable Stress (As) Rating Reported By		
(32) App. Rdw Width: 54 Ft (51) Brdg. Rdw Width: 54.0 Ft	(65) Inv Rat Method: Allowable Stress (As) Rating Reported By		
(52) Deck Width: 66.6 Ft (424) Deck Area: 18643 Sq. Ft	Load Rater: (705) (706) (707) PE#: 0		
(406) Median Type: None/Non Barrier/No Joint		APPROACH INFORMATION	
(33) Bridge Median: No Median	(401) Approach Guardrail: Steel Beam		
Sidewalks: (50A) Left 5.0 Ft (50B) Right 5.0 Ft	(403) Approach Pavement: Bituminous	(402) Grade: Good	
Type Curb or Sidewalk:	(575) Culvert Type: Not A Culvert Or Rigid Frame	(578) Length: 0.0 Ft	
(427) Left Matl: Concrete (428) Type: Sidewalk (Greater Than 2' In Width)	(580) Depth of Fill: 0.0 Ft	(582) Headwalls: None Or Not Applicable (Not A Culvert)	
(429) Right Matl: Concrete (430) Type: Sidewalk (Greater Than 2' In Width)			
(35) Flared: 0 (408) Composite: U - Not Applicable		CULVERT INFORMATION	
(407) Railing: Reinforced Concrete Safety Curb And Para	(475) Main Member: Rolled Steel	(477) Moment Plate:	
(409) Deck Drainage: Scuppers And Downspouts	(414) Expansion Joint: Elastomeric Strip Seal		
	(453) Bearing Devices: Elastomeric (Laminated)		
	(38) Navigation: N (39) Nav Vert Clr: 0.0 Ft	(40) Nav Horiz Clear: 0.0 Ft	

<p>(203) Bridge (Dedicated) Name: Structure File Number: 4805224 Sufficiency Rating: 091.0 Deficiency Rating: FO</p>		<p>BRIDGE INVENTORY AND APPRAISAL Inventory Bridge Number: LUC 00051 12850 L US 23 & SR 51 SB</p>		Report Date: 8/3/2017	
				Bridge Status: Active	
<p>(107) Deck Type: Reinforced Concrete Deck Protection: (108B) External: Not Applicable (Only For Bridges For No Internal: Not Applicable (Applies Only To Bridges (108A) Wearing Surface: Micro-Silica Modified Concrete - Overlay (423) Thickness: 1.3 in (422) Date of Wearing Surface: 1/1/1995 (547) Slope Protection: Stone (No. 1 Aggregate)</p>		<p>(92C) Spec Insp: N Freq: 0 (93C) Special Inspection Date: (92A) Fracture Critical Insp: N Freq: 0 (93A) Fracture Critical Feature Inspection Date: (474) Main Structure System: Not Applicable (I.E. Culvert, Beam, Slab (487) Structural Steel Memb: Unknown (482) Paint: Paint System Ozeu (483) PCS Date: 1/1/1995 (468) Hinges: Not Applicable (Structures With No Hinge (465) Framing: (426) Bridge Railing Steel: U</p>			
GENERAL INFORMATION (CONTINUED)		ORIGINAL PLANS INFORMATION			
<p>(37) Hist Significance: Not Eligible (112) NBIS: Y (842) Hist/Designer: Ohio State Highway Department (827) Hist Build Year: 1960 (828) Hist Type: Continuous (98A) Border Bridge State: (98B) Border Bridge Resp: (99) Border Bridge SFN:</p>		<p>(250) Fabricator: (249) Contractor: (248) Ohio Original Construction Project No: 022658 (252) Microfilm Reel: ***** (251) Standard Drawing: Aperture Cards: (246) Orig: N (247) Repair: Y (245) Fabr: N</p>			
PROPOSED IMPROVEMENTS					
(114) Future ADT (On Bridge): 1246 (115) Year of Future ADT: 2038		(709) Rating Source: 1 Plan Information Available For Load Rati			
INSPECTION SUMMARY		SURVEY ITEMS		UTILITIES	SPECIAL FEATURES
<p>(58) Deck: 6 (59) Superstructure: 7 (60) Substructure: 7 (62) Culvert: N (61) Channel: N (C6) Approaches: 5 General Appraisal: 7 (41) Operational Status: A (90) Inspection date: 3/1/2017 (91) Desig Insp Freq: 12 Mos</p>		<p>(36A) Railings: Meets Acceptable Standards (36B) Transitions: Does Not Meet Acceptable Standards/Safet (36C) Guardrail: Meets Acceptable Standards (36D) Guardrail Ends: Meets Acceptable Standards (219) Temporary Barrier: N (223) Temporary Shoring: N (224) Temporary Sub Decking: N</p>		<p>(265) Electric Line: Y (266) Gas Line: U (269) Sanitary Sewer: U (267) Telephone Line: U (268) TV Cable: U (270) Water Line: U (271) Other Utilities: U</p>	<p>(283) Lighting: Y (431) Fence: N (433) Glare-Screen: N (436) Splash-Guard: N (459) Catwalks: N (271) Other-Feat: U (279) Signs-On: N (281) Signs-Under: N (432) Fence-Ht on Bridge: 0.0 FT (434) Noise Barrier Walls: N</p>
<p>(253) SFNs Replacing this retired bridge: (255) SFNs That were replaced by this bridge:</p>		<p>Insp 1st: 1 - Ohio State Transportation Department 2nd: 3rd: (21) Major Maint 1st: 1 - Ohio State Transportation Department 2nd: 3rd: (225) Routine Maint 1st: 4 - City Or Other Local Agency 2nd: 3rd:</p>			

**STATE OF OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE INSPECTION REPORT**

STRUCTURE FILE NUMBER:	4805224	LUC CO	00051 Route	12850 SLM	LUC-M-76022-SYLVANIA FIPS	DATE BUILT	07/01/1960
District	<u>02</u>	<u>STEEL/BEAM/CONTINUOUS</u>		Type of Service	1 61 US 23 & SR 51 SB	L SD	<u>LUC</u>

DECK							
1. Floor	Out/Out 66.6 1-REINFORCED CONCRETE	1	2. Wearing Surface	THICK= 1.3 C-MICRO-SILICA MODIFIED CONCRETE -			1
3. Curbs, Sidewalks & Walkways	1-CONCRETE 1-CONCRETE		4. Median	W.S. Date = 01/01/1995 0-NO MEDIAN			1
5. Railing	3-REINFORCED CONCRETE SAFETY CURB AND PARA		6. Drainage	3-SCUPPERS AND DOWNSPOUTS			
7. Expansion Joints	8-ELASTOMERIC STRIP SEAL		8. SUMMARY	Deck Area: 18,643			6

SUPERSTRUCTURE

9. Alignment of Members	MAX.SPAN.LENGTH = 87		10. Beams/Girders/Slab	1-ROLLED STEEL			
11. Diaphragms or Cross Frames	TOT.LGTH = 280		12. Joist/Stringers				
13. Floorbeams			14. Floorbeam Connections				
15. Verticals			16. Diagonals				
17. End posts			18. Upper Chord				
19. Lower Chord			20. Gusset Plates				
21. Lateral Bracing			22. Sway Bracing				
23. Portals			24. Bearing Devices	C-ELASTOMERIC (LAMINATED) 2-ROCKERS & BOLSTERS			
25. Arch			26. Arch Columns or Hangers				
27. Spandrel Walls			28. Protective Coating System (PCS)	TYPE: 5PAINT SYSTEM OZEU DATE = 01/01/1995		1	
29. Pins/Hangers/Hinges	ADT: 898	TRUCK: 59	YEAR: 2015	30. Fatigue Prone Detail (E & E')			
31. Live Load Response (E or S)		S	32. SUMMARY				7

SUBSTRUCTURE

33. Abutments	2-CONCRETE 2-CONCRETE		34. Abutment Seats	PIERS=	# OF SPANS=4	2
35. Piers	TYPE = 2-CONCRETE	1	36. Pier Seats			
37. Backwalls			38. Wingwalls	ABUTMENT:=UNKNOWN/UNKNOWN		
39. Fenders and Dolphins			40. Scour (Insp Type - 1, 2, 3)	N-BRIDGE NOT OVER WATERWAY.		
41. Slope Protection	2-STONE (NO. 1 AGGREGATE)		42. SUMMARY	DIVE DT= N/A		7

CULVERTS

43. General		44. Alignment		
45. Shape		46. Seams		
47. Headwalls or Endwalls		48. Scour (Insp Type - 1, 2, 3)		
49. Abutments		50. SUMMARY		N

CHANNEL

51. Alignment		52. Protection	X-NOT APPLICABLE	
53. Hydraulic Opening		54. SUMMARY		N

APPROACHES

55. Pavement	2-BITUMINOUS	56. Approach Slabs		
57. Guardrail	1-STEEL BEAM	58. Relief Joint		
59. Embankment	BRDG.WIDTH=54.0	60. SUMMARY	PCT.LEGAL= 150	5

GENERAL

61. Navigation Lights		62. Warning Signs	ROUTINE.RESP: 4-CITY OR OTHER LOCAL AGENCY MAINT.RESP: 1-OHIO STATE TRANSPORTATION	
63. Sign Supports	MVC ON=9999 UND=1410	64. Utilities	ELEC/	
65. Vertical Clearance (1, 2-change, N)		66. General Appraisal & Operational Status		7 A

67. INSPECTED BY

Print First & Last Name	PE Number	DW Initial	Print First & Last Name	45.046 PE Number	JB Initial
Inspected Date: 3/1/2017		1 0 1 1		Reviewed Date: 6/20/2017	
69. Survey (1, 0, N)					

(203) Bridge (Dedicated) Name:

Structure File Number: 4805135

Sufficiency Rating: 074.1 Deficiency Rating: FO

BRIDGE INVENTORY AND APPRAISAL

Inventory Bridge Number: LUC 00184 00030 R

OTTAWA RIVER

Bridge Status: Active

(2) District: 02	(3) County: 48-LUCAS	(9) Location: 0.03 Mile West Of Us 23	(7) Facility Carried: Ramp From Us 23 To
(4) FIPS Code: LUC-M-76022-SYLVANIA	Owner: OHIO DEPT OF TRANSPORTATION	(208) Route On Bridge: State (Odot) (Toll Free)	(207) Route Under Bridge: Non Highway Traffic On Bridge (I.E.
(102) Direction of Traffic: 1 - 1-Way Traffic	(103) Temporary Structure:	(110) Designated National Network: Not National Network	(101) Parallel: R
		(42A) Type Serv: (On): Highway	(42B) Type Serv (Under): Waterway
INVENTORY ROUTE DATA			
(5A) Route On/Under: 1 - Route Carried "On" The Structure		(45) Main Spans Number: 3	(43) Type: Concrete/Slab/Continuous
(5B) Hwy Sys: 3 - State Highway		(46) Approach Spans Nbr: 0	(44) Type: None/None/None
(5D) Route No: 00184 (5E) Dir: Not Applic (5C) Des: Mainline		(307) Total Spans: 3	(48) Max Span: 40.0 Ft (49) Overall Leng: 106.0 Ft
(6) Feature Int: Ottawa River		SUBSTRUCTURE	
(200) CL: 00030 (201) Spec Des:R (209) Interstate Mile:	Abut-Rear (532) Matl: Concrete	(531) Type: Stub - Capped Pile (Single Row Piles)	(533) Fnd: Steel H Piles (Other Size)
(29) Avg. Daily Traffic(ADT): 5,347 (30) ADT Year: 2015	Abut-Fwd (527) Matl: Concrete	(526) Type: Stub - Capped Pile (Single Row Piles)	(528) Fnd: Steel H Piles (Other Size)
(235) Truck Traf: 196 (210) Corridor: N (104) NHS: nhs bridge - 1	Pier-Pred (535) Matl: Concrete	(534) Type: Gravity	(536) Fnd: None (Such As Most Culverts)
(26) Functional Class: urban - other principal (100) Strahnt: Not Strahnet			
INTERSECTED ROUTE DATA			
(370A) Record Type: (370B) Hwy Sys:		(663) Stream Velocity: 00000 fps	(113) Scour: Scour Within Limits Of Footing Or Piles.
(370D) Route No: (370E) Dir: (370C) Des:		(92B) Underwater Inspection: N Freq:	(655) Chan Prot: Other (Grass, Bushes, Trees)
(373) Feature Int:		(93B) Date of last Underwater Insp:	(657) Drainage Area: 147 Sq Mi
(382) CL: 0000 (371) Interstate Mile: (387) Special Desig:		CLEARANCE UNDER THE BRIDGE	
(379) Avg. Daily Traffic(ADT): (380) ADT Year:		Min. Horiz Under Clear: (326) NC: 0.0 Ft (325) Card: 0.0 Ft	
(381) Truck Traf: (384) Corridor: (378) NHS: Non-Nhs Bridge - 0		(328) Prac Max Vrt Under Clear: 0.0 Ft	
(375) Functional Class: (386) Strahnt:		Min Vert Under Clear: (327) NC: 0.0 Ft (54) Card: 0.0 Ft	
CLEARANCE ON THE BRIDGE		Min Lat Under Clear: (329) Right NC: 0.0 Ft (55) Right Card: 0.0 Ft	
Min. Hriz on Bridge: (335) NC: 0.0 Ft (47) Card: 29.5 Ft		(330) Left NC: 0.0 Ft (56) Left Card: 0.0 Ft	
(53) Prac Max Vert On Brg: 9999.9 Ft			
Min Vrt Clr On Brg: (336) NC: 0.0 Ft (10) Card: 9999.9 Ft			
Min Latl Clr: (338) Right NC: 0.0 Ft (337) Right Card: 0.0 Ft			
(340) Left NC: 0.0 Ft (339) Left Card: 0.0 Ft			
STRUCTURE INFORMATION		LOAD RATING INFORMATION	
(19) Bypass Length: 0.0 Miles	(31) Design Load: HS20	APPRAISAL	
(16) Latitude: 41 Deg 42 Min 42.01 Sec (17) Longitude: 83 Deg 41 Min 14.83 Sec	(64) Opr Rat Fact/Ton: 0.970	(71) Waterway Adequacy: 6 Equal to present minimum criteria	
(20) Toll: On Free Road, The Structure Is Toll Free	(66) Inv Rat Fact/Ton: 0.720	(72) Approach Alignment: 6 Equal to present minimum criteria	
(263) Date Built: 7/1/1962 (264) Major Reconstruction Date:	(734) Ohio Percent of Legal Load: 150	(67) Calc Str Appraisal: 5 - Somewhat better than minimum adequacy	
(28A) No. Lanes On: 1 (28B) No. Lanes Under: 0	(704) Year of Rating: 1988 (708) Rate Soft: Bars	(68) Calc Deck Geometry: 2 - Intolerable - high priority of replacement	
(301) Horiz Curve: (34) Skew: 0 Deg	(63) Opr Rat Method: Allowable Stress (As) Rating Reported By	(69) Calc Underclearance: N - Not Applicable	
(32) App. Rdw Width: 28 Ft (51) Brdg. Rdw Width: 29.6 Ft	(65) Inv Rat Method: Allowable Stress (As) Rating Reported By		
(52) Deck Width: 34.3 Ft (424) Deck Area: 3631 Sq. Ft	Load Rater: (705) (706) (707) PE#: 0		
(406) Median Type: None/Non Barrier/No Joint		APPROACH INFORMATION	
(33) Bridge Median: No Median	(401) Approach Guardrail: Steel Beam		
Sidewalks: (50A) Left 0.0 Ft (50B) Right 1.0 Ft	(403) Approach Pavement: Bituminous	(402) Grade: Good	
Type Curb or Sidewalk:	(575) Culvert Type: Not A Culvert Or Rigid Frame	CULVERT INFORMATION	
(427) Left Matl: None (428) Type: None Or N/A (Rr, Pedestrian, Etc.)	(580) Depth of Fill: 0.0 Ft	(578) Length: 0.0 Ft (582) Headwalls: None Or Not Applicable (Not A Culvert)	
(429) Right Matl: Concrete (430) Type: Safety Curb (2' Or Less Width)		GENERAL INFORMATION	
(35) Flared: 0 (408) Composite: U - Not Applicable	(475) Main Member: Slab	(414) Expansion Joint: None (477) Moment Plate:	
(407) Railing: Reinforced Concrete Safety Curb And Para	(414) Expansion Joint: None		
(409) Deck Drainage: Scuppers And Downspouts	(453) Bearing Devices: None		
	(38) Navigation: 0	(39) Nav Vert Clr: 0.0 Ft	(40) Nav Horiz Clear: 0.0 Ft

<p>(203) Bridge (Dedicated) Name: Structure File Number: 4805135 Sufficiency Rating: 074.1 Deficiency Rating: FO</p>		<p>BRIDGE INVENTORY AND APPRAISAL Inventory Bridge Number: LUC 00184 00030 R OTTAWA RIVER</p>		Report Date: 8/3/2017
				Bridge Status: Active
<p>(107) Deck Type: Reinforced Concrete Deck Protection: (108B) External: None (108C) Internal: Not Applicable (Applies Only To Bridges) (108A) Wearing Surface: Latex Modified Concrete (Lmc) - Overlay (423) Thickness: 1.2 in (422) Date of Wearing Surface: (547) Slope Protection: Stone (No. 1 Aggregate)</p>		<p>(92C) Spec Insp: N Freq: 0 (93C) Special Inspection Date: (92A) Fracture Critical Insp: N Freq: 0 (93A) Fracture Critical Feature Inspection Date: (474) Main Structure System: Not Applicable (I.E. Culvert, Beam, Slab (487) Structural Steel Memb: None (482) Paint: None Or Not Applicable (483) PCS Date:</p>		
GENERAL INFORMATION (CONTINUED)		ORIGINAL PLANS INFORMATION		
<p>(37) Hist Significance: Not Eligible (112) NBIS: Y (842) Hist/Designer: None N/A (827) Hist Build Year: (828) Hist Type: (98A) Border Bridge State: (98B) Border Bridge Resp: (99) Border Bridge SFN:</p>		<p>(250) Fabricator: (249) Contractor: GROVES & SONS (248) Ohio Original Construction Project No: 081460 (252) Microfilm Reel: LUC011 (251) Standard Drawing: Aperture Cards: (246) Orig: Y (247) Repair: Y (245) Fabr: N</p>		
PROPOSED IMPROVEMENTS				
(114) Future ADT (On Bridge): 7422 (115) Year of Future ADT: 2038		(709) Rating Source: 1 Plan Information Available For Load Rati		
INSPECTION SUMMARY		SURVEY ITEMS		
<p>(58) Deck: 5 (59) Superstructure: 5 (60) Substructure: 6 (62) Culvert: N (61) Channel: 6 (C6) Approaches: 5 General Appraisal: 5 (41) Operational Status: A (90) Inspection date: 3/16/2016 (91) Desig Insp Freq: 12 Mos</p>		<p>UTILITIES</p> <p>(36A) Railings: Does Not Meet Acceptable Standards/Safet (36B) Transitions: Does Not Meet Acceptable Standards/Safet (36C) Guardrail: Meets Acceptable Standards (36D) Guardrail Ends: Meets Acceptable Standards (219) Temporary Barrier: N (223) Temporary Shoring: N (224) Temporary Sub Decking: N</p> <p>(265) Electric Line: U (266) Gas Line: U (269) Sanitary Sewer: U (267) Telephone Line: U (268) TV Cable: U (270) Water Line: U (271) Other Utilities: U</p> <p>Insp 1st: 1 - Ohio State Transportation Department 2nd: 3rd: (21) Major Maint 1st: 1 - Ohio State Transportation Department 2nd: 3rd: (225) Routine Maint 1st: 3 - County Agency 2nd: 3rd:</p> <p>(283) Lighting: N (431) Fence: N (433) Glare-Screen: N (436) Splash-Guard: N (459) Catwalks: N (271) Other-Feat: U (279) Signs-On: N (281) Signs-Under: N (432) Fence-Ht on Bridge: 0.0 FT (434) Noise Barrier Walls: N</p>		
<p>(253) SFNs Replacing this retired bridge: (255) SFNs That were replaced by this bridge:</p>				

**STATE OF OHIO DEPARTMENT OF TRANSPORTATION
BRIDGE INSPECTION REPORT**

STRUCTURE FILE NUMBER:	4805135	<u>LUC</u> <u>CO</u>	00184	00030	<u>LUC-M-76022-SYLVANIA</u> <u>FIPS</u>	DATE BUILT	07/01/1962
		Route	SLM			R SD	LUC
District	<u>02</u>	<u>CONCRETE/SLAB/CONTINUOUS</u>		Type of Service	1 15 OTTAWA RIVER		

DECK

1. Floor	Out/Out 34.3 1-REINFORCED CONCRETE	2	2. Wearing Surface 3-LATEX MODIFIED CONCRETE (LMC) -	THCK= 1.2	1
3. Curbs, Sidewalks & Walkways	N-CONCRETE 1-NONE		4. Median W.S. Date = 0-NO MEDIAN		1
5. Railing	3-REINFORCED CONCRETE SAFETY CURB AND PARA		6. Drainage 3-SCUPPERS AND DOWNSPOUTS		
7. Expansion Joints	N-NONE		8. SUMMARY Deck Area: 3,631		5

SUPERSTRUCTURE

9. Alignment of Members	MAX.SPAN.LENGTH = 40	10. Beams/Girders/Slab C-SLAB	2
11. Diaphragms or Cross Frames	TOT.LGTH = 106	12. Joist/Stringers	
13. Floorbeams		14. Floorbeam Connections	
15. Verticals		16. Diagonals	
17. End posts		18. Upper Chord	
19. Lower Chord		20. Gusset Plates	
21. Lateral Bracing		22. Sway Bracing	
23. Portals		24. Bearing Devices N-NONE N-NONE	
25. Arch		26. Arch Columns or Hangers	
27. Spandrel Walls		28. Protective Coating System (PCS) TYPE: NNONE OR NOT APPLICABLE DATE =	
29. Pins/Hangers/Hinges ADT: 5,347	TRUCK: 196	YEAR: 2015	30. Fatigue Prone Detail (E & E')
31. Live Load Response (E or S)	S	32. SUMMARY	5

SUBSTRUCTURE

33. Abutments	2-CONCRETE 2-CONCRETE	PIERS=	# OF SPANS=3
35. Piers	TYPE = 2-CONCRETE	1	36. Pier Seats
37. Backwalls		38. Wingwalls ABUTMENT:=STEEL H PILES (OTHER SIZE)/STEEL H PILES (OTHER SIZE)	
39. Fenders and Dolphins		40. Scour (Insp Type - 1, 2, 3) 5-SCOUR WITHIN LIMITS OF FOOTING OR PILES.	
41. Slope Protection	2-STONE (NO. 1 AGGREGATE)	42. SUMMARY	DIVE DT= N/A

CULVERTS

43. General		44. Alignment	
45. Shape		46. Seams	
47. Headwalls or Endwalls		48. Scour (Insp Type - 1, 2, 3)	
49. Abutments		50. SUMMARY	N

CHANNEL

51. Alignment		52. Protection 0-OTHER (GRASS, BUSHES, TREES)	
53. Hydraulic Opening		54. SUMMARY	6

APPROACHES

55. Pavement	2-BITUMINOUS	56. Approach Slabs	
57. Guardrail	1-STEEL BEAM	58. Relief Joint	
59. Embankment	BRDG.WIDTH=29.6	60. SUMMARY	PCT.LEGAL= 150

GENERAL

61. Navigation Lights		62. Warning Signs ROUTINE.RESP: 3-COUNTY AGENCY MAINT.RESP: 1-OHIO STATE TRANSPORTATION	1
63. Sign Supports	MVC ON=9999 UND=0000	64. Utilities	
65. Vertical Clearance (1, 2-change, N)		66. General Appraisal & Operational Status	5 A

67. INSPECTED BY

Print First & Last Name	PE Number	DW Initial	Print First & Last Name	45.046 PE Number	JB Initial
Inspected Date: 3/16/2016		0 0 1 1		Reviewed Date: 9/6/2016	
69. Survey (1, 0, N)					

Appendix C: **SYNCHRO AND SIMTRAFFIC REPORTS**

1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

AM Existing Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑↑	↑↑		↑	↑↑		↓
Traffic Volume (vph)	2	1171	473	682	45	1	635	1	1
Future Volume (vph)	2	1171	473	682	45	1	635	1	1
Turn Type	Perm	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases				2	1	6		8	1
Permitted Phases						8		8	4
Detector Phase				2	2	1	6	8	1
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	46.0	46.0	22.0	68.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	51.1%	51.1%	24.4%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	None	Max	Max
Act Effect Green (s)	41.4	41.4	16.6	63.0		17.0	38.6		17.0
Actuated g/C Ratio	0.46	0.46	0.18	0.70		0.19	0.43		0.19
v/c Ratio	0.01	0.83	0.81	0.30		0.19	0.57		0.01
Control Delay	13.5	26.9	49.6	3.8		32.9	20.1		26.7
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	13.5	26.9	49.6	3.8		32.9	20.1		26.7
LOS	B	C	D	A		C	C		C
Approach Delay		26.9		22.5		21.0			26.7
Approach LOS		C		C		C			C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 46 (51%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 24.0

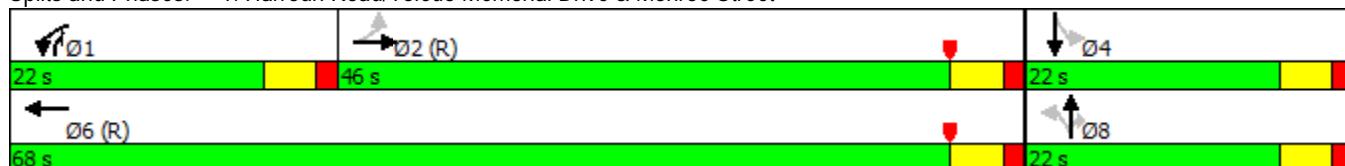
Intersection LOS: C

Intersection Capacity Utilization 75.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
AM Existing Conditions



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	Ø4
Lane Configurations	↑↑	↗	↖	↑↗	↖	↗	
Traffic Volume (vph)	1694	35	49	1031	8	0	
Future Volume (vph)	1694	35	49	1031	8	0	
Turn Type	NA	Perm	Perm	NA	custom	NA	
Protected Phases	2				6		4
Permitted Phases		2	6			8	8
Detector Phase	2	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	20.0	20.0	20.0	20.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	25.0	13.0	13.0	13.0
Total Split (s)	77.0	77.0	77.0	77.0	13.0	13.0	13.0
Total Split (%)	85.6%	85.6%	85.6%	85.6%	14.4%	14.4%	14%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
Act Effect Green (s)	76.0	76.0	76.0	76.0	7.4	7.4	
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.08	0.08	
v/c Ratio	0.62	0.03	0.34	0.38	0.08	0.43	
Control Delay	1.5	0.2	7.7	1.2	39.5	26.0	
Queue Delay	0.3	0.0	0.0	0.0	0.0	0.0	
Total Delay	1.8	0.2	7.7	1.2	39.5	26.0	
LOS	A	A	A	A	D	C	
Approach Delay	1.8			1.5		27.4	
Approach LOS	A			A		C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 78 (87%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 2.4

Intersection LOS: A

Intersection Capacity Utilization 61.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

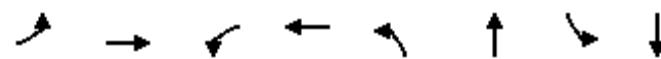


3: SB US 23 Ramp/Glasgow Road & Monroe Street

Sylvania Interchange PID 105889

Timings

AM Existing Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑ ↗	↑ ↘	↑ ↗	↑ ↘	↑ ↗	↗	↑ ↗	↑ ↘
Traffic Volume (vph)	2	1068	431	1011	101	0	15	14
Future Volume (vph)	2	1068	431	1011	101	0	15	14
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2			6		8		4
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	20.0	20.0	5.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.0	26.0	11.0	26.0	11.0	11.0	11.0	11.0
Total Split (s)	60.0	60.0	15.0	75.0	15.0	15.0	15.0	15.0
Total Split (%)	66.7%	66.7%	16.7%	83.3%	16.7%	16.7%	16.7%	16.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max	Max
Act Effect Green (s)	55.0	55.0	70.0	70.0	10.0	10.0	10.0	10.0
Actuated g/C Ratio	0.61	0.61	0.78	0.78	0.11	0.11	0.11	0.11
v/c Ratio	0.01	0.78	1.67	0.41	0.72	0.37	0.15	0.14
Control Delay	7.0	10.4	337.6	4.7	65.8	2.8	39.7	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	10.4	337.6	4.7	65.8	2.8	39.7	26.3
LOS	A	B	F	A	E	A	D	C
Approach Delay		10.4		103.3		29.9		31.2
Approach LOS		B		F		C		C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 62 (69%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.67

Intersection Signal Delay: 53.6

Intersection LOS: D

Intersection Capacity Utilization 92.8%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: Monroe Street & Alexis Road
Timings

Sylvania Interchange PID 105889
AM Existing Conditions



Lane Group	EBT	WBT	NWL	Ø10	Ø12	Ø14	Ø16
Lane Configurations	↑↑	↑↑	↑↑				
Traffic Volume (vph)	596	907	340				
Future Volume (vph)	596	907	340				
Turn Type	NA	NA	Prot				
Protected Phases	5	5	6	10	12	14	16
Permitted Phases			5				
Detector Phase	5	5	6				
Switch Phase							
Minimum Initial (s)	15.0	15.0	10.0	15.0	10.0	15.0	4.0
Minimum Split (s)	21.0	21.0	16.0	21.0	16.0	21.0	10.0
Total Split (s)	45.0	45.0	45.0	65.0	25.0	65.0	25.0
Total Split (%)	50.0%	50.0%	50.0%	72%	28%	72%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0				
Total Lost Time (s)	5.0	5.0	5.0				
Lead/Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	64.8	64.8	15.2				
Actuated g/C Ratio	0.72	0.72	0.17				
v/c Ratio	0.25	0.39	0.64				
Control Delay	2.3	1.3	33.5				
Queue Delay	0.0	0.1	0.0				
Total Delay	2.3	1.3	33.5				
LOS	A	A	C				
Approach Delay	2.3	1.3	33.5				
Approach LOS	A	A	C				

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 13 (14%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 7.6

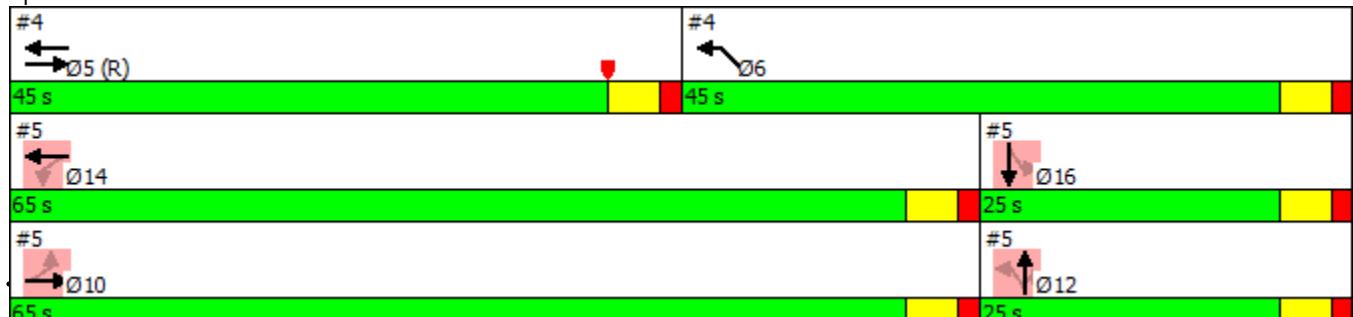
Intersection LOS: A

Intersection Capacity Utilization 43.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Monroe Street & Alexis Road



AM Existing Conditions

The Mannik & Smith Group Inc.

5: Acres Road & Alexis Road

Sylvania Interchange PID 105889

AM Existing Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	Ø5	Ø6
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↓		
Traffic Volume (vph)	19	431	14	812	1	32	259	21	11		
Future Volume (vph)	19	431	14	812	1	32	259	21	11		
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA		
Protected Phases	10!			14!		12!			16!	5	6
Permitted Phases	10!			14!		12!		12	16!		
Detector Phase	10	10	14	14	12	12	12	16	16		
Switch Phase											
Minimum Initial (s)	15.0	15.0	15.0	15.0	10.0	10.0	10.0	4.0	4.0	15.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	16.0	16.0	16.0	10.0	10.0	21.0	16.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0	45.0	45.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%	50%	50%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0		
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes									
Recall Mode	None	C-Max	None								
Act Effect Green (s)	40.7	40.7	57.2	57.2		39.3	39.3			25.9	
Actuated g/C Ratio	0.45	0.45	0.64	0.64		0.44	0.44			0.29	
v/c Ratio	0.10	0.29	0.03	0.40		0.04	0.33			0.26	
Control Delay	11.4	10.7	5.6	7.8		20.2	7.8			8.6	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	11.4	10.7	5.6	7.8		20.2	7.8			8.6	
LOS	B	B	A	A		C	A			A	
Approach Delay		10.7		7.8		9.2				8.6	
Approach LOS		B		A		A				A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 13 (14%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 8.9

Intersection LOS: A

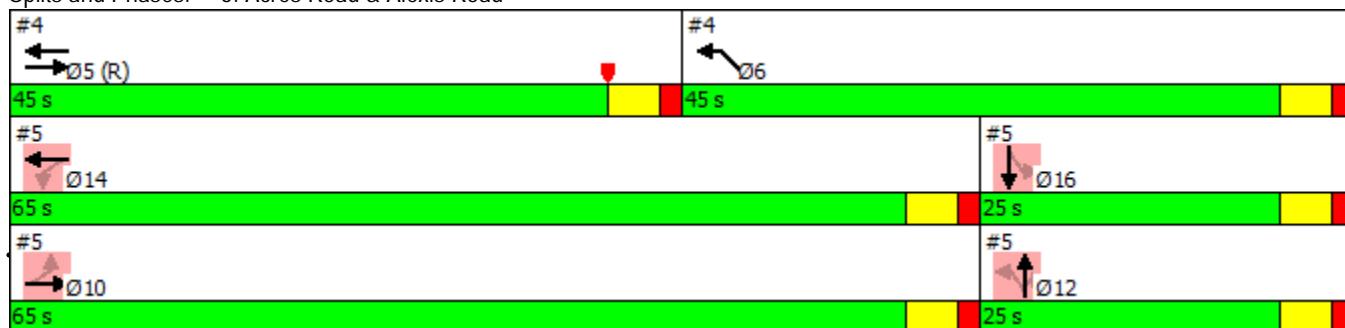
Intersection Capacity Utilization 48.6%

ICU Level of Service A

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 5: Acres Road & Alexis Road



6: US 23 Ramp/Acres Road & Monroe Street
Timings

Sylvania Interchange PID 105889
AM Existing Conditions

Lane Configurations						
Traffic Volume (vph)	314	272	29	1	564	268
Future Volume (vph)	314	272	29	1	564	268
Turn Type	pm+pt	NA	Perm	NA	NA	NA
Protected Phases	3	8		4	14	10
Permitted Phases	8			4		
Detector Phase	3	8	4	4	14	10
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	26.0	26.0
Total Split (s)	27.0	40.0	13.0	13.0	50.0	50.0
Total Split (%)	30.0%	44.4%	14.4%	14.4%	55.6%	55.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effect Green (s)	33.5	33.5		8.4	46.5	46.5
Actuated g/C Ratio	0.37	0.37		0.09	0.52	0.52
v/c Ratio	0.53	0.94		0.27	0.37	0.19
Control Delay	25.1	47.0		51.7	4.4	15.6
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	25.1	47.0		51.7	4.4	15.6
LOS	C	D		D	A	B
Approach Delay	39.4			51.7	4.4	15.6
Approach LOS		D		D	A	B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 5 (6%), Referenced to phase 10:NWT and 14:SET, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 24.0

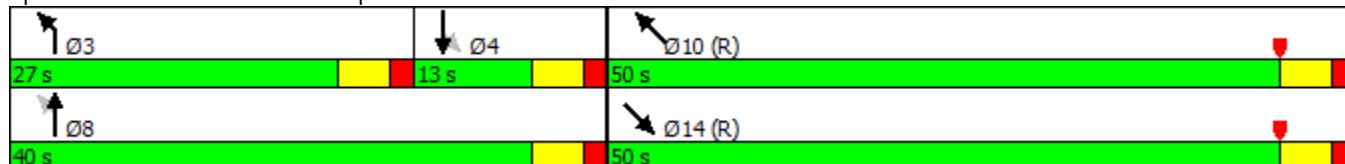
Intersection LOS: C

Intersection Capacity Utilization 59.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: US 23 Ramp/Acres Road & Monroe Street



7: Elliot Drive & Alexis Road

Sylvania Interchange PID 105889

AM Existing Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↑	↑
Traffic Volume (vph)	8	638	41	793	5	0	11	11	2	27
Future Volume (vph)	8	638	41	793	5	0	11	11	2	27
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases				2		6		8		4
Permitted Phases	2				6		8		8	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	25.0	25.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (%)	55.6%	55.6%	55.6%	55.6%	44.4%	44.4%	44.4%	44.4%	44.4%	44.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	21.0	21.0	21.0	21.0		16.0	16.0		16.0	16.0
Actuated g/C Ratio	0.47	0.47	0.47	0.47		0.36	0.36		0.36	0.36
v/c Ratio	0.04	0.44	0.15	0.53		0.01	0.02		0.02	0.05
Control Delay	7.0	8.2	8.6	9.9		9.6	3.4		9.7	4.9
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	7.0	8.2	8.6	9.9		9.6	3.4		9.7	4.9
LOS	A	A	A	A		A	A		A	A
Approach Delay		8.2		9.8		5.2			6.5	
Approach LOS		A		A		A			A	

Intersection Summary

Cycle Length: 45

Actuated Cycle Length: 45

Offset: 29 (64%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 9.0

Intersection LOS: A

Intersection Capacity Utilization 42.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Elliot Drive & Alexis Road



8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
 Timings AM Existing Conditions

Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	30	815	5	360	9	6	4	14	4
Future Volume (vph)	30	815	5	360	9	6	4	14	4
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2		6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	14.0	14.0	14.0	14.0	14.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	79.1	79.1	79.1	79.1		8.1	8.1	8.1	8.1
Actuated g/C Ratio	0.88	0.88	0.88	0.88		0.09	0.09	0.09	0.09
v/c Ratio	0.04	0.29	0.01	0.14		0.13	0.02	0.11	0.12
Control Delay	1.9	2.4	2.0	1.5		40.1	0.2	39.7	22.2
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	1.9	2.4	2.0	1.5		40.1	0.2	39.7	22.2
LOS	A	A	A	A		D	A	D	C
Approach Delay		2.4		1.5		32.5		29.7	
Approach LOS		A		A		C		C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 57 (63%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.29

Intersection Signal Delay: 3.3

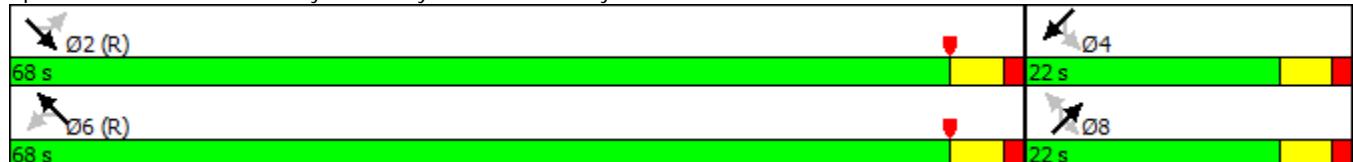
Intersection LOS: A

Intersection Capacity Utilization 48.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street



1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

PM Existing Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑↑	↑↑		↑	↑↑		↓
Traffic Volume (vph)	6	939	473	682	118	3	603	2	7
Future Volume (vph)	6	939	473	682	118	3	603	2	7
Turn Type	Perm	NA	Prot	NA	Perm	NA	Over	Perm	NA
Protected Phases					2	1	6		8
Permitted Phases							8		1
Detector Phase					2	2	1	6	8
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	43.0	43.0	24.0	67.0	23.0	23.0	24.0	23.0	23.0
Total Split (%)	47.8%	47.8%	26.7%	74.4%	25.6%	25.6%	26.7%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	None	Max	Max
Act Effect Green (s)	39.0	39.0	18.0	62.0		18.0	18.0		18.0
Actuated g/C Ratio	0.43	0.43	0.20	0.69		0.20	0.20		0.20
v/c Ratio	0.02	0.74	0.75	0.30		0.49	0.61		0.07
Control Delay	15.7	24.9	44.4	2.0		39.2	5.2		19.5
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	15.7	24.9	44.4	2.0		39.2	5.2		19.5
LOS	B	C	D	A		D	A		B
Approach Delay		24.8		19.3		10.9			19.5
Approach LOS		C		B		B			B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 45 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 19.2

Intersection LOS: B

Intersection Capacity Utilization 68.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
PM Existing Conditions

	→	↓	↖	←	↗	↑	↘	↓
Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑	↑	↔
Traffic Volume (vph)	1503	52	186	1573	61	0	14	0
Future Volume (vph)	1503	52	186	1573	61	0	14	0
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6		8	4
Permitted Phases				2	6		8	4
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	20.0	20.0	4.0	20.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	10.0	25.0	13.0	13.0	13.0	13.0
Total Split (s)	57.0	57.0	12.0	69.0	21.0	21.0	21.0	21.0
Total Split (%)	63.3%	63.3%	13.3%	76.7%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	54.2	54.2	70.1	70.1	9.9	9.9		9.9
Actuated g/C Ratio	0.60	0.60	0.78	0.78	0.11	0.11		0.11
v/c Ratio	0.77	0.06	0.68	0.62	0.43	0.51		0.15
Control Delay	6.7	0.2	34.7	5.6	45.4	13.4		38.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	6.7	0.2	34.7	5.6	45.4	13.4		38.3
LOS	A	A	C	A	D	B		D
Approach Delay	6.5				8.7	22.9		38.3
Approach LOS	A				A	C		D

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 51 (57%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 8.7

Intersection LOS: A

Intersection Capacity Utilization 84.4%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street



3: SB US 23 Ramp/Glasgow Road & Monroe Street

Sylvania Interchange PID 105889

Timings

PM Existing Conditions

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↓	↑	↑↓	↑	↓	↑	↓
Traffic Volume (vph)	40	1176	516	1632	91	2	16	7
Future Volume (vph)	40	1176	516	1632	91	2	16	7
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2			6		8		4
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	20.0	20.0	5.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.0	26.0	11.0	26.0	11.0	11.0	11.0	11.0
Total Split (s)	50.0	50.0	25.0	75.0	15.0	15.0	15.0	15.0
Total Split (%)	55.6%	55.6%	27.8%	83.3%	16.7%	16.7%	16.7%	16.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max	Max
Act Effect Green (s)	45.0	45.0	70.0	70.0	10.0	10.0	10.0	10.0
Actuated g/C Ratio	0.50	0.50	0.78	0.78	0.11	0.11	0.11	0.11
v/c Ratio	0.37	1.02	1.18	0.67	0.64	0.44	0.14	0.11
Control Delay	17.3	36.0	114.6	6.1	58.8	12.8	39.0	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	36.0	114.6	6.1	58.8	12.8	39.0	23.8
LOS	B	D	F	A	E	B	D	C
Approach Delay		35.5		31.6		33.1		30.6
Approach LOS		D		C		C		C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 54 (60%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 33.2

Intersection LOS: C

Intersection Capacity Utilization 99.7%

ICU Level of Service F

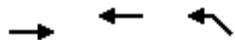
Analysis Period (min) 15

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: Monroe Street & Alexis Road
Timings

Sylvania Interchange PID 105889
PM Existing Conditions



Lane Group	EBT	WBT	NWL	Ø10	Ø12	Ø14	Ø16
Lane Configurations	↑↑	↑↑	↑↑				
Traffic Volume (vph)	450	914	1652				
Future Volume (vph)	450	914	1652				
Turn Type	NA	NA	Prot				
Protected Phases	5	5	6	10	12	14	16
Permitted Phases			5				
Detector Phase	5	5	6				
Switch Phase							
Minimum Initial (s)	15.0	15.0	10.0	15.0	10.0	15.0	4.0
Minimum Split (s)	21.0	21.0	16.0	21.0	16.0	21.0	10.0
Total Split (s)	40.0	40.0	50.0	65.0	25.0	65.0	25.0
Total Split (%)	44.4%	44.4%	55.6%	72%	28%	72%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0				
Total Lost Time (s)	5.0	5.0	5.0				
Lead/Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	35.0	35.0	45.0				
Actuated g/C Ratio	0.39	0.39	0.50				
v/c Ratio	0.36	0.72	1.05				
Control Delay	19.4	12.1	63.5				
Queue Delay	0.0	0.1	22.4				
Total Delay	19.4	12.2	85.9				
LOS	B	B	F				
Approach Delay	19.4	12.2	85.9				
Approach LOS	B	B	F				

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 4 (4%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 53.6

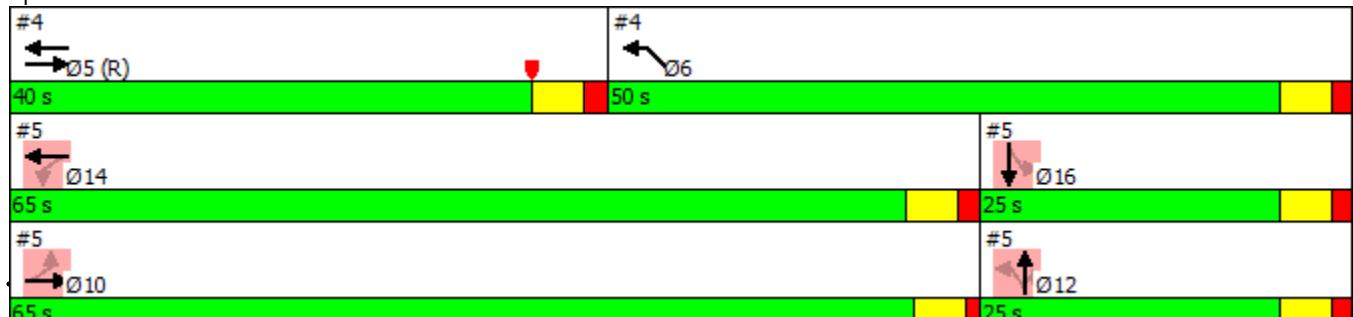
Intersection LOS: D

Intersection Capacity Utilization 80.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Monroe Street & Alexis Road



PM Existing Conditions

The Mannik & Smith Group Inc.

