US-411 Intersections APPLE Study
Advance Planning Report

RPC Project. No. 1289.45

November 2022

Prepared For: The City of Moody, St. Clair County,
Regional Planning Commission of Greater Birmingham

Prepared By: Sain Associates, Inc.
Sain Project #: 22-0104

SAIN ASSOCIATES

Executive Summary

Study Initiation and Study Area

This study was initiated by the City of Moody and St. Clair County through the Advanced Planning, Programming, and Logical Engineering (APPLE) program developed by the Regional Planning Commission of Greater Birmingham (RPCGB). The City and the County requested professional planning assistance in evaluating the feasibility of improvements at the unsignalized intersections along US-411 from Avalon Drive to Stuart Drive and Coupland Road. Ten intersections were evaluated as a part of this study:

- US-411 at Avalon Drive
- US-411 at Washington Drive and Verbena Drive
- US-411 at Robbie Drive
- US-411 at James Taylor Road
- US-411 at High School Drive
- US-411 at Valleybend Lane
- US-411 at Lake Joyce Road
- US-411 at Myers Road and Church Road
- US-411 at Bethel Road
- US-411 at Stuart Drive and Coupland Road

US-411 at Kerr Road was previously studied and selected for an Alabama Transportation Rehabilitation and Improvement Program-II (ATRIP-II) project during the Fiscal Year 2022 cycle; therefore, the Kerr Road intersection was not included in this study effort.

Purpose of the Study

This study was undertaken to assess the feasibility of improving traffic operations at unsignalized intersections along US-411. This Advance Planning Report includes:

- The process used to identify potential improvement options,
- The resulting improvement options that were developed from that process, and
- An evaluation of potential positive and negative impacts to the area and adjacent properties that may be associated with each potential improvement.

If the City or County chooses to move forward with an improvement project for the area, a more detailed Environmental Planning Study would be required for federally funded projects.

Improvement Recommendations

Based upon feedback from stakeholders, traffic operations analysis, crash data trends, and field review, the following recommendations have been identified at the study intersections:

- US-411 at Avalon Drive
  - Install Northbound Left Turn Lane on US-411.
- US-411 at Washington Drive and Verbena Drive
  - Install traffic signal.
  - Install Northbound Left Turn Lane on US-411.
  - Install Northbound Right Turn Lane on US-411.
  - Install Southbound Left Turn Lane on US-411.
  - Close access on US-411 south of Verbena Drive.
- US-411 at Robbie Drive
  - Install Northbound Left Turn Lane on US-411.
- US-411 at James Taylor Road
  - Install Northbound Left Turn Lane on US-411.
  - Install Southbound Right Turn Lane on US-411.
- US-411 at High School Drive
  - Install traffic signal.
  - Restripe High School Drive approach.
  - Extend southbound left turn lane on US-411.
- US-411 at Valleybend Lane
  - No recommendations
- US-411 at Lake Joyce Road
  - Install Northbound Left Turn Lane on US-411.
- US-411 at Myers Road and Church Road
  - Install Northbound Left Turn Lane on US-411.
- US-411 at Bethel Road
  - Cul-de-sac Bethel Road.
- US-411 at Stuart Drive and Coupland Road
  - Install Northbound Left Turn Lane on US-411.

Additional information regarding the prioritization of recommended improvements can be found in Section 5.2. A total shoulder width of 8 feet, with 4 feet of paved shoulder and 4 feet of grass shoulder, should be included with any turn lane installation on US-411.

Stakeholder Involvement

A project kickoff meeting was held at Moody City Hall on April 19, 2022. Representatives from the City, the County, RPCGB, and Sain Associates attended the meeting. Stakeholders discussed project background, identified study priorities, and determined expectations for the scope of the study. Out of ten study intersections along US-411, the City identified three priority intersections to study in greater detail: Washington Drive and Verbena Drive, James Taylor Road, and High School Drive.

Another meeting was conducted on July 27, 2022, to discuss preliminary improvement recommendations. Representatives from the City, the County, RPCGB, and Sain Associates were in attendance. Stakeholders reviewed the proposed improvement recommendations and provided feedback to the project team prior to the submission of the report.

Next Steps

This report documents the study undertaken to further evaluate the traffic operations at ten (10) unsignalized intersections along US-411 from Avalon Drive to Stuart Drive and Coupland Road. In previous sections of this report, transportation analysis and improvement recommendations have been provided.

If the City and the County choose to move forward with implementing any of the recommended improvements using state funding, the next step would be to apply for Fiscal Year 2023 ATRIP-II funding. The application deadline for Fiscal Year 2023 ATRIP-II funding is November 18, 2022. Most recommended improvements, which include the installation of turn lanes to mitigate reported crash trends, could also be eligible for HSIP funding.

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Sources

City of Moody

St. Clair County

Regional Planning Commission of Greater Birmingham (RPCGB)

Alabama Department of Transportation (ALDOT)

Corridor Feasibility Study for Multilane Facility on SR-25 (US-411) – (2018)

Federal Highway Administration (FHWA)

Google Maps

National Cooperative Highway Research Program (NCHRP)

Quality Counts, LLC

Skipper Consulting – *Traffic Signal Warrant Assessment Technical Memorandum* (2018)

St. Clair County Safety Study – US-411 at Kerr Road (2021)

Transportation Research Board (TRB)

University of Alabama Center for Advanced Public Safety (CAPS)

US-411 from CR-10 (Park Avenue) to Kerr Road APPLE Study (2015)

1 Introduction

This study was initiated by the City of Moody and the Regional Planning Commission of Greater Birmingham (RPCGB) through the Advanced Planning, Programming, and Logical Engineering (APPLE) program developed by the RPCGB. Sain Associates was tasked with analyzing existing and future traffic operations at ten (10) unsignalized intersections along US-411 from Avalon Drive to Stuart Drive and Coupland Road.

The purpose of this document is to summarize existing traffic operational conditions and deficiencies at the study intersections. The City has experienced significant development, resulting in additional strain on the transportation system. Following this document, an Advanced Planning Report will be prepared that will include the process used to identify potential improvement options, the resulting improvement options that were developed from that process, and an evaluation of potential impacts associated with each improvement.

The study area is along US-411 in western St. Clair County, just north of Interstate 20, between the cities of Moody and Odenville. The study area is illustrated in **Figure 1**.

2 Existing Conditions

Within St. Clair County, US-411 serves as the main artery connecting the cities of Moody and Odenville to Interstate 20. According to the 2020 Census, the population of Moody is 13,170 and the population of St. Clair County is 91,103. Since 2010, this equates to a 12% increase in population for the City and a 9% increase in population for the County, which ranks in the top ten among all Alabama counties.

The study intersections begin with Avalon Drive and end with Stuart Drive and Coupland Road. Land use adjacent to the study area is primarily residential and commercial. Most land uses have direct access to US-411.

US-411 is considered a rural minor arterial with a two-lane cross section within the study area. The posted speed limit on US-411 is 50 MPH from Avalon Drive to Lake Joyce Road and 55 MPH from Myers Road and Church Road to Stuart Drive and Coupland Drive. A flashing beacon is located at High School Drive, near the center of the study area. All other intersections are two-way stop controlled, with the stop sign on the minor street approach. **Table 1** identifies the speed limit, functional classification, and typical sections of notable side streets along the US-411 corridor.

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NOT TO SCALE

Figure 1: Study Area Location Map

★ Study Intersections

US-411 Intersections APPLE Study
Moody, AL

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Table 1: Notable Study Area Side Street Characteristics

Side Street	Speed Limit	Functional Classification	Typical Section
Avalon Drive	20 MPH	Local Road	Two-Lane
Washington Drive	20 MPH	Local Road	Two-Lane
Verbena Drive	20 MPH	Local Road	Two-Lane
Robbie Drive	25 MPH	Local Road	Two-Lane
James Taylor Road	35 MPH	Local Road	Two-Lane
High School Drive	Not Posted	Local Road	Two-Lane
Valleybend Lane	25 MPH	Local Road	Two-Lane
Lake Joyce Road	25 MPH	Local Road	Two-Lane
Myers Road	20 MPH	Local Road	Two-Lane
Church Road	Not Posted	Local Road	Two-Lane
Bethel Road	Not Posted	Local Road	Two-Lane
Stuart Drive	Not Posted	Local Road	Two-Lane
Coupland Road	Not Posted	Local Road	Two-Lane

2.1 Existing Documents and Adjacent Projects

APPLE Study – US-411 from CR-10 (Park Avenue) to Kerr Road

RPCGB Project No. 1289.05

Completed by Sain Associates in February 2015, the study was performed to determine the feasibility of improvements to a three-mile segment of US-411 between Park Avenue and Kerr Road. At the time of the study, several residential subdivisions were being developed in the area surrounding the study corridor. The additional traffic volumes generated by these developments resulted in more traffic congestion along US-411, especially at intersections. Among reported crashes, the data indicated a high rate of rear-end collisions.

Several potential improvements were identified for the area. The study did not select a preferred alternative; however, the recommended improvements were listed in priority order based on traffic volumes, crash history, field observations, and expected ease of implementation. The following improvements apply to current study intersections:

1. Install a right turn lane on US-411 northbound at Verbena Drive
2. Install a left turn lane on US-411 northbound at Lake Joyce Road.
3. Install a left turn lane on US-411 northbound at Washington Drive.
4. Install a right turn lane on US-411 southbound at James Taylor Road.
5. Consider widening US-411 from two lanes to a five-lane typical section.

Additional recommendations were provided without consideration for implementation priority:

- Maintain the officers directing traffic at school intersections.
- Conduct a school circulation study for the three schools located on High School Drive.
- Consider requiring traffic impact studies for all future developments in conformance with ALDOT's Access Management Manual.
- Turn lanes along Washington Drive and Verbena Drive may be needed as more properties develop in the adjacent neighborhoods. The developer should be required to perform a traffic impact study. If the study finds that turn lanes are warranted, the developer should be required to install them.

Corridor Feasibility Study for Multilane Facility on SR-25 (US-411) from Park Avenue to Sanie Road

ALDOT Project STPAA-0025(549)

The Corridor Feasibility Study was completed by Sain Associates in November 2018. The purpose of the study was to determine the feasibility of widening the three-mile section of US-411 between Park Avenue and Sanie Road to provide four travel lanes. The evaluated improvements were aimed at increasing the capacity of US-411 and improving traffic operations along the corridor.

Potential improvements were listed by intersection with no assigned level of priority. The following improvement options apply to current study intersections:

- Avalon Drive
  - Install a left turn lane on US-411 northbound at Avalon Drive.
- Washington Drive/Verbena Drive
  - Install left and right turn lanes on both US-411 approaches.
- Robbie Drive
  - Install a left turn lane on US-411 northbound to Robbie Drive.
- James Taylor Road
  - Install a left turn lane on US-411 northbound at James Taylor Road.
- Myers Road/Church Road
  - Install left and right turn lanes on both US-411 approaches.
- Bethel Road
  - Realign Bethel Road approach to intersect with US-411 at closer to a 90-degree angle.
- Stuart Drive/Coupland Road
  - Install a left turn lane on US-411 northbound at Stuart Drive.

The study also recommended widening US-411 to a five-lane typical section between Park Avenue and Sanie Road, but the project did not gain momentum within ALDOT and lacks funding for the foreseeable future.

US-411 at CR-10 (Park Avenue) and Sanie Road Design Projects

ALDOT Project CMAQ-0025(559)

Improvements are recommended at the intersections of US-411 at Park Avenue and US-411 at Sanie Road. Intersection improvements at Park Avenue include an eastbound left turn lane, an eastbound right turn lane, and a westbound left turn lane. Intersection improvements at Sanie Road include a northbound left turn lane, a southbound left turn lane, the extension of the eastbound right turn lane to 450 feet with a 100-foot taper, and channelized right turn striping with yield signs. As of June 2022, this project is in the design stage.

ATRIP II Project – US-411 at Kerr Road

ALDOT Project ATRP2-58-2022-058

In 2021, Sain Associates conducted a safety APPLE study at the intersection of US-411 and Kerr Road and assisted the County in applying for funding. St. Clair County was awarded Alabama Transportation Rehabilitation Improvement Program (ATRIP-II) funds to construct the project. Improvements at this intersection include the installation of a southbound left turn lane onto US-411 and reconfiguring Kerr Road as a two-lane approach. During the field visit for the US-411 project, conducted on May 12, 2022, significant northbound and southbound queues were

observed near Kerr Road during the AM peak hour. The ATRIP project is expected to address queuing issues near Kerr Road; therefore, Kerr Road is excluded from the current US-411 APPLE study. As of June 2022, the Kerr Road project is in the design stage.

2.2 Data Collection

On behalf of Sain Associates, Quality Counts, LLC performed traffic data collection within the study area on Wednesday, May 4, 2022. Weekday peak hour turning movement counts were collected during the periods of 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM at the following intersections:

- US-411 at Avalon Drive
- US-411 at Robbie Drive
- US-411 at James Taylor Road
- US-411 at Myers Road/Church Road
- US-411 at Stuart Drive/Coupland Road
- US-411 at Lake Joyce Road
- US-411 at Valleybend Lane
- US-411 at Bethel Road

Weekday 14-hour turning movement counts were collected from 6:00 AM to 8:00 PM on Wednesday, May 4, 2022, at the following intersections:

- US-411 at Washington Drive/Verbena Drive
- US-411 at High School Drive

The existing peak hour turning movement volumes are illustrated in **Figure 2-3**.

Weekday 24-hour tube counts, including speed and vehicle classification data, were collected on Wednesday, May 4, 2022, at the following locations:

- US-411 approximately 1200 feet south of James Taylor Road
  - ADT = 12,899
  - 85th Percentile Speed = 56 MPH
  - Heavy Vehicle Percentage = 2.5%
- US-411 approximately 400 feet north of Bethel Road
  - ADT = 14,656
  - 85th Percentile Speed = 56 MPH
  - Heavy Vehicle Percentage = 1.4%

The raw traffic data can be found in **Appendix A**.

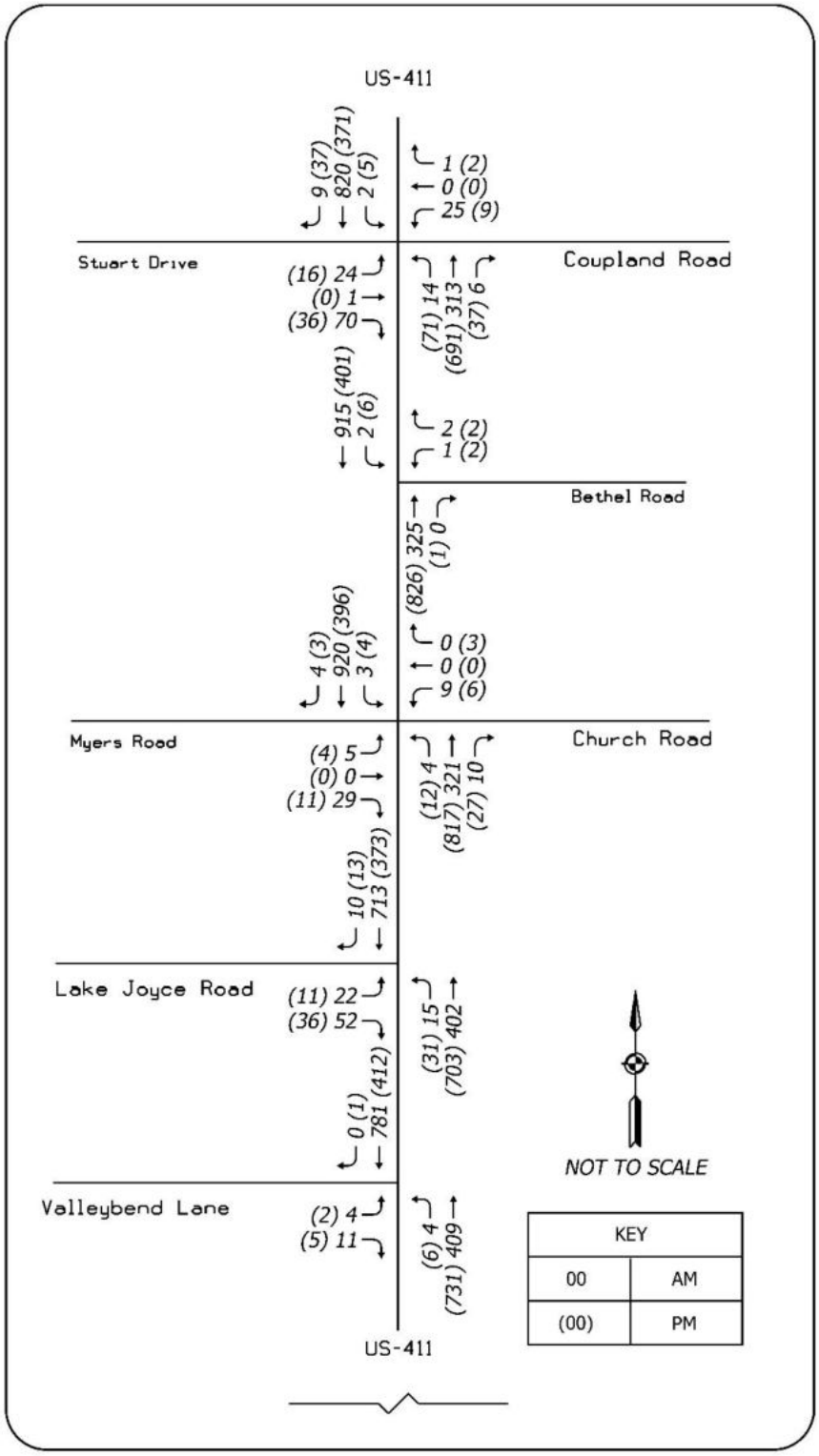


Figure 2: Existing Peak Hour Traffic Volumes

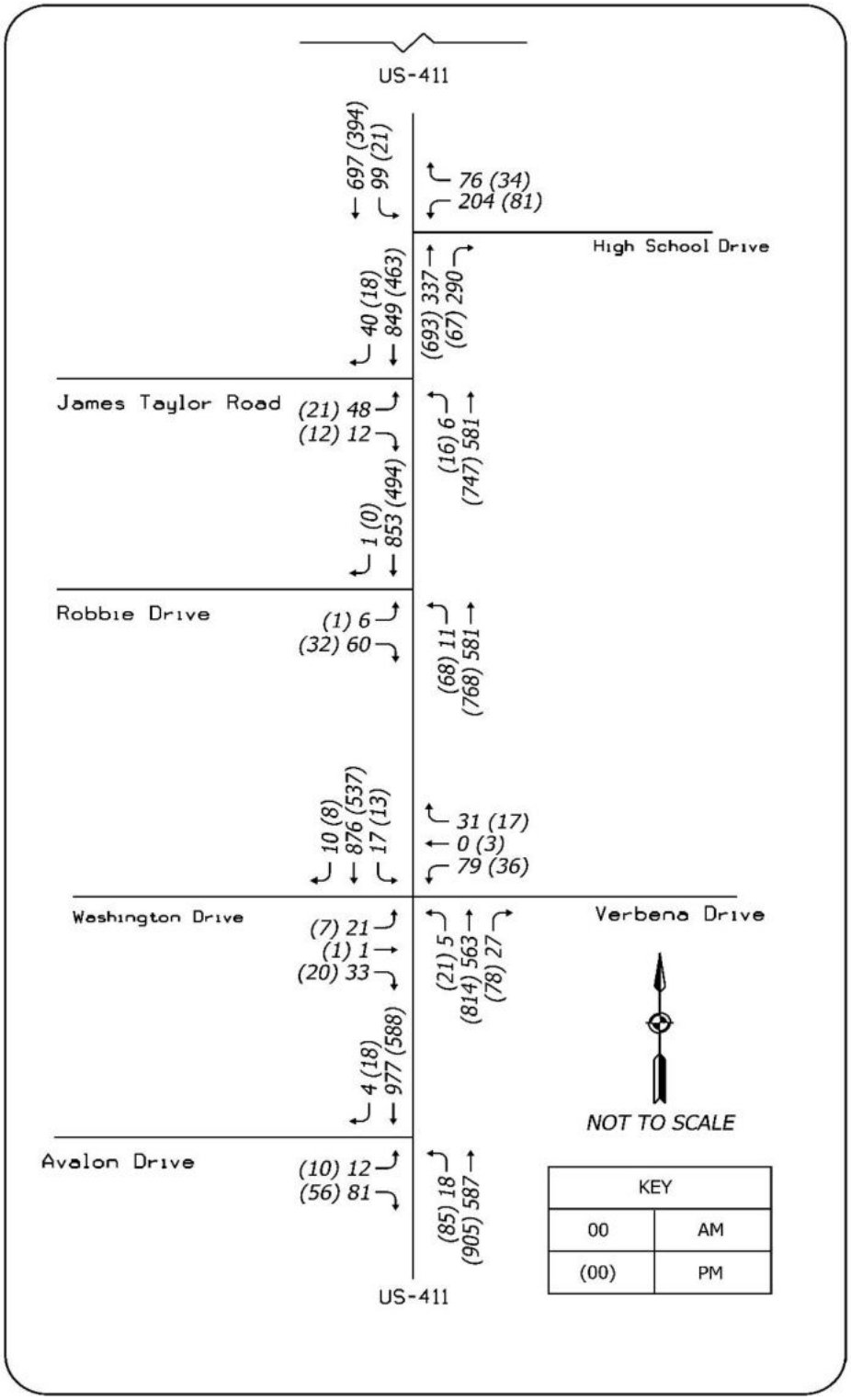


Figure 3: Existing Peak Hour Traffic Volumes - Continued

2.3 Field Review

Field reviews were performed on Wednesday, May 11, 2022, from 4:00 PM to 6:00 PM and Thursday, May 12, 2022, from 7:00 AM to 9:00 AM. Particular attention was paid to Washington Drive/Verbena Drive and High School Drive, as signal warrants were analyzed at these intersections. During the AM peak hour, traffic flow was heaviest in the southbound direction toward Birmingham. Traffic had noticeably dwindled by approximately 7:45 AM, and even more so by 8:00 AM. Traffic volumes were heaviest in the northbound direction during the PM peak hour.

Overall, motorists entering US-411 from a side street approach experience extended delays before an acceptable gap in traffic occurs. It is common for a driver exiting US-411 to allow another motorist exiting the side street to complete their turn, despite having the right-of-way. Familiar drivers know how difficult it is to find acceptable gaps in traffic during peak hours. Vehicle platoons form in the northbound direction on US-411 closer to Park Avenue during the PM peak hour, which causes unacceptable delays for drivers exiting Verbena Drive and Washington Drive and other side streets. Northbound platoons tend to dissipate over the course of the three-mile segment of US-411 from Park Avenue to Sanie Road, creating more frequent acceptable gaps for drivers entering from side streets.

US-411 at Avalon Drive

Avalon Drive at US-411 is a three-leg, side-street stop-controlled intersection. The speed limit on Avalon Drive is 20 MPH. It provides access to a Dollar General and the Avalon residential subdivision. Avalon Drive connects to Washington Drive through this subdivision, thereby splitting the volume of traffic from the subdivision between two access connections onto US-411. During the AM peak hour, the southbound queue on US-411 backed up past the Dollar General due to a vehicle making a southbound left turn at Avalon Drive.

Photos 1 and 2 show views of US-411 from the Avalon Drive approach.

Photo 1: Looking Northbound along US-411 from Avalon Drive

Photo 2: Looking Southbound along US-411 from Avalon Drive

US-411 at Washington Drive and Verbena Drive

This is a four-leg, side-street stop-controlled intersection. The speed limits on both Washington Drive and Verbena Drive are 20 MPH. Verbena Drive provides access to a gas station, a gym, and The Arbors residential subdivision, which contains approximately 165 homes at the time of this study. Avalon Drive connects to Washington Drive through the Avalon subdivision, which contains approximately 310 homes at the time of this study. The westbound left turning movement from Verbena Drive is the movement with the highest delay during peak hours. A sample of westbound left turning vehicles in the AM peak hour observed delays between 20 and 30 seconds per vehicle. A sample of PM peak hour observed delays were often up to 120 seconds of delay per vehicle.

Photos 3 – 6 show several views from the intersection.

Photo 3: Washington Drive Approach to US-411

Photo 4: Looking Southbound along US-411 from Washington Drive

Photo 5: Verbena Drive Approach to US-411

Photo 6: Looking Northbound along US-411 from Verbena Drive

US-411 at Robbie Drive

Robbie Drive at US-411 is a three-leg, side-street stop-controlled intersection. The speed limit on Robbie Drive is 25 MPH. Adjacent land uses include a Tractor Supply and a storage facility. Robbie Drive connects to James Taylor Road approximately 0.5 miles from US-411. Per the City, World Victory Church has purchased a 15-acre parcel on the northwest corner of the intersection. **Photos 7 and 8** show views of US-411 from the Robbie Drive approach.

Photo 7: Looking Northbound along US-411 from Avalon Drive

Photo 8: Looking Southbound along US-411 from Avalon Drive

US-411 at James Taylor Road

James Taylor Road at US-411 is a three-leg, side-street stop-controlled intersection. The speed limit on James Taylor Road is 35 MPH. Adjacent land use is primarily residential. James Taylor Road has a sharp horizontal curve on its approach to the US-411 intersection, but it does intersect at approximately 90 degrees which is preferable to a skewed approach. **Photos 9 and 10** show views of US-411 from the James Taylor Road approach.

Photo 9: Looking Northbound along US-411 from James Taylor Road

Photo 10: Looking Southbound along US-411 from James Taylor Road

US-411 at High School Drive

US-411 at High School Drive is a three-leg, side-street stop-controlled intersection providing access to Moody High School, Moody Middle School, and Moody Junior High School. During the school peak hours at the US-411 intersection with High School Drive, a police officer was directing traffic. The officer would routinely stop US-411 traffic in both directions to allow motorists to exit High School Drive as students were dropped off and picked up on campus. When traffic was stopped on US-411, queueing occurred on the southbound approach of US-411. Despite queuing, the current strategy seemed to be effective in moving traffic on and off of school property. The striping on High School Drive is faded and in poor condition.

A northbound right turn lane and a southbound left turn lane exist on US-411 at High School Drive, and there is a flashing beacon installed at the intersection.

Photo 11 shows the High School Drive approach to US-411.

Photo 11: High School Drive Approach to US-411

US-411 at Valleybend Lane

Valleybend Lane at US-411 is a three-leg, side-street stop-controlled intersection. The speed limit on Valleybend Lane is 25 MPH. Valleybend Lane serves as the entrance to the Spring Valley Estates neighborhood. This intersection is 670 feet north of High School Drive and within the taper for the southbound left turn lane into High School Drive. The cross-sectional width of the roadway is 36 feet at this location.

Photo 12 shows a view from the Valleybend Lane approach.

Photo 12: Valleybend Lane Approach to US-411

US-411 at Lake Joyce Road

Lake Joyce Road at US-411 is a three-leg, side-street stop-controlled intersection. The speed limit on Lake Joyce Road is 25 MPH. Lake Joyce Road provides access to a residential subdivision of single-family homes and Grace Valley Church.

Photos 13 and 14 show views of US-411 from the Lake Joyce Road approach.

Photo 13: Looking Northbound Along US-411 from Lake Joyce Road

Photo 14: Looking Southbound along US-411 from Lake Joyce Road

US-411 at Myers Road & Church Road

This is a four-leg, two-way stop-controlled intersection. The speed limit on Myers Road is 20 MPH, and the speed limit on Church Road is not posted. Bethel Baptist Church is located on Church Road. Other nearby land uses are residential. Church Road also connects to Bethel Road, near the church entrance. During the AM peak hour, a southbound queue backed up from Kerr Road to Church Road (0.5 miles). Although the volume on Myers Road is low, there are several open tracts of land nearby, which could be developed in the future.

Photos 15 – 18 show views around the intersection of US-411 at Myers Road and Church Road.

Photo 15: Looking Northbound along US-411 from Myers Road

Photo 16: View of Church Road from US-411

Photo 17: View of SB Queue from Kerr Road to Church Road

Photo 18: Looking Southbound along US-411 from Church Road

US-411 at Bethel Road

Bethel Road at US-411 is a three-leg, side-street stop-controlled intersection. The speed limit on Bethel Road is not posted. Adjacent land use is primarily single-family residential. Bethel Road connects to Church Road near the entrance of Bethel Baptist Church. Bethel Road also has a skewed approach angle near the stop sign at US-411. The stop bar is 42 feet away from the stop sign, and a residential driveway and mailbox are located between them. The longest observed queue reached Bethel Road from Kerr Road during the AM peak hour, approximately 1.5 miles to the north of Kerr Road.

Photos 19 and 20 show views of US-411 from Bethel Drive.

Photo 19: Looking Northbound Along US-411 from Bethel Road

Photo 20: View of Bethel Road Approach to US-411

US-411 at Stuart Drive & Coupland Road

This is a four-leg, two-way stop-controlled intersection. There are no posted speed limits on either side street. Adjacent land use is residential and commercial. There are several tracts of open land nearby which could be developed in the future. **Photo 21-24** show views of the intersection.

Photo 21: Coupland Road Approach to US-411

Photo 22: Stuart Drive Approach to US-411

Photo 23: Looking Southbound along US-411 from Stuart Drive

Photo 24: Looking Northbound along US-411 from Coupland Road

2.4 Existing Conditions Capacity Analysis

Using the methods described in the Transportation Research Board's *Highway Capacity Manual*, Sain Associates analyzed the existing traffic conditions within the study area. According to this method of analysis, traffic capacities are expressed as levels of service (LOS) ranging from "A" (free-flow conditions) to "F" (very congested conditions). A detailed description of each LOS designation is included in **Appendix B**. Generally, LOS "C" is considered desirable, while LOS "D" is considered acceptable during peak hours of traffic flow. The analysis was conducted using Trafficware's Synchro 10 software.

The results of the existing conditions capacity analysis are summarized in **Table 2** and **Table 3**. Full printouts are provided in **Appendix C.**

Table 2: Existing Levels of Service

Intersection	Approach		Level of Service	
			AM Peak	PM Peak
Avalon Drive at US-411 (Unsignalized)	EB	Avalon Drive	**E**	D
	NB	US-411	A	A
	SB	US-411	A	A
Washington Drive/Verbena Drive at US-411 (Unsignalized)	EB	Washington Drive	**F**	D
	WB	Verbena Drive	**F**	**F**
	NB	US-411	A	A
	SB	US-411	A	A
Robbie Drive at US-411 (Unsignalized)	EB	Robbie Drive	C	B
	NB	US-411	A	A
	SB	US-411	A	A
James Taylor Road at US-411 (Unsignalized)	EB	James Taylor Road	**F**	D
	NB	US-411	A	A
	SB	US-411	A	A
High School Drive at US-411 (Unsignalized)	WB	High School Drive	**F**	D
	NB	US-411	A	A
	SB	US-411	A	A
Valleybend Lane at US-411 (Unsignalized)	EB	Valleybend Lane	C	B
	NB	US-411	A	A
	SB	US-411	A	A

*Note that a police officer is posted at the High School Drive intersection during the AM peak hour. Synchro results do not account for this.

Table 3: Existing Levels of Service (Continued)

Intersection	Approach		Level of Service	
			AM Peak	PM Peak
Lake Joyce Road at US-411 (Unsignalized)	EB	Lake Joyce Road	C	C
	NB	US-411	A	A
	SB	US-411	A	A
Myers Road/Church Road at US-411 (Unsignalized)	EB	Myers Road	C	C
	WB	Church Road	**E**	D
	NB	US-411	A	A
	SB	US-411	A	A
Bethel Road at US-411 (Unsignalized)	WB	Bethel Road	C	C
	NB	US-411	A	A
	SB	US-411	A	A
Stuart Drive/ Coupland Road at US-411 (Unsignalized)	EB	Stuart Drive	D	C
	WB	Coupland Road	**F**	**E**
	NB	US-411	A	A
	SB	US-411	A	A

As shown in the tables above, the US-411 intersections with Robbie Drive, Valleybend Lane, Lake Joyce Road, and Bethel Road operate at acceptable levels of service. Several intersection approaches to US-411 have unacceptable levels of service (LOS E or F):

- Avalon Drive - LOS E during the AM peak hour.
- Washington Drive - LOS F during the AM peak hour.
- Verbena Drive - LOS F during both the AM and PM peak hours.
- James Taylor Road - LOS F during the AM peak hour.
- High School Drive - LOS F during the AM peak hour. Note that a police officer is posted at this intersection during the AM peak hour, so the Synchro software does not account for this.
- Church Road - LOS E during the AM peak hour.
- Coupland Road - LOS F during the Am peak hour and an LOS E during the PM peak hour.

In general, traffic volumes and delays are higher near the Park Avenue intersection. On high-volume roadways, it is not uncommon for unsignalized approaches to have a poor or failing LOS without needing signalization. Signalization is typically not considered a solution to this unless side-street approach volumes are considerable. This is the case for the US-411 intersections with Washington Drive/Verbena Drive and High School Drive, and signal warrant evaluations were performed at the two intersections. The results are summarized in Section 2.7 of this report.

2.5 Crash Data Analysis

The information presented in this section is exempt from open records, discovery or admission under Alabama Law and 23 U.S.C. §§ 148(h)(4) and 409). The collection of safety data is encouraged to actively address safety issues on regional, local, and site-specific levels. Congress has laws, 23 U.S.C. § 148(h)(4) and 23 U.S.C. § 409 which prohibit the production under open records and the discovery or admission of crash and safety data from being admitted into evidence in a Federal or state court proceeding. This document contains text, charts, tables, graphs, lists, and diagrams for the purpose of identifying and evaluating safety enhancements in the project area. These materials are protected under 23 U.S.C. §409 and 23 U.S.C. § 148(h)(4). In addition, the Supreme Court in Ex parte Alabama Dept. of Trans., 757 So. 2d 371 (Ala. 1999) found that these are sensitive materials exempt from the Alabama Open Records Act.

Crashes are to some degree random events; therefore, crash frequencies naturally fluctuate over time at a given site. This randomness indicates that short-term crash frequencies alone are not a reliable estimator of long-term crash frequency. The crash fluctuation over time makes it difficult to determine whether changes in the observed crash frequency are due to changes in site conditions or are due to natural fluctuations. When a period with high crash frequency is observed, it is statistically probable that the following period will have low crash frequency. This tendency is known as regression-to-the-mean (RTM). Not accounting for the effects of RTM introduces the potential for "RTM bias" (Refer to the Highway Safety Manual for more information).

Crash data for this analysis was provided by the Regional Planning Commission of Greater Birmingham (RPCGB). Data included crash information from January 2017 to December 2021 from the Critical Analysis Reporting Environment (CARE) database maintained by the Center for Advanced Public Safety (CAPS) at The University of Alabama. The data is summarized as follows:

- One hundred seventy-seven (177) total crashes reported,
- Two (2) fatal crashes,
- Six (6) incapacitating injury crashes,
- Twelve (12) non-incapacitating injury crashes,
- Nineteen (19) possible injury crashes, and
- One hundred thirty-six (136) property damage only crashes.
- Two (2) crashes reported no crash severity.

The majority of reported crashes in the dataset involved rear-end collisions, which are typically low-severity crashes. This pattern is common for high-volume roadways such as US-411 with an absence of turn lanes.

Figure 4 illustrates the breakdown of the crash data by collision type.

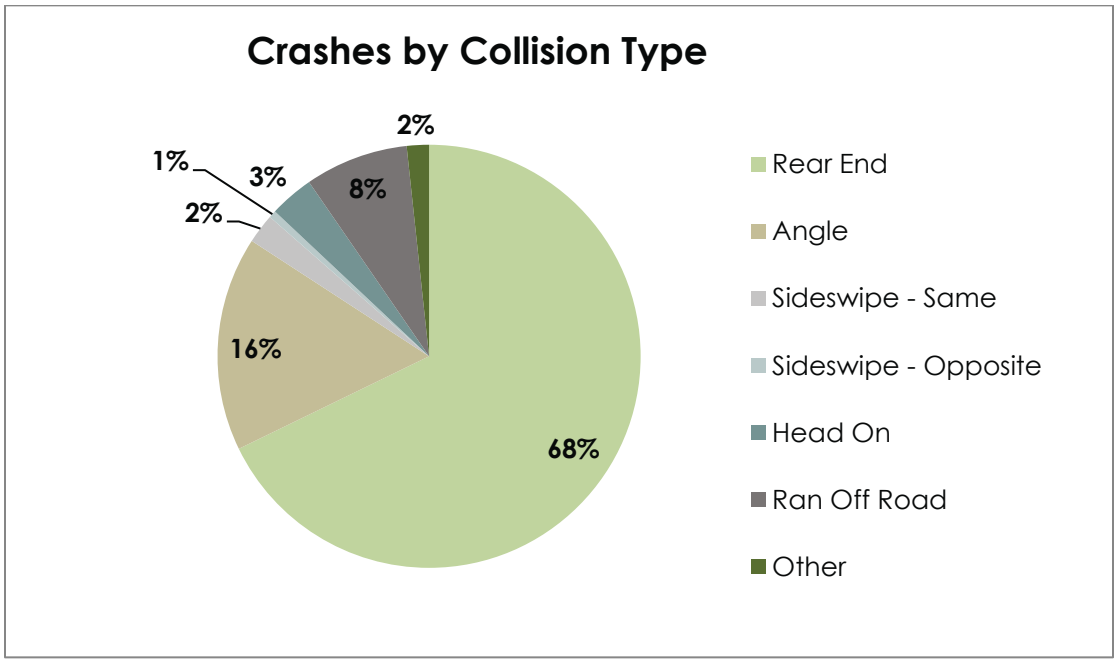


Figure 4: Crash Data Breakdown by Collision Type

Figure 5 illustrates the breakdown of the crash data by severity.

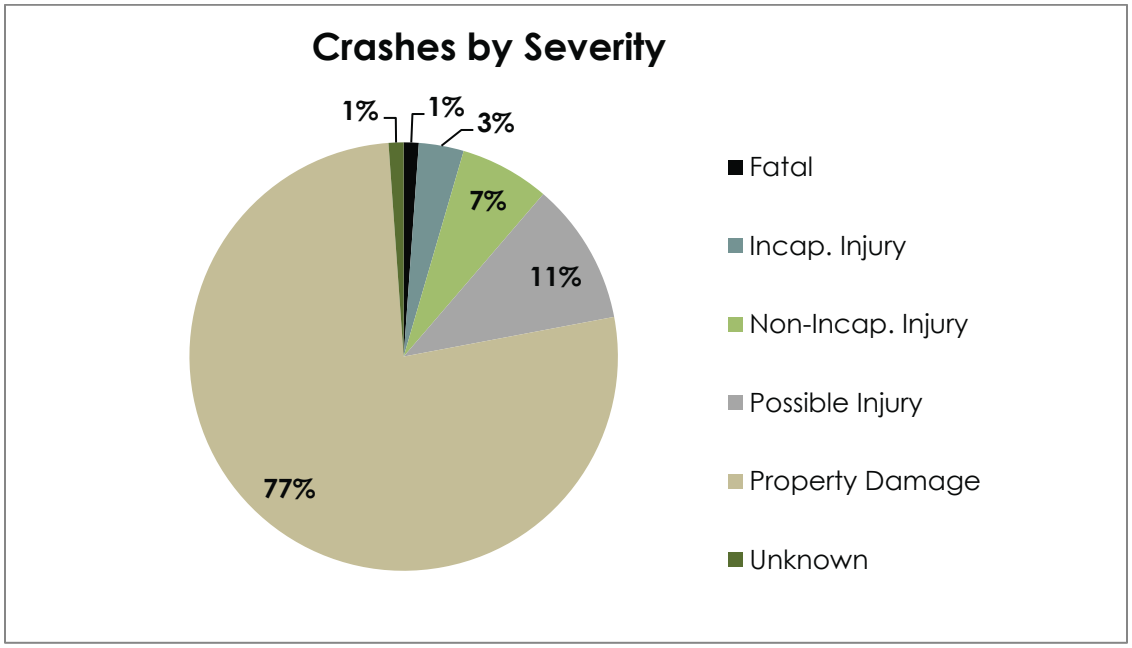


Figure 5: Crash Data Breakdown by Severity

2.6 Existing Turn Lane Warrant Analysis

Utilizing the information contained in NCHRP Report 457, Sain Associates conducted a turn lane warrant analysis under existing conditions at the study intersections. The posted speed limit on US-411 is 50 MPH from Avalon Drive to Lake Joyce Road and 55 MPH from Myers Road and Church Road to Stuart Drive and Coupland Drive.

Satisfaction of a turn lane warrant by volume does not necessarily justify the installation of a turn lane. Recommendation of a turn lane can also be based on traffic safety considerations and observed crash data trends.

Without any growth in traffic volumes or additional development, the following locations satisfy the warrant-by-volume thresholds for the installation of a turn lane during AM and PM peak hours:

- Avalon Drive at US-411
  - Northbound Left Turn Lane
- Washington Drive/Verbena Drive at US-411
  - Northbound Right Turn Lane
  - Northbound Left Turn Lane
  - Southbound Left Turn Lane
- Robbie Drive at US-411
  - Northbound Left Turn Lane
- Lake Joyce Road at US-411
  - Northbound Left Turn Lane
- Stuart Drive/Coupland Road at US-411
  - Northbound Left Turn Lane

Existing turn lane warrant evaluation results are shown in **Table 4 – 5**, and the turn lane warrant evaluation summaries can be found in **Appendix D.**

Table 4: Existing Right Turn Lane Warrant Evaluation (2-lane Roadway)

Intersection	Peak Period/ Direction	Major-Road Volume (veh/h)	Turn Volume (veh/h)	Limiting Right Turn Volume (veh/h)	Satisfies Warrant?
Avalon Drive at US-411	AM/SB	981	4	11	NO
	PM/SB	606	18	19	NO
Washington Drive/Verbena Drive at US-411	AM/NB	595	27	20	**YES**
	PM/NB	913	78	12	**YES**
	AM/SB	903	10	12	NO
	PM/SB	558	8	21	NO
Robbie Drive at US-411	AM/SB	854	1	13	NO
	PM/SB	494	0	25	NO
James Taylor Road at US-411	AM/SB	889	40	12	**YES**
	PM/SB	481	18	26	NO
High School Drive at US-411	AM/NB	627	290	19	**YES**
	PM/NB	760	67	15	**YES**
Valleybend Lane at US-411	AM/SB	781	0	14	NO
	PM/SB	413	1	31	NO
Lake Joyce Road at US-411	AM/SB	723	10	16	NO
	PM/SB	386	13	33	NO
Myers Road/Church Road at US-411	AM/NB	335	10	22	NO
	PM/NB	856	27	10	**YES**
	AM/SB	927	4	10	NO
	PM/SB	403	3	19	NO
Bethel Road at US-411	AM/NB	325	0	22	NO
	PM/NB	827	1	11	NO
Stuart Drive/ Coupland Road at US-411	AM/NB	333	6	22	NO
	PM/NB	799	37	11	**YES**
	AM/SB	831	9	11	NO
	PM/SB	413	37	18	**YES**

Table 5: Existing Left Turn Lane Warrant Evaluation (2-lane Roadway)

Intersection	Peak Period/ Direction	Opposing Volume (veh/h)	Advancing Volume (veh/h)	Turn Volume (veh/h)	Limiting Advancing Volume to Warrant (veh/h)	Satisfies Warrant?
Avalon Drive at US-411	AM/NB	981	605	18	313	**YES**
	PM/NB	606	990	85	276	**YES**
Washington Drive/Verbena Drive at US-411	AM/NB	886	595	5	588	**YES**
	PM/NB	545	913	21	587	**YES**
	AM/SB	590	903	17	561	**YES**
	PM/SB	892	558	13	416	**YES**
Robbie Drive at US-411	AM/NB	854	592	11	431	**YES**
	PM/NB	494	836	68	319	**YES**
James Taylor Road at US-411	AM/NB	889	587	6	587	**YES**
	PM/NB	481	763	16	627	**YES**
Valleybend Lane at US-411	AM/NB	781	413	4	652	NO
	PM/NB	413	737	6	947	NO
Lake Joyce Road at US-411	AM/NB	723	417	15	374	**YES**
	PM/NB	386	734	31	528	**YES**
Myers Road/ Church Road at US-411	AM/NB	924	335	4	518	NO
	PM/NB	399	856	12	878	NO
	AM/SB	331	927	3	944	NO
	PM/SB	844	403	4	559	NO
Bethel Road at US-411	AM/SB	325	917	2	950	NO
	PM/SB	827	407	6	569	NO
Stuart Drive/ Coupland Road at US-411	AM/NB	829	333	14	288	**YES**
	PM/NB	408	799	71	319	**YES**
	AM/SB	319	831	2	956	NO
	PM/SB	728	413	5	627	NO

2.7 Signal Warrant Evaluation

Unsignalized intersections can be evaluated for suitability of installing a traffic signal to improve safety and operations. Traffic signals promote the orderly movement of vehicular and pedestrian traffic and aim to prevent excessive delay to traffic. It is also common for traffic signals to increase the likelihood of rear end and left turn collisions at an intersection after installation. It should be noted that traffic signals should not be installed unless one of the warrants specified by the Manual on Uniform Traffic Control Devices (MUTCD) has been satisfied. **Satisfaction of a signal warrant alone does not necessarily justify installation of a traffic signal.**

Signal warrant evaluations were performed at two study intersections along the corridor: US-411 at Washington Drive/Verbena Drive and US-411 at High School Drive. Signal warrant evaluations were performed according to the guidelines in the MUTCD. In the state of Alabama, Warrant #1 (8-Hour Vehicular Volume) and Warrant #2 (4-Hour Vehicular Volume) are most commonly used to justify the installation of a traffic signal.

The signal warrant evaluation reports can be found in **Appendix E**.

Signal Warrant Evaluation Results

Under Warrant #1, the minimum threshold of hourly volume primarily depends on lane configuration and speed limit. The minimum hourly volume thresholds for the intersections of Washington Drive/Verbena Drive and High School Drive are shown in **Table 6**.

Table 6: Warrant #1 Minimum Hourly Volume Thresholds

Street Type Description	Minimum Volume Threshold (vehicles per hour)			
	Condition 1A – 100%	Condition 1B – 100%	Condition 1A & 1B Combined – 80%	
Both Approaches on Major Street	350	525	280	420
Highest Approach on Minor Street	105	53	84	42

The minimum hourly volume thresholds from **Table 6** were compared to the traffic volumes collected at the intersections of Washington Drive/Verbena Drive and High School Drive. **Table 7** notes the number of hours satisfied under each condition associated with Warrant #1. The US-411 approach volumes exceed the minimum hourly volume thresholds for eight out of eight hours at both intersections. **However, the minor street approach volumes on Verbena Drive and High School Drive were not high enough to satisfy Warrant #1 Condition A, Warrant #1 Condition B, or the combined #1A and #1B – 80% condition.**

Table 7: Warrant #1 Results by Condition

Street Name	Warrant #1 Condition		
	Condition 1A – 100%	Condition 1B – 100%	Condition 1A & 1B Combined – 80%
US-411 (Major Street)	8/8 Hours	8/8 Hours	8/8 Hours
Washington Drive/Verbena Drive (Minor Street)	1/8 Hours	3/8 Hours	1/8 Hours
US-411 (Major Street)	8/8 Hours	8/8 Hours	8/8 Hours
High School Drive (Minor Street)	4/8 Hours	5/8 Hours	4/8 Hours

At Washington Drive and Verbena Drive, the condition most likely to warrant in the future is Condition #1B – 100%. Despite only three out of eight hours (6 AM, 7 AM, 5 PM) meeting the minimum hourly volume threshold, the other five hours (8 AM, 12 PM, 3 PM, 4 PM, 6 PM) measured volumes were each within 8 vehicles per hour of meeting the minimum hourly volume threshold of 53 vehicles. A plat for 29 additional homes accessing Verbena Drive was approved by the City Council in October 2022. Based on a technical memorandum produced by Skipper Consulting in March 2018, this development is expected to generate enough additional trips to satisfy Condition #1B – 100%. The approved plat and technical memorandum are included in **Appendix F**.

Using Warrant #2 at both intersections, the minor street approach volumes must meet the minimum hourly volume threshold of 60 vehicles per hour during four hours of the day. At US-411 and Washington Drive and Verbena Drive, two out of four hours (6 AM, 7 AM) meet the minimum hourly volume threshold. Two additional hours (8 AM, 5 PM) were each within 10 vehicles per hour of the minimum volume threshold. At US-411 and High School Drive, four out of four hours meet the minimum hourly volume threshold. **Therefore, the intersection of US-411 and High School Drive satisfies Warrant #2.**

Table 8 summarizes the results of the existing conditions signal warrant evaluation at each intersection. In general, an intersection satisfying both warrants is a strong, straightforward candidate for signalization. An intersection that only satisfies Warrant #2 may need additional justification, especially on a state route. With several schools located on High School Drive, that could be used as context in the justification for installation of a traffic signal.

Table 8: Existing Conditions Signal Warrant Evaluation Results

Intersection	Signal Warrant Result	
	#1 – Eight Hour	#2 – Four Hour
US-411 at Washington Drive and Verbena Drive	No	No
US-411 at High School Drive	No	Yes

3 Pre-NEPA Evaluation

In conjunction with a previously performed study, *Corridor Feasibility Study for Multilane Facility on SR-25 (US-411) from Park Avenue to Sanie Road*, associated technical studies were prepared. This section summarizes this previously collected data. Should federal funds be used to implement improvements to the study intersections, a NEPA document would be required. Updates to studies will be required for projects utilizing state and/or federal funds.

