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Stark County, Ohio

September 9, 2022

Prepared for:

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AREA-WIDE TRAFFIC STUDY

Stark County, Ohio

September 9, 2022

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Executive Summary

This Area-Wide Planning Study has been prepared at the request of the Stark County Regional Planning Commission (SCRPC). The study area includes the Richville Drive/State Route 627 corridor from Southway Drive to Navarre Road, Navarre Road from State Route 21 to State Route 627, and Fohl Road from the Navarre corporation line to Kemary Avenue. The study area is located in the western portion of Stark County, Ohio primarily in the Village of Navarre, the City of Massillon, and Perry Township.

The study area will include the following existing intersections:

1. North Main Street (US 62/SR 21) & Wooster Street
2. Kemary Avenue & Fohl Street
3. Erie Street (US 62/SR 21) & Navarre Road
4. Navarre Road & Millennium Boulevard
5. Millennium Boulevard & Prospect Drive
6. Navarre Road & Sterilite Street
7. Navarre Road & Stump Avenue/Bosford Street
8. Navarre Road & Richville Drive (SR 627)
9. Stump Avenue & Cincinnati Drive
10. Richville Drive (SR 627) & Stump Avenue/Creston Road
11. Richville Drive (SR 627) & US 30 Eastbound Ramps
12. Richville Drive (SR 627) & US 30 Westbound Ramps
13. Richville Drive & Nave Road (S)/RG Drage Driveway
14. Richville Drive & Nave Road (N)
15. Richville Drive & Ohio State Drive/Business Place
16. Richville Drive & Jackson Avenue
17. Richville Drive & Southway Street
18. Fohl Street & Sterilite Street

The analysis of the study area included proposed and under construction developments that are located within the study area. The following developments were considered in the forecast of future traffic volumes for the study area:

- Stark Farm Development
- Project Redbone
- Proposed Sheetz
- Trucking Company - Nova Road (East)

No-Build and Build forecasts were prepared as part of the procedure to determine future traffic volumes in the study area. The No-Build traffic is the expected traffic if the previously listed developments **are not** constructed, the “**No-Build**” condition. The Build traffic volumes are the expected volumes if the proposed developments **are** constructed, or the “**Build**” condition.

The year 2025 was analyzed for the opening year conditions. The future design year was 2045 based on providing a twenty year design period for any recommended improvements in the study area. The recommendations found in this report will be based on the Build conditions as the previously listed developments are in various stages of development and all are expected to be completed by the opening year 2025.

The ODOT GIS Crash Analysis Tool (GCAT) was used to collect crash information at the study area intersections for the years 2019 through June of 2022. Crashes were reported at 14 of the 18 intersections under study. The study area experienced a total of 154 intersection related crashes in time period under analysis. Rear end crashes were determined to be the predominate crash type at 9 of the intersections. Angle and turn crashes were determined to be the predominate crash type at 5 of the intersections.

Conditions at the study area intersections during the AM and PM peak hours were determined to meet the operational goals shown in **Table 1.2** under the forecasted 2025 and 2045 Build conditions with the exception of the following intersections.

- Richville Road (SR 627) & Stump Avenue/Creston Road
- Richville Road (SR 627) & US Route 30 Eastbound Ramps
- Richville Road (SR 627) & US Route 30 Westbound Ramps
- Richville Road (SR 627) & Nave Road/RG Drage Driveway

The following turn lanes were determined to experience a queue length which exceeds the existing length of the turn lane based on the HCS analysis:

Erie Street (US 62/SR 21) & Navarre Road

- Southbound Left Turn Lane (PM Peak Hour)
- Westbound Left Turn Lane (PM Peak Hour)

An improvement project is currently underway to improve the westbound left turn lane at the intersection of Erie Street (US 62/SR 21) and Navarre Road.

Based on the results of the analyses, we offer the following potential improvements and recommendations:

Short Term/Low Cost Improvements

Install signal backplate/retro-reflective back-plates to increase visibility of traffic control devices at the following signalized intersections:

- Richville Drive & Southway Street
- Main Street (US 62/SR 21) & Wooster Street

The remaining signalized intersections within the study currently use back-plates with the traffic signal heads.

It is recommended that beacons or light emitting diodes (LED) within the border of the sign be added to the Intersection Ahead (W2-1) warning signs located on Fohl Street ahead of Kemary Avenue.

It is recommended that Intersection Ahead (W2-2) warning signs be placed on Fohl Street to the east and west of the new intersection with Sterilite Street. The Intersection Ahead (W2-2) signs are recommended to be placed no closer than 325 feet from the intersection and no further than 495 feet away. A strip of retroreflective material on the sign supports is recommended to increase the conspicuity of the sign assembly. Consideration should also be give to installing flashing beacons or signs light emitting diodes (LED) within the border to further increase the visibility of the sign.

Install dilemma zone radar detection on the Erie Street (US 62/SR 21) north and south approaches at Navarre Road due to the amount of rear-end crashes and the red-light running that resulted in angle and turn movement crashes.

Install dilemma zone radar detection on the Navarre Road east and west approaches at Richville Drive (SR 627) due to the amount of rear-end crashes.

Medium Term/Medium Cost Improvements

The installation of traffic signal control was determined to be a viable improvement at the following intersections:

- Richville Drive (SR 627) & US 30 Eastbound Ramps
- Richville Drive (SR 627) & US 30 Westbound Ramps
- Richville Drive & Nave Road (S)/RG Drage Driveway

The storage length for the northbound and southbound left turn lanes on Richville Drive (SR 627) at the US Route 30 interchange intersections should be increased from 150 feet to 250 feet with the installation of traffic signal control.

Roundabout control would be a suitable alternative to traffic signal control at the following intersections:

- Richville Drive (SR 627) & US 30 Eastbound Ramps
- Richville Drive (SR 627) & US 30 Westbound Ramps
- Richville Drive & Nave Road (S)/RG Drage Driveway

Roundabout control was recommended as an improvement at the intersection of Richville Drive (SR 627) and Stump Avenue/Creston Road in order to improve the intersection levels-of-service.

Turn lanes were recommended at the following locations:

- Navarre Road & Millennium Boulevard
 - Construct an eastbound left turn lane.
 - Construct a westbound right turn lane.
 - Provide pavement markings on Millennium Boulevard to create separate right and left turn lanes.
- Navarre Road & Sterilite Street
 - Construct an eastbound right turn lane.
 - Construct a westbound left turn lane.

- Navarre Road & Richville Drive (SR 627)
 - Construct an eastbound left turn lane.
 - Construct a westbound left turn lane.
 - Construct a northbound left turn lane.
 - Construct a southbound left turn lane.
 - Update traffic signal control sequence to remove the “split” north and south phasing.

It is recommended that the storage length for the southbound left turn lane at the intersection of Erie Street (US 62/SR 221 and Navarre Road be increased from 175 feet to 400 feet.

Long Term/High Cost Improvements

The extension of Cincinnati Drive to Erie Street (US 62/SR 21) through a connection to Orr Road is recommended for further consideration. The connection would be expected to provide a more direct access to US Route 62/SR 21 and the US Route 30 interchange for the parcels located north of Navarre Road and west of Richville Drive (SR 627).

The immediate development areas north of Navarre Road and east of US Route 62/SR 21 would likely use Navarre Road to access routes to the south and west and would use Richville Drive (SR 627) to access US Route 30. A connection of Cincinnati Drive to Ortt Road would provide a more direct connection to US Route 62/SR 21 and the US Route 30 interchange.

The project would likely require additional right-of-way to construct the extension of Cincinnati Drive to Ortt Road as well as improvements to Ortt Road and the traffic signal control installation at the intersection of Ortt Road and US Route 62/SR 21.

Chapter 1

Introduction

1.1 Purpose of Report

This Area-Wide Planning Study has been prepared at the request of the Stark County Regional Planning Commission (SCRPC). The study area includes the Richville Drive/State Route 627 corridor from Southway Drive to Navarre Road, Navarre Road from State Route 21 to State Route 627, and Fohl Road from the Navarre corporation line to Kemark Avenue. The study area is located in the western portion of Stark County, Ohio primarily in the Village of Navarre, the City of Massillon, and Perry Township.

The study area will consist of the following existing intersections:

1. North Main Street (US 62/SR 21) & Wooster Street
2. Kemark Avenue & Fohl Street
3. Erie Street (US 62/SR 21) & Navarre Road
4. Navarre Road & Millennium Boulevard
5. Millennium Boulevard & Prospect Drive
6. Navarre Road & Sterilite Street
7. Navarre Road & Stump Avenue/Bosford Street
8. Navarre Road & Richville Drive (SR 627)
9. Stump Avenue & Cincinnati Drive
10. Richville Drive (SR 627) & Stump Avenue/Creston Road
11. Richville Drive (SR 627) & US 30 Eastbound Ramps
12. Richville Drive (SR 627) & US 30 Westbound Ramps
13. Richville Drive & Nave Road (S)/RG Drage Driveway
14. Richville Drive & Nave Road (N)
15. Richville Drive & Ohio State Drive/Business Place
16. Richville Drive & Jackson Avenue
17. Richville Drive & Southway Street
18. Fohl Street & Sterilite Street

These intersections will be enumerated and referenced as listed above throughout the report and the analyses contained within it. **Figure 1.1, Appendix A** shows the study area and intersections under study.

1.2 Study Objectives

This study is structured for the following purposes;

- to adequately identify and assess the existing and future study area traffic conditions,
- to adequately assess the traffic impacts associated with future development and identify the level of off-site access and traffic,
- to provide a comprehensive study which evaluates and documents the traffic impacts and off-site improvements, where warranted,
- and to provide a technically sound basis to identify mitigation requirements to off-site traffic impacts.

This study documents the methodologies, findings and conclusions of the analysis, including the basis for all assumptions, traffic parameters utilized and conclusions reached.

The development of future traffic volumes will be based on the forecasting guidelines and methodology found in the Ohio Department of Transportation's **Ohio Traffic Forecasting Manual, Volume 1** ⁽⁴⁾ & **Volume 2** ⁽⁵⁾.

The traffic impacts will be determined through the use of intersection levels-of-service, delay or density, volume to capacity ratio and queue storage ratio. Traffic analyses for the study area intersections will be calculated using the computerized version of the Transportation Research Board's **Highway Capacity Manual 6TH Edition** ⁽¹⁾, (**HCS7, Release 8.1**). Data inputs for the HCS software program will be based on the guidance found in the Ohio Department of Transportation's **Analysis & Traffic Simulation Manual (OATS)** ⁽⁶⁾.

The justification for any changes in the intersections will be determined by comparing data collected of the existing traffic conditions to the criteria established by the **Ohio Manual of Uniform Traffic Control Devices** ⁽²⁾ and professional engineering judgment from an on-site field review.

Intersection geometric design guidelines will be based in the information and procedures found in the Ohio Department of Transportation's **Location & Design Manual, Volume 1** ⁽³⁾.

1.3 Intersection Capacity & Levels-of-Service

Intersection capacity analyses will be performed at the study area intersections using the procedures outlined in the computerized version of the Transportation Research Board's **Highway Capacity Manual** ⁽¹⁾.

The **HCM** ⁽¹⁾ is the most widely used document in the transportation industry. It contains a set of methodologies and application procedures for evaluating the capacity and quality of service of various transportation facilities. The **HCM** ⁽¹⁾ is built from more than 60 years of research work and represents a body of expert transportation consensus.

The capacity analysis procedures provide a calculated "average vehicle delay", which is based on traffic volumes, number of lanes, type of traffic control, channelization, grade, and percentage of large vehicles in the traffic stream at each intersection. The average delay calculated at an intersection is then assigned a "grade" or level of service (LOS) ranging from LOS A, the best, to LOS F, the worst based upon driver expectation. The intersection LOS "grades" as defined by the Transportation Research Board are as follows:

Table 1.1 Intersection Levels-of-Service

LEVEL OF SERVICE (LOS)	UNSIGNALIZED AVERAGE DELAY PER VEHICLE (sec)	SIGNALIZED AVERAGE DELAY PER VEHICLE (sec)
A	≤ 10.0	≤ 10.0
B	10.1 to 15.0	10.1 to 20.0
C	15.1 to 25.0	20.1 to 35.0
D	25.1 to 35.0	35.1 to 55.0
E	35.1 to 50.0	55.1 to 80.0
F	> 50	> 80

The computerized version of the Transportation Research Board's **Highway Capacity Manual** ⁽¹⁾, does not have the ability to analyze a 5-leg intersection. Trafficware's Synchro plus SimTraffic will be utilized for the analysis of the Navarre Road and Stump Avenue/Bosford Street intersection.

Intersection capacity analyses will be performed in order to estimate the maximum amount of traffic that can be accommodated by the intersection while maintaining recommended operational qualities.

The selection of the design level-of-service is most frequently chosen from *Section 5.9* of the Ohio Department of Transportation's **OATS Manual** ⁽⁶⁾. In most cases, a level-of-service D is considered the maximum delay threshold after which improvements should be investigated to determine if the delay can be reduced to a level of D or better. The following table from *Section 5.9* details the operation goals for intersection analyses (All-Way Stop Control, Two-Way Stop Control, Signalized, & Roundabout).

Table 1.2 Intersection Operational Goals

RESULT	INSIDE AN MPO	OUTSIDE AN MPO
Intersection LOS	D or BETTER	C or BETTER
Approach LOS	E or BETTER	
Control LOS	E or BETTER	
v/c	All movements < 1.0 (<= 0.93 preferred)	
QSR	All movements <1.0 from HCS analysis, TransModeler may be needed to determine if queuing impacts upstream intersections.	

MPO = Metropolitan Planning Organization

v/c = Volume to Capacity Ratio

QSR = Queue Storage Ratio

An evaluation of the capacity analyses will determine if there are any locations, approaches or movements in which the delay, v/c, and QSR exceeds the operational goals shown in **Table 1.2**.

The capacity analyses for signalized intersections will be based on the process detailed in *Section 6.2.2.1* of the ODOT **OATS Manual** ⁽⁶⁾. The optimization of the signal timings will be based on the delay minimization function with the objective of Balanced Delay.

It should be noted that any values for queue length, shown in the HCS analysis summary sheets that are displayed in red, indicate that the movement is expected to experience a "spillover" condition where the queue may exceed the existing length of the turn lane and extend into the adjacent through lane. These instances, if they occur, will be investigated for mitigation.

1.4 Intersection Turn Lanes

Turn Lane Warrants

The ODOT **Location and Design Manual, Volume 1** ⁽³⁾ and the **State Highway Access Management Manual** ⁽⁷⁾ describes the need for auxiliary turn lanes at unsignalized intersections. The Auxiliary Lane Graphs found in *Section 401-6* of the **Location and Design Manual, Volume 1** ⁽⁴⁾ are used for this determination. This applies to the free-flow approaches at unsignalized intersections. *Section 401.6.1* of the ODOT **Location and Design Manual** ⁽⁴⁾ states that:

“To determine the number and use of left (right) turn lanes, intersection capacity analysis procedures of the current edition of the Highway Capacity Manual should be used. For unsignalized intersections, left (right) turn lanes may also be needed if they meet warrants provided in Figures 401-5(6)a, b, c and d. The warrants apply only to the free-flow approach of the unsignalized intersection.”

Turn Lane Length

Proposed turn lanes and existing turn lanes, found to be deficient in length, will be analyzed to determine the necessary turn lane storage length in accordance with the procedure found in the Ohio Department of Transportation’s **Location and Design Manual, Volume 1** ⁽³⁾, *Section 401*. The ODOT criteria and procedures are furnished in **Appendix B**.

It should be noted that the recommended maximum length is 800 feet for a right turn lane and 600 feet for a left turn lane, however if the calculated turn lane length is lower than these values, the maximum length will not be applicable.

1.5 References

The following list of references will be utilized for this report and the analysis contained within it:

1. *Highway Capacity Manual*, 7th Edition
Transportation Research Board of the National Academies, Washington, D.C.
2. *Ohio Manual of Uniform Traffic Control Devices for Streets and Highways*, 2012 Edition
Ohio Department of Transportation, Office of Traffic Engineering, Columbus, Ohio.
3. *Location and Design Manual*, Volume 1, Roadway Design. Ohio Department of Transportation, Office of Roadway Engineering, Columbus, Ohio.
4. *Ohio Traffic Forecasting Manual*, Volume 1, Traffic Forecasting Background. Ohio Department of Transportation, Office of Statewide Planning & Research, Columbus, Ohio.
5. *Ohio Traffic Forecasting Manual*, Volume 2, Traffic Forecasting Methodologies. Ohio Department of Transportation, Office of Statewide Planning & Research, Columbus, Ohio.
6. *ODOT Analysis and Traffic Simulation Manual (OATS)*, Ohio Department of Transportation Office of Roadway Engineering, Columbus, Ohio.
7. *State Highway Access Management Manual*, Ohio Department of Transportation Office of Roadway Engineering, Columbus, Ohio.
8. *Trip Generation Manual*, 11th Edition, September 2021
Institute of Transportation Engineers, (ITE), Washington, D.C.
9. *Trip Generation Handbook*, 3rd Edition, September 2017
Institute of Transportation Engineers, (ITE), Washington, D.C.
10. *Traffic Engineering Manual*, October 23, 2002 Edition (Revised January 15, 2021),
Ohio Department of Transportation, Office of Roadway Engineering, Columbus, Ohio.
11. *A Policy on Geometric Design of Highways and Streets (Green Book)*, 7TH Edition, September 2018,
American Association of State Highway and Transportation Officials, Washington, D.C.
12. *Highway Safety Manual w/ 2014 Supplement*, 1ST Edition, September 2014
American Association of State Highway and Transportation Officials, Washington, D.C.
13. *NCHRP Report 672 Roundabouts: An Informational Guide*, 2ND Edition, 2010
Transportation Research Board, Washington, D.C.

Chapter 2

Area Conditions

2.1 Transportation Network Study Area

The study area includes the following intersections:

1. North Main Street (US 62/SR 21) & Wooster Street
2. Kemary Avenue & Fohl Street
3. Erie Street (US 62/SR 21) & Navarre Road
4. Navarre Road & Millennium Boulevard
5. Millennium Boulevard & Prospect Drive
6. Navarre Road & Sterilite Street
7. Navarre Road & Stump Avenue/Bosford Street
8. Navarre Road & Richville Drive (SR 627)
9. Stump Avenue & Cincinnati Drive
10. Richville Drive (SR 627) & Stump Avenue/Creston Road
11. Richville Drive (SR 627) & US 30 Eastbound Ramps
12. Richville Drive (SR 627) & US 30 Westbound Ramps
13. Richville Drive & Nave Road (S)/RG Drage Driveway
14. Richville Drive & Nave Road (N)
15. Richville Drive & Ohio State Drive/Business Place
16. Richville Drive & Jackson Avenue
17. Richville Drive & Southway Street
18. Fohl Street & Sterilite Street

A location map detailing the intersection locations can be seen in **Figure 1.1, Appendix A**.

The following table details the primary characteristics of the existing intersections and study area roadways:

Table 2.1 - Intersection & Roadway Characteristics

INT. #	ROADWAYS	ORIENTATION	LANE USE		TRAFFIC CONTROL
			THROUGH LANES	TURN LANES	
1	N. Main Steet (US 62/SR 21) Wooster Street	North-South East-West	2 2	NB & SB Left Turn	Traffic Signal
2	Fohl Street Kemary Avenue	East-West North-South	2 2	NONE	2-Way Stop
3	Erie Street (US 62/SR 21) Navarre Road	North-South East-West	5 2	NB & SB Left Turn WB Left Turn	Traffic Signal
4	Navarre Road Millennium Boulevard	East-West North-South	2 2	NONE	1-Way Stop
5	Millennium Boulevard Prospect Drive	North-South East-West	2 2	NONE	1-Way Stop
6	Navarre Road Sterlite Street	East-West North-South	2 2	NONE	1-Way Stop
7	Navarre Road Stump Avenue Bosford Street	East-West North-South NW-SE	2 2 2	NONE	3-Way Stop
8	Navarre Road Richville Drive (SR 627)	East-West North-South	2 2	NONE	Traffic Signal
9	Stump Avenue Cincinnati Drive	North-South East-West	2 2	NONE	1-Way Stop
10	Richville Drive (SR 627) Stump Avenue Creston Drive	East-West North-South North-South	2 2 2	NONE	2-Way Stop
11	Richville Drive (SR 627) US 30 Eastbound Ramps	North-South East-West	2 2	SB Left Turn	1-Way Stop
12	Richville Drive (SR 627) US 30 Westbound Ramps	North-South East-West	2 2	NB Left Turn	1-Way Stop
13	Richville Drive Nave Road (S) RG Drage Driveway	North-South East-West East-West	2 2 2	NONE	2-Way Stop
14	Richville Drive Nave Road (N)	North-South East-West	2 2	NONE	Traffic Signal
15	Richville Drive Ohio State Drive Business Place	North-South East-West East-West	2 2 2	NONE	2-Way Stop
16	Richville Drive Jackson Avenue	NW-SE North-South	2 2	NONE	1-Way Stop
17	Richville Drive Southway Street	NW-SE East-West	2 2	SB Left Turn	Traffic Signal
18	Fohl Street Sterlite Street	East-West North-South	2 2	NONE	1-Way Stop

Figure 2.1, Appendix A shows the lane use and traffic control conditions based upon the existing conditions in the study area. These will be considered the existing base conditions for this report.

2.2 Functional Classification

The Ohio Department of Transportation functionally classifies roadways to help define a roadway's characteristics as well as identify roadways that are eligible for federal funds. Functional classification is the grouping of roads, streets, and highways in a hierarchy based on the type of highway service they provide. Generally, streets and highways perform two types of service. They provide either traffic mobility or land access and can be ranked in terms of the proportion of service they provide.

The functional classification as determined by ODOT will be used in this report to apply growth and design hour factors to the study area roadways for use in forecasting the future traffic volumes in the study area. These factors are determined using data, guidelines, and methodology supplied by ODOT. These methods and the corresponding data are based on the roadways assigned functional classification. The ODOT methods for forecasting future traffic volumes are a recognized traffic engineering standard in the State of Ohio.

Roadways that are not listed as having a functional classification can be assigned into one of two categories. The first category is a local roadway and the second category is that of an access drive.

The ODOT functional classification of the roadways in the study area can currently be found using the ODOT Transportation Information Mapping System (TIMS). TIMS is ODOT's web-mapping portal where information about Ohio's transportation system can be found. TIMS can currently be found at the following web address:

<https://gis.dot.state.oh.us/tims/>

Figure 2.2, Appendix A illustrates the section of the functional classification map for the study area.

The following table lists the study area roadways that have an assigned functional classification as determined by ODOT and local government entities.

Table 2.2 - Functional Classification

INT. #	ROADWAYS	AREA	FC #	CLASSIFICATION
1	North Main Street (US 62/SR 21)	Urban	3	Principal Arterial
	Wooster Street	Urban	5	Major Collector
2	Fohl Street	Urban	5	Major Collector
	Kemary Avenue (North)	Urban	7	Local Roadway
	Kemary Avenue (South)	Rural	7	Local Roadway
3	Erie Street (US 62/SR 21)	Urban	3	Principal Arterial
	Navarre Road (East)	Urban	4	Minor Arterial
	Navarre Road (West)	Urban	7	Local Roadway
4	Navarre Road	Urban	4	Minor Arterial
	Millennium Boulevard	Urban	7	Local Roadway
5	Millennium Boulevard	Urban	7	Local Roadway
	Prospect Drive	Urban	7	Local Roadway
6	Navarre Road	Urban	4	Minor Arterial
	Sterlite Street	Urban	6	Minor Collector
7	Navarre Road	Urban	4	Minor Arterial
	Stump Avenue (North)	Urban	5	Major Collector
	Stump Avenue (South)	Urban	7	Local Roadway
	Bosford Street	Urban	7	Local Roadway
8	Navarre Road	Urban	4	Minor Arterial
	Richville Drive (SR 627)	Urban	4	Minor Arterial
9	Stump Avenue	Urban	5	Major Collector
	Cincinnati Drive	Urban	7	Local Roadway
10	Richville Drive (SR 627)	Urban	4	Minor Arterial
	Stump Avenue	Urban	5	Major Collector
	Creston Drive	Urban	7	Local Roadway
11	Richville Drive (SR 627)	Urban	4	Minor Arterial
	US 30 Eastbound Ramps	Urban	2	Freeway/Expressway
12	Richville Drive (SR 627)	Urban	4	Minor Arterial
	US 30 Westbound Ramps	Urban	2	Freeway/Expressway
13	Richville Drive	Urban	4	Minor Arterial
	Nave Road (S)	Urban	6	Minor Collector
	RG Drage Driveway	Urban	7	Access Drive
14	Richville Drive	Urban	4	Minor Arterial
	Nave Road (N)	Urban	7	Local Roadway
15	Richville Drive	Urban	4	Minor Arterial
	Ohio State Drive	Urban	7	Local Roadway
	Business Place	Urban	7	Local Roadway
16	Richville Drive	Urban	4	Minor Arterial
	Jackson Avenue	Urban	6	Minor Collector
17	Richville Drive	Urban	4	Minor Arterial
	Southway Street	Urban	4	Minor Arterial
18	Fohl Street	Urban	5	Major Collector
	Sterlite Street	Urban	6	Minor Collector

2.3 Speed Limits & Design Speed

Speed Limits

The posted speed limit on a roadway can be categorized as either the statutory speed limit or a journalized speed limit. Statutory speed limits in the State of Ohio are determined by the **Ohio Revised Code, Section 4511.21**. Roadways that have speed limits posted that do not coincide with the **ORC** guidance must be approved and journalized by the Ohio Department of Transportation (ODOT). The approved speed limits in Ohio that are journalized can be found on ODOT's TIMS website at the following web address:

<https://gis.dot.state.oh.us/tims>

Figure 2.3, Appendix A details the location of journalized speed limits within the the study area.

Design Speeds

The design speed of a roadway is key component in the design and operation of roadways and their associated facilities. The AASHTO publication, **A Policy on Geometric Design of Highway Streets (Green Book)** ⁽¹¹⁾, defines design speed as a selected speed used to determine the various geometric design features of the roadway. The assumed design speed should be a logical one with respect to the topography, anticipated operating speed, the adjacent land use and the functional classification of highway.

The ODOT **Location and Design Manual, Volume 1** ⁽³⁾ provides guidance for determining the design speed of a roadway. *Section 104.2* of the ODOT **Location and Design Manual** ⁽³⁾ states that:

"The design speed should match the legal speed for facilities with a legal speed of 35 mph or less. For facilities with a legal speed of 40 or 45 mph the design speed should either match the legal speed, or be 5 mph greater than the legal speed, depending on the context of the area. For facilities with a legal speed 50 mph or greater, the design speed should be 5 mph greater than the legal speed."

The following table details the speed limit and design speed for the study area roadways:

Table 2.3 - SPEED LIMITS & DESIGN SPEEDS

INT. #	ROADWAYS	SPEED LIMIT (MPH)	DESIGN SPEED (MPH)
1	North Main Steet (US 62/SR 21)	35	35
	Wooster Street	25	25
2	Fohl Street	55	60
	Kemary Avenue (North)	45	50
	Kemary Avenue (South)	40	45
3	Erie Street (US 62/SR 21)	40	45
	Navarre Road	45	50
4	Navarre Road	45	50
	Millennium Boulevard	25	25
5	Millennium Boulevard	25	25
	Prospect Drive	25	25
6	Navarre Road	45	50
	Sterlite Street	25	25
7	Navarre Road	40	45
	Stump Avenue	35	35
	Bosford Street	25	25
8	Navarre Road	40	45
	Richville Drive-SR627 (North)	40	45
	Richville Drive-SR627 (South)	35	35
9	Stump Avenue	45	50
	Cincinnati Drive	25	25
10	Richville Drive (SR 627)	40	45
	Stump Avenue	45	50
	Creston Drive	25	25
11	Richville Drive (SR 627)	40	45
	US 30 Eastbound Ramps	35	35
12	Richville Drive (SR 627)	40	45
	US 30 Westbound Ramps	35	35
13	Richville Drive	40	45
	Nave Road (S)	35	35
	RG Drage Driveway	10	10
14	Richville Drive	40	45
	Nave Road (N)	35	35
15	Richville Drive	40	45
	Ohio State Drive	25	25
	Business Place	25	25
16	Richville Drive	40	45
	Jackson Avenue	40	45
17	Richville Drive	40	45
	Southway Street	45	50
18	Fohl Street	55	60
	Sterlite Street	25	25

2.4 Traffic

Weekday Peak Hours

The Stark County Area Transportation Study (SCATS) provided traffic count data for 16 of the 18 intersections under study. SCATS provided the following data for use in determining the existing peak hour traffic volumes in the study area:

- Counts - Raw Data
 - Excel raw data and Houston Radar raw data for traffic counts.
- Turn Movement Data
 - Petra turn movement count data files.
- Intersection Data
 - PDF's of analyzed traffic counts not found within the MS2 system.

The SCATS weekday traffic counts were conducted in fifteen (15) minute intervals between the hours of 7 AM - 9 AM and 4 PM - 6 PM, then hourly totals were calculated. A copy of the intersection turn movement counts are included in **Appendix C**.

TMS Engineers collected traffic data at the intersection Richville Drive and Southway Street. The TMS Engineers weekday traffic count also was conducted in fifteen (15) minute intervals between the hours of 7 AM - 10 AM, 11 AM - 2 PM, and 3 PM - 6 PM, then hourly totals were calculated. A copy of the intersection turn movement count is included in **Appendix C**.

The peak hour traffic data for the intersection of Fohl Street and Sterilite Street was obtained from the Project Redbone Traffic Impact Study that was prepared by TMS Engineers and dated October 19, 2020.

The intersection AM and PM peak hours are selected by reviewing data in 15-minute intervals to find the 4 consecutive 15 minute periods with the highest total volume.

The following table details a summary of the traffic data collection and the intersection AM and PM peak hours:

Table 2.4 - Traffic Data Collection Summary

INT. #	ROADWAYS	DATA COLLECTION			AM	PM
		DATE	MONTH	DAY	PEAK HOUR	PEAK HOUR
1	N. Main Steet (US 62/SR 21) Wooster Street	4/20/2022	April	Wednesday	7:00 - 8:00	4:30 - 5:30
2	Fohl Street Kemary Avenue	4/8/2022	April	Friday	7:00 - 8:00	4:00 - 5:00
3	Erie Street (US 62/SR 21) Navarre Road	3/31/2022	March	Thursday	7:00 - 8:00	4:00 - 5:00
4	Navarre Road Millennium Boulevard	4/6/2022	April	Wednesday	7:00 - 8:00	4:00 - 5:00
5	Millennium Boulevard Prospect Drive	4/6/2022	April	Wednesday	7:00 - 8:00	4:00 - 5:00
6	Navarre Road Sterlite Street	4/8/2022	April	Friday	7:00 - 8:00	4:00 - 5:00
7	Navarre Road Stump Ave./Bosford St.	3/29/2022	March	Tuesday	7:30 - 8:00	4:00 - 5:00
8	Navarre Road Richville Drive (SR 627)	4/19/2022	April	Tuesday	7:00 - 8:00	4:30 - 5:30
9	Stump Avenue Cincinnati Drive	4/14/2022	April	Thursday	7:00 - 8:00	4:30 - 5:30
10	Richville Drive (SR 627) Stump Ave/Creston Dr.	4/14/2022	April	Thursday	7:00 - 8:00	4:00 - 5:00
11	Richville Drive (SR 627) US 30 Eastbound Ramps	4/12/2022	April	Tuesday	7:00 - 8:00	4:00 - 5:00
12	Richville Drive (SR 627) US 30 Westbound Ramps	4/12/2022	April	Tuesday	7:00 - 8:00	4:00 - 5:00
13	Richville Drive Nave Road (S)/RG Drage	4/21/2022	April	Thursday	7:15 - 8:15	4:30 - 5:30
14	Richville Drive Nave Road (N)	4/18/2022	April	Monday	7:00 - 8:00	4:00 - 5:00
15	Richville Drive Ohio State Dr./Business Place	4/4/2022	April	Monday	7:00 - 8:00	4:15 - 5:15
16	Richville Drive Jackson Avenue	4/4/2022	April	Monday	7:00 - 8:00	4:15 - 5:15
17	Richville Drive Southway Street	7/14/2022	July	Thursday	8:00 - 9:00	4:15 - 5:15
18	Fohl Street Sterlite Street	9/24/2020	September	Thursday	7:00 - 8:00	3:45 - 4:45

These periods will be used to forecast expected and future traffic volumes since they reflect the period of the highest volume of vehicular traffic flow at each intersection. The use of each intersection's peak hour as opposed to a system wide peak hour is expected to provide a conservative estimate of traffic at each intersection and within the study area.

The existing AM and PM peak hour traffic volumes are shown in **Figure 2.4, Appendix A**.

2.5 Crash Data

The Ohio Department of Transportation provides a tool to retrieve crash data. The ODOT GIS Crash Analysis Tool (GCAT) was used to collect crash information at the 18 study area intersections. The ODOT GIS Crash Analysis Tool can currently be found at the following web address:

<https://gis.dot.state.oh.us/tims/>

The years 2019 through June of 2022 were reviewed using the ODOT GCAT portal. The following intersections were found to have zero reported crashes during the time period under study:

- Millennium Boulevard & Prospect Drive
- Stump Avenue & Cincinnati Drive
- Richville Drive & Ohio State Drive/Business Place
- Fohl Street & Sterilite Street

Crash data summaries for the remaining 14 area intersections with reported crash data can be found in **Appendix D**.

The 14 study area intersections with a reported crash history experienced a total of 154 intersection related crashes between 2019 and June of 2022.

Rear end crashes were determined to be the predominate crash type at 9 of the intersections. Typical causes of rear end crashes at signalized intersections may include congestion, large turn volumes, slippery surfaces, excessive speed, lack of adequate gaps, and drivers unaware of the intersection. Rear end crashes can also be associated with roadways and intersections that are nearing or exceeding capacity. The cited contributing circumstance for all of the rear end crashes was "Followed Too Closely/ACDA". Based on a review of the rear-end crash reports it is likely that driver inattention was also a factor in the crashes.

Typical countermeasures in order to reduce the frequency of rear end crashes may include:

- Update signal timing with optimized change and clearance intervals.
- Install signal backplate/retro-reflective back-plates to increase visibility of traffic control devices.
- Provide surface treatment to increase friction of roadway surface.
- Install dilemma zone radar detection on high speed (> 40 miles per hour) approaches at signalized intersections.

Angle and turn crashes were determined to be the predominate crash type at 5 of the intersections. Typical causes of angle, left turn, and right turn crashes are congestion, large turn volumes, slippery surfaces, excessive speed, poor traffic signal coordination between intersections, inadequate clearance intervals, and poor visibility of traffic control devices. Left turn crashes can also be associated with roadways and intersections that are nearing or exceeding capacity.

Typical countermeasures in order to reduce the frequency of left turn, right turn, and angle crashes may include:

- Improve turn lane channelization with turn lanes.
- Update signal timing with optimized change and clearance intervals.
- Install signal backplate/retro-reflective back-plates to increase visibility of traffic control devices.
- Install “Left Turn Yield On Green Ball” signs (R10-12) on the traffic signal mast arms for approaches with protected and permissive left turn phases.
- Upgrade traffic signal control to use the flashing yellow arrow for the left turn movements.
- Install dilemma zone radar detection on high speed (> 40 miles per hour) approaches at signalized intersections.

Crash Diagram

An intersection crash diagram was prepared for the each intersection based on the results from the previous table and the summaries in **Appendix D**.

A crash diagram is a schematic drawing that has been compiled from a series of individual crash reports relative to a specific location (intersection). The diagram includes the vehicles direction of travel prior to contact, and the presence of any pedestrians or bicycles whose presence contributed to a collision or were involved directly in the crash. The crash diagrams can be used as a visual reference in analyzing possible crash patterns at an intersection.

The crash diagrams include the following information:

- Title block with project and study area description.
- Schematic of the location with the approaches labeled and directional arrow indicating north.
- A legend key to denote the symbols and abbreviations used in the diagram.
- Each crash includes the date and hour of the crash in the following format: DD-MM-YR /HH
- Each crash also includes the road conditions.

The crash data from the years 2019 though June of 2022 was used to create a crash diagram for each intersection under study. The intersection crash diagrams can be seen in **Appendix E**.

ECAT Analysis

The **Highway Safety Manual** ⁽¹²⁾ (**HSM**) provides a methodology to conduct a safety performance evaluation for intersections and roadway segments. The Ohio Department of Transportation provides a spreadsheet tool to complete the **Highway Safety Manual** ⁽¹²⁾ (**HSM**) calculations. The spreadsheet tool is known as the Economic Crash Analysis Tool (ECAT). The spreadsheet has the ability to calculate predicted crash frequencies, complete Empirical Bayes calculations, predict crash frequencies for proposed conditions, conduct alternative analyses, and complete a benefit-cost analysis.

Predicted crashes are estimated from a Safety Performance Function (SPF). The SPF is an equation to estimate or predict the average crash frequency at a location as a function of traffic volume and intersection characteristics. The predicted number of crashes for a given site is therefore an estimate of the average number of crashes per year based on the crash experience at other locations with similar characteristics. Existing observed crash history is not used to determine the **predicted** crash frequency.

Expected crashes are estimated using the Empirical Bayes (EB) method. The use of the Empirical Bayes method provides a weighted average of the existing observed crashes at the intersection and the predicted crashes from similar sites to estimate its **expected** crash frequency. This improves the accuracy and reliability of the estimate.

An intersection is expected to have the potential for safety improvements if the **expected** crash frequency is greater than the **predicted** crash frequency. The potential for improvement at the study area location is not based on site specific improvements but related to the comparison of similar sites that were used to determine the **predicted** crash frequency. The application of site specific improvements to the **expected** crash analysis may result in crash rate improvements that exceed or fall below the potential for improvement at these locations.

Copies of the ECAT analysis worksheet for each intersection with a reported crash history can be found in **Appendix F**.

The crashes were tabulated by intersection, crash type, and ECAT analysis results in order to address probable causes and corrective measures at each intersection based on the dominate crash type. The table detailing the intersection crash patterns can be seen on the following page:

Table 2.5 - Intersection Crash Patterns

INT. #	ROADWAYS	TOTAL CRASHES (Injuries)	MAJOR CRASH PATTERN	PREDICTED CRASH FREQUENCY	EXPECTED CRASH FREQUENCY	POTENTIAL IMPROVEMENT
1	N. Main Steet (US 62/SR 21) Wooster Street	19 (5)	Rear End (11)	4.2714	4.3627	0.0913
2	Fohl Street Kemary Avenue	6 (6)	Angle (5)	1.3588	1.3188	0.0000
3	Erie Street (US 62/SR 21) Navarre Road	39 (14)	Rear End (14) Angle (11)	8.3840	8.8024	0.4184
4	Navarre Road Millennium Boulevard	5 (1)	Rear End (3)	0.5419	0.6705	0.1286
5	Millennium Boulevard Prospect Drive	0 (0)	NONE			
6	Navarre Road Sterilite Street	3 (0)	Run-Off Road (2)	0.4264	0.5148	0.0884
7	Navarre Road Stump Ave./Bosford St.	16 (3)	Angle (5)	NA	NA	NA
8	Navarre Road Richville Drive (SR 627)	27 (7)	Rear End (18)	4.2708	5.5724	1.3016
9	Stump Avenue Cincinnati Drive	0 (0)	NONE			
10	Richville Drive (SR 627) Stump Ave/Creston Dr.	7 (3)	Angle (4)	1.1880	1.3732	0.1852
11	Richville Drive (SR 627) US 30 Eastbound Ramps	4 (0)	Rear End (2)	0.8001	0.9297	0.1296
12	Richville Drive (SR 627) US 30 Westbound Ramps	7 (1)	Rear End (5)	0.7544	1.4355	0.6811
13	Richville Drive Nave Road (S)/RG Drage	5 (0)	Angle (2) Rear End (2)	1.5038	1.6105	0.1067
14	Richville Drive Nave Road (N)	7 (2)	Rear End (4)	1.8366	1.9983	0.1617
15	Richville Drive Ohio State Dr./Business Place	0 (0)	NONE			
16	Richville Drive Jackson Avenue	3 (0)	Run-Off Road (2)	0.2869	0.3613	0.0744
17	Richville Drive Southway Street	6 (2)	Rear End (2)	1.2320	1.2369	0.0049
18	Fohl Street Sterilite Street	0 (0)	NONE			

Chapter 3

Projected Traffic Conditions

3.1 Non-Site Traffic

Background Traffic Growth

Design of new roadways or improvements to existing roadways should not usually be based on current traffic volumes alone, but should consider future traffic volumes expected to make use of the facilities. Roadways should be designed to accommodate the traffic volume that is likely to occur within the design life of the facility. In a practical sense, this design volume should be a value that can be estimated with reasonable accuracy. It is believed that the maximum design period is in the range of 15 to 24 years. Therefore, a period of twenty years is widely used as a basis for design for large projects. Traffic cannot usually be forecasted accurately beyond this period on a specific facility because of probable changes in the general regional economy, population, and land development along the roadway. The **ODOT Certified Traffic Manual** requires that twenty year design hour traffic volumes be analyzed.

Roadways, like those found in the study area, carry a significant amount of through traffic due to their functional characteristics. This through traffic component generally increases as regional growth occurs. Therefore, it is anticipated that existing traffic in the study area will increase in future years.

The years 2025 (Opening Year) and 2045 (Design Year) will be analyzed for the study area. Therefore, it is necessary to estimate historical growth rates in order to establish the future traffic on the study area roadways.

Growth rates for the study area roadways were developed using data supplied by the SCATS. A copy of the SCATS supplied data can be found in **Appendix G**.

Design Hour Traffic

The traffic patterns on any roadway typically show considerable variation in the traffic volumes experienced during the various hours of the day and in the hourly volumes experienced throughout the year. A key decision in the design process involves determining which of these hourly traffic volumes should be used as the basis for the design.

It would be wasteful to predicate a design on the maximum peak hour traffic that occurs during the year and the use of the average hourly traffic would result in an inadequate design. The hourly traffic volumes used in a design should not be exceeded very often or by very much. However, the hourly traffic volumes should not be so high that traffic would rarely be sufficient to make full use of the designed facility.

Normal design policy in the State of Ohio is based upon a review of curves that depict the variation in hourly traffic volumes during the year. The Ohio Department of Transportation recommends using the 30TH highest hour as a design control for urban streets. There is typically very little difference between the volumes in this range. The Ohio Department of Transportation provides factors that are applied to counted daily traffic volumes to determine appropriate design hour traffic volumes.

Following guidelines set forth in the **ODOT State Highway Access Management Manual**, all analyses are required to examine the design hour volume for the adjacent roadway and peak hour traffic volume of the proposed development. The **Ohio Traffic Forecasting Manual** will be used to determine peak hour factors for the study area roadways.

The design hour volumes are determined by multiplying the AM and PM peak hour volumes by the appropriate factors from the ODOT Peak Hour to Design Hour Factor Report based on the functional classification of the roadway, the day of the week and the month that the traffic data was collected. A copy of the ODOT's Peak Hour to Design Hour Factor Report can be seen in **Appendix H**.

3.2 Site Traffic

Trip Generation

Calculating future total driveway trips requires an estimate of the traffic generated by proposed developments in the study area. The most widely accepted method of determining the amount of traffic that the proposed development will generate is to compare the proposed land use with existing facilities of the same use. The Institute of Transportation Engineers (ITE) has prepared a manual titled **“Trip Generation Manual”**, which is a compilation of similar traffic generation studies to aide in making such a comparison. The most recent update of this manual is the 10TH edition and was utilized for this study.

The following developments were identified in the study area that are either under construction currently or will be in the near future:

- Stark Farm Development
 - TIS prepared and dated 1/24/2019
- Project Redbone
 - TIS prepared and dated 10/19/2020
- Proposed Sheetz
 - Located northeast corner of SR 21/US 62 & Ortt Road
- Trucking Company - Nova Road (East)
 - Expected 125 additional trucks per day.

Site generated traffic from the these expected developments will be included in the future traffic volume forecasts as a “build” scenario.

Distribution of Generated Traffic

The directional distribution for the new generated traffic of each development is a function of the prevailing operating conditions on the existing roadways. The primary distribution patterns that were assumed for each development were based upon the existing traffic volumes entering and exiting the study area during the AM and PM peak hours shown in **Figure 2.4**.

The distribution pattern that was assumed at each development was based on the overall inbound (entering traffic) and outbound (exiting traffic) at each point of access for the proposed developments. The entering and exiting site generated traffic was then distributed through the study area roadway network based on the distribution of traffic at each intersection as the traffic volumes progress through the system.

3.3 Future Traffic

No-Build Condition

The previously discussed calculation of design hour factors and growth rates for each movement were applied to the existing 2022 traffic volumes shown in **Figure 2.4** in order to estimate the future traffic without the site specific developments discussed in Section 3.2.

A spreadsheet detailing the use of the calculated growth rates, the design hour factors, and the resulting expected 2025 and 2045 No-Build traffic volumes can be found in **Appendix I**.

The estimated 2025 and 2045 No-Build traffic volumes for the study area are shown graphically in **Figures 3.1 and 3.2, Appendix A**. This traffic is the expected traffic if the proposed developments **are not** constructed, the “**No-Build**” condition.

The No-Build traffic volumes have been rounded to the nearest 10 to adhere to preferred ODOT practices.

Build Condition

The sum of the 2025 and 2045 No-Build volumes, shown in **Figures 3.1 and 3.2**, were added to the new generated traffic to equal the future Build peak hour volumes in order to estimate the future traffic considering the expected conditions.

The estimated 2025 Build traffic volumes for the study area are shown graphically in **Figure 3.3, Appendix A**. These traffic volumes are the expected volumes if the proposed developments **are** constructed, or the “**Build**” condition.

The estimated 2045 Build traffic volumes for the study area under the full build conditions are shown graphically in **Figure 3.4, Appendix A**. These traffic volumes are the expected volumes if the proposed developments **are** constructed, or the “**Build**” condition.

The Build traffic volumes have also been rounded to the nearest 10.

Chapter 4

Traffic Analysis

4.1 Capacity & LOS at Study Area Intersections

2025 Traffic Analysis - No-Build & Build Conditions

Traffic analyses were performed for the projected 2025 opening year conditions under the No-Build and Build scenarios so that:

1. any existing roadway/intersection deficiencies can be identified in the No-Build scenario which would not be attributable additional development, and;
2. a comparison can be made to determine the changes in the traffic operations which may be attributed to additional development.

The traffic volumes used in the No-Build analyses can be seen in **Figure 3.1, Appendix A**. Copies of the capacity worksheets for the No-Build analyses are included in **Appendix J**.

The traffic volumes used in the Build analyses can be seen in **Figure 3.3, Appendix A**. Copies of the capacity worksheets for the Build analyses are included in **Appendix K**.

The results of the Year 2025 No-Build and Build analyses with the existing roadway conditions are shown in the following tables:

(1) North Main Street (US 62/SR 21) & Wooster Street**Table 4.1- 2025 Peak Hour Levels-of-Service
(North Main Street & Wooster Street)**

Intersection #1	2025 AM No-Build Conditions Traffic Signal Control (45.6 Seconds)					Intersection #1	2025 PM No-Build Conditions Traffic Signal Control (48.6 Seconds)				
Main & Wooster	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Main & Wooster	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	A	8.7	0.286	0.00	48	EBT	B	10.1	0.325	0.00	60
EB Approach	A	8.7	-	-	-	EB Approach	B	10.1	-	-	-
WBT	A	7.8	0.114	0.00	20	WBT	A	9.3	0.184	0.00	35
WB Approach	A	7.8	-	-	-	WB Approach	A	9.3	-	-	-
NBL	B	17.1	0.040	0.02	5	NBL	C	20.3	0.048	0.02	5
NBT	B	15.3	0.782	0.00	155	NBT	B	14.4	0.714	0.00	160
NB Approach	B	15.4	-	-	-	NB Approach	B	14.6	-	-	-
SBL	B	19.2	0.050	0.05	5	SBL	B	18.9	0.082	0.09	9
SBT	B	14.1	0.635	0.00	118	SBT	B	15.4	0.807	0.00	188
SB Approach	B	14.2	-	-	-	SB Approach	B	15.6	-	-	-
Intersection	B	13.1	-	-	-	Intersection	B	13.6	-	-	-

**Table 4.2 - 2025 Peak Hour Levels-of-Service
(North Main Street & Wooster Street)**

Intersection #1	2025 AM Build Conditions Traffic Signal Control (46.2 Seconds)					Intersection #1	2025 PM Build Conditions Traffic Signal Control (48.7 Seconds)				
Main & Wooster	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Main & Wooster	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	A	8.9	0.304	0.00	50	EBT	B	10.1	0.340	0.00	63
EB Approach	A	8.9	-	-	-	EB Approach	B	10.1	-	-	-
WBT	A	8.1	0.128	0.00	23	WBT	A	9.4	0.213	0.00	40
WB Approach	A	8.1	-	-	-	WB Approach	A	9.4	-	-	-
NBL	B	17.0	0.039	0.02	5	NBL	C	20.4	0.048	0.02	5
NBT	B	15.4	0.790	0.00	160	NBT	B	14.4	0.714	0.00	160
NB Approach	B	15.5	-	-	-	NB Approach	B	14.6	-	-	-
SBL	B	19.5	0.050	0.05	5	SBL	B	18.9	0.082	0.09	9
SBT	B	13.9	0.622	0.00	118	SBT	B	15.5	0.807	0.00	190
SB Approach	B	14.1	-	-	-	SB Approach	B	15.6	-	-	-
Intersection	B	13.1	-	-	-	Intersection	B	13.6	-	-	-

(2) Kemary Avenue & Fohl Street**Table 4.3 - 2025 Peak Hour Levels-of-Serivce
(Fohl Street & Kemary Avenue)**

Intersection #2	2025 AM No-Build Conditions Two-Way Stop Control				Intersection #2	2025 PM No-Build Conditions Two-Way Stop Control			
Fohl & Kemary	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Fohl & Kemary	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	7.5	0.02	0.1	EBT	A	7.5	0.02	0.0
EB Approach	A	2.6	--	--	EB Approach	A	1.6	--	--
WBT	A	7.4	0.01	0.0	WBT	A	7.4	0.01	0.0
WB Approach	A	0.9	--	--	WB Approach	A	0.7	--	--
NBL	B	11.0	0.12	0.4	NBL	B	11.1	0.09	0.3
NB Approach	B	11.0	--	--	NB Approach	B	11.1	--	--
SBL	B	10.6	0.07	0.2	SBL	B	12.0	0.21	0.8
SB Approach	B	10.6	--	--	SB Approach	B	12.0	--	--

**Table 4.4 - 2025 Peak Hour Levels-of-Serivce
(Fohl Street & Kemary Avenue)**

Intersection #2	2025 AM Build Conditions Two-Way Stop Control				Intersection #2	2025 PM Build Conditions Two-Way Stop Control			
Fohl & Kemary	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Fohl & Kemary	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	7.6	0.02	0.1	EBT	A	7.6	0.02	0.1
EB Approach	A	2.2	--	--	EB Approach	A	1.0	--	--
WBT	A	7.4	0.01	0.0	WBT	A	7.6	0.01	0.0
WB Approach	A	0.5	--	--	WB Approach	A	0.5	--	--
NBL	B	11.9	0.13	0.5	NBL	B	12.4	0.11	0.4
NB Approach	B	11.9	--	--	NB Approach	B	12.4	--	--
SBL	B	11.5	0.08	0.2	SBL	B	13.8	0.26	1.0
SB Approach	B	11.5	--	--	SB Approach	B	13.8	--	--

(3) Erie Street (US 62/SR 21) & Navarre Road**Table 4.5 - 2025 Peak Hour Levels-of-Service
(Erie Street & Navarre Road)**

Intersection #3	2025 AM No-Build Conditions Traffic Signal Control (56.3 Seconds)					Intersection #3	2025 PM No-Build Conditions Traffic Signal Control (75.2 Seconds)				
Erie & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Erie & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	B	18.3	0.248	0.00	38	EBT	B	19.0	0.280	0.00	70
EB Approach	B	18.3	-	-	-	EB Approach	B	19.0	-	-	-
WBL	C	24.3	0.283	0.79	40	WBL	C	26.9	0.458	2.74	137
WBT	C	20.1	0.553	0.00	90	WBT	C	22.6	0.639	0.00	220
WB Approach	C	21.3	-	-	-	WB Approach	C	24.1	-	-	-
NBL	B	12.4	0.045	0.06	7	NBL	B	17.9	0.081	0.12	14
NBT	B	15.0	0.520	0.00	128	NBT	C	23.7	0.742	0.00	293
NBR	B	15.1	0.524	0.00	123	NBR	C	23.8	0.742	0.00	280
NB Approach	B	15.0	-	-	-	NB Approach	C	23.6	-	-	-
SBL	A	9.4	0.389	0.26	46	SBL	D	40.1	0.861	1.15	201
SBT	A	5.8	0.172	0.00	30	SBT	B	12.8	0.459	0.00	193
SBR	A	5.8	0.173	0.00	30	SBR	B	12.8	0.459	0.00	193
SB Approach	A	7.1	-	-	-	SB Approach	B	19.2	-	-	-
Intersection	B	13.4	-	-	-	Intersection	C	21.7	-	-	-

**Table 4.6 - 2025 Peak Hour Levels-of-Service
(Erie Street & Navarre Road)**

Intersection #3	2025 AM Build Conditions Traffic Signal Control (58.5 Seconds)					Intersection #3	2025 PM Build Conditions Traffic Signal Control (107.7 Seconds)				
Erie & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Erie & Navarre	BUIDL	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	B	17.9	0.237	0.00	38	EBT	C	26.9	0.346	0.00	98
EB Approach	B	17.9	-	-	-	EB Approach	C	26.9	-	-	-
WBL	C	24.8	0.309	0.95	48	WBL	D	41.3	0.602	4.71	236
WBT	B	19.9	0.551	0.00	103	WBT	C	30.5	0.723	0.00	373
WB Approach	C	21.3	-	-	-	WB Approach	C	34.0	-	-	-
NBL	B	13.4	0.047	0.07	8	NBL	C	25.9	0.090	0.18	21
NBT	B	16.6	0.563	0.00	148	NBT	C	34.3	0.774	0.00	425
NBR	B	16.7	0.566	0.00	140	NBR	C	34.4	0.774	0.00	405
NB Approach	B	16.5	-	-	-	NB Approach	C	34.1	-	-	-
SBL	B	11.8	0.568	0.45	79	SBL	D	54.3	0.923	1.79	313
SBT	A	6.6	0.177	0.00	35	SBT	B	17.5	0.454	0.00	275
SBR	A	6.6	0.178	0.00	35	SBR	B	17.5	0.454	0.00	273
SB Approach	A	8.8	-	-	-	SB Approach	C	27.3	-	-	-
Intersection	B	14.6	-	-	-	Intersection	C	31.0	-	-	-

(4) Navarre Road & Millennium Boulevard

**Table 4.7 - 2025 Peak Hour Levels-of-Serivce
(Navarre Road & Millennium Bouelvard)**

Intersection #4	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #4	2025 PM Mo-Build Conditions Two-Way Stop Control			
Navarre & Millennium	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Navarre & Millennium	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	8.3	0.08	0.3	EBT	A	8.2	0.03	0.1
EB Approach	A	2.8	--	--	EB Approach	A	1.0	--	--
SBL	C	17.1	0.35	1.6	SBL	C	17.5	0.34	1.5
SB Approach	C	17.1	--	--	SB Approach	C	17.5	--	--

**Table 4.8 - 2025 Peak Hour Levels-of-Serivce
(Navarre Road & Millennium Bouelvard)**

Intersection #4	2025 AM Two-Way Stop Control Build Conditions				Intersection #4	2025 PM Two-Way Stop Control Build Conditions			
Navarre & Millennium	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Navarre & Millennium	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	8.4	0.08	0.3	EBT	A	8.5	0.04	0.1
EB Approach	A	2.4	--	--	EB Approach	A	1.0	--	--
SBL	C	17.1	0.32	1.3	SBL	C	19.7	0.36	1.6
SB Approach	C	17.1	--	--	SB Approach	C	19.7	--	--

(5) Millennium Boulevard & Prospect Drive**Table 4.9 - 2025 Peak Hour Levels-of-Serivce
(Millennium Boulevard & Prospect Drive)**

Intersection #5	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #5	2025 PM Two-Way Stop Control No-Build Conditions			
Millennium & Prospect	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Millennium & Prospect	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	B	10.3	0.16	0.6	WBT	A	9.2	0.03	0.1
WB Approach	B	10.3	--	--	WB Approach	A	9.2	--	--
SBL	A	7.5	0.01	0.0	SBL	A	7.3	0.01	0.0
SB Approach	A	1.6	--	--	SB Approach	A	0.7	--	--

**Table 4.10 - 2025 Peak Hour Levels-of-Serivce
(Millennium Boulevard & Prospect Drive)**

Intersection #5	2025 AM Two-Way Stop Control Build Conditions				Intersection #5	2025 PM Two-Way Stop Control Build Conditions			
Millennium & Prospect	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Millennium & Prospect	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	A	10.0	0.15	0.5	WBT	A	9.1	0.03	0.1
WB Approach	A	10.0	--	--	WB Approach	A	9.1	--	--
SBL	A	7.5	0.01	0.0	SBL	A	7.3	0.01	0.0
SB Approach	A	2.5	--	--	SB Approach	A	0.7	--	--

(6) Navarre Road & Sterilite Street**Table 4.11 - 2025 Peak Hour Levels-of-Service
(Navarre Road & Sterilite Street)**

Intersection #6	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #6	2025 PM Two-Way Stop Control No-Build Conditions			
Navarre & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Navarre & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBL	A	8.1	0.03	0.1	WBL	A	8.2	0.01	0.0
WB Approach	A	1.1	--	--	WB Approach	A	0.4	--	--
NBT	B	14.3	0.30	1.2	NBT	C	15.1	0.25	1.0
NB Approach	B	14.3	--	--	NB Approach	C	15.1	--	--

**Table 4.12 - 2025 Peak Hour Levels-of-Service
(Navarre Road & Sterilite Street)**

Intersection #6	2025 AM Two-Way Stop Control Build Conditions				Intersection #6	2025 PM Two-Way Stop Control Build Conditions			
Navarre & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Navarre & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	A	8.6	0.11	0.4	WBT	A	8.4	0.05	0.2
WB Approach	A	3.4	--	--	WB Approach	A	1.8	--	--
SBL	C	22.1	0.51	2.8	SBL	E	37.7	0.77	6.4
SB Approach	C	22.1	--	--	SB Approach	E	37.7	--	--

(7) Navarre Road & Stump Avenue/Bosford Street

**Table 4.13 -2025 Peak Hour Levels-of-Service
(Navarre Road & Stump Avenue/Bosford Street)**

SimTraffic Performance Report
Delay/Vehicle

AM Peak Hour
2025 - Existing Conditions

2: Navarre Road & Stump Avenue & Bosford Street Performance by approach

Approach	NB	SB	NW	NE	SW	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	7.5	2.6	9.8	2.8	1.8	3.2

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	3.7

SimTraffic Performance Report
Delay/Vehicle

AM Peak Hour
2025 - Build Conditions

2: Navarre Road & Stump Avenue & Bosford Street Performance by approach

Approach	NB	SB	NW	NE	SW	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	8.3	5.3	6.3	2.6	2.2	3.5

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	4.2

The computerized version of the Transportation Research Board's **Highway Capacity Manual**⁽¹⁾, does not have the ability to analyze a 5-leg intersection. Trafficware's Synchro plus SimTraffic was utilized for the analysis of the Navarre Road and Stump Avenue/Bosford Street intersection. The tables shown above detail the delay experienced for each approach. The corresponding approach levels-of-service are detailed in **Figures 4.1 & 4.3, Appendix A**.

**Table 4.14 -2025 Peak Hour Levels-of-Service
(Navarre Road & Stump Avenue/Bosford Street)**

SimTraffic Performance Report
Delay/Vehicle

PM Peak Hour
2025 - Existing Conditions

2: Navarre Road & Stump Avenue & Bosford Street Performance by approach

Approach	NB	SB	NW	NE	SW	All
Denied Del/Veh (s)	0.4	0.1	0.1	0.5	0.2	0.3
Total Del/Veh (s)	34.3	51.1	25.4	3.2	1.4	11.3

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	11.9

SimTraffic Performance Report
Delay/Vehicle

PM Peak Hour
2025 - Build Conditions

2: Navarre Road & Stump Avenue & Bosford Street Performance by approach

Approach	NB	SB	NW	NE	SW	All
Denied Del/Veh (s)	0.3	0.1	0.1	0.4	0.2	0.3
Total Del/Veh (s)	14.0	43.6	28.2	4.7	2.0	9.3

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	10.0

Trafficware's Synchro plus SimTraffic was utilized for the analysis of the Navarre Road and Stump Avenue/Bosford Street intersection. The tables shown above detail the delay experienced for each approach. The corresponding approach levels-of-service are detailed in **Figures 4.2 & 4.4, Appendix A**.

(8) Navarre Road & Richville Drive (SR 627)**Table 4.15 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Navarre Road)**

Intersection #8	2025 AM No-Build Conditions Traffic Signal Control (61.5 Seconds)					Intersection #8	2025 PM No-Build Conditions Traffic Signal Control (68.6 Seconds)				
Richville & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	B	17.6	0.527	0.00	155	EBT	C	23.2	0.688	0.00	233
EB Approach	B	17.6	-	-	-	EB Approach	C	23.2	-	-	-
WBT	B	16.4	0.388	0.00	103	WBT	C	22.1	0.614	0.00	198
WB Approach	B	16.4	-	-	-	WB Approach	C	22.1	-	-	-
NBT	C	24.4	0.836	0.00	195	NBT	C	26.1	0.778	0.00	218
NB Approach	C	24.4	-	-	-	NB Approach	C	26.1	-	-	-
SBT	C	25.1	0.593	0.00	95	SBT	C	28.0	0.746	0.00	185
SB Approach	C	25.1	-	-	-	SB Approach	C	28.0	-	-	-
Intersection	C	20.6	-	-	-	Intersection	C	24.6	-	-	-

**Table 4.16 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Navarre Road)**

Intersection #8	2025 AM Build Conditions Traffic Signal Control (63.3 Seconds)					Intersection #8	2025 PM Build Conditions Traffic Signal Control (67.1 Seconds)				
Richville & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	B	19.9	0.598	0.00	190	EBT	C	23.9	0.810	0.00	270
EB Approach	B	19.9	-	-	-	EB Approach	C	23.9	-	-	-
WBT	B	17.4	0.416	0.00	115	WBT	C	22.0	0.639	0.00	198
WB Approach	B	17.4	-	-	-	WB Approach	C	22.0	-	-	-
NBT	C	24.5	0.847	0.00	215	NBT	C	26.9	0.869	0.00	225
NB Approach	C	24.5	-	-	-	NB Approach	C	26.9	-	-	-
SBT	C	26.5	0.681	0.00	113	SBT	C	28.6	0.841	0.00	188
SB Approach	C	26.5	-	-	-	SB Approach	C	28.6	-	-	-
Intersection	C	21.9	-	-	-	Intersection	C	25.1	-	-	-

(9) Stump Avenue & Cincinnati Drive

**Table 4.17 - 2025 Peak Hour Levels-of-Service
(Stump Avenue & Cincinnati Drive)**

Intersection #9	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #9	2025 PM Two-Way Stop Control No-Build Conditions			
Stump & Cincinnati	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Stump & Cincinnati	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	9.8	0.03	0.1	EBT	B	10.2	0.03	0.1
EB Approach	A	9.8	--	--	EB Approach	B	10.2	--	--
NBL	A	7.5	0.01	0.0	NBL	A	7.6	0.01	0.0
NB Approach	A	0.4	--	--	NB Approach	A	0.5	--	--

**Table 4.18 - 2025 Peak Hour Levels-of-Service
(Stump Avenue & Cincinnati Drive)**

Intersection #9	2025 AM Two-Way Stop Control Build Conditions				Intersection #9	2025 PM Two-Way Stop Control Build Conditions			
Stump & Cincinnati	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Stump & Cincinnati	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	B	10.6	0.08	0.2	EBT	B	11.1	0.08	0.2
EB Approach	B	10.6	--	--	EB Approach	B	11.1	--	--
NBL	A	7.5	0.01	0.0	NBL	A	7.6	0.01	0.0
NB Approach	A	0.4	--	--	NB Approach	A	0.5	--	--

(10) Richville Drive (SR 627) & Stump Avenue/Creston Road**Table 4.19 - 2025 Peak Hour Levels-of-Serivce
(Richville Drive & Stump Avenue/Creston Road)**

Intersection #10	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #10	2025 PM Two-Way Stop Control No-Build Conditions			
Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	8.0	0.01	0.0	EBT	A	8.0	0.02	0.1
EB Approach	A	0.4	--	--	EB Approach	A	0.5	--	--
WBT	A	7.8	0.01	0.0	WBT	A	8.5	0.01	0.0
WB Approach	A	0.3	--	--	WB Approach	A	0.4	--	--
NBL	D	27.4	0.63	4.2	NBL	E	44.6	0.69	4.6
NB Approach	D	27.4	--	--	NB Approach	E	44.6	--	--
SBL	B	13.1	0.07	0.2	SBL	C	16.9	0.10	0.3
SB Approach	B	13.1	--	--	SB Approach	C	16.9	--	--

**Table 4.20 - 2025 Peak Hour Levels-of-Serivce
(Richville Drive & Stump Avenue/Creston Road)**

Intersection #10	2025 AM Two-Way Stop Control Build Conditions				Intersection #10	2025 PM Two-Way Stop Control Build Conditions			
Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	8.0	0.01	0.0	EBT	A	8.0	0.02	0.1
EB Approach	A	0.4	--	--	EB Approach	A	0.5	--	--
WBT	A	7.8	0.01	0.0	WBT	A	8.6	0.01	0.0
WB Approach	A	0.3	--	--	WB Approach	A	0.4	--	--
NBL	D	27.9	0.63	4.2	NBL	F	56.4	0.79	6.0
NB Approach	D	27.9	--	--	NB Approach	F	56.4	--	--
SBL	B	13.1	0.07	0.2	SBL	C	17.0	0.10	0.3
SB Approach	B	13.1	--	--	SB Approach	C	17.0	--	--

(11) Richville Drive (SR 627) & US 30 Eastbound Ramps**Table 4.21 - 2025 Peak Hour Levels-of-Serivce
(Richville Drive & US 30 Eastbound Ramps)**

Intersection #11	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #11	2025 PM Two-Way Stop Control No-Build Conditions			
Richville & US30 EB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & US30 EB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	F	58.5	0.81	6.4	EBT	F	211.1	1.33	17.6
EB Approach	F	58.5	--	--	EB Approach	F	211.1	--	--
SBL	A	9.6	0.22	0.9	SBL	A	9.5	0.23	0.9
SB Approach	A	5.6	--	--	SB Approach	A	3.9	--	--

**Table 4.22 - 2025 Peak Hour Levels-of-Serivce
(Richville Drive & US 30 Eastbound Ramps)**

Intersection #11	2025 AM Two-Way Stop Control Build Conditions				Intersection #11	2025 PM Two-Way Stop Control Build Conditions			
Richville & US30 EB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & US30 EB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	F	63.2	0.85	7.0	EBT	F	234.7	1.39	19.0
EB Approach	F	63.2	--	--	EB Approach	F	234.7	--	--
SBL	A	9.7	0.23	0.9	SBL	A	9.6	0.24	0.9
SB Approach	A	5.5	--	--	SB Approach	A	3.9	--	--

(12) Richville Drive (SR 627) & US 30 Westbound Ramps

**Table 4.23 - 2025 Peak Hour Levels-of-Serivce
(Richville Drive & US 30 Westbound Ramps)**

Intersection #12	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #12	2025 PM Two-Way Stop Control No-Build Conditions			
Richville & US30 WB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & US30 WB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	D	30.6	0.76	6.6	WBT	F	53.3	0.90	9.7
WB Approach	D	30.6	--	--	WB Approach	F	53.3	--	--
NBL	A	9.3	0.21	0.8	NBL	A	9.3	0.17	0.6
NB Approach	A	3.3	--	--	NB Approach	A	2.9	--	--

**Table 4.24 - 2025 Peak Hour Levels-of-Serivce
(Richville Drive & US 30 Westbound Ramps)**

Intersection #12	2025 AM Two-Way Stop Control Build Conditions				Intersection #12	2025 PM Two-Way Stop Control Build Conditions			
Richville & US30 WB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & US30 WB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	E	46.8	0.87	9.1	WBT	F	92.3	1.05	13.4
WB Approach	E	46.8	--	--	WB Approach	F	92.3	--	--
NBL	A	9.4	0.22	0.9	NBL	A	9.4	0.18	0.7
NB Approach	A	3.5	--	--	NB Approach	A	3.0	--	--

(13) Richville Drive & Nave Road (S)/RG Drage Driveway**Table 4.25 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Nave Road/RG Drage)**

Intersection #13	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #13	2025 PM Two-Way Stop Control No-Build Conditions			
Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	C	24.5	0.45	2.2	EBT	F	312.0	1.51	15.3
EB Approach	C	24.5	--	--	EB Approach	F	312.0	--	--
WBT	D	25.9	0.13	0.4	WBT	E	43.3	0.62	3.7
WB Approach	D	25.9	--	--	WB Approach	E	43.3	--	--
NBL	A	8.4	0.08	0.2	NBL	A	8.5	0.01	0.0
NB Approach	A	1.9	--	--	NB Approach	A	0.3	--	--
SBL	A	9.0	0.05	0.2	SBL	A	8.4	0.02	0.1
SB Approach	A	1.5	--	--	SB Approach	A	0.6	--	--

**Table 4.26 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Nave Road/RG Drage)**

Intersection #13	2025 AM Two-Way Stop Control Build Conditions				Intersection #13	2025 PM Two-Way Stop Control Build Conditions			
Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	D	25.1	0.46	2.3	EBT	F	345.3	1.58	16.0
EB Approach	D	25.1	--	--	EB Approach	F	345.3	--	--
WBT	D	26.5	0.13	0.4	WBT	E	46.5	0.64	3.9
WB Approach	D	26.5	--	--	WB Approach	E	46.5	--	--
NBL	A	8.5	0.08	0.2	NBL	A	8.5	0.01	0.0
NB Approach	A	2.0	--	--	NB Approach	A	0.3	--	--
SBL	A	9.0	0.05	0.2	SBL	A	8.4	0.02	0.1
SB Approach	A	1.5	--	--	SB Approach	A	0.6	--	--

(14) Richville Drive & Nave Road (N)**Table 4.27 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Nave Road)**

Intersection #14	2025 AM No-Build Conditions Traffic Signal Control (40.0 Seconds)					Intersection #14	2025 PM No-Build Conditions Traffic Signal Control (40.6 Seconds)				
Richville & Nave (N)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Nave (N)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
WBT	B	14.3	0.415	0.00	40	WBT	B	14.4	0.477	0.00	50
WB Approach	B	14.3	-	-	-	WB Approach	B	14.4	-	-	-
NBT	A	6.5	0.431	0.00	50	NBT	A	8.6	0.622	0.00	95
NB Approach	A	6.5	-	-	-	NB Approach	A	8.6	-	-	-
SBT	A	5.9	0.282	0.00	35	SBT	A	6.6	0.384	0.00	50
SB Approach	A	5.9	-	-	-	SB Approach	A	6.6	-	-	-
Intersection	A	7.7	-	-	-	Intersection	A	8.8	-	-	-

**Table 4.28 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Nave Road)**

Intersection #14	2025 AM No-Build Conditions Traffic Signal Control (40.0 Seconds)					Intersection #14	2025 PM No-Build Conditions Traffic Signal Control (40.6 Seconds)				
Richville & Nave (N)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Nave (N)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
WBT	B	14.3	0.415	0.00	40	WBT	B	14.4	0.477	0.00	50
WB Approach	B	14.3	-	-	-	WB Approach	B	14.4	-	-	-
NBT	A	6.5	0.431	0.00	50	NBT	A	8.8	0.635	0.00	98
NB Approach	A	6.5	-	-	-	NB Approach	A	8.8	-	-	-
SBT	A	6.0	0.294	0.00	35	SBT	A	6.7	0.396	0.00	53
SB Approach	A	6.0	-	-	-	SB Approach	A	6.7	-	-	-
Intersection	A	7.7	-	-	-	Intersection	A	8.9	-	-	-

(15) Richville Drive & Ohio State Drive/Business Place

**Table 4.29 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Ohio State Drive/Business Place)**

Intersection #15	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #15	2025 PM Two-Way Stop Control No-Build Conditions			
Richville & Business Place	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Business Place	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	B	14.7	0.30	1.3	EBT	C	16.7	0.20	0.7
EB Approach	B	14.7	--	--	EB Approach	C	16.7	--	--
WBT	B	12.3	0.04	0.1	WBT	C	16.6	0.12	0.4
WB Approach	B	12.3	--	--	WB Approach	C	16.6	--	--
NBL	A	7.9	0.02	0.1	NBL	A	8.2	0.05	0.2
NB Approach	A	0.8	--	--	NB Approach	A	1.9	--	--
SBL	A	7.8	0.01	0.0	SBL	A	7.9	0.01	0.0
SB Approach	A	0.3	--	--	SB Approach	A	0.3	--	--

**Table 4.30 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Ohio State Drive/Business Place)**

Intersection #15	2025 AM Two-Way Stop Control Build Conditions				Intersection #15	2025 PM Two-Way Stop Control Build Conditions			
Richville & Business Place	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Business Place	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	B	15.0	0.31	1.3	EBT	C	17.1	0.20	0.7
EB Approach	B	15.0	--	--	EB Approach	C	17.1	--	--
WBT	B	12.4	0.04	0.1	WBT	C	17.0	0.13	0.4
WB Approach	B	12.4	--	--	WB Approach	C	17.0	--	--
NBL	A	7.9	0.02	0.1	NBL	A	8.2	0.05	0.2
NB Approach	A	0.8	--	--	NB Approach	A	1.9	--	--
SBL	A	7.8	0.01	0.0	SBL	A	7.9	0.01	0.0
SB Approach	A	0.3	--	--	SB Approach	A	0.3	--	--

(16) Richville Drive & Jackson Avenue

**Table 4.31 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Jackson Avenue)**

Intersection #16	2025 AM Two-Way Stop Control No-Build Conditions				Intersection #16	2025 PM Two-Way Stop Control No-Build Conditions			
Richville & Jackson	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Jackson	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	B	12.6	0.10	0.3	WBT	B	14.8	0.17	0.6
WB Approach	B	12.6	--	--	WB Approach	B	14.8	--	--
SBL	A	7.9	0.01	0.0	SBL	A	8.1	0.01	0.0
SB Approach	A	0.4	--	--	SB Approach	A	0.4	--	--

**Table 4.32 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Jackson Avenue)**

Intersection #16	2025 AM Two-Way Stop Control Build Conditions				Intersection #16	2025 PM Two-Way Stop Control Build Conditions			
Richville & Jackson	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Jackson	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	B	12.7	0.10	0.3	WBT	C	15.1	0.18	0.6
WB Approach	B	12.7	--	--	WB Approach	C	15.1	--	--
SBL	A	7.9	0.01	0.0	SBL	A	8.1	0.01	0.0
SB Approach	A	0.4	--	--	SB Approach	A	0.4	--	--

(17) Richville Drive & Southway Street**Table 4.33 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Southway Street)**

Intersection #17	2025 AM No-Build Conditions Traffic Signal Control (53.2 Seconds)					Intersection #17	2025 PM No-Build Conditions Traffic Signal Control (53.2 Seconds)				
Richville & Southway	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Southway	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
WBT	C	21.1	0.564	0.00	70	WBT	C	22.0	0.731	0.00	100
WB Approach	C	21.1	-	-	-	WB Approach	C	22.0	-	-	-
NBT	B	12.4	0.368	0.00	78	NBT	B	13.0	0.447	0.00	100
NB Approach	B	12.4	-	-	-	NB Approach	B	13.0	-	-	-
SBL	A	7.3	0.304	0.25	38	SBL	A	7.6	0.243	0.19	29
SBT	A	4.7	0.200	0.00	30	SBT	A	5.3	0.292	0.00	48
SB Approach	A	5.9	-	-	-	SB Approach	A	6.0	-	-	-
Intersection	B	10.6	-	-	-	Intersection	B	11.6	-	-	-

**Table 4.34 - 2025 Peak Hour Levels-of-Service
(Richville Drive & Southway Street)**

Intersection #17	2025 AM Build Conditions Traffic Signal Control (53.2 Seconds)					Intersection #17	2025 PM Build Conditions Traffic Signal Control (53.2 Seconds)				
Richville & Southway	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Southway	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
WBT	C	21.1	0.564	0.00	70	WBT	C	22.0	0.731	0.00	100
WB Approach	C	21.1	-	-	-	WB Approach	C	22.0	-	-	-
NBT	B	12.4	0.368	0.00	80	NBT	B	13.1	0.463	0.00	103
NB Approach	B	12.4	-	-	-	NB Approach	B	13.1	-	-	-
SBL	A	7.3	0.304	0.25	38	SBL	A	7.6	0.247	0.19	29
SBT	A	4.7	0.211	0.00	30	SBT	A	5.4	0.302	0.00	50
SB Approach	A	5.9	-	-	-	SB Approach	A	6.1	-	-	-
Intersection	B	10.6	-	-	-	Intersection	B	11.6	-	-	-

(18) Fohl Street & Sterilite Street

**Table 4.35 - 2025 Peak Hour Levels-of-Service
(Fohl Street & Sterilite Street)**

Intersection #18	2025 AM Two-Way Stop Control Build Conditions				Intersection #18	2025 PM Two-Way Stop Control Build Conditions			
Fohl & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Fohl & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBL	A	7.5	0.01	0.0	EBL	A	7.6	0.01	0.0
EB Approach	A	0.7	--	--	EB Approach	A	0.6	--	--
SBT	A	9.6	0.03	0.1	SBT	B	10.4	0.06	0.2
SB Approach	A	9.6	--	--	SB Approach	B	10.4	--	--

A summary of the intersection and approach levels-of-service can be seen in **Figures 4.1 & 4.2, Appendix A** for the 2025 No-Build AM and PM peak hour analyses.