5: Acres Road & Alexis Road

Sylvania Interchange PID 105889

PM Existing Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	Ø5	Ø6
Lane Configurations	↑ ↘	↑ ↗	↑ ↘	↑ ↗		↑ ↘	↑ ↗				
Traffic Volume (vph)	47	639	14	827	15	62	366	28	17		
Future Volume (vph)	47	639	14	827	15	62	366	28	17		
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA		
Protected Phases	10!			14!		12!				16!	5
Permitted Phases	10!			14!		12!		12	16!		
Detector Phase	10	10	14	14	12	12	12	16	16		
Switch Phase											
Minimum Initial (s)	15.0	15.0	15.0	15.0	10.0	10.0	10.0	4.0	4.0	15.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	16.0	16.0	16.0	10.0	10.0	21.0	16.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0	40.0	50.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%	44%	56%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.5	4.5	5.0	5.0		5.0	5.0			5.0	
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes									
Recall Mode	None	C-Max	None								
Act Effect Green (s)	26.7	26.7	47.3	47.3		53.8	53.8			35.8	
Actuated g/C Ratio	0.30	0.30	0.53	0.53		0.60	0.60			0.40	
v/c Ratio	0.56	0.66	0.05	0.50		0.08	0.38			0.19	
Control Delay	35.5	17.4	10.7	15.5		3.0	0.7			7.3	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.4			0.0	
Total Delay	35.5	17.4	10.7	15.5		3.0	1.1			7.3	
LOS	D	B	B	B		A	A			A	
Approach Delay		18.6		15.5		1.4				7.3	
Approach LOS		B		B		A				A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 4 (4%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 13.1

Intersection LOS: B

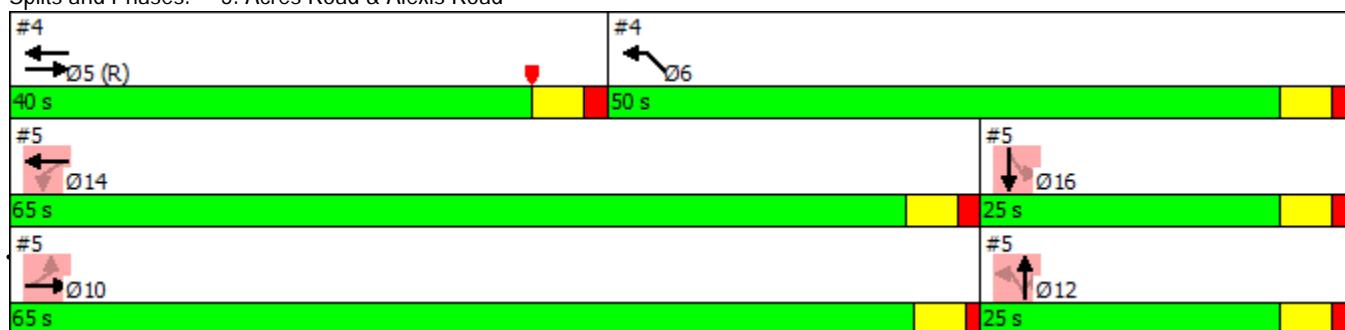
Intersection Capacity Utilization 60.5%

ICU Level of Service B

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 5: Acres Road & Alexis Road



6: US 23 Ramp/Acres Road & Monroe Street
Timings

Sylvania Interchange PID 105889
PM Existing Conditions

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Configurations						
Traffic Volume (vph)	453	385	27	0	757	1196
Future Volume (vph)	453	385	27	0	757	1196
Turn Type	pm+pt	NA	Perm	NA	NA	NA
Protected Phases	3	8		4	14	10
Permitted Phases	8			4		
Detector Phase	3	8	4	4	14	10
Switch Phase						
Minimum Initial (s)	5.0	7.0	7.0	7.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	26.0	26.0
Total Split (s)	36.0	51.0	15.0	15.0	39.0	39.0
Total Split (%)	40.0%	56.7%	16.7%	16.7%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effect Green (s)	39.1	39.1		8.7	40.9	40.9
Actuated g/C Ratio	0.43	0.43		0.10	0.45	0.45
v/c Ratio	0.66	0.85		0.17	0.59	0.84
Control Delay	23.8	31.4		6.7	19.0	32.2
Queue Delay	70.2	0.0		0.0	0.2	22.2
Total Delay	94.0	31.4		6.7	19.2	54.4
LOS	F	C		A	B	D
Approach Delay		57.9		6.7	19.2	54.4
Approach LOS		E		A	B	D

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 85 (94%), Referenced to phase 10:NWT and 14:SET, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 45.7

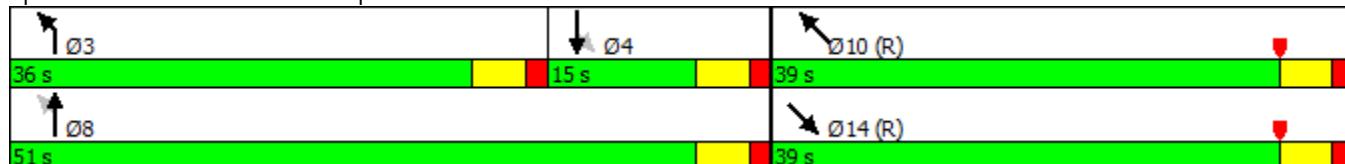
Intersection LOS: D

Intersection Capacity Utilization 77.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: US 23 Ramp/Acres Road & Monroe Street



7: Elliot Drive & Alexis Road

Sylvania Interchange PID 105889

Timings

PM Existing Conditions

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↑	↑
Traffic Volume (vph)	33	1003	63	829	37	11	91	24	1	15
Future Volume (vph)	33	1003	63	829	37	11	91	24	1	15
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases				2		6		8		4
Permitted Phases	2				6		8		8	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	67.0	67.0	67.0	67.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	74.4%	25.6%	25.6%	25.6%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	63.0	63.0	63.0	63.0		19.0	19.0		19.0	19.0
Actuated g/C Ratio	0.70	0.70	0.70	0.70		0.21	0.21		0.21	0.21
v/c Ratio	0.10	0.45	0.24	0.38		0.16	0.24		0.09	0.05
Control Delay	3.5	3.3	7.4	6.0		30.7	8.1		29.5	13.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	3.5	3.3	7.4	6.0		30.7	8.1		29.5	13.6
LOS	A	A	A	A		C	A		C	B
Approach Delay		3.3			6.0		15.9			23.6
Approach LOS		A			A		B			C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 6 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 5.7

Intersection LOS: A

Intersection Capacity Utilization 51.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Elliot Drive & Alexis Road



8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
 Timings PM Existing Conditions

Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	39	786	33	945	69	17	22	38	13
Future Volume (vph)	39	786	33	945	69	17	22	38	13
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases				2		6			8
Permitted Phases		2				6			8
Detector Phase		2	2	6	6	8	8	8	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	14.0	14.0	14.0	14.0	14.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	71.9	71.9	71.9	71.9		11.7	11.7	11.7	11.7
Actuated g/C Ratio	0.80	0.80	0.80	0.80		0.13	0.13	0.13	0.13
v/c Ratio	0.12	0.34	0.08	0.40		0.53	0.11	0.24	0.19
Control Delay	3.6	4.9	4.0	4.2		46.6	13.9	37.3	17.8
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	3.6	4.9	4.0	4.2		46.6	13.9	37.3	17.8
LOS	A	A	A	A		D	B	D	B
Approach Delay		4.8		4.2		39.9			26.9
Approach LOS		A		A		D			C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 57 (63%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 7.1

Intersection LOS: A

Intersection Capacity Utilization 52.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street



1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

AM 2025 No Build Conditions



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑↑	↑↑		↑	↑↑		↓
Traffic Volume (vph)	10	1220	490	690	50	10	650	10	10
Future Volume (vph)	10	1220	490	690	50	10	650	10	10
Turn Type	Perm	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases					2	1	6	8	1
Permitted Phases							8	8	4
Detector Phase					2	2	1	6	8
Switch Phase								1	4
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	51.0	51.0	25.0	76.0	14.0	14.0	25.0	14.0	14.0
Total Split (%)	56.7%	56.7%	27.8%	84.4%	15.6%	15.6%	27.8%	15.6%	15.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	None	Max	Max
Act Effect Green (s)	47.2	47.2	18.8	71.0		9.0	32.8		9.0
Actuated g/C Ratio	0.52	0.52	0.21	0.79		0.10	0.36		0.10
v/c Ratio	0.03	0.77	0.74	0.27		0.47	0.67		0.20
Control Delay	11.4	20.7	37.8	1.0		50.5	25.4		31.1
Queue Delay	0.0	35.1	0.0	0.0		0.0	0.0		0.0
Total Delay	11.4	55.8	37.8	1.0		50.5	25.5		31.1
LOS	B	E	D	A		D	C		C
Approach Delay		55.5		16.1		27.6		31.1	
Approach LOS		E		B		C		C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 46 (51%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 34.7

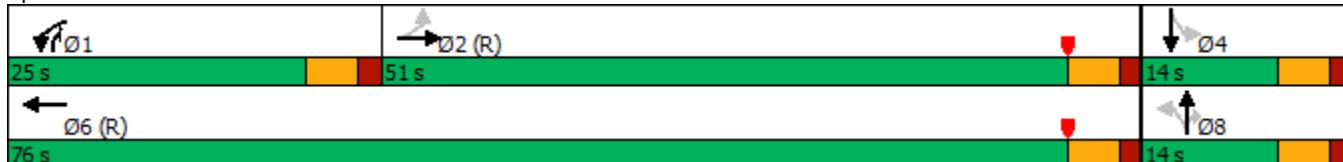
Intersection LOS: C

Intersection Capacity Utilization 77.3%

ICU Level of Service D

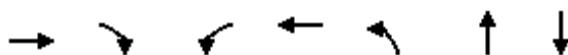
Analysis Period (min) 15

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
AM 2025 No Build Conditions



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations	↑↑	↗	↖	↑↗	↖	↗	↖
Traffic Volume (vph)	1750	130	60	1050	130	0	0
Future Volume (vph)	1750	130	60	1050	130	0	0
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	NA
Protected Phases	2			1	6		8
Permitted Phases				2	6		8
Detector Phase	2	2	1	6	8	8	4
Switch Phase							
Minimum Initial (s)	20.0	20.0	5.0	20.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	9.5	25.0	13.0	13.0	13.0
Total Split (s)	62.0	62.0	10.0	72.0	18.0	18.0	18.0
Total Split (%)	68.9%	68.9%	11.1%	80.0%	20.0%	20.0%	20.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	4.5	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None
Act Effect Green (s)	59.9	59.9	68.5	68.0	12.0	12.0	12.0
Actuated g/C Ratio	0.67	0.67	0.76	0.76	0.13	0.13	0.13
v/c Ratio	0.81	0.13	0.34	0.43	0.76	0.28	0.03
Control Delay	12.5	1.1	8.7	3.0	63.2	6.6	0.2
Queue Delay	7.2	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	1.1	8.7	3.0	63.2	6.6	0.2
LOS	B	A	A	A	E	A	A
Approach Delay	18.4				3.3	41.6	0.2
Approach LOS	B				A	D	A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 78 (87%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 14.6

Intersection LOS: B

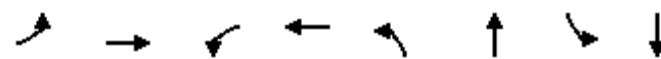
Intersection Capacity Utilization 72.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑ ↗	↑ ↘	↑ ↗	↑ ↘	↑ ↗	↗	↑ ↗	↗
Traffic Volume (vph)	10	1070	480	1020	90	20	10	10
Future Volume (vph)	10	1070	480	1020	90	20	10	10
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases						8		4
Permitted Phases	2			6		8		4
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	20.0	20.0	5.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.0	26.0	11.0	26.0	11.0	11.0	11.0	11.0
Total Split (s)	60.0	60.0	15.0	75.0	15.0	15.0	15.0	15.0
Total Split (%)	66.7%	66.7%	16.7%	83.3%	16.7%	16.7%	16.7%	16.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max	Max
Act Effect Green (s)	55.0	55.0	70.0	70.0	10.0	10.0	10.0	10.0
Actuated g/C Ratio	0.61	0.61	0.78	0.78	0.11	0.11	0.11	0.11
v/c Ratio	0.04	0.91	1.86	0.41	0.64	0.57	0.13	0.11
Control Delay	11.7	20.2	422.5	2.2	58.7	16.3	40.3	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	20.2	422.5	2.2	58.7	16.3	40.3	26.2
LOS	B	C	F	A	E	B	D	C
Approach Delay		20.1		134.9		31.0		30.9
Approach LOS		C		F		C		C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 62 (69%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.86

Intersection Signal Delay: 68.9

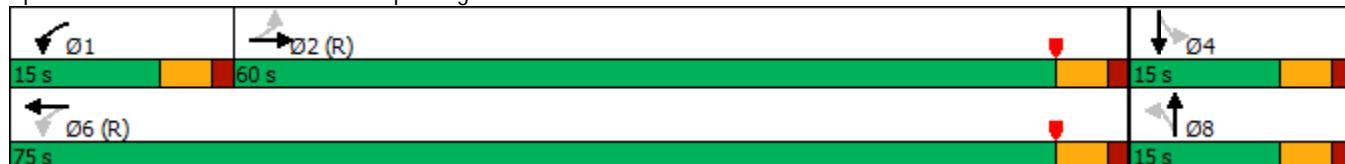
Intersection LOS: E

Intersection Capacity Utilization 104.4%

ICU Level of Service G

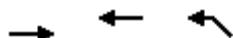
Analysis Period (min) 15

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: Monroe Street & Alexis Road
Timings

Sylvania Interchange PID 105889
AM 2025 No Build Conditions



Lane Group	EBT	WBT	NWL	Ø10	Ø12	Ø14	Ø16
Lane Configurations	↑↑	↑↑	↑↑				
Traffic Volume (vph)	520	940	660				
Future Volume (vph)	520	940	660				
Turn Type	NA	NA	Prot				
Protected Phases	5	5	6	10	12	14	16
Permitted Phases			5				
Detector Phase	5	5	6				
Switch Phase							
Minimum Initial (s)	15.0	15.0	10.0	15.0	10.0	15.0	4.0
Minimum Split (s)	21.0	21.0	16.0	21.0	16.0	21.0	10.0
Total Split (s)	45.0	45.0	45.0	65.0	25.0	65.0	25.0
Total Split (%)	50.0%	50.0%	50.0%	72%	28%	72%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0				
Total Lost Time (s)	5.0	5.0	5.0				
Lead/Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	55.0	55.0	25.0				
Actuated g/C Ratio	0.61	0.61	0.28				
v/c Ratio	0.26	0.47	0.75				
Control Delay	6.3	2.8	30.8				
Queue Delay	0.0	0.1	0.0				
Total Delay	6.3	2.8	30.8				
LOS	A	A	C				
Approach Delay	6.3	2.8	30.8				
Approach LOS	A	A	C				

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 13 (14%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 12.4

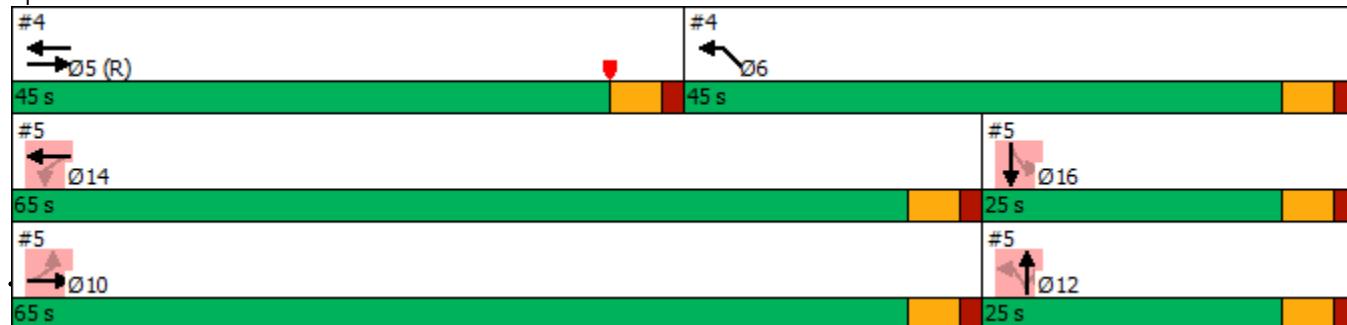
Intersection LOS: B

Intersection Capacity Utilization 53.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Monroe Street & Alexis Road



AM 2025 No Build Conditions

Page 4

5: Acres Road & Alexis Road

Sylvania Interchange PID 105889

Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	Ø5	Ø6
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑		↓		
Traffic Volume (vph)	20	490	20	820	10	40	320	30	20		
Future Volume (vph)	20	490	20	820	10	40	320	30	20		
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA		
Protected Phases	10!			14!		12!			16!	5	6
Permitted Phases	10!			14!		12!		12	16!		
Detector Phase	10	10	14	14	12	12	12	16	16		
Switch Phase											
Minimum Initial (s)	15.0	15.0	15.0	15.0	10.0	10.0	10.0	4.0	4.0	15.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	16.0	16.0	16.0	10.0	10.0	21.0	16.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0	45.0	45.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%	50%	50%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0		
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes									
Recall Mode	None	C-Max	None								
Act Effect Green (s)	33.3	33.3	41.9	41.9		46.7	46.7			38.1	
Actuated g/C Ratio	0.37	0.37	0.47	0.47		0.52	0.52			0.42	
v/c Ratio	0.16	0.42	0.07	0.56		0.06	0.35			0.24	
Control Delay	13.9	12.8	13.1	16.8		9.8	1.8			7.8	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.4			0.0	
Total Delay	13.9	12.8	13.1	16.8		9.8	2.1			7.8	
LOS	B	B	B	B		A	A			A	
Approach Delay		12.8		16.7		3.2			7.8		
Approach LOS		B		B		A			A		

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 13 (14%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 12.3

Intersection LOS: B

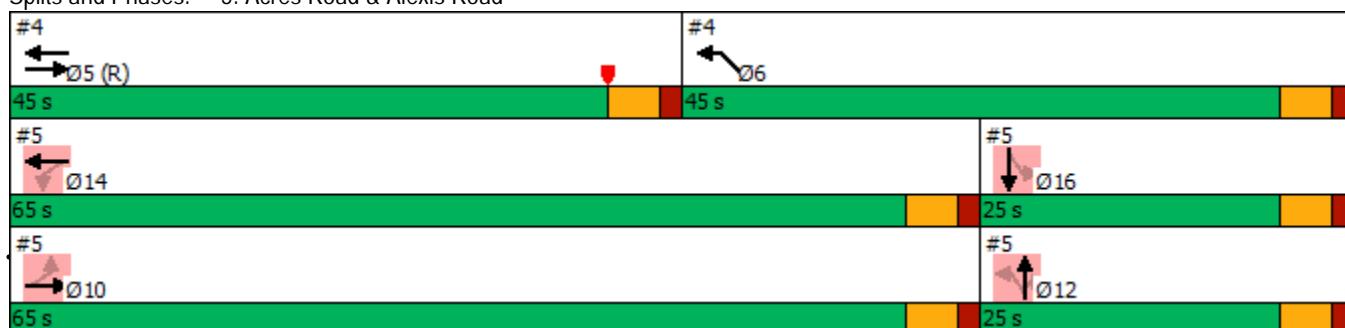
Intersection Capacity Utilization 55.7%

ICU Level of Service B

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 5: Acres Road & Alexis Road



6: US 23 Ramp/Acres Road & Monroe Street
Timings

Sylvania Interchange PID 105889
AM 2025 No Build Conditions

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Configurations						
Traffic Volume (vph)	340	320	30	10	580	320
Future Volume (vph)	340	320	30	10	580	320
Turn Type	pm+pt	NA	Perm	NA	NA	NA
Protected Phases	3	8		4	14	10
Permitted Phases	8		4			
Detector Phase	3	8	4	4	14	10
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	26.0	26.0
Total Split (s)	27.0	40.0	13.0	13.0	50.0	50.0
Total Split (%)	30.0%	44.4%	14.4%	14.4%	55.6%	55.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effect Green (s)	35.0	35.0		8.3	45.0	45.0
Actuated g/C Ratio	0.39	0.39		0.09	0.50	0.50
v/c Ratio	0.57	1.02		0.38	0.44	0.22
Control Delay	25.4	66.5		54.3	5.8	11.2
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	25.4	66.5		54.3	5.8	11.2
LOS	C	E		D	A	B
Approach Delay		52.6		54.3	5.8	11.2
Approach LOS		D		D	A	B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 5 (6%), Referenced to phase 10:NWT and 14:SET, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 30.0

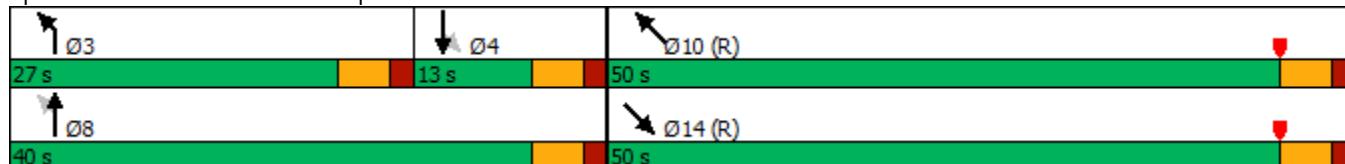
Intersection LOS: C

Intersection Capacity Utilization 66.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: US 23 Ramp/Acres Road & Monroe Street



7: Elliot Drive & Alexis Road
Timings

Sylvania Interchange PID 105889
AM 2025 No Build Conditions

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↑	↑
Traffic Volume (vph)	10	750	50	800	10	0	20	10	10	20
Future Volume (vph)	10	750	50	800	10	0	20	10	10	20
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases				2		6		8		4
Permitted Phases	2				6		8		8	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	67.0	67.0	67.0	67.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	74.4%	25.6%	25.6%	25.6%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	63.0	63.0	63.0	63.0		19.0	19.0		19.0	19.0
Actuated g/C Ratio	0.70	0.70	0.70	0.70		0.21	0.21		0.21	0.21
v/c Ratio	0.03	0.34	0.14	0.36		0.04	0.06		0.06	0.06
Control Delay	2.4	3.1	5.4	5.9		28.8	12.6		29.1	12.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	2.4	3.1	5.4	5.9		28.8	12.6		29.1	12.6
LOS	A	A	A	A		C	B		C	B
Approach Delay		3.1		5.8		18.0			20.8	
Approach LOS		A		A		B			C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 29 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 5.1

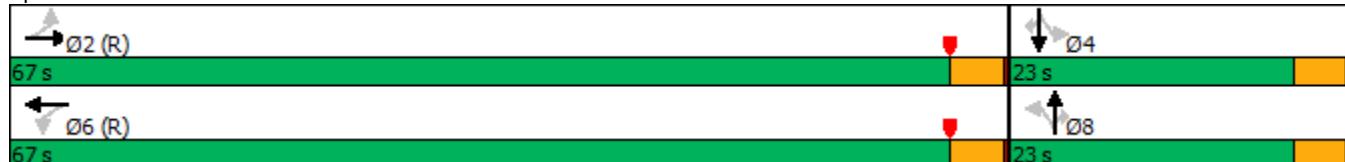
Intersection LOS: A

Intersection Capacity Utilization 43.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Elliot Drive & Alexis Road



8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
Timings AM 2025 No Build Conditions

Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	40	840	10	370	20	20	10	20	10
Future Volume (vph)	40	840	10	370	20	20	10	20	10
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases				2		6			8
Permitted Phases		2				6		8	
Detector Phase		2	2	6	6	8	8	8	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	14.0	14.0	14.0	14.0	14.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	78.4	78.4	78.4	78.4		8.8	8.8	8.8	8.8
Actuated g/C Ratio	0.87	0.87	0.87	0.87		0.10	0.10	0.10	0.10
v/c Ratio	0.05	0.30	0.02	0.15		0.30	0.06	0.17	0.23
Control Delay	1.7	1.5	2.4	1.7		42.8	7.6	39.8	20.2
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	1.7	1.5	2.4	1.7		42.8	7.6	39.8	20.2
LOS	A	A	A	A		D	A	D	C
Approach Delay		1.5		1.8		35.8			26.8
Approach LOS		A		A		D			C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 17 (19%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 3.9

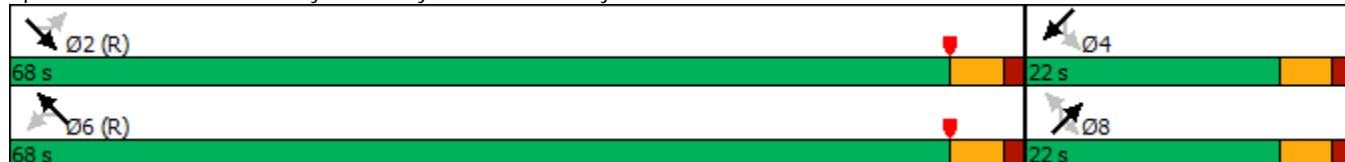
Intersection LOS: A

Intersection Capacity Utilization 50.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street



Queuing and Blocking Report
AM 2025 No Build Conditions

12/13/2018

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	R	LTR
Maximum Queue (ft)	80	430	481	168	180	214	88	109	212	241	116
Average Queue (ft)	10	224	258	99	114	26	27	39	123	131	36
95th Queue (ft)	65	368	405	171	177	119	68	82	194	214	89
Link Distance (ft)		1095	1095			352	352		577	577	191
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	250			160	160			185			
Storage Blk Time (%)	0	6		0	1				1		
Queuing Penalty (veh)	0	1		1	4				0		

Intersection: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	R	L	T	TR	L	TR	LTR
Maximum Queue (ft)	336	354	171	99	77	69	166	129	34
Average Queue (ft)	169	183	76	32	25	25	82	38	8
95th Queue (ft)	378	396	220	74	64	61	147	87	29
Link Distance (ft)	352	352			761	761	218	218	141
Upstream Blk Time (%)	1	2					0		
Queuing Penalty (veh)	11	16					0		
Storage Bay Dist (ft)			175	155					
Storage Blk Time (%)	15	17	0	0					
Queuing Penalty (veh)	0	21	1	0					

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	109	801	791	525	677	669	222	138	52	52
Average Queue (ft)	14	541	592	485	550	177	75	67	11	17
95th Queue (ft)	67	927	924	642	923	595	178	137	37	47
Link Distance (ft)	761	761		647	647	1069			273	
Upstream Blk Time (%)	2	4		30	2					
Queuing Penalty (veh)	18	34		230	15					
Storage Bay Dist (ft)	135			500			115		85	
Storage Blk Time (%)	30			72	10		4	3	0	0
Queuing Penalty (veh)	3			366	47		7	3	0	0

Queuing and Blocking Report
AM 2025 No Build Conditions

12/13/2018

Intersection: 4: Monroe Street & Alexis Road

Movement	EB	EB	B18	B18	WB	WB	NW	NW
Directions Served	T	T	T	T	T	T	L	L
Maximum Queue (ft)	184	183	119	136	291	300	178	163
Average Queue (ft)	81	83	17	15	234	179	130	98
95th Queue (ft)	169	171	96	94	363	337	186	163
Link Distance (ft)	104	104	139	139	258	258	153	153
Upstream Blk Time (%)	11	10	2	1	50	11	9	3
Queuing Penalty (veh)	28	27	5	4	235	52	29	9
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 5: Acres Road & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	B17	SB
Directions Served	L	T	TR	L	T	TR	LT	R	T	LTR
Maximum Queue (ft)	75	228	247	165	1012	1014	83	101	277	225
Average Queue (ft)	17	117	124	33	622	598	36	42	76	139
95th Queue (ft)	56	227	237	131	1214	1218	78	98	245	273
Link Distance (ft)		258	258		981	981	22	22	197	205
Upstream Blk Time (%)		2	3		19	16	45	16	24	52
Queuing Penalty (veh)		6	6		80	66	80	29	85	0
Storage Bay Dist (ft)	55			140						
Storage Blk Time (%)	1	31		0	67					
Queuing Penalty (veh)	2	6		0	13					

Intersection: 6: US 23 Ramp/Acres Road & Monroe Street

Movement	NB	NB	SB	SE	SE	NW	NW
Directions Served	L	TR	LTR	T	TR	T	TR
Maximum Queue (ft)	220	742	89	152	158	249	242
Average Queue (ft)	170	695	26	86	96	67	53
95th Queue (ft)	313	820	70	148	160	172	175
Link Distance (ft)		697	197	141	141	1087	1087
Upstream Blk Time (%)		64		4	4		
Queuing Penalty (veh)		0		13	15		
Storage Bay Dist (ft)	195						
Storage Blk Time (%)	6	60					
Queuing Penalty (veh)	37	205					

Queuing and Blocking Report
AM 2025 No Build Conditions

12/13/2018

Intersection: 7: Elliot Drive & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	25	127	134	165	664	629	48	37	52	50
Average Queue (ft)	4	17	36	42	282	242	9	10	13	11
95th Queue (ft)	21	72	97	126	804	786	35	30	39	35
Link Distance (ft)		981	981		911	911	243	243	255	
Upstream Blk Time (%)					14	13				
Queuing Penalty (veh)					0	0				
Storage Bay Dist (ft)	140			140					100	
Storage Blk Time (%)	0				29				0	
Queuing Penalty (veh)	0				15				0	

Intersection: 8: Fairways Driveway/Tireman Driveway & Monroe Street

Movement	SE	SE	SE	NW	NW	NW	NE	SW	SW
Directions Served	L	T	TR	L	T	TR	LT	L	TR
Maximum Queue (ft)	41	74	86	42	78	53	74	54	73
Average Queue (ft)	11	20	34	7	23	11	29	14	23
95th Queue (ft)	34	54	73	29	62	37	63	44	54
Link Distance (ft)		1087	1087		499	499	241	156	156
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	180			145					
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 9: Monroe Street

Movement	EB	EB	NW	NW
Directions Served	R	R	T	T
Maximum Queue (ft)	157	192	136	115
Average Queue (ft)	12	16	25	13
95th Queue (ft)	112	128	97	80
Link Distance (ft)	485	485	141	141
Upstream Blk Time (%)	0	1	0	
Queuing Penalty (veh)	1	4	1	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 20: Monroe Street

Movement	EB	EB	WB	WB	B18	B18
Directions Served	TR	R	T	TR	T	T
Maximum Queue (ft)	117	117	238	215	190	173
Average Queue (ft)	9	26	171	89	134	41
95th Queue (ft)	77	90	311	229	253	146
Link Distance (ft)	647	647	139	139	104	104
Upstream Blk Time (%)			62	5	38	2
Queuing Penalty (veh)			500	44	310	19
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 2704



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑↑	↑↑		↑	↑↑		↓
Traffic Volume (vph)	10	960	470	1400	130	10	610	10	10
Future Volume (vph)	10	960	470	1400	130	10	610	10	10
Turn Type	Perm	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases					2	1	6		8
Permitted Phases					8		8	4	
Detector Phase	2	2	1	6	8	8	1	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	43.0	43.0	23.0	66.0	24.0	24.0	23.0	24.0	24.0
Total Split (%)	47.8%	47.8%	25.6%	73.3%	26.7%	26.7%	25.6%	26.7%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	None	Max	Max
Act Effect Green (s)	38.6	38.6	17.4	61.0		19.0	41.4		19.0
Actuated g/C Ratio	0.43	0.43	0.19	0.68		0.21	0.46		0.21
v/c Ratio	0.08	0.76	0.77	0.64		0.55	0.50		0.12
Control Delay	17.7	25.9	51.9	3.5		40.1	16.6		18.6
Queue Delay	0.0	1.6	0.0	0.3		0.0	0.0		0.0
Total Delay	17.7	27.4	51.9	3.9		40.1	16.6		18.6
LOS	B	C	D	A		D	B		B
Approach Delay		27.3		15.9		21.0			18.6
Approach LOS		C		B		C			B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 45 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 20.2

Intersection LOS: C

Intersection Capacity Utilization 71.7%

ICU Level of Service C

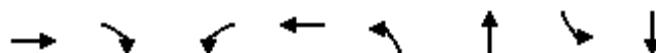
Analysis Period (min) 15

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
PM 2025 No Build Conditions



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑↑	↗	↖	↑↗	↖	↗	↖	↔
Traffic Volume (vph)	1530	50	220	1580	290	0	10	0
Future Volume (vph)	1530	50	220	1580	290	0	10	0
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6		8	4
Permitted Phases				2	6		8	4
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	20.0	20.0	4.0	20.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	10.0	25.0	13.0	13.0	13.0	13.0
Total Split (s)	52.0	52.0	13.0	65.0	25.0	25.0	25.0	25.0
Total Split (%)	57.8%	57.8%	14.4%	72.2%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effect Green (s)	47.0	47.0	60.0	60.0	20.0	20.0		20.0
Actuated g/C Ratio	0.52	0.52	0.67	0.67	0.22	0.22		0.22
v/c Ratio	0.90	0.06	1.00	0.73	1.03	0.38		0.06
Control Delay	20.9	1.4	79.7	11.1	95.1	8.5		0.2
Queue Delay	2.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	22.9	1.4	79.7	11.1	95.1	8.5		0.2
LOS	C	A	E	B	F	A		A
Approach Delay	22.2			19.4		63.1		0.3
Approach LOS	C			B		E		A

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 51 (57%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 25.7

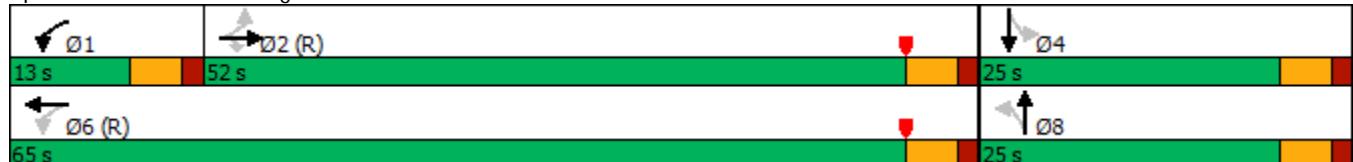
Intersection LOS: C

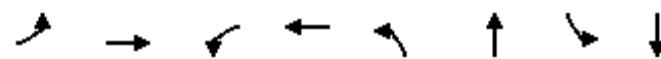
Intersection Capacity Utilization 95.9%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	↑ ↗	↑ ↘	↑ ↗	↑ ↘	↑ ↗	↑ ↘	↑ ↗	↑ ↘	
Traffic Volume (vph)	40	1180	580	1660	130	10	30	10	
Future Volume (vph)	40	1180	580	1660	130	10	30	10	
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases		2	1	6		8		4	
Permitted Phases	2			6		8		4	
Detector Phase	2	2	1	6	8	8	4	4	
Switch Phase									
Minimum Initial (s)	20.0	20.0	5.0	20.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	26.0	26.0	11.0	26.0	11.0	11.0	11.0	11.0	
Total Split (s)	50.0	50.0	25.0	75.0	15.0	15.0	15.0	15.0	
Total Split (%)	55.6%	55.6%	27.8%	83.3%	16.7%	16.7%	16.7%	16.7%	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes						
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max	Max	
Act Effect Green (s)	45.0	45.0	70.0	70.0	10.0	10.0	10.0	10.0	
Actuated g/C Ratio	0.50	0.50	0.78	0.78	0.11	0.11	0.11	0.11	
v/c Ratio	0.41	1.04	1.32	0.70	0.93	0.50	0.32	0.16	
Control Delay	17.7	41.9	177.0	6.3	98.6	14.5	45.8	21.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	17.7	41.9	177.0	6.3	98.6	14.5	45.8	21.9	
LOS	B	D	F	A	F	B	D	C	
Approach Delay		41.3			48.5		54.9		33.8
Approach LOS		D			D		D		C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 54 (60%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.32

Intersection Signal Delay: 45.9

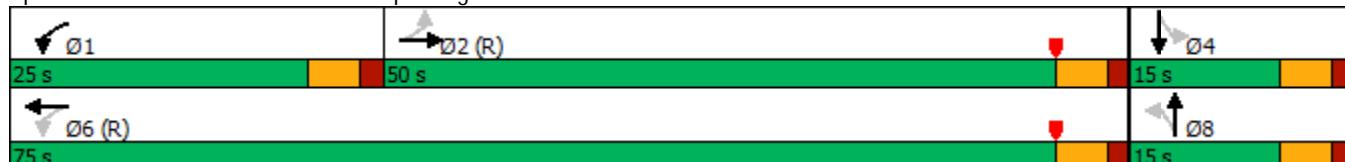
Intersection LOS: D

Intersection Capacity Utilization 109.8%

ICU Level of Service H

Analysis Period (min) 15

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: Monroe Street & Alexis Road
Timings

Sylvania Interchange PID 105889
PM 2025 No Build Conditions



Lane Group	EBT	WBT	NWL	Ø10	Ø12	Ø14	Ø16
Lane Configurations	↑↑	↑↑	↑↑				
Traffic Volume (vph)	520	970	1580				
Future Volume (vph)	520	970	1580				
Turn Type	NA	NA	Prot				
Protected Phases	5	5	6	10	12	14	16
Permitted Phases			5				
Detector Phase	5	5	6				
Switch Phase							
Minimum Initial (s)	15.0	15.0	10.0	15.0	10.0	15.0	4.0
Minimum Split (s)	21.0	21.0	16.0	21.0	16.0	21.0	10.0
Total Split (s)	40.0	40.0	50.0	65.0	25.0	65.0	25.0
Total Split (%)	44.4%	44.4%	55.6%	72%	28%	72%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0				
Total Lost Time (s)	5.0	5.0	5.0				
Lead/Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	35.0	35.0	45.0				
Actuated g/C Ratio	0.39	0.39	0.50				
v/c Ratio	0.41	0.77	1.00				
Control Delay	12.1	14.5	50.4				
Queue Delay	0.0	0.1	36.9				
Total Delay	12.1	14.7	87.3				
LOS	B	B	F				
Approach Delay	12.1	14.7	87.3				
Approach LOS	B	B	F				

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 4 (4%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 51.6

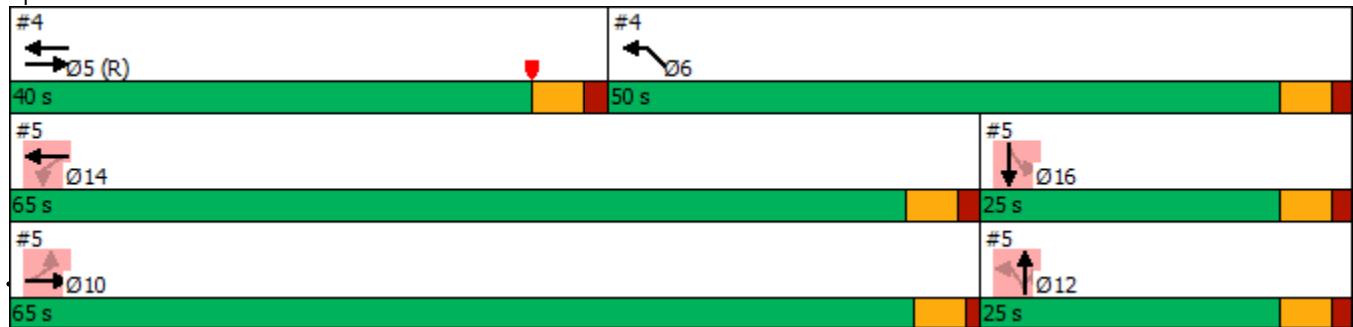
Intersection LOS: D

Intersection Capacity Utilization 80.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Monroe Street & Alexis Road



5: Acres Road & Alexis Road

Sylvania Interchange PID 105889

Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	Ø5	Ø6
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↓		
Traffic Volume (vph)	20	500	20	880	10	70	490	60	40		
Future Volume (vph)	20	500	20	880	10	70	490	60	40		
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA		
Protected Phases	10!			14!		12!				16!	5
Permitted Phases	10!			14!		12!		12	16!		
Detector Phase	10	10	14	14	12	12	12	16	16		
Switch Phase											
Minimum Initial (s)	15.0	15.0	15.0	15.0	10.0	10.0	10.0	4.0	4.0	15.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	16.0	16.0	16.0	10.0	10.0	21.0	16.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0	40.0	50.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%	44%	56%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Lost Time (s)	4.5	4.5	5.0	5.0		5.0	5.0			5.0	
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes									
Recall Mode	None	C-Max	None								
Act Effect Green (s)	21.2	21.2	49.5	49.5		59.3	59.3			33.8	
Actuated g/C Ratio	0.24	0.24	0.55	0.55		0.66	0.66			0.38	
v/c Ratio	0.26	0.65	0.06	0.52		0.07	0.45			0.32	
Control Delay	13.7	14.2	9.5	14.5		2.8	0.9			15.8	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.4			0.0	
Total Delay	13.7	14.2	9.5	14.5		2.8	1.3			15.8	
LOS	B	B	A	B		A	A			B	
Approach Delay		14.1		14.4		1.5				15.8	
Approach LOS		B		B		A				B	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 4 (4%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 11.1

Intersection LOS: B

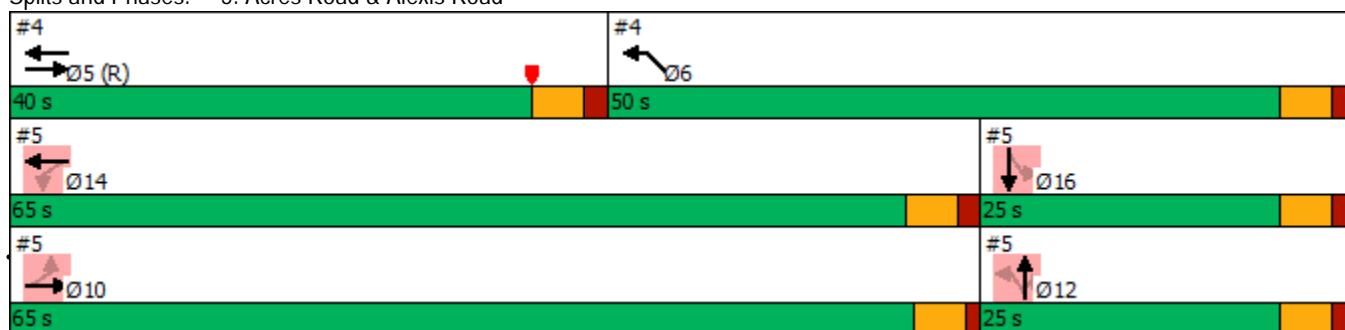
Intersection Capacity Utilization 66.6%

ICU Level of Service C

Analysis Period (min) 15

! Phase conflict between lane groups.

Splits and Phases: 5: Acres Road & Alexis Road



6: US 23 Ramp/Acres Road & Monroe Street
Timings

Sylvania Interchange PID 105889
PM 2025 No Build Conditions

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Configurations						
Traffic Volume (vph)	500	430	30	10	710	1080
Future Volume (vph)	500	430	30	10	710	1080
Turn Type	pm+pt	NA	Perm	NA	NA	NA
Protected Phases	3	8		4	14	10
Permitted Phases	8		4			
Detector Phase	3	8	4	4	14	10
Switch Phase						
Minimum Initial (s)	5.0	7.0	7.0	7.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	26.0	26.0
Total Split (s)	36.0	51.0	15.0	15.0	39.0	39.0
Total Split (%)	40.0%	56.7%	16.7%	16.7%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effect Green (s)	42.1	42.1		9.9	37.9	37.9
Actuated g/C Ratio	0.47	0.47		0.11	0.42	0.42
v/c Ratio	0.69	0.88		0.42	0.61	0.83
Control Delay	23.0	33.3		44.3	7.9	33.3
Queue Delay	64.3	0.0		0.0	0.1	0.7
Total Delay	87.3	33.3		44.3	8.1	34.0
LOS	F	C		D	A	C
Approach Delay		56.0		44.3	8.1	34.0
Approach LOS		E		D	A	C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 85 (94%), Referenced to phase 10:NWT and 14:SET, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 35.6

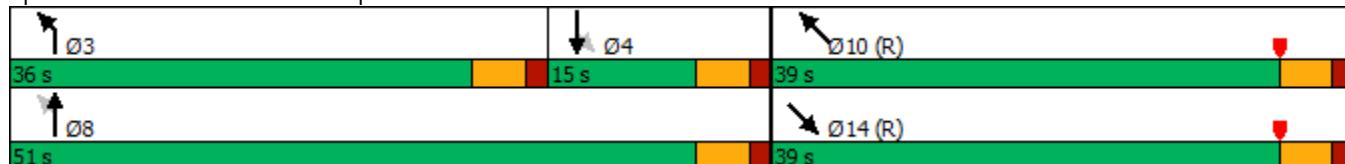
Intersection LOS: D

Intersection Capacity Utilization 78.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: US 23 Ramp/Acres Road & Monroe Street



7: Elliot Drive & Alexis Road
Timings

Sylvania Interchange PID 105889
PM 2025 No Build Conditions

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↑	↑
Traffic Volume (vph)	40	1010	70	830	40	10	100	30	10	20
Future Volume (vph)	40	1010	70	830	40	10	100	30	10	20
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases				2		6		8		4
Permitted Phases	2				6		8		8	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	67.0	67.0	67.0	67.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	74.4%	25.6%	25.6%	25.6%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effect Green (s)	63.0	63.0	63.0	63.0		19.0	19.0		19.0	19.0
Actuated g/C Ratio	0.70	0.70	0.70	0.70		0.21	0.21		0.21	0.21
v/c Ratio	0.12	0.45	0.27	0.38		0.17	0.26		0.14	0.06
Control Delay	4.4	4.1	7.9	6.0		30.9	8.0		30.3	12.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	4.4	4.1	7.9	6.0		30.9	8.0		30.3	12.6
LOS	A	A	A	A		C	A		C	B
Approach Delay		4.1		6.1		15.6			24.4	
Approach LOS		A		A		B			C	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 6 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.3

Intersection LOS: A

Intersection Capacity Utilization 51.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 7: Elliot Drive & Alexis Road



8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
 Timings PM 2025 No Build Conditions

Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑	↑	↑
Traffic Volume (vph)	50	800	30	960	80	20	30	40	20
Future Volume (vph)	50	800	30	960	80	20	30	40	20
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases				2		6			8
Permitted Phases	2				6		8		
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	14.0	14.0	14.0	14.0	14.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effect Green (s)	71.0	71.0	71.0	71.0		12.6	12.6	12.6	12.6
Actuated g/C Ratio	0.79	0.79	0.79	0.79		0.14	0.14	0.14	0.14
v/c Ratio	0.16	0.35	0.08	0.41		0.59	0.13	0.24	0.27
Control Delay	5.3	4.9	4.4	4.6		48.3	12.5	36.4	16.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	5.3	4.9	4.4	4.6		48.3	12.5	36.4	16.4
LOS	A	A	A	A		D	B	D	B
Approach Delay		4.9		4.6		40.0			23.6
Approach LOS		A		A		D			C

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 57 (63%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 7.7

Intersection LOS: A

Intersection Capacity Utilization 62.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street



Queuing and Blocking Report
PM 2025 No Build Conditions

12/13/2018

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	R	LTR
Maximum Queue (ft)	222	932	952	172	181	223	152	210	563	540	160
Average Queue (ft)	22	528	532	115	124	62	64	114	291	283	61
95th Queue (ft)	125	1105	1099	178	180	155	119	243	634	621	157
Link Distance (ft)		1095	1095			352	352		577	577	191
Upstream Blk Time (%)		8	9						19	15	8
Queuing Penalty (veh)		0	0						0	0	0
Storage Bay Dist (ft)	250			160	160			185			
Storage Blk Time (%)		44		0	2	0		1	38		
Queuing Penalty (veh)		4		3	17	0		3	53		

Intersection: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	R	L	T	TR	L	TR	LTR
Maximum Queue (ft)	390	387	200	178	238	203	245	213	47
Average Queue (ft)	316	313	59	99	126	113	195	75	14
95th Queue (ft)	459	457	197	164	204	174	280	162	41
Link Distance (ft)	352	352			760	760	218	218	141
Upstream Blk Time (%)	22	23					28	1	
Queuing Penalty (veh)	174	182					0	0	
Storage Bay Dist (ft)			175	155					
Storage Blk Time (%)	50	47	0	4	1				
Queuing Penalty (veh)	0	23	1	30	3				

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	160	783	784	525	677	710	606	140	86	68
Average Queue (ft)	47	610	630	501	552	402	306	105	30	22
95th Queue (ft)	141	914	921	604	895	846	694	186	67	55
Link Distance (ft)	760	760		649	649	838			273	
Upstream Blk Time (%)	1	1		12	2	1				
Queuing Penalty (veh)	8	11		134	27	0				
Storage Bay Dist (ft)	135			500			115		85	
Storage Blk Time (%)	0	50		49	5		51	3	0	0
Queuing Penalty (veh)	0	20		408	27		71	4	0	0

Queuing and Blocking Report
PM 2025 No Build Conditions

12/13/2018

Intersection: 4: Monroe Street & Alexis Road

Movement	EB	EB	WB	WB	NW	NW
Directions Served	T	T	T	T	L	L
Maximum Queue (ft)	111	116	289	303	251	262
Average Queue (ft)	57	60	224	217	231	230
95th Queue (ft)	96	108	335	344	243	250
Link Distance (ft)	289	289	256	256	216	216
Upstream Blk Time (%)			27	19	32	30
Queuing Penalty (veh)			132	93	251	235
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: Acres Road & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	B17	SB
Directions Served	L	T	TR	L	T	TR	LT	R	T	LTR
Maximum Queue (ft)	60	193	205	164	530	496	81	95	223	233
Average Queue (ft)	15	89	99	27	238	217	26	51	21	125
95th Queue (ft)	47	183	197	112	499	479	65	94	111	238
Link Distance (ft)		256	256		981	981	22	22	196	205
Upstream Blk Time (%)							24	24	1	25
Queuing Penalty (veh)							59	57	5	0
Storage Bay Dist (ft)	55			140						
Storage Blk Time (%)	1	26			29					
Queuing Penalty (veh)	1	5			6					

Intersection: 6: US 23 Ramp/Acres Road & Monroe Street

Movement	NB	NB	SB	SE	SE	NW	NW
Directions Served	L	TR	LTR	T	TR	T	TR
Maximum Queue (ft)	220	754	142	130	133	840	831
Average Queue (ft)	218	710	44	102	109	495	475
95th Queue (ft)	233	820	115	127	128	911	885
Link Distance (ft)		702	196	99	99	1087	1087
Upstream Blk Time (%)		62	0	26	29	1	0
Queuing Penalty (veh)		0	0	108	120	3	1
Storage Bay Dist (ft)	195						
Storage Blk Time (%)	45	24					
Queuing Penalty (veh)	308	120					

Queuing and Blocking Report
PM 2025 No Build Conditions

12/13/2018

Intersection: 7: Elliot Drive & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	96	207	222	144	194	179	94	79	66	33
Average Queue (ft)	22	87	105	42	88	55	29	32	21	9
95th Queue (ft)	63	183	197	93	152	117	72	63	53	29
Link Distance (ft)		981	981		911	911	243	243	255	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	140			140					100	
Storage Blk Time (%)		2		0		1			0	
Queuing Penalty (veh)		1		1		1			0	

Intersection: 8: Fairways Driveway/Tireman Driveway & Monroe Street

Movement	SE	SE	SE	NW	NW	NW	NE	SW	SW
Directions Served	L	T	TR	L	T	TR	LT	L	TR
Maximum Queue (ft)	70	131	152	64	202	156	124	72	105
Average Queue (ft)	25	40	58	16	93	54	62	32	38
95th Queue (ft)	54	105	123	47	175	124	106	65	84
Link Distance (ft)		1087	1087		499	499	241	156	156
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	180			145					
Storage Blk Time (%)				2					
Queuing Penalty (veh)				0					

Intersection: 9: Monroe Street

Movement	EB	EB	NW	NW
Directions Served	R	R	T	T
Maximum Queue (ft)	171	177	145	136
Average Queue (ft)	37	57	120	112
95th Queue (ft)	109	125	137	139
Link Distance (ft)	539	539	99	99
Upstream Blk Time (%)		32	27	
Queuing Penalty (veh)		249	212	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 20: Monroe Street

Movement	EB	EB	WB	WB
Directions Served	TR	R	T	TR
Maximum Queue (ft)	88	96	312	336
Average Queue (ft)	7	42	203	187
95th Queue (ft)	44	81	408	394
Link Distance (ft)	649	649	289	289
Upstream Blk Time (%)			6	2
Queuing Penalty (veh)			80	29
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 3279



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑↑	↑↑	↑	↑	↑↑	↓	↓
Traffic Volume (vph)	10	1430	600	800	60	10	750	10	10
Future Volume (vph)	10	1430	600	800	60	10	750	10	10
Lane Group Flow (vph)	11	1663	652	881	0	76	815	0	33
Turn Type	Perm	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases		2	1	6		8	1		4
Permitted Phases	2				8		8	4	
Detector Phase	2	2	1	6	8	8	1	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	46.0	46.0	22.0	68.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	51.1%	51.1%	24.4%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	None	Max	Max
Act Effct Green (s)	41.0	41.0	17.0	63.0		17.0	39.0		17.0
Actuated g/C Ratio	0.46	0.46	0.19	0.70		0.19	0.43		0.19
v/c Ratio	0.04	1.04	1.01	0.36		0.29	0.67		0.10
Control Delay	14.3	58.7	74.2	2.7		35.0	23.0		23.7
Queue Delay	0.0	25.7	0.0	0.2		0.0	0.0		0.0
Total Delay	14.3	84.4	74.2	2.9		35.0	23.0		23.7
LOS	B	F	E	A		C	C		C
Approach Delay		83.9		33.2		24.0		23.7	
Approach LOS		F		C		C		C	
Queue Length 50th (ft)	3	~541	~209	39		37	197		10
Queue Length 95th (ft)	13	#680	m#308	m61		78	269		36
Internal Link Dist (ft)		1055		359		550		163	
Turn Bay Length (ft)	250		160						
Base Capacity (vph)	274	1601	648	2473		259	1221		316
Starvation Cap Reductn	0	0	0	711		0	0		0
Spillback Cap Reductn	0	447	0	0		0	2		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.04	1.44	1.01	0.50		0.29	0.67		0.10

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 46 (51%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 51.7

Intersection LOS: D

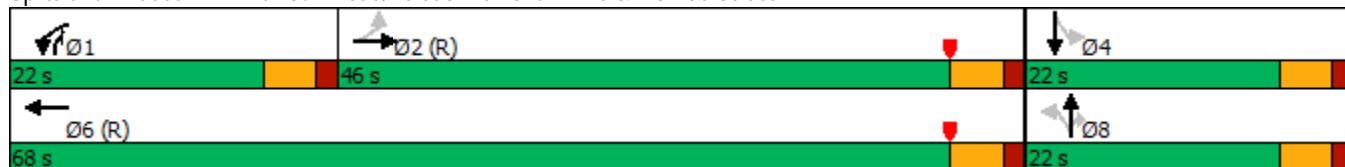
Intersection Capacity Utilization 87.3%

ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



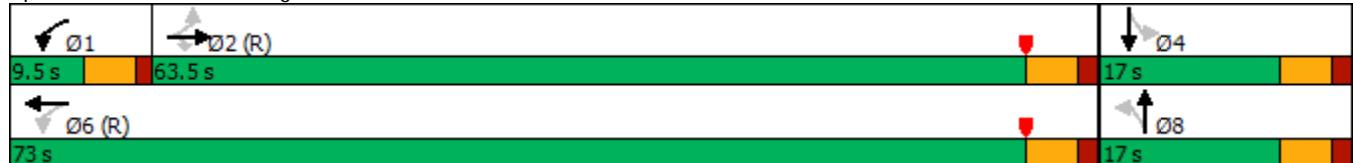
2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