Historic Places

A Phase 1 Cultural Resources (CR) Assessment (December 2018) was prepared by MRS Consultants, LLC. in conjunction with the *Corridor Feasibility Study for Multilane Facility on SR-25 (US-411) from Park Avenue to Sanie Road*. The study area for the Phase 1 assessment included: 125 feet beyond the existing US-411 right-of-way between Park Avenue and Sanie Road; 750 feet along each approach leg for Park Avenue and Sanie Road; 500 feet for intersecting roadways at Church Street, Washington Drive/Verbena Drive, Robbie Drive, James Taylor Road, High School Drive, Lake Joyce Road, Kerr Road, Myers Road/Church Road, and Stuart Road/Coupland Road. The Phase 1 assessment concluded that, "no cultural materials, above-ground features, notable depressions, or other features were identified within the survey corridor." Additionally, the Phase 1 assessment states, "No cultural materials were identified during the field survey. As such, the proposed undertaking will have no adverse effect upon any historic properties for direct effect."

Section 4(f)

There are no publicly owned parks and/or recreation areas located in the immediate area of the study intersections.

Threatened and Endangered Species

A threatened and endangered species evaluation (prepared by Environmental Inc.) was prepared and USFWS coordination performed in conjunction with the *Corridor Feasibility Study for Multilane Facility on SR-25 (US-411) from Park Avenue to Sanie Road.*

Suitable habitat for the white fringeless orchid was noted along the project corridor; however, a survey of the area performed in August 2019 that thoroughly examined the area for the presence of flowering or vegetative stems of the white fringeless orchid, but no specimens were identified.

Suitable summer roosting habitat for the Indiana bat and the Northern long-eared bat exists within the study corridor. Because of this, there are restrictions related to tree and structure removal.

Streams and Wetlands

A wetlands and streams jurisdictional evaluation report was prepared by Environmental, Inc. in conjunction with the *Corridor Feasibility Study for Multilane Facility on SR-25 (US-411) from Park Avenue to Sanie Road*. This report identified twelve (12) streams and nine (9) wetlands that would be considered under the jurisdiction of US Army Corps of Engineers (USACE). Of these identified streams and wetlands, four (4) streams and two (2) wetland areas are located in the proximity of intersections included in this APPLE study area:

- 2 streams located just north of Avalon Drive
- 1 stream located across US-411 at Robbie Drive
- Wetlands located at High School Drive
- 1 stream crossing and a wetland area at Coupland Road

Impacts to jurisdictional streams and wetlands could require a USACE permit. This will require an evaluation during design.

Prime and Unique Farmlands

For highway projects using federal funds, the Farmland Protection Policy Act applies. This means for federal highway projects that have the potential to convert important farmland to a non-farm use, the land must be evaluated using the NRCS's LESA system. This land evaluation and site assessment system establishes a farmland conversion impact rating score, and this score is used to determine if potential adverse impacts on the farmland exceed the recommended allowable level.

A search of the Natural Resources Conservation Service's (NRCS) Web Soil Survey was used to determine the potential for prime and unique farmlands within the study area. Mapping generated by the Web Soil Survey website is provided in **Appendix G**. The NRCS Web Soil Survey shows that the study area is made up primarily of prime farmland; however, the current land use adjacent to US-411 is residential with some commercial. It does not appear that properties within the study area are currently being used for farming.

Should the implementation of improvements identified in this study take place, an AD-1006, Farmland Conversion Rating form will be required. The site assessment portion of this form which assesses non-soil related criteria, is completed by the sponsoring agency and the USDA makes the final determination.

Hazardous Materials

A hazardous materials evaluation was performed in conjunction with the *Corridor Feasibility Study for Multilane Facility on SR-25 (US-411) from Park Avenue to Sanie Road*. The evaluation revealed several areas of concern within that study corridor; however, there was no evidence

of hazardous materials from surrounding properties adversely affecting the APPLE intersections study area.

Environmental Justice

Environmental Justice is a component of the National Environmental Policy Act (NEPA) that seeks to ensure that all socio-economic groups share in the benefits and burdens of Federal transportation projects. Two areas of environmental justice that frequently become a concern are areas with a high minority population or areas where the majority of the inhabitants are members of low-income households.

Table 9 provides a brief overview of the socioeconomic demographics surrounding the study area. The data is from the Environmental Protection Agency's (EPA) Environmental Justice Screening Tool (EJ Screen). When compared to data for the state, the EPA region, and the country, it can be concluded that there are no concerns related to environmental justice. The minority population percentages of the area are below what is seen in the state, the EPA region, and the country. The percentage of families living below the poverty line is also below that of the state, the EPA region, and the country.

Table 9: Environmental Justice Screen Tool Summary

Socioeconomic Overview	Value	State Average	Percentile in State	EPA Region Average	Percentile in EPA Region	USA Average	Percentile in USA
Demographic Index	17%	36%	18	37%	16	36%	23
Minority Population	11%	34%	23	39%	20	40%	23
Low Income Population	22%	37%	25	35%	29	31%	39
Linguistically Isolated Population	1%	1%	73	3%	53	5%	47
Population with Less Than High School Education	9%	14%	35	13%	41	12%	48

If federal monies are used to install improvements, the sponsoring agency will need to ensure that all planning and outreach components of the project comply with environmental justice regulations under NEPA.

4 Concept Plan Development and Evaluation

4.1 Traffic Volume Forecasting

The 2018 Corridor Study included a technical memorandum which established a straight-line annual growth rate of 2.3% per year to be used in future conditions traffic analysis. For this study, existing traffic volumes were grown to a ten-year horizon (2032) using the same 2.3% per year growth rate. **Figures 6 and 7** display the traffic volumes used in the future conditions traffic analysis.

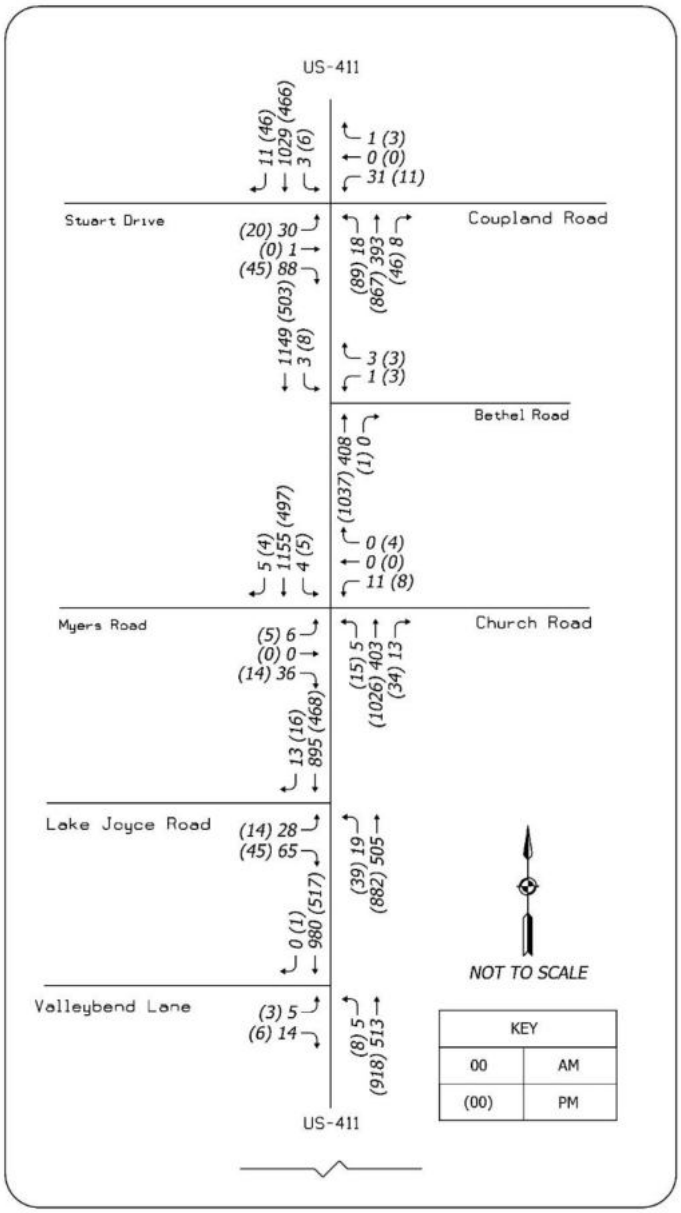


Figure 6: Future Peak Hour Traffic Volumes (2032) – Stuart Drive & Coupland Road to Valleybend Lane

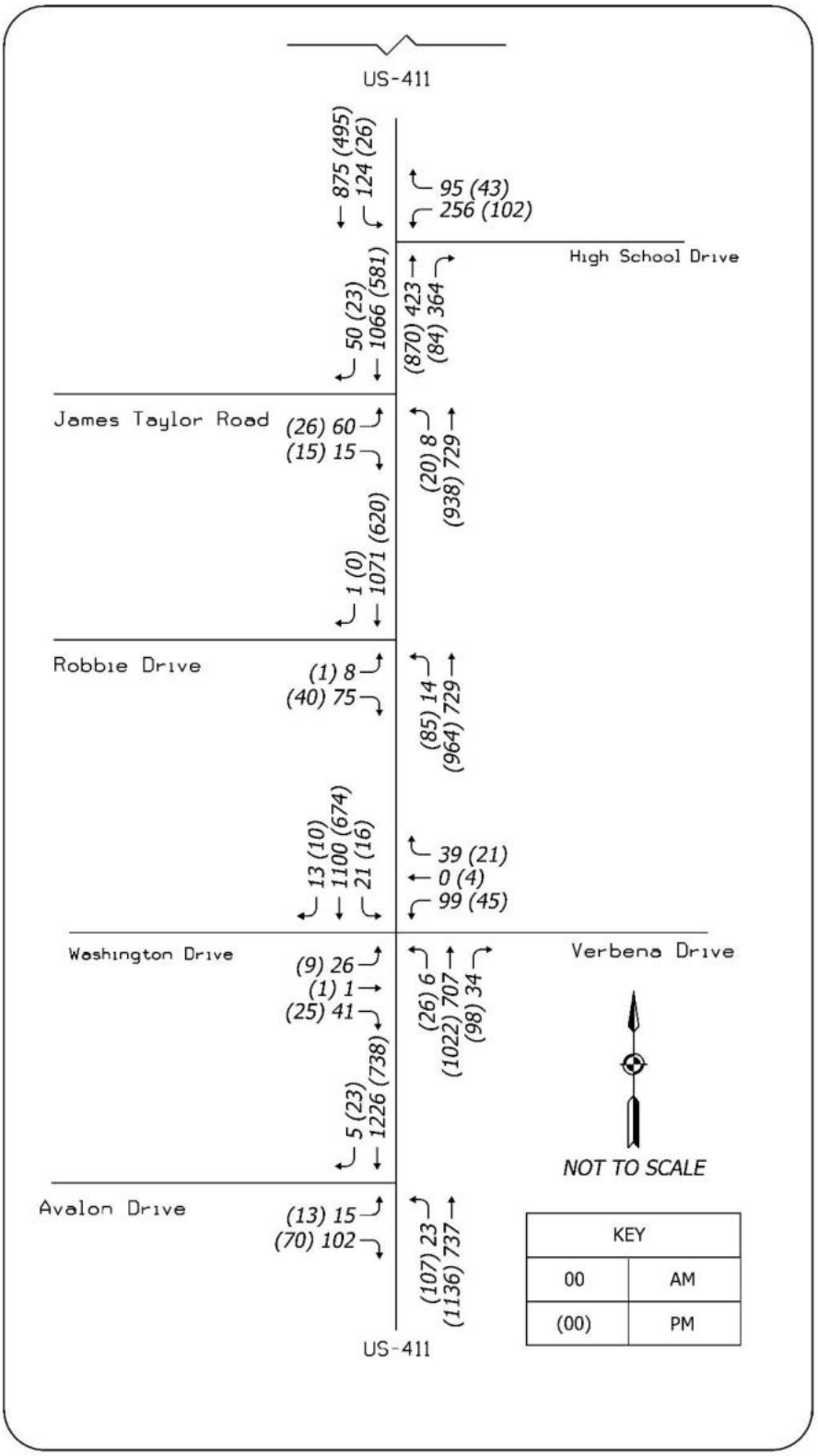


Figure 7: Future Peak Hour Traffic Volumes (2032) – High School Drive to Avalon Drive

4.2 Future Conditions Turn Lane Warrant Evaluation

Using the same methods described in Section 2.6, Sain Associates conducted a turn lane warrant analysis with future forecasted volumes (2032) at the study intersections. In addition to the turn lanes warranted under existing conditions (See Section 2.6), the following turn lane is expected to warrant by the horizon year during AM and PM peak hours due to forecasted growth in traffic volumes:

- US-411 Southbound Right Turn Lane at James Taylor Road.

Future conditions turn lane warrant evaluation reports can be found in **Appendix H**.

4.3 Recommended Improvements at Priority Intersections

Along with the evaluation of traffic signals, turn lanes, and short-term improvements, conceptual layouts and opinions of probable cost were developed as a part of this study for three priority intersections. The opinions of probable cost are summarized in Section 4.4. Each numbered improvement for the three priority intersections corresponds to the labels in **Figures 8 – 10**. The following three intersections were identified by stakeholders as priority intersections for the study:

- US-411 at Washington Drive and Verbena Drive
- US-411 at James Taylor Road
- US-411 at High School Drive

All recommended minimum turn lane storage lengths and taper lengths are based on Table 4.6 of the *ALDOT Access Management Manual* (2021).

US-411 at Washington Drive and Verbena Drive – Figure 8

1. Install a left turn lane along US-411 northbound at Washington Drive and Verbena Drive, with a minimum storage length of 245 feet and a minimum taper length of 180 feet. Construct an 8 feet wide shoulder, consisting of 4 feet of paved shoulder and 4 feet of grass shoulder.
2. Install a right turn lane along US-411 northbound at Washington Drive and Verbena Drive, with a minimum storage length of 245 feet and a minimum taper length of 180 feet. Construct an 8 feet wide shoulder, consisting of 4 feet of paved shoulder and 4 feet of grass shoulder.
3. Install a left turn lane along US-411 southbound at Washington Drive and Verbena Drive, with a minimum storage length of 245 feet and a minimum taper length of 180 feet. Construct an 8 feet wide shoulder, consisting of 4 feet of paved shoulder and 4 feet of grass shoulder.

4. In conjunction with the installation of turn lanes, consider installation of a traffic signal and associated stop lines. If a traffic signal is not approved immediately, perform a signal warrant evaluation if further development occurs along Verbena Drive.
5. Close the access on the east side US-411 approximately 150 feet south of Verbena Drive. If closure is not feasible, convert to a right-in only access with a raised concrete island for channelization.

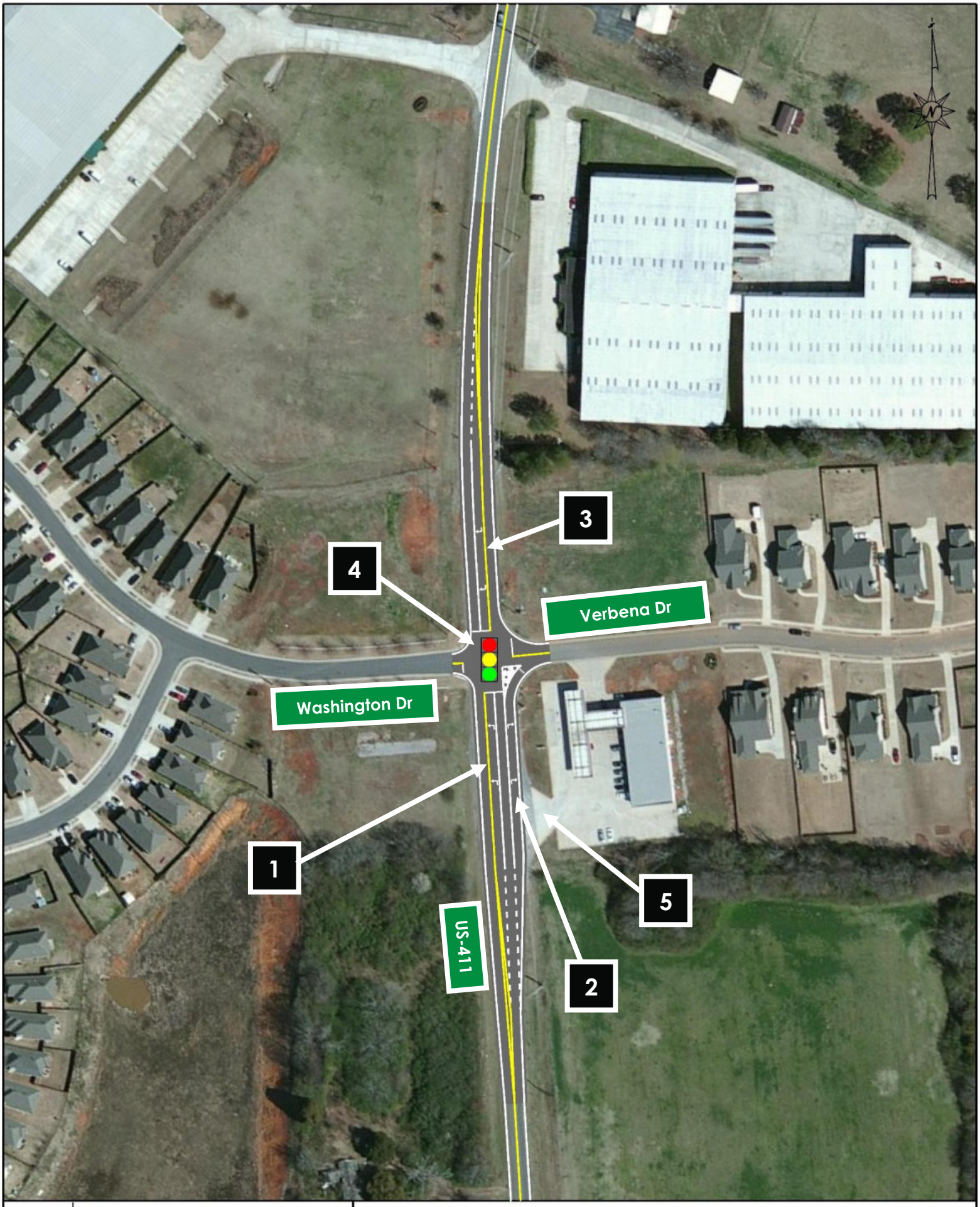
US-411 at James Taylor Road – Figure 9

1. Install a left turn lane along US-411 northbound at James Taylor Road, with a minimum storage length of 245 feet and a minimum taper length of 180 feet. Construct an 8 feet wide shoulder, consisting of 4 feet of paved shoulder and 4 feet of grass shoulder.
2. Install a right turn lane along US-411 southbound at James Taylor Road, with a minimum storage length of 245 feet and a minimum taper length of 180 feet. Construct an 8 feet wide shoulder, consisting of 4 feet of paved shoulder and 4 feet of grass shoulder.

US-411 at High School Drive – Figure 10

1. Install a traffic signal at the intersection. In conjunction with the installation of a traffic signal, install stop lines on both US-411 approaches to the intersection.
2. Restripe the High School Drive approach to US-411.
3. Extend the US-411 southbound left turn by restriping existing pavement.

Due to the proximity of proposed improvements at Washington Drive and Verbena Drive to the proposed turn lanes Avalon Drive and Robbie Drive (see Section 4.4), an alternative strategy would be to construct a continuous three-lane typical section along US-411 from the existing five-lane section at Park Avenue to the existing left turn lane at Tractor Supply, which is just north of Robbie Drive. However, constructing a continuous three lane segment would increase the required project funding and could result in additional time in the project life cycle.



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Website: www.sain.com

Figure 8: US-411 at Washington Drive and Verbena Drive – Recommended Improvements

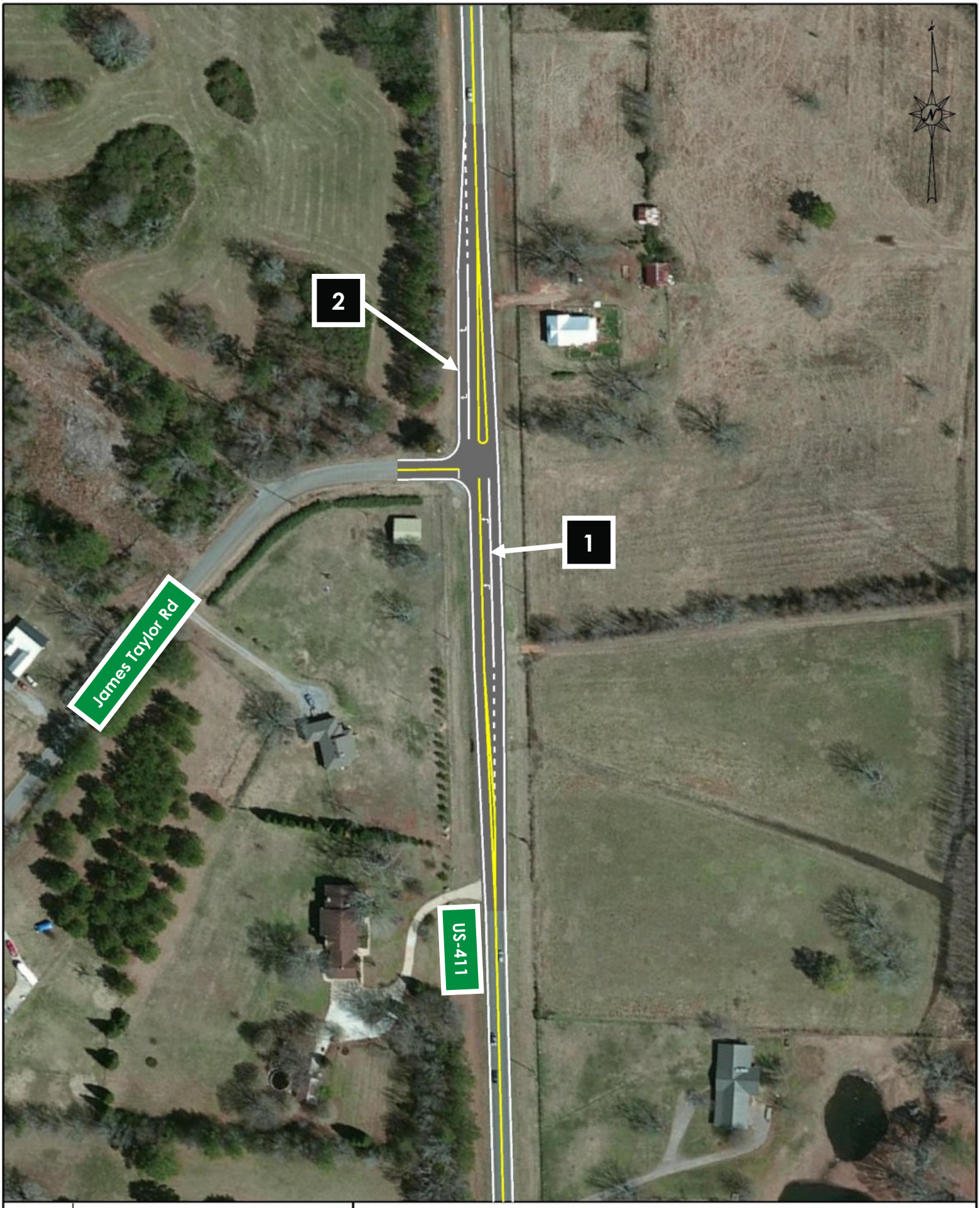

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Figure 9: US-411 at James Taylor Road – Recommended Improvements

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Figure 10: US-411 at High School Drive – Recommended Improvements

4.4 Recommended Improvements at Other Intersections

The remaining seven study intersections were evaluated for the installation of turn lanes and short-term improvements. No conceptual layouts or opinions of probable cost were developed for the following intersections.

US-411 at Avalon Drive

- Install a left turn lane along US-411 northbound at Avalon Drive, with a minimum storage length of 245 feet and a minimum taper length of 180 feet.

US-411 at Robbie Drive

- Install a left turn lane along US-411 northbound at Robbie Drive, with a minimum storage length of 245 feet and a minimum taper length of 180 feet.

US-411 at Valleybend Lane

No recommendations.

US-411 at Lake Joyce Road

- Install a left turn lane along US-411 northbound at Lake Joyce Road, with a minimum storage length of 245 feet and a minimum taper length of 180 feet.

US-411 at Myers Road and Church Road

- Install a left turn lane along US-411 northbound at Myers Road and Church Road, with a minimum storage length of 295 feet and a minimum taper length of 180 feet.

US-411 at Bethel Road

- Consider closing Bethel Road with a cul-de-sac and diverting traffic to the Church Road approach to US-411.

US-411 at Stuart Drive and Coupland Road

- Install a left turn lane along US-411 northbound at Stuart Drive and Coupland Road, with a minimum storage length of 295 feet and a minimum taper length of 180 feet.

All US-411 Intersections

- For applicable developments accessing US-411 (State Route 25), a traffic study should be conducted according to the guidelines in the *ALDOT Access Management Manual* (2021). The manual states, "For developments that generate more than 100 total (inbound plus outbound) peak hour vehicle trips, a traffic impact study is required unless indicated otherwise by the ALDOT Engineer."

4.5 Future Conditions Capacity Analysis

Using the methods described in the Transportation Research Board's *Highway Capacity Manual*, Sain Associates analyzed the future traffic conditions within the study area with all recommended improvements installed. A list of recommended improvements for each intersection can be found in Section 5 of this report.

According to this method of analysis, traffic capacities are expressed as levels of service (LOS) ranging from "A" (free-flow conditions) to "F" (very congested conditions). A detailed description of each LOS designation is included in **Appendix B**. Generally, LOS "C" is considered desirable, while LOS "D" is considered acceptable during peak hours of traffic flow. The analysis was conducted using Trafficware's Synchro 10 software.

The results of the future conditions capacity analysis are summarized in **Tables 10 and 11**. Full analysis reports are provided in **Appendix I.**

Table 10: Future Conditions LOS – 2032

Intersection	Approach		Level of Service	
			AM Peak	PM Peak
Avalon Drive at US-411 (Unsignalized)	EB	Avalon Drive	**F**	**F**
	NB	US-411	A	A
	SB	US-411	A	A
Washington Drive/Verbena Drive at US-411 (Signalized)	EB	Washington Drive	D	C
	WB	Verbena Drive	D	C
	NB	US-411	A	B
	SB	US-411	C	A
		Intersection LOS	**B**	**B**
Robbie Drive at US-411 (Unsignalized)	EB	Robbie Drive	**E**	C
	NB	US-411	A	A
	SB	US-411	A	A
James Taylor Road at US-411 (Unsignalized)	EB	James Taylor Road	**F**	**E**
	NB	US-411	A	A
	SB	US-411	A	A

The recommended improvements, which include signalization, are anticipated to improve the Washington Drive and Verbena Drive intersection to LOS B from failing side street approach LOS under existing conditions. While some low-volume approaches possess LOS F in future conditions, this is not uncommon during peak hours at side street approaches to high volume roadways. The turn lanes proposed at James Taylor Road are not necessarily expected to improve the LOS directly, but the improvements would reduce the likelihood of rear end collisions on US-411.

Table 11: Future Conditions LOS – 2032 (Continued)

Intersection	Approach		Level of Service	
			AM Peak	PM Peak
High School Drive at US-411 (Signalized)	WB	High School Drive	C	C
	NB	US-411	B	B
	SB	US-411	B	A
		Intersection LOS	**C**	**C**
Valleybend Lane at US-411 (Unsignalized)	EB	Valleybend Lane	D	C
	NB	US-411	A	A
	SB	US-411	A	A
Lake Joyce Road at US-411 (Unsignalized)	EB	Lake Joyce Road	**E**	C
	NB	US-411	A	A
	SB	US-411	A	A
Myers Road/Church Road at US-411 (Unsignalized)	EB	Myers Road	**E**	D
	WB	Church Road	**F**	**F**
	NB	US-411	A	A
	SB	US-411	A	A
Bethel Road at US-411 (Unsignalized)	WB	Bethel Road	N/A	N/A
	NB	US-411	A	A
	SB	US-411	A	A
Stuart Drive/ Coupland Road at US-411 (Unsignalized)	EB	Stuart Drive	**F**	**E**
	WB	Coupland Road	**F**	**F**
	NB	US-411	A	A
	SB	US-411	A	A

At the High School Drive intersection, the LOS F and LOS D on the side street approach are improved to an intersection LOS C. Similarly to Table 10, Table 11 also shows several approaches with failing LOS. This is not uncommon during peak hours at side street approaches to high-volume roadways.

4.6 Opinions of Probable Cost

Planning-level opinions of probable cost were prepared for each of the three priority intersections. The estimates are based on the engineer's experiences and qualifications and represent the engineer's best judgment within the industry. The engineer does not guarantee that proposals, bids, or actual costs will not vary from the engineer's opinions of probable cost. The opinions of probable cost were estimated in 2022 dollars. For budgeting future year projects, these costs will need to be escalated to future year dollars.

The totals include opinions of probable cost of construction, preliminary engineering (15%), utility relocation, right-of-way, construction engineering and inspection (15%), ALDOT indirect costs (10%), and a 20% contingency. **Table 12** shows the opinions of probable cost, estimated in 2022 dollars, for the recommended improvements at each of the priority intersections. Detailed breakdowns of each intersection's opinion of probable cost can be found in **Appendix J**.

Table 12: Opinions of Probable Cost for Priority Intersections (2022 Dollars)

Intersection	Opinion of Probable Cost (2022 Dollars)
US-411 at Washington Drive and Verbena Drive	$1.8 million
US-411 at James Taylor Road	$1.4 million
US-411 at High School Drive	$540,000

At Washington Drive and Verbena Drive, there is enough existing pavement on US-411 to mill and overlay most of the length of the recommended turn lanes as long as the quality and depth of the pavement is acceptable. This also reduces the chances of impacting the utility poles on the southwest corner of the intersection. No cross drains were located within the turn lane limits, but a small quantity of pipe and a few inlets were estimated. Right-of-way acquisition is not anticipated. If any right-of-way acquisition is required, it would likely be limited to small areas on corners of the intersection. Most utilities are located at the back of existing right-of-way. There are existing water lines that currently tee under the existing pavement on the Verbena approach. ALDOT would likely require relocation of water lines in conjunction with construction of the recommended improvements.

At James Taylor Road, right-of-way acquisition would be required on the northeast corner to accommodate installation of the southbound right turn lane. Several utilities will require relocation, including water lines and sanitary sewer lines. Additionally, there is a large culvert on the northbound approach to the intersection that would likely need to be relocated or extended.

At High School Drive, the major cost item is the traffic signal. Additional striping and pavement markings will be required as a part of the traffic signal design. The costs unrelated to the traffic signal include the mill and overlay of a portion of the southbound left turn lane. This is recommended in order to extend the turn lane within the existing striped area on US-411.

4.7 Prioritization of Recommended Improvements

Based on stakeholder input, engineering judgment, anticipated funding availability, and the analysis performed in the study, each of the recommended improvements have been assigned to one of two categories: short-term priority improvements or improvements which are contingent upon development.

Short-term priority improvements are comprised of the priority intersections' recommendations and the northbound left turn lane at Avalon Drive. The Avalon Drive northbound left turn lane was included as a short-term priority based upon its geographic location on the corridor, reported crash data trends, and its effect on the improvements at priority intersections.

Short-Term Priority

- Washington Drive & Verbena Drive – Improvements #1 – #5
- High School Drive – Improvements #1 – #3
- James Taylor Road – Improvements #1 & #2
- Avalon Drive – Install Northbound Left Turn Lane

Recommended improvements categorized as contingent upon development were based on the presence of undeveloped land nearby and the geographic location of the intersections. US-411 is the main artery of the attractive, fast-growing St. Clair County, which presents an opportunity for the County and the City to pass on a percentage of the cost of roadway improvements to developers desiring to take advantage of access to the roadway network.

Contingent Upon Development

- Robbie Drive – Install Northbound Left Turn Lane
- Myers Road & Church Road – Install Northbound Left Turn Lane
- Stuart Drive & Coupland Road – Install Northbound Left Turn Lane
- Lake Joyce Road – Install Northbound Left Turn Lane
- Bethel Road – Close/Cul-de-sac Bethel Road

Priorities tend to change over time through leadership transitions and funding availability. The City and the County may choose to adjust prioritization of improvements as needed.

5 Funding Sources

The County has options for funding the preferred improvements through federal, state, and local government sources.

Due to the nature of the improvements' purpose and need being safety, there is potential for the City and the County to obtain **Highway Safety Improvement Program (HSIP)** funds administered by ALDOT's Safety Operations Office. HSIP funding is awarded based on an application that the County must complete. The application involves providing evidence of crash reduction resulting from the implementation of improvement measures. If awarded, the funding match for HSIP is 90% federal and 10% local. HSIP-funded projects require additional time to account for ALDOT and FHWA involvement including additional plan reviews and more stringent design and construction standards. For these reasons, a timeframe for completing a HSIP funded project is estimated at five to eight years.

The **Congestion Mitigation and Air Quality Improvement Program (CMAQ)** is an 80% Federal/20% Local match program and has been continued through the Infrastructure Investment and Jobs Act (IIJA). CMAQ funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for various pollutants. Any project must be included in the metropolitan planning organization's (MPO) current transportation plan and transportation improvement plan (TIP).

Alabama Transportation Rehabilitation and Improvement Program-II (ATRIP-II) was created in 2019 by the Rebuild Alabama Act and is administered by ALDOT. Eligible projects include transportation projects that improve any state-maintained highway system. Projects with a primary focus on local roads are not eligible. For ATRIP-II projects, ALDOT will perform the preliminary engineering as an eligible cost to the project. A project sponsor can request to perform the preliminary engineering; however, preliminary engineering performed by any entity other than ALDOT is not eligible for ATRIP II funding. Right-of-way acquisition is an ATRIP-II eligible activity, but utility relocation is not. A total of $40 Million in ATRIP-II funding has been allocated in Fiscal Year (FY) 2023. The application deadline for FY 2023 funding is November 18, 2022. The maximum requested funding allowed per project is $2 Million in FY 2023.

The Rebuild Alabama Act authorizes the **ALDOT Annual Grant Program**, a $10 million fund, for which cities and counties may apply. The Program provides the opportunity for cities and counties to partner with the State on larger projects where adequate local funding may not be available. There is not a specified or required match for local governments, but any funds that local governments can leverage to team with ALDOT to fund a project could play a role in the decision-making process. Up to $250,000 per project can be awarded from this fund, and funds must be used for construction or a federal match when construction is imminent.

The County has the option to fund the design and construction of their preferred alternative using only **local funds**. Choosing this route allows the project design and construction to have shorter timelines and the potential for reduced project costs since fewer plan reviews would be required. US-411 is a state route and ALDOT guidelines will govern the design for that project. An ALDOT permit would also be required for any improvements within the right-of-way on US-411.

6 Next Steps

This report documents the study undertaken to further evaluate the traffic operations at ten (10) unsignalized intersections along US-411 from Avalon Drive to Stuart Drive and Coupland Road. In previous sections of this report, transportation analysis and improvement recommendations have been provided.

If the City and the County choose to move forward with implementing any of the recommended improvements using state funding, the next step would be to apply for Fiscal Year 2023 ATRIP-II funding. The application deadline for Fiscal Year 2023 ATRIP-II funding is November 18, 2022. Most recommended improvements, which include the installation of turn lanes to mitigate reported crash trends, could also be eligible for HSIP funding at the federal level.

Appendix A – Raw Traffic Data

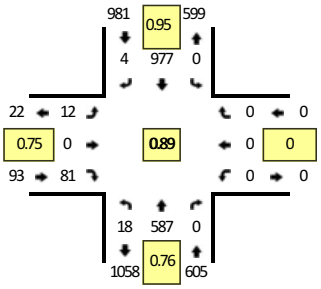
Type of peak hour being reported: Intersection Peak

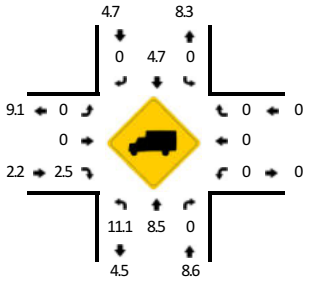
Method for determining peak hour: Total Entering Volume

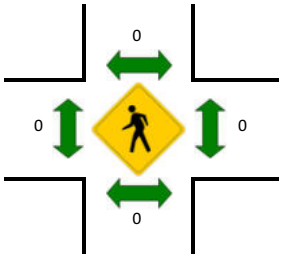
LOCATION: Moody Pkwy -- Avalon Dr
CITY/STATE: Moody, AL

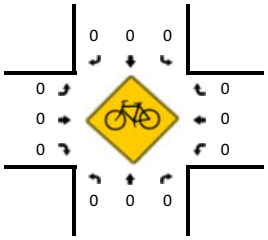
QC JOB #: 15768801
DATE: Wed, May 4 2022

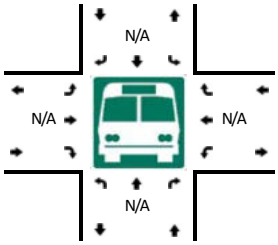
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

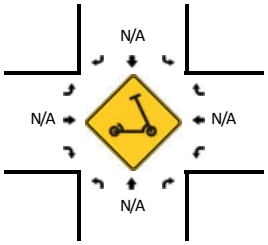












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Avalon Dr (Eastbound)				Avalon Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	6	110	0	0	0	246	0	0	3	0	28	0	0	0	0	0	393	
7:15 AM	1	150	0	0	0	238	3	0	5	0	23	0	0	0	0	0	420	
7:30 AM	5	194	0	0	0	258	0	0	2	0	13	0	0	0	0	0	472	
7:45 AM	6	133	0	0	0	235	1	0	2	0	17	0	0	0	0	0	394	1679
8:00 AM	5	93	0	0	0	209	6	0	0	0	10	0	0	0	0	0	323	1609
8:15 AM	5	73	1	0	0	184	2	0	1	0	15	0	0	0	0	0	281	1470
8:30 AM	6	103	0	0	0	147	2	0	0	0	13	0	1	0	0	0	272	1270
8:45 AM	1	83	0	0	0	189	2	0	1	0	13	0	0	0	0	0	289	1165

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	776	0	0	0	1032	0	0	8	0	52	0	0	0	0	0	1888
Heavy Trucks	0	36	0		0	44	0		0	0	4		0	0	0		84
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

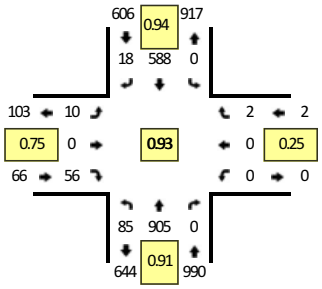
Type of peak hour being reported: Intersection Peak

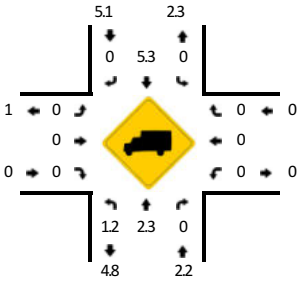
Method for determining peak hour: Total Entering Volume

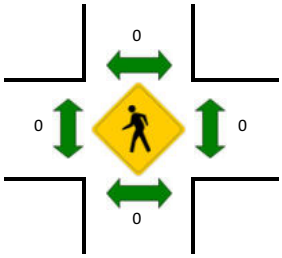
LOCATION: Moody Pkwy -- Avalon Dr
CITY/STATE: Moody, AL

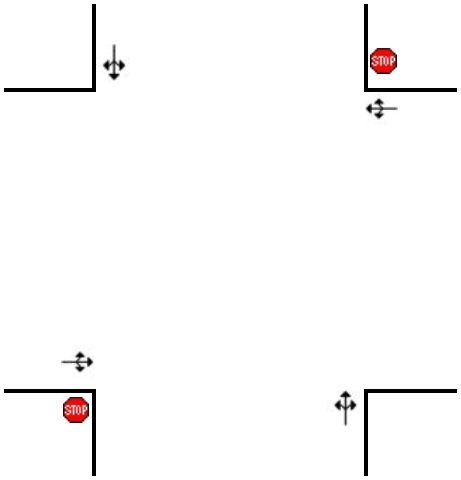
QC JOB #: 15768802
DATE: Wed, May 4 2022

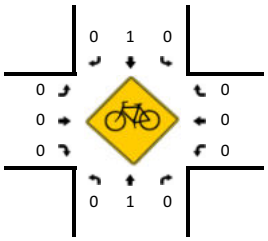
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

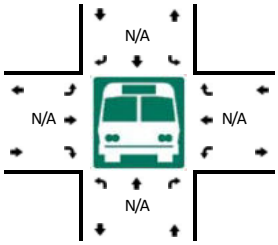


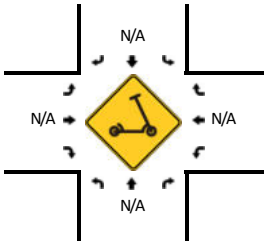












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Avalon Dr (Eastbound)				Avalon Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	18	195	1	0	0	177	4	0	1	0	13	0	0	0	1	0	410	
4:15 PM	18	209	0	0	0	112	5	0	0	0	14	0	0	0	0	0	358	
4:30 PM	15	195	0	0	0	130	3	0	4	0	15	0	0	0	0	0	362	
4:45 PM	19	213	0	0	0	118	3	0	1	0	13	0	1	0	0	0	368	1498
5:00 PM	19	216	0	0	0	139	2	0	5	0	9	0	0	0	0	0	390	1478
5:15 PM	14	258	0	0	0	157	4	0	1	0	11	0	0	0	2	0	447	1567
5:30 PM	30	220	0	0	0	148	6	0	3	0	19	0	0	0	0	0	426	1631
5:45 PM	22	211	0	0	0	144	6	0	1	0	17	0	0	0	0	0	401	1664

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	56	1032	0	0	0	628	16	0	4	0	44	0	0	0	8	0	1788
Heavy Trucks	0	32	0		0	20	0		0	0	0		0	0	0		52
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

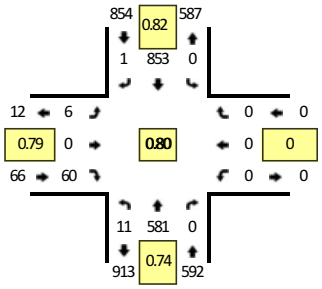
Type of peak hour being reported: Intersection Peak

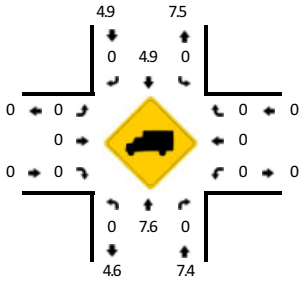
Method for determining peak hour: Total Entering Volume

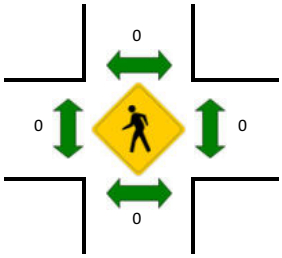
LOCATION: Moody Pkwy -- Robbie Dr
CITY/STATE: Moody, AL

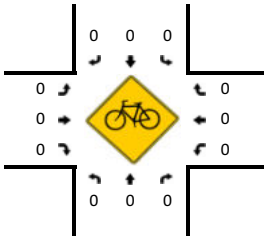
QC JOB #: 15768803
DATE: Wed, May 4 2022

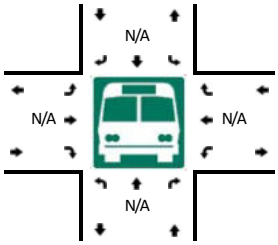
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

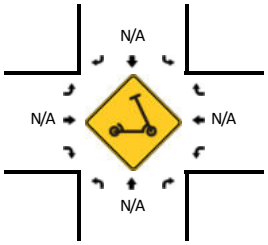












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Robbie Dr (Eastbound)				Robbie Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	111	0	0	0	201	0	0	1	0	13	0	0	0	0	0	326	
7:15 AM	3	148	0	0	0	188	0	0	2	0	19	0	0	0	0	0	360	
7:30 AM	5	195	0	0	0	260	1	0	1	0	10	0	0	0	0	0	472	
7:45 AM	3	127	0	0	0	204	0	0	2	0	18	0	0	0	0	0	354	1512
8:00 AM	4	68	0	0	0	168	0	0	0	0	10	0	0	0	0	0	250	1436
8:15 AM	4	66	0	0	0	156	1	0	1	0	10	0	0	0	0	0	238	1314
8:30 AM	4	88	0	0	0	131	0	0	0	0	4	0	0	0	0	0	227	1069
8:45 AM	8	65	0	0	0	170	0	0	0	0	7	0	0	0	0	0	250	965

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	780	0	0	0	1040	4	0	4	0	40	0	0	0	0	0	1888
Heavy Trucks	0	36	0		0	36	0		0	0	0		0	0	0		72
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

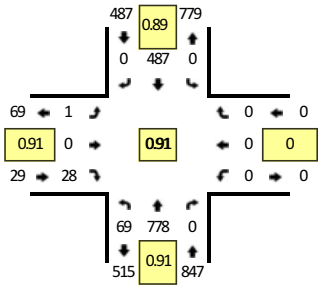
Type of peak hour being reported: Intersection Peak

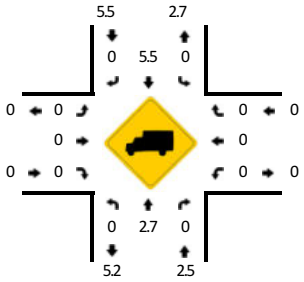
Method for determining peak hour: Total Entering Volume

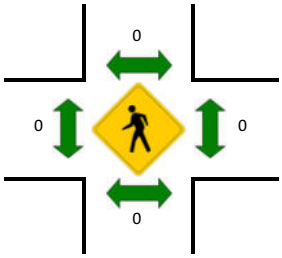
LOCATION: Moody Pkwy -- Robbie Dr
CITY/STATE: Moody, AL

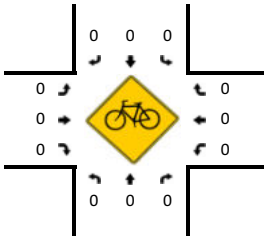
QC JOB #: 15768804
DATE: Wed, May 4 2022

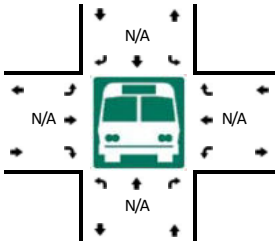
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

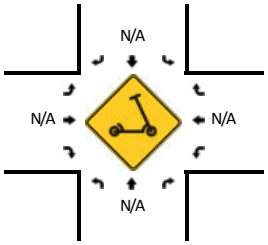












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Robbie Dr (Eastbound)				Robbie Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	189	0	0	0	131	1	0	0	0	8	0	0	0	0	0	337	
4:15 PM	13	174	0	0	0	91	0	0	1	0	8	0	0	0	0	0	287	
4:30 PM	12	171	0	0	0	108	0	0	0	0	10	0	0	0	0	0	301	
4:45 PM	18	189	0	0	0	110	0	0	0	0	7	0	0	0	0	0	324	1249
5:00 PM	15	181	0	0	0	120	0	0	1	0	7	0	0	0	0	0	324	1236
5:15 PM	21	211	0	0	0	137	0	0	0	0	7	0	0	0	0	0	376	1325
5:30 PM	15	197	0	0	0	120	0	0	0	0	7	0	0	0	0	0	339	1363
5:45 PM	17	179	0	0	0	117	0	0	0	0	11	0	0	0	0	0	324	1363

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	84	844	0	0	0	548	0	0	0	0	28	0	0	0	0	0	1504
Heavy Trucks	0	24	0		0	20	0		0	0	0		0	0	0		44
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

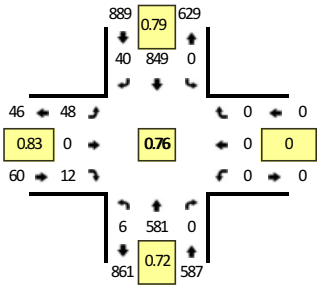
Type of peak hour being reported: Intersection Peak

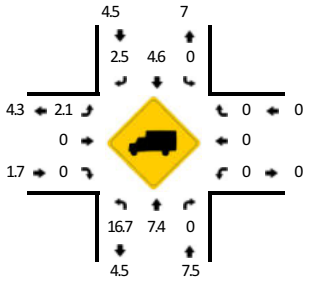
Method for determining peak hour: Total Entering Volume

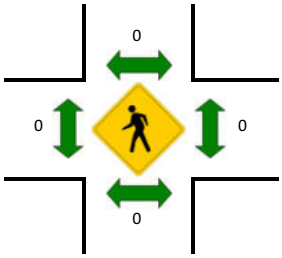
LOCATION: Moody Pkwy -- James Taylor Rd
CITY/STATE: Moody, AL