Figures 4.3 & 4.4, Appendix A detail a summary of the intersection and approach levels-of-service for the AM and PM peak hour 2025 Build conditions.

The analysis shows that the following intersections do not meet the operational goals shown in **Table 1.2, Page 4** under the forecasted 2025 No-Build and Build conditions.

- Richville Road (SR 627) & Stump Avenue/Creston Road
- Richville Road (SR 627) & US Route 30 Eastbound Ramps
- Richville Road (SR 627) & US Route 30 Westbound Ramps
- Richville Road (SR 627) & Nave Road/RG Drage Driveway

The peak hour capacity analyses at these intersections indicate a level-of-service where it is recommended to investigate improvements that could provide a LOS D or better. Analyses will be performed in a later section of this report to determine what improvements will provide an acceptable level of service in the AM and PM peak periods that will adhere to the acceptable ranges shown in **Table 1.2** as stated in the ODOT **OATS Manual**.

The analysis indicates that the storage length of turn lanes may be inadequate for 2025 No-Build and Build conditions at the following intersections:

- Erie Street (US 62/SR 21) & Navarre Road - SB Left Turn Lane & WB Left Turn Lane

It should be noted that a project is currently underway to improve the westbound left turn lane length.

An analysis will be performed in a later section of this report to determine the queue length needed to mitigate the effect or any other improvement that could reduce the queue storage length required.

2045 Traffic Analysis - No-Build & Build Conditions

Traffic analyses were performed for the projected 2045 design year conditions under the No-Build and Build scenarios so that:

1. any existing roadway/intersection deficiencies can be identified in the No-Build scenario which would not be attributable additional development, and;
2. a comparison can be made to determine the changes in the traffic operations which may be attributed to additional development.

The traffic volumes used in the No-Build analyses can be seen in **Figure 3.2, Appendix A**. Copies of the capacity worksheets for the No-Build analyses are included in **Appendix L**.

The traffic volumes used in the Build analyses can be seen in **Figure 3.4, Appendix A**. Copies of the capacity worksheets for the Build analyses are included in **Appendix M**.

The results of the Year 2045 No-Build and Build analyses with the existing roadway conditions are shown in the following tables:

(1) North Main Street (US 62/SR 21) & Wooster Street**Table 4.36 - 2025 Peak Hour Levels-of-Service
(North Main Street & Wooster Street)**

Intersection #1	2025 AM Build Conditions Traffic Signal Control (46.2 Seconds)					Intersection #1	2025 PM Build Conditions Traffic Signal Control (48.7 Seconds)				
Main & Wooster	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Main & Wooster	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	A	8.9	0.304	0.00	50	EBT	B	10.1	0.340	0.00	63
EB Approach	A	8.9	-	-	-	EB Approach	B	10.1	-	-	-
WBT	A	8.1	0.128	0.00	23	WBT	A	9.4	0.213	0.00	40
WB Approach	A	8.1	-	-	-	WB Approach	A	9.4	-	-	-
NBL	B	17.0	0.039	0.02	5	NBL	C	20.4	0.048	0.02	5
NBT	B	15.4	0.790	0.00	160	NBT	B	14.4	0.714	0.00	160
NB Approach	B	15.5	-	-	-	NB Approach	B	14.6	-	-	-
SBL	B	19.5	0.050	0.05	5	SBL	B	18.9	0.082	0.09	9
SBT	B	13.9	0.622	0.00	118	SBT	B	15.5	0.807	0.00	190
SB Approach	B	14.1	-	-	-	SB Approach	B	15.6	-	-	-
Intersection	B	13.1	-	-	-	Intersection	B	13.6	-	-	-

**Table 4.37 - 2045 Peak Hour Levels-of-Service
(North Main Street & Wooster Street)**

Intersection #1	2045 AM Build Conditions Traffic Signal Control (45.7 Seconds)					Intersection #1	2045 PM Build Conditions Traffic Signal Control (48.7 Seconds)				
Main & Wooster	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Main & Wooster	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	A	8.7	0.301	0.00	50	EBT	B	10.1	0.340	0.00	63
EB Approach	A	8.7	-	-	-	EB Approach	B	10.1	-	-	-
WBT	A	7.9	0.127	0.00	23	WBT	A	9.4	0.213	0.00	40
WB Approach	A	7.9	-	-	-	WB Approach	A	9.4	-	-	-
NBL	B	17.2	0.040	0.02	5	NBL	C	20.4	0.048	0.02	5
NBT	B	15.4	0.782	0.00	155	NBT	B	14.6	0.734	0.00	165
NB Approach	B	15.4	-	-	-	NB Approach	B	14.8	-	-	-
SBL	B	19.3	0.050	0.05	5	SBL	B	19.3	0.084	0.09	9
SBT	B	14.1	0.636	0.00	118	SBT	B	15.4	0.806	0.00	190
SB Approach	B	14.3	-	-	-	SB Approach	B	15.6	-	-	-
Intersection	B	13.0	-	-	-	Intersection	B	13.7	-	-	-

(2) Kemary Avenue & Fohl Street**Table 4.38- 2045 Peak Hour Levels-of-Serivce
(Fohl Street & Kemary Avenue)**

Intersection #2	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #2	2045 PM Two-Way Stop Control No-Build Conditions			
Fohl & Kemary	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Fohl & Kemary	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	7.5	0.02	0.1	EBT	A	7.5	0.02	0.0
EB Approach	A	2.6	--	--	EB Approach	A	1.5	--	--
WBT	A	7.4	0.01	0.0	WBT	A	7.5	0.01	0.0
WB Approach	A	0.8	--	--	WB Approach	A	0.7	--	--
NBL	B	11.1	0.12	0.4	NBL	B	11.2	0.09	0.3
NB Approach	B	11.1	--	--	NB Approach	B	11.2	--	--
SBL	B	10.7	0.07	0.2	SBL	B	12.2	0.22	0.8
SB Approach	B	10.7	--	--	SB Approach	B	12.2	--	--

**Table 4.39 - 2045 Peak Hour Levels-of-Serivce
(Fohl Street & Kemary Avenue)**

Intersection #2	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #2	2045 PM Two-Way Stop Control Build Conditions			
Fohl & Kemary	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Fohl & Kemary	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	7.7	0.02	0.1	EBT	A	7.6	0.02	0.1
EB Approach	A	2.2	--	--	EB Approach	A	1.0	--	--
WBT	A	7.4	0.01	0.0	WBT	A	7.6	0.01	0.0
WB Approach	A	0.5	--	--	WB Approach	A	0.5	--	--
NBL	B	12.0	0.13	0.5	NBL	B	12.5	0.11	0.4
NB Approach	B	12.0	--	--	NB Approach	B	12.5	--	--
SBL	B	11.7	0.08	0.3	SBL	B	14.0	0.26	1.0
SB Approach	B	11.7	--	--	SB Approach	B	14.0	--	--

(3) Erie Street (US 62/SR 21) & Navarre Road**Table 4.40 - 2045 Peak Hour Levels-of-Service
(Erie Street & Navarre Road)**

Intersection #3	2045 AM No-Build Conditions Traffic Signal Control (56.4 Seconds)					Intersection #3	2045 PM No-Build Conditions Traffic Signal Control (75.4 Seconds)				
Erie & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Erie & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	B	18.4	0.248	0.00	38	EBT	B	19.2	0.278	0.00	70
EB Approach	B	18.4	-	-	-	EB Approach	B	19.2	-	-	-
WBL	C	24.4	0.283	0.79	40	WBL	C	26.7	0.452	2.75	138
WBT	C	20.1	0.554	0.00	90	WBT	C	22.7	0.639	0.00	223
WB Approach	C	21.3	-	-	-	WB Approach	C	24.1	-	-	-
NBL	B	12.4	0.045	0.06	7	NBL	B	18.5	0.084	0.12	14
NBT	B	15.1	0.521	0.00	130	NBT	C	23.7	0.738	0.00	293
NBR	B	15.1	0.525	0.00	123	NBR	C	23.8	0.738	0.00	283
NB Approach	B	15.0	-	-	-	NB Approach	C	23.6	-	-	-
SBL	A	9.4	0.410	0.28	49	SBL	D	40.7	0.863	1.16	203
SBT	A	5.9	0.177	0.00	33	SBT	B	13.0	0.472	0.00	200
SBR	A	5.9	0.177	0.00	33	SBR	B	13.0	0.472	0.00	200
SB Approach	A	7.1	-	-	-	SB Approach	B	19.3	-	-	-
Intersection	B	13.4	-	-	-	Intersection	C	21.7	-	-	-

**Table 4.41 - 2045 Peak Hour Levels-of-Service
(Erie Street & Navarre Road)**

Intersection #3	2045 AM Build Conditions Traffic Signal Control (58.6 Seconds)					Intersection #3	2045 PM Build Conditions Traffic Signal Control (103.3 Seconds)				
Erie & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Erie & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	B	17.9	0.237	0.00	38	EBT	C	25.6	0.357	0.00	93
EB Approach	B	17.9	-	-	-	EB Approach	C	25.6	-	-	-
WBL	C	24.9	0.309	0.95	48	WBL	D	40.5	0.625	4.55	228
WBT	B	19.8	0.550	0.00	103	WBT	C	29.4	0.732	0.00	358
WB Approach	C	21.3	-	-	-	WB Approach	C	33.0	-	-	-
NBL	B	13.5	0.047	0.07	8	NBL	C	24.7	0.091	0.17	20
NBT	B	16.6	0.563	0.00	148	NBT	C	32.7	0.777	0.00	405
NBR	B	16.7	0.567	0.00	140	NBR	C	32.8	0.777	0.00	388
NB Approach	B	16.6	-	-	-	NB Approach	C	32.6	-	-	-
SBL	B	12.3	0.592	0.48	84	SBL	D	53.2	0.923	1.74	305
SBT	A	6.6	0.182	0.00	38	SBT	B	16.8	0.468	0.00	268
SBR	A	6.6	0.183	0.00	38	SBR	B	16.8	0.468	0.00	268
SB Approach	A	9.0	-	-	-	SB Approach	C	26.3	-	-	-
Intersection	B	14.6	-	-	-	Intersection	C	29.8	-	-	-

(4) Navarre Road & Millennium Boulevard

**Table 4.42 - 2045 Peak Hour Levels-of-Serivce
(Navarre Road & Millennium Bouelvard)**

Intersection #4	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #4	2045 PM Two-Way Stop Control No-Build Conditions			
Navarre & Millennium	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Navarre & Millennium	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	8.3	0.08	0.3	EBT	A	8.2	0.03	0.1
EB Approach	A	2.8	--	--	EB Approach	A	1.0	--	--
SBL	C	17.1	0.35	1.6	SBL	C	17.5	0.34	1.5
SB Approach	C	17.1	--	--	SB Approach	C	17.5	--	--

**Table 4.43 - 2045 Peak Hour Levels-of-Serivce
(Navarre Road & Millennium Bouelvard)**

Intersection #4	2045 AM Two-Way Stop Control Build Conditions				Intersection #4	2045 PM Two-Way Stop Control Build Conditions			
Navarre & Millennium	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Navarre & Millennium	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	8.4	0.08	0.3	EBT	A	8.5	0.04	0.1
EB Approach	A	2.4	--	--	EB Approach	A	1.0	--	--
SBL	C	17.1	0.32	1.3	SBL	C	19.7	0.36	1.6
SB Approach	C	17.1	--	--	SB Approach	C	19.7	--	--

(5) Millennium Boulevard & Prospect Drive**Table 4.44 - 2045 Peak Hour Levels-of-Service
(Millennium Boulevard & Prospect Drive)**

Intersection #5	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #5	2045 PM Two-Way Stop Control No-Build Conditions			
Millennium & Prospect	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Millennium & Prospect	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	B	10.3	0.16	0.6	WBT	A	9.2	0.03	0.1
WB Approach	B	10.3	--	--	WB Approach	A	9.2	--	--
SBL	A	7.5	0.01	0.0	SBL	A	7.3	0.01	0.0
SB Approach	A	1.6	--	--	SB Approach	A	0.7	--	--

**Table 4.45 - 2045 Peak Hour Levels-of-Service
(Millennium Boulevard & Prospect Drive)**

Intersection #5	2045 AM Two-Way Stop Control Build Conditions				Intersection #5	2045 PM Two-Way Stop Control Build Conditions			
Millennium & Prospect	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Millennium & Prospect	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	B	10.0	0.15	0.5	WBT	A	9.1	0.03	0.1
WB Approach	B	10.0	--	--	WB Approach	A	9.1	--	--
SBL	A	7.5	0.01	0.0	SBL	A	7.3	0.01	0.0
SB Approach	A	2.5	--	--	SB Approach	A	0.7	--	--

(6) Navarre Road & Sterilite Street**Table 4.46 - 2045 Peak Hour Levels-of-Service
(Navarre Road & Sterilite Street)**

Intersection #6	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #6	2045 PM Two-Way Stop Control No-Build Conditions			
Navarre & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Navarre & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBL	A	8.1	0.03	0.1	WBL	A	8.2	0.01	0.0
WB Approach	A	1.1	--	--	WB Approach	A	0.4	--	--
NBT	B	14.3	0.30	1.2	NBT	C	15.1	0.25	1.0
NB Approach	B	14.3	--	--	NB Approach	C	15.1	--	--

**Table 4.47 - 2045 Peak Hour Levels-of-Service
(Navarre Road & Sterilite Street)**

Intersection #6	2045 AM Two-Way Stop Control Build Conditions				Intersection #6	2045 PM Two-Way Stop Control Build Conditions			
Navarre & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Navarre & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBL	A	8.5	0.11	0.4	WBL	A	8.4	0.05	0.2
WB Approach	A	3.4	--	--	WB Approach	A	1.8	--	--
NBT	C	21.0	0.49	2.6	NBT	E	37.7	0.77	6.4
NB Approach	C	21.0	--	--	NB Approach	E	37.7	--	--

(7) Navarre Road & Stump Avenue/Bosford Street

**Table 4.48 -2045 Peak Hour Levels-of-Service
(Navarre Road & Stump Avenue/Bosford Street)**

SimTraffic Performance Report
Delay/Vehicle

AM Peak Hour
2045 - Existing Conditions

2: Navarre Road & Stump Avenue & Bosford Street Performance by approach

Approach	NB	SB	NW	NE	SW	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	7.5	3.3	9.7	2.7	1.9	3.3

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	3.8

SimTraffic Performance Report
Delay/Vehicle

AM Peak Hour
2045 - Build Conditions

2: Navarre Road & Stump Avenue & Bosford Street Performance by approach

Approach	NB	SB	NW	NE	SW	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.2
Total Del/Veh (s)	8.3	5.3	6.3	2.6	2.2	3.5

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	4.2

The computerized version of the Transportation Research Board's **Highway Capacity Manual**⁽¹⁾, does not have the ability to analyze a 5-leg intersection. Trafficware's Synchro plus SimTraffic was utilized for the analysis of the Navarre Road and Stump Avenue/Bosford Street intersection. The tables shown above detail the delay experienced for each approach. The corresponding approach levels-of-service are detailed in **Figures 4.5 & 4.7, Appendix A**.

**Table 4.49 -2045 Peak Hour Levels-of-Service
(Navarre Road & Stump Avenue/Bosford Street)**

SimTraffic Performance Report
Delay/Vehicle

PM Peak Hour
2045 - Existing Conditions

2: Navarre Road & Stump Avenue & Bosford Street Performance by approach

Approach	NB	SB	NW	NE	SW	All
Denied Del/Veh (s)	0.4	0.1	0.1	0.5	0.2	0.3
Total Del/Veh (s)	34.3	51.1	25.4	3.2	1.4	11.3

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	11.9

SimTraffic Performance Report
Delay/Vehicle

PM Peak Hour
2045 - Build Conditions

2: Navarre Road & Stump Avenue & Bosford Street Performance by approach

Approach	NB	SB	NW	NE	SW	All
Denied Del/Veh (s)	0.3	0.1	0.1	0.4	0.2	0.3
Total Del/Veh (s)	14.0	43.6	28.2	4.7	2.0	9.3

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	10.0

Trafficware's Synchro plus SimTraffic was utilized for the analysis of the Navarre Road and Stump Avenue/Bosford Street intersection. The tables shown above detail the delay experienced for each approach. The corresponding approach levels-of-service are detailed in **Figures 4.6 & 4.8, Appendix A**.

8) Navarre Road & Richville Drive (SR 627)**Table 4.50 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Navarre Road)**

Intersection #8	2045 AM No-Build Conditions Traffic Signal Control (62.0 Seconds)					Intersection #8	2045 PM No-Build Conditions Traffic Signal Control (70.7 Seconds)				
Richville & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	B	17.8	0.531	0.00	158	EBT	C	26.1	0.704	0.00	253
EB Approach	B	17.8	-	-	-	EB Approach	C	26.1	-	-	-
WBT	B	16.6	0.390	0.00	105	WBT	C	23.5	0.636	0.00	208
WB Approach	B	16.6	-	-	-	WB Approach	C	23.5	-	-	-
NBT	C	24.5	0.841	0.00	203	NBT	C	26.6	0.776	0.00	230
NB Approach	C	24.5	-	-	-	NB Approach	C	26.6	-	-	-
SBT	C	25.3	0.597	0.00	95	SBT	C	28.5	0.746	0.00	198
SB Approach	C	25.3	-	-	-	SB Approach	C	28.5	-	-	-
Intersection	C	20.8	-	-	-	Intersection	C	26.1	-	-	-

**Table 4.51 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Navarre Road)**

Intersection #8	2045 AM Build Conditions Traffic Signal Control (63.6 Seconds)					Intersection #8	2045 PM Build Conditions Traffic Signal Control (69.5 Seconds)				
Richville & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Navarre	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	C	20.1	0.602	0.00	190	EBT	C	24.3	0.815	0.00	278
EB Approach	C	20.1	-	-	-	EB Approach	C	24.3	-	-	-
WBT	B	17.6	0.418	0.00	115	WBT	C	23.1	0.650	0.00	205
WB Approach	B	17.6	-	-	-	WB Approach	C	23.1	-	-	-
NBT	C	24.6	0.855	0.00	220	NBT	C	28.0	0.874	0.00	240
NB Approach	C	24.6	-	-	-	NB Approach	C	28.0	-	-	-
SBT	C	26.8	0.687	0.00	115	SBT	C	29.4	0.845	0.00	200
SB Approach	C	26.8	-	-	-	SB Approach	C	29.4	-	-	-
Intersection	C	22.1	-	-	-	Intersection	C	25.9	-	-	-

(9) Stump Avenue & Cincinnati Drive

**Table 4.52 - 2045 Peak Hour Levels-of-Serivce
(Stump Avenue & Cincinnati Drive)**

Intersection #9	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #9	2045 PM Two-Way Stop Control No-Build Conditions			
Stump & Cincinnati	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Stump & Cincinnati	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	9.8	0.03	0.1	EBT	B	10.2	0.03	0.1
EB Approach	A	9.8	--	--	EB Approach	B	10.2	--	--
NBL	A	7.5	0.01	0.0	NBL	A	7.6	0.01	0.0
NB Approach	A	0.4	--	--	NB Approach	A	0.5	--	--

**Table 4.53 - 2045 Peak Hour Levels-of-Serivce
(Stump Avenue & Cincinnati Drive)**

Intersection #9	2045 AM Two-Way Stop Control Build Conditions				Intersection #9	2045 PM Two-Way Stop Control Build Conditions			
Stump & Cincinnati	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Stump & Cincinnati	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	B	10.6	0.08	0.1	EBT	B	11.1	0.08	0.2
EB Approach	B	10.6	--	--	EB Approach	B	11.1	--	--
NBL	A	7.5	0.02	0.0	NBL	A	7.6	0.01	0.0
NB Approach	A	0.4	--	--	NB Approach	A	0.5	--	--

(10) Richville Drive (SR 627) & Stump Avenue/Creston Road**Table 4.54 - 2045 Peak Hour Levels-of-Serivce
(Richville Drive & Stump Avenue/Creston Road)**

Intersection #10	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #10	2045 PM Two-Way Stop Control No-Build Conditions			
Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	8.0	0.01	0.0	EBT	A	8.1	0.02	0.1
EB Approach	A	0.4	--	--	EB Approach	A	0.5	--	--
WBT	A	7.8	0.01	0.0	WBT	A	8.6	0.01	0.0
WB Approach	A	0.3	--	--	WB Approach	A	0.4	--	--
NBL	D	29.5	0.65	4.4	NBL	F	52.0	0.74	5.2
NB Approach	D	29.5	--	--	NB Approach	F	52.0	--	--
SBL	B	13.3	0.07	0.2	SBL	C	17.6	0.11	0.4
SB Approach	B	13.3	--	--	SB Approach	C	17.6	--	--

**Table 4.55 - 2045 Peak Hour Levels-of-Serivce
(Richville Drive & Stump Avenue/Creston Road)**

Intersection #10	2045 AM Two-Way Stop Control Build Conditions				Intersection #10	2045 PM Two-Way Stop Control Build Conditions			
Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	A	8.0	0.01	0.0	EBT	A	8.1	0.02	0.1
EB Approach	A	0.4	--	--	EB Approach	A	0.5	--	--
WBT	A	7.8	0.01	0.0	WBT	A	8.7	0.01	0.0
WB Approach	A	0.3	--	--	WB Approach	A	0.4	--	--
NBL	D	30.0	0.66	4.5	NBL	F	67.6	0.84	6.7
NB Approach	D	30.0	--	--	NB Approach	F	67.6	--	--
SBL	B	13.4	0.07	0.2	SBL	C	17.7	0.11	0.4
SB Approach	B	13.4	--	--	SB Approach	C	17.7	--	--

(11) Richville Drive (SR 627) & US 30 Eastbound Ramps

**Table 4.56 - 2045 Peak Hour Levels-of-Serivce
(Richville Drive & US 30 Eastbound Ramps)**

Intersection #11	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #11	2045 PM Two-Way Stop Control No-Build Conditions			
Richville & US30 EB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & US30 EB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	F	120.6	1.05	10.2	EBT	F	400.4	1.76	24.8
EB Approach	F	120.6	--	--	EB Approach	F	400.4	--	--
SBL	A	10.0	0.25	1.0	SBL	A	9.8	0.26	1.1
SB Approach	A	5.7	--	--	SB Approach	A	4.0	--	--

**Table 4.57 - 2045 Peak Hour Levels-of-Serivce
(Richville Drive & US 30 Eastbound Ramps)**

Intersection #11	2045 AM Two-Way Stop Control Build Conditions				Intersection #11	2045 PM Two-Way Stop Control Build Conditions			
Richville & US30 EB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & US30 EB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	F	133.4	1.09	11.1	EBT	F	434.7	1.84	26.4
EB Approach	F	133.4	--	--	EB Approach	F	434.7	--	--
SBL	A	10.1	0.26	1.0	SBL	A	9.9	0.27	1.1
SB Approach	A	5.6	--	--	SB Approach	A	4.0	--	--

(12) Richville Drive (SR 627) & US 30 Westbound Ramps

**Table 4.58 - 2045 Peak Hour Levels-of-Serivce
(Richville Drive & US 30 Westbound Ramps)**

Intersection #12	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #12	2045 PM Two-Way Stop Control No-Build Conditions			
Richville & US30 WB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & US30 WB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	F	53.1	0.91	10.1	WBT	F	148.7	1.20	17.8
WB Approach	F	53.1	--	--	WB Approach	F	148.7	--	--
NBL	A	9.6	0.24	0.9	NBL	A	9.7	0.20	0.7
NB Approach	A	3.5	--	--	NB Approach	A	3.1	--	--

**Table 4.59 - 2045 Peak Hour Levels-of-Serivce
(Richville Drive & US 30 Westbound Ramps)**

Intersection #12	2045 AM Two-Way Stop Control Build Conditions				Intersection #12	2045 PM Two-Way Stop Control Build Conditions			
Richville & US30 WB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & US30 WB	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	F	95.5	1.06	14.3	WBT	F	232.5	1.40	22.7
WB Approach	F	95.5	--	--	WB Approach	F	232.5	--	--
NBL	A	9.8	0.26	1.0	NBL	A	9.8	0.21	0.8
NB Approach	A	3.6	--	--	NB Approach	A	3.2	--	--

(13) Richville Drive & Nave Road (S)/RG Drage Driveway**Table 4.60 - 2045 Peak Hour Levels-of-Serivce
(Richville Drive & Nave Road/RG Drage)**

Intersection #13	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #13	2045 PM Two-Way Stop Control No-Build Conditions			
Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	D	29.4	0.53	2.9	EBT	F	484.5	1.89	19.7
EB Approach	D	29.4	--	--	EB Approach	F	484.5	--	--
WBT	D	30.9	0.15	0.5	WBT	F	58.5	0.72	4.6
WB Approach	D	30.9	--	--	WB Approach	F	58.5	--	--
NBL	A	8.6	0.09	0.3	NBL	A	8.6	0.01	0.0
NB Approach	A	2.2	--	--	NB Approach	A	0.3	--	--
SBL	A	9.1	0.05	0.2	SBL	A	8.5	0.02	0.1
SB Approach	A	1.5	--	--	SB Approach	A	0.6	--	--

**Table 4.61 - 2045 Peak Hour Levels-of-Serivce
(Richville Drive & Nave Road/RG Drage)**

Intersection #13	2045 AM Two-Way Stop Control Build Conditions				Intersection #13	2045 PM Two-Way Stop Control Build Conditions			
Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	D	30.4	0.54	3.0	EBT	F	529.5	1.99	20.4
EB Approach	D	30.4	--	--	EB Approach	F	529.5	--	--
WBT	D	31.7	0.15	0.5	WBT	F	64.0	0.74	4.9
WB Approach	D	31.7	--	--	WB Approach	F	64.0	--	--
NBL	A	8.6	0.09	0.3	NBL	A	8.6	0.01	0.0
NB Approach	A	2.3	--	--	NB Approach	A	0.3	--	--
SBL	A	9.1	0.05	0.2	SBL	A	8.5	0.02	0.1
SB Approach	A	1.4	--	--	SB Approach	A	0.6	--	--

(14) Richville Drive & Nave Road (N)**Table 4.62 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Nave Road)**

Intersection #14	2045 AM No-Build Conditions Traffic Signal Control (40.0 Seconds)					Intersection #14	2045 PM No-Build Conditions Traffic Signal Control (40.6 Seconds)				
Richville & Nave (N)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Nave (N)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
WBT	B	14.3	0.415	0.00	40	WBT	B	14.4	0.477	0.00	50
WB Approach	B	14.3	-	-	-	WB Approach	B	14.4	-	-	-
NBT	A	6.6	0.456	0.00	53	NBT	A	9.2	0.660	0.00	108
NB Approach	A	6.6	-	-	-	NB Approach	A	9.2	-	-	-
SBT	A	6.0	0.306	0.00	38	SBT	A	6.7	0.408	0.00	55
SB Approach	A	6.0	-	-	-	SB Approach	A	6.7	-	-	-
Intersection	A	7.7	-	-	-	Intersection	A	9.2	-	-	-

**Table 4.63 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Nave Road)**

Intersection #14	2045 AM Build Conditions Traffic Signal Control (40.0 Seconds)					Intersection #14	2045 PM Build Conditions Traffic Signal Control (40.6 Seconds)				
Richville & Nave (N)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Nave (N)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
WBT	B	14.3	0.415	0.00	40	WBT	B	14.4	0.477	0.00	50
WB Approach	B	14.3	-	-	-	WB Approach	B	14.4	-	-	-
NBT	A	6.6	0.456	0.00	53	NBT	A	9.5	0.673	0.00	113
NB Approach	A	6.6	-	-	-	NB Approach	A	9.5	-	-	-
SBT	A	6.1	0.317	0.00	40	SBT	A	6.8	0.420	0.00	58
SB Approach	A	6.1	-	-	-	SB Approach	A	6.8	-	-	-
Intersection	A	7.7	-	-	-	Intersection	A	9.3	-	-	-

(15) Richville Drive & Ohio State Drive/Business Place

**Table 4.64 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Ohio State Drive/Business Place)**

Intersection #15	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #15	2045 PM Two-Way Stop Control No-Build Conditions			
Richville & Business Place	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Business Place	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	C	15.4	0.32	1.3	EBT	C	17.9	0.21	0.8
EB Approach	C	15.4	--	--	EB Approach	C	17.9	--	--
WBT	B	12.6	0.04	0.1	WBT	C	17.7	0.13	0.4
WB Approach	B	12.6	--	--	WB Approach	C	17.7	--	--
NBL	A	7.9	0.02	0.1	NBL	A	8.3	0.06	0.2
NB Approach	A	0.8	--	--	NB Approach	A	1.8	--	--
SBL	A	7.8	0.01	0.0	SBL	A	7.9	0.01	0.0
SB Approach	A	0.3	--	--	SB Approach	A	0.3	--	--

**Table 4.65 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Ohio State Drive/Business Place)**

Intersection #15	2045 AM Two-Way Stop Control Build Conditions				Intersection #15	2045 PM Two-Way Stop Control Build Conditions			
Richville & Business Place	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Business Place	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBT	C	15.6	0.32	1.4	EBT	C	18.4	0.22	0.8
EB Approach	C	15.6	--	--	EB Approach	C	18.4	--	--
WBT	B	12.7	0.04	0.1	WBT	C	18.2	0.14	0.5
WB Approach	B	12.7	--	--	WB Approach	C	18.2	--	--
NBL	A	8.0	0.02	0.1	NBL	A	8.3	0.06	0.2
NB Approach	A	0.8	--	--	NB Approach	A	1.8	--	--
SBL	A	7.8	0.01	0.0	SBL	A	8.0	0.01	0.0
SB Approach	A	0.3	--	--	SB Approach	A	0.3	--	--

(16) Richville Drive & Jackson Avenue

**Table 4.66 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Jackson Avenue)**

Intersection #16	2045 AM Two-Way Stop Control No-Build Conditions				Intersection #16	2045 PM Two-Way Stop Control No-Build Conditions			
Richville & Jackson	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Jackson	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	B	13.1	0.11	0.4	WBT	C	15.9	0.21	0.8
WB Approach	B	13.1	--	--	WB Approach	C	15.9	--	--
SBL	A	8.0	0.01	0.0	SBL	A	8.1	0.01	0.0
SB Approach	A	0.4	--	--	SB Approach	A	0.4	--	--

**Table 4.67 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Jackson Avenue)**

Intersection #16	2045 AM Two-Way Stop Control Build Conditions				Intersection #16	2045 PM Two-Way Stop Control Build Conditions			
Richville & Jackson	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Jackson	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
WBT	B	13.2	0.11	0.4	WBT	C	16.3	0.22	0.8
WB Approach	B	13.2	--	--	WB Approach	C	16.3	--	--
SBL	A	8.0	0.01	0.0	SBL	A	8.1	0.01	0.0
SB Approach	A	0.4	--	--	SB Approach	A	0.3	--	--

(17) Richville Drive & Southway Street**Table 4.68 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Southway Street)**

Intersection #17	2045 AM No-Build Conditions Traffic Signal Control (53.5 Seconds)					Intersection #17	2045 PM No-Build Conditions Traffic Signal Control (53.4 Seconds)				
Richville & Southway	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Southway	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
WBT	C	21.3	0.602	0.00	75	WBT	C	22.4	0.763	0.00	108
WB Approach	C	21.3	-	-	-	WB Approach	C	22.4	-	-	-
NBT	B	12.7	0.406	0.00	90	NBT	B	13.4	0.496	0.00	113
NB Approach	B	12.7	-	-	-	NB Approach	B	13.4	-	-	-
SBL	A	7.5	0.334	0.27	41	SBL	A	7.8	0.271	0.20	30
SBT	A	4.8	0.212	0.00	33	SBT	A	5.4	0.312	0.00	53
SB Approach	A	6.1	-	-	-	SB Approach	A	6.2	-	-	-
Intersection	B	10.9	-	-	-	Intersection	B	11.8	-	-	-

**Table 4.69 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Southway Street)**

Intersection #17	2045 AM Build Conditions Traffic Signal Control (53.4 Seconds)					Intersection #17	2045 PM Build Conditions Traffic Signal Control (53.3 Seconds)				
Richville & Southway	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Southway	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
WBT	C	21.3	0.601	0.00	75	WBT	C	22.4	0.763	0.00	105
WB Approach	C	21.3	-	-	-	WB Approach	C	22.4	-	-	-
NBT	B	12.7	0.407	0.00	90	NBT	B	13.5	0.512	0.00	118
NB Approach	B	12.7	-	-	-	NB Approach	B	13.5	-	-	-
SBL	A	7.5	0.334	0.27	41	SBL	A	7.9	0.275	0.20	30
SBT	A	4.9	0.223	0.00	33	SBT	A	5.5	0.321	0.00	53
SB Approach	A	6.1	-	-	-	SB Approach	A	6.2	-	-	-
Intersection	B	10.9	-	-	-	Intersection	B	11.8	-	-	-

(18) Fohl Street & Sterilite Street

**Table 4.70 - 2045 Peak Hour Levels-of-Servive
(Fohl Street & Sterilite Street)**

Intersection #18	2045 AM Two-Way Stop Control Build Conditions				Intersection #18	2045 PM Two-Way Stop Control Build Conditions			
Fohl & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Fohl & Sterilite	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EBL	A	7.6	0.01	0.0	EBL	A	7.6	0.01	0.0
EB Approach	A	0.7	--	--	EB Approach	A	0.6	--	--
SBT	A	9.6	0.03	0.1	SBT	B	10.6	0.08	0.3
SB Approach	A	9.6	--	--	SB Approach	B	10.6	--	--

A summary of the intersection and approach levels-of-service can be seen in **Figures 4.5 & 4.6, Appendix A** for the 2045 No-Build AM and PM peak hour analyses.

Figures 4.7 & 4.8, Appendix A detail a summary of the intersection and approach levels-of-service for the AM and PM peak hour 2045 Build conditions.

The analysis shows that the following intersections do not meet the operational goals shown in **Table 1.2, Page 4** under the forecasted 2045 No-Build and Build conditions.

- Richville Road (SR 627) & Stump Avenue/Creston Road
- Richville Road (SR 627) & US Route 30 Eastbound Ramps
- Richville Road (SR 627) & US Route 30 Westbound Ramps
- Richville Road (SR 627) & Nave Road/RG Drage Driveway

The peak hour capacity analyses at these intersections indicate a level-of-service where it is recommended to investigate improvements that could provide a LOS D or better. Analyses will be performed in a later section of this report to determine what improvements will provide an acceptable level of service in the AM and PM peak periods that will adhere to the acceptable ranges shown in **Table 1.2** as stated in the ODOT **OATS Manual**.

The analysis indicates that the storage length of turn lanes may be inadequate for the 2045 No-Build and Build conditions at the following intersections:

- Erie Street (US 62/SR 21) & Navarre Road - SB Left Turn Lane & WB Left Turn Lane

It should be noted that a project is currently underway to improve the westbound left turn lane length.

An analysis will be performed in a later section of this report to determine the queue length needed to mitigate the effect or any other improvement that could reduce the queue storage length required.

4.2 Improvements for Capacity & LOS at Study Area Intersections

2045 Traffic Analysis - Improvements

Traffic analyses for 2045 Build conditions revealed issues at four intersections where levels-of-service failed to meet the operational goals shown in **Table 1.2, Page 4**.

Certain improvements were tested with further capacity analyses in order to determine what mitigation would be necessary to improve the levels-of-service at the intersections under the forecasted 2045 Build conditions.

The following improvements were determined to mitigate the poor levels-of-service at the intersections so that they will operate at LOS D or better under the forecasted 2045 Build conditions.

- Richville Road (SR 627) & Stump Avenue/Creston Road
 - Install roundabout control.
- Richville Road (SR 627) & US Route 30 Eastbound Ramps
 - Install traffic signal control.
- Richville Road (SR 627) & US Route 30 Westbound Ramps
 - Install traffic signal control.
- Richville Road (SR 627) & Nave Road/RG Drage Driveway
 - Install traffic signal control.

The following tables show the capacity analysis results of the recommended improvements at the intersections. Copies of the capacity worksheets for the intersections are included in **Appendix N**.

(10) Richville Drive (SR 627) & Stump Avenue/Creston Road

**Table 4.71 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Stump Avenue/Creston Road)**

Intersection #10	2045 AM Build Conditions Roundabout				Intersection #10	2045 PM Build Conditions Roundabout			
Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)	Richville & Stump/Creston	LOS	Delay (sec/veh)	v/c	Q ₉₅ %tile (Veh/Ln)
EB Approach	A	4.6	0.22	0.8	EB Approach	A	7.5	0.47	2.5
WB Approach	A	7.1	0.34	1.5	WB Approach	A	6.8	0.34	1.5
NB Approach	A	5.4	0.23	0.9	NB Approach	A	6.7	0.24	0.9
SB Approach	A	5.1	0.02	0.0	SB Approach	A	5.2	0.05	0.1
Intersection	A	5.8	--	--	Intersection	A	7.1	--	--

(11) Richville Drive (SR 627) & US 30 Eastbound Ramps

**Table 4.72 - 2045 Peak Hour Levels-of-Service
(Richville Drive & US 30 Eastbound Ramps)**

Intersection #11	2045 AM Build Conditions Traffic Signal Control					Intersection #11	2045 PM Build Conditions Traffic Signal Control				
Richville & US30 EB	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & US30 EB	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	B	16.1	0.731	0.00	68	EBT	B	15.7	0.832	0.00	120
EB Approach	B	16.1	-	-	-	EB Approach	B	15.7	-	-	-
NBT	B	16.4	0.866	0.00	155	NBT	B	12.4	0.723	0.00	150
NB Approach	B	16.4	-	-	-	NB Approach	B	12.4	-	-	-
SBL	C	29.8	0.817	0.79	119	SBL	C	34.0	0.830	1:11	167
SBT	A	6.1	0.261	0.00	20	SBT	A	8.4	0.483	0.00	75
SB Approach	B	19.3	-	-	-	SB Approach	B	18.8	-	-	-
Intersection	B	17.3	-	-	-	Intersection	B	15.8	-	-	-

(12) Richville Drive (SR 627) & US 30 Westbound Ramps**Table 4.73 - 2045 Peak Hour Levels-of-Service
(Richville Drive & US 30 Westbound Ramps)**

Intersection #12	2045 AM Build Conditions Traffic Signal Control					Intersection #12	2045 PM Build Conditions Traffic Signal Control				
Richville & US30 WB	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & US30 WB	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
WBT	B	19.4	0.866	0.00	185	WBT	B	18.5	0.864	0.00	180
WB Approach	B	19.4	-	-	-	WB Approach	B	18.5	-	-	-
NBL	C	34.8	0.812	1.20	138	NBL	C	34.7	0.775	0.90	104
NBT	A	9.9	0.521	0.00	115	NBT	A	9.9	0.517	0.00	108
NB Approach	B	19.2	-	-	-	NB Approach	B	17.9	-	-	-
SBT	B	12.8	0.690	0.00	178	SBT	B	16.9	0.800	0.00	230
SB Approach	B	12.8	-	-	-	SB Approach	B	16.9	-	-	-
Intersection	B	17.2	-	-	-	Intersection	B	17.7	-	-	-

(13) Richville Drive & Nave Road (S)/RG Drage Driveway**Table 4.74 - 2045 Peak Hour Levels-of-Service
(Richville Drive & Nave Road/RG Drage)**

Intersection #13	2045 AM Build Conditions Traffic Signal Control					Intersection #13	2045 PM Build Conditions Traffic Signal Control				
Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)	Richville & Nave (S)	LOS	Delay (sec/veh)	v/c	QSR	95th %tile Queue (ft)
EBT	B	14.6	0.428	0.00	45	EBT	B	11.1	0.474	0.00	48
EB Approach	B	14.6	-	-	-	EB Approach	B	11.1	-	-	-
WBT	B	13.2	0.063	0.00	8	WBT	A	9.9	0.263	0.00	25
WB Approach	B	13.2	-	-	-	WB Approach	A	9.9	-	-	-
NBT	A	9.1	0.794	0.00	123	NBT	A	9.7	0.644	0.00	85
NB Approach	A	9.1	-	-	-	NB Approach	A	9.7	-	-	-
SBT	A	6.4	0.524	0.00	65	SBT	B	11.1	0.733	0.00	108
SB Approach	A	6.4	-	-	-	SB Approach	B	11.1	-	-	-
Intersection	A	8.8	-	-	-	Intersection	B	10.5	-	-	-

The analysis indicates with the addition of traffic signal control at the Richville Drive (SR 627) and US Route 30 interchange intersections that the storage length of the left turn lanes on Richville Drive (SR 627) may be inadequate for the 2045 Build conditions.

An analysis will be performed in a later section of this report to determine the queue length needed to mitigate the effect or any other improvement that could reduce the queue storage length required.

Traffic Signal Warrant Analysis - 2022 Conditions

Traffic signal warrants were reviewed to determine if traffic signal control is warranted at the three intersections along Richville Drive. The existing 2022 traffic conditions at the intersection will be analyzed and compared to the criteria established by the **Ohio Manual of Uniform Traffic Control Devices** ⁽²⁾ and professional engineering judgement to determine if traffic signal control is warranted at the intersection under existing conditions.

The **OMUTCD** ⁽²⁾ provides nine (9) sets of criteria, called warrants for the justification of traffic signal control. The warrants are;

- Warrant 1 - Eight Hour Vehicular Volume
- Warrant 2 - Four Hour Vehicular Volume
- Warrant 3 - Peak Hour Vehicular Volume
- Warrant 4 - Pedestrian Volume
- Warrant 5 - School Crossing
- Warrant 6 - Coordinated Signal System
- Warrant 7 - Crash Experience
- Warrant 8 - Roadway Network
- Warrant 9 - Intersection Near a Grade Crossing

All of the collected data and forecasted traffic volumes were analyzed and compared to the thresholds established by the criteria from the **OMUTCD** ⁽²⁾. Warrants 1 and 2 were evaluated for this analysis.

Warrant 1 - Eight Hour Vehicular Volume

This warrant has three conditions. The Minimum Vehicular Volume, Condition A, is intended for application where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal. The Interruption of Continuous Traffic, Condition B, is intended for application where the traffic volume of a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. The third condition is a combination of Condition A and Condition B in which 80% of each condition must be satisfied.

Warrant 2 - Four Hour Vehicular Volume

This warrant addresses the need for signalization based on situations existing for less than eight hours and is based upon a sliding scale or combined volume. Four hours of volume must be met. The **OMUTCD** ⁽²⁾ provides an "Option" that if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, or the speed limit exceeds 40 miles per hour the minimum thresholds may be reduced to 70% levels. The posted speed limit along Richville Drive does not exceed 40 miles per hour.

The ODOT **Traffic Engineering Manual (TEM)** ⁽¹⁰⁾ Section 402-3.2 provides the following additional guidance regarding the use of the 100 percent and 70 percent values in signal warrants 1 -3:

*"For new ODOT signals, Warrants 1, 2 and 3 shall be based on the 100 percent values (**OMUTCD** Chapter 4C) and right-turn reduction factors except in the following circumstance. If there are five or more crashes in one year that can be corrected with the addition of a signal, and the speed exceeds 40 miles per hour on the major street, Warrants 1, 2 and 3 may be based on the 70 percent values combined with engineering judgment and right-turn reduction factors."*

The signal warrant analysis will review all conditions for the 100% criteria. The intersection will be further evaluated with the 70% values if the 100% levels are not found to be met.

In order to determine if the 2022 conditions are expected to meet one of these warrants, the peak hour volumes were used to determine the intersection ADT by dividing the peak hours by a factor determined from the Ohio Department of Transportation's Hourly Percentages by Vehicle Type chart. These ODOT factors can be seen at ODOT's website at:

<http://www.dot.state.oh.us/Divisions/Planning/TechServ/traffic/Pages/HrlyPercent.aspx>

The determined major street and minor street ADT were then multiplied by the corresponding hourly percentages to determine the remaining hourly volumes at the intersection.

The following table details the results of the traffic signal warrant analysis for the 2022 existing conditions. Copies of the signal warrant analysis worksheets can be found **Appendix O**.

Table 4.75 Traffic Signal Warrant Analysis

INTERSECTION	WARRANTS	
	1	2
Richville Drive (SR 627) & US 30 Eastbound Ramps	YES	YES
Richville Drive (SR 627) & US 30 Westbound Ramps	YES	YES
Richville Drive & Nave Road/RG Drage Driveway	YES	YES

Based upon the evaluation of the warrants established by the **Ohio Manual of Uniform Traffic Control Devices** ⁽²⁾, we conclude that traffic signal control is justified as required by the **Ohio Revised Code** based upon the existing 2022 conditions and therefore will be considered as a viable improvement at the following intersections:

- Richville Drive (SR 627) & US 30 Eastbound Ramps
- Richville Drive (SR 627) & US 30 Westbound Ramps
- Richville Drive & Nave Road (S)/RG Drage Driveway

4.3 Turn Lane Length Analysis

Analyses were performed to determine the necessary turn lane storage lengths in order to accommodate the recommended and warranted turns lanes at the study area intersections and driveways.

The calculations will be based on the Year 2045 peak hour Build conditions.

The turn lane calculations at the traffic signal controlled intersections will be based on the following conditions:

- Erie Street (US 62/SR 21) @ Navarre Road
 - Design Speed $\geq$ 40 miles per hour
 - Condition B or C (Whichever is greater)

- Richville Drive (SR 627) North Approach @ Navarre Road
 - Design Speed $\geq$ 40 miles per hour
 - Condition B or C (Whichever is greater)

- Richville Drive (SR 627) South Approach @ Navarre Road
 - Design Speed = 35 miles per hour
 - Condition A

- Navarre Road @ Richville Drive (SR 627)
 - Design Speed $\geq$ 40 miles per hour
 - Condition B or C (Whichever is greater)

The turn lane calculations at the stop sign controlled intersections will be based on the following conditions:

- Navarre Road @ Millennium Boulevard
 - Unsignalized Through Road
 - Design Speed $\geq$ 40 miles per hour
 - Turn Movement > 10% of Approach Volume = High Turn Demand Volume
 - Condition B or C, whichever is greater

- Millennium Boulevard @ Navarre Road
 - Design Speed = 25 miles per hour
 - Condition A

- Navarre Road @ Sterilite Street
 - Unsignalized Through Road
 - Design Speed $\geq$ 40 miles per hour
 - Turn Movement > 10% of Approach Volume = High Turn Demand Volume
 - Condition B or C, whichever is greater

The following tables detail the results of the turn lane length analyses based upon the highest anticipated turn volumes at the intersections under the expected 2045 Build conditions.

**Table 4.76 - Turn Lane Length Analysis
(Erie Street & Navarre Road)**

Movement Direction	DHV	No. of Lanes	Cycles / Hour	Average Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition		Backup Length (ft)	Turn Lane Length* (ft)
							B*	C*		
SB LT	260	1	40	6.50	45	275	175	450		450*
SB T/RT	700	2	40	8.75	45	350			350	

* Includes 50' taper

**Table 4.77 - Turn Lane Length Analysis
(Richville Drive & Navarre Road)**

Movement Direction	DHV	No. of Lanes	Cycles / Hour	Average Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition		Backup Length (ft)	Turn Lane Length* (ft)
							B*	C*		
SB LT	50	1	40	1.25	45	100	175	275		275*
SB T/RT	230	1	40	5.75	45	250			250	
EB LT	40	1	40	1.00	45	50	175	225		400*
EB T/RT	420	1	40	10.50	45	400			400	
WB LT	60	1	40	1.50	45	100	175	275		275*
WB T/RT	270	1	40	6.75	45	275			275	

* Includes 50' taper

**Table 4.78 - Turn Lane Length Analysis
(Richville Drive & Navarre Road)**

Movement Direction	DHV	No. of Lanes	Cycles / Hour	Average Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition	Backup Length (ft)	Turn Lane Length* (ft)
							B*		
NB LT	100	1	40	2.50	35	150	200		275*
NB T/RT	280	1	40	7.00	35	275		275	

* Includes 50' taper

**Table 4.79 - Turn Lane Length Analysis
(Navarre Road & Millennium Boulevard)**

Movement Direction	DHV	No. of Lanes	Cycles / Hour	Average Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition		Turn Lane Length* (ft)
							B*	C*	
EB LT	80	1	60	1.33	50	100	225	245	245*
WB RT	50	1	60	0.83	50	50	225	195	225*

* Includes 50' taper

**Table 4.80 - Turn Lane Length Analysis
(Navarre Road & Millennium Boulevard)**

Movement Direction	DHV	No. of Lanes	Cycles / Hour	Average Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition	Backup Length (ft)	Turn Lane Length* (ft)
							B*		
SB LT	50	1	60	0.83	25	50	100		100*
SB RT	70	1	60	1.17	25	100		100	

* Includes 50' taper

**Table 4.81 - Turn Lane Length Analysis
(Navarre Road & Sterilite Street)**

Movement Direction	DHV	No. of Lanes	Cycles / Hour	Average Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition		Turn Lane Length* (ft)
							B*	C*	
EB RT	130	1	60	2.17	50	150	225	295	295*
WB LT	100	1	60	1.67	50	100	225	245	245*

* Includes 50' taper

Analyses were performed to determine the necessary Richville Drive (SR 627) left turn lane storage lengths at the US Route 30 interchange intersections in order to accommodate the traffic signal control that was warranted in Section 4.2.

The turn lane calculations at the traffic signal controlled intersections will be based on the following conditions:

- Richville Drive (SR 627)
 - Design Speed $\geq$ 40 miles per hour
 - Condition B or C (Whichever is greater)

The following tables detail the results of the turn lane length analyses based upon the highest anticipated turn volumes at the intersections under the expected 2045 Build conditions with traffic signal control.

**Table 4.82 - Turn Lane Length Analysis
(Richville Drive & US Route 30 Eastbound Ramps)**

Movement Direction	DHV	No. of Lanes	Cycles / Hour	Average Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition		Backup Length (ft)	Turn Lane Length* (ft)
							B*	C*		
SB LT	240	1	60	4.00	45	175	175	300		300*
SB Thru	350	1	60	5.83	45	250			250	

* Includes 50' taper

**Table 4.83 - Turn Lane Length Analysis
(Richville Drive & US Route 30 Westbound Ramps)**

Movement Direction	DHV	No. of Lanes	Cycles / Hour	Average Veh/ Cycle/ Lane	Design Speed (mph)	Fig. 401-10 Storage Length (ft)	Fig. 401-9 Condition		Backup Length (ft)	Turn Lane Length* (ft)
							B*	C*		
NB LT	220	1	60	3.67	45	175	175	300		300*
NB Thru	380	1	60	6.33	45	275			275	

* Includes 50' taper

Chapter 5

Conclusions

Based on the results of the analyses, we offer the following conclusions and recommendations:

5.1 This Area-Wide Planning Study has been prepared at the request of the Stark County Regional Planning Commission (SCRPC). The study area includes the Richville Drive/State Route 627 corridor from Southway Drive to Navarre Road, Navarre Road from State Route 21 to State Route 627, and Fohl Road from the Navarre corporation line to Kemary Avenue. The study area is located in the western portion of Stark County, Ohio primarily in the Village of Navarre, the City of Massillon, and Perry Township.

5.2 The study area will include the following existing intersections:

1. North Main Street (US 62/SR 21) & Wooster Street
2. Kemary Avenue & Fohl Street
3. Erie Street (US 62/SR 21) & Navarre Road
4. Navarre Road & Millennium Boulevard
5. Millennium Boulevard & Prospect Drive
6. Navarre Road & Sterilite Street
7. Navarre Road & Stump Avenue/Bosford Street
8. Navarre Road & Richville Drive (SR 627)
9. Stump Avenue & Cincinnat Drive
10. Richville Drive (SR 627) & Stump Avenue/Creston Road
11. Richville Drive (SR 627) & US 30 Eastbound Ramps
12. Richville Drive (SR 627) & US 30 Westbound Ramps
13. Richville Drive & Nave Road (S)/RG Drage Driveway
14. Richville Drive & Nave Road (N)
15. Richville Drive & Ohio State Drive/Business Place
16. Richville Drive & Jackson Avenue
17. Richville Drive & Southway Street
18. Fohl Street & Sterilite Street

5.3 The analysis of the study area included proposed and under construction developments that are located within the study area. The following developments were considered in forecast of future traffic volumes for the study area:

- Stark Farm Development
 - TIS prepared and dated 1/24/2019
- Project Redbone
 - TIS prepared and dated 10/19/2020
- Proposed Sheetz
 - Located northeast corner of SR 21/US 62 & Ortt Road
- Trucking Company - Nova Road (East
 - Expected 125 additional truck per day.

5.4 No-Build and Build forecasts were prepared as part of the procedure to determine future traffic volumes in the study area. The No-Build traffic is the expected traffic if the previously listed developments **are not** constructed, the “**No-Build**” condition. The Build traffic volumes are the expected volumes if the proposed developments **are** constructed, or the “**Build**” condition.

5.5 The year 2025 was analyzed for the opening year conditions. The future design year was 2045 based on providing a twenty year design period for any recommended improvements in the study area. The recommendations found in this report were based on the Build conditions as the previously listed developments are in various stages of development and all are expected to be completed by the opening year 2025.

5.6 The ODOT GIS Crash Analysis Tool (GCAT) was used to collect crash information at the study area intersections for the years 2019 through June of 2022. The study area experienced a total of 154 intersection related crashes in time period under analysis. Crashes were reported at 14 of the 18 intersections under study. Rear end crashes were determined to be the predominate crash type at 9 of the intersections. Angle and turn crashes were determined to be the predominate crash type at 5 of the intersections.

5.7 Conditions at the study area intersections during the AM and PM peak hours were determined to meet the operational goals shown in **Table 1.2** under the forecasted 2025 and 2045 Build conditions with the exception of the following intersections.

- Richville Road (SR 627) & Stump Avenue/Creston Road
- Richville Road (SR 627) & US Route 30 Eastbound Ramps
- Richville Road (SR 627) & US Route 30 Westbound Ramps
- Richville Road (SR 627) & Nave Road/RG Drage Driveway

5.8 The following turn lanes were determined to experience a queue length which exceeds the existing length of the turn lane based on the HCS analysis:

Erie Street (US 62/SR 21) & Navarre Road

- Southbound Left Turn Lane (PM Peak Hour)
- Westbound Left Turn Lane (PM Peak Hour)

5.9 An improvement project is currently underway to improve the westbound left turn lane at the intersection of Erie Street (US 62/SR 21) and Navarre Road.

Chapter 6

Improvements & Recommendations

The cost breakdown for the recommended improvements was based upon low, medium, and high cost projects. A high cost project should be expected to exceed \$5,000,000. A low cost project should not be expected to exceed \$100,000. A medium cost project should be expected to cost between \$100,000 and \$5,000,000.

The time frame for implementation was broken down into short, medium, and long term projects. A short term project was considered to take less than a year to implement. A medium term project was considered to take between 1 and 5 years to complete. A long term project was considered to take at least 5 years to complete.

Based on the results of the analyses, we offer the following potential improvements and recommendations:

Short Term/Low Cost Improvements

6.1 Install signal backplate/retro-reflective back-plates to increase visibility of traffic control devices at the following signalized intersections:

- Richville Drive & Southway Street
- Main Street (US 62/SR 21) & Wooster Street

The remaining signalized intersections within the study currently use back-plates with the traffic signal heads.

6.2 It is recommended that beacons or light emitting diodes (LED) within the border of the sign be added to the Intersection Ahead (W2-1) warning signs located on Fohl Street ahead of Kemary Avenue. Warning beacons or the use of light emitting diodes (LED) within the border of the sign can be used as a supplemental emphasis to the warning signs and as an emphasis for the presence of an intersection ahead. The LED beacon units can be powered by a solar panel attached to the sign installation or may be wired to a traditional power source.

- 6.3 It is recommended that Intersection Ahead (W2-2) warning signs shown below be placed on Fohl Street to the east and west of the new intersection with Sterilite Street. A strip of retroreflective material on the signs support is recommended to increase the conspicuity of the sign assembly. The strip of material shall be least 2 inches wide, placed for the full length of the support from the sign to within 2 feet above the edge of the roadway, and the color will match the background of the warning signs. Consideration should also be give to installing flashing beacons or signs light emitting diodes (LED) within the border to further increase the visibility of the sign.



W2-2

- The Intersection Ahead (W2-2) signs are recommended to be placed no closer than 325 feet from the intersection and no further than 495 feet away. These distances are based on a speed limit of 55 miles per hour and *Table 2C-4* from the **OMUTCD** ⁽²⁾.
- 6.4 Install dilemma zone radar detection on the Erie Street (US 62/SR 21) north and south approaches at Navarre Road due to the amount of rear-end crashes and the red-light running that resulted in angle and turn movement crashes.
- 6.5 Install dilemma zone radar detection on the Navarre Road east and west approaches at Richville Drive (SR 627) due to the amount of rear-end crashes.

Medium Term/Medium Cost Improvements

6.6 The installation of traffic signal control was determined to be a viable improvement at the following intersections:

- Richville Drive (SR 627) & US 30 Eastbound Ramps
- Richville Drive (SR 627) & US 30 Westbound Ramps
- Richville Drive & Nave Road (S)/RG Drage Driveway

6.7 The storage length for the northbound and southbound left turn lanes on Richville Drive (SR 627) at the US Route 30 interchange intersections should be increased from 150 feet to 250 feet with the installation of traffic signal control.

6.8 Roundabout control would be a suitable alternative to traffic signal control at the following intersections:

- Richville Drive (SR 627) & US 30 Eastbound Ramps
- Richville Drive (SR 627) & US 30 Westbound Ramps
- Richville Drive & Nave Road (S)/RG Drage Driveway

6.9 Roundabout control was recommended as an improvement at the intersection of Richville Drive (SR 627) and Stump Avenue/Creston Road in order to improve the intersection levels-of-service.

6.10 Turn lanes were recommended at the following locations:

- Navarre Road & Millennium Boulevard
 - Construct an eastbound left turn lane.
 - Construct a westbound right turn lane.
 - Provide pavement markings on Millennium Boulevard to create separate right and left turn lanes.
- Navarre Road & Sterilite Street
 - Construct an eastbound right turn lane.
 - Construct a westbound left turn lane.

- Navarre Road & Richville Drive (SR 627)
 - Construct an eastbound left turn lane.
 - Construct a westbound left turn lane.
 - Construct a northbound left turn lane.
 - Construct a southbound left turn lane.
 - Update traffic signal control sequence to remove the “split” north and south phasing.

6.11 It is recommended that the storage length for the southbound left turn lane at the intersection of Erie Street (US 62/SR 221 and Navarre Road be increased from 175 feet to 400 feet.

6.10 It should be noted that the closure of Bosford Road at the intersection with Navarre Road and Stump Avenue to create a four-way intersection was not considered a viable improvement due to the location of the fire station along Bosford Street.

Long Term/High Cost Improvements

6.11 The extension of Cincinnati Drive to Erie Street (US 62/SR 21) through a connection to Orr Road is recommended for further consideration. The connection would be expected to provide a more direct access to US Route 62/SR 21 and the US Route 30 interchange for the parcels located north of Navarre Road and west of Richville Drive (SR 627).

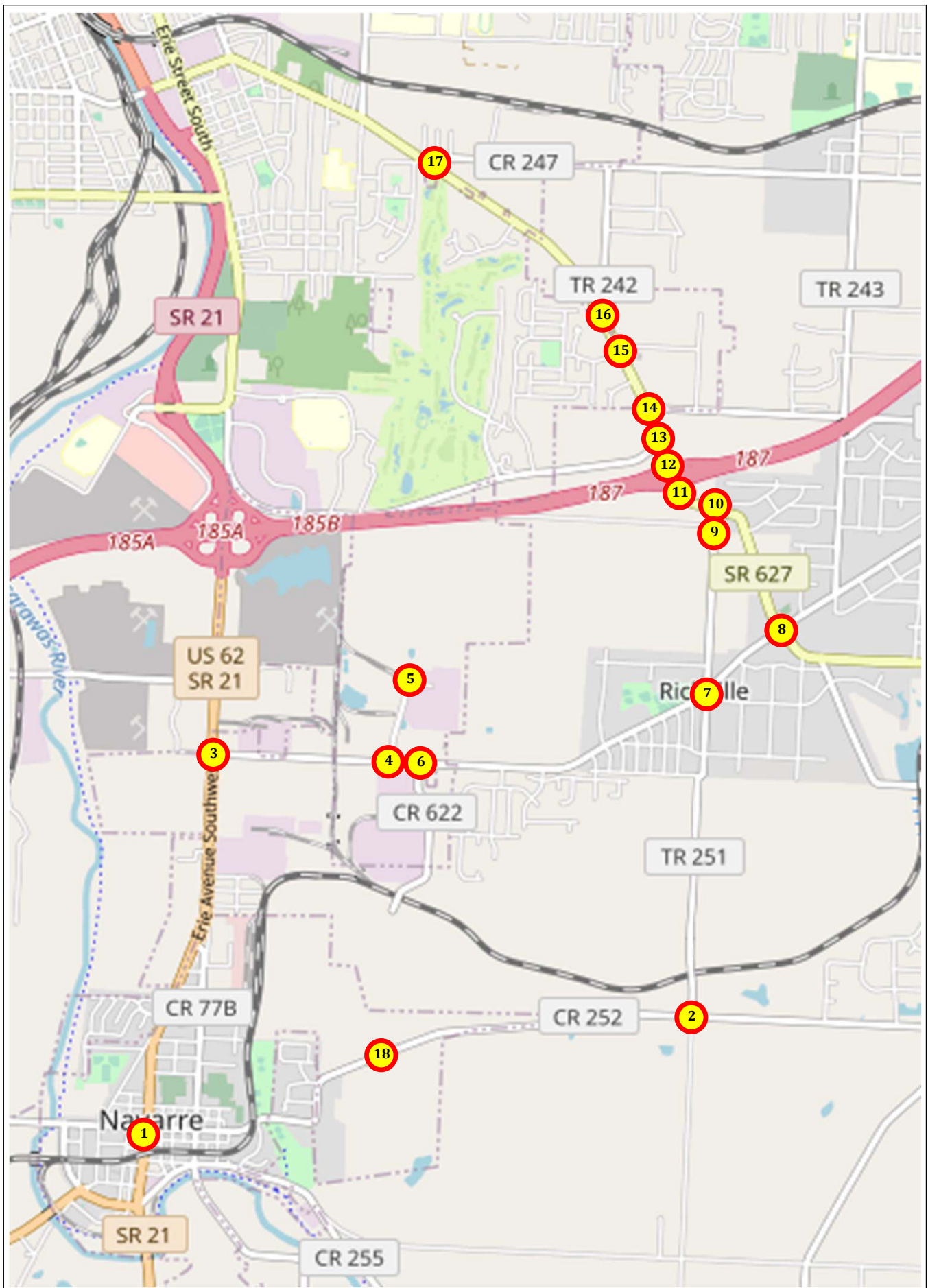
The immediate development areas north of Navarre Road and east of US Route 62/SR 21 would likely use Navarre Road to access routes to the south and west and would use Richville Drive (SR 627) to access US Route 30. A connection of Cincinnati Drive to Ortt Road would provide a more direct connection to US Route 62/SR 21 and the US Route 30 interchange.

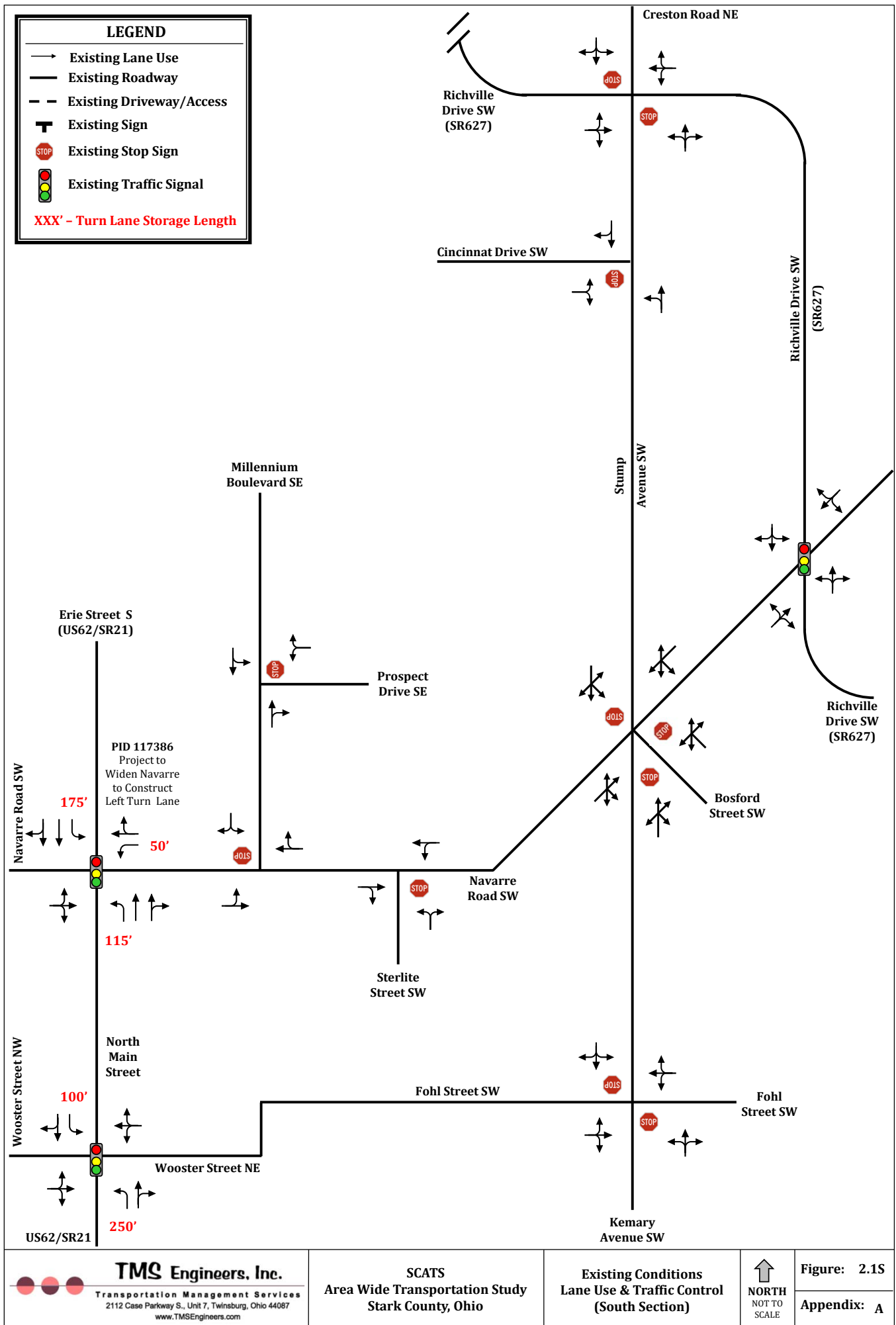
The project would likely require additional right-of-way to construct the extension of Cincinnati Drive to Ortt Road as well as improvements to Ortt Road and the traffic signal control installation at the intersection of Ortt Road and US Route 62/SR 21.

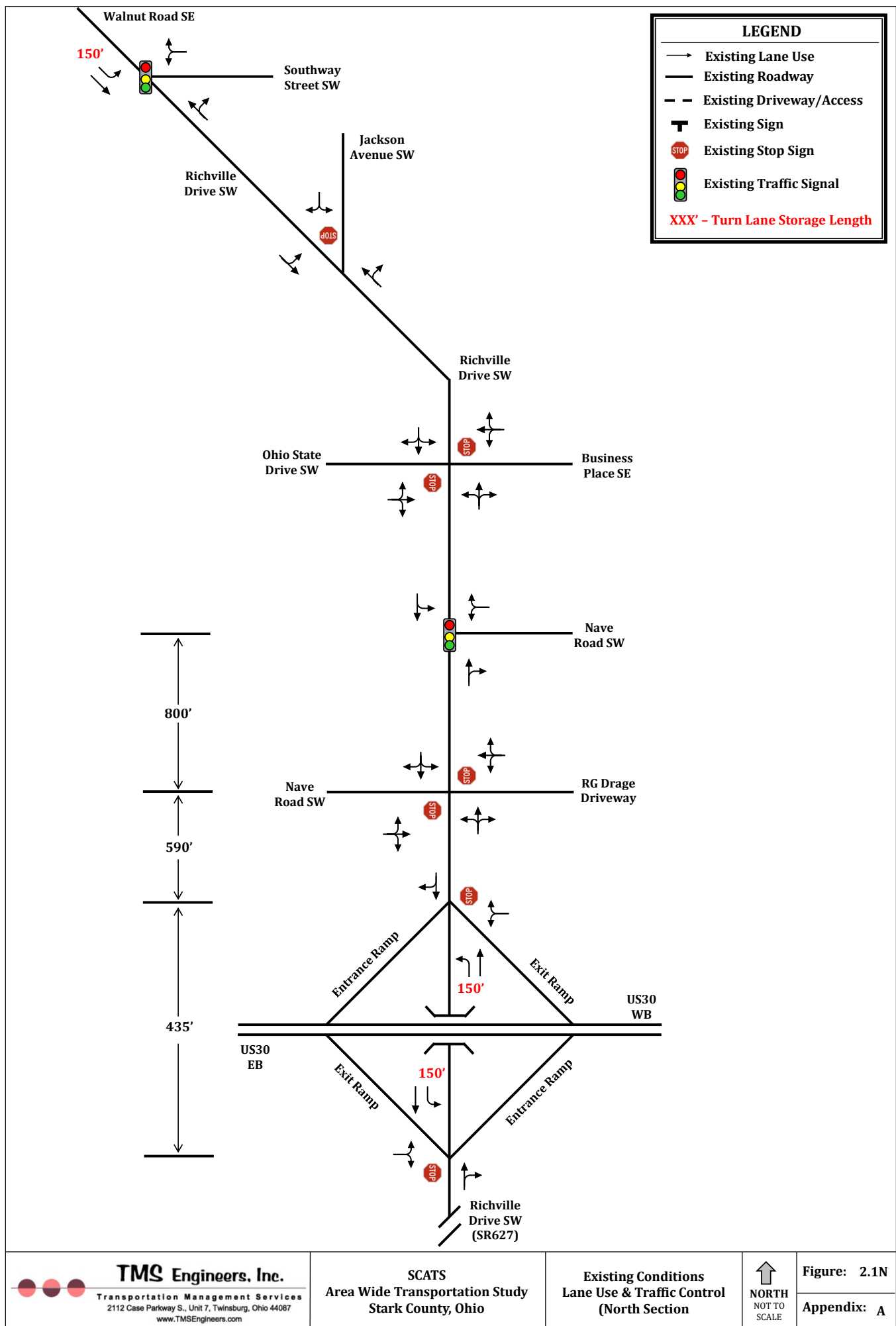
A summary figure of the recommended lane use and traffic control improvements for the study area can be seen in **Figure 6.1, Appendix A**.