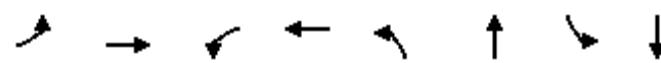
Sylvania Interchange PID 105889
AM 2045 No Build Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	10	2020	160	80	1230	170	0	10	0
Future Volume (vph)	10	2020	160	80	1230	170	0	10	0
Lane Group Flow (vph)	11	2196	174	87	1348	185	109	0	22
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2			1	6		8	
Permitted Phases	2		2		6		8		4
Detector Phase	2	2	2	1	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	5.0	20.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	25.0	9.5	25.0	13.0	13.0	13.0	13.0
Total Split (s)	63.5	63.5	63.5	9.5	73.0	17.0	17.0	17.0	17.0
Total Split (%)	70.6%	70.6%	70.6%	10.6%	81.1%	18.9%	18.9%	18.9%	18.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.0	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	60.4	60.4	60.4	68.5	68.0	12.0	12.0		12.0
Actuated g/C Ratio	0.67	0.67	0.67	0.76	0.76	0.13	0.13		0.13
v/c Ratio	0.04	0.92	0.16	0.49	0.50	1.01	0.37		0.08
Control Delay	3.9	13.9	0.7	17.6	3.2	109.6	14.0		0.6
Queue Delay	0.0	45.3	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	3.9	59.2	0.7	17.6	3.2	109.6	14.0		0.6
LOS	A	E	A	B	A	F	B		A
Approach Delay		54.6			4.1		74.1		0.6
Approach LOS		D			A		E		A
Queue Length 50th (ft)	1	547	1	7	42	~107	7		0
Queue Length 95th (ft)	m1	m592	m2	m35	47	#241	53		0
Internal Link Dist (ft)		359			768		204		113
Turn Bay Length (ft)	120		175	155					
Base Capacity (vph)	249	2375	1107	179	2672	184	294		263
Starvation Cap Reductn	0	440	0	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0	0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0	0		0
Reduced v/c Ratio	0.04	1.13	0.16	0.49	0.50	1.01	0.37		0.08
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 90									
Offset: 78 (87%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow									
Natural Cycle: 90									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 1.01									
Intersection Signal Delay: 38.2					Intersection LOS: D				
Intersection Capacity Utilization 88.4%					ICU Level of Service E				
Analysis Period (min) 15									

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

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↓	↑	↑↓	↑	↓	↑	↓
Traffic Volume (vph)	10	1170	610	1200	110	30	10	10
Future Volume (vph)	10	1170	610	1200	110	30	10	10
Lane Group Flow (vph)	11	2305	663	1326	120	240	11	22
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	20.0	20.0	5.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.0	26.0	11.0	26.0	11.0	11.0	11.0	11.0
Total Split (s)	60.0	60.0	15.0	75.0	15.0	15.0	15.0	15.0
Total Split (%)	66.7%	66.7%	16.7%	83.3%	16.7%	16.7%	16.7%	16.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max	Max
Act Effct Green (s)	55.0	55.0	70.0	70.0	10.0	10.0	10.0	10.0
Actuated g/C Ratio	0.61	0.61	0.78	0.78	0.11	0.11	0.11	0.11
v/c Ratio	0.05	1.06	2.37	0.48	0.78	0.66	0.13	0.11
Control Delay	11.5	48.4	643.1	2.4	73.4	18.0	40.3	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	48.4	643.1	2.4	73.4	18.0	40.3	26.2
LOS	B	D	F	A	E	B	D	C
Approach Delay		48.2		215.9		36.5		30.9
Approach LOS		D		F		D		C
Queue Length 50th (ft)	3	-697	-571	27	68	17	6	6
Queue Length 95th (ft)	m4	m#821	#813	77	#160	91	22	28
Internal Link Dist (ft)		768		649		1050		240
Turn Bay Length (ft)	135		500					
Base Capacity (vph)	235	2180	280	2748	153	364	82	201
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	1.06	2.37	0.48	0.78	0.66	0.13	0.11

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 62 (69%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.37

Intersection Signal Delay: 118.2

Intersection LOS: F

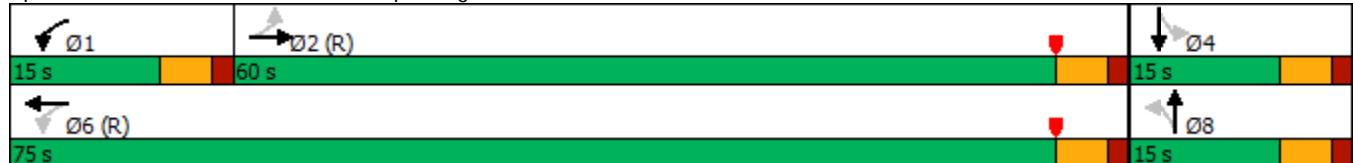
Intersection Capacity Utilization 122.4%

ICU Level of Service H

Analysis Period (min) 15

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

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: Monroe Street & Alexis Road
Timings

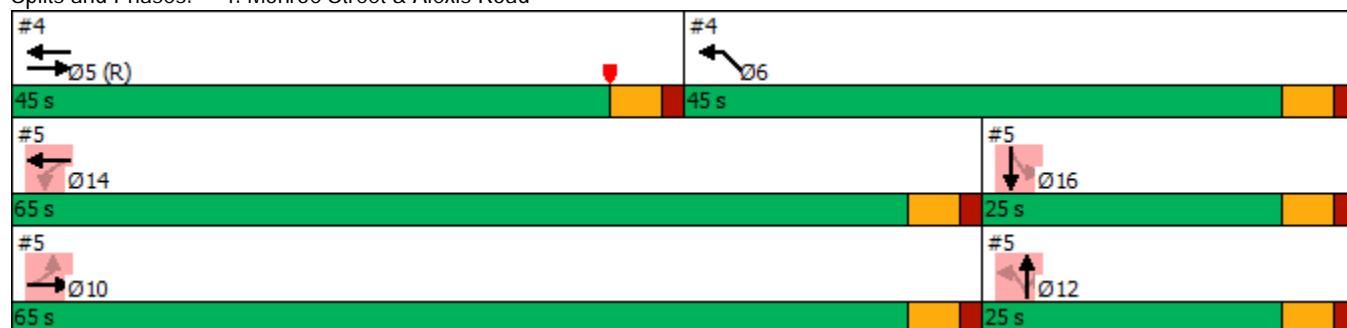
Sylvania Interchange PID 105889
AM 2045 No Build Conditions



Lane Group	EBT	WBT	NWL	Ø10	Ø12	Ø14	Ø16
Lane Configurations	↑↑	↑↑	↑↑				
Traffic Volume (vph)	600	1030	910				
Future Volume (vph)	600	1030	910				
Lane Group Flow (vph)	652	1120	989				
Turn Type	NA	NA	Prot				
Protected Phases	5	5	6	10	12	14	16
Permitted Phases			5				
Detector Phase	5	5	6				
Switch Phase							
Minimum Initial (s)	15.0	15.0	10.0	15.0	10.0	15.0	4.0
Minimum Split (s)	21.0	21.0	16.0	21.0	16.0	21.0	10.0
Total Split (s)	45.0	45.0	45.0	65.0	25.0	65.0	25.0
Total Split (%)	50.0%	50.0%	50.0%	72%	28%	72%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0				
Total Lost Time (s)	5.0	5.0	5.0				
Lead/Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	47.4	47.4	32.6				
Actuated g/C Ratio	0.53	0.53	0.36				
v/c Ratio	0.35	0.60	0.79				
Control Delay	10.7	5.3	30.7				
Queue Delay	0.0	0.0	0.0				
Total Delay	10.7	5.3	30.7				
LOS	B	A	C				
Approach Delay	10.7	5.3	30.7				
Approach LOS	B	A	C				
Queue Length 50th (ft)	107	27	253				
Queue Length 95th (ft)	m127	94	m286				
Internal Link Dist (ft)	61	266	155				
Turn Bay Length (ft)							
Base Capacity (vph)	1862	1862	1525				
Starvation Cap Reductn	0	14	0				
Spillback Cap Reductn	0	0	0				
Storage Cap Reductn	0	0	0				
Reduced v/c Ratio	0.35	0.61	0.65				
Intersection Summary							
Cycle Length: 90							
Actuated Cycle Length: 90							
Offset: 13 (14%), Referenced to phase 5:EBWB, Start of Yellow							
Natural Cycle: 45							
Control Type: Actuated-Coordinated							
Maximum v/c Ratio: 0.79							
Intersection Signal Delay: 15.7				Intersection LOS: B			
Intersection Capacity Utilization 62.8%				ICU Level of Service B			
Analysis Period (min) 15							

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

Splits and Phases: 4: Monroe Street & Alexis Road



Timings



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	Ø5	Ø6
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↓		
Traffic Volume (vph)	30	560	30	910	10	50	400	30	20		
Future Volume (vph)	30	560	30	910	10	50	400	30	20		
Lane Group Flow (vph)	33	620	33	1011	0	65	435	0	175		
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA		
Protected Phases		10!			14!		12!			16!	5 6
Permitted Phases	10!		14!		12!		12	16!			
Detector Phase	10	10	14	14	12	12	12	16	16		
Switch Phase											
Minimum Initial (s)	15.0	15.0	15.0	15.0	10.0	10.0	10.0	4.0	4.0	15.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	16.0	16.0	16.0	10.0	10.0	21.0	16.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0	45.0	45.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%	50%	50%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0		
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0		
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes									
Recall Mode	None	C-Max	None								
Act Effct Green (s)	29.2	29.2	40.7	40.7		50.8	50.8			39.3	
Actuated g/C Ratio	0.32	0.32	0.45	0.45		0.56	0.56			0.44	
v/c Ratio	0.40	0.54	0.12	0.63		0.06	0.42			0.23	
Control Delay	23.9	12.1	10.0	16.3		5.0	0.5			7.9	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.5			0.0	
Total Delay	23.9	12.2	10.0	16.3		5.0	1.0			7.9	
LOS	C	B	B	B		A	A			A	
Approach Delay		12.8		16.1		1.5				7.9	
Approach LOS		B		B		A				A	
Queue Length 50th (ft)	4	40	10	229		9	2			20	
Queue Length 95th (ft)	12	23	26	259		m6	m0			67	
Internal Link Dist (ft)		266		973		23				177	
Turn Bay Length (ft)	55		140								
Base Capacity (vph)	170	2354	410	2354		1008	1039			760	
Starvation Cap Reductn	0	107	0	0		0	265			0	
Spillback Cap Reductn	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.19	0.28	0.08	0.43		0.06	0.56			0.23	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 13 (14%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 11.5

Intersection LOS: B

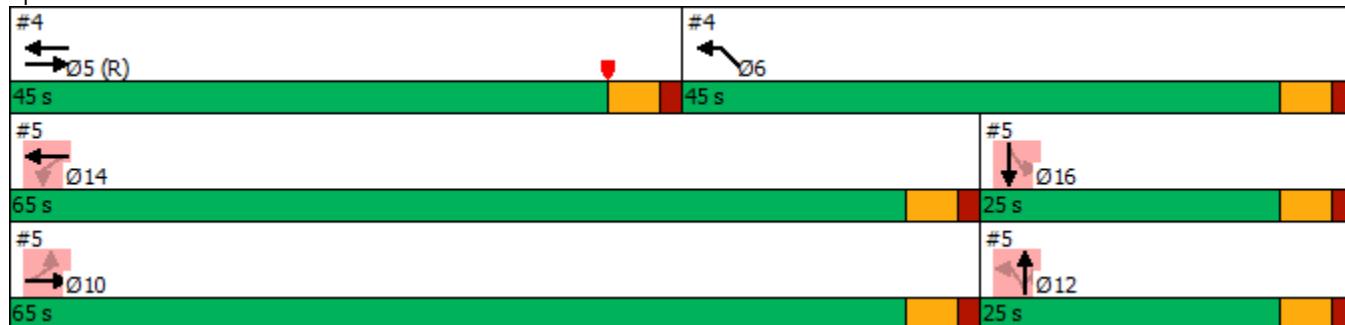
Intersection Capacity Utilization 62.5%

ICU Level of Service B

Analysis Period (min) 15

- m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

Splits and Phases: 5: Acres Road & Alexis Road



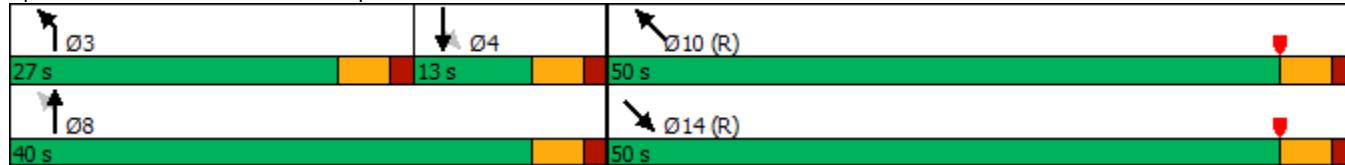
6: US 23 Ramp/Acres Road & Monroe Street
Timings

Sylvania Interchange PID 105889
AM 2045 No Build Conditions

Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Configurations						
Traffic Volume (vph)	440	380	40	10	620	460
Future Volume (vph)	440	380	40	10	620	460
Lane Group Flow (vph)	478	902	0	65	837	554
Turn Type	pm+pt	NA	Perm	NA	NA	NA
Protected Phases	3	8		4	14	10
Permitted Phases	8			4		
Detector Phase	3	8	4	4	14	10
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	7.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	26.0	26.0
Total Split (s)	27.0	40.0	13.0	13.0	50.0	50.0
Total Split (%)	30.0%	44.4%	14.4%	14.4%	55.6%	55.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effct Green (s)	35.0	35.0		8.9	45.0	45.0
Actuated g/C Ratio	0.39	0.39		0.10	0.50	0.50
v/c Ratio	0.78	1.27		0.87	0.48	0.32
Control Delay	33.4	156.5		116.3	6.0	17.1
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	33.4	156.5		116.3	6.0	17.1
LOS	C	F		F	A	B
Approach Delay		113.9		116.3	6.0	17.1
Approach LOS		F		F	A	B
Queue Length 50th (ft)	223	-628		35	74	109
Queue Length 95th (ft)	#349	#861		#119	m80	147
Internal Link Dist (ft)		677		216	156	1096
Turn Bay Length (ft)	195					
Base Capacity (vph)	621	712		75	1742	1752
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.77	1.27		0.87	0.48	0.32
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 5 (6%), Referenced to phase 10:NWT and 14:SET, Start of Yellow						
Natural Cycle: 70						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.27						
Intersection Signal Delay: 63.2				Intersection LOS: E		
Intersection Capacity Utilization 77.8%				ICU Level of Service D		
Analysis Period (min) 15						

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

Splits and Phases: 6: US 23 Ramp/Acres Road & Monroe Street



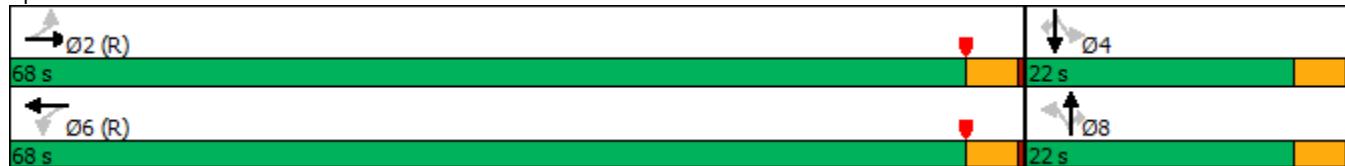
7: Elliot Drive & Alexis Road
Timings

Sylvania Interchange PID 105889
AM 2045 No Build Conditions

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	880	60	870	10	0	30	20	10	30
Future Volume (vph)	20	880	60	870	10	0	30	20	10	30
Lane Group Flow (vph)	22	1000	65	957	0	11	33	0	33	33
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2			6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	64.0	64.0	64.0	64.0		18.0	18.0		18.0	18.0
Actuated g/C Ratio	0.71	0.71	0.71	0.71		0.20	0.20		0.20	0.20
v/c Ratio	0.06	0.40	0.19	0.38		0.04	0.10		0.10	0.10
Control Delay	7.8	6.9	6.0	5.6		29.7	11.4		30.5	11.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	7.8	6.9	6.0	5.6		29.7	11.4		30.5	11.4
LOS	A	A	A	A		C	B		C	B
Approach Delay		6.9		5.7		16.0			21.0	
Approach LOS		A		A		B			C	
Queue Length 50th (ft)	2	62	11	95		5	0		16	0
Queue Length 95th (ft)	m18	192	26	124		19	24		41	24
Internal Link Dist (ft)		973		866		215			226	
Turn Bay Length (ft)	140		140							100
Base Capacity (vph)	359	2505	339	2512		274	343		321	343
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.06	0.40	0.19	0.38		0.04	0.10		0.10	0.10
Intersection Summary										
Cycle Length: 90										
Actuated Cycle Length: 90										
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow										
Natural Cycle: 45										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 0.40										
Intersection Signal Delay: 6.9					Intersection LOS: A					
Intersection Capacity Utilization 47.2%					ICU Level of Service A					
Analysis Period (min) 15										

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

Splits and Phases: 7: Elliot Drive & Alexis Road



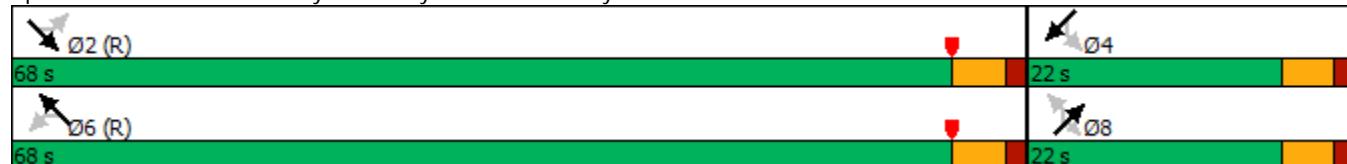
8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
 Timings AM 2045 No Build Conditions

Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	50	1040	20	450	40	30	10	30	10
Future Volume (vph)	50	1040	20	450	40	30	10	30	10
Lane Group Flow (vph)	54	1152	22	543	0	76	11	33	54
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2		6		8			4
Permitted Phases	2		6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	14.0	14.0	14.0	14.0	14.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	73.3	73.3	73.3	73.3		10.3	10.3	10.3	10.3
Actuated g/C Ratio	0.81	0.81	0.81	0.81		0.11	0.11	0.11	0.11
v/c Ratio	0.08	0.40	0.06	0.19		0.45	0.05	0.22	0.24
Control Delay	3.6	4.9	3.5	2.7		45.2	6.9	38.7	17.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	3.6	4.9	3.5	2.7		45.2	6.9	38.7	17.0
LOS	A	A	A	A		D	A	D	B
Approach Delay		4.8		2.7		40.4			25.3
Approach LOS		A		A		D			C
Queue Length 50th (ft)	5	150	2	30		41	0	18	6
Queue Length 95th (ft)	m12	m180	9	54		81	8	44	38
Internal Link Dist (ft)		1096		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	681	2876	350	2846		279	318	249	344
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.08	0.40	0.06	0.19		0.27	0.03	0.13	0.16
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 90									
Offset: 57 (63%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow									
Natural Cycle: 40									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.45									
Intersection Signal Delay: 6.7					Intersection LOS: A				
Intersection Capacity Utilization 60.3%					ICU Level of Service B				
Analysis Period (min) 15									

8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
Timings AM 2045 No Build Conditions

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

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street



Queuing and Blocking Report
AM 2045 No Build Conditions

12/13/2018

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	R	LTR
Maximum Queue (ft)	274	1147	1141	172	184	339	127	209	412	438	120
Average Queue (ft)	42	1067	1073	132	142	85	42	55	185	206	31
95th Queue (ft)	198	1310	1293	201	203	276	101	142	359	387	85
Link Distance (ft)		1095	1095			352	352		577	577	191
Upstream Blk Time (%)		75	83			1			2	3	
Queuing Penalty (veh)		0	0			4			0	0	
Storage Bay Dist (ft)	250			160	160			185			
Storage Blk Time (%)	0	77		2	8				11		
Queuing Penalty (veh)	0	8		6	32				7		

Intersection: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	
Directions Served	L	T	T	R	L	T	TR	L	TR	LTR	
Maximum Queue (ft)	121	406	395	200	99	119	82	222	189	47	
Average Queue (ft)	10	338	346	166	31	38	36	134	67	16	
95th Queue (ft)	60	443	434	284	67	86	71	236	164	42	
Link Distance (ft)		352	352			761	761	218	218	141	
Upstream Blk Time (%)		11	16					9	2		
Queuing Penalty (veh)		124	177					0	0		
Storage Bay Dist (ft)	120			175	155						
Storage Blk Time (%)		46	59	0		0					
Queuing Penalty (veh)		5	95	2		0					

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	131	810	806	525	679	695	280	140	44	47
Average Queue (ft)	9	757	768	514	591	259	105	87	10	16
95th Queue (ft)	58	837	815	576	897	741	228	158	35	42
Link Distance (ft)		761	761		647	647	1069		273	
Upstream Blk Time (%)		7	16		28	4				
Queuing Penalty (veh)		74	169		258	33				
Storage Bay Dist (ft)	135			500			115		85	
Storage Blk Time (%)		27		77	8		7	6	0	
Queuing Penalty (veh)		3		462	49		15	7	0	

Queuing and Blocking Report
AM 2045 No Build Conditions

12/13/2018

Intersection: 4: Monroe Street & Alexis Road

Movement	EB	EB	B18	B18	WB	WB	NW	NW
Directions Served	T	T	T	T	T	T	L	L
Maximum Queue (ft)	177	176	106	103	300	309	184	181
Average Queue (ft)	100	103	14	16	258	195	156	128
95th Queue (ft)	183	191	74	81	346	357	201	189
Link Distance (ft)	104	104	139	139	258	258	153	153
Upstream Blk Time (%)	11	13	1	1	66	18	24	7
Queuing Penalty (veh)	34	40	3	3	340	94	111	33
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 5: Acres Road & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	B17	SB
Directions Served	L	T	TR	L	T	TR	LT	R	T	LTR
Maximum Queue (ft)	79	247	252	165	1013	1021	69	101	224	230
Average Queue (ft)	22	115	123	40	784	767	27	44	47	179
95th Queue (ft)	66	221	233	150	1297	1322	65	94	190	274
Link Distance (ft)		258	258		981	981	22	22	197	205
Upstream Blk Time (%)		1	2		39	34	32	19	12	75
Queuing Penalty (veh)		4	6		179	152	69	41	53	0
Storage Bay Dist (ft)	55			140						
Storage Blk Time (%)	1	30			78					
Queuing Penalty (veh)	3	9			23					

Intersection: 6: US 23 Ramp/Acres Road & Monroe Street

Movement	NB	NB	SB	SE	SE	NW	NW
Directions Served	L	TR	LTR	T	TR	T	TR
Maximum Queue (ft)	220	751	107	141	150	345	333
Average Queue (ft)	196	717	36	73	80	116	91
95th Queue (ft)	298	740	92	141	149	263	240
Link Distance (ft)		697	197	141	141	1087	1087
Upstream Blk Time (%)		64		2	3		
Queuing Penalty (veh)		0		8	11		
Storage Bay Dist (ft)	195						
Storage Blk Time (%)	9	53					
Queuing Penalty (veh)	71	236					

Queuing and Blocking Report
AM 2045 No Build Conditions

12/13/2018

Intersection: 7: Elliot Drive & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	70	240	252	165	954	934	52	50	90	94
Average Queue (ft)	11	97	116	57	527	487	11	13	21	26
95th Queue (ft)	44	216	237	168	1153	1146	35	36	59	73
Link Distance (ft)		981	981		911	911	243	243	255	
Upstream Blk Time (%)					34	27				
Queuing Penalty (veh)					0	0				
Storage Bay Dist (ft)	140			140					100	
Storage Blk Time (%)		2			55				0	2
Queuing Penalty (veh)		0			33				0	1

Intersection: 8: Fairways Driveway/Tireman Driveway & Monroe Street

Movement	SE	SE	SE	NW	NW	NW	NE	SW	SW
Directions Served	L	T	TR	L	T	TR	LT	L	TR
Maximum Queue (ft)	49	96	114	55	94	68	117	65	69
Average Queue (ft)	14	25	50	11	36	17	47	26	27
95th Queue (ft)	40	69	103	36	85	51	88	57	54
Link Distance (ft)		1087	1087		499	499	241	156	156
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	180			145					
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 9: Monroe Street

Movement	EB	EB	NW	NW
Directions Served	R	R	T	T
Maximum Queue (ft)	65	106	174	149
Average Queue (ft)	8	11	69	30
95th Queue (ft)	83	94	169	117
Link Distance (ft)	485	485	141	141
Upstream Blk Time (%)		5	1	
Queuing Penalty (veh)		23	4	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 20: Monroe Street

Movement	EB	EB	WB	WB	B18	B18
Directions Served	TR	R	T	TR	T	T
Maximum Queue (ft)	79	91	244	231	189	180
Average Queue (ft)	4	17	195	108	151	40
95th Queue (ft)	52	60	302	248	243	141
Link Distance (ft)	647	647	139	139	104	104
Upstream Blk Time (%)			70	8	44	3
Queuing Penalty (veh)			677	82	429	30
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary

Network wide Queuing Penalty: 4332



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↓	↑↓	↑↓		↑	↑↓		↓
Traffic Volume (vph)	10	1130	550	1500	170	10	800	20	10
Future Volume (vph)	10	1130	550	1500	170	10	800	20	10
Lane Group Flow (vph)	11	1369	598	1641	0	196	870	0	55
Turn Type	Perm	NA	Prot	NA	Perm	NA	pm+ov	Perm	NA
Protected Phases		2	1	6		8	1		4
Permitted Phases	2				8		8	4	
Detector Phase	2	2	1	6	8	8	1	4	4
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Total Split (s)	43.0	43.0	24.0	67.0	23.0	23.0	24.0	23.0	23.0
Total Split (%)	47.8%	47.8%	26.7%	74.4%	25.6%	25.6%	26.7%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0		5.0
Lead/Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	None	Max	Max
Act Effct Green (s)	38.2	38.2	18.8	62.0		18.0	41.8		18.0
Actuated g/C Ratio	0.42	0.42	0.21	0.69		0.20	0.46		0.20
v/c Ratio	0.09	0.92	0.84	0.67		0.75	0.66		0.18
Control Delay	18.3	35.6	46.8	3.6		53.9	20.8		21.9
Queue Delay	0.0	45.7	0.0	0.5		0.0	0.0		0.0
Total Delay	18.3	81.4	46.8	4.1		53.9	20.8		21.9
LOS	B	F	D	A		D	C		C
Approach Delay		80.9		15.5		26.9			21.9
Approach LOS		F		B		C			C
Queue Length 50th (ft)	4	374	171	87		106	199		16
Queue Length 95th (ft)	15	#525	m204	m147		#213	271		48
Internal Link Dist (ft)		1055		359		550			163
Turn Bay Length (ft)	250		160						
Base Capacity (vph)	118	1490	724	2436		260	1320		314
Starvation Cap Reductn	0	0	0	357		0	0		0
Spillback Cap Reductn	0	277	0	0		0	2		1
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.09	1.13	0.83	0.79		0.75	0.66		0.18

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 45 (50%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 37.2

Intersection LOS: D

Intersection Capacity Utilization 81.7%

ICU Level of Service D

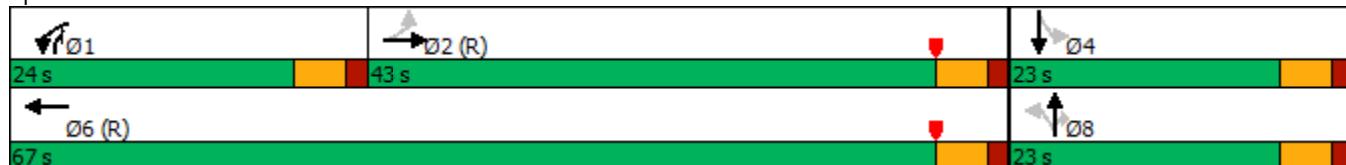
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

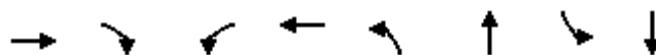
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
PM 2045 No Build Conditions



Lane Group	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑↑	↑	↑	↑↓	↑	↑	↓	↓
Traffic Volume (vph)	1880	70	250	1690	360	0	10	0
Future Volume (vph)	1880	70	250	1690	360	0	10	0
Lane Group Flow (vph)	2043	76	272	1859	391	228	0	22
Turn Type	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2			1	6		8	4
Permitted Phases			2	6		8		4
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	20.0	20.0	4.0	20.0	7.0	7.0	7.0	7.0
Minimum Split (s)	25.0	25.0	10.0	25.0	13.0	13.0	13.0	13.0
Total Split (s)	57.0	57.0	12.0	69.0	21.0	21.0	21.0	21.0
Total Split (%)	63.3%	63.3%	13.3%	76.7%	23.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	52.0	52.0	64.0	64.0	16.0	16.0		16.0
Actuated g/C Ratio	0.58	0.58	0.71	0.71	0.18	0.18		0.18
v/c Ratio	1.00	0.08	1.24	0.74	1.59	0.58		0.07
Control Delay	30.9	1.9	154.6	8.5	312.4	20.6		0.4
Queue Delay	24.9	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	55.8	1.9	154.6	8.5	312.4	20.6		0.4
LOS	E	A	F	A	F	C		A
Approach Delay	53.8			27.1		204.9		0.4
Approach LOS	D			C		F		A
Queue Length 50th (ft)	~292	2	~145	210	~320	46		0
Queue Length 95th (ft)	m#758	m3	m#241	m230	#495	120		0
Internal Link Dist (ft)	359			768		204		113
Turn Bay Length (ft)		175	155					
Base Capacity (vph)	2044	950	220	2512	246	394		325
Starvation Cap Reductn	136	0	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0	0	0		0
Storage Cap Reductn	0	0	0	0	0	0		0
Reduced v/c Ratio	1.07	0.08	1.24	0.74	1.59	0.58		0.07

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 51 (57%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.59

Intersection Signal Delay: 61.1

Intersection LOS: E

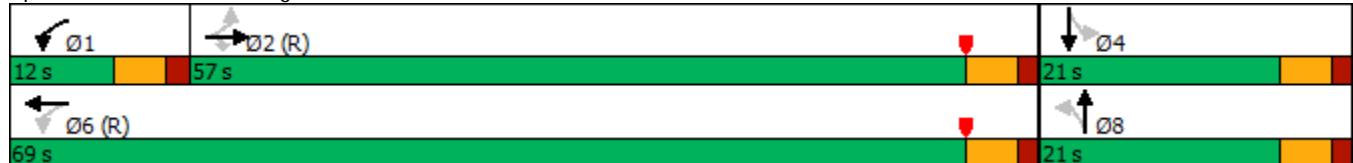
Intersection Capacity Utilization 104.9%

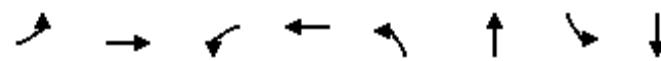
ICU Level of Service G

Analysis Period (min) 15

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

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑ ↗	↑ ↗	↑ ↗	↑ ↗	↑ ↗	↗	↑ ↗	↑ ↗
Traffic Volume (vph)	60	1420	740	1770	170	40	40	10
Future Volume (vph)	60	1420	740	1770	170	40	40	10
Lane Group Flow (vph)	65	2217	804	2054	185	217	43	33
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	20.0	20.0	5.0	20.0	5.0	5.0	5.0	5.0
Minimum Split (s)	26.0	26.0	11.0	26.0	11.0	11.0	11.0	11.0
Total Split (s)	50.0	50.0	25.0	75.0	15.0	15.0	15.0	15.0
Total Split (%)	55.6%	55.6%	27.8%	83.3%	16.7%	16.7%	16.7%	16.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max	Max
Act Effct Green (s)	45.0	45.0	70.0	70.0	10.0	10.0	10.0	10.0
Actuated g/C Ratio	0.50	0.50	0.78	0.78	0.11	0.11	0.11	0.11
v/c Ratio	0.71	1.27	1.69	0.75	1.22	0.65	0.52	0.16
Control Delay	33.8	141.5	334.3	6.8	180.2	19.9	62.1	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	141.5	334.3	6.8	180.2	19.9	62.1	21.9
LOS	C	F	F	A	F	B	E	C
Approach Delay		138.4		98.9		93.6		44.6
Approach LOS		F		F		F		D
Queue Length 50th (ft)	13	~816	~632	266	~130	23	23	6
Queue Length 95th (ft)	m14	m#390	m#619	m233	#260	94	#70	33
Internal Link Dist (ft)		768		649		950		240
Turn Bay Length (ft)	135		500					
Base Capacity (vph)	91	1742	476	2733	152	336	82	205
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	1.27	1.69	0.75	1.22	0.65	0.52	0.16

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 54 (60%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 130

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.69

Intersection Signal Delay: 113.9

Intersection LOS: F

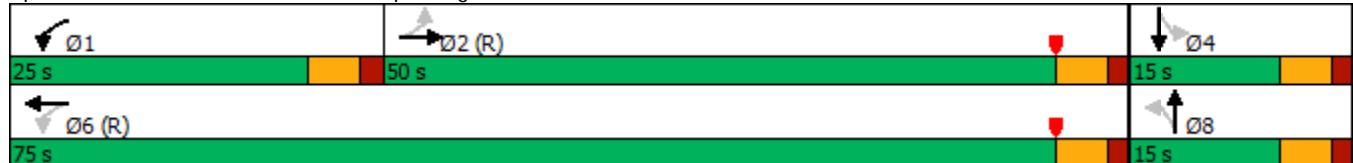
Intersection Capacity Utilization 132.9%

ICU Level of Service H

Analysis Period (min) 15

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

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: Monroe Street & Alexis Road
Timings

Sylvania Interchange PID 105889
PM 2045 No Build Conditions



Lane Group	EBT	WBT	NWL	Ø10	Ø12	Ø14	Ø16
Lane Configurations	↑↑	↑↑	↑↑				
Traffic Volume (vph)	600	1060	1830				
Future Volume (vph)	600	1060	1830				
Lane Group Flow (vph)	652	1152	1989				
Turn Type	NA	NA	Prot				
Protected Phases	5	5	6	10	12	14	16
Permitted Phases			5				
Detector Phase	5	5	6				
Switch Phase							
Minimum Initial (s)	15.0	15.0	10.0	15.0	10.0	15.0	4.0
Minimum Split (s)	21.0	21.0	16.0	21.0	16.0	21.0	10.0
Total Split (s)	40.0	40.0	50.0	65.0	25.0	65.0	25.0
Total Split (%)	44.4%	44.4%	55.6%	72%	28%	72%	28%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.0	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0				
Total Lost Time (s)	5.0	5.0	5.0				
Lead/Lag	Lead	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	35.0	35.0	45.0				
Actuated g/C Ratio	0.39	0.39	0.50				
v/c Ratio	0.47	0.84	1.16				
Control Delay	12.9	16.1	104.2				
Queue Delay	0.0	0.4	0.7				
Total Delay	12.9	16.5	104.9				
LOS	B	B	F				
Approach Delay	12.9	16.5	104.9				
Approach LOS	B	B	F				
Queue Length 50th (ft)	142	86	~719				
Queue Length 95th (ft)	m107	144	m#751				
Internal Link Dist (ft)	335	266	120				
Turn Bay Length (ft)							
Base Capacity (vph)	1376	1376	1716				
Starvation Cap Reductn	0	33	321				
Spillback Cap Reductn	0	0	0				
Storage Cap Reductn	0	0	0				
Reduced v/c Ratio	0.47	0.86	1.43				

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 4 (4%), Referenced to phase 5:EBWB, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.16

Intersection Signal Delay: 62.2

Intersection LOS: E

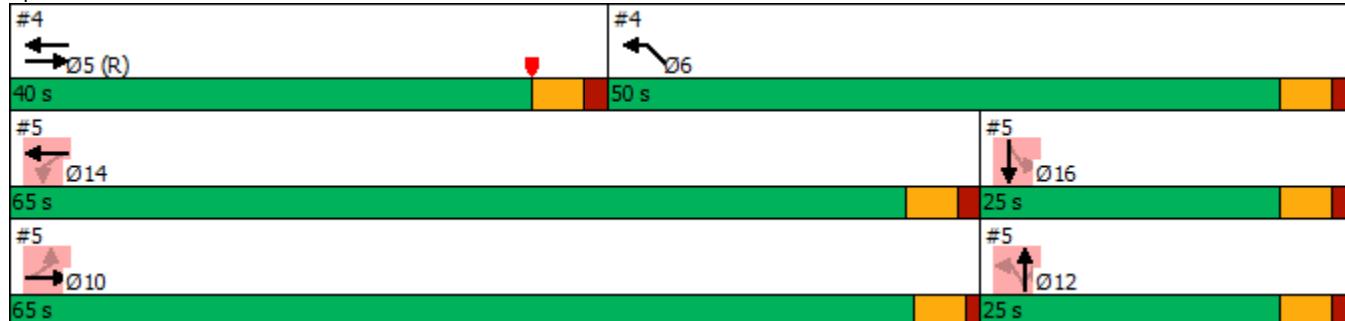
Intersection Capacity Utilization 89.8%

ICU Level of Service E

Analysis Period (min) 15

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

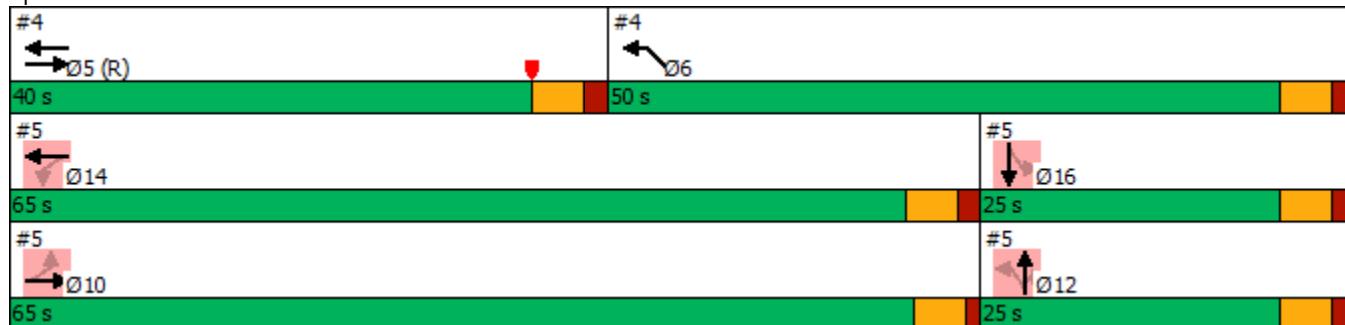
Splits and Phases: 4: Monroe Street & Alexis Road



	↗	→	↖	←	↖	↑	↗	↖	↓	∅5	∅6
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	∅5	∅6
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↓		
Traffic Volume (vph)	30	560	30	940	20	90	600	90	50		
Future Volume (vph)	30	560	30	940	20	90	600	90	50		
Lane Group Flow (vph)	33	620	33	1076	0	120	652	0	261		
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA		
Protected Phases		10!			14!		12!			16!	5 6
Permitted Phases	10!		14!		12!		12	16!			
Detector Phase	10	10	14	14	12	12	12	16	16		
Switch Phase											
Minimum Initial (s)	15.0	15.0	15.0	15.0	10.0	10.0	10.0	4.0	4.0	15.0	10.0
Minimum Split (s)	21.0	21.0	21.0	21.0	16.0	16.0	16.0	10.0	10.0	21.0	16.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0	40.0	50.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%	44%	56%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0		
Total Lost Time (s)	4.5	4.5	5.0	5.0		5.0	5.0		5.0		
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	None	None	C-Max	None
Act Effct Green (s)	23.6	23.6	39.6	39.6		56.9	56.9			40.4	
Actuated g/C Ratio	0.26	0.26	0.44	0.44		0.63	0.63			0.45	
v/c Ratio	0.40	0.67	0.13	0.69		0.11	0.58			0.38	
Control Delay	18.4	11.8	9.6	17.9		3.4	1.2			18.1	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.6			0.0	
Total Delay	18.4	11.8	9.6	18.0		3.4	1.9			18.1	
LOS	B	B	A	B		A	A			B	
Approach Delay		12.1		17.7		2.1				18.1	
Approach LOS		B		B		A				B	
Queue Length 50th (ft)	2	22	8	256		10	0			80	
Queue Length 95th (ft)	m4	14	m15	263		m15	m0			174	
Internal Link Dist (ft)		266		973		23				177	
Turn Bay Length (ft)	55		140								
Base Capacity (vph)	211	2373	384	2345		1095	1124			686	
Starvation Cap Reductn	0	24	0	0		0	184			0	
Spillback Cap Reductn	0	0	0	42		0	0			0	
Storage Cap Reductn	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.16	0.26	0.09	0.47		0.11	0.69			0.38	
Intersection Summary											
Cycle Length: 90											
Actuated Cycle Length: 90											
Offset: 4 (4%), Referenced to phase 5:EBWB, Start of Yellow											
Natural Cycle: 90											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 1.16											
Intersection Signal Delay: 12.1						Intersection LOS: B					
Intersection Capacity Utilization 78.8%						ICU Level of Service D					
Analysis Period (min) 15											

- m Volume for 95th percentile queue is metered by upstream signal.
! Phase conflict between lane groups.

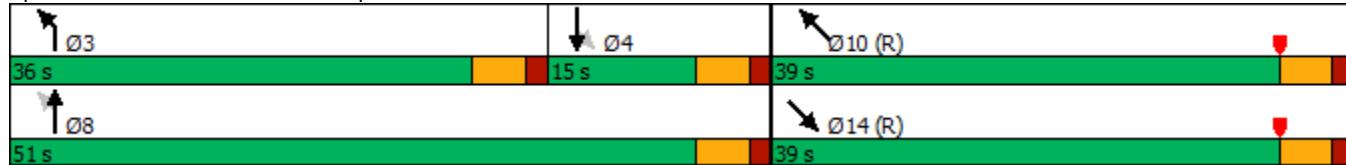
Splits and Phases: 5: Acres Road & Alexis Road



Lane Group	NBL	NBT	SBL	SBT	SET	NWT
Lane Configurations						
Traffic Volume (vph)	640	530	40	10	800	1180
Future Volume (vph)	640	530	40	10	800	1180
Lane Group Flow (vph)	696	935	0	65	1109	1348
Turn Type	pm+pt	NA	Perm	NA	NA	NA
Protected Phases	3	8		4	14	10
Permitted Phases	8			4		
Detector Phase	3	8	4	4	14	10
Switch Phase						
Minimum Initial (s)	5.0	7.0	7.0	7.0	20.0	20.0
Minimum Split (s)	13.0	13.0	13.0	13.0	26.0	26.0
Total Split (s)	36.0	51.0	15.0	15.0	39.0	39.0
Total Split (%)	40.0%	56.7%	16.7%	16.7%	43.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effct Green (s)	46.0	46.0		11.7	34.0	34.0
Actuated g/C Ratio	0.51	0.51		0.13	0.38	0.38
v/c Ratio	0.85	1.02		0.87	0.84	1.01
Control Delay	29.8	56.1		111.3	10.7	58.8
Queue Delay	61.1	0.0		0.0	0.7	32.8
Total Delay	91.0	56.1		111.3	11.4	91.6
LOS	F	E		F	B	F
Approach Delay		71.0		111.3	11.4	91.6
Approach LOS		E		F	B	F
Queue Length 50th (ft)	303	-514		34	160	-446
Queue Length 95th (ft)	#504	#788		#115	m111	#584
Internal Link Dist (ft)		681		216	190	1096
Turn Bay Length (ft)	195					
Base Capacity (vph)	828	921		75	1322	1331
Starvation Cap Reductn	0	0		0	51	0
Spillback Cap Reductn	614	0		0	0	165
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	3.25	1.02		0.87	0.87	1.16
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 85 (94%), Referenced to phase 10:NWT and 14:SET, Start of Yellow						
Natural Cycle: 90						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 1.02						
Intersection Signal Delay: 62.4					Intersection LOS: E	
Intersection Capacity Utilization 90.9%					ICU Level of Service E	
Analysis Period (min) 15						

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

Splits and Phases: 6: US 23 Ramp/Acres Road & Monroe Street



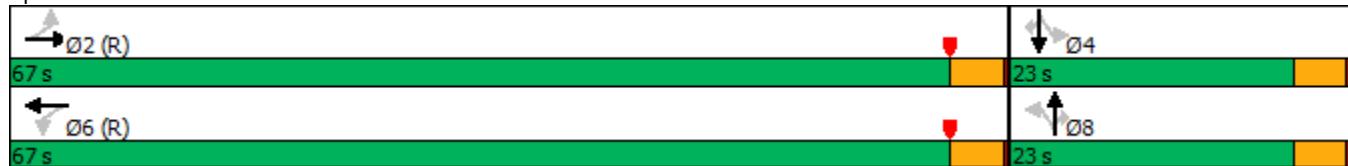
7: Elliot Drive & Alexis Road
Timings

Sylvania Interchange PID 105889
PM 2045 No Build Conditions

	↗	→	↖	←	↗	↑	↖	↙	↓	↖
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↖	↖	↑↖		↖	↖		↖	↖
Traffic Volume (vph)	40	1130	90	900	50	10	120	40	10	20
Future Volume (vph)	40	1130	90	900	50	10	120	40	10	20
Lane Group Flow (vph)	43	1261	98	1011	0	65	130	0	54	22
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2		6		8		8	4		4
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	67.0	67.0	67.0	67.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	74.4%	25.6%	25.6%	25.6%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	63.0	63.0	63.0	63.0		19.0	19.0		19.0	19.0
Actuated g/C Ratio	0.70	0.70	0.70	0.70		0.21	0.21		0.21	0.21
v/c Ratio	0.13	0.51	0.42	0.41		0.22	0.31		0.18	0.06
Control Delay	5.5	5.4	12.3	6.2		31.7	11.0		31.0	12.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	5.5	5.4	12.3	6.2		31.7	11.0		31.0	12.6
LOS	A	A	B	A		C	B		C	B
Approach Delay		5.4		6.7		17.9			25.6	
Approach LOS		A		A		B			C	
Queue Length 50th (ft)	4	84	20	107		31	11		25	0
Queue Length 95th (ft)	m15	163	58	140		67	57		58	20
Internal Link Dist (ft)		973		866		215			226	
Turn Bay Length (ft)	140		140							100
Base Capacity (vph)	326	2469	234	2468		300	418		306	351
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.13	0.51	0.42	0.41		0.22	0.31		0.18	0.06
Intersection Summary										
Cycle Length: 90										
Actuated Cycle Length: 90										
Offset: 6 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow										
Natural Cycle: 60										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 0.51										
Intersection Signal Delay: 7.4					Intersection LOS: A					
Intersection Capacity Utilization 57.1%					ICU Level of Service B					
Analysis Period (min) 15										

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

Splits and Phases: 7: Elliot Drive & Alexis Road



8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
 Timings PM 2045 No Build Conditions

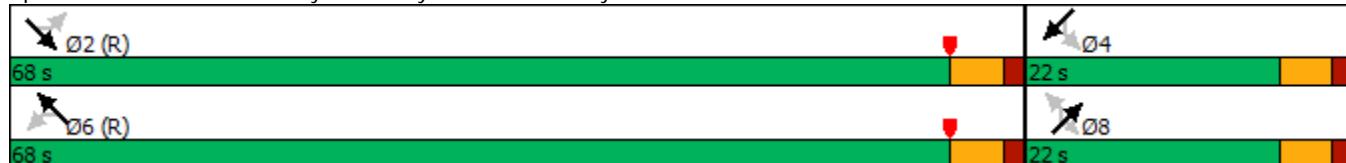
Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	60	840	40	1060	120	30	40	50	20
Future Volume (vph)	60	840	40	1060	120	30	40	50	20
Lane Group Flow (vph)	65	1033	43	1261	0	163	43	54	87
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2			6		8		4	
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	14.0	14.0	14.0	14.0	14.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	65.2	65.2	65.2	65.2		14.8	14.8	14.8	14.8
Actuated g/C Ratio	0.72	0.72	0.72	0.72		0.16	0.16	0.16	0.16
v/c Ratio	0.25	0.41	0.13	0.50		0.75	0.15	0.33	0.27
Control Delay	7.1	5.8	5.4	6.3		57.2	11.2	37.8	14.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	7.1	5.8	5.4	6.3		57.2	11.2	37.8	14.4
LOS	A	A	A	A		E	B	D	B
Approach Delay		5.9		6.3		47.6			23.3
Approach LOS		A		A		D			C
Queue Length 50th (ft)	13	169	7	144		87	0	27	11
Queue Length 95th (ft)	m14	m172	19	190		#168	28	62	50
Internal Link Dist (ft)		1096		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	255	2532	341	2539		250	333	191	365
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.25	0.41	0.13	0.50		0.65	0.13	0.28	0.24
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 90									
Offset: 57 (63%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow									
Natural Cycle: 45									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.75									
Intersection Signal Delay: 10.1					Intersection LOS: B				
Intersection Capacity Utilization 73.1%					ICU Level of Service D				
Analysis Period (min) 15									

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street



Queuing and Blocking Report
PM 2045 No Build Conditions

12/13/2018

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	TR	L	L	T	TR	LT	R	R	LTR
Maximum Queue (ft)	274	1141	1141	172	183	283	153	210	621	630	206
Average Queue (ft)	30	1030	1035	117	128	66	61	187	596	594	181
95th Queue (ft)	165	1381	1364	184	182	189	122	285	614	616	226
Link Distance (ft)		1095	1095			352	352		577	577	191
Upstream Blk Time (%)		75	81			0			94	90	81
Queuing Penalty (veh)		0	0			1			0	0	0
Storage Bay Dist (ft)	250			160	160			185			
Storage Blk Time (%)		81		1	3			0	93		
Queuing Penalty (veh)		8		4	25			1	167		

Intersection: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	R	L	T	TR	L	TR	LTR
Maximum Queue (ft)	413	401	200	158	194	207	272	245	53
Average Queue (ft)	375	374	100	75	113	104	238	149	15
95th Queue (ft)	397	393	262	129	181	170	255	283	44
Link Distance (ft)	352	352			762	762	218	218	141
Upstream Blk Time (%)	44	51					90	11	
Queuing Penalty (veh)	425	502					0	0	
Storage Bay Dist (ft)			175	155					
Storage Blk Time (%)	70	83	0	0	1				
Queuing Penalty (veh)	0	58	0	2	3				