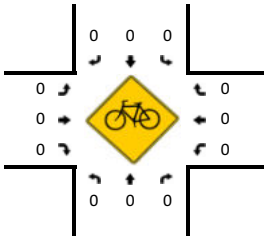
QC JOB #: 15768805
DATE: Wed, May 4 2022

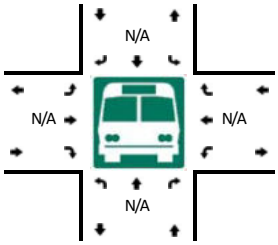
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

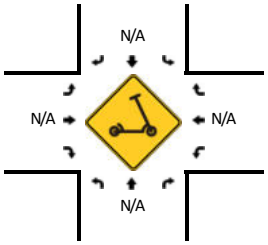












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				James Taylor Rd (Eastbound)				James Taylor Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	105	0	0	0	197	2	0	9	0	3	0	0	0	0	0	316	
7:15 AM	1	149	0	0	0	186	4	0	14	0	4	0	0	0	0	0	358	
7:30 AM	0	204	0	0	0	261	22	0	14	0	2	0	0	0	0	0	503	
7:45 AM	5	123	0	0	0	205	12	0	11	0	3	0	0	0	0	0	359	1536
8:00 AM	2	66	0	0	0	155	4	0	3	0	8	0	0	0	0	0	238	1458
8:15 AM	1	62	0	0	0	142	6	0	3	0	2	0	0	0	0	0	216	1316
8:30 AM	0	84	0	0	0	138	1	0	3	0	2	0	0	0	0	0	228	1041
8:45 AM	2	65	0	0	0	162	1	0	4	0	3	0	0	0	0	0	237	919

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	816	0	0	0	1044	88	0	56	0	8	0	0	0	0	0	2012
Heavy Trucks	0	40	0		0	36	0		0	0	0		0	0	0		76
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

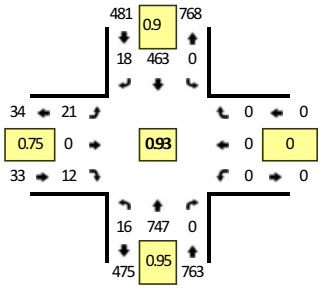
Type of peak hour being reported: Intersection Peak

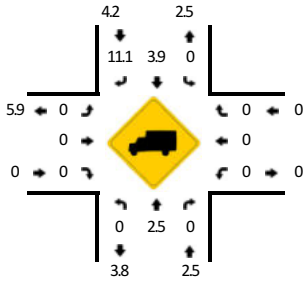
Method for determining peak hour: Total Entering Volume

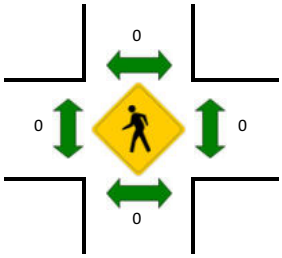
LOCATION: Moody Pkwy -- James Taylor Rd
CITY/STATE: Moody, AL

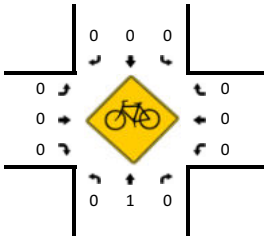
QC JOB #: 15768806
DATE: Wed, May 4 2022

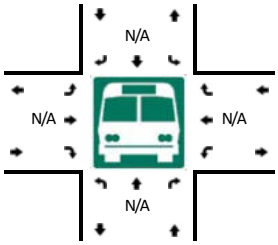
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

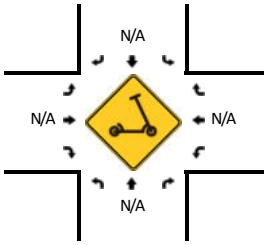












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				James Taylor Rd (Eastbound)				James Taylor Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	180	0	0	0	121	4	0	3	0	1	0	0	0	0	0	314	
4:15 PM	9	163	0	0	0	90	6	0	4	0	1	0	0	0	0	0	273	
4:30 PM	5	172	0	0	0	110	4	0	5	0	1	0	0	0	0	0	297	
4:45 PM	2	171	0	1	0	108	4	0	3	0	5	0	0	0	0	0	294	1178
5:00 PM	8	179	0	0	0	109	2	0	6	0	2	0	0	0	0	0	306	1170
5:15 PM	4	197	0	0	0	129	4	0	4	0	4	0	0	0	0	0	342	1239
5:30 PM	1	190	0	0	0	116	5	0	7	0	4	0	0	0	0	0	323	1265
5:45 PM	3	181	0	0	0	109	7	0	4	0	2	0	0	0	0	0	306	1277

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	788	0	0	0	516	16	0	16	0	16	0	0	0	0	0	1368
Heavy Trucks	0	24	0		0	16	0		0	0	0		0	0	0		40
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

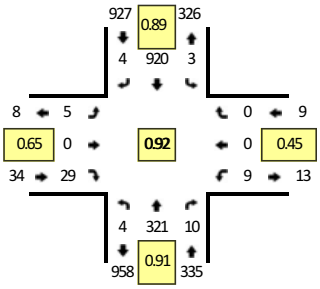
Type of peak hour being reported: Intersection Peak

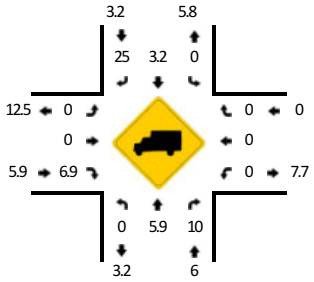
Method for determining peak hour: Total Entering Volume

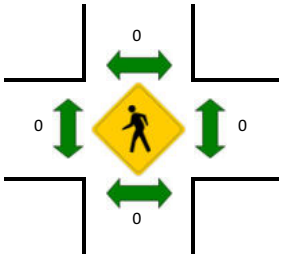
LOCATION: Moody Pkwy -- Myers Rd/Church Rd
CITY/STATE: Moody, AL

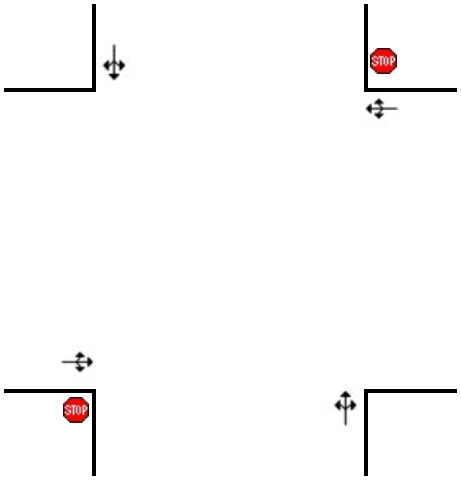
QC JOB #: 15768807
DATE: Wed, May 4 2022

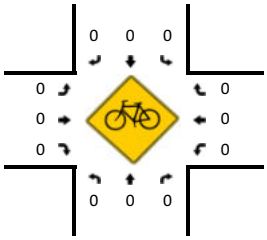
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM

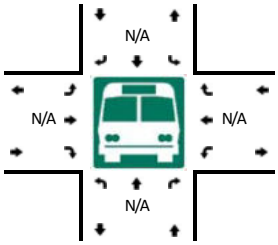


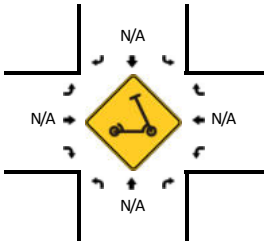












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Myers Rd/Church Rd (Eastbound)				Myers Rd/Church Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	91	0	0	1	249	1	0	3	0	10	0	1	0	0	0	356	
7:15 AM	0	64	1	0	1	257	1	0	2	0	8	0	5	0	0	0	339	
7:30 AM	3	80	4	0	0	224	2	0	0	0	9	0	3	0	0	0	325	
7:45 AM	1	86	5	0	1	190	0	0	0	0	2	0	0	0	0	0	285	1305
8:00 AM	0	56	3	0	1	148	2	0	1	0	0	0	1	0	0	0	212	1161
8:15 AM	1	59	0	1	0	143	0	0	1	0	1	0	0	0	1	0	207	1029
8:30 AM	1	77	0	1	0	130	1	0	1	0	1	0	6	0	1	0	219	923
8:45 AM	0	69	2	0	0	155	0	0	0	0	2	0	7	0	0	0	235	873

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	364	0	0	4	996	4	0	12	0	40	0	4	0	0	0	1424
Heavy Trucks	0	44	0		0	16	4		0	0	4		0	0	0		68
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

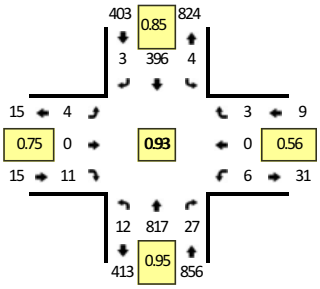
Type of peak hour being reported: Intersection Peak

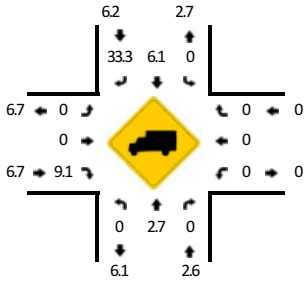
Method for determining peak hour: Total Entering Volume

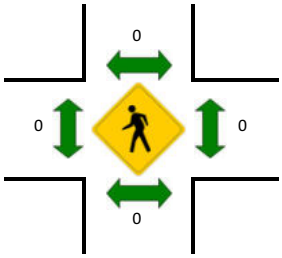
LOCATION: Moody Pkwy -- Myers Rd/Church Rd
CITY/STATE: Moody, AL

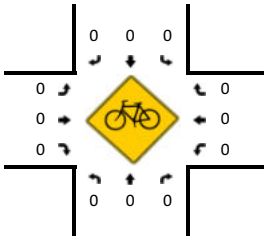
QC JOB #: 15768808
DATE: Wed, May 4 2022

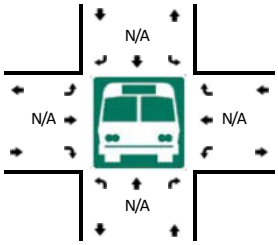
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

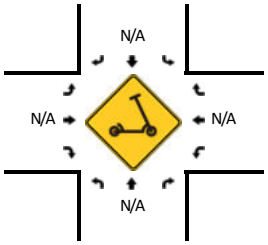












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Myers Rd/Church Rd (Eastbound)				Myers Rd/Church Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	188	1	0	0	113	1	0	2	0	3	0	1	0	0	0	314	
4:15 PM	3	176	1	0	0	99	1	0	1	0	2	0	4	0	0	0	287	
4:30 PM	2	170	4	0	0	109	1	0	0	0	0	0	0	0	0	0	286	
4:45 PM	3	183	6	0	0	116	1	0	0	0	3	0	0	0	1	0	313	1200
5:00 PM	2	194	5	0	1	90	1	0	1	0	3	0	0	0	0	0	297	1183
5:15 PM	3	211	3	0	1	116	2	0	1	0	4	0	1	0	3	0	345	1241
5:30 PM	4	213	8	0	1	88	0	0	2	0	3	0	3	0	0	0	322	1277
5:45 PM	3	199	11	0	1	102	0	0	0	0	1	0	2	0	0	0	319	1283

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	844	12	0	4	464	8	0	4	0	16	0	4	0	12	0	1380
Heavy Trucks	0	32	0		0	20	4		0	0	0		0	0	0		56
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

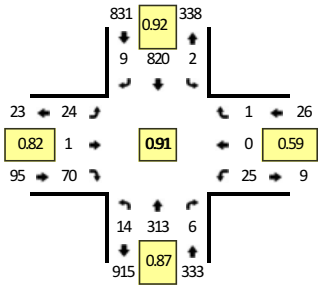
Type of peak hour being reported: Intersection Peak

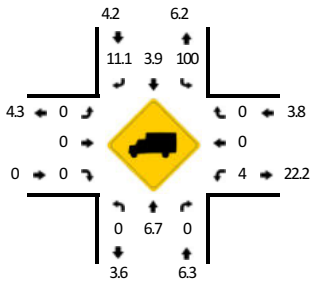
Method for determining peak hour: Total Entering Volume

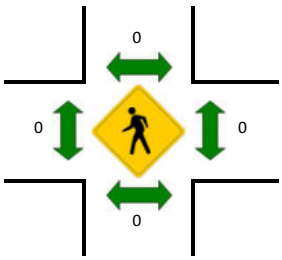
LOCATION: Moody Pkwy -- Stuart Dr (Lazy V Lakes Rd)/Copeland Rd
CITY/STATE: Moody, AL

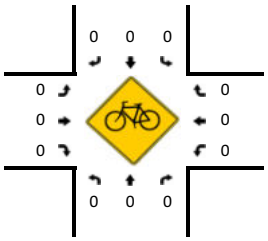
QC JOB #: 15768809
DATE: Wed, May 4 2022

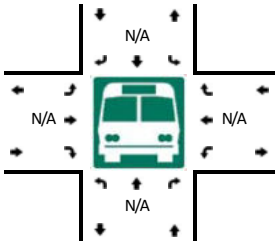
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM

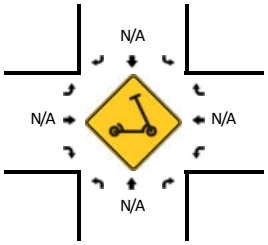












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Stuart Dr (Lazy V Lakes Rd)/Copeland Rd (Eastbound)				Stuart Dr (Lazy V Lakes Rd)/Copeland Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	93	2	0	1	223	1	0	8	1	20	0	3	0	1	0	354	
7:15 AM	5	63	2	0	1	221	2	0	7	0	17	0	11	0	0	0	329	
7:30 AM	4	67	1	0	0	203	2	0	9	0	20	0	5	0	0	0	311	
7:45 AM	4	90	1	0	0	173	4	0	0	0	13	0	6	0	0	0	291	1285
8:00 AM	2	51	4	0	2	137	2	0	8	0	14	0	5	0	1	0	226	1157
8:15 AM	7	57	0	0	1	122	4	0	4	0	8	0	2	0	0	0	205	1033
8:30 AM	3	70	3	0	2	122	2	0	4	0	8	0	4	0	0	0	218	940
8:45 AM	3	61	4	0	0	142	2	0	4	0	4	0	2	0	1	0	223	872

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	372	8	0	4	892	4	0	32	4	80	0	12	0	4	0	1416
Heavy Trucks	0	40	0		4	24	0		0	0	0		4	0	0		72
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

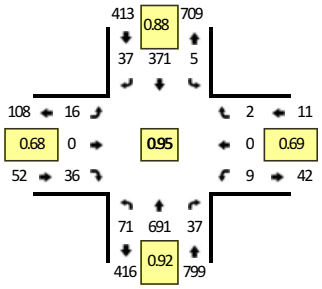
Report generated on 5/13/2022 12:04 PM

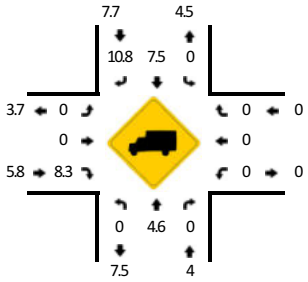
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

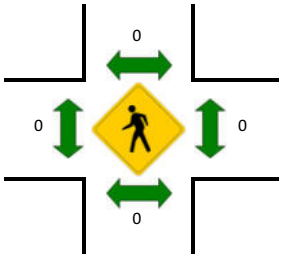
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

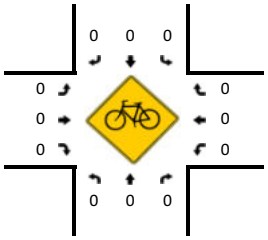
LOCATION: Moody Pkwy -- Stuart Dr (Lazy V Lakes Rd)/Copeland Rd | **QC JOB #:** 15768810
CITY/STATE: Moody, AL | **DATE:** Wed, May 4 2022

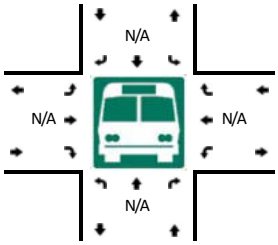
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

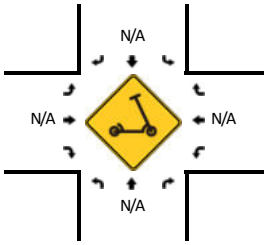












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Stuart Dr (Lazy V Lakes Rd)/Copeland Rd (Eastbound)				Stuart Dr (Lazy V Lakes Rd)/Copeland Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	15	168	9	0	1	100	6	0	4	1	7	0	2	1	1	0	315	
4:15 PM	8	160	3	0	0	86	8	0	6	1	7	0	2	0	0	0	281	
4:30 PM	17	145	7	0	2	107	10	0	4	1	8	0	1	0	1	0	303	
4:45 PM	16	163	7	0	1	107	10	0	5	0	7	0	2	0	1	0	319	1218
5:00 PM	20	163	2	0	0	89	18	0	6	0	13	0	3	0	0	0	314	1217
5:15 PM	24	178	15	0	2	98	7	0	1	0	8	0	1	0	0	0	334	1270
5:30 PM	11	187	13	0	2	77	2	0	4	0	8	0	3	0	1	0	308	1275
5:45 PM	13	173	13	0	1	98	4	0	4	0	7	0	1	0	2	0	316	1272

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	96	712	60	0	8	392	28	0	4	0	32	0	4	0	0	0	1336
Heavy Trucks	0	24	0		0	20	0		0	0	4		0	0	0		48
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

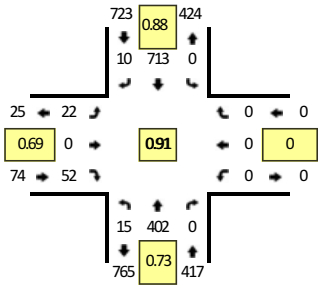
Type of peak hour being reported: Intersection Peak

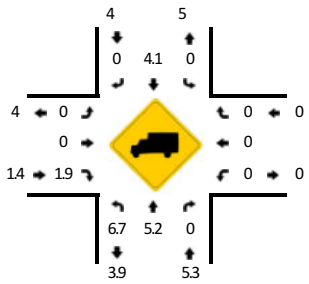
Method for determining peak hour: Total Entering Volume

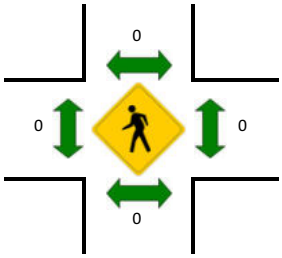
LOCATION: Moody Pkwy -- Lake Joyce Rd
CITY/STATE: Moody, AL

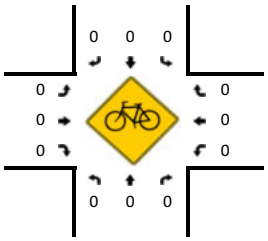
QC JOB #: 15768811
DATE: Wed, May 4 2022

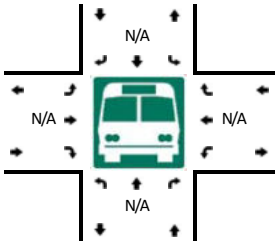
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

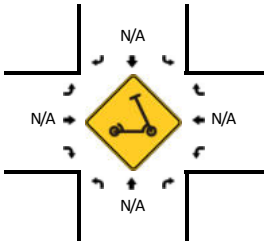












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Lake Joyce Rd (Eastbound)				Lake Joyce Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	91	0	0	0	190	0	0	6	0	12	0	0	0	0	0	299	
7:15 AM	1	92	0	0	0	202	3	0	5	0	10	0	0	0	0	0	313	
7:30 AM	7	135	0	0	0	163	2	0	6	0	21	0	0	0	0	0	334	
7:45 AM	7	84	0	0	0	158	5	0	5	0	9	0	0	0	0	0	268	1214
8:00 AM	5	58	0	0	0	135	3	0	2	0	11	0	0	0	0	0	214	1129
8:15 AM	8	50	0	0	0	131	0	0	1	0	7	0	0	0	0	0	197	1013
8:30 AM	4	67	0	0	0	128	1	0	0	0	10	0	0	0	0	0	210	889
8:45 AM	3	57	0	0	0	143	1	0	2	0	10	0	0	0	0	0	216	837

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	540	0	0	0	652	8	0	24	0	84	0	0	0	0	0	1336
Heavy Trucks	4	16	0		0	24	0		0	0	4		0	0	0		48
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

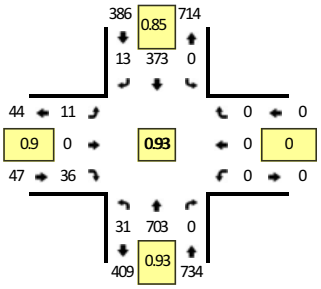
Type of peak hour being reported: Intersection Peak

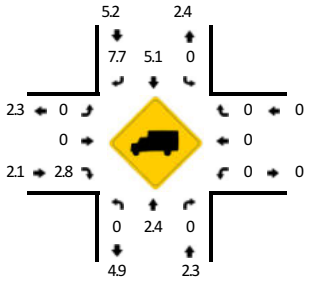
Method for determining peak hour: Total Entering Volume

LOCATION: Moody Pkwy -- Lake Joyce Rd
CITY/STATE: Moody, AL

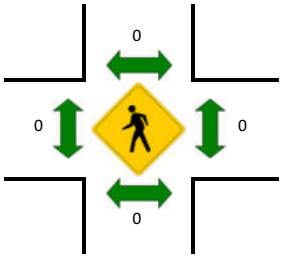
QC JOB #: 15768812
DATE: Wed, May 4 2022

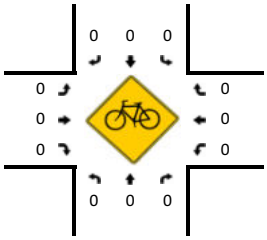
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

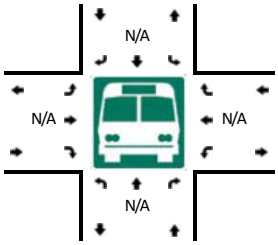


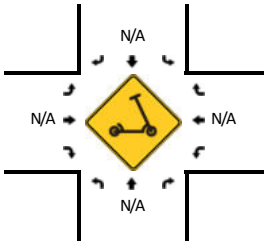


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Lake Joyce Rd (Eastbound)				Lake Joyce Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	167	0	0	0	111	1	0	3	0	4	0	0	0	0	0	289	
4:15 PM	11	150	0	0	0	86	3	0	1	0	5	0	0	0	0	0	256	
4:30 PM	11	149	0	0	0	94	7	0	2	0	2	0	0	0	0	0	265	
4:45 PM	14	153	0	0	0	102	4	0	1	0	7	0	0	0	0	0	281	1091
5:00 PM	6	169	0	0	0	81	1	0	1	0	7	0	0	0	0	0	265	1067
5:15 PM	6	181	0	0	0	111	3	0	4	0	9	0	0	0	0	0	314	1125
5:30 PM	11	187	0	0	0	89	4	0	4	0	9	0	0	0	0	0	304	1164
5:45 PM	8	166	0	0	0	92	5	0	2	0	11	0	0	0	0	0	284	1167

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	724	0	0	0	444	12	0	16	0	36	0	0	0	0	0	1256
Heavy Trucks	0	28	0		0	12	0		0	0	4		0	0	0		44
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: Moody Pkwy -- Washington Dr/Verbena Dr

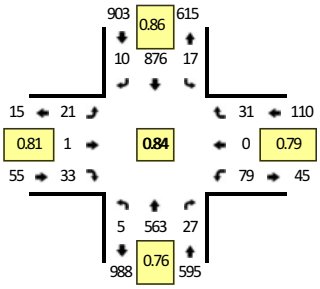
CITY/STATE: Moody, AL

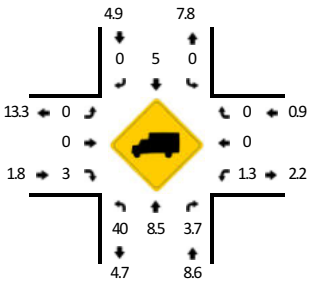
QC JOB #: 15768815

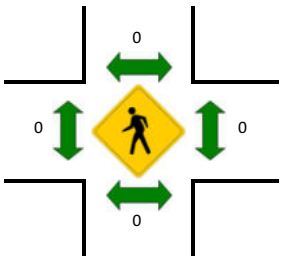
DATE: Wed, May 4 2022

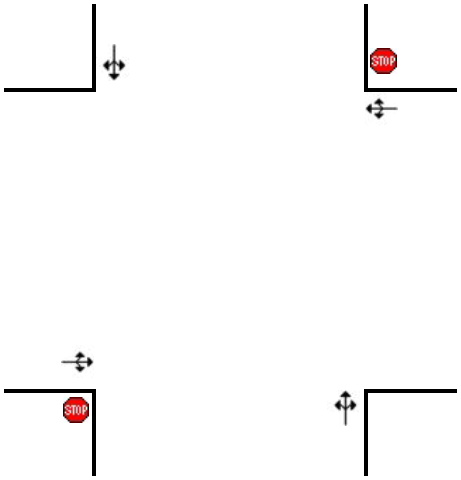
Peak-Hour: 7:00 AM -- 8:00 AM

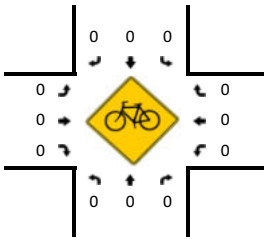
Peak 15-Min: 7:30 AM -- 7:45 AM

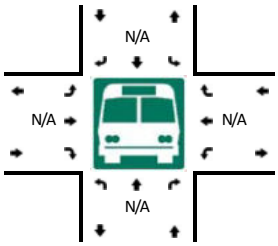


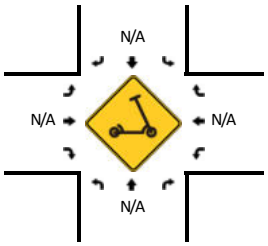












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Washington Dr/Verbena Dr (Eastbound)				Washington Dr/Verbena Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	29	1	0	2	127	0	0	0	0	2	0	11	0	3	0	175	
6:15 AM	1	44	2	0	1	185	0	0	2	0	6	0	15	0	1	0	257	
6:30 AM	2	59	2	0	1	208	2	0	3	0	6	0	12	0	4	0	299	
6:45 AM	1	72	2	0	1	208	0	0	2	1	8	0	15	0	5	0	315	1046
7:00 AM	2	103	7	0	3	212	0	0	6	1	9	0	20	0	6	0	369	1240
7:15 AM	0	152	10	0	2	202	1	0	6	0	11	0	27	0	8	0	419	1402
7:30 AM	1	190	6	0	4	253	7	0	6	0	7	0	12	0	11	0	497	1600
7:45 AM	2	118	4	0	8	209	2	0	3	0	6	0	20	0	6	0	378	1663
8:00 AM	5	81	5	0	4	183	1	0	0	1	6	0	13	0	3	0	302	1596
8:15 AM	2	72	5	0	0	167	0	0	1	2	6	0	10	0	4	0	269	1446
8:30 AM	1	90	3	0	0	135	0	0	2	0	4	0	7	0	4	0	246	1195
8:45 AM	1	77	3	0	1	181	0	0	1	0	4	0	9	0	1	0	278	1095
9:00 AM	2	86	1	0	1	170	0	0	0	0	4	0	8	0	1	0	273	1066
9:15 AM	3	77	6	0	0	162	3	0	3	0	3	0	4	0	1	0	262	1059
9:30 AM	1	81	5	0	3	90	1	0	1	0	1	0	8	0	2	0	193	1006
9:45 AM	0	78	4	0	1	112	0	0	0	0	2	0	4	1	2	0	204	932
10:00 AM	1	86	10	1	2	99	1	0	0	1	0	0	4	0	1	0	206	865
10:15 AM	1	90	6	0	4	124	1	0	1	0	2	0	10	0	3	0	242	845
10:30 AM	0	77	2	0	0	100	1	0	1	0	3	0	4	0	3	0	191	843
10:45 AM	0	84	8	0	1	104	0	0	0	0	1	0	6	0	5	0	209	848
11:00 AM	4	112	5	0	7	133	0	0	0	1	1	0	7	0	6	0	276	918
11:15 AM	1	99	7	0	0	102	1	0	2	0	1	0	4	0	3	0	220	896
11:30 AM	2	109	5	0	2	138	1	0	0	0	3	0	4	0	6	0	270	975
11:45 AM	5	116	12	0	1	141	0	0	0	2	4	0	9	2	1	0	293	1059
12:00 PM	1	117	9	0	4	143	2	0	1	0	1	0	13	1	2	0	294	1077
12:15 PM	3	125	6	0	1	148	1	0	2	1	5	0	7	0	4	0	303	1160
12:30 PM	4	129	5	0	3	122	0	0	1	1	5	0	8	1	1	0	280	1170
12:45 PM	2	125	6	0	1	114	2	0	1	0	3	0	6	0	3	0	263	1140
1:00 PM	3	146	6	0	5	107	2	0	0	0	1	0	3	0	3	0	276	1122
1:15 PM	4	126	8	0	4	110	0	0	0	0	2	0	10	0	3	0	267	1086
1:30 PM	1	161	9	0	1	107	0	0	0	0	0	0	11	0	4	0	294	1100
1:45 PM	2	149	8	1	1	115	1	0	1	0	3	0	5	1	4	0	291	1128
2:00 PM	0	143	9	0	1	144	1	0	3	0	1	0	4	0	5	0	311	1163
2:15 PM	2	147	8	0	3	155	2	0	1	0	4	0	8	0	2	0	332	1228
2:30 PM	5	183	9	0	3	124	1	0	5	1	0	0	4	0	6	0	341	1275
2:45 PM	2	211	10	0	5	136	5	0	1	0	3	0	4	0	2	0	379	1363
3:00 PM	3	163	12	0	10	177	7	0	4	0	2	0	11	0	5	0	394	1446
3:15 PM	5	164	8	0	5	177	4	0	1	1	8	0	8	1	7	0	389	1503

15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Washington Dr/Verbena Dr (Eastbound)				Washington Dr/Verbena Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:30 PM	3	174	8	0	3	135	4	0	1	0	1	0	4	0	4	0	337	1499
3:45 PM	3	167	11	0	7	143	1	0	3	1	3	0	7	1	5	0	352	1472
4:00 PM	0	177	16	0	2	152	4	0	0	0	8	0	6	1	7	0	373	1451
4:15 PM	8	188	9	0	6	104	0	0	1	0	2	0	9	1	2	0	330	1392
4:30 PM	5	176	21	0	5	124	0	0	2	0	1	0	6	1	11	0	352	1407
4:45 PM	8	197	9	0	3	125	3	0	0	0	4	0	2	2	6	0	359	1414
5:00 PM	6	193	16	0	2	129	4	0	1	1	4	0	5	1	3	0	365	1406
5:15 PM	5	234	27	0	4	145	1	0	4	0	3	0	11	0	9	0	443	1519
5:30 PM	3	191	20	0	4	136	1	0	1	0	6	0	14	1	2	0	379	1546
5:45 PM	7	196	15	0	3	127	2	0	1	0	7	0	6	1	3	0	368	1555
6:00 PM	6	186	20	0	4	126	0	0	1	1	6	0	11	0	4	0	365	1555
6:15 PM	11	139	8	0	4	106	3	0	2	0	5	0	5	0	4	0	287	1399
6:30 PM	5	148	9	0	4	85	2	0	0	0	5	0	11	0	3	0	272	1292
6:45 PM	8	128	14	0	3	81	2	0	0	0	6	0	5	0	4	0	251	1175
7:00 PM	4	114	12	0	3	66	1	0	1	0	3	0	6	2	1	0	213	1023
7:15 PM	2	118	10	0	0	50	0	0	0	2	2	0	6	0	3	0	193	929
7:30 PM	4	102	7	0	1	68	2	0	1	1	2	0	5	0	1	0	194	851
7:45 PM	4	118	5	0	1	61	3	0	4	0	5	0	3	0	2	0	206	806

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	760	24	0	16	1012	28	0	24	0	28	0	48	0	44	0	1988
Heavy Trucks	0	32	0		0	40	0		0	0	0		0	0	0		72
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

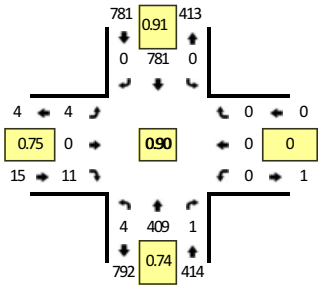
Type of peak hour being reported: Intersection Peak

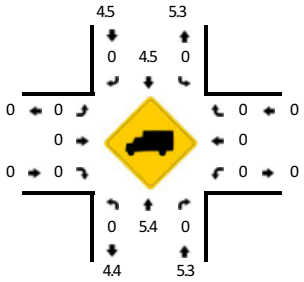
Method for determining peak hour: Total Entering Volume

LOCATION: Moody Pkwy -- Valleybend Ln
CITY/STATE: Moody, AL

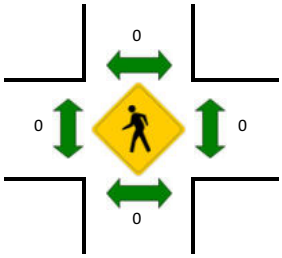
QC JOB #: 15768818
DATE: Wed, May 4 2022

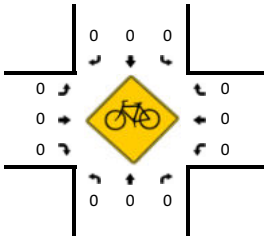
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

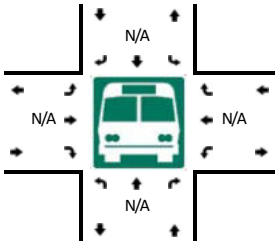


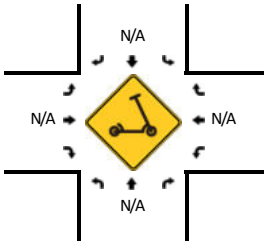


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Valleybend Ln (Eastbound)				Valleybend Ln (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	84	0	0	0	214	0	0	3	0	2	0	0	0	0	0	303	
7:15 AM	0	85	1	0	0	192	0	0	1	0	3	0	0	0	0	0	282	
7:30 AM	0	140	0	0	0	192	0	0	0	0	3	0	0	0	0	0	335	
7:45 AM	4	100	0	0	0	183	0	0	0	0	3	0	0	0	0	0	290	1210
8:00 AM	2	63	0	0	0	144	0	0	0	0	1	0	0	0	0	0	210	1117
8:15 AM	1	56	0	0	0	142	0	0	0	0	3	0	0	0	0	0	202	1037
8:30 AM	0	69	0	0	0	137	1	0	1	0	2	0	0	0	0	0	210	912
8:45 AM	1	65	0	0	0	157	0	0	0	0	0	0	0	0	0	0	223	845

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	560	0	0	0	768	0	0	0	0	12	0	0	0	0	0	1340
Heavy Trucks	0	12	0		0	28	0		0	0	0		0	0	0		40
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

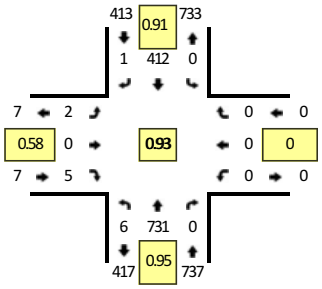
Type of peak hour being reported: Intersection Peak

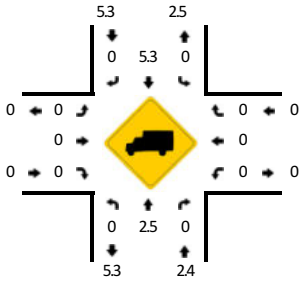
Method for determining peak hour: Total Entering Volume

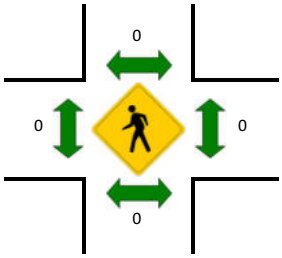
LOCATION: Moody Pkwy -- Valleybend Ln
CITY/STATE: Moody, AL

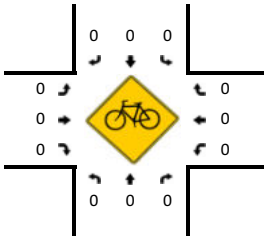
QC JOB #: 15768819
DATE: Wed, May 4 2022

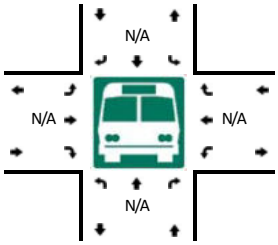
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

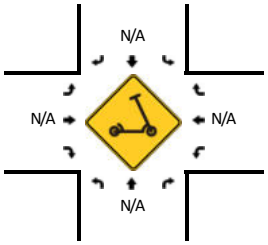












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Valleybend Ln (Eastbound)				Valleybend Ln (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	174	0	0	0	110	1	0	0	0	3	0	0	0	0	0	291	
4:15 PM	2	163	0	0	0	85	1	0	2	0	2	0	0	0	0	0	255	
4:30 PM	1	152	0	0	0	103	1	0	0	0	1	0	0	0	0	0	258	
4:45 PM	1	166	0	0	0	103	0	0	0	0	3	0	0	0	0	0	273	1077
5:00 PM	0	174	0	0	0	92	1	0	0	0	1	0	0	0	0	0	268	1054
5:15 PM	1	192	0	0	0	114	0	0	1	0	2	0	0	0	0	0	310	1109
5:30 PM	3	190	0	0	0	102	0	0	1	0	1	0	0	0	0	0	297	1148
5:45 PM	2	175	0	0	0	104	0	0	0	0	1	0	0	0	0	0	282	1157

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	768	0	0	0	456	0	0	4	0	8	0	0	0	0	0	1240
Heavy Trucks	0	28	0		0	16	0		0	0	0		0	0	0		44
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

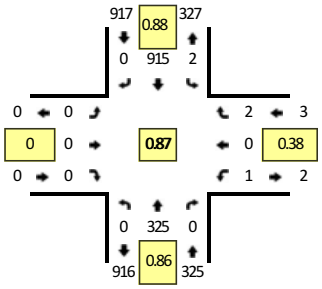
Type of peak hour being reported: Intersection Peak

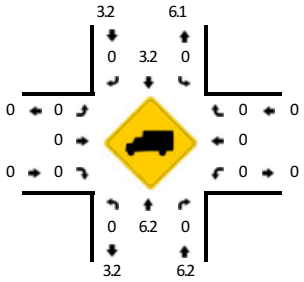
Method for determining peak hour: Total Entering Volume

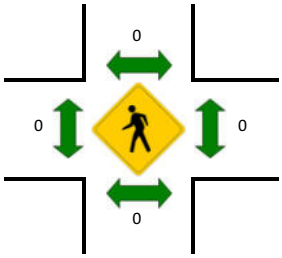
LOCATION: Moody Pkwy -- Bethel Rd
CITY/STATE: Moody, AL

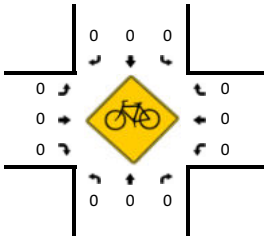
QC JOB #: 15768820
DATE: Wed, May 4 2022

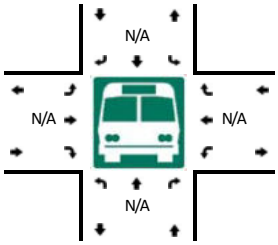
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:00 AM -- 7:15 AM

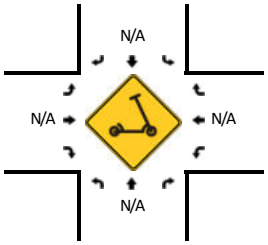












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Bethel Rd (Eastbound)				Bethel Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	95	0	0	0	261	0	0	0	0	0	0	1	0	0	0	357	
7:15 AM	0	64	0	0	0	244	0	0	0	0	0	0	0	0	0	0	308	
7:30 AM	0	85	0	0	1	223	0	0	0	0	0	0	0	0	2	0	311	
7:45 AM	0	81	0	0	1	187	0	0	0	0	0	0	0	0	0	0	269	1245
8:00 AM	0	59	0	0	0	155	0	0	0	0	0	0	1	0	0	0	215	1103
8:15 AM	0	60	0	0	0	133	0	0	0	0	0	0	0	0	0	0	193	988
8:30 AM	0	79	0	0	2	130	0	0	0	0	0	0	0	0	0	0	211	888
8:45 AM	0	62	0	0	1	148	0	1	0	0	0	0	0	0	1	0	213	832

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	380	0	0	0	1044	0	0	0	0	0	0	4	0	0	0	1428
Heavy Trucks	0	44	0		0	36	0		0	0	0		0	0	0		80
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

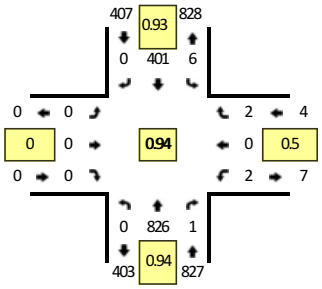
Report generated on 5/13/2022 12:04 PM

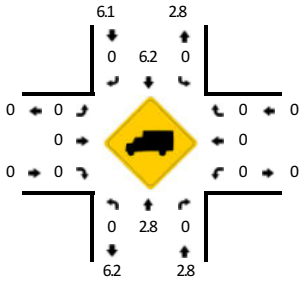
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

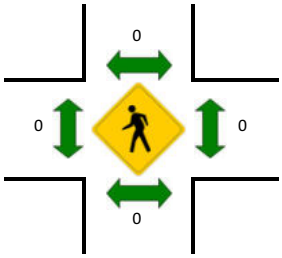
LOCATION: Moody Pkwy -- Bethel Rd | **QC JOB #:** 15768821
CITY/STATE: Moody, AL | **DATE:** Wed, May 4 2022

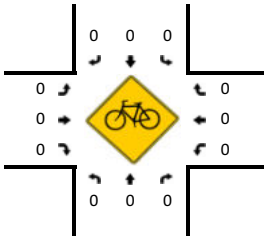
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

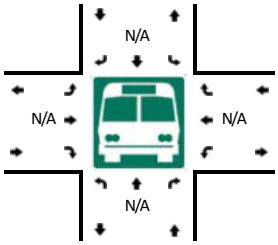


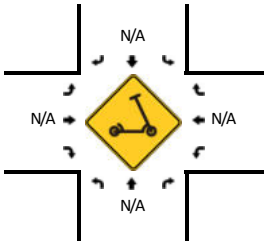


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				Bethel Rd (Eastbound)				Bethel Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	192	0	0	0	107	0	0	0	0	0	0	0	0	0	0	299	
4:15 PM	0	177	0	0	0	103	0	0	0	0	0	0	0	0	1	0	281	
4:30 PM	0	165	0	0	2	114	0	2	0	0	0	0	0	0	0	0	283	
4:45 PM	0	184	0	0	0	106	0	0	0	0	0	0	0	0	0	0	290	1153
5:00 PM	0	193	0	0	3	103	0	0	0	0	0	0	1	0	1	0	301	1155
5:15 PM	0	219	1	0	1	109	0	0	0	0	0	0	0	0	1	0	331	1205
5:30 PM	0	211	0	0	0	84	0	0	0	0	0	0	1	0	0	0	296	1218
5:45 PM	0	203	0	0	2	105	0	0	0	0	0	0	0	0	0	0	310	1238

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	876	4	0	4	436	0	0	0	0	0	0	0	0	4	0	1324
Heavy Trucks	0	32	0		0	20	0		0	0	0		0	0	0		52
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

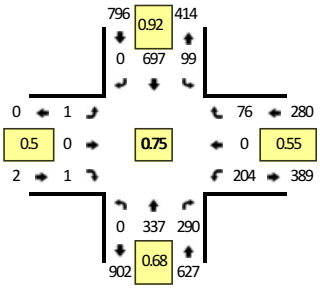
Type of peak hour being reported: Intersection Peak

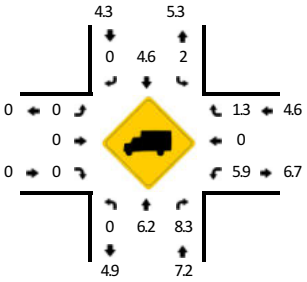
Method for determining peak hour: Total Entering Volume

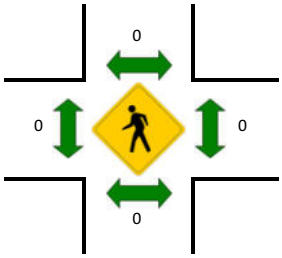
LOCATION: Moody Pkwy -- High School Dr
CITY/STATE: Moody, AL

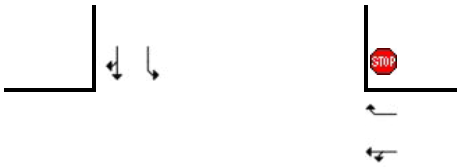
QC JOB #: 15768822
DATE: Wed, May 4 2022

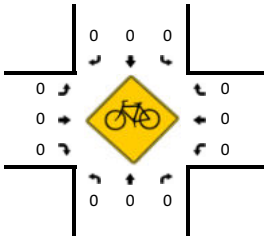
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:30 AM -- 7:45 AM

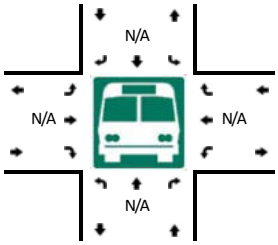


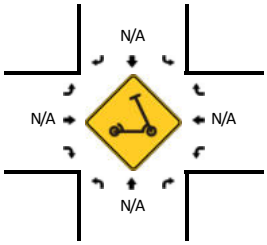












15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				High School Dr (Eastbound)				High School Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	27	2	0	2	120	0	0	0	0	0	0	2	0	0	0	153	
6:15 AM	0	30	13	0	4	177	0	0	0	0	0	0	4	0	3	0	231	
6:30 AM	0	37	25	0	7	178	0	0	0	0	0	0	19	0	3	0	269	
6:45 AM	0	52	9	0	5	192	0	0	0	0	0	0	7	0	1	0	266	919
7:00 AM	0	81	32	0	24	192	0	0	1	0	0	0	7	0	2	0	339	1105
7:15 AM	0	77	67	0	21	162	0	0	0	0	0	0	45	0	9	0	381	1255
7:30 AM	0	111	121	0	32	174	0	0	0	0	1	0	94	0	34	0	567	1553
7:45 AM	0	68	70	0	22	169	0	0	0	0	0	0	58	0	31	0	418	1705
8:00 AM	0	59	12	0	6	138	0	0	0	0	0	0	10	0	6	0	231	1597
8:15 AM	0	56	10	0	3	140	0	1	0	0	0	0	6	0	0	0	216	1432
8:30 AM	0	68	18	0	2	136	0	0	0	0	0	0	8	0	1	0	233	1098
8:45 AM	0	64	6	0	2	153	0	0	0	0	0	0	7	0	2	0	234	914
9:00 AM	1	53	7	0	0	157	0	0	0	0	0	0	3	0	0	0	221	904
9:15 AM	0	57	19	0	3	125	0	0	0	0	0	0	7	0	2	0	213	901
9:30 AM	1	62	16	0	4	87	0	0	0	0	0	0	10	0	4	0	184	852
9:45 AM	0	64	3	0	1	95	0	0	0	0	0	0	3	0	3	0	169	787
10:00 AM	0	70	7	0	1	90	0	0	0	0	0	0	6	0	1	0	175	741
10:15 AM	0	80	4	0	4	112	0	0	0	0	0	0	2	0	1	0	203	731
10:30 AM	0	71	7	0	1	104	0	0	0	0	0	0	1	0	4	0	188	735
10:45 AM	0	72	4	0	0	97	0	0	0	0	0	0	3	0	1	0	177	743
11:00 AM	1	84	9	0	3	105	0	0	0	0	0	0	7	0	2	0	211	779
11:15 AM	0	95	7	0	3	86	0	1	0	0	0	0	6	0	4	0	202	778
11:30 AM	0	89	6	0	4	111	0	0	0	0	0	0	9	0	2	0	221	811
11:45 AM	0	85	11	0	2	103	0	0	0	0	0	0	10	0	3	0	214	848
12:00 PM	0	99	16	0	2	108	0	0	0	0	0	0	7	0	1	0	233	870
12:15 PM	0	95	5	0	1	106	0	1	0	0	0	0	15	0	2	0	225	893
12:30 PM	0	92	9	0	2	111	0	0	0	0	0	0	4	0	2	0	220	892
12:45 PM	0	109	9	0	4	108	0	0	0	0	0	0	7	0	1	0	238	916
1:00 PM	0	106	16	0	3	90	0	0	0	0	0	0	9	0	4	0	228	911
1:15 PM	0	112	4	0	3	82	0	0	0	0	1	0	13	0	2	0	217	903
1:30 PM	1	129	3	0	3	113	0	0	0	0	0	0	8	0	1	0	258	941
1:45 PM	0	137	10	0	1	76	0	0	0	0	2	0	2	0	3	0	231	934
2:00 PM	1	121	14	0	5	112	0	0	0	0	0	0	23	0	12	0	288	994
2:15 PM	0	120	16	0	5	111	0	0	0	0	0	0	31	0	6	0	289	1066
2:30 PM	0	144	21	0	5	80	0	0	0	0	0	0	24	0	9	0	283	1091
2:45 PM	0	160	51	0	15	115	0	0	0	0	0	0	28	0	5	0	374	1234
3:00 PM	0	146	16	0	3	78	0	0	0	0	0	0	131	0	48	0	422	1368
3:15 PM	0	150	9	0	2	110	0	0	0	0	0	0	66	0	30	0	367	1446