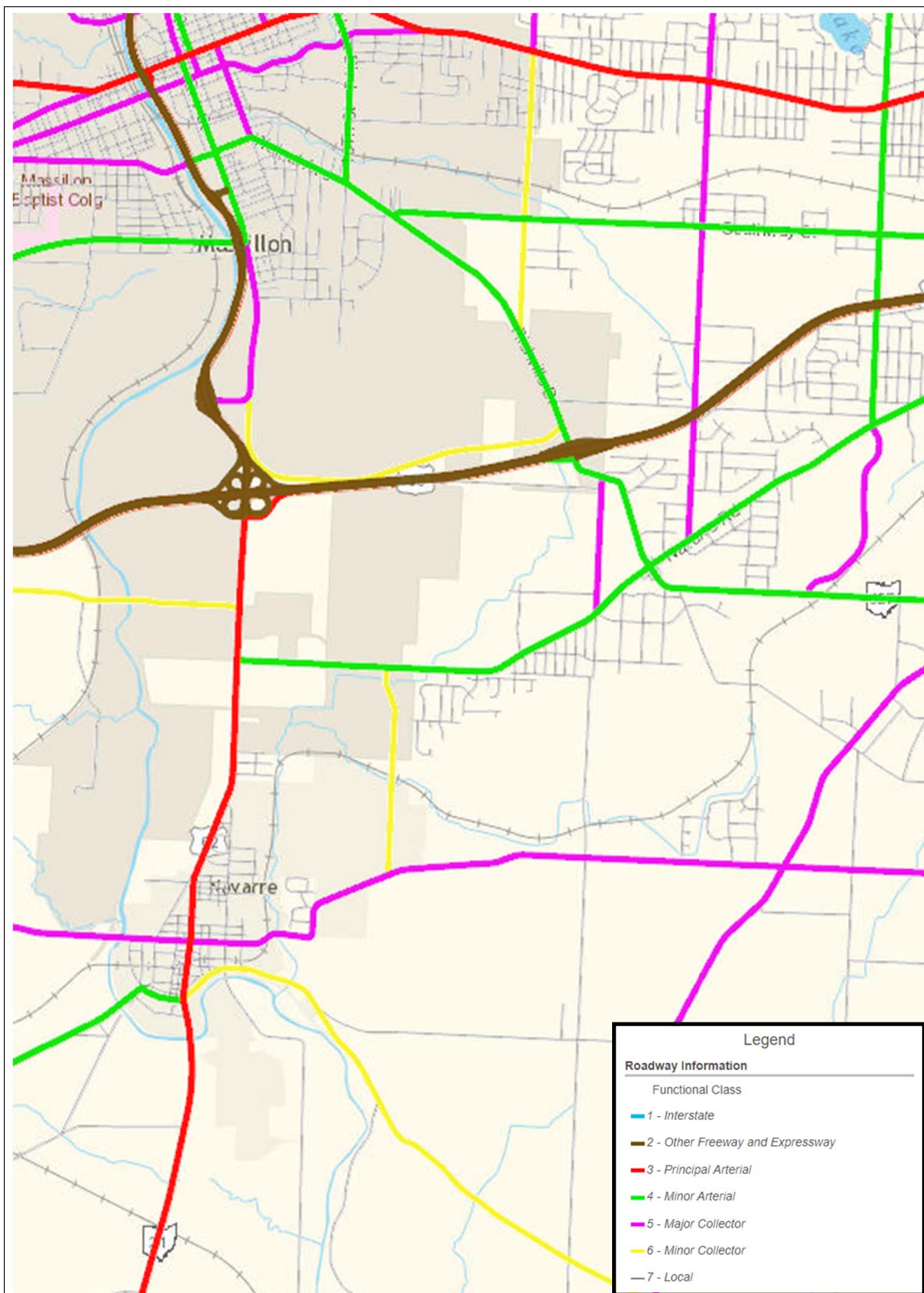
Appendix A

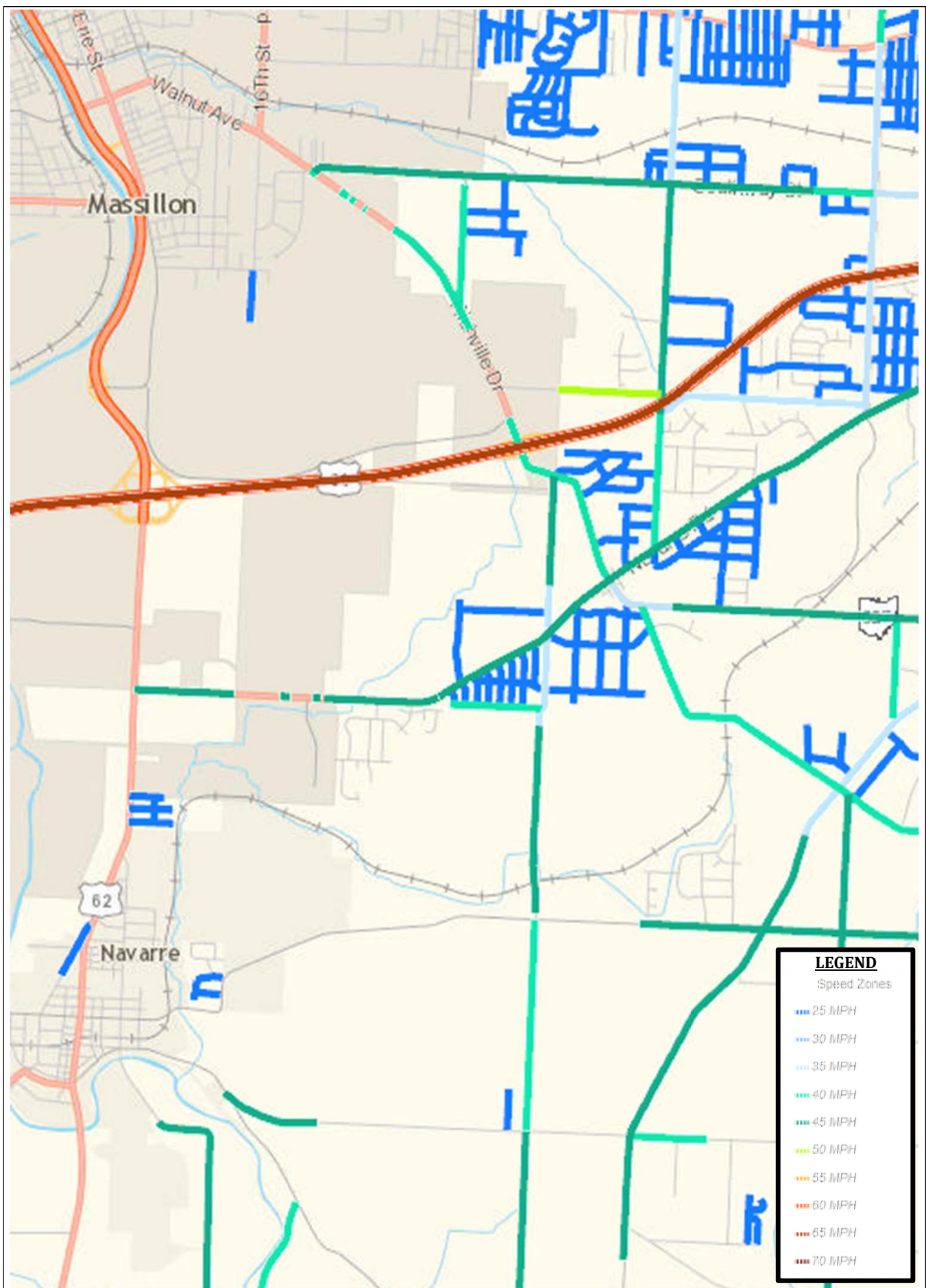
Figures











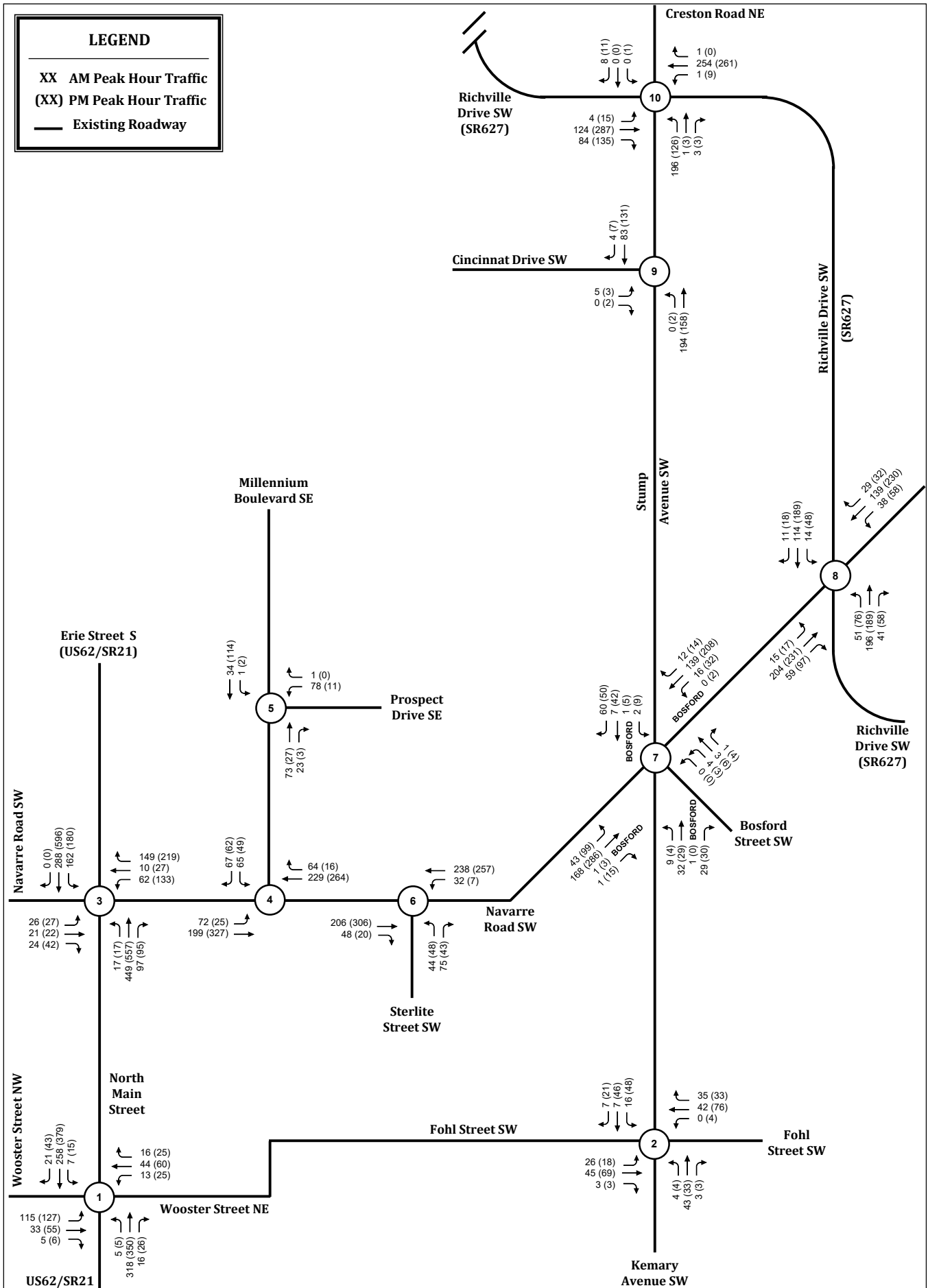
LEGEND

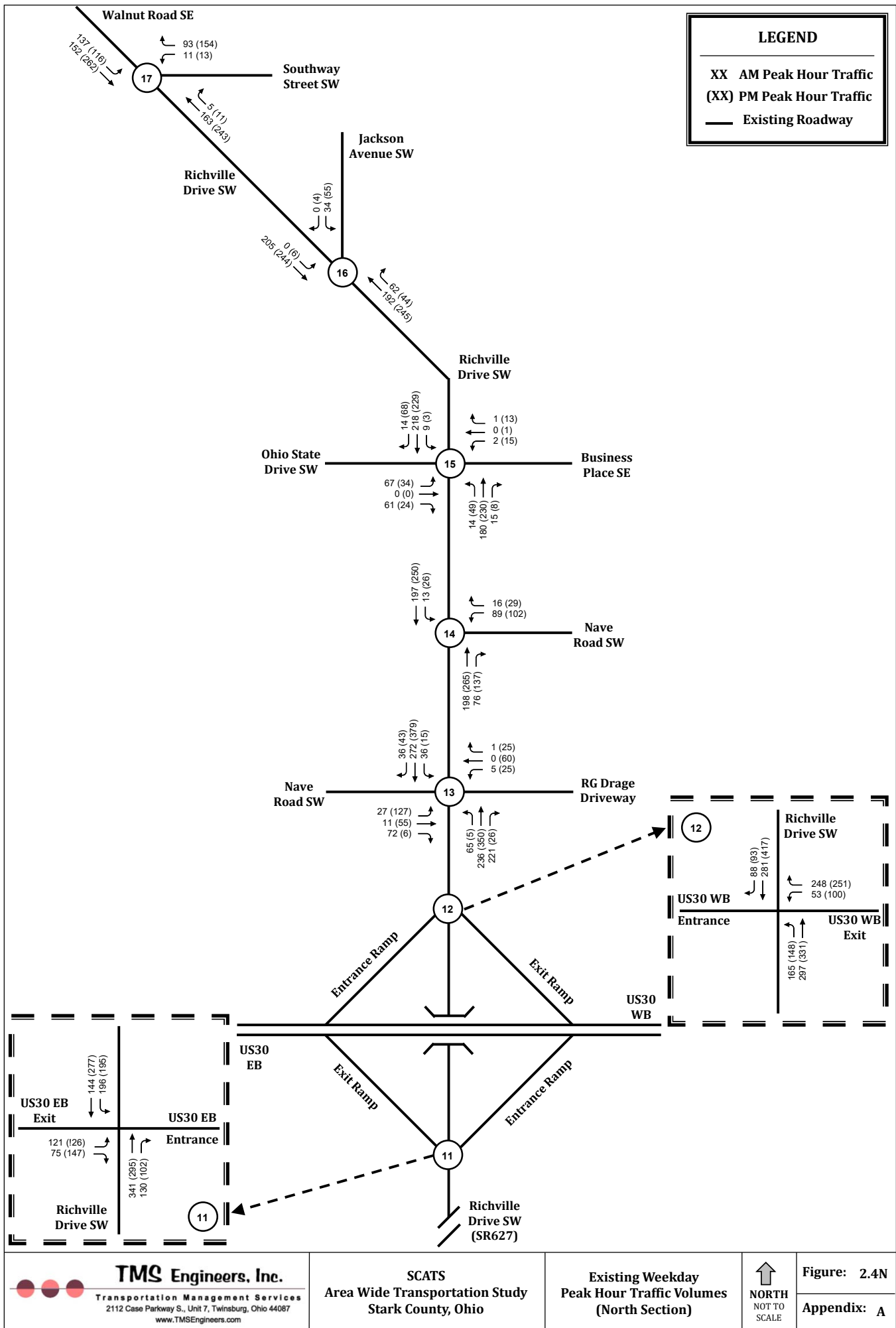
Speed Zones

- 25 MPH
- 30 MPH
- 35 MPH
- 40 MPH
- 45 MPH
- 50 MPH
- 55 MPH
- 60 MPH
- 65 MPH
- 70 MPH

LEGEND

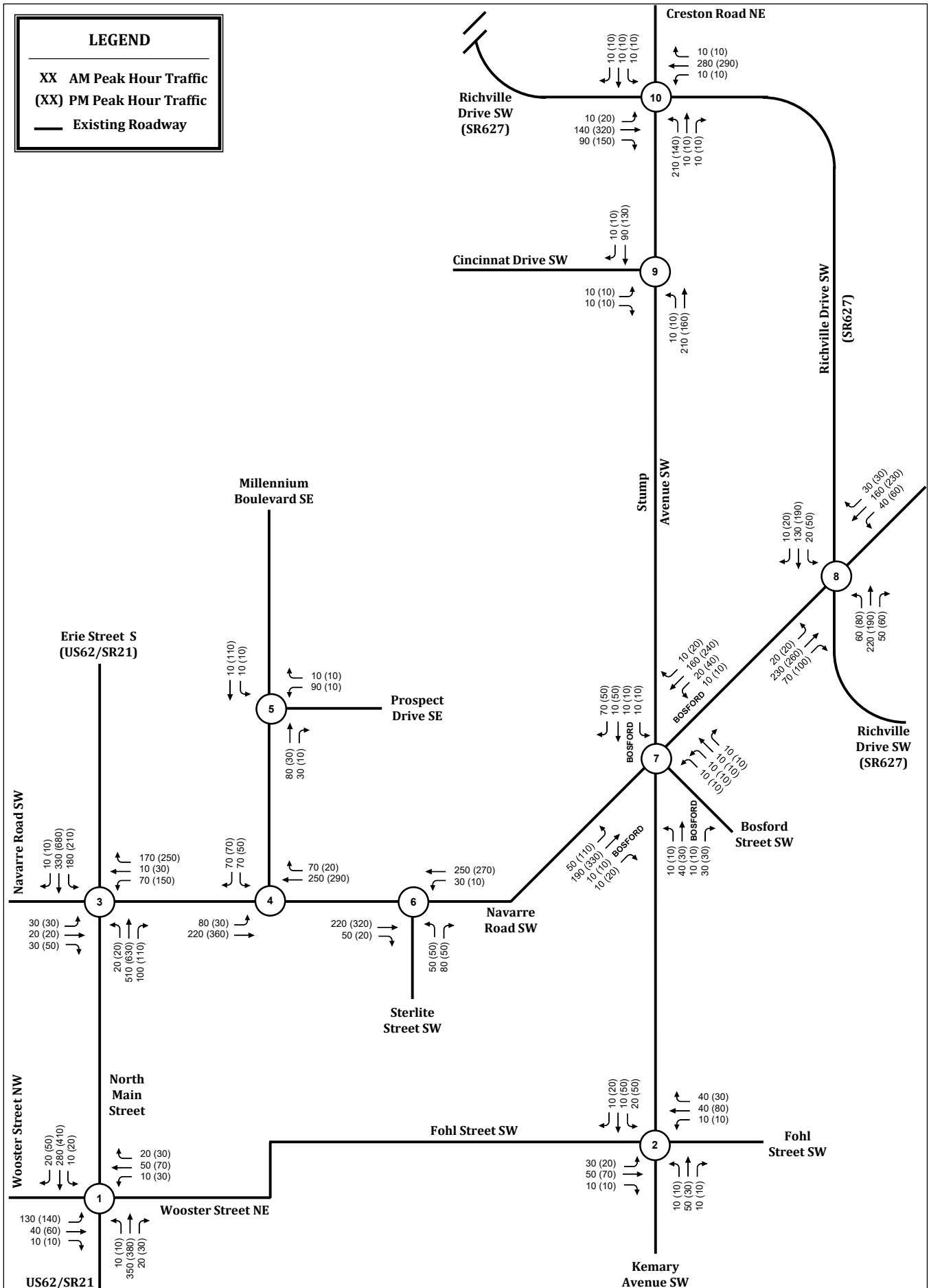
XX AM Peak Hour Traffic
(XX) PM Peak Hour Traffic
— Existing Roadway

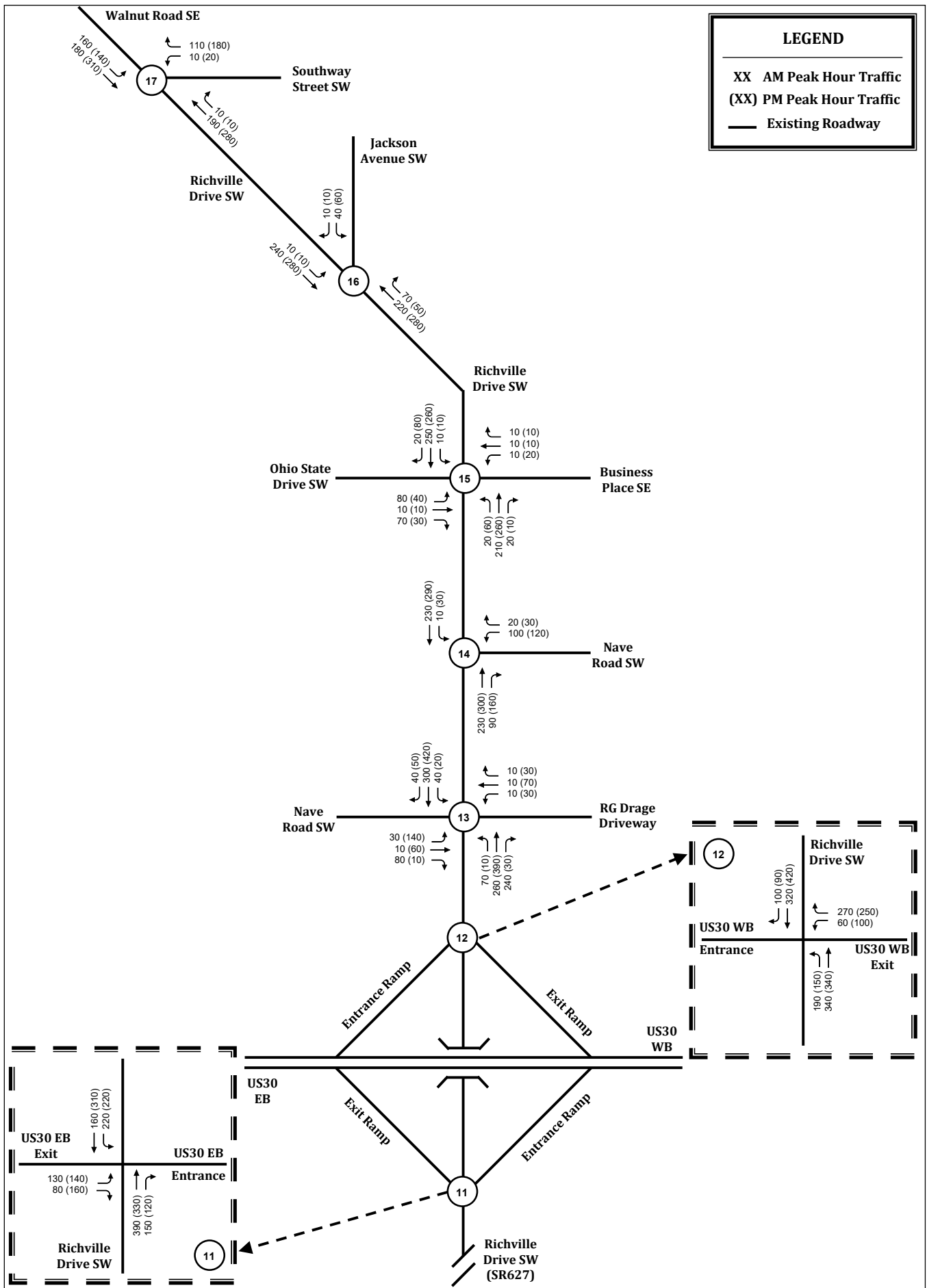


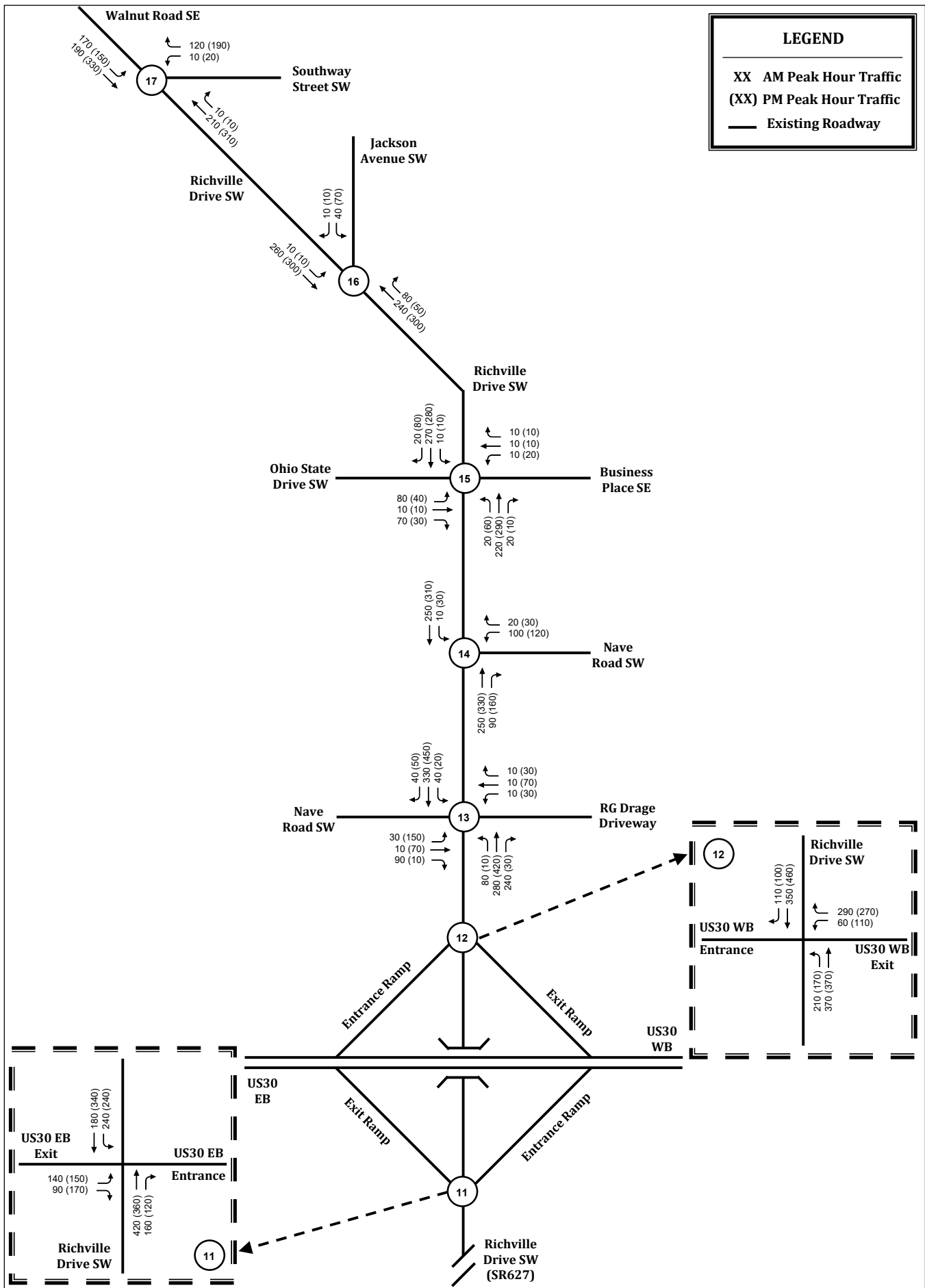


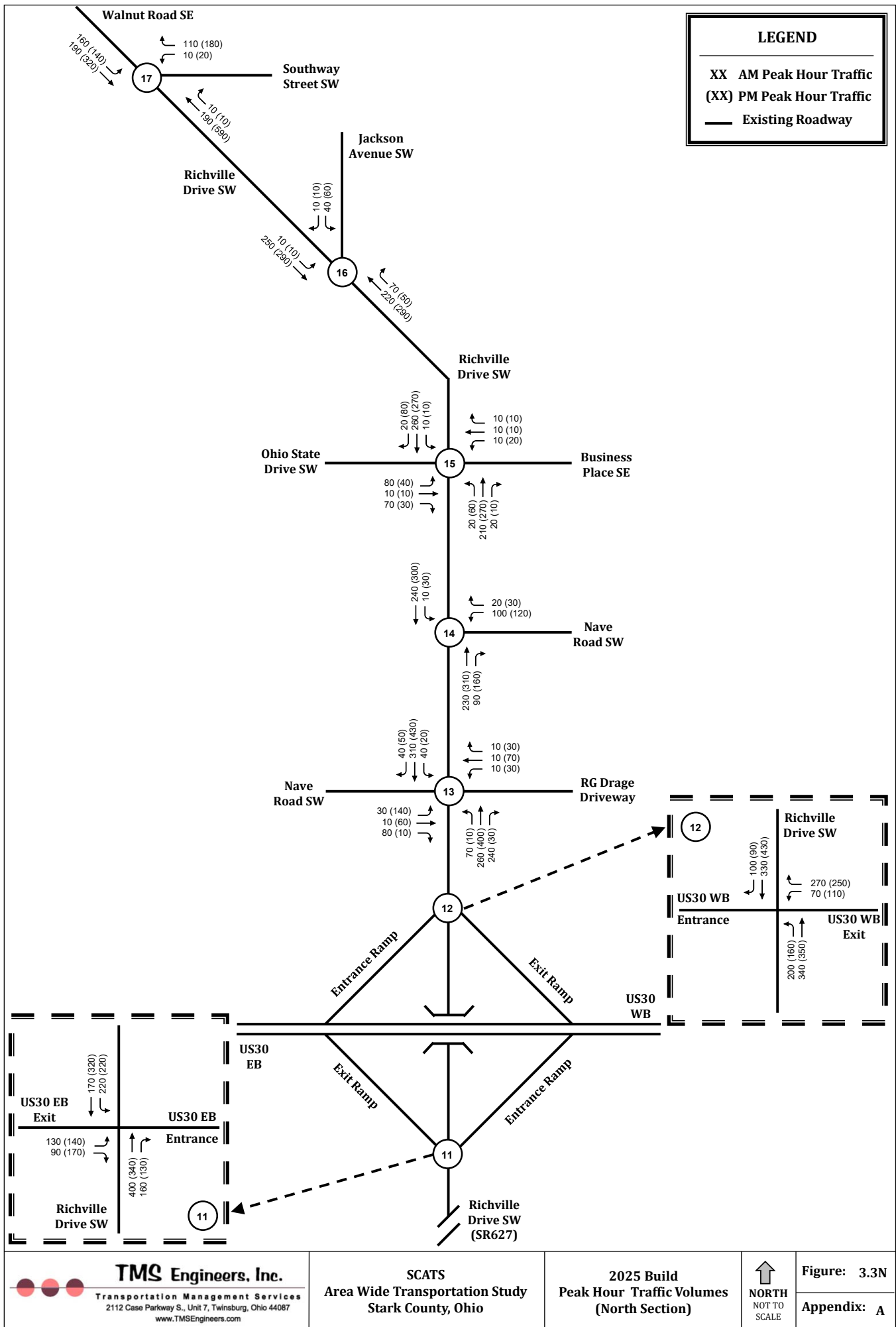
LEGEND

XX AM Peak Hour Traffic
(XX) PM Peak Hour Traffic
— Existing Roadway

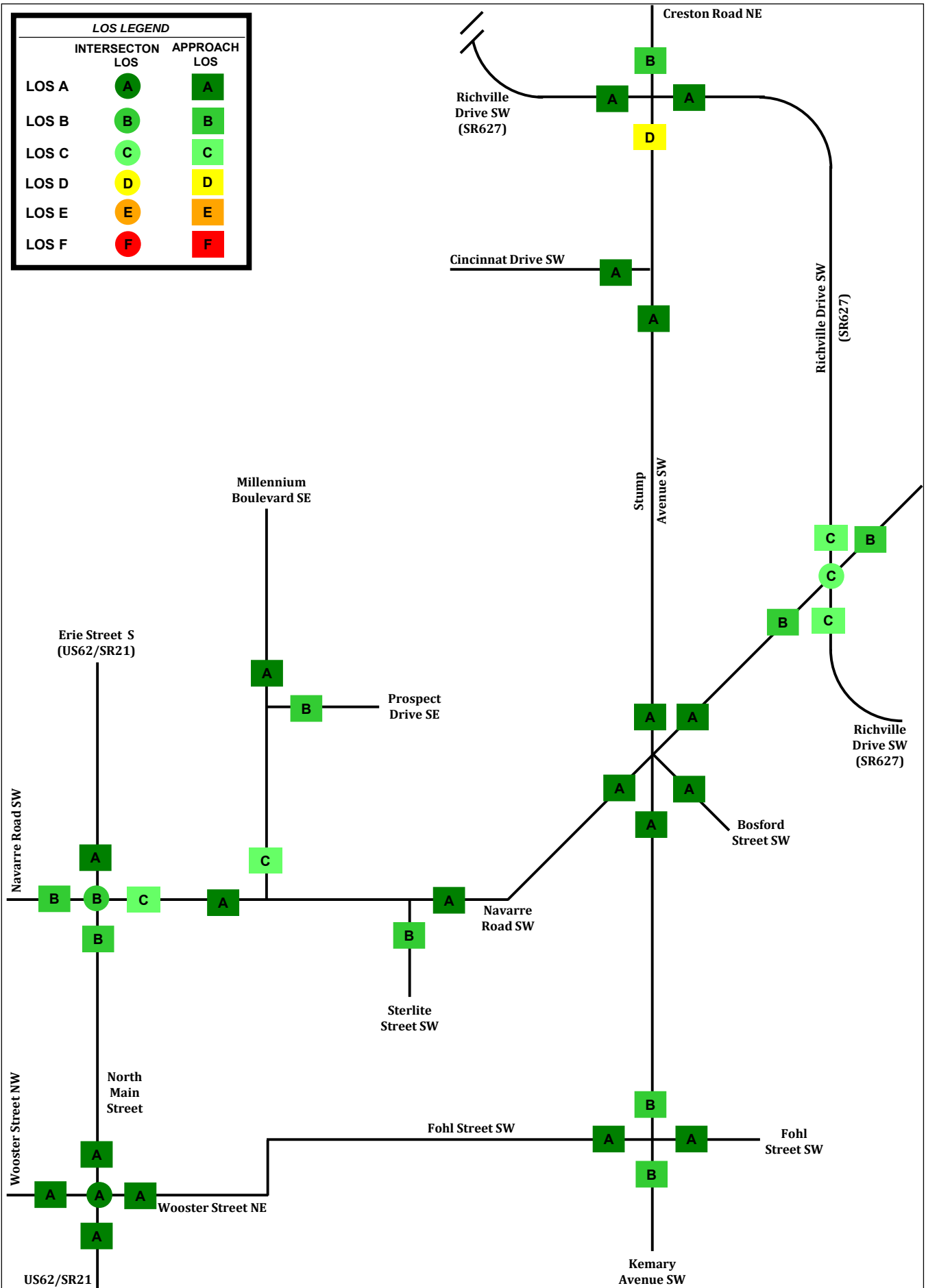


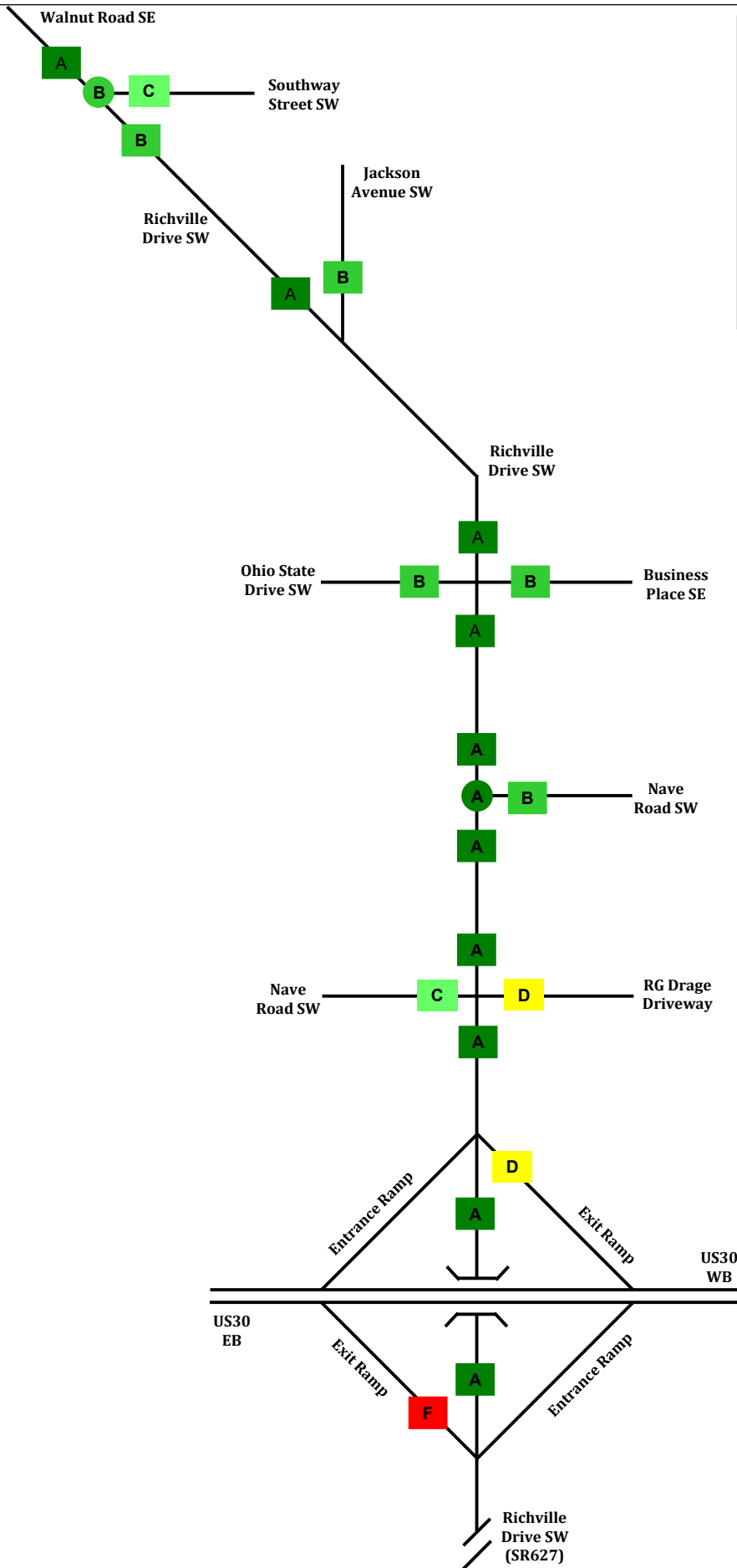




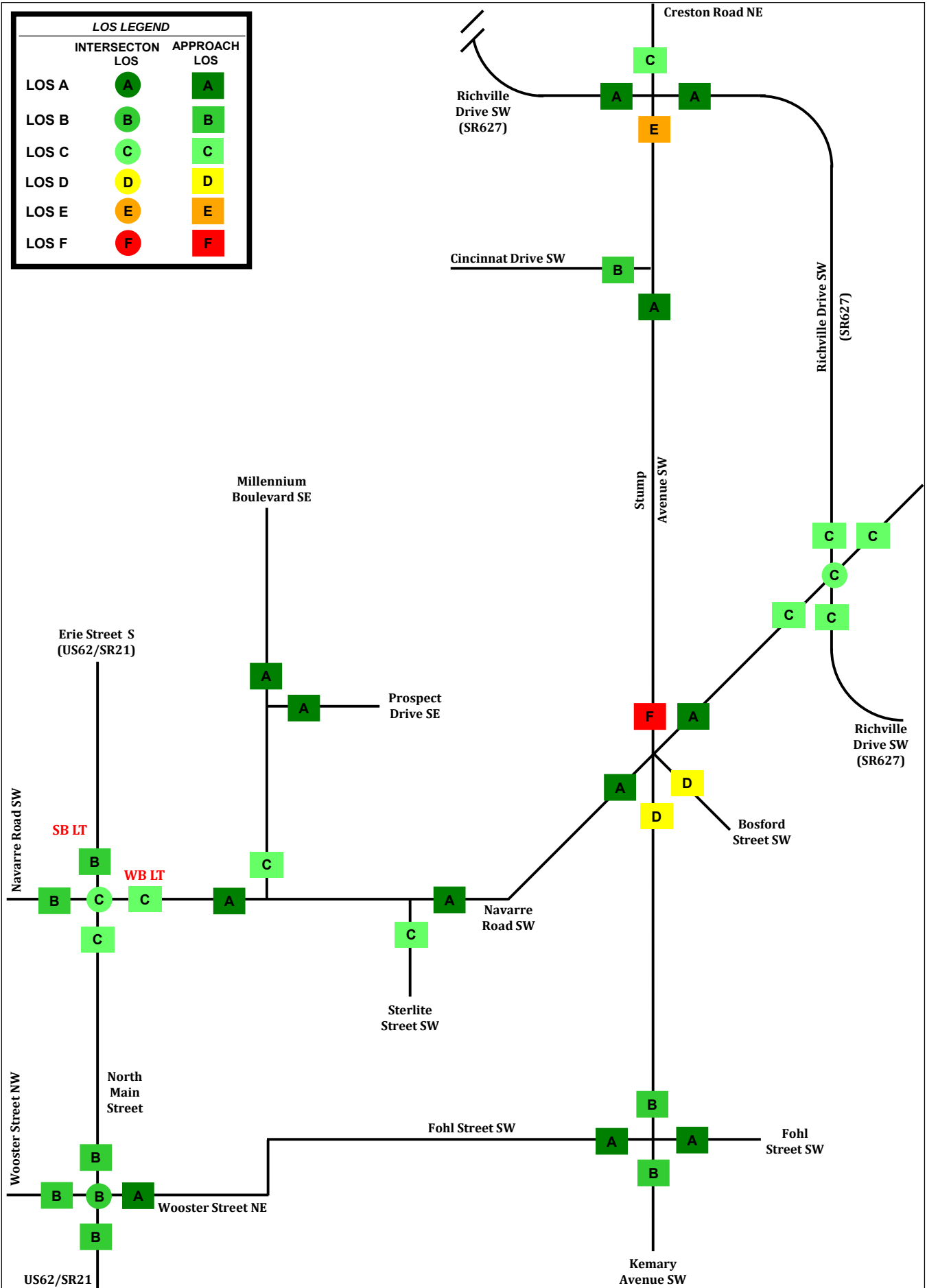


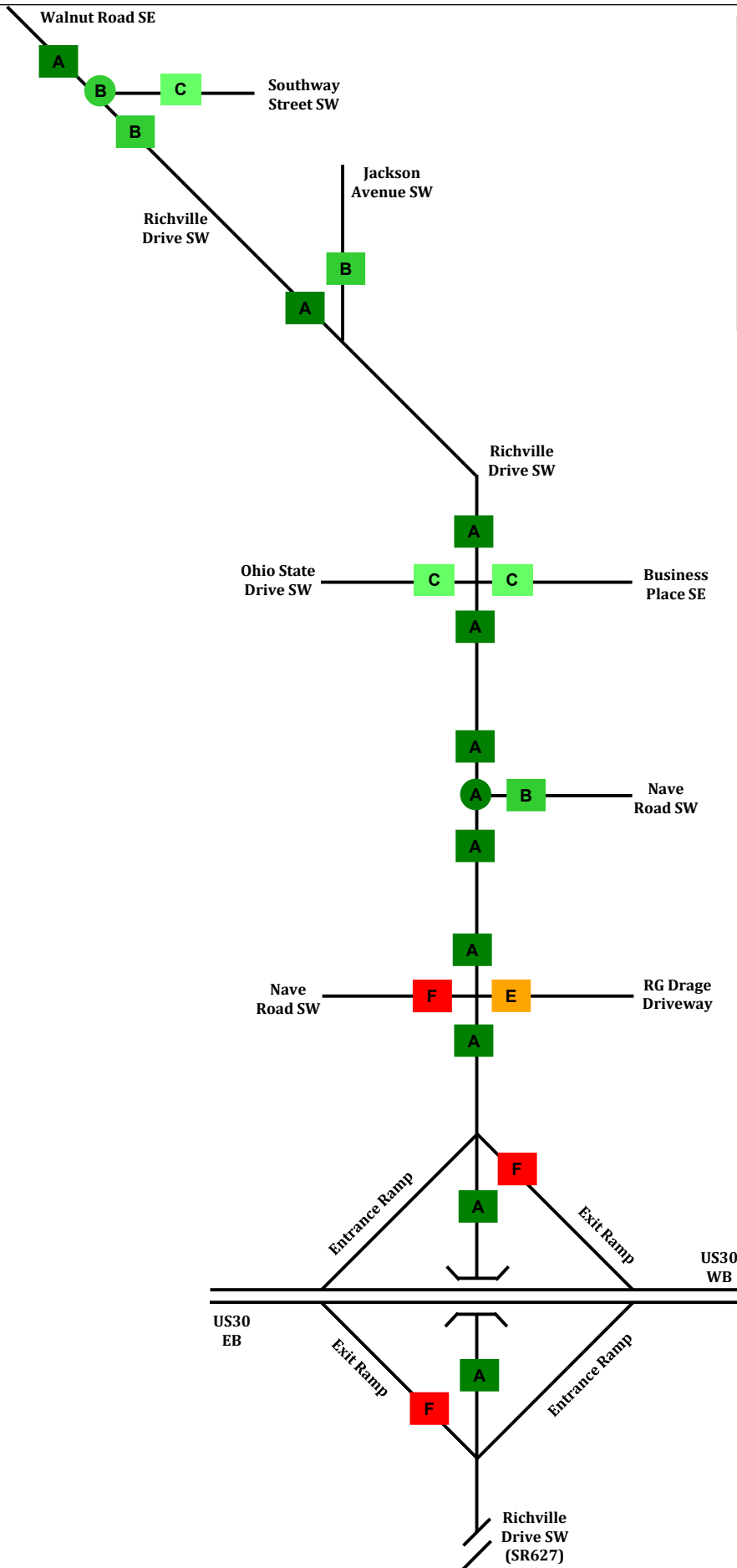
LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A	A	A
LOS B	B	B
LOS C	C	C
LOS D	D	D
LOS E	E	E
LOS F	F	F





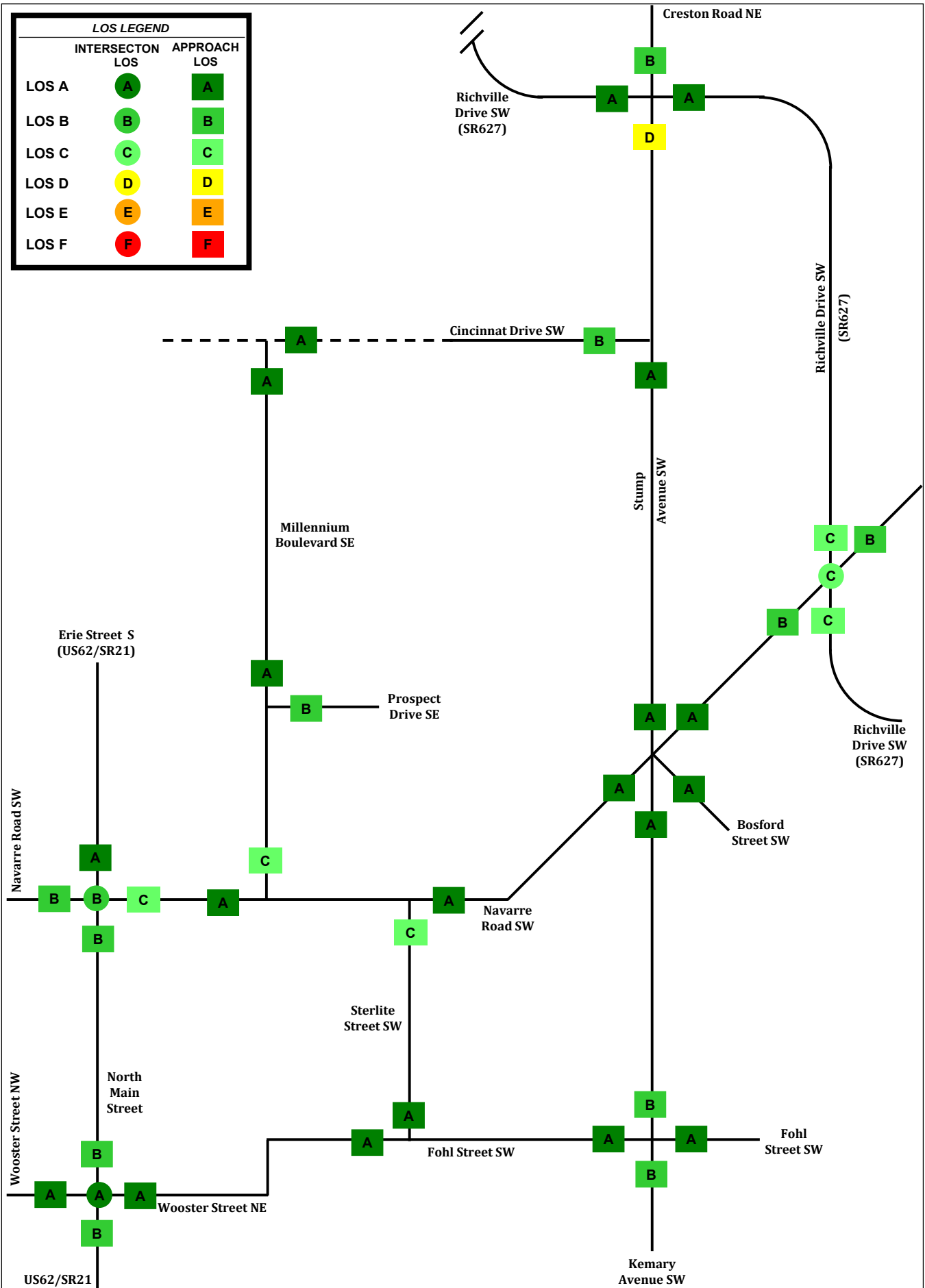
LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A		
LOS B		
LOS C		
LOS D		
LOS E		
LOS F		

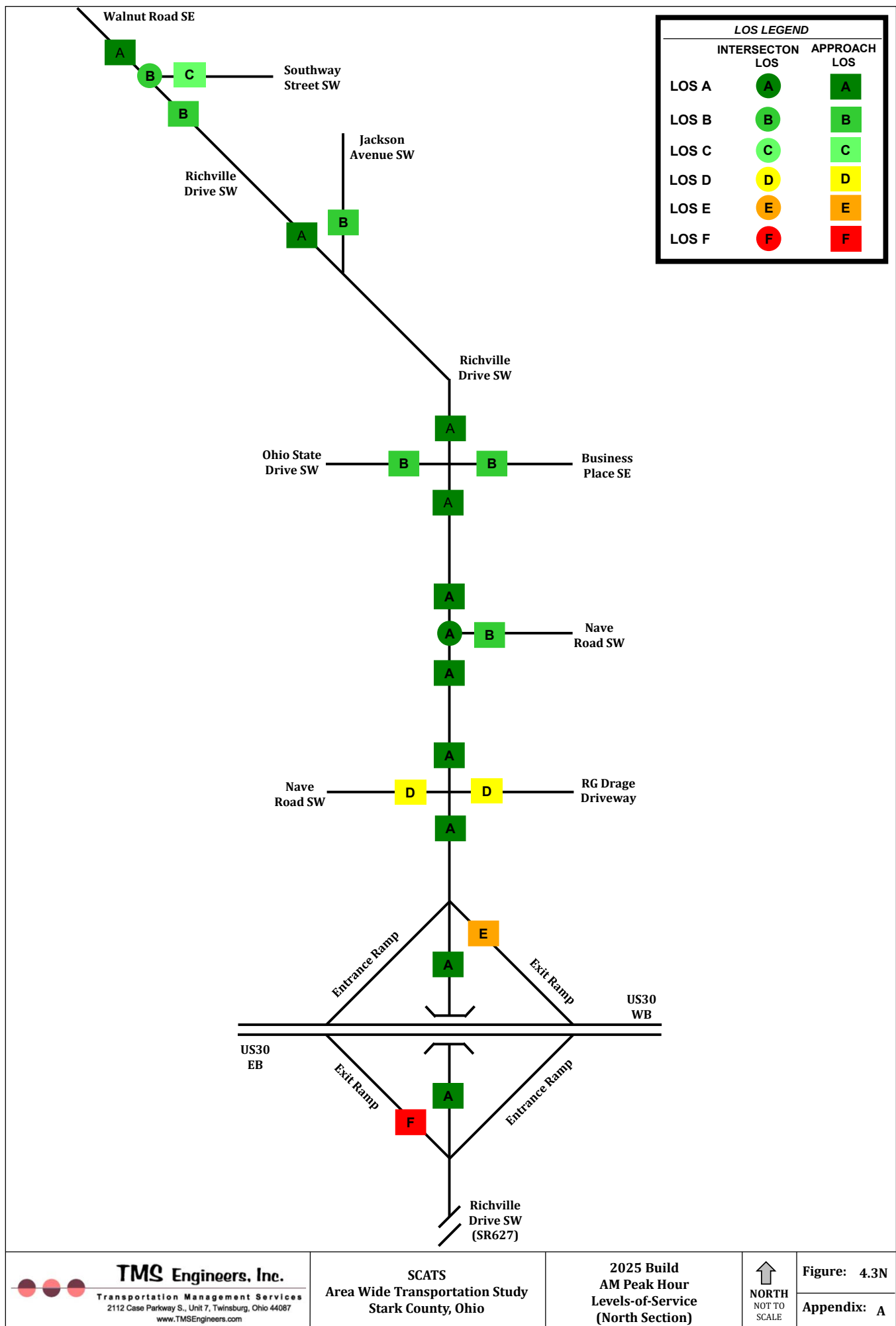




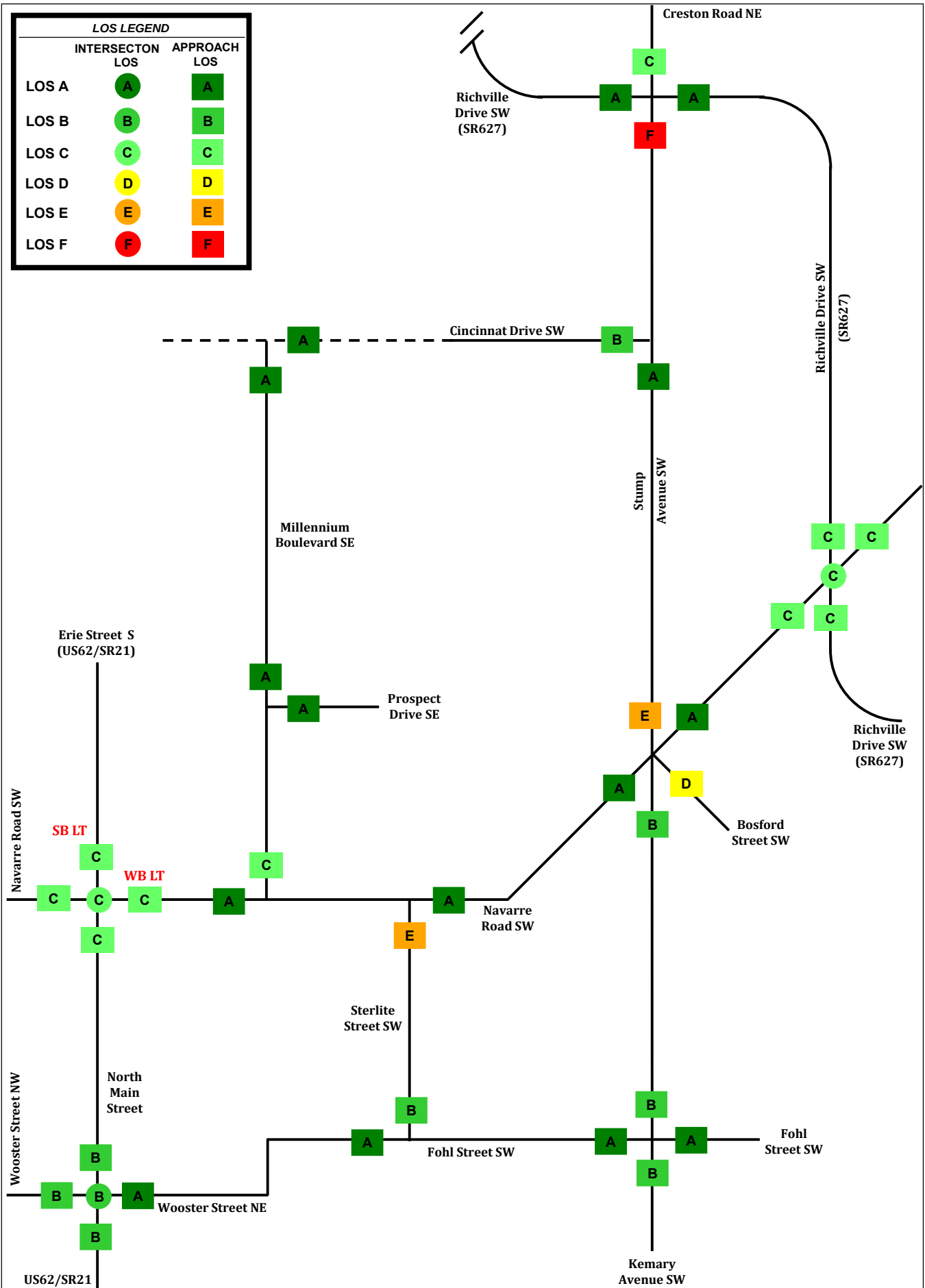
LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A	A	A
LOS B	B	B
LOS C	C	C
LOS D	D	D
LOS E	E	E
LOS F	F	F

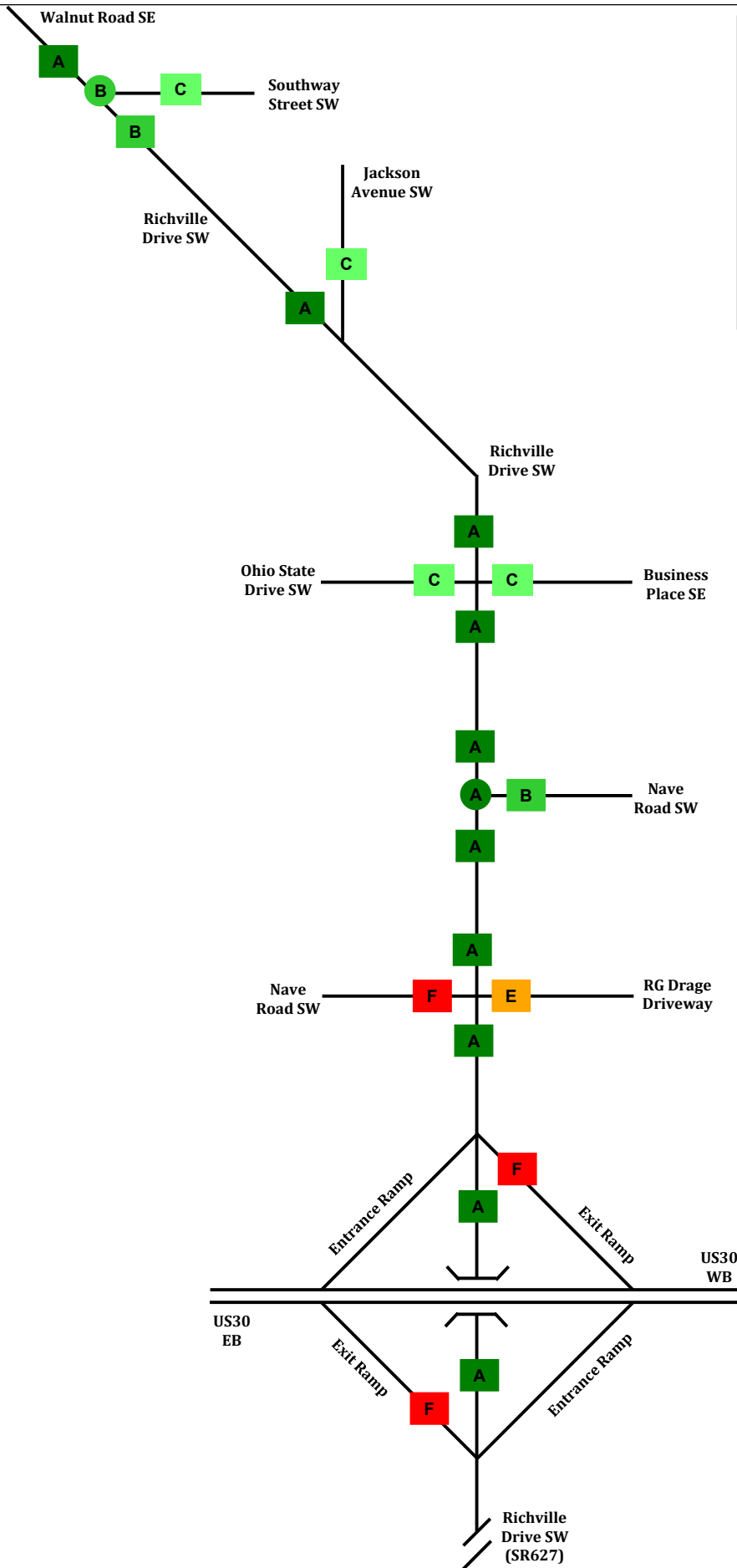
LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A		
LOS B		
LOS C		
LOS D		
LOS E		
LOS F		





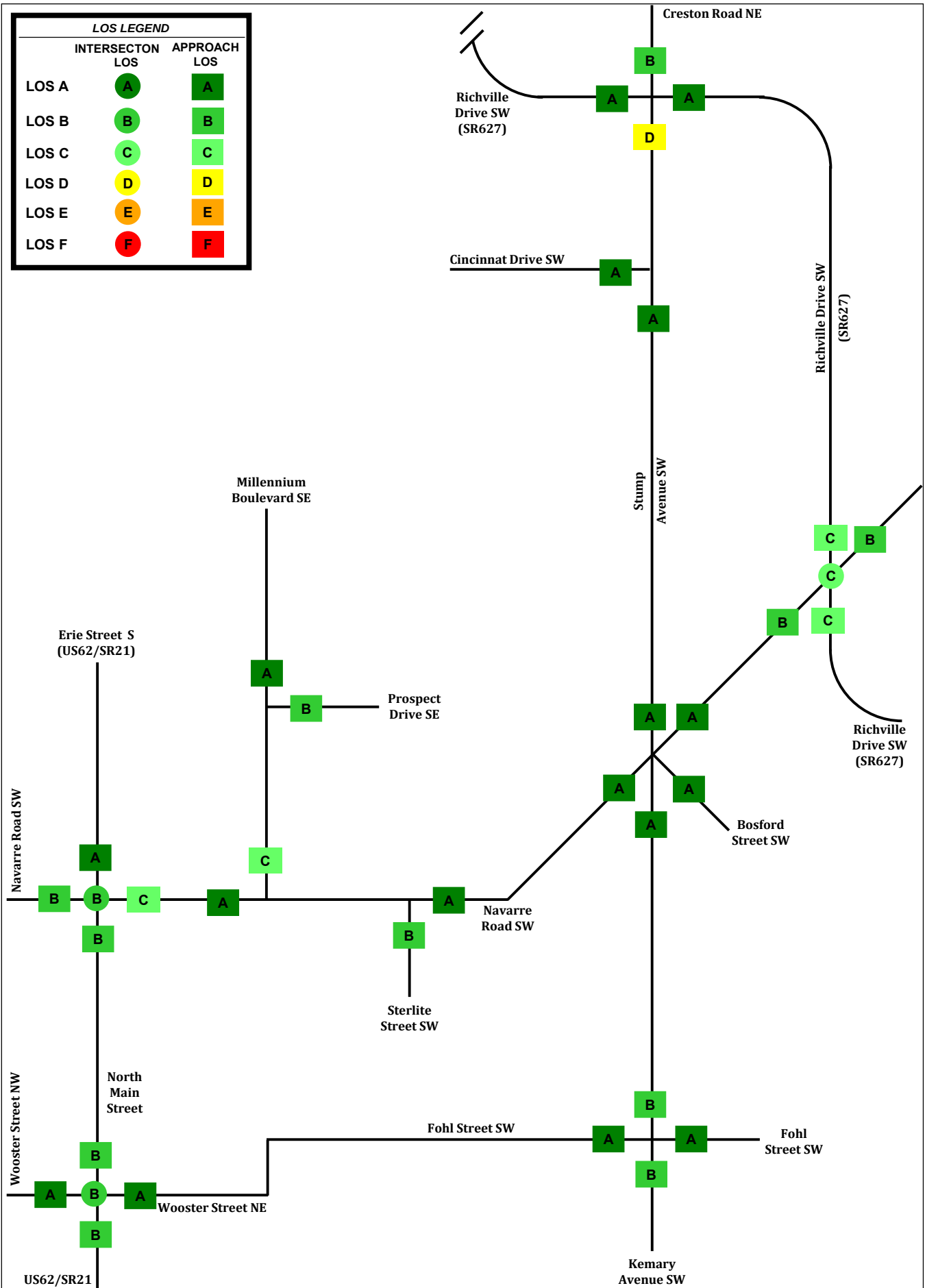
LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A		
LOS B		
LOS C		
LOS D		
LOS E		
LOS F		

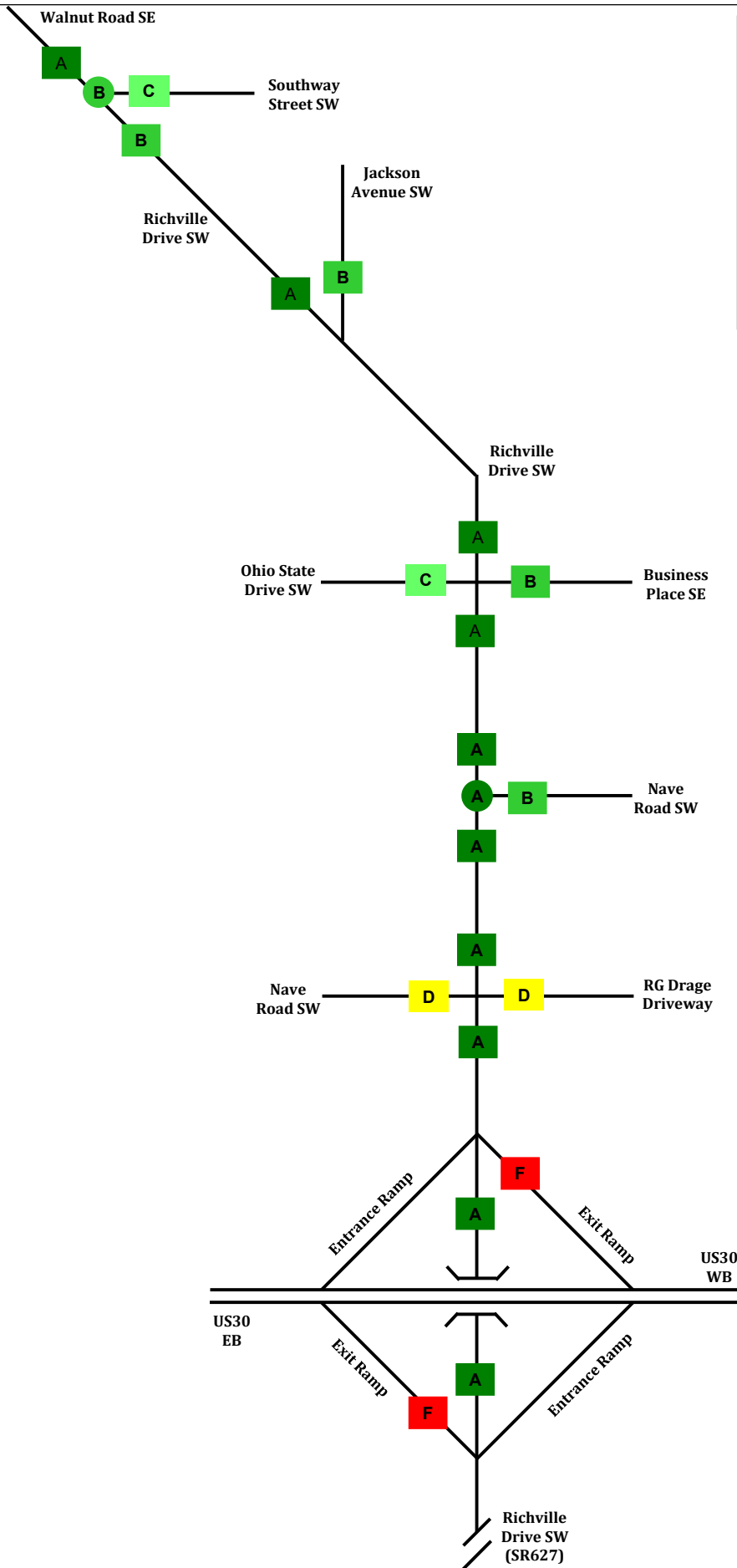




LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A	A	A
LOS B	B	B
LOS C	C	C
LOS D	D	D
LOS E	E	E
LOS F	F	F

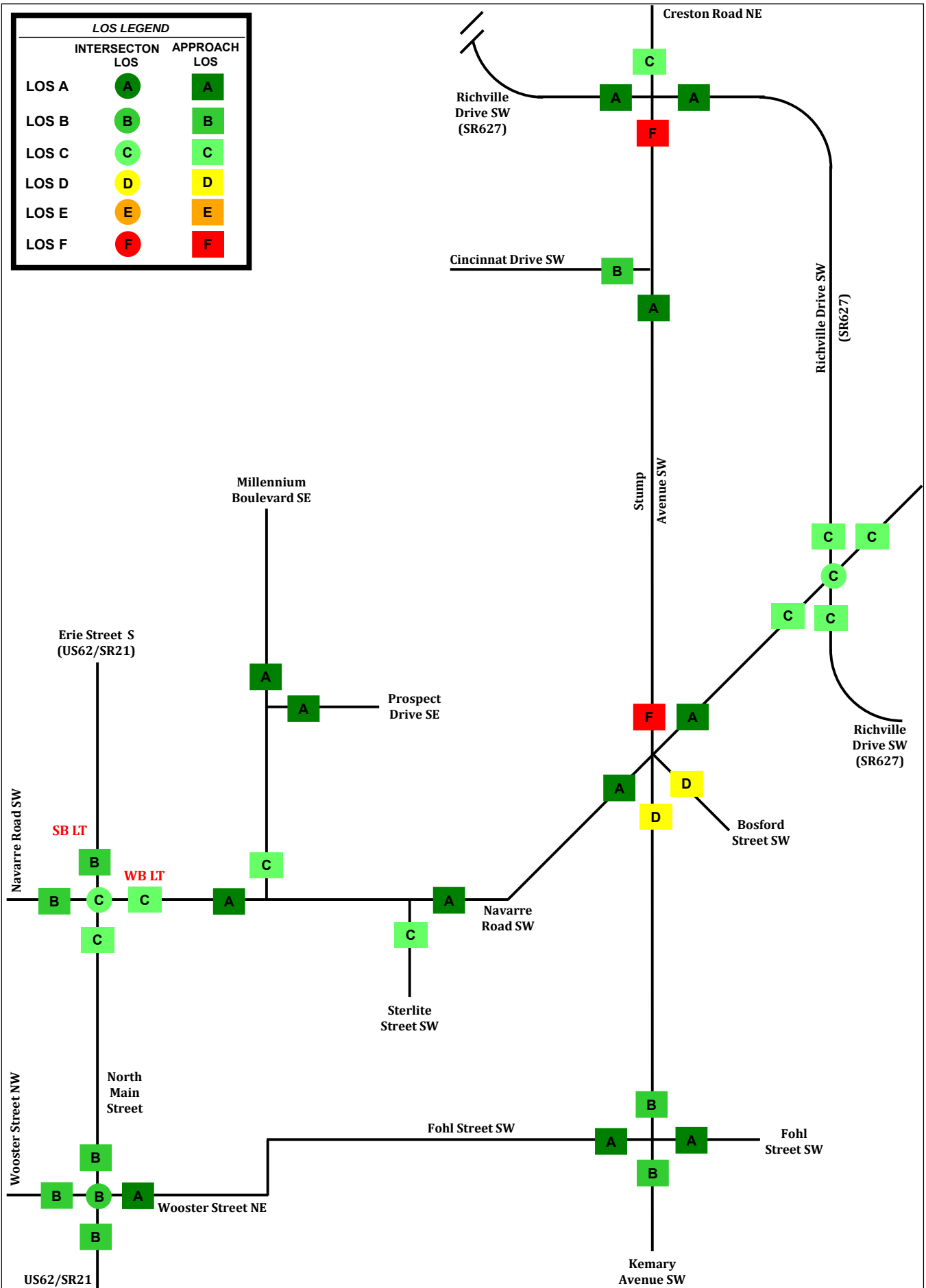
LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A		
LOS B		
LOS C		
LOS D		
LOS E		
LOS F		

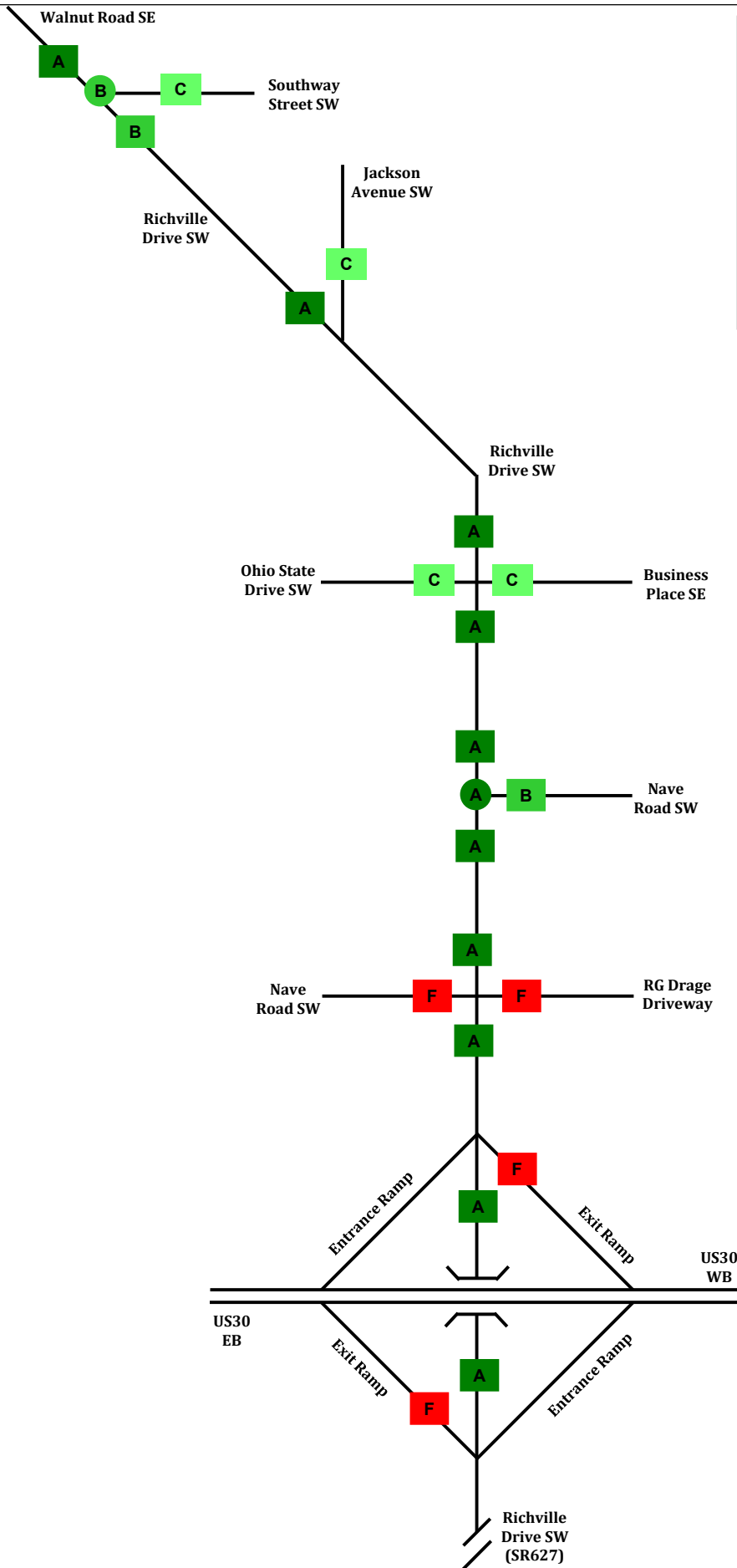




LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A		
LOS B		
LOS C		
LOS D		
LOS E		
LOS F		

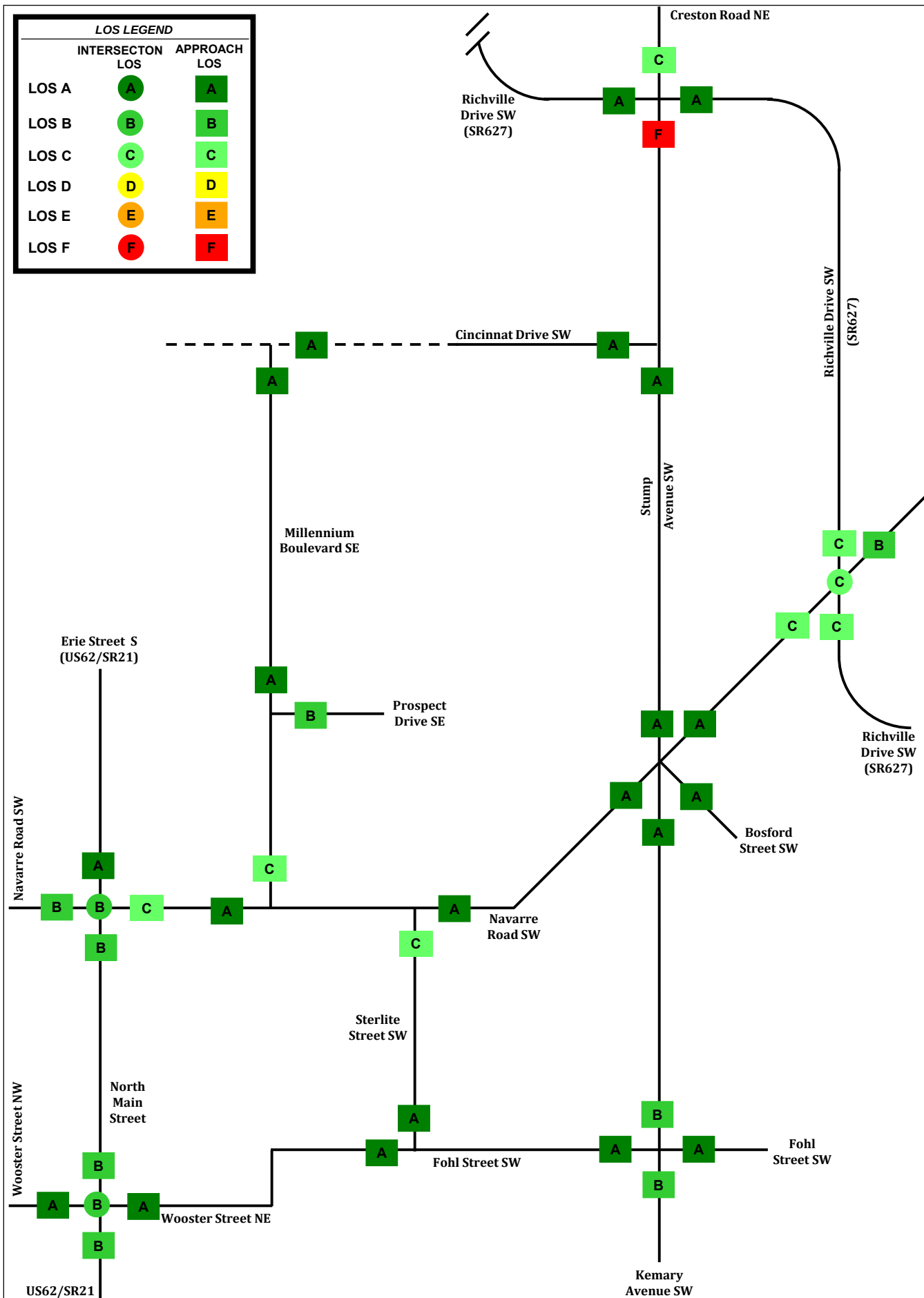
LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A	A	A
LOS B	B	B
LOS C	C	C
LOS D	D	D
LOS E	E	E
LOS F	F	F