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (ft)	160	818	814	525	671	684	943	140	134	110
Average Queue (ft)	53	774	780	473	500	302	629	131	45	26
95th Queue (ft)	155	810	802	646	895	741	1176	175	106	69
Link Distance (ft)	762	762			650	650	970		273	
Upstream Blk Time (%)	12	21			8	1	27			
Queuing Penalty (veh)	125	218			107	15	0			
Storage Bay Dist (ft)	135			500				115		85
Storage Blk Time (%)	0	37		40	4		70	13	6	0
Queuing Penalty (veh)	0	22		349	31		140	22	2	0

Queuing and Blocking Report
PM 2045 No Build Conditions

12/13/2018

Intersection: 4: Monroe Street & Alexis Road

Movement	EB	EB	WB	WB	NW	NW
Directions Served	T	T	T	T	L	L
Maximum Queue (ft)	136	141	290	304	165	166
Average Queue (ft)	66	68	228	224	127	132
95th Queue (ft)	116	118	332	344	159	165
Link Distance (ft)	282	282	256	256	117	117
Upstream Blk Time (%)			27	20	36	34
Queuing Penalty (veh)			142	106	325	312
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 5: Acres Road & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	B17	SB
Directions Served	L	T	TR	L	T	TR	LT	R	T	LTR
Maximum Queue (ft)	71	190	193	165	658	622	74	102	221	239
Average Queue (ft)	17	71	73	36	277	255	35	48	45	158
95th Queue (ft)	52	161	166	127	639	618	71	93	194	274
Link Distance (ft)		256	256		981	981	22	22	194	205
Upstream Blk Time (%)		0	0		0	0	39	21	9	39
Queuing Penalty (veh)		0	0		0	0	115	62	54	0
Storage Bay Dist (ft)	55			140						
Storage Blk Time (%)	1	21			32					
Queuing Penalty (veh)	3	6			10					

Intersection: 6: US 23 Ramp/Acres Road & Monroe Street

Movement	NB	NB	SB	SE	SE	NW	NW
Directions Served	L	TR	LTR	T	TR	T	TR
Maximum Queue (ft)	220	753	154	185	187	1125	1120
Average Queue (ft)	208	721	45	104	126	982	975
95th Queue (ft)	281	741	109	175	191	1346	1344
Link Distance (ft)		702	194	175	175	1087	1087
Upstream Blk Time (%)		69	0	3	4	28	26
Queuing Penalty (veh)		0	0	15	19	176	165
Storage Bay Dist (ft)	195						
Storage Blk Time (%)	49	26					
Queuing Penalty (veh)	419	165					

Queuing and Blocking Report
PM 2045 No Build Conditions

12/13/2018

Intersection: 7: Elliot Drive & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	52	139	184	114	186	139	99	84	81	28
Average Queue (ft)	15	53	72	43	94	59	37	36	28	8
95th Queue (ft)	42	124	147	87	154	111	78	69	65	26
Link Distance (ft)		981	981		911	911	243	243	255	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	140			140					100	
Storage Blk Time (%)	0			0	1				0	
Queuing Penalty (veh)	0			0	1				0	

Intersection: 8: Fairways Driveway/Tireman Driveway & Monroe Street

Movement	SE	SE	SE	NW	NW	NW	NE	NE	SW	SW
Directions Served	L	T	TR	L	T	TR	LT	R	L	TR
Maximum Queue (ft)	81	136	138	170	519	508	259	207	102	151
Average Queue (ft)	25	48	66	63	352	330	169	42	36	69
95th Queue (ft)	61	104	127	187	666	670	300	194	81	145
Link Distance (ft)		1087	1087		499	499	241	241	156	156
Upstream Blk Time (%)					45	40	38	7		9
Queuing Penalty (veh)					0	0	0	0		0
Storage Bay Dist (ft)	180			145						
Storage Blk Time (%)	0			0	56					
Queuing Penalty (veh)	0			0	22					

Intersection: 9: Monroe Street & Monroe Right

Movement	EB	EB	NW	NW
Directions Served	R	R	T	T
Maximum Queue (ft)	174	214	218	220
Average Queue (ft)	13	18	193	181
95th Queue (ft)	119	138	248	243
Link Distance (ft)	447	447	175	175
Upstream Blk Time (%)	0	0	32	24
Queuing Penalty (veh)	0	1	289	223
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 20: Monroe Right & Monroe Street

Movement	EB	EB	WB	WB
Directions Served	T	TR	T	TR
Maximum Queue (ft)	132	309	302	317
Average Queue (ft)	6	125	164	125
95th Queue (ft)	67	261	373	325
Link Distance (ft)	650	650	282	282
Upstream Blk Time (%)		5	1	
Queuing Penalty (veh)		65	18	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 4942

1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

AM 2025 Conditions Feasible Alt A



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	1	↑↑↓	1↓	↑↓		1↑	↑↑		1↓
Traffic Volume (vph)	10	1220	490	690	50	10	650	10	10
Future Volume (vph)	10	1220	490	690	50	10	650	10	10
Lane Group Flow (vph)	11	1413	533	761	0	65	707	0	33
Turn Type	Perm	NA	Prot	NA	Perm	NA	pt+ov	Perm	NA
Protected Phases		2	1	6		8	8 1		4
Permitted Phases	2				8			4	
Detector Phase	2	2	1	6	8	8	8 1	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	7.0	20.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.0	25.0	15.0	25.0	15.0	15.0		15.0	15.0
Total Split (s)	37.0	37.0	26.0	63.0	27.0	27.0		27.0	27.0
Total Split (%)	41.1%	41.1%	28.9%	70.0%	30.0%	30.0%		30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0			5.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	None	None		None	None
Act Effct Green (s)	33.7	33.7	19.4	58.1		21.9	46.3		21.9
Actuated g/C Ratio	0.37	0.37	0.22	0.65		0.24	0.51		0.24
v/c Ratio	0.04	0.74	0.72	0.33		0.19	0.64		0.08
Control Delay	19.8	27.5	49.8	6.5		28.7	18.2		20.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0
Total Delay	19.8	27.5	49.8	6.5		28.7	18.2		20.4
LOS	B	C	D	A		C	B		C
Approach Delay		27.5		24.3		19.1			20.4
Approach LOS		C		C		B			C
Queue Length 50th (ft)	4	257	159	62		29	189		10
Queue Length 95th (ft)	16	314	216	82		64	275		33
Internal Link Dist (ft)		284		359		266			163
Turn Bay Length (ft)	250		250				150		
Base Capacity (vph)	253	1897	801	2282		351	1119		410
Starvation Cap Reductn	0	0	0	0		0	0		0
Spillback Cap Reductn	0	0	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.04	0.74	0.67	0.33		0.19	0.63		0.08

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 24.4

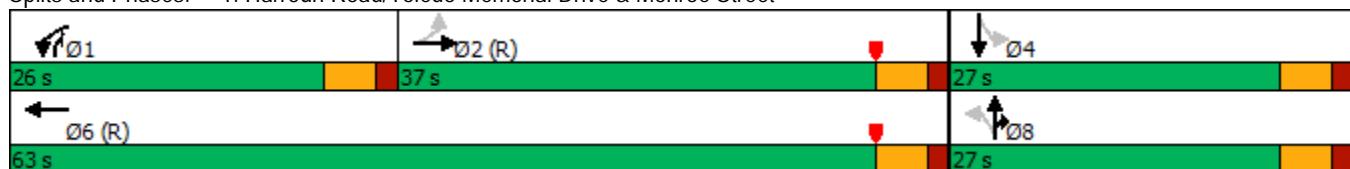
Intersection LOS: C

Intersection Capacity Utilization 68.9%

ICU Level of Service C

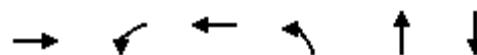
Analysis Period (min) 15

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



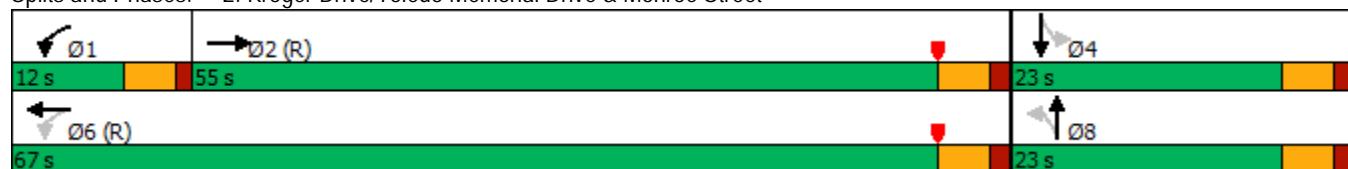
2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
AM 2025 Conditions Feasible Alt A



Lane Group	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	↑↑↓	↑	↑↓	↑	↓	↔
Traffic Volume (vph)	1750	60	1050	130	0	0
Future Volume (vph)	1750	60	1050	130	0	0
Lane Group Flow (vph)	2043	65	1152	141	87	11
Turn Type	NA	pm+pt	NA	Perm	NA	NA
Protected Phases	2	1	6		8	4
Permitted Phases				8		
Detector Phase	2	1	6	8	8	4
Switch Phase						
Minimum Initial (s)	20.0	7.0	20.0	10.0	10.0	10.0
Minimum Split (s)	25.0	11.5	25.0	15.0	15.0	15.0
Total Split (s)	55.0	12.0	67.0	23.0	23.0	23.0
Total Split (%)	61.1%	13.3%	74.4%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.0	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.5	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead				
Lead-Lag Optimize?						
Recall Mode	C-Max	None	C-Max	None	None	None
Act Effct Green (s)	56.5	66.3	65.8	14.2	14.2	14.2
Actuated g/C Ratio	0.63	0.74	0.73	0.16	0.16	0.16
v/c Ratio	0.64	0.29	0.45	0.64	0.23	0.03
Control Delay	8.6	18.1	0.8	48.7	2.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	18.1	0.8	48.7	2.2	0.2
LOS	A	B	A	D	A	A
Approach Delay	8.6			1.7	31.0	0.2
Approach LOS	A			A	C	A
Queue Length 50th (ft)	153	6	2	76	0	0
Queue Length 95th (ft)	238	40	9	132	7	0
Internal Link Dist (ft)	359			768	204	113
Turn Bay Length (ft)			155			
Base Capacity (vph)	3170	229	2587	279	437	419
Starvation Cap Reductn	107	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.28	0.45	0.51	0.20	0.03
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow						
Natural Cycle: 60						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.64						
Intersection Signal Delay: 7.7					Intersection LOS: A	
Intersection Capacity Utilization 68.5%					ICU Level of Service C	
Analysis Period (min) 15						

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

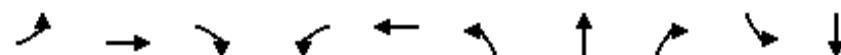


3: SB US 23 Ramp/Glasgow Road & Monroe Street

Sylvania Interchange PID 105889

Timings

AM 2025 Conditions Feasible Alt A



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑↑	↑	↑	↑	↑
Traffic Volume (vph)	10	1070	750	480	1020	90	20	150	10	10
Future Volume (vph)	10	1070	750	480	1020	90	20	150	10	10
Lane Group Flow (vph)	11	1163	815	522	1131	98	94	91	11	22
Turn Type	Perm	NA	Free	Prot	NA	Split	NA	Perm	Split	NA
Protected Phases		2			1	6	8		4	4
Permitted Phases	2			Free				8		
Detector Phase	2	2			1	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0		7.0	20.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	26.0	26.0		12.0	26.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	41.0	41.0		23.0	64.0	15.0	15.0	15.0	11.0	11.0
Total Split (%)	45.6%	45.6%		25.6%	71.1%	16.7%	16.7%	16.7%	12.2%	12.2%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None
Act Effct Green (s)	41.4	41.4	90.0	17.0	63.4	10.0	10.0	10.0	5.8	5.8
Actuated g/C Ratio	0.46	0.46	1.00	0.19	0.70	0.11	0.11	0.11	0.06	0.06
v/c Ratio	0.05	0.71	0.51	0.80	0.45	0.26	0.39	0.31	0.10	0.18
Control Delay	18.4	22.2	3.1	34.1	9.7	38.5	19.0	4.5	41.5	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	22.2	3.1	34.1	9.7	38.5	19.0	4.5	41.5	30.9
LOS	B	C	A	C	A	D	B	A	D	C
Approach Delay		14.4			17.4		21.1			34.5
Approach LOS		B			B		C			C
Queue Length 50th (ft)	3	303	24	126	232	26	11	0	6	6
Queue Length 95th (ft)	m4	375	68	184	275	50	60	14	23	30
Internal Link Dist (ft)		768			649		1050			240
Turn Bay Length (ft)	135			350				115		
Base Capacity (vph)	215	1627	1583	686	2486	381	238	296	118	125
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.71	0.51	0.76	0.45	0.26	0.39	0.31	0.09	0.18

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 16.3

Intersection LOS: B

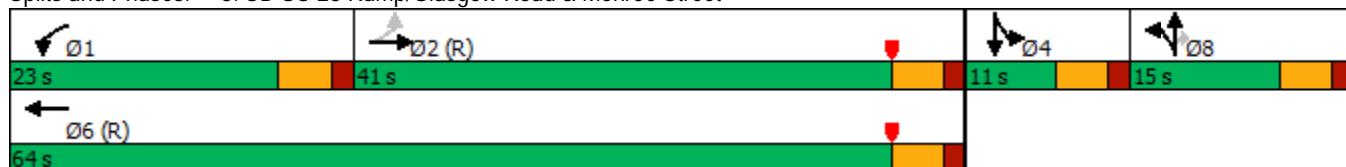
Intersection Capacity Utilization 67.2%

ICU Level of Service C

Analysis Period (min) 15

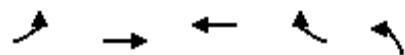
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: NB On Off & Monroe Street/Monroe St
Timings

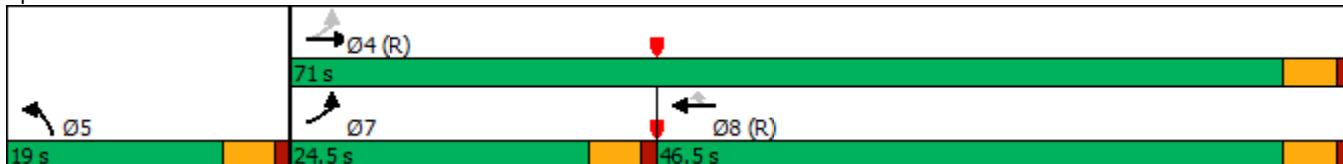
Sylvania Interchange PID 105889
AM 2025 Conditions Feasible Alt A



Lane Group	EBL	EBT	WBT	WBR	NBL
Lane Configurations	↑	↑↑	↑↑	↑	↑↑
Traffic Volume (vph)	130	1100	1180	90	340
Future Volume (vph)	130	1100	1180	90	340
Lane Group Flow (vph)	141	1196	1283	98	370
Turn Type	pm+pt	NA	NA	Perm	Prot
Protected Phases	7	4	8		5
Permitted Phases	4			8	
Detector Phase	7	4	8	8	5
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	20.0	10.0
Minimum Split (s)	24.5	24.5	24.5	24.5	14.5
Total Split (s)	24.5	71.0	46.5	46.5	19.0
Total Split (%)	27.2%	78.9%	51.7%	51.7%	21.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?					
Recall Mode	None	C-Max	C-Max	C-Max	None
Act Effct Green (s)	67.5	67.5	54.5	54.5	13.5
Actuated g/C Ratio	0.75	0.75	0.61	0.61	0.15
v/c Ratio	0.42	0.45	0.60	0.10	0.72
Control Delay	10.4	2.2	8.6	2.0	44.8
Queue Delay	0.0	0.0	0.1	0.0	0.0
Total Delay	10.4	2.2	8.7	2.0	44.8
LOS	B	A	A	A	D
Approach Delay		3.1	8.2		
Approach LOS		A	A		
Queue Length 50th (ft)	14	9	229	5	103
Queue Length 95th (ft)	m33	8	290	m14	150
Internal Link Dist (ft)		649	505		
Turn Bay Length (ft)	200				
Base Capacity (vph)	529	2653	2143	997	553
Starvation Cap Reductn	0	0	128	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.27	0.45	0.64	0.10	0.67
Intersection Summary					
Cycle Length: 90					
Actuated Cycle Length: 90					
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBT, Start of Green					
Natural Cycle: 75					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.72					
Intersection Signal Delay: 10.4			Intersection LOS: B		
Intersection Capacity Utilization 60.4%			ICU Level of Service B		
Analysis Period (min) 15					

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

Splits and Phases: 4: NB On Off & Monroe Street/Monroe St





Lane Group	EBL	EBT	WBT	NET	NER	SWL	SWR	Ø4
Lane Configurations	↑↑	↑↑	↑↑↑↓	↑↑	↑	↑	↑↑	
Traffic Volume (vph)	480	620	320	320	350	20	950	
Future Volume (vph)	480	620	320	320	350	20	950	
Lane Group Flow (vph)	522	674	424	348	380	55	1033	
Turn Type	Prot	NA	NA	NA	Perm	Prot	pm+ov	
Protected Phases	5	2	6	8		7	5	4
Permitted Phases					8		4	
Detector Phase	5	2	6	8	8	7	5	
Switch Phase								
Minimum Initial (s)	10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.5	24.5	24.5	21.0	21.0	21.0	24.5	21.0
Total Split (s)	24.5	48.0	23.5	21.0	21.0	21.0	24.5	42.0
Total Split (%)	27.2%	53.3%	26.1%	23.3%	23.3%	23.3%	27.2%	47%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.5	1.5	1.5	1.0	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	5.0	5.0	5.0	4.5	
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	21.3	57.0	31.1	14.3	14.3	10.2	49.9	
Actuated g/C Ratio	0.24	0.63	0.35	0.16	0.16	0.11	0.55	
v/c Ratio	0.64	0.30	0.24	0.62	0.67	0.28	0.63	
Control Delay	39.7	17.2	20.8	40.1	10.1	35.8	14.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	39.7	17.2	20.8	40.1	10.1	35.8	14.9	
LOS	D	B	C	D	B	D	B	
Approach Delay		27.0	20.8	24.4				
Approach LOS		C	C	C				
Queue Length 50th (ft)	167	141	64	96	0	29	127	
Queue Length 95th (ft)	220	198	100	141	79	65	142	
Internal Link Dist (ft)		505	397	1016				
Turn Bay Length (ft)	300				300	140		
Base Capacity (vph)	849	2240	1743	629	593	314	1667	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.61	0.30	0.24	0.55	0.64	0.18	0.62	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 22.2

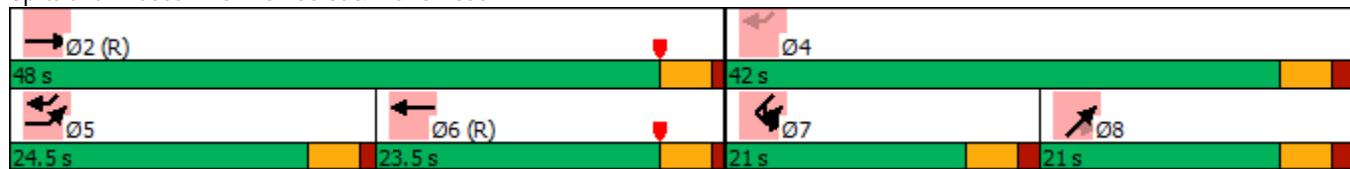
Intersection LOS: C

Intersection Capacity Utilization 57.5%

ICU Level of Service B

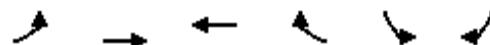
Analysis Period (min) 15

Splits and Phases: 5: Monroe St & Alexis Road



6: Alexis Road & Acres
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889
AM 2025 Conditions Feasible Alt A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑			↑
Traffic Volume (veh/h)	60	840	840	20	0	160
Future Volume (Veh/h)	60	840	840	20	0	160
Sign Control	Free	Free		Stop		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	913	913	22	0	174
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None				
Median storage veh						
Upstream signal (ft)		321	1032			
pX, platoon unblocked	0.92			0.96	0.92	
vC, conflicting volume	935			1510	468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	744			1049	233	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	92			100	75	
cM capacity (veh/h)	787			196	704	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	65	456	456	609	326	174
Volume Left	65	0	0	0	0	0
Volume Right	0	0	0	0	22	174
cSH	787	1700	1700	1700	1700	704
Volume to Capacity	0.08	0.27	0.27	0.36	0.19	0.25
Queue Length 95th (ft)	7	0	0	0	0	24
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	11.8
Lane LOS	A				B	
Approach Delay (s)	0.7			0.0		11.8
Approach LOS					B	
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization		40.4%		ICU Level of Service		A
Analysis Period (min)		15				



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑		↑	↑
Traffic Volume (vph)	10	750	50	800	10	0	20	10	10	20
Future Volume (vph)	10	750	50	800	10	0	20	10	10	20
Lane Group Flow (vph)	11	848	54	881	0	11	22	0	22	22
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2			6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.0	24.0	24.0	24.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	67.0	67.0	67.0	67.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	74.4%	25.6%	25.6%	25.6%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	63.0	63.0	63.0	63.0		19.0	19.0		19.0	19.0
Actuated g/C Ratio	0.70	0.70	0.70	0.70		0.21	0.21		0.21	0.21
v/c Ratio	0.03	0.34	0.14	0.36		0.04	0.06		0.06	0.06
Control Delay	1.5	1.4	5.4	5.9		28.8	12.6		29.1	12.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	1.5	1.4	5.4	5.9		28.8	12.6		29.1	12.6
LOS	A	A	A	A		C	B		C	B
Approach Delay		1.4		5.8		18.0			20.8	
Approach LOS		A		A		B			C	
Queue Length 50th (ft)	0	17	9	89		5	0		10	0
Queue Length 95th (ft)	m1	23	22	117		19	20		30	20
Internal Link Dist (ft)		952		866		215			226	
Turn Bay Length (ft)	140		140							100
Base Capacity (vph)	385	2465	400	2473		292	351		359	351
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.03	0.34	0.14	0.36		0.04	0.06		0.06	0.06

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 4.4

Intersection LOS: A

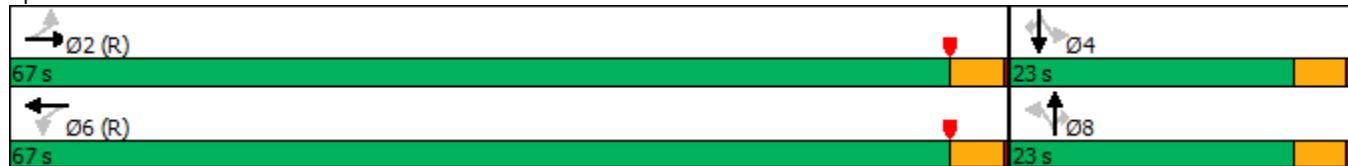
Intersection Capacity Utilization 56.6%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 7: Elliot Drive & Alexis Road



8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

AM 2025 Conditions Feasible Alt A



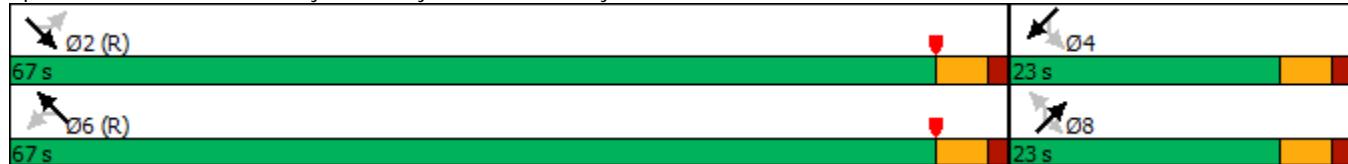
Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑	↑	↑
Traffic Volume (vph)	40	840	10	370	20	20	10	20	10
Future Volume (vph)	40	840	10	370	20	20	10	20	10
Lane Group Flow (vph)	43	935	11	445	0	44	11	22	44
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2			6		8		8	4
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	26.0	26.0	26.0	26.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	67.0	67.0	67.0	67.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	74.4%	25.6%	25.6%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	77.9	77.9	77.9	77.9		10.1	10.1	10.1	10.1
Actuated g/C Ratio	0.87	0.87	0.87	0.87		0.11	0.11	0.11	0.11
v/c Ratio	0.05	0.31	0.02	0.15		0.26	0.06	0.14	0.20
Control Delay	0.9	1.1	2.5	1.9		40.6	7.5	38.4	19.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	0.9	1.1	2.5	1.9		40.6	7.5	38.4	19.4
LOS	A	A	A	A		D	A	D	B
Approach Delay		1.1		1.9		34.0			25.7
Approach LOS		A		A		C			C
Queue Length 50th (ft)	2	22	1	24		23	0	12	6
Queue Length 95th (ft)	m2	22	5	36		56	9	34	37
Internal Link Dist (ft)		896		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	796	3050	485	3023		305	335	271	356
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.05	0.31	0.02	0.15		0.14	0.03	0.08	0.12
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 90									
Offset: 0 (0%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow									
Natural Cycle: 45									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.31									
Intersection Signal Delay: 3.5					Intersection LOS: A				
Intersection Capacity Utilization 53.0%					ICU Level of Service A				
Analysis Period (min) 15									

8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

AM 2025 Conditions Feasible Alt A

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

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St



9: Harroun Road
HCM Unsignedized Intersection Capacity Analysis

Sylvania Interchange PID 105889

AM 2025 Conditions Feasible Alt A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	1	710	10	0	579	1
Future Volume (Veh/h)	0	0	0	0	0	0	1	710	10	0	579	1
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	1	772	11	0	629	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)											346	
pX, platoon unblocked												
vC, conflicting volume	1018	1414	315	1094	1410	392	630			783		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1018	1414	315	1094	1410	392	630			783		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	191	136	681	168	137	607	948			831		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	0	387	397	419	211						
Volume Left	0	0	1	0	0	0						
Volume Right	0	0	0	11	0	1						
cSH	1700	1700	948	1700	1700	1700						
Volume to Capacity	0.00	0.00	0.00	0.23	0.25	0.12						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	A	A	A									
Approach Delay (s)	0.0	0.0	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			24.0%			ICU Level of Service					A	
Analysis Period (min)			15									

Intersection Sign configuration not allowed in HCM analysis.

1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

PM 2025 Conditions Feasible Alt A



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↓	↑↑	↑↓		↑	↑↑		↓
Traffic Volume (vph)	10	960	470	1400	130	10	610	10	10
Future Volume (vph)	10	960	470	1400	130	10	610	10	10
Lane Group Flow (vph)	11	1152	511	1533	0	152	663	0	44
Turn Type	Perm	NA	Prot	NA	Perm	NA	pt+ov	Perm	NA
Protected Phases		2	1	6		8	8 1		4
Permitted Phases	2				8			4	
Detector Phase	2	2	1	6	8	8	8 1	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	7.0	20.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	15.0	15.0		15.0	15.0
Total Split (s)	35.0	35.0	27.0	62.0	28.0	28.0		28.0	28.0
Total Split (%)	38.9%	38.9%	30.0%	68.9%	31.1%	31.1%		31.1%	31.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0			5.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	None	None		None	None
Act Effct Green (s)	33.1	33.1	19.5	57.5		22.5	46.9		22.5
Actuated g/C Ratio	0.37	0.37	0.22	0.64		0.25	0.52		0.25
v/c Ratio	0.10	0.62	0.69	0.68		0.46	0.59		0.11
Control Delay	23.5	25.3	41.4	6.8		33.7	16.4		16.5
Queue Delay	0.0	0.0	0.0	0.4		0.0	0.0		0.0
Total Delay	23.5	25.3	41.4	7.3		33.7	16.4		16.5
LOS	C	C	D	A		C	B		B
Approach Delay		25.3		15.8		19.7			16.5
Approach LOS		C		B		B			B
Queue Length 50th (ft)	4	194	137	124		73	171		9
Queue Length 95th (ft)	18	250	m175	153		132	235		36
Internal Link Dist (ft)		284		359		266			163
Turn Bay Length (ft)	250		250				150		
Base Capacity (vph)	115	1855	839	2260		337	1166		428
Starvation Cap Reductn	0	0	0	279		0	0		0
Spillback Cap Reductn	0	25	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.10	0.63	0.61	0.77		0.45	0.57		0.10

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 19.3

Intersection LOS: B

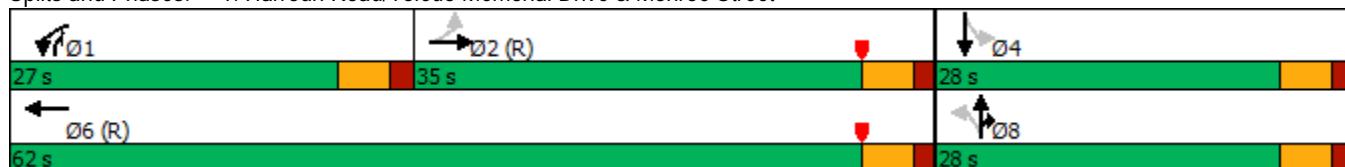
Intersection Capacity Utilization 82.6%

ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
PM 2025 Conditions Feasible Alt A



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑	↑↑	↑	↑	↑	↓
Traffic Volume (vph)	1530	220	1580	290	0	10	0
Future Volume (vph)	1530	220	1580	290	0	10	0
Lane Group Flow (vph)	1717	239	1728	315	185	0	22
Turn Type	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2	1	6		8		4
Permitted Phases			6		8		4
Detector Phase	2	1	6	8	8	4	4
Switch Phase							
Minimum Initial (s)	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.0	11.5	25.0	15.0	15.0	15.0	15.0
Total Split (s)	41.0	18.0	59.0	31.0	31.0	31.0	31.0
Total Split (%)	45.6%	20.0%	65.6%	34.4%	34.4%	34.4%	34.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.0	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	4.5	5.0	5.0	5.0		5.0
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	40.5	56.9	56.4	23.6	23.6		23.6
Actuated g/C Ratio	0.45	0.63	0.63	0.26	0.26		0.26
v/c Ratio	0.75	0.78	0.78	0.87	0.29		0.05
Control Delay	16.2	41.0	10.1	55.8	1.2		0.2
Queue Delay	0.1	0.0	0.0	0.0	0.0		0.0
Total Delay	16.2	41.0	10.1	55.8	1.2		0.2
LOS	B	D	B	E	A		A
Approach Delay	16.2		13.9		35.6		0.2
Approach LOS	B		B		D		A
Queue Length 50th (ft)	175	97	146	164	0		0
Queue Length 95th (ft)	214	m143	210	#299	0		0
Internal Link Dist (ft)	359		768		204		113
Turn Bay Length (ft)		155					
Base Capacity (vph)	2280	345	2215	399	670		490
Starvation Cap Reductn	38	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0	0		0
Storage Cap Reductn	0	0	0	0	0		0
Reduced v/c Ratio	0.77	0.69	0.78	0.79	0.28		0.04

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 17.3

Intersection LOS: B

Intersection Capacity Utilization 77.7%

ICU Level of Service D

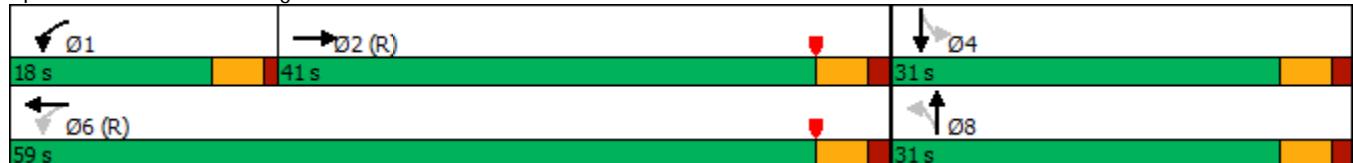
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

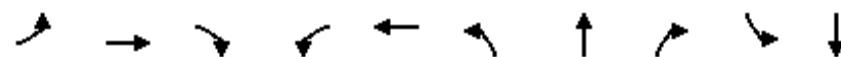


3: SB US 23 Ramp/Glasgow Road & Monroe Street

Sylvania Interchange PID 105889

Timings

PM 2025 Conditions Feasible Alt A



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑↑	↑	↑	↑	↑
Traffic Volume (vph)	40	1180	490	580	1660	130	10	130	30	10
Future Volume (vph)	40	1180	490	580	1660	130	10	130	30	10
Lane Group Flow (vph)	43	1283	533	630	1913	141	77	75	33	33
Turn Type	Perm	NA	Free	Prot	NA	Split	NA	Perm	Split	NA
Protected Phases		2			1	6	8	8	4	4
Permitted Phases	2			Free				8		
Detector Phase	2	2			1	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0		7.0	20.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	26.0	26.0		12.0	26.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	41.0	41.0		23.0	64.0	15.0	15.0	15.0	11.0	11.0
Total Split (%)	45.6%	45.6%		25.6%	71.1%	16.7%	16.7%	16.7%	12.2%	12.2%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None
Act Effct Green (s)	39.7	39.7	90.0	18.7	63.4	10.0	10.0	10.0	5.9	5.9
Actuated g/C Ratio	0.44	0.44	1.00	0.21	0.70	0.11	0.11	0.11	0.07	0.07
v/c Ratio	0.50	0.82	0.34	0.88	0.77	0.37	0.34	0.25	0.28	0.25
Control Delay	38.2	22.3	0.7	54.7	10.7	40.2	16.8	2.1	46.6	26.9
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	22.3	0.7	54.7	10.9	40.2	16.8	2.1	46.6	26.9
LOS	D	C	A	D	B	D	B	A	D	C
Approach Delay		16.5			21.7		24.3			36.7
Approach LOS		B			C		C			D
Queue Length 50th (ft)	10	162	0	202	0	39	6	0	18	6
Queue Length 95th (ft)	m18	#265	4	m214	m127	68	48	2	48	35
Internal Link Dist (ft)		768			649		1050			240
Turn Bay Length (ft)	135			350				115		
Base Capacity (vph)	86	1561	1583	713	2474	381	229	296	118	132
Starvation Cap Reductn	0	0	0	0	89	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.82	0.34	0.88	0.80	0.37	0.34	0.25	0.28	0.25

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 20.0

Intersection LOS: C

Intersection Capacity Utilization 88.6%

ICU Level of Service E

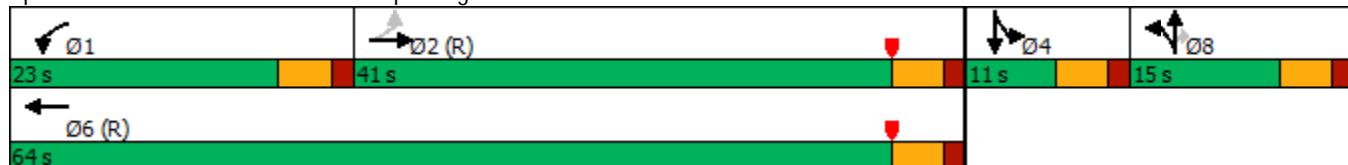
Analysis Period (min) 15

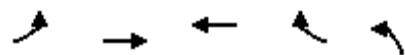
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street





Lane Group	EBL	EBT	WBT	WBR	NBL
Lane Configurations	↑	↑↑	↑↑	↑	↑↑
Traffic Volume (vph)	110	1230	1840	220	500
Future Volume (vph)	110	1230	1840	220	500
Lane Group Flow (vph)	120	1337	2000	239	543
Turn Type	pm+pt	NA	NA	Perm	Prot
Protected Phases	7	4	8		5
Permitted Phases	4			8	
Detector Phase	7	4	8	8	5
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	20.0	10.0
Minimum Split (s)	11.5	24.5	24.5	24.5	14.5
Total Split (s)	11.5	70.0	58.5	58.5	20.0
Total Split (%)	12.8%	77.8%	65.0%	65.0%	22.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?					
Recall Mode	None	C-Max	C-Max	C-Max	None
Act Effct Green (s)	65.5	65.5	54.0	54.0	15.5
Actuated g/C Ratio	0.73	0.73	0.60	0.60	0.17
v/c Ratio	0.55	0.52	0.94	0.23	0.92
Control Delay	26.3	9.7	29.5	4.0	59.5
Queue Delay	0.0	0.0	1.5	0.0	0.0
Total Delay	26.3	9.7	31.0	4.0	59.5
LOS	C	A	C	A	E
Approach Delay		11.0	28.1		
Approach LOS		B	C		
Queue Length 50th (ft)	52	191	455	9	158
Queue Length 95th (ft)	m72	214	#581	m39	#253
Internal Link Dist (ft)		649	502		
Turn Bay Length (ft)	200				
Base Capacity (vph)	220	2575	2123	1045	591
Starvation Cap Reductn	0	0	45	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.55	0.52	0.96	0.23	0.92

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 26.3

Intersection LOS: C

Intersection Capacity Utilization 82.1%

ICU Level of Service E

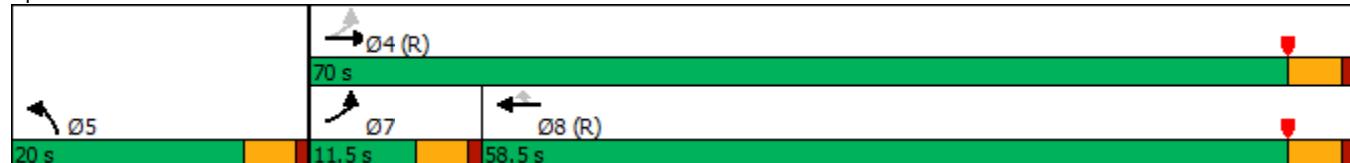
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 4: NB On Off & Monroe Street



5: Monroe Street & Alexis Road
Timings

Sylvania Interchange PID 105889
PM 2025 Conditions Feasible Alt A

								Ø4
Lane Group	EBL	EBT	WBT	NET	NER	SWL	SWR	Ø4
Lane Configurations								
Traffic Volume (vph)	650	580	1080	430	260	40	980	
Future Volume (vph)	650	580	1080	430	260	40	980	
Lane Group Flow (vph)	707	630	1250	467	283	108	1065	
Turn Type	Prot	NA	NA	NA	Perm	Prot	pm+ov	
Protected Phases	5	2	6	8		7	5	4
Permitted Phases					8		4	
Detector Phase	5	2	6	8	8	7	5	
Switch Phase								
Minimum Initial (s)	10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.5	24.5	24.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	45.0	22.5	22.5	22.5	22.5	22.5	45.0
Total Split (%)	25.0%	50.0%	25.0%	25.0%	25.0%	25.0%	25.0%	50%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	18.0	50.5	28.0	17.3	17.3	11.6	53.0	
Actuated g/C Ratio	0.20	0.56	0.31	0.19	0.19	0.13	0.59	
v/c Ratio	1.03	0.32	0.80	0.69	0.53	0.47	0.65	
Control Delay	76.4	13.8	35.1	39.5	8.0	43.0	13.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.2	
Total Delay	76.4	13.8	35.1	39.5	8.0	43.0	13.7	
LOS	E	B	D	D	A	D	B	
Approach Delay		46.9	35.1	27.6				
Approach LOS		D	D	C				
Queue Length 50th (ft)	~234	98	246	130	0	58	187	
Queue Length 95th (ft)	#348	192	#378	182	64	105	215	
Internal Link Dist (ft)		502	395	1039				
Turn Bay Length (ft)	300				300	140		
Base Capacity (vph)	686	1984	1572	707	543	354	1649	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	101	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	1.03	0.32	0.80	0.66	0.52	0.31	0.69	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay: 32.5

Intersection LOS: C

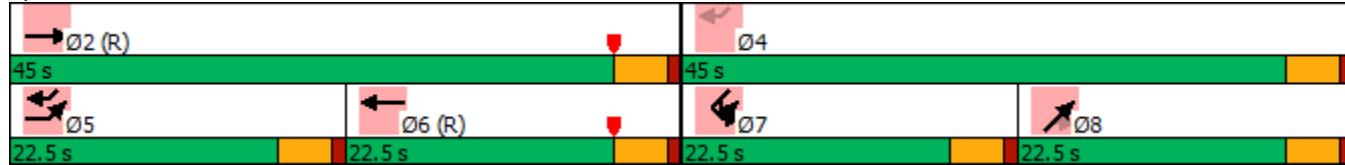
Intersection Capacity Utilization 73.0%

ICU Level of Service C

Analysis Period (min) 15

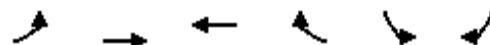
- Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.

Splits and Phases: 5: Monroe Street & Alexis Road



6: Alexis Road & Acres
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889
PM 2025 Conditions Feasible Alt A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑			↑
Traffic Volume (veh/h)	90	1120	900	40	0	180
Future Volume (Veh/h)	90	1120	900	40	0	180
Sign Control	Free	Free		Stop		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	1217	978	43	0	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None				
Median storage veh						
Upstream signal (ft)		320	1032			
pX, platoon unblocked	0.97			0.90	0.97	
vC, conflicting volume	1021			1804	510	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	951			1504	423	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	86			100	65	
cM capacity (veh/h)	693			87	560	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	98	608	608	652	369	196
Volume Left	98	0	0	0	0	0
Volume Right	0	0	0	0	43	196
cSH	693	1700	1700	1700	1700	560
Volume to Capacity	0.14	0.36	0.36	0.38	0.22	0.35
Queue Length 95th (ft)	12	0	0	0	0	39
Control Delay (s)	11.0	0.0	0.0	0.0	0.0	14.9
Lane LOS	B					B
Approach Delay (s)	0.8			0.0		14.9
Approach LOS						B
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization		44.0%		ICU Level of Service		A
Analysis Period (min)		15				



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↑	↑
Traffic Volume (vph)	40	1010	70	830	40	10	100	30	10	20
Future Volume (vph)	40	1010	70	830	40	10	100	30	10	20
Lane Group Flow (vph)	43	1120	76	935	0	54	109	0	44	22
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2			6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.0	24.0	24.0	24.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	65.0	65.0	65.0	65.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	None	None	None	None	None	None
Act Effct Green (s)	66.1	66.1	66.1	66.1		10.3	10.3		10.3	10.3
Actuated g/C Ratio	0.82	0.82	0.82	0.82		0.13	0.13		0.13	0.13
v/c Ratio	0.10	0.39	0.21	0.32		0.31	0.37		0.25	0.10
Control Delay	2.9	3.1	4.2	2.8		36.7	10.8		35.2	14.3
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	2.9	3.1	4.2	2.8		36.7	10.8		35.2	14.3
LOS	A	A	A	A		D	B		D	B
Approach Delay		3.1		2.9		19.4			28.3	
Approach LOS		A		A		B			C	
Queue Length 50th (ft)	4	72	8	55		25	0		20	0
Queue Length 95th (ft)	12	105	22	82		59	43		50	20
Internal Link Dist (ft)		952		866		215			226	
Turn Bay Length (ft)	140		140							100
Base Capacity (vph)	451	2889	364	2884		358	492		361	427
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.10	0.39	0.21	0.32		0.15	0.22		0.12	0.05

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 80.8

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 4.8

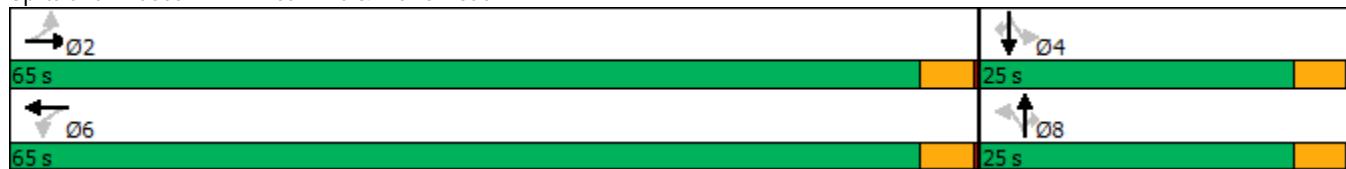
Intersection LOS: A

Intersection Capacity Utilization 64.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 7: Elliot Drive & Alexis Road

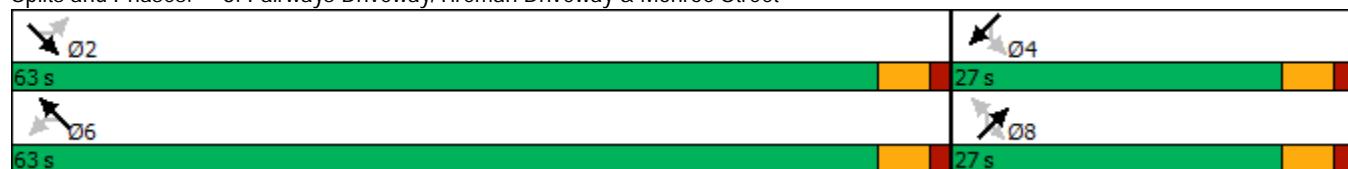


8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
 Timings PM 2025 Conditions Feasible Alt A

Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑	↑	↑
Traffic Volume (vph)	50	800	30	960	80	20	30	40	20
Future Volume (vph)	50	800	30	960	80	20	30	40	20
Lane Group Flow (vph)	54	968	33	1141	0	109	33	43	76
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2			6		8		8	4
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	26.0	26.0	26.0	26.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	63.0	63.0	63.0	63.0	27.0	27.0	27.0	27.0	27.0
Total Split (%)	70.0%	70.0%	70.0%	70.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	Max	Max	Max	Max	None	None	None	None	None
Act Effct Green (s)	62.6	62.6	62.6	62.6		12.5	12.5	12.5	12.5
Actuated g/C Ratio	0.77	0.77	0.77	0.77		0.15	0.15	0.15	0.15
v/c Ratio	0.16	0.36	0.08	0.42		0.53	0.12	0.22	0.25
Control Delay	5.7	4.5	4.6	4.9		41.1	11.5	32.3	15.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	5.7	4.5	4.6	4.9		41.1	11.5	32.3	15.0
LOS	A	A	A	A		D	B	C	B
Approach Delay		4.5		4.9		34.3			21.3
Approach LOS		A		A		C		C	
Queue Length 50th (ft)	7	73	4	94		51	0	19	10
Queue Length 95th (ft)	25	133	15	168		101	23	48	45
Internal Link Dist (ft)		896		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	328	2702	404	2706		363	454	348	491
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.16	0.36	0.08	0.42		0.30	0.07	0.12	0.15
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 81									
Natural Cycle: 45									
Control Type: Semi Act-Uncoord									
Maximum v/c Ratio: 0.53									
Intersection Signal Delay: 7.2					Intersection LOS: A				
Intersection Capacity Utilization 62.0%					ICU Level of Service B				
Analysis Period (min) 15									

8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
Timings PM 2025 Conditions Feasible Alt A

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	1	750	20	0	579	1
Future Volume (Veh/h)	0	0	0	0	0	0	1	750	20	0	579	1
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	1	815	22	0	629	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)											346	
pX, platoon unblocked												
vC, conflicting volume	1039	1468	315	1142	1458	418	630			837		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1039	1468	315	1142	1458	418	630			837		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	185	126	681	155	128	583	948			793		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	0	408	430	419	211						
Volume Left	0	0	1	0	0	0						
Volume Right	0	0	0	22	0	1						
cSH	1700	1700	948	1700	1700	1700						
Volume to Capacity	0.00	0.00	0.00	0.25	0.25	0.12						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	A	A	A									
Approach Delay (s)	0.0	0.0	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			25.4%				ICU Level of Service			A		
Analysis Period (min)			15									

Intersection Sign configuration not allowed in HCM analysis.

1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

AM 2045 Conditions Feasible Alt A



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↓	↑↓	↑↓		↑	↑↓		↓
Traffic Volume (vph)	10	1430	600	800	60	10	750	10	10
Future Volume (vph)	10	1430	600	800	60	10	750	10	10
Lane Group Flow (vph)	11	1663	652	881	0	76	815	0	33
Turn Type	Perm	NA	Prot	NA	Perm	NA	pt+ov	Perm	NA
Protected Phases		2	1	6		8	8 1		4
Permitted Phases	2				8			4	
Detector Phase	2	2	1	6	8	8	8 1	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	7.0	20.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.0	25.0	15.0	25.0	15.0	15.0		15.0	15.0
Total Split (s)	44.0	44.0	28.0	72.0	28.0	28.0		28.0	28.0
Total Split (%)	44.0%	44.0%	28.0%	72.0%	28.0%	28.0%		28.0%	28.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0	
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	None	None		None	None
Act Effct Green (s)	39.5	39.5	22.5	67.0		23.0	50.5		23.0
Actuated g/C Ratio	0.40	0.40	0.22	0.67		0.23	0.50		0.23
v/c Ratio	0.05	0.83	0.84	0.37		0.24	0.75		0.09
Control Delay	19.9	31.8	58.4	5.6		33.7	24.5		23.4
Queue Delay	0.0	7.6	0.0	0.2		0.0	0.0		0.0
Total Delay	19.9	39.4	58.4	5.8		33.7	24.5		23.4
LOS	B	D	E	A		C	C		C
Approach Delay		39.3		28.2		25.3		23.4	
Approach LOS		D		C		C		C	
Queue Length 50th (ft)	4	344	227	39		40	285		11
Queue Length 95th (ft)	16	409	#299	119		80	400		36
Internal Link Dist (ft)		284		359		266		163	
Turn Bay Length (ft)	250		250				150		
Base Capacity (vph)	237	1995	789	2367		322	1093		385
Starvation Cap Reductn	0	0	0	570		0	0		0
Spillback Cap Reductn	0	306	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.05	0.98	0.83	0.49		0.24	0.75		0.09

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 99 (99%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 32.0

Intersection LOS: C

Intersection Capacity Utilization 76.9%

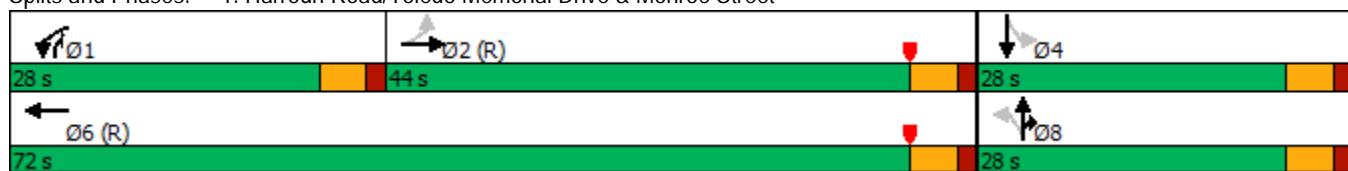
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

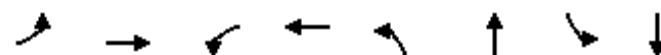
Queue shown is maximum after two cycles.