15-Min Count Period Beginning At	Moody Pkwy (Northbound)				Moody Pkwy (Southbound)				High School Dr (Eastbound)				High School Dr (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
3:30 PM	0	162	12	0	3	110	0	0	0	0	0	0	17	0	7	0	311	1474
3:45 PM	0	142	15	0	4	121	0	0	0	0	1	0	20	0	13	0	316	1416
4:00 PM	0	171	14	0	8	106	0	0	0	0	0	0	19	0	9	0	327	1321
4:15 PM	0	157	8	0	0	85	0	0	0	0	0	0	9	0	5	0	264	1218
4:30 PM	0	150	17	0	3	103	0	0	0	0	0	0	9	0	3	0	285	1192
4:45 PM	0	161	13	0	5	101	0	0	0	0	0	0	16	0	6	0	302	1178
5:00 PM	0	164	22	0	7	83	0	0	0	0	0	0	23	0	11	0	310	1161
5:15 PM	0	184	22	0	7	109	0	0	0	0	0	0	23	0	8	0	353	1250
5:30 PM	0	184	10	0	2	101	0	0	0	0	0	0	19	0	9	0	325	1290
5:45 PM	0	170	6	0	2	106	0	0	0	0	0	0	13	0	4	0	301	1289
6:00 PM	0	172	4	0	0	108	0	0	0	0	0	0	11	0	5	0	300	1279
6:15 PM	0	142	4	0	0	91	0	0	0	0	0	0	6	0	5	0	248	1174
6:30 PM	0	121	0	0	0	74	0	0	0	0	0	0	9	0	1	0	205	1054
6:45 PM	0	113	3	0	0	68	0	0	0	0	0	0	0	0	2	0	186	939
7:00 PM	0	112	1	0	0	59	0	0	0	0	0	0	2	0	0	0	174	813
7:15 PM	0	104	3	1	0	47	0	0	0	0	0	0	0	0	0	0	155	720
7:30 PM	0	98	2	0	0	51	0	0	0	0	0	0	2	0	2	0	155	670
7:45 PM	0	119	6	0	0	65	0	0	0	0	0	0	1	0	0	0	191	675

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	444	484	0	128	696	0	0	0	0	4	0	376	0	136	0	2268
Heavy Trucks	0	20	32		4	20	0		0	0	0		8	0	0		84
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 5/13/2022 12:04 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of report: Tube Count - Volume Data

LOCATION: Moody Pkwy approx. 1200' south of James Taylor Rd
QC JOB #: 15768816
SPECIFIC LOCATION:
DIRECTION: NB, SB
CITY/STATE: Moody, AL
DATE: May 4 2022 - May 4 2022

Start Time	Mon	Tue	Wed 4 May 22	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			59			59			59	
01:00 AM			30			30			30	
02:00 AM			35			35			35	
03:00 AM			61			61			61	
04:00 AM			161			161			161	
05:00 AM			422			422			422	
06:00 AM			879			879			879	
07:00 AM			**1404**			**1404**			**1404**	
08:00 AM			891			891			891	
09:00 AM			796			796			796	
10:00 AM			736			736			736	
11:00 AM			838			838			838	
12:00 PM			907			907			907	
01:00 PM			933			933			933	
02:00 PM			1177			1177			1177	
03:00 PM			**1262**			**1262**			**1262**	
04:00 PM			292			292			292	
05:00 PM			0			0			0	
06:00 PM			0			0			0	
07:00 PM			763			763			763	
08:00 PM			565			565			565	
09:00 PM			389			389			389	
10:00 PM			190			190			190	
11:00 PM			109			109			109	
Day Total			12899			12899			12899	
% Weekday Average			100%							
% Week Average			100%			100%				
AM Peak Volume			7:00 AM 1404			7:00 AM 1404			7:00 AM 1404	
PM Peak Volume			3:00 PM 1262			3:00 PM 1262			3:00 PM 1262	

Comments:

Report generated on 5/12/2022 8:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: Moody Pkwy approx. 1200' south of James Taylor Rd (combined volume) **QC JOB #:** 15768823

SPECIFIC LOCATION: **DIRECTION:** NB, SB

CITY/STATE: Moody, AL **DATE:** May 4 2022 - May 4 2022

Start Time	Mon	Tue	Wed 4 May 22	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM										
01:00 AM										
02:00 AM										
03:00 AM										
04:00 AM										
05:00 AM										
06:00 AM										
07:00 AM										
08:00 AM										
09:00 AM										
10:00 AM										
11:00 AM										
12:00 PM										
01:00 PM										
02:00 PM										
03:00 PM										
04:00 PM			847			847			847	
05:00 PM			**1235**			**1235**			**1235**	
06:00 PM			930			930			930	
07:00 PM										
08:00 PM										
09:00 PM										
10:00 PM										
11:00 PM										
Day Total			3012			3012			3012	
% Weekday Average			100%							
% Week Average			100%			100%				
AM Peak Volume			12:00 AM			12:00 AM			12:00 AM	
PM Peak Volume			5:00 PM 1235			5:00 PM 1235			5:00 PM 1235	

Comments:

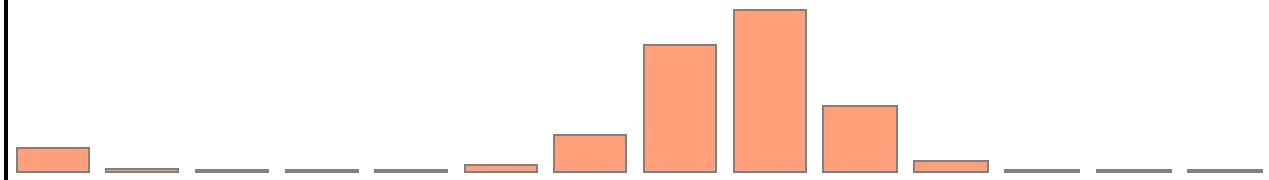
Report generated on 5/12/2022 8:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Speed Data

LOCATION: Moody Pkwy approx. 1200' south of James Taylor Rd
QC JOB #: 15768816
SPECIFIC LOCATION:
DIRECTION: NB, SB
CITY/STATE: Moody, AL
DATE: May 4 2022

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	0	0	0	0	0	5	18	17	13	6	0	0	0	59	46-55	35
01:00 AM	0	0	0	0	0	0	4	9	13	2	2	0	0	0	30	46-55	22
02:00 AM	0	0	0	0	0	1	3	6	18	6	1	0	0	0	35	46-55	24
03:00 AM	1	0	0	0	0	0	2	13	21	18	4	1	1	0	61	51-60	39
04:00 AM	1	0	1	0	0	0	3	34	57	52	7	3	**2**	**1**	161	51-60	109
05:00 AM	5	0	0	0	0	0	8	62	189	135	22	1	0	0	422	51-60	324
06:00 AM	29	2	1	0	0	0	20	139	**443**	**215**	27	2	1	0	879	51-60	658
07:00 AM	**126**	**15**	1	0	9	**36**	**193**	**525**	391	103	5	0	0	0	**1404**	46-55	916
08:00 AM	30	2	0	**8**	**11**	8	26	170	396	192	**41**	**6**	0	1	891	51-60	588
09:00 AM	44	4	0	0	0	5	29	192	354	146	18	3	0	1	796	46-55	546
10:00 AM	28	1	**2**	0	4	15	57	219	281	110	19	0	0	0	736	46-55	500
11:00 AM	47	1	0	0	2	4	52	206	325	174	25	2	0	0	838	46-55	531
12:00 PM	52	2	0	0	1	3	57	241	402	126	19	**4**	0	0	907	46-55	643
01:00 PM	64	5	3	**4**	3	13	83	258	317	**153**	**26**	3	1	0	933	46-55	575
02:00 PM	81	**8**	0	1	**4**	25	**153**	**460**	330	101	12	2	0	0	1177	46-55	790
03:00 PM	**96**	4	0	1	3	**27**	146	449	**404**	117	15	0	0	0	**1262**	46-55	853
04:00 PM	46	3	**5**	0	1	0	26	90	101	17	2	0	0	1	292	46-55	191
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1-10	0
07:00 PM	38	4	2	1	2	13	66	234	305	83	13	2	0	0	763	46-55	539
08:00 PM	13	0	0	4	2	20	73	207	165	69	7	3	**2**	0	565	46-55	372
09:00 PM	4	0	0	0	0	2	38	129	140	58	15	3	0	0	389	46-55	269
10:00 PM	4	0	0	0	0	0	16	52	77	31	10	0	0	0	190	46-55	129
11:00 PM	1	0	1	0	1	0	6	35	36	20	6	1	0	**2**	109	46-55	71
Day Total	710	51	16	19	43	172	1066	3748	4782	1941	302	36	7	6	12899	46-55	8530
Percent	5.5%	0.4%	0.1%	0.1%	0.3%	1.3%	8.3%	29.1%	37.1%	15%	2.3%	0.3%	0.1%	0%			
AM Peak Volume	7:00 AM 126	7:00 AM 15	10:00 AM 2	8:00 AM 8	8:00 AM 11	7:00 AM 36	7:00 AM 193	7:00 AM 525	6:00 AM 443	6:00 AM 215	8:00 AM 41	8:00 AM 6	4:00 AM 2	4:00 AM 1	7:00 AM 1404		
PM Peak Volume	3:00 PM 96	2:00 PM 8	4:00 PM 5	1:00 PM 4	2:00 PM 4	3:00 PM 27	2:00 PM 153	2:00 PM 460	3:00 PM 404	1:00 PM 153	1:00 PM 26	12:00 PM 4	8:00 PM 2	11:00 PM 2	3:00 PM 1262		



Comments:

Report generated on 5/12/2022 8:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

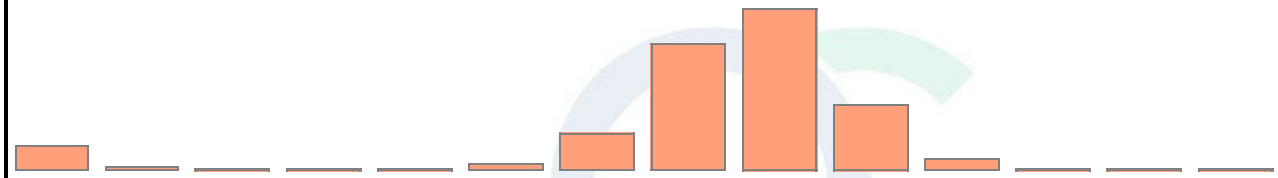
Type of report: Tube Count - Speed Data

SUMMARY - Tube Count - Speed Data

LOCATION: Moody Pkwy approx. 1200' south of James Taylor Rd
QC JOB #: 15768816
SPECIFIC LOCATION:
DIRECTION: NB, SB
CITY/STATE: Moody, AL
DATE: May 4 2022

Speed Range	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	710	51	16	19	43	172	1066	3748	4782	1941	302	36	7	6	12899	46-55	8530
Percent	5.5%	0.4%	0.1%	0.1%	0.3%	1.3%	8.3%	29.1%	37.1%	15%	2.3%	0.3%	0.1%	0%			
Cumulative Percent	5.5%	5.9%	6%	6.2%	6.5%	7.8%	16.1%	45.2%	82.2%	97.3%	99.6%	99.9%	100%	100%			

ADT
12899



85th Percentile: 56 MPH
Mean Speed(Average): 50 MPH
Median: 51 MPH
Mode: 53 MPH

Comments:

Report generated on 5/12/2022 8:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Vehicle Classification Data

LOCATION: Moody Pkwy approx. 1200' south of James Taylor Rd
QC JOB #: 15768816
SPECIFIC LOCATION:
DIRECTION: NB, SB
CITY/STATE: Moody, AL
DATE: May 4 2022

Start Time	Motorcycles	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM	0	31	19	2	6	0	0	0	1	0	0	0	0	0	59
01:00 AM	0	24	6	0	0	0	0	0	0	0	0	0	0	0	30
02:00 AM	0	21	11	0	1	0	0	1	1	0	0	0	0	0	35
03:00 AM	0	35	22	0	2	0	0	0	1	0	0	0	0	1	61
04:00 AM	0	95	50	0	12	2	0	0	1	0	0	0	0	1	161
05:00 AM	2	223	131	5	46	4	0	5	1	0	0	0	0	5	422
06:00 AM	7	510	218	10	**80**	6	1	13	6	0	0	0	0	28	879
07:00 AM	**41**	**749**	**340**	**31**	73	**9**	**5**	**28**	4	**3**	0	0	0	**121**	**1404**
08:00 AM	5	511	250	10	58	3	1	17	6	2	0	0	0	28	891
09:00 AM	14	436	207	12	56	4	2	18	4	0	0	0	0	43	796
10:00 AM	9	398	208	9	58	2	1	16	**7**	1	0	0	0	27	736
11:00 AM	10	444	236	9	56	6	1	24	4	1	0	0	0	47	838
12:00 PM	6	486	265	5	60	7	**4**	19	2	**2**	0	0	0	51	907
01:00 PM	10	519	239	8	55	**8**	3	26	2	0	0	0	0	63	933
02:00 PM	**20**	661	274	22	**74**	8	4	**33**	4	1	0	**1**	0	75	1177
03:00 PM	17	**698**	**323**	**30**	60	7	4	22	4	1	0	0	0	**96**	**1262**
04:00 PM	10	145	73	4	13	2	0	2	1	0	0	0	0	42	292
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
06:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:00 PM	9	462	200	3	33	2	2	10	4	0	0	0	0	38	763
08:00 PM	7	389	120	2	23	4	1	2	2	0	0	0	0	15	565
09:00 PM	3	271	97	0	10	0	0	0	4	0	0	0	0	4	389
10:00 PM	0	134	38	0	5	0	0	3	**6**	0	0	0	0	4	190
11:00 PM	1	75	21	1	6	0	0	0	3	0	**1**	0	0	1	109
Day Total	171	7317	3348	163	787	74	29	239	68	11	1	1	0	690	12899
Percent	1.3%	56.7%	26%	1.3%	6.1%	0.6%	0.2%	1.9%	0.5%	0.1%	0%	0%	0%	5.3%	
ADT 12899															
AM Peak	7:00 AM	7:00 AM	7:00 AM	7:00 AM	6:00 AM	7:00 AM	7:00 AM	7:00 AM	10:00 AM	7:00 AM	12:00 AM	12:00 AM	12:00 AM	7:00 AM	7:00 AM
Volume	41	749	340	31	80	9	5	28	7	3	0	0	0	121	1404
PM Peak	2:00 PM	3:00 PM	3:00 PM	3:00 PM	2:00 PM	1:00 PM	12:00 PM	2:00 PM	10:00 PM	12:00 PM	11:00 PM	2:00 PM	12:00 PM	3:00 PM	3:00 PM
Volume	20	698	323	30	74	8	4	33	6	2	1	1	0	96	1262

Comments:

Report generated on 5/12/2022 8:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Vehicle Classification Data

SUMMARY - Tube Count - Vehicle Classification Data

LOCATION: Moody Pkwy approx. 1200' south of James Taylor Rd
QC JOB #: 15768816
SPECIFIC LOCATION:
DIRECTION: NB, SB
CITY/STATE: Moody, AL
DATE: May 4 2022

	Motorcycles	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
Grand Total	171	7317	3348	163	787	74	29	239	68	11	1	1	0	690	12899
Percent	1.3%	56.7%	26%	1.3%	6.1%	0.6%	0.2%	1.9%	0.5%	0.1%	0%	0%	0%	5.3%	
ADT 12899															

Comments:

Report generated on 5/12/2022 8:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: Moody Pkwy approx. 400' north of Bethel Rd
QC JOB #: 15768817
SPECIFIC LOCATION:
DIRECTION: NB, SB
CITY/STATE: Moody, AL
DATE: May 4 2022 - May 4 2022

Start Time	Mon	Tue	Wed 4 May 22	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			70			70			70	
01:00 AM			26			26			26	
02:00 AM			47			47			47	
03:00 AM			76			76			76	
04:00 AM			176			176			176	
05:00 AM			476			476			476	
06:00 AM			964			964			964	
07:00 AM			**1183**			**1183**			**1183**	
08:00 AM			831			831			831	
09:00 AM			696			696			696	
10:00 AM			673			673			673	
11:00 AM			765			765			765	
12:00 PM			829			829			829	
01:00 PM			861			861			861	
02:00 PM			981			981			981	
03:00 PM			1126			1126			1126	
04:00 PM			1110			1110			1110	
05:00 PM			**1164**			**1164**			**1164**	
06:00 PM			845			845			845	
07:00 PM			621			621			621	
08:00 PM			501			501			501	
09:00 PM			336			336			336	
10:00 PM			196			196			196	
11:00 PM			103			103			103	
Day Total			14656			14656			14656	
% Weekday Average			100%							
% Week Average			100%			100%				
AM Peak Volume			7:00 AM 1183			7:00 AM 1183			7:00 AM 1183	
PM Peak Volume			5:00 PM 1164			5:00 PM 1164			5:00 PM 1164	

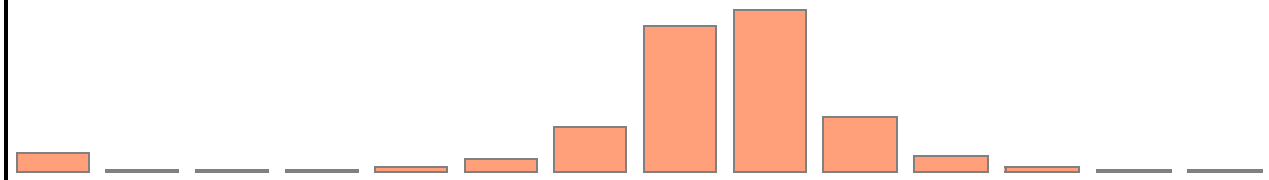
Comments:

Report generated on 5/10/2022 3:55 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Speed Data

LOCATION: Moody Pkwy approx. 400' north of Bethel Rd
QC JOB #: 15768817
SPECIFIC LOCATION:
DIRECTION: NB, SB
CITY/STATE: Moody, AL
DATE: May 4 2022

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
12:00 AM	0	0	0	0	0	1	5	15	22	21	4	2	0	0	70	51-60	43
01:00 AM	0	0	0	0	0	0	3	9	10	2	0	2	0	0	26	46-55	19
02:00 AM	1	0	0	0	0	0	3	17	17	6	1	2	0	0	47	46-55	34
03:00 AM	0	0	0	0	0	0	5	19	26	19	4	1	1	1	76	46-55	45
04:00 AM	0	0	**1**	1	0	1	10	43	50	38	22	6	**3**	1	176	46-55	93
05:00 AM	1	0	0	0	0	2	15	84	195	116	46	12	2	**3**	476	51-60	311
06:00 AM	21	0	0	0	0	6	73	279	357	**174**	**49**	3	1	1	964	46-55	636
07:00 AM	**32**	0	0	**3**	**5**	**35**	**117**	**368**	**425**	145	45	8	0	0	**1183**	46-55	793
08:00 AM	19	0	0	0	0	5	46	203	328	170	38	**20**	0	2	831	46-55	531
09:00 AM	23	**1**	1	0	1	5	22	151	291	143	47	8	3	0	696	46-55	442
10:00 AM	16	0	0	0	3	0	24	177	297	101	47	6	0	2	673	46-55	474
11:00 AM	26	0	1	0	3	4	37	191	342	124	31	5	0	1	765	46-55	533
12:00 PM	35	1	0	0	2	10	69	280	317	90	18	5	**2**	0	829	46-55	597
01:00 PM	31	0	1	2	2	9	66	280	345	**98**	20	6	1	0	861	46-55	625
02:00 PM	46	1	1	1	1	27	109	381	319	69	**21**	3	0	**2**	981	46-55	700
03:00 PM	68	2	1	3	13	63	153	390	334	73	20	4	1	1	1126	46-55	724
04:00 PM	43	0	1	1	4	22	121	**445**	**380**	71	19	3	0	0	1110	46-55	825
05:00 PM	**101**	**4**	3	**14**	**52**	**118**	**251**	366	197	45	10	2	1	0	**1164**	41-50	617
06:00 PM	75	3	**12**	10	19	34	112	225	274	52	19	**9**	1	0	845	46-55	499
07:00 PM	14	0	0	0	1	10	79	257	196	46	13	2	2	1	621	46-55	453
08:00 PM	13	0	0	1	1	12	45	211	173	32	8	5	0	0	501	46-55	384
09:00 PM	3	0	0	0	0	5	34	137	124	27	3	2	1	0	336	46-55	261
10:00 PM	0	0	0	0	1	5	6	69	89	22	2	1	1	0	196	46-55	158
11:00 PM	0	0	0	0	0	0	8	34	37	18	5	1	0	0	103	46-55	71
Day Total	568	12	22	36	108	374	1413	4631	5145	1702	492	118	20	15	14656	46-55	9776
Percent	3.9%	0.1%	0.2%	0.2%	0.7%	2.6%	9.6%	31.6%	35.1%	11.6%	3.4%	0.8%	0.1%	0.1%			
																	
AM Peak Volume	7:00 AM 32	9:00 AM 1	4:00 AM 1	7:00 AM 3	7:00 AM 5	7:00 AM 35	7:00 AM 117	7:00 AM 368	7:00 AM 425	6:00 AM 174	6:00 AM 49	8:00 AM 20	4:00 AM 3	5:00 AM 3	7:00 AM 1183		
PM Peak Volume	5:00 PM 101	5:00 PM 4	6:00 PM 12	5:00 PM 14	5:00 PM 52	5:00 PM 118	5:00 PM 251	4:00 PM 445	4:00 PM 380	1:00 PM 98	2:00 PM 21	6:00 PM 9	12:00 PM 2	2:00 PM 2	5:00 PM 1164		

Comments:

Report generated on 5/10/2022 3:55 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Speed Data

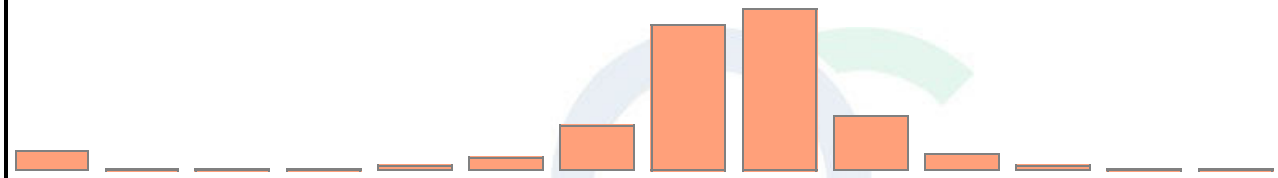
SUMMARY - Tube Count - Speed Data

LOCATION: Moody Pkwy approx. 400' north of Bethel Rd
SPECIFIC LOCATION:
CITY/STATE: Moody, AL

QC JOB #: 15768817
DIRECTION: NB, SB
DATE: May 4 2022

Speed Range	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total	Pace Speed	Number in Pace
Grand Total	568	12	22	36	108	374	1413	4631	5145	1702	492	118	20	15	14656	46-55	9776
Percent	3.9%	0.1%	0.2%	0.2%	0.7%	2.6%	9.6%	31.6%	35.1%	11.6%	3.4%	0.8%	0.1%	0.1%			
Cumulative Percent	3.9%	4%	4.1%	4.4%	5.1%	7.6%	17.3%	48.9%	84%	95.6%	99%	99.8%	99.9%	100%			

ADT
14656



85th Percentile: 56 MPH
Mean Speed(Average): 50 MPH
Median: 51 MPH
Mode: 53 MPH

Comments:

Report generated on 5/10/2022 3:55 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Vehicle Classification Data

LOCATION: Moody Pkwy approx. 400' north of Bethel Rd
QC JOB #: 15768817
SPECIFIC LOCATION:
DIRECTION: NB, SB
CITY/STATE: Moody, AL
DATE: May 4 2022

Start Time	Motorcycles	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
12:00 AM	0	36	26	2	5	0	0	0	1	0	0	0	0	0	70
01:00 AM	0	20	5	0	1	0	0	0	0	0	0	0	0	0	26
02:00 AM	0	27	16	0	2	0	0	1	0	0	0	0	0	1	47
03:00 AM	0	49	16	0	9	0	0	1	1	0	0	0	0	0	76
04:00 AM	0	97	55	1	20	0	0	1	2	0	0	0	0	0	176
05:00 AM	2	256	133	6	72	3	0	3	0	0	0	0	0	1	476
06:00 AM	**5**	569	255	4	**93**	**8**	0	6	4	0	0	0	0	20	964
07:00 AM	3	**766**	**288**	5	70	2	0	7	**8**	**2**	0	0	0	**32**	**1183**
08:00 AM	2	490	238	6	56	2	0	11	5	2	0	0	0	19	831
09:00 AM	2	401	166	**8**	72	6	0	**14**	4	0	0	0	0	23	696
10:00 AM	5	397	177	6	51	4	0	11	5	1	0	0	0	16	673
11:00 AM	4	444	216	8	49	5	**2**	8	3	0	0	0	0	26	765
12:00 PM	3	499	205	8	54	**8**	0	11	**5**	**1**	0	0	0	35	829
01:00 PM	4	514	231	8	54	4	0	11	4	1	0	0	0	30	861
02:00 PM	9	602	236	**11**	58	6	**1**	7	4	0	0	0	0	47	981
03:00 PM	7	650	289	8	**85**	4	1	11	3	0	**1**	0	0	67	1126
04:00 PM	3	654	**320**	5	73	2	0	7	2	0	0	0	0	44	1110
05:00 PM	**10**	**678**	284	2	85	5	1	11	0	0	0	0	0	**88**	**1164**
06:00 PM	5	520	197	2	48	0	1	**13**	2	0	0	0	0	57	845
07:00 PM	2	397	166	1	34	1	0	4	2	0	0	0	0	14	621
08:00 PM	1	348	120	0	18	0	0	1	0	0	0	0	0	13	501
09:00 PM	1	240	76	0	14	0	0	1	1	0	0	0	0	3	336
10:00 PM	4	150	32	0	3	0	0	5	2	0	0	0	0	0	196
11:00 PM	0	82	19	0	2	0	0	0	0	0	0	0	0	0	103
Day Total	72	8886	3766	91	1028	60	6	145	58	7	1	0	0	536	14656
Percent	0.5%	60.6%	25.7%	0.6%	7%	0.4%	0%	1%	0.4%	0%	0%	0%	0%	3.7%	
ADT 14656															
AM Peak	6:00 AM	7:00 AM	7:00 AM	9:00 AM	6:00 AM	6:00 AM	11:00 AM	9:00 AM	7:00 AM	7:00 AM	12:00 AM	12:00 AM	12:00 AM	7:00 AM	7:00 AM
Volume	5	766	288	8	93	8	2	14	8	2	0	0	0	32	1183
PM Peak	5:00 PM	5:00 PM	4:00 PM	2:00 PM	3:00 PM	12:00 PM	2:00 PM	6:00 PM	12:00 PM	12:00 PM	3:00 PM	12:00 PM	12:00 PM	5:00 PM	5:00 PM
Volume	10	678	320	11	85	8	1	13	5	1	1	0	0	88	1164

Comments:

Report generated on 5/10/2022 3:55 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Vehicle Classification Data

SUMMARY - Tube Count - Vehicle Classification Data

LOCATION: Moody Pkwy approx. 400' north of Bethel Rd
SPECIFIC LOCATION:
CITY/STATE: Moody, AL

QC JOB #: 15768817
DIRECTION: NB, SB
DATE: May 4 2022

	Motorcycles	Cars & Trailer	2 Axle Long	Buses	2 Axle 6 Tire	3 Axle Single	4 Axle Single	<5 Axle Double	5 Axle Double	>6 Axle Double	<6 Axle Multi	6 Axle Multi	>6 Axle Multi	Not Classified	Total
Grand Total	72	8886	3766	91	1028	60	6	145	58	7	1	0	0	536	14656
Percent	0.5%	60.6%	25.7%	0.6%	7%	0.4%	0%	1%	0.4%	0%	0%	0%	0%	3.7%	
ADT 14656															

Comments:

Report generated on 5/10/2022 3:55 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

SAIN ASSOCIATES

CELEBRATING 50 YEARS

Appendix B – Level of Service Description

Levels of Service
Signalized Intersections

Level of service criteria for signalized intersections is defined in terms of *delay*. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period.

Level of service A describes operations with very low delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of service B describes operations with delay in the range of > 10 to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level of service C describes operations with delay in the range of > 20 to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level of service D describes operations with delay in the range of > 35 to 55 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high vehicle/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level of service E describes operations with delay in the range of > 55 to 80 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high vehicle/capacity ratios. Individual cycle failures are frequent occurrences.

Level of service F describes operations with delay in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over saturation, i.e., when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Levels of Service
Unsignalized Intersections

Level of service criteria for unsignalized intersections is stated in terms of average control delay. Control delay is defined as the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The criteria for each level of service are cited in the table below.

Level of Service	Average Control Delay (seconds/vehicle)
A	0 - 10
B	> 10 – 15
C	> 15 – 25
D	> 25 – 35
E	> 35 – 50
F	> 50

Levels of Service
Daily Volume

The criteria for daily level of service are derived from ALDOT defined roadway capacities for urban 2-lane and 3-lane arterials and are cited in the table below.

Level of Service	Daily Service Volume	
	2-lane	3-lane
A	6,500	8,200
B	9,400	11,600
C	11,600	14,400
D	14,000	17,500
E	18,700	23,300
F	> 18,700	> 23,300

Levels of Service: Unsignalized Intersections

Level of service criteria for unsignalized intersections is stated in terms of average control delay. Control delay is defined as the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The criteria for each level of service are cited in the table below.

Level of Service	Average Control Delay (seconds/vehicle)
A	0 - 10
B	> 10 – 15
C	> 15 – 25
D	> 25 – 35
E	> 35 – 50
F	> 50

SAIN ASSOCIATES

CELEBRATING 50 YEARS

Appendix C – Existing Conditions Capacity Analysis Reports

Intersection	
Int Delay, s/veh	2.1

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	12	81	18	587	977	4
Future Vol, veh/h	12	81	18	587	977	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	88	20	638	1062	4

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1742	1064	1066	0	-	0
Stage 1	1064	-	-	-	-	-
Stage 2	678	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	95	271	654	-	-	-
Stage 1	332	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	91	271	654	-	-	-
Mov Cap-2 Maneuver	91	-	-	-	-	-
Stage 1	316	-	-	-	-	-
Stage 2	504	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	35.5	0.3	0
HCM LOS	E		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	654	-	216	-	-
HCM Lane V/C Ratio	0.03	-	0.468	-	-
HCM Control Delay (s)	10.7	0	35.5	-	-
HCM Lane LOS	B	A	E	-	-
HCM 95th %tile Q(veh)	0.1	-	2.3	-	-

Intersection	
Int Delay, s/veh	22

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	21	1	33	79	0	31	5	563	27	17	876	10
Future Vol, veh/h	21	1	33	79	0	31	5	563	27	17	876	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	1	36	86	0	34	5	612	29	18	952	11

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1648	1645	958	1649	1636	627	963	0	0	641	0	0
Stage 1	994	994	-	637	637	-	-	-	-	-	-	-
Stage 2	654	651	-	1012	999	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	79	99	312	~ 79	101	484	715	-	-	943	-	-
Stage 1	295	323	-	465	471	-	-	-	-	-	-	-
Stage 2	456	465	-	288	321	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	71	94	312	~ 67	96	484	715	-	-	943	-	-
Mov Cap-2 Maneuver	71	94	-	~ 67	96	-	-	-	-	-	-	-
Stage 1	292	310	-	460	466	-	-	-	-	-	-	-
Stage 2	420	460	-	244	308	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	52.5	$ 304.2	0.1	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	715	-	-	88	133	943	-	-
HCM Lane V/C Ratio	0.008	-	-	1.359	0.449	0.02	-	-
HCM Control Delay (s)	10.1	0	-	$ 304.2	52.5	8.9	0	-
HCM Lane LOS	B	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	9	2	0.1	-	-

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

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	11	581	853	1	6	60
Future Vol, veh/h	11	581	853	1	6	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	632	927	1	7	65

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	928	0	-	0	1584	928
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	656	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	737	-	-	-	119	325
Stage 1	-	-	-	-	385	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	737	-	-	-	116	325
Mov Cap-2 Maneuver	-	-	-	-	116	-
Stage 1	-	-	-	-	375	-
Stage 2	-	-	-	-	516	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	22.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	737	-	-	-	279
HCM Lane V/C Ratio	0.016	-	-	-	0.257
HCM Control Delay (s)	10	0	-	-	22.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	1

Intersection	
Int Delay, s/veh	2.2

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	48	12	6	581	849	40
Future Vol, veh/h	48	12	6	581	849	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	52	13	7	632	923	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1591	945	966	0	-	0
Stage 1	945	-	-	-	-	-
Stage 2	646	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	118	318	713	-	-	-
Stage 1	378	-	-	-	-	-
Stage 2	522	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	116	318	713	-	-	-
Mov Cap-2 Maneuver	116	-	-	-	-	-
Stage 1	372	-	-	-	-	-
Stage 2	522	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	55.7	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	713	-	133	-	-
HCM Lane V/C Ratio	0.009	-	0.49	-	-
HCM Control Delay (s)	10.1	0	55.7	-	-
HCM Lane LOS	B	A	F	-	-
HCM 95th %tile Q(veh)	0	-	2.3	-	-

Intersection	
Int Delay, s/veh	38.4

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	204	76	337	290	99	697
Future Vol, veh/h	204	76	337	290	99	697
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	175	0	-	250	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	222	83	366	315	108	758

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1340	366	0	0	681	0
Stage 1	366	-	-	-	-	-
Stage 2	974	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	~ 168	679	-	-	912	-
Stage 1	702	-	-	-	-	-
Stage 2	366	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	~ 148	679	-	-	912	-
Mov Cap-2 Maneuver	~ 148	-	-	-	-	-
Stage 1	702	-	-	-	-	-
Stage 2	323	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	230	0	1.2
HCM LOS	F		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	148	679	912	-
HCM Lane V/C Ratio	-	-	1.498	0.122	0.118	-
HCM Control Delay (s)	-	-	$ 311.6	11	9.5	-
HCM Lane LOS	-	-	F	B	A	-
HCM 95th %tile Q(veh)	-	-	14.8	0.4	0.4	-

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

Intersection	
Int Delay, s/veh	0.3

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	4	11	4	409	781	0
Future Vol, veh/h	4	11	4	409	781	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	12	4	445	849	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1302	849	849	0	-	0
Stage 1	849	-	-	-	-	-
Stage 2	453	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	177	361	789	-	-	-
Stage 1	419	-	-	-	-	-
Stage 2	640	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	176	361	789	-	-	-
Mov Cap-2 Maneuver	176	-	-	-	-	-
Stage 1	416	-	-	-	-	-
Stage 2	640	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	18.5	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	789	-	282	-	-
HCM Lane V/C Ratio	0.006	-	0.058	-	-
HCM Control Delay (s)	9.6	0	18.5	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	22	52	15	402	713	10
Future Vol, veh/h	22	52	15	402	713	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	57	16	437	775	11

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1250	781	786	0	-	0
Stage 1	781	-	-	-	-	-
Stage 2	469	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	191	395	833	-	-	-
Stage 1	451	-	-	-	-	-
Stage 2	630	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	186	395	833	-	-	-
Mov Cap-2 Maneuver	186	-	-	-	-	-
Stage 1	440	-	-	-	-	-
Stage 2	630	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	21.6	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	833	-	296	-	-
HCM Lane V/C Ratio	0.02	-	0.272	-	-
HCM Control Delay (s)	9.4	0	21.6	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	0	29	9	0	0	4	321	10	3	920	4
Future Vol, veh/h	5	0	29	9	0	0	4	321	10	3	920	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	32	10	0	0	4	349	11	3	1000	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1371	1376	1002	1387	1373	355	1004	0	0	360	0	0
Stage 1	1008	1008	-	363	363	-	-	-	-	-	-	-
Stage 2	363	368	-	1024	1010	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	123	145	294	120	146	689	690	-	-	1199	-	-
Stage 1	290	318	-	656	625	-	-	-	-	-	-	-
Stage 2	656	621	-	284	317	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	122	143	294	106	144	689	690	-	-	1199	-	-
Mov Cap-2 Maneuver	122	143	-	106	144	-	-	-	-	-	-	-
Stage 1	288	316	-	651	621	-	-	-	-	-	-	-
Stage 2	651	617	-	252	315	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.4	42.4	0.1	0
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	690	-	-	244	106	1199	-	-
HCM Lane V/C Ratio	0.006	-	-	0.151	0.092	0.003	-	-
HCM Control Delay (s)	10.2	0	-	22.4	42.4	8	0	-
HCM Lane LOS	B	A	-	C	E	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.3	0	-	-

Intersection	
Int Delay, s/veh	0

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Vol, veh/h	325	0	2	915	1	2
Future Vol, veh/h	325	0	2	915	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	353	0	2	995	1	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	353	0	1352	353
Stage 1	-	-	-	-	353	-
Stage 2	-	-	-	-	999	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1206	-	165	691
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	356	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1206	-	164	691
Mov Cap-2 Maneuver	-	-	-	-	164	-
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	355	-

Approach	NB	SB	NW
HCM Control Delay, s	0	0	15.9
HCM LOS			C

Minor Lane/Major Mvmt	NBT	NBR	NWLn1	SBL	SBT
Capacity (veh/h)	-	-	334	1206	-
HCM Lane V/C Ratio	-	-	0.01	0.002	-
HCM Control Delay (s)	-	-	15.9	8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	3.3

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	14	313	6	2	820	9	24	1	70	25	0	1
Future Vol, veh/h	14	313	6	2	820	9	24	1	70	25	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	15	340	7	2	891	10	26	1	76	27	0	1

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	901	0	0	347	0	0	1274	1277	896	1313	1279	344
Stage 1	-	-	-	-	-	-	900	900	-	374	374	-
Stage 2	-	-	-	-	-	-	374	377	-	939	905	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	754	-	-	1212	-	-	144	166	339	135	166	699
Stage 1	-	-	-	-	-	-	333	357	-	647	618	-
Stage 2	-	-	-	-	-	-	647	616	-	317	355	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	754	-	-	1212	-	-	141	161	339	102	161	699
Mov Cap-2 Maneuver	-	-	-	-	-	-	141	161	-	102	161	-
Stage 1	-	-	-	-	-	-	325	356	-	631	603	-
Stage 2	-	-	-	-	-	-	630	601	-	244	354	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	0.4	0	29.5	51.5
HCM LOS			D	F

Minor Lane/Major Mvmt	NBL	NBT	NBR	NWLn1	SELn1	SBL	SBT	SBR
Capacity (veh/h)	754	-	-	105	248	1212	-	-
HCM Lane V/C Ratio	0.02	-	-	0.269	0.416	0.002	-	-
HCM Control Delay (s)	9.9	0	-	51.5	29.5	8	0	-
HCM Lane LOS	A	A	-	F	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	1.9	0	-	-

Intersection	
Int Delay, s/veh	1.5

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	10	56	85	905	588	18
Future Vol, veh/h	10	56	85	905	588	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	61	92	984	639	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1817	649	659	0	-	0
Stage 1	649	-	-	-	-	-
Stage 2	1168	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	86	470	929	-	-	-
Stage 1	520	-	-	-	-	-
Stage 2	296	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	67	470	929	-	-	-
Mov Cap-2 Maneuver	67	-	-	-	-	-
Stage 1	407	-	-	-	-	-
Stage 2	296	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	25.5	0.8	0
HCM LOS	D		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	929	-	246	-	-
HCM Lane V/C Ratio	0.099	-	0.292	-	-
HCM Control Delay (s)	9.3	0	25.5	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.3	-	1.2	-	-

Intersection	
Int Delay, s/veh	3.7

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	7	1	20	36	3	17	21	814	78	13	537	8
Future Vol, veh/h	7	1	20	36	3	17	21	814	78	13	537	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	1	22	39	3	18	23	885	85	14	584	9

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1601	1633	589	1602	1595	928	593	0	0	970	0	0
Stage 1	617	617	-	974	974	-	-	-	-	-	-	-
Stage 2	984	1016	-	628	621	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	85	101	508	85	107	325	983	-	-	710	-	-
Stage 1	477	481	-	303	330	-	-	-	-	-	-	-
Stage 2	299	315	-	471	479	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	73	93	508	76	99	325	983	-	-	710	-	-
Mov Cap-2 Maneuver	73	93	-	76	99	-	-	-	-	-	-	-
Stage 1	452	467	-	287	313	-	-	-	-	-	-	-
Stage 2	265	299	-	437	465	-	-	-	-	-	-	-

Approach	SE	NW	NE	SW
HCM Control Delay, s	27.3	84.1	0.2	0.2
HCM LOS	D	F		

Minor Lane/Major Mvmt	NEL	NET	NER	NWLn1	SELn1	SWL	SWT	SWR
Capacity (veh/h)	983	-	-	101	192	710	-	-
HCM Lane V/C Ratio	0.023	-	-	0.603	0.159	0.02	-	-
HCM Control Delay (s)	8.7	0	-	84.1	27.3	10.2	0	-
HCM Lane LOS	A	A	-	F	D	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.9	0.6	0.1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	68	768	494	0	1	32
Future Vol, veh/h	68	768	494	0	1	32
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	74	835	537	0	1	35

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	537	0	-	0	1520	537
Stage 1	-	-	-	-	537	-
Stage 2	-	-	-	-	983	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1031	-	-	-	131	544
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	362	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1031	-	-	-	113	544
Mov Cap-2 Maneuver	-	-	-	-	113	-
Stage 1	-	-	-	-	507	-
Stage 2	-	-	-	-	362	-

Approach	EB	WB	SB
HCM Control Delay, s	0.7	0	13
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1031	-	-	-	488
HCM Lane V/C Ratio	0.072	-	-	-	0.074
HCM Control Delay (s)	8.8	0	-	-	13
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.8

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	21	12	16	747	463	18
Future Vol, veh/h	21	12	16	747	463	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	13	17	812	503	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1359	513	523	0	-	0
Stage 1	513	-	-	-	-	-
Stage 2	846	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	164	561	1043	-	-	-
Stage 1	601	-	-	-	-	-
Stage 2	421	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	159	561	1043	-	-	-
Mov Cap-2 Maneuver	159	-	-	-	-	-
Stage 1	583	-	-	-	-	-
Stage 2	421	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	25.1	0.2	0
HCM LOS	D		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1043	-	215	-	-
HCM Lane V/C Ratio	0.017	-	0.167	-	-
HCM Control Delay (s)	8.5	0	25.1	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0.1	-	0.6	-	-

Intersection	
Int Delay, s/veh	3

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Vol, veh/h	81	34	693	67	21	394
Future Vol, veh/h	81	34	693	67	21	394
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	175	0	-	250	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	88	37	753	73	23	428

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1227	753	0	0	826	0
Stage 1	753	-	-	-	-	-
Stage 2	474	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	197	410	-	-	805	-
Stage 1	465	-	-	-	-	-
Stage 2	626	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	191	410	-	-	805	-
Mov Cap-2 Maneuver	191	-	-	-	-	-
Stage 1	465	-	-	-	-	-
Stage 2	608	-	-	-	-	-

Approach	NW	NE	SW
HCM Control Delay, s	31.8	0	0.5
HCM LOS	D		

Minor Lane/Major Mvmt	NET	NER	NWLn1	NWLn2	SWL	SWT
Capacity (veh/h)	-	-	191	410	805	-
HCM Lane V/C Ratio	-	-	0.461	0.09	0.028	-
HCM Control Delay (s)	-	-	39	14.6	9.6	-
HCM Lane LOS	-	-	E	B	A	-
HCM 95th %tile Q(veh)	-	-	2.2	0.3	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	2	5	6	731	412	1
Future Vol, veh/h	2	5	6	731	412	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	5	7	795	448	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1258	449	449	0	-	0
Stage 1	449	-	-	-	-	-
Stage 2	809	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	189	610	1111	-	-	-
Stage 1	643	-	-	-	-	-
Stage 2	438	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	187	610	1111	-	-	-
Mov Cap-2 Maneuver	187	-	-	-	-	-
Stage 1	636	-	-	-	-	-
Stage 2	438	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	14.9	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1111	-	371	-	-
HCM Lane V/C Ratio	0.006	-	0.021	-	-
HCM Control Delay (s)	8.3	0	14.9	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	11	36	31	703	373	13
Future Vol, veh/h	11	36	31	703	373	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	39	34	764	405	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1244	412	419	0	-	0
Stage 1	412	-	-	-	-	-
Stage 2	832	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	192	640	1140	-	-	-
Stage 1	669	-	-	-	-	-
Stage 2	427	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	182	640	1140	-	-	-
Mov Cap-2 Maneuver	182	-	-	-	-	-
Stage 1	634	-	-	-	-	-
Stage 2	427	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	15.2	0.3	0
HCM LOS	C		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1140	-	403	-	-
HCM Lane V/C Ratio	0.03	-	0.127	-	-
HCM Control Delay (s)	8.3	0	15.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.4	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	4	0	11	6	0	3	12	817	27	4	396	3
Future Vol, veh/h	4	0	11	6	0	3	12	817	27	4	396	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	12	7	0	3	13	888	29	4	430	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1370	1383	432	1375	1370	903	433	0	0	917	0	0
Stage 1	440	440	-	929	929	-	-	-	-	-	-	-
Stage 2	930	943	-	446	441	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	124	144	624	123	146	336	1127	-	-	744	-	-
Stage 1	596	578	-	321	346	-	-	-	-	-	-	-
Stage 2	321	341	-	591	577	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	120	140	624	118	141	336	1127	-	-	744	-	-
Mov Cap-2 Maneuver	120	140	-	118	141	-	-	-	-	-	-	-
Stage 1	582	574	-	313	338	-	-	-	-	-	-	-
Stage 2	310	333	-	576	573	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18	30.5	0.1	0.1
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1127	-	-	294	151	744	-	-
HCM Lane V/C Ratio	0.012	-	-	0.055	0.065	0.006	-	-
HCM Control Delay (s)	8.2	0	-	18	30.5	9.9	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	0.1

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Vol, veh/h	826	1	6	401	2	2
Future Vol, veh/h	826	1	6	401	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	898	1	7	436	2	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	899	0	1349	899
Stage 1	-	-	-	-	899	-
Stage 2	-	-	-	-	450	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	756	-	166	338
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	642	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	756	-	164	338
Mov Cap-2 Maneuver	-	-	-	-	164	-
Stage 1	-	-	-	-	397	-
Stage 2	-	-	-	-	634	-

Approach	NB	SB	NW
HCM Control Delay, s	0	0.1	21.6
HCM LOS			C

Minor Lane/Major Mvmt	NBT	NBR	NWLn1	SBL	SBT
Capacity (veh/h)	-	-	221	756	-
HCM Lane V/C Ratio	-	-	0.02	0.009	-
HCM Control Delay (s)	-	-	21.6	9.8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.8

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	71	691	37	5	371	37	16	0	36	9	0	2
Future Vol, veh/h	71	691	37	5	371	37	16	0	36	9	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	77	751	40	5	403	40	17	0	39	10	0	2

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	443	0	0	791	0	0	1359	1378	423	1378	1378	771
Stage 1	-	-	-	-	-	-	433	433	-	925	925	-
Stage 2	-	-	-	-	-	-	926	945	-	453	453	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1117	-	-	829	-	-	126	145	631	122	145	400
Stage 1	-	-	-	-	-	-	601	582	-	323	348	-
Stage 2	-	-	-	-	-	-	322	340	-	586	570	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1117	-	-	829	-	-	113	126	631	103	126	400
Mov Cap-2 Maneuver	-	-	-	-	-	-	113	126	-	103	126	-
Stage 1	-	-	-	-	-	-	526	577	-	283	305	-
Stage 2	-	-	-	-	-	-	281	298	-	545	565	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	0.8	0.1	22.5	38.6
HCM LOS			C	E

Minor Lane/Major Mvmt	NBL	NBT	NBR	NWLn1	SELn1	SBL	SBT	SBR
Capacity (veh/h)	1117	-	-	119	262	829	-	-
HCM Lane V/C Ratio	0.069	-	-	0.1	0.216	0.007	-	-
HCM Control Delay (s)	8.5	0	-	38.6	22.5	9.4	0	-
HCM Lane LOS	A	A	-	E	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.8	0	-	-