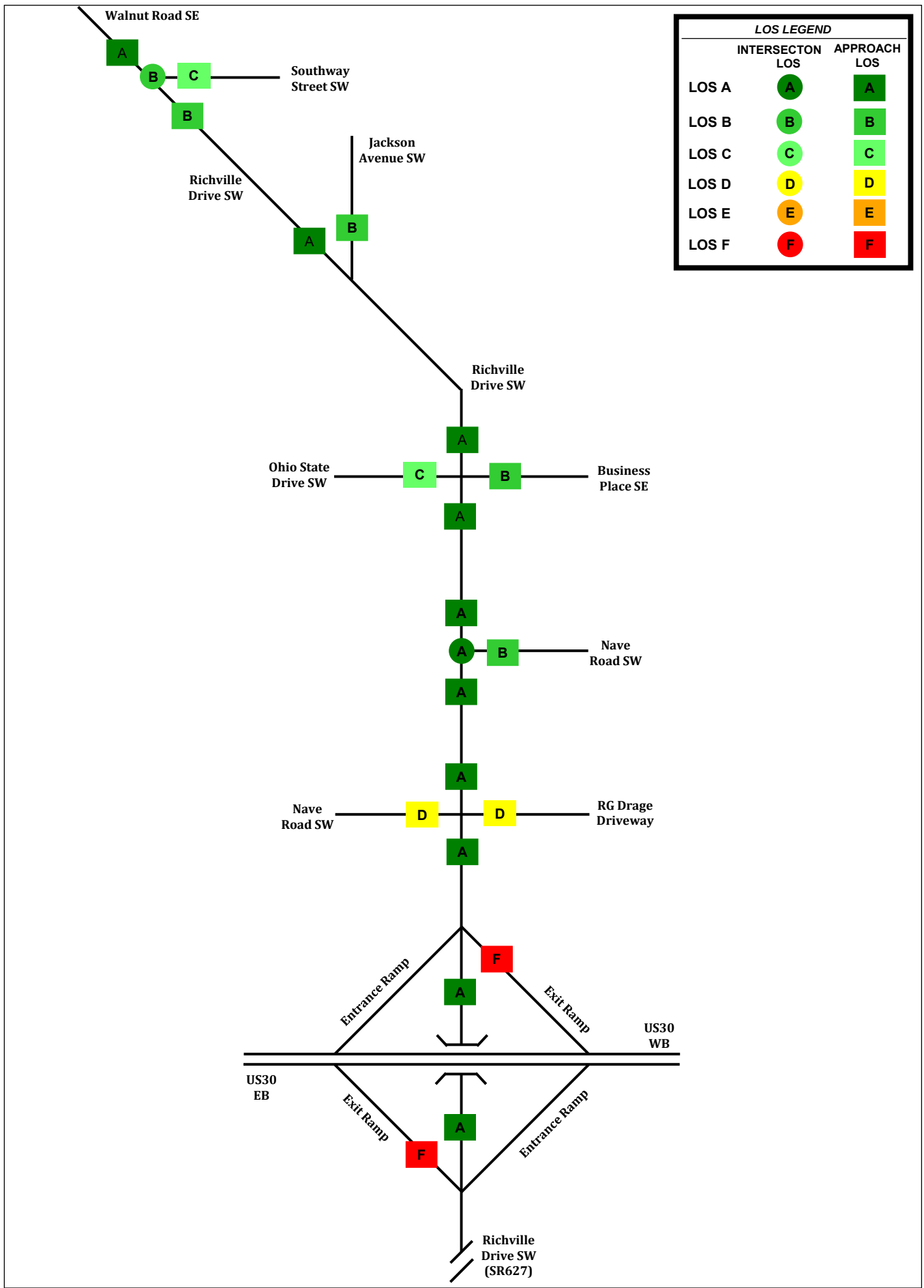




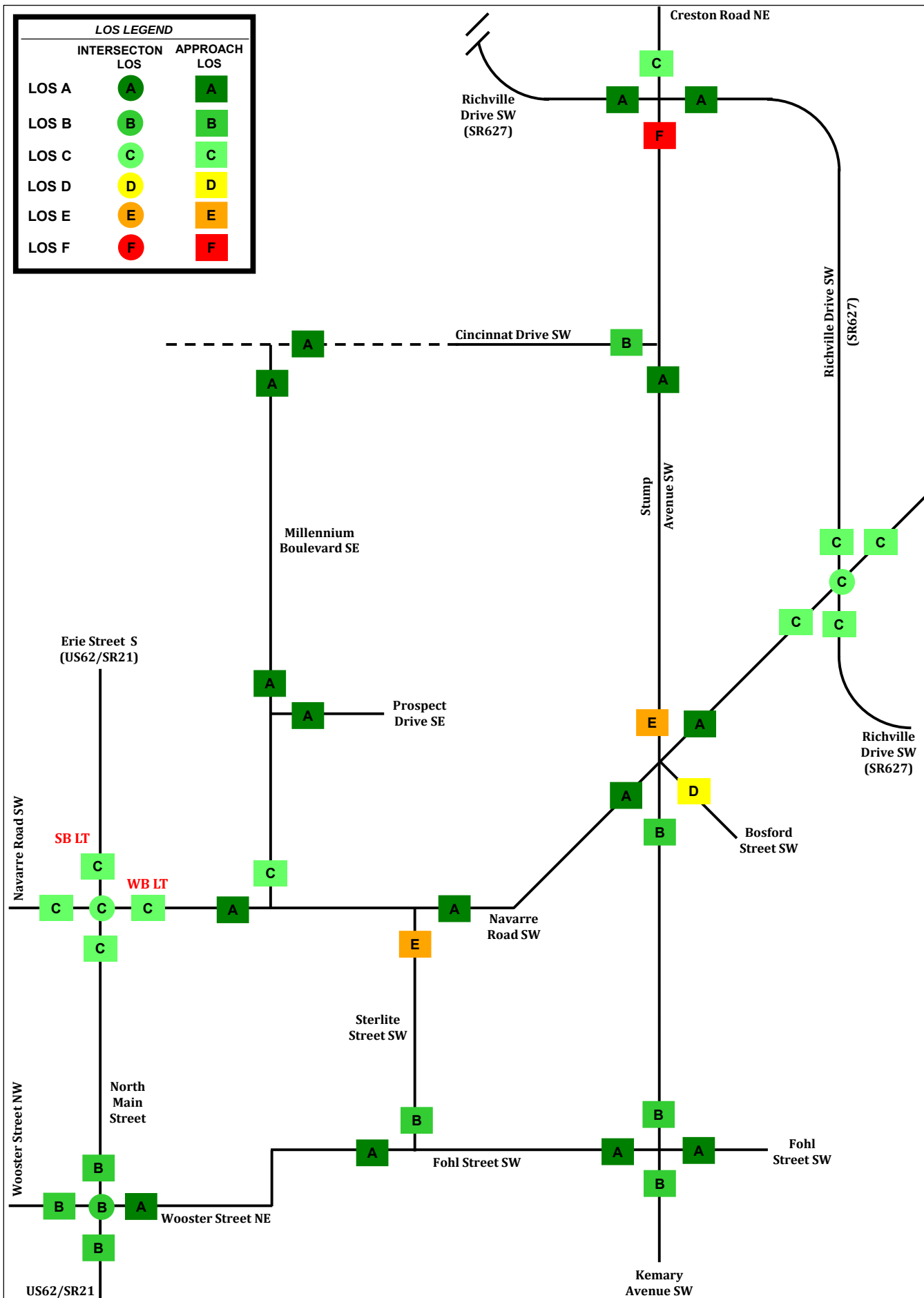
LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A	A	A
LOS B	B	B
LOS C	C	C
LOS D	D	D
LOS E	E	E
LOS F	F	F

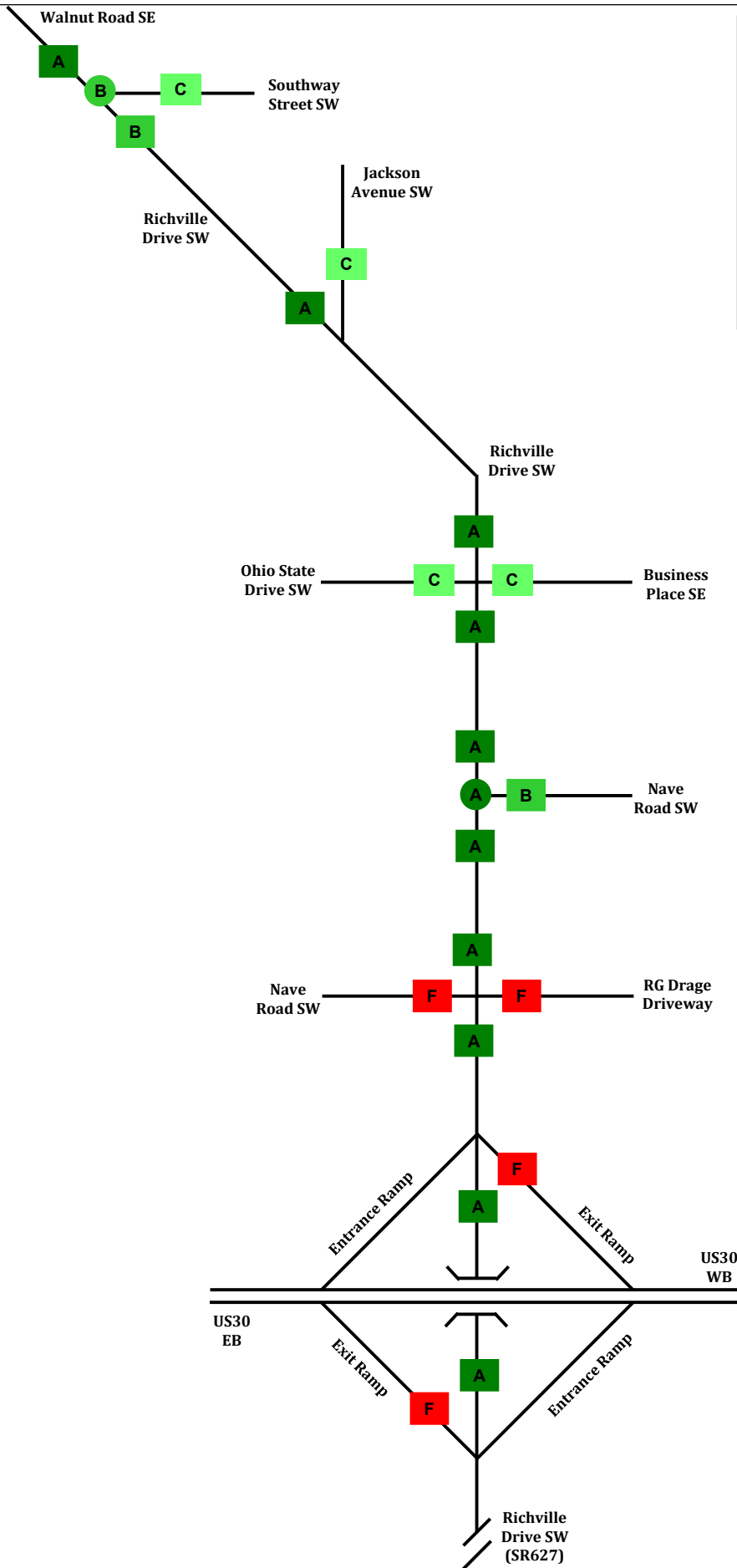
LOS LEGEND		
	INTERSECTION LOS	APPROACH LOS
LOS A		
LOS B		
LOS C		
LOS D		
LOS E		
LOS F		

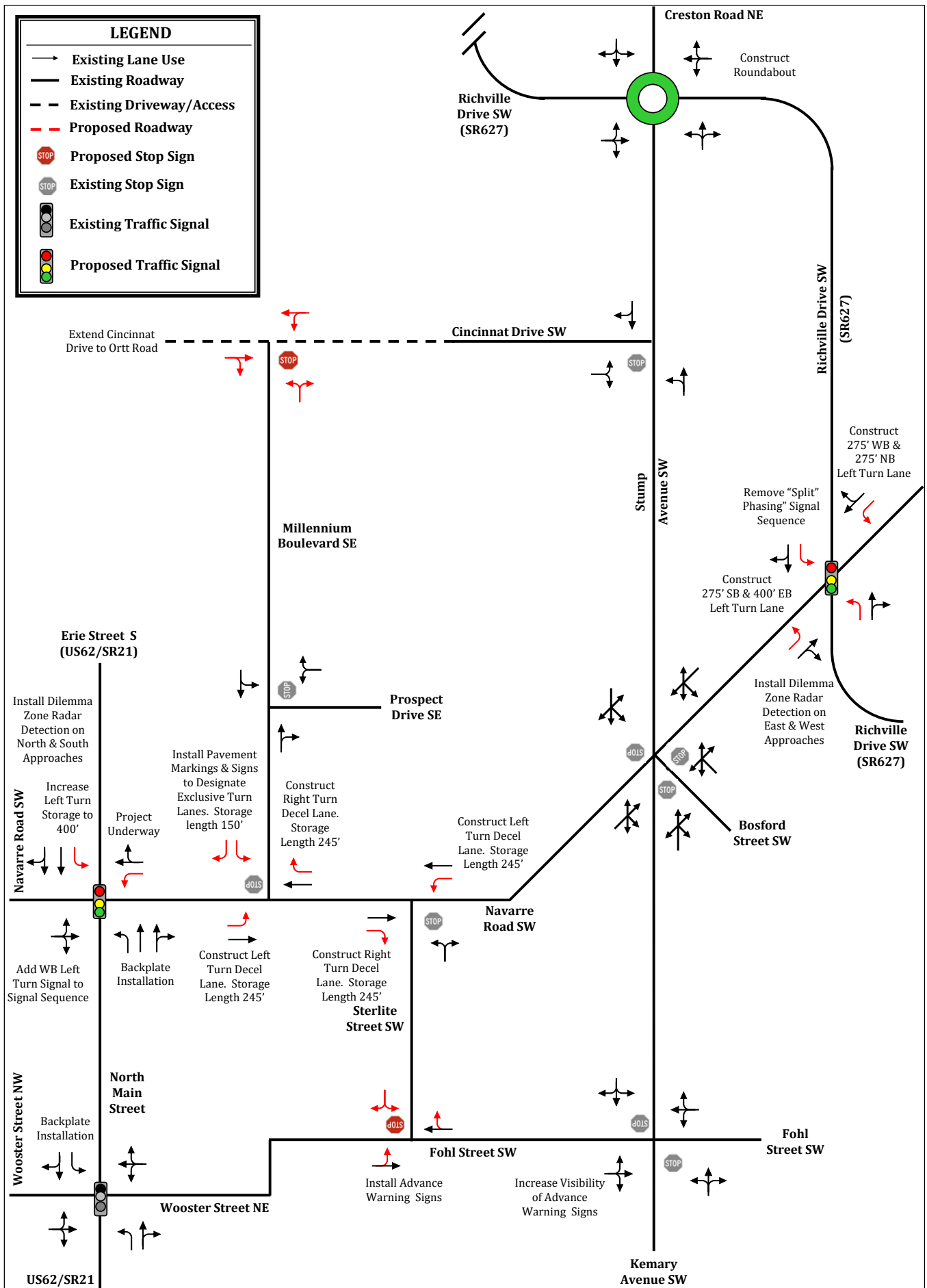


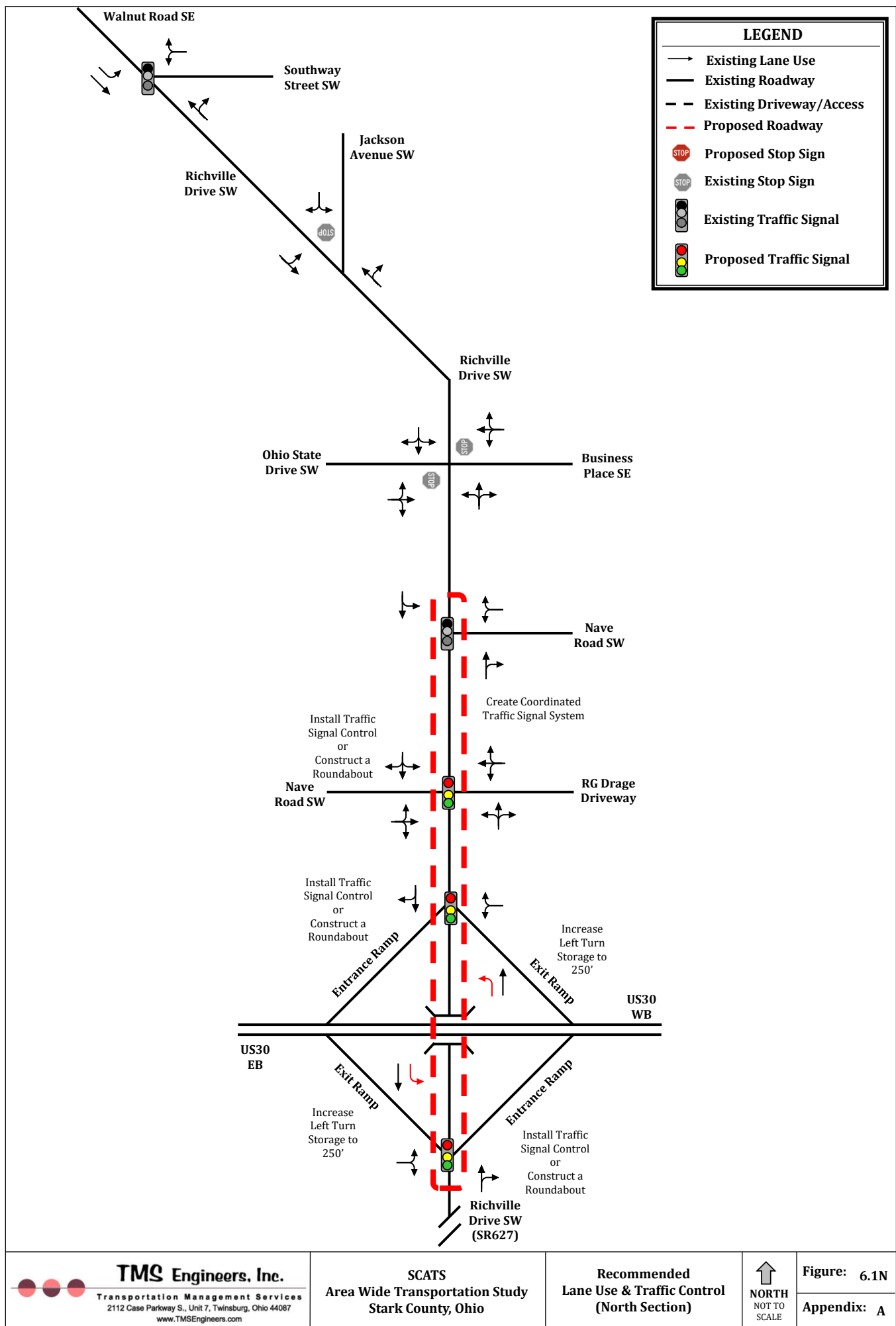


LOS LEGEND		
	INTERSECTON LOS	APPROACH LOS
LOS A		
LOS B		
LOS C		
LOS D		
LOS E		
LOS F		









Appendix B

ODOT Turn Lane Design Criteria

400 Intersection Design

BASIS FOR COMPUTING LENGTH OF TURN LANES	401-9
	REFERENCE SECTION 401.6.1 & 401.6.3

Type of Traffic Control	Design Speed		
	30-35	40-65	
	Turn Demand Volume		
	All	Low*	High
Signalized	A	** B or C	** B or C
Unsignalized Stopped Crossroad	A	A	A
Unsignalized Through Road	A	B	** B or C

* Low is considered 10% or less of approach traffic volume

** Whichever is greater

CONDITION A	STORAGE ONLY
Length = 50' (diverging taper) + Storage Length (Figure 401-10)	

CONDITION B	HIGH SPEED DECELERATION ONLY
Design Speed	Length (including 50' Diverging Taper)
40	125
45	175
50	225
55	285
60	345
65	405

CONDITION C	MODERATE SPEED DECELERATION AND STORAGE
Design Speed	Length (including 50' Diverging Taper)
40	115 + Storage Length (Figure 401-10)
45	125 "
50	145 "
55	165 "
60	185 "
65	205 "

For explanation, see Turn Lane Design Example

400 Intersection Design

STORAGE LENGTH AT INTERSECTIONS	401-10
	REFERENCE SECTION 401.6.1 & 401.6.3

* AVERAGE NO. OF VEHICLES/CYCLE	REQUIRED LENGTH (FT.)
1	50
2	100
3	150
4	175
5	200
6	250
7	275
8	325
9	350
10	375
11	400
12	450
13	475
14	500
15	525
16	550

* AVERAGE NO. OF VEHICLES/CYCLE	REQUIRED LENGTH (FT.)
17	600
18	625
19	650
20	675
21	725
22	750
23	775
24	800
25	825
30	975
35	1125
40	1250
45	1400
50	1550
55	1700
60	1850

$$\text{* AVERAGE VEHICLES PER CYCLE} = \frac{\text{DHV (TURNING LANE)}}{\text{CYCLES/HOUR}}$$

IF CYCLES ARE UNKNOWN ASSUME:

UNSIGNALIZED OR 2 PHASE = 60 CYCLES/HOUR
3 PHASE = 40 CYCLES/HOUR
4 PHASE = 30 CYCLES/HOUR

400 Intersection Design

Example - Turn Lane Design Using Figures 401-9 and 401-10

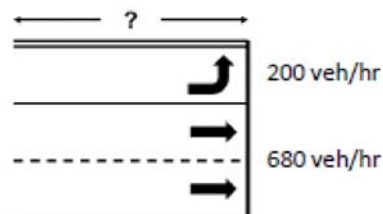
Problem

Calculate the length of an exclusive left turn lane.

Traffic Control: **Signalized**

Design Speed: **55 mph**

Cycle Length: **90 sec**



Determine Storage and Turn Lane Lengths

$$\text{Turn Lane Demand (High/Low)} = \frac{\left(200 \frac{\text{veh}}{\text{hr}}\right)}{200 \frac{\text{veh}}{\text{hr}} + 680 \frac{\text{veh}}{\text{hr}}} = 23\% = \text{High Demand}$$

Refer to the matrix in **Figure 401-9**.

For Signalized, 55 mph, High Demand, use Method B or C, whichever is greater.

Method B - For 55 mph, a **285'** turn lane length is required (235' storage + 50' taper).

Method C - For 55 mph, 165' + calculated storage length in **Figure 401-10**.

$$\text{Average Vehicles per Cycle} = \frac{\left(200 \frac{\text{veh}}{\text{hr}}\right) * \left(90 \frac{\text{sec}}{\text{cyc}}\right)}{3600 \text{ sec/hr}} = 5 \text{ veh/cyc} \rightarrow 200'$$

$$\text{Total Length} = 165' + 200' = \mathbf{365'} \text{ (315' storage + 50' taper)}$$

$$\text{Method C} = 365' > \text{Method B} = 285'$$

Use Method C

Check Length for Thru-Block

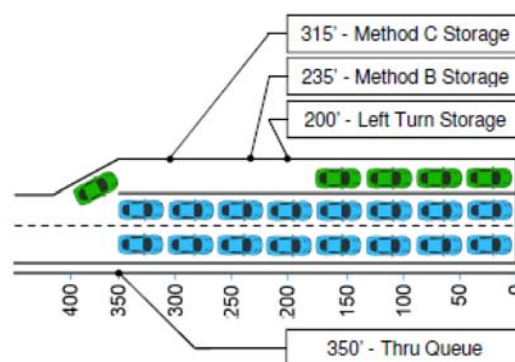
Refer to **Figure 401-10** to calculate thru lane(s) queue distance.

$$680 \text{ veh/hr} / 2 \text{ lanes} = 340 \text{ veh/hr/ln}$$

$$\text{Average Vehicles per Cycle} = \frac{\left(340 \frac{\text{veh}}{\text{hr}}\right) * \left(90 \frac{\text{sec}}{\text{cyc}}\right)}{3600 \text{ sec/hr}} = 9 \text{ veh/cyc/ln} \rightarrow \mathbf{350 \text{ ft/ln}}$$

$$\text{Thru Block} = \mathbf{350'} > \text{Method C Storage} = 315' \rightarrow \text{Turn Lane Blocked}$$

$$\text{Use } \mathbf{350'} \text{ storage} + \mathbf{50'} \text{ taper} = \mathbf{400'} \text{ Turn Lane Length}$$



Appendix C

Traffic Count Data

SCATS TURNING MOVEMENT COUNT

FILE # 61004	Main St & Wooster St										Main St & Wooster St										Main St & Wooster St									
	Main St					Main St					Wooster St					Wooster St					Wooster St					GRAND				
	NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB					TOTAL									
	LEFT	THRU	RIGHT	PED	TOTAL	LEFT	THRU	RIGHT	PED	TOTAL	LEFT	THRU	RIGHT	PED	TOTAL	LEFT	THRU	RIGHT	PED	TOTAL	LEFT	THRU	RIGHT	PED	TOTAL					
DATE OF COUNT	4/20/2022																													
	7:00- 7:15 AM	3	62	8	0	73	1	68	3	0	72	5	17	6	1	28	21	7	1	0	29									
	7:15- 7:30 AM	2	53	3	0	58	2	96	1	0	99	2	7	3	0	12	22	3	1	0	26									
	7:30- 7:45 AM	1	78	3	0	82	2	80	8	0	90	0	10	3	1	13	51	14	2	0	67									
	7:45- 8:00 AM	1	65	7	0	73	0	74	4	0	78	6	10	4	0	20	21	9	1	0	31									
7:00- 8:00 AM	7	258	21	0	286	5	318	16	0	339	13	44	16	2	73	115	33	5	0	153										
8:00- 8:15 AM	1	62	2	0	65	1	64	2	0	67	1	7	4	0	12	12	3	1	0	16										
8:15- 8:30 AM	0	56	3	0	59	2	64	5	0	71	5	13	1	0	19	17	5	4	0	26										
8:30- 8:45 AM	1	66	6	0	73	1	69	6	0	76	5	11	4	0	20	16	6	2	0	24										
8:45- 9:00 AM	5	62	5	0	72	0	56	2	0	58	4	11	5	0	20	21	8	1	0	30										
8:00- 9:00 AM	7	246	16	0	269	4	253	15	0	272	15	42	14	0	71	66	22	8	0	96										
4:00- 4:15 PM	2	91	9	0	102	3	109	5	0	117	4	10	4	0	18	38	9	2	0	49										
4:15- 4:30 PM	8	90	13	0	111	2	77	8	1	87	4	27	5	0	36	35	16	1	1	52										
4:30- 4:45 PM	6	81	10	1	97	2	94	8	0	104	3	10	6	0	19	26	9	1	1	36										
4:45- 5:00 PM	2	98	13	0	113	0	90	2	0	92	9	16	4	0	29	37	8	3	0	48										
4:00- 5:00 PM	18	360	45	1	423	7	370	23	1	400	20	63	19	0	102	136	42	7	2	185										
5:00- 5:15 PM	4	96	9	0	109	1	76	7	0	84	7	15	7	0	29	31	18	1	0	50										
5:15- 5:30 PM	3	104	11	0	118	2	90	9	0	101	6	19	8	0	33	33	20	1	0	54										
5:30- 5:45 PM	1	77	4	0	82	1	62	9	0	72	4	16	6	0	26	26	16	3	1	45										
5:45- 6:00 PM	5	65	6	0	76	2	55	5	0	62	7	14	12	0	33	21	35	3	0	59										
5:00- 6:00 PM	13	342	30	0	385	6	283	30	0	319	24	64	33	0	121	111	89	8	1	208										
TOTAL	45	1206	112	1	1363	22	1224	84	1	1330	72	213	82	2	367	428	186	28	3	642										
AM Peak Hour:																														
7:00-8:00 AM	7	258	21	0	286	5	318	16	0	339	13	44	16	2	73	115	33	5	0	153										
PM Peak Hour:																														
4:30-5:30 PM	15	379	43	1	437	5	350	26	0	381	25	60	25	0	110	127	55	6	1	188										
24-Hour Exp Fact	3.75					3.82					3.40					3.75														
Seasonal Adj Fact	0.92					0.92					0.92					0.92														
Average Daily	3.3%	88.5%	8.2%			1.7%	92.0%	6.3%			19.6%	58.0%	22.3%			66.7%	29.0%	4.4%												
Traffic	154	4,140	384	3	4,679	77	4,284	294	4	4,655	224	664	256	6	1,144	1,469	638	96	10	2,203										

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

DATE OF COUNT	Kemary Ave & Fohl St										Kemary Ave & Fohl St									
	Kemary Ave					Kemary Ave					Fohl St					Fohl St				
	NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB				
	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL
4/8/2022																				
7:00- 7:15 AM	6	1	2	0	9	1	7	1	0	9	0	10	7	0	17	4	12	2	0	18
7:15- 7:30 AM	2	2	4	0	8	1	8	1	0	10	0	12	11	0	23	6	11	0	0	17
7:30- 7:45 AM	4	3	0	0	7	1	13	0	0	14	0	11	9	0	20	11	13	1	0	25
7:45- 8:00 AM	4	1	1	0	6	1	15	1	0	17	0	9	8	0	17	5	9	0	0	14
7:00- 8:00 AM	16	7	7	0	30	4	43	3	0	50	0	42	35	0	77	26	45	3	0	74
8:00- 8:15 AM	4	3	2	0	9	0	7	0	0	7	0	9	4	0	13	2	4	0	0	6
8:15- 8:30 AM	4	2	3	0	9	1	9	0	0	10	0	7	6	0	13	0	5	2	0	7
8:30- 8:45 AM	3	3	2	0	8	1	5	1	0	7	0	10	5	0	15	1	8	1	0	10
8:45- 9:00 AM	3	2	2	0	7	0	7	0	0	7	0	12	5	0	17	5	5	0	0	10
8:00- 9:00 AM	14	10	9	0	33	2	28	1	0	31	0	38	20	0	58	8	22	3	0	33
4:00- 4:15 PM	13	13	7	0	33	2	7	0	0	9	1	15	4	0	20	3	20	2	0	25
4:15- 4:30 PM	7	6	6	0	19	0	4	0	0	4	1	14	8	0	23	4	15	0	0	19
4:30- 4:45 PM	16	12	6	0	34	1	9	0	0	10	1	24	8	0	33	6	14	1	0	21
4:45- 5:00 PM	9	12	1	0	22	1	11	3	0	15	1	19	11	0	31	4	16	0	0	20
4:00- 5:00 PM	45	43	20	0	108	4	31	3	0	38	4	72	31	0	107	17	65	3	0	85
5:00- 5:15 PM	11	9	5	0	25	0	7	1	0	8	0	20	5	0	25	2	17	0	0	19
5:15- 5:30 PM	8	7	5	0	20	0	6	0	0	6	1	17	7	0	25	3	16	2	0	21
5:30- 5:45 PM	17	12	4	0	33	1	9	0	0	10	0	8	10	0	18	4	12	3	0	19
5:45- 6:00 PM	13	14	5	0	32	2	3	1	0	6	0	5	8	0	13	4	10	0	0	14
5:00- 6:00 PM	49	42	19	0	110	3	25	2	0	30	1	50	30	0	81	13	55	5	0	73
TOTAL	124	102	55	0	281	13	127	9	0	149	5	202	116	0	323	64	187	14	0	265
AM Peak Hour:																				
7:00-8:00 AM	16	7	7	0	30	4	43	3	0	50	0	42	35	0	77	26	45	3	0	74
PM Peak Hour:																				
4:00-5:00 PM	45	43	20	0	108	4	31	3	0	38	4	72	31	0	107	17	65	3	0	85
24-Hour Exp Fact	3.58					3.11					3.42					3.75				
Seasonal Adj Fact	0.86					0.86					0.86					0.86				
Average Daily	44.1%	36.3%	19.6%			8.7%	85.2%	6.0%			1.5%	62.5%	35.9%			24.2%	70.6%	5.3%		
Traffic	382	314	169	0	865	35	340	24	0	399	15	595	342	0	952	207	604	45	0	856

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

DATE OF COUNT			US 62/SR 21 & Navarre Rd										US 62/SR 21 & Navarre Rd										US 62/SR 21 & Navarre Rd									
			US 62/SR 21					US 62/SR 21					Navarre Rd					Navarre Rd					Driveway									
			NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB					GRAND									
			LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL										
3/31/2022	25	57	0	0	82	1	103	17	0	121	16	2	55	0	73	4	5	5	0	14	290											
7:00- 7:15 AM	36	69	0	0	105	7	120	27	0	154	17	1	30	0	48	8	3	5	0	16	323											
7:15- 7:30 AM	53	76	0	0	129	5	113	19	0	137	16	4	30	0	50	7	7	9	0	23	339											
7:30- 7:45 AM	48	86	0	0	134	4	113	24	0	141	13	3	34	0	50	7	6	5	0	18	343											
7:45- 8:00 AM	162	288	0	0	450	17	449	87	0	553	62	10	149	0	221	26	21	24	0	71	1295											
8:00- 8:15 AM	19	65	1	0	85	4	87	16	0	107	16	3	32	0	51	6	5	5	0	16	259											
8:15- 8:30 AM	27	76	0	0	103	6	82	11	0	99	12	2	33	0	47	5	9	4	0	18	267											
8:30- 8:45 AM	31	93	1	0	125	4	94	29	0	127	16	1	27	0	44	8	1	4	0	13	309											
8:45- 9:00 AM	25	79	0	0	104	2	79	23	0	104	12	0	31	0	43	1	2	2	0	5	256											
8:00- 9:00 AM	102	313	2	0	417	16	342	79	0	437	56	6	123	0	185	20	17	15	0	52	1091											
4:00- 4:15 PM	51	169	0	0	220	4	188	34	0	226	35	9	79	0	123	8	10	9	0	27	596											
4:15- 4:30 PM	33	144	0	0	177	3	129	17	0	149	36	5	45	0	86	5	4	10	0	19	431											
4:30- 4:45 PM	42	133	0	0	175	5	125	25	0	155	22	7	61	0	90	9	4	10	0	23	443											
4:45- 5:00 PM	54	150	0	0	204	5	115	19	0	139	40	6	34	0	80	5	4	13	0	22	445											
4:00- 5:00 PM	180	596	0	0	776	17	557	95	0	669	133	27	219	0	379	27	22	42	0	91	1915											
5:00- 5:15 PM	52	161	2	0	215	8	135	22	0	165	37	7	53	0	97	8	6	8	0	22	499											
5:15- 5:30 PM	31	156	1	0	188	2	136	20	0	158	36	3	44	0	83	8	5	12	0	25	454											
5:30- 5:45 PM	43	129	0	0	172	1	108	26	0	135	37	4	36	0	77	4	4	3	0	11	395											
5:45- 6:00 PM	43	114	0	0	157	3	96	21	0	120	24	5	36	0	65	7	2	2	0	11	353											
5:00- 6:00 PM	169	560	3	0	732	14	475	89	0	578	134	19	169	0	322	27	17	25	0	69	1701											
TOTAL	613	1757	5	0	2375	64	1823	350	0	2237	385	62	660	0	1107	100	77	106	0	283	6002											
AM Peak Hour:																																
7:00-8:00 AM	162	288	0	0	450	17	449	87	0	553	62	10	149	0	221	26	21	24	0	71	1295											
PM Peak Hour:																																
4:00-5:00 PM	180	596	0	0	776	17	557	95	0	669	133	27	219	0	379	27	22	42	0	91	1915											
24-Hour Exp Fact	3.98					4.43					3.75					-																
Seasonal Adj Fact	0.96					0.96					0.91					0.96																
Average Daily	25.8%	74.0%	0.2%			2.9%	81.5%	15.6%			34.8%	5.6%	59.6%			35.3%	27.2%	37.5%														
Traffic	2,346	6,724	19	0	9,089	273	7,766	1,491	0	9,530	1,309	211	2,243	0	3,763	270	208	286	0	764	23,146											

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

DATE OF COUNT	Millennium Blvd & Navarre Rd										Millennium Blvd & Navarre Rd									
	Millennium Blvd					NA					Navarre Rd					Navarre Rd				
	NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB				
	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL
4/6/2022																				
7:00- 7:15 AM	42	0	29	0	71	0	0	0	0	0	0	67	17	0	84	13	31	0	0	44
7:15- 7:30 AM	11	0	19	0	30	0	0	0	0	0	0	52	12	0	64	14	59	0	0	73
7:30- 7:45 AM	5	0	11	0	16	0	0	0	0	0	0	52	11	0	63	18	59	0	0	77
7:45- 8:00 AM	7	0	8	0	15	0	0	0	0	0	0	58	24	0	82	27	50	0	0	77
7:00- 8:00 AM	65	0	67	0	132	0	0	0	0	0	0	229	64	0	293	72	199	0	0	271
8:00- 8:15 AM	8	0	9	0	17	0	0	0	0	0	0	47	7	0	54	11	43	0	0	54
8:15- 8:30 AM	1	0	5	0	6	0	0	0	0	0	0	36	5	0	41	7	33	0	0	40
8:30- 8:45 AM	3	0	6	0	9	0	0	0	0	0	0	55	1	0	56	11	46	0	0	57
8:45- 9:00 AM	2	0	7	0	9	0	0	0	0	0	0	42	10	0	52	9	44	0	0	53
8:00- 9:00 AM	14	0	27	0	41	0	0	0	0	0	0	180	23	0	203	38	166	0	0	204
4:00- 4:15 PM	16	0	17	0	33	0	0	0	1	0	0	84	5	0	89	9	106	0	0	115
4:15- 4:30 PM	5	0	11	0	16	0	0	0	0	0	0	51	2	0	53	7	85	0	0	92
4:30- 4:45 PM	12	0	14	0	26	0	0	0	0	0	0	67	2	0	69	5	79	0	0	84
4:45- 5:00 PM	16	0	20	0	36	0	0	0	0	0	0	62	7	0	69	4	57	0	0	61
4:00- 5:00 PM	49	0	62	0	111	0	0	0	1	0	0	264	16	0	280	25	327	0	0	352
5:00- 5:15 PM	23	0	35	0	58	0	0	0	0	0	0	62	3	0	65	5	80	0	0	85
5:15- 5:30 PM	9	0	21	0	30	0	0	0	0	0	0	57	5	0	62	5	61	0	0	66
5:30- 5:45 PM	5	0	7	0	12	0	0	0	0	0	0	57	2	0	59	5	54	0	0	59
5:45- 6:00 PM	3	0	8	0	11	0	0	0	0	0	0	34	5	0	39	3	61	0	0	64
5:00- 6:00 PM	40	0	71	0	111	0	0	0	0	0	0	210	15	0	225	18	256	0	0	274
TOTAL	168	0	227	0	395	0	0	0	1	0	0	883	118	0	1001	153	948	0	0	1101
AM Peak Hour:																				
7:00-8:00 AM	65	0	67	0	132	0	0	0	0	0	0	229	64	0	293	72	199	0	0	271
PM Peak Hour:																				
4:00-5:00 PM	49	0	62	0	111	0	0	0	1	0	0	264	16	0	280	25	327	0	0	352
24-Hour Exp Fact	3.53					-					3.82					3.92				
Seasonal Adj Fact	0.92					0.92					0.92					0.92				
Average Daily	42.5%	0.0%	57.5%			#DIV/0!	#DIV/0!	#DIV/0!	0	0	0.0%	88.2%	11.8%			13.9%	86.1%	0.0%		
Traffic	543	0	733	0	1,276	0	0	0	0	0	0	3,091	413	0	3,505	549	3,400	0	0	3,948
																				8,729

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

DATE OF COUNT	Millennium Blvd & Prospect St										Millennium Blvd & Prospect St									
	Millennium Blvd					Millennium Blvd					Prospect St					NA				
	NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB				
	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL
4/6/2022																				
7:00- 7:15 AM	1	16	0	0	17	0	12	9	0	21	51	0	1	0	52	0	0	0	0	0
7:15- 7:30 AM	0	6	0	0	6	0	14	4	0	18	17	0	0	0	17	0	0	0	0	0
7:30- 7:45 AM	0	6	0	0	6	0	14	5	0	19	5	0	0	0	5	0	0	0	0	0
7:45- 8:00 AM	0	6	0	0	6	0	33	5	0	38	5	0	0	0	5	0	0	0	0	0
7:00- 8:00 AM	1	34	0	0	35	0	73	23	0	96	78	0	1	0	79	0	0	0	0	0
8:00- 8:15 AM	0	12	0	0	12	0	13	6	0	19	3	0	0	0	3	0	0	0	0	0
8:15- 8:30 AM	2	2	0	0	4	0	5	2	0	7	0	0	0	0	0	0	0	0	0	0
8:30- 8:45 AM	1	2	0	0	3	0	3	4	0	7	3	0	2	0	5	0	0	0	0	0
8:45- 9:00 AM	3	4	0	0	7	0	8	5	0	13	3	0	0	0	3	0	0	0	0	0
8:00- 9:00 AM	6	20	0	0	26	0	29	17	0	46	9	0	2	0	11	0	0	0	0	0
4:00- 4:15 PM	1	17	0	0	18	0	9	2	0	11	5	0	0	0	5	0	0	0	0	0
4:15- 4:30 PM	0	5	0	0	5	0	5	2	0	7	7	0	1	0	8	0	0	0	0	0
4:30- 4:45 PM	1	17	0	0	18	0	2	0	0	2	1	0	0	0	1	0	0	0	0	0
4:45- 5:00 PM	0	25	0	0	25	0	8	2	0	10	2	0	0	0	2	0	0	0	0	0
4:00- 5:00 PM	2	64	0	0	66	0	24	6	0	30	15	0	1	0	16	0	0	0	0	0
5:00- 5:15 PM	1	42	0	0	43	0	8	0	0	8	5	0	0	0	5	0	0	0	0	0
5:15- 5:30 PM	0	20	0	0	20	0	7	1	0	8	2	0	0	0	2	0	0	0	0	0
5:30- 5:45 PM	0	5	0	0	5	0	3	2	0	5	3	0	2	0	5	0	0	0	0	0
5:45- 6:00 PM	1	6	0	0	7	0	6	3	0	9	3	0	0	0	3	0	0	0	0	0
5:00- 6:00 PM	2	73	0	0	75	0	24	6	0	30	13	0	2	0	15	0	0	0	0	0
TOTAL	11	191	0	0	202	0	150	52	0	202	115	0	6	0	121	0	0	0	0	0
AM Peak Hour:																				
7:00-8:00 AM	1	34	0	0	35	0	73	23	0	96	78	0	1	0	79	0	0	0	0	0
PM Peak Hour:																				
4:30-5:30 PM	2	104	0	0	106	0	25	3	0	28	10	0	0	0	10	0	0	0	0	0
24-Hour Exp Fact	3.53					4.86					7.08					-				
Seasonal Adj Fact	0.92					0.92					0.92					0.92				
Average Daily	5.4%	94.6%	0.0%			0.0%	74.3%	25.7%			95.0%	0.0%	5.0%			#DIV/0!	#DIV/0!	#DIV/0!		
Traffic	36	617	0	0	653	0	667	231	0	899	746	0	39	0	785	0	0	0	0	2,336

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

DATE OF COUNT	Richville Dr & Navarre Rd										Richville Dr & Navarre Rd									
	Richville Dr					Richville Dr					Navarre Rd					Navarre Rd				
	NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB				
	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL
7:00- 7:15 AM	2	30	1	0	33	9	41	12	0	62	6	37	3	0	46	4	71	21	0	96
7:15- 7:30 AM	2	31	1	0	34	11	62	11	0	84	9	35	8	0	52	5	44	16	0	65
7:30- 7:45 AM	4	33	2	0	39	14	40	10	0	64	12	33	8	0	53	3	55	7	0	65
7:45- 8:00 AM	6	20	7	0	33	17	53	8	0	78	11	34	10	0	55	3	34	15	0	52
7:00- 8:00 AM	14	114	11	0	139	51	196	41	0	288	38	139	29	0	206	15	204	59	0	278
8:00- 8:15 AM	2	9	5	0	16	9	38	9	0	56	10	19	10	0	39	3	30	10	0	43
8:15- 8:30 AM	5	16	6	0	27	11	30	3	0	44	8	28	5	0	41	4	31	7	0	42
8:30- 8:45 AM	7	18	6	0	31	8	40	11	0	59	6	20	3	0	29	2	47	14	0	63
8:45- 9:00 AM	6	23	4	0	33	9	36	7	0	52	7	36	12	0	55	5	42	15	0	62
8:00- 9:00 AM	20	66	21	0	107	37	144	30	0	211	31	103	30	0	164	14	150	46	0	210
4:00- 4:15 PM	8	56	2	0	66	18	45	8	0	71	4	53	11	0	68	4	77	13	0	94
4:15- 4:30 PM	7	38	7	0	52	18	37	16	0	71	14	42	11	0	67	4	49	25	0	78
4:30- 4:45 PM	8	34	0	0	42	22	32	11	0	65	18	60	5	0	83	6	60	19	0	85
4:45- 5:00 PM	9	42	8	0	59	14	51	14	0	79	11	49	10	0	70	5	53	26	0	84
4:00- 5:00 PM	32	170	17	0	219	72	165	49	0	286	47	204	37	0	288	19	239	83	0	341
5:00- 5:15 PM	17	44	6	0	67	16	42	20	0	78	14	41	5	0	60	3	69	20	0	92
5:15- 5:30 PM	9	49	2	0	60	16	44	7	0	67	9	56	9	0	74	3	49	22	0	74
5:30- 5:45 PM	14	38	4	0	56	14	33	12	0	59	11	60	12	0	83	0	46	13	0	59
5:45- 6:00 PM	13	24	6	0	43	14	29	12	0	55	17	43	11	0	71	1	38	19	0	58
5:00- 6:00 PM	53	155	18	0	226	60	148	51	0	259	51	200	37	0	288	7	202	74	0	283
TOTAL	119	505	67	0	691	220	653	171	0	1044	167	646	133	0	946	55	795	262	0	1112
AM Peak Hour:																				
7:00-8:00 AM	14	114	11	0	139	51	196	41	0	288	38	139	29	0	206	15	204	59	0	278
PM Peak Hour:																				
4:30-5:30 PM	43	169	16	0	228	68	169	52	0	289	52	206	29	0	287	17	231	87	0	335
24-Hour Exp Fact	3.53					3.38					3.76					3.45				
Seasonal Adj Fact	0.94					0.94					0.94					0.94				
Average Daily	17.2%	73.1%	9.7%			21.1%	62.5%	16.4%			17.7%	68.3%	14.1%			4.9%	71.5%	23.6%		
Traffic	394	1,670	222	0	2,285	698	2,071	542	0	3,311	588	2,273	468	0	3,328	178	2,569	847	0	3,594

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

DATE OF COUNT	Creston Ave & Richville Dr										Creston Ave & Richville Dr									
	Creston Ave					Stump Ave					Richville Dr					Richville Dr				
	NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB				
	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL
7:00- 7:15 AM	0	0	3	0	3	49	0	0	0	49	1	52	0	0	53	0	31	25	0	56
7:15- 7:30 AM	0	0	1	0	1	52	0	2	0	54	0	59	1	0	60	1	27	16	0	44
7:30- 7:45 AM	0	0	0	0	0	55	1	0	0	56	0	76	0	0	76	2	38	17	0	57
7:45- 8:00 AM	0	0	4	0	4	40	0	1	0	41	0	67	0	0	67	1	28	26	0	55
7:00- 8:00 AM	0	0	8	0	8	196	1	3	0	200	1	254	1	0	256	4	124	84	0	212
8:00- 8:15 AM	0	0	1	0	1	27	0	0	0	27	0	57	0	0	57	0	42	14	0	56
8:15- 8:30 AM	0	0	2	0	2	12	1	0	0	13	1	59	0	0	60	2	23	16	0	41
8:30- 8:45 AM	0	0	2	0	2	18	0	0	0	18	0	52	0	0	52	1	37	14	0	52
8:45- 9:00 AM	0	0	1	0	1	11	1	0	0	12	1	43	0	0	44	0	34	18	0	52
8:00- 9:00 AM	0	0	6	0	6	68	2	0	0	70	2	211	0	0	213	3	136	62	0	201
4:00- 4:15 PM	0	0	3	0	3	29	1	2	0	32	5	75	0	0	80	3	86	38	0	127
4:15- 4:30 PM	1	0	3	0	4	19	0	0	0	19	4	63	0	0	67	3	59	31	0	93
4:30- 4:45 PM	0	0	2	0	2	48	1	0	0	49	0	68	0	0	68	4	70	33	0	107
4:45- 5:00 PM	0	0	3	0	3	30	1	0	0	31	0	55	0	0	55	5	72	33	0	110
4:00- 5:00 PM	1	0	11	0	12	126	3	2	0	131	9	261	0	0	270	15	287	135	0	437
5:00- 5:15 PM	0	0	1	0	1	35	0	1	0	36	0	63	0	0	63	0	65	33	0	98
5:15- 5:30 PM	0	1	0	0	1	30	0	2	0	32	3	44	0	0	47	2	68	23	0	93
5:30- 5:45 PM	0	0	0	0	0	28	1	1	0	30	0	71	0	0	71	5	69	37	0	111
5:45- 6:00 PM	0	0	1	0	1	30	1	2	0	33	0	52	0	0	52	0	55	36	0	91
5:00- 6:00 PM	0	1	2	0	3	123	2	6	0	131	3	230	0	0	233	7	257	129	0	393
TOTAL	1	1	27	0	29	513	8	11	0	532	15	956	1	0	972	29	804	410	0	1243
AM Peak Hour:																				
7:00-8:00 AM	0	0	8	0	8	196	1	3	0	200	1	254	1	0	256	4	124	84	0	212
PM Peak Hour:																				
4:00-5:00 PM	1	0	11	0	12	126	3	2	0	131	9	261	0	0	270	15	287	135	0	437
24-Hour Exp Fact	3.82					2.86					3.52					4.18				
Seasonal Adj Fact	0.90					0.90					0.90					0.90				
Average Daily	3.4%	3.4%	93.1%			96.4%	1.5%	2.1%			1.5%	98.4%	0.1%			2.3%	64.7%	33.0%		
Traffic	3	3	93	0	100	1,325	21	28	0	1,374	48	3,038	3	0	3,089	109	3,032	1,546	0	4,687

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

DATE OF COUNT	Richville Dr & US-30 EB Onramp										Richville Dr & US-30 EB Onramp									
	Richville Dr					Richville Dr					US-30 EB Onramp					US-30 EB Offramp				
	NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB				
	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL
4/12/2022																				
7:00- 7:15 AM	44	39	0	0	83	0	83	45	0	128	0	0	0	0	0	14	0	16	0	30
7:15- 7:30 AM	39	29	0	0	68	0	81	50	0	131	0	0	0	0	0	29	0	23	0	52
7:30- 7:45 AM	58	42	0	0	100	0	93	18	0	111	0	0	0	0	0	30	0	19	0	49
7:45- 8:00 AM	55	34	0	0	89	0	84	17	0	101	0	0	0	0	0	48	0	17	0	65
7:00- 8:00 AM	196	144	0	0	340	0	341	130	0	471	0	0	0	0	0	121	0	75	0	196
8:00- 8:15 AM	33	36	0	0	69	0	79	14	0	93	0	0	0	0	0	12	0	8	0	20
8:15- 8:30 AM	25	33	0	0	58	0	54	5	0	59	0	0	0	0	0	15	1	16	0	32
8:30- 8:45 AM	15	28	0	0	43	0	51	15	0	66	0	0	0	0	0	15	0	20	0	35
8:45- 9:00 AM	25	22	0	0	47	0	79	8	0	87	0	0	0	0	0	15	0	19	0	34
8:00- 9:00 AM	98	119	0	0	217	0	263	42	0	305	0	0	0	0	0	57	1	63	0	121
4:00- 4:15 PM	68	72	0	0	140	0	78	24	0	102	0	0	0	0	0	33	1	45	0	79
4:15- 4:30 PM	42	70	0	0	112	0	78	26	0	104	0	0	0	0	0	24	0	36	0	60
4:30- 4:45 PM	48	67	0	0	115	0	82	27	0	109	0	0	0	0	0	41	0	29	0	70
4:45- 5:00 PM	37	68	0	0	105	0	57	25	0	82	0	0	0	0	0	28	0	37	0	65
4:00- 5:00 PM	195	277	0	0	472	0	295	102	0	397	0	0	0	0	0	126	1	147	0	274
5:00- 5:15 PM	47	71	0	0	118	0	73	21	0	94	0	0	0	0	0	22	0	36	0	58
5:15- 5:30 PM	29	68	0	0	97	0	56	18	0	74	0	0	0	0	0	20	1	40	0	61
5:30- 5:45 PM	33	64	0	0	97	0	61	18	0	79	0	0	0	0	0	22	0	34	0	56
5:45- 6:00 PM	20	41	0	0	61	0	44	3	0	47	0	0	0	0	0	14	0	26	0	40
5:00- 6:00 PM	129	244	0	0	373	0	234	60	0	294	0	0	0	0	0	78	1	136	0	215
TOTAL	618	784	0	0	1402	0	1133	334	0	1467	0	0	0	0	0	382	3	421	0	806
AM Peak Hour:																				
7:00-8:00 AM	196	144	0	0	340	0	341	130	0	471	0	0	0	0	0	121	0	75	0	196
PM Peak Hour:																				
4:00-5:00 PM	195	277	0	0	472	0	295	102	0	397	0	0	0	0	0	126	1	147	0	274
24-Hour Exp Fact	4.46					4.49					-					3.57				
Seasonal Adj Fact	0.94					0.94					0.94					0.94				
Average Daily	44.1%	55.9%	0.0%			0.0%	77.2%	22.8%			#DIV/0!	#DIV/0!	#DIV/0!			47.4%	0.4%	52.2%		
Traffic	2,585	3,279	0	0	5,865	0	4,767	1,405	0	6,172	0	0	0	0	0	1,277	10	1,407	0	2,694

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

DATE OF COUNT	Richville Dr & US-30 Offramp										Richville Dr & US-30 Offramp										Richville Dr & US-30 Offramp									
	Richville Dr					Richville Dr					US-30 Offramp					US-30 Offramp					US-30 Onramp					US-30 Onramp				
	NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB					WEST APPROACH EB					WEST APPROACH EB				
	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL
7:00- 7:15 AM	0	67	19	0	86	50	46	0	0	96	16	0	41	0	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	239
7:15- 7:30 AM	0	61	19	0	80	45	63	0	0	108	9	0	50	0	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247
7:30- 7:45 AM	0	85	26	0	111	42	83	0	0	125	11	0	67	0	78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	314
7:45- 8:00 AM	0	68	24	0	92	28	105	0	0	133	17	0	90	0	107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	332
7:00- 8:00 AM	0	281	88	0	369	165	297	0	0	462	53	0	248	0	301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1132
8:00- 8:15 AM	0	56	15	0	71	34	56	0	0	90	16	0	39	0	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	216
8:15- 8:30 AM	0	43	11	0	54	29	37	0	0	66	12	0	27	0	39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	159
8:30- 8:45 AM	0	35	17	0	52	20	50	0	0	70	9	0	36	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	167
8:45- 9:00 AM	0	40	17	0	57	37	52	0	0	89	7	0	31	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	184
8:00- 9:00 AM	0	174	60	0	234	120	195	0	0	315	44	0	133	0	177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	726
4:00- 4:15 PM	0	107	34	0	141	42	78	0	0	120	26	0	47	0	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	334
4:15- 4:30 PM	0	93	12	0	105	34	64	0	0	98	21	1	70	0	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	295
4:30- 4:45 PM	0	86	21	0	107	33	82	0	0	115	29	0	59	0	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	310
4:45- 5:00 PM	0	87	16	0	103	23	72	0	0	95	16	0	55	0	71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	269
4:00- 5:00 PM	0	373	83	0	456	132	296	0	0	428	92	1	231	0	324	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1208
5:00- 5:15 PM	0	95	18	0	113	37	61	0	0	98	18	1	47	0	66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	277
5:15- 5:30 PM	0	84	11	0	95	27	53	0	0	80	14	0	36	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	225
5:30- 5:45 PM	0	82	19	0	101	21	61	0	0	82	14	0	43	0	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	240
5:45- 6:00 PM	0	44	16	0	60	20	37	0	0	57	14	0	35	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	166
5:00- 6:00 PM	0	305	64	0	369	105	212	0	0	317	60	1	161	0	222	0	0	0	0	0	0	0	0	0	0	0	0	0	0	908
TOTAL	0	1133	295	0	1428	522	1000	0	0	1522	249	2	773	0	1024	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3974
AM Peak Hour:																														
7:00-8:00 AM	0	281	88	0	369	165	297	0	0	462	53	0	248	0	301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1132
PM Peak Hour:																														
4:00-5:00 PM	0	373	83	0	456	132	296	0	0	428	92	1	231	0	324	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1208
24-Hour Exp Fact	3.65					-					3.65					-														
Seasonal Adj Fact	0.94					0.94					0.94					0.94														
Average Daily	0.0%	79.3%	20.7%			34.3%	65.7%	0.0%	0	5,205	24.3%	0.2%	75.5%			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!										
Traffic	0	3,879	1,010	0	4,889	1,785	3,420	0	0	5,205	851	7	2,642	0	3,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13,595

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

FILE # 11046

Richville Dr & Nave St

Richville Dr & Nave St

DATE OF COUNT		Richville Dr						Richville Dr						Nave St						NA						GRAND TOTAL
		NORTH APPROACH SB						SOUTH APPROACH NB						EAST APPROACH WB						WEST APPROACH EB						
		LEFT	THRU	RIGHT	COML	TOTAL		LEFT	THRU	RIGHT	COML	TOTAL		LEFT	THRU	RIGHT	COML	TOTAL		LEFT	THRU	RIGHT	COML	TOTAL		
4/18/2022		4	48	0	0	52		0	43	19	0	62		16	0	3	0	19		0	0	0	0	0	133	
7:00- 7:15 AM		0	49	0	0	49		0	37	13	0	50		22	0	3	0	25		0	0	0	0	0	124	
7:15- 7:30 AM		4	53	0	0	57		0	48	24	0	72		25	0	3	0	28		0	0	0	0	0	157	
7:30- 7:45 AM		5	47	0	0	52		0	70	20	0	90		26	0	7	0	33		0	0	0	0	0	175	
7:45- 8:00 AM		13	197	0	0	210		0	198	76	0	274		89	0	16	0	105		0	0	0	0	0	589	
8:00- 8:15 AM		2	33	0	0	35		0	34	20	0	54		13	0	2	0	15		0	0	0	0	0	104	
8:15- 8:30 AM		3	32	0	0	35		0	36	12	0	48		20	0	0	0	20		0	0	0	0	0	103	
8:30- 8:45 AM		4	37	0	0	41		0	52	15	0	67		23	0	7	0	30		0	0	0	0	0	138	
8:45- 9:00 AM		2	38	0	0	40		0	36	11	0	47		18	0	3	0	21		0	0	0	0	0	108	
8:00- 9:00 AM		11	140	0	0	151		0	158	58	0	216		74	0	12	0	86		0	0	0	0	0	453	
4:00- 4:15 PM		4	67	0	0	71		0	63	37	0	100		31	0	6	0	37		0	0	0	0	0	208	
4:15- 4:30 PM		7	50	0	0	57		0	72	30	0	102		33	0	12	0	45		0	0	0	0	0	204	
4:30- 4:45 PM		11	77	0	0	88		0	77	35	0	112		25	0	9	0	34		0	0	0	0	0	234	
4:45- 5:00 PM		4	56	0	0	60		0	53	35	0	88		13	0	2	0	15		0	0	0	0	0	163	
4:00- 5:00 PM		26	250	0	0	276		0	265	137	0	402		102	0	29	0	131		0	0	0	0	0	809	
5:00- 5:15 PM		6	63	0	0	69		0	60	23	0	83		19	0	14	0	33		0	0	0	0	0	185	
5:15- 5:30 PM		10	68	0	0	78		0	67	25	0	92		19	0	3	0	22		0	0	0	0	0	192	
5:30- 5:45 PM		1	34	0	0	35		0	75	35	0	110		16	0	5	0	21		0	0	0	0	0	166	
5:45- 6:00 PM		3	36	0	0	39		0	50	20	0	70		14	0	4	0	18		0	0	0	0	0	127	
5:00- 6:00 PM		20	201	0	0	221		0	252	103	0	355		68	0	26	0	94		0	0	0	0	0	670	
TOTAL		70	788	0	0	858		0	873	374	0	1247		333	0	83	0	416		0	0	0	0	0	2521	
AM Peak Hour:																										
7:00-8:00 AM		13	197	0	0	210		0	198	76	0	274		89	0	16	0	105		0	0	0	0	0	589	
PM Peak Hour:																										
4:00-5:00 PM		26	250	0	0	276		0	265	137	0	402		102	0	29	0	131		0	0	0	0	0	809	
24-Hour Exp Fact		3.35					4.28						3.49					-								
Seasonal Adj Fact		0.96					0.96						0.96					0.96								
Average Daily		8.2%	91.8%	0.0%			0.0%	70.0%	30.0%				80.0%	0.0%	20.0%			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!					
Traffic		225	2,533	0	0	2,758		0	3,591	1,538	0	5,129		1,117	0	278	0	1,395		0	0	0	0	0	9,282	

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

DATE OF COUNT	Richville Dr & Business Pl										Richville Dr & Business Pl									
	Richville Dr					Richville Dr					Business Pl					Ohio State Dr				
	NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB				
	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL
7:00- 7:15 AM	1	56	5	0	62	3	46	5	0	54	1	0	0	0	1	23	0	13	0	36
7:15- 7:30 AM	2	42	3	0	47	4	44	2	0	50	0	0	0	0	0	18	0	23	0	41
7:30- 7:45 AM	1	67	3	0	71	2	33	2	0	37	0	0	1	0	1	17	0	9	0	26
7:45- 8:00 AM	5	53	3	0	61	5	57	6	0	68	1	0	0	0	1	9	0	16	0	25
7:00- 8:00 AM	9	218	14	0	241	14	180	15	0	209	2	0	1	0	3	67	0	61	0	128
8:00- 8:15 AM	4	31	5	0	40	5	31	2	0	38	2	0	1	0	3	6	0	8	0	14
8:15- 8:30 AM	0	29	1	0	30	0	50	1	0	51	2	0	1	0	3	12	0	12	0	24
8:30- 8:45 AM	2	34	0	0	36	2	34	1	0	37	3	0	0	0	3	12	0	7	0	19
8:45- 9:00 AM	1	26	4	0	31	4	38	2	0	44	0	0	1	0	1	8	0	6	0	14
8:00- 9:00 AM	7	120	10	0	137	11	153	6	0	170	7	0	3	0	10	38	0	33	0	71
4:00- 4:15 PM	1	75	10	0	86	13	51	1	0	65	0	1	2	0	3	12	0	9	0	21
4:15- 4:30 PM	1	50	11	0	62	15	65	2	0	82	2	1	1	0	4	1	0	9	0	10
4:30- 4:45 PM	1	58	20	0	79	12	61	2	0	75	7	0	6	0	13	9	0	5	0	14
4:45- 5:00 PM	1	55	15	0	71	9	55	3	0	67	3	0	1	1	4	6	0	7	0	13
4:00- 5:00 PM	4	238	56	0	298	49	232	8	0	289	12	2	10	1	24	28	0	30	0	58
5:00- 5:15 PM	0	66	22	0	88	13	49	1	0	63	3	0	5	0	8	18	0	3	0	21
5:15- 5:30 PM	1	44	11	0	56	10	46	0	0	56	2	0	3	0	5	7	0	7	0	14
5:30- 5:45 PM	0	33	9	0	42	16	53	1	0	70	1	0	1	0	2	9	0	6	0	15
5:45- 6:00 PM	0	41	7	0	48	5	40	0	0	45	0	0	0	0	0	6	0	11	0	17
5:00- 6:00 PM	1	184	49	0	234	44	188	2	0	234	6	0	9	0	15	40	0	27	0	67
TOTAL	21	760	129	0	910	118	753	31	0	902	27	2	23	1	52	173	0	151	0	324
AM Peak Hour:																				
7:00-8:00 AM	9	218	14	0	241	14	180	15	0	209	2	0	1	0	3	67	0	61	0	128
PM Peak Hour:																				
4:15-5:15 PM	3	229	68	0	300	49	230	8	0	287	15	1	13	1	29	34	0	24	0	58
24-Hour Exp Fact	3.41					3.56					2.93					2.50				
Seasonal Adj Fact	0.96					0.96					0.96					0.96				
Average Daily	2.3%	83.5%	14.2%			13.1%	83.5%	3.4%			51.9%	3.8%	44.2%			53.4%	0.0%	46.6%		
Traffic	69	2,490	423	0	2,981	404	2,575	106	0	3,085	76	6	65	3	146	415	0	362	0	777

COUNTERS:

BROWN

SCATS TURNING MOVEMENT COUNT

FILE # 11046				Richville Dr & Jackson Ave										Richville Dr & Jackson Ave										Richville Dr & Jackson Ave									
DATE OF COUNT				Richville Dr					Richville Dr					Jackson Ave					Driveway					GRAND TOTAL									
				NORTH APPROACH SB					SOUTH APPROACH NB					EAST APPROACH WB					WEST APPROACH EB														
				LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL	LEFT	THRU	RIGHT	COML	TOTAL										
4/4/2022				0	52	0	0	52	0	47	22	1	69	9	0	0	0	9	0	1	0	0	1	131									
7:00- 7:15 AM				0	36	0	0	36	0	42	21	0	63	10	0	0	0	10	1	0	0	0	1	110									
7:15- 7:30 AM				0	65	0	0	65	0	39	13	0	52	6	0	0	0	6	0	0	0	0	0	123									
7:30- 7:45 AM				0	52	0	0	52	0	64	6	0	70	9	0	0	0	9	0	1	0	0	1	132									
7:45- 8:00 AM				0	205	0	0	205	0	192	62	1	254	34	0	0	0	34	1	2	0	0	3	496									
7:00- 8:00 AM				2	29	0	0	31	0	33	5	0	38	11	0	0	0	11	0	0	0	0	0	80									
8:00- 8:15 AM				0	23	0	0	23	0	53	8	0	61	9	0	0	0	9	0	0	0	0	0	93									
8:15- 8:30 AM				0	33	0	0	33	0	34	11	0	45	4	0	0	0	4	1	0	1	0	2	84									
8:30- 8:45 AM				1	28	0	0	29	0	36	12	0	48	2	0	0	0	2	0	0	0	0	0	79									
8:45- 9:00 AM				3	113	0	0	116	0	156	36	0	192	26	0	0	0	26	1	0	1	0	2	336									
8:00- 9:00 AM				1	68	0	0	69	0	48	14	0	62	17	0	0	0	17	0	0	0	0	0	148									
4:00- 4:15 PM				0	51	0	0	51	0	68	4	0	72	11	0	1	0	12	0	0	0	0	0	135									
4:15- 4:30 PM				1	62	0	0	63	1	63	16	0	80	17	1	3	0	21	0	0	0	0	0	164									
4:30- 4:45 PM				3	60	0	0	63	0	55	10	0	65	10	0	0	0	10	0	0	0	0	0	138									
4:45- 5:00 PM				5	241	0	0	246	1	234	44	0	279	55	1	4	0	60	0	0	0	0	0	585									
4:00- 5:00 PM				2	71	0	0	73	0	59	14	0	73	17	0	0	0	17	0	0	0	0	0	163									
5:00- 5:15 PM				0	47	0	0	47	1	49	8	0	58	11	0	1	0	12	0	0	0	0	0	117									
5:15- 5:30 PM				0	33	1	0	34	0	48	17	0	65	8	0	1	0	9	1	0	0	0	1	109									
5:30- 5:45 PM				0	45	0	0	45	0	35	10	0	45	4	0	0	0	4	0	0	0	0	0	94									
5:45- 6:00 PM				2	196	1	0	199	1	191	49	0	241	40	0	2	0	42	1	0	0	0	1	483									
5:00- 6:00 PM				10	755	1	0	766	2	773	191	1	966	155	1	6	0	162	3	2	1	0	6	1900									
TOTAL																																	
AM Peak Hour:																																	
7:00-8:00 AM				0	205	0	0	205	0	192	62	1	254	34	0	0	0	34	1	2	0	0	3	496									
PM Peak Hour:																																	
4:15-5:15 PM				6	244	0	0	250	1	245	44	0	290	55	1	4	0	60	0	0	0	0	0	600									
24-Hour Exp Fact				3.43					3.54					3.29				-															
Seasonal Adj Fact				0.96					0.96					0.96				0.96															
Average Daily				1.3%	98.6%	0.1%			0.2%	80.0%	19.8%			95.7%	0.6%	3.7%		50.0%	33.3%	16.7%													
Traffic				33	2,489	3	0	2,526	7	2,625	649	3	3,281	489	3	19	0	511	8	5	3	0	15	6,332									

COUNTERS:

BROWN

VEHICULAR TRAFFIC COUNT SUMMARY

Municipality: _____		Massillon		At Intersection of: _____ and _____		Richville Drive _____ and _____		Southway Street _____	
Date: 7/14/2022	Day: Thu.	Comments: _____		Project: 21-122		Richville Dr & Southway St 07/14/22			
Weather: Clear	Recorder(s): JMC	Data entry by: JLO		Date entered: Jul. 15, 2022					

TIME BEGINS	Richville Dr. FROM NORTH					Richville Dr. FROM SOUTH					TOTAL NORTH SOUTH					FROM EAST					FROM WEST					TOTAL EAST WEST		TOTAL ALL DIREC.		PEAK HOUR FACTOR			
	Left	Thru	Right	Total	Bus	Left	Thru	Right	Total	Bus	Left	Thru	Right	Total	Bus	Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus	West	East	North	South	East	West
06:00																																	
07:00	118	141	0	259	10	0	0	149	9	158	9	1	417	3	0	66	69	12	0									69	0.841	0.693	0.750	0.000	
08:00	137	152	0	289	3	0	0	163	5	168	4	0	457	11	0	93	104	8	0									104	0.708	0.955	0.765	0.000	
09:00	90	115	0	205	9	1	0	129	11	140	15	0	345	14	0	84	98	14	0									98	0.840	0.745	0.942	0.000	
10:00																																	
11:00	78	130	0	208	9	0	0	122	8	130	7	0	338	8	0	97	105	10	0									105	0.912	0.878	0.938	0.000	
12:00	97	144	0	241	10	0	0	151	9	160	7	0	401	19	0	110	129	14	0									129	0.763	0.889	0.849	0.000	
1:00	105	155	0	260	22	2	0	160	16	176	6	0	436	13	0	87	100	7	0									100	0.867	0.863	0.781	0.000	
2:00																																	
3:00	129	237	0	366	23	0	0	186	11	197	10	0	563	33	0	166	199	21	0									199	0.863	0.714	0.711	0.000	
4:00	110	222	0	332	10	2	0	237	16	253	9	1	585	16	0	179	195	14	0									195	0.814	0.735	0.871	0.000	
5:00	126	203	0	329	7	1	0	232	17	249	5	3	578	11	0	133	144	9	1									144	0.715	0.830	0.857	0.000	
6:00																																	
7:00																																	
8:00																																	
9:00																																	
TOTALS	990	1499	0	2489	103	6	0	1529	102	1631	72	5	4120	128	0	1015	1143	109	1									1143	5263				
ADT	1356	2054	0	3410	4.4%	0	2095	140	2235	4.7%	5645	175	0	1391	1566	9.6%												1566	7211				

N Log Hourly Factor: 1.57

S Log Hourly Factor: 1.57

N Log Monthly Factor: 0.87

S Log Monthly Factor: 0.87

E Log Hourly Factor: 1.57

W Log Hourly Factor: 0.00

E Log Monthly Factor: 0.87

W Log Monthly Factor: 0.00

N Log Combined Factor: 1.37

S Log Combined Factor: 1.37

E Log Combined Factor: 1.37

W Log Combined Factor: 1.37

Figure #:

Page #:

TMS ENGINEERS, INC.

2112 Case Parkway South #7
Twinsburg, Ohio 44087
(330) 686-6402 FAX: (330) 686-6417

	RICHVILLE DRIVE From North						SOUTHWAY STREET From East						RICHVILLE DRIVE From South						Groups Printed- Cars - Trucks - Buses From West					
Start Time	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	33	21	0	54		9	0	0	0	9		4	26	0	0	30		0	0	0	0	0	93
07:15 AM	0	25	29	0	54		14	0	0	0	14		1	35	0	0	36		0	0	0	0	0	104
07:30 AM	0	49	28	0	77		22	0	1	0	23		1	34	0	0	35		0	0	0	0	0	135
07:45 AM	0	34	40	0	74		21	0	2	0	23		3	54	0	0	57		0	0	0	0	0	154
Total	0	141	118	0	259		66	0	3	0	69		9	149	0	0	158		0	0	0	0	0	486
08:00 AM	0	30	25	0	55		30	0	2	0	32		2	42	0	0	44		0	0	0	0	0	131
08:15 AM	0	25	29	0	54		15	0	1	0	16		1	39	0	0	40		0	0	0	0	0	110
08:30 AM	0	42	36	0	78		22	0	0	0	22		2	39	0	0	41		0	0	0	0	0	141
08:45 AM	0	55	47	0	102		26	0	8	1	35		0	43	0	0	43		0	0	0	0	0	180
Total	0	152	137	0	289		93	0	11	1	105		5	163	0	0	168		0	0	0	0	0	562
09:00 AM	0	29	21	0	50		23	0	3	0	26		6	22	0	0	28		0	0	0	0	0	104
09:15 AM	0	27	34	0	61		23	0	1	0	24		0	29	0	0	29		0	0	0	0	0	114
09:30 AM	0	23	18	0	41		19	0	6	0	25		3	33	0	0	36		0	0	0	0	0	102
09:45 AM	0	36	17	0	53		19	0	4	0	23		2	45	0	0	47		0	0	0	0	0	123
Total	0	115	90	0	205		84	0	14	0	98		11	129	0	0	140		0	0	0	0	0	443
10:00 AM	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0
10:15 AM	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0
10:30 AM	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0

TMS Engineers, Inc.