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



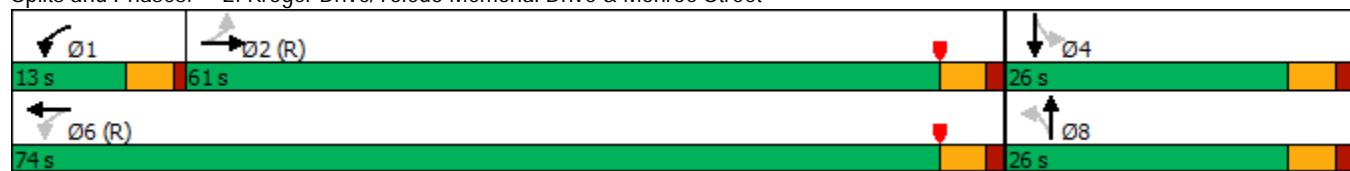
2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
AM 2045 Conditions Feasible Alt A



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↑↑↓	↑	↑↓	↑	↑	↓	↔
Traffic Volume (vph)	10	2020	80	1230	170	0	10	0
Future Volume (vph)	10	2020	80	1230	170	0	10	0
Lane Group Flow (vph)	0	2381	87	1348	185	109	0	22
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	20.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.0	25.0	11.5	25.0	15.0	15.0	15.0	15.0
Total Split (s)	61.0	61.0	13.0	74.0	26.0	26.0	26.0	26.0
Total Split (%)	61.0%	61.0%	13.0%	74.0%	26.0%	26.0%	26.0%	26.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.0	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.0	4.5	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)		63.0	73.1	72.6	17.4	17.4		17.4
Actuated g/C Ratio		0.63	0.73	0.73	0.17	0.17		0.17
v/c Ratio		0.81	0.43	0.53	0.77	0.27		0.07
Control Delay		13.0	28.8	4.7	59.7	4.1		0.4
Queue Delay		1.3	0.0	0.0	0.0	0.0		0.0
Total Delay		14.3	28.8	4.7	59.7	4.1		0.4
LOS	B	C	A	E	A			A
Approach Delay		14.3		6.2		39.1		0.4
Approach LOS		B		A		D		A
Queue Length 50th (ft)		182	14	94	112	0		0
Queue Length 95th (ft)		632	60	41	184	22		0
Internal Link Dist (ft)		359		768		204		113
Turn Bay Length (ft)			155					
Base Capacity (vph)		2955	222	2566	290	449		372
Starvation Cap Reductn		349	0	0	0	0		0
Spillback Cap Reductn		0	0	0	0	0		0
Storage Cap Reductn		0	0	0	0	0		0
Reduced v/c Ratio		0.91	0.39	0.53	0.64	0.24		0.06
Intersection Summary								
Cycle Length: 100								
Actuated Cycle Length: 100								
Offset: 17 (17%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow								
Natural Cycle: 75								
Control Type: Actuated-Coordinated								
Maximum v/c Ratio: 0.81								
Intersection Signal Delay: 13.2						Intersection LOS: B		
Intersection Capacity Utilization 90.9%						ICU Level of Service E		
Analysis Period (min) 15								

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

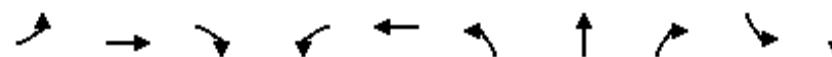


3: SB US 23 Ramp/Glasgow Road & Monroe Street

Sylvania Interchange PID 105889

Timings

AM 2045 Conditions Feasible Alt A



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑↑	↑	↑	↑	↑
Traffic Volume (vph)	10	1170	950	610	1200	110	30	190	10	10
Future Volume (vph)	10	1170	950	610	1200	110	30	190	10	10
Lane Group Flow (vph)	11	1272	1033	663	1326	120	122	118	11	22
Turn Type	Perm	NA	Free	Prot	NA	Split	NA	Perm	Split	NA
Protected Phases		2			1	6	8	8	4	4
Permitted Phases	2		Free					8		
Detector Phase	2	2		1	6	8	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0		7.0	20.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	26.0	26.0		12.0	26.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	46.0	46.0		28.0	74.0	15.0	15.0	15.0	11.0	11.0
Total Split (%)	46.0%	46.0%		28.0%	74.0%	15.0%	15.0%	15.0%	11.0%	11.0%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None
Act Effct Green (s)	46.1	46.1	100.0	22.3	73.4	10.0	10.0	10.0	5.8	5.8
Actuated g/C Ratio	0.46	0.46	1.00	0.22	0.73	0.10	0.10	0.10	0.06	0.06
v/c Ratio	0.06	0.78	0.65	0.87	0.51	0.35	0.51	0.44	0.11	0.20
Control Delay	14.7	15.8	7.7	37.2	9.6	45.1	23.3	11.8	47.0	34.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	15.8	7.7	37.2	9.6	45.1	23.3	11.8	47.0	34.6
LOS	B	B	A	D	A	D	C	B	D	C
Approach Delay		12.2			18.8		26.8		38.7	
Approach LOS		B			B		C		D	
Queue Length 50th (ft)	1	151	408	232	216	37	21	0	7	7
Queue Length 95th (ft)	m3	#368	611	#305	363	65	80	46	25	32
Internal Link Dist (ft)		768			649		1050		240	
Turn Bay Length (ft)	135			350				115		
Base Capacity (vph)	178	1631	1583	790	2593	343	237	268	106	113
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.78	0.65	0.84	0.51	0.35	0.51	0.44	0.10	0.19

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 17 (17%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 16.3

Intersection LOS: B

Intersection Capacity Utilization 72.8%

ICU Level of Service C

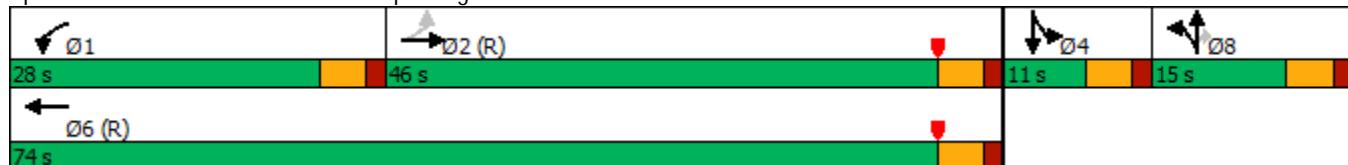
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

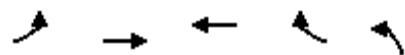
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: NB On Off & Monroe Street/Monroe St
Timings

Sylvania Interchange PID 105889
AM 2045 Conditions Feasible Alt A



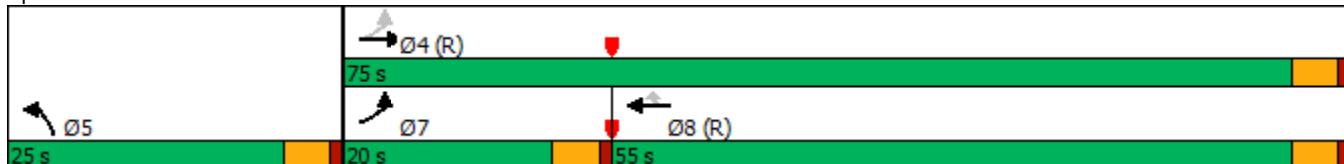
Lane Group	EBL	EBT	WBT	WBR	NBL
Lane Configurations	↑	↑↑	↑↑	↑	↑↑
Traffic Volume (vph)	150	1220	1390	120	440
Future Volume (vph)	150	1220	1390	120	440
Lane Group Flow (vph)	163	1326	1511	130	478
Turn Type	pm+pt	NA	NA	Perm	Prot
Protected Phases	7	4	8		5
Permitted Phases	4			8	
Detector Phase	7	4	8	8	5
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	20.0	10.0
Minimum Split (s)	24.5	24.5	24.5	24.5	14.5
Total Split (s)	20.0	75.0	55.0	55.0	25.0
Total Split (%)	20.0%	75.0%	55.0%	55.0%	25.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?					
Recall Mode	None	C-Max	C-Max	C-Max	None
Act Effct Green (s)	72.7	72.7	58.0	58.0	18.3
Actuated g/C Ratio	0.73	0.73	0.58	0.58	0.18
v/c Ratio	0.60	0.52	0.74	0.13	0.76
Control Delay	38.8	1.7	17.0	4.0	47.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	1.7	17.0	4.0	47.2
LOS	D	A	B	A	D
Approach Delay		5.7	16.0		
Approach LOS		A	B		
Queue Length 50th (ft)	59	21	255	11	148
Queue Length 95th (ft)	m88	45	359	m28	201
Internal Link Dist (ft)		649	505		
Turn Bay Length (ft)	200				
Base Capacity (vph)	359	2573	2053	973	703
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.45	0.52	0.74	0.13	0.68
Intersection Summary					
Cycle Length: 100					
Actuated Cycle Length: 100					
Offset: 97 (97%), Referenced to phase 4:EBTL and 8:WBT, Start of Green					
Natural Cycle: 90					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.76					
Intersection Signal Delay: 15.9				Intersection LOS: B	
Intersection Capacity Utilization 70.1%				ICU Level of Service C	
Analysis Period (min) 15					

4: NB On Off & Monroe Street/Monroe St
Timings

Sylvania Interchange PID 105889
AM 2045 Conditions Feasible Alt A

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

Splits and Phases: 4: NB On Off & Monroe Street/Monroe St



5: Monroe St & Alexis Road

Sylvania Interchange PID 105889

Timings

AM 2045 Conditions Feasible Alt A



Lane Group	EBL	EBT	WBT	NET	NER	SWL	SWR	Ø4
Lane Configurations	↑↑	↑↑	↑↑↓	↑↑	↑	↑	↑↑	
Traffic Volume (vph)	520	700	460	400	430	20	1050	
Future Volume (vph)	520	700	460	400	430	20	1050	
Lane Group Flow (vph)	565	761	576	435	467	55	1141	
Turn Type	Prot	NA	NA	NA	Perm	Prot	pm+ov	
Protected Phases	5	2	6	8		7	5	4
Permitted Phases					8		4	
Detector Phase	5	2	6	8	8	7	5	
Switch Phase								
Minimum Initial (s)	10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.5	24.5	24.5	21.0	21.0	21.0	24.5	21.0
Total Split (s)	27.0	53.0	26.0	26.0	26.0	21.0	27.0	47.0
Total Split (%)	27.0%	53.0%	26.0%	26.0%	26.0%	21.0%	27.0%	47%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.5	1.5	1.5	1.0	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	5.0	5.0	5.0	4.5	
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	25.3	59.3	29.5	18.9	18.9	10.3	61.5	
Actuated g/C Ratio	0.25	0.59	0.30	0.19	0.19	0.10	0.62	
v/c Ratio	0.65	0.36	0.39	0.65	0.81	0.30	0.65	
Control Delay	44.3	1.2	26.5	42.2	22.3	42.1	16.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.3	1.2	26.5	42.2	22.3	42.1	16.2	
LOS	D	A	C	D	C	D	B	
Approach Delay		19.6	26.5	31.9				
Approach LOS		B	C	C				
Queue Length 50th (ft)	137	6	86	132	68	34	202	
Queue Length 95th (ft)	170	5	128	183	#206	71	242	
Internal Link Dist (ft)		505	397	1016				
Turn Bay Length (ft)	300				300	140		
Base Capacity (vph)	868	2099	1489	743	604	283	1745	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	7	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.65	0.36	0.39	0.59	0.77	0.19	0.65	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 43 (43%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 22.7

Intersection LOS: C

Intersection Capacity Utilization 60.9%

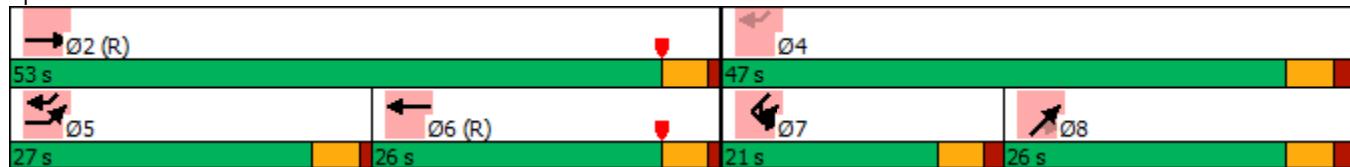
ICU Level of Service B

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

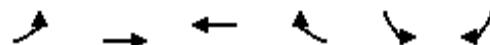
Queue shown is maximum after two cycles.

Splits and Phases: 5: Monroe St & Alexis Road



6: Alexis Road & Acres
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889
AM 2045 Conditions Feasible Alt A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑			↑
Traffic Volume (veh/h)	80	940	940	20	0	160
Future Volume (Veh/h)	80	940	940	20	0	160
Sign Control	Free	Free		Stop		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	1022	1022	22	0	174
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None				
Median storage veh						
Upstream signal (ft)		321	1032			
pX, platoon unblocked	0.91			0.94	0.91	
vC, conflicting volume	1044			1718	522	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	847			1197	273	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	88			100	74	
cM capacity (veh/h)	714			147	659	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	87	511	511	681	363	174
Volume Left	87	0	0	0	0	0
Volume Right	0	0	0	0	22	174
cSH	714	1700	1700	1700	1700	659
Volume to Capacity	0.12	0.30	0.30	0.40	0.21	0.26
Queue Length 95th (ft)	10	0	0	0	0	26
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	12.4
Lane LOS	B					B
Approach Delay (s)	0.8			0.0		12.4
Approach LOS						B
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization		43.2%		ICU Level of Service		A
Analysis Period (min)		15				



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑		↑	↑
Traffic Volume (vph)	20	910	60	870	10	0	30	20	10	30
Future Volume (vph)	20	910	60	870	10	0	30	20	10	30
Lane Group Flow (vph)	22	1032	65	957	0	11	33	0	33	33
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2			6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.0	24.0	24.0	24.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	77.0	77.0	77.0	77.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	77.0%	77.0%	77.0%	77.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	73.0	73.0	73.0	73.0		19.0	19.0		19.0	19.0
Actuated g/C Ratio	0.73	0.73	0.73	0.73		0.19	0.19		0.19	0.19
v/c Ratio	0.06	0.40	0.19	0.37		0.04	0.10		0.11	0.10
Control Delay	1.2	1.6	5.9	5.5		33.8	12.4		34.7	12.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	1.2	1.6	5.9	5.5		33.8	12.4		34.7	12.4
LOS	A	A	A	A		C	B		C	B
Approach Delay		1.6		5.5		17.8			23.6	
Approach LOS		A		A		B			C	
Queue Length 50th (ft)	0	12	11	100		6	0		18	0
Queue Length 95th (ft)	m1	25	27	128		22	26		45	26
Internal Link Dist (ft)		952		866		215			226	
Turn Bay Length (ft)	140		140							100
Base Capacity (vph)	371	2571	337	2579		260	327		304	327
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.06	0.40	0.19	0.37		0.04	0.10		0.11	0.10

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 50 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 4.4

Intersection LOS: A

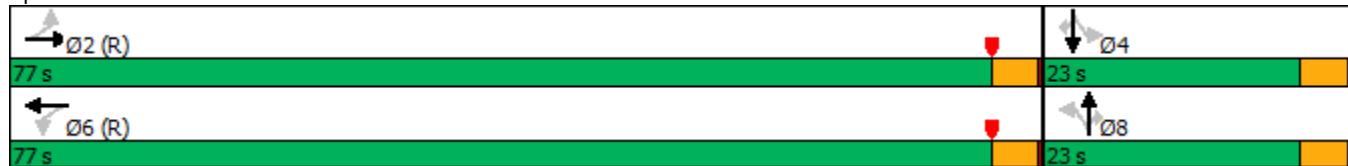
Intersection Capacity Utilization 61.4%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 7: Elliot Drive & Alexis Road



8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

AM 2045 Conditions Feasible Alt A



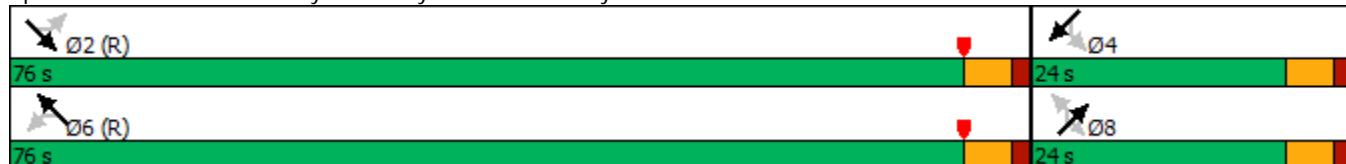
Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑	↑	↑
Traffic Volume (vph)	50	1040	20	450	40	30	10	30	10
Future Volume (vph)	50	1040	20	450	40	30	10	30	10
Lane Group Flow (vph)	54	1152	22	543	0	76	11	33	54
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2			6		8		8	4
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	26.0	26.0	26.0	26.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	76.0	76.0	76.0	76.0	24.0	24.0	24.0	24.0	24.0
Total Split (%)	76.0%	76.0%	76.0%	76.0%	24.0%	24.0%	24.0%	24.0%	24.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	82.6	82.6	82.6	82.6		11.4	11.4	11.4	11.4
Actuated g/C Ratio	0.83	0.83	0.83	0.83		0.11	0.11	0.11	0.11
v/c Ratio	0.08	0.40	0.06	0.19		0.45	0.06	0.22	0.24
Control Delay	2.1	2.1	3.2	2.6		49.8	8.4	43.2	18.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	2.1	2.1	3.2	2.6		49.8	8.4	43.2	18.6
LOS	A	A	A	A		D	A	D	B
Approach Delay		2.1		2.6		44.6			27.9
Approach LOS		A		A		D			C
Queue Length 50th (ft)	4	45	2	31		47	0	20	6
Queue Length 95th (ft)	m8	64	9	56		89	10	48	41
Internal Link Dist (ft)		896		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	690	2916	355	2885		281	318	250	346
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.08	0.40	0.06	0.19		0.27	0.03	0.13	0.16
Intersection Summary									
Cycle Length: 100									
Actuated Cycle Length: 100									
Offset: 66 (66%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow									
Natural Cycle: 45									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.45									
Intersection Signal Delay: 5.3					Intersection LOS: A				
Intersection Capacity Utilization 60.3%					ICU Level of Service B				
Analysis Period (min) 15									

8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

AM 2045 Conditions Feasible Alt A

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

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St



9: Harroun Road
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889

AM 2045 Conditions Feasible Alt A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	1	809	10	0	709	1
Future Volume (Veh/h)	0	0	0	0	0	0	1	809	10	0	709	1
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	1	879	11	0	771	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)											346	
pX, platoon unblocked												
vC, conflicting volume	1213	1664	386	1272	1658	445	772			890		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1213	1664	386	1272	1658	445	772			890		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	138	96	612	124	97	561	839			757		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	0	440	450	514	258						
Volume Left	0	0	1	0	0	0						
Volume Right	0	0	0	11	0	1						
cSH	1700	1700	839	1700	1700	1700						
Volume to Capacity	0.00	0.00	0.00	0.27	0.30	0.15						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	A	A	A									
Approach Delay (s)	0.0	0.0	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			26.7%				ICU Level of Service			A		
Analysis Period (min)			15									

Intersection Sign configuration not allowed in HCM analysis.

1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

PM 2045 Conditions Feasible Alt A



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↓	↑↑	↑↓		↑	↑↑		↓
Traffic Volume (vph)	10	1130	550	1500	170	10	800	20	10
Future Volume (vph)	10	1130	550	1500	170	10	800	20	10
Lane Group Flow (vph)	11	1369	598	1641	0	196	870	0	55
Turn Type	Perm	NA	Prot	NA	Perm	NA	pt+ov	Perm	NA
Protected Phases		2	1	6		8	8 1		4
Permitted Phases	2				8			4	
Detector Phase	2	2	1	6	8	8	8 1	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	7.0	20.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	15.0	15.0		15.0	15.0
Total Split (s)	46.0	46.0	33.0	79.0	41.0	41.0		41.0	41.0
Total Split (%)	38.3%	38.3%	27.5%	65.8%	34.2%	34.2%		34.2%	34.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0	
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	None	None		None	None
Act Effct Green (s)	42.6	42.6	26.4	74.0		36.0	67.4		36.0
Actuated g/C Ratio	0.36	0.36	0.22	0.62		0.30	0.56		0.30
v/c Ratio	0.13	0.76	0.79	0.75		0.48	0.73		0.12
Control Delay	32.3	37.5	56.5	12.4		39.2	23.1		21.0
Queue Delay	0.0	2.9	0.0	1.9		0.0	0.0		0.0
Total Delay	32.3	40.4	56.5	14.3		39.2	23.1		21.0
LOS	C	D	E	B		D	C		C
Approach Delay		40.3		25.5		26.1		21.0	
Approach LOS		D		C		C		C	
Queue Length 50th (ft)	6	345	212	227		124	336		18
Queue Length 95th (ft)	22	404	m254	m263		200	450		51
Internal Link Dist (ft)		284		359		266		163	
Turn Bay Length (ft)	250		250				150		
Base Capacity (vph)	85	1791	801	2181		407	1210		469
Starvation Cap Reductn	0	0	0	365		0	0		0
Spillback Cap Reductn	0	305	0	0		0	0		1
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.13	0.92	0.75	0.90		0.48	0.72		0.12

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 117 (98%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.9

Intersection LOS: C

Intersection Capacity Utilization 87.6%

ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
PM 2045 Conditions Feasible Alt A



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑↑→	↖	↑↑←	↖	↑	↖	↓
Traffic Volume (vph)	1880	250	1690	360	0	10	0
Future Volume (vph)	1880	250	1690	360	0	10	0
Lane Group Flow (vph)	2119	272	1859	391	228	0	22
Turn Type	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2	1	6		8		4
Permitted Phases			6		8		4
Detector Phase	2	1	6	8	8	4	4
Switch Phase							
Minimum Initial (s)	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.0	11.5	25.0	15.0	15.0	15.0	15.0
Total Split (s)	58.0	21.0	79.0	41.0	41.0	41.0	41.0
Total Split (%)	48.3%	17.5%	65.8%	34.2%	34.2%	34.2%	34.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.0	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	4.5	5.0	5.0	5.0		5.0
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	54.5	75.2	74.7	35.3	35.3		35.3
Actuated g/C Ratio	0.45	0.63	0.62	0.29	0.29		0.29
v/c Ratio	0.92	0.92	0.84	0.96	0.35		0.05
Control Delay	27.2	59.0	14.5	78.3	3.8		0.2
Queue Delay	3.1	0.0	0.5	0.0	0.0		0.0
Total Delay	30.3	59.0	15.0	78.3	3.8		0.2
LOS	C	E	B	E	A		A
Approach Delay	30.3		20.6		50.9		0.2
Approach LOS	C		C		D		A
Queue Length 50th (ft)	412	155	510	295	0		0
Queue Length 95th (ft)	#530	m#275	707	#491	39		0
Internal Link Dist (ft)	359		768		204		113
Turn Bay Length (ft)		155					
Base Capacity (vph)	2299	305	2200	415	656		490
Starvation Cap Reductn	115	0	81	0	0		0
Spillback Cap Reductn	0	0	47	0	0		0
Storage Cap Reductn	0	0	0	0	0		0
Reduced v/c Ratio	0.97	0.89	0.88	0.94	0.35		0.04

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 3 (3%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 28.6

Intersection LOS: C

Intersection Capacity Utilization 90.4%

ICU Level of Service E

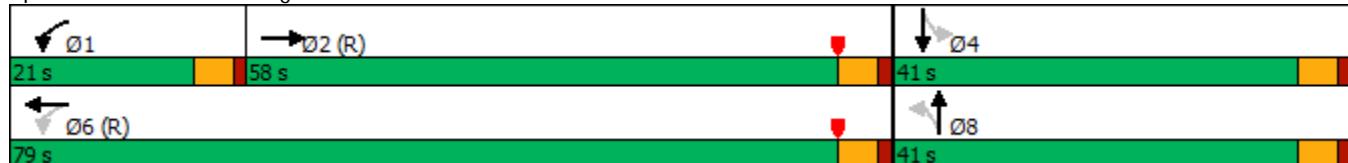
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

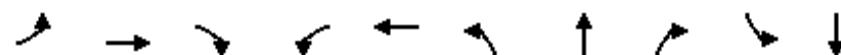


3: SB US 23 Ramp/Glasgow Road & Monroe Street

Sylvania Interchange PID 105889

Timings

PM 2045 Conditions Feasible Alt A



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑↑	↑	↑	↑	↑
Traffic Volume (vph)	60	1420	620	740	1770	170	40	160	40	10
Future Volume (vph)	60	1420	620	740	1770	170	40	160	40	10
Lane Group Flow (vph)	65	1543	674	804	2054	185	111	106	43	33
Turn Type	Perm	NA	Free	Prot	NA	Split	NA	Perm	Split	NA
Protected Phases		2			1	6	8	8	4	4
Permitted Phases	2		Free					8		
Detector Phase	2	2		1	6	8	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0		7.0	20.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	26.0	26.0		12.0	26.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	60.0	60.0		34.0	94.0	15.0	15.0	15.0	11.0	11.0
Total Split (%)	50.0%	50.0%		28.3%	78.3%	12.5%	12.5%	12.5%	9.2%	9.2%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None
Act Effct Green (s)	56.9	56.9	120.0	29.3	91.2	10.0	10.0	10.0	5.9	5.9
Actuated g/C Ratio	0.47	0.47	1.00	0.24	0.76	0.08	0.08	0.08	0.05	0.05
v/c Ratio	0.83	0.92	0.43	0.96	0.77	0.65	0.61	0.47	0.49	0.32
Control Delay	80.3	41.9	1.3	54.3	4.0	64.5	44.6	16.4	75.1	37.1
Queue Delay	0.0	0.0	0.0	0.0	1.1	0.0	11.5	2.2	1.3	0.0
Total Delay	80.3	41.9	1.3	54.3	5.1	64.5	56.1	18.7	76.4	37.1
LOS	F	D	A	D	A	E	E	B	E	D
Approach Delay		31.0			18.9		50.1		59.3	
Approach LOS		C			B		D		E	
Queue Length 50th (ft)	33	424	0	288	88	72	46	0	33	8
Queue Length 95th (ft)	m#42	m#508	m0	m251	m112	112	#117	55	#77	43
Internal Link Dist (ft)		768			649		1050		240	
Turn Bay Length (ft)	135			350				115		
Base Capacity (vph)	78	1679	1583	837	2669	286	181	225	88	104
Starvation Cap Reductn	0	0	0	0	350	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	38	0	47	47	6	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.92	0.43	0.96	0.89	0.65	0.83	0.60	0.52	0.32

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 106 (88%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 26.6

Intersection LOS: C

Intersection Capacity Utilization 93.4%

ICU Level of Service F

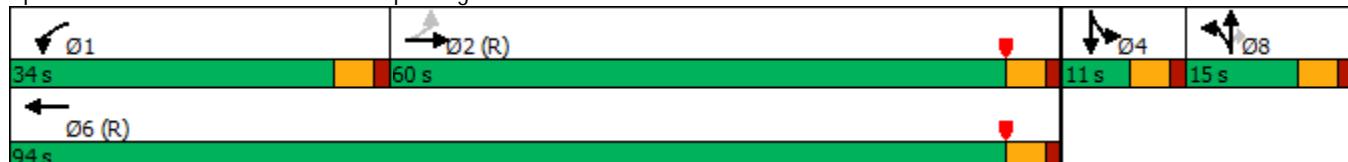
Analysis Period (min) 15

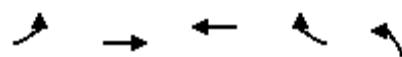
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

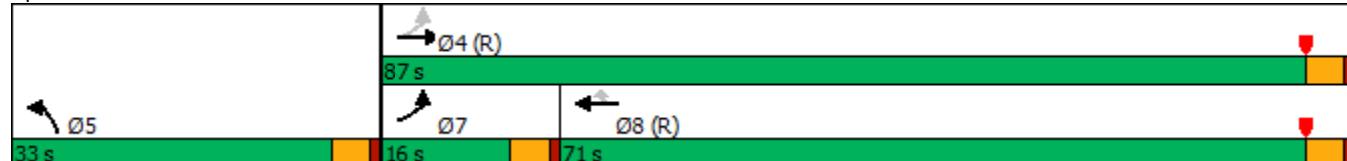




Lane Group	EBL	EBT	WBT	WBR	NBL
Lane Configurations	↑	↑↑	↑↑	↑	↑↑
Traffic Volume (vph)	220	1400	1990	270	640
Future Volume (vph)	220	1400	1990	270	640
Lane Group Flow (vph)	239	1522	2163	293	696
Turn Type	pm+pt	NA	NA	Perm	Prot
Protected Phases	7	4	8		5
Permitted Phases	4			8	
Detector Phase	7	4	8	8	5
Switch Phase					
Minimum Initial (s)	7.0	20.0	20.0	20.0	10.0
Minimum Split (s)	11.5	24.5	24.5	24.5	14.5
Total Split (s)	16.0	87.0	71.0	71.0	33.0
Total Split (%)	13.3%	72.5%	59.2%	59.2%	27.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lead		Lag	Lag	
Lead-Lag Optimize?					
Recall Mode	None	C-Max	C-Max	C-Max	None
Act Effct Green (s)	83.0	83.0	66.5	66.5	28.0
Actuated g/C Ratio	0.69	0.69	0.55	0.55	0.23
v/c Ratio	1.00	0.62	1.10	0.30	0.87
Control Delay	69.0	27.4	72.1	4.4	56.8
Queue Delay	0.0	2.6	0.0	0.0	0.0
Total Delay	69.0	29.9	72.1	4.4	56.8
LOS	E	C	E	A	E
Approach Delay		35.2	64.0		
Approach LOS		D	E		
Queue Length 50th (ft)	~169	590	~1022	27	267
Queue Length 95th (ft)	m#191	m655	#1117	m43	#359
Internal Link Dist (ft)		649	502		
Turn Bay Length (ft)	200				
Base Capacity (vph)	238	2447	1961	962	815
Starvation Cap Reductn	0	768	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.00	0.91	1.10	0.30	0.85
Intersection Summary					
Cycle Length: 120					
Actuated Cycle Length: 120					
Offset: 70.5 (59%), Referenced to phase 4:EBTL and 8:WBT, Start of Yellow					
Natural Cycle: 120					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 1.10					
Intersection Signal Delay: 52.7				Intersection LOS: D	
Intersection Capacity Utilization 96.3%				ICU Level of Service F	
Analysis Period (min) 15					

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

Splits and Phases: 4: NB On Off & Monroe Street



5: Monroe Street & Alexis Road
Timings

Sylvania Interchange PID 105889
PM 2045 Conditions Feasible Alt A

								Ø4
Lane Group	EBL	EBT	WBT	NET	NER	SWL	SWR	Ø4
Lane Configurations								
Traffic Volume (vph)	780	620	1180	530	330	40	1080	
Future Volume (vph)	780	620	1180	530	330	40	1080	
Lane Group Flow (vph)	848	674	1359	576	359	141	1174	
Turn Type	Prot	NA	NA	NA	Perm	Prot	pm+ov	
Protected Phases	5	2	6	8		7	5	4
Permitted Phases					8		4	
Detector Phase	5	2	6	8	8	7	5	
Switch Phase								
Minimum Initial (s)	10.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.5	24.5	24.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	34.4	72.9	38.5	24.6	24.6	22.5	34.4	47.1
Total Split (%)	28.7%	60.8%	32.1%	20.5%	20.5%	18.8%	28.7%	39%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lead/Lag	Lead		Lag	Lag	Lag	Lead	Lead	
Lead-Lag Optimize?				Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	29.9	71.9	37.5	20.1	20.1	14.5	73.5	
Actuated g/C Ratio	0.25	0.60	0.31	0.17	0.17	0.12	0.61	
v/c Ratio	0.99	0.32	0.86	0.97	0.65	0.66	0.69	
Control Delay	72.0	4.8	39.7	80.8	11.4	64.2	16.5	
Queue Delay	0.0	0.0	2.8	0.0	0.0	0.0	0.0	
Total Delay	72.0	4.8	42.5	80.8	11.4	64.2	16.5	
LOS	E	A	D	F	B	E	B	
Approach Delay		42.3	42.5	54.2				
Approach LOS		D	D	D				
Queue Length 50th (ft)	261	30	368	236	7	104	294	
Queue Length 95th (ft)	#463	33	#476	#353	100	162	332	
Internal Link Dist (ft)		502	395	1039				
Turn Bay Length (ft)	300				300	140		
Base Capacity (vph)	855	2121	1583	592	554	265	1711	
Starvation Cap Reductn	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	135	0	0	0	28	
Storage Cap Reductn	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.99	0.32	0.94	0.97	0.65	0.53	0.70	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 62 (52%), Referenced to phase 2:EBT and 6:WBT, Start of Yellow

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.99

Intersection Signal Delay: 39.2

Intersection LOS: D

Intersection Capacity Utilization 83.0%

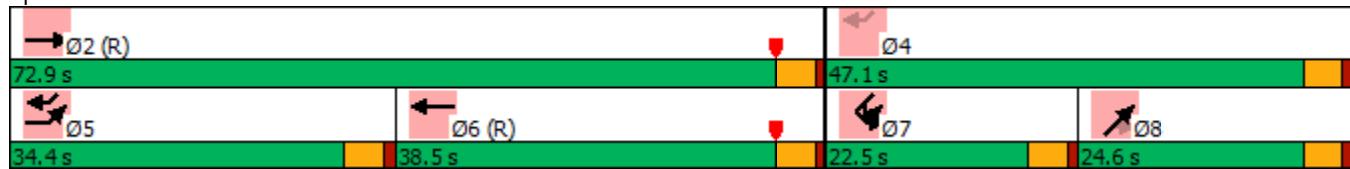
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

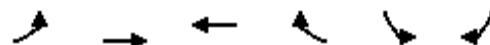
Queue shown is maximum after two cycles.

Splits and Phases: 5: Monroe Street & Alexis Road



6: Alexis Road & Acres
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889
PM 2045 Conditions Feasible Alt A



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑		↑	
Traffic Volume (veh/h)	120	1350	970	50	0	240
Future Volume (Veh/h)	120	1350	970	50	0	240
Sign Control	Free	Free		Stop		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	1467	1054	54	0	261
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None				
Median storage veh						
Upstream signal (ft)	320	1032				
pX, platoon unblocked	0.95			0.87	0.95	
vC, conflicting volume	1108			2074	554	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1005			1669	420	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	80			100	53	
cM capacity (veh/h)	650			61	552	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	130	734	734	703	405	261
Volume Left	130	0	0	0	0	0
Volume Right	0	0	0	0	54	261
cSH	650	1700	1700	1700	1700	552
Volume to Capacity	0.20	0.43	0.43	0.41	0.24	0.47
Queue Length 95th (ft)	19	0	0	0	0	63
Control Delay (s)	11.9	0.0	0.0	0.0	0.0	17.3
Lane LOS	B				C	
Approach Delay (s)	1.0			0.0		17.3
Approach LOS					C	
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization		49.9%		ICU Level of Service		A
Analysis Period (min)		15				



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑		↑	↑
Traffic Volume (vph)	40	1220	90	900	50	10	120	40	10	20
Future Volume (vph)	40	1220	90	900	50	10	120	40	10	20
Lane Group Flow (vph)	43	1359	98	1011	0	65	130	0	54	22
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2			6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.0	24.0	24.0	24.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	95.0	95.0	95.0	95.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	79.2%	79.2%	79.2%	79.2%	20.8%	20.8%	20.8%	20.8%	20.8%	20.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)	100.1	100.1	100.1	100.1		11.9	11.9		11.9	11.9
Actuated g/C Ratio	0.83	0.83	0.83	0.83		0.10	0.10		0.10	0.10
v/c Ratio	0.10	0.46	0.35	0.34		0.49	0.51		0.41	0.12
Control Delay	0.6	0.6	6.4	2.8		63.2	20.8		59.3	19.2
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	0.6	0.6	6.4	2.8		63.2	20.8		59.3	19.2
LOS	A	A	A	A		E	C		E	B
Approach Delay		0.6		3.1		34.9			47.7	
Approach LOS		A		A		C			D	
Queue Length 50th (ft)	0	7	12	66		49	16		40	0
Queue Length 95th (ft)	m1	m23	41	112		93	75		80	25
Internal Link Dist (ft)		952		866		215			226	
Turn Bay Length (ft)	140		140						100	
Base Capacity (vph)	421	2942	283	2939		236	366		236	295
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.10	0.46	0.35	0.34		0.28	0.36		0.23	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 78 (65%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 5.3

Intersection LOS: A

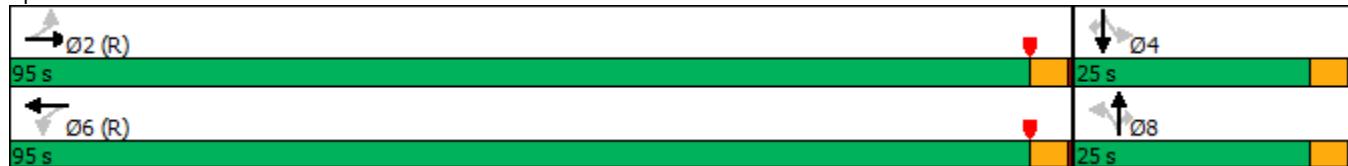
Intersection Capacity Utilization 71.3%

ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 7: Elliot Drive & Alexis Road

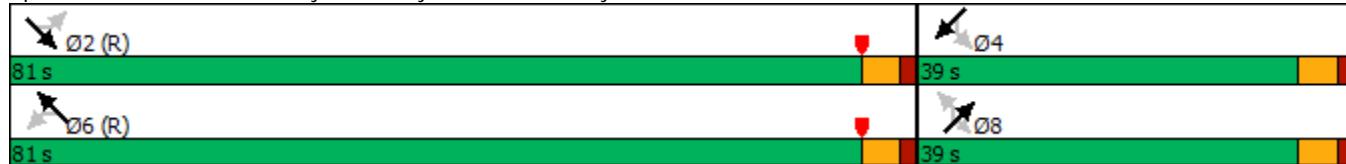


8: Fairways Driveway/Tireman Driveway & Monroe Street Sylvania Interchange PID 105889
 Timings PM 2045 Conditions Feasible Alt A

Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations									
Traffic Volume (vph)	60	840	40	1060	120	30	40	50	20
Future Volume (vph)	60	840	40	1060	120	30	40	50	20
Lane Group Flow (vph)	65	1033	43	1261	0	163	43	54	87
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	26.0	26.0	26.0	26.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	81.0	81.0	81.0	81.0	39.0	39.0	39.0	39.0	39.0
Total Split (%)	67.5%	67.5%	67.5%	67.5%	32.5%	32.5%	32.5%	32.5%	32.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	89.9	89.9	89.9	89.9		20.1	20.1	20.1	20.1
Actuated g/C Ratio	0.75	0.75	0.75	0.75		0.17	0.17	0.17	0.17
v/c Ratio	0.25	0.40	0.12	0.48		0.74	0.14	0.35	0.26
Control Delay	4.7	2.7	6.5	7.2		66.0	12.1	48.4	16.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	4.7	2.7	6.5	7.2		66.0	12.1	48.4	16.0
LOS	A	A	A	A		E	B	D	B
Approach Delay		2.8		7.2		54.7			28.4
Approach LOS		A		A		D			C
Queue Length 50th (ft)	6	53	8	171		121	0	37	15
Queue Length 95th (ft)	m15	76	26	278		184	30	73	56
Internal Link Dist (ft)		896		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	265	2611	352	2620		374	479	260	515
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.25	0.40	0.12	0.48		0.44	0.09	0.21	0.17
Intersection Summary									
Cycle Length: 120									
Actuated Cycle Length: 120									
Offset: 81 (68%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow									
Natural Cycle: 50									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.74									
Intersection Signal Delay: 10.1					Intersection LOS: B				
Intersection Capacity Utilization 73.1%					ICU Level of Service D				
Analysis Period (min) 15									

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

Splits and Phases: 8: Fairways Driveway/Tireman Driveway & Monroe Street



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	1	980	20	0	689	1
Future Volume (Veh/h)	0	0	0	0	0	0	1	980	20	0	689	1
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	1	1065	22	0	749	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											346	
pX, platoon unblocked												
vC, conflicting volume	1284	1838	375	1452	1828	544	750			1087		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1284	1838	375	1452	1828	544	750			1087		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	122	75	623	91	76	484	855			638		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	0	534	554	499	251						
Volume Left	0	0	1	0	0	0						
Volume Right	0	0	0	22	0	1						
cSH	1700	1700	855	1700	1700	1700						
Volume to Capacity	0.00	0.00	0.00	0.33	0.29	0.15						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	A	A	A									
Approach Delay (s)	0.0	0.0	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			31.8%				ICU Level of Service			A		
Analysis Period (min)			15									

Intersection Sign configuration not allowed in HCM analysis.

1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

AM 2025 Conditions Feasible Alt B



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↓	↑↓	↑↓		↑	↑↓		↓
Traffic Volume (vph)	10	1220	490	690	50	10	650	10	10
Future Volume (vph)	10	1220	490	690	50	10	650	10	10
Lane Group Flow (vph)	11	1413	533	761	0	65	707	0	33
Turn Type	Perm	NA	Prot	NA	Perm	NA	pt+ov	Perm	NA
Protected Phases			2	1	6		8	8 1	4
Permitted Phases	2					8		4	
Detector Phase	2	2	1	6	8	8	8 1	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	10.0	20.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.0	25.0	15.0	25.0	15.0	15.0		15.0	15.0
Total Split (s)	37.0	37.0	26.0	63.0	27.0	27.0		27.0	27.0
Total Split (%)	41.1%	41.1%	28.9%	70.0%	30.0%	30.0%		30.0%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0	
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	33.6	33.6	19.4	58.0		22.0	46.4		22.0
Actuated g/C Ratio	0.37	0.37	0.22	0.64		0.24	0.52		0.24
v/c Ratio	0.04	0.75	0.72	0.33		0.19	0.64		0.08
Control Delay	19.8	27.7	51.9	3.8		28.7	18.1		20.4
Queue Delay	0.0	0.1	0.0	0.0		0.0	0.0		0.0
Total Delay	19.8	27.8	51.9	3.8		28.7	18.1		20.4
LOS	B	C	D	A		C	B		C
Approach Delay		27.7		23.6		19.0		20.4	
Approach LOS		C		C		B		C	
Queue Length 50th (ft)	4	257	158	26		29	189		10
Queue Length 95th (ft)	16	314	220	54		64	275		33
Internal Link Dist (ft)		284		359		266		163	
Turn Bay Length (ft)	250		250				150		
Base Capacity (vph)	252	1889	801	2277		351	1142		410
Starvation Cap Reductn	0	0	0	0		0	0		0
Spillback Cap Reductn	0	35	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.04	0.76	0.67	0.33		0.19	0.62		0.08

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 27 (30%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 24.2

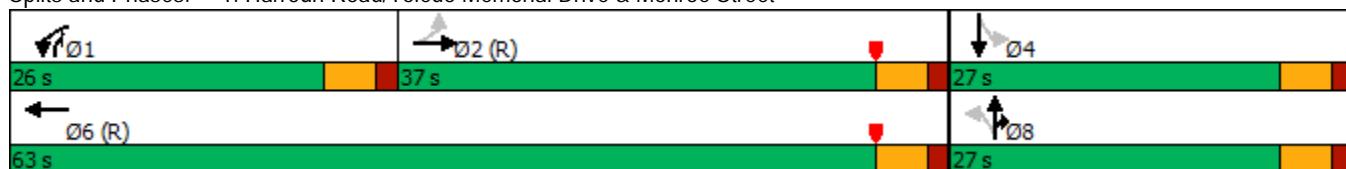
Intersection LOS: C

Intersection Capacity Utilization 68.9%

ICU Level of Service C

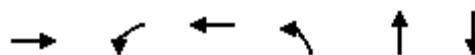
Analysis Period (min) 15

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



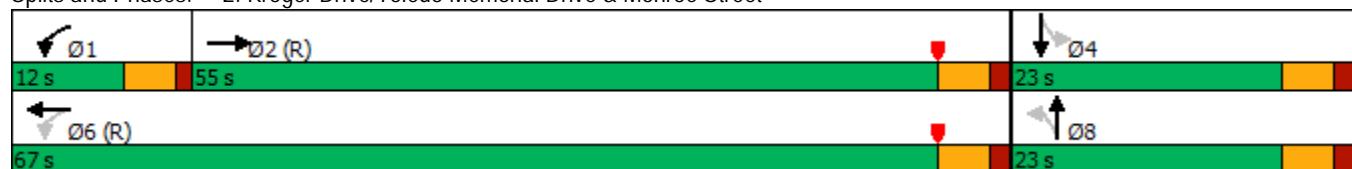
2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
AM 2025 Conditions Feasible Alt B



Lane Group	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	↑↑↓	↑	↑↓	↑	↓	↔
Traffic Volume (vph)	1750	60	1050	130	0	0
Future Volume (vph)	1750	60	1050	130	0	0
Lane Group Flow (vph)	2043	65	1152	141	87	11
Turn Type	NA	pm+pt	NA	Perm	NA	NA
Protected Phases	2	1	6		8	4
Permitted Phases				8		
Detector Phase	2	1	6	8	8	4
Switch Phase						
Minimum Initial (s)	20.0	7.0	20.0	10.0	10.0	10.0
Minimum Split (s)	25.0	11.5	25.0	15.0	15.0	15.0
Total Split (s)	55.0	12.0	67.0	23.0	23.0	23.0
Total Split (%)	61.1%	13.3%	74.4%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.0	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	4.5	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lead				
Lead-Lag Optimize?						
Recall Mode	C-Max	None	C-Max	None	None	None
Act Effct Green (s)	56.5	66.3	65.8	14.2	14.2	14.2
Actuated g/C Ratio	0.63	0.74	0.73	0.16	0.16	0.16
v/c Ratio	0.64	0.29	0.45	0.64	0.23	0.03
Control Delay	8.5	12.7	2.2	48.7	2.2	0.2
Queue Delay	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	12.7	2.2	48.7	2.2	0.2
LOS	A	B	A	D	A	A
Approach Delay	8.7		2.7		31.0	0.2
Approach LOS	A		A		C	A
Queue Length 50th (ft)	138	3	28	76	0	0
Queue Length 95th (ft)	166	24	35	132	7	0
Internal Link Dist (ft)	359		768		204	113
Turn Bay Length (ft)	250					
Base Capacity (vph)	3170	229	2587	279	437	419
Starvation Cap Reductn	408	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.28	0.45	0.51	0.20	0.03
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 43 (48%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow						
Natural Cycle: 60						
Control Type: Actuated-Coordinated						
Maximum v/c Ratio: 0.64						
Intersection Signal Delay: 8.1				Intersection LOS: A		
Intersection Capacity Utilization 68.5%				ICU Level of Service C		
Analysis Period (min) 15						

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

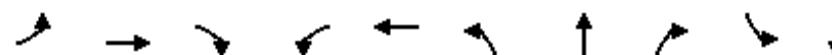


3: SB US 23 Ramp/Glasgow Road & Monroe Street

Sylvania Interchange PID 105889

Timings

AM 2025 Conditions Feasible Alt B



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑↑	↑	↑	↑	↑
Traffic Volume (vph)	10	1070	750	480	1020	90	20	150	10	10
Future Volume (vph)	10	1070	750	480	1020	90	20	150	10	10
Lane Group Flow (vph)	11	1163	815	527	1217	98	94	91	11	22
Turn Type	Perm	NA	Free	Prot	NA	Split	NA	Perm	Split	NA
Protected Phases		2			1	6	8		4	4
Permitted Phases	2			Free				8		
Detector Phase	2	2			1	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0		7.0	20.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	26.0	26.0		12.0	26.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	38.0	38.0		26.0	64.0	15.0	15.0	15.0	11.0	11.0
Total Split (%)	42.2%	42.2%		28.9%	71.1%	16.7%	16.7%	16.7%	12.2%	12.2%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None
Act Effct Green (s)	39.4	39.4	90.0	19.0	63.4	10.0	10.0	10.0	5.8	5.8
Actuated g/C Ratio	0.44	0.44	1.00	0.21	0.70	0.11	0.11	0.11	0.06	0.06
v/c Ratio	0.06	0.75	0.51	0.78	0.47	0.26	0.39	0.31	0.10	0.18
Control Delay	28.2	29.5	4.3	38.5	9.8	38.5	19.0	4.5	41.5	30.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	29.5	4.3	38.5	9.8	38.5	19.0	4.5	41.5	30.9
LOS	C	C	A	D	A	D	B	A	D	C
Approach Delay		19.2			18.5		21.1		34.5	
Approach LOS		B			B		C		C	
Queue Length 50th (ft)	4	216	38	143	164	26	11	0	6	6
Queue Length 95th (ft)	m7	#432	148	173	178	50	60	14	23	30
Internal Link Dist (ft)		768			1228		1050		240	
Turn Bay Length (ft)	135			250				115		
Base Capacity (vph)	197	1547	1583	743	2589	381	238	296	118	125
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.75	0.51	0.71	0.47	0.26	0.39	0.31	0.09	0.18

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 25 (28%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 19.1

Intersection LOS: B

Intersection Capacity Utilization 67.2%

ICU Level of Service C

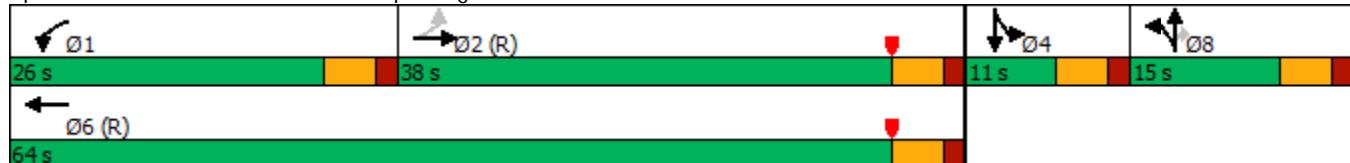
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: Monroe St & Alexis Road

Sylvania Interchange PID 105889

Timings

AM 2025 Conditions Feasible Alt B

	→	→	↗	↖	←	↙	↗	↖	→	↙	↖	→
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑	↑↑
Traffic Volume (vph)	480	620	130	20	300	70	340	320	350	20	70	880
Future Volume (vph)	480	620	130	20	300	70	340	320	350	20	70	880
Lane Group Flow (vph)	522	674	141	22	326	76	370	348	380	55	76	957
Turn Type	Prot	NA	pm+ov	pm+pt	NA	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	6	3	8	1	7	4	5
Permitted Phases			2	6					8			4
Detector Phase	5	2	3	1	6	6	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	10.0	20.0	7.0	7.0	20.0	20.0	7.0	10.0	7.0	5.0	10.0	10.0
Minimum Split (s)	22.5	24.5	11.5	11.5	24.5	24.5	11.5	22.5	11.5	9.5	22.5	22.5
Total Split (s)	23.0	31.9	18.0	17.6	26.5	26.5	18.0	28.9	17.6	11.6	22.5	23.0
Total Split (%)	25.6%	35.4%	20.0%	19.6%	29.4%	29.4%	20.0%	32.1%	19.6%	12.9%	25.0%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	Max	None	None	Max	None
Act Effct Green (s)	18.5	33.0	45.9	22.5	22.5	22.5	13.0	26.2	35.2	6.7	18.0	41.0
Actuated g/C Ratio	0.21	0.37	0.51	0.25	0.25	0.25	0.14	0.29	0.39	0.07	0.20	0.46
v/c Ratio	0.74	0.52	0.16	0.09	0.37	0.14	0.75	0.34	0.50	0.42	0.20	0.63
Control Delay	26.6	11.3	1.9	24.3	27.4	0.7	47.2	26.9	7.7	64.6	30.6	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.6	11.3	1.9	24.3	27.4	0.7	47.2	26.9	7.7	64.6	30.6	14.5
LOS	C	B	A	C	C	A	D	C	A	E	C	B
Approach Delay		16.3			22.4			27.1			18.2	
Approach LOS		B			C			C			B	
Queue Length 50th (ft)	162	102	10	8	80	1	104	84	43	34	38	176
Queue Length 95th (ft)	219	193	m21	23	123	0	152	123	90	74	75	241
Internal Link Dist (ft)		1228			395			487			240	
Turn Bay Length (ft)	300		200	200		200			300	140		
Base Capacity (vph)	705	1296	885	315	886	532	514	1031	831	139	372	1514
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.52	0.16	0.07	0.37	0.14	0.72	0.34	0.46	0.40	0.20	0.63