SAIN ASSOCIATES

CELEBRATING 50 YEARS

Appendix D – Existing Turn Lane Warrant Evaluation Reports

Avalon Drive @ US-411
NB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

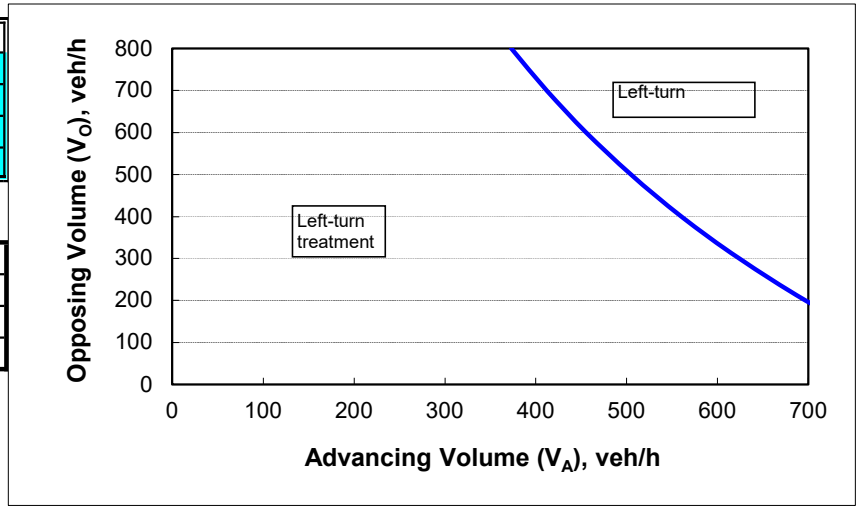
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	3%
Advancing volume (V_A), veh/h:	605
Opposing volume (V_O), veh/h:	981

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	313
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Avalon Drive at US-411
SB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

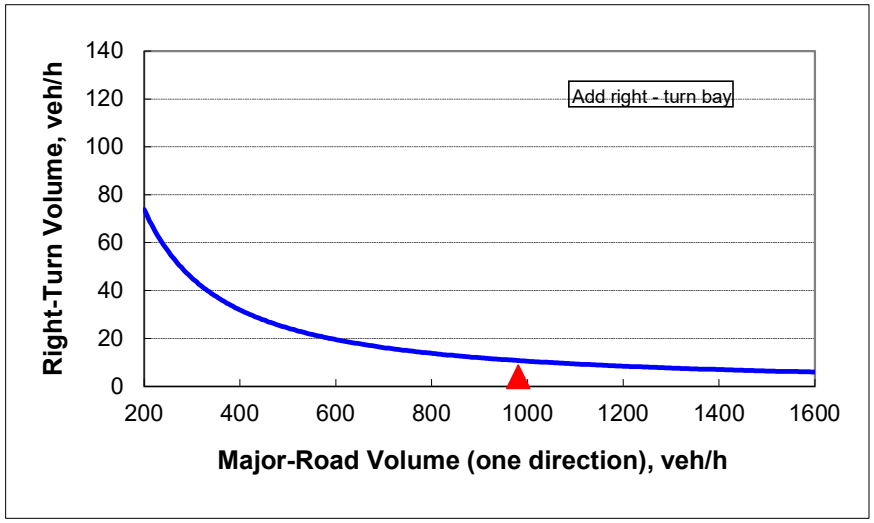
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	981
Right-turn volume, veh/h:	4

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	11
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Avalon Drive @ US-411
NB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

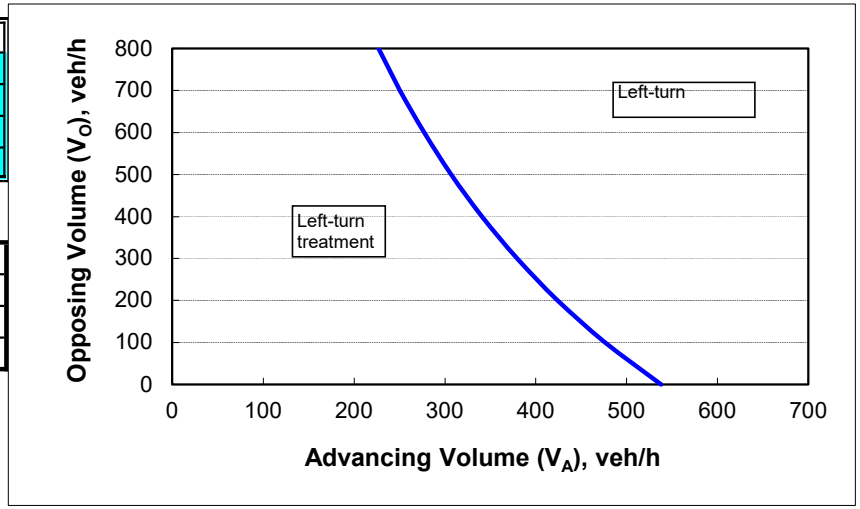
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	9%
Advancing volume (V_A), veh/h:	990
Opposing volume (V_O), veh/h:	606

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	276
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Avalon Drive at US-411
SB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

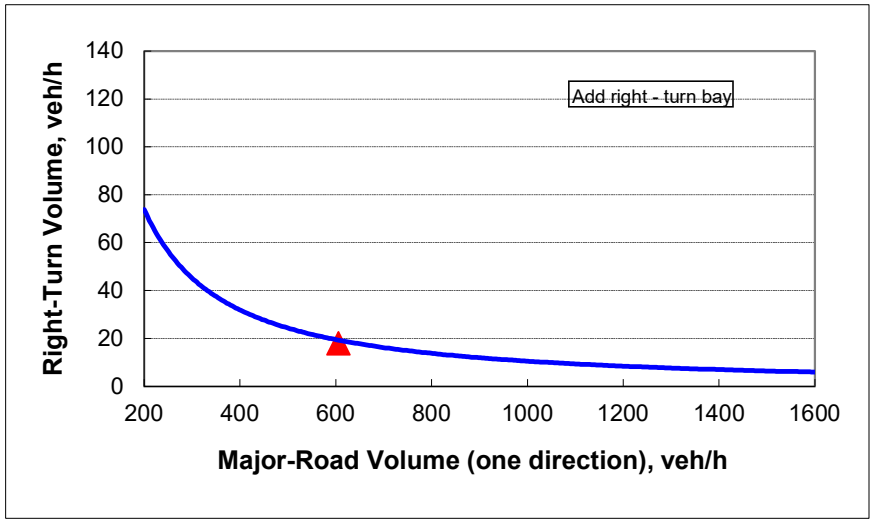
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	606
Right-turn volume, veh/h:	18

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	19
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Bethel Road at US-411
NB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

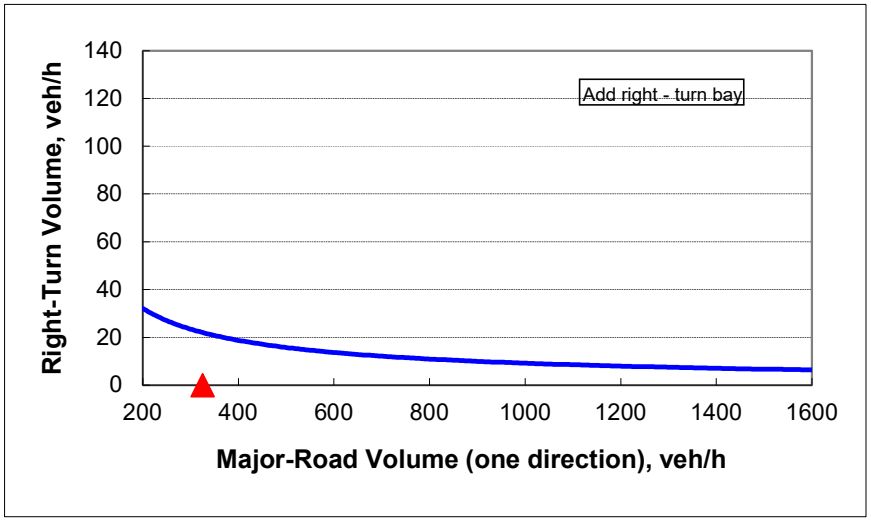
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	325
Right-turn volume, veh/h:	0

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	22
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Bethel Road @ US-411
SB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

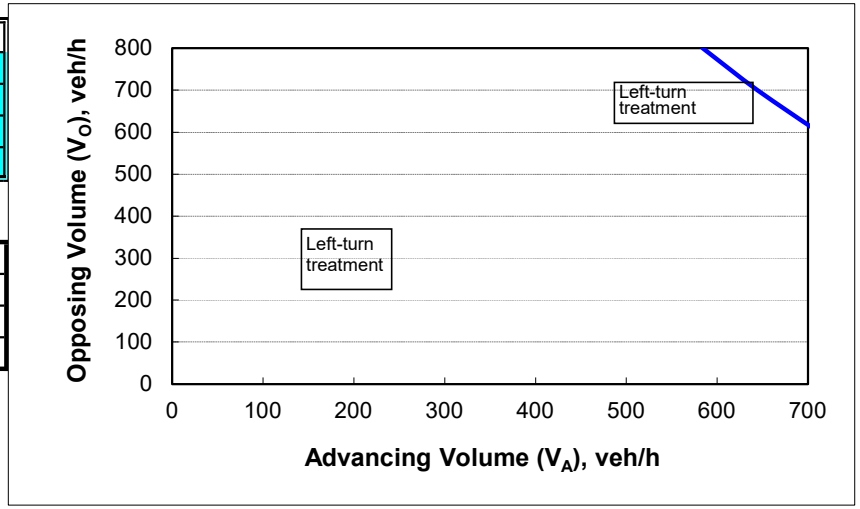
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	917
Opposing volume (V_O), veh/h:	325

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	950
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Bethel Road at US-411
NB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

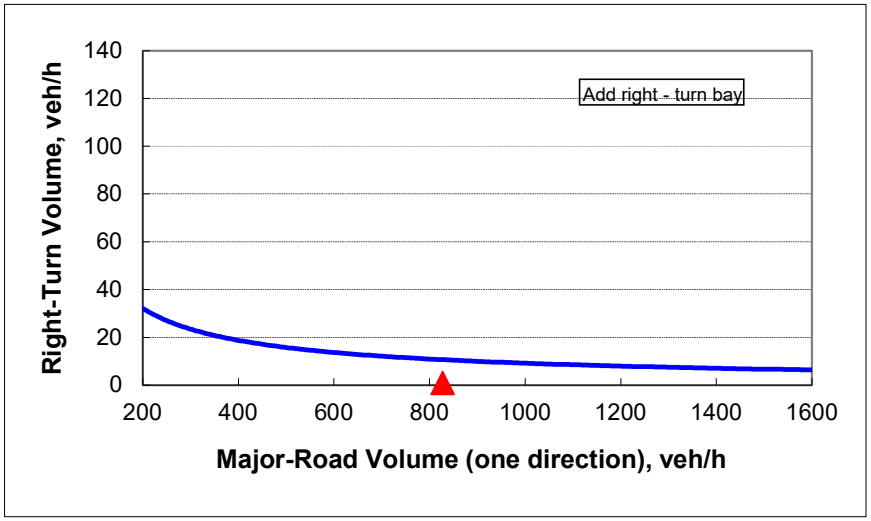
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	827
Right-turn volume, veh/h:	1

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	11
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Bethel Road @ US-411
SB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

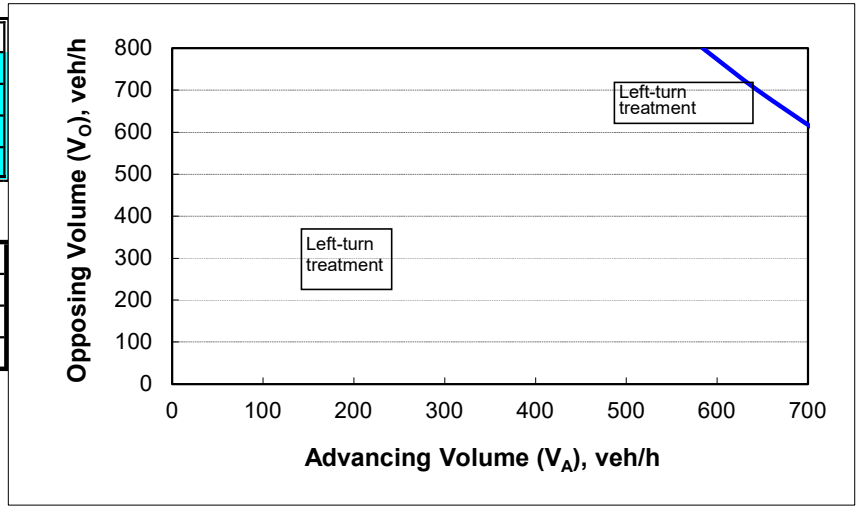
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	407
Opposing volume (V_O), veh/h:	827

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	569
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

James Taylor Road @ US-411
NB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

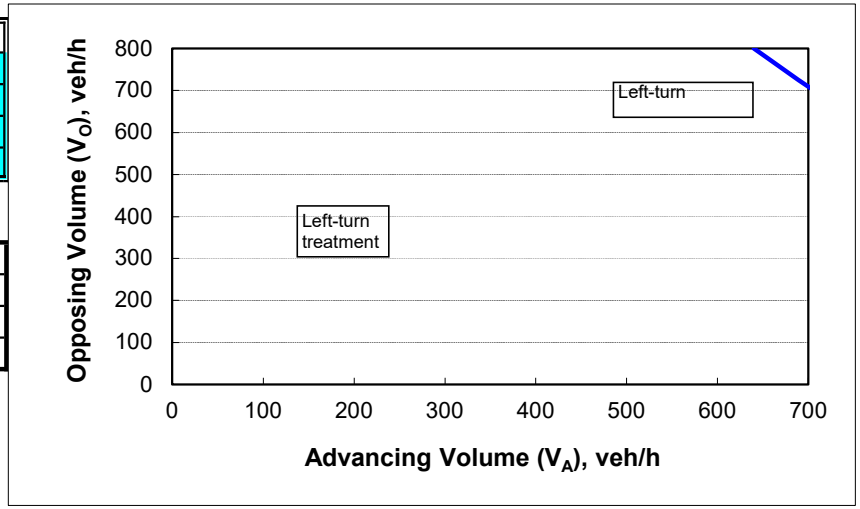
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	587
Opposing volume (V_O), veh/h:	889

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	587
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

James Taylor Road at US-411
SB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

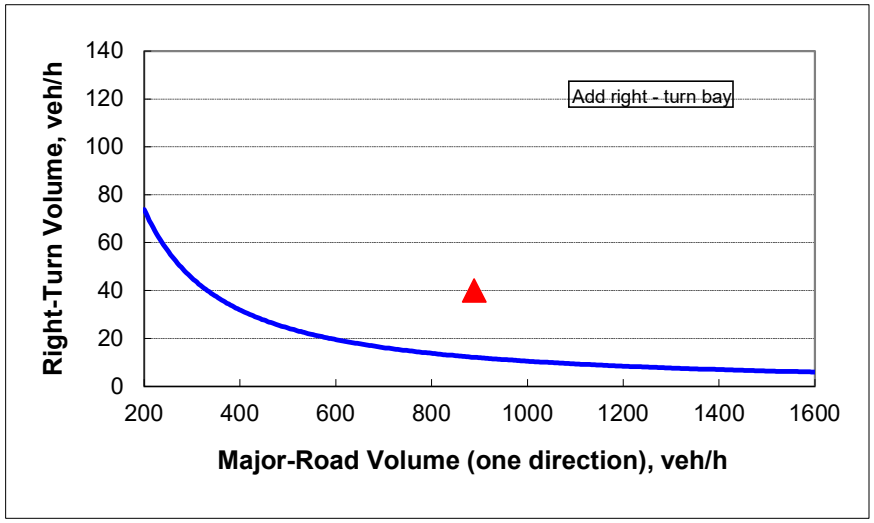
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	889
Right-turn volume, veh/h:	40

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	12
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



James Taylor Road @ US-411
NB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

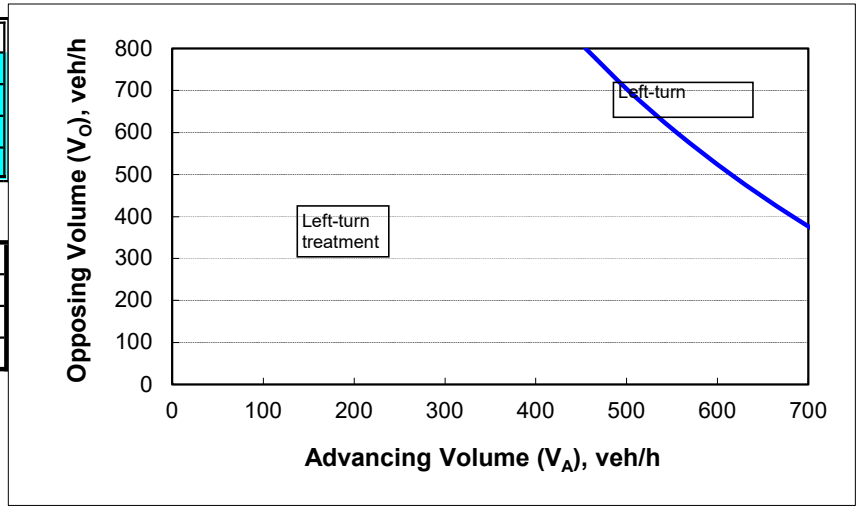
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	763
Opposing volume (V_O), veh/h:	481

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	627
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

James Taylor Road at US-411
SB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

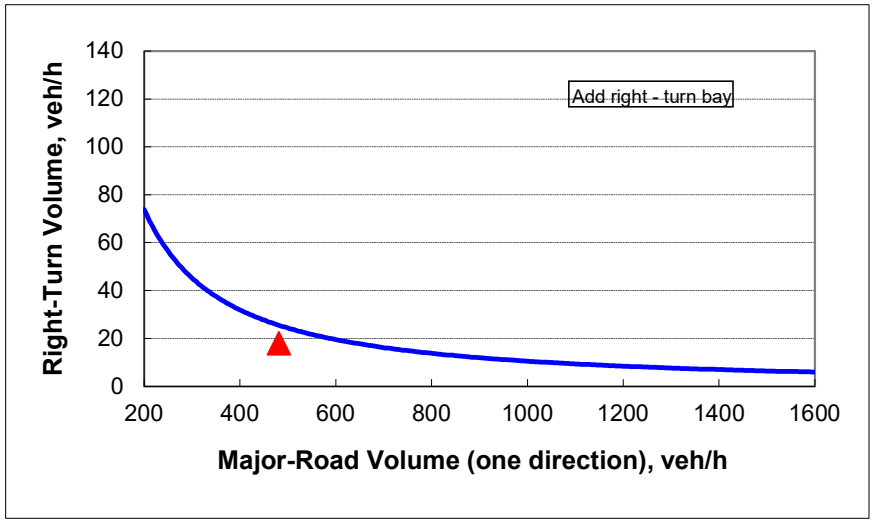
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	481
Right-turn volume, veh/h:	18

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	26
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Lake Joyce Road @ US-411
NB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

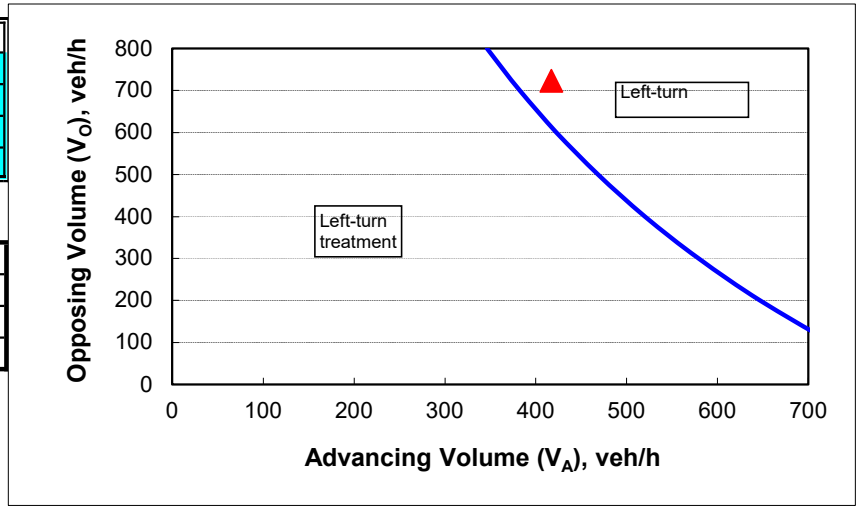
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	417
Opposing volume (V_O), veh/h:	723

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	374
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Lake Joyce Road at US-411
SB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

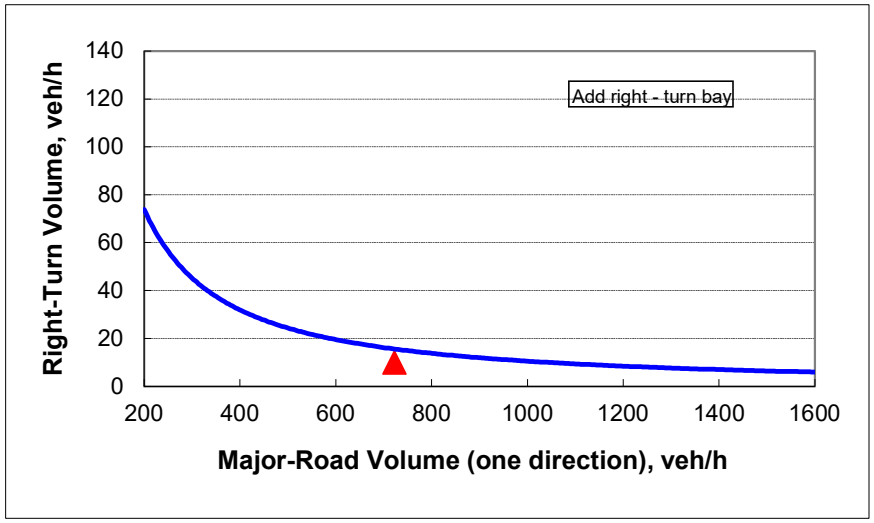
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	723
Right-turn volume, veh/h:	10

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	16
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Lake Joyce Road @ US-411
NB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

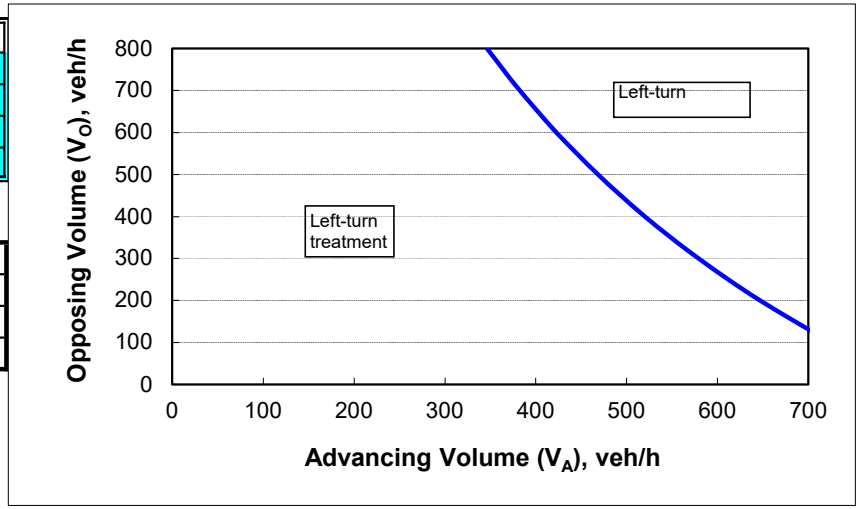
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	734
Opposing volume (V_O), veh/h:	386

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	528
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Lake Joyce Road at US-411
SB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

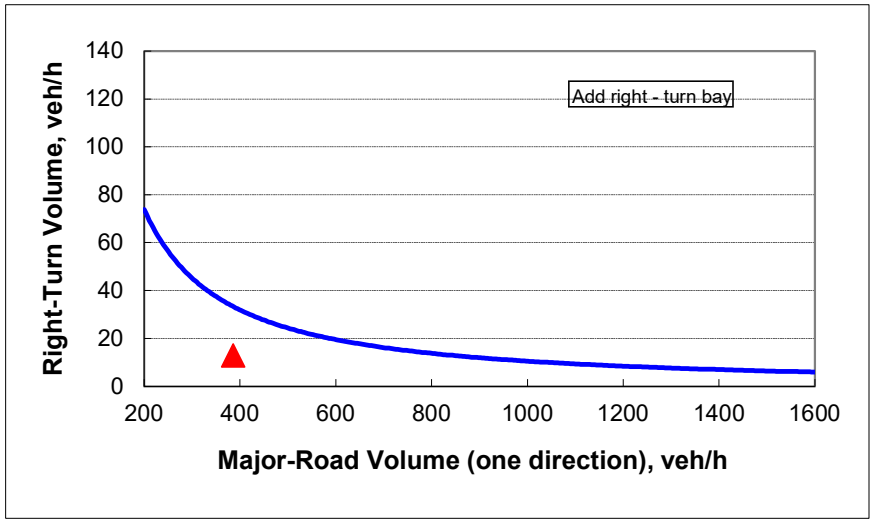
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	386
Right-turn volume, veh/h:	13

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	33
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Myers Road-Church Road @ US-411
NB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

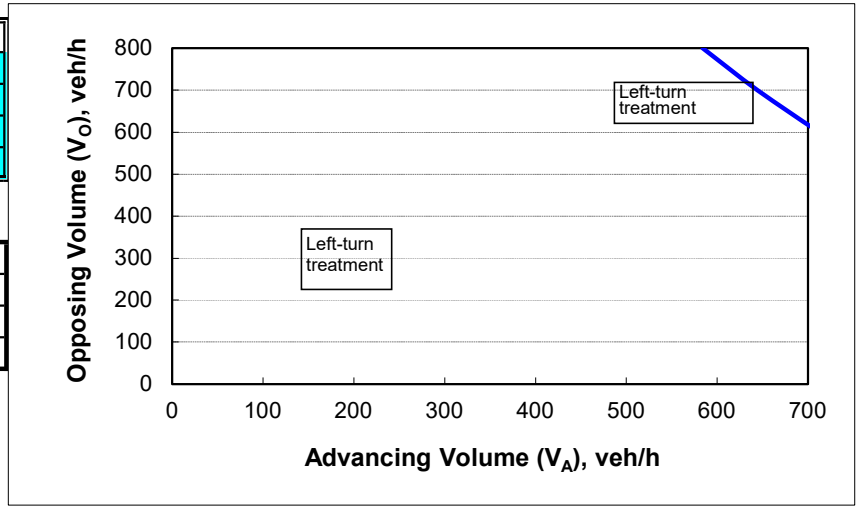
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	335
Opposing volume (V_O), veh/h:	924

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	518
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Church Road at US-411
NB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

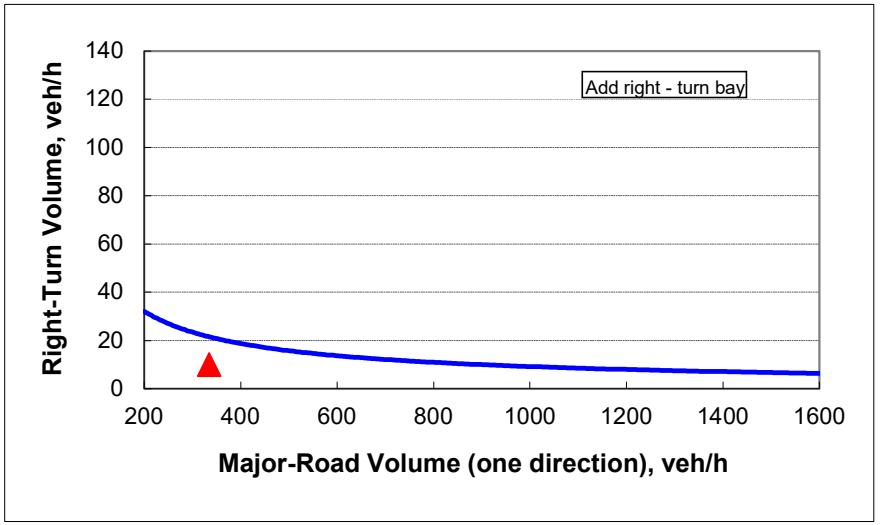
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	335
Right-turn volume, veh/h:	10

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	22
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Myers Road-Church Road @ US-411
SB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

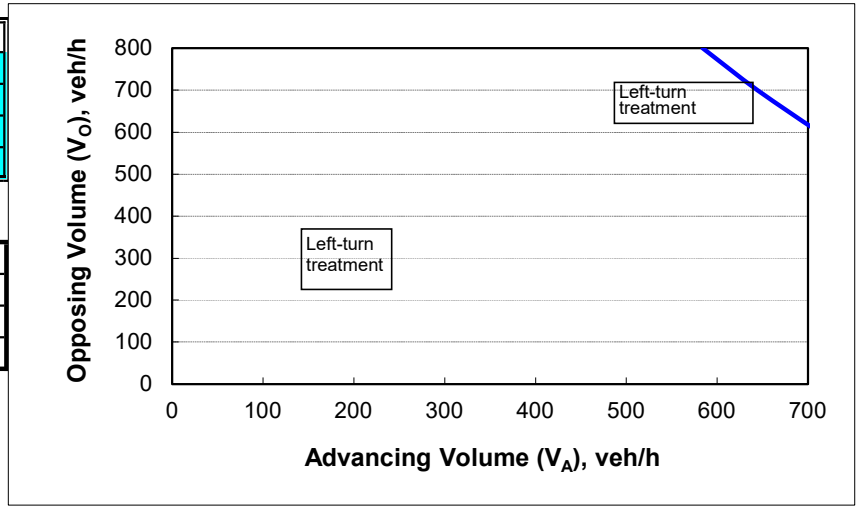
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	927
Opposing volume (V_O), veh/h:	331

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	944
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Myers Road at US-411
SB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

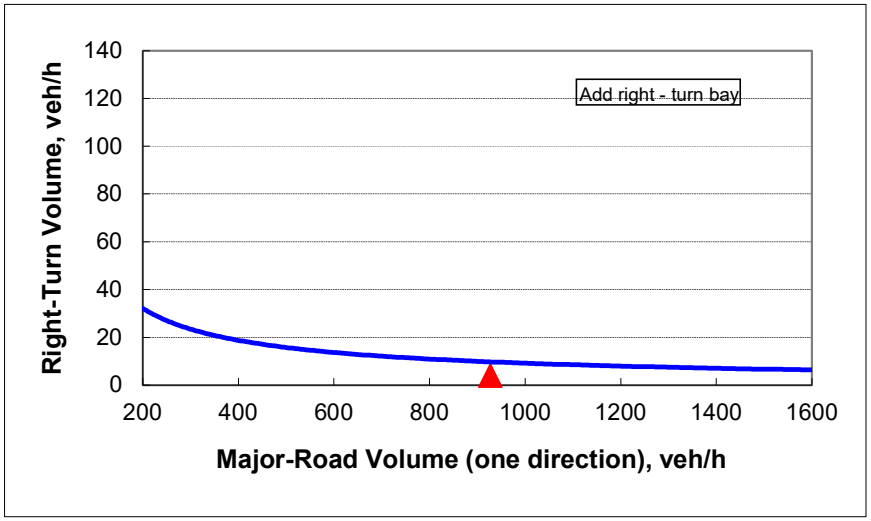
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	927
Right-turn volume, veh/h:	4

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	10
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Myers Road-Church Road @ US-411
NB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

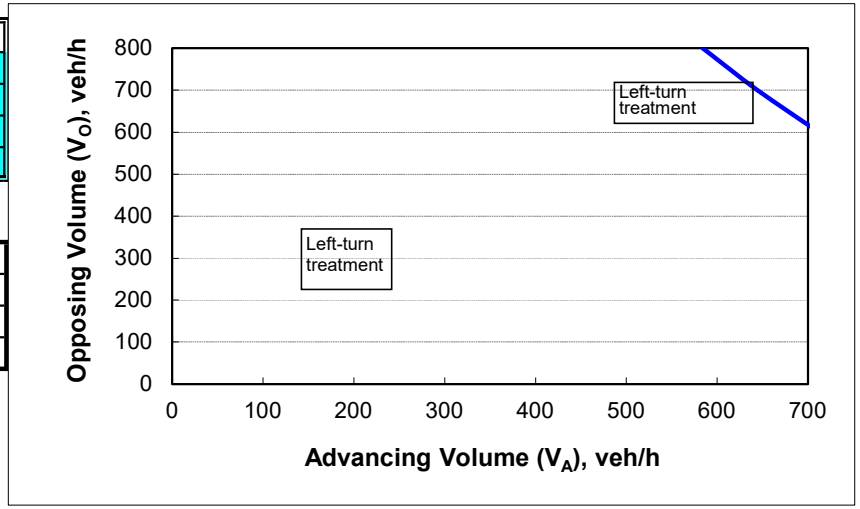
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	856
Opposing volume (V_O), veh/h:	399

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	878
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Church Road at US-411
NB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

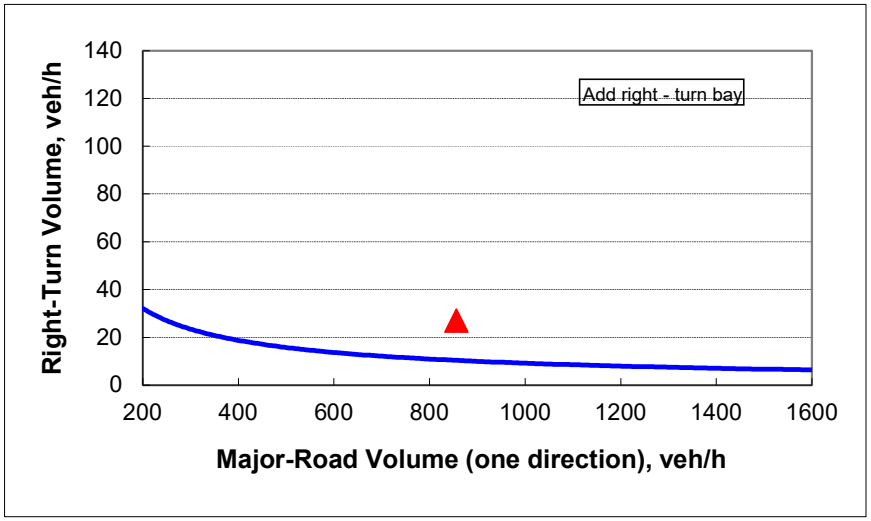
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	856
Right-turn volume, veh/h:	27

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	10
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Myers Road-Church Road @ US-411
SB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

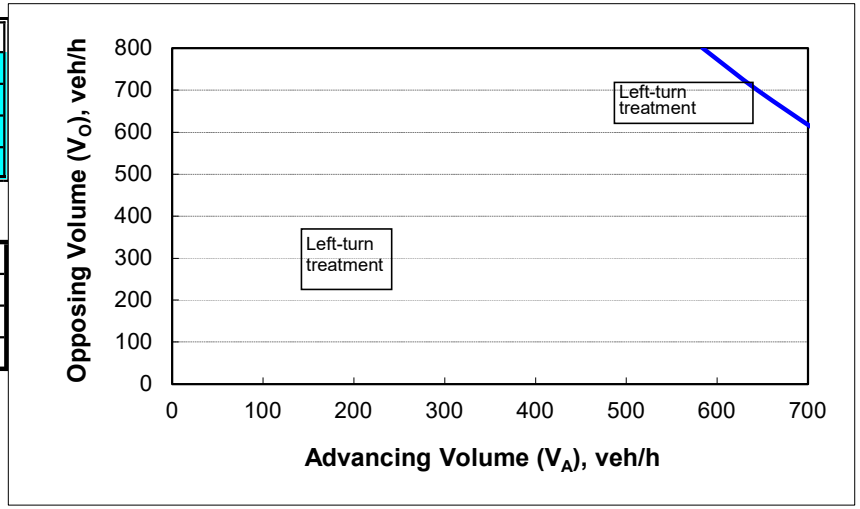
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	403
Opposing volume (V_O), veh/h:	844

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	559
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Myers Road at US-411
SB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

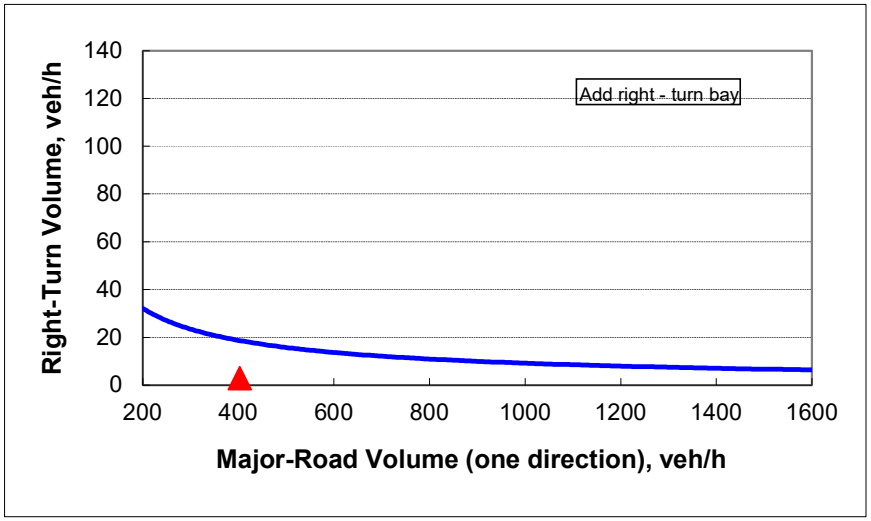
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	403
Right-turn volume, veh/h:	3

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	19
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Robbie Drive @ US-411
NB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

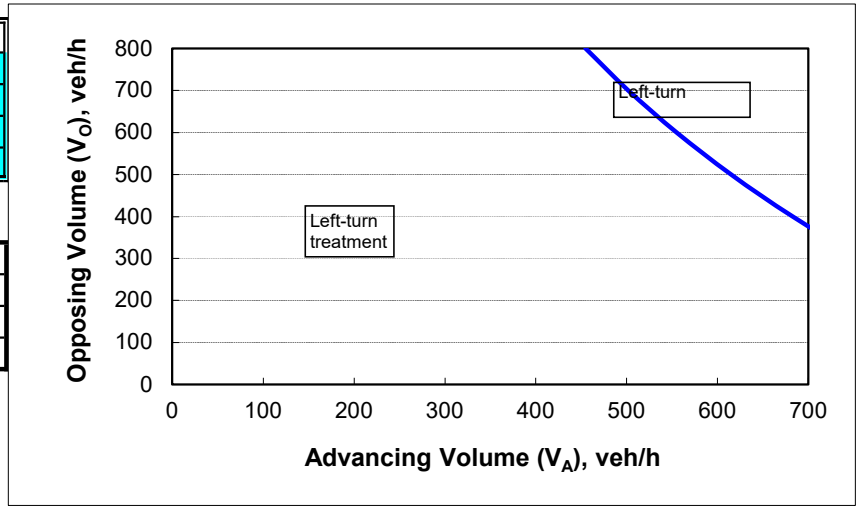
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	592
Opposing volume (V_O), veh/h:	854

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	431
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Robbie Drive at US-411
SB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

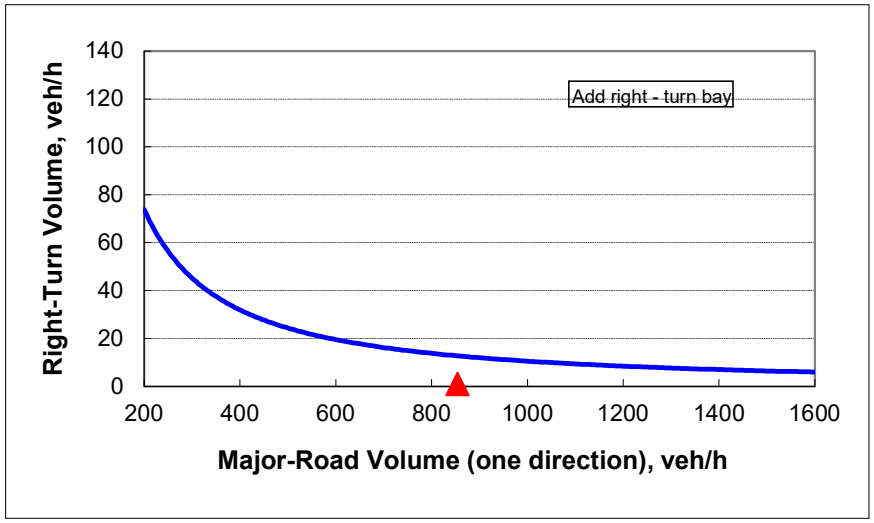
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	854
Right-turn volume, veh/h:	1

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	13
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Robbie Drive @ US-411
NB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

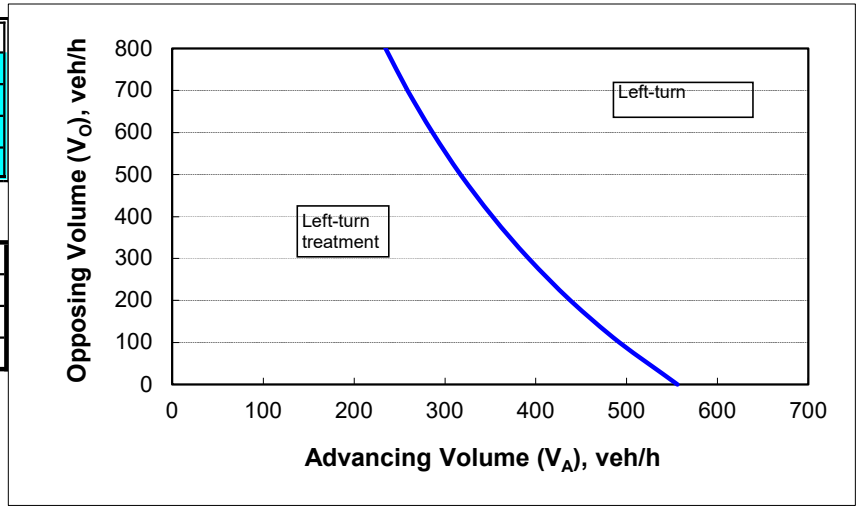
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	8%
Advancing volume (V_A), veh/h:	836
Opposing volume (V_O), veh/h:	494

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	319
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Robbie Drive at US-411
SB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

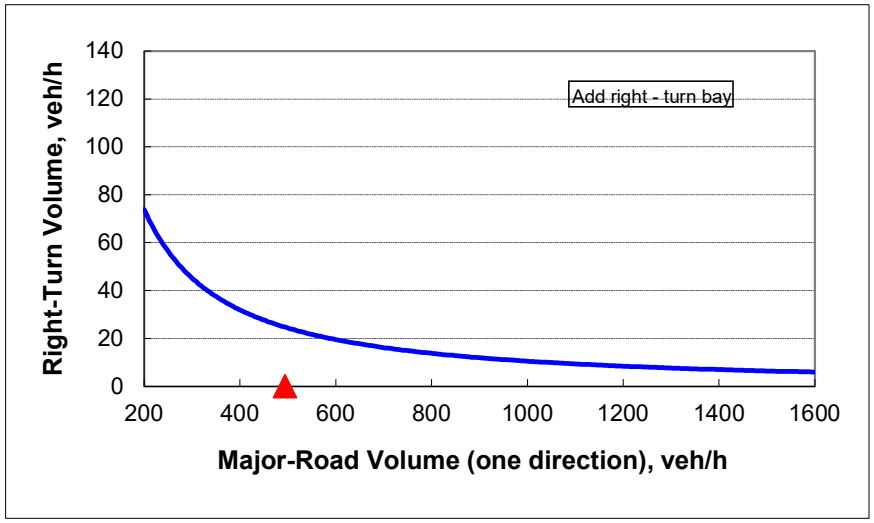
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	494
Right-turn volume, veh/h:	0

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	25
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Stuart Drive-Coupland Road @ US-411
NB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

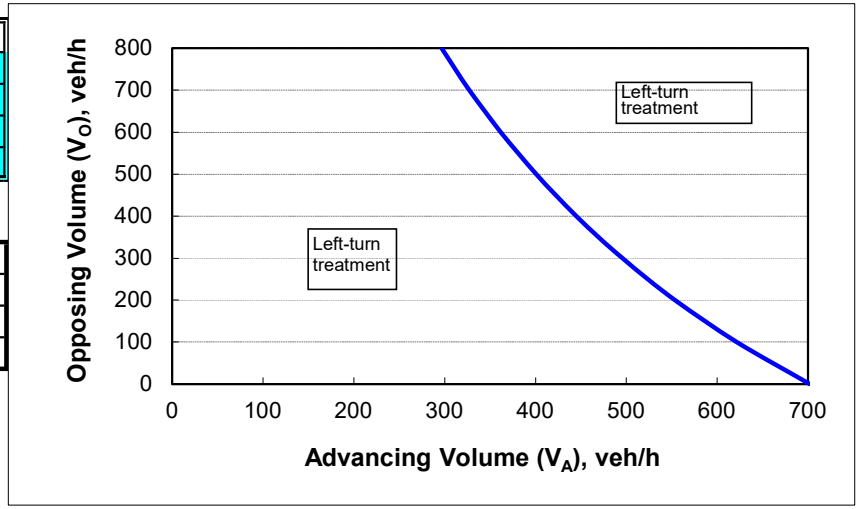
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	4%
Advancing volume (V_A), veh/h:	333
Opposing volume (V_O), veh/h:	829

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	288
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Stuart Drive-Coupland Road at US-411
NB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

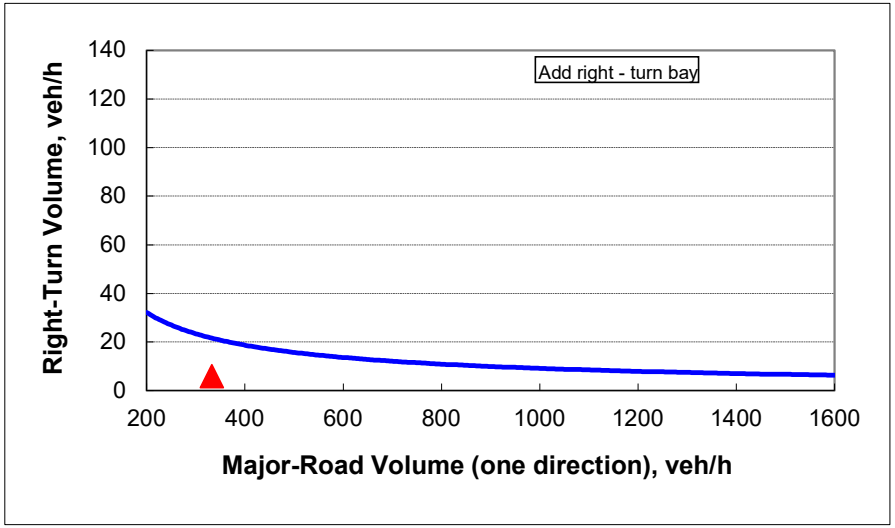
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	333
Right-turn volume, veh/h:	6

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	22
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Stuart Drive-Coupland Road @ US-411
SB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

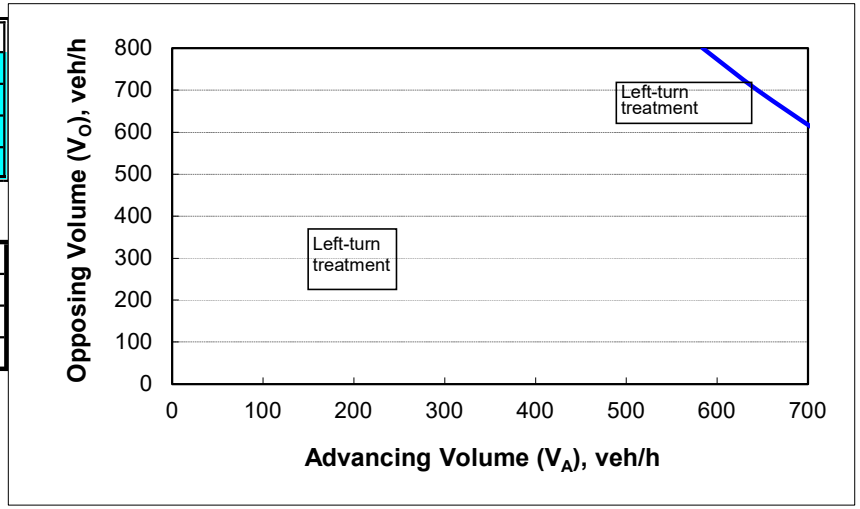
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	831
Opposing volume (V_O), veh/h:	319

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	956
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Stuart Drive-Coupland Road at US-411
SB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

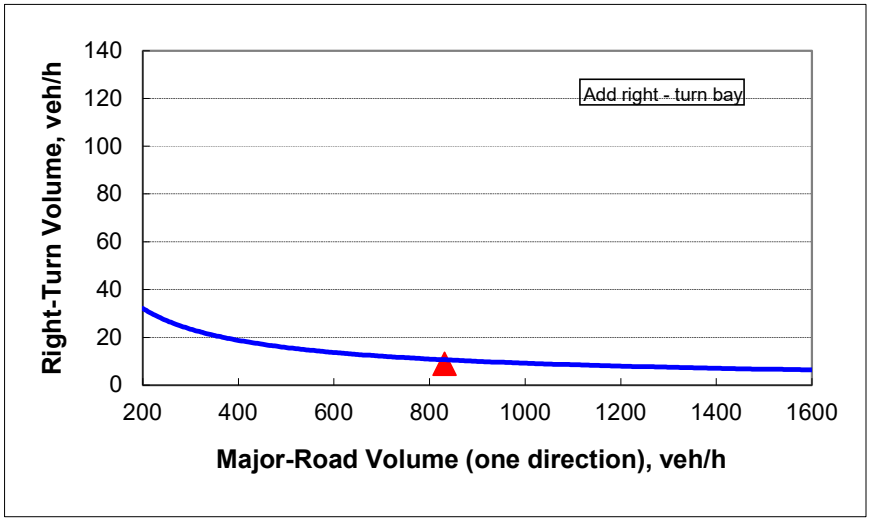
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	831
Right-turn volume, veh/h:	9