2112 Case Parkway South #7
Twinsburg, Ohio 44087

Transportation Management Services

City: Massilon
Intersection: Richville Dr & Southway St
Counter: JMC
Day of the Week: Thursday

File Name : southway richville 71422 jmc massillon
Site Code : 00000000
Start Date : 7/14/2022
Page No : 2

Groups Printed: Cars - Trucks - Buses

Start Time	RICHVILLE DRIVE From North						SOUTHWAY STREET From East						RICHVILLE DRIVE From South						From West			
	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Thru	Left	Peds	App. Total
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00 AM	0	26	21	0	47		25	0	2	0	27		4	25	0	0	29		0	0	0	0
11:15 AM	0	34	17	0	51		23	0	3	0	26		1	31	0	0	32		0	0	0	0
11:30 AM	0	43	14	0	57		27	0	1	0	28		1	31	0	0	32		0	0	0	0
11:45 AM	0	27	26	0	53		22	0	2	0	24		2	35	0	0	37		0	0	0	0
Total	0	130	78	0	208		97	0	8	0	105		8	122	0	0	130		0	0	0	0
12:00 PM	0	20	17	0	37		29	0	3	0	32		1	27	0	0	28		0	0	0	0
12:15 PM	0	43	19	0	62		33	0	5	0	38		1	43	0	0	44		0	0	0	0
12:30 PM	0	37	26	0	63		24	0	5	0	29		2	41	0	0	43		0	0	0	0
12:45 PM	0	44	35	0	79		24	0	6	0	30		5	40	0	0	45		0	0	0	0
Total	0	144	97	0	241		110	0	19	0	129		9	151	0	0	160		0	0	0	0
01:00 PM	0	42	27	0	69		19	0	2	0	21		2	38	0	0	40		0	0	0	0
01:15 PM	0	26	26	0	52		19	0	8	0	27		5	36	0	0	41		0	0	0	0
01:30 PM	0	42	33	0	75		17	0	3	0	20		6	45	0	0	51		0	0	0	0
01:45 PM	0	45	19	0	64		32	0	0	0	32		3	41	0	0	44		0	0	0	0
Total	0	155	105	0	260		87	0	13	0	100		16	160	0	0	176		0	0	0	0
02:00 PM	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0
02:15 PM	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0

TMS Engineers, Inc.

2112 Case Parkway South #7
Twinsburg, Ohio 44087

Transportation Management Services

City: Massilon
Intersection: Richville Dr & Southway St
Counter: JMC
Day of the Week: Thursday

File Name : southway richville 71422 jmc massillon
Site Code : 00000000
Start Date : 7/14/2022
Page No : 3

Groups Printed: Cars - Trucks - Buses

	RICHVILLE DRIVE From North						SOUTHWAY STREET From East						RICHVILLE DRIVE From South						From West					
Start Time	Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total		Right	Thru	Left	Peds	App. Total	Int. Total
02:30 PM	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0
02:45 PM	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0
Total	0	0	0	0	0		0	0	0	0	0		0	0	0	0	0	0		0	0	0	0	0
03:00 PM	0	58	32	0	90		38	0	4	0	42		2	36	0	0	38		0	0	0	0	0	170
03:15 PM	0	65	41	0	106		58	0	12	0	70		4	65	0	0	69		0	0	0	0	0	245
03:30 PM	0	55	18	0	73		40	0	9	0	49		3	39	0	0	42		0	0	0	0	0	164
03:45 PM	0	59	38	0	97		30	0	8	0	38		2	46	0	0	48		0	0	0	0	0	183
Total	0	237	129	0	366		166	0	33	0	199		11	186	0	0	197		0	0	0	0	0	762
04:00 PM	0	37	32	0	69		50	0	6	0	56		7	44	0	0	51		0	0	0	0	0	176
04:15 PM	0	55	32	0	87		43	0	4	0	47		4	51	0	0	55		0	0	0	0	0	189
04:30 PM	0	80	22	0	102		40	0	5	0	45		3	58	0	0	61		0	0	0	0	0	208
04:45 PM	0	50	24	0	74		46	0	1	0	47		2	84	0	0	86		0	0	0	0	0	207
Total	0	222	110	0	332		179	0	16	0	195		16	237	0	0	253		0	0	0	0	0	780
05:00 PM	0	77	38	0	115		25	0	3	0	28		2	50	0	0	52		0	0	0	0	0	195
05:15 PM	0	41	26	0	67		39	0	3	0	42		7	52	0	0	59		0	0	0	0	0	168
05:30 PM	0	47	29	0	76		40	0	1	0	41		6	69	0	0	75		0	0	0	0	0	192
05:45 PM	0	38	33	0	71		29	0	4	0	33		2	61	0	0	63		0	0	0	0	0	167
Total	0	203	126	0	329		133	0	11	0	144		17	232	0	0	249		0	0	0	0	0	722
Grand Total	0	1499	990	0	2489		1015	0	128	1	1144		102	1529	0	0	1631		0	0	0	0	0	5264
Approch %	0	60.2	39.8	0			88.7	0	11.2	0.1			6.3	93.7	0	0			0	0	0	0		
Total %	0	28.5	18.8	0	47.3		19.3	0	2.4	0	21.7		1.9	29	0	0	31		0	0	0	0	0	
Cars	0	1446	934	0	2380		962	0	71	1	1034		71	1483	0	0	1554		0	0	0	0	0	4968
% Cars	0	96.5	94.3	0	95.6		94.8	0	55.5	100	90.4		69.6	97	0	0	95.3		0	0	0	0	0	94.4

Appendix D

Crash Data Summaries

(1) North Main Street (US62/SR21) & Wooster Street NE

Crash Summary Sheet

Fatalities	0
Serious Injuries	1
Other Injuries	5

Crash Severity	Crashes	%
(2) Serious Injury Suspected	1	5.26%
(3) Minor Injury Suspected	3	15.79%
(4) Injury Possible	1	5.26%
(5) PDO/No Injury	14	73.68%
Grand Total	19	100.00%

Day of Week	Crashes	%
(1) Sunday	3	15.79%
(2) Monday	3	15.79%
(3) Tuesday	2	10.53%
(4) Wednesday	2	10.53%
(5) Thursday	4	21.05%
(6) Friday	1	5.26%
(7) Saturday	4	21.05%
Grand Total	19	100.00%

Hour of Day	Crashes	%
11	1	5.26%
12	2	10.53%
13	6	31.58%
14	2	10.53%
17	4	21.05%
18	2	10.53%
19	2	10.53%
Grand Total	19	100.00%

Crashes Per Year	4.75
Fatal and All Injury Crashes	5
Percent Injury	26.3%
Equivalent PDO Index Value	4.38

Year	Crashes	%
2019	5	26.32%
2020	6	31.58%
2021	6	31.58%
2022	2	10.53%
Grand Total	19	100.00%

Crash Type	Crashes	%
Angle	3	15.79%
Backing	2	10.53%
Fixed Object	1	5.26%
Left Turn	1	5.26%
Rear End	11	57.89%
Unknown	1	5.26%
Grand Total	19	100.00%

Month	Crashes	%
1	2	10.53%
2	2	10.53%
3	1	5.26%
5	2	10.53%
7	1	5.26%
8	3	15.79%
9	1	5.26%
10	3	15.79%
11	1	5.26%
12	3	15.79%
Grand Total	19	100.00%

(1) North Main Street (US62/SR21) & Wooster Street NE

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	9	47.37%
Cloudy	7	36.84%
Snow	2	10.53%
Rain	1	5.26%
Grand Total	19	100.00%

Road Condition	Crashes	%
Dry	14	73.68%
Wet	3	15.79%
Snow	2	10.53%
Grand Total	19	100.00%

Light Condition	Crashes	%
Daylight	15	78.95%
Dark - Lighted Roadway	3	15.79%
Dawn/Dusk	1	5.26%
Grand Total	19	100.00%

Number of Units	Crashes	%
2	16	84.21%
1	2	10.53%
3	1	5.26%
Grand Total	19	100.00%

ODOT Location	Crashes	%
Four-Way Intersection	12	63.16%
Not An Intersection	6	31.58%
Data Not Valid or Not Provided	1	5.26%
Grand Total	19	100.00%

Work Zone Related	Crashes	%
No	19	100.00%
Grand Total	19	100.00%

Alcohol Related	Crashes	%
No	18	94.74%
Yes	1	5.26%
Grand Total	19	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	19	100.00%
Grand Total	19	100.00%

Contour	Crashes	%
Straight Grade	3	15.79%
Straight Level	16	84.21%
Grand Total	19	100.00%

Marijuana Related	Crashes	%
No	19	100.00%
Grand Total	19	100.00%

Roadway Departure	Crashes	%
No	18	94.74%
Yes	1	5.26%
Grand Total	19	100.00%

Older Driver (65+)	Crashes	%
No	11	57.89%
Yes	8	42.11%
Grand Total	19	100.00%

Intersection Related	Crashes	%
Yes	19	100.00%
Grand Total	19	100.00%

Young Driver (15-25)	Crashes	%
No	14	73.68%
Yes	5	26.32%
Grand Total	19	100.00%

Speed Related	Crashes	%
No	19	100.00%
Grand Total	19	100.00%

Motorcycle Involved	Crashes	%
No	18	94.74%
Yes	1	5.26%
Grand Total	19	100.00%

(1) North Main Street (US62/SR21) & Wooster Street NE

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	12	63.16%
Making Right Turn	2	10.53%
Backing	2	10.53%
Making Left Turn	2	10.53%
Leaving Traffic Lane	1	5.26%
Grand Total	19	100.00%

Unit 1 Contributing Factor	Crashes	%
Following Too Closely/ACDA	10	52.63%
Improper Turn	3	15.79%
Improper Backing	2	10.53%
Other Improper Action	1	5.26%
Ran Red Light	1	5.26%
Failure to Yield	1	5.26%
None	1	5.26%
Grand Total	19	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	18	94.74%
Traffic Sign Post	1	5.26%
Grand Total	19	100.00%

Unit 1 Traffic Control	Crashes	%
Signal	18	94.74%
No Control	1	5.26%
Grand Total	19	100.00%

Unit 1 Posted Speed	Crashes	%
0	1	5.26%
25	4	21.05%
35	14	73.68%
Grand Total	19	100.00%

Unit 1 Direction From	Crashes	%
North	13	68.42%
South	4	21.05%
West	1	5.26%
East	1	5.26%
Grand Total	19	100.00%

Unit 1 Direction To	Crashes	%
South	9	47.37%
North	4	21.05%
West	3	15.79%
Southeast	1	5.26%
East	1	5.26%
Northeast	1	5.26%
Grand Total	19	100.00%

(1) North Main Street (US62/SR21) & Wooster Street NE

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	7	36.84%
Sport Utility Vehicle	5	26.32%
Pick up	4	21.05%
Single Unit Truck	1	5.26%
Other Vehicle	1	5.26%
Passenger Van (minivan)	1	5.26%
Grand Total	19	100.00%

Unit 1 Special Function	Crashes	%
None	16	84.21%
Farm	1	5.26%
Towing	1	5.26%
Other / Unknown	1	5.26%
Grand Total	19	100.00%

(1) North Main Street (US62/SR21) & Wooster Street NE

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Slowing or Stopped In Traffic	12	63.16%
Straight Ahead	3	15.79%
	2	10.53%
Making Left Turn	2	10.53%
Grand Total	19	100.00%

Unit 2 Contributing Factor	Crashes	%
None	17	89.47%
	2	10.53%
Grand Total	19	100.00%

Unit 2 Direction From	Crashes	%
	2	10.53%
East	2	10.53%
North	10	52.63%
South	4	21.05%
West	1	5.26%
Grand Total	19	100.00%

Unit 2 Direction To	Crashes	%
	2	10.53%
East	1	5.26%
North	3	15.79%
South	11	57.89%
West	2	10.53%
Grand Total	19	100.00%

Unit 2 Type	Crashes	%
Sport Utility Vehicle	7	36.84%
Passenger Car	6	31.58%
	2	10.53%
Motorcycle 2 Wheeled	1	5.26%
Semi-Tractor	1	5.26%
Pick up	1	5.26%
Passenger Van (minivan)	1	5.26%
Grand Total	19	100.00%

Unit 2 Special Function	Crashes	%
None	15	78.95%
Other / Unknown	2	10.53%
	2	10.53%
Grand Total	19	100.00%

(2) Kemary Avenue SW Fohl Street SW

Crash Summary Sheet

Fatalities	0
Serious Injuries	3
Other Injuries	7

Crash Severity	Crashes	%
(2) Serious Injury Suspected	2	33.33%
(3) Minor Injury Suspected	3	50.00%
(4) Injury Possible	1	16.67%
Grand Total	6	100.00%

Day of Week	Crashes	%
(1) Sunday	1	16.67%
(2) Monday	2	33.33%
(6) Friday	1	16.67%
(7) Saturday	2	33.33%
Grand Total	6	100.00%

Hour of Day	Crashes	%
7	1	16.67%
12	1	16.67%
14	2	33.33%
16	1	16.67%
17	1	16.67%
Grand Total	6	100.00%

Crashes Per Year	1.50
Fatal and All Injury Crashes	6
Percent Injury	100.0%
Equivalent PDO Index Value	19.09

Year	Crashes	%
2019	2	33.33%
2020	2	33.33%
2021	1	16.67%
2022	1	16.67%
Grand Total	6	100.00%

Crash Type	Crashes	%
Angle	5	83.33%
Left Turn	1	16.67%
Grand Total	6	100.00%

Month	Crashes	%
3	1	16.67%
4	1	16.67%
8	1	16.67%
9	2	33.33%
10	1	16.67%
Grand Total	6	100.00%

(2) Kemary Avenue SW Fohl Street SW

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	2	33.33%
Rain	2	33.33%
Cloudy	2	33.33%
Grand Total	6	100.00%

Light Condition	Crashes	%
Daylight	6	100.00%
Grand Total	6	100.00%

ODOT Location	Crashes	%
Four-Way Intersection	6	100.00%
Grand Total	6	100.00%

Contour	Crashes	%
Straight Level	6	100.00%
Grand Total	6	100.00%

Roadway Departure	Crashes	%
No	5	83.33%
Yes	1	16.67%
Grand Total	6	100.00%

Intersection Related	Crashes	%
Yes	6	100.00%
Grand Total	6	100.00%

Speed Related	Crashes	%
No	5	83.33%
Yes	1	16.67%
Grand Total	6	100.00%

Road Condition	Crashes	%
Wet	3	50.00%
Dry	3	50.00%
Grand Total	6	100.00%

Number of Units	Crashes	%
2	6	100.00%
Grand Total	6	100.00%

Work Zone Related	Crashes	%
No	6	100.00%
Grand Total	6	100.00%

Alcohol Related	Crashes	%
No	6	100.00%
Grand Total	6	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	5	83.33%
Yes	1	16.67%
Grand Total	6	100.00%

Marijuana Related	Crashes	%
No	5	83.33%
Yes	1	16.67%
Grand Total	6	100.00%

Older Driver (65+)	Crashes	%
No	4	66.67%
Yes	2	33.33%
Grand Total	6	100.00%

Young Driver (15-25)	Crashes	%
No	3	50.00%
Yes	3	50.00%
Grand Total	6	100.00%

Motorcycle Involved	Crashes	%
No	5	83.33%
Yes	1	16.67%
Grand Total	6	100.00%

(2) Kemary Avenue SW Fohl Street SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	4	66.67%
Making Left Turn	1	16.67%
Slowing or Stopped In Traffic	1	16.67%
Grand Total	6	100.00%

Unit 1 Contributing Factor	Crashes	%
Failure to Yield	4	66.67%
Ran Stop Sign	1	16.67%
Improper Turn	1	16.67%
Grand Total	6	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	4	66.67%
Utility Pole	1	16.67%
Other Fixed Object	1	16.67%
Grand Total	6	100.00%

Unit 1 Traffic Control	Crashes	%
Stop Sign	5	83.33%
Flasher	1	16.67%
Grand Total	6	100.00%

Unit 1 Posted Speed	Crashes	%
45	6	100.00%
Grand Total	6	100.00%

Unit 1 Direction From	Crashes	%
North	3	50.00%
South	2	33.33%
West	1	16.67%
Grand Total	6	100.00%

Unit 1 Direction To	Crashes	%
South	3	50.00%
North	3	50.00%
Grand Total	6	100.00%

(2) Kemary Avenue SW Fohl Street SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	3	50.00%
Cargo Van	1	16.67%
Sport Utility Vehicle	1	16.67%
Pick up	1	16.67%
Grand Total	6	100.00%

Unit 1 Special Function	Crashes	%
None	6	100.00%
Grand Total	6	100.00%

(2) Kemary Avenue SW Fohl Street SW
Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Straight Ahead	6	100.00%
Grand Total	6	100.00%

Unit 2 Contributing Factor	Crashes	%
None	6	100.00%
Grand Total	6	100.00%

Unit 2 Direction From	Crashes	%
East	5	83.33%
West	1	16.67%
Grand Total	6	100.00%

Unit 2 Direction To	Crashes	%
East	1	16.67%
West	5	83.33%
Grand Total	6	100.00%

Unit 2 Type	Crashes	%
Pick up	2	33.33%
Motorcycle 2 Wheeled	1	16.67%
Sport Utility Vehicle	1	16.67%
Passenger Car	1	16.67%
Passenger Van (minivan)	1	16.67%
Grand Total	6	100.00%

Unit 2 Special Function	Crashes	%
None	6	100.00%
Grand Total	6	100.00%

(3) Erie Street S (US62/SR21) & Navarre Road SW

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	21

Crash Severity	Crashes	%
(3) Minor Injury Suspected	4	10.26%
(4) Injury Possible	10	25.64%
(5) PDO/No Injury	25	64.10%
Grand Total	39	100.00%

Day of Week	Crashes	%
(1) Sunday	1	2.56%
(2) Monday	4	10.26%
(3) Tuesday	6	15.38%
(4) Wednesday	10	25.64%
(5) Thursday	4	10.26%
(6) Friday	10	25.64%
(7) Saturday	4	10.26%
Grand Total	39	100.00%

Hour of Day	Crashes	%
0	1	2.56%
5	1	2.56%
6	2	5.13%
7	2	5.13%
8	1	2.56%
10	2	5.13%
11	2	5.13%
12	2	5.13%
13	3	7.69%
14	4	10.26%
15	7	17.95%
16	6	15.38%
17	3	7.69%
18	2	5.13%
19	1	2.56%
Grand Total	39	100.00%

Crashes Per Year	9.75
Fatal and All Injury Crashes	14
Percent Injury	35.9%
Equivalent PDO Index Value	2.45

Year	Crashes	%
2019	12	30.77%
2020	8	20.51%
2021	13	33.33%
2022	6	15.38%
Grand Total	39	100.00%

Crash Type	Crashes	%
Rear End	14	35.90%
Left Turn	11	28.21%
Angle	4	10.26%
Sideswipe - Passing	3	7.69%
Right Turn	2	5.13%
Backing	2	5.13%
Head On	2	5.13%
Fixed Object	1	2.56%
Grand Total	39	100.00%

Month	Crashes	%
1	3	7.69%
2	5	12.82%
3	6	15.38%
4	3	7.69%
5	7	17.95%
6	4	10.26%
7	2	5.13%
8	1	2.56%
10	4	10.26%
11	2	5.13%
12	2	5.13%
Grand Total	39	100.00%

(3) Erie Street S (US62/SR21) & Navarre Road SW

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	21	53.85%
Cloudy	12	30.77%
Rain	5	12.82%
Snow	1	2.56%
Grand Total	39	100.00%

Road Condition	Crashes	%
Dry	30	76.92%
Wet	8	20.51%
Snow	1	2.56%
Grand Total	39	100.00%

Light Condition	Crashes	%
Daylight	32	82.05%
Dark - Lighted Roadway	3	7.69%
Dark - Roadway Not Lighted	2	5.13%
Dawn/Dusk	1	2.56%
Dark - Unknown Roadway Lighting	1	2.56%
Grand Total	39	100.00%

Number of Units	Crashes	%
2	33	84.62%
3	5	12.82%
1	1	2.56%
Grand Total	39	100.00%

ODOT Location	Crashes	%
Four-Way Intersection	26	66.67%
Not An Intersection	6	15.38%
5 Or More Point Intersection	2	5.13%
Data Not Valid or Not Provided	2	5.13%
Driveway/Alley Access	2	5.13%
T-Intersection	1	2.56%
Grand Total	39	100.00%

Work Zone Related	Crashes	%
No	38	97.44%
Yes	1	2.56%
Grand Total	39	100.00%

Alcohol Related	Crashes	%
No	39	100.00%
Grand Total	39	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	39	100.00%
Grand Total	39	100.00%

Contour	Crashes	%
Straight Grade	5	12.82%
Straight Level	34	87.18%
Grand Total	39	100.00%

Marijuana Related	Crashes	%
No	39	100.00%
Grand Total	39	100.00%

Roadway Departure	Crashes	%
No	38	97.44%
Yes	1	2.56%
Grand Total	39	100.00%

Older Driver (65+)	Crashes	%
No	27	69.23%
Yes	12	30.77%
Grand Total	39	100.00%

Intersection Related	Crashes	%
Yes	34	87.18%
No	5	12.82%
Grand Total	39	100.00%

Young Driver (15-25)	Crashes	%
No	22	56.41%
Yes	17	43.59%
Grand Total	39	100.00%

Speed Related	Crashes	%
No	36	92.31%
Yes	3	7.69%
Grand Total	39	100.00%

Motorcycle Involved	Crashes	%
No	39	100.00%
Grand Total	39	100.00%

(3) Erie Street S (US62/SR21) & Navarre Road SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	15	38.46%
Making Left Turn	13	33.33%
Changing Lanes	4	10.26%
Making Right Turn	3	7.69%
Backing	2	5.13%
Entering Traffic Lane	1	2.56%
Slowing or Stopped In Traffic	1	2.56%
Grand Total	39	100.00%

Unit 1 Contributing Factor	Crashes	%
Failure to Yield	14	35.90%
Following Too Closely/ACDA	12	30.77%
Improper Lane Change	4	10.26%
Improper Backing	2	5.13%
Improper Turn	2	5.13%
Ran Red Light	1	2.56%
Left of Center	1	2.56%
Improper Start From a Parked Position	1	2.56%
None	1	2.56%
Not Discernible	1	2.56%
Grand Total	39	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	37	94.87%
Utility Pole	1	2.56%
Ditch	1	2.56%
Grand Total	39	100.00%

Unit 1 Traffic Control	Crashes	%
Signal	27	69.23%
No Control	12	30.77%
Grand Total	39	100.00%

Unit 1 Posted Speed	Crashes	%
0	1	2.56%
35	2	5.13%
40	27	69.23%
45	8	20.51%
50	1	2.56%
Grand Total	39	100.00%

Unit 1 Direction From	Crashes	%
South	17	43.59%
North	10	25.64%
East	9	23.08%
West	3	7.69%
Grand Total	39	100.00%

Unit 1 Direction To	Crashes	%
North	14	35.90%
West	10	25.64%
East	9	23.08%
South	5	12.82%
Northwest	1	2.56%
Grand Total	39	100.00%

(3) Erie Street S (US62/SR21) & Navarre Road SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	14	35.90%
Sport Utility Vehicle	11	28.21%
Pick up	6	15.38%
Semi-Tractor	5	12.82%
Bus (16+ Passengers)	1	2.56%
Unknown or Hit/Skip	1	2.56%
Passenger Van (minivan)	1	2.56%
Grand Total	39	100.00%

Unit 1 Special Function	Crashes	%
None	34	87.18%
Other / Unknown	3	7.69%
Taxi	1	2.56%
Bus – Transit/Commuter	1	2.56%
Grand Total	39	100.00%

(3) Erie Street S (US62/SR21) & Navarre Road SW

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Straight Ahead	20	51.28%
Slowing or Stopped In Traffic	14	35.90%
Making Left Turn	3	7.69%
	1	2.56%
Making Right Turn	1	2.56%
Grand Total	39	100.00%

Unit 2 Contributing Factor	Crashes	%
None	37	94.87%
Not Discernible	1	2.56%
	1	2.56%
Grand Total	39	100.00%

Unit 2 Direction From	Crashes	%
	1	2.56%
East	5	12.82%
North	13	33.33%
South	19	48.72%
West	1	2.56%
Grand Total	39	100.00%

Unit 2 Direction To	Crashes	%
	1	2.56%
East	4	10.26%
North	19	48.72%
South	10	25.64%
West	5	12.82%
Grand Total	39	100.00%

Unit 2 Type	Crashes	%
Passenger Car	19	48.72%
Sport Utility Vehicle	8	20.51%
Pick up	6	15.38%
Semi-Tractor	3	7.69%
Cargo Van	1	2.56%
	1	2.56%
Passenger Van (minivan)	1	2.56%
Grand Total	39	100.00%

Unit 2 Special Function	Crashes	%
None	38	97.44%
	1	2.56%
Grand Total	39	100.00%

(4) Navarre Road SW & Millennium Boulevard SE

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	2

Crash Severity	Crashes	%
(3) Minor Injury Suspected	1	20.00%
(5) PDO/No Injury	4	80.00%
Grand Total	5	100.00%

Day of Week	Crashes	%
(2) Monday	1	20.00%
(4) Wednesday	2	40.00%
(5) Thursday	1	20.00%
(6) Friday	1	20.00%
Grand Total	5	100.00%

Hour of Day	Crashes	%
7	2	40.00%
12	1	20.00%
17	1	20.00%
19	1	20.00%
Grand Total	5	100.00%

Crashes Per Year	1.25
Fatal and All Injury Crashes	1
Percent Injury	20.0%
Equivalent PDO Index Value	2.11

Year	Crashes	%
2019	1	20.00%
2020	2	40.00%
2022	2	40.00%
Grand Total	5	100.00%

Crash Type	Crashes	%
Rear End	3	60.00%
Backing	1	20.00%
Head On	1	20.00%
Grand Total	5	100.00%

Month	Crashes	%
4	1	20.00%
5	1	20.00%
6	1	20.00%
7	1	20.00%
10	1	20.00%
Grand Total	5	100.00%

(4) Navarre Road SW & Millennium Boulevard SE

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	3	60.00%
Rain	1	20.00%
Cloudy	1	20.00%
Grand Total	5	100.00%

Light Condition	Crashes	%
Daylight	5	100.00%
Grand Total	5	100.00%

ODOT Location	Crashes	%
Data Not Valid or Not Provided	2	40.00%
T-Intersection	2	40.00%
Not An Intersection	1	20.00%
Grand Total	5	100.00%

Contour	Crashes	%
Straight Level	5	100.00%
Grand Total	5	100.00%

Roadway Departure	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Intersection Related	Crashes	%
Yes	5	100.00%
Grand Total	5	100.00%

Speed Related	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Road Condition	Crashes	%
Dry	3	60.00%
Wet	2	40.00%
Grand Total	5	100.00%

Number of Units	Crashes	%
2	5	100.00%
Grand Total	5	100.00%

Work Zone Related	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Alcohol Related	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Marijuana Related	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Older Driver (65+)	Crashes	%
No	4	80.00%
Yes	1	20.00%
Grand Total	5	100.00%

Young Driver (15-25)	Crashes	%
No	4	80.00%
Yes	1	20.00%
Grand Total	5	100.00%

Motorcycle Involved	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

(4) Navarre Road SW & Millennium Boulevard SE

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	3	60.00%
Backing	1	20.00%
Making Left Turn	1	20.00%
Grand Total	5	100.00%

Unit 1 Contributing Factor	Crashes	%
Following Too Closely/ACDA	2	40.00%
None	1	20.00%
Failure to Yield	1	20.00%
Improper Backing	1	20.00%
Grand Total	5	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	5	100.00%
Grand Total	5	100.00%

Unit 1 Traffic Control	Crashes	%
Stop Sign	5	100.00%
Grand Total	5	100.00%

Unit 1 Posted Speed	Crashes	%
25	4	80.00%
35	1	20.00%
Grand Total	5	100.00%

Unit 1 Direction From	Crashes	%
North	4	80.00%
South	1	20.00%
Grand Total	5	100.00%

Unit 1 Direction To	Crashes	%
South	3	60.00%
East	1	20.00%
North	1	20.00%
Grand Total	5	100.00%

(4) Navarre Road SW & Millennium Boulevard SE

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	2	40.00%
Semi-Tractor	1	20.00%
Sport Utility Vehicle	1	20.00%
Pick up	1	20.00%
Grand Total	5	100.00%

Unit 1 Special Function	Crashes	%
None	5	100.00%
Grand Total	5	100.00%

(4) Navarre Road SW & Millennium Boulevard SE

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Slowing or Stopped In Traffic	4	80.00%
Straight Ahead	1	20.00%
Grand Total	5	100.00%

Unit 2 Contributing Factor	Crashes	%
None	5	100.00%
Grand Total	5	100.00%

Unit 2 Direction From	Crashes	%
East	1	20.00%
North	4	80.00%
Grand Total	5	100.00%

Unit 2 Direction To	Crashes	%
South	4	80.00%
West	1	20.00%
Grand Total	5	100.00%

Unit 2 Type	Crashes	%
Passenger Car	3	60.00%
Sport Utility Vehicle	1	20.00%
Semi-Tractor	1	20.00%
Grand Total	5	100.00%

Unit 2 Special Function	Crashes	%
None	5	100.00%
Grand Total	5	100.00%

(6) Navarre Road SW & Sterilite Street SE

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	0

Crash Severity	Crashes	%
(5) PDO/No Injury	3	100.00%
Grand Total	3	100.00%

Day of Week	Crashes	%
(1) Sunday	1	33.33%
(2) Monday	1	33.33%
(3) Tuesday	1	33.33%
Grand Total	3	100.00%

Hour of Day	Crashes	%
15	1	33.33%
18	1	33.33%
21	1	33.33%
Grand Total	3	100.00%

Crashes Per Year	1.50
Fatal and All Injury Crashes	0
Percent Injury	0.0%
Equivalent PDO Index Value	1.00

Year	Crashes	%
2020	2	66.67%
2021	1	33.33%
Grand Total	3	100.00%

Crash Type	Crashes	%
Angle	1	33.33%
Other Non-Collision	1	33.33%
Fixed Object	1	33.33%
Grand Total	3	100.00%

Month	Crashes	%
2	1	33.33%
5	1	33.33%
12	1	33.33%
Grand Total	3	100.00%

(6) Navarre Road SW & Sterilite Street SE

Crash Summary Sheet

Weather Condition	Crashes	%
Cloudy	2	66.67%
Clear	1	33.33%
Grand Total	3	100.00%

Light Condition	Crashes	%
Dark - Roadway Not Lighted	1	33.33%
Daylight	1	33.33%
Dawn/Dusk	1	33.33%
Grand Total	3	100.00%

ODOT Location	Crashes	%
T-Intersection	2	66.67%
Not An Intersection	1	33.33%
Grand Total	3	100.00%

Contour	Crashes	%
Straight Level	3	100.00%
Grand Total	3	100.00%

Roadway Departure	Crashes	%
No	1	33.33%
Yes	2	66.67%
Grand Total	3	100.00%

Intersection Related	Crashes	%
Yes	2	66.67%
No	1	33.33%
Grand Total	3	100.00%

Speed Related	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Road Condition	Crashes	%
Wet	3	100.00%
Grand Total	3	100.00%

Number of Units	Crashes	%
1	2	66.67%
2	1	33.33%
Grand Total	3	100.00%

Work Zone Related	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Alcohol Related	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Marijuana Related	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Older Driver (65+)	Crashes	%
No	2	66.67%
Yes	1	33.33%
Grand Total	3	100.00%

Young Driver (15-25)	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Motorcycle Involved	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

(6) Navarre Road SW & Sterilite Street SE

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Making Right Turn	2	66.67%
Straight Ahead	1	33.33%
Grand Total	3	100.00%

Unit 1 Contributing Factor	Crashes	%
Other Improper Action	2	66.67%
Drove off Road	1	33.33%
Grand Total	3	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	2	66.67%
Utility Pole	1	33.33%
Grand Total	3	100.00%

Unit 1 Traffic Control	Crashes	%
No Control	3	100.00%
Grand Total	3	100.00%

Unit 1 Posted Speed	Crashes	%
0	1	33.33%
45	1	33.33%
55	1	33.33%
Grand Total	3	100.00%

Unit 1 Direction From	Crashes	%
West	3	100.00%
Grand Total	3	100.00%

Unit 1 Direction To	Crashes	%
South	2	66.67%
East	1	33.33%
Grand Total	3	100.00%

(6) Navarre Road SW & Sterilite Street SE

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	1	33.33%
Sport Utility Vehicle	1	33.33%
Semi-Tractor	1	33.33%
Grand Total	3	100.00%

Unit 1 Special Function	Crashes	%
None	3	100.00%
Grand Total	3	100.00%

(6) Navarre Road SW & Sterilite Street SE
Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
	2	66.67%
Making Left Turn	1	33.33%
Grand Total	3	100.00%

Unit 2 Contributing Factor	Crashes	%
	2	66.67%
None	1	33.33%
Grand Total	3	100.00%

Unit 2 Direction From	Crashes	%
	2	66.67%
South	1	33.33%
Grand Total	3	100.00%

Unit 2 Direction To	Crashes	%
	2	66.67%
West	1	33.33%
Grand Total	3	100.00%

Unit 2 Type	Crashes	%
	2	66.67%
Semi-Tractor	1	33.33%
Grand Total	3	100.00%

Unit 2 Special Function	Crashes	%
	2	66.67%
Other / Unknown	1	33.33%
Grand Total	3	100.00%

(7) Navarre Road SW & Stump Avenue SW/Bosford Street SW

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	4

Crash Severity	Crashes	%
(3) Minor Injury Suspected	1	6.25%
(4) Injury Possible	2	12.50%
(5) PDO/No Injury	13	81.25%
Grand Total	16	100.00%

Day of Week	Crashes	%
(1) Sunday	4	25.00%
(3) Tuesday	2	12.50%
(4) Wednesday	5	31.25%
(5) Thursday	4	25.00%
(6) Friday	1	6.25%
Grand Total	16	100.00%

Hour of Day	Crashes	%
5	1	6.25%
6	1	6.25%
7	1	6.25%
9	2	12.50%
10	1	6.25%
11	2	12.50%
14	2	12.50%
15	2	12.50%
17	1	6.25%
18	1	6.25%
19	1	6.25%
20	1	6.25%
Grand Total	16	100.00%

Crashes Per Year	4.00
Fatal and All Injury Crashes	3
Percent Injury	18.8%
Equivalent PDO Index Value	1.78

Year	Crashes	%
2019	5	31.25%
2020	3	18.75%
2021	4	25.00%
2022	4	25.00%
Grand Total	16	100.00%

Crash Type	Crashes	%
Angle	5	31.25%
Rear End	3	18.75%
Sideswipe - Passing	3	18.75%
Right Turn	2	12.50%
Fixed Object	2	12.50%
Left Turn	1	6.25%
Grand Total	16	100.00%

Month	Crashes	%
1	2	12.50%
3	1	6.25%
4	4	25.00%
5	1	6.25%
6	2	12.50%
8	2	12.50%
10	1	6.25%
12	3	18.75%
Grand Total	16	100.00%

(7) Navarre Road SW & Stump Avenue SW/Bosford Street SW

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	7	43.75%
Cloudy	7	43.75%
Snow	1	6.25%
Rain	1	6.25%
Grand Total	16	100.00%

Light Condition	Crashes	%
Daylight	11	68.75%
Dark - Lighted Roadway	3	18.75%
Dawn/Dusk	1	6.25%
Dark - Roadway Not Lighted	1	6.25%
Grand Total	16	100.00%

ODOT Location	Crashes	%
5 Or More Point Intersection	13	81.25%
Data Not Valid or Not Provided	2	12.50%
Four-Way Intersection	1	6.25%
Grand Total	16	100.00%

Contour	Crashes	%
Curve Level	1	6.25%
Straight Grade	6	37.50%
Straight Level	9	56.25%
Grand Total	16	100.00%

Roadway Departure	Crashes	%
No	14	87.50%
Yes	2	12.50%
Grand Total	16	100.00%

Intersection Related	Crashes	%
Yes	15	93.75%
No	1	6.25%
Grand Total	16	100.00%

Speed Related	Crashes	%
No	15	93.75%
Yes	1	6.25%
Grand Total	16	100.00%

Road Condition	Crashes	%
Dry	13	81.25%
Wet	2	12.50%
Ice	1	6.25%
Grand Total	16	100.00%

Number of Units	Crashes	%
2	14	87.50%
1	2	12.50%
Grand Total	16	100.00%

Work Zone Related	Crashes	%
No	16	100.00%
Grand Total	16	100.00%

Alcohol Related	Crashes	%
No	16	100.00%
Grand Total	16	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	16	100.00%
Grand Total	16	100.00%

Marijuana Related	Crashes	%
No	16	100.00%
Grand Total	16	100.00%

Older Driver (65+)	Crashes	%
No	8	50.00%
Yes	8	50.00%
Grand Total	16	100.00%

Young Driver (15-25)	Crashes	%
No	8	50.00%
Yes	8	50.00%
Grand Total	16	100.00%

Motorcycle Involved	Crashes	%
No	16	100.00%
Grand Total	16	100.00%

(7) Navarre Road SW & Stump Avenue SW/Bosford Street SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	11	68.75%
Making Right Turn	2	12.50%
Making Left Turn	2	12.50%
Entering Traffic Lane	1	6.25%
Grand Total	16	100.00%

Unit 1 Contributing Factor	Crashes	%
Failure to Yield	10	62.50%
Following Too Closely/ACDA	3	18.75%
Ran Stop Sign	1	6.25%
Drove off Road	1	6.25%
Other Improper Action	1	6.25%
Grand Total	16	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	14	87.50%
Ditch	2	12.50%
Grand Total	16	100.00%

Unit 1 Traffic Control	Crashes	%
Stop Sign	13	81.25%
No Control	3	18.75%
Grand Total	16	100.00%

Unit 1 Posted Speed	Crashes	%
25	2	12.50%
35	7	43.75%
40	6	37.50%
45	1	6.25%
Grand Total	16	100.00%

Unit 1 Direction From	Crashes	%
North	7	43.75%
South	5	31.25%
East	2	12.50%
Southwest	1	6.25%
Southeast	1	6.25%
Grand Total	16	100.00%

Unit 1 Direction To	Crashes	%
North	6	37.50%
South	4	25.00%
West	2	12.50%
East	2	12.50%
Southwest	1	6.25%
Southeast	1	6.25%
Grand Total	16	100.00%

(7) Navarre Road SW & Stump Avenue SW/Bosford Street SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	11	68.75%
Sport Utility Vehicle	4	25.00%
Pick up	1	6.25%
Grand Total	16	100.00%

Unit 1 Special Function	Crashes	%
None	16	100.00%
Grand Total	16	100.00%

(7) Navarre Road SW & Stump Avenue SW/Bosford Street SW

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Straight Ahead	7	43.75%
Slowing or Stopped In Traffic	3	18.75%
	2	12.50%
Making Left Turn	2	12.50%
Making Right Turn	2	12.50%
Grand Total	16	100.00%

Unit 2 Contributing Factor	Crashes	%
None	14	87.50%
	2	12.50%
Grand Total	16	100.00%

Unit 2 Direction From	Crashes	%
	2	12.50%
East	5	31.25%
North	2	12.50%
Northeast	3	18.75%
South	1	6.25%
Southwest	1	6.25%
West	2	12.50%
Grand Total	16	100.00%

Unit 2 Direction To	Crashes	%
	2	12.50%
East	2	12.50%
Northeast	1	6.25%
South	4	25.00%
Southeast	1	6.25%
Southwest	2	12.50%
West	4	25.00%
Grand Total	16	100.00%

Unit 2 Type	Crashes	%
Passenger Car	6	37.50%
Sport Utility Vehicle	5	31.25%
Pick up	2	12.50%
	2	12.50%
Passenger Van (minivan)	1	6.25%
Grand Total	16	100.00%

Unit 2 Special Function	Crashes	%
None	14	87.50%
	2	12.50%
Grand Total	16	100.00%

(8) Navarre Road SW & Richville Drive SW/Faircrest Street SW (SR 627)

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	9

Crash Severity	Crashes	%
(3) Minor Injury Suspected	1	3.70%
(4) Injury Possible	6	22.22%
(5) PDO/No Injury	20	74.07%
Grand Total	27	100.00%

Day of Week	Crashes	%
(1) Sunday	4	14.81%
(2) Monday	6	22.22%
(3) Tuesday	1	3.70%
(4) Wednesday	5	18.52%
(5) Thursday	3	11.11%
(6) Friday	4	14.81%
(7) Saturday	4	14.81%
Grand Total	27	100.00%

Hour of Day	Crashes	%
6	1	3.70%
7	1	3.70%
8	1	3.70%
10	1	3.70%
11	1	3.70%
12	1	3.70%
13	2	7.41%
14	3	11.11%
15	4	14.81%
16	4	14.81%
17	2	7.41%
18	1	3.70%
19	3	11.11%
20	1	3.70%
22	1	3.70%
Grand Total	27	100.00%

Crashes Per Year	6.75
Fatal and All Injury Crashes	7
Percent Injury	25.9%
Equivalent PDO Index Value	1.97

Year	Crashes	%
2019	7	25.93%
2020	9	33.33%
2021	9	33.33%
2022	2	7.41%
Grand Total	27	100.00%

Crash Type	Crashes	%
Rear End	18	66.67%
Sideswipe - Passing	3	11.11%
Backing	2	7.41%
Right Turn	1	3.70%
Angle	1	3.70%
Head On	1	3.70%
Left Turn	1	3.70%
Grand Total	27	100.00%

Month	Crashes	%
1	2	7.41%
2	4	14.81%
3	1	3.70%
5	2	7.41%
7	1	3.70%
8	2	7.41%
9	2	7.41%
10	6	22.22%
11	3	11.11%
12	4	14.81%
Grand Total	27	100.00%

(8) Navarre Road SW & Richville Drive SW/Faircrest Street SW (SR 627)

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	18	66.67%
Cloudy	7	25.93%
Rain	2	7.41%
Grand Total	27	100.00%

Road Condition	Crashes	%
Dry	22	81.48%
Wet	5	18.52%
Grand Total	27	100.00%

Light Condition	Crashes	%
Daylight	21	77.78%
Dark - Lighted Roadway	3	11.11%
Dark - Roadway Not Lighted	2	7.41%
Dawn/Dusk	1	3.70%
Grand Total	27	100.00%

Number of Units	Crashes	%
2	27	100.00%
Grand Total	27	100.00%

ODOT Location	Crashes	%
Four-Way Intersection	25	92.59%
Not An Intersection	1	3.70%
Data Not Valid or Not Provided	1	3.70%
Grand Total	27	100.00%

Work Zone Related	Crashes	%
No	27	100.00%
Grand Total	27	100.00%

Alcohol Related	Crashes	%
No	27	100.00%
Grand Total	27	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	27	100.00%
Grand Total	27	100.00%

Contour	Crashes	%
Straight Grade	6	22.22%
Straight Level	21	77.78%
Grand Total	27	100.00%

Marijuana Related	Crashes	%
No	27	100.00%
Grand Total	27	100.00%

Roadway Departure	Crashes	%
No	27	100.00%
Grand Total	27	100.00%

Older Driver (65+)	Crashes	%
No	21	77.78%
Yes	6	22.22%
Grand Total	27	100.00%

Intersection Related	Crashes	%
Yes	26	96.30%
No	1	3.70%
Grand Total	27	100.00%

Young Driver (15-25)	Crashes	%
No	12	44.44%
Yes	15	55.56%
Grand Total	27	100.00%

Speed Related	Crashes	%
No	27	100.00%
Grand Total	27	100.00%

Motorcycle Involved	Crashes	%
No	24	88.89%
Yes	3	11.11%
Grand Total	27	100.00%

(8) Navarre Road SW & Richville Drive SW/Faircrest Street SW (SR 627)

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	18	66.67%
Making Left Turn	2	7.41%
Backing	2	7.41%
Slowing or Stopped In Traffic	2	7.41%
Overtaking/Passing	1	3.70%
Making Right Turn	1	3.70%
Other / Unknown	1	3.70%
Grand Total	27	100.00%

Unit 1 Contributing Factor	Crashes	%
Following Too Closely/ACDA	14	51.85%
Improper Start From a Parked Position	3	11.11%
Improper Backing	2	7.41%
Other Improper Action	2	7.41%
Improper Passing	2	7.41%
Improper Turn	2	7.41%
Failure to Yield	1	3.70%
Swerving to Avoid	1	3.70%
Grand Total	27	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	27	100.00%
Grand Total	27	100.00%

Unit 1 Traffic Control	Crashes	%
Signal	23	85.19%
No Control	4	14.81%
Grand Total	27	100.00%

Unit 1 Posted Speed	Crashes	%
0	1	3.70%
35	1	3.70%
40	21	77.78%
45	4	14.81%
Grand Total	27	100.00%

Unit 1 Direction From	Crashes	%
East	11	40.74%
West	5	18.52%
Southwest	3	11.11%
North	3	11.11%
Northeast	3	11.11%
Southeast	1	3.70%
South	1	3.70%
Grand Total	27	100.00%

Unit 1 Direction To	Crashes	%
West	11	40.74%
South	5	18.52%
East	3	11.11%
Northeast	3	11.11%
Southwest	2	7.41%
North	2	7.41%
Northwest	1	3.70%
Grand Total	27	100.00%

(8) Navarre Road SW & Richville Drive SW/Faircrest Street SW (SR 627)

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	11	40.74%
Sport Utility Vehicle	6	22.22%
Pick up	5	18.52%
Motorcycle 2 Wheeled	3	11.11%
Semi-Tractor	1	3.70%
Single Unit Truck	1	3.70%
Grand Total	27	100.00%

Unit 1 Special Function	Crashes	%
None	24	88.89%
Other / Unknown	3	11.11%
Grand Total	27	100.00%

(8) Navarre Road SW & Richville Drive SW/Faircrest Street SW (SR 627)

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Slowing or Stopped In Traffic	20	74.07%
Straight Ahead	4	14.81%
Making Right Turn	2	7.41%
Making Left Turn	1	3.70%
Grand Total	27	100.00%

Unit 2 Contributing Factor	Crashes	%
None	26	96.30%
Left of Center	1	3.70%
Grand Total	27	100.00%

Unit 2 Direction From	Crashes	%
East	9	33.33%
North	4	14.81%
Northeast	2	7.41%
South	1	3.70%
Southeast	1	3.70%
Southwest	4	14.81%
West	6	22.22%
Grand Total	27	100.00%

Unit 2 Direction To	Crashes	%
East	5	18.52%
North	1	3.70%
Northeast	5	18.52%
Northwest	1	3.70%
South	6	22.22%
Southwest	2	7.41%
West	7	25.93%
Grand Total	27	100.00%

Unit 2 Type	Crashes	%
Sport Utility Vehicle	11	40.74%
Passenger Car	7	25.93%
Pick up	6	22.22%
Semi-Tractor	2	7.41%
Passenger Van (minivan)	1	3.70%
Grand Total	27	100.00%

Unit 2 Special Function	Crashes	%
None	27	100.00%
Grand Total	27	100.00%

(10) Richville Drive SW (SR 627) & Stump Avenue SW/Creston Road SW

Crash Summary Sheet

Fatalities	0
Serious Injuries	1
Other Injuries	2

Crash Severity	Crashes	%
(2) Serious Injury Suspected	1	14.29%
(4) Injury Possible	2	28.57%
(5) PDO/No Injury	4	57.14%
Grand Total	7	100.00%

Day of Week	Crashes	%
(3) Tuesday	2	28.57%
(4) Wednesday	1	14.29%
(5) Thursday	3	42.86%
(6) Friday	1	14.29%
Grand Total	7	100.00%

Hour of Day	Crashes	%
9	1	14.29%
11	1	14.29%
13	1	14.29%
18	3	42.86%
19	1	14.29%
Grand Total	7	100.00%

Crashes Per Year	2.33
Fatal and All Injury Crashes	3
Percent Injury	42.9%
Equivalent PDO Index Value	8.30

Year	Crashes	%
2019	1	14.29%
2020	2	28.57%
2021	4	57.14%
Grand Total	7	100.00%

Crash Type	Crashes	%
Angle	4	57.14%
Rear End	2	28.57%
Right Turn	1	14.29%
Grand Total	7	100.00%

Month	Crashes	%
2	1	14.29%
6	2	28.57%
7	1	14.29%
10	2	28.57%
11	1	14.29%
Grand Total	7	100.00%

(10) Richville Drive SW (SR 627) & Stump Avenue SW/Creston Road SW

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	3	42.86%
Cloudy	3	42.86%
Rain	1	14.29%
Grand Total	7	100.00%

Road Condition	Crashes	%
Dry	6	85.71%
Wet	1	14.29%
Grand Total	7	100.00%

Light Condition	Crashes	%
Daylight	6	85.71%
Dawn/Dusk	1	14.29%
Grand Total	7	100.00%

Number of Units	Crashes	%
2	7	100.00%
Grand Total	7	100.00%

ODOT Location	Crashes	%
Four-Way Intersection	3	42.86%
T-Intersection	2	28.57%
Not An Intersection	2	28.57%
Grand Total	7	100.00%

Work Zone Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Alcohol Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Contour	Crashes	%
Straight Grade	5	71.43%
Straight Level	2	28.57%
Grand Total	7	100.00%

Marijuana Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Roadway Departure	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Older Driver (65+)	Crashes	%
No	5	71.43%
Yes	2	28.57%
Grand Total	7	100.00%

Intersection Related	Crashes	%
Yes	7	100.00%
Grand Total	7	100.00%

Young Driver (15-25)	Crashes	%
No	3	42.86%
Yes	4	57.14%
Grand Total	7	100.00%

Speed Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Motorcycle Involved	Crashes	%
No	6	85.71%
Yes	1	14.29%
Grand Total	7	100.00%

(10) Richville Drive SW (SR 627) & Stump Avenue SW/Creston Road SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Making Left Turn	3	42.86%
Straight Ahead	3	42.86%
Making Right Turn	1	14.29%
Grand Total	7	100.00%

Unit 1 Contributing Factor	Crashes	%
Failure to Yield	4	57.14%
Following Too Closely/ACDA	2	28.57%
Improper Turn	1	14.29%
Grand Total	7	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	6	85.71%
Ditch	1	14.29%
Grand Total	7	100.00%

Unit 1 Traffic Control	Crashes	%
Stop Sign	4	57.14%
No Control	3	42.86%
Grand Total	7	100.00%

Unit 1 Posted Speed	Crashes	%
35	2	28.57%
40	3	42.86%
45	2	28.57%
Grand Total	7	100.00%

Unit 1 Direction From	Crashes	%
East	3	42.86%
South	3	42.86%
North	1	14.29%
Grand Total	7	100.00%

Unit 1 Direction To	Crashes	%
South	2	28.57%
West	1	14.29%
Southwest	1	14.29%
North	1	14.29%
East	1	14.29%
Northwest	1	14.29%
Grand Total	7	100.00%

(10) Richville Drive SW (SR 627) & Stump Avenue SW/Creston Road SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Sport Utility Vehicle	3	42.86%
Passenger Car	2	28.57%
Cargo Van	1	14.29%
Pick up	1	14.29%
Grand Total	7	100.00%

Unit 1 Special Function	Crashes	%
None	7	100.00%
Grand Total	7	100.00%

(10) Richville Drive SW (SR 627) & Stump Avenue SW/Creston Road SW

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Slowing or Stopped In Traffic	4	57.14%
Straight Ahead	3	42.86%
Grand Total	7	100.00%

Unit 2 Contributing Factor	Crashes	%
None	7	100.00%
Grand Total	7	100.00%

Unit 2 Direction From	Crashes	%
East	1	14.29%
South	3	42.86%
West	3	42.86%
Grand Total	7	100.00%

Unit 2 Direction To	Crashes	%
East	3	42.86%
North	2	28.57%
South	1	14.29%
West	1	14.29%
Grand Total	7	100.00%

Unit 2 Type	Crashes	%
Passenger Car	3	42.86%
Sport Utility Vehicle	2	28.57%
Motorcycle 2 Wheeled	1	14.29%
Semi-Tractor	1	14.29%
Grand Total	7	100.00%

Unit 2 Special Function	Crashes	%
None	7	100.00%
Grand Total	7	100.00%

(11) Richville Drive SW (SR 627) & US 30 Eastbound Ramps

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	0

Crash Severity	Crashes	%
(5) PDO/No Injury	4	100.00%
Grand Total	4	100.00%

Day of Week	Crashes	%
(3) Tuesday	1	25.00%
(5) Thursday	1	25.00%
(6) Friday	1	25.00%
(7) Saturday	1	25.00%
Grand Total	4	100.00%

Hour of Day	Crashes	%
6	1	25.00%
15	1	25.00%
18	1	25.00%
22	1	25.00%
Grand Total	4	100.00%

Crashes Per Year	1.33
Fatal and All Injury Crashes	0
Percent Injury	0.0%
Equivalent PDO Index Value	1.00

Year	Crashes	%
2020	2	50.00%
2021	1	25.00%
2022	1	25.00%
Grand Total	4	100.00%

Crash Type	Crashes	%
Rear End	2	50.00%
Sideswipe - Passing	1	25.00%
Fixed Object	1	25.00%
Grand Total	4	100.00%

Month	Crashes	%
3	1	25.00%
6	1	25.00%
7	1	25.00%
11	1	25.00%
Grand Total	4	100.00%

(11) Richville Drive SW (SR 627) & US 30 Eastbound Ramps

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	3	75.00%
Cloudy	1	25.00%
Grand Total	4	100.00%

Light Condition	Crashes	%
Daylight	2	50.00%
Dark - Lighted Roadway	1	25.00%
Dark - Roadway Not Lighted	1	25.00%
Grand Total	4	100.00%

ODOT Location	Crashes	%
Not An Intersection	3	75.00%
T-Intersection	1	25.00%
Grand Total	4	100.00%

Contour	Crashes	%
Straight Grade	4	100.00%
Grand Total	4	100.00%

Roadway Departure	Crashes	%
No	3	75.00%
Yes	1	25.00%
Grand Total	4	100.00%

Intersection Related	Crashes	%
Yes	3	75.00%
No	1	25.00%
Grand Total	4	100.00%

Speed Related	Crashes	%
No	4	100.00%
Grand Total	4	100.00%

Road Condition	Crashes	%
Dry	4	100.00%
Grand Total	4	100.00%

Number of Units	Crashes	%
2	3	75.00%
1	1	25.00%
Grand Total	4	100.00%

Work Zone Related	Crashes	%
No	4	100.00%
Grand Total	4	100.00%

Alcohol Related	Crashes	%
No	4	100.00%
Grand Total	4	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	4	100.00%
Grand Total	4	100.00%

Marijuana Related	Crashes	%
No	4	100.00%
Grand Total	4	100.00%

Older Driver (65+)	Crashes	%
No	4	100.00%
Grand Total	4	100.00%

Young Driver (15-25)	Crashes	%
No	3	75.00%
Yes	1	25.00%
Grand Total	4	100.00%

Motorcycle Involved	Crashes	%
No	4	100.00%
Grand Total	4	100.00%

(11) Richville Drive SW (SR 627) & US 30 Eastbound Ramps

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	2	50.00%
Changing Lanes	1	25.00%
Slowing or Stopped In Traffic	1	25.00%
Grand Total	4	100.00%

Unit 1 Contributing Factor	Crashes	%
Following Too Closely/ACDA	1	25.00%
Vision Obstruction	1	25.00%
Drove off Road	1	25.00%
Other Improper Action	1	25.00%
Grand Total	4	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	3	75.00%
Guardrail End	1	25.00%
Grand Total	4	100.00%

Unit 1 Traffic Control	Crashes	%
Stop Sign	3	75.00%
No Control	1	25.00%
Grand Total	4	100.00%

Unit 1 Posted Speed	Crashes	%
35	2	50.00%
40	1	25.00%
60	1	25.00%
Grand Total	4	100.00%

Unit 1 Direction From	Crashes	%
West	4	100.00%
Grand Total	4	100.00%

Unit 1 Direction To	Crashes	%
East	4	100.00%
Grand Total	4	100.00%

(11) Richville Drive SW (SR 627) & US 30 Eastbound Ramps

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Pick up	3	75.00%
Passenger Car	1	25.00%
Grand Total	4	100.00%

Unit 1 Special Function	Crashes	%
None	4	100.00%
Grand Total	4	100.00%

(11) Richville Drive SW (SR 627) & US 30 Eastbound Ramps

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Slowing or Stopped In Traffic	2	50.00%
Straight Ahead	1	25.00%
	1	25.00%
Grand Total	4	100.00%

Unit 2 Contributing Factor	Crashes	%
None	3	75.00%
	1	25.00%
Grand Total	4	100.00%

Unit 2 Direction From	Crashes	%
	1	25.00%
East	1	25.00%
West	2	50.00%
Grand Total	4	100.00%

Unit 2 Direction To	Crashes	%
	1	25.00%
East	2	50.00%
West	1	25.00%
Grand Total	4	100.00%

Unit 2 Type	Crashes	%
Passenger Car	2	50.00%
Pick up	1	25.00%
	1	25.00%
Grand Total	4	100.00%

Unit 2 Special Function	Crashes	%
None	3	75.00%
	1	25.00%
Grand Total	4	100.00%

(12) Richville Drive SW (SR 627) & US 30 Westbound Ramps

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	1

Crash Severity	Crashes	%
(4) Injury Possible	1	14.29%
(5) PDO/No Injury	6	85.71%
Grand Total	7	100.00%

Day of Week	Crashes	%
(2) Monday	1	14.29%
(3) Tuesday	2	28.57%
(5) Thursday	2	28.57%
(6) Friday	2	28.57%
Grand Total	7	100.00%

Hour of Day	Crashes	%
6	1	14.29%
7	1	14.29%
14	2	28.57%
18	2	28.57%
19	1	14.29%
Grand Total	7	100.00%

Crashes Per Year	3.50
Fatal and All Injury Crashes	1
Percent Injury	14.3%
Equivalent PDO Index Value	1.49

Year	Crashes	%
2020	2	28.57%
2021	5	71.43%
Grand Total	7	100.00%

Crash Type	Crashes	%
Rear End	5	71.43%
Angle	2	28.57%
Grand Total	7	100.00%

Month	Crashes	%
2	3	42.86%
4	1	14.29%
12	3	42.86%
Grand Total	7	100.00%

(12) Richville Drive SW (SR 627) & US 30 Westbound Ramps

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	4	57.14%
Cloudy	2	28.57%
Rain	1	14.29%
Grand Total	7	100.00%

Road Condition	Crashes	%
Dry	5	71.43%
Wet	2	28.57%
Grand Total	7	100.00%

Light Condition	Crashes	%
Daylight	5	71.43%
Dark - Roadway Not Lighted	1	14.29%
Dawn/Dusk	1	14.29%
Grand Total	7	100.00%

Number of Units	Crashes	%
2	7	100.00%
Grand Total	7	100.00%

ODOT Location	Crashes	%
Not An Intersection	4	57.14%
Off Ramp	2	28.57%
Four-Way Intersection	1	14.29%
Grand Total	7	100.00%

Work Zone Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Alcohol Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Contour	Crashes	%
Straight Grade	4	57.14%
Straight Level	3	42.86%
Grand Total	7	100.00%

Marijuana Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Roadway Departure	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Older Driver (65+)	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Intersection Related	Crashes	%
Yes	5	71.43%
No	2	28.57%
Grand Total	7	100.00%

Young Driver (15-25)	Crashes	%
Yes	7	100.00%
Grand Total	7	100.00%

Speed Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Motorcycle Involved	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

(12) Richville Drive SW (SR 627) & US 30 Westbound Ramps

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	4	57.14%
Making Left Turn	2	28.57%
Slowing or Stopped In Traffic	1	14.29%
Grand Total	7	100.00%

Unit 1 Contributing Factor	Crashes	%
Following Too Closely/ACDA	5	71.43%
Failure to Yield	1	14.29%
Other Improper Action	1	14.29%
Grand Total	7	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	7	100.00%
Grand Total	7	100.00%

Unit 1 Traffic Control	Crashes	%
No Control	4	57.14%
Stop Sign	3	42.86%
Grand Total	7	100.00%

Unit 1 Posted Speed	Crashes	%
25	1	14.29%
30	1	14.29%
35	1	14.29%
40	2	28.57%
65	2	28.57%
Grand Total	7	100.00%

Unit 1 Direction From	Crashes	%
East	6	85.71%
South	1	14.29%
Grand Total	7	100.00%

Unit 1 Direction To	Crashes	%
West	4	57.14%
South	2	28.57%
North	1	14.29%
Grand Total	7	100.00%

(12) Richville Drive SW (SR 627) & US 30 Westbound Ramps

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	5	71.43%
Pick up	2	28.57%
Grand Total	7	100.00%

Unit 1 Special Function	Crashes	%
None	7	100.00%
Grand Total	7	100.00%

(12) Richville Drive SW (SR 627) & US 30 Westbound Ramps

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Slowing or Stopped In Traffic	4	57.14%
Straight Ahead	3	42.86%
Grand Total	7	100.00%

Unit 2 Contributing Factor	Crashes	%
None	7	100.00%
Grand Total	7	100.00%

Unit 2 Direction From	Crashes	%
East	4	57.14%
North	2	28.57%
South	1	14.29%
Grand Total	7	100.00%

Unit 2 Direction To	Crashes	%
North	1	14.29%
South	2	28.57%
West	4	57.14%
Grand Total	7	100.00%

Unit 2 Type	Crashes	%
Passenger Car	5	71.43%
Passenger Van (minivan)	1	14.29%
Bus (16+ Passengers)	1	14.29%
Grand Total	7	100.00%

Unit 2 Special Function	Crashes	%
None	5	71.43%
Taxi	1	14.29%
School Transport	1	14.29%
Grand Total	7	100.00%

(13) Richville Drive SW & Nave Road SE/RG Drage CTC Driveway

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	0

Crash Severity	Crashes	%
(5) PDO/No Injury	5	100.00%
Grand Total	5	100.00%

Day of Week	Crashes	%
(2) Monday	1	20.00%
(5) Thursday	2	40.00%
(6) Friday	1	20.00%
(7) Saturday	1	20.00%
Grand Total	5	100.00%

Hour of Day	Crashes	%
6	3	60.00%
16	1	20.00%
22	1	20.00%
Grand Total	5	100.00%

Crashes Per Year	1.67
Fatal and All Injury Crashes	0
Percent Injury	0.0%
Equivalent PDO Index Value	1.00

Year	Crashes	%
2020	3	60.00%
2021	1	20.00%
2022	1	20.00%
Grand Total	5	100.00%

Crash Type	Crashes	%
Angle	2	40.00%
Rear End	2	40.00%
Right Turn	1	20.00%
Grand Total	5	100.00%

Month	Crashes	%
1	3	60.00%
10	1	20.00%
11	1	20.00%
Grand Total	5	100.00%

(13) Richville Drive SW & Nave Road SE/RG Drage CTC Driveway

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	3	60.00%
Cloudy	2	40.00%
Grand Total	5	100.00%

Road Condition	Crashes	%
Dry	5	100.00%
Grand Total	5	100.00%

Light Condition	Crashes	%
Dark - Roadway Not Lighted	2	40.00%
Dawn/Dusk	2	40.00%
Daylight	1	20.00%
Grand Total	5	100.00%

Number of Units	Crashes	%
2	5	100.00%
Grand Total	5	100.00%

ODOT Location	Crashes	%
Four-Way Intersection	2	40.00%
T-Intersection	2	40.00%
Not An Intersection	1	20.00%
Grand Total	5	100.00%

Work Zone Related	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Alcohol Related	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Contour	Crashes	%
Curve Level	1	20.00%
Straight Level	4	80.00%
Grand Total	5	100.00%

Marijuana Related	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Roadway Departure	Crashes	%
No	4	80.00%
Yes	1	20.00%
Grand Total	5	100.00%

Older Driver (65+)	Crashes	%
No	2	40.00%
Yes	3	60.00%
Grand Total	5	100.00%

Intersection Related	Crashes	%
Yes	5	100.00%
Grand Total	5	100.00%

Young Driver (15-25)	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Speed Related	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

Motorcycle Involved	Crashes	%
No	5	100.00%
Grand Total	5	100.00%

(13) Richville Drive SW & Nave Road SE/RG Drage CTC Driveway

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	3	60.00%
Making Left Turn	1	20.00%
Making Right Turn	1	20.00%
Grand Total	5	100.00%

Unit 1 Contributing Factor	Crashes	%
Following Too Closely/ACDA	2	40.00%
Ran Stop Sign	1	20.00%
Improper Turn	1	20.00%
Left of Center	1	20.00%
Grand Total	5	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	5	100.00%
Grand Total	5	100.00%

Unit 1 Traffic Control	Crashes	%
Stop Sign	3	60.00%
No Control	2	40.00%
Grand Total	5	100.00%

Unit 1 Posted Speed	Crashes	%
35	2	40.00%
40	2	40.00%
45	1	20.00%
Grand Total	5	100.00%

Unit 1 Direction From	Crashes	%
West	2	40.00%
South	2	40.00%
East	1	20.00%
Grand Total	5	100.00%

Unit 1 Direction To	Crashes	%
East	2	40.00%
North	2	40.00%
West	1	20.00%
Grand Total	5	100.00%

(13) Richville Drive SW & Nave Road SE/RG Drage CTC Driveway

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	2	40.00%
Pick up	2	40.00%
Sport Utility Vehicle	1	20.00%
Grand Total	5	100.00%

Unit 1 Special Function	Crashes	%
None	5	100.00%
Grand Total	5	100.00%

(13) Richville Drive SW & Nave Road SE/RG Drage CTC Driveway

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Making Left Turn	2	40.00%
Straight Ahead	2	40.00%
Slowing or Stopped In Traffic	1	20.00%
Grand Total	5	100.00%

Unit 2 Contributing Factor	Crashes	%
None	5	100.00%
Grand Total	5	100.00%

Unit 2 Direction From	Crashes	%
East	2	40.00%
North	1	20.00%
South	2	40.00%
Grand Total	5	100.00%

Unit 2 Direction To	Crashes	%
North	1	20.00%
South	2	40.00%
West	2	40.00%
Grand Total	5	100.00%

Unit 2 Type	Crashes	%
Pick up	2	40.00%
Passenger Car	2	40.00%
Other Vehicle	1	20.00%
Grand Total	5	100.00%

Unit 2 Special Function	Crashes	%
None	4	80.00%
Public Utility	1	20.00%
Grand Total	5	100.00%

(14) Richville Drive SW & Nave Street SW

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	2

Crash Severity	Crashes	%
(3) Minor Injury Suspected	1	14.29%
(4) Injury Possible	1	14.29%
(5) PDO/No Injury	5	71.43%
Grand Total	7	100.00%

Day of Week	Crashes	%
(3) Tuesday	2	28.57%
(4) Wednesday	1	14.29%
(5) Thursday	1	14.29%
(6) Friday	1	14.29%
(7) Saturday	2	28.57%
Grand Total	7	100.00%

Hour of Day	Crashes	%
9	1	14.29%
13	1	14.29%
14	1	14.29%
15	2	28.57%
16	1	14.29%
20	1	14.29%
Grand Total	7	100.00%

Crashes Per Year	2.33
Fatal and All Injury Crashes	2
Percent Injury	28.6%
Equivalent PDO Index Value	2.28

Year	Crashes	%
2020	1	14.29%
2021	4	57.14%
2022	2	28.57%
Grand Total	7	100.00%

Crash Type	Crashes	%
Rear End	4	57.14%
Left Turn	1	14.29%
Angle	1	14.29%
Head On	1	14.29%
Grand Total	7	100.00%

Month	Crashes	%
3	1	14.29%
4	1	14.29%
5	1	14.29%
6	2	28.57%
9	2	28.57%
Grand Total	7	100.00%

(14) Richville Drive SW & Nave Street SW

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	6	85.71%
Rain	1	14.29%
Grand Total	7	100.00%

Road Condition	Crashes	%
Dry	6	85.71%
Wet	1	14.29%
Grand Total	7	100.00%

Light Condition	Crashes	%
Daylight	7	100.00%
Grand Total	7	100.00%

Number of Units	Crashes	%
2	5	71.43%
3	2	28.57%
Grand Total	7	100.00%

ODOT Location	Crashes	%
T-Intersection	4	57.14%
Data Not Valid or Not Provided	2	28.57%
Not An Intersection	1	14.29%
Grand Total	7	100.00%

Work Zone Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Alcohol Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Contour	Crashes	%
Straight Grade	1	14.29%
Straight Level	6	85.71%
Grand Total	7	100.00%

Marijuana Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Roadway Departure	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Older Driver (65+)	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Intersection Related	Crashes	%
Yes	7	100.00%
Grand Total	7	100.00%

Young Driver (15-25)	Crashes	%
No	2	28.57%
Yes	5	71.43%
Grand Total	7	100.00%

Speed Related	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

Motorcycle Involved	Crashes	%
No	7	100.00%
Grand Total	7	100.00%

(14) Richville Drive SW & Nave Street SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	5	71.43%
Making Left Turn	2	28.57%
Grand Total	7	100.00%

Unit 1 Contributing Factor	Crashes	%
Following Too Closely/ACDA	3	42.86%
Failure to Yield	1	14.29%
Ran Stop Sign	1	14.29%
Improper Start From a Parked Position	1	14.29%
Ran Red Light	1	14.29%
Grand Total	7	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	7	100.00%
Grand Total	7	100.00%

Unit 1 Traffic Control	Crashes	%
Signal	4	57.14%
Stop Sign	3	42.86%
Grand Total	7	100.00%

Unit 1 Posted Speed	Crashes	%
20	1	14.29%
35	2	28.57%
40	4	57.14%
Grand Total	7	100.00%

Unit 1 Direction From	Crashes	%
East	3	42.86%
Southwest	1	14.29%
West	1	14.29%
North	1	14.29%
South	1	14.29%
Grand Total	7	100.00%

Unit 1 Direction To	Crashes	%
West	3	42.86%
East	1	14.29%
Southeast	1	14.29%
North	1	14.29%
South	1	14.29%
Grand Total	7	100.00%

(14) Richville Drive SW & Nave Street SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	4	57.14%
Sport Utility Vehicle	2	28.57%
Pick up	1	14.29%
Grand Total	7	100.00%

Unit 1 Special Function	Crashes	%
None	7	100.00%
Grand Total	7	100.00%

(14) Richville Drive SW & Nave Street SW
Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
Slowing or Stopped In Traffic	3	42.86%
Straight Ahead	2	28.57%
Making Left Turn	2	28.57%
Grand Total	7	100.00%

Unit 2 Contributing Factor	Crashes	%
None	7	100.00%
Grand Total	7	100.00%

Unit 2 Direction From	Crashes	%
East	3	42.86%
North	1	14.29%
South	1	14.29%
Southeast	1	14.29%
West	1	14.29%
Grand Total	7	100.00%

Unit 2 Direction To	Crashes	%
East	2	28.57%
North	1	14.29%
Northwest	1	14.29%
South	1	14.29%
West	2	28.57%
Grand Total	7	100.00%

Unit 2 Type	Crashes	%
Passenger Car	4	57.14%
Sport Utility Vehicle	2	28.57%
Passenger Van (minivan)	1	14.29%
Grand Total	7	100.00%

Unit 2 Special Function	Crashes	%
None	7	100.00%
Grand Total	7	100.00%

(16) Richville Drive SW & Jackson Avenue SW/Driveway

Crash Summary Sheet

Fatalities	0
Serious Injuries	0
Other Injuries	0

Crash Severity	Crashes	%
(5) PDO/No Injury	3	100.00%
Grand Total	3	100.00%

Day of Week	Crashes	%
(2) Monday	1	33.33%
(3) Tuesday	1	33.33%
(7) Saturday	1	33.33%
Grand Total	3	100.00%

Hour of Day	Crashes	%
4	1	33.33%
7	1	33.33%
22	1	33.33%
Grand Total	3	100.00%

Crashes Per Year	1.50
Fatal and All Injury Crashes	0
Percent Injury	0.0%
Equivalent PDO Index Value	1.00

Year	Crashes	%
2020	2	66.67%
2021	1	33.33%
Grand Total	3	100.00%

Crash Type	Crashes	%
Backing	1	33.33%
Other Non-Collision	1	33.33%
Fixed Object	1	33.33%
Grand Total	3	100.00%

Month	Crashes	%
3	1	33.33%
8	1	33.33%
11	1	33.33%
Grand Total	3	100.00%

(16) Richville Drive SW & Jackson Avenue SW/Driveway

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	3	100.00%
Grand Total	3	100.00%

Road Condition	Crashes	%
Dry	3	100.00%
Grand Total	3	100.00%

Light Condition	Crashes	%
Dark - Lighted Roadway	2	66.67%
Daylight	1	33.33%
Grand Total	3	100.00%

Number of Units	Crashes	%
1	3	100.00%
Grand Total	3	100.00%

ODOT Location	Crashes	%
T-Intersection	2	66.67%
Not An Intersection	1	33.33%
Grand Total	3	100.00%

Work Zone Related	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Alcohol Related	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Contour	Crashes	%
Curve Level	1	33.33%
Straight Grade	1	33.33%
Straight Level	1	33.33%
Grand Total	3	100.00%

Marijuana Related	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Roadway Departure	Crashes	%
No	1	33.33%
Yes	2	66.67%
Grand Total	3	100.00%

Older Driver (65+)	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Intersection Related	Crashes	%
Yes	2	66.67%
No	1	33.33%
Grand Total	3	100.00%

Young Driver (15-25)	Crashes	%
No	2	66.67%
Yes	1	33.33%
Grand Total	3	100.00%

Speed Related	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

Motorcycle Involved	Crashes	%
No	3	100.00%
Grand Total	3	100.00%

(16) Richville Drive SW & Jackson Avenue SW/Driveway

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Making Left Turn	2	66.67%
Backing	1	33.33%
Grand Total	3	100.00%

Unit 1 Contributing Factor	Crashes	%
Drove off Road	1	33.33%
Improper Turn	1	33.33%
Improper Backing	1	33.33%
Grand Total	3	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	1	33.33%
Utility Pole	1	33.33%
Traffic Sign Post	1	33.33%
Grand Total	3	100.00%

Unit 1 Traffic Control	Crashes	%
No Control	3	100.00%
Grand Total	3	100.00%

Unit 1 Posted Speed	Crashes	%
35	1	33.33%
40	1	33.33%
45	1	33.33%
Grand Total	3	100.00%

Unit 1 Direction From	Crashes	%
Northwest	1	33.33%
West	1	33.33%
South	1	33.33%
Grand Total	3	100.00%

Unit 1 Direction To	Crashes	%
North	2	66.67%
East	1	33.33%
Grand Total	3	100.00%

(16) Richville Drive SW & Jackson Avenue SW/Driveway

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Semi-Tractor	2	66.67%
Sport Utility Vehicle	1	33.33%
Grand Total	3	100.00%

Unit 1 Special Function	Crashes	%
None	3	100.00%
Grand Total	3	100.00%

(16) Richville Drive SW & Jackson Avenue SW/Driveway
Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
	3	100.00%
Grand Total	3	100.00%

Unit 2 Contributing Factor	Crashes	%
	3	100.00%
Grand Total	3	100.00%

Unit 2 Direction From	Crashes	%
	3	100.00%
Grand Total	3	100.00%

Unit 2 Direction To	Crashes	%
	3	100.00%
Grand Total	3	100.00%

Unit 2 Type	Crashes	%
	3	100.00%
Grand Total	3	100.00%

Unit 2 Special Function	Crashes	%
	3	100.00%
Grand Total	3	100.00%

(17) Richville Drive SW & Southway Street SW

Crash Summary Sheet

Fatalities	1
Serious Injuries	0
Other Injuries	1

Crash Severity	Crashes	%
(1) Fatal	1	16.67%
(3) Minor Injury Suspected	1	16.67%
(5) PDO/No Injury	4	66.67%
Grand Total	6	100.00%

Day of Week	Crashes	%
(2) Monday	1	16.67%
(3) Tuesday	1	16.67%
(5) Thursday	1	16.67%
(6) Friday	2	33.33%
(7) Saturday	1	16.67%
Grand Total	6	100.00%

Hour of Day	Crashes	%
0	1	16.67%
2	1	16.67%
4	1	16.67%
6	1	16.67%
14	2	33.33%
Grand Total	6	100.00%

Crashes Per Year	2.00
Fatal and All Injury Crashes	2
Percent Injury	33.3%
Equivalent PDO Index Value	9.29

Year	Crashes	%
2020	1	16.67%
2021	3	50.00%
2022	2	33.33%
Grand Total	6	100.00%

Crash Type	Crashes	%
Rear End	2	33.33%
Fixed Object	1	16.67%
Pedestrian	1	16.67%
Left Turn	1	16.67%
Overturning	1	16.67%
Grand Total	6	100.00%

Month	Crashes	%
1	1	16.67%
4	2	33.33%
5	2	33.33%
10	1	16.67%
Grand Total	6	100.00%