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 42 (47%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 20.5

Intersection LOS: C

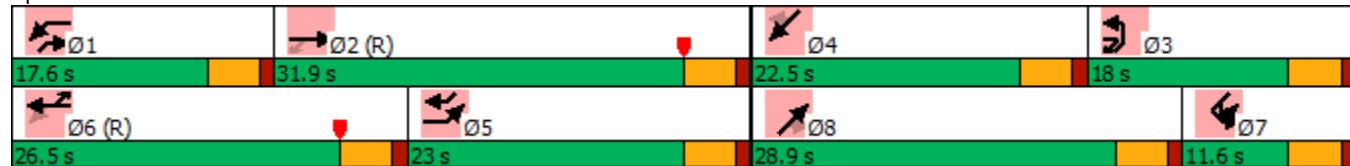
Intersection Capacity Utilization 68.4%

ICU Level of Service C

Analysis Period (min) 15

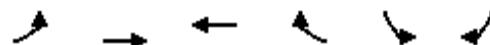
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Monroe St & Alexis Road



5: Alexis Road & Acres
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889
AM 2025 Conditions Feasible Alt B

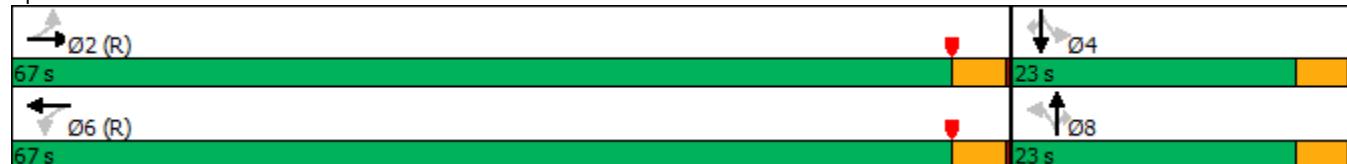


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑			↑
Traffic Volume (veh/h)	60	840	840	20	0	160
Future Volume (Veh/h)	60	840	840	20	0	160
Sign Control	Free	Free		Stop		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	913	913	22	0	174
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None				
Median storage veh						
Upstream signal (ft)	320	1032				
pX, platoon unblocked	0.92			0.95	0.92	
vC, conflicting volume	935			1510	468	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	744			1104	233	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	92			100	75	
cM capacity (veh/h)	787			179	704	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	65	456	456	609	326	174
Volume Left	65	0	0	0	0	0
Volume Right	0	0	0	0	22	174
cSH	787	1700	1700	1700	1700	704
Volume to Capacity	0.08	0.27	0.27	0.36	0.19	0.25
Queue Length 95th (ft)	7	0	0	0	0	24
Control Delay (s)	10.0	0.0	0.0	0.0	0.0	11.8
Lane LOS	A				B	
Approach Delay (s)	0.7			0.0		11.8
Approach LOS					B	
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization		40.4%		ICU Level of Service		A
Analysis Period (min)		15				

	↑	→	↖	←	↗	↑	↗	↖	↓	↙
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑		↑	↑
Traffic Volume (vph)	10	750	50	800	10	0	20	10	10	20
Future Volume (vph)	10	750	50	800	10	0	20	10	10	20
Lane Group Flow (vph)	11	848	54	881	0	11	22	0	22	22
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2			6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.0	24.0	24.0	24.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	67.0	67.0	67.0	67.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	74.4%	25.6%	25.6%	25.6%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	63.0	63.0	63.0	63.0		19.0	19.0		19.0	19.0
Actuated g/C Ratio	0.70	0.70	0.70	0.70		0.21	0.21		0.21	0.21
v/c Ratio	0.03	0.34	0.14	0.36		0.04	0.06		0.06	0.06
Control Delay	6.0	11.5	5.4	5.9		28.8	12.6		29.1	12.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	6.0	11.5	5.4	5.9		28.8	12.6		29.1	12.6
LOS	A	B	A	A		C	B		C	B
Approach Delay		11.5		5.8		18.0			20.8	
Approach LOS		B		A		B			C	
Queue Length 50th (ft)	4	207	9	89		5	0		10	0
Queue Length 95th (ft)	m6	296	22	117		19	20		30	20
Internal Link Dist (ft)		952		866		215			226	
Turn Bay Length (ft)	140		140							100
Base Capacity (vph)	385	2465	400	2473		292	351		359	351
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.03	0.34	0.14	0.36		0.04	0.06		0.06	0.06
Intersection Summary										
Cycle Length: 90										
Actuated Cycle Length: 90										
Offset: 60 (67%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow										
Natural Cycle: 45										
Control Type: Prewimed										
Maximum v/c Ratio: 0.36										
Intersection Signal Delay: 9.0					Intersection LOS: A					
Intersection Capacity Utilization 56.6%					ICU Level of Service B					
Analysis Period (min) 15										

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

Splits and Phases: 6: Elliot Drive & Alexis Road



7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

AM 2025 Conditions Feasible Alt B



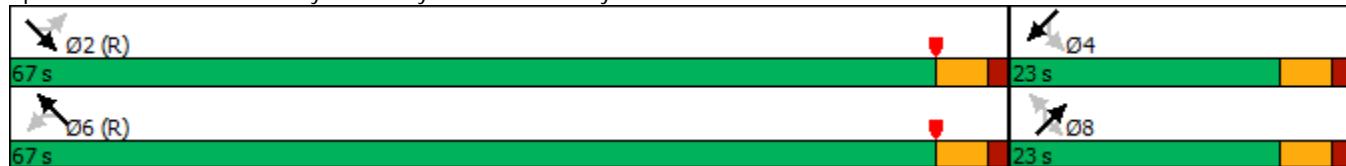
Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations	↑ ↗	↑ ↗	↑ ↗	↑ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗	↖ ↗
Traffic Volume (vph)	40	840	10	370	20	20	10	20	10
Future Volume (vph)	40	840	10	370	20	20	10	20	10
Lane Group Flow (vph)	43	935	11	445	0	44	11	22	44
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2			6		8		8	4
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	26.0	26.0	26.0	26.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	67.0	67.0	67.0	67.0	23.0	23.0	23.0	23.0	23.0
Total Split (%)	74.4%	74.4%	74.4%	74.4%	25.6%	25.6%	25.6%	25.6%	25.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	77.9	77.9	77.9	77.9		10.1	10.1	10.1	10.1
Actuated g/C Ratio	0.87	0.87	0.87	0.87		0.11	0.11	0.11	0.11
v/c Ratio	0.05	0.31	0.02	0.15		0.26	0.06	0.14	0.20
Control Delay	4.0	6.3	2.5	1.9		40.6	7.5	38.4	19.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	4.0	6.3	2.5	1.9		40.6	7.5	38.4	19.4
LOS	A	A	A	A		D	A	D	B
Approach Delay		6.2		1.9		34.0			25.7
Approach LOS		A		A		C			C
Queue Length 50th (ft)	11	212	1	24		23	0	12	6
Queue Length 95th (ft)	m16	255	5	36		56	9	34	37
Internal Link Dist (ft)		896		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	796	3050	485	3023		305	335	271	356
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.05	0.31	0.02	0.15		0.14	0.03	0.08	0.12
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 90									
Offset: 55 (61%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow									
Natural Cycle: 45									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.31									
Intersection Signal Delay: 6.7					Intersection LOS: A				
Intersection Capacity Utilization 53.0%					ICU Level of Service A				
Analysis Period (min) 15									

7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

AM 2025 Conditions Feasible Alt B

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

Splits and Phases: 7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St



9:
HCM Unsignalized Intersection Capacity Analysis

Sylvania Interchange PID 105889
AM 2025 Conditions Feasible Alt B

	→	↗	↑	↗	↖	↙
Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations				↑↑		↑
Traffic Volume (veh/h)	0	0	0	1010	0	220
Future Volume (Veh/h)	0	0	0	1010	0	220
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1098	0	239
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				567		
pX, platoon unblocked						
vC, conflicting volume	549	0	239			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	549	0	239			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	466	1084	1325			
Direction, Lane #	NE 1	NE 2	SW 1			
Volume Total	549	549	239			
Volume Left	0	0	0			
Volume Right	0	0	239			
cSH	1700	1700	1700			
Volume to Capacity	0.32	0.32	0.14			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS						
Approach Delay (s)	0.0		0.0			
Approach LOS						
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		31.3%		ICU Level of Service		A
Analysis Period (min)		15				

18: Harroun Road
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889

AM 2025 Conditions Feasible Alt B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	1	710	10	0	579	1
Future Volume (Veh/h)	0	0	0	0	0	0	1	710	10	0	579	1
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	1	772	11	0	629	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)											346	
pX, platoon unblocked												
vC, conflicting volume	1018	1414	315	1094	1410	392	630			783		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1018	1414	315	1094	1410	392	630			783		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	191	136	681	168	137	607	948			831		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	0	387	397	419	211						
Volume Left	0	0	1	0	0	0						
Volume Right	0	0	0	11	0	1						
cSH	1700	1700	948	1700	1700	1700						
Volume to Capacity	0.00	0.00	0.00	0.23	0.25	0.12						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	A	A	A									
Approach Delay (s)	0.0	0.0	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			24.0%			ICU Level of Service					A	
Analysis Period (min)			15									

Queuing and Blocking Report
AM 2025 Conditions Feasible Alt B

11/27/2018

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	EB	B20	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	TR	T	L	L	T	TR	LT	R	R
Maximum Queue (ft)	43	366	294	305	48	232	244	96	94	95	248	199
Average Queue (ft)	5	186	181	201	2	131	152	34	51	43	84	72
95th Queue (ft)	23	279	270	291	16	187	210	71	74	88	172	153
Link Distance (ft)	294	294	294	743				377	377	248	248	
Upstream Blk Time (%)	1	0	0							0		
Queuing Penalty (veh)	0	0	0							1		
Storage Bay Dist (ft)	250				250	250					150	
Storage Blk Time (%)	2					0	0			0	0	
Queuing Penalty (veh)	0					0	0			2	1	

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	200
Average Queue (ft)	187
95th Queue (ft)	191
Link Distance (ft)	191
Upstream Blk Time (%)	100
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	TR	L	T	TR	L	TR	LTR
Maximum Queue (ft)	168	139	180	91	118	126	176	86	53
Average Queue (ft)	74	83	102	38	53	41	81	40	10
95th Queue (ft)	135	139	179	82	106	85	141	70	36
Link Distance (ft)	377	377	377		739	739	220	220	141
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)				250					
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	TR	L	L	TR	R
Maximum Queue (ft)	184	508	497	329	149	118	205	201	122	18	146	132
Average Queue (ft)	4	256	248	181	85	74	108	95	49	8	49	9
95th Queue (ft)	14	416	404	327	144	121	186	164	97	21	95	28
Link Distance (ft)		739	739	739		1215	1215	1215	1061	1061	1061	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		135				250						115
Storage Blk Time (%)			45							1	0	
Queuing Penalty (veh)			5							1	0	

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (ft)	30	50
Average Queue (ft)	14	20
95th Queue (ft)	36	46
Link Distance (ft)	269	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		85
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
AM 2025 Conditions Feasible Alt B

11/27/2018

Intersection: 5: Monroe St & Alexis Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NE	NE	NE
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	150	169	104	122	52	110	185	124	74	219	204	139
Average Queue (ft)	85	98	45	57	14	26	88	53	33	127	99	86
95th Queue (ft)	130	138	91	112	40	74	142	106	64	208	175	126
Link Distance (ft)			1215	1215			386	386		473	473	473
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300	300			200	200			200			
Storage Blk Time (%)								0				
Queuing Penalty (veh)								0				

Intersection: 5: Monroe St & Alexis Road

Movement	NE	NE	SW	SW	SW	SW
Directions Served	T	R	UL	T	R	R
Maximum Queue (ft)	139	186	81	108	177	189
Average Queue (ft)	60	86	37	37	74	54
95th Queue (ft)	115	156	72	84	170	139
Link Distance (ft)	473			228	228	228
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	300	140				
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: Elliot Drive & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	30	94	116	74	156	137	28	25	28	25
Average Queue (ft)	6	56	72	26	81	55	11	7	10	10
95th Queue (ft)	24	84	102	61	142	118	32	24	29	29
Link Distance (ft)	962	962		911	911	245	245	255		
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	140			140					100	
Storage Blk Time (%)					0					
Queuing Penalty (veh)					0					

Intersection: 8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St

Movement	SE	SE	SE	NW	NW	NW	NE	SW	SW
Directions Served	L	T	TR	L	T	TR	LT	L	TR
Maximum Queue (ft)	70	113	137	30	74	70	52	72	95
Average Queue (ft)	23	45	61	3	20	10	28	22	24
95th Queue (ft)	61	105	132	18	61	40	56	60	58
Link Distance (ft)		909	909		499	499	241	156	156
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)		180			145				
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 9:

Movement	B23	B23
Directions Served	T	T
Maximum Queue (ft)	55	55
Average Queue (ft)	2	4
95th Queue (ft)	19	27
Link Distance (ft)	78	78
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Alexis Road & Acres

Movement	EB	WB	SB
Directions Served	L	TR	R
Maximum Queue (ft)	55	22	113
Average Queue (ft)	25	1	49
95th Queue (ft)	54	7	91
Link Distance (ft)		962	422
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		100	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 18: Harroun Road

Movement	NB	NB
Directions Served	LT	TR
Maximum Queue (ft)	31	133
Average Queue (ft)	2	5
95th Queue (ft)	14	46
Link Distance (ft)	634	634
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 8

1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

PM 2025 Conditions Feasible Alt B



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↑	↑↑	↑↑		↑	↑↑		↓
Traffic Volume (vph)	10	960	470	1400	130	10	610	10	10
Future Volume (vph)	10	960	470	1400	130	10	610	10	10
Lane Group Flow (vph)	11	1152	511	1533	0	152	663	0	44
Turn Type	Perm	NA	Prot	NA	Perm	NA	pt+ov	Perm	NA
Protected Phases		2	1	6		8	8 1		4
Permitted Phases	2				8			4	
Detector Phase	2	2	1	6	8	8	8 1	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	7.0	20.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	15.0	15.0		15.0	15.0
Total Split (s)	46.0	46.0	33.0	79.0	36.0	36.0		36.0	36.0
Total Split (%)	40.0%	40.0%	28.7%	68.7%	31.3%	31.3%		31.3%	31.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0			5.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	None	None		None	None
Act Effct Green (s)	46.3	46.3	23.7	75.0		30.0	58.7		30.0
Actuated g/C Ratio	0.40	0.40	0.21	0.65		0.26	0.51		0.26
v/c Ratio	0.09	0.57	0.72	0.66		0.44	0.60		0.10
Control Delay	26.7	28.4	45.3	7.9		39.9	21.1		19.7
Queue Delay	0.0	0.0	0.0	0.7		0.0	0.0		0.0
Total Delay	26.7	28.4	45.3	8.6		39.9	21.1		19.7
LOS	C	C	D	A		D	C		B
Approach Delay		28.4		17.7		24.6			19.7
Approach LOS		C		B		C			B
Queue Length 50th (ft)	5	239	156	214		93	233		12
Queue Length 95th (ft)	20	305	208	115		158	294		41
Internal Link Dist (ft)		284		359		266			163
Turn Bay Length (ft)	250		250				150		
Base Capacity (vph)	125	2027	835	2306		356	1156		451
Starvation Cap Reductn	0	0	0	404		0	0		0
Spillback Cap Reductn	0	27	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.09	0.58	0.61	0.81		0.43	0.57		0.10

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 3 (3%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 22.2

Intersection LOS: C

Intersection Capacity Utilization 82.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
PM 2025 Conditions Feasible Alt B



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑↑→	↑	↑↑←	↑	↑	↓	↓
Traffic Volume (vph)	1530	220	1580	290	0	10	0
Future Volume (vph)	1530	220	1580	290	0	10	0
Lane Group Flow (vph)	1717	239	1728	315	185	0	22
Turn Type	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2	1	6		8		4
Permitted Phases			6		8		4
Detector Phase	2	1	6	8	8	4	4
Switch Phase							
Minimum Initial (s)	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.0	11.5	25.0	15.0	15.0	15.0	15.0
Total Split (s)	51.0	23.0	74.0	41.0	41.0	41.0	41.0
Total Split (%)	44.3%	20.0%	64.3%	35.7%	35.7%	35.7%	35.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.0	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	4.5	5.0	5.0	5.0		5.0
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	55.4	74.9	74.4	30.6	30.6		30.6
Actuated g/C Ratio	0.48	0.65	0.65	0.27	0.27		0.27
v/c Ratio	0.70	0.83	0.76	0.86	0.28		0.05
Control Delay	19.8	53.7	12.5	61.5	1.1		0.2
Queue Delay	0.1	0.0	0.1	0.0	0.0		0.0
Total Delay	19.9	53.7	12.6	61.5	1.1		0.2
LOS	B	D	B	E	A		A
Approach Delay	19.9		17.6		39.2		0.2
Approach LOS	B		B		D		A
Queue Length 50th (ft)	230	122	263	217	0		0
Queue Length 95th (ft)	323	m#201	453	316	0		0
Internal Link Dist (ft)	359		768		204		113
Turn Bay Length (ft)		250					
Base Capacity (vph)	2440	346	2288	433	711		514
Starvation Cap Reductn	92	0	47	0	0		0
Spillback Cap Reductn	0	0	42	0	0		0
Storage Cap Reductn	0	0	0	0	0		0
Reduced v/c Ratio	0.73	0.69	0.77	0.73	0.26		0.04

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 107 (93%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 21.0

Intersection LOS: C

Intersection Capacity Utilization 77.7%

ICU Level of Service D

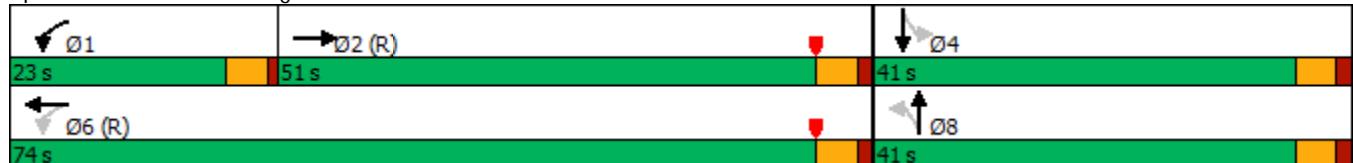
Analysis Period (min) 15

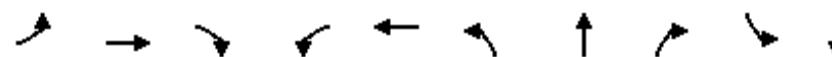
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street





Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑↑	↑	↑	↑	↑
Traffic Volume (vph)	40	1180	490	580	1660	130	10	130	30	10
Future Volume (vph)	40	1180	490	580	1660	130	10	130	30	10
Lane Group Flow (vph)	43	1283	533	644	1918	141	77	75	33	33
Turn Type	Perm	NA	Free	Prot	NA	Split	NA	Perm	Split	NA
Protected Phases		2			1	6	8	8	4	4
Permitted Phases	2			Free				8		
Detector Phase	2	2			1	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0		7.0	20.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	26.0	26.0		12.0	26.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	48.0	48.0		41.0	89.0	15.0	15.0	15.0	11.0	11.0
Total Split (%)	41.7%	41.7%		35.7%	77.4%	13.0%	13.0%	13.0%	9.6%	9.6%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None
Act Effct Green (s)	53.9	53.9	115.0	27.3	86.2	10.0	10.0	10.0	5.9	5.9
Actuated g/C Ratio	0.47	0.47	1.00	0.24	0.75	0.09	0.09	0.09	0.05	0.05
v/c Ratio	0.41	0.77	0.34	0.77	0.70	0.47	0.40	0.32	0.37	0.31
Control Delay	25.7	17.3	0.7	27.9	5.4	55.6	21.8	6.6	64.3	35.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.7	17.3	0.7	27.9	5.4	55.6	21.8	6.6	64.3	35.2
LOS	C	B	A	C	A	E	C	A	E	D
Approach Delay		12.7			11.0		34.2		49.8	
Approach LOS		B			B		C		D	
Queue Length 50th (ft)	8	132	0	235	201	52	8	0	24	8
Queue Length 95th (ft)	m15	#214	0	m251	m212	85	57	18	58	41
Internal Link Dist (ft)		768			1226		1050		240	
Turn Bay Length (ft)	135			250				115		
Base Capacity (vph)	106	1658	1583	1096	2741	298	194	234	92	108
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.77	0.34	0.59	0.70	0.47	0.40	0.32	0.36	0.31

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 111 (97%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 13.6

Intersection LOS: B

Intersection Capacity Utilization 88.6%

ICU Level of Service E

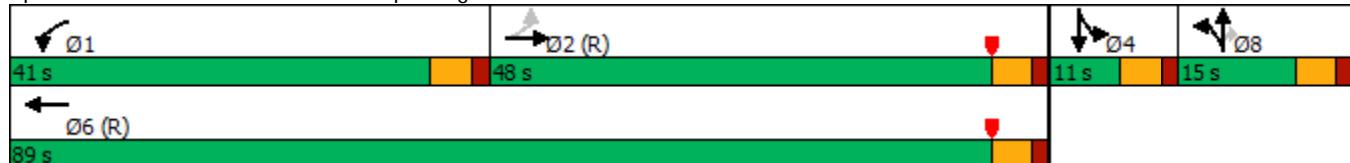
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

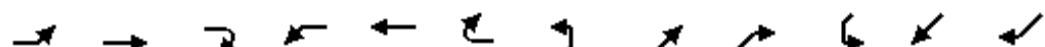


4: Monroe St & Alexis Road

Sylvania Interchange PID 105889

Timings

PM 2025 Conditions Feasible Alt B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑	↑↑
Traffic Volume (vph)	650	580	110	140	940	70	500	430	260	40	80	900
Future Volume (vph)	650	580	110	140	940	70	500	430	260	40	80	900
Lane Group Flow (vph)	707	630	120	152	1022	76	543	467	283	108	87	978
Turn Type	Prot	NA	pm+ov	pm+pt	NA	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	6	3	8	1	7	4	5
Permitted Phases				2	6					8		4
Detector Phase	5	2	3	1	6	6	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	10.0	20.0	7.0	7.0	20.0	20.0	7.0	10.0	7.0	5.0	10.0	10.0
Minimum Split (s)	22.5	24.5	11.5	11.5	24.5	24.5	11.5	22.5	11.5	9.5	22.5	22.5
Total Split (s)	29.2	48.7	23.7	20.1	39.6	39.6	23.7	28.2	20.1	18.0	22.5	29.2
Total Split (%)	25.4%	42.3%	20.6%	17.5%	34.4%	34.4%	20.6%	24.5%	17.5%	15.7%	19.6%	25.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	Max	None	None	Max	None
Act Effct Green (s)	24.7	47.2	70.9	35.1	35.1	35.1	19.2	23.7	36.3	13.5	18.0	42.7
Actuated g/C Ratio	0.21	0.41	0.62	0.31	0.31	0.31	0.17	0.21	0.32	0.12	0.16	0.37
v/c Ratio	0.96	0.43	0.12	0.59	0.95	0.14	0.95	0.64	0.41	0.52	0.30	0.83
Control Delay	50.3	10.1	2.2	44.4	54.0	5.9	74.5	46.4	4.3	51.4	40.1	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	10.1	2.2	44.4	54.0	5.9	74.5	46.4	4.3	51.4	40.1	22.4
LOS	D	B	A	D	D	A	E	D	A	D	D	C
Approach Delay		29.0			49.9			49.0			26.4	
Approach LOS		C			D			D			C	
Queue Length 50th (ft)	286	141	6	74	301	0	207	167	6	77	51	167
Queue Length 95th (ft)	#401	155	m18	160	#505	26	#313	224	45	138	94	225
Internal Link Dist (ft)		1226			395			487			240	
Turn Bay Length (ft)	300		200	200		200			300	140		
Base Capacity (vph)	737	1452	1021	296	1080	552	573	729	716	207	291	1179
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.43	0.12	0.51	0.95	0.14	0.95	0.64	0.40	0.52	0.30	0.83

Intersection Summary

Cycle Length: 115

Actuated Cycle Length: 115

Offset: 10 (9%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 38.5

Intersection LOS: D

Intersection Capacity Utilization 83.0%

ICU Level of Service E

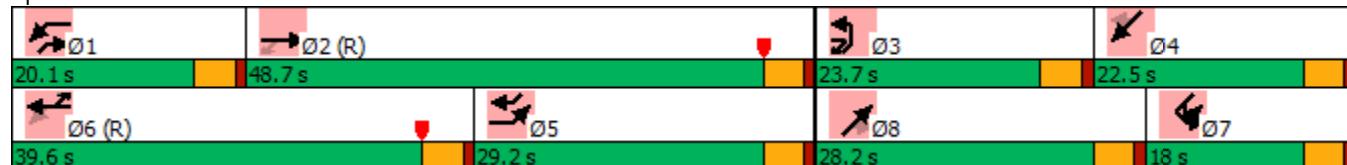
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

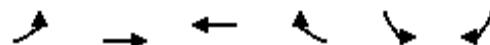
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Monroe St & Alexis Road



5: Alexis Road & Acres
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889
PM 2025 Conditions Feasible Alt B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑			↑
Traffic Volume (veh/h)	90	1120	900	40	0	180
Future Volume (Veh/h)	90	1120	900	40	0	180
Sign Control	Free	Free		Stop		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	1217	978	43	0	196
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None				
Median storage veh						
Upstream signal (ft)		320	1032			
pX, platoon unblocked	0.91			0.93	0.91	
vC, conflicting volume	1021			1804	510	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	814			1260	250	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	87			100	71	
cM capacity (veh/h)	732			131	679	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	98	608	608	652	369	196
Volume Left	98	0	0	0	0	0
Volume Right	0	0	0	0	43	196
cSH	732	1700	1700	1700	1700	679
Volume to Capacity	0.13	0.36	0.36	0.38	0.22	0.29
Queue Length 95th (ft)	12	0	0	0	0	30
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	12.4
Lane LOS	B					B
Approach Delay (s)	0.8			0.0		12.4
Approach LOS						B
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization		44.0%		ICU Level of Service		A
Analysis Period (min)		15				

6: Elliot Drive & Alexis Road

Sylvania Interchange PID 105889

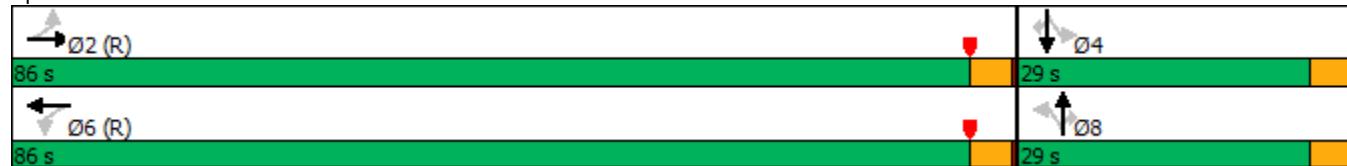
Timings

PM 2025 Conditions Feasible Alt B

	↗	→	↖	←	↖	↑	↗	↖	↓	↖
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↑↖	↖	↑↖		↖	↖		↖	↖
Traffic Volume (vph)	40	1010	70	830	40	10	100	30	10	20
Future Volume (vph)	40	1010	70	830	40	10	100	30	10	20
Lane Group Flow (vph)	43	1120	76	935	0	54	109	0	44	22
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2			6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.0	24.0	24.0	24.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	86.0	86.0	86.0	86.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	74.8%	74.8%	74.8%	74.8%	25.2%	25.2%	25.2%	25.2%	25.2%	25.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	82.0	82.0	82.0	82.0		25.0	25.0		25.0	25.0
Actuated g/C Ratio	0.71	0.71	0.71	0.71		0.22	0.22		0.22	0.22
v/c Ratio	0.12	0.44	0.26	0.37		0.17	0.25		0.13	0.06
Control Delay	0.6	0.6	8.6	6.9		38.3	8.6		37.7	14.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	0.6	0.6	8.6	6.9		38.3	8.6		37.7	14.4
LOS	A	A	A	A		D	A		D	B
Approach Delay		0.6		7.0		18.4			30.0	
Approach LOS		A		A		B			C	
Queue Length 50th (ft)	1	8	18	124		33	0		26	0
Queue Length 95th (ft)	m0	m4	40	155		69	47		59	22
Internal Link Dist (ft)		952		866		215			226	
Turn Bay Length (ft)	140		140							100
Base Capacity (vph)	363	2517	288	2513		319	429		327	361
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.12	0.44	0.26	0.37		0.17	0.25		0.13	0.06
Intersection Summary										
Cycle Length: 115										
Actuated Cycle Length: 115										
Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow										
Natural Cycle: 50										
Control Type: Prewimed										
Maximum v/c Ratio: 0.44										
Intersection Signal Delay: 5.3					Intersection LOS: A					
Intersection Capacity Utilization 64.6%					ICU Level of Service C					
Analysis Period (min) 15										

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

Splits and Phases: 6: Elliot Drive & Alexis Road



7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

PM 2025 Conditions Feasible Alt B



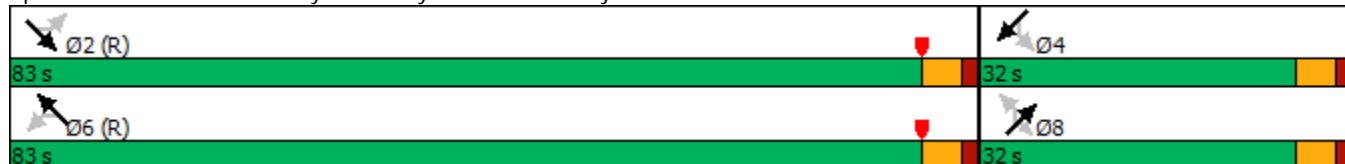
Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑	↑	↑
Traffic Volume (vph)	50	800	30	960	80	20	30	40	20
Future Volume (vph)	50	800	30	960	80	20	30	40	20
Lane Group Flow (vph)	54	968	33	1141	0	109	33	43	76
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2			6		8		8	4
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	26.0	26.0	26.0	26.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	83.0	83.0	83.0	83.0	32.0	32.0	32.0	32.0	32.0
Total Split (%)	72.2%	72.2%	72.2%	72.2%	27.8%	27.8%	27.8%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	90.0	90.0	90.0	90.0		15.0	15.0	15.0	15.0
Actuated g/C Ratio	0.78	0.78	0.78	0.78		0.13	0.13	0.13	0.13
v/c Ratio	0.16	0.35	0.08	0.42		0.63	0.14	0.29	0.29
Control Delay	3.4	2.6	4.2	4.8		62.5	14.7	48.4	19.8
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	3.4	2.6	4.2	4.8		62.5	14.7	48.4	19.8
LOS	A	A	A	A		E	B	D	B
Approach Delay		2.6		4.8		51.4			30.1
Approach LOS		A		A		D			C
Queue Length 50th (ft)	4	45	5	112		78	0	29	15
Queue Length 95th (ft)	m14	74	16	187		131	28	62	55
Internal Link Dist (ft)		896		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	332	2733	408	2738		313	396	271	431
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.16	0.35	0.08	0.42		0.35	0.08	0.16	0.18
Intersection Summary									
Cycle Length: 115									
Actuated Cycle Length: 115									
Offset: 52 (45%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow									
Natural Cycle: 45									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.63									
Intersection Signal Delay: 7.8					Intersection LOS: A				
Intersection Capacity Utilization 62.0%					ICU Level of Service B				
Analysis Period (min) 15									

7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

PM 2025 Conditions Feasible Alt B

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

Splits and Phases: 7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St



9:
HCM Unsignalized Intersection Capacity Analysis

Sylvania Interchange PID 105889
PM 2025 Conditions Feasible Alt B



Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations				↑↑		↑
Traffic Volume (veh/h)	0	0	0	1190	0	330
Future Volume (Veh/h)	0	0	0	1190	0	330
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1293	0	359
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				567		
pX, platoon unblocked						
vC, conflicting volume	646	0	359			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	646	0	359			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	404	1084	1196			
Direction, Lane #	NE 1	NE 2	SW 1			
Volume Total	646	646	359			
Volume Left	0	0	0			
Volume Right	0	0	359			
cSH	1700	1700	1700			
Volume to Capacity	0.38	0.38	0.21			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS						
Approach Delay (s)	0.0		0.0			
Approach LOS						
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		36.2%		ICU Level of Service		A
Analysis Period (min)		15				

18: Harroun Road
HCM Unsignedized Intersection Capacity Analysis

Sylvania Interchange PID 105889
PM 2025 Conditions Feasible Alt B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	1	750	20	0	579	1
Future Volume (Veh/h)	0	0	0	0	0	0	1	750	20	0	579	1
Sign Control	Stop				Stop			Free			Free	
Grade		0%				0%			0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	1	815	22	0	629	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)											346	
pX, platoon unblocked												
vC, conflicting volume	1039	1468	315	1142	1458	418	630			837		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1039	1468	315	1142	1458	418	630			837		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	185	126	681	155	128	583	948			793		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	0	408	430	419	211						
Volume Left	0	0	1	0	0	0						
Volume Right	0	0	0	22	0	1						
cSH	1700	1700	948	1700	1700	1700						
Volume to Capacity	0.00	0.00	0.00	0.25	0.25	0.12						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	A	A	A									
Approach Delay (s)	0.0	0.0	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization		25.4%		ICU Level of Service					A			
Analysis Period (min)		15										

Queuing and Blocking Report
PM 2025 Conditions Feasible Alt B

11/27/2018

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	L	T	TR	LT	R	R	LTR
Maximum Queue (ft)	24	265	288	283	236	248	209	228	175	176	196	198
Average Queue (ft)	3	184	163	180	122	143	108	126	82	68	62	172
95th Queue (ft)	15	253	242	268	216	226	171	187	152	163	148	227
Link Distance (ft)		296	296	296			376	376	249	249		191
Upstream Blk Time (%)		0	0									82
Queuing Penalty (veh)		0	0									0
Storage Bay Dist (ft)	250				250	250					150	
Storage Blk Time (%)		1			0	0				1	0	
Queuing Penalty (veh)		0			0	3				2	0	

Intersection: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	TR	L	T	TR	L	TR	LTR
Maximum Queue (ft)	307	439	409	299	439	350	235	132	52
Average Queue (ft)	185	187	181	98	175	157	178	56	18
95th Queue (ft)	285	314	306	179	288	273	266	108	46
Link Distance (ft)	376	376	376		739	739	220	220	141
Upstream Blk Time (%)		1	1				7		
Queuing Penalty (veh)		5	3				0		
Storage Bay Dist (ft)		250							
Storage Blk Time (%)				2					
Queuing Penalty (veh)				5					

Queuing and Blocking Report
PM 2025 Conditions Feasible Alt B

11/27/2018

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	T	L	L	T	TR	L	L	TR	R	L
Maximum Queue (ft)	184	536	592	201	215	255	280	128	115	145	97	93
Average Queue (ft)	58	323	284	105	126	147	152	58	13	50	9	35
95th Queue (ft)	171	543	506	167	207	258	244	96	30	113	39	72
Link Distance (ft)		739	739		1199	1199	1199	1061	1061	1061		269
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		135			250						115	
Storage Blk Time (%)			43							3	0	0
Queuing Penalty (veh)			17							2	0	0

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	SB
Directions Served	TR
Maximum Queue (ft)	71
Average Queue (ft)	20
95th Queue (ft)	51
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	85
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Queuing and Blocking Report
PM 2025 Conditions Feasible Alt B

11/27/2018

Intersection: 5: Monroe St & Alexis Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	B17	NE	NE
Directions Served	L	L	T	T	R	L	T	T	R	T	L	L
Maximum Queue (ft)	224	218	110	138	48	250	456	455	250	39	381	370
Average Queue (ft)	141	157	53	64	17	163	294	302	130	2	226	204
95th Queue (ft)	209	212	95	120	43	277	436	447	285	16	349	332
Link Distance (ft)			1199	1199			386	386		909	462	462
Upstream Blk Time (%)							3	4				
Queuing Penalty (veh)							17	20				
Storage Bay Dist (ft)	300	300			200	200			200			
Storage Blk Time (%)							1	27	28			
Queuing Penalty (veh)							6	38	19			

Intersection: 5: Monroe St & Alexis Road

Movement	NE	NE	NE	SW	SW	SW	SW
Directions Served	T	T	R	UL	T	R	R
Maximum Queue (ft)	206	192	128	144	260	269	228
Average Queue (ft)	124	101	46	69	66	143	125
95th Queue (ft)	185	168	109	118	191	236	194
Link Distance (ft)	462	462			228	228	228
Upstream Blk Time (%)					1	1	0
Queuing Penalty (veh)					2	3	0
Storage Bay Dist (ft)		300	140				
Storage Blk Time (%)				2	0		
Queuing Penalty (veh)				1	0		

Intersection: 7: Elliot Drive & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	52	30	72	92	199	182	68	68	69	25
Average Queue (ft)	25	9	23	37	114	78	29	33	29	9
95th Queue (ft)	47	30	60	64	185	141	62	62	58	28
Link Distance (ft)		962	962		911	911	245	245	255	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	140			140					100	
Storage Blk Time (%)					2					
Queuing Penalty (veh)					2					

Intersection: 8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St

Movement	SE	SE	SE	NW	NW	NW	NE	SW	SW
Directions Served	L	T	TR	L	T	TR	LT	L	TR
Maximum Queue (ft)	90	130	134	52	203	190	141	117	98
Average Queue (ft)	31	61	76	12	86	58	62	39	38
95th Queue (ft)	71	115	126	42	153	128	116	83	78
Link Distance (ft)		909	909		499	499	241	156	156
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	180			145					
Storage Blk Time (%)					1				
Queuing Penalty (veh)					0				

Intersection: 9:

Movement	B23	B23
Directions Served	T	T
Maximum Queue (ft)	64	93
Average Queue (ft)	2	3
95th Queue (ft)	22	32
Link Distance (ft)	78	78
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Alexis Road & Acres

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	93	29	54	115
Average Queue (ft)	45	2	7	50
95th Queue (ft)	82	13	29	95
Link Distance (ft)		962	962	422
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	100			
Storage Blk Time (%)	1			
Queuing Penalty (veh)	5			

Intersection: 18: Harroun Road

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 151

1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

AM 2045 Conditions Feasible Alt B



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↓	↑↓	↑↓		↑	↑↑		↓
Traffic Volume (vph)	10	1430	600	800	60	10	750	10	10
Future Volume (vph)	10	1430	600	800	60	10	750	10	10
Lane Group Flow (vph)	11	1663	652	881	0	76	815	0	33
Turn Type	Perm	NA	Prot	NA	Perm	NA	pt+ov	Perm	NA
Protected Phases		2	1	6		8	8 1		4
Permitted Phases	2				8			4	
Detector Phase	2	2	1	6	8	8	8 1	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	10.0	20.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.0	25.0	15.0	25.0	15.0	15.0		15.0	15.0
Total Split (s)	45.0	45.0	29.0	74.0	16.0	16.0		16.0	16.0
Total Split (%)	50.0%	50.0%	32.2%	82.2%	17.8%	17.8%		17.8%	17.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0	
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	Max	Max	Max	Max	Max
Act Effct Green (s)	40.7	40.7	23.3	69.0		11.0	39.3		11.0
Actuated g/C Ratio	0.45	0.45	0.26	0.77		0.12	0.44		0.12
v/c Ratio	0.04	0.73	0.73	0.33		0.46	0.87		0.16
Control Delay	14.9	22.4	44.4	2.3		46.3	33.7		28.7
Queue Delay	0.0	0.2	0.0	0.1		0.0	0.0		0.0
Total Delay	14.9	22.6	44.4	2.4		46.3	33.7		28.7
LOS	B	C	D	A		D	C		C
Approach Delay		22.6		20.2		34.8		28.7	
Approach LOS		C		C		C		C	
Queue Length 50th (ft)	3	275	188	27		41	291		11
Queue Length 95th (ft)	13	332	261	58		86	#461		39
Internal Link Dist (ft)		284		359		266		163	
Turn Bay Length (ft)	250		250				150		
Base Capacity (vph)	272	2284	915	2708		167	956		203
Starvation Cap Reductn	0	0	0	666		0	0		0
Spillback Cap Reductn	0	121	0	0		0	0		0
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.04	0.77	0.71	0.43		0.46	0.85		0.16

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 26 (29%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 24.4

Intersection LOS: C

Intersection Capacity Utilization 76.9%

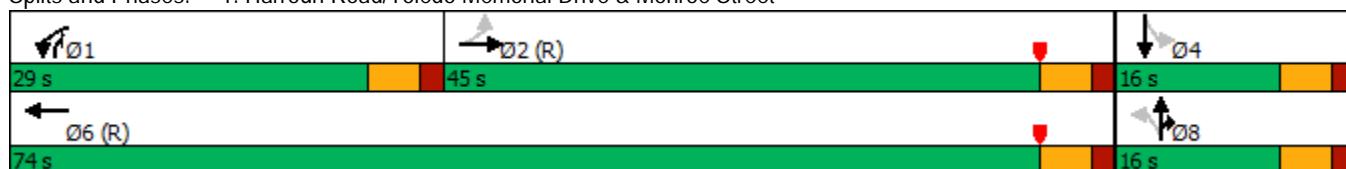
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
AM 2045 Conditions Feasible Alt B



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑↑↓	↑	↑↓	↑	↓	↑	↓
Traffic Volume (vph)	2020	80	1230	170	0	10	0
Future Volume (vph)	2020	80	1230	170	0	10	0
Lane Group Flow (vph)	2370	87	1348	185	109	0	22
Turn Type	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2	1	6		8		4
Permitted Phases			6		8		4
Detector Phase	2	1	6	8	8	4	4
Switch Phase							
Minimum Initial (s)	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.0	11.5	25.0	15.0	15.0	15.0	15.0
Total Split (s)	52.0	12.0	64.0	26.0	26.0	26.0	26.0
Total Split (%)	57.8%	13.3%	71.1%	28.9%	28.9%	28.9%	28.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.0	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	4.5	5.0	5.0	5.0		5.0
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	54.0	64.0	63.5	16.5	16.5		16.5
Actuated g/C Ratio	0.60	0.71	0.71	0.18	0.18		0.18
v/c Ratio	0.78	0.39	0.54	0.73	0.26		0.06
Control Delay	10.5	15.5	3.3	50.8	3.6		0.3
Queue Delay	0.1	0.0	0.0	0.0	0.0		0.0
Total Delay	10.6	15.5	3.3	50.8	3.6		0.3
LOS	B	B	A	D	A		A
Approach Delay	10.6		4.1		33.3		0.3
Approach LOS	B		A		C		A
Queue Length 50th (ft)	197	6	47	99	0		0
Queue Length 95th (ft)	254	41	55	164	19		0
Internal Link Dist (ft)	359		768		204		113
Turn Bay Length (ft)	250						
Base Capacity (vph)	3027	228	2493	322	486		411
Starvation Cap Reductn	76	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0	0		0
Storage Cap Reductn	0	0	0	0	0		0
Reduced v/c Ratio	0.80	0.38	0.54	0.57	0.22		0.05

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 31 (34%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 9.9

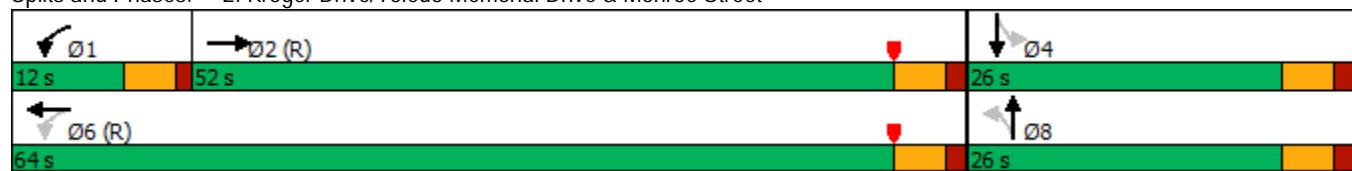
Intersection LOS: A

Intersection Capacity Utilization 76.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

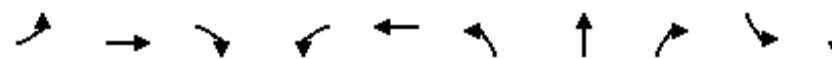


3: SB US 23 Ramp/Glasgow Road & Monroe Street

Sylvania Interchange PID 105889

Timings

AM 2045 Conditions Feasible Alt B



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑↑	↑	↑	↑	↑
Traffic Volume (vph)	10	1170	950	610	1200	110	30	190	10	10
Future Volume (vph)	10	1170	950	610	1200	110	30	190	10	10
Lane Group Flow (vph)	11	1272	1033	670	1426	120	122	118	11	22
Turn Type	Perm	NA	Free	Prot	NA	Split	NA	Perm	Split	NA
Protected Phases		2			1	6	8	8	4	4
Permitted Phases	2			Free				8		
Detector Phase	2	2			1	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0		7.0	20.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	26.0	26.0		12.0	26.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	36.0	36.0		32.0	68.0	13.0	13.0	13.0	9.0	9.0
Total Split (%)	40.0%	40.0%		35.6%	75.6%	14.4%	14.4%	14.4%	10.0%	10.0%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None
Act Effct Green (s)	37.7	37.7	90.0	23.9	66.6	8.0	8.0	8.0	4.0	4.0
Actuated g/C Ratio	0.42	0.42	1.00	0.27	0.74	0.09	0.09	0.09	0.04	0.04
v/c Ratio	0.07	0.86	0.65	0.79	0.52	0.39	0.55	0.45	0.14	0.25
Control Delay	28.0	32.1	8.3	30.4	7.3	42.8	24.3	10.0	45.5	35.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	32.1	8.3	30.4	7.3	42.8	24.3	10.0	45.5	35.9
LOS	C	C	A	C	A	D	C	A	D	D
Approach Delay		21.4			14.7		25.8		39.1	
Approach LOS		C			B		C		D	
Queue Length 50th (ft)	3	199	614	135	201	34	18	0	6	6
Queue Length 95th (ft)	m6	#532	240	m151	203	61	74	36	23	30
Internal Link Dist (ft)		768			1228		1050		240	
Turn Bay Length (ft)	135			250				115		
Base Capacity (vph)	154	1483	1583	955	2722	305	221	265	78	87
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.86	0.65	0.70	0.52	0.39	0.55	0.45	0.14	0.25

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 19 (21%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 18.9

Intersection LOS: B

Intersection Capacity Utilization 72.8%

ICU Level of Service C

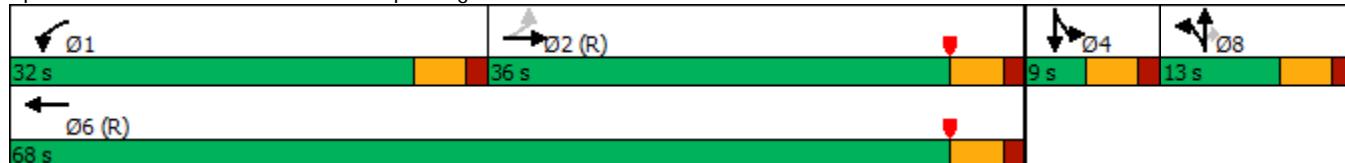
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: Monroe St & Alexis Road

Sylvania Interchange PID 105889

Timings

AM 2045 Conditions Feasible Alt B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑	↑↑
Traffic Volume (vph)	520	700	150	30	430	70	440	400	430	20	90	960
Future Volume (vph)	520	700	150	30	430	70	440	400	430	20	90	960
Lane Group Flow (vph)	565	761	163	33	467	76	478	435	467	55	98	1043
Turn Type	Prot	NA	pm+ov	pm+pt	NA	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	6	3	8	1	7	4	5
Permitted Phases				2	6				8			4
Detector Phase	5	2	3	1	6	6	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	10.0	20.0	7.0	7.0	20.0	20.0	7.0	10.0	7.0	5.0	10.0	10.0
Minimum Split (s)	22.5	24.5	11.5	11.5	24.5	24.5	11.5	22.5	11.5	9.5	22.5	22.5
Total Split (s)	22.6	32.1	20.1	15.3	24.8	24.8	20.1	31.0	15.3	11.6	22.5	22.6
Total Split (%)	25.1%	35.7%	22.3%	17.0%	27.6%	27.6%	22.3%	34.4%	17.0%	12.9%	25.0%	25.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?												
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	Max	None	None	Max	None
Act Effct Green (s)	18.1	29.7	44.9	20.7	20.7	20.7	15.2	28.4	38.4	6.8	18.0	40.6
Actuated g/C Ratio	0.20	0.33	0.50	0.23	0.23	0.23	0.17	0.32	0.43	0.08	0.20	0.45
v/c Ratio	0.82	0.65	0.19	0.12	0.57	0.15	0.83	0.39	0.59	0.41	0.26	0.72
Control Delay	33.2	19.3	4.4	26.3	32.1	1.7	49.4	26.0	9.9	44.7	28.0	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	19.3	4.4	26.3	32.1	1.7	49.4	26.0	9.9	44.7	28.0	15.6
LOS	C	B	A	C	C	A	D	C	A	D	C	B
Approach Delay		22.9			27.7			28.7			17.9	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	176	234	25	15	128	0	136	104	70	31	47	106
Queue Length 95th (ft)	m210	m285	m42	40	180	0	#207	147	131	68	92	138
Internal Link Dist (ft)		1228			395			487			240	
Turn Bay Length (ft)	300		200	200		200			300	140		
Base Capacity (vph)	690	1168	877	288	814	504	595	1117	821	139	372	1456
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.65	0.19	0.11	0.57	0.15	0.80	0.39	0.57	0.40	0.26	0.72

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 42 (47%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 23.9

Intersection LOS: C

Intersection Capacity Utilization 74.1%

ICU Level of Service D

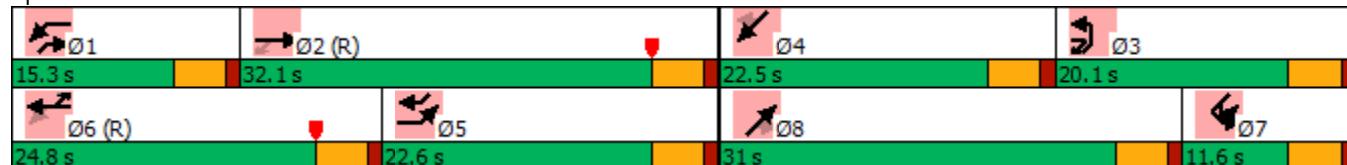
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