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	11
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Stuart Drive-Coupland Road @ US-411
NB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

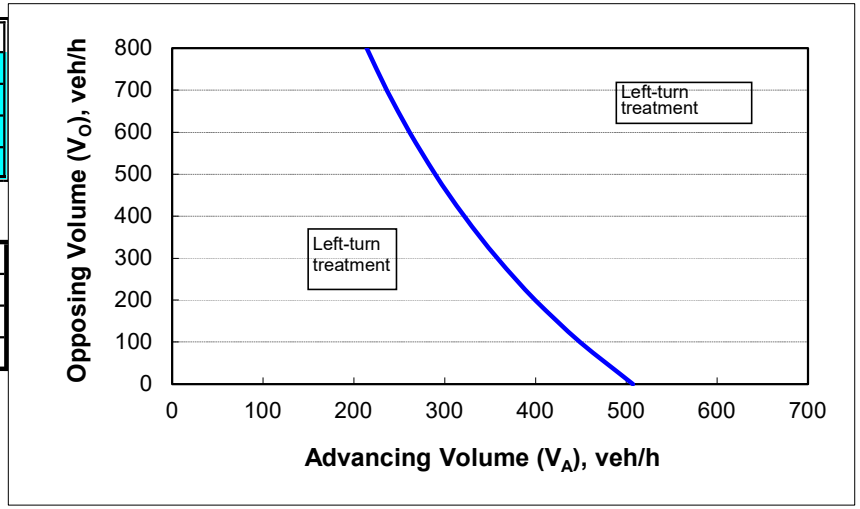
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	8%
Advancing volume (V_A), veh/h:	799
Opposing volume (V_O), veh/h:	408

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	319
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Stuart Drive-Coupland Road at US-411
NB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

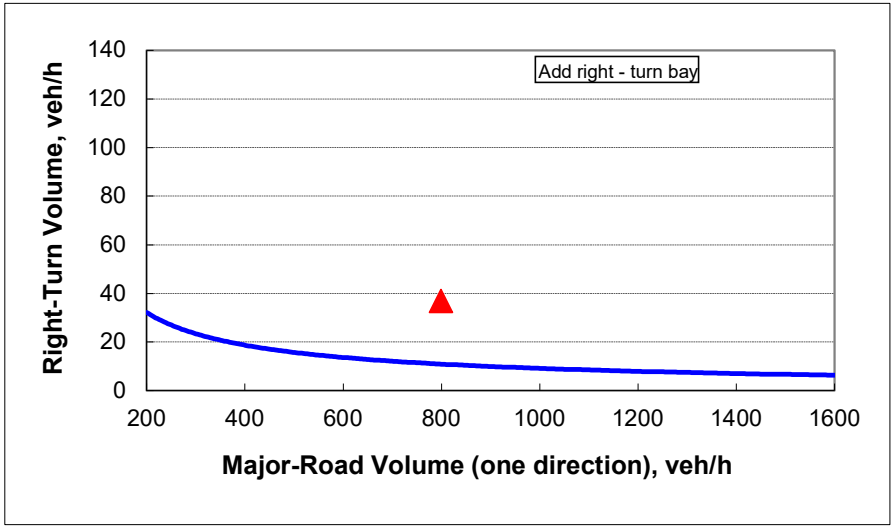
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	799
Right-turn volume, veh/h:	37

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	11
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Stuart Drive-Coupland Road @ US-411
SB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

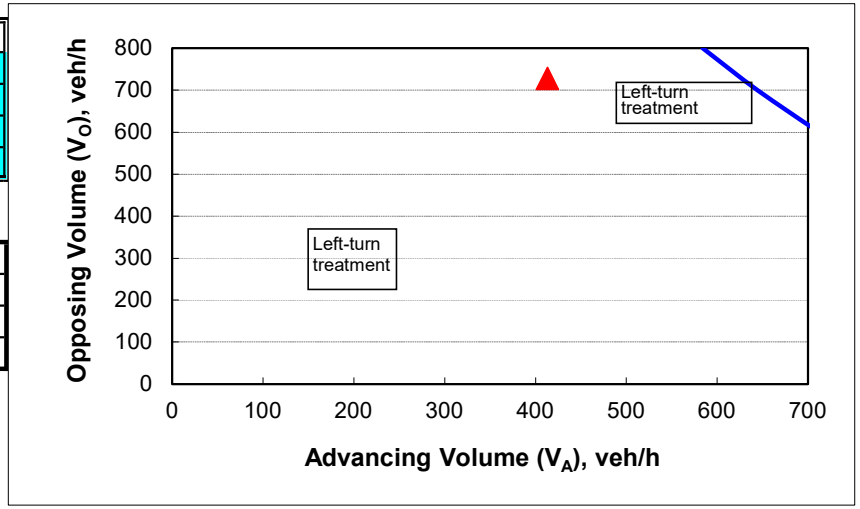
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	413
Opposing volume (V_O), veh/h:	728

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	627
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Stuart Drive-Coupland Road at US-411
SB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

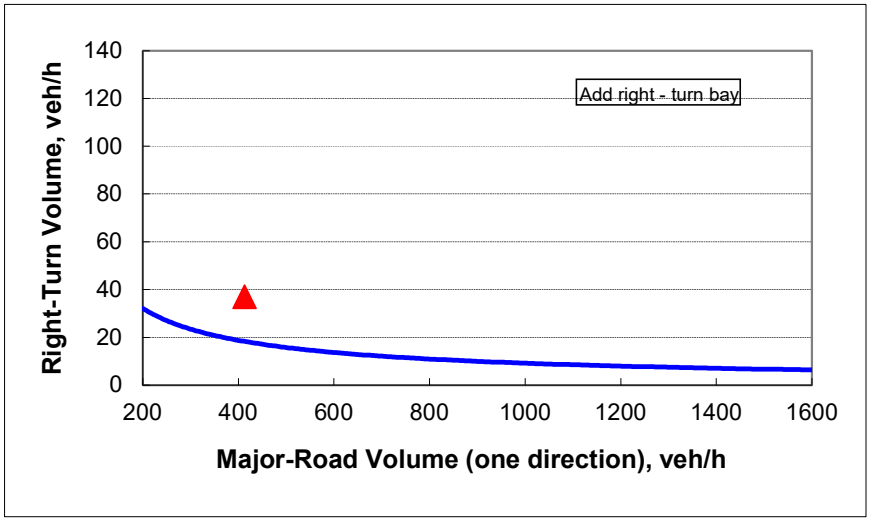
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	413
Right-turn volume, veh/h:	37

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	18
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Valleybend Lane @ US-411
NB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

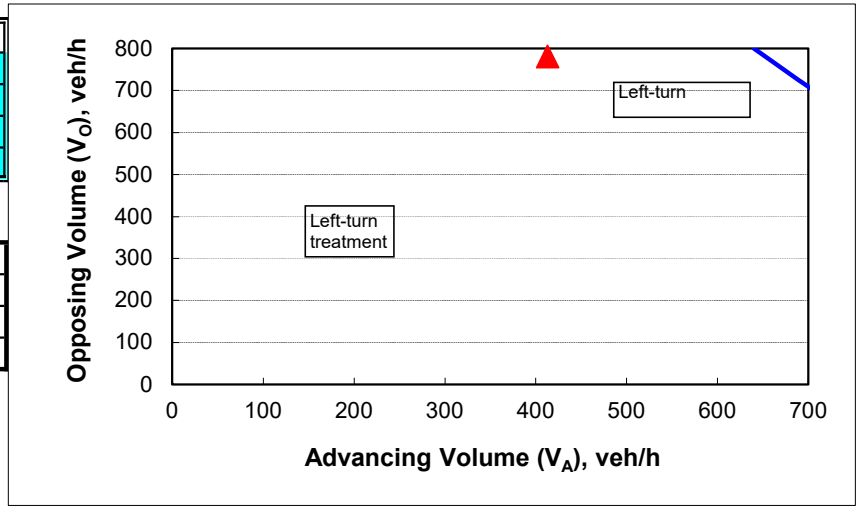
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	413
Opposing volume (V_O), veh/h:	781

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	652
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Valleybend Lane at US-411
SB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

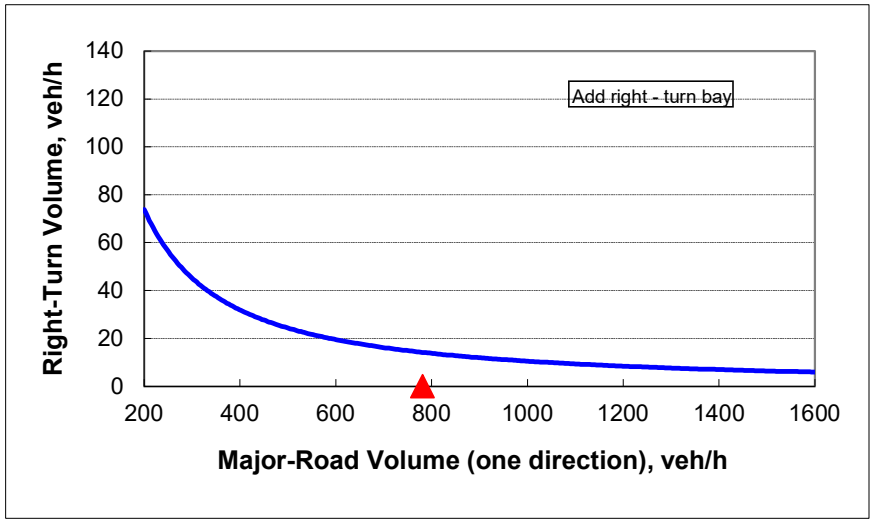
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	781
Right-turn volume, veh/h:	0

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	14
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Valleybend Lane @ US-411
NB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

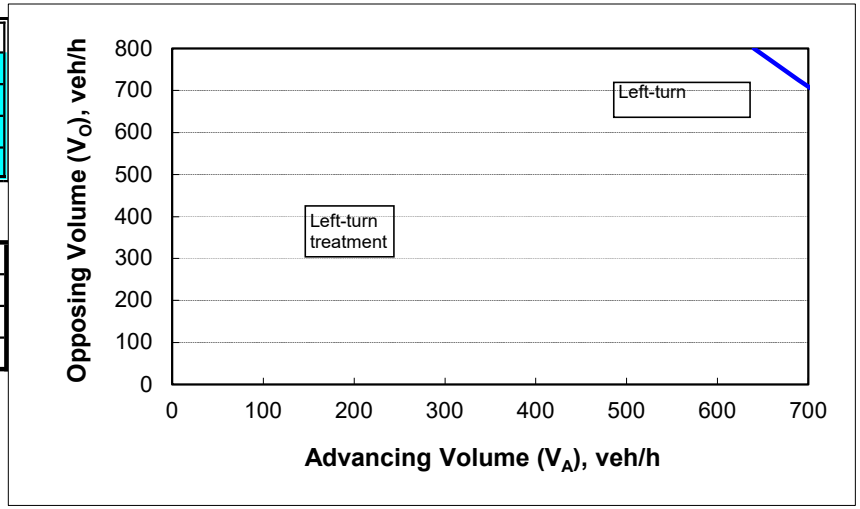
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	737
Opposing volume (V_O), veh/h:	413

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	947
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Valleybend Lane at US-411
SB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

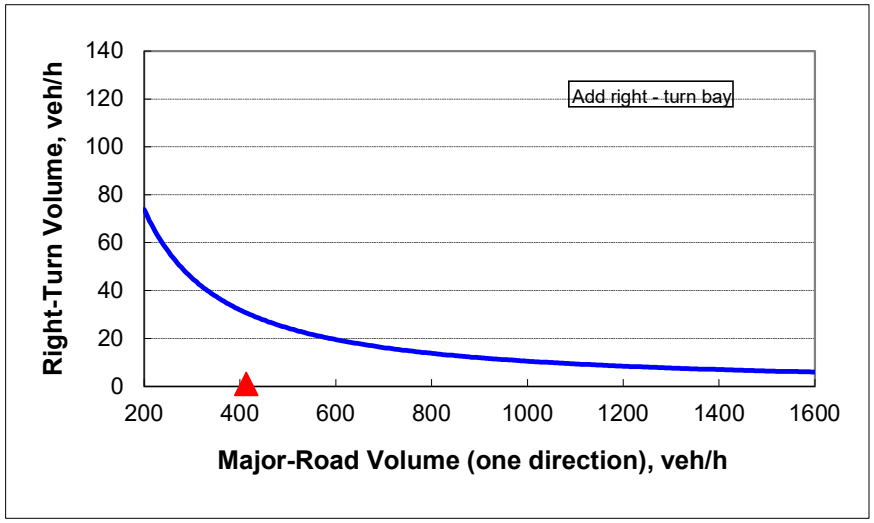
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	413
Right-turn volume, veh/h:	1

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	31
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Washington Drive/Verbena Drive @ US-411
NB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

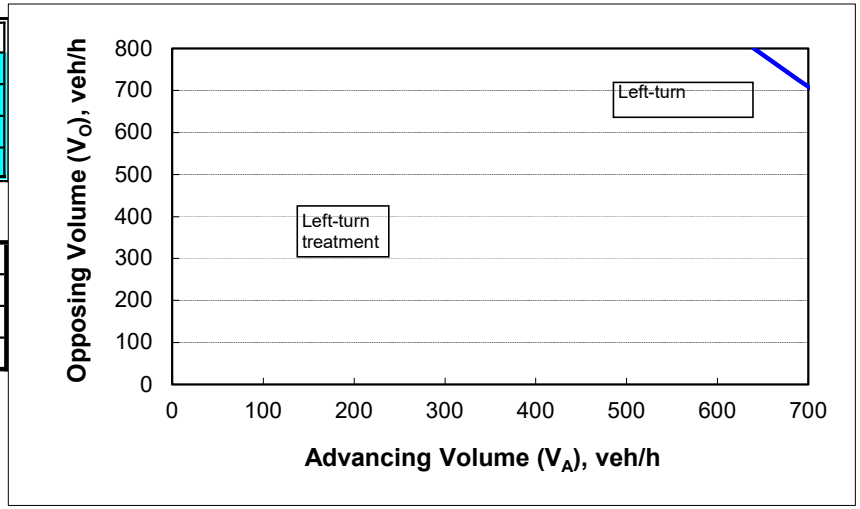
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	595
Opposing volume (V_O), veh/h:	886

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	588
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Washington Drive at US-411
NB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

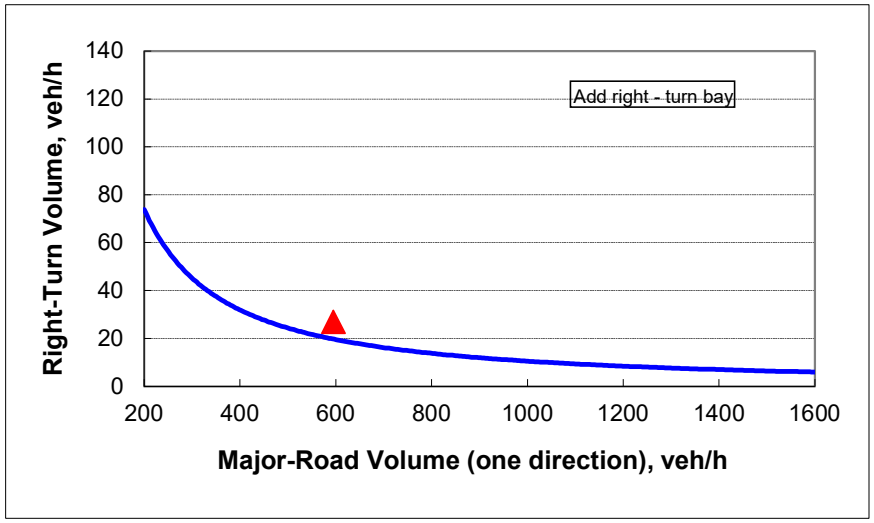
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	595
Right-turn volume, veh/h:	27

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	20
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Washington Drive/Verbena Drive @ US-411
SB Left Turn Lane Warrant
AM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

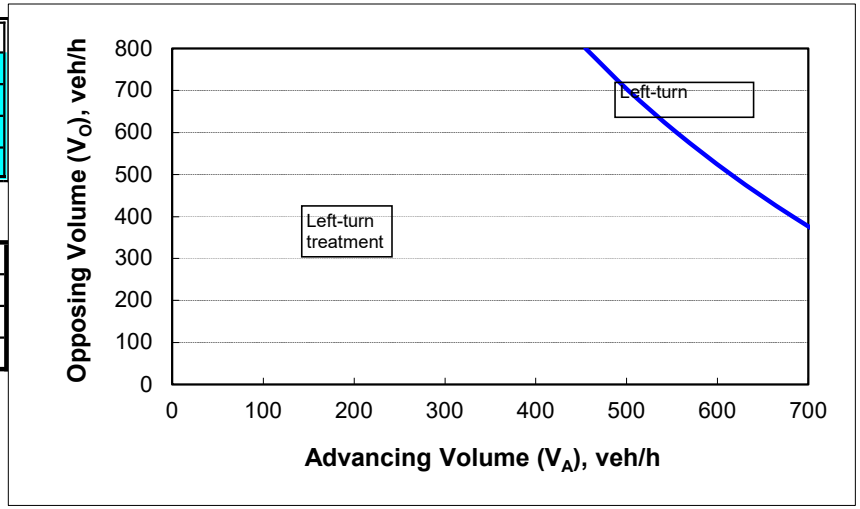
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	903
Opposing volume (V_O), veh/h:	590

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	561
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Washington Drive at US-411
SB Right Turn Lane Warrant
AM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

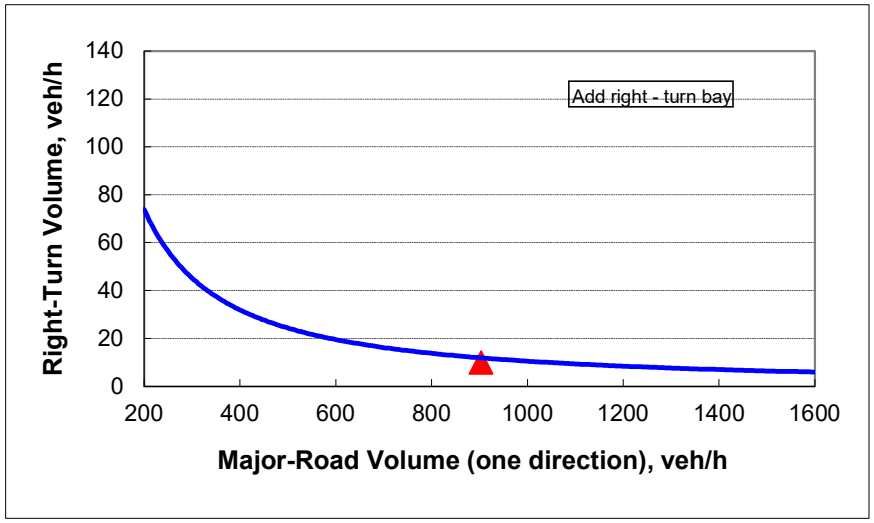
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	903
Right-turn volume, veh/h:	10

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	12
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Washington Drive/Verbena Drive @ US-411
NB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

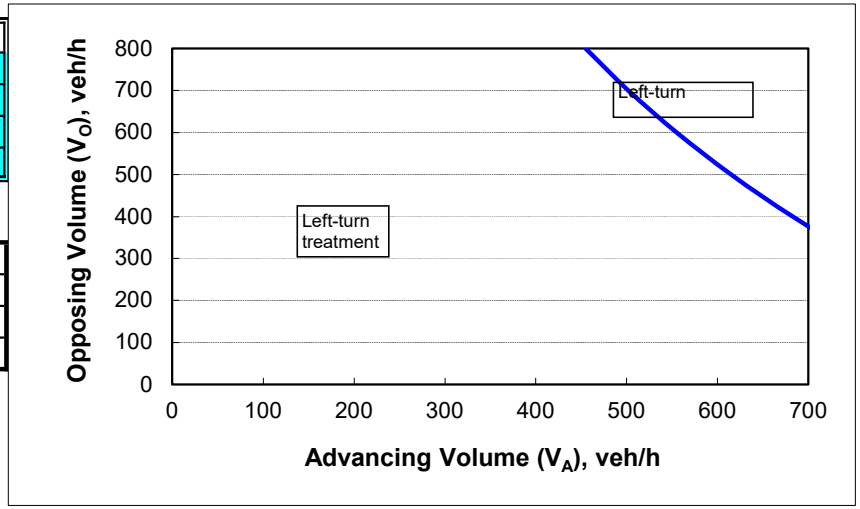
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	913
Opposing volume (V_O), veh/h:	545

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	587
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Washington Drive at US-411
NB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

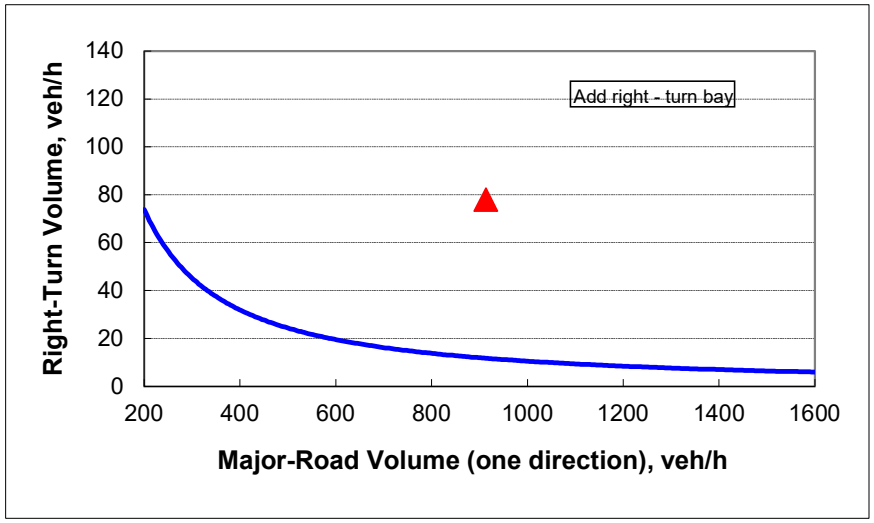
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	913
Right-turn volume, veh/h:	78

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	12
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Washington Drive/Verbena Drive @ US-411
SB Left Turn Lane Warrant
PM Existing

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

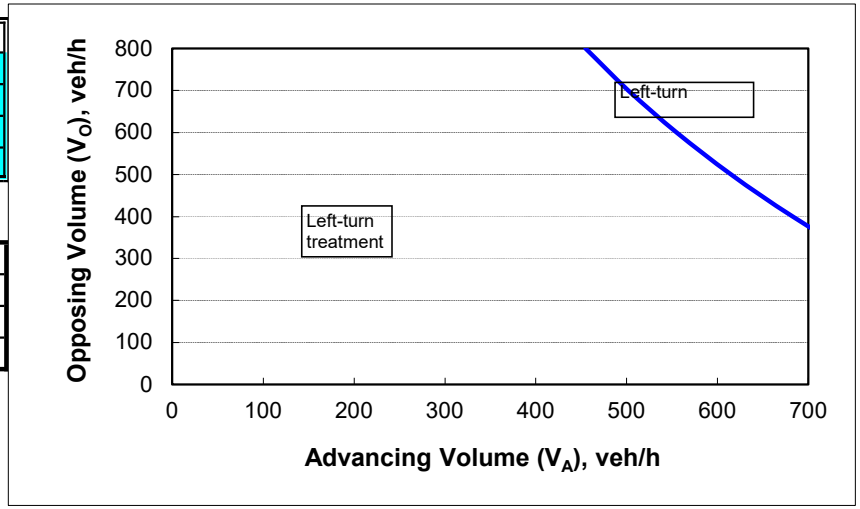
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	558
Opposing volume (V_O), veh/h:	892

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	416
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Washington Drive at US-411
SB Right Turn Lane Warrant
PM Existing

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

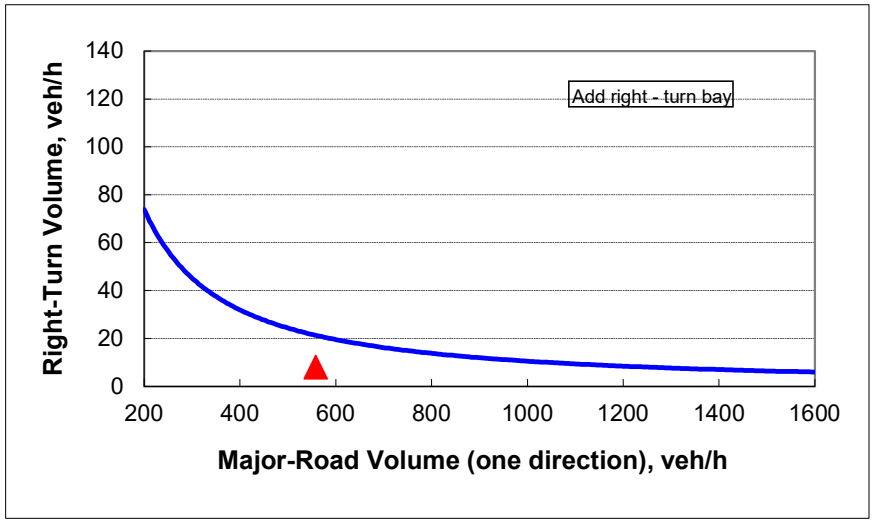
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	558
Right-turn volume, veh/h:	8

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	21
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



SAIN ASSOCIATES

CELEBRATING 50 YEARS

Appendix E – Signal Warrant Evaluation Reports

TRAFFIC SIGNAL WARRANTS

City/Town:	Moody	Analysis Performed By:	DEC
County:	St. Clair	Date Analysis Performed:	6/1/2022
Division:	ALDOT East Central	Project Number if Applicable:	220104
Data Date:	5/4/2022	Weather Conditions:	Overcast

Major Route:	US-411	Appr. Lanes:	1	Critical Approach Speed (mph):	50
Minor Route:	Washington Drive/Verbena Drive	Appr. Lanes:	1		

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? [X] Yes [ ] No
2. Is the intersection in a built-up area or isolated community of <10,000 population? [ ] Yes [ ] No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level [X] 70% [ ] 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied.

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied, given adequate trials of other remedial measures have been tried.

Satisfied: [ ] Yes [X] No

Adequate trial(s) of other remedial measures tried: [ ] Yes [X] No

List Remedial Measures Tried (Required for 80% Combination of A & B)

Condition A - Minimum Vehicular Volume & Condition B - Interruption of Continuous Traffic

100% Satisfied: [ ] Yes [X] No

(Used if neither Condition A or B is satisfied) 80% Satisfied: [ ] Yes [X] No

	(volumes in veh/hr)	Minimum Requirements				Eight Highest Hours							
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%	6 AM	7 AM	8 AM	12 PM	3PM	4PM	5PM	6PM
W - 1A 100%	Both Approaches on Major Street	500	350	600	420	950	1,498	1,017	1,073	1,394	1,342	1,471	1,102
	Highest Approach on Minor Street	150	105	200	140	64	110	50	45	48	48	56	46
	(volumes in veh/hr)	Minimum Requirements				6 AM	7 AM	8 AM	12 PM	3PM	4PM	5PM	6PM
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 100%	Both Approaches on Major Street	750	525	900	630	950	1,498	1,017	1,073	1,394	1,342	1,471	1,102
	Highest Approach on Minor Street	75	53	100	70	64	110	50	45	48	48	56	46
	(volumes in veh/hr)	Minimum Requirements				6 AM	7 AM	8 AM	12 PM	3PM	4PM	5PM	6PM
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1A 80%	Both Approaches on Major Street	400	280	480	336	950	1,498	1,017	1,073	1,394	1,342	1,471	1,102
	Highest Approach on Minor Street	120	84	160	112	64	110	50	45	48	48	56	46
	(volumes in veh/hr)	Minimum Requirements				6 AM	7 AM	8 AM	12 PM	3PM	4PM	5PM	6PM
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 80%	Both Approaches on Major Street	600	420	720	504	950	1,498	1,017	1,073	1,394	1,342	1,471	1,102
	Highest Approach on Minor Street	60	42	80	56	64	110	50	45	48	48	56	46

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

TRAFFIC SIGNAL WARRANTS

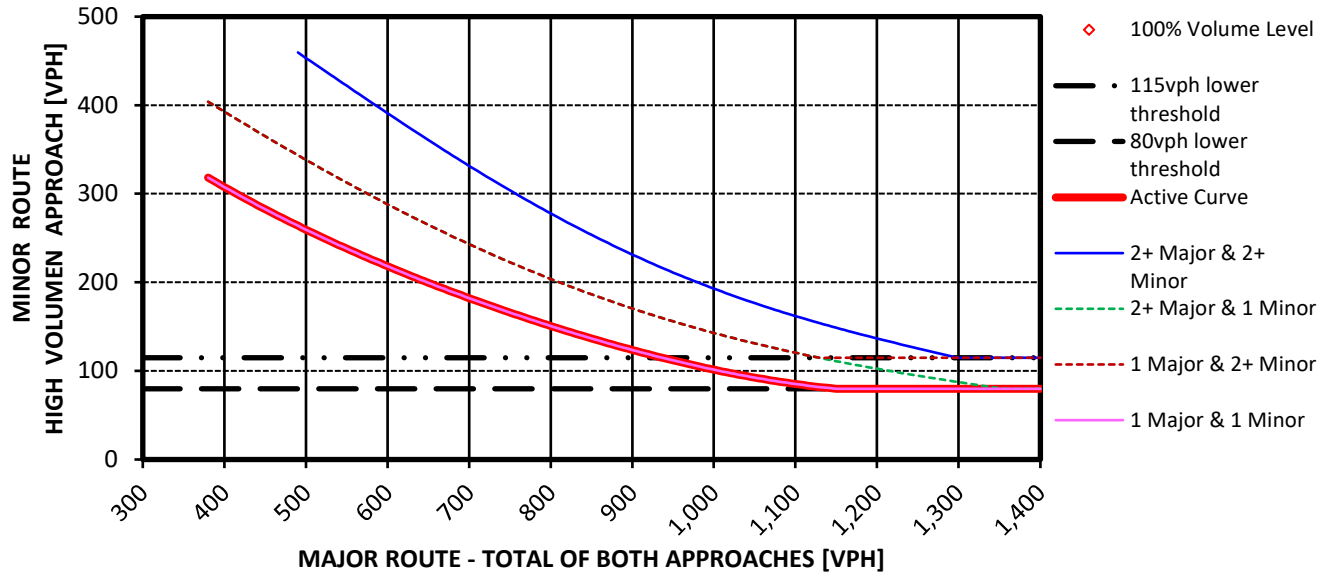
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Satisfied: ☐ Yes ☒ No

If all four points lie above the appropriate line, then this warrant is satisfied.

(Volumes in veh/hr)	Four Highest Hours			
	6 AM	7 AM	8 AM	5 PM
SUM of Both Approaches on Major Street	950	1,498	1,017	1,471
Highest Minor Street Approach	64	110	50	56

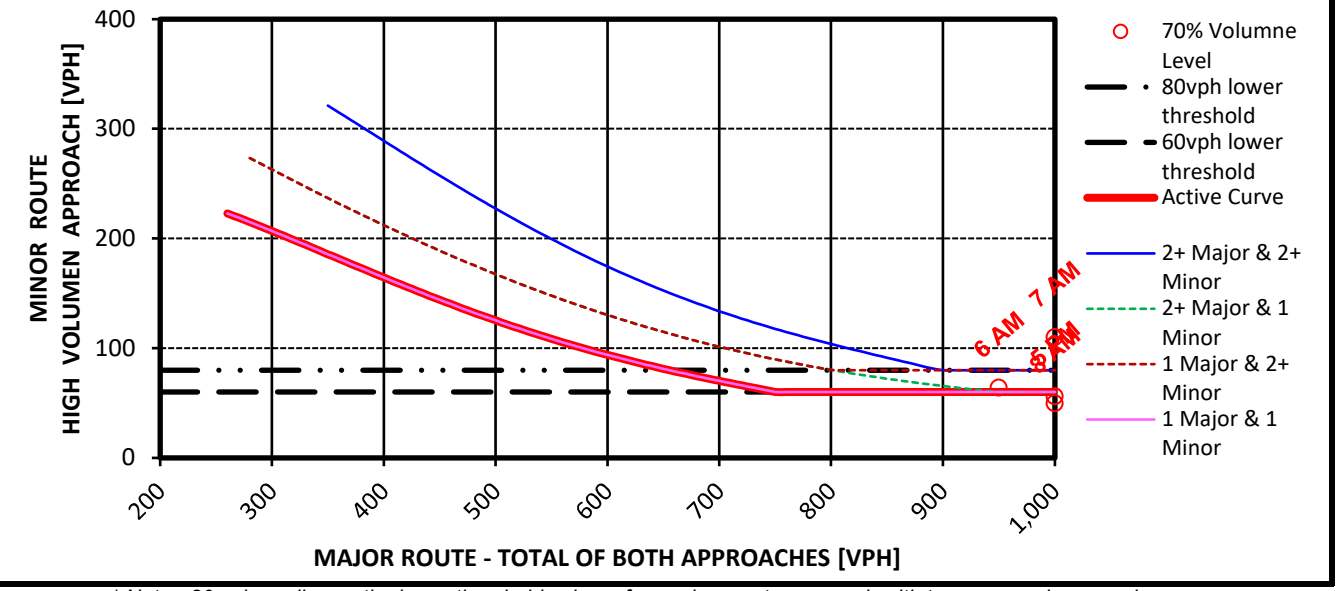
FIGURE W-2: Criteria for "100%" Volume Level



** Note: 115 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

FIGURE W-2: Criteria for "70%" Volume Level

(Community less-than 10,000 population or speeds greater-than 70 km/hr [40 mph] on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 60 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANT SUMMARY

City/Town: Moody
County: St. Clair
Division: ALDOT East Central
Data Date: 5/4/2022

Analysis Performed By: DEC
Date Analysis Performed: 6/1/2022
Project Number if Applicable: 220104
Weather Conditions: Overcast

Major Route: US-411 Appr. Lanes: 1
Minor Route: Washington Drive/Verbena Drive Appr. Lanes: 1
Critical Approach Speed (mph): 50

	80% Satisfied		100% Satisfied	
	SATISFIED			
Warrant #1: Eight-Hour Vehicular Volume		[ ] Yes [X] No		
1A - Minimum Vehicular Volume:	[ ] Yes	[X] No	[ ] Yes	[X] No
1B - Interruption of Continuous Traffic:	[X] Yes	[ ] No	[ ] Yes	[X] No

Any Remedial Measures Tried and their Outcome.

Warrant #2: Four-Hour Vehicular Volume [ ] Yes [X] No

Warrant #3: Peak Hour [ ] Yes [X] No

The Unusual Case(s) that Justifies the use of this Warrant.

Warrant #4: Pedestrian Volume [ ] Yes [X] No

Warrant #5: School Crossing [ ] Yes [X] No

Any Remedial Measures Implemented to improve the Safety of the Students.

Warrant #6: Coordinated Signal System [ ] Yes [X] No

Warrant #7: Crash Experience [ ] Yes [X] No

Other Alternatives that have failed to reduce crashes.

Warrant #8: Roadway Network [ ] Yes [X] No

Warrant #9: Intersection Near a Grade Crossing [ ] Yes [X] No

CONCLUSIONS

Warrants Satisfied: [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Remarks:

TRAFFIC SIGNAL WARRANTS

City/Town:	Moody	Analysis Performed By:	DEC
County:	St. Clair	Date Analysis Performed:	6/1/2022
Division:	ALDOT East Central	Project Number if Applicable:	220104
Data Date:	5/4/2022	Weather Conditions:	Overcast

Major Route:	US-411	Appr. Lanes:	1	Critical Approach Speed (mph):	50
Minor Route:	High School Drive	Appr. Lanes:	1		

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? [X] Yes [ ] No
2. Is the intersection in a built-up area or isolated community of <10,000 population? [ ] Yes [ ] No

If Question 1 or 2 above is answered "Yes", then use "70%" volume level [X] 70% [ ] 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied. Satisfied: [ ] Yes [X] No

Warrant is also satisfied if both Condition A and Condition B are "80%" satisfied, given adequate trials of other remedial measures have been tried.

Adequate trial(s) of other remedial measures tried: [ ] Yes [X] No

List Remedial Measures Tried (Required for 80% Combination of A & B)

Condition A - Minimum Vehicular Volume & Condition B - Interruption of Continuous Traffic

100% Satisfied: [ ] Yes [X] No

(Used if neither Condition A or B is satisfied) 80% Satisfied: [ ] Yes [X] No

	(volumes in veh/hr)	Minimum Requirements				Eight Highest Hours							
	Approach Lanes	1		2 or more		7AM	8AM	11AM	1PM	2PM	3PM	4PM	5PM
	Volume Level	100%	70%	100%	70%								
W - 1A 100%	Both Approaches on Major Street	500	350	600	420	1,423	874	805	889	1,096	1,083	1,102	1,179
	Highest Approach on Minor Street	150	105	200	140	280	39	41	41	135	322	74	107
	(volumes in veh/hr)	Minimum Requirements				7AM	8AM	11AM	1PM	2PM	3PM	4PM	5PM
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 100%	Both Approaches on Major Street	750	525	900	630	1,423	874	805	889	1,096	1,083	1,102	1,179
	Highest Approach on Minor Street	75	53	100	70	280	39	41	41	135	322	74	107
	(volumes in veh/hr)	Minimum Requirements				7AM	8AM	11AM	1PM	2PM	3PM	4PM	5PM
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1A 80%	Both Approaches on Major Street	400	280	480	336	1,423	874	805	889	1,096	1,083	1,102	1,179
	Highest Approach on Minor Street	120	84	160	112	280	39	41	41	135	322	74	107
	(volumes in veh/hr)	Minimum Requirements				7AM	8AM	11AM	1PM	2PM	3PM	4PM	5PM
	Approach Lanes	1		2 or more									
	Volume Level	100%	70%	100%	70%								
W - 1B 80%	Both Approaches on Major Street	600	420	720	504	1,423	874	805	889	1,096	1,083	1,102	1,179
	Highest Approach on Minor Street	60	42	80	56	280	39	41	41	135	322	74	107

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal*

TRAFFIC SIGNAL WARRANTS

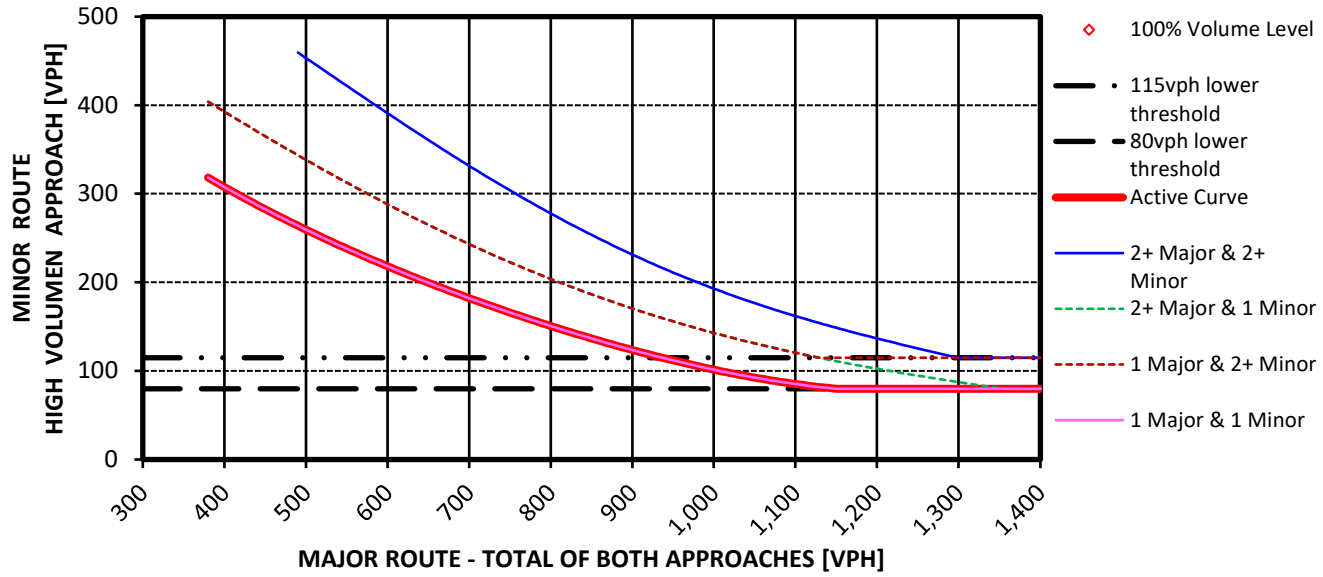
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

Satisfied: [X] Yes [ ] No

If all four points lie above the appropriate line, then this warrant is satisfied.

(Volumes in veh/hr)	Four Highest Hours			
	7AM	2PM	3PM	5PM
SUM of Both Approaches on Major Street	1,423	1,096	1,102	1,179
Highest Minor Street Approach	280	135	322	107

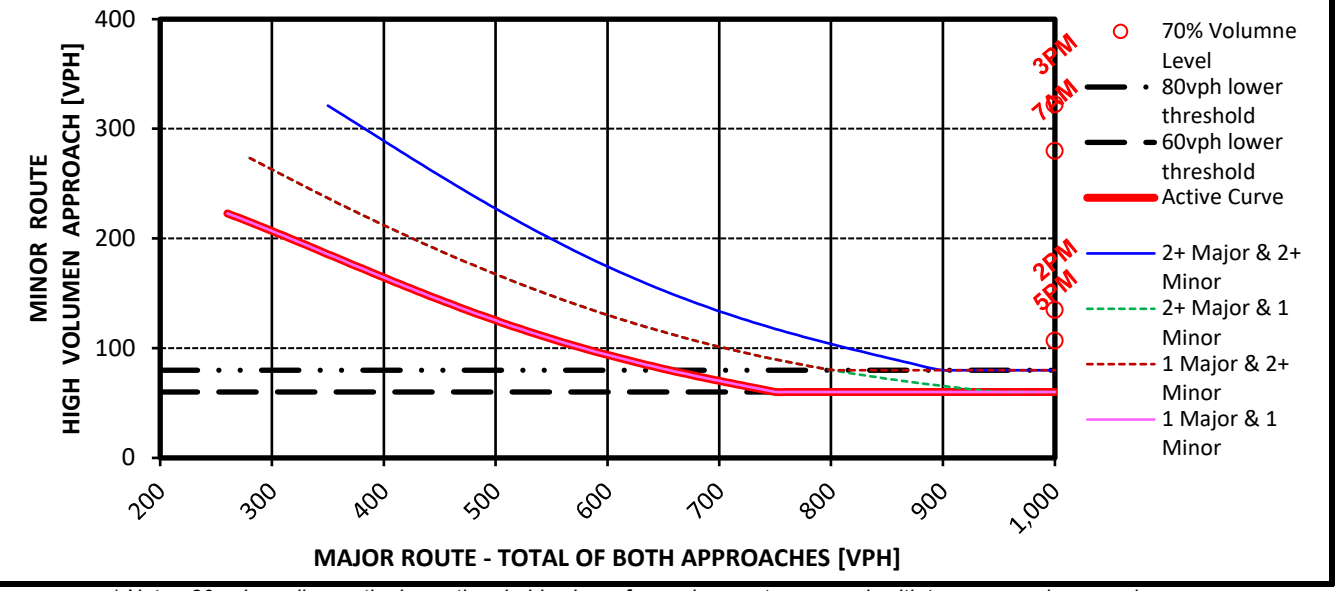
FIGURE W-2: Criteria for "100%" Volume Level



** Note: 115 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

FIGURE W-2: Criteria for "70%" Volume Level

(Community less-than 10,000 population or speeds greater-than 70 km/hr [40 mph] on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor route approach with two or more lanes and 60 vph applies as the lower threshold volume threshold for a minor route approach with one lane.*

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

TRAFFIC SIGNAL WARRANT SUMMARY

City/Town:	Moody	Analysis Performed By:	DEC
County:	St. Clair	Date Analysis Performed:	6/1/2022
Division:	ALDOT East Central	Project Number if Applicable:	220104
Data Date:	5/4/2022	Weather Conditions:	Overcast

Major Route:	US-411	Appr. Lanes:	1	Critical Approach Speed (mph): 50
Minor Route:	High School Drive	Appr. Lanes:	1	

SATISFIED

Warrant #1: Eight-Hour Vehicular Volume — [ ] Yes [X] No

	80% Satisfied		100% Satisfied	
1A - Minimum Vehicular Volume:	[ ] Yes	[X] No	[ ] Yes	[X] No
1B - Interruption of Continuous Traffic:	[ ] Yes	[X] No	[ ] Yes	[X] No

Any Remedial Measures Tried and their Outcome.

Warrant #2: Four-Hour Vehicular Volume — [X] Yes [ ] No

Warrant #3: Peak Hour — [ ] Yes [X] No

The Unusual Case(s) that Justifies the use of this Warrant.

Warrant #4: Pedestrian Volume — [ ] Yes [X] No

Warrant #5: School Crossing — [ ] Yes [X] No

Any Remedial Measures Implemented to improve the Safety of the Students.

Warrant #6: Coordinated Signal System — [ ] Yes [X] No

Warrant #7: Crash Experience — [ ] Yes [X] No

Other Alternatives that have failed to reduce crashes.

Warrant #8: Roadway Network — [ ] Yes [X] No

Warrant #9: Intersection Near a Grade Crossing — [ ] Yes [X] No

CONCLUSIONS

Warrants Satisfied: 2

Remarks:

NOTE: *The satisfaction of a warrant or warrants shall not in itself require the installation of a traffic control signal.*

SAIN ASSOCIATES

CELEBRATING 50 YEARS

Appendix F – Verbena Drive Plat and Technical Memorandum

DEED BOOK 2015, PAGE 10,000

N 88°30'25" W 657.86'

EXISTING 1" PIPE

S 17°30'35" W 37.89'

EXISTING 1/2" CRIMPED PIPE

EXISTING 1 1/4" PIPE

ARBORS OF AVALON PHASE FOUR MAP BOOK 2015, PAGE 6

ARBORS OF AVALON PHASE ONE MAP BOOK 19857, PAGE 9

ARBORS OF AVALON PHASE TWO MAP BOOK 2013, PAGE 12

Detention Area

Common Area

SUNFLOWER LANE (50' R/W)

VERBENA DRIVE (50' R/W)

RIDGECOURT (50' R/W)

35' BUILDING SETBACK LINE

10' UTILITY EASEMENT

20' DRAINAGE EASEMENT

SANITARY SEWER MANHOLE
RIM = 719.62
FL = 710.61 (I)
FL = 710.23 (O)

S 64°59'30" E 229.75'

S 25°00'30" E 182.44'

N 25°00'30" E 151.08'

N 25°00'30" E 89.42'

N 33°09'35" W 135.89'

N 33°09'35" W 146.04'

N 33°09'35" W 146.36'

N 33°09'35" W 321.79'

N 33°09'35" W 287.07'

N 33°09'35" W 185.57'

N 33°09'35" W 219.43'

N 33°09'35" W 234.56'

N 32°00'35" E 146.14'

S 24°44'45" W 172.53'

S 58°43'05" E 63.81'

N 58°30'25" E 222.66'

N 58°30'25" E 70.00'

S 58°33'05" E 77.77'

N 48°18'10" E 63.78'

N 58°50'25" E 117.04'

N 32°50'50" E 359.94'

N 59°37'40" W 146.82'

N 59°37'40" W 175.56'

N 59°37'40" W 160.33'

S 52°22'25" E 146.56'

N 57°50'20" E 160.17'

N 32°44'50" E 111.07'

N 35°49'35" E 405.59'

N 32°50'50" E 77.86'

N 88°33'35" W 198.19'

N 88°33'35" W 236.71'

N 82°58'55" W 145.26'

N 89°58'35" E 47.38'

N 89°53'00" W 134.08'

N 89°07'25" W 216.66'

S 89°25'55" W 914.08'

1/4 1/4 LINE

S 01°51'30" W 1383.17'

1/4 1/4 LINE

EXISTING 5/8" REBAR

EXISTING 1/2" REBAR

EXISTING 1" PIPE

NE CORNER SE 1/4 OF SE 1/4 SEC. 36, T16S, R1E

NW CORNER SW 1/4 OF SW 1/4 SEC. 31, T16S, R1E

SEC. 36, T16S, R1E

SEC. 31, T16S, R2E

LOT 9
THE HIGHLANDS SUBDIVISION
SECTOR ONE
SLIDE A-85, PAGE 7

LOT 10

PART OF THE NW 1/4 OF SW 1/4 SEC. 31, T16S, R2E CONTAINING 26.49 ACRES

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

29 28 27 26 25

SKIPPER
CONSULTING INC

3644 Vann Road, Suite 100
Birmingham, Alabama 35235
Phone (205) 655-8855 Fax (205) 655-8825

Technical Memorandum

TO: **Keith Hager**

From: **D. Scott Skipper**

Date: **March 23, 2018**

Subject: **US 411 at Verbena Drive/Washington Drive**
Moody, Alabama
Traffic Signal Warrant Assessment

The document outlines preliminary traffic signal warrant analyses conducted for the U.S. Highway 411 at Verbena Drive/Washington Drive intersection in Moody, Alabama. U.S. Highway 411 is a two-lane roadway with a posted speed limit of 50 miles per hour. Both Verbena Drive and Washington Drive are two-lane local roadways providing access to primarily residential development. Currently, the study intersection is controlled by side street stop signs.