(17) Richville Drive SW & Southway Street SW

Crash Summary Sheet

Weather Condition	Crashes	%
Clear	3	50.00%
Rain	2	33.33%
Cloudy	1	16.67%
Grand Total	6	100.00%

Light Condition	Crashes	%
Dark - Lighted Roadway	3	50.00%
Daylight	2	33.33%
Dark - Roadway Not Lighted	1	16.67%
Grand Total	6	100.00%

ODOT Location	Crashes	%
Not An Intersection	3	50.00%
Data Not Valid or Not Provided	2	33.33%
T-Intersection	1	16.67%
Grand Total	6	100.00%

Contour	Crashes	%
Straight Grade	2	33.33%
Straight Level	4	66.67%
Grand Total	6	100.00%

Roadway Departure	Crashes	%
No	5	83.33%
Yes	1	16.67%
Grand Total	6	100.00%

Intersection Related	Crashes	%
Yes	4	66.67%
No	2	33.33%
Grand Total	6	100.00%

Speed Related	Crashes	%
No	5	83.33%
Yes	1	16.67%
Grand Total	6	100.00%

Road Condition	Crashes	%
Wet	3	50.00%
Dry	3	50.00%
Grand Total	6	100.00%

Number of Units	Crashes	%
2	3	50.00%
1	2	33.33%
3	1	16.67%
Grand Total	6	100.00%

Work Zone Related	Crashes	%
No	6	100.00%
Grand Total	6	100.00%

Alcohol Related	Crashes	%
No	5	83.33%
Yes	1	16.67%
Grand Total	6	100.00%

Drug Related (Inc. Marijuana)	Crashes	%
No	6	100.00%
Grand Total	6	100.00%

Marijuana Related	Crashes	%
No	6	100.00%
Grand Total	6	100.00%

Older Driver (65+)	Crashes	%
No	6	100.00%
Grand Total	6	100.00%

Young Driver (15-25)	Crashes	%
No	2	33.33%
Yes	4	66.67%
Grand Total	6	100.00%

Motorcycle Involved	Crashes	%
No	6	100.00%
Grand Total	6	100.00%

(17) Richville Drive SW & Southway Street SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Pre-Crash Action	Crashes	%
Straight Ahead	3	50.00%
Walking, Running, Jogging, Playing	1	16.67%
Making Left Turn	1	16.67%
Making Right Turn	1	16.67%
Grand Total	6	100.00%

Unit 1 Contributing Factor	Crashes	%
Following Too Closely/ACDA	2	33.33%
Drove off Road	2	33.33%
Not Discernible	1	16.67%
Improper Crossing	1	16.67%
Grand Total	6	100.00%

Unit 1 Object Struck	Crashes	%
Nothing Struck	5	83.33%
Tree	1	16.67%
Grand Total	6	100.00%

Unit 1 Traffic Control	Crashes	%
Signal	3	50.00%
No Control	3	50.00%
Grand Total	6	100.00%

Unit 1 Posted Speed	Crashes	%
0	1	16.67%
25	3	50.00%
35	2	33.33%
Grand Total	6	100.00%

Unit 1 Direction From	Crashes	%
East	2	33.33%
North	2	33.33%
West	1	16.67%
Southeast	1	16.67%
Grand Total	6	100.00%

Unit 1 Direction To	Crashes	%
West	3	50.00%
South	1	16.67%
North	1	16.67%
Northwest	1	16.67%
Grand Total	6	100.00%

(17) Richville Drive SW & Southway Street SW

Crash Summary Sheet

Unit 1 Summary

Unit 1 Type	Crashes	%
Passenger Car	3	50.00%
Other Vehicle	1	16.67%
Sport Utility Vehicle	1	16.67%
Pedestrian/Skater	1	16.67%
Grand Total	6	100.00%

Unit 1 Special Function	Crashes	%
None	5	83.33%
Other / Unknown	1	16.67%
Grand Total	6	100.00%

(17) Richville Drive SW & Southway Street SW

Crash Summary Sheet

Unit 2 Summary

Unit 2 Pre-Crash Action	Crashes	%
	2	33.33%
Straight Ahead	2	33.33%
Slowing or Stopped In Traffic	2	33.33%
Grand Total	6	100.00%

Unit 2 Contributing Factor	Crashes	%
None	3	50.00%
	2	33.33%
Not Discernible	1	16.67%
Grand Total	6	100.00%

Unit 2 Direction From	Crashes	%
	2	33.33%
East	3	50.00%
Southeast	1	16.67%
Grand Total	6	100.00%

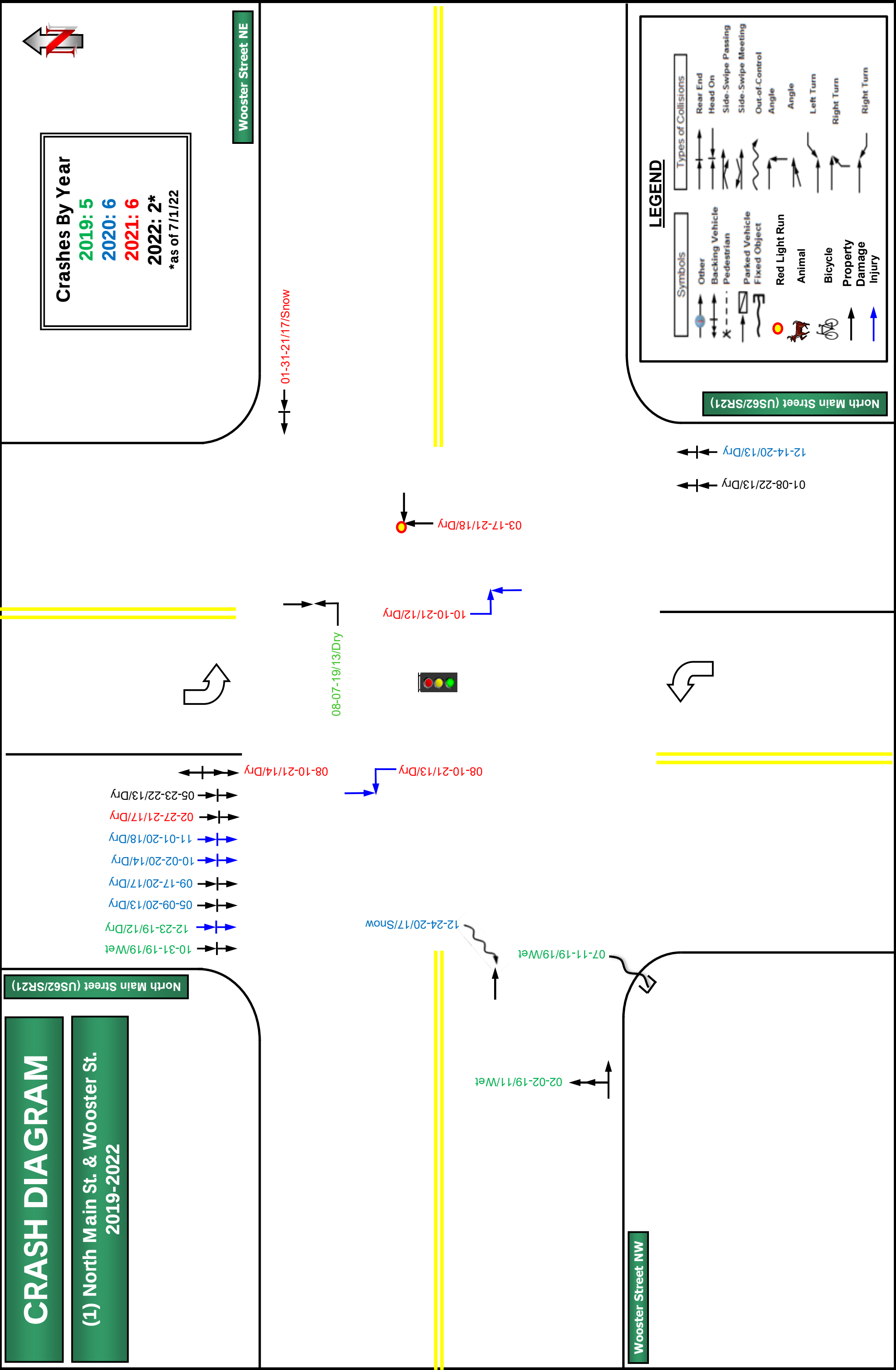
Unit 2 Direction To	Crashes	%
	2	33.33%
Northwest	1	16.67%
West	3	50.00%
Grand Total	6	100.00%

Unit 2 Type	Crashes	%
Passenger Car	3	50.00%
	2	33.33%
Pick up	1	16.67%
Grand Total	6	100.00%

Unit 2 Special Function	Crashes	%
None	4	66.67%
	2	33.33%
Grand Total	6	100.00%

Appendix E

Crash Diagrams



CRASH DIAGRAM

(2) Kemary Ave. SW & Foh St. SW
2019-2022



Fohl Street SW



Kemary Avenue SW

Crashes By Year

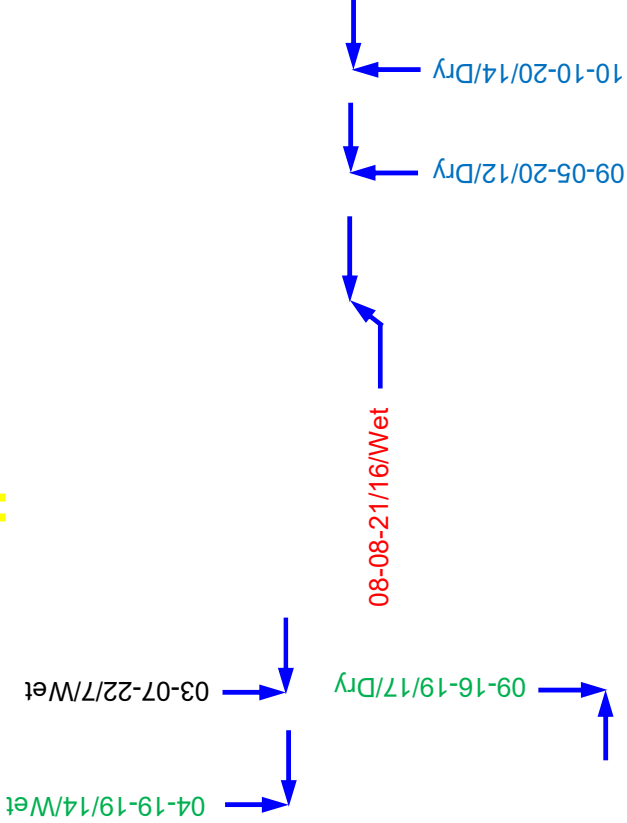
2019: 2

2020: 2

2021: 1

2022: 1*

*as of 7/1/22



Kemary Avenue SW

Fohl Street SW



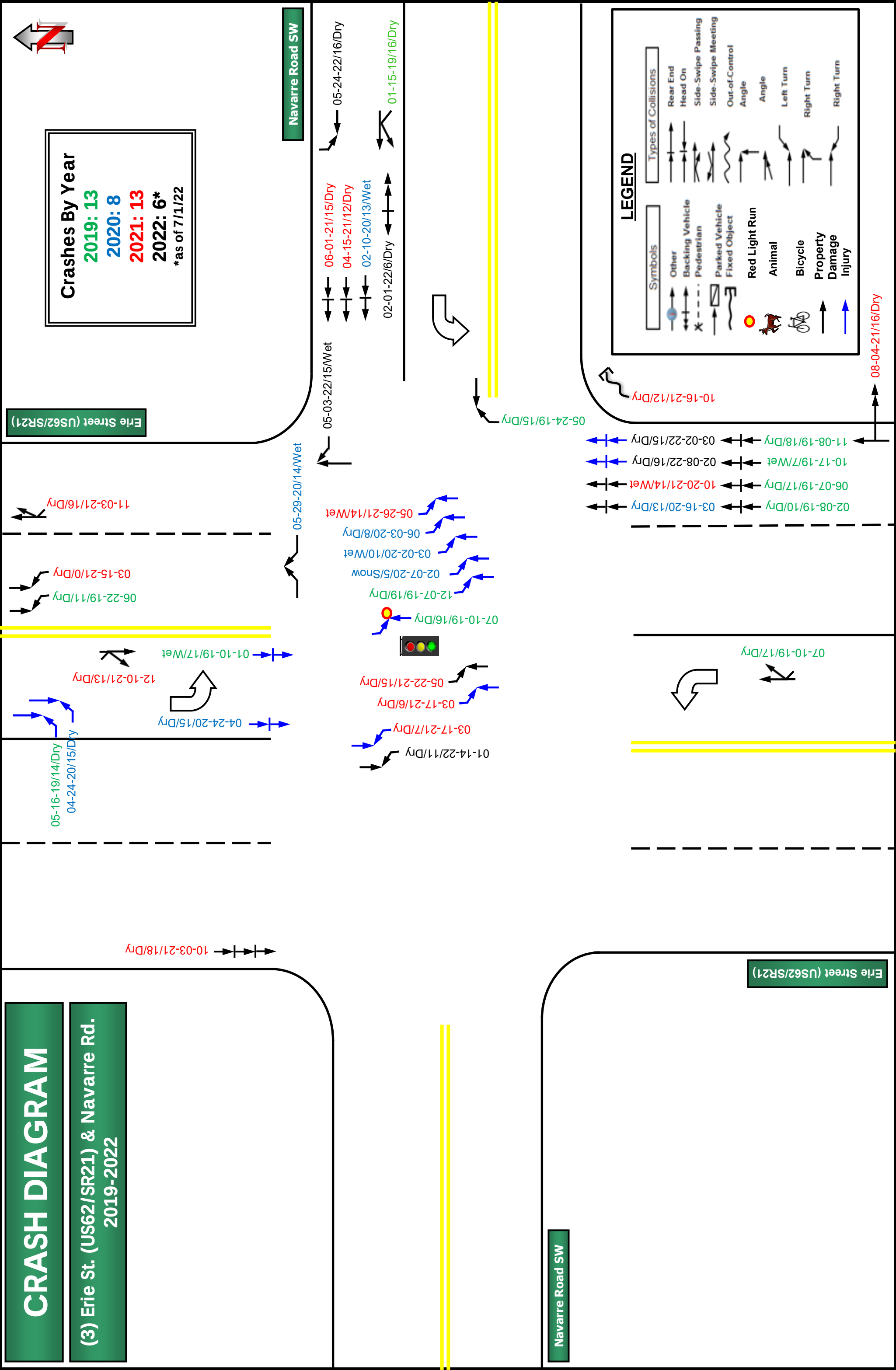
LEGEND

Symbols	Types of Collisions
	Rear End
	Head On
	Side-Swipe Passing
	Side-Swipe Meeting
	Out-of-Control
	Angle
	Angle
	Left Turn
	Right Turn
	Right Turn

CRASH DIAGRAM

(3) Erie St. (US62/SR21) & Navarre Rd.

2019-2022



CRASH DIAGRAM

(4) Navarre Road SW
&
Millennium Boulevard SE
2019-2022



07-13-20/17/Dry

10-28-20/12/Wet

05-13-22/7/Dry

04-20-22/7/Dry

06-13-19/19/Wet

Millennium Blvd. SE

Crashes By Year

2019: 1

2020: 2

2021: 0

2022: 2*

*as of 7/1/22



Navarre Road SW

LEGEND

Symbols	Types of Collisions
	Rear End
	Head On
	Side-Swipe Passing
	Side-Swipe Meeting
	Out-of-Control
	Angle
	Angle
	Left Turn
	Right Turn
	Right Turn

CRASH DIAGRAM

**(5) Millennium Blvd. SE & Prospect Dr. SE
2019-2022**

Crashes By Year

2019:	0
2020:	0
2021:	0
2022:	0*

***as of 7/1/22**

2020: 0

2021: 0

***as of 7/1/22**

Millennium Blvd. SE



Prospect Drive SW

Symbols	Types of Collisions
Other	Rear End
Backing Vehicle	Head On
Pedestrian	Side-Swipe Passing
Parked Vehicle	Side-Swipe Meeting
Fixed Object	Out-of-Control
Red Light Run	Angle
Animal	Angle
Bicycle	Left Turn
Property Damage	Right Turn
Injury	Right Turn

—

Parked

Fixed (

Red Lig

Anima

Bicycle

Proper

Damaç

Rear End



—

1

night time

CRASH DIAGRAM

(6) Navare Rd. SW & Sterlite St. SE
2019-2022

Crashes By Year

2019: 0

2020: 2

2021: 1

2022: 0*

*as of 7/1/22



Navarre Road SW

02-16-21/15/Wet

LEGEND

Symbols

Other

Backing Vehicle

Pedestrian

Parked Vehicle

Fixed Object

Red Light Run

Animal

Bicycle

Property Damage

Injury

Types of Collisions

Rear End

Head On

Side-Swipe Passing

Side-Swipe Meeting

Out-of-Control

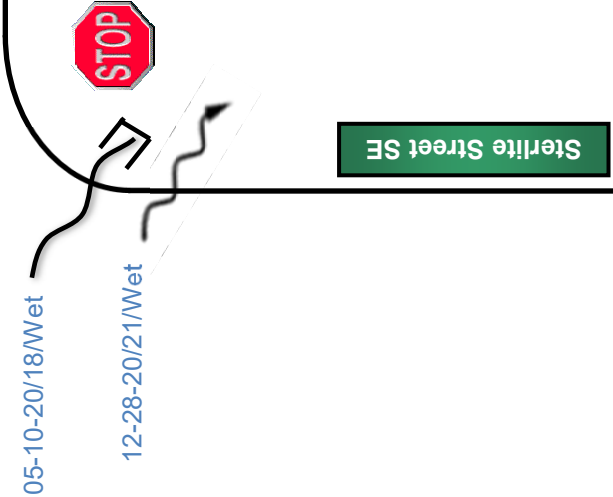
Angle

Angle

Left Turn

Right Turn

Right Turn



CRASH DIAGRAM

(7) Navarre Road SW
&
Stump Ave. SW/Bosford St. SW
2019-2022

Other

Backing Vehicle

Pedestrian

Parked Vehicle

Fixed Object

Red Light Run

Animal

Bicycle

Property Damage

Injury

Types of Collisions

Rear End

Head On

Side-Swipe Passing

Side-Swipe Meeting

Out-of-Control

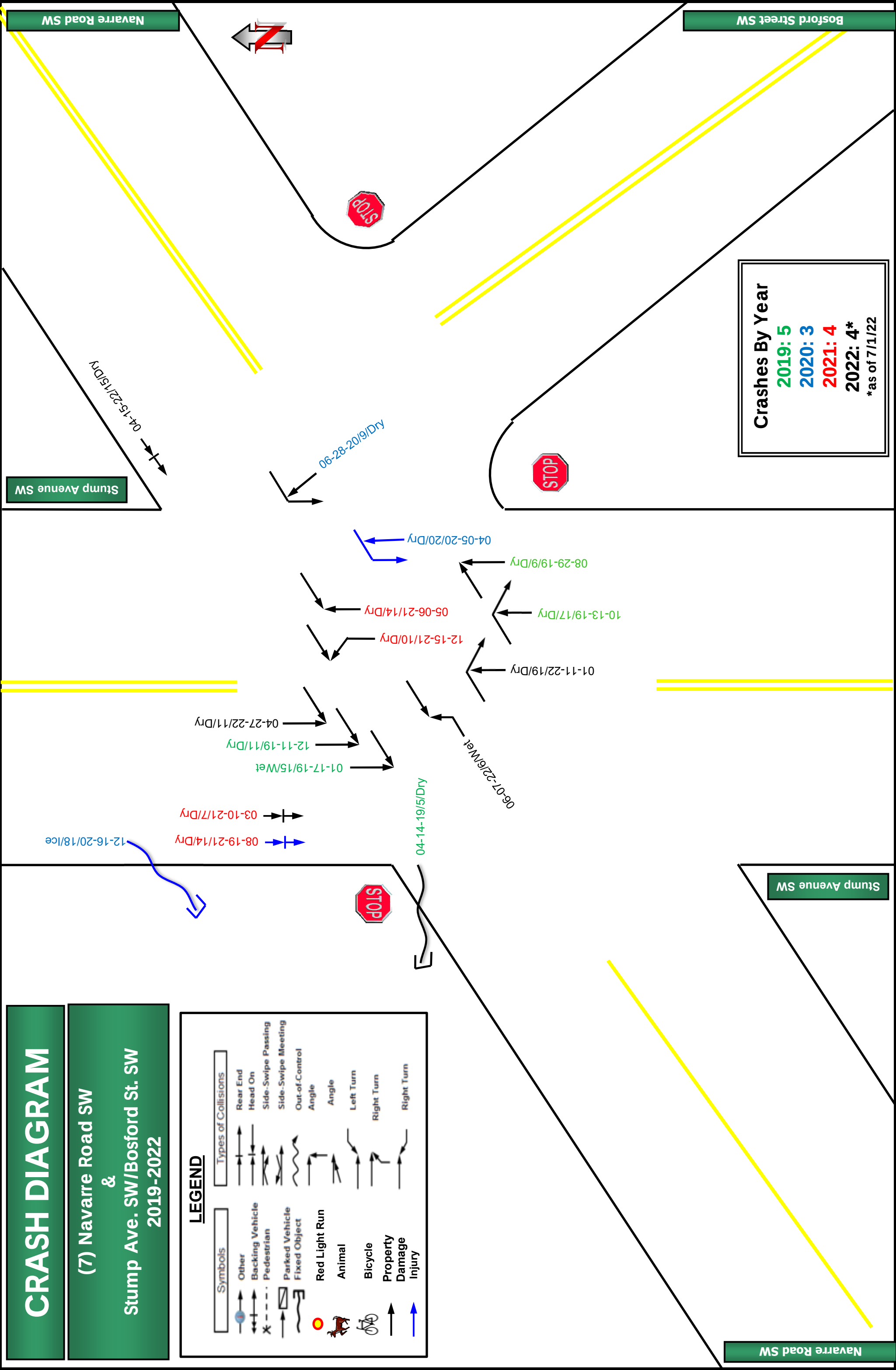
Angle

Angle

Left Turn

Right Turn

Right Turn



Navarre Road SW

Stump Avenue SW

Crashes By Year
2019: 5
2020: 3
2021: 4
2022: 4*
*as of 7/1/22

Bosford Street SW

Navarre Road SW

Stump Avenue SW

CRASH DIAGRAM

(8) Navarre Road SW
&
Richville Dr./Faircrest St. SW (SR627)
2019-2022

02-04-19/10/Wet
08-09-21/15/Dry

CRASH DIAGRAM

(8) Navarre Road SW
&
Richville Dr./Faircrest St. SW (SR627)
2019-2022

Richville Drive SW (SR627)

Crashes By Year

2019: 7

2020: 9

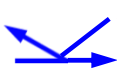
2021: 9

2022: 2*

*as of 7/1/22



Navarre Road SW



11-06-21/14/Dry

10-09-20/19/Dry



07-04-20/13/Dry



05-19-22/19/Dry



03-06-20/7/Dry



10-27-20/15/Wet



09-16-20/16/Dry



12-18-19/16/Dry



02-28-22/13/Dry



12-26-21/16/Dry



12-26-21/20/Dry



11-15-21/6/Dry



10-14-21/15/Dry



01-15-21/16/Wet



05-29-20/18/Wet



12-30-21/17/Dry

10-10-21/14/Dry



09-16-20/11/Dry



02-04-19/17/Dry



02-27-19/14/Dry



10-23-19/15/Dry



11-09-19/8/Dry



Navarre Road SW

Faircrest Street SW (SR627)

08-08-20/22/Dry
10-25-20/19/Wet
01-28-19/12/Dry



LEGEND

Symbols

Other
Backing Vehicle
Pedestrian
Parked Vehicle
Fixed Object
Red Light Run
Animal
Bicycle
Property Damage
Injury

Types of Collisions

Rear End
Head On
Side-Swipe Passing
Side-Swipe Meeting
Out-of-Control
Angle
Angle
Left Turn
Right Turn
Right Turn

CRASH DIAGRAM

(9) Stump Avenue SW
&
Cincinnati Drive SE
2019-2022

Stump Avenue SW



Cincinnati Drive SE



Crashes By Year

2019: 0
2020: 0
2021: 0
2022: 0*
*as of 7/1/22

LEGEND

Symbols	Types of Collisions
	Rear End
	Head On
	Side-Swipe Passing
	Side-Swipe Meeting
	Out-of-Control
	Angle
	Angle
	Left Turn
	Right Turn
	Right Turn

CRASH DIAGRAM

(10) Richville Drive SW (SR627)
&
Stump Ave. SW/Creston Rd. SW
2019-2022



Richville Road SW (SR627)

Creston Road SW

Crashes By Year

2019: 1

2020: 2

2021: 4

2022: 0*

*as of 7/1/22



LEGEND

Symbols

Other

Backing Vehicle

Pedestrian

Parked Vehicle

Fixed Object

Red Light Run

Animal

Bicycle

Property Damage

Injury

Types of Collisions

Rear End

Head On

Side-Swipe Passing

Side-Swipe Meeting

Out-of-Control

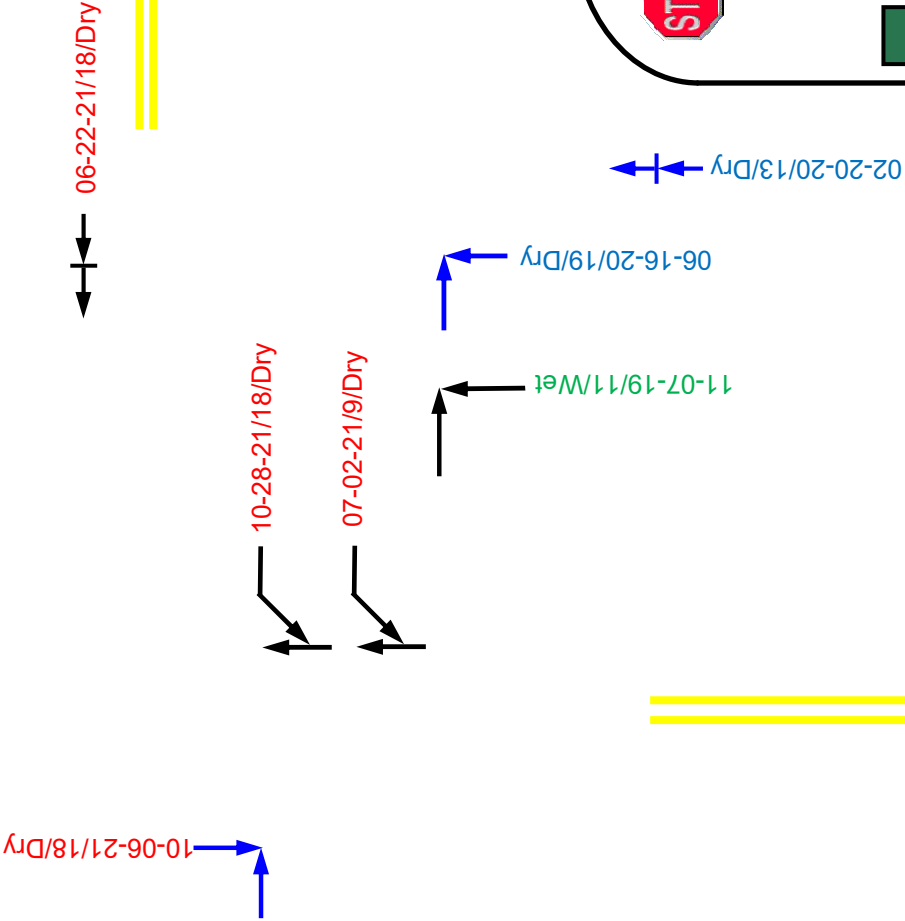
Angle

Angle

Left Turn

Right Turn

Right Turn



Stump Avenue SW

Richville Road SW (SR627)

CRASH DIAGRAM

(11) Richville Drive SW (SR627)
&
US 30 Eastbound Ramps
2019-2022



Richville Drive SW (SR627)

Crashes By Year

2019: 0

2020: 2

2021: 1

2022: 1*

*as of 7/1/22

US 30 EB Entrance Ramp



03-04-22/18/Dry



06-16-20/6/Dry



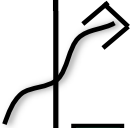
11-28-20/22/Dry



07-15-21/15/Dry



US 30 EB Exit Ramp



Richville Drive SW (SR627)

LEGEND

Symbols	Types of Collisions
	Rear End
	Head On
	Side-Swipe Passing
	Side-Swipe Meeting
	Out-of-Control
	Angle
	Angle
	Left Turn
	Right Turn
	Right Turn

CRASH DIAGRAM

(12) Richville Drive SW (SR627)
&
US 30 Westbound Ramps
2019-2022

Richville Drive SW (SR627)

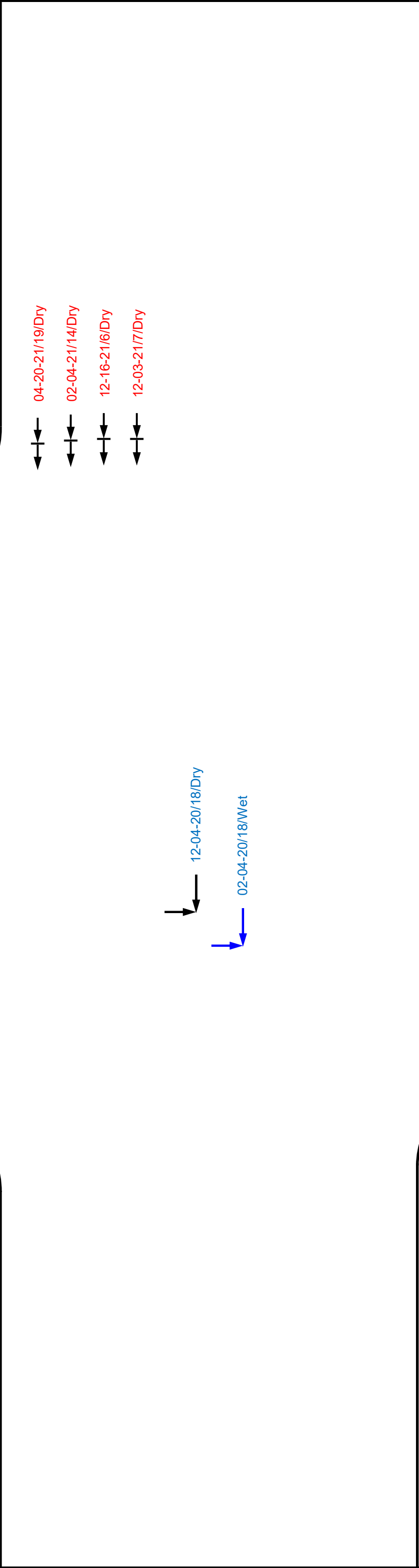
Crashes By Year

2019: 0
2020: 2
2021: 5
2022: 0*

*as of 7/1/22

US 30 WB Exit Ramp

STOP



US WB Entrance Ramp

Richville Drive SW (SR627)

02-01-21/14/Wet

LEGEND

Symbols

Other

Backing Vehicle

Pedestrian

Parked Vehicle

Fixed Object

Red Light Run

Animal

Bicycle

Property Damage

Injury

Types of Collisions

Rear End

Head On

Side-Swipe Passing

Side-Swipe Meeting

Out-of-Control Angle

Angle

Left Turn

Right Turn

Right Turn

CRASH DIAGRAM

(13) Richville Drive SW
&
Nave Road SE/RG Drage CTC
2019-2022

Richville Drive SW



RG Drage CTC Driveway

Crashes By Year

2019: 0

2020: 3

2021: 1

2022: 1*

*as of 7/1/22



10-23-20/16/Dry

01-06-22/6/Dry

11-28-20/22/Dry

01-11-21/6/Dry

01-09-20/6/Dry



Nave Road SE

Richville Drive SW

LEGEND

Symbols

Other

Backing Vehicle

Pedestrian

Parked Vehicle

Fixed Object

Red Light Run

Animal

Bicycle

Property Damage

Injury

Types of Collisions

Rear End

Head On

Side-Swipe Passing

Side-Swipe Meeting

Out-of-Control

Angle

Angle

Left Turn

Right Turn

Right Turn

CRASH DIAGRAM

(14) Richville Drive SW
&
Nave Road SW
2019-2022

Crashes By Year	
2019:	0
2020:	1
2021:	4
2022:	2*
*as of 7/1/22	

Richville Drive SW

04-30-22/9/Dry
05-17-22/15/Dry

Richville Drive SW

Nave Road SW



09-10-21/14/Dry
06-16-21/20/Dry

03-03-20/13/Wet
06-19-21/15/Dry
09-16-21/16/Dry



LEGEND

Symbols	Types of Collisions
Other	Rear End
Backing Vehicle	Head On
Pedestrian	Side-Swipe Passing
Parked Vehicle	Side-Swipe Meeting
Fixed Object	Out-of-Control
Red Light Run	Angle
Animal	Angle
Bicycle	Left Turn
Property Damage	Right Turn
Injury	Right Turn

CRASH DIAGRAM

(15) Richville Drive SW
&
Ohio State Dr. SE/Business Place SE
2019-2022

Richville Drive SW



Crashes By Year

2019: 0

2020: 0

2021: 0

2022: 0*

*as of 7/1/22



Business Place SE

Ohio State Drive SE



Richville Drive SW

LEGEND

Symbols	Types of Collisions
	Rear End
	Head On
	Side-Swipe Passing
	Side-Swipe Meeting
	Out-of-Control
	Angle
	Angle
	Left Turn
	Right Turn
	Right Turn

CRASH DIAGRAM

(16) Richville Dr. SW
&
Jackson Avenue SW
2019-2022

Richville Drive SW

LEGEND

Symbols

Other

Backing Vehicle

Pedestrian

Parked Vehicle

Fixed Object

Red Light Run

Animal

Bicycle

Property Damage

Injury

Types of Collisions

Rear End

Head On

Side-Swipe Passing

Side-Swipe Meeting

Out-of-Control

Angle

Angle

Left Turn

Right Turn

Right Turn

Crashes By Year

2019: 0

2020: 2

2021: 1

2022: 0*

*as of 7/1/22



03-20-21/22/Dry

11-02-20/7/Dry

08-25-20/4/Dry

Jackson Avenue SW

CRASH DIAGRAM

(17) Richville Dr. SW
&
Southway Street SW
2019-2022

Southway Street SW

Crashes By Year

2019: 0

2020: 1

2021: 3

2022: 2*

*as of 7/1/22



04-09-21/0/Wet

05-28-22/2/Wet

01-07-21/4/Dry

10-09-20/6/Dry

04-05-21/14/Dry

05-03-22/14/Wet



Richville Drive SW

LEGEND	
Symbols	Types of Collisions
	Rear End
	Head On
	Side-Swipe Passing
	Side-Swipe Meeting
	Out-of-Control
	Angle
	Angle
	Left Turn
	Right Turn
	Right Turn

Appendix F

ECAT Analysis Worksheets

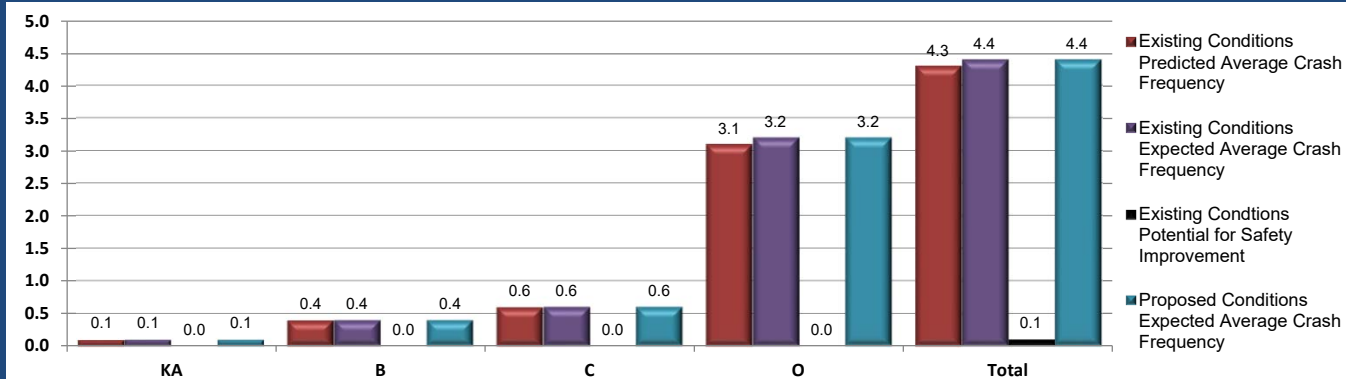


Project Safety Performance Report

General Information

Project Name	(1) Main & Wooster	Contact Email	abc@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0950	0.4304	0.5966	3.1494	4.2714
N_{expected} - Existing Conditions	0.0980	0.4493	0.6350	3.1804	4.3627
N_{potential for improvement} - Existing Conditions	0.0030	0.0189	0.0384	0.0310	0.0913
N_{expected} - Proposed Conditions	0.0980	0.4493	0.6350	3.1804	4.3627

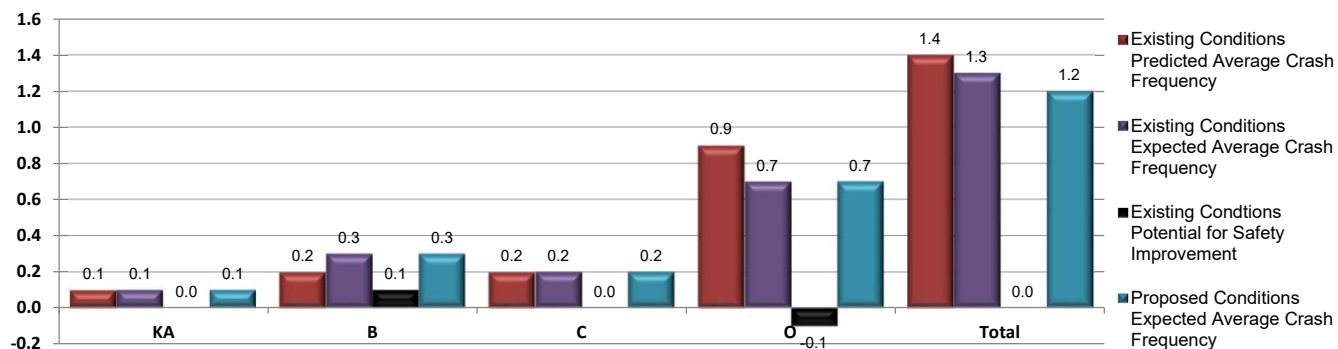


Project Safety Performance Report

General Information

Project Name	(2) Kemary & Fohl	Contact Email	abc@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0988	0.2399	0.1605	0.8596	1.3588
N_{expected} - Existing Conditions	0.1203	0.2917	0.1943	0.7125	1.3188
N_{potential for improvement} - Existing Conditions	0.0215	0.0518	0.0338	-0.1471	-0.0400
N_{expected} - Proposed Conditions	0.1064	0.2589	0.1734	0.6542	1.1929

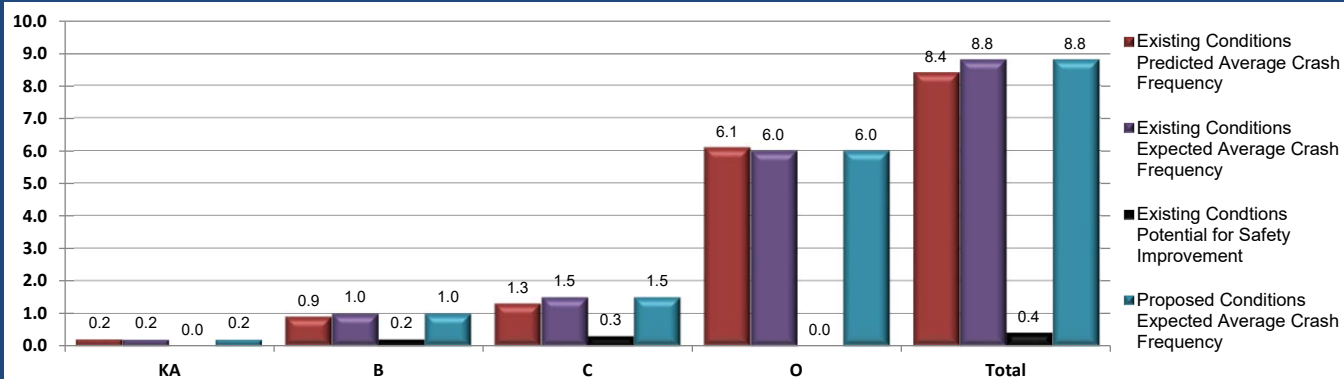


Project Safety Performance Report

General Information

Project Name	(3) Navarre & Erie	Contact Email	abc@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.1918	0.8866	1.2508	6.0548	8.3840
N_{expected} - Existing Conditions	0.2190	1.0367	1.5180	6.0287	8.8024
N_{potential for improvement} - Existing Conditions	0.0272	0.1501	0.2672	-0.0261	0.4184
N_{expected} - Proposed Conditions	0.2190	1.0367	1.5180	6.0287	8.8024

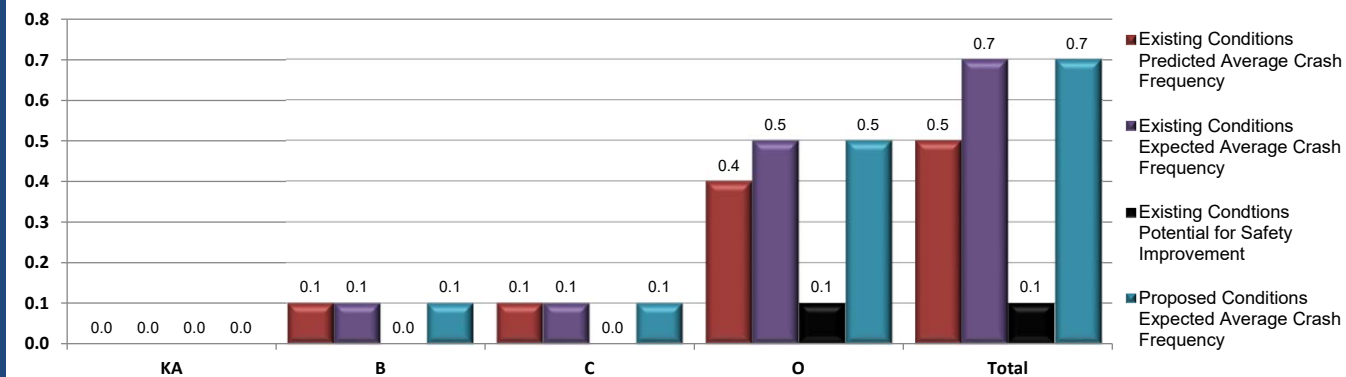


Project Safety Performance Report

General Information

Project Name	(4) Navarre & Millennium	Contact Email	abc@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0156	0.0666	0.0935	0.3662	0.5419
N_{expected} - Existing Conditions	0.0148	0.0669	0.0968	0.4920	0.6705
N_{potential for improvement} - Existing Conditions	-0.0008	0.0003	0.0033	0.1258	0.1286
N_{expected} - Proposed Conditions	0.0148	0.0669	0.0968	0.4920	0.6705

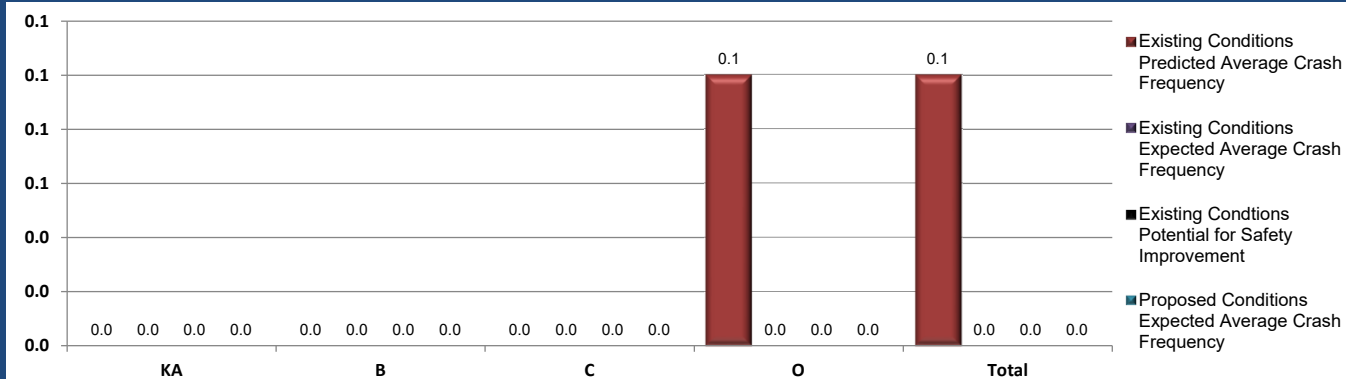


Project Safety Performance Report

General Information

Project Name	(5) Millennium & Propsect	Contact Email	abc@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0046	0.0171	0.0209	0.0788	0.1214
N_{expected} - Existing Conditions	0.0000	0.0000	0.0000	0.0000	0.0000
N_{potential for improvement} - Existing Conditions	0.0000	0.0000	0.0000	0.0000	0.0000
N_{expected} - Proposed Conditions	0.0000	0.0000	0.0000	0.0000	0.0000

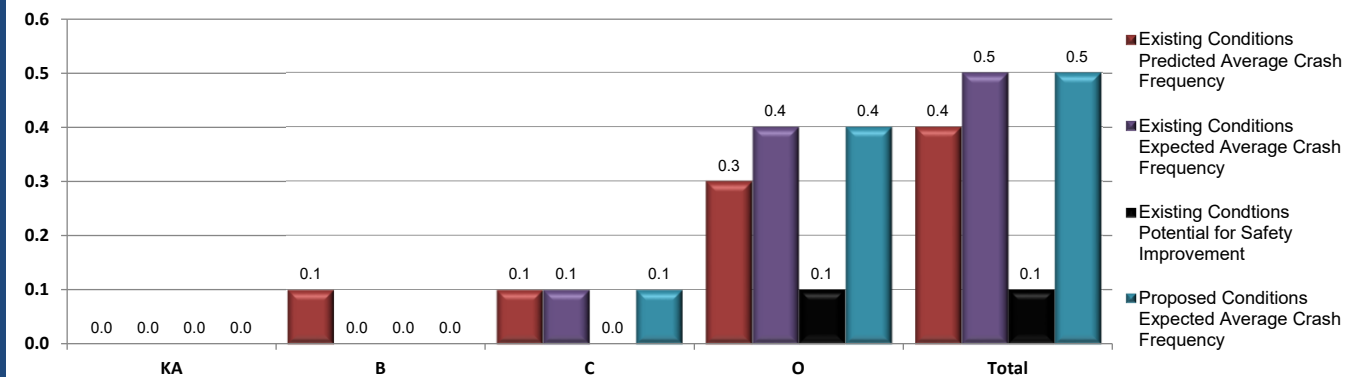


Project Safety Performance Report

General Information

Project Name	(6) Navarre & Sterilite	Contact Email	abc@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0128	0.0549	0.0773	0.2814	0.4264
N_{expected} - Existing Conditions	0.0110	0.0494	0.0707	0.3837	0.5148
N_{potential for improvement} - Existing Conditions	-0.0018	-0.0055	-0.0066	0.1023	0.0884
N_{expected} - Proposed Conditions	0.0110	0.0494	0.0707	0.3837	0.5148

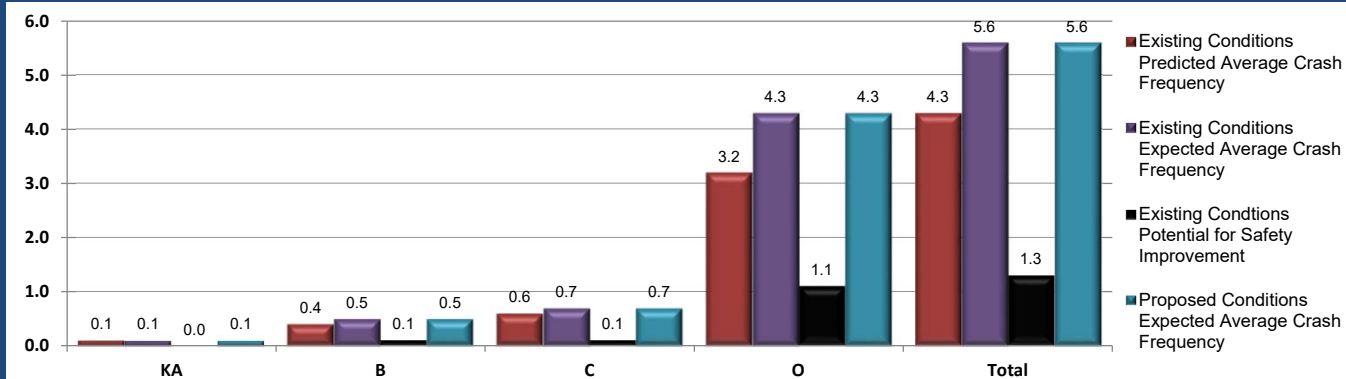


Project Safety Performance Report

General Information

Project Name	(8) Navarre & Richville	Contact Email	andy@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0932	0.4191	0.5754	3.1831	4.2708
N_{expected} - Existing Conditions	0.1046	0.4804	0.6812	4.3062	5.5724
N_{potential for improvement} - Existing Conditions	0.0114	0.0613	0.1058	1.1231	1.3016
N_{expected} - Proposed Conditions	0.1046	0.4804	0.6812	4.3062	5.5724

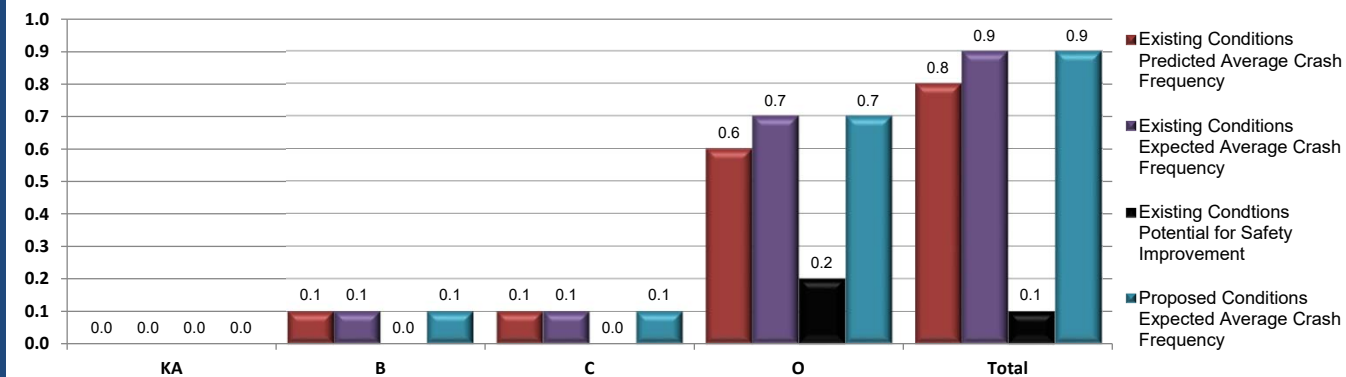


Project Safety Performance Report

General Information

Project Name	(11) Richville & US30 Eastbound Ramps	Contact Email	andy@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0203	0.0879	0.1255	0.5664	0.8001
N_{expected} - Existing Conditions	0.0165	0.0754	0.1095	0.7283	0.9297
N_{potential for improvement} - Existing Conditions	-0.0038	-0.0125	-0.0160	0.1619	0.1296
N_{expected} - Proposed Conditions	0.0165	0.0754	0.1095	0.7283	0.9297

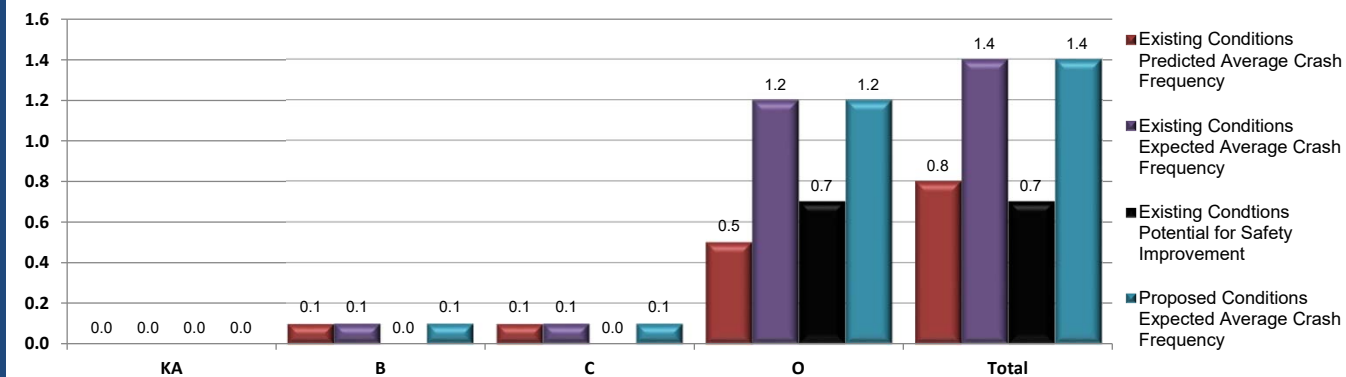


Project Safety Performance Report

General Information

Project Name	(12) Richville & US 30 Westbound Ramps	Contact Email	andy@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0190	0.0811	0.1142	0.5401	0.7544
N_{expected} - Existing Conditions	0.0194	0.0893	0.1307	1.1961	1.4355
N_{potential for improvement} - Existing Conditions	0.0004	0.0082	0.0165	0.6560	0.6811
N_{expected} - Proposed Conditions	0.0194	0.0893	0.1307	1.1961	1.4355

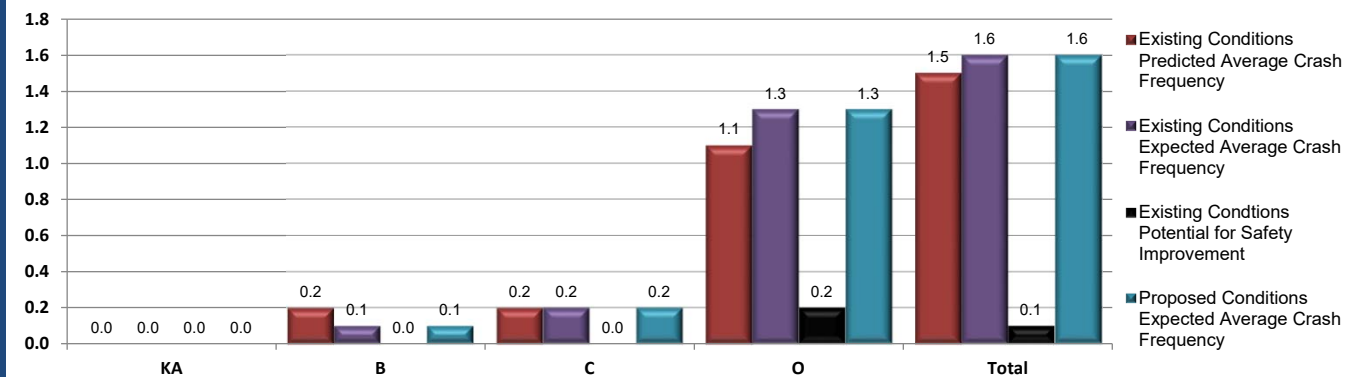


Project Safety Performance Report

General Information

Project Name	(13) Richville & Nave (S)	Contact Email	andy@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0400	0.1657	0.2315	1.0666	1.5038
N_{expected} - Existing Conditions	0.0289	0.1325	0.1921	1.2570	1.6105
N_{potential for improvement} - Existing Conditions	-0.0111	-0.0332	-0.0394	0.1904	0.1067
N_{expected} - Proposed Conditions	0.0289	0.1325	0.1921	1.2570	1.6105

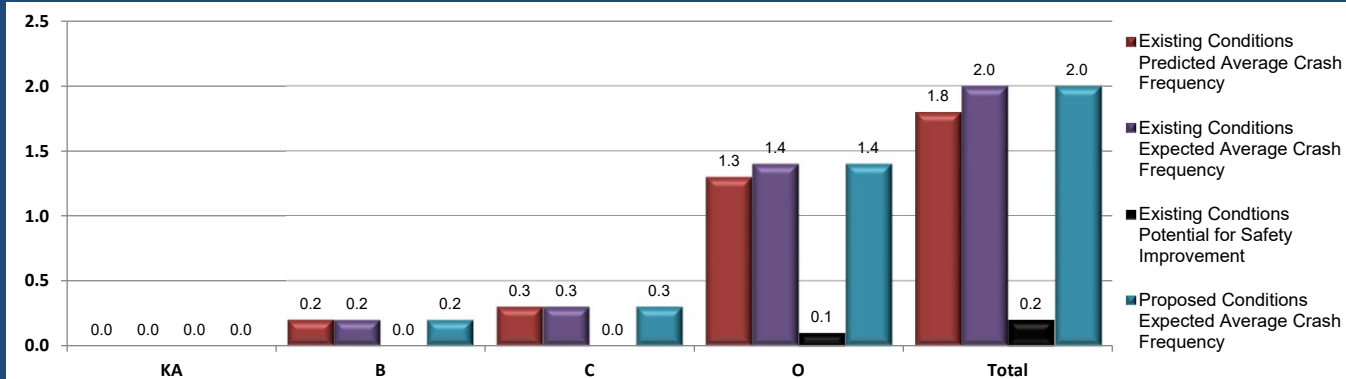


Project Safety Performance Report

General Information

Project Name	(14) Richville & Nave N	Contact Email	andy@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0472	0.2124	0.2958	1.2812	1.8366
N_{expected} - Existing Conditions	0.0485	0.2198	0.3092	1.4208	1.9983
N_{potential for improvement} - Existing Conditions	0.0013	0.0074	0.0134	0.1396	0.1617
N_{expected} - Proposed Conditions	0.0485	0.2198	0.3092	1.4208	1.9983

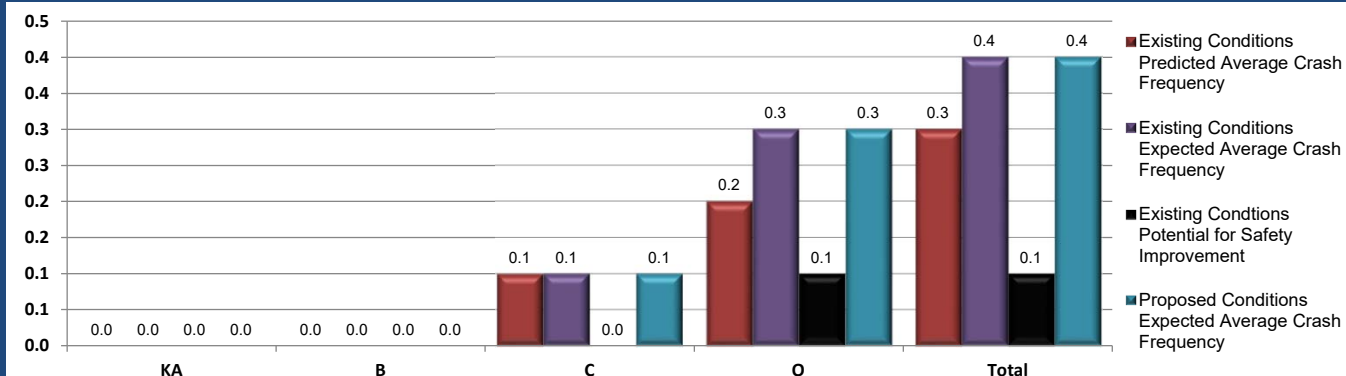


Project Safety Performance Report

General Information

Project Name	(16) Richville & Jackson	Contact Email	andy@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0092	0.0393	0.0552	0.1832	0.2869
N_{expected} - Existing Conditions	0.0081	0.0361	0.0516	0.2655	0.3613
N_{potential for improvement} - Existing Conditions	-0.0011	-0.0032	-0.0036	0.0823	0.0744
N_{expected} - Proposed Conditions	0.0081	0.0361	0.0516	0.2655	0.3613

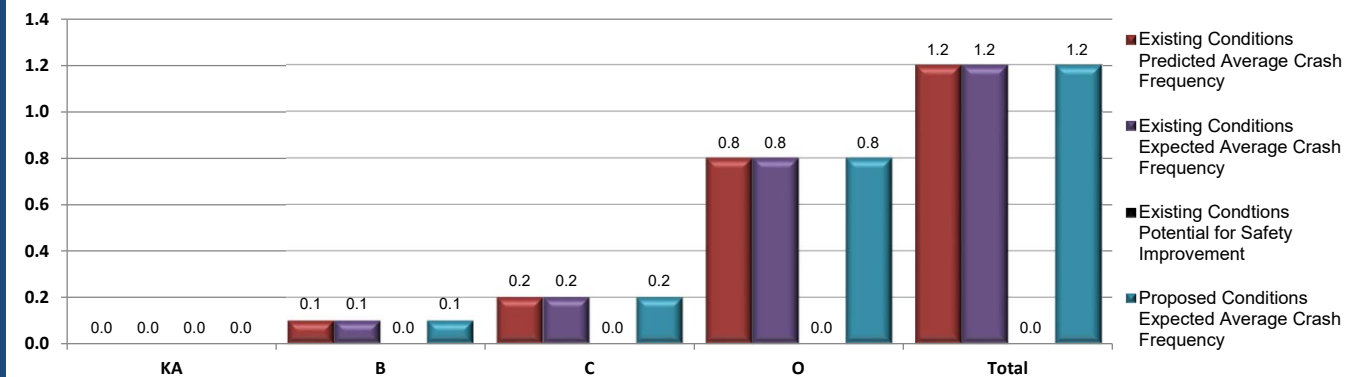


Project Safety Performance Report

General Information

Project Name	(17) Richville & Southway	Contact Email	andy@tmsengineers.com
Project Description	Existing Conditions	Contact Phone	(330) 686-6402
Reference Number	21-122	Date Performed	7/5/2022
Analyst	ABC	Analysis Year	2022
Agency/Company	TMS Engineers, Inc.		

Summary of Anticipated Safety Performance of the Project (average crashes/year)



Project Summary Results (Without Animal Crashes)

	KA	B	C	O	Total
N_{predicted} - Existing Conditions	0.0342	0.1484	0.2026	0.8468	1.2320
N_{expected} - Existing Conditions	0.0345	0.1492	0.2041	0.8491	1.2369
N_{potential for improvement} - Existing Conditions	0.0003	0.0008	0.0015	0.0023	0.0049
N_{expected} - Proposed Conditions	0.0345	0.1492	0.2041	0.8491	1.2369

Appendix G

SCATS Growth Rate Data

Appendix H

ODOT Peak Hour to Design Hour Factors

PEAK HOUR to DESIGN HOUR FACTORS
FUNCTIONAL CLASSIFICATION = 03, 04, 05u
 (Urban Principal Arterial, Urban Minor Arterial, & Urban Minor Collector)

Day Month		Monthly Average by Day-of-Week							
		WEEKDAY MON-THUR	Sun	Mon	Tue	Wed	Thu	Fri	Sat
		0	1	2	3	4	5	6	7
January	1	1.20	1.72	1.22	1.21	1.20	1.17	1.15	1.56
February	2	1.17	1.63	1.19	1.16	1.17	1.16	1.11	1.48
March	3	1.15	1.57	1.16	1.16	1.16	1.13	1.11	1.45
April	4	1.11	1.52	1.13	1.12	1.09	1.09	1.06	1.41
May	5	1.08	1.44	1.10	1.09	1.08	1.06	1.04	1.35
June	6	1.14	1.51	1.16	1.15	1.14	1.11	1.09	1.39
July	7	1.16	1.54	1.19	1.17	1.15	1.15	1.13	1.44
August	8	1.13	1.51	1.15	1.14	1.13	1.11	1.08	1.40
September	9	1.12	1.53	1.15	1.11	1.12	1.09	1.04	1.40
October	10	1.10	1.53	1.13	1.10	1.10	1.08	1.05	1.40
November	11	1.13	1.56	1.16	1.12	1.13	1.11	1.06	1.48
December	12	1.13	1.58	1.14	1.13	1.12	1.12	1.09	1.44

peak hour volume * factor = design hour volume

source: year 2016, 2017, & 2018 Automatic Traffic Recorders (ATR) Data

ATR Stations:

2018: 21, 28, 123, 131, 134, 166, 169, 517, 523, 543, 544, 550, 565, 605, 765

2017: 21, 123, 523, 538, 543, 544, 550, 565, 605, 725, 765, 28, 134, 169, 517, 131, 166

Ohio Department of Transportation

Modeling & Forecasting Section

June 2019

NOTE: These are NOT seasonal adjustment factors!!!

Note: Insufficient data exists to produce factors for functional classes 06 and 07 Urban.

PEAK HOUR to DESIGN HOUR FACTORS

FUNCTIONAL CLASSIFICATION = 05, 06r
(Rural Major Collector & Rural Minor Collector)

Day Month		Monthly Average by Day-of-Week							
		WEEKDAY MON-THUR	Sun	Mon	Tue	Wed	Thu	Fri	Sat
		0	1	2	3	4	5	6	7
January	1	1.31	2.00	1.35	1.32	1.29	1.28	1.23	1.80
February	2	1.26	1.91	1.27	1.25	1.27	1.28	1.18	1.67
March	3	1.24	1.80	1.25	1.24	1.24	1.23	1.17	1.64
April	4	1.16	1.60	1.20	1.18	1.13	1.14	1.08	1.55
May	5	1.13	1.56	1.15	1.12	1.12	1.11	1.06	1.46
June	6	1.18	1.57	1.20	1.20	1.15	1.15	1.13	1.44
July	7	1.22	1.60	1.25	1.22	1.20	1.22	1.17	1.50
August	8	1.17	1.53	1.18	1.17	1.16	1.14	1.09	1.40
September	9	1.13	1.54	1.16	1.13	1.12	1.10	1.04	1.39
October	10	1.13	1.59	1.17	1.11	1.12	1.11	1.04	1.39
November	11	1.18	1.77	1.21	1.17	1.17	1.19	1.08	1.59
December	12	1.22	1.86	1.22	1.22	1.22	1.24	1.16	1.64

peak hour volume * factor = design hour volume

source: year 2016, 2017, & 2018 Automatic Traffic Recorders (ATR) Data

ATR Stations:

2018: 7, 67, 171, 516, 520, 548, 773, 774

2017: 7, 67, 171, 516, 520, 773, 774, 548, 549

2016: 7, 67, 516, 520, 773, 774, 548, 549

Ohio Department of Transportation

Modeling & Forecasting Section

June 2019

NOTE: These are NOT seasonal adjustment factors!!!

PEAK HOUR to DESIGN HOUR FACTORS

FUNCTIONAL CLASSIFICATION = 01r

(Rural Interstate)

Day Month		Monthly Average by Day-of-Week							
		WEEKDAY MON-THUR	Sun	Mon	Tue	Wed	Thu	Fri	Sat
		0	1	2	3	4	5	6	7
January	1	1.65	1.68	1.75	1.72	1.62	1.52	1.34	1.75
February	2	1.59	1.58	1.69	1.63	1.57	1.49	1.20	1.66
March	3	1.48	1.33	1.54	1.54	1.47	1.36	1.13	1.50
April	4	1.42	1.27	1.50	1.48	1.40	1.31	1.11	1.46
May	5	1.37	1.27	1.44	1.41	1.37	1.26	1.06	1.35
June	6	1.32	1.18	1.38	1.37	1.30	1.22	1.05	1.29
July	7	1.29	1.13	1.36	1.33	1.27	1.21	1.04	1.22
August	8	1.33	1.15	1.40	1.37	1.32	1.23	1.05	1.24
September	9	1.41	1.25	1.49	1.45	1.40	1.29	1.05	1.32
October	10	1.38	1.18	1.47	1.42	1.36	1.26	1.04	1.33
November	11	1.44	1.35	1.49	1.45	1.45	1.36	1.10	1.46
December	12	1.47	1.57	1.57	1.53	1.42	1.37	1.19	1.54

peak hour volume * factor = design hour volume

source: year 2016, 2017, & 2018 Automatic Traffic Recorders (ATR) Data

ATR Stations:

Ohio Department of Transportation

2018: 135, 596, 608, 616, 617, 715, 745, 775, 787

2017: 135, 159, 596, 616, 617, 715, 745, 775

2016: 50, 135, 155, 159, 507, 596, 608, 610, 616, 617, 715, 775

Modeling & Forecasting Section

June 2019

NOTE: These are NOT seasonal adjustment factors!!!

PEAK HOUR to DESIGN HOUR FACTORS

FUNCTIONAL CLASSIFICATION = 04r

(Rural Minor Arterial)

Day Month		Monthly Average by Day-of-Week							
		WEEKDAY MON-THUR	Sun	Mon	Tue	Wed	Thu	Fri	Sat
		0	1	2	3	4	5	6	7
January	1	1.32	1.84	1.35	1.34	1.30	1.29	1.23	1.63
February	2	1.27	1.76	1.31	1.26	1.26	1.25	1.17	1.54
March	3	1.23	1.65	1.25	1.24	1.23	1.20	1.14	1.49
April	4	1.18	1.55	1.21	1.20	1.16	1.15	1.07	1.42
May	5	1.14	1.47	1.17	1.14	1.14	1.12	1.05	1.32
June	6	1.16	1.43	1.20	1.18	1.15	1.12	1.07	1.29
July	7	1.17	1.45	1.22	1.18	1.16	1.14	1.09	1.31
August	8	1.15	1.44	1.19	1.15	1.15	1.12	1.04	1.27
September	9	1.16	1.48	1.23	1.16	1.15	1.12	1.04	1.35
October	10	1.17	1.50	1.20	1.17	1.17	1.13	1.05	1.34
November	11	1.23	1.65	1.28	1.22	1.22	1.21	1.11	1.51
December	12	1.23	1.70	1.26	1.23	1.22	1.20	1.15	1.52

peak hour volume * factor = design hour volume

source: year 2016, 2017, & 2018 Automatic Traffic Recorders (ATR) Data

ATR Stations:

2018: 26, 69, 163, 165, 515, 607, 710, 738, 771, 780

2017: 26, 53, 69, 163, 165, 515, 607, 710, 738, 771

2016: 26, 53, 69, 163, 165, 607, 710, 771

Ohio Department of Transportation

Modeling & Forecasting Section

June 2019

NOTE: These are NOT seasonal adjustment factors!!!