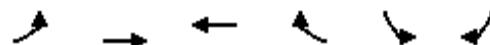
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Monroe St & Alexis Road



5: Alexis Road & Acres
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889
AM 2045 Conditions Feasible Alt B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑			↑
Traffic Volume (veh/h)	80	940	940	20	0	160
Future Volume (Veh/h)	80	940	940	20	0	160
Sign Control	Free	Free		Stop		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	1022	1022	22	0	174
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None				
Median storage veh						
Upstream signal (ft)		320	1032			
pX, platoon unblocked	0.90			0.95	0.90	
vC, conflicting volume	1044			1718	522	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	835			1229	257	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	88			100	74	
cM capacity (veh/h)	718			142	670	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	87	511	511	681	363	174
Volume Left	87	0	0	0	0	0
Volume Right	0	0	0	0	22	174
cSH	718	1700	1700	1700	1700	670
Volume to Capacity	0.12	0.30	0.30	0.40	0.21	0.26
Queue Length 95th (ft)	10	0	0	0	0	26
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	12.2
Lane LOS	B					B
Approach Delay (s)	0.8			0.0		12.2
Approach LOS						B
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization		43.2%		ICU Level of Service		A
Analysis Period (min)		15				

6: Elliot Drive & Alexis Road

Sylvania Interchange PID 105889

Timings

AM 2045 Conditions Feasible Alt B



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑		↑	↑
Traffic Volume (vph)	20	910	60	870	10	0	30	20	10	30
Future Volume (vph)	20	910	60	870	10	0	30	20	10	30
Lane Group Flow (vph)	22	1032	65	957	0	11	33	0	33	33
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2			6		8		8	4	
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.0	24.0	24.0	24.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	64.0	64.0	64.0	64.0		18.0	18.0		18.0	18.0
Actuated g/C Ratio	0.71	0.71	0.71	0.71		0.20	0.20		0.20	0.20
v/c Ratio	0.06	0.41	0.20	0.38		0.04	0.10		0.10	0.10
Control Delay	6.3	6.7	6.2	5.6		29.7	11.4		30.5	11.4
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	6.3	6.7	6.2	5.6		29.7	11.4		30.5	11.4
LOS	A	A	A	A		C	B		C	B
Approach Delay		6.7		5.7		16.0			21.0	
Approach LOS		A		A		B			C	
Queue Length 50th (ft)	4	91	11	95		5	0		16	0
Queue Length 95th (ft)	m8	130	26	124		19	24		41	24
Internal Link Dist (ft)		952		866		215			226	
Turn Bay Length (ft)	140		140						100	
Base Capacity (vph)	359	2505	325	2512		274	343		321	343
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.06	0.41	0.20	0.38		0.04	0.10		0.10	0.10

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 6 (7%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 45

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 6.8

Intersection LOS: A

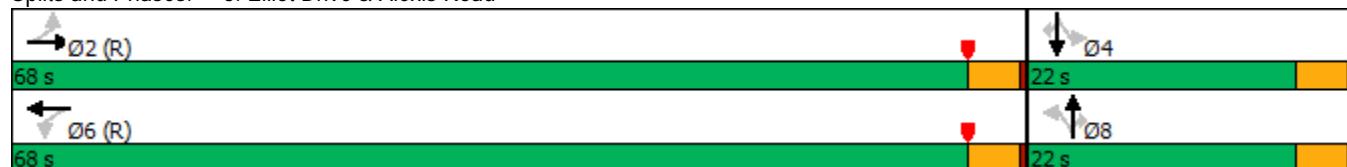
Intersection Capacity Utilization 61.4%

ICU Level of Service B

Analysis Period (min) 15

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

Splits and Phases: 6: Elliot Drive & Alexis Road



7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

AM 2045 Conditions Feasible Alt B



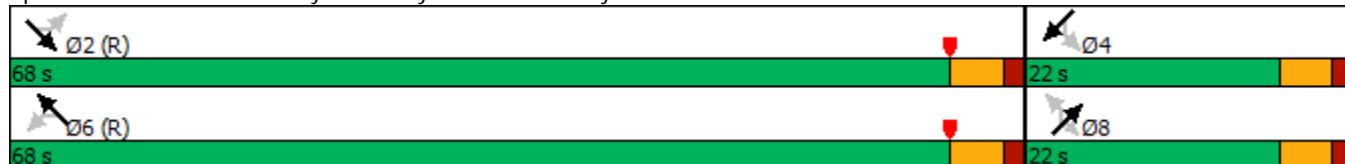
Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑	↑	↑
Traffic Volume (vph)	50	1040	20	450	40	30	10	30	10
Future Volume (vph)	50	1040	20	450	40	30	10	30	10
Lane Group Flow (vph)	54	1152	22	543	0	76	11	33	54
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2			6		8		8	4
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	26.0	26.0	26.0	26.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	68.0	68.0	68.0	68.0	22.0	22.0	22.0	22.0	22.0
Total Split (%)	75.6%	75.6%	75.6%	75.6%	24.4%	24.4%	24.4%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	72.9	72.9	72.9	72.9		11.1	11.1	11.1	11.1
Actuated g/C Ratio	0.81	0.81	0.81	0.81		0.12	0.12	0.12	0.12
v/c Ratio	0.08	0.40	0.06	0.19		0.42	0.05	0.20	0.23
Control Delay	1.8	4.2	3.5	2.7		43.4	6.8	38.0	16.7
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	1.8	4.2	3.5	2.7		43.4	6.8	38.0	16.7
LOS	A	A	A	A		D	A	D	B
Approach Delay		4.1		2.8		38.8			24.8
Approach LOS		A		A		D			C
Queue Length 50th (ft)	3	33	2	31		41	0	17	6
Queue Length 95th (ft)	m6	168	9	54		81	8	44	38
Internal Link Dist (ft)		896		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	677	2860	346	2830		279	318	249	344
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.08	0.40	0.06	0.19		0.27	0.03	0.13	0.16
Intersection Summary									
Cycle Length: 90									
Actuated Cycle Length: 90									
Offset: 45 (50%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow									
Natural Cycle: 45									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.42									
Intersection Signal Delay: 6.2					Intersection LOS: A				
Intersection Capacity Utilization 60.3%					ICU Level of Service B				
Analysis Period (min) 15									

7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

AM 2045 Conditions Feasible Alt B

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

Splits and Phases: 7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St





Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations				↑↑		↑
Traffic Volume (veh/h)	0	0	0	1270	0	270
Future Volume (Veh/h)	0	0	0	1270	0	270
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1380	0	293
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				567		
pX, platoon unblocked						
vC, conflicting volume	690	0	293			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	690	0	293			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	379	1084	1265			
Direction, Lane #	NE 1	NE 2	SW 1			
Volume Total	690	690	293			
Volume Left	0	0	0			
Volume Right	0	0	293			
cSH	1700	1700	1700			
Volume to Capacity	0.41	0.41	0.17			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS						
Approach Delay (s)	0.0		0.0			
Approach LOS						
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		38.4%		ICU Level of Service		A
Analysis Period (min)		15				

18: Harroun Road
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889

AM 2045 Conditions Feasible Alt B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	1	809	10	0	709	1
Future Volume (Veh/h)	0	0	0	0	0	0	1	809	10	0	709	1
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	1	879	11	0	771	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)											346	
pX, platoon unblocked												
vC, conflicting volume	1213	1664	386	1272	1658	445	772			890		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1213	1664	386	1272	1658	445	772			890		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	138	96	612	124	97	561	839			757		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	0	440	450	514	258						
Volume Left	0	0	1	0	0	0						
Volume Right	0	0	0	11	0	1						
cSH	1700	1700	839	1700	1700	1700						
Volume to Capacity	0.00	0.00	0.00	0.27	0.30	0.15						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	A	A	A									
Approach Delay (s)	0.0	0.0	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			26.7%				ICU Level of Service			A		
Analysis Period (min)			15									

Queuing and Blocking Report
AM 2045 Conditions Feasible Alt B

11/27/2018

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	L	T	TR	LT	R	R	LTR
Maximum Queue (ft)	45	303	294	299	232	245	76	97	95	252	200	199
Average Queue (ft)	7	165	182	225	154	170	23	47	42	129	137	183
95th Queue (ft)	26	246	275	300	209	226	60	76	73	212	206	202
Link Distance (ft)		294	294	294			377	377	248	248		191
Upstream Blk Time (%)		0	0	0						0		87
Queuing Penalty (veh)		0	0	0						2		0
Storage Bay Dist (ft)	250				250	250					150	
Storage Blk Time (%)		1				0	1			5	4	
Queuing Penalty (veh)		0			0	5				17	15	

Intersection: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	TR	L	T	TR	L	TR	LTR
Maximum Queue (ft)	317	377	377	117	256	225	216	112	73
Average Queue (ft)	125	145	207	38	79	74	107	48	23
95th Queue (ft)	217	253	302	67	170	161	180	96	55
Link Distance (ft)	377	377	377		739	739	220	220	141
Upstream Blk Time (%)		0	0				0		
Queuing Penalty (veh)		1	0				0		
Storage Bay Dist (ft)		250							
Storage Blk Time (%)				0					
Queuing Penalty (veh)				0					

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	TR	L	L	TR	R
Maximum Queue (ft)	185	706	711	796	332	531	183	157	171	140	250	215
Average Queue (ft)	10	211	216	379	194	215	70	75	67	21	75	26
95th Queue (ft)	68	419	459	694	323	396	168	160	131	70	167	119
Link Distance (ft)		739	739	739			1215	1215	1215	1061	1061	1061
Upstream Blk Time (%)					1							
Queuing Penalty (veh)					6							
Storage Bay Dist (ft)	135				250							115
Storage Blk Time (%)		22				6	14			8		3
Queuing Penalty (veh)		2			20	44				8		4

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (ft)	73	71
Average Queue (ft)	14	20
95th Queue (ft)	47	51
Link Distance (ft)	269	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		85
Storage Blk Time (%)	0	0
Queuing Penalty (veh)	0	0

Queuing and Blocking Report
AM 2045 Conditions Feasible Alt B

11/27/2018

Intersection: 5: Monroe St & Alexis Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	NE	NE	NE
Directions Served	L	L	T	T	R	L	T	T	R	L	L	T
Maximum Queue (ft)	172	197	242	286	100	86	199	165	115	238	216	152
Average Queue (ft)	96	110	91	95	24	27	136	84	34	161	133	101
95th Queue (ft)	150	175	181	195	69	72	191	139	67	229	188	147
Link Distance (ft)			1215	1215			386	386		473	473	473
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	300	300			200	200			200			
Storage Blk Time (%)					1				0			
Queuing Penalty (veh)					2				0			

Intersection: 5: Monroe St & Alexis Road

Movement	NE	NE	SW	SW	SW	SW
Directions Served	T	R	UL	T	R	R
Maximum Queue (ft)	139	233	190	201	206	187
Average Queue (ft)	80	99	42	52	142	101
95th Queue (ft)	136	178	99	132	216	186
Link Distance (ft)	473			228	228	228
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)	300	140				
Storage Blk Time (%)			1			
Queuing Penalty (veh)			0			

Intersection: 7: Elliot Drive & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	30	159	203	124	183	133	50	48	50	25
Average Queue (ft)	13	85	106	28	81	49	12	20	21	10
95th Queue (ft)	35	149	181	74	157	107	36	42	48	29
Link Distance (ft)	962	962			911	911	245	245	255	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	140			140					100	
Storage Blk Time (%)		0		0	0	1				
Queuing Penalty (veh)		0		0	1					

Intersection: 8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St

Movement	SE	SE	SE	NW	NW	NW	NE	SW	SW
Directions Served	L	T	TR	L	T	TR	LT	L	TR
Maximum Queue (ft)	69	102	107	51	96	72	133	76	99
Average Queue (ft)	23	35	51	9	37	21	48	20	26
95th Queue (ft)	51	87	102	33	81	54	101	51	69
Link Distance (ft)		909	909		499	499	241	156	156
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)		180			145				
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 9:

Movement	B23	B23
Directions Served	T	T
Maximum Queue (ft)	86	78
Average Queue (ft)	9	10
95th Queue (ft)	48	46
Link Distance (ft)	78	78
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 16: Alexis Road & Acres

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	97	43	41	112
Average Queue (ft)	42	2	3	45
95th Queue (ft)	73	15	17	80
Link Distance (ft)		962	962	422
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		100		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		1		

Intersection: 18: Harroun Road

Movement	NB
Directions Served	TR
Maximum Queue (ft)	185
Average Queue (ft)	7
95th Queue (ft)	63
Link Distance (ft)	634
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 129

1: Harroun Road/Toledo Memorial Drive & Monroe Street

Sylvania Interchange PID 105889

Timings

PM 2045 Conditions Feasible Alt B



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑↓	↑↓	↑↓	↑	↑	↑↑	↓	↓
Traffic Volume (vph)	10	1130	550	1500	170	10	800	20	10
Future Volume (vph)	10	1130	550	1500	170	10	800	20	10
Lane Group Flow (vph)	11	1369	598	1641	0	196	870	0	55
Turn Type	Perm	NA	Prot	NA	Perm	NA	pt+ov	Perm	NA
Protected Phases		2	1	6		8	8 1		4
Permitted Phases	2				8		4		
Detector Phase	2	2	1	6	8	8	8 1	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	7.0	20.0	10.0	10.0		10.0	10.0
Minimum Split (s)	25.0	25.0	25.0	25.0	15.0	15.0		15.0	15.0
Total Split (s)	50.0	50.0	36.0	86.0	44.0	44.0		44.0	44.0
Total Split (%)	38.5%	38.5%	27.7%	66.2%	33.8%	33.8%		33.8%	33.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0	
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	None	None		None	None
Act Effct Green (s)	47.2	47.2	28.8	81.0		39.0	72.8		39.0
Actuated g/C Ratio	0.36	0.36	0.22	0.62		0.30	0.56		0.30
v/c Ratio	0.13	0.75	0.79	0.74		0.48	0.73		0.12
Control Delay	33.9	39.3	52.1	10.0		42.1	24.8		22.5
Queue Delay	0.0	0.0	0.3	1.9		0.0	1.0		0.0
Total Delay	33.9	39.3	52.4	11.9		42.1	25.8		22.5
LOS	C	D	D	B		D	C		C
Approach Delay		39.3		22.7		28.8		22.5	
Approach LOS		D		C		C		C	
Queue Length 50th (ft)	6	373	213	288		135	367		20
Queue Length 95th (ft)	23	433	m277	m298		213	482		53
Internal Link Dist (ft)		284		359		266		163	
Turn Bay Length (ft)	250		250				150		
Base Capacity (vph)	87	1829	818	2203		405	1231		469
Starvation Cap Reductn	0	0	29	389		0	0		0
Spillback Cap Reductn	0	18	0	0		0	150		1
Storage Cap Reductn	0	0	0	0		0	0		0
Reduced v/c Ratio	0.13	0.76	0.76	0.90		0.48	0.80		0.12

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 47 (36%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 28.9

Intersection LOS: C

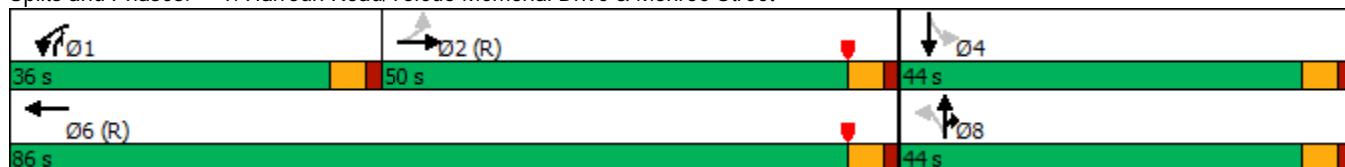
Intersection Capacity Utilization 87.6%

ICU Level of Service E

Analysis Period (min) 15

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

Splits and Phases: 1: Harroun Road/Toledo Memorial Drive & Monroe Street



2: Kroger Drive/Toledo Memorial Drive & Monroe Street
Timings

Sylvania Interchange PID 105889
PM 2045 Conditions Feasible Alt B



Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑↑↑	↑	↑↑	↑	↑	↑	↓
Traffic Volume (vph)	1880	250	1690	360	0	10	0
Future Volume (vph)	1880	250	1690	360	0	10	0
Lane Group Flow (vph)	2119	272	1859	391	228	0	22
Turn Type	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	2	1	6		8		4
Permitted Phases			6		8		4
Detector Phase	2	1	6	8	8	4	4
Switch Phase							
Minimum Initial (s)	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	25.0	11.5	25.0	15.0	15.0	15.0	15.0
Total Split (s)	63.0	23.0	86.0	44.0	44.0	44.0	44.0
Total Split (%)	48.5%	17.7%	66.2%	33.8%	33.8%	33.8%	33.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.0	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	5.0	4.5	5.0	5.0	5.0		5.0
Lead/Lag	Lag	Lead					
Lead-Lag Optimize?							
Recall Mode	C-Max	None	C-Max	None	None	None	None
Act Effct Green (s)	59.7	82.3	81.8	38.2	38.2		38.2
Actuated g/C Ratio	0.46	0.63	0.63	0.29	0.29		0.29
v/c Ratio	0.91	0.92	0.84	0.96	0.35		0.05
Control Delay	29.2	64.8	16.1	81.7	3.5		0.2
Queue Delay	2.8	0.0	0.7	0.0	0.0		0.0
Total Delay	32.0	64.8	16.8	81.7	3.5		0.2
LOS	C	E	B	F	A		A
Approach Delay	32.0		22.9		52.9		0.2
Approach LOS	C		C		D		A
Queue Length 50th (ft)	356	161	525	322	0		0
Queue Length 95th (ft)	#450	#333	654	#522	36		1
Internal Link Dist (ft)	359		768		204		113
Turn Bay Length (ft)	250						
Base Capacity (vph)	2327	308	2224	415	660		486
Starvation Cap Reductn	129	0	86	0	0		0
Spillback Cap Reductn	0	0	121	0	0		0
Storage Cap Reductn	0	0	0	0	0		0
Reduced v/c Ratio	0.96	0.88	0.88	0.94	0.35		0.05

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 40 (31%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 30.5

Intersection LOS: C

Intersection Capacity Utilization 90.4%

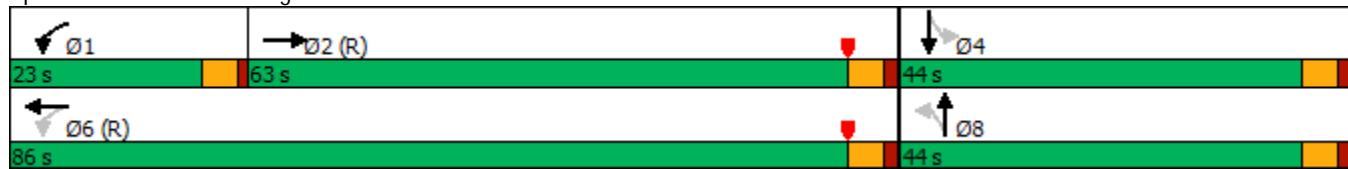
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

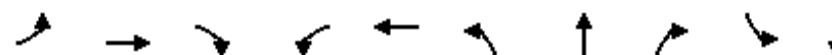


3: SB US 23 Ramp/Glasgow Road & Monroe Street

Sylvania Interchange PID 105889

Timings

PM 2045 Conditions Feasible Alt B



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↑	↑	↑↑	↑↑	↑↑	↑	↑	↑	↑
Traffic Volume (vph)	60	1420	620	740	1770	170	40	160	40	10
Future Volume (vph)	60	1420	620	740	1770	170	40	160	40	10
Lane Group Flow (vph)	65	1543	674	822	2063	185	111	106	43	33
Turn Type	Perm	NA	Free	Prot	NA	Split	NA	Perm	Split	NA
Protected Phases		2			1	6	8	8	4	4
Permitted Phases	2			Free				8		
Detector Phase	2	2			1	6	8	8	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0		7.0	20.0	10.0	10.0	10.0	5.0	5.0
Minimum Split (s)	26.0	26.0		12.0	26.0	15.0	15.0	15.0	11.0	11.0
Total Split (s)	62.0	62.0		42.0	104.0	15.0	15.0	15.0	11.0	11.0
Total Split (%)	47.7%	47.7%		32.3%	80.0%	11.5%	11.5%	11.5%	8.5%	8.5%
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5		1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead						
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max		None	C-Max	None	None	None	None	None
Act Effct Green (s)	61.3	61.3	130.0	34.9	101.2	10.0	10.0	10.0	5.9	5.9
Actuated g/C Ratio	0.47	0.47	1.00	0.27	0.78	0.08	0.08	0.08	0.05	0.05
v/c Ratio	0.71	0.93	0.43	0.87	0.73	0.70	0.66	0.50	0.54	0.34
Control Delay	44.7	26.0	1.2	30.1	5.9	73.3	53.7	18.7	84.7	40.4
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	44.7	26.0	1.2	30.1	6.0	73.3	53.7	18.7	84.7	40.4
LOS	D	C	A	C	A	E	D	B	F	D
Approach Delay		19.2			12.9		53.5		65.5	
Approach LOS		B			B		D		E	
Queue Length 50th (ft)	18	228	0	336	262	79	55	0	36	9
Queue Length 95th (ft)	m23	m#821	m0	m334	m259	#127	#141	61	#86	45
Internal Link Dist (ft)		768			1226		1050		240	
Turn Bay Length (ft)	135			250				115		
Base Capacity (vph)	92	1667	1583	997	2841	264	167	213	81	98
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	58	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.93	0.43	0.82	0.74	0.70	0.66	0.50	0.53	0.34

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 40 (31%), Referenced to phase 2:EBTL and 6:WBT, Start of Yellow

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 19.0

Intersection LOS: B

Intersection Capacity Utilization 93.4%

ICU Level of Service F

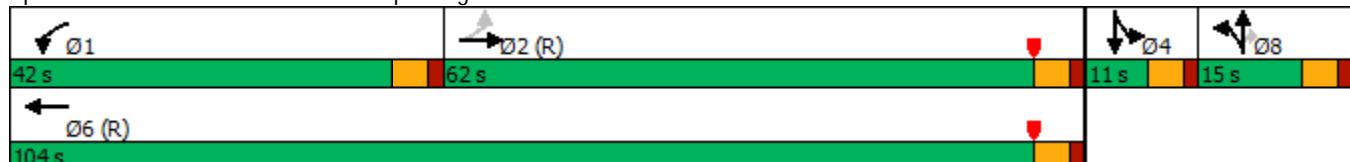
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 3: SB US 23 Ramp/Glasgow Road & Monroe Street



4: Monroe St & Alexis Road

Sylvania Interchange PID 105889

Timings

PM 2045 Conditions Feasible Alt B



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↑↑	↑↑	↑	↑	↑↑	↑	↑↑	↑↑	↑	↑	↑	↑↑
Traffic Volume (vph)	780	620	220	170	1010	70	640	530	330	40	100	980
Future Volume (vph)	780	620	220	170	1010	70	640	530	330	40	100	980
Lane Group Flow (vph)	848	674	239	185	1098	76	696	576	359	141	109	1065
Turn Type	Prot	NA	pm+ov	pm+pt	NA	Prot	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2	3	1	6	6	3	8	1	7	4	5
Permitted Phases				2	6					8		4
Detector Phase	5	2	3	1	6	6	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	10.0	20.0	7.0	7.0	20.0	20.0	7.0	10.0	7.0	5.0	10.0	10.0
Minimum Split (s)	22.5	24.5	11.5	11.5	24.5	24.5	11.5	22.5	11.5	9.5	22.5	22.5
Total Split (s)	35.5	54.0	31.5	24.8	43.3	43.3	31.5	32.6	24.8	18.6	19.7	35.5
Total Split (%)	27.3%	41.5%	24.2%	19.1%	33.3%	33.3%	24.2%	25.1%	19.1%	14.3%	15.2%	27.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag						
Lead-Lag Optimize?												
Recall Mode	None	C-Min	None	None	C-Min	C-Min	None	Min	None	None	Min	None
Act Effct Green (s)	31.0	55.9	87.4	40.6	40.6	40.6	27.0	25.7	41.4	14.8	13.4	44.4
Actuated g/C Ratio	0.24	0.43	0.67	0.31	0.31	0.31	0.21	0.20	0.32	0.11	0.10	0.34
v/c Ratio	1.04	0.44	0.21	0.68	0.99	0.14	0.98	0.83	0.54	0.70	0.57	0.98
Control Delay	76.9	21.4	8.9	48.9	63.9	4.1	79.5	60.6	9.7	73.0	65.3	44.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.9	21.4	8.9	48.9	63.9	4.1	79.5	60.6	9.7	73.0	65.3	44.3
LOS	E	C	A	D	E	A	E	E	A	E	E	D
Approach Delay		46.4			58.5			57.5			49.1	
Approach LOS		D			E			E			D	
Queue Length 50th (ft)	~408	286	71	95	-529	0	303	243	53	114	87	262
Queue Length 95th (ft)	m#480	m320	m104	181	#647	18	#428	308	108	#199	149	#403
Internal Link Dist (ft)		1226			395			487			240	
Turn Bay Length (ft)	300		200	200		200			300	140		
Base Capacity (vph)	818	1520	1142	323	1104	554	713	764	712	201	217	1085
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.44	0.21	0.57	0.99	0.14	0.98	0.75	0.50	0.70	0.50	0.98

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 69 (53%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 52.7

Intersection LOS: D

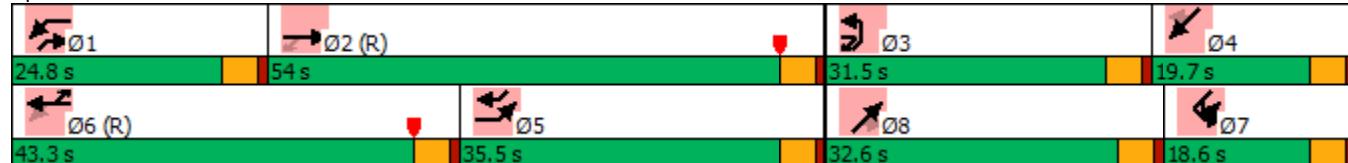
Intersection Capacity Utilization 91.8%

ICU Level of Service F

Analysis Period (min) 15

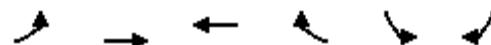
- Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Monroe St & Alexis Road



5: Alexis Road & Acres
HCM Unsigned Intersection Capacity Analysis

Sylvania Interchange PID 105889
PM 2045 Conditions Feasible Alt B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↑	↑↑	↑↑			↑
Traffic Volume (veh/h)	120	1350	970	50	0	240
Future Volume (Veh/h)	120	1350	970	50	0	240
Sign Control	Free	Free		Stop		
Grade	0%	0%		0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	1467	1054	54	0	261
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None				
Median storage veh						
Upstream signal (ft)	320	1032				
pX, platoon unblocked	0.92			0.89	0.92	
vC, conflicting volume	1108			2074	554	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	936			1540	332	
tC, single (s)	4.1			6.8	6.9	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	81			100	57	
cM capacity (veh/h)	667			76	609	
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	130	734	734	703	405	261
Volume Left	130	0	0	0	0	0
Volume Right	0	0	0	0	54	261
cSH	667	1700	1700	1700	1700	609
Volume to Capacity	0.19	0.43	0.43	0.41	0.24	0.43
Queue Length 95th (ft)	18	0	0	0	0	54
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	15.3
Lane LOS	B				C	
Approach Delay (s)	1.0			0.0		15.3
Approach LOS					C	
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization		49.9%		ICU Level of Service		A
Analysis Period (min)		15				



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑		↑	↑
Traffic Volume (vph)	40	1220	90	900	50	10	120	40	10	20
Future Volume (vph)	40	1220	90	900	50	10	120	40	10	20
Lane Group Flow (vph)	43	1359	98	1011	0	65	130	0	54	22
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8			4
Permitted Phases	2		6		8		8	4		4
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	24.0	24.0	24.0	24.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	105.0	105.0	105.0	105.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	80.8%	80.8%	80.8%	80.8%	19.2%	19.2%	19.2%	19.2%	19.2%	19.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	Max									
Act Effct Green (s)	101.0	101.0	101.0	101.0		21.0	21.0		21.0	21.0
Actuated g/C Ratio	0.78	0.78	0.78	0.78		0.16	0.16		0.16	0.16
v/c Ratio	0.11	0.50	0.40	0.37		0.29	0.37		0.24	0.08
Control Delay	6.0	7.2	10.2	4.9		52.0	14.5		50.7	18.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	6.0	7.2	10.2	4.9		52.0	14.5		50.7	18.0
LOS	A	A	B	A		D	B		D	B
Approach Delay		7.2		5.4		27.0			41.2	
Approach LOS		A		A		C			D	
Queue Length 50th (ft)	9	140	23	117		49	12		40	0
Queue Length 95th (ft)	m12	m208	56	143		96	70		82	26
Internal Link Dist (ft)		952		866		215			226	
Turn Bay Length (ft)	140		140						100	
Base Capacity (vph)	377	2739	246	2738		224	351		229	274
Starvation Cap Reductn	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.11	0.50	0.40	0.37		0.29	0.37		0.24	0.08

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 11 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Prewimed

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 8.8

Intersection LOS: A

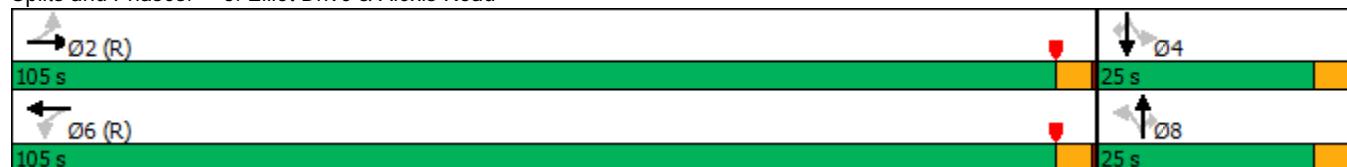
Intersection Capacity Utilization 71.3%

ICU Level of Service C

Analysis Period (min) 15

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

Splits and Phases: 6: Elliot Drive & Alexis Road



7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
 Timings

PM 2045 Conditions Feasible Alt B



Lane Group	SEL	SET	NWL	NWT	NEL	NET	NER	SWL	SWT
Lane Configurations	↑	↑↑	↑	↑↑		↑	↑	↑	↑
Traffic Volume (vph)	60	840	40	1060	120	30	40	50	20
Future Volume (vph)	60	840	40	1060	120	30	40	50	20
Lane Group Flow (vph)	65	1033	43	1261	0	163	43	54	87
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2			6		8		8	4
Detector Phase	2	2	6	6	8	8	8	4	4
Switch Phase									
Minimum Initial (s)	20.0	20.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	26.0	26.0	26.0	26.0	15.0	15.0	15.0	15.0	15.0
Total Split (s)	87.0	87.0	87.0	87.0	43.0	43.0	43.0	43.0	43.0
Total Split (%)	66.9%	66.9%	66.9%	66.9%	33.1%	33.1%	33.1%	33.1%	33.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	98.6	98.6	98.6	98.6		21.4	21.4	21.4	21.4
Actuated g/C Ratio	0.76	0.76	0.76	0.76		0.16	0.16	0.16	0.16
v/c Ratio	0.24	0.39	0.12	0.48		0.77	0.15	0.37	0.27
Control Delay	9.6	6.7	6.4	7.2		73.8	12.7	53.4	17.1
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	9.6	6.7	6.4	7.2		73.8	12.7	53.4	17.1
LOS	A	A	A	A		E	B	D	B
Approach Delay		6.8		7.2		61.1			31.0
Approach LOS		A		A		E			C
Queue Length 50th (ft)	7	67	8	181		133	0	41	16
Queue Length 95th (ft)	m47	241	26	288		200	32	79	59
Internal Link Dist (ft)		896		460		211			126
Turn Bay Length (ft)	180		145						
Base Capacity (vph)	270	2643	357	2652		377	493	259	529
Starvation Cap Reductn	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.24	0.39	0.12	0.48		0.43	0.09	0.21	0.16

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 101 (78%), Referenced to phase 2:SETL and 6:NWTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 12.3

Intersection LOS: B

Intersection Capacity Utilization 73.1%

ICU Level of Service D

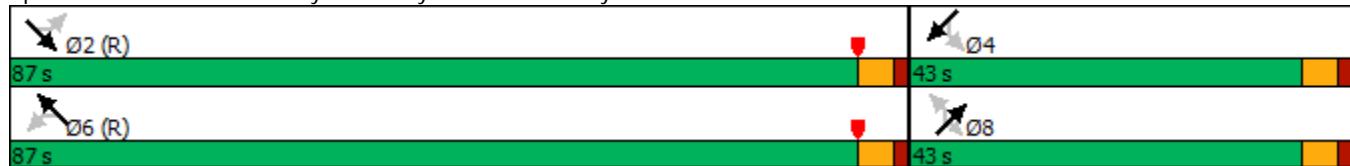
Analysis Period (min) 15

7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe Street Interchange PID 105889
Timings

PM 2045 Conditions Feasible Alt B

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

Splits and Phases: 7: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St



9:
HCM Unsignalized Intersection Capacity Analysis

Sylvania Interchange PID 105889
PM 2045 Conditions Feasible Alt B



Movement	EBL	EBR	NEL	NET	SWT	SWR
Lane Configurations				↑↑		↑
Traffic Volume (veh/h)	0	0	0	1500	0	490
Future Volume (Veh/h)	0	0	0	1500	0	490
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	1630	0	533
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				567		
pX, platoon unblocked						
vC, conflicting volume	815	0	533			
vc1, stage 1 conf vol						
vc2, stage 2 conf vol						
vCu, unblocked vol	815	0	533			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	315	1084	1031			
Direction, Lane #	NE 1	NE 2	SW 1			
Volume Total	815	815	533			
Volume Left	0	0	0			
Volume Right	0	0	533			
cSH	1700	1700	1700			
Volume to Capacity	0.48	0.48	0.31			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS						
Approach Delay (s)	0.0		0.0			
Approach LOS						
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		44.8%		ICU Level of Service		A
Analysis Period (min)		15				

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	0	0	1	980	20	0	689	1
Future Volume (Veh/h)	0	0	0	0	0	0	1	980	20	0	689	1
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	0	0	1	1065	22	0	749	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											346	
pX, platoon unblocked												
vC, conflicting volume	1284	1838	375	1452	1828	544	750			1087		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1284	1838	375	1452	1828	544	750			1087		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	100	100			100		
cM capacity (veh/h)	122	75	623	91	76	484	855			638		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	0	534	554	499	251						
Volume Left	0	0	1	0	0	0						
Volume Right	0	0	0	22	0	1						
cSH	1700	1700	855	1700	1700	1700						
Volume to Capacity	0.00	0.00	0.00	0.33	0.29	0.15						
Queue Length 95th (ft)	0	0	0	0	0	0						
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0						
Lane LOS	A	A	A									
Approach Delay (s)	0.0	0.0	0.0		0.0							
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.0									
Intersection Capacity Utilization			31.8%				ICU Level of Service			A		
Analysis Period (min)			15									

Queuing and Blocking Report
PM 2045 Conditions Feasible Alt B

11/27/2018

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	EB	B20	B20	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	TR	T	T	L	L	T	TR	LT	R
Maximum Queue (ft)	87	386	355	370	496	517	297	348	415	254	187	274
Average Queue (ft)	9	321	281	294	61	57	153	181	153	155	96	221
95th Queue (ft)	40	408	349	389	255	253	230	278	273	231	166	328
Link Distance (ft)		296	296	296	743	743			376	376	249	249
Upstream Blk Time (%)		26	7	18					0			28
Queuing Penalty (veh)		0	0	0					3			136
Storage Bay Dist (ft)	250						250	250				
Storage Blk Time (%)		36						1	3	0		51
Queuing Penalty (veh)		4						7	23	1		201

Intersection: 1: Harroun Road/Toledo Memorial Drive & Monroe Street

Movement	NB	SB
Directions Served	R	LTR
Maximum Queue (ft)	200	186
Average Queue (ft)	182	186
95th Queue (ft)	250	186
Link Distance (ft)		191
Upstream Blk Time (%)	100	
Queuing Penalty (veh)	0	
Storage Bay Dist (ft)	150	
Storage Blk Time (%)	44	
Queuing Penalty (veh)	171	

Intersection: 2: Kroger Drive/Toledo Memorial Drive & Monroe Street

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	T	T	TR	L	T	TR	L	TR	LTR
Maximum Queue (ft)	385	442	422	300	867	867	259	235	52
Average Queue (ft)	333	420	380	207	428	395	222	104	15
95th Queue (ft)	399	497	501	351	765	726	284	193	44
Link Distance (ft)	376	376	376		739	739	220	220	141
Upstream Blk Time (%)	16	59	51		4	3	34	1	
Queuing Penalty (veh)	102	383	325		36	30	0	0	
Storage Bay Dist (ft)				250					
Storage Blk Time (%)				0	24				
Queuing Penalty (veh)				1	60				

Queuing and Blocking Report
PM 2045 Conditions Feasible Alt B

11/27/2018

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	TR	L	L	TR	R
Maximum Queue (ft)	184	778	799	805	336	327	345	350	170	157	187	152
Average Queue (ft)	135	607	602	321	153	161	183	185	105	56	90	27
95th Queue (ft)	251	893	905	893	253	278	296	294	163	138	169	98
Link Distance (ft)		739	739	739		1199	1199	1199	1061	1061	1061	
Upstream Blk Time (%)		13	15	11								
Queuing Penalty (veh)		90	101	75								
Storage Bay Dist (ft)	135				250							115
Storage Blk Time (%)	55	44			0	2				9	0	
Queuing Penalty (veh)	384	26			2	6				7	0	

Intersection: 3: SB US 23 Ramp/Glasgow Road & Monroe Street

Movement	SB	SB
Directions Served	L	TR
Maximum Queue (ft)	95	50
Average Queue (ft)	35	23
95th Queue (ft)	72	47
Link Distance (ft)	269	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		85
Storage Blk Time (%)	1	
Queuing Penalty (veh)	0	

Queuing and Blocking Report
PM 2045 Conditions Feasible Alt B

11/27/2018

Intersection: 5: Monroe St & Alexis Road

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	B17	B17	NE
Directions Served	L	L	T	T	R	L	T	T	R	T	T	L
Maximum Queue (ft)	344	354	209	316	250	250	457	456	250	250	291	514
Average Queue (ft)	242	251	134	145	83	178	335	333	120	31	35	355
95th Queue (ft)	381	384	203	230	200	281	496	488	295	150	165	531
Link Distance (ft)			1199	1199			386	386		909	909	462
Upstream Blk Time (%)							13	12				4
Queuing Penalty (veh)							85	75				16
Storage Bay Dist (ft)	300	300			200	200			200			
Storage Blk Time (%)	3	4		1	0	4	37	37				
Queuing Penalty (veh)	8	12		3	0	20	63	26				

Intersection: 5: Monroe St & Alexis Road

Movement	NE	NE	NE	NE	SW	SW	SW	SW
Directions Served	L	T	T	R	UL	T	R	R
Maximum Queue (ft)	481	278	261	152	190	290	275	245
Average Queue (ft)	315	201	182	62	127	169	191	160
95th Queue (ft)	481	261	247	119	207	301	278	245
Link Distance (ft)	462	462	462			228	228	228
Upstream Blk Time (%)	1					4	5	1
Queuing Penalty (veh)	2					17	19	5
Storage Bay Dist (ft)			300		140			
Storage Blk Time (%)					10	8		
Queuing Penalty (veh)					10	10		

Intersection: 7: Elliot Drive & Alexis Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LT	R
Maximum Queue (ft)	189	249	252	138	176	162	114	109	92	44
Average Queue (ft)	38	151	171	58	80	64	38	45	34	10
95th Queue (ft)	114	252	255	116	143	127	79	86	64	29
Link Distance (ft)	962	962			911	911	245	245	255	
Upstream Blk Time (%)									100	
Queuing Penalty (veh)										
Storage Bay Dist (ft)	140			140						100
Storage Blk Time (%)		5			0	1			0	
Queuing Penalty (veh)		2			1	1			0	

Queuing and Blocking Report
PM 2045 Conditions Feasible Alt B

11/27/2018

Intersection: 8: Fairways Driveway/Tireman Driveway & Monroe Street/Monroe St

Movement	SE	SE	SE	NW	NW	NW	NE	SW	SW
Directions Served	L	T	TR	L	T	TR	LT	L	TR
Maximum Queue (ft)	223	264	271	74	183	160	181	116	116
Average Queue (ft)	31	104	126	23	98	84	109	48	40
95th Queue (ft)	68	216	237	52	177	156	169	93	77
Link Distance (ft)		909	909		499	499	241	156	156
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	180			145					
Storage Blk Time (%)		2			2				
Queuing Penalty (veh)		1			1				

Intersection: 9:

Movement	NE	B23	B23
Directions Served	T	T	T
Maximum Queue (ft)	85	103	93
Average Queue (ft)	11	10	12
95th Queue (ft)	52	48	56
Link Distance (ft)	470	78	78
Upstream Blk Time (%)	0	0	
Queuing Penalty (veh)	0	0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 16: Alexis Road & Acres

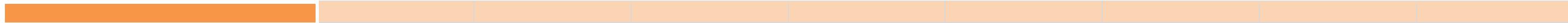
Movement	EB	WB	WB	SB
Directions Served	L	T	TR	R
Maximum Queue (ft)	137	163	229	344
Average Queue (ft)	60	21	31	118
95th Queue (ft)	115	89	118	245
Link Distance (ft)		962	962	422
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	100			
Storage Blk Time (%)	4			
Queuing Penalty (veh)	26			

Intersection: 18: Harroun Road

Movement	NB	NB
Directions Served	LT	TR
Maximum Queue (ft)	667	671
Average Queue (ft)	278	284
95th Queue (ft)	806	806
Link Distance (ft)	633	633
Upstream Blk Time (%)	29	38
Queuing Penalty (veh)	0	0
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 2581



Appendix D: HCS REPORTS

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	8/8/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 AM
Project Description	NB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	600
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	1340	1010
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	7.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (f _{hv})	0.862	0.919
Flow Rate (v _i), pc/h	1654	1169
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.37	0.58

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	13.1
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.354
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	55.8
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	1654	Ramp Junction Speed (S), mi/h	55.8
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	14.8
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 AM
Project Description	NB US-23 On Ramp (North of Monroe St)		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	890
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.51	1.51
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1480	80
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	6.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.838	0.923
Flow Rate (vi), pc/h	1879	92
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.44	0.05

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	15.3
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.262
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{OWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	57.8
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	1879	Ramp Junction Speed (S), mi/h	57.8
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	1971	Average Density (D), pc/mi/ln	17.1
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 AM
Project Description	NB US-23 On Ramp (South of Monroe St)		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	435
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1340	140
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	6.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.846	0.931
Flow Rate (vi), pc/h	1685	160
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.41	0.08

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	17.1
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.303
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{OWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	56.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	1685	Ramp Junction Speed (S), mi/h	56.9
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	1845	Average Density (D), pc/mi/ln	16.2
Level of Service (LOS)	B		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	2/5/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 AM
Project Description	SB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	40.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	1950	260
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	7.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f _{hv})	0.847	0.935
Flow Rate (v _i), pc/h	2449	296
Capacity (c), pc/h	4453	1936
Volume-to-Capacity Ratio (v/c)	0.55	0.15

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	20.0
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.403
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.8
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2449	Ramp Junction Speed (S), mi/h	54.8
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	22.3
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	2/1/2018
Agency	The Mannik & Smith Group Inc.	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group Inc.	Time Period Analyzed	2025 AM
Project Description	SB US-23 On Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	950
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.63	0.63
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1950	1240
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.864	0.947
Flow Rate (vi), pc/h	2401	1393
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.85	0.69

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	28.5
Distance to Upstream Ramp (LU _P), ft	-	Speed Index (Ms)	0.402
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	54.8
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2401	Ramp Junction Speed (S), mi/h	54.8
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	3794	Average Density (D), pc/mi/ln	34.6
Level of Service (LOS)	D		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	8/8/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 PM
Project Description	NB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	600
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	2240	1190
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	11.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (f _{hv})	0.862	0.888
Flow Rate (v _i), pc/h	2764	1426
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.62	0.70

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	22.6
Distance to Upstream Ramp (L _{UP}), ft	-	Speed Index (D _s)	0.377
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	55.3
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2764	Ramp Junction Speed (S), mi/h	55.3
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	25.0
Level of Service (LOS)	C		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 PM
Project Description	NB US-23 On Ramp (North of Monroe St)		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	890
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.51	1.51
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	2360	210
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.838	0.940
Flow Rate (vi), pc/h	2996	238
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.73	0.12

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	25.1
Distance to Upstream Ramp (LU _P), ft	-	Speed Index (Ms)	0.333
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	56.3
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2996	Ramp Junction Speed (S), mi/h	56.3
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	3234	Average Density (D), pc/mi/ln	28.7
Level of Service (LOS)	C		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 PM
Project Description	NB US-23 On Ramp (South of Monroe St)		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	435
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	2240	120
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.846	0.948
Flow Rate (vi), pc/h	2817	135
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.66	0.07

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	25.8
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.353
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	55.8
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2817	Ramp Junction Speed (S), mi/h	55.8
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	2952	Average Density (D), pc/mi/ln	26.5
Level of Service (LOS)	C		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	2/5/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 PM
Project Description	SB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	40.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	1740	270
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	3.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f _{hv})	0.847	0.971
Flow Rate (v _i), pc/h	2185	296
Capacity (c), pc/h	4453	1936
Volume-to-Capacity Ratio (v/c)	0.49	0.15

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	17.7
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.403
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.8
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2185	Ramp Junction Speed (S), mi/h	54.8
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	19.9
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	2/1/2018
Agency	The Mannik & Smith Group Inc.	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group Inc.	Time Period Analyzed	2025 PM
Project Description	SB US-23 On Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	950
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.63	0.63
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1740	1080
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.864	0.947
Flow Rate (vi), pc/h	2142	1213
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.75	0.60

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	25.2
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.340
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	56.1
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2142	Ramp Junction Speed (S), mi/h	56.1
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	3355	Average Density (D), pc/mi/ln	29.9
Level of Service (LOS)	C		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	8/8/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 AM
Project Description	NB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	600
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	1630	1270
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	7.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (f _{hv})	0.862	0.919
Flow Rate (v _i), pc/h	2012	1470
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.45	0.72

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	16.2
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.381
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	55.2
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2012	Ramp Junction Speed (S), mi/h	55.2
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	18.2
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 AM
Project Description	NB US-23 On Ramp (North of Monroe St)		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	890
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.51	1.51
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1790	110
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	6.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.838	0.923
Flow Rate (vi), pc/h	2272	127
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.54	0.06

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	18.6
Distance to Upstream Ramp (LU _P), ft	-	Speed Index (Ms)	0.277
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	57.5
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2272	Ramp Junction Speed (S), mi/h	57.5
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	2399	Average Density (D), pc/mi/ln	20.9
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 AM
Project Description	NB US-23 On Ramp (South of Monroe St)		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	435
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1630	160
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	6.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.846	0.931
Flow Rate (vi), pc/h	2050	183
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.50	0.09

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	20.2
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.315
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{OWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	56.7
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2050	Ramp Junction Speed (S), mi/h	56.7
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	2233	Average Density (D), pc/mi/ln	19.7
Level of Service (LOS)	C		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	2/5/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 AM
Project Description	SB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	40.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	2920	330
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	7.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f _{hv})	0.847	0.935
Flow Rate (v _i), pc/h	3668	375
Capacity (c), pc/h	4453	1936
Volume-to-Capacity Ratio (v/c)	0.82	0.19

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	30.5
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.410
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.6
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3668	Ramp Junction Speed (S), mi/h	54.6
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	33.6
Level of Service (LOS)	D		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	2/1/2018
Agency	The Mannik & Smith Group Inc.	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group Inc.	Time Period Analyzed	2045 AM
Project Description	SB US-23 On Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	950
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.63	0.63
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	2920	1570
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.864	0.947
Flow Rate (vi), pc/h	3595	1764
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	1.20	0.87

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	-
Distance to Upstream Ramp (LU _P), ft	-	Speed Index (Ms)	-
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3595	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	5359	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	8/8/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 PM
Project Description	NB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	600
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	2700	1500
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	11.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (f _{hv})	0.862	0.888
Flow Rate (v _i), pc/h	3332	1797
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.75	0.88

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	27.5
Distance to Upstream Ramp (L _{UP}), ft	-	Speed Index (D _s)	0.410
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.6
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3332	Ramp Junction Speed (S), mi/h	54.6
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	30.5
Level of Service (LOS)	C		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 PM
Project Description	NB US-23 On Ramp (North of Monroe St)		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	890
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.51	1.51
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	2930	260
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.838	0.940
Flow Rate (vi), pc/h	3720	294
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.90	0.14

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	31.1
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.450
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	53.8
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3720	Ramp Junction Speed (S), mi/h	53.8
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	4014	Average Density (D), pc/mi/ln	37.3
Level of Service (LOS)	D		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 PM
Project Description	NB US-23 On Ramp (South of Monroe St)		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	435
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	2700	230
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.846	0.948
Flow Rate (vi), pc/h	3395	258
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.82	0.13

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	31.2
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.429
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{OWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	54.2
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3395	Ramp Junction Speed (S), mi/h	54.2
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	3653	Average Density (D), pc/mi/ln	33.7
Level of Service (LOS)	D		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	2/5/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 PM
Project Description	SB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	40.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	2530	370
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	3.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f _{hv})	0.847	0.971
Flow Rate (v _i), pc/h	3178	405
Capacity (c), pc/h	4453	1936
Volume-to-Capacity Ratio (v/c)	0.71	0.21

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	26.3
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.412
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.6
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3178	Ramp Junction Speed (S), mi/h	54.6
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	29.1
Level of Service (LOS)	C		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	2/1/2018
Agency	The Mannik & Smith Group Inc.	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group Inc.	Time Period Analyzed	2045 PM
Project Description	SB US-23 On Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	950
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.63	0.63
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	2530	1370
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.864	0.947
Flow Rate (vi), pc/h	3115	1539
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	1.05	0.76

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	-
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	-
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3115	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	4654	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	8/8/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 AM
Project Description	NB US-23 Off Ramp-Alt B		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	600
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	1340	1010
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	7.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (f _{hv})	0.862	0.919
Flow Rate (v _i), pc/h	1654	1169
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.37	0.58

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	13.1
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.354
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	55.8
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	1654	Ramp Junction Speed (S), mi/h	55.8
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	14.8
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 AM
Project Description	NB US-23 On Ramp-Alt B		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	1450
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.75	0.75
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1340	220
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	6.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.839	0.923
Flow Rate (vi), pc/h	1699	254
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.44	0.12