Peak period traffic counts were conducted at the study intersection from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. Additionally, hourly approach traffic counts for a 24-hour period were conducted for each approach of the study intersection. Traffic count data is also provided in the attached for reference.

Signal warrant evaluations were conducted for the subject intersection based on existing traffic counts and signal warrant criteria contained in the Federal Highway Administration's *Manual on Uniform Traffic Control Devices*, 9th Edition (MUTCD). The evaluations consisted of comparing existing traffic volumes with signal warrant criteria of the MUTCD for Warrant 1 (Eight-Hour Vehicular Volumes), Warrant 2 (Four-Hour Vehicular Volume) and Warrant 3 (Peak Hour). The results of these comparisons indicate that existing traffic volumes are not sufficient to meet the minimum criteria for traffic signalization based on MUTCD criteria. For reference, the signal warrant summary for existing conditions is provided in the attachment.

Since existing volumes would not be sufficient to meet the signal warrant criteria of the MUTCD, projected volumes for the proposed residential development to the east along Verbena Drive was considered. The proposed residential includes 35 lots. Traffic projected as a result of the proposed 35 lots was estimated based upon information contained in the Institute of Transportation Engineers' publication *Trip Generation*. The trip generation estimates for the proposed 35 residential homes is provided in the following table.

Trip Generation Estimates

Land Use (ITE#)	D.U,	Weekday Trips	AM Peak In	AM Peak Out	PM Peak In	PM Peak Out
Single-Family Detached Housing (210)	35	396	7	22	23	14

The trips expected to be generated by the proposed residential development was assigned to the study intersection based upon the current distribution patterns which exist.

Using projected hourly traffic volumes for the study intersection, signal warrant analyses were conducted by comparing projected hourly traffic volumes with the signal warrant criteria of the MUTCD. Based upon this comparison, it appears projected traffic volumes resulting from the additional residential homes plus existing traffic volumes would be sufficient to meet traffic signal warrant criteria. It is anticipated traffic generated by approximately 15-20 occupied homes plus existing traffic volumes would be sufficient meet the signal warrant criteria of the MUTCD. For reference, signal warrant worksheets for projected volumes (assuming development of 35 residential homes) are provided in the attached.

It should be noted that approval of traffic signal warrants would be based on review and approval by the Alabama Department of Transportation. It should also be noted that turn lanes on U.S. Highway 411 are justified by current volumes and consideration for installation of a traffic signal should include consideration for construction of left-turn lanes and possibly right-turn lanes on U.S. Highway 411. Also, consideration for side street turn lanes should be considered.

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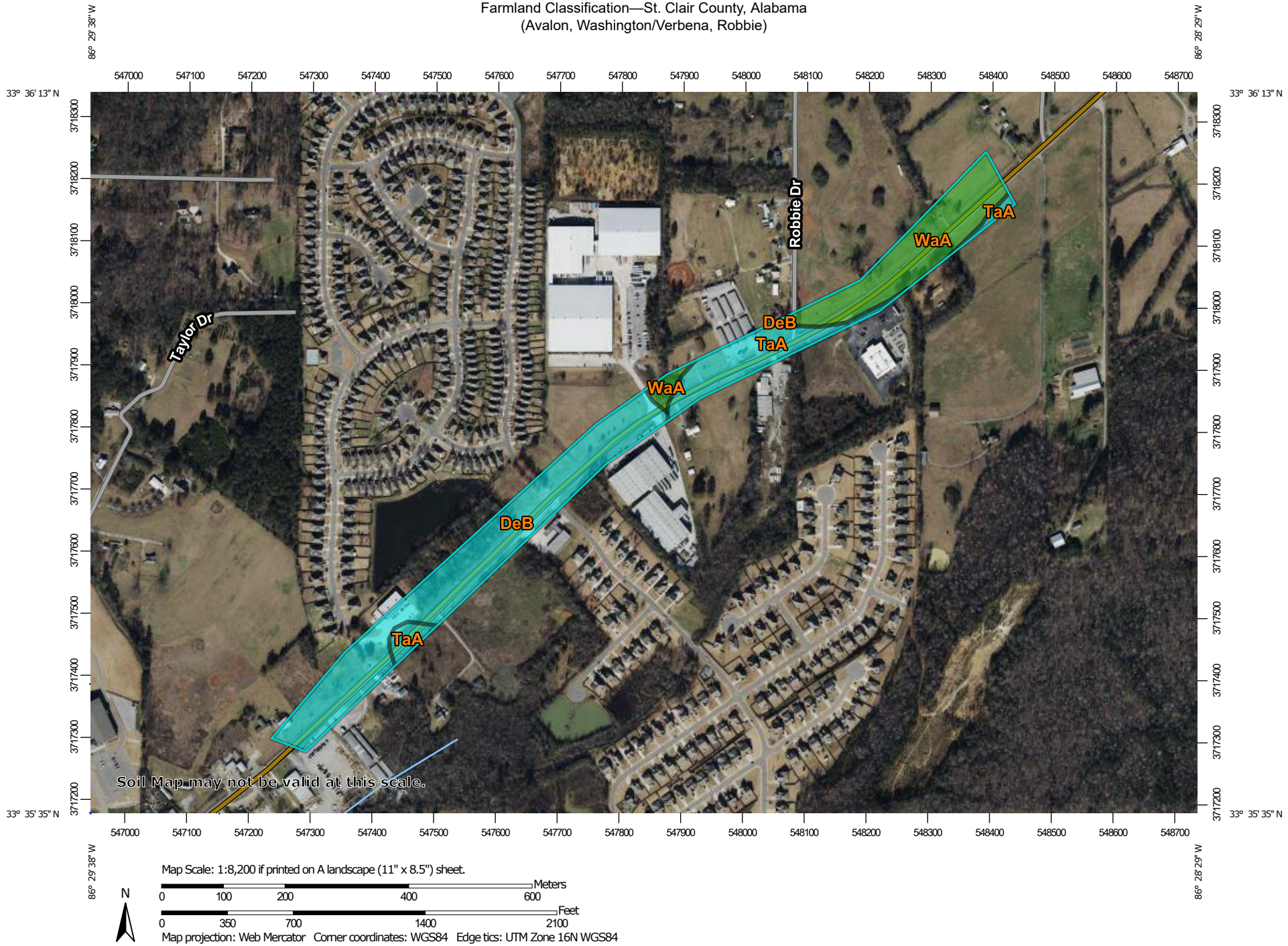
Appendix G – NCRS Web Soil Survey

Farmland Classification—St. Clair County, Alabama
(Avalon, Washington/Verbena, Robbie)



Map Scale: 1:8,200 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DeB	Dewey loam, 2 to 6 percent slopes	Farmland of statewide importance	12.3	51.5%
TaA	Tanyard silt loam, 0 to 2 percent slopes	Farmland of statewide importance	4.7	19.5%
WaA	Wax loam, 0 to 3 percent slopes	All areas are prime farmland	7.0	29.0%
Totals for Area of Interest			**23.9**	**100.0%**

Description

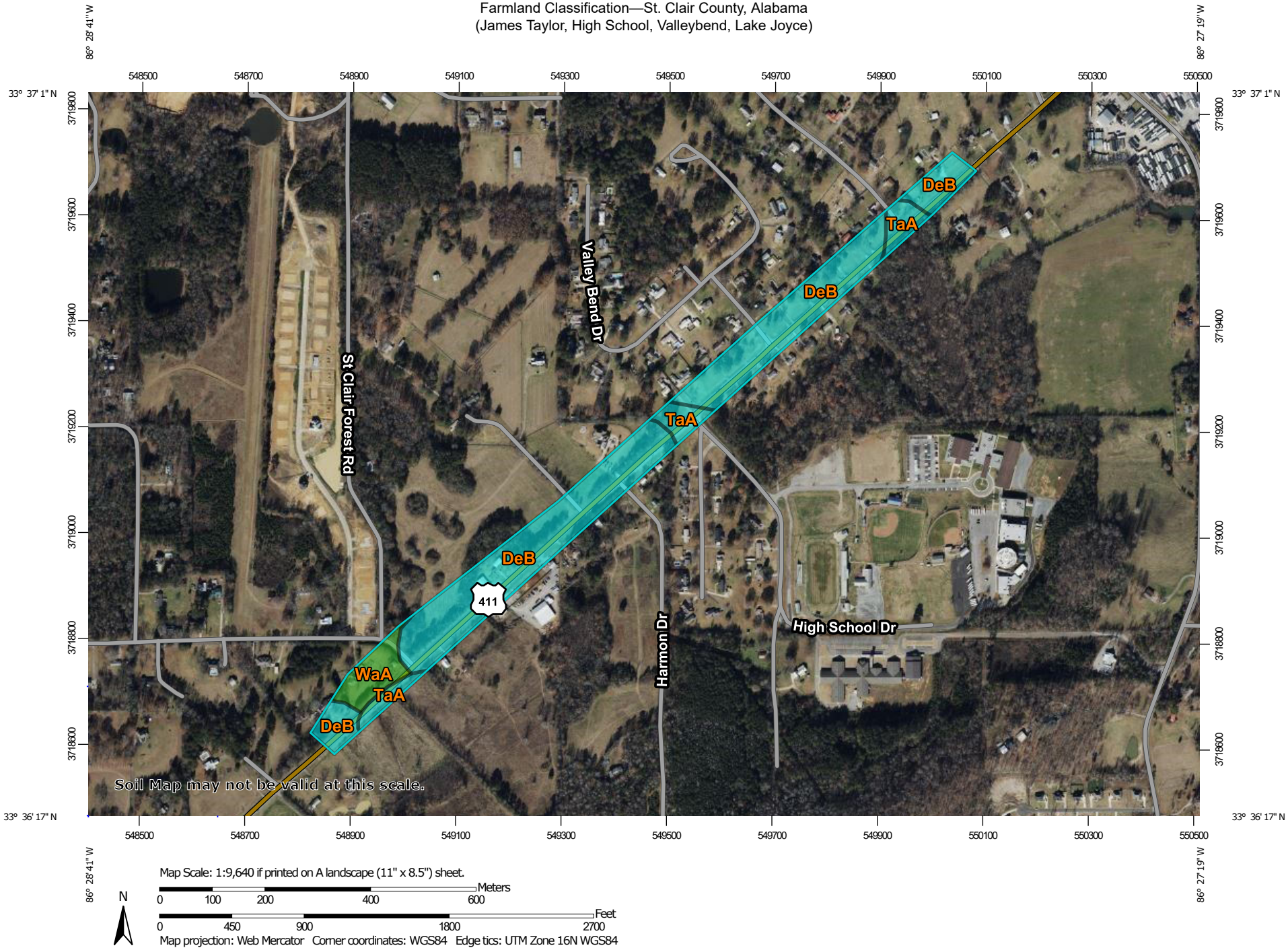
Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Farmland Classification—St. Clair County, Alabama
(James Taylor, High School, Valleybend, Lake Joyce)



Map Scale: 1:9,640 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
DeB	Dewey loam, 2 to 6 percent slopes	Farmland of statewide importance	24.7	80.7%
TaA	Tanyard silt loam, 0 to 2 percent slopes	Farmland of statewide importance	3.3	10.9%
WaA	Wax loam, 0 to 3 percent slopes	All areas are prime farmland	2.6	8.4%
Totals for Area of Interest			**30.6**	**100.0%**

Description

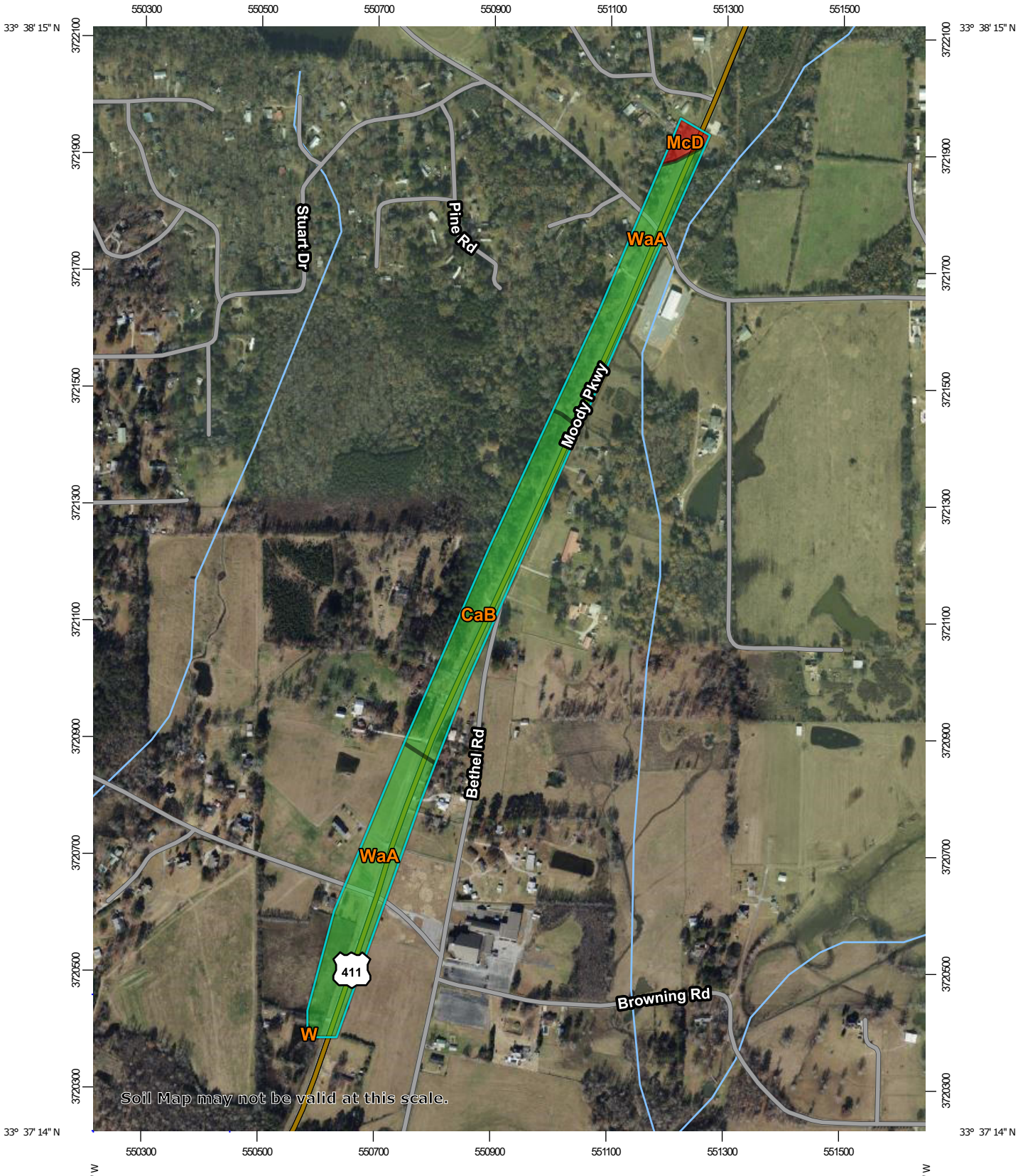
Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Farmland Classification—St. Clair County, Alabama
(Myers/Church, Bethel, Stuart/Copeland)



Map Scale: 1:9,230 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CaB	Cane loam, 2 to 8 percent slopes	All areas are prime farmland	9.0	35.9%
McD	Minvale cherty loam, 8 to 15 percent slopes	Not prime farmland	0.8	3.2%
W	Water	Not prime farmland	0.0	0.1%
WaA	Wax loam, 0 to 3 percent slopes	All areas are prime farmland	15.3	60.8%
Totals for Area of Interest			**25.1**	**100.0%**

Description

Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime and unique farmlands are published in the "Federal Register," Vol. 43, No. 21, January 31, 1978.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

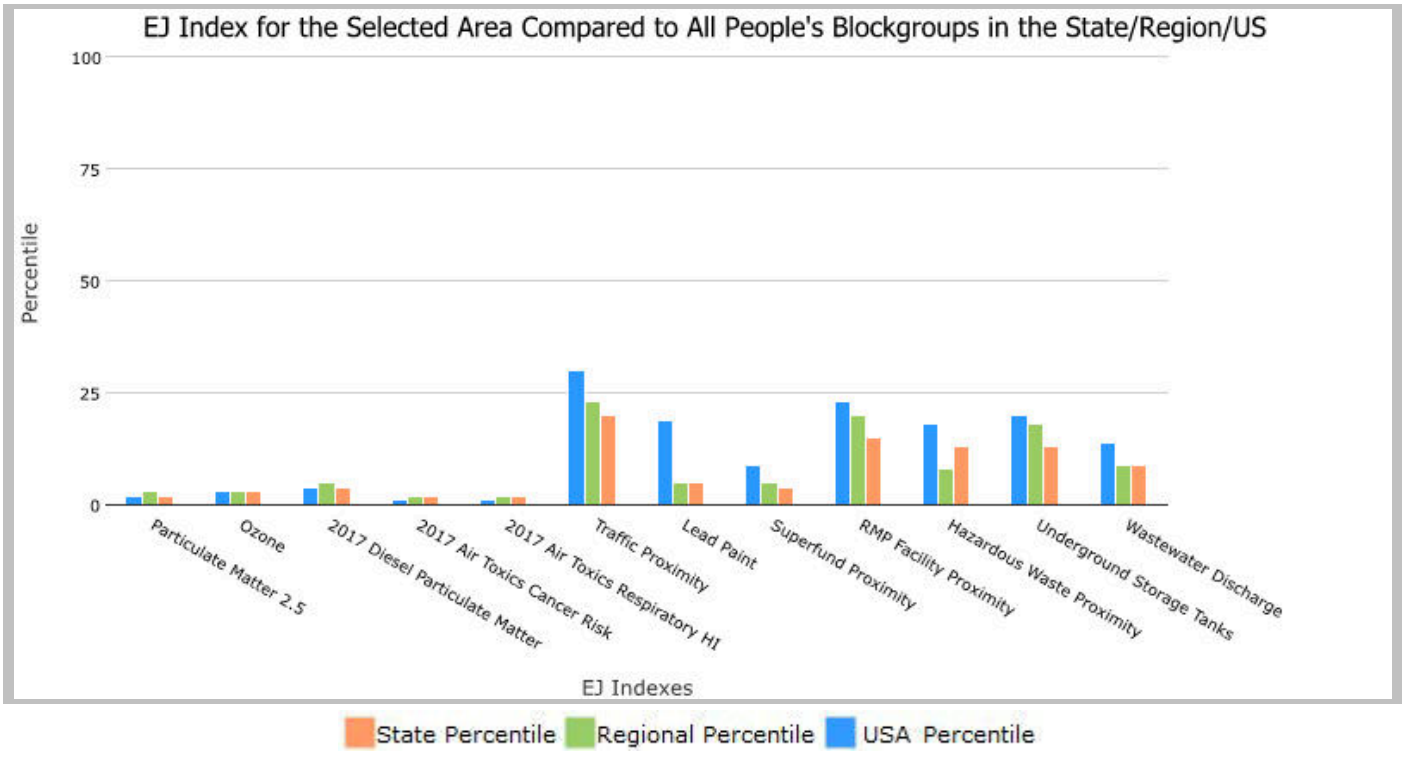
EJScreen Report (Version 2.0)

the User Specified Area, ALABAMA, EPA Region 4

Approximate Population: 952

Input Area (sq. miles): 3.95

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	2	3	2
EJ Index for Ozone	3	3	3
EJ Index for 2017 Diesel Particulate Matter*	4	5	4
EJ Index for 2017 Air Toxics Cancer Risk*	2	2	1
EJ Index for 2017 Air Toxics Respiratory HI*	2	2	1
EJ Index for Traffic Proximity	20	23	30
EJ Index for Lead Paint	5	5	19
EJ Index for Superfund Proximity	4	5	9
EJ Index for RMP Facility Proximity	15	20	23
EJ Index for Hazardous Waste Proximity	13	8	18
EJ Index for Underground Storage Tanks	13	18	20
EJ Index for Wastewater Discharge	9	9	14

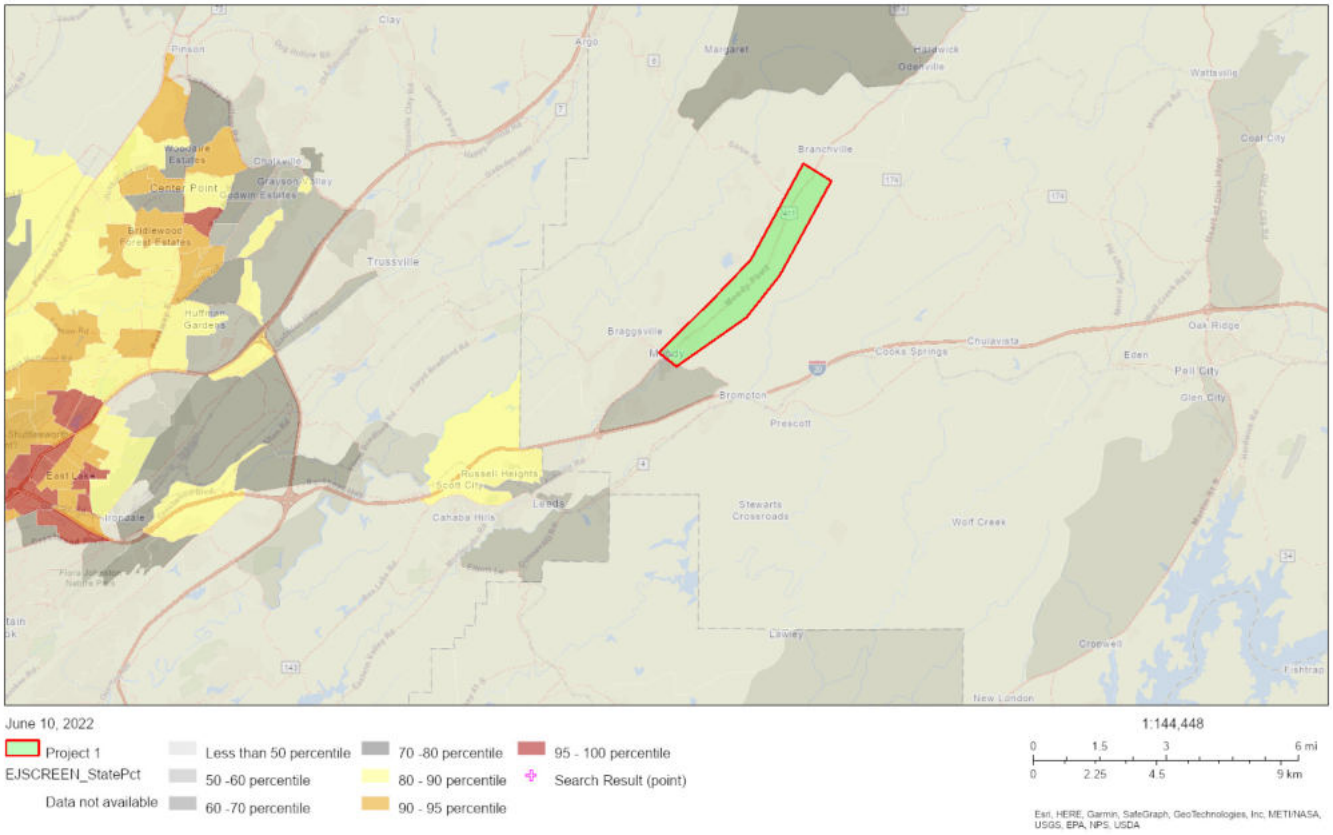


This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJScreen Report (Version 2.0)

the User Specified Area, ALABAMA, EPA Region 4

Approximate Population: 952
Input Area (sq. miles): 3.95



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJScreen Report (Version 2.0)

the User Specified Area, ALABAMA, EPA Region 4

Approximate Population: 952

Input Area (sq. miles): 3.95

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 (µg/m^3)	9.33	8.9	82	8.18	89	8.74	70
Ozone (ppb)	41.9	39.1	80	37.9	74	42.6	47
2017 Diesel Particulate Matter* (µg/m^3)	0.215	0.216	60	0.261	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	40	34	98	31	95-100th	29	95-100th
2017 Air Toxics Respiratory HI*	0.5	0.47	90	0.4	95-100th	0.36	90-95th
Traffic Proximity (daily traffic count/distance to road)	35	230	31	430	25	710	18
Lead Paint (% Pre-1960 Housing)	0.073	0.18	37	0.15	50	0.28	34
Superfund Proximity (site count/km distance)	0.058	0.054	73	0.083	63	0.13	47
RMP Facility Proximity (facility count/km distance)	0.1	0.41	30	0.6	20	0.75	15
Hazardous Waste Proximity (facility count/km distance)	0.31	0.83	46	0.62	59	2.2	37
Underground Storage Tanks (count/km^2)	0.39	1.7	42	3.5	33	3.9	33
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.0036	0.42	68	0.45	73	12	60
Socioeconomic Indicators							
Demographic Index	17%	36%	18	37%	16	36%	23
People of Color	11%	34%	23	39%	20	40%	23
Low Income	22%	37%	25	35%	29	31%	39
Unemployment Rate	4%	6%	41	6%	41	5%	43
Linguistically Isolated	1%	1%	73	3%	53	5%	47
Less Than High School Education	9%	14%	35	13%	41	12%	48
Under Age 5	8%	6%	70	6%	72	6%	70
Over Age 64	14%	17%	37	17%	43	16%	47

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

SAIN ASSOCIATES

CELEBRATING 50 YEARS

Appendix H – Future Turn Lane Warrant Evaluation Reports

Avalon Drive at US-411
SB Right Turn Lane Warrant
AM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

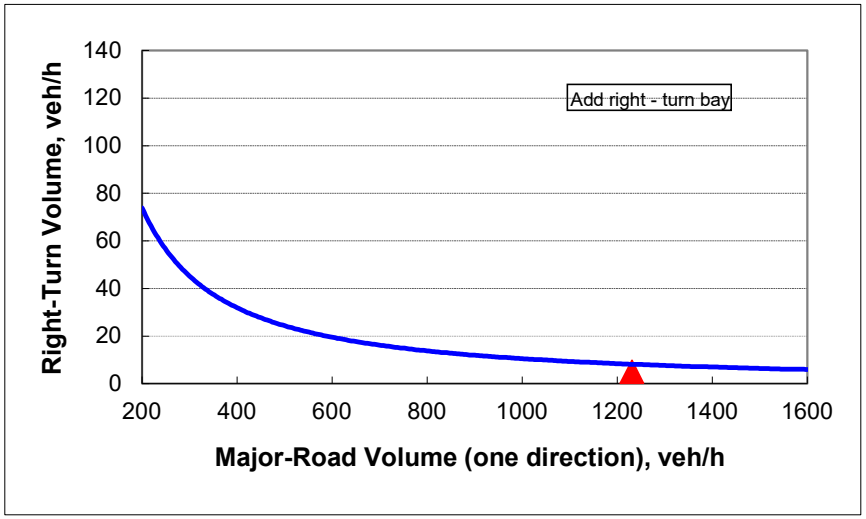
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	1231
Right-turn volume, veh/h:	5

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	8
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Avalon Drive at US-411
SB Right Turn Lane Warrant
PM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

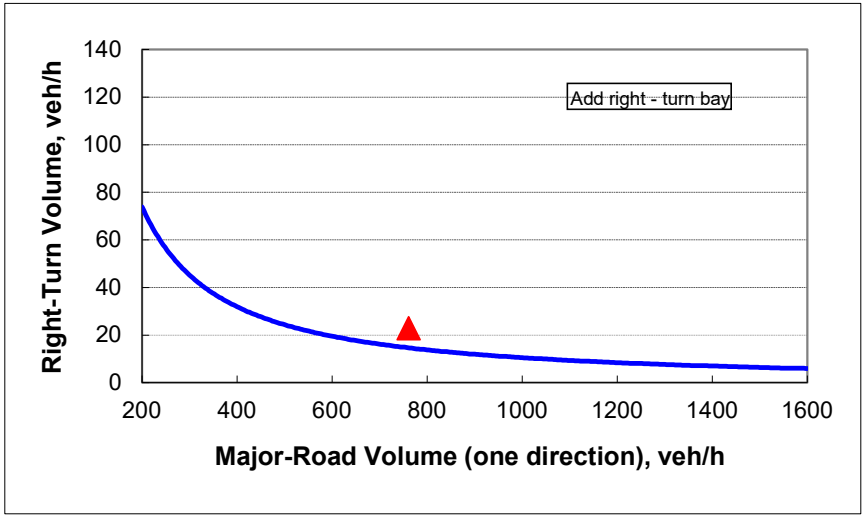
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	761
Right-turn volume, veh/h:	23

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	15
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Bethel Road at US-411
NB Right Turn Lane Warrant
AM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

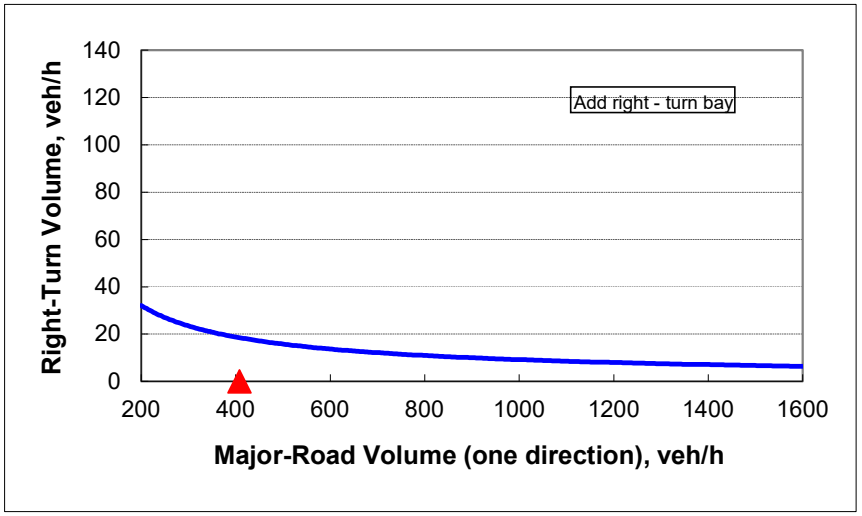
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	408
Right-turn volume, veh/h:	0

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	18
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Bethel Road @ US-411
SB Left Turn Lane Warrant
AM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

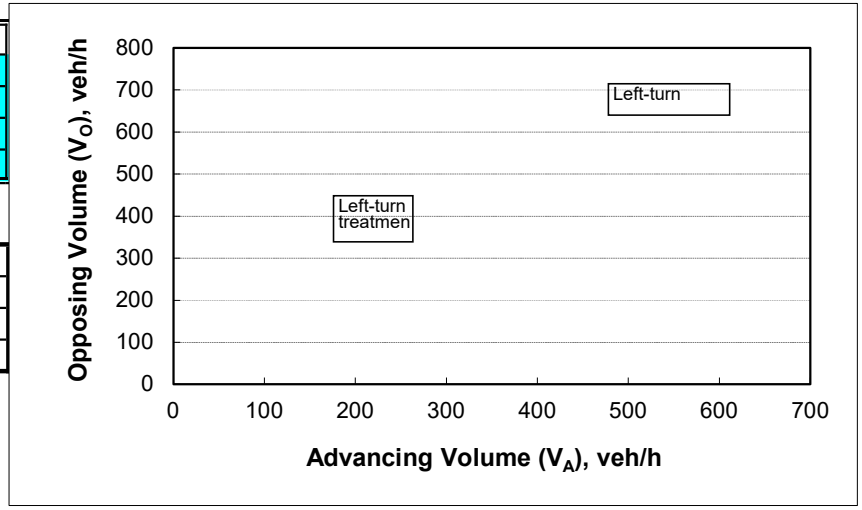
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	0%
Advancing volume (V_A), veh/h:	1151
Opposing volume (V_O), veh/h:	408

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	1697
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Bethel Road at US-411
NB Right Turn Lane Warrant
PM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

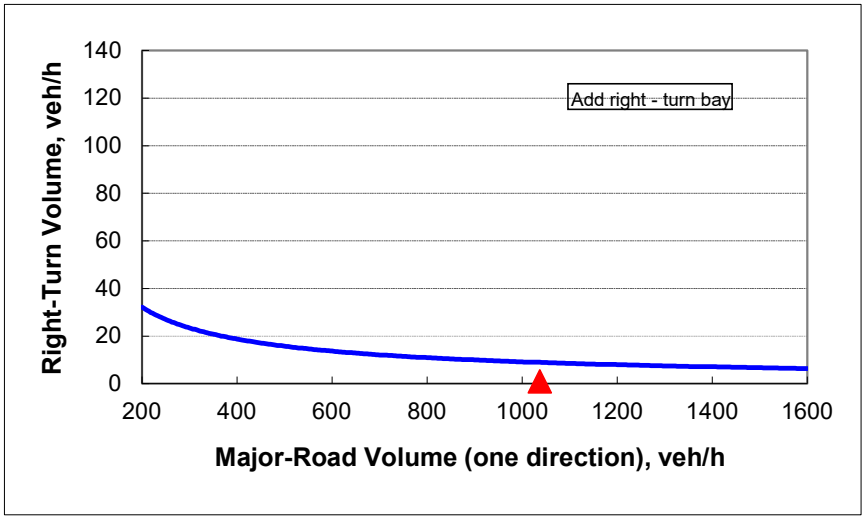
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	1037
Right-turn volume, veh/h:	1

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	9
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Bethel Road @ US-411
SB Left Turn Lane Warrant
PM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

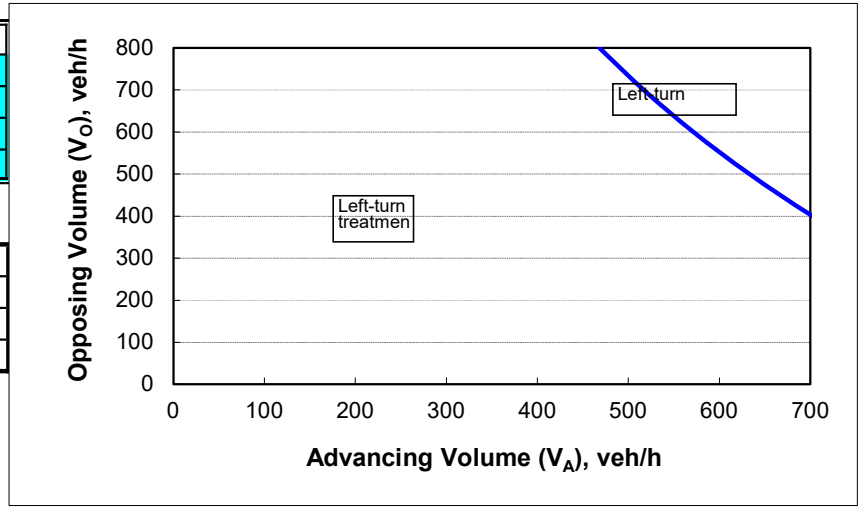
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	2%
Advancing volume (V_A), veh/h:	511
Opposing volume (V_O), veh/h:	1038

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	372
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

James Taylor Road at US-411
SB Right Turn Lane Warrant
PM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

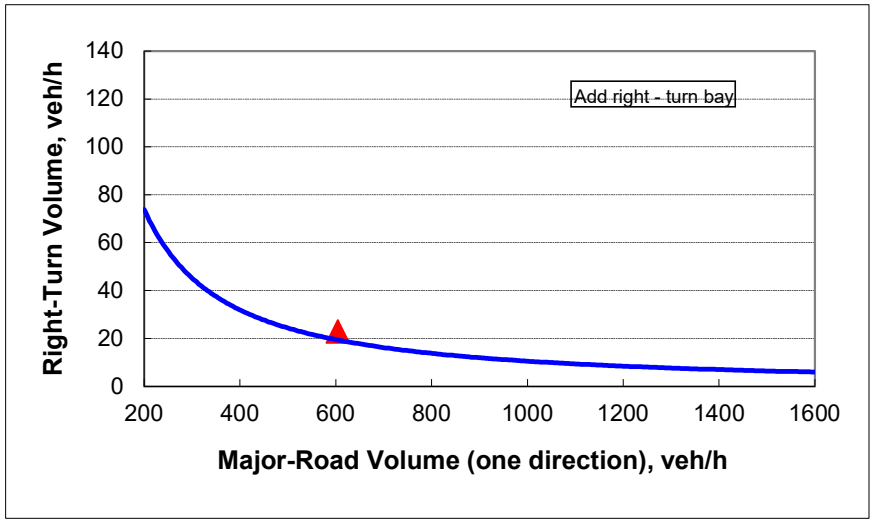
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	604
Right-turn volume, veh/h:	23

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	19
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Lake Joyce Road at US-411
SB Right Turn Lane Warrant
AM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

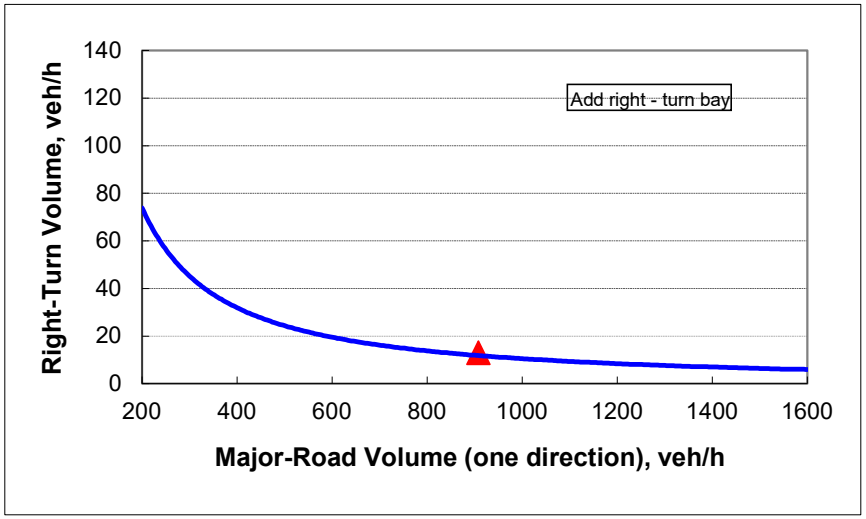
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	908
Right-turn volume, veh/h:	13

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	12
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Lake Joyce Road at US-411
SB Right Turn Lane Warrant
PM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

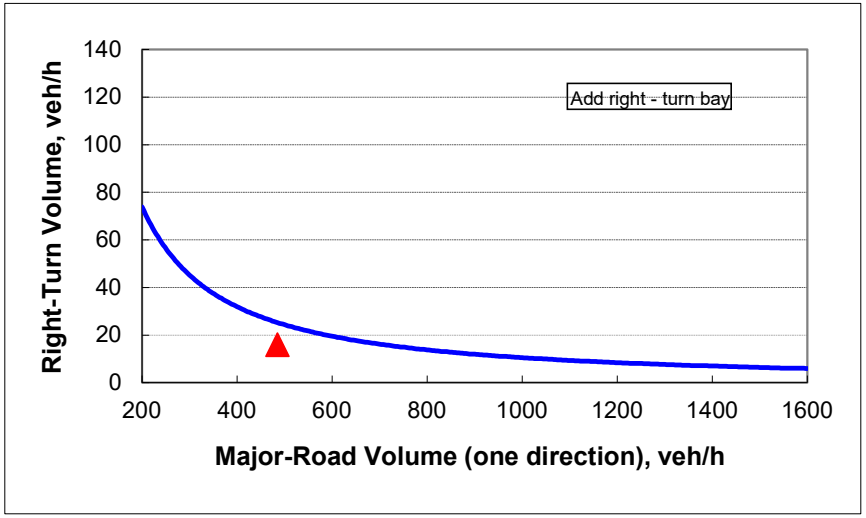
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	485
Right-turn volume, veh/h:	16

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	25
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Myers Road-Church Road @ US-411
NB Left Turn Lane Warrant
AM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

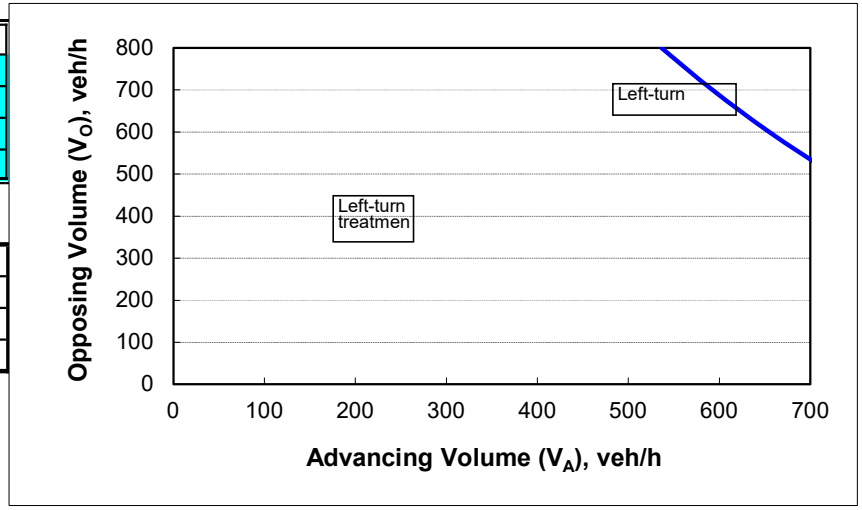
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	421
Opposing volume (V_O), veh/h:	1164

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	377
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Church Road at US-411
NB Right Turn Lane Warrant
AM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

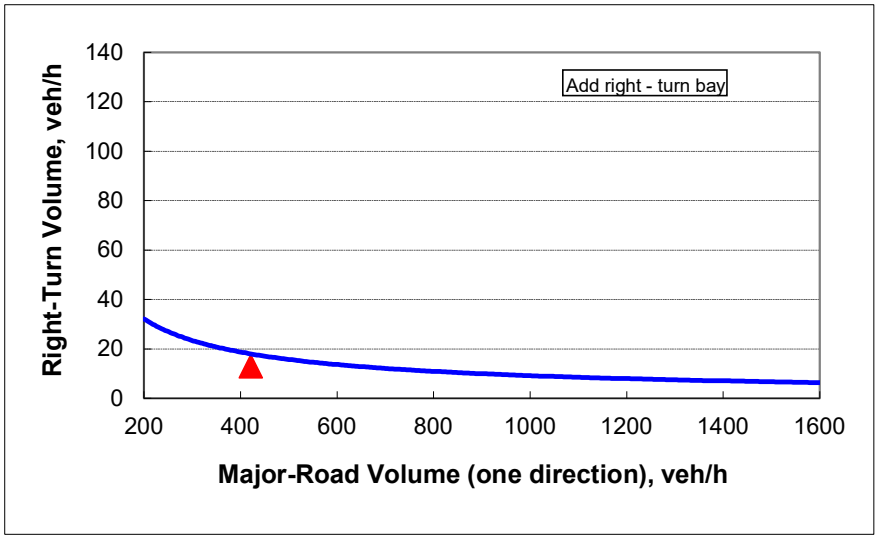
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	421
Right-turn volume, veh/h:	13

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	18
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Myers Road-Church Road @ US-411
SB Left Turn Lane Warrant
AM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

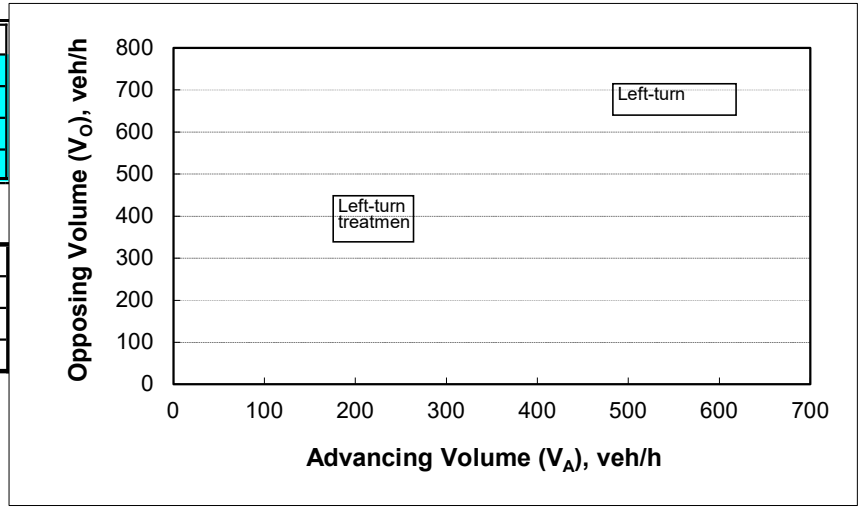
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	0%
Advancing volume (V_A), veh/h:	1164
Opposing volume (V_O), veh/h:	416

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	1466
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Myers Road at US-411
SB Right Turn Lane Warrant
AM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

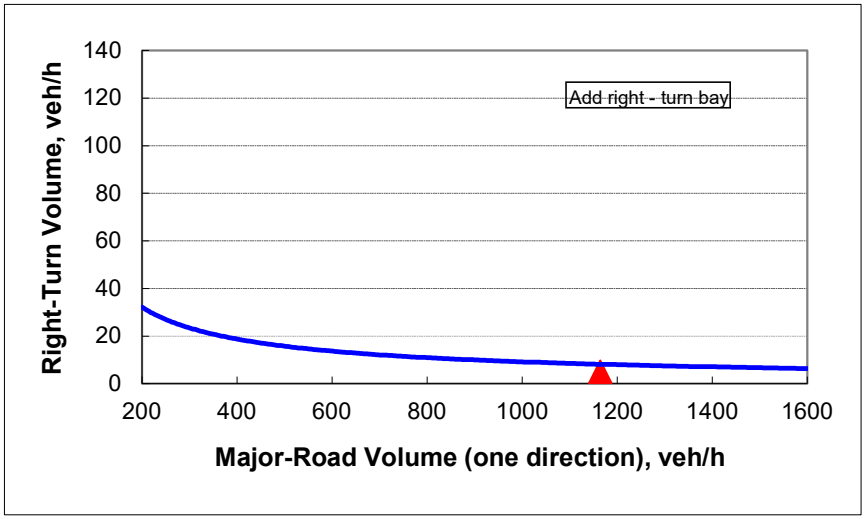
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	1164
Right-turn volume, veh/h:	5

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	8
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Myers Road-Church Road @ US-411
NB Left Turn Lane Warrant
PM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

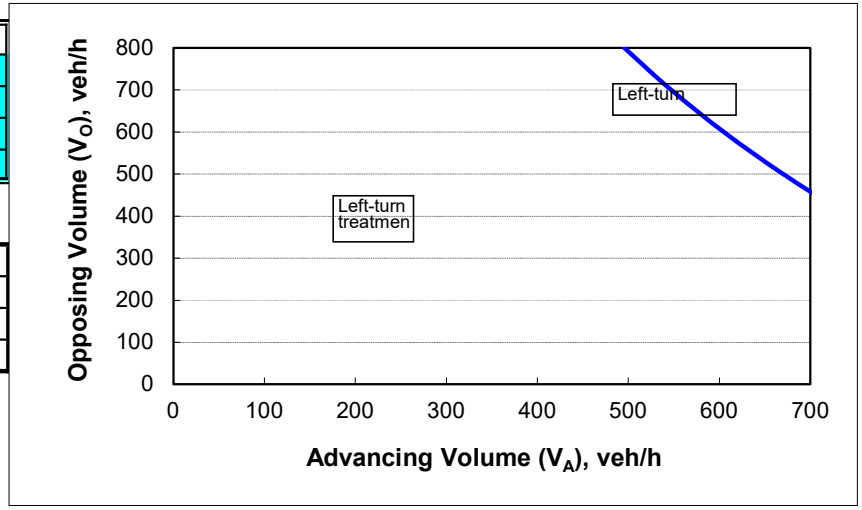
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	1075
Opposing volume (V_O), veh/h:	501

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	669
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Myers Road-Church Road @ US-411
SB Left Turn Lane Warrant
PM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

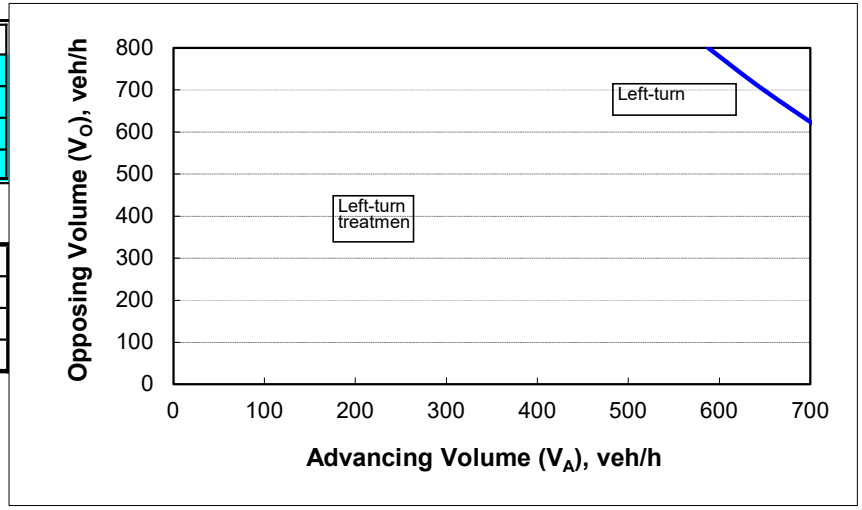
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	506
Opposing volume (V_O), veh/h:	1059