Appendix I

Background Traffic Volume Forecast Calculations

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

1_MainWooster TF 042022

		Main Street (US 62/SR21) FROM NORTH						Main Street (US 62/SR21) FROM SOUTH						TOTAL NORTH SOUTH	Wooster Street NW FROM EAST						Wooster Street NW FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus		Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
AM PEAK	2022		Raw	7	258	21	286																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

2_KemaryFohl TF 040822

		Komary Avenue FROM NORTH						Komary Avenue FROM SOUTH						TOTAL NORTH SOUTH	Fohl Street FROM EAST						Fohl Street FROM WEST						TOTAL EAST WEST	TOTAL ALL DIRECTIONAL		
		Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus		Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus				
AM PEAK	2022	Raw	16	7	7	30				4	43	3	50			80	0	42	35	77			26	45	3	74			151	231
	DHV 2022	Federal No Build	1.060 17	1.060 7	1.060 7		32		1.078 4	1.078 46	1.078 3		54		86	1.060 0	1.060 45	1.060 37	82			1.060 28	1.060 48	1.060 3	78			160	246	
	Growth	Federal	0.000	0.000	0.000				0.001	0.001	0.001					0.003	0.003	0.003				0.006	0.006	0.006						
AM PEAK	2025	Adj +Growth+DHV Round	17 20	7 10	7 10	32 40			4 10	47 50	3 10	54 70		86 110	0 40	45 40	37 80	82				28 30	49 50	3 10	80 90			162 170	248 280	
	2045	Adj +Growth+DHV Round	17 20	7 10	7 10	32 40			4 10	48 50	3 10	56 70		87 110	0 40	47 50	39 40	87 90				31 30	54 50	4 10	89 90			176 180	263 290	
	2022	Raw	45	43	20	108			4	31	3	38		146	4	72	31	107				17	65	3	85			192	338	
PM PEAK	DHV 2022	Federal No Build	1.060 48	1.060 46	1.060 21		115		1.078 4	1.078 33	1.078 3		41		155	1.060 4	1.060 76	1.060 33	113			1.060 18	1.060 69	1.060 3	90			204	359	
	Growth	Federal	0.000	0.000	0.000				0.001	0.001	0.001					0.003	0.003	0.003				0.006	0.006	0.006						
	2025	Adj+Growth+DHV Round	48 50	46 50	21 20		115 120			4 10	34 30	3 10	41 50		156 170	4 10	77 80	33 30	114 120			18 20	70 70	3 10	92 100			206 220	362 390	
	2045	Adj+Growth+DHV Round	48 50	46 50	21 20		115 120			4 10	35 30	3 10	42 50		157 170	5 10	81 80	35 30	120 120			21 20	78 80	4 10	103 110			223 230	380 400	

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

3_NavarreMain TF 033122

[illegible]

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

4_NavarreMillennium TF 040622

[illegible]

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

5_MillenniumProspect TF 040622

		Millennium Boulevard SE						Millennium Boulevard SE						TOTAL NORTH SOUTH	Prospect Street SE						FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		FROM NORTH			Total			FROM SOUTH			Total				FROM EAST			Total			FROM WEST			Total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
		Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus		Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
AM PEAK	2022																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

AM PEAK

PM PEAK

TMS Engineers, Inc.
2112 Case Parkway S.
Unit #7
Twinsburg, Ohio 44087

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

7_NavarreStump TF 032922

[illegible]

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

8_NavarreRichville TF 041922

[illegible]

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

9_StumpCincinnati TF 041422

		Stump Avenue SW FROM NORTH						Stump Avenue SW FROM SOUTH						TOTAL NORTH SOUTH		FROM EAST						Cineinnat Drive SW FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.				
		Thru			Total			Trk			Bus			Total		Trk		Bus		Total			Trk			Bus							
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru			Right			
AM PEAK	2022		Raw	0	83	4	87					0	194	0	194					281	0	0	0	0	0	0	5	0	0	5	5	286	
	DHV 2022		Factor No Build	1.089 0	1.089 90	1.089 4	95					1.089 0	1.089 211	1.089 0	1.089 211					306	1.000 0	1.000 0	1.000 0	0	0	0	1.089 5	1.089 0	1.089 0	5	5	311	
	Growth		Factor	0.000	0.000	0.000						0.000	0.000	0.000							0.000	0.000	0.000										
PM PEAK	2025		Adj +Growth+DHV Round	0 0	90 90	4 10	95 100					0 0	211 210	0 0	211 210					306 310	0 0	0 0	0 0	0 0	0 0	0 0	5 10	0 0	0 0	5 10	5 10	311 320	
	2045		Adj +Growth+DHV Round	0 0	90 90	4 10	95 100					0 0	211 210	0 0	211 210					306 310	0 0	0 0	0 0	0 0	0 0	0 0	5 10	0 0	0 0	10 10	5 10	311 320	
	2022		Raw	0	120	6	126					2	145	0	147					273	0	0	0	0	0	0	3	0	2	5	5	278	
	DHV 2022		Factor No Build	1.089 0	1.089 131	1.089 7	137					1.089 2	1.089 158	1.089 0	1.089 160					1.089 297	1.089 0	1.000 0	1.000 0	0	0	0	1.089 3	1.089 0	1.089 2	5	5	303	
	Growth		Factor	0.000	0.000	0.000						0.000	0.000	0.000							0.000	0.000	0.000										
2025		Adj +Growth+DHV Round	0 0	131 130	7 10	137 140					2 10	158 160	0 0	160 170					297 310	0 0	0 0	0 0	0 0	0 0	0 0	5 20	3 10	0 0	2 10	5 20	5 20	303 330	
2045		Adj +Growth+DHV Round	0 0	131 130	7 10	137 140					2 10	158 160	0 0	160 170					297 310	0 0	0 0	0 0	0 0	0 0	0 0	5 20	3 10	0 0	2 10	5 20	5 20	303 330	

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

10_RichvilleStump TF 041422

		Creston Road SW FROM NORTH							Stump Avenue SW FROM SOUTH							TOTAL NORTH SOUTH		Richville Drive SW (SR 627) FROM EAST							Richville Drive SW (SR 627) FROM WEST							TOTAL EAST WEST		TOTAL ALL DIREC.										
		Lft	Thru	Right	Total	Trk	Bus	Lft	Thru	Right	Total	Trk	Bus	Lft	Thru			Right	Total	Trk	Bus	Lft	Thru	Right	Total	Trk	Bus																	
AM PEAK	2022							0	0	8	8					196	1	3	200							208	1	254	1	256							4	124	84	212			458	676
	DHV							1.089	1.089	1.089						1.089	1.089	1.089																										
	2022							0	0	9	9					213	1	3	218							227	1	277	1	279						1.089	1.089	1.089			510	736		
	Growth							0.000	0.000	0.000						0.000	0.000	0.000																										
PM PEAK	2025							0	0	9	9					213	1	3	218							227	1	279	1	281						4	137	93	234			514	741	
	Opening Year							0	0	10	10					210	10	10	230						240	10	280	10	300						10	140	90	240			540	780		
	2045							0	0	9	9					213	1	3	218						227	1	292	1	294						5	147	100	252			546	773		
	Design Year							0	0	10	10					210	10	10	230						240	10	290	10	310						10	150	100	260			570	810		
	2022							1	0	11	12					126	3	2	131						143	9	261	0	270					15	287	135	437			707	850			
	DHV							1.089	1.089	1.089						1.089	1.089	1.089										1.089	1.089	1.089							1.089	1.089	1.089					
2022							1	0	12	13					137	3	2	143						156	10	284	0	294						16	313	147	476			770	926			
Growth							0.000	0.000	0.000						0.000	0.000	0.000										0.002	0.002	0.002							0.004	0.004	0.004						
2025								1	0	12	13					137	3	2	143						156	10	286	0	296						17	316	149	482			778	934		
Opening Year								10	0	10	20					140	10	10	160					180	10	290	0	300	0	300					20	320	150	490			790	970		
2045																																												
Design Year								1	0	12	13					137	3	2	143					156	10	300	0	310						18	341	161	520			830	986			
2025								10	0	10	20					140	10	10	160					180	10	300	0	310						20	340	160	520			830	1010			
Opening Year																																												
2045																																												
Design Year																																												

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

11_Richville30EB TF 041222

		Richville Drive SW (SR 627)								Richville Drive SW (SR 627)								TOTAL NORTH SOUTH		FROM EAST								US 30 Eastbound Exit Ramp								TOTAL EAST WEST		TOTAL ALL DIREC.		
		FROM NORTH				FROM SOUTH				FROM SOUTH				FROM SOUTH				Lft	Thru	Right	Total	Trk	Bus	Lft	Thru	Right	Total	Trk	Bus	Lft	Thru	Right	Total	Trk	Bus					
		Lft	Thru	Right	Total	Trk	Bus	Lft	Thru	Right	Total	Trk	Bus	Lft	Thru	Right	Total																			Trk	Bus		Lft	Thru
AM PEAK	2022	Raw	196	144	0	340								0	341	130	471																		121	0	75	196	196	1007
	DHV	Factor	1.119	1.119	1.119										1.119	1.119	1.119																							
	2022	No Build	219	161	0	380									0	381	145	527																						
	Growth	Factor	0.004	0.004	0.004										0.004	0.004	0.004																							
PM PEAK	2025	Adj +Growth+DHV	222	163	0	385								0	386	147	533																							
	Opening Year	Round	220	160	0	380								0	390	150	540																							
	2045	Adj +Growth+DHV	239	175	0	414								0	416	159	575																							
	Design Year	Round	240	180	0	420								0	420	160	580																							
	2022	Raw	195	277	0	472								0	295	102	397																							
	DHV	Factor	1.119	1.119	1.119										1.119	1.119	1.119																							
	2022	No Build	218	310	0	528									0	330	114	444																						
Growth	Factor	0.004	0.004	0.004										0.004	0.004	0.004																								
2025	Adj +Growth+DHV	221	313	0	534									0	334	115	449																							
Opening Year	Round	220	310	0	530									0	330	120	450																							
2045	Adj +Growth+DHV	237	337	0	575									0	360	125	485																							
Design Year	Round	240	340	0	580									0	360	120	480																							

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

12_Richville30WB TF 041222

		Richville Drive SW (SR 627)						Richville Drive SW (SR 627)						TOTAL NORTH SOUTH	US 30 Westbound Exit Ramp FROM EAST						FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus		Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
AM PEAK	2022							0	281	88	369																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

13_RichvilleNaveS TF 042122

[illegible]

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

14_RichvilleNaveN TF 041822

		Richville Drive SW FROM NORTH						Richville Drive SW FROM SOUTH						TOTAL NORTH SOUTH		Nave Street SW FROM EAST						FROM WEST						TOTAL EAST WEST		TOTAL ALL DIREC.					
		Thru			Right			Total			Trk			Bus			Left			Thru			Right			Total			Trk			Bus			
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left		Thru	Right	Left	Thru	Right
2022	Raw	13	197	0	210				0	198	76	274				89	0	16	105				0	0	0	0							105	589	
COVID	Feeler	1,000	1,000	1,000					1,000	1,000	1,000					1,000	1,000	1,000				0,000	0,000	0,000											
2022	Adjusted	13	197	0	210				0	198	76	274				89	0	16	105				0	0	0	0							105	589	
DNV	Feeler	1,133	1,133	1,133					1,133	1,133	1,133					1,133	1,133	1,133				1,000	1,000	1,000											
2022	No Build	15	223	0	238				0	224	86	311				101	0	18	119			0	0	0	0							119	667		
Growth	Feeler	0,000	0,004	0,000					0,000	0,004	0,000					0,000	0,000	0,000				0,000	0,000	0,000											
2025	Adj +Growth+DNV	15	226	0	241				0	227	86	313				101	0	18	119			0	0	0	0							119	673		
Opening Year	Round	10	230	0	240				0	230	90	320				100	0	20	120			0	0	0	0							120	680		
2045	Adj +Growth+DNV	15	245	0	260				0	246	86	332				101	0	18	119			0	0	0	0							119	711		
Design Year	Round	10	250	0	260				0	250	90	340				100	0	20	120			0	0	0	0							120	720		
2022	Raw	26	250	0	276				0	265	137	402				102	0	29	131			0	0	0	0							131	809		
COVID	Feeler	1,000	1,000	1,000					1,000	1,000	1,000					1,000	1,000	1,000				0,000	0,000	0,000											
2022	Adjusted	26	250	0	276				0	265	137	402				102	0	29	131			0	0	0	0							131	809		
DNV	Feeler	1,133	1,133	1,133					1,133	1,133	1,133					1,133	1,133	1,133				1,000	1,000	1,000											
2022	No Build	29	283	0	313				0	300	155	456				116	0	33	148			0	0	0	0							148	917		
Growth	Feeler	0,000	0,004	0,000					0,000	0,004	0,000					0,000	0,000	0,000				0,000	0,000	0,000											
2025	Adj +Growth+DNV	29	287	0	316				0	304	155	459				116	0	33	148			0	0	0	0							148	924		
Opening Year	Round	30	290	0	320				0	300	160	460				120	0	30	150			0	0	0	0							150	930		
2045	Adj +Growth+DNV	29	311	0	341				0	330	155	485				116	0	33	148			0	0	0	0							148	974		
Design Year	Round	30	310	0	340				0	330	160	490				120	0	30	150			0	0	0	0							150	980		

AM PEAK

PM PEAK

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

15_RichvilleBusiness TF 040422

[illegible]

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

16_RichvilleJackson TF 040422

		Richville Drive SW FROM NORTH						Richville Drive SW FROM SOUTH						TOTAL NORTH SOUTH		Jackson Avenue SW FROM EAST						Driveway FROM WEST						TOTAL EAST WEST		TOTAL ALL DIREC.		
		Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus			Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus					
AM PEAK	2022		Raw	0	205	0	205			0	192	62	254					34	0	0	34					1	2	0	3		37	496
	DHV		Factor	1.133	1.133					1.133	1.133	1.133						1.133	1.133	1.133	1.133											
	2022		No Build	0	232	0	232	0	232	0	218	70	288					39	0	0	39					1	2	0	3		42	562
	Growth		Factor	0.004	0.004	0.004					0.004	0.004	0.004					0.004	0.004	0.004	0.004											
PM PEAK	2022		Raw	6	244	0	250			1	245	44	290					55	1	4	60					0	0	0	0		60	600
	DHV		Factor	1.133	1.133	1.133				1.133	1.133	1.133					1.133	1.133	1.133	1.133					1.133	1.133	1.133					
	2022		No Build	7	277	0	283			1	278	50	329					62	1	5	68					0	0	0	0		68	680
	Growth		Factor	0.004	0.004	0.004				0.004	0.004	0.004					0.004	0.004	0.004	0.004					0.000	0.000	0.000					
	2025		Adj +Growth+DHV	7	280	0	287																			0	0	0	0		69	689
Opening Year		Round	10	280	0	290			10	280	50	340					60	10	10	80					0	0	0	0		80	710	
2045		Adj +Growth+DHV	7	304	0	311																			0	0	0	0		75	747	
Design Year		Round	10	300	0	310			10	300	50	360					70	10	10	90					0	0	0	0		90	760	

WORKSHEET FOR NO BUILD VEHICULAR TRAFFIC VOLUME CALCULATIONS

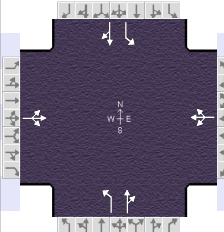
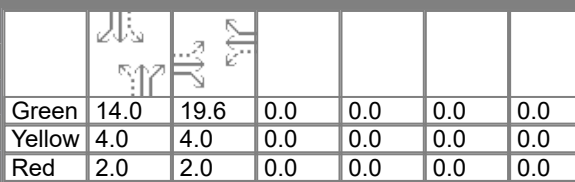
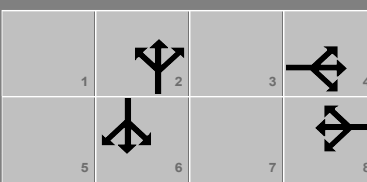
17_RichvilleSouthway TF 071422

		Richville Dr. FROM NORTH						Richville Dr. FROM SOUTH						TOTAL NORTH SOUTH	Southway St. FROM EAST						FROM WEST						TOTAL EAST WEST	TOTAL ALL DIREC.			
		Trk			Bus			Trk			Bus				Trk			Bus			Trk			Bus							
		Lft	Thru	Right	Total	Lft	Thru	Right	Total	Lft	Thru	Right	Total		Lft	Thru	Right	Total	Lft	Thru	Right	Total	Lft	Thru	Right	Total					
AM PEAK	2022	Raw	137	152	0	289			0	163	5	168			457			11	0	93	104			0	0	0	0			104	561
	DHV	Factor	1.153	1.153	1.153				1.153	1.153	1.153	1.153						1.153	1.153	1.153	1.000	1.000									
	2022	No Build	158	175	0	333			0	188	6	194			527			13	0	107	120			0	0	0	0			120	647
	Growth	Factor	0.004	0.004	0.004				0.004	0.004	0.004							0.004	0.004	0.004	0.000	0.000									
PM PEAK	2025	Adj +Growth+DHV	160	177	0	337			0	190	6	196			533			13	0	109	121			0	0	0	0			121	655
	Opening Year	Round	160	180	0	340			0	190	10	200			540			10	0	110	120			0	0	0	0			120	660
	2045	Adj +Growth+DHV	173	192	0	366			0	206	6	213			578			14	0	118	132			0	0	0	0			132	710
	Design Year	Round	170	190	0	360			0	210	10	220			580			10	0	120	130			0	0	0	0			130	710
	2022	Raw	116	262	0	378			0	243	11	254			632			13	0	154	167			0	0	0	0			167	799
	DHV	Factor	1.153	1.153	1.153				1.153	1.153	1.153	1.153						1.153	1.153	1.153	1.000	1.000			1.000	1.000	1.000			192	921
	2022	No Build	134	302	0	436			0	280	13	293			728			15	0	177	192			0	0	0	0				
Growth	Factor	0.004	0.004	0.004				0.004	0.004	0.004							0.004	0.004	0.004	0.000	0.000			0.000	0.000	0.000					
2025	Adj +Growth+DHV	135	306	0	441				0	284	13	296			738			15	0	180	195			0	0	0	0			195	933
Opening Year	Round	140	310	0	450			0	280	10	290			740			20	0	180	200			0	0	0	0			200	940	
2045	Adj +Growth+DHV	147	332	0	478				0	307	14	321			800			16	0	195	211			0	0	0	0			211	1011
Design Year	Round	150	330	0	480				0	310	10	320			800			20	0	190	210			0	0	0	0			210	1010

Appendix J

No-Build Capacity Analysis Worksheets - 2025

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Navarre, OH		Time Period		AM Peak		PHF		0.84									
Urban Street		North Main Street		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Wooster Street		File Name		1_AM 25 MainWooster.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				130	40	10	10	50	20	10	350	20	10	280	20				
Signal Information																			
Cycle, s	45.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	14.0	19.6	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				6.0				6.0	
Phase Duration, s						25.6				25.6				20.0				20.0	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.1	
Queue Clearance Time (g s), s						6.4				3.5				12.0				12.5	
Green Extension Time (g e), s						0.5				0.5				1.3				1.4	
Phase Call Probability						0.98				0.98				1.00				1.00	
Max Out Probability						0.00				0.00				0.06				0.02	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					214			95		12	440		12	357					
Adjusted Saturation Flow Rate (s), veh/h/ln					1428			1738		1016	1838		941	1834					
Queue Service Time (g s), s					2.9			0.0		0.5	10.0		0.5	7.6					
Cycle Queue Clearance Time (g c), s					4.4			1.5		8.1	10.0		10.5	7.6					
Green Ratio (g/C)					0.43			0.43		0.31	0.31		0.31	0.31					
Capacity (c), veh/h					750			836		299	563		240	562					
Volume-to-Capacity Ratio (X)					0.286			0.114		0.040	0.782		0.050	0.635					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					1.9			0.8		0.2	6.2		0.2	4.7					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00		0.02	0.00		0.05	0.00					
Uniform Delay (d 1), s/veh					8.6			7.8		17.1	14.4		19.2	13.6					
Incremental Delay (d 2), s/veh					0.1			0.0		0.0	0.9		0.0	0.4					
Initial Queue Delay (d 3), s/veh					0.0			0.0		0.0	0.0		0.0	0.0					
Control Delay (d), s/veh					8.7			7.8		17.1	15.3		19.2	14.1					
Level of Service (LOS)					A			A		B	B		B	B					
Approach Delay, s/veh / LOS				8.7	A	7.8	A	15.4	B	14.2	B								
Intersection Delay, s/veh / LOS				13.1						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

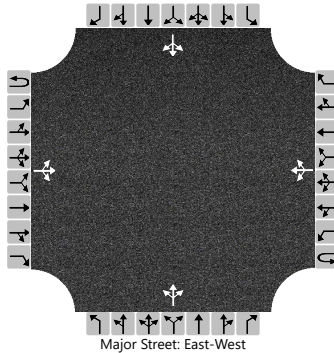
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Kemary & Fohl
Jurisdiction	Perry Twp, OH
East/West Street	Fohl Street
North/South Street	Kemary Avenue
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		30	50	10		10	40	40		10	50	10		20	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

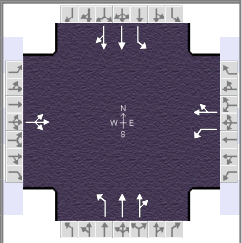
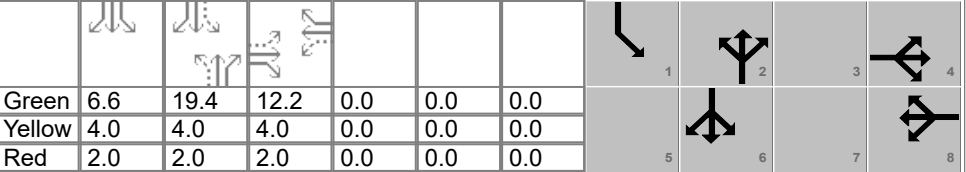
Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		34				11					80					45
Capacity, c (veh/h)		1498				1527					681					692
v/c Ratio		0.02				0.01					0.12					0.07
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					0.4					0.2
Control Delay (s/veh)		7.5	0.2	0.2		7.4	0.1	0.1			11.0					10.6
Level of Service (LOS)		A	A	A		A	A	A			B					B
Approach Delay (s/veh)	2.6				0.9				11.0				10.6			
Approach LOS	A				A				B				B			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon-Perry Twp		Time Period		AM Peak		PHF		0.94									
Urban Street		Erie Street		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		2_AM 25 NavarreMain.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	20	30	70	10	170	20	510	100	180	330	10				
Signal Information																			
Cycle, s	56.3	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.6	19.4	12.2	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2		1		6	
Case Number						8.0				6.0				6.3		1.0		4.0	
Phase Duration, s						18.2				18.2				25.4		12.6		38.1	
Change Period, (Y+R c), s						6.0				6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s						3.3				3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s						8.3				11.6				10.1		5.4		4.6	
Green Extension Time (g e), s						0.3				0.6				1.1		0.1		1.8	
Phase Call Probability						1.00				1.00				1.00		0.95		1.00	
Max Out Probability						0.75				0.00				0.09		1.00		0.01	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					85		74	191		21	333	316	191	181	180				
Adjusted Saturation Flow Rate (s), veh/h/ln					1170		1340	1586		1012	1856	1750	1767	1856	1836				
Queue Service Time (g s), s					0.2		3.0	6.1		0.8	8.1	8.1	3.4	2.6	2.6				
Cycle Queue Clearance Time (g c), s					6.3		9.6	6.1		0.8	8.1	8.1	3.4	2.6	2.6				
Green Ratio (g/C)					0.22		0.22	0.22		0.35	0.35	0.35	0.50	0.57	0.57				
Capacity (c), veh/h					343		263	346		476	640	603	492	1056	1045				
Volume-to-Capacity Ratio (X)					0.248		0.283	0.553		0.045	0.520	0.524	0.389	0.172	0.173				
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					1.5		1.5	3.6		0.3	5.1	4.9	1.8	1.2	1.2				
Queue Storage Ratio (RQ) (95 th percentile)					0.00		0.79	0.00		0.06	0.00	0.00	0.26	0.00	0.00				
Uniform Delay (d 1), s/veh					18.2		24.1	19.6		12.4	14.8	14.8	9.2	5.8	5.8				
Incremental Delay (d 2), s/veh					0.1		0.2	0.5		0.0	0.3	0.3	0.2	0.0	0.0				
Initial Queue Delay (d 3), s/veh					0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh					18.3		24.3	20.1		12.4	15.0	15.1	9.4	5.8	5.8				
Level of Service (LOS)					B		C	C		B	B	B	A	A	A				
Approach Delay, s/veh / LOS				18.3		B	21.3		C	15.0		B	7.1		A				
Intersection Delay, s/veh / LOS				13.4						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

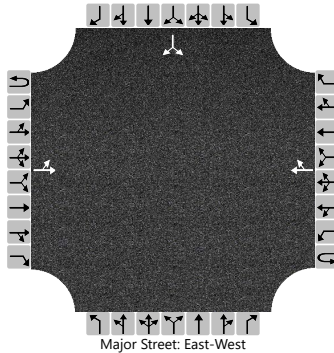
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Navarre & Millennium
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Millennium Boulevard
Peak Hour Factor	0.87
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		80	220				250	70						70		70
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		92													161	
Capacity, c (veh/h)		1185													457	
v/c Ratio		0.08													0.35	
95% Queue Length, Q ₉₅ (veh)		0.3													1.6	
Control Delay (s/veh)		8.3	0.7												17.1	
Level of Service (LOS)		A	A												C	
Approach Delay (s/veh)	2.8												17.1			
Approach LOS	A												C			

HCS Two-Way Stop-Control Report

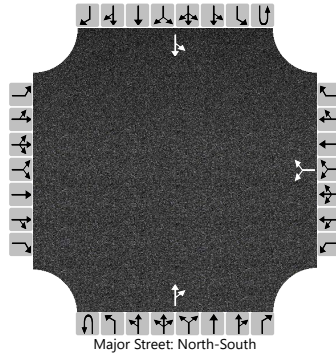
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Millennium & Prospect
Jurisdiction	Massillon, OH
East/West Street	Prospect Drive
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						90		10			80	30		10	40	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.43		6.23							4.13		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.53		3.33							2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							125								13		
Capacity, c (veh/h)							798								1440		
v/c Ratio							0.16								0.01		
95% Queue Length, Q ₉₅ (veh)							0.6								0.0		
Control Delay (s/veh)							10.3								7.5	0.1	
Level of Service (LOS)							B								A	A	
Approach Delay (s/veh)						10.3								1.6			
Approach LOS						B								A			

HCS Two-Way Stop-Control Report

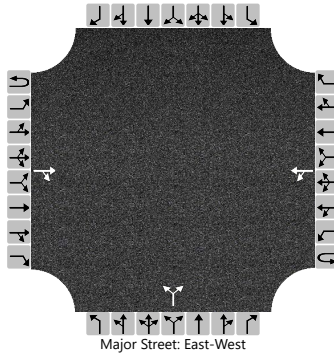
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Navarre & Sterilite
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Sterilite Street
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			220	50		30	250			50		80				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

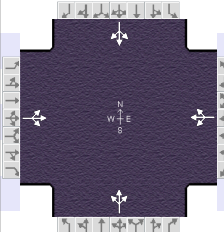
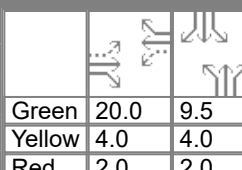
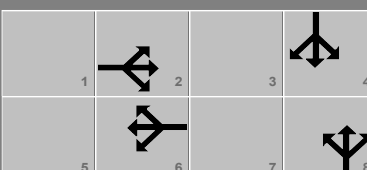
Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						38					163					
Capacity, c (veh/h)						1216					549					
v/c Ratio						0.03					0.30					
95% Queue Length, Q ₉₅ (veh)						0.1					1.2					
Control Delay (s/veh)						8.1	0.3				14.3					
Level of Service (LOS)						A	A				B					
Approach Delay (s/veh)					1.1				14.3							
Approach LOS					A				B							

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Perry Twp, OH		Time Period		AM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		8_AM 25 NavarreRichville.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				20	230	70	40	160	30	60	220	50	20	130	10				
Signal Information																			
Cycle, s	61.5	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.0	9.5	14.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						2				6				8				4	
Case Number						8.0				8.0				12.0				12.0	
Phase Duration, s						26.0				26.0				20.0				15.5	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.1				3.1				3.0				3.0	
Queue Clearance Time (g s), s						11.6				8.3				13.3				7.3	
Green Extension Time (g e), s						0.9				1.1				0.6				0.3	
Phase Call Probability						1.00				1.00				1.00				0.94	
Max Out Probability						0.02				0.00				0.00				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				5	2	12	1	6	16	3	8	18	7	4	14				
Adjusted Flow Rate (v), veh/h					333			240			344			167					
Adjusted Saturation Flow Rate (s), veh/h/ln					1757			1692			1790			1824					
Queue Service Time (g s), s					0.0			0.0			11.3			5.3					
Cycle Queue Clearance Time (g c), s					9.6			6.3			11.3			5.3					
Green Ratio (g/C)					0.33			0.33			0.23			0.15					
Capacity (c), veh/h					633			618			411			281					
Volume-to-Capacity Ratio (X)					0.527			0.388			0.836			0.593					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					6.2			4.1			7.8			3.8					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00			0.00			0.00					
Uniform Delay (d 1), s/veh					17.3			16.2			22.7			24.3					
Incremental Delay (d 2), s/veh					0.3			0.1			1.8			0.7					
Initial Queue Delay (d 3), s/veh					0.0			0.0			0.0			0.0					
Control Delay (d), s/veh					17.6			16.4			24.4			25.1					
Level of Service (LOS)					B			B			C			C					
Approach Delay, s/veh / LOS				17.6		B	16.4		B	24.4		C	25.1		C				
Intersection Delay, s/veh / LOS				20.6						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

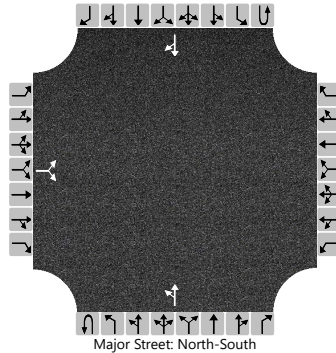
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Stump & Cincinnati
Jurisdiction	Perry Twp, OH
East/West Street	Stump Avenue
North/South Street	Cincinnati Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		10		10						10	210				90	10
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			21							11						
Capacity, c (veh/h)			768							1478						
v/c Ratio			0.03							0.01						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			9.8							7.5	0.1					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)	9.8								0.4							
Approach LOS	A								A							

HCS Two-Way Stop-Control Report

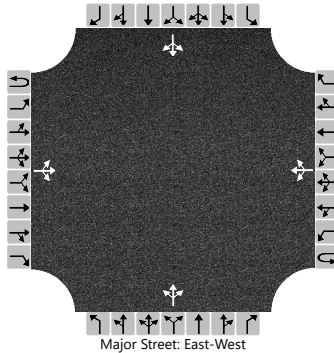
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Richville & Stump
Jurisdiction	Perry Twp, OH
East/West Street	Richville Drive
North/South Street	Stump Avenue/Creston Drive
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		10	140	90		10	280	10		210	10	10		10	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11				11					258					34
Capacity, c (veh/h)		1228				1300					411					479
v/c Ratio		0.01				0.01					0.63					0.07
95% Queue Length, Q ₉₅ (veh)		0.0				0.0					4.2					0.2
Control Delay (s/veh)		8.0	0.1	0.1		7.8	0.1	0.1			27.4					13.1
Level of Service (LOS)		A	A	A		A	A	A			D					B
Approach Delay (s/veh)	0.4				0.3				27.4				13.1			
Approach LOS	A				A				D				B			

HCS Two-Way Stop-Control Report

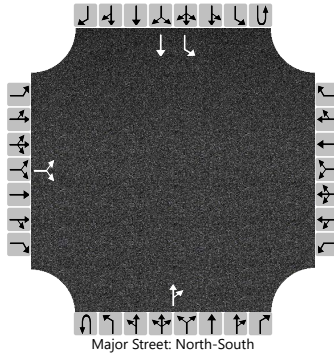
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & US30 EB
Jurisdiction	Massillon, OH
East/West Street	US30 EB Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	1	1	0
Configuration			LR									TR		L	T	
Volume (veh/h)		130		80							390	150		220	160	
Percent Heavy Vehicles (%)		3		3										3		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2										4.1		
Critical Headway (sec)		7.13		6.23										4.13		
Base Follow-Up Headway (sec)		3.5		3.3										2.2		
Follow-Up Headway (sec)		3.53		3.33										2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			216											227		
Capacity, c (veh/h)			266											1009		
v/c Ratio			0.81											0.22		
95% Queue Length, Q ₉₅ (veh)			6.4											0.9		
Control Delay (s/veh)			58.5											9.6		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)	58.5												5.6			
Approach LOS	F												A			

HCS Two-Way Stop-Control Report

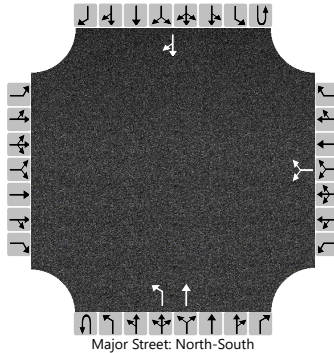
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & US30 WB
Jurisdiction	Massillon, OH
East/West Street	US30 Westbound Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.85
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	0
Configuration							LR			L	T					TR
Volume (veh/h)						60		270		190	340				320	100
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						388				224						
Capacity, c (veh/h)						513				1064						
v/c Ratio						0.76				0.21						
95% Queue Length, Q ₉₅ (veh)						6.6				0.8						
Control Delay (s/veh)						30.6				9.3						
Level of Service (LOS)						D				A						
Approach Delay (s/veh)					30.6				3.3							
Approach LOS					D				A							

HCS Two-Way Stop-Control Report

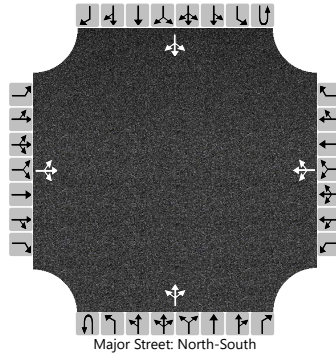
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Nave (S)
Jurisdiction	Massillon, OH
East/West Street	Nave Road/RG Drage
North/South Street	Richville Road
Peak Hour Factor	0.81
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		30	10	80		10	0	10		70	260	240		40	300	40
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

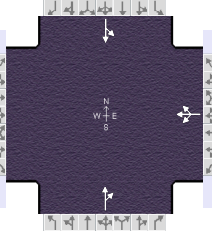
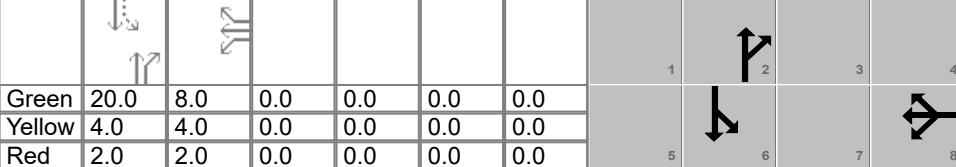
Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			148				25				86				49	
Capacity, c (veh/h)			330				197				1134				958	
v/c Ratio			0.45				0.13				0.08				0.05	
95% Queue Length, Q ₉₅ (veh)			2.2				0.4				0.2				0.2	
Control Delay (s/veh)			24.5				25.9				8.4	1.0	1.0		9.0	0.6
Level of Service (LOS)			C				D				A	A	A		A	A
Approach Delay (s/veh)	24.5				25.9				1.9				1.5			
Approach LOS	C				D				A				A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.84									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Nave Road (North)		File Name		14_AM 25 RichvilleNaveN.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							100	0	20		230	90	10	230					
Signal Information																			
Cycle, s	40.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.0	8.0	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2				6	
Case Number										12.0				8.0				8.0	
Phase Duration, s										14.0				26.0				26.0	
Change Period, (Y+R c), s										6.0				6.0				6.0	
Max Allow Headway (MAH), s										3.1				3.0				3.0	
Queue Clearance Time (g s), s										4.9				7.5				5.6	
Green Extension Time (g e), s										0.1				1.1				1.1	
Phase Call Probability										0.80				1.00				1.00	
Max Out Probability										0.10				0.01				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								143			381			286					
Adjusted Saturation Flow Rate (s), veh/h/ln								1731			1766			1835					
Queue Service Time (g s), s								2.9			5.5			0.0					
Cycle Queue Clearance Time (g c), s								2.9			5.5			3.6					
Green Ratio (g/C)								0.20			0.50			0.50					
Capacity (c), veh/h								345			884			1013					
Volume-to-Capacity Ratio (X)								0.415			0.431			0.282					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								1.6			2.0			1.4					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00			0.00					
Uniform Delay (d 1), s/veh								14.0			6.4			5.9					
Incremental Delay (d 2), s/veh								0.3			0.1			0.1					
Initial Queue Delay (d 3), s/veh								0.0			0.0			0.0					
Control Delay (d), s/veh								14.3			6.5			5.9					
Level of Service (LOS)								B			A			A					
Approach Delay, s/veh / LOS				0.0				14.3		B		6.5		A		5.9		A	
Intersection Delay, s/veh / LOS				7.7										A					
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

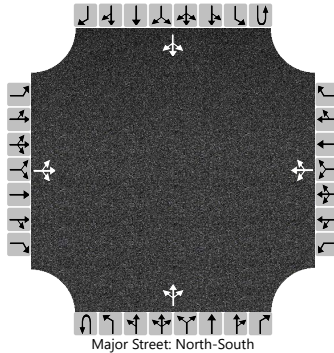
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Business Place
Jurisdiction	Massillon, OH
East/West Street	Business Place & Ohio State Drive
North/South Street	Richville Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		80	0	70		10	0	10		20	210	20		10	250	20
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			160				21				21				11	
Capacity, c (veh/h)			528				517				1269				1316	
v/c Ratio			0.30				0.04				0.02				0.01	
95% Queue Length, Q ₉₅ (veh)			1.3				0.1				0.1				0.0	
Control Delay (s/veh)			14.7				12.3				7.9	0.2	0.2		7.8	0.1
Level of Service (LOS)			B				B				A	A	A		A	A
Approach Delay (s/veh)	14.7				12.3				0.8				0.3			
Approach LOS	B				B				A				A			

HCS Two-Way Stop-Control Report

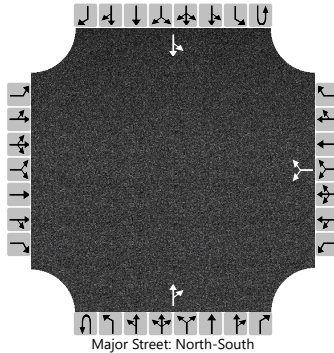
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Jackson
Jurisdiction	Massillon, OH
East/West Street	Jackson Avenue
North/South Street	Richville Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						40		10			220	70		10	240	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

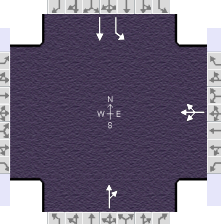
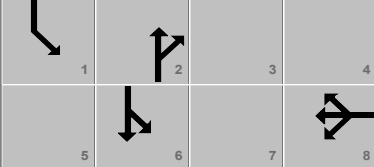
Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

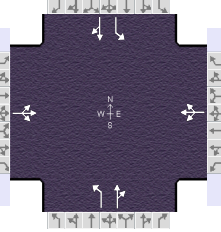
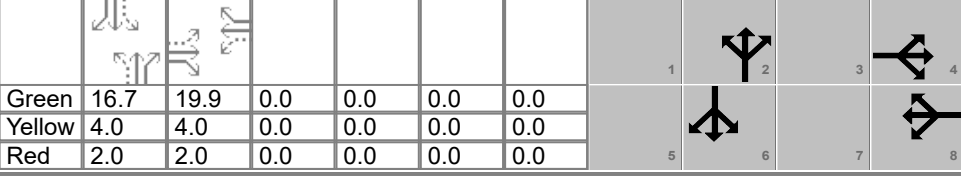
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							53								11			
Capacity, c (veh/h)							529								1246			
v/c Ratio							0.10								0.01			
95% Queue Length, Q ₉₅ (veh)							0.3								0.0			
Control Delay (s/veh)							12.6								7.9	0.1		
Level of Service (LOS)							B								A	A		
Approach Delay (s/veh)						12.6										0.4		
Approach LOS						B										A		

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.80									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Southway Street		File Name		17_AM 25 RichvilleSouthway.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							10	0	110		190	10	160	180					
Signal Information																			
Cycle, s	53.2	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.6	19.7	8.9	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2		1		6	
Case Number										12.0				8.3		1.0		4.0	
Phase Duration, s										14.9				25.7		12.6		38.3	
Change Period, (Y+R c), s										6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s										3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s										6.6				7.3		5.2		4.9	
Green Extension Time (g e), s										0.1				0.4		0.1		0.7	
Phase Call Probability										0.89				1.00		0.95		1.00	
Max Out Probability										0.92				0.00		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								150			250		200	225					
Adjusted Saturation Flow Rate (s), veh/h/ln								1587			1839		1767	1856					
Queue Service Time (g s), s								4.6			5.3		3.2	2.9					
Cycle Queue Clearance Time (g c), s								4.6			5.3		3.2	2.9					
Green Ratio (g/C)								0.17			0.37		0.53	0.61					
Capacity (c), veh/h								266			680		659	1126					
Volume-to-Capacity Ratio (X)								0.564			0.368		0.304	0.200					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								2.8			3.1		1.5	1.2					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00		0.25	0.00					
Uniform Delay (d 1), s/veh								20.4			12.2		7.2	4.7					
Incremental Delay (d 2), s/veh								0.7			0.1		0.1	0.0					
Initial Queue Delay (d 3), s/veh								0.0			0.0		0.0	0.0					
Control Delay (d), s/veh								21.1			12.4		7.3	4.7					
Level of Service (LOS)								C			B		A	A					
Approach Delay, s/veh / LOS				0.0				21.1		C		12.4		B		5.9		A	
Intersection Delay, s/veh / LOS				10.6						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Navarre, OH		Time Period		PM Peak		PHF		0.91									
Urban Street		North Main Street		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Wooster Street		File Name		1_PM 25 MainWooster.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				140	60	10	30	70	30	10	380	30	20	410	50				
Signal Information																			
Cycle, s	48.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	16.7	19.9	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				6.0				6.0	
Phase Duration, s						25.9				25.9				22.7				22.7	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.1	
Queue Clearance Time (g s), s						7.2				4.5				14.8				14.3	
Green Extension Time (g e), s						0.6				0.7				1.9				1.8	
Phase Call Probability						0.99				0.99				1.00				1.00	
Max Out Probability						0.00				0.00				0.02				0.04	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h				231			143			11	451		22	505					
Adjusted Saturation Flow Rate (s), veh/h/ln				1435			1678			886	1831		933	1820					
Queue Service Time (g s), s				2.7			0.0			0.6	10.4		1.0	12.3					
Cycle Queue Clearance Time (g c), s				5.2			2.5			12.8	10.4		11.4	12.3					
Green Ratio (g/C)				0.41			0.41			0.34	0.34		0.34	0.34					
Capacity (c), veh/h				710			777			229	631		269	627					
Volume-to-Capacity Ratio (X)				0.325			0.184			0.048	0.714		0.082	0.807					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)				2.4			1.4			0.2	6.4		0.4	7.5					
Queue Storage Ratio (RQ) (95 th percentile)				0.00			0.00			0.02	0.00		0.09	0.00					
Uniform Delay (d 1), s/veh				10.0			9.2			20.3	13.9		18.8	14.5					
Incremental Delay (d 2), s/veh				0.1			0.0			0.0	0.6		0.0	1.0					
Initial Queue Delay (d 3), s/veh				0.0			0.0			0.0	0.0		0.0	0.0					
Control Delay (d), s/veh				10.1			9.3			20.3	14.4		18.9	15.4					
Level of Service (LOS)				B			A			C	B		B	B					
Approach Delay, s/veh / LOS				10.1		B		9.3		A		14.6		B		15.6		B	
Intersection Delay, s/veh / LOS				13.6												B			
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

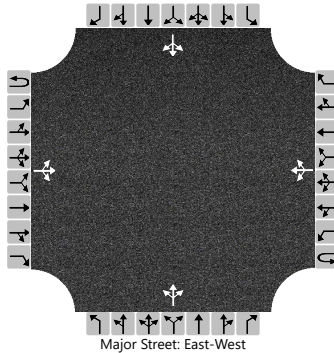
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Kemary & Fohl
Jurisdiction	Perry Twp, OH
East/West Street	Fohl Street
North/South Street	Kemary Avenue
Peak Hour Factor	0.86
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		20	70	10		10	80	30		10	30	10		50	50	20
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				12					58				140	
Capacity, c (veh/h)		1452				1495					649				651	
v/c Ratio		0.02				0.01					0.09				0.21	
95% Queue Length, Q ₉₅ (veh)		0.0				0.0					0.3				0.8	
Control Delay (s/veh)		7.5	0.1	0.1		7.4	0.1	0.1			11.1				12.0	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	1.6				0.7				11.1				12.0			
Approach LOS	A				A				B				B			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon-Perry Twp		Time Period		PM Peak		PHF		0.80									
Urban Street		Erie Street		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		3_PM 25 NavarreMain.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	20	50	150	30	250	20	630	110	210	680	10				
Signal Information																			
Cycle, s	75.2	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	7.0	25.8	24.4	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2		1		6	
Case Number						8.0				6.0				6.3		1.0		4.0	
Phase Duration, s						30.4				30.4				31.8		13.0		44.8	
Change Period, (Y+R c), s						6.0				6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s						3.3				3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s						13.4				19.9				20.0		9.0		14.0	
Green Extension Time (g e), s						1.4				1.5				3.9		0.0		3.9	
Phase Call Probability						1.00				1.00				1.00		1.00		1.00	
Max Out Probability						0.00				0.00				0.00		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					125		188	350		25	475	450	263	432	430				
Adjusted Saturation Flow Rate (s), veh/h/ln					1132		1299	1599		636	1856	1759	1767	1856	1846				
Queue Service Time (g s), s					0.6		10.2	14.7		2.1	18.0	18.0	7.0	12.0	12.0				
Cycle Queue Clearance Time (g c), s					11.4		17.9	14.7		2.2	18.0	18.0	7.0	12.0	12.0				
Green Ratio (g/C)					0.32		0.32	0.32		0.34	0.34	0.34	0.49	0.52	0.52				
Capacity (c), veh/h					446		410	548		309	640	606	305	941	937				
Volume-to-Capacity Ratio (X)					0.280		0.458	0.639		0.081	0.742	0.742	0.861	0.459	0.459				
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					2.8		5.3	8.8		0.5	11.7	11.2	7.9	7.7	7.7				
Queue Storage Ratio (RQ) (95 th percentile)					0.00		2.74	0.00		0.12	0.00	0.00	1.15	0.00	0.00				
Uniform Delay (d 1), s/veh					18.9		26.6	22.1		17.9	23.1	23.1	19.6	12.7	12.7				
Incremental Delay (d 2), s/veh					0.1		0.3	0.5		0.0	0.6	0.7	20.5	0.1	0.1				
Initial Queue Delay (d 3), s/veh					0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh					19.0		26.9	22.6		17.9	23.7	23.8	40.1	12.8	12.8				
Level of Service (LOS)					B		C	C		B	C	C	D	B	B				
Approach Delay, s/veh / LOS				19.0	B		24.1	C		23.6	C		19.2	B					
Intersection Delay, s/veh / LOS				21.7									C						
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

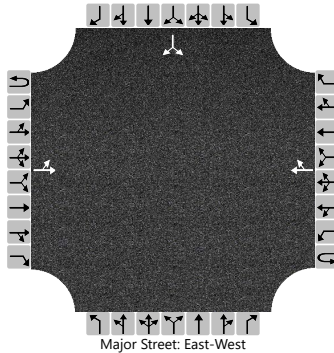
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Navarre & Millennium
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		30	360				290	20						50		70
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		38													150	
Capacity, c (veh/h)		1166													437	
v/c Ratio		0.03													0.34	
95% Queue Length, Q ₉₅ (veh)		0.1													1.5	
Control Delay (s/veh)		8.2	0.4												17.5	
Level of Service (LOS)		A	A												C	
Approach Delay (s/veh)	1.0												17.5			
Approach LOS	A												C			

HCS Two-Way Stop-Control Report

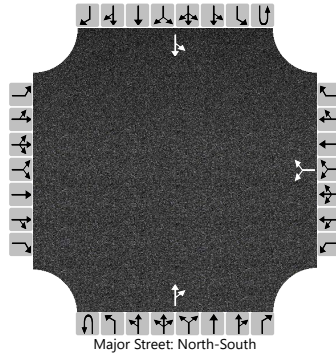
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Millennium & Prospect
Jurisdiction	Massillon, OH
East/West Street	Prospect Drive
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						10		10			30	10		10	110	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.43		6.23							4.13		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.53		3.33							2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							25								13		
Capacity, c (veh/h)							881								1550		
v/c Ratio							0.03								0.01		
95% Queue Length, Q ₉₅ (veh)							0.1								0.0		
Control Delay (s/veh)							9.2								7.3	0.1	
Level of Service (LOS)							A								A	A	
Approach Delay (s/veh)						9.2								0.7			
Approach LOS						A								A			

HCS Two-Way Stop-Control Report

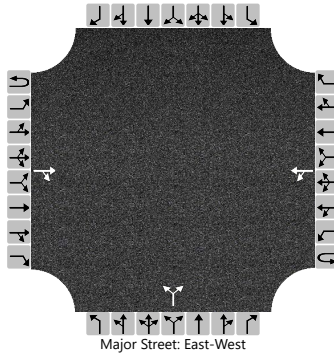
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Navarre & Sterilite
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Sterilite Street
Peak Hour Factor	0.83
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			320	20		10	270			50		50				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

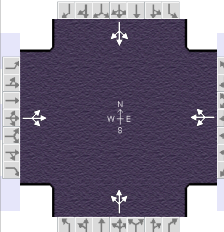
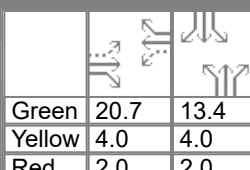
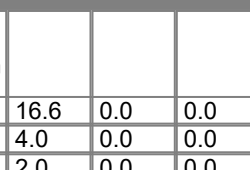
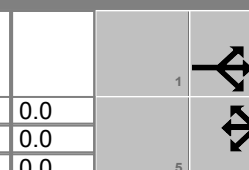
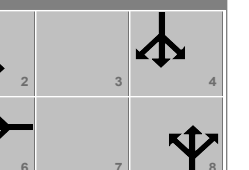
Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						12					120					
Capacity, c (veh/h)						1144					475					
v/c Ratio						0.01					0.25					
95% Queue Length, Q ₉₅ (veh)						0.0					1.0					
Control Delay (s/veh)						8.2	0.1				15.1					
Level of Service (LOS)						A	A				C					
Approach Delay (s/veh)					0.4				15.1							
Approach LOS					A				C							

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Perry Twp, OH		Time Period		PM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		8_PM 25 NavarreRichville.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				20	260	100	60	230	30	80	190	60	50	190	20				
Signal Information																			
Cycle, s	68.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.7	13.4	16.6	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						2				6				8				4	
Case Number						8.0				8.0				12.0				12.0	
Phase Duration, s						26.7				26.6				22.6				19.4	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.1				3.1				3.1				3.0	
Queue Clearance Time (g s), s						16.5				14.6				14.9				12.0	
Green Extension Time (g e), s						1.5				1.5				0.6				0.5	
Phase Call Probability						1.00				1.00				1.00				1.00	
Max Out Probability						0.00				0.00				0.00				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				5	2	12	1	6	16	3	8	18	7	4	14				
Adjusted Flow Rate (v), veh/h					396			333			344			271					
Adjusted Saturation Flow Rate (s), veh/h/ln					1748			1619			1776			1813					
Queue Service Time (g s), s					2.1			0.0			12.9			10.0					
Cycle Queue Clearance Time (g c), s					14.5			12.6			12.9			10.0					
Green Ratio (g/C)					0.30			0.30			0.24			0.19					
Capacity (c), veh/h					575			543			442			363					
Volume-to-Capacity Ratio (X)					0.688			0.614			0.778			0.746					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					9.3			7.9			8.7			7.4					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00			0.00			0.00					
Uniform Delay (d 1), s/veh					22.6			21.7			25.0			26.8					
Incremental Delay (d 2), s/veh					0.6			0.4			1.1			1.2					
Initial Queue Delay (d 3), s/veh					0.0			0.0			0.0			0.0					
Control Delay (d), s/veh					23.2			22.1			26.1			28.0					
Level of Service (LOS)					C			C			C			C					
Approach Delay, s/veh / LOS				23.2	C	22.1	C	26.1	C	28.0	C								
Intersection Delay, s/veh / LOS				24.6						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

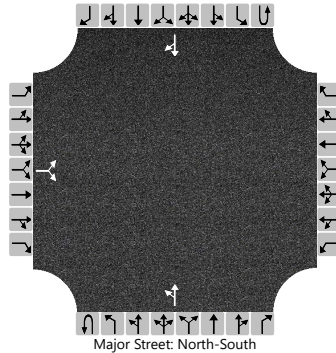
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Stump & Cincinnati
Jurisdiction	Perry Twp, OH
East/West Street	Stump Avenue
North/South Street	Cincinnati Drive
Peak Hour Factor	0.82
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		10		10						10	160				130	10
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			24							12						
Capacity, c (veh/h)			720							1400						
v/c Ratio			0.03							0.01						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			10.2							7.6	0.1					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	10.2								0.5							
Approach LOS	B								A							

HCS Two-Way Stop-Control Report

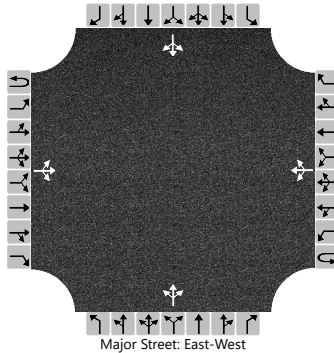
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Richville & Stump
Jurisdiction	Perry Twp, OH
East/West Street	Richville Drive
North/South Street	Stump Avenue/Creston Drive
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		20	320	150		10	290	10		140	10	10		10	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				11					182				34	
Capacity, c (veh/h)		1213				1029					263				338	
v/c Ratio		0.02				0.01					0.69				0.10	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					4.6				0.3	
Control Delay (s/veh)		8.0	0.2	0.2		8.5	0.1	0.1			44.6				16.9	
Level of Service (LOS)		A	A	A		A	A	A			E				C	
Approach Delay (s/veh)	0.5				0.4				44.6				16.9			
Approach LOS	A				A				E				C			

HCS Two-Way Stop-Control Report

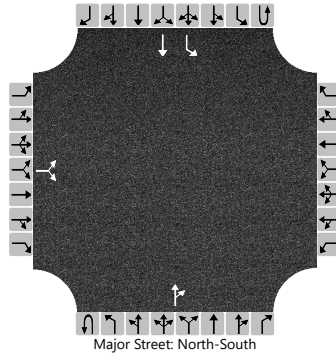
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & US30 EB
Jurisdiction	Massillon, OH
East/West Street	US30 EB Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	1	1	0
Configuration			LR									TR		L	T	
Volume (veh/h)		140		160							330	120		220	310	
Percent Heavy Vehicles (%)		3		3										3		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2										4.1		
Critical Headway (sec)		7.13		6.23										4.13		
Base Follow-Up Headway (sec)		3.5		3.3										2.2		
Follow-Up Headway (sec)		3.53		3.33										2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			337											247		
Capacity, c (veh/h)			254											1054		
v/c Ratio			1.33											0.23		
95% Queue Length, Q ₉₅ (veh)			17.6											0.9		
Control Delay (s/veh)			211.1											9.5		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)	211.1												3.9			
Approach LOS	F												A			

HCS Two-Way Stop-Control Report

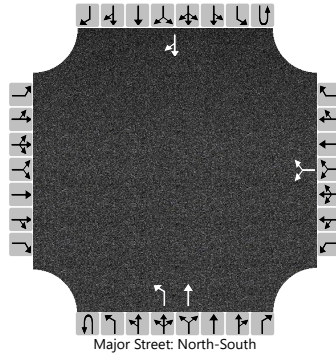
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & US30 WB
Jurisdiction	Massillon, OH
East/West Street	US30 Westbound Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	0
Configuration							LR			L	T					TR
Volume (veh/h)						100		250		150	340				420	90
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						389				167						
Capacity, c (veh/h)						432				1000						
v/c Ratio						0.90				0.17						
95% Queue Length, Q ₉₅ (veh)						9.7				0.6						
Control Delay (s/veh)						53.3				9.3						
Level of Service (LOS)						F				A						
Approach Delay (s/veh)					53.3				2.9							
Approach LOS					F				A							

HCS Two-Way Stop-Control Report

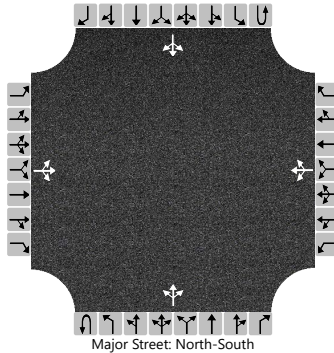
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Nave (S)
Jurisdiction	Massillon, OH
East/West Street	Nave Road/RG Drage
North/South Street	Richville Road
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		140	60	10		30	70	30		10	390	30		20	420	50
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

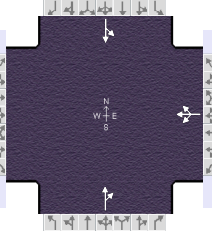
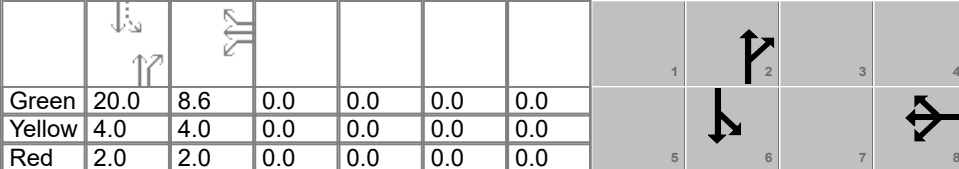
Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			231				143			11				22		
Capacity, c (veh/h)			153				230			1044				1094		
v/c Ratio			1.51				0.62			0.01				0.02		
95% Queue Length, Q ₉₅ (veh)			15.3				3.7			0.0				0.1		
Control Delay (s/veh)			312.0				43.3			8.5	0.1	0.1		8.4	0.2	0.2
Level of Service (LOS)			F				E			A	A	A		A	A	A
Approach Delay (s/veh)	312.0				43.3				0.3				0.6			
Approach LOS	F				E				A				A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.86									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Nave Road (North)		File Name		14_PM 25 RichvilleNaveN.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							120	0	30		300	160	30	290					
Signal Information																			
Cycle, s	40.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.0	8.6	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2				6	
Case Number										12.0				8.0				8.0	
Phase Duration, s										14.6				26.0				26.0	
Change Period, (Y+R c), s										6.0				6.0				6.0	
Max Allow Headway (MAH), s										3.1				3.1				3.1	
Queue Clearance Time (g s), s										5.6				11.1				7.2	
Green Extension Time (g e), s										0.1				1.5				1.7	
Phase Call Probability										0.86				1.00				1.00	
Max Out Probability										0.25				0.12				0.03	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								174			535			372					
Adjusted Saturation Flow Rate (s), veh/h/ln								1724			1746			1769					
Queue Service Time (g s), s								3.6			9.1			0.0					
Cycle Queue Clearance Time (g c), s								3.6			9.1			5.2					
Green Ratio (g/C)								0.21			0.49			0.49					
Capacity (c), veh/h								365			860			968					
Volume-to-Capacity Ratio (X)								0.477			0.622			0.384					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								2.0			3.8			2.0					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00			0.00					
Uniform Delay (d 1), s/veh								14.0			7.5			6.5					
Incremental Delay (d 2), s/veh								0.4			1.0			0.1					
Initial Queue Delay (d 3), s/veh								0.0			0.0			0.0					
Control Delay (d), s/veh								14.4			8.6			6.6					
Level of Service (LOS)								B			A			A					
Approach Delay, s/veh / LOS				0.0				14.4		B		8.6		A		6.6		A	
Intersection Delay, s/veh / LOS				8.8						A									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

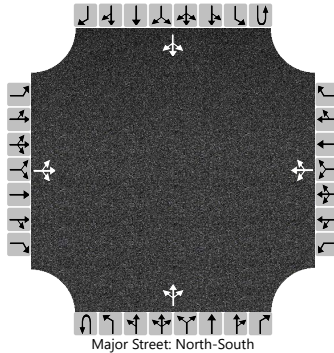
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Business Place
Jurisdiction	Massillon, OH
East/West Street	Business Place & Ohio State Drive
North/South Street	Richville Drive
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		40	0	30		20	10	10		60	260	10		10	260	80
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			75				43			65				11		
Capacity, c (veh/h)			383				353			1187				1266		
v/c Ratio			0.20				0.12			0.05				0.01		
95% Queue Length, Q ₉₅ (veh)			0.7				0.4			0.2				0.0		
Control Delay (s/veh)			16.7				16.6			8.2	0.5	0.5		7.9	0.1	0.1
Level of Service (LOS)			C				C			A	A	A		A	A	A
Approach Delay (s/veh)	16.7				16.6				1.9				0.3			
Approach LOS	C				C				A				A			

HCS Two-Way Stop-Control Report

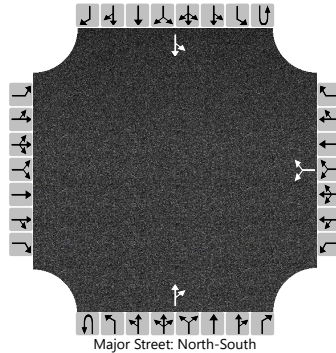
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Jackson
Jurisdiction	Massillon, OH
East/West Street	Jackson Avenue
North/South Street	Richville Drive
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						60		10			280	50		10	280	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

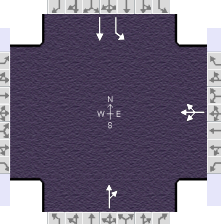
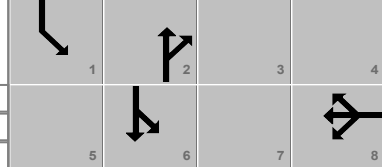
Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							77								11		
Capacity, c (veh/h)							445								1190		
v/c Ratio							0.17								0.01		
95% Queue Length, Q ₉₅ (veh)							0.6								0.0		
Control Delay (s/veh)							14.8								8.1	0.1	
Level of Service (LOS)							B								A	A	
Approach Delay (s/veh)						14.8								0.4			
Approach LOS						B								A			

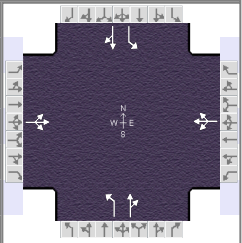
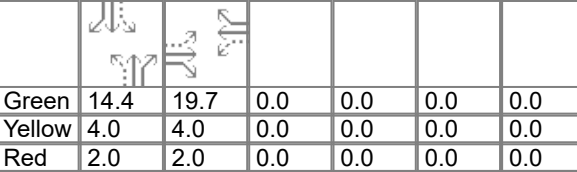
HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Southway Street		File Name		17_PM 25 RichvilleSouthway.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							20	0	180		280	10	140	310					
Signal Information																			
Cycle, s	53.2	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.2	19.5	9.5	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2		1		6	
Case Number										12.0				8.3		1.0		4.0	
Phase Duration, s										15.5				25.5		12.2		37.7	
Change Period, (Y+R c), s										6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s										3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s										8.6				8.6		4.3		6.5	
Green Extension Time (g e), s										0.2				0.5		0.1		1.0	
Phase Call Probability										0.95				1.00		0.88		1.00	
Max Out Probability										0.14				0.01		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								208			302		146	323					
Adjusted Saturation Flow Rate (s), veh/h/ln								1590			1844		1767	1856					
Queue Service Time (g s), s								6.6			6.6		2.3	4.5					
Cycle Queue Clearance Time (g c), s								6.6			6.6		2.3	4.5					
Green Ratio (g/C)								0.18			0.37		0.52	0.60					
Capacity (c), veh/h								285			676		600	1105					
Volume-to-Capacity Ratio (X)								0.731			0.447		0.243	0.292					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								4.0			4.0		1.1	1.9					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00		0.19	0.00					
Uniform Delay (d 1), s/veh								20.6			12.8		7.5	5.3					
Incremental Delay (d 2), s/veh								1.4			0.2		0.1	0.1					
Initial Queue Delay (d 3), s/veh								0.0			0.0		0.0	0.0					
Control Delay (d), s/veh								22.0			13.0		7.6	5.3					
Level of Service (LOS)								C			B		A	A					
Approach Delay, s/veh / LOS				0.0				22.0		C		13.0		B		6.0		A	
Intersection Delay, s/veh / LOS				11.6						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

Appendix K

Build Capacity Analysis Worksheets - 2025

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Navarre, OH		Time Period		AM Peak		PHF		0.84									
Urban Street		North Main Street		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Wooster Street		File Name		1_AM 25B MainWooster.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				130	50	10	10	60	20	10	350	30	10	280	20				
Signal Information																			
Cycle, s	46.2	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	14.4	19.7	0.0	0.0	0.0	0.0	1		2	3	4				
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0	5		6	7	8				
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				6.0				6.0	
Phase Duration, s						25.7				25.7				20.4				20.5	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.1	
Queue Clearance Time (g s), s						6.7				3.7				12.4				13.0	
Green Extension Time (g e), s						0.5				0.6				1.4				1.5	
Phase Call Probability						0.99				0.99				1.00				1.00	
Max Out Probability						0.00				0.00				0.05				0.03	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					226			107		12	452		12	357					
Adjusted Saturation Flow Rate (s), veh/h/ln					1437			1751		1016	1830		931	1834					
Queue Service Time (g s), s					3.0			0.0		0.5	10.4		0.5	7.7					
Cycle Queue Clearance Time (g c), s					4.7			1.7		8.2	10.4		11.0	7.7					
Green Ratio (g/C)					0.43			0.43		0.31	0.31		0.31	0.31					
Capacity (c), veh/h					745			834		305	573		237	574					
Volume-to-Capacity Ratio (X)					0.304			0.128		0.039	0.790		0.050	0.622					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					2.0			0.9		0.2	6.4		0.2	4.7					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00		0.02	0.00		0.05	0.00					
Uniform Delay (d 1), s/veh					8.9			8.1		17.0	14.5		19.5	13.5					
Incremental Delay (d 2), s/veh					0.1			0.0		0.0	0.9		0.0	0.4					
Initial Queue Delay (d 3), s/veh					0.0			0.0		0.0	0.0		0.0	0.0					
Control Delay (d), s/veh					8.9			8.1		17.0	15.4		19.5	13.9					
Level of Service (LOS)					A			A		B	B		B	B					
Approach Delay, s/veh / LOS				8.9	A	8.1	A	15.5	B	14.1	B								
Intersection Delay, s/veh / LOS				13.1						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

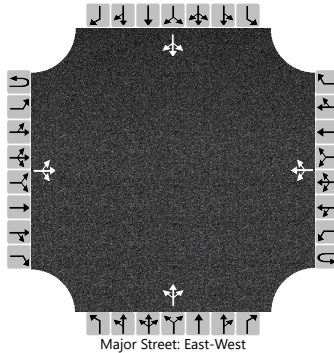
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Kemary & Fohl
Jurisdiction	Perry Twp, OH
East/West Street	Fohl Street
North/South Street	Kemary Avenue
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		30	70	10		10	110	40		10	50	10		20	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

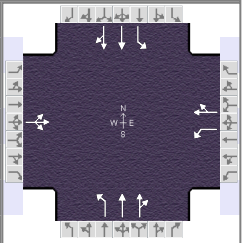
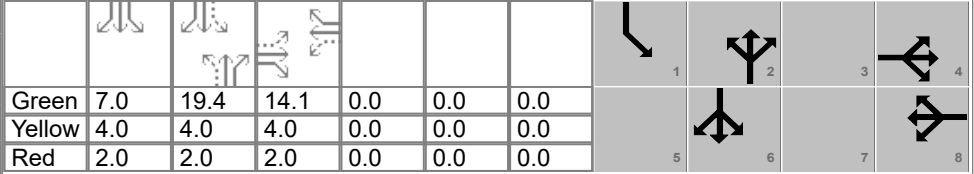
Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		34				11					80				45	
Capacity, c (veh/h)		1401				1498					599				596	
v/c Ratio		0.02				0.01					0.13				0.08	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					0.5				0.2	
Control Delay (s/veh)		7.6	0.2	0.2		7.4	0.1	0.1			11.9				11.5	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	2.2				0.5				11.9				11.5			
Approach LOS	A				A				B				B			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon-Perry Twp		Time Period		AM Peak		PHF		0.94									
Urban Street		Erie Street		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		3_AM 25B NavarreMain.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	20	30	80	10	190	20	510	120	250	330	10				
Signal Information																			
Cycle, s	58.5	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	7.0	19.4	14.1	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2		1		6	
Case Number						8.0				6.0				6.3		1.0		4.0	
Phase Duration, s						20.1				20.1				25.4		13.0		38.4	
Change Period, (Y+R c), s						6.0				6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s						3.3				3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s						9.2				13.1				11.1		7.4		4.9	
Green Extension Time (g e), s						0.5				0.7				1.1		0.0		1.8	
Phase Call Probability						1.00				1.00				1.00		0.99		1.00	
Max Out Probability						0.18				0.00				0.09		1.00		0.02	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					85		85	213		21	345	325	266	181	180				
Adjusted Saturation Flow Rate (s), veh/h/ln					1128		1340	1585		1012	1856	1733	1767	1856	1836				
Queue Service Time (g s), s					0.2		3.5	6.9		0.8	9.0	9.1	5.4	2.9	2.9				
Cycle Queue Clearance Time (g c), s					7.2		11.1	6.9		0.9	9.0	9.1	5.4	2.9	2.9				
Green Ratio (g/C)					0.24		0.24	0.24		0.33	0.33	0.33	0.49	0.55	0.55				
Capacity (c), veh/h					359		276	386		457	614	574	468	1025	1014				
Volume-to-Capacity Ratio (X)					0.237		0.309	0.551		0.047	0.563	0.566	0.568	0.177	0.178				
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					1.5		1.8	4.1		0.3	5.9	5.6	3.1	1.4	1.4				
Queue Storage Ratio (RQ) (95 th percentile)					0.00		0.95	0.00		0.07	0.00	0.00	0.45	0.00	0.00				
Uniform Delay (d 1), s/veh					17.8		24.6	19.4		13.4	16.2	16.2	10.8	6.5	6.5				
Incremental Delay (d 2), s/veh					0.1		0.2	0.5		0.0	0.4	0.5	1.0	0.0	0.0				
Initial Queue Delay (d 3), s/veh					0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh					17.9		24.8	19.9		13.4	16.6	16.7	11.8	6.6	6.6				
Level of Service (LOS)					B		C	B		B	B	B	B	A	A				
Approach Delay, s/veh / LOS				17.9		B	21.3		C	16.5		B	8.8		A				
Intersection Delay, s/veh / LOS				14.6						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

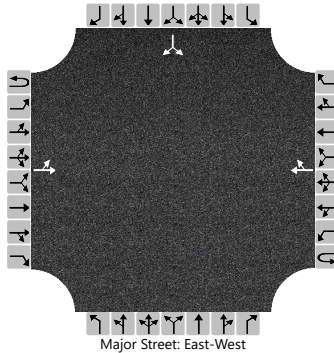
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Navarre & Millennium
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Millennium Boulevard
Peak Hour Factor	0.87
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		80	300				270	70						50		70
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		92													138	
Capacity, c (veh/h)		1162													434	
v/c Ratio		0.08													0.32	
95% Queue Length, Q ₉₅ (veh)		0.3													1.3	
Control Delay (s/veh)		8.4	0.8												17.1	
Level of Service (LOS)		A	A												C	
Approach Delay (s/veh)	2.4												17.1			
Approach LOS	A												C			

HCS Two-Way Stop-Control Report

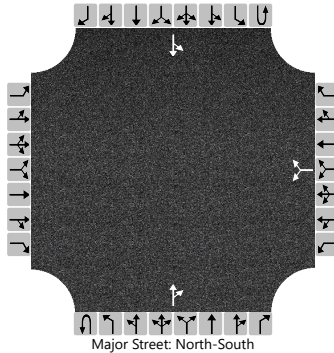
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Millennium & Prospect
Jurisdiction	Massillon, OH
East/West Street	Prospect Drive
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						90		10			60	30		10	20	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.43		6.23							4.13		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.53		3.33							2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							125								13		
Capacity, c (veh/h)							850								1471		
v/c Ratio							0.15								0.01		
95% Queue Length, Q ₉₅ (veh)							0.5								0.0		
Control Delay (s/veh)							10.0								7.5	0.1	
Level of Service (LOS)							A								A	A	
Approach Delay (s/veh)						10.0								2.5			
Approach LOS						A								A			

HCS Two-Way Stop-Control Report

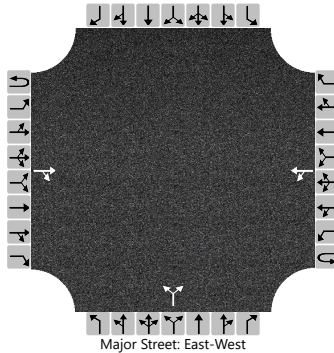
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Navarre & Sterilite
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Sterilite Street
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			220	130		100	230			70		100				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

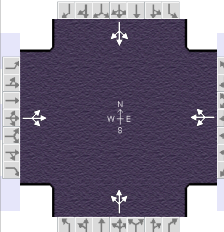
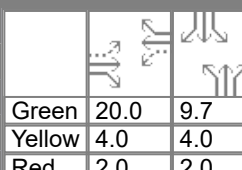
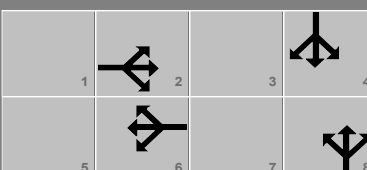
Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						125					213					
Capacity, c (veh/h)						1117					419					
v/c Ratio						0.11					0.51					
95% Queue Length, Q ₉₅ (veh)						0.4					2.8					
Control Delay (s/veh)						8.6	1.1				22.1					
Level of Service (LOS)						A	A				C					
Approach Delay (s/veh)					3.4				22.1							
Approach LOS					A				C							

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Perry Twp, OH		Time Period		AM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		8_AM 25B NavarreRichville.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	240	80	40	170	30	90	220	50	20	130	30				
Signal Information																			
Cycle, s	63.3	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On			Green	20.0	9.7	15.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Force Mode	Fixed	Simult. Gap N/S	On			Yellow	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
				Red	2.0	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						2				6				8				4	
Case Number						8.0				8.0				12.0				12.0	
Phase Duration, s						26.0				26.0				21.5				15.7	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.1				3.1				3.0				3.0	
Queue Clearance Time (g s), s						13.3				9.0				14.7				8.3	
Green Extension Time (g e), s						0.8				1.2				0.7				0.3	
Phase Call Probability						1.00				1.00				1.00				0.96	
Max Out Probability						0.16				0.00				0.00				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				5	2	12	1	6	16	3	8	18	7	4	14				
Adjusted Flow Rate (v), veh/h					365			250			375			188					
Adjusted Saturation Flow Rate (s), veh/h/ln					1737			1696			1788			1792					
Queue Service Time (g s), s					2.2			0.0			12.7			6.3					
Cycle Queue Clearance Time (g c), s					11.3			7.0			12.7			6.3					
Green Ratio (g/C)					0.32			0.32			0.25			0.15					
Capacity (c), veh/h					609			601			443			275					
Volume-to-Capacity Ratio (X)					0.598			0.416			0.847			0.681					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					7.6			4.6			8.6			4.5					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00			0.00			0.00					
Uniform Delay (d 1), s/veh					18.7			17.3			22.8			25.4					
Incremental Delay (d 2), s/veh					1.1			0.2			1.8			1.1					
Initial Queue Delay (d 3), s/veh					0.0			0.0			0.0			0.0					
Control Delay (d), s/veh					19.9			17.4			24.5			26.5					
Level of Service (LOS)					B			B			C			C					
Approach Delay, s/veh / LOS				19.9	B	17.4	B	24.5	C	26.5	C								
Intersection Delay, s/veh / LOS				21.9						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

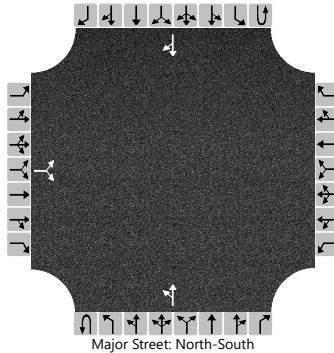
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Stump & Cincinnati
Jurisdiction	Perry Twp, OH
East/West Street	Stump Avenue
North/South Street	Cincinnati Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		40		10						10	200				80	40
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			53							11						
Capacity, c (veh/h)			692							1452						
v/c Ratio			0.08							0.01						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			10.6							7.5	0.1					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	10.6								0.4							
Approach LOS	B								A							

HCS Two-Way Stop-Control Report

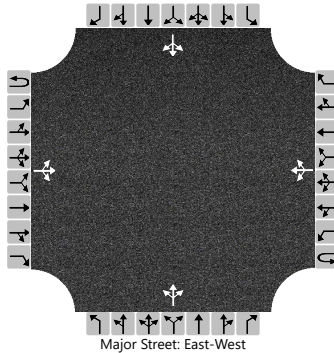
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Richville & Stump
Jurisdiction	Perry Twp, OH
East/West Street	Richville Drive
North/South Street	Stump Avenue/Creston Drive
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		10	140	100		10	280	10		210	10	10		10	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11				11					258					34
Capacity, c (veh/h)		1228				1288					408					476
v/c Ratio		0.01				0.01					0.63					0.07
95% Queue Length, Q ₉₅ (veh)		0.0				0.0					4.2					0.2
Control Delay (s/veh)		8.0	0.1	0.1		7.8	0.1	0.1			27.9					13.1
Level of Service (LOS)		A	A	A		A	A	A			D					B
Approach Delay (s/veh)	0.4				0.3				27.9				13.1			
Approach LOS	A				A				D				B			

HCS Two-Way Stop-Control Report

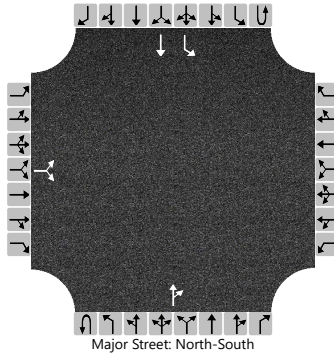
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & US30 EB
Jurisdiction	Massillon, OH
East/West Street	US30 EB Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	1	1	0
Configuration			LR									TR		L	T	
Volume (veh/h)		130		90							400	160		220	170	
Percent Heavy Vehicles (%)		3		3										3		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2										4.1		
Critical Headway (sec)		7.13		6.23										4.13		
Base Follow-Up Headway (sec)		3.5		3.3										2.2		
Follow-Up Headway (sec)		3.53		3.33										2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			227											227		
Capacity, c (veh/h)			268											991		
v/c Ratio			0.85											0.23		
95% Queue Length, Q ₉₅ (veh)			7.0											0.9		
Control Delay (s/veh)			63.2											9.7		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)	63.2												5.5			
Approach LOS	F												A			

HCS Two-Way Stop-Control Report

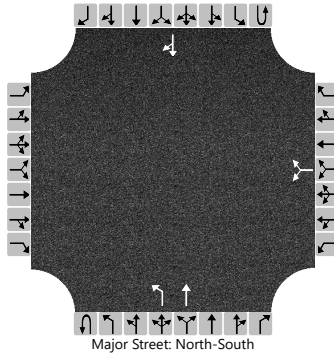
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & US30 WB
Jurisdiction	Massillon, OH
East/West Street	US30 Westbound Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.85
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	0
Configuration							LR			L	T					TR
Volume (veh/h)						70		270		200	340				330	100
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						400				235						
Capacity, c (veh/h)						458				1054						
v/c Ratio						0.87				0.22						
95% Queue Length, Q ₉₅ (veh)						9.1				0.9						
Control Delay (s/veh)						46.8				9.4						
Level of Service (LOS)						E				A						
Approach Delay (s/veh)					46.8				3.5							
Approach LOS					E				A							

HCS Two-Way Stop-Control Report

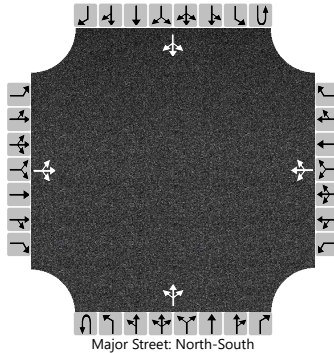
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Nave (S)
Jurisdiction	Massillon, OH
East/West Street	Nave Road/RG Drage
North/South Street	Richville Road
Peak Hour Factor	0.81
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		30	10	80		10	0	10		70	260	240		40	310	40
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

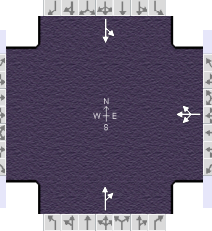
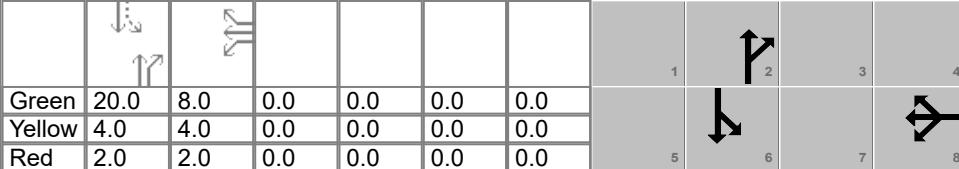
Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			148				25				86				49	
Capacity, c (veh/h)			324				192				1122				958	
v/c Ratio			0.46				0.13				0.08				0.05	
95% Queue Length, Q ₉₅ (veh)			2.3				0.4				0.2				0.2	
Control Delay (s/veh)			25.1				26.5				8.5	1.0	1.0		9.0	0.6
Level of Service (LOS)			D				D				A	A	A		A	A
Approach Delay (s/veh)	25.1				26.5				2.0				1.5			
Approach LOS	D				D				A				A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.84									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Nave Road (North)		File Name		14_AM 25B RichvilleNaveN.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							100	0	20		230	90	10	240					
Signal Information																			
Cycle, s	40.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.0	8.0	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2				6	
Case Number										12.0				8.0				8.0	
Phase Duration, s										14.0				26.0				26.0	
Change Period, (Y+R c), s										6.0				6.0				6.0	
Max Allow Headway (MAH), s										3.1				3.0				3.0	
Queue Clearance Time (g s), s										4.9				7.5				5.8	
Green Extension Time (g e), s										0.1				1.1				1.2	
Phase Call Probability										0.80				1.00				1.00	
Max Out Probability										0.10				0.01				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								143			381			298					
Adjusted Saturation Flow Rate (s), veh/h/ln								1731			1766			1836					
Queue Service Time (g s), s								2.9			5.5			0.0					
Cycle Queue Clearance Time (g c), s								2.9			5.5			3.8					
Green Ratio (g/C)								0.20			0.50			0.50					
Capacity (c), veh/h								345			884			1013					
Volume-to-Capacity Ratio (X)								0.415			0.431			0.294					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								1.6			2.0			1.4					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00			0.00					
Uniform Delay (d 1), s/veh								14.0			6.4			5.9					
Incremental Delay (d 2), s/veh								0.3			0.1			0.1					
Initial Queue Delay (d 3), s/veh								0.0			0.0			0.0					
Control Delay (d), s/veh								14.3			6.5			6.0					
Level of Service (LOS)								B			A			A					
Approach Delay, s/veh / LOS				0.0				14.3		B		6.5		A		6.0		A	
Intersection Delay, s/veh / LOS				7.7						A									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

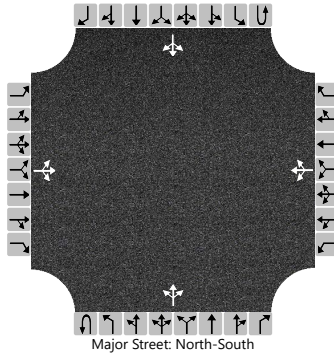
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Business Place
Jurisdiction	Massillon, OH
East/West Street	Business Place & Ohio State Drive
North/South Street	Richville Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		80	0	70		10	0	10		20	210	20		10	260	20
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			160				21				21				11	
Capacity, c (veh/h)			520				510				1258				1316	
v/c Ratio			0.31				0.04				0.02				0.01	
95% Queue Length, Q ₉₅ (veh)			1.3				0.1				0.1				0.0	
Control Delay (s/veh)			15.0				12.4				7.9	0.2	0.2		7.8	0.1
Level of Service (LOS)			B				B				A	A	A		A	A
Approach Delay (s/veh)	15.0				12.4				0.8				0.3			
Approach LOS	B				B				A				A			

HCS Two-Way Stop-Control Report

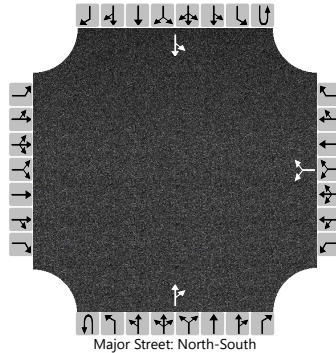
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Jackson
Jurisdiction	Massillon, OH
East/West Street	Jackson Avenue
North/South Street	Richville Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						40		10			220	70		10	250	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

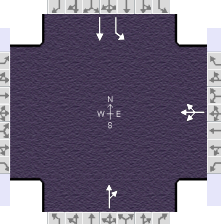
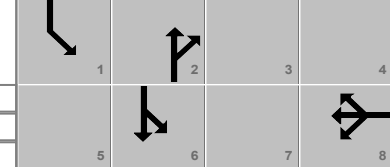
Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						53								11		
Capacity, c (veh/h)						522								1246		
v/c Ratio						0.10								0.01		
95% Queue Length, Q ₉₅ (veh)						0.3								0.0		
Control Delay (s/veh)						12.7								7.9	0.1	
Level of Service (LOS)						B								A	A	
Approach Delay (s/veh)					12.7								0.4			
Approach LOS					B								A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.80									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Southway Street		File Name		17_AM 25B RichvilleSouthway.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							10	0	110		190	10	160	190					
Signal Information																			
Cycle, s	53.2	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.6	19.6	8.9	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2		1		6	
Case Number										12.0				8.3		1.0		4.0	
Phase Duration, s										14.9				25.6		12.6		38.3	
Change Period, (Y+R c), s										6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s										3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s										6.6				7.3		5.2		5.1	
Green Extension Time (g e), s										0.1				0.4		0.1		0.8	
Phase Call Probability										0.89				1.00		0.95		1.00	
Max Out Probability										0.91				0.00		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								150			250		200	238					
Adjusted Saturation Flow Rate (s), veh/h/ln								1587			1839		1767	1856					
Queue Service Time (g s), s								4.6			5.3		3.2	3.1					
Cycle Queue Clearance Time (g c), s								4.6			5.3		3.2	3.1					
Green Ratio (g/C)								0.17			0.37		0.53	0.61					
Capacity (c), veh/h								266			679		658	1126					
Volume-to-Capacity Ratio (X)								0.564			0.368		0.304	0.211					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								2.8			3.2		1.5	1.2					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00		0.25	0.00					
Uniform Delay (d 1), s/veh								20.4			12.2		7.2	4.7					
Incremental Delay (d 2), s/veh								0.7			0.1		0.1	0.0					
Initial Queue Delay (d 3), s/veh								0.0			0.0		0.0	0.0					
Control Delay (d), s/veh								21.1			12.4		7.3	4.7					
Level of Service (LOS)								C			B		A	A					
Approach Delay, s/veh / LOS				0.0				21.1		C		12.4		B		5.9		A	
Intersection Delay, s/veh / LOS				10.6						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

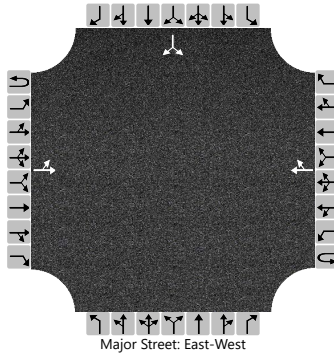
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Fohl & Sterilite
Jurisdiction	Perry Township, OH
East/West Street	Fohl Street
North/South Street	Sterilite Street
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		10	100				100	30						10		10
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

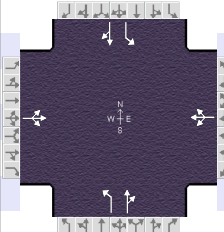
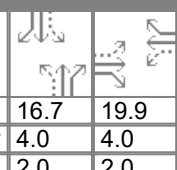
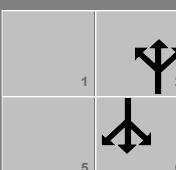
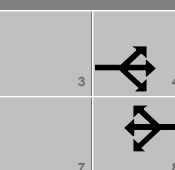
Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11													22	
Capacity, c (veh/h)		1436													812	
v/c Ratio		0.01													0.03	
95% Queue Length, Q ₉₅ (veh)		0.0													0.1	
Control Delay (s/veh)		7.5	0.1												9.6	
Level of Service (LOS)		A	A												A	
Approach Delay (s/veh)	0.7												9.6			
Approach LOS	A												A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency	TMS Engineers, Inc.					Duration, h	0.250												
Analyst	ABC		Analysis Date	Jul 5, 2022		Area Type	Other												
Jurisdiction	Navarre, OH		Time Period	PM Peak		PHF	0.91												
Urban Street	North Main Street		Analysis Year	2025		Analysis Period	1> 7:00												
Intersection	@ Wooster Street		File Name	1_PM 25B MainWooster.xus															
Project Description	Build Conditions																		
Demand Information																			
				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				140	70	10	40	80	30	10	380	30	20	410	50				
Signal Information																			
Cycle, s	48.7	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On				Green	16.7	19.9	0.0	0.0	0.0	0.0						
Force Mode	Fixed	Simult. Gap N/S	On				Yellow	4.0	4.0	0.0	0.0	0.0	0.0						
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				6.0				6.0	
Phase Duration, s						25.9				25.9				22.7				22.7	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.1	
Queue Clearance Time (g s), s						7.5				4.9				14.9				14.3	
Green Extension Time (g e), s						0.7				0.7				1.9				1.8	
Phase Call Probability						1.00				1.00				1.00				1.00	
Max Out Probability						0.00				0.00				0.02				0.04	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					242			165		11	451		22	505					
Adjusted Saturation Flow Rate (s), veh/h/ln					1443			1661		886	1831		933	1820					
Queue Service Time (g s), s					2.6			0.0		0.6	10.4		1.0	12.3					
Cycle Queue Clearance Time (g c), s					5.5			2.9		12.9	10.4		11.5	12.3					
Green Ratio (g/C)					0.41			0.41		0.34	0.34		0.34	0.34					
Capacity (c), veh/h					711			773		229	631		269	627					
Volume-to-Capacity Ratio (X)					0.340			0.213		0.048	0.714		0.082	0.807					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					2.5			1.6		0.2	6.4		0.4	7.6					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00		0.02	0.00		0.09	0.00					
Uniform Delay (d 1), s/veh					10.0			9.4		20.3	13.9		18.9	14.5					
Incremental Delay (d 2), s/veh					0.1			0.1		0.0	0.6		0.0	1.0					
Initial Queue Delay (d 3), s/veh					0.0			0.0		0.0	0.0		0.0	0.0					
Control Delay (d), s/veh					10.1			9.4		20.4	14.4		18.9	15.5					
Level of Service (LOS)					B			A		C	B		B	B					
Approach Delay, s/veh / LOS				10.1	B		9.4	A		14.6	B		15.6	B					
Intersection Delay, s/veh / LOS				13.6						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

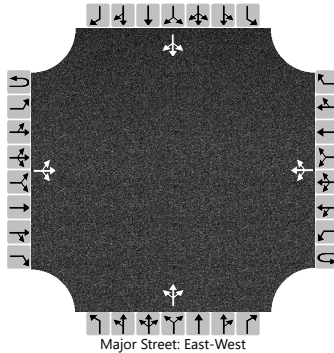
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Kemary & Fohl
Jurisdiction	Perry Twp, OH
East/West Street	Fohl Street
North/South Street	Kemary Avenue
Peak Hour Factor	0.86
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		20	140	10		10	120	30		10	30	10		50	50	20
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

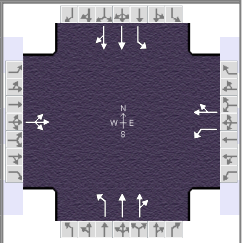
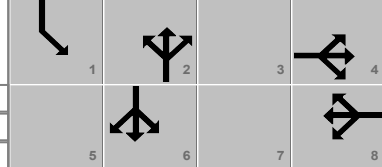
Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				12					58				140	
Capacity, c (veh/h)		1396				1396					547				547	
v/c Ratio		0.02				0.01					0.11				0.26	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					0.4				1.0	
Control Delay (s/veh)		7.6	0.1	0.1		7.6	0.1	0.1			12.4				13.8	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	1.0				0.5				12.4				13.8			
Approach LOS	A				A				B				B			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency	TMS Engineers, Inc.					Duration, h	0.250												
Analyst	ABC		Analysis Date	Jul 5, 2022		Area Type	Other												
Jurisdiction	Massillon-Perry Twp		Time Period	PM Peak		PHF	0.80												
Urban Street	Erie Street		Analysis Year	2025		Analysis Period	1> 7:00												
Intersection	@ Navarre Road		File Name	3_PM 25B NavarreMain.xus															
Project Description	Build Conditions																		
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	20	50	170	30	320	20	630	120	250	680	10				
Signal Information																			
Cycle, s	107.7	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
Green	14.0	35.0	40.7	0.0	0.0	0.0													
Yellow	4.0	4.0	4.0	0.0	0.0	0.0													
Red	2.0	2.0	2.0	0.0	0.0	0.0													
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2		1		6	
Case Number						8.0				6.0				6.3		1.0		4.0	
Phase Duration, s						46.7				46.7				41.0		20.0		61.0	
Change Period, (Y+R c), s						6.0				6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s						3.3				3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s						26.8				36.8				28.2		14.6		18.6	
Green Extension Time (g e), s						1.8				1.8				3.9		0.0		3.9	
Phase Call Probability						1.00				1.00				1.00		1.00		1.00	
Max Out Probability						0.00				0.00				0.00		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h				125			213 438			25 482 455			313 432 430						
Adjusted Saturation Flow Rate (s), veh/h/ln				842			1299 1593			636 1856 1752			1767 1856 1846						
Queue Service Time (g s), s				2.9			17.1 26.4			3.1 26.2 26.2			12.6 16.6 16.6						
Cycle Queue Clearance Time (g c), s				24.8			34.8 26.4			3.1 26.2 26.2			12.6 16.6 16.6						
Green Ratio (g/C)				0.38			0.38 0.38			0.33 0.33 0.33			0.50 0.51 0.51						
Capacity (c), veh/h				361			353 605			278 623 588			339 953 948						
Volume-to-Capacity Ratio (X)				0.346			0.602 0.723			0.090 0.774 0.774			0.923 0.454 0.454						
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)				3.9			9.2 14.9			0.8 17.0 16.2			12.2 11.0 10.9						
Queue Storage Ratio (RQ) (95 th percentile)				0.00			4.71 0.00			0.18 0.00 0.00			1.79 0.00 0.00						
Uniform Delay (d 1), s/veh				26.7			40.7 29.9			25.8 33.5 33.5			24.7 17.4 17.4						
Incremental Delay (d 2), s/veh				0.2			0.6 0.6			0.1 0.8 0.8			29.5 0.1 0.1						
Initial Queue Delay (d 3), s/veh				0.0			0.0 0.0			0.0 0.0 0.0			0.0 0.0 0.0						
Control Delay (d), s/veh				26.9			41.3 30.5			25.9 34.3 34.4			54.3 17.5 17.5						
Level of Service (LOS)				C			D C			C C C			D B B						
Approach Delay, s/veh / LOS				26.9 C			34.0 C			34.1 C			27.3 C						
Intersection Delay, s/veh / LOS				31.0									C						
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

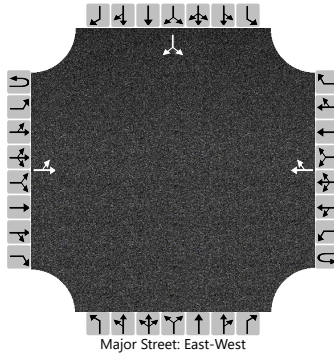
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Navarre & Millennium
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		30	400				380	10						40		70
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		38													138	
Capacity, c (veh/h)		1070													380	
v/c Ratio		0.04													0.36	
95% Queue Length, Q ₉₅ (veh)		0.1													1.6	
Control Delay (s/veh)		8.5	0.4												19.7	
Level of Service (LOS)		A	A												C	
Approach Delay (s/veh)	1.0												19.7			
Approach LOS	A												C			

HCS Two-Way Stop-Control Report

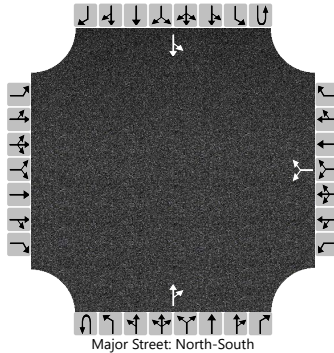
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Millennium & Prospect
Jurisdiction	Massillon, OH
East/West Street	Prospect Drive
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						10		10			20	10		10	100	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							25								13		
Capacity, c (veh/h)							904								1566		
v/c Ratio							0.03								0.01		
95% Queue Length, Q ₉₅ (veh)							0.1								0.0		
Control Delay (s/veh)							9.1								7.3	0.1	
Level of Service (LOS)							A								A	A	
Approach Delay (s/veh)						9.1								0.7			
Approach LOS						A								A			

HCS Two-Way Stop-Control Report

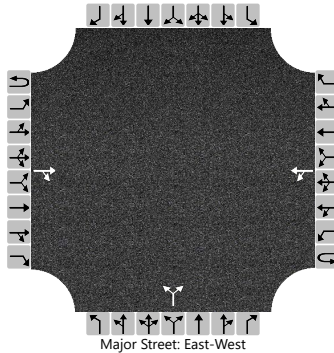
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Navarre & Sterilite
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Sterilite Street
Peak Hour Factor	0.83
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			310	60		50	260			140		120				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

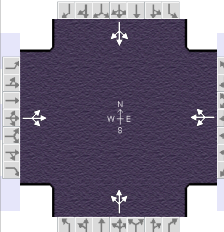
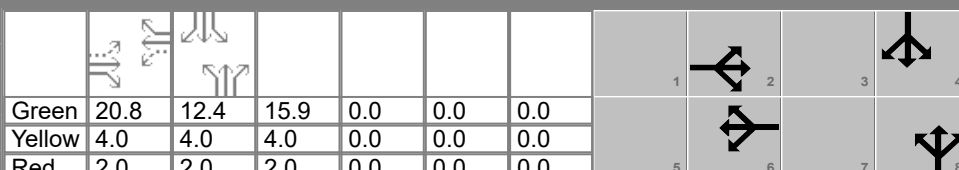
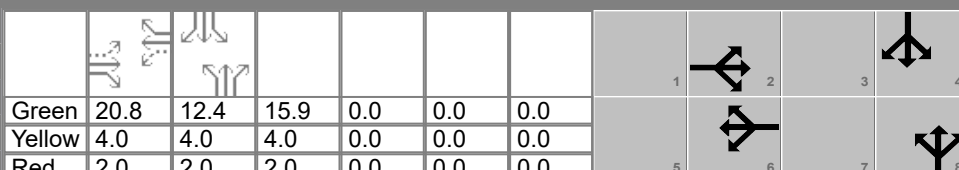
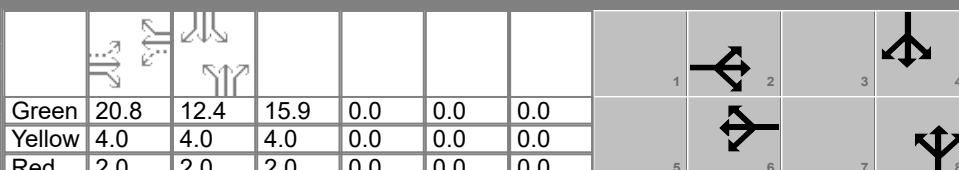
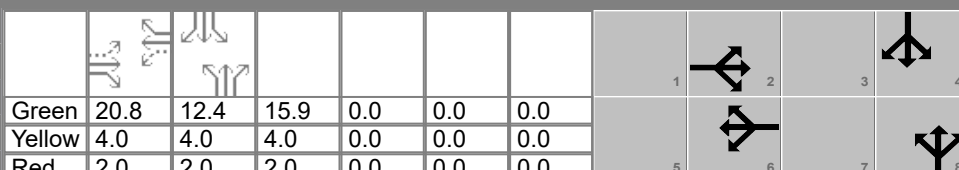
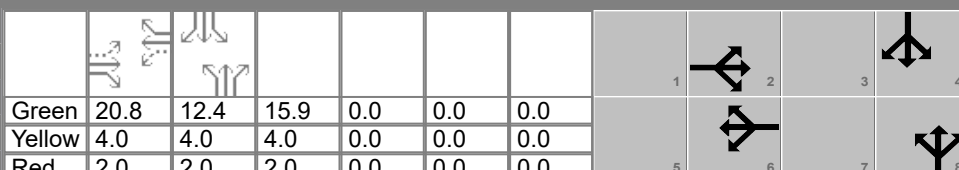
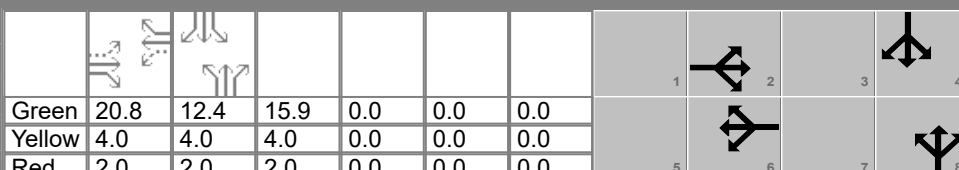
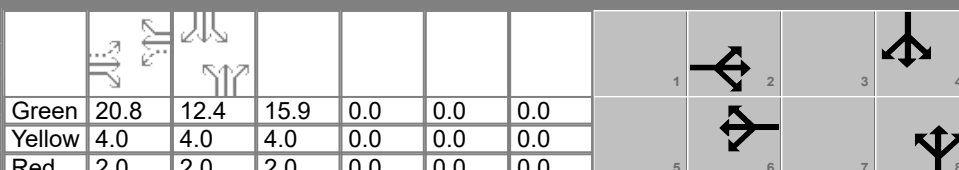
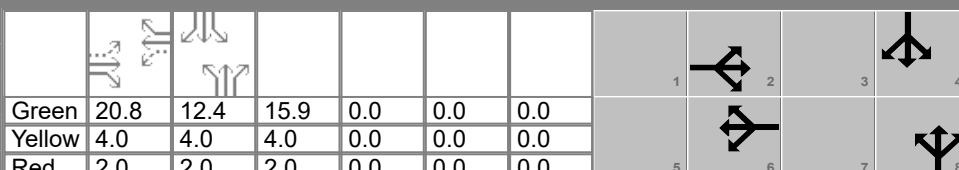
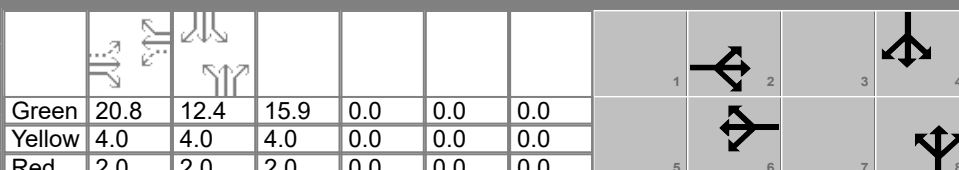
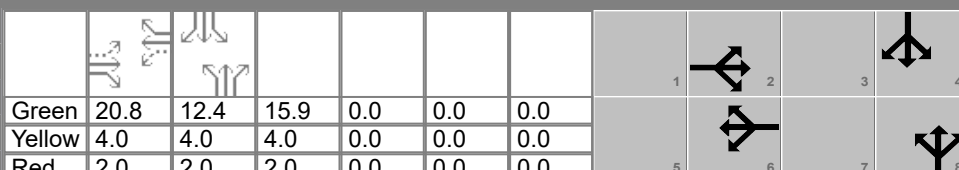
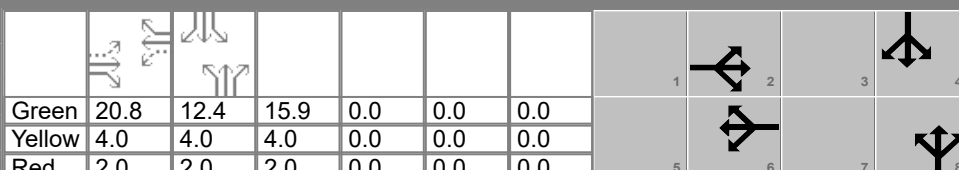
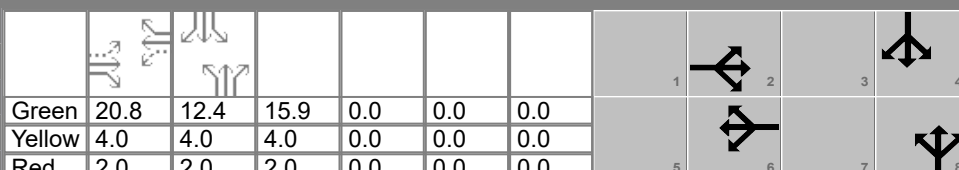
Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						60					313					
Capacity, c (veh/h)						1109					407					
v/c Ratio						0.05					0.77					
95% Queue Length, Q ₉₅ (veh)						0.2					6.4					
Control Delay (s/veh)						8.4	0.6				37.7					
Level of Service (LOS)						A	A				E					
Approach Delay (s/veh)					1.8				37.7							
Approach LOS					A				E							

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Perry Twp, OH		Time Period		PM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		8_PM 25B NavarreRichville.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				40	280	140	60	240	30	100	190	60	50	190	30				
Signal Information																			
Cycle, s	67.1	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.8	12.4	15.9	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						2				6				8				4	
Case Number						8.0				8.0				12.0				12.0	
Phase Duration, s						26.8				26.8				21.9				18.4	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.0	
Queue Clearance Time (g s), s						19.8				14.8				15.3				12.1	
Green Extension Time (g e), s						1.0				1.1				0.6				0.4	
Phase Call Probability						1.00				1.00				1.00				0.99	
Max Out Probability						0.02				0.46				0.00				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				5	2	12	1	6	16	3	8	18	7	4	14				
Adjusted Flow Rate (v), veh/h					479			344			365			281					
Adjusted Saturation Flow Rate (s), veh/h/ln					1720			1531			1775			1803					
Queue Service Time (g s), s					4.9			0.0			13.3			10.1					
Cycle Queue Clearance Time (g c), s					17.8			12.8			13.3			10.1					
Green Ratio (g/C)					0.31			0.31			0.24			0.19					
Capacity (c), veh/h					592			538			420			334					
Volume-to-Capacity Ratio (X)					0.810			0.639			0.869			0.841					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					10.8			7.9			9.0			7.5					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00			0.00			0.00					
Uniform Delay (d 1), s/veh					22.0			20.0			24.7			26.4					
Incremental Delay (d 2), s/veh					1.9			2.0			2.2			2.2					
Initial Queue Delay (d 3), s/veh					0.0			0.0			0.0			0.0					
Control Delay (d), s/veh					23.9			22.0			26.9			28.6					
Level of Service (LOS)					C			C			C			C					
Approach Delay, s/veh / LOS				23.9	C	22.0	C	26.9	C	28.6	C								
Intersection Delay, s/veh / LOS				25.1						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

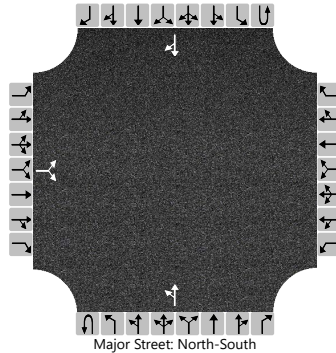
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Stump & Cincinnati
Jurisdiction	Perry Twp, OH
East/West Street	Stump Avenue
North/South Street	Cincinnati Drive
Peak Hour Factor	0.82
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		30		10						10	170				130	30
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			49							12						
Capacity, c (veh/h)			642							1372						
v/c Ratio			0.08							0.01						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			11.1							7.6	0.1					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	11.1								0.5							
Approach LOS	B								A							

HCS Two-Way Stop-Control Report

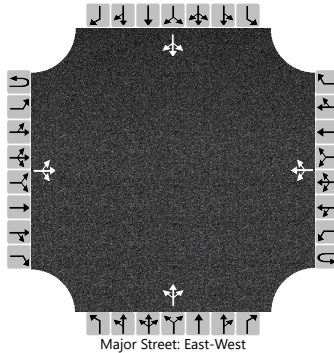
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Richville & Stump
Jurisdiction	Perry Twp, OH
East/West Street	Richville Drive
North/South Street	Stump Avenue/Creston Drive
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		20	320	160		10	290	10		160	10	10		10	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				11					205				34	
Capacity, c (veh/h)		1213				1019					259				335	
v/c Ratio		0.02				0.01					0.79				0.10	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					6.0				0.3	
Control Delay (s/veh)		8.0	0.2	0.2		8.6	0.1	0.1			56.4				17.0	
Level of Service (LOS)		A	A	A		A	A	A			F				C	
Approach Delay (s/veh)	0.5				0.4				56.4				17.0			
Approach LOS	A				A				F				C			

HCS Two-Way Stop-Control Report

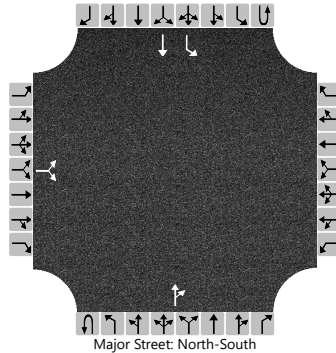
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & US30 EB
Jurisdiction	Massillon, OH
East/West Street	US30 EB Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	1	1	0
Configuration			LR									TR		L	T	
Volume (veh/h)		140		170							340	130		220	320	
Percent Heavy Vehicles (%)		3		3										3		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2										4.1		
Critical Headway (sec)		7.13		6.23										4.13		
Base Follow-Up Headway (sec)		3.5		3.3										2.2		
Follow-Up Headway (sec)		3.53		3.33										2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			348											247		
Capacity, c (veh/h)			251											1034		
v/c Ratio			1.39											0.24		
95% Queue Length, Q ₉₅ (veh)			19.0											0.9		
Control Delay (s/veh)			234.7											9.6		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)	234.7												3.9			
Approach LOS	F												A			

HCS Two-Way Stop-Control Report

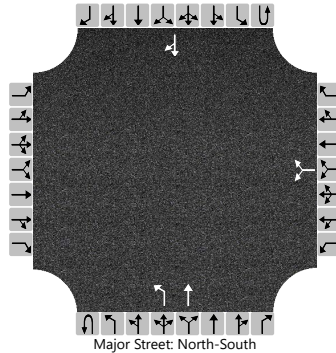
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & US30 WB
Jurisdiction	Massillon, OH
East/West Street	US30 Westbound Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	0
Configuration							LR			L	T					TR
Volume (veh/h)						110		250		160	350				430	90
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						400				178						
Capacity, c (veh/h)						382				991						
v/c Ratio						1.05				0.18						
95% Queue Length, Q ₉₅ (veh)						13.4				0.7						
Control Delay (s/veh)						92.3				9.4						
Level of Service (LOS)						F				A						
Approach Delay (s/veh)					92.3				3.0							
Approach LOS					F				A							

HCS Two-Way Stop-Control Report

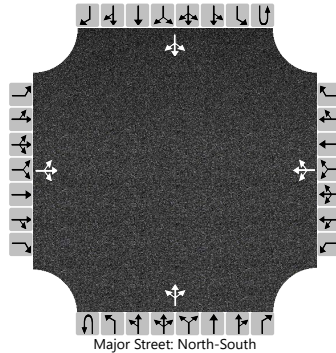
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Nave (S)
Jurisdiction	Massillon, OH
East/West Street	Nave Road/RG Drage
North/South Street	Richville Road
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		140	60	10		30	70	30		10	400	30		20	430	50
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

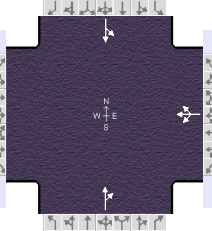
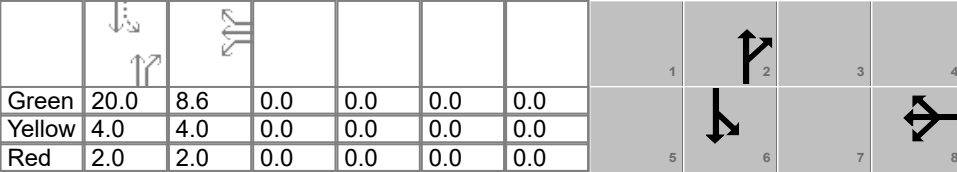
Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			231				143			11				22		
Capacity, c (veh/h)			146				222			1034				1084		
v/c Ratio			1.58				0.64			0.01				0.02		
95% Queue Length, Q ₉₅ (veh)			16.0				3.9			0.0				0.1		
Control Delay (s/veh)			345.3				46.5			8.5	0.1	0.1		8.4	0.2	0.2
Level of Service (LOS)			F				E			A	A	A		A	A	A
Approach Delay (s/veh)	345.3				46.5				0.3				0.6			
Approach LOS	F				E				A				A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.86									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Nave Road (North)		File Name		14_PM 25B RichvilleNaveN.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							120	0	30		310	160	30	300					
Signal Information																			
Cycle, s	40.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.0	8.6	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2				6	
Case Number										12.0				8.0				8.0	
Phase Duration, s										14.6				26.0				26.0	
Change Period, (Y+R c), s										6.0				6.0				6.0	
Max Allow Headway (MAH), s										3.1				3.1				3.1	
Queue Clearance Time (g s), s										5.6				11.4				7.4	
Green Extension Time (g e), s										0.1				1.5				1.7	
Phase Call Probability										0.86				1.00				1.00	
Max Out Probability										0.25				0.14				0.03	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								174			547			384					
Adjusted Saturation Flow Rate (s), veh/h/ln								1724			1748			1770					
Queue Service Time (g s), s								3.6			9.4			0.0					
Cycle Queue Clearance Time (g c), s								3.6			9.4			5.4					
Green Ratio (g/C)								0.21			0.49			0.49					
Capacity (c), veh/h								365			861			968					
Volume-to-Capacity Ratio (X)								0.477			0.635			0.396					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								2.0			3.9			2.1					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00			0.00					
Uniform Delay (d 1), s/veh								14.0			7.6			6.6					
Incremental Delay (d 2), s/veh								0.4			1.2			0.1					
Initial Queue Delay (d 3), s/veh								0.0			0.0			0.0					
Control Delay (d), s/veh								14.4			8.8			6.7					
Level of Service (LOS)								B			A			A					
Approach Delay, s/veh / LOS				0.0				14.4		B		8.8		A		6.7		A	
Intersection Delay, s/veh / LOS				8.9												A			
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

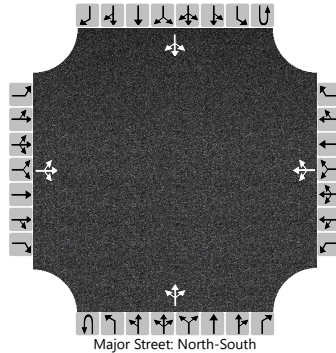
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Business Place
Jurisdiction	Massillon, OH
East/West Street	Business Place & Ohio State Drive
North/South Street	Richville Drive
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		40	0	30		20	10	10		60	270	10		10	270	80
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			75				43			65				11		
Capacity, c (veh/h)			371				343			1177				1254		
v/c Ratio			0.20				0.13			0.05				0.01		
95% Queue Length, Q ₉₅ (veh)			0.7				0.4			0.2				0.0		
Control Delay (s/veh)			17.1				17.0			8.2	0.5	0.5		7.9	0.1	0.1
Level of Service (LOS)			C				C			A	A	A		A	A	A
Approach Delay (s/veh)	17.1				17.0				1.9				0.3			
Approach LOS	C				C				A				A			

HCS Two-Way Stop-Control Report

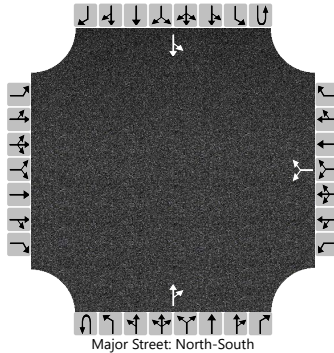
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Jackson
Jurisdiction	Massillon, OH
East/West Street	Jackson Avenue
North/South Street	Richville Drive
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						60		10			290	50		10	290	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

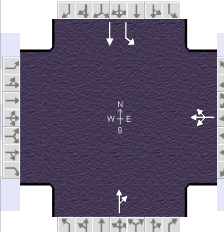
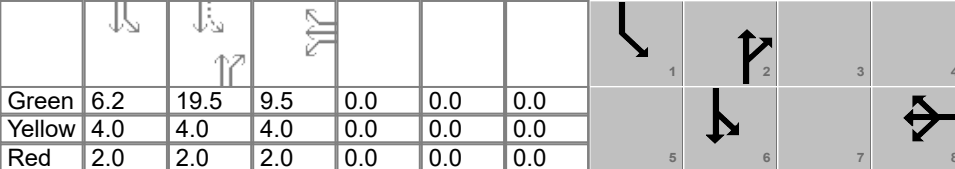
Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						77								11		
Capacity, c (veh/h)						432								1179		
v/c Ratio						0.18								0.01		
95% Queue Length, Q ₉₅ (veh)						0.6								0.0		
Control Delay (s/veh)						15.1								8.1	0.1	
Level of Service (LOS)						C								A	A	
Approach Delay (s/veh)					15.1								0.4			
Approach LOS					C								A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2025		Analysis Period		1> 7:00									
Intersection		@ Southway Street		File Name		17_PM 25B RichvilleSouthway.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							20	0	180		290	10	140	320					
Signal Information																			
Cycle, s	53.2	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.2	19.5	9.5	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2		1		6	
Case Number										12.0				8.3		1.0		4.0	
Phase Duration, s										15.5				25.5		12.2		37.7	
Change Period, (Y+R c), s										6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s										3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s										8.6				8.9		4.3		6.7	
Green Extension Time (g e), s										0.2				0.5		0.1		1.0	
Phase Call Probability										0.95				1.00		0.88		1.00	
Max Out Probability										0.14				0.01		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								208			313			146	333				
Adjusted Saturation Flow Rate (s), veh/h/ln								1590			1844			1767	1856				
Queue Service Time (g s), s								6.6			6.9			2.3	4.7				
Cycle Queue Clearance Time (g c), s								6.6			6.9			2.3	4.7				
Green Ratio (g/C)								0.18			0.37			0.52	0.60				
Capacity (c), veh/h								285			676			592	1105				
Volume-to-Capacity Ratio (X)								0.731			0.463			0.247	0.302				
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								4.0			4.1			1.1	2.0				
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00			0.19	0.00				
Uniform Delay (d 1), s/veh								20.6			12.9			7.5	5.3				
Incremental Delay (d 2), s/veh								1.4			0.2			0.1	0.1				
Initial Queue Delay (d 3), s/veh								0.0			0.0			0.0	0.0				
Control Delay (d), s/veh								22.0			13.1			7.6	5.4				
Level of Service (LOS)								C			B			A	A				
Approach Delay, s/veh / LOS				0.0				22.0		C		13.1		B		6.1		A	
Intersection Delay, s/veh / LOS				11.6						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

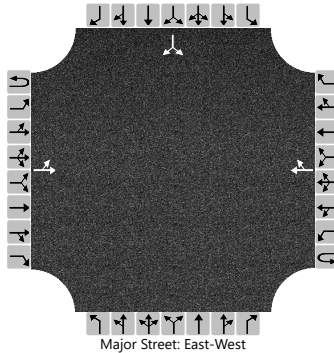
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2025
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Fohl & Sterilite
Jurisdiction	Perry Township, OH
East/West Street	Fohl Street
North/South Street	Sterilite Street
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		10	140				130	10						30		10
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

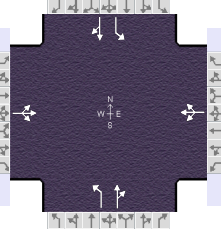
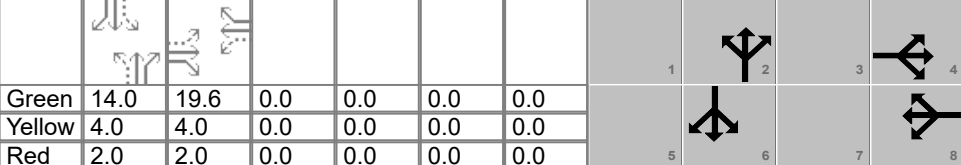
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11													43	
Capacity, c (veh/h)		1422													711	
v/c Ratio		0.01													0.06	
95% Queue Length, Q ₉₅ (veh)		0.0													0.2	
Control Delay (s/veh)		7.6	0.1												10.4	
Level of Service (LOS)		A	A												B	
Approach Delay (s/veh)	0.6												10.4			
Approach LOS	A												B			

Appendix L

No-Build Capacity Analysis Worksheets - 2045

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Navarre, OH		Time Period		AM Peak		PHF		0.84									
Urban Street		North Main Street		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Wooster Street		File Name		1_AM 45 MainWooster.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				130	40	10	10	50	20	10	350	20	10	280	20				
Signal Information																			
Cycle, s	45.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	14.0	19.6	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				6.0				6.0	
Phase Duration, s						25.6				25.6				20.0				20.0	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.1	
Queue Clearance Time (g s), s						6.4				3.5				12.0				12.5	
Green Extension Time (g e), s						0.5				0.5				1.3				1.4	
Phase Call Probability						0.98				0.98				1.00				1.00	
Max Out Probability						0.00				0.00				0.06				0.02	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h				214			95			12 440			12 357						
Adjusted Saturation Flow Rate (s), veh/h/ln				1428			1738			1016 1838			941 1834						
Queue Service Time (g s), s				2.9			0.0			0.5 10.0			0.5 7.6						
Cycle Queue Clearance Time (g c), s				4.4			1.5			8.1 10.0			10.5 7.6						
Green Ratio (g/C)				0.43			0.43			0.31 0.31			0.31 0.31						
Capacity (c), veh/h				750			836			299 563			240 562						
Volume-to-Capacity Ratio (X)				0.286			0.114			0.040 0.782			0.050 0.635						
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)				1.9			0.8			0.2 6.2			0.2 4.7						
Queue Storage Ratio (RQ) (95 th percentile)				0.00			0.00			0.02 0.00			0.05 0.00						
Uniform Delay (d 1), s/veh				8.6			7.8			17.1 14.4			19.2 13.6						
Incremental Delay (d 2), s/veh				0.1			0.0			0.0 0.9			0.0 0.4						
Initial Queue Delay (d 3), s/veh				0.0			0.0			0.0 0.0			0.0 0.0						
Control Delay (d), s/veh				8.7			7.8			17.1 15.3			19.2 14.1						
Level of Service (LOS)				A			A			B B			B B						
Approach Delay, s/veh / LOS				8.7		A		7.8		A		15.4		B		14.2		B	
Intersection Delay, s/veh / LOS				13.1										B					
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

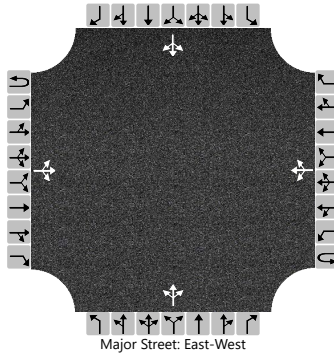
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Kemary & Fohl
Jurisdiction	Perry Twp, OH
East/West Street	Fohl Street
North/South Street	Kemary Avenue
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		30	50	10		10	50	40		10	50	10		20	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

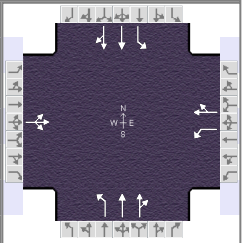
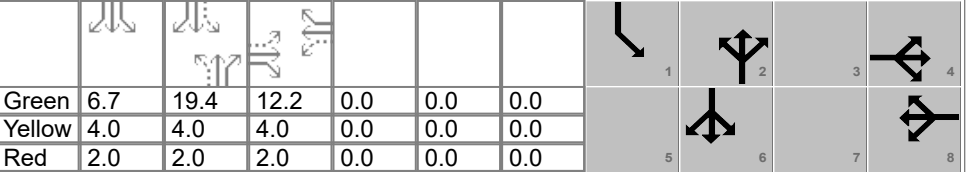
Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		34				11					80				45	
Capacity, c (veh/h)		1484				1527					671				680	
v/c Ratio		0.02				0.01					0.12				0.07	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					0.4				0.2	
Control Delay (s/veh)		7.5	0.2	0.2		7.4	0.1	0.1			11.1				10.7	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	2.6				0.8				11.1				10.7			
Approach LOS	A				A				B				B			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon-Perry Twp		Time Period		AM Peak		PHF		0.94									
Urban Street		Erie Street		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		3_AM 45 NavarreMain.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	20	30	70	10	170	20	510	100	190	340	10				
Signal Information																			
Cycle, s	56.4	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.7	19.4	12.2	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2		1		6	
Case Number						8.0				6.0				6.3		1.0		4.0	
Phase Duration, s						18.2				18.2				25.4		12.7		38.1	
Change Period, (Y+R c), s						6.0				6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s						3.3				3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s						8.3				11.6				10.2		5.7		4.7	
Green Extension Time (g e), s						0.3				0.6				1.1		0.1		1.8	
Phase Call Probability						1.00				1.00				1.00		0.96		1.00	
Max Out Probability						0.75				0.00				0.09		1.00		0.01	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					85		74	191		21	333	316	202	187	186				
Adjusted Saturation Flow Rate (s), veh/h/ln					1170		1340	1586		1002	1856	1750	1767	1856	1837				
Queue Service Time (g s), s					0.2		3.0	6.1		0.8	8.1	8.2	3.7	2.7	2.7				
Cycle Queue Clearance Time (g c), s					6.3		9.6	6.1		0.8	8.1	8.2	3.7	2.7	2.7				
Green Ratio (g/C)					0.22		0.22	0.22		0.34	0.34	0.34	0.50	0.57	0.57				
Capacity (c), veh/h					343		263	346		472	639	602	493	1056	1046				
Volume-to-Capacity Ratio (X)					0.248		0.283	0.554		0.045	0.521	0.525	0.410	0.177	0.177				
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					1.5		1.6	3.6		0.3	5.2	4.9	1.9	1.3	1.3				
Queue Storage Ratio (RQ) (95 th percentile)					0.00		0.79	0.00		0.06	0.00	0.00	0.28	0.00	0.00				
Uniform Delay (d 1), s/veh					18.2		24.1	19.6		12.4	14.8	14.8	9.2	5.8	5.8				
Incremental Delay (d 2), s/veh					0.1		0.2	0.5		0.0	0.3	0.3	0.2	0.0	0.0				
Initial Queue Delay (d 3), s/veh					0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh					18.4		24.4	20.1		12.4	15.1	15.1	9.4	5.9	5.9				
Level of Service (LOS)					B		C	C		B	B	B	A	A	A				
Approach Delay, s/veh / LOS				18.4	B		21.3	C		15.0	B		7.1	A					
Intersection Delay, s/veh / LOS				13.4									B						
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

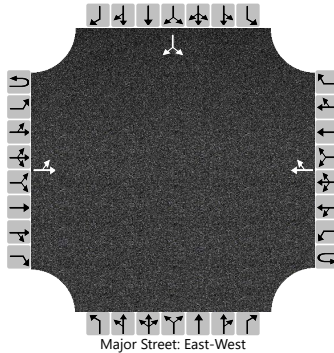
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Navarre & Millennium
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Millennium Boulevard
Peak Hour Factor	0.87
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		80	220				250	70						70		70
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		92													161	
Capacity, c (veh/h)		1185													457	
v/c Ratio		0.08													0.35	
95% Queue Length, Q ₉₅ (veh)		0.3													1.6	
Control Delay (s/veh)		8.3	0.7												17.1	
Level of Service (LOS)		A	A												C	
Approach Delay (s/veh)	2.8												17.1			
Approach LOS	A												C			

HCS Two-Way Stop-Control Report

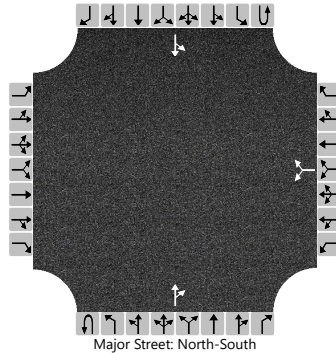
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Millennium & Prospect
Jurisdiction	Massillon, OH
East/West Street	Prospect Drive
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						90		10			80	30		10	40	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.43		6.23							4.13		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.53		3.33							2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							125								13		
Capacity, c (veh/h)							798								1440		
v/c Ratio							0.16								0.01		
95% Queue Length, Q ₉₅ (veh)							0.6								0.0		
Control Delay (s/veh)							10.3								7.5	0.1	
Level of Service (LOS)							B								A	A	
Approach Delay (s/veh)						10.3								1.6			
Approach LOS						B								A			

HCS Two-Way Stop-Control Report

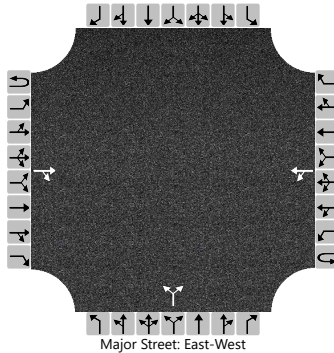
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Navarre & Sterilite
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Sterilite Street
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			220	50		30	250			50		80				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

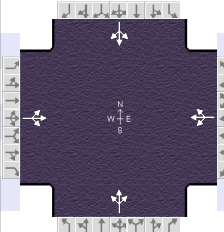
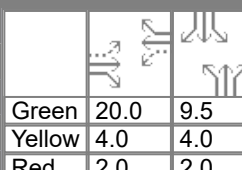
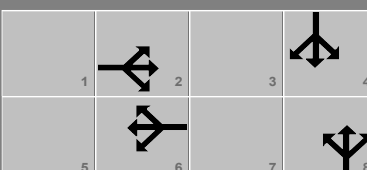
Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						38					163					
Capacity, c (veh/h)						1216					549					
v/c Ratio						0.03					0.30					
95% Queue Length, Q ₉₅ (veh)						0.1					1.2					
Control Delay (s/veh)						8.1	0.3				14.3					
Level of Service (LOS)						A	A				B					
Approach Delay (s/veh)					1.1				14.3							
Approach LOS					A				B							

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Perry Twp, OH		Time Period		AM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		8_AM 45 NavarreRichville.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				20	230	70	40	160	30	60	230	50	20	130	10				
Signal Information																			
Cycle, s	62.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.0	9.5	14.5	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						2				6				8				4	
Case Number						8.0				8.0				12.0				12.0	
Phase Duration, s						26.0				26.0				20.5				15.5	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.1				3.1				3.0				3.0	
Queue Clearance Time (g s), s						11.7				8.4				13.7				7.3	
Green Extension Time (g e), s						0.9				1.1				0.6				0.3	
Phase Call Probability						1.00				1.00				1.00				0.94	
Max Out Probability						0.02				0.00				0.00				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				5	2	12	1	6	16	3	8	18	7	4	14				
Adjusted Flow Rate (v), veh/h					333			240			354			167					
Adjusted Saturation Flow Rate (s), veh/h/ln					1757			1692			1792			1824					
Queue Service Time (g s), s					0.0			0.0			11.7			5.3					
Cycle Queue Clearance Time (g c), s					9.7			6.4			11.7			5.3					
Green Ratio (g/C)					0.32			0.32			0.23			0.15					
Capacity (c), veh/h					628			614			421			279					
Volume-to-Capacity Ratio (X)					0.531			0.390			0.841			0.597					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					6.3			4.2			8.1			3.8					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00			0.00			0.00					
Uniform Delay (d 1), s/veh					17.6			16.4			22.7			24.5					
Incremental Delay (d 2), s/veh					0.3			0.2			1.8			0.8					
Initial Queue Delay (d 3), s/veh					0.0			0.0			0.0			0.0					
Control Delay (d), s/veh					17.8			16.6			24.5			25.3					
Level of Service (LOS)					B			B			C			C					
Approach Delay, s/veh / LOS				17.8		B	16.6		B	24.5		C	25.3		C				
Intersection Delay, s/veh / LOS				20.8						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

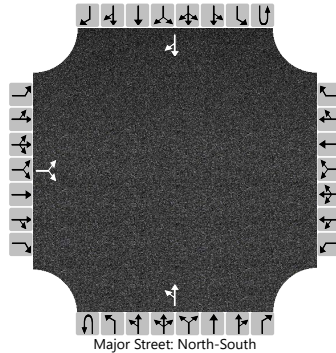
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Stump & Cincinnati
Jurisdiction	Perry Twp, OH
East/West Street	Stump Avenue
North/South Street	Cincinnati Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		10		10						10	210				90	10
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			21							11						
Capacity, c (veh/h)			768							1478						
v/c Ratio			0.03							0.01						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			9.8							7.5	0.1					
Level of Service (LOS)			A							A	A					
Approach Delay (s/veh)	9.8								0.4							
Approach LOS	A								A							

HCS Two-Way Stop-Control Report

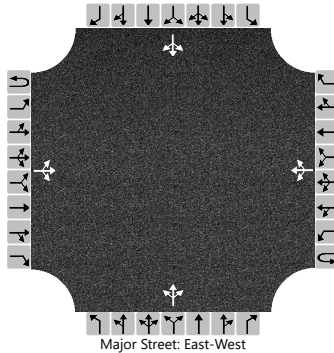
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Richville & Stump
Jurisdiction	Perry Twp, OH
East/West Street	Richville Drive
North/South Street	Stump Avenue/Creston Drive
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		10	150	90		10	290	10		210	10	10		10	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11				11					258					34
Capacity, c (veh/h)		1217				1288					397					466
v/c Ratio		0.01				0.01					0.65					0.07
95% Queue Length, Q ₉₅ (veh)		0.0				0.0					4.4					0.2
Control Delay (s/veh)		8.0	0.1	0.1		7.8	0.1	0.1			29.5					13.3
Level of Service (LOS)		A	A	A		A	A	A			D					B
Approach Delay (s/veh)	0.4				0.3				29.5				13.3			
Approach LOS	A				A				D				B			

HCS Two-Way Stop-Control Report

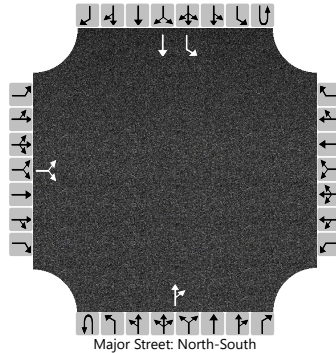
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & US30 EB
Jurisdiction	Massillon, OH
East/West Street	US30 EB Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	1	1	0
Configuration			LR									TR		L	T	
Volume (veh/h)		140		90							420	160		240	180	
Percent Heavy Vehicles (%)		3		3										3		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2										4.1		
Critical Headway (sec)		7.13		6.23										4.13		
Base Follow-Up Headway (sec)		3.5		3.3										2.2		
Follow-Up Headway (sec)		3.53		3.33										2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			237											247		
Capacity, c (veh/h)			225											974		
v/c Ratio			1.05											0.25		
95% Queue Length, Q ₉₅ (veh)			10.2											1.0		
Control Delay (s/veh)			120.6											10.0		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)	120.6												5.7			
Approach LOS	F												A			

HCS Two-Way Stop-Control Report

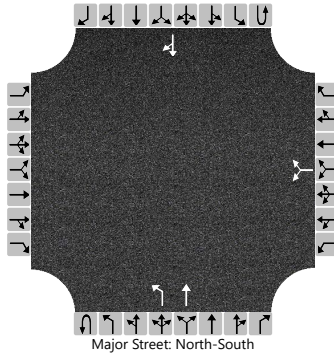
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & US30 WB
Jurisdiction	Massillon, OH
East/West Street	US30 Westbound Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.85
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	0
Configuration							LR			L	T					TR
Volume (veh/h)						60		290		210	370				350	110
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						412				247						
Capacity, c (veh/h)						453				1022						
v/c Ratio						0.91				0.24						
95% Queue Length, Q ₉₅ (veh)						10.1				0.9						
Control Delay (s/veh)						53.1				9.6						
Level of Service (LOS)						F				A						
Approach Delay (s/veh)					53.1				3.5							
Approach LOS					F				A							

HCS Two-Way Stop-Control Report

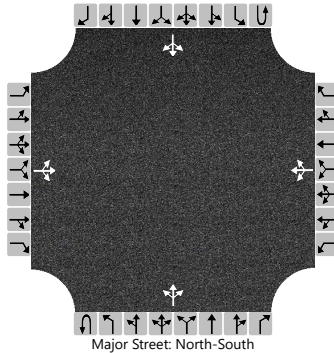
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Nave (S)
Jurisdiction	Massillon, OH
East/West Street	Nave Road/RG Drage
North/South Street	Richville Road
Peak Hour Factor	0.81
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		30	10	90		10	0	10		80	280	240		40	330	40
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

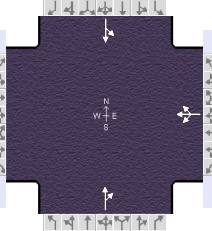
Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			160				25			99				49		
Capacity, c (veh/h)			303				163			1099				938		
v/c Ratio			0.53				0.15			0.09				0.05		
95% Queue Length, Q ₉₅ (veh)			2.9				0.5			0.3				0.2		
Control Delay (s/veh)			29.4				30.9			8.6	1.3	1.3		9.1	0.6	0.6
Level of Service (LOS)			D				D			A	A	A		A	A	A
Approach Delay (s/veh)	29.4				30.9				2.2				1.5			
Approach LOS	D				D				A				A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.84									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Nave Road (North)		File Name		14_AM 45 RichvilleNaveN.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							100	0	20		250	90	10	250					
Signal Information																			
Cycle, s	40.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On	Green	20.0	8.0	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
Force Mode	Fixed	Simult. Gap N/S	On	Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2				6	
Case Number										12.0				8.0				8.0	
Phase Duration, s										14.0				26.0				26.0	
Change Period, (Y+R c), s										6.0				6.0				6.0	
Max Allow Headway (MAH), s										3.1				3.0				3.0	
Queue Clearance Time (g s), s										4.9				7.9				6.0	
Green Extension Time (g e), s										0.1				1.2				1.2	
Phase Call Probability										0.80				1.00				1.00	
Max Out Probability										0.10				0.01				0.01	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								143			405			310					
Adjusted Saturation Flow Rate (s), veh/h/ln								1731			1771			1836					
Queue Service Time (g s), s								2.9			5.9			0.0					
Cycle Queue Clearance Time (g c), s								2.9			5.9			4.0					
Green Ratio (g/C)								0.20			0.50			0.50					
Capacity (c), veh/h								345			887			1013					
Volume-to-Capacity Ratio (X)								0.415			0.456			0.306					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								1.6			2.1			1.5					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00			0.00					
Uniform Delay (d 1), s/veh								14.0			6.5			6.0					
Incremental Delay (d 2), s/veh								0.3			0.1			0.1					
Initial Queue Delay (d 3), s/veh								0.0			0.0			0.0					
Control Delay (d), s/veh								14.3			6.6			6.0					
Level of Service (LOS)								B			A			A					
Approach Delay, s/veh / LOS				0.0				14.3		B		6.6		A		6.0		A	
Intersection Delay, s/veh / LOS				7.7						A									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

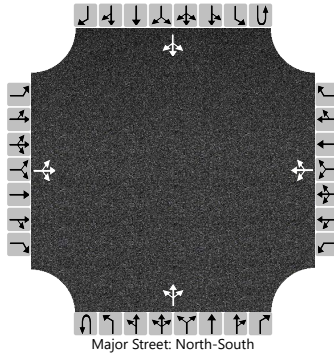
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Business Place
Jurisdiction	Massillon, OH
East/West Street	Business Place & Ohio State Drive
North/South Street	Richville Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		80	0	70		10	0	10		20	220	20		10	270	20
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			160				21				21				11	
Capacity, c (veh/h)			506				496				1246				1304	
v/c Ratio			0.32				0.04				0.02				0.01	
95% Queue Length, Q ₉₅ (veh)			1.3				0.1				0.1				0.0	
Control Delay (s/veh)			15.4				12.6				7.9	0.2	0.2		7.8	0.1
Level of Service (LOS)			C				B				A	A	A		A	A
Approach Delay (s/veh)	15.4				12.6				0.8				0.3			
Approach LOS	C				B				A				A			

HCS Two-Way Stop-Control Report

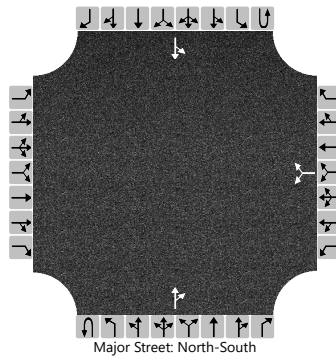
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Jackson
Jurisdiction	Massillon, OH
East/West Street	Jackson Avenue
North/South Street	Richville Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						40		10			240	80		10	260	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

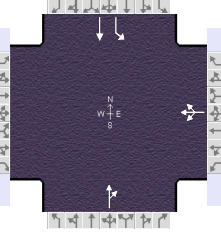
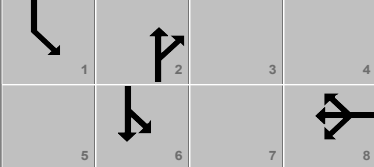
Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

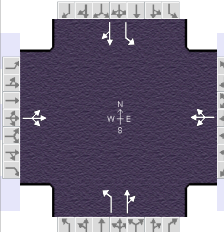
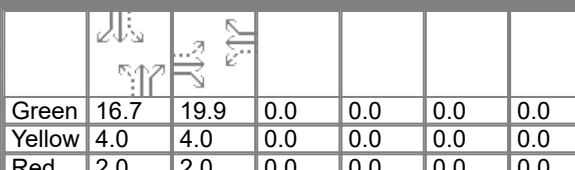
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						53								11		
Capacity, c (veh/h)						498								1213		
v/c Ratio						0.11								0.01		
95% Queue Length, Q ₉₅ (veh)						0.4								0.0		
Control Delay (s/veh)						13.1								8.0	0.1	
Level of Service (LOS)						B								A	A	
Approach Delay (s/veh)					13.1								0.4			
Approach LOS					B								A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.80									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Southway Street		File Name		17_AM 45 RichvilleSouthway.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							10	0	120		210	10	170	190					
Signal Information																			
Cycle, s	53.5	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.7	19.6	9.1	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2		1		6	
Case Number										12.0				8.3		1.0		4.0	
Phase Duration, s										15.1				25.6		12.7		38.4	
Change Period, (Y+R c), s										6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s										3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s										7.1				7.9		5.4		5.1	
Green Extension Time (g e), s										0.1				0.4		0.1		0.8	
Phase Call Probability										0.91				1.00		0.96		1.00	
Max Out Probability										0.52				0.00		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								163			275		213	238					
Adjusted Saturation Flow Rate (s), veh/h/ln								1586			1840		1767	1856					
Queue Service Time (g s), s								5.1			5.9		3.4	3.1					
Cycle Queue Clearance Time (g c), s								5.1			5.9		3.4	3.1					
Green Ratio (g/C)								0.17			0.37		0.53	0.61					
Capacity (c), veh/h								270			677		637	1123					
Volume-to-Capacity Ratio (X)								0.602			0.406		0.334	0.212					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								3.0			3.6		1.6	1.3					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00		0.27	0.00					
Uniform Delay (d 1), s/veh								20.5			12.6		7.4	4.8					
Incremental Delay (d 2), s/veh								0.8			0.1		0.1	0.0					
Initial Queue Delay (d 3), s/veh								0.0			0.0		0.0	0.0					
Control Delay (d), s/veh								21.3			12.7		7.5	4.8					
Level of Service (LOS)								C			B		A	A					
Approach Delay, s/veh / LOS				0.0				21.3		C		12.7		B		6.1		A	
Intersection Delay, s/veh / LOS				10.9						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Navarre, OH		Time Period		PM Peak		PHF		0.91									
Urban Street		North Main Street		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Wooster Street		File Name		1_PM 45 MainWooster.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				140	60	10	30	70	30	10	380	30	20	410	50				
Signal Information																			
Cycle, s	48.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	16.7	19.9	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				6.0				6.0	
Phase Duration, s						25.9				25.9				22.7				22.7	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.1	
Queue Clearance Time (g s), s						7.2				4.5				14.8				14.3	
Green Extension Time (g e), s						0.6				0.7				1.9				1.8	
Phase Call Probability						0.99				0.99				1.00				1.00	
Max Out Probability						0.00				0.00				0.02				0.04	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h				231			143			11	451		22	505					
Adjusted Saturation Flow Rate (s), veh/h/ln				1435			1678			886	1831		933	1820					
Queue Service Time (g s), s				2.7			0.0			0.6	10.4		1.0	12.3					
Cycle Queue Clearance Time (g c), s				5.2			2.5			12.8	10.4		11.4	12.3					
Green Ratio (g/C)				0.41			0.41			0.34	0.34		0.34	0.34					
Capacity (c), veh/h				710			777			229	631		269	627					
Volume-to-Capacity Ratio (X)				0.325			0.184			0.048	0.714		0.082	0.807					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)				2.4			1.4			0.2	6.4		0.4	7.5					
Queue Storage Ratio (RQ) (95 th percentile)				0.00			0.00			0.02	0.00		0.09	0.00					
Uniform Delay (d 1), s/veh				10.0			9.2			20.3	13.9		18.8	14.5					
Incremental Delay (d 2), s/veh				0.1			0.0			0.0	0.6		0.0	1.0					
Initial Queue Delay (d 3), s/veh				0.0			0.0			0.0	0.0		0.0	0.0					
Control Delay (d), s/veh				10.1			9.3			20.3	14.4		18.9	15.4					
Level of Service (LOS)				B			A			C	B		B	B					
Approach Delay, s/veh / LOS				10.1		B		9.3		A		14.6		B		15.6		B	
Intersection Delay, s/veh / LOS				13.6												B			
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

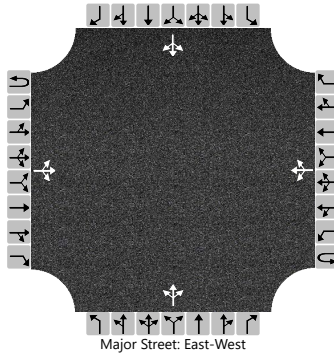
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Kemary & Fohl
Jurisdiction	Perry Twp, OH
East/West Street	Fohl Street
North/South Street	Kemary Avenue
Peak Hour Factor	0.86
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		20	80	10		10	80	30		10	30	10		50	50	20
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

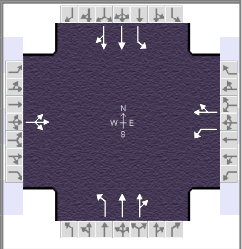
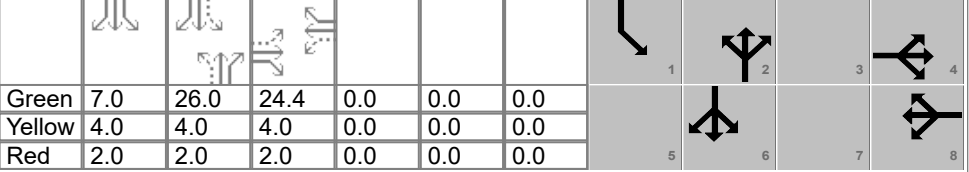
Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				12					58				140	
Capacity, c (veh/h)		1452				1481					639				641	
v/c Ratio		0.02				0.01					0.09				0.22	
95% Queue Length, Q ₉₅ (veh)		0.0				0.0					0.3				0.8	
Control Delay (s/veh)		7.5	0.1	0.1		7.5	0.1	0.1			11.2				12.2	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	1.5				0.7				11.2				12.2			
Approach LOS	A				A				B				B			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon-Perry Twp		Time Period		PM Peak		PHF		0.80									
Urban Street		Erie Street		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		3_PM 45 NavarreMain.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	20	50	150	30	250	20	630	110	210	700	10				
Signal Information																			
Cycle, s	75.4	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	7.0	26.0	24.4	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2		1		6	
Case Number						8.0				6.0				6.3		1.0		4.0	
Phase Duration, s						30.4				30.4				32.0		13.0		45.0	
Change Period, (Y+R c), s						6.0				6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s						3.3				3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s						13.2				19.6				20.1		9.0		14.5	
Green Extension Time (g e), s						1.3				1.5				4.0		0.0		4.0	
Phase Call Probability						1.00				1.00				1.00		1.00		1.00	
Max Out Probability						0.01				0.00				0.00		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					125		188	350		25	475	450	263	445	443				
Adjusted Saturation Flow Rate (s), veh/h/ln					1142		1299	1599		621	1856	1759	1767	1856	1846				
Queue Service Time (g s), s					0.6		10.2	14.8		2.2	18.1	18.1	7.0	12.5	12.5				
Cycle Queue Clearance Time (g c), s					11.2		17.6	14.8		3.0	18.1	18.1	7.0	12.5	12.5				
Green Ratio (g/C)					0.32		0.32	0.32		0.35	0.35	0.35	0.49	0.52	0.52				
Capacity (c), veh/h					449		415	548		299	643	610	304	943	938				
Volume-to-Capacity Ratio (X)					0.278		0.452	0.639		0.084	0.738	0.738	0.863	0.472	0.472				
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					2.8		5.4	8.9		0.5	11.7	11.3	7.9	8.0	8.0				
Queue Storage Ratio (RQ) (95 th percentile)					0.00		2.75	0.00		0.12	0.00	0.00	1.16	0.00	0.00				
Uniform Delay (d 1), s/veh					19.0		26.5	22.3		18.4	23.1	23.1	19.8	12.8	12.8				
Incremental Delay (d 2), s/veh					0.1		0.3	0.5		0.0	0.6	0.7	20.9	0.1	0.1				
Initial Queue Delay (d 3), s/veh					0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh					19.2		26.7	22.7		18.5	23.7	23.8	40.7	13.0	13.0				
Level of Service (LOS)					B		C	C		B	C	C	D	B	B				
Approach Delay, s/veh / LOS				19.2		B	24.1		C	23.6		C	19.3		B				
Intersection Delay, s/veh / LOS				21.7						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

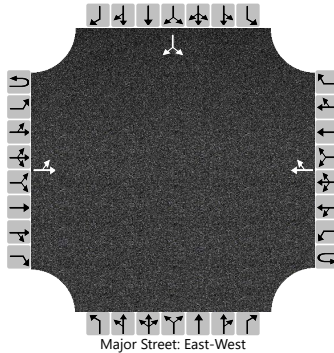
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Navarre & Millennium
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		30	360				290	20						50		70
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		38													150	
Capacity, c (veh/h)		1166													437	
v/c Ratio		0.03													0.34	
95% Queue Length, Q ₉₅ (veh)		0.1													1.5	
Control Delay (s/veh)		8.2	0.4												17.5	
Level of Service (LOS)		A	A												C	
Approach Delay (s/veh)	1.0												17.5			
Approach LOS	A												C			

HCS Two-Way Stop-Control Report

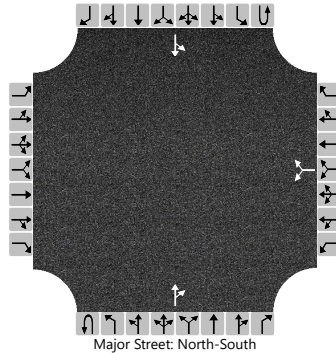
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Millennium & Prospect
Jurisdiction	Massillon, OH
East/West Street	Prospect Drive
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						10		10			30	10		10	110	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							25								13		
Capacity, c (veh/h)							881								1550		
v/c Ratio							0.03								0.01		
95% Queue Length, Q ₉₅ (veh)							0.1								0.0		
Control Delay (s/veh)							9.2								7.3	0.1	
Level of Service (LOS)							A								A	A	
Approach Delay (s/veh)						9.2								0.7			
Approach LOS						A								A			

HCS Two-Way Stop-Control Report

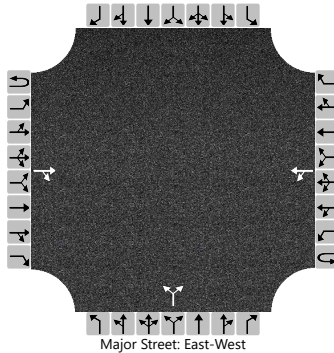
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Navarre & Sterilite
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Sterilite Street
Peak Hour Factor	0.83
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			320	20		10	270			50		50				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

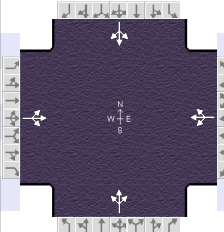
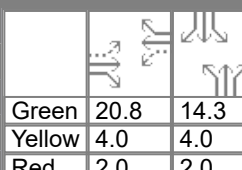
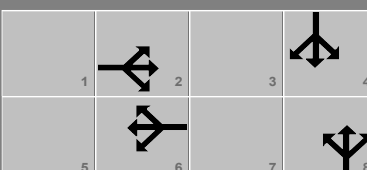
Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						12					120					
Capacity, c (veh/h)						1144					475					
v/c Ratio						0.01					0.25					
95% Queue Length, Q ₉₅ (veh)						0.0					1.0					
Control Delay (s/veh)						8.2	0.1				15.1					
Level of Service (LOS)						A	A				C					
Approach Delay (s/veh)					0.4				15.1							
Approach LOS					A				C							

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Perry Twp, OH		Time Period		PM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		8_PM 45 NavarreRichville.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				20	260	100	60	230	30	80	200	60	50	200	20				
Signal Information																			
Cycle, s	70.7	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.8	14.3	17.6	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						2				6				8				4	
Case Number						8.0				8.0				12.0				12.0	
Phase Duration, s						26.8				26.8				23.6				20.3	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.1				3.1				3.1				3.0	
Queue Clearance Time (g s), s						17.1				15.5				15.7				12.7	
Green Extension Time (g e), s						1.1				1.5				0.7				0.5	
Phase Call Probability						1.00				1.00				1.00				1.00	
Max Out Probability						0.12				0.00				0.00				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				5	2	12	1	6	16	3	8	18	7	4	14				
Adjusted Flow Rate (v), veh/h					396			333			354			281					
Adjusted Saturation Flow Rate (s), veh/h/ln					1753			1598			1778			1815					
Queue Service Time (g s), s					1.3			0.0			13.7			10.7					
Cycle Queue Clearance Time (g c), s					15.1			13.5			13.7			10.7					
Green Ratio (g/C)					0.29			0.29			0.25			0.20					
Capacity (c), veh/h					562			524			456			377					
Volume-to-Capacity Ratio (X)					0.704			0.636			0.776			0.746					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					10.1			8.3			9.2			7.9					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00			0.00			0.00					
Uniform Delay (d 1), s/veh					23.9			23.0			25.5			27.4					
Incremental Delay (d 2), s/veh					2.2			0.5			1.1			1.1					
Initial Queue Delay (d 3), s/veh					0.0			0.0			0.0			0.0					
Control Delay (d), s/veh					26.1			23.5			26.6			28.5					
Level of Service (LOS)					C			C			C			C					
Approach Delay, s/veh / LOS				26.1	C	23.5	C	26.6	C	28.5	C								
Intersection Delay, s/veh / LOS				26.1						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

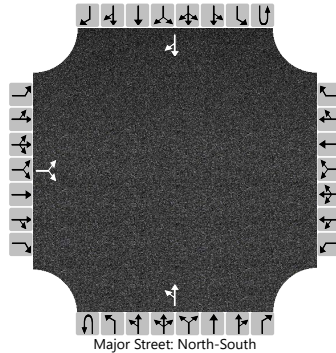
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Stump & Cincinnati
Jurisdiction	Perry Twp, OH
East/West Street	Stump Avenue
North/South Street	Cincinnati Drive
Peak Hour Factor	0.82
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		10		10						10	160				130	10
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			24							12						
Capacity, c (veh/h)			720							1400						
v/c Ratio			0.03							0.01						
95% Queue Length, Q ₉₅ (veh)			0.1							0.0						
Control Delay (s/veh)			10.2							7.6	0.1					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	10.2								0.5							
Approach LOS	B								A							

HCS Two-Way Stop-Control Report