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	11.6
Distance to Upstream Ramp (LU _P), ft	-	Speed Index (Ms)	0.207
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	59.0
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	1699	Ramp Junction Speed (S), mi/h	59.0
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	1953	Average Density (D), pc/mi/ln	16.6
Level of Service (LOS)	B		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	2/5/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 AM
Project Description	SB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	40.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	1950	260
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	7.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f _{hv})	0.847	0.935
Flow Rate (v _i), pc/h	2449	296
Capacity (c), pc/h	4453	1936
Volume-to-Capacity Ratio (v/c)	0.55	0.15

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	20.0
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.403
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.8
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2449	Ramp Junction Speed (S), mi/h	54.8
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	22.3
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	2/1/2018
Agency	The Mannik & Smith Group Inc.	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group Inc.	Time Period Analyzed	2025 AM
Project Description	SB US-23 On Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	950
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.63	0.63
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1950	1240
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.864	0.947
Flow Rate (vi), pc/h	2401	1393
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.85	0.69

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	28.5
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.402
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{OWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	54.8
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2401	Ramp Junction Speed (S), mi/h	54.8
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	3794	Average Density (D), pc/mi/ln	34.6
Level of Service (LOS)	D		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	8/8/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 PM
Project Description	NB US-23 Off Ramp-Alt B		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	600
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	2240	1190
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	11.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (f _{hv})	0.862	0.888
Flow Rate (v _i), pc/h	2764	1426
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.62	0.70

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	22.6
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.377
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	55.3
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2764	Ramp Junction Speed (S), mi/h	55.3
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	25.0
Level of Service (LOS)	C		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 PM
Project Description	NB US-23 On Ramp-Alt B		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	1450
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.75	0.75
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V_i), veh/h	2240	330
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (f_{HV})	0.839	0.940
Flow Rate (v_i), pc/h	2840	373
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.72	0.18

Speed and Density

Upstream Equilibrium Distance (L_{EQ}), ft	-	Density in Ramp Influence Area (D_R), pc/mi/ln	21.3
Distance to Upstream Ramp (L_{UP}), ft	-	Speed Index (M_s)	0.276
Downstream Equilibrium Distance (L_{EQ}), ft	-	Flow Outer Lanes (v_{OA}), pc/h/ln	-
Distance to Downstream Ramp (L_{DOWN}), ft	-	On-Ramp Influence Area Speed (S_R), mi/h	57.5
Prop. Freeway Vehicles in Lane 1 and 2 (P_{FM})	1.000	Outer Lanes Freeway Speed (S_o), mi/h	-
Flow in Lanes 1 and 2 (v_{12}), pc/h	2840	Ramp Junction Speed (S), mi/h	57.5
Flow Entering Ramp-Infl. Area (v_{R12}), pc/h	3213	Average Density (D), pc/mi/ln	27.9
Level of Service (LOS)	C		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	2/5/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2025 PM
Project Description	SB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	40.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	1740	270
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	3.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f _{hv})	0.847	0.971
Flow Rate (v _i), pc/h	2185	296
Capacity (c), pc/h	4453	1936
Volume-to-Capacity Ratio (v/c)	0.49	0.15

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	17.7
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.403
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.8
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2185	Ramp Junction Speed (S), mi/h	54.8
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	19.9
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	2/1/2018
Agency	The Mannik & Smith Group Inc.	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group Inc.	Time Period Analyzed	2025 PM
Project Description	SB US-23 On Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	950
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.63	0.63
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1740	1080
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.864	0.947
Flow Rate (vi), pc/h	2142	1213
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.75	0.60

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	25.2
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.340
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	56.1
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2142	Ramp Junction Speed (S), mi/h	56.1
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	3355	Average Density (D), pc/mi/ln	29.9
Level of Service (LOS)	C		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	8/8/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 AM
Project Description	NB US-23 Off Ramp-Alt B		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	600
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	1630	1270
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	7.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (f _{hv})	0.862	0.919
Flow Rate (v _i), pc/h	2012	1470
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.45	0.72

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	16.2
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.381
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	55.2
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2012	Ramp Junction Speed (S), mi/h	55.2
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	18.2
Level of Service (LOS)	B		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 AM
Project Description	NB US-23 On Ramp-Alt B		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	1450
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.75	0.75
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	1630	270
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	6.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.839	0.923
Flow Rate (vi), pc/h	2067	311
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.53	0.15

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	14.9
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	0.222
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{OWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	58.6
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	2067	Ramp Junction Speed (S), mi/h	58.6
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	2378	Average Density (D), pc/mi/ln	20.3
Level of Service (LOS)	B		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	2/5/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 AM
Project Description	SB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	40.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	2920	330
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	7.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f _{hv})	0.847	0.935
Flow Rate (v _i), pc/h	3668	375
Capacity (c), pc/h	4453	1936
Volume-to-Capacity Ratio (v/c)	0.82	0.19

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	30.5
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.410
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.6
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3668	Ramp Junction Speed (S), mi/h	54.6
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	33.6
Level of Service (LOS)	D		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	2/1/2018
Agency	The Mannik & Smith Group Inc.	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group Inc.	Time Period Analyzed	2045 AM
Project Description	SB US-23 On Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	950
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.63	0.63
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	2920	1570
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.864	0.947
Flow Rate (vi), pc/h	3595	1764
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	1.20	0.87

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	-
Distance to Upstream Ramp (LU _P), ft	-	Speed Index (Ms)	-
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3595	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	5359	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	8/8/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 PM
Project Description	NB US-23 Off Ramp-Alt B		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	600
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	1.00	1.00
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	2700	1500
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	11.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (f _{hv})	0.862	0.888
Flow Rate (v _i), pc/h	3332	1797
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.75	0.88

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	27.5
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.410
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.6
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3332	Ramp Junction Speed (S), mi/h	54.6
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	30.5
Level of Service (LOS)	C		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	8/9/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 PM
Project Description	NB US-23 On Ramp-Alt B		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	1450
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.75	0.75
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	2700	490
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.839	0.940
Flow Rate (vi), pc/h	3424	555
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	0.89	0.27

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	27.2
Distance to Upstream Ramp (LU _P), ft	-	Speed Index (Ms)	0.388
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LDOWN), ft	-	On-Ramp Influence Area Speed (SR), mi/h	55.1
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3424	Ramp Junction Speed (S), mi/h	55.1
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	3979	Average Density (D), pc/mi/ln	36.1
Level of Service (LOS)	C		

HCS7 Freeway Diverge Report

Project Information

Analyst		Date	2/5/2018
Agency	The Mannik & Smith Group	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group	Time Period Analyzed	2045 PM
Project Description	SB US-23 Off Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	40.0
Segment Length (L) / Deceleration Length (L _d), ft	1500	590
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (V _i), veh/h	2530	370
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	18.00	3.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (f _{hv})	0.847	0.971
Flow Rate (v _i), pc/h	3178	405
Capacity (c), pc/h	4453	1936
Volume-to-Capacity Ratio (v/c)	0.71	0.21

Speed and Density

Upstream Equilibrium Distance (L _{EQ}), ft	-	Density in Ramp Influence Area (D _R), pc/mi/ln	26.3
Distance to Upstream Ramp (L _{UR}), ft	-	Speed Index (D _s)	0.412
Downstream Equilibrium Distance (L _{EQ}), ft	-	Flow Outer Lanes (v _{OA}), pc/h/ln	-
Distance to Downstream Ramp (L _{DOWN}), ft	-	Off-Ramp Influence Area Speed (S _R), mi/h	54.6
Prop. Freeway Vehicles in Lane 1 and 2 (P _{FD})	1.000	Outer Lanes Freeway Speed (S _o), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3178	Ramp Junction Speed (S), mi/h	54.6
Flow Entering Ramp-Infl. Area (v _{R12}), pc/h	-	Average Density (D), pc/mi/ln	29.1
Level of Service (LOS)	C		

HCS7 Freeway Merge Report

Project Information

Analyst		Date	2/1/2018
Agency	The Mannik & Smith Group Inc.	Analysis Year	2018
Jurisdiction	The Mannik & Smith Group Inc.	Time Period Analyzed	2045 PM
Project Description	SB US-23 On Ramp		

Geometric Data

	Freeway	Ramp
Number of Lanes (N)	2	1
Free-Flow Speed (FFS), mi/h	65.0	50.0
Segment Length (L) / Acceleration Length (LA), ft	1500	950
Terrain Type	Specific Grade	Specific Grade
Percent Grade, %	0.63	0.63
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors

Driver Population	Mostly Familiar	Mostly Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	0.975	0.975
Final Capacity Adjustment Factor (CAF)	0.968	0.968
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity

Demand Volume (Vi), veh/h	2530	1370
Peak Hour Factor (PHF)	0.94	0.94
Total Trucks, %	15.00	4.00
Single-Unit Trucks (SUT), %	30	30
Tractor-Trailers (TT), %	70	70
Heavy Vehicle Adjustment Factor (fHV)	0.864	0.947
Flow Rate (vi), pc/h	3115	1539
Capacity (c), pc/h	4453	2033
Volume-to-Capacity Ratio (v/c)	1.05	0.76

Speed and Density

Upstream Equilibrium Distance (LEQ), ft	-	Density in Ramp Influence Area (DR), pc/mi/ln	-
Distance to Upstream Ramp (LU _R), ft	-	Speed Index (Ms)	-
Downstream Equilibrium Distance (LD _{EQ}), ft	-	Flow Outer Lanes (vo _A), pc/h/ln	-
Distance to Downstream Ramp (LD _{DOWN}), ft	-	On-Ramp Influence Area Speed (SR), mi/h	-
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	1.000	Outer Lanes Freeway Speed (So), mi/h	-
Flow in Lanes 1 and 2 (v ₁₂), pc/h	3115	Ramp Junction Speed (S), mi/h	-
Flow Entering Ramp-Infl. Area (vr ₁₂), pc/h	4654	Average Density (D), pc/mi/ln	-
Level of Service (LOS)	F		

Appendix E: **COST ESTIMATE**

ALT A

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
PAVEMENT				
ASPHALT CONCRETE SURFACE COURSE, 12.5MM, TYPE A	948 CY	\$ 144.28	\$ 137,000	
ASPHALT CONCRETE INTERMEDIATE COURSE, 19 MM, TYPE A (446)	1207 CY	\$ 114.32	\$ 138,000	
ASPHALT CONCRETE BASE, PG64-22	6898 CY	\$ 88.05	\$ 607,000	
AGGREGATE BASE	4139 CY	\$ 45.86	\$ 190,000	
6" CONCRETE TRAFFIC ISLAND	1735 SY	\$ 68.32	\$ 119,000	
CURB, TYPE 6	3278 FT	\$ 21.05	\$ 69,000	
PAVEMENT SUBTOTAL				\$ 1,260,000
ROADWAY				
PAVEMENT REMOVED	23866 SY	\$ 9.56	\$ 228,000	
WALK REMOVED	8370 SF	\$ 2.06	\$ 17,000	
CURB REMOVED	3321 FT	\$ 5.36	\$ 18,000	
GUARDRAIL REMOVED	1800 FT	\$ 1.82	\$ 3,000	
CONCRETE BARRIER REMOVED	141 FT	\$ 13.34	\$ 2,000	
4" CONCRETE WALK	12043 SF	\$ 5.67	\$ 68,000	
GUARDRAIL, TYPE MGS	1200 FT	\$ 11.64	\$ 14,000	
AESTHETICS	1 EACH	\$ 400,000.00	\$ 400,000	
CEMENT	368 TON	\$ 175.00	\$ 64,000	
CURING COAT	14201 SY	\$ 0.27	\$ 4,000	
CEMENT STABILIZED SUBGRADE, 12 INCHES DEEP	14201 SY	\$ 3.50	\$ 50,000	
MIXTURE DESIGN FOR CHEMICALLY STABILIZED SOILS	1 LS	\$ 7,000.00	\$ 7,000	
PROOF ROLLING	13 HR	\$ 170.76	\$ 2,000	
SUBGRADE COMPACTION	24834 SY	\$ 1.61	\$ 40,000	
EMBANKMENT	130000 CY	\$ 8.92	\$ 1,160,000	
EXCAVATION	75000 CY	\$ 11.77	\$ 883,000	
SEEDING AND MULCHING	25000 SY	\$ 0.72	\$ 18,000	
ROADWAY SUBTOTAL				\$ 2,978,000
TRAFFIC CONTROL				
SIGNAL REPLACED	2 EACH	\$ 250,000.00	\$ 500,000	
REMOVE AND REERECT EXISTING CANTILEVER SIGN	4 EA	\$ 21,730.00	\$ 87,000	
SINGLE ARM OVERHEAD SIGN SUPPORT RELOCATED	1 EA	\$ 17,000.00	\$ 17,000	
REMOVAL OF OVERHEAD SIGN SUPPORT AND DISPOSAL, TYPE TC-15.115	1 EA	\$ 2,500.00	\$ 3,000	
TRAFFIC CONTROL SUBTOTAL				\$ 607,000
BRIDGE				
NB EXIT BRIDGE REMOVAL AND REPLACEMENT	6600 SF	\$ 200.00	\$ 1,320,000	
MONROE ST WIDENING	3930 SF	\$ 200.00	\$ 786,000	
BRIDGE SUBTOTAL				\$ 2,106,000
CONSTRUCTION MISC.				
FIELD OFFICE, TYPE C	12 MONTH	\$ 3,260.18	\$ 39,000	
MOBILIZATION	1 LS	\$ 400,000.00	\$ 400,000	
CONSTRUCTION LAYOUT STAKES	1 LS	\$ 100,000.00	\$ 100,000	
CONSTRUCTION SUBTOTAL				\$ 539,000
LIGHTING				
FULL INTERCHANGE LIGHTING	LS		\$	300,000
MAINTENANCE OF TRAFFIC				
12% OF COST			\$	1,050,000
DRAINAGE				
10% OF COST			\$	884,000
TOTAL				
SUBTOTAL			\$	9,724,000
CONTINGENCY (30%)			\$	2,917,000
PROJECT TOTAL			\$	12,641,000
INFLATION (22%)			\$	2,781,000
GRAND TOTAL			\$	15,430,000

NOTE: DOLLARS SHOWN ARE IN THE PRESENT YEAR (2019)

ESTIMATE DOES NOT INCLUDE R/W COSTS

ALT B

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
PAVEMENT				
ASPHALT CONCRETE SURFACE COURSE, 12.5MM, TYPE A	1151 CY	\$ 144.28	\$ 166,000	
ASPHALT CONCRETE INTERMEDIATE COURSE, 19 MM, TYPE A (446)	1473 CY	\$ 114.32	\$ 168,000	
ASPHALT CONCRETE BASE, PG64-22	8419 CY	\$ 88.05	\$ 741,000	
AGGREGATE BASE	5051 CY	\$ 45.86	\$ 232,000	
6" CONCRETE TRAFFIC ISLAND	1064 SY	\$ 68.32	\$ 73,000	
CURB, TYPE 6	3080 FT	\$ 21.05	\$ 65,000	
PAVEMENT SUBTOTAL				\$ 1,445,000
ROADWAY				
PAVEMENT REMOVED	22240 SY	\$ 9.56	\$ 213,000	
WALK REMOVED	8370 SF	\$ 2.06	\$ 17,000	
CURB REMOVED	3320 FT	\$ 5.36	\$ 18,000	
GUARDRAIL REMOVED	2150 FT	\$ 1.82	\$ 4,000	
CONCRETE BARRIER REMOVED	141 FT	\$ 13.34	\$ 2,000	
4" CONCRETE WALK	12063 SF	\$ 5.67	\$ 68,000	
GUARDRAIL, TYPE MGS	2335 FT	\$ 11.64	\$ 27,000	
CONCRETE BARRIER	200 FT	\$ 165.85	\$ 33,170	
AESTHETICS	1 EACH	\$ 400,000.00	\$ 400,000	
CEMENT	497 TON	\$ 175.00	\$ 87,000	
CURING COAT	19189 SY	\$ 0.27	\$ 5,000	
CEMENT STABILIZED SUBGRADE, 12 INCHES DEEP	19189 SY	\$ 3.50	\$ 67,000	
MIXTURE DESIGN FOR CHEMICALLY STABILIZED SOILS	1 LS	\$ 7,000.00	\$ 7,000	
PROOF ROLLING	16 HR	\$ 170.76	\$ 3,000	
SUBGRADE COMPACTION	30307 SY	\$ 1.61	\$ 49,000	
EMBANKMENT	125000 CY	\$ 8.92	\$ 1,115,000	
EXCAVATION	75000 CY	\$ 11.77	\$ 883,000	
SEEDING AND MULCHING	23000 SY	\$ 0.72	\$ 17,000	
ROADWAY SUBTOTAL				\$ 3,015,170
TRAFFIC CONTROL				
SIGNAL REPLACED	1 EACH	\$ 250,000.00	\$ 250,000	
REMOVE AND REERECT EXISTING CANTILEVER SIGN	4 EA	\$ 21,730.00	\$ 87,000	
REMOVAL OF OVERHEAD SIGN SUPPORT AND DISPOSAL, TYPE TC-15.115	1 EA	\$ 2,500.00	\$ 3,000	
TRAFFIC CONTROL SUBTOTAL				\$ 340,000
BRIDGE				
NB EXIT BRIDGE REMOVAL AND REPLACEMENT	4800 SF	\$ 200.00	\$ 960,000	
MONROE ST WIDENING	1120 SF	\$ 200.00	\$ 224,000	
SOIL NAIL WALL	1600 SF	\$ 110.00	\$ 176,000	
BRIDGE SUBTOTAL				\$ 1,360,000
CONSTRUCTION MISC.				
FIELD OFFICE, TYPE C	12 MONTH	\$ 3,260.18	\$ 39,000	
MOBILIZATION	1 LS	\$ 250,000.00	\$ 400,000	
CONSTRUCTION LAYOUT STAKES	1 LS	\$ 90,000.00	\$ 90,000	
CONSTRUCTION SUBTOTAL				\$ 529,000.00
LIGHTING				
FULL INTERCHANGE LIGHTING	LS		\$ 300,000	
MAINTENANCE OF TRAFFIC				
12% OF COST	LS		\$ 944,000	
DRAINAGE				
10% OF COST			\$ 793,000	
ENCLOSED DRAINAGE				
15" CONDUIT, TYPE B	1000 FT	\$ 72.86	\$ 72,860	
CATCH BASIN, NO. 2-4	2 EACH	\$ 2,470.57	\$ 4,941	
DRAINAGE SUBTOTAL				\$ 870,801
TOTAL				
SUBTOTAL			\$ 8,804,000	
CONTINGENCY (30%)			\$ 2,641,000	
PROJECT TOTAL			\$ 11,445,000	
INFLATION (22%)			\$ 2,518,000	
GRAND TOTAL			\$ 13,970,000	

NOTE: DOLLARS SHOWN ARE IN THE PRESENT YEAR (2019)

ESTIMATE DOES NOT INCLUDE R/W COSTS

GLASGOW OPTION 1

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
PAVEMENT				
ASPHALT CONCRETE SURFACE COURSE, 12.5MM, TYPE A	776 CY	\$	144.28	\$ 112,000
ASPHALT CONCRETE INTERMEDIATE COURSE, 19 MM, TYPE A (446)	663 CY	\$	114.32	\$ 76,000
ASPHALT CONCRETE BASE, PG64-22	3790 CY	\$	88.05	\$ 334,000
AGGREGATE BASE	2274 CY	\$	45.86	\$ 104,000
		\$		-
6" CONCRETE TRAFFIC ISLAND	470 SY	\$	68.32	\$ 32,000
CURB, TYPE 6	2175 FT	\$	21.05	\$ 46,000
		PAVEMENT SUBTOTAL	\$	704,000
ROADWAY				
PAVEMENT REMOVED	2763 SY	\$	9.56	\$ 26,000
WALK REMOVED	5000 SF	\$	2.06	\$ 10,000
CURB REMOVED	1439 FT	\$	5.36	\$ 8,000
GUARDRAIL REMOVED	2600 FT	\$	1.82	\$ 5,000
CONCRETE BARRIER REMOVED	358 FT	\$	13.34	\$ 5,000
4" CONCRETE WALK	6316 SF	\$	5.67	\$ 36,000
GUARDRAIL, TYPE MGS	3012 FT	\$	11.64	\$ 35,000
CEMENT	319 TON	\$	175.00	\$ 56,000
CURING COAT	12314 SY	\$	0.27	\$ 3,000
CEMENT STABILIZED SUBGRADE, 12 INCHES DEEP	12314 SY	\$	3.50	\$ 43,000
MIXTURE DESIGN FOR CHEMICALLY STABILIZED SOILS	1 LS	\$	7,000.00	\$ 7,000
PROOF ROLLING	7 HR	\$	170.76	\$ 1,000
SUBGRADE COMPACTION	13645 SY	\$	1.61	\$ 22,000
EMBANKMENT	50000 CY	\$	8.92	\$ 446,000
EXCAVATION	25000 CY	\$	11.77	\$ 294,000
SEEDING AND MULCHING	10000 SY	\$	0.72	\$ 7,000
		ROADWAY SUBTOTAL	\$	1,004,000
BRIDGE				
SB ENTRANCE BRIDGE REMOVAL AND REPLACEMENT	4000 SF	\$	200.00	\$ 800,000
		BRIDGE SUBTOTAL	\$	800,000
TRAFFIC CONTROL				
SIGNAL REPLACED	1 EACH	\$	250,000.00	\$ 250,000
SINGLE ARM OVERHEAD SIGN SUPPORT RELOCATED	1 EA	\$	17,000.00	\$ 17,000
		TRAFFIC CONTROL SUBTOTAL	\$	267,000
MAINTENANCE OF TRAFFIC				
12% OF COST				\$ 370,000
DRAINAGE				
10% OF COST				\$ 315,000
TOTAL				
SUBTOTAL				\$ 3,460,000
CONTINGENCY (30%)				\$ 1,038,000
PROJECT TOTAL				\$ 4,498,000
INFLATION (22%)				\$ 990,000
GRAND TOTAL				\$ 5,490,000

NOTE: DOLLARS SHOWN ARE IN THE PRESENT YEAR (2019)

ESTIMATE DOES NOT INCLUDE R/W COSTS

GLASGOW OPTION 2

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
PAVEMENT				
ASPHALT CONCRETE SURFACE COURSE, 12.5MM, TYPE A	800 CY	\$	144.28	\$ 115,000
ASPHALT CONCRETE INTERMEDIATE COURSE, 19 MM, TYPE A (446)	858 CY	\$	114.32	\$ 98,000
ASPHALT CONCRETE BASE, PG64-22	4905 CY	\$	88.05	\$ 432,000
AGGREGATE BASE	2943 CY	\$	45.86	\$ 135,000
				\$ -
6" CONCRETE TRAFFIC ISLAND	597 SY	\$	68.32	\$ 41,000
CURB, TYPE 6	2175 FT	\$	21.05	\$ 46,000
				PAVEMENT SUBTOTAL \$ 867,000
ROADWAY				
PAVEMENT REMOVED	5556 SY	\$	9.56	\$ 53,000
WALK REMOVED	5000 SF	\$	2.06	\$ 10,000
CURB REMOVED	1439 FT	\$	5.36	\$ 8,000
GUARDRAIL REMOVED	2600 FT	\$	1.82	\$ 5,000
CONCRETE BARRIER REMOVED	358 FT	\$	13.34	\$ 5,000
4" CONCRETE WALK	6316 SF	\$	5.67	\$ 36,000
GUARDRAIL, TYPE MGS	3012 FT	\$	11.64	\$ 35,000
CEMENT	457 TON	\$	175.00	\$ 80,000
CURING COAT	17656 SY	\$	0.27	\$ 5,000
CEMENT STABILIZED SUBGRADE, 12 INCHES DEEP	17656 SY	\$	3.50	\$ 62,000
MIXTURE DESIGN FOR CHEMICALLY STABILIZED SOILS	1 LS	\$	7,000.00	\$ 7,000
PROOF ROLLING	7 HR	\$	170.76	\$ 1,000
SUBGRADE COMPACTION	17656 SY	\$	1.61	\$ 28,000
EMBANKMENT	75000 CY	\$	8.92	\$ 669,000
EXCAVATION	50000 CY	\$	11.77	\$ 589,000
SEEDING AND MULCHING	20000 SY	\$	0.72	\$ 14,000
				ROADWAY SUBTOTAL \$ 1,607,000
BRIDGE				
SB ENTRANCE BRIDGE REMOVAL AND REPLACEMENT	4000 SF	\$	200.00	\$ 800,000
				BRIDGE SUBTOTAL \$ 800,000
TRAFFIC CONTROL				
SIGNAL REPLACED	1 EACH	\$	250,000.00	\$ 250,000
SINGLE ARM OVERHEAD SIGN SUPPORT RELOCATED	1 EA	\$	17,000.00	\$ 17,000
				TRAFFIC CONTROL SUBTOTAL \$ 267,000
MAINTENANCE OF TRAFFIC				
12% OF COST				\$ 473,000
DRAINAGE				
10% OF COST				\$ 401,000
TOTAL				
SUBTOTAL				\$ 4,415,000
CONTINGENCY (30%)				\$ 1,325,000
PROJECT TOTAL				\$ 5,740,000
INFLATION (22%)				\$ 1,263,000
GRAND TOTAL				\$ 7,010,000

NOTE: DOLLARS SHOWN ARE IN THE PRESENT YEAR (2019)

ESTIMATE DOES NOT INCLUDE R/W COSTS

GLASGOW OPTION 3

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
PAVEMENT				
ASPHALT CONCRETE SURFACE COURSE, 12.5MM, TYPE A	769 CY	\$	144.28	\$ 111,000
ASPHALT CONCRETE INTERMEDIATE COURSE, 19 MM, TYPE A (446)	839 CY	\$	114.32	\$ 96,000
ASPHALT CONCRETE BASE, PG64-22	4796 CY	\$	88.05	\$ 422,000
AGGREGATE BASE	2878 CY	\$	45.86	\$ 132,000
				\$ -
6" CONCRETE TRAFFIC ISLAND	424 SY	\$	68.32	\$ 29,000
CURB, TYPE 6	2175 FT	\$	21.05	\$ 46,000
				PAVEMENT SUBTOTAL \$ 836,000
ROADWAY				
PAVEMENT REMOVED	5556 SY	\$	9.56	\$ 53,000
WALK REMOVED	5000 SF	\$	2.06	\$ 10,000
CURB REMOVED	1439 FT	\$	5.36	\$ 8,000
GUARDRAIL REMOVED	2600 FT	\$	1.82	\$ 5,000
CONCRETE BARRIER REMOVED	358 FT	\$	13.34	\$ 5,000
4" CONCRETE WALK	6316 SF	\$	5.67	\$ 36,000
GUARDRAIL, TYPE MGS	3012 FT	\$	11.64	\$ 35,000
CEMENT	447 TON	\$	175.00	\$ 78,000
CURING COAT	17265 SY	\$	0.27	\$ 5,000
CEMENT STABILIZED SUBGRADE, 12 INCHES DEEP	17265 SY	\$	3.50	\$ 60,000
MIXTURE DESIGN FOR CHEMICALLY STABILIZED SOILS	1 LS	\$	7,000.00	\$ 7,000
PROOF ROLLING	7 HR	\$	170.76	\$ 1,000
SUBGRADE COMPACTION	17265 SY	\$	1.61	\$ 28,000
EMBANKMENT	75000 CY	\$	8.92	\$ 669,000
EXCAVATION	50000 CY	\$	11.77	\$ 589,000
SEEDING AND MULCHING	15000 SY	\$	0.72	\$ 11,000
				ROADWAY SUBTOTAL \$ 1,600,000
BRIDGE				
SB ENTRANCE BRIDGE REMOVAL AND REPLACEMENT	4000 SF	\$	200.00	\$ 800,000
				BRIDGE SUBTOTAL \$ 800,000
TRAFFIC CONTROL				
SIGNAL REPLACED	1 EACH	\$	250,000.00	\$ 250,000
SINGLE ARM OVERHEAD SIGN SUPPORT RELOCATED	1 EA	\$	17,000.00	\$ 17,000
				TRAFFIC CONTROL SUBTOTAL \$ 267,000
MAINTENANCE OF TRAFFIC				
12% OF COST				\$ 467,000
DRAINAGE				
10% OF COST				\$ 397,000
TOTAL				
SUBTOTAL				\$ 4,367,000
CONTINGENCY (30%)				\$ 1,310,000
PROJECT TOTAL				\$ 5,677,000
INFLATION (22%)				\$ 1,249,000
GRAND TOTAL				\$ 6,930,000

NOTE: DOLLARS SHOWN ARE IN THE PRESENT YEAR (2019)

ESTIMATE DOES NOT INCLUDE R/W COSTS

GLASGOW OPTION 4

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
PAVEMENT				
ASPHALT CONCRETE SURFACE COURSE, 12.5MM, TYPE A	756 CY	\$	144.28	\$ 109,000
ASPHALT CONCRETE INTERMEDIATE COURSE, 19 MM, TYPE A (446)	666 CY	\$	114.32	\$ 76,000
ASPHALT CONCRETE BASE, PG64-22	3808 CY	\$	88.05	\$ 335,000
AGGREGATE BASE	2285 CY	\$	45.86	\$ 105,000
				\$ -
6" CONCRETE TRAFFIC ISLAND	822 SY	\$	68.32	\$ 56,000
CURB, TYPE 6	2175 FT	\$	21.05	\$ 46,000
				PAVEMENT SUBTOTAL \$ 727,000
ROADWAY				
PAVEMENT REMOVED	2778 SY	\$	9.56	\$ 27,000
WALK REMOVED	5000 SF	\$	2.06	\$ 10,000
CURB REMOVED	1439 FT	\$	5.36	\$ 8,000
GUARDRAIL REMOVED	2600 FT	\$	1.82	\$ 5,000
CONCRETE BARRIER REMOVED	358 FT	\$	13.34	\$ 5,000
4" CONCRETE WALK	6316 SF	\$	5.67	\$ 36,000
GUARDRAIL, TYPE MGS	3012 FT	\$	11.64	\$ 35,000
CEMENT	355 TON	\$	175.00	\$ 62,000
CURING COAT	13708 SY	\$	0.27	\$ 4,000
CEMENT STABILIZED SUBGRADE, 12 INCHES DEEP	13708 SY	\$	3.50	\$ 48,000
MIXTURE DESIGN FOR CHEMICALLY STABILIZED SOILS	1 LS	\$	7,000.00	\$ 7,000
PROOF ROLLING	7 HR	\$	170.76	\$ 1,000
SUBGRADE COMPACTION	13708 SY	\$	1.61	\$ 22,000
EMBANKMENT	50000 CY	\$	8.92	\$ 446,000
EXCAVATION	25000 CY	\$	11.77	\$ 294,000
SEEDING AND MULCHING	10000 SY	\$	0.72	\$ 7,000
				ROADWAY SUBTOTAL \$ 1,017,000
BRIDGE				
SB ENTRANCE BRIDGE REMOVAL AND REPLACEMENT	4000 SF	\$	200.00	\$ 800,000
				BRIDGE SUBTOTAL \$ 800,000
TRAFFIC CONTROL				
SIGNAL REPLACED	1 EACH	\$	250,000.00	\$ 250,000
SINGLE ARM OVERHEAD SIGN SUPPORT RELOCATED	1 EA	\$	17,000.00	\$ 17,000
				TRAFFIC CONTROL SUBTOTAL \$ 267,000
MAINTENANCE OF TRAFFIC				
12% OF COST				\$ 376,000
DRAINAGE				
10% OF COST				\$ 319,000
TOTAL				
SUBTOTAL				\$ 3,506,000
CONTINGENCY (30%)				\$ 1,052,000
PROJECT TOTAL				\$ 4,558,000
INFLATION (22%)				\$ 1,003,000
GRAND TOTAL				\$ 5,570,000

NOTE: DOLLARS SHOWN ARE IN THE PRESENT YEAR (2019)

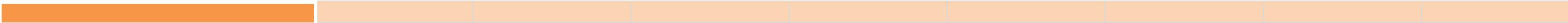
ESTIMATE DOES NOT INCLUDE R/W COSTS

Monroe Street Widening

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL PRICE
PAVEMENT				
ASPHALT CONCRETE SURFACE COURSE, 12.5MM, TYPE A	46 CY	\$	144.28	\$ 7,000
ASPHALT CONCRETE INTERMEDIATE COURSE, 19 MM, TYPE A (446)	5 CY	\$	114.32	\$ 1,000
ASPHALT CONCRETE BASE, PG64-22	28 CY	\$	88.05	\$ 2,000
AGGREGATE BASE	17 CY	\$	45.86	\$ 1,000
SUBGRADE COMPACTION	100 SY	\$	1.61	\$ -
CURB, TYPE 6	826 FT	\$	21.05	\$ 17,000
		PAVEMENT SUBTOTAL		\$ 28,000
ROADWAY				
WALK REMOVED	1644 SF	\$	2.06	\$ 3,000
CURB REMOVED	829 FT	\$	5.36	\$ 4,000
4" CONCRETE WALK	1644 SF	\$	5.67	\$ 9,000
EMBANKMENT	0 CY	\$	8.92	\$ -
EXCAVATION	0 CY	\$	11.77	\$ -
		ROADWAY SUBTOTAL		\$ 16,000
TRAFFIC CONTROL				
REMOVE AND REERECT EXISTING CANTILEVER SIGN	1 EA	\$	21,730.00	\$ 22,000
SIGNAL REPLACED	2 EA	\$	100,000.00	\$ 200,000
SINGLE ARM OVERHEAD SIGN SUPPORT RELOCATED	1 EA	\$	17,000.00	\$ 17,000
		TRAFFIC CONTROL SUBTOTAL		\$ 239,000
LIGHTING				
WOOD POLE REMOVED	4 EA	\$	375.00	\$ 2,000
NEW LIGHT POLE	4 EA	\$	4,200.00	\$ 17,000
REMOVED AND REERECT EXISTING LIGHT TOWER	1 EA	\$	14,289.00	\$ 14,000
		LIGHTING SUBTOTAL		\$ 33,000
MAINTENANCE OF TRAFFIC				
12% OF COST				\$ 45,000
DRAINAGE				
10% OF COST				\$ 36,000
TOTAL				
SUBTOTAL				\$ 397,000
CONTINGENCY (30%)				\$ 119,000
PROJECT TOTAL				\$ 516,000
INFLATION (22%)				\$ 114,000
GRAND TOTAL				\$ 630,000

NOTE: DOLLARS SHOWN ARE IN THE PRESENT YEAR (2019)

ESTIMATE DOES NOT INCLUDE R/W COSTS



Appendix F: PURPOSE AND NEED DOCUMENT

APRIL 2018

US-23 INTERCHANGE STUDY PURPOSE & NEED



CLIENT:

City of Sylvania
6730 Monroe Street
Sylvania, OH 43560



PREPARED FOR:

The Mannik & Smith Group, Inc.
1800 Indian Wood Circle
Maumee, OH 43537



PREPARED BY:

Burton Planning Services, LLC
252 Electric Avenue
Westerville, OH 43081
(614) 392-2284
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PURPOSE AND NEED

1. Project History

The City of Sylvania is conducting an Interchange Study for the LUC US-23 11.75 project. The project involves engineering for a Feasibility Study and Alternative Evaluation Report (AER) for the reconstruction of the US-23 interchange with Monroe Street and Alexis Road in the City of Sylvania. The Study Area is pictured in Exhibit 1 on the following page. This project involves the Planning (PL) and Preliminary Engineering (PE) phases of the PDP phased approach and is anticipated to follow a Path 3, Complex Project. The study area includes 1) US-23 interchange with Monroe Street and Alexis Road, 2) Monroe Street from Harroun Road to 0.25 miles east of Acres Road and 3) Alexis Road from Monroe Street to Elliott Drive.

Local land use and visioning documents that are relevant to the study area include the Codified Ordinances of Sylvania (2005), which is the City's Planning and Zoning Code; as well as the City of Sylvania, Ohio Land Use Plan (2010), which provides an overall context for development decisions on issues related to land use, transportation, and community facilities. Lucas County has a transportation plan created by the Toledo Metropolitan Area Council of Governments. This plan, On the Move 2007 2035 Transportation Plan (Updated in 2011), provides a program of transportation projects, initiatives, and policies that guide public investment over 28 years to enhance the regional transportation system.

The project is currently only funded through the Feasibility Study. Funding sources will be identified later in the Study, and the future schedule will be based on funding success.

2. Purpose Statement

The purpose of this project is to improve existing facility deficiencies, existing and future safety and congestion concerns, and mitigate environmental impacts of any interchange improvements on nearby sensitive areas.

3. Need Elements

Crash rates at the on/off ramp intersections on Monroe Street are higher than those of nearby local intersections (see Appendix A). Between 2014 and 2016, 44 crashes occurred at the southbound On and Off Ramps, and 60 crashes occurred at the NB On and Off Ramps. These two intersections account for 56 percent of the crashes within the Study Area. As such, safety is a primary concern for this feasibility study. In addition, four out of nine intersections in the study area are projected to drop below a Level of Service D by 2045 (see Appendix A), suggesting that congestion may become a major concern in the future. As documented in Appendix B, the ramp barrier on the northbound US-23 Off Ramp to Monroe Street shows evidence of unreported crashes, which may indicate that the ramp curvature is creating a safety issue due to facility deficiencies.

Other than safety, facility deficiencies, and congestion, one additional environmental need exists within the Study Area. The Ottawa River flows crosses under the southern portion of northbound interchange, creating a flood hazard zone adjacent to the southbound US-23 On Ramp and the NB

US-23 Off Ramp. Any improvements to the interchange should consider possible impacts to this riparian corridor, as well as two small wetland areas within the interchange.

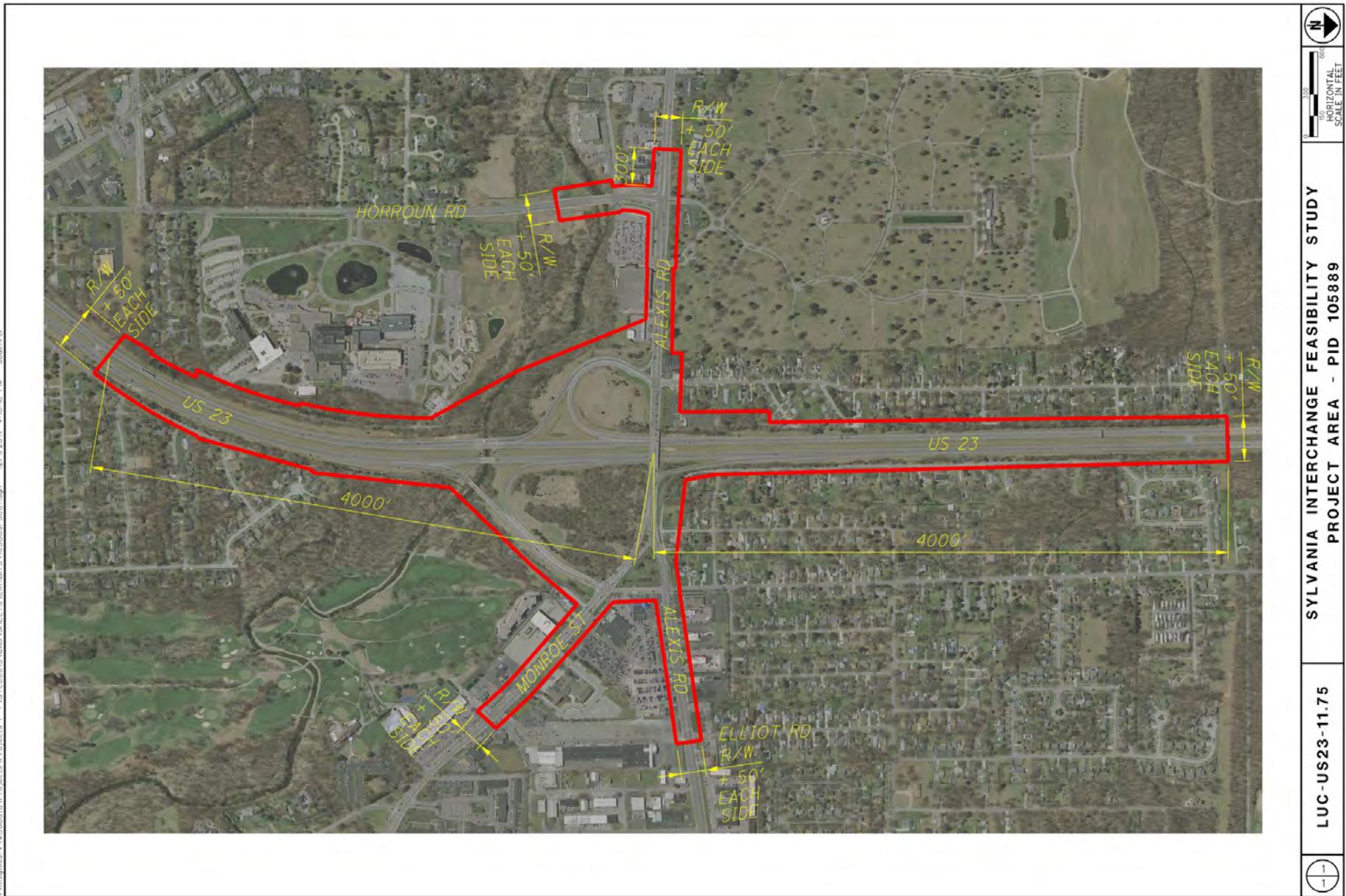
4. Summary Statement

The purpose of this project is to improve existing facility deficiencies, existing and future safety and congestion concerns, and mitigate environmental impacts of any interchange improvements on nearby sensitive areas.

5. Logical Termini and Independent Utility

Logical termini are based on where the transportation problem begins and ends. Safety, congestion, and existing facility deficiencies are the primary needs in the study area. The logical termini are the two intersections with high crash rates and future level of service concerns at either end of the study area: Harroun Road marks the western terminus (with 16 crashes between 2014 and 2016 and a projected LOS D in 2045), and the southbound US-23 On and Off Ramps mark the eastern terminus (with 60 crashes between 2014 and 2016 and a projected LOS D in 2045).

Exhibit 1: Study Area Map

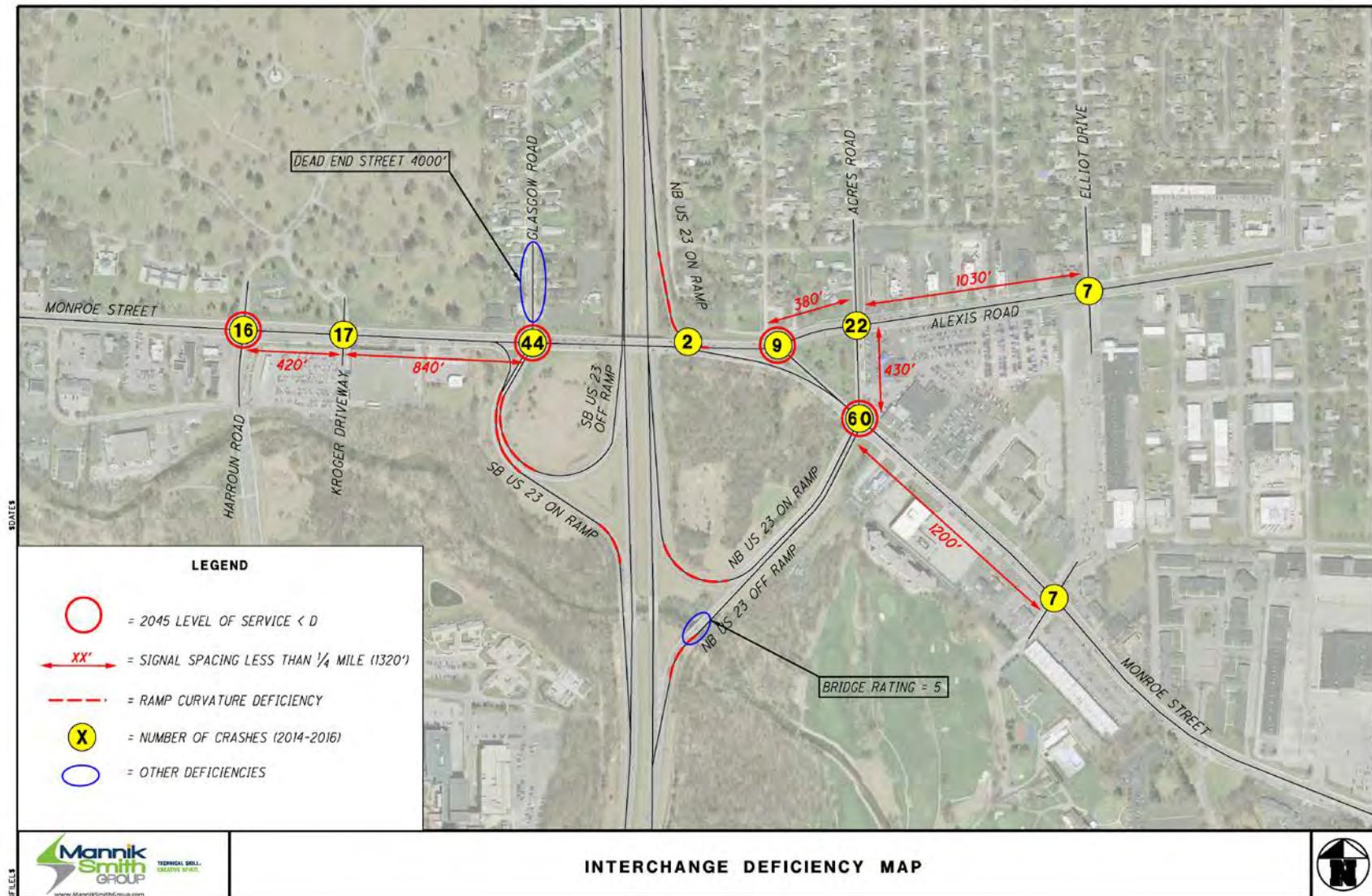


APPENDIX A

Operational Efficiency Data and Crash Data

This appendix contains the following materials:

1. 2045 Level of Service
2. Crash Data (2014-2016)



APPENDIX B

Barrier Strikes Summary

This appendix contains the following materials:

1. Memorandum on Evidence of Ramp Barrier Unreported Crashes



1800 Indian Wood Circle, Maumee, Ohio 43537
Tel: 419.891.2222 Fax: 419.891.1595
www.MannikSmithGroup.com



MEMO

To: Enter Recipient
From: Enter Sender Name
CC: Enter Carbon Copies
Date: March 15, 2018

Project #: SYLC0013
Re: Evidence of Ramp Barrier Unreported Crashes

According to the crash data obtained from the ODOT TIMS website, no crashes occurred on the NB US 23 Off Ramp to Monroe Street between the years 2014-2016. When viewing the ramp in Google earth street view, it is evident that the front half of the ramp barrier was repainted recently and contains no strike marks. In a recent site visit in March 2018, several strikes along the ramp barrier wall were observed. The strike marks along the barrier indicate that there have been unreported crashes along this off ramp and that the ramp curvature could potentially be a safety issue. Figure 1 is a Google Earth street view of the freshly painted barrier.



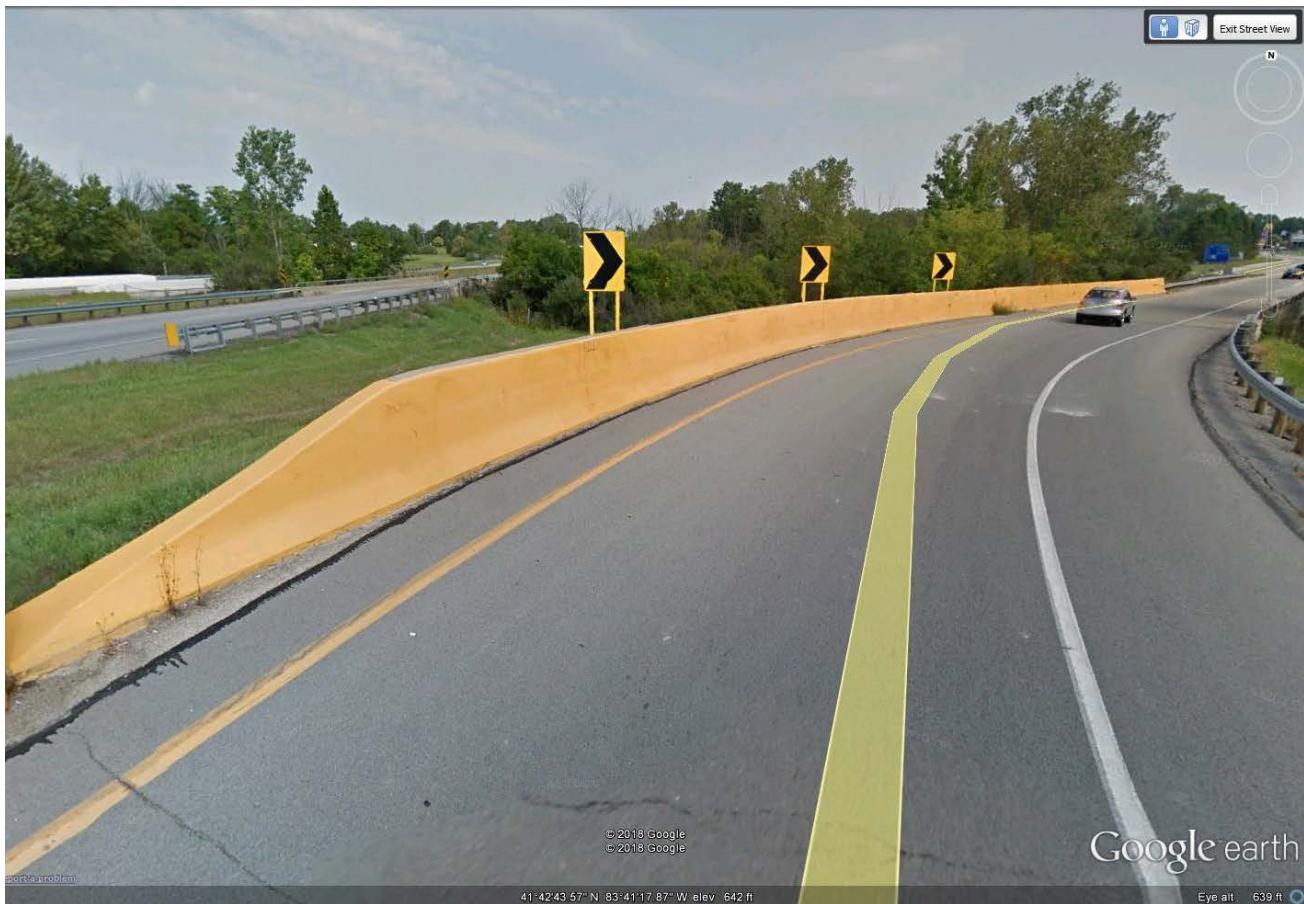


Figure 1: Google Earth View

Figures 2, 3, and 4 are images from the most recent site visit of the barrier as you progress up the ramp.



Figure 2: South End of Barrier



Figure 3: Middle of Barrier





Figure 4: End of Barrier