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	457
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Myers Road at US-411
SB Right Turn Lane Warrant
PM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

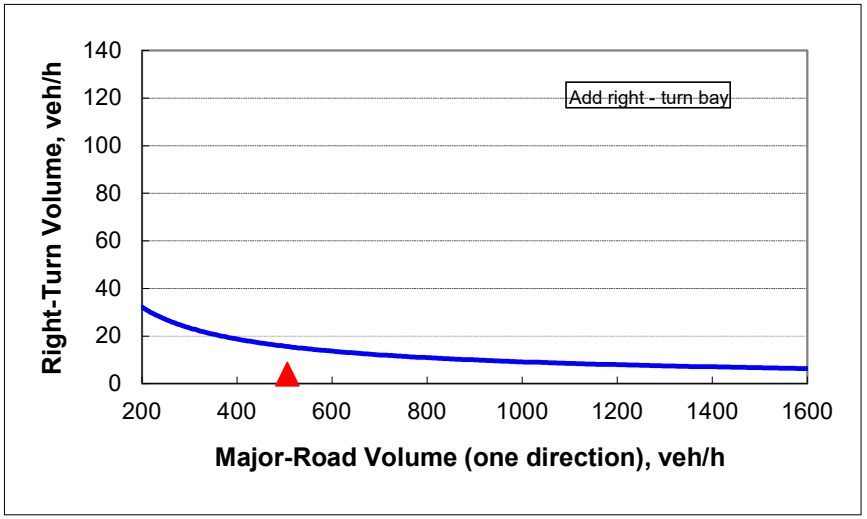
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	506
Right-turn volume, veh/h:	4

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	16
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Robbie Drive at US-411
SB Right Turn Lane Warrant
AM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

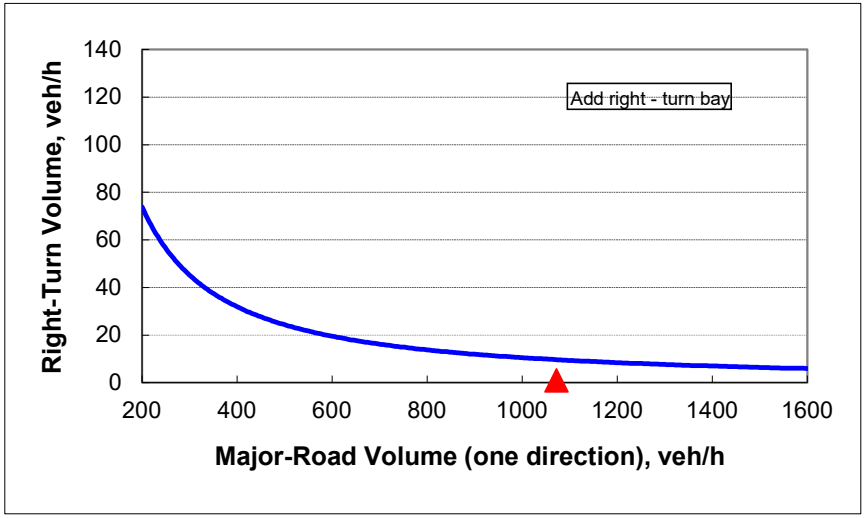
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	1072
Right-turn volume, veh/h:	1

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	10
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Robbie Drive at US-411
SB Right Turn Lane Warrant
PM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

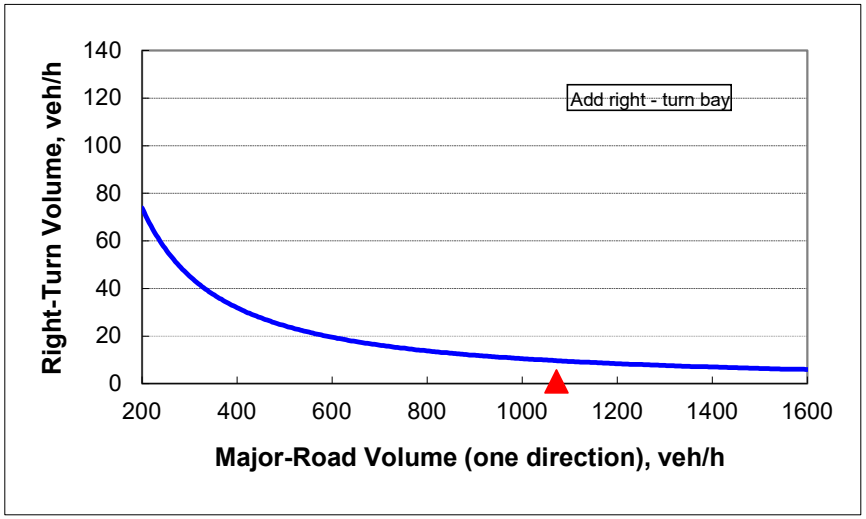
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	1072
Right-turn volume, veh/h:	1

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	10
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Stuart Drive-Coupland Road at US-411
NB Right Turn Lane Warrant
AM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

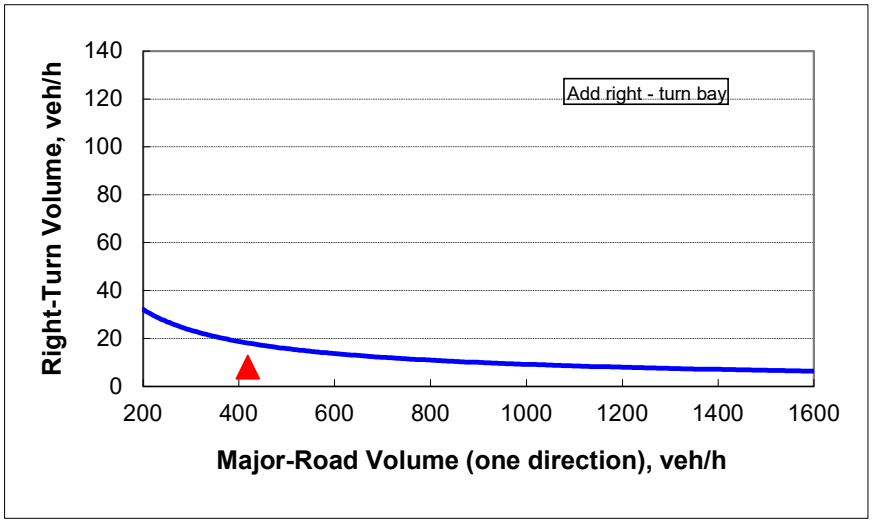
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	55
Major-road volume (one direction), veh/h:	419
Right-turn volume, veh/h:	8

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	18
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Stuart Drive-Coupland Road @ US-411
SB Left Turn Lane Warrant
AM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

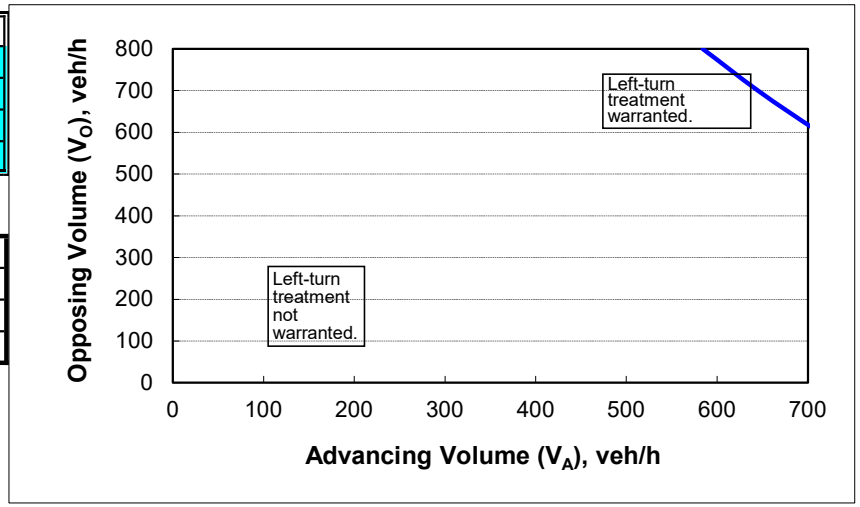
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	1043
Opposing volume (V_O), veh/h:	400

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	877
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Stuart Drive-Coupland Road @ US-411
SB Left Turn Lane Warrant
PM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

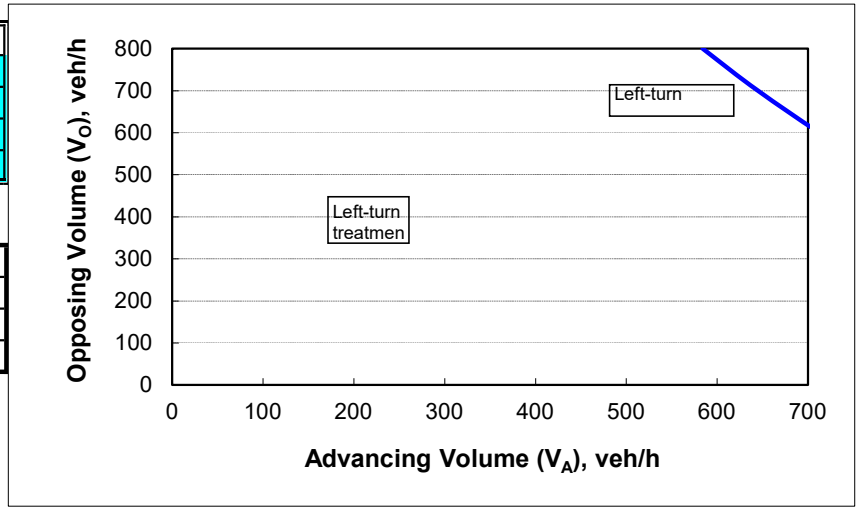
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	55
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	518
Opposing volume (V_O), veh/h:	914

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	523
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Valleybend Lane @ US-411
NB Left Turn Lane Warrant
AM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

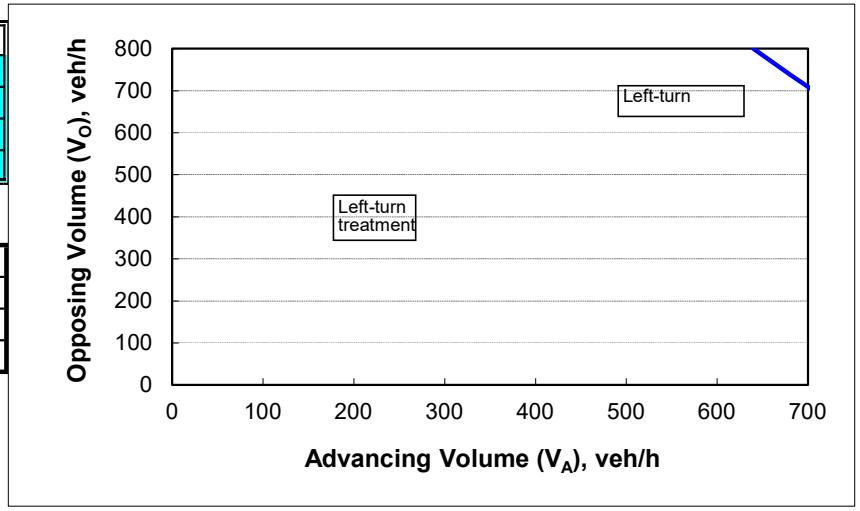
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	518
Opposing volume (V_O), veh/h:	980

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	537
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Valleybend Lane at US-411
SB Right Turn Lane Warrant
AM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

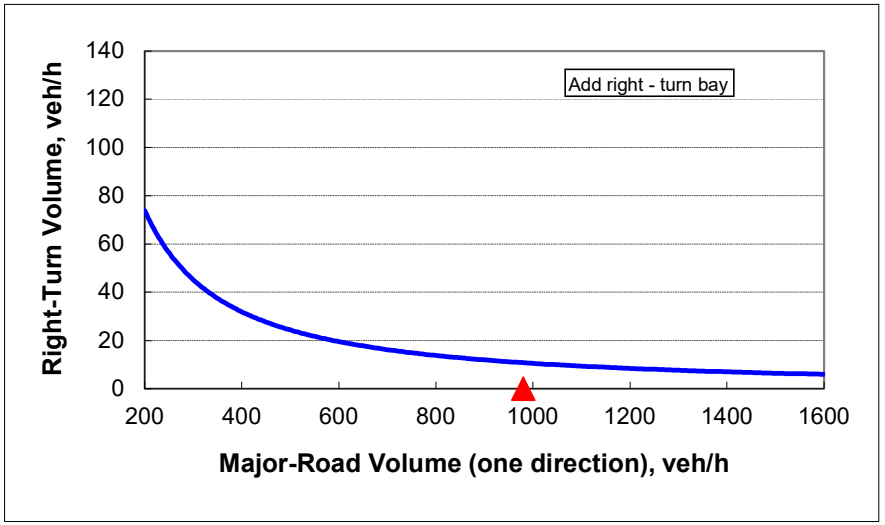
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	980
Right-turn volume, veh/h:	0

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	11
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Valleybend Lane @ US-411
NB Left Turn Lane Warrant
PM Future

Figure 2 - 5. Guideline for determining the need for a major-road left-turn bay at a two-way stop-controlled intersection.

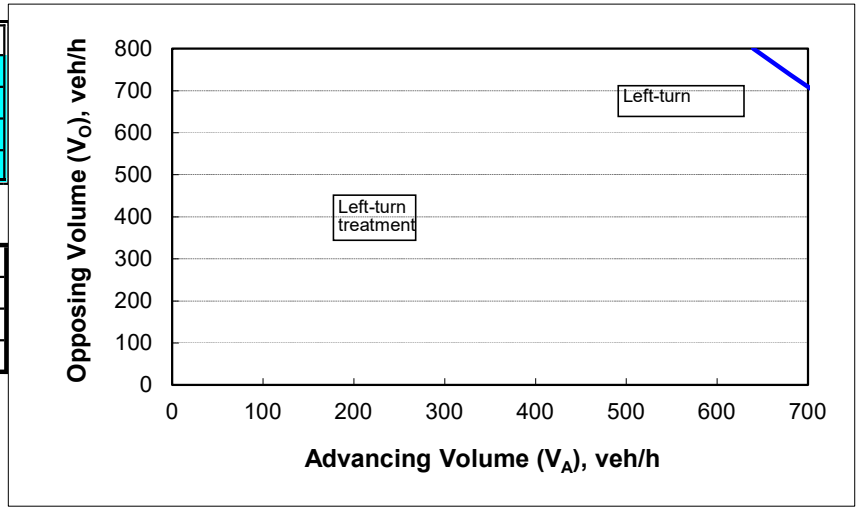
2-lane roadway (English)

INPUT

Variable	Value
85th percentile speed, mph:	50
Percent of left-turns in advancing volume (V_A), %:	1%
Advancing volume (V_A), veh/h:	925
Opposing volume (V_O), veh/h:	518

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	849
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Valleybend Lane at US-411
SB Right Turn Lane Warrant
PM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

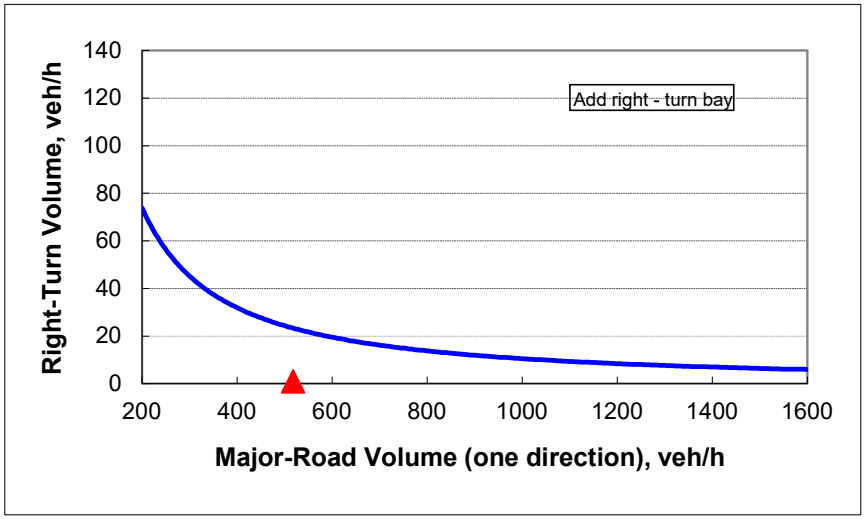
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	518
Right-turn volume, veh/h:	1

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	23
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



Washington Drive at US-411
SB Right Turn Lane Warrant
AM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

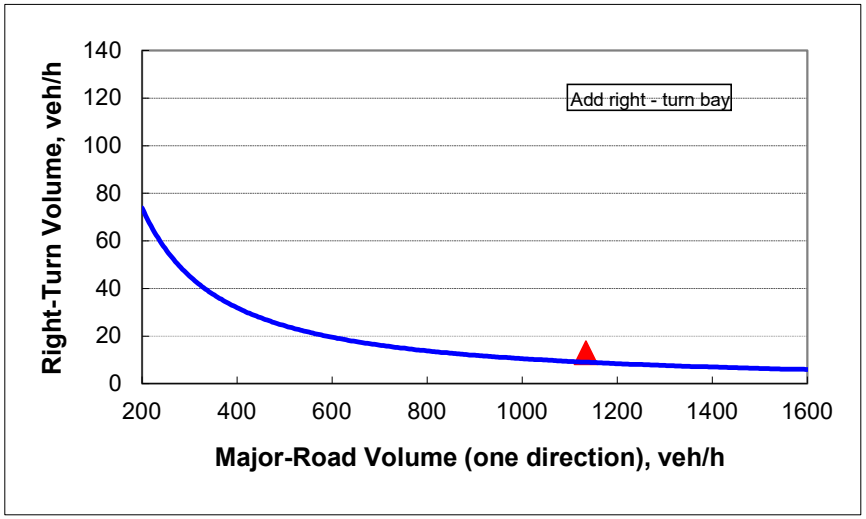
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	1134
Right-turn volume, veh/h:	13

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	9
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Add right-turn bay.	



Washington Drive at US-411
SB Right Turn Lane Warrant
PM Future

Figure 2 - 6. Guideline for determining the need for a major-road right-turn bay at a two-way stop-controlled intersection.

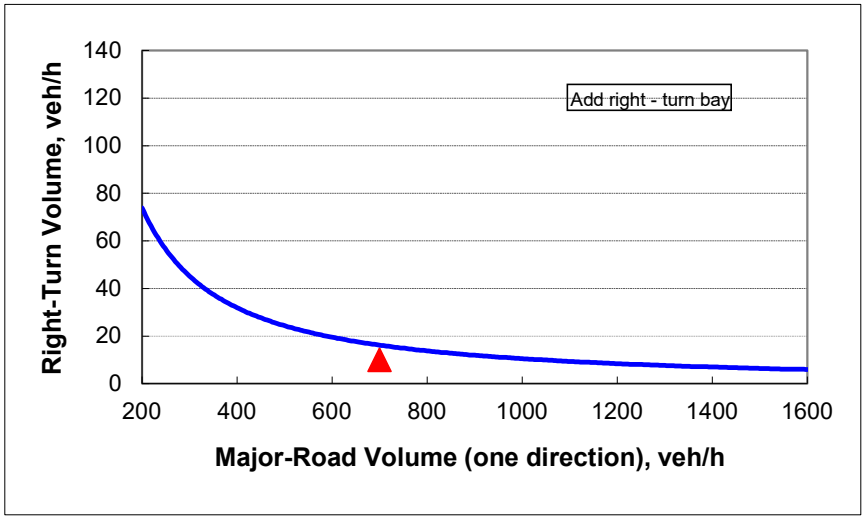
INPUT

Roadway geometry:	2-lane roadway

Variable	Value
Major-road speed, mph:	50
Major-road volume (one direction), veh/h:	700
Right-turn volume, veh/h:	10

OUTPUT

Variable	Value
Limiting right-turn volume, veh/h:	16
Guidance for determining the need for a major-road right-turn bay for a 2-lane roadway:	
Do NOT add right-turn bay.	



SAIN ASSOCIATES

CELEBRATING 50 YEARS

Appendix I – Future Conditions Capacity Analysis Reports

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	26	1	41	99	0	39	6	707	34	21	1100	13
Future Volume (veh/h)	26	1	41	99	0	39	6	707	34	21	1100	13
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	28	1	45	108	0	42	7	768	37	23	1196	14
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	112	25	123	203	2	52	164	1275	1080	438	1286	15
Arrive On Green	0.12	0.12	0.12	0.12	0.00	0.12	0.01	0.68	0.68	0.02	0.70	0.70
Sat Flow, veh/h	451	208	1024	1093	20	433	1781	1870	1585	1781	1845	22
Grp Volume(v), veh/h	74	0	0	150	0	0	7	768	37	23	0	1210
Grp Sat Flow(s),veh/h/ln	1683	0	0	1546	0	0	1781	1870	1585	1781	0	1866
Q Serve(g_s), s	0.0	0.0	0.0	4.5	0.0	0.0	0.1	19.1	0.7	0.3	0.0	48.1
Cycle Q Clear(g_c), s	3.5	0.0	0.0	7.9	0.0	0.0	0.1	19.1	0.7	0.3	0.0	48.1
Prop In Lane	0.38		0.61	0.72		0.28	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	259	0	0	257	0	0	164	1275	1080	438	0	1301
V/C Ratio(X)	0.29	0.00	0.00	0.58	0.00	0.00	0.04	0.60	0.03	0.05	0.00	0.93
Avail Cap(c_a), veh/h	393	0	0	383	0	0	292	1519	1287	539	0	1516
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.9	0.0	0.0	36.6	0.0	0.0	17.0	7.4	4.5	6.0	0.0	11.2
Incr Delay (d2), s/veh	0.6	0.0	0.0	2.1	0.0	0.0	0.1	0.5	0.0	0.0	0.0	9.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	0.0	3.2	0.0	0.0	0.1	5.2	0.1	0.1	0.0	15.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.5	0.0	0.0	38.7	0.0	0.0	17.1	7.9	4.5	6.0	0.0	20.9
LnGrp LOS	D	A	A	D	A	A	B	A	A	A	A	C
Approach Vol, veh/h		74			150			812			1233	
Approach Delay, s/veh		35.5			38.7			7.8			20.6	
Approach LOS		D			D			A			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.1	63.7		15.3	5.8	65.1		15.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	70.0		18.0	7.0	70.0		18.0				
Max Q Clear Time (g_c+I1), s	2.3	21.1		5.5	2.1	50.1		9.9				
Green Ext Time (p_c), s	0.0	5.7		0.2	0.0	10.0		0.5				

Intersection Summary			
HCM 6th Ctrl Delay		17.7	
HCM 6th LOS		B	

Movement	NWL	NWR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (veh/h)	256	95	423	364	124	875
Future Volume (veh/h)	256	95	423	364	124	875
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	278	103	460	396	135	951
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	361	322	773	655	437	1118
Arrive On Green	0.20	0.20	0.41	0.41	0.08	0.60
Sat Flow, veh/h	1781	1585	1870	1585	1781	1870
Grp Volume(v), veh/h	278	103	460	396	135	951
Grp Sat Flow(s),veh/h/ln	1781	1585	1870	1585	1781	1870
Q Serve(g_s), s	7.4	2.8	9.6	9.8	1.9	20.9
Cycle Q Clear(g_c), s	7.4	2.8	9.6	9.8	1.9	20.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	361	322	773	655	437	1118
V/C Ratio(X)	0.77	0.32	0.59	0.60	0.31	0.85
Avail Cap(c_a), veh/h	639	569	1306	1106	536	1753
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.9	17.0	11.4	11.5	7.5	8.3
Incr Delay (d2), s/veh	3.5	0.6	0.7	0.9	0.4	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	1.0	2.8	2.5	0.4	4.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.3	17.6	12.2	12.4	7.9	10.8
LnGrp LOS	C	B	B	B	A	B
Approach Vol, veh/h	381		856			1086
Approach Delay, s/veh	21.1		12.3			10.4
Approach LOS	C		B			B

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	9.2	25.7		15.2		35.0
Change Period (Y+Rc), s	5.0	5.0		5.0		5.0
Max Green Setting (Gmax), s	7.0	35.0		18.0		47.0
Max Q Clear Time (g_c+I1), s	3.9	11.8		9.4		22.9
Green Ext Time (p_c), s	0.1	4.0		0.8		7.1

Intersection Summary						
HCM 6th Ctrl Delay			12.8			
HCM 6th LOS			B			

Intersection	
Int Delay, s/veh	6.9

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	15	102	23	737	1226	5
Future Vol, veh/h	15	102	23	737	1226	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	245	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	16	111	25	801	1333	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2187	1336	1338	0	-	0
Stage 1	1336	-	-	-	-	-
Stage 2	851	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	50	188	515	-	-	-
Stage 1	245	-	-	-	-	-
Stage 2	419	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	48	188	515	-	-	-
Mov Cap-2 Maneuver	48	-	-	-	-	-
Stage 1	233	-	-	-	-	-
Stage 2	419	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	121.1	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	515	-	137	-	-
HCM Lane V/C Ratio	0.049	-	0.928	-	-
HCM Control Delay (s)	12.3	-	121.1	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.2	-	6.3	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	729	1071	1	8	75
Future Vol, veh/h	14	729	1071	1	8	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	245	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	792	1164	1	9	82

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1165	0	-	0	1987	1165
Stage 1	-	-	-	-	1165	-
Stage 2	-	-	-	-	822	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	600	-	-	-	67	236
Stage 1	-	-	-	-	297	-
Stage 2	-	-	-	-	432	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	600	-	-	-	65	236
Mov Cap-2 Maneuver	-	-	-	-	65	-
Stage 1	-	-	-	-	290	-
Stage 2	-	-	-	-	432	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	40.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	600	-	-	-	188
HCM Lane V/C Ratio	0.025	-	-	-	0.48
HCM Control Delay (s)	11.2	-	-	-	40.7
HCM Lane LOS	B	-	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	2.3

Intersection	
Int Delay, s/veh	8

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	60	15	8	729	1066	50
Future Vol, veh/h	60	15	8	729	1066	50
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	245	-	-	245
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	16	9	792	1159	54

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1969	1159	1213	0	-	0
Stage 1	1159	-	-	-	-	-
Stage 2	810	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	69	238	575	-	-	-
Stage 1	299	-	-	-	-	-
Stage 2	438	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	68	238	575	-	-	-
Mov Cap-2 Maneuver	68	-	-	-	-	-
Stage 1	294	-	-	-	-	-
Stage 2	438	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	203.4	0.1	0
HCM LOS	F		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	575	-	79	-	-
HCM Lane V/C Ratio	0.015	-	1.032	-	-
HCM Control Delay (s)	11.4	-	203.4	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0	-	5.7	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	5	14	5	513	980	0
Future Vol, veh/h	5	14	5	513	980	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	15	5	558	1065	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1633	1065	1065	0	-	0
Stage 1	1065	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	111	270	654	-	-	-
Stage 1	331	-	-	-	-	-
Stage 2	567	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	110	270	654	-	-	-
Mov Cap-2 Maneuver	110	-	-	-	-	-
Stage 1	327	-	-	-	-	-
Stage 2	567	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	25.6	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	654	-	195	-	-
HCM Lane V/C Ratio	0.008	-	0.106	-	-
HCM Control Delay (s)	10.6	0	25.6	-	-
HCM Lane LOS	B	A	D	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	28	65	19	505	895	13
Future Vol, veh/h	28	65	19	505	895	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	245	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	30	71	21	549	973	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1571	980	987	0	-	0
Stage 1	980	-	-	-	-	-
Stage 2	591	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	122	303	700	-	-	-
Stage 1	364	-	-	-	-	-
Stage 2	553	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	118	303	700	-	-	-
Mov Cap-2 Maneuver	118	-	-	-	-	-
Stage 1	353	-	-	-	-	-
Stage 2	553	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	38.2	0.4	0
HCM LOS	E		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	700	-	206	-	-
HCM Lane V/C Ratio	0.03	-	0.491	-	-
HCM Control Delay (s)	10.3	-	38.2	-	-
HCM Lane LOS	B	-	E	-	-
HCM 95th %tile Q(veh)	0.1	-	2.4	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↗		↕	
Traffic Vol, veh/h	6	0	36	12	0	3	5	403	13	7	1155	5
Future Vol, veh/h	6	0	36	12	0	3	5	403	13	7	1155	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	295	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	7	0	39	13	0	3	5	438	14	8	1255	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1731	1736	1258	1741	1724	438	1260	0	0	452	0	0
Stage 1	1274	1274	-	448	448	-	-	-	-	-	-	-
Stage 2	457	462	-	1293	1276	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	69	87	209	68	89	619	552	-	-	1109	-	-
Stage 1	205	238	-	590	573	-	-	-	-	-	-	-
Stage 2	583	565	-	200	238	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	67	84	209	54	86	619	552	-	-	1109	-	-
Mov Cap-2 Maneuver	67	84	-	54	86	-	-	-	-	-	-	-
Stage 1	203	232	-	583	566	-	-	-	-	-	-	-
Stage 2	573	558	-	159	232	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36.2	76.6	0.1	0
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	552	-	-	160	66	1109	-	-
HCM Lane V/C Ratio	0.01	-	-	0.285	0.247	0.007	-	-
HCM Control Delay (s)	11.6	0	-	36.2	76.6	8.3	0	-
HCM Lane LOS	B	A	-	E	F	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.1	0.9	0	-	-

Intersection	
Int Delay, s/veh	0

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Vol, veh/h	411	0	0	1152	0	0
Future Vol, veh/h	411	0	0	1152	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	447	0	0	1252	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	447	0	1699	447
Stage 1	-	-	-	-	447	-
Stage 2	-	-	-	-	1252	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1113	-	101	612
Stage 1	-	-	-	-	644	-
Stage 2	-	-	-	-	269	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1113	-	101	612
Mov Cap-2 Maneuver	-	-	-	-	101	-
Stage 1	-	-	-	-	644	-
Stage 2	-	-	-	-	269	-

Approach	NB	SB	NW
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBT	NBR	NWLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1113	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	9.6

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	18	393	8	3	1029	11	30	1	88	31	0	1
Future Vol, veh/h	18	393	8	3	1029	11	30	1	88	31	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	295	-	295	245	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	427	9	3	1118	12	33	1	96	34	0	1

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	1130	0	0	436	0	0	1602	1606	1124	1646	1603	427
Stage 1	-	-	-	-	-	-	1130	1130	-	467	467	-
Stage 2	-	-	-	-	-	-	472	476	-	1179	1136	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	618	-	-	1124	-	-	85	105	250	79	106	628
Stage 1	-	-	-	-	-	-	248	279	-	576	562	-
Stage 2	-	-	-	-	-	-	573	557	-	232	277	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	618	-	-	1124	-	-	83	101	250	47	102	628
Mov Cap-2 Maneuver	-	-	-	-	-	-	83	101	-	47	102	-
Stage 1	-	-	-	-	-	-	240	278	-	558	544	-
Stage 2	-	-	-	-	-	-	553	539	-	142	276	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	0.5	0	78.5	186.3
HCM LOS			F	F

Minor Lane/Major Mvmt	NBL	NBT	NBR	NWLn1	SELn1	SBL	SBT	SBR
Capacity (veh/h)	618	-	-	48	165	1124	-	-
HCM Lane V/C Ratio	0.032	-	-	0.725	0.784	0.003	-	-
HCM Control Delay (s)	11	-	-	186.3	78.5	8.2	-	-
HCM Lane LOS	B	-	-	F	F	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.9	5.1	0	-	-

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	9	1	25	45	4	21	26	1022	98	16	674	10
Future Volume (veh/h)	9	1	25	45	4	21	26	1022	98	16	674	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	10	1	27	49	4	23	28	1111	0	17	733	11
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	97	12	84	169	6	33	475	1238		240	1197	18
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.07	0.03	0.66	0.00	0.02	0.65	0.65
Sat Flow, veh/h	317	170	1194	1010	82	474	1781	1870	1585	1781	1838	28
Grp Volume(v), veh/h	38	0	0	76	0	0	28	1111	0	17	0	744
Grp Sat Flow(s),veh/h/ln	1681	0	0	1567	0	0	1781	1870	1585	1781	0	1865
Q Serve(g_s), s	0.0	0.0	0.0	1.5	0.0	0.0	0.3	30.0	0.0	0.2	0.0	14.0
Cycle Q Clear(g_c), s	1.3	0.0	0.0	2.8	0.0	0.0	0.3	30.0	0.0	0.2	0.0	14.0
Prop In Lane	0.26		0.71	0.64		0.30	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	194	0	0	208	0	0	475	1238		240	0	1215
V/C Ratio(X)	0.20	0.00	0.00	0.37	0.00	0.00	0.06	0.90		0.07	0.00	0.61
Avail Cap(c_a), veh/h	540	0	0	538	0	0	625	1542		409	0	1538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.8	0.0	0.0	27.4	0.0	0.0	4.8	8.6	0.0	10.7	0.0	6.1
Incr Delay (d2), s/veh	0.5	0.0	0.0	1.1	0.0	0.0	0.1	6.3	0.0	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	1.1	0.0	0.0	0.1	7.4	0.0	0.1	0.0	2.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.3	0.0	0.0	28.5	0.0	0.0	4.9	14.9	0.0	10.8	0.0	6.6
LnGrp LOS	C	A	A	C	A	A	A	B		B	A	A
Approach Vol, veh/h		38			76			1139	A		761	
Approach Delay, s/veh		27.3			28.5			14.6			6.7	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	45.1		9.3	6.9	44.5		9.3				
Change Period (Y+Rc), s	5.0	5.0		5.0	5.0	5.0		5.0				
Max Green Setting (Gmax), s	7.0	50.0		18.0	7.0	50.0		18.0				
Max Q Clear Time (g_c+I1), s	2.2	32.0		3.3	2.3	16.0		4.8				
Green Ext Time (p_c), s	0.0	8.1		0.1	0.0	5.2		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		12.4
HCM 6th LOS		B

Notes

Unsignalized Delay for [NER] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	2.7

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	13	70	107	1136	738	23
Future Vol, veh/h	13	70	107	1136	738	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	245	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	76	116	1235	802	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2282	815	827	0	-	0
Stage 1	815	-	-	-	-	-
Stage 2	1467	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	44	377	804	-	-	-
Stage 1	435	-	-	-	-	-
Stage 2	212	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	38	377	804	-	-	-
Mov Cap-2 Maneuver	38	-	-	-	-	-
Stage 1	372	-	-	-	-	-
Stage 2	212	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	55.1	0.9	0
HCM LOS	F		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	804	-	157	-	-
HCM Lane V/C Ratio	0.145	-	0.575	-	-
HCM Control Delay (s)	10.2	-	55.1	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.5	-	3	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	85	964	620	0	1	40
Future Vol, veh/h	85	964	620	0	1	40
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	245	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	92	1048	674	0	1	43

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	674	0	-	0	1906	674
Stage 1	-	-	-	-	674	-
Stage 2	-	-	-	-	1232	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	917	-	-	-	75	455
Stage 1	-	-	-	-	506	-
Stage 2	-	-	-	-	275	-
Platoon blocked, %			-	-		
Mov Cap-1 Maneuver	917	-	-	-	68	455
Mov Cap-2 Maneuver	-	-	-	-	68	-
Stage 1	-	-	-	-	455	-
Stage 2	-	-	-	-	275	-

Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	917	-	-	-	400
HCM Lane V/C Ratio	0.101	-	-	-	0.111
HCM Control Delay (s)	9.4	-	-	-	15.1
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.3	-	-	-	0.4

Intersection	
Int Delay, s/veh	1.2

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	26	15	20	938	581	23
Future Vol, veh/h	26	15	20	938	581	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	245	-	-	245
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	16	22	1020	632	25

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1696	632	657	0	-	0
Stage 1	632	-	-	-	-	-
Stage 2	1064	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	102	480	931	-	-	-
Stage 1	530	-	-	-	-	-
Stage 2	332	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	100	480	931	-	-	-
Mov Cap-2 Maneuver	100	-	-	-	-	-
Stage 1	517	-	-	-	-	-
Stage 2	332	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	41.9	0.2	0
HCM LOS	E		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	931	-	141	-	-
HCM Lane V/C Ratio	0.023	-	0.316	-	-
HCM Control Delay (s)	9	-	41.9	-	-
HCM Lane LOS	A	-	E	-	-
HCM 95th %tile Q(veh)	0.1	-	1.3	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	3	6	8	918	517	1
Future Vol, veh/h	3	6	8	918	517	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	7	9	998	562	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1579	563	563	0	-	0
Stage 1	563	-	-	-	-	-
Stage 2	1016	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	120	526	1008	-	-	-
Stage 1	570	-	-	-	-	-
Stage 2	350	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	118	526	1008	-	-	-
Mov Cap-2 Maneuver	118	-	-	-	-	-
Stage 1	559	-	-	-	-	-
Stage 2	350	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	20.4	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1008	-	244	-	-
HCM Lane V/C Ratio	0.009	-	0.04	-	-
HCM Control Delay (s)	8.6	0	20.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	SEL	SER	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	14	45	39	882	468	16
Future Vol, veh/h	14	45	39	882	468	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	245	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	15	49	42	959	509	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1561	518	526	0	-	0
Stage 1	518	-	-	-	-	-
Stage 2	1043	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	123	558	1041	-	-	-
Stage 1	598	-	-	-	-	-
Stage 2	339	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	118	558	1041	-	-	-
Mov Cap-2 Maneuver	118	-	-	-	-	-
Stage 1	574	-	-	-	-	-
Stage 2	339	-	-	-	-	-

Approach	SE	NE	SW
HCM Control Delay, s	20.5	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NEL	NET	SELn1	SWT	SWR
Capacity (veh/h)	1041	-	296	-	-
HCM Lane V/C Ratio	0.041	-	0.217	-	-
HCM Control Delay (s)	8.6	-	20.5	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.8	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↗		↕	
Traffic Vol, veh/h	5	0	14	11	0	7	15	1026	35	13	497	4
Future Vol, veh/h	5	0	14	11	0	7	15	1026	35	13	497	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	295	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	0	15	12	0	8	16	1115	38	14	540	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1740	1755	542	1725	1719	1115	544	0	0	1153	0	0
Stage 1	570	570	-	1147	1147	-	-	-	-	-	-	-
Stage 2	1170	1185	-	578	572	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	68	85	540	70	90	253	1025	-	-	606	-	-
Stage 1	506	505	-	242	274	-	-	-	-	-	-	-
Stage 2	235	263	-	501	504	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	62	79	540	64	83	253	1025	-	-	606	-	-
Mov Cap-2 Maneuver	62	79	-	64	83	-	-	-	-	-	-	-
Stage 1	484	488	-	231	262	-	-	-	-	-	-	-
Stage 2	218	251	-	471	487	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.9	55.8	0.1	0.3
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1025	-	-	178	90	606	-	-
HCM Lane V/C Ratio	0.016	-	-	0.116	0.217	0.023	-	-
HCM Control Delay (s)	8.6	0	-	27.9	55.8	11.1	0	-
HCM Lane LOS	A	A	-	D	F	B	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.8	0.1	-	-

Intersection	
Int Delay, s/veh	0

Movement	NBT	NBR	SBL	SBT	NWL	NWR
Lane Configurations						
Traffic Vol, veh/h	1040	0	0	506	0	0
Future Vol, veh/h	1040	0	0	506	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1130	0	0	550	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1130	0	1680	1130
Stage 1	-	-	-	-	1130	-
Stage 2	-	-	-	-	550	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	618	-	104	248
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	578	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	618	-	104	248
Mov Cap-2 Maneuver	-	-	-	-	104	-
Stage 1	-	-	-	-	308	-
Stage 2	-	-	-	-	578	-

Approach	NB	SB	NW
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBT	NBR	NWLn1	SBL	SBT
Capacity (veh/h)	-	-	-	618	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	-	-	0	0	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	2.8

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Traffic Vol, veh/h	89	867	46	6	466	46	20	0	45	11	0	3
Future Vol, veh/h	89	867	46	6	466	46	20	0	45	11	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	295	-	295	245	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	97	942	50	7	507	50	22	0	49	12	0	3

Major/Minor	Major1			Major2			Minor2			Minor1		
Conflicting Flow All	557	0	0	992	0	0	1709	1732	532	1707	1707	942
Stage 1	-	-	-	-	-	-	546	546	-	1136	1136	-
Stage 2	-	-	-	-	-	-	1163	1186	-	571	571	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1014	-	-	697	-	-	72	88	547	72	91	319
Stage 1	-	-	-	-	-	-	522	518	-	246	277	-
Stage 2	-	-	-	-	-	-	237	262	-	506	505	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1014	-	-	697	-	-	66	79	547	60	81	319
Mov Cap-2 Maneuver	-	-	-	-	-	-	66	79	-	60	81	-
Stage 1	-	-	-	-	-	-	472	513	-	222	250	-
Stage 2	-	-	-	-	-	-	212	237	-	456	500	-

Approach	NB	SB	SE	NW
HCM Control Delay, s	0.8	0.1	40.8	66.9
HCM LOS			E	F

Minor Lane/Major Mvmt	NBL	NBT	NBR	NWLn1	SELn1	SBL	SBT	SBR
Capacity (veh/h)	1014	-	-	73	169	697	-	-
HCM Lane V/C Ratio	0.095	-	-	0.208	0.418	0.009	-	-
HCM Control Delay (s)	8.9	-	-	66.9	40.8	10.2	-	-
HCM Lane LOS	A	-	-	F	E	B	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.7	1.9	0	-	-

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Appendix J – Opinions of Probable Cost

US-411 at Washington Drive and Verbena Drive				
Traffic Signal, Northbound Left Turn Lane, Southbound Left Turn Lane, and Northbound Right Turn Lane on US-411				
Item Description	**Unit**	**Quantity**	**Unit Price**	**Amount**
Clearing & Grubbing (Max ALDOT Bid = $8,000/Acre)	LS	1	$ 4,000.00	$ 4,000.00
Unclassified Excavation	CY	1000	$ 25.00	$ 25,000.00
Borrow Excavation	CY	2500	$ 25.00	$ 62,500.00
Micro-Milling	SY	5600	$ 5.00	$ 28,000.00
Wearing Surface (1.5")	TN	668	$ 200.00	$ 133,650.00
Upper Binder Layer (1.5")	TN	206	$ 190.00	$ 39,187.50
Lower Binder Layer (5")	TN	675	$ 180.00	$ 121,500.00
Aggregate Base (6")	SY	2500	$ 15.00	$ 37,500.00
Tack Coat	GAL	1048	$ 8.00	$ 8,384.00
Bituminous Treatment	SY	2500	$ 8.00	$ 20,000.00
Topsoil	CY	500	$ 35.00	$ 17,500.00
Temporary Seeding	AC	2	$ 1,200.00	$ 2,400.00
Permanent Seeding	AC	1	$ 1,200.00	$ 1,200.00
Curb & Gutter	LF	250	$ 35.00	$ 8,750.00
Storm Pipe	LF	75	$ 150.00	$ 11,250.00
Storm Inlets	EA	2	$ 6,000.00	$ 12,000.00
Traffic Stripe, Markings, Legends	LS	1	$ 33,500.00	$ 33,500.00
Erosion Control	LS	1	$ 30,000.00	$ 30,000.00
Traffic Control	LS	1	$ 40,000.00	$ 40,000.00
Traffic Signal	LS	1	$ 250,000.00	$ 250,000.00
Mobilization (9.7% of Overall Cost)	LS	1	$ 61,723.19	$ 61,723.19
Engineering Controls (1.3% of Overall Cost)	LS	1	$ 12,324.58	$ 12,324.58

Roadway Total	$ 960,369.27
Preliminary Engineering (15%)	$ 144,055.39
Utility Cost:	$ 100,000.00
Right-of-Way Cost:	$ -
Contingency (20%)	$ 192,073.85
Local Funds Grand Total:	$ 1,396,498.51
CE&I and Indirect Costs (25%)	$ 349,124.63
Federal Funds Grand Total:	$ 1,745,623.14

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

NOTE: THE TOTAL ESTIMATED PROJECT COST WAS PREPARED FOR THE 2022 PLANNING YEAR. THIS NUMBER SHOULD BE INCREASED TO ACCOUNT FOR RISING COSTS DUE TO INFLATION SHOULD THE IMPROVEMENTS NOT BE IMPLEMENTED IN 2022.

US-411 at High School Drive				
Traffic Signal and Restriping				
Item Description	**Unit**	**Quantity**	**Unit Price**	**Amount**
Micro-Milling	SY	600	$ 5.00	$ 3,000.00
Wearing Surface (1.5")	TN	50	$ 200.00	$ 9,900.00
Tack Coat	GAL	48	$ 8.00	$ 384.00
Traffic Stripe, Markings, Legends	LS	1	$ 23,500.00	$ 23,500.00
Traffic Control	LS	1	$ 20,000.00	$ 20,000.00
Traffic Signal	LS	1	$ 250,000.00	$ 250,000.00
Mobilization (9.7% of Overall Cost)	LS	1	$ 5,508.05	$ 5,508.05
Engineering Controls (1.3% of Overall Cost)	LS	1	$ 4,059.80	$ 4,059.80

Roadway Total	$	316,351.84
Preliminary Engineering (15%)	$	47,452.78
Utility Cost:	$	-
Right-of-Way Cost:	$	-
Contingency (20%):	$	63,270.37
Local Funds Grand Total:	$	427,074.99
CE&I and Indirect Costs (25%)	$	106,768.75
Federal Funds Grand Total:	$	533,843.74

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

NOTE: THE TOTAL ESTIMATED PROJECT COST WAS PREPARED FOR THE 2022 PLANNING YEAR. THIS NUMBER SHOULD BE INCREASED TO ACCOUNT FOR RISING COSTS DUE TO INFLATION SHOULD THE IMPROVEMENTS NOT BE IMPLEMENTED IN 2022.

US-411 at James Taylor Road				
Northbound Left Turn Lane and Southbound Right Turn Lane				
Item Description	**Unit**	**Quantity**	**Unit Price**	**Amount**
Clearing & Grubbing (Max ALDOT Bid = $8,000/Acre)	LS	1	$ 8,000.00	$ 8,000.00
Unclassified Excavation	CY	1000	$ 25.00	$ 25,000.00
Borrow Excavation	CY	2500	$ 25.00	$ 62,500.00
Micro-Milling	SY	3200	$ 5.00	$ 16,000.00
Wearing Surface (1.5")	TN	479	$ 200.00	$ 95,700.00
Upper Binder Layer (1.5")	TN	215	$ 190.00	$ 40,755.00
Lower Binder Layer (5")	TN	702	$ 180.00	$ 126,360.00
Aggregate Base (6")	SY	2600	$ 15.00	$ 39,000.00
Tack Coat	GAL	880	$ 8.00	$ 7,040.00
Bituminous Treatment	SY	2600	$ 8.00	$ 20,800.00
Topsoil	CY	400	$ 35.00	$ 14,000.00
Temporary Seeding	AC	2	$ 1,200.00	$ 2,400.00
Permanent Seeding	AC	1	$ 1,200.00	$ 1,200.00
Storm Pipe	LF	130	$ 150.00	$ 19,500.00
Pipe End Treatment	EA	4	$ 2,000.00	$ 8,000.00
Traffic Stripe, Markings, Legends	LS	1	$ 26,500.00	$ 26,500.00
Erosion Control	LS	1	$ 30,000.00	$ 30,000.00
Traffic Control	LS	1	$ 40,000.00	$ 40,000.00
Mobilization (9.7% of Overall Cost)	LS	1	$ 56,527.24	$ 56,527.24
Engineering Controls (1.3% of Overall Cost)	LS	1	$ 8,310.67	$ 8,310.67

Roadway Total	$ 647,592.90
Preliminary Engineering (15%)	$ 97,138.94
Utility Cost:	$ 200,000.00
Right-of-Way Cost:	$ 25,000.00
Contingency (20%)	$ 129,518.58
Local Funds Grand Total:	$ 1,099,250.42
CE&I and Indirect Costs (25%)	$ 274,812.61
Federal Funds Grand Total:	$ 1,374,063.03

NOTE: ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST PROVIDED IS MADE ON THE BASIS OF ENGINEER'S EXPERIENCES AND QUALIFICATION AND REPRESENTS ENGINEER'S BEST JUDGMENT WITHIN THE INDUSTRY. ENGINEER DOES NOT GUARANTEE THAT PROPOSALS, BIDS OR ACTUAL COST WILL NOT VARY FROM ENGINEER'S OPINION OF PROBABLE COST.

NOTE: THE TOTAL ESTIMATED PROJECT COST WAS PREPARED FOR THE 2022 PLANNING YEAR. THIS NUMBER SHOULD BE INCREASED TO ACCOUNT FOR RISING COSTS DUE TO INFLATION SHOULD THE IMPROVEMENTS NOT BE IMPLEMENTED IN 2022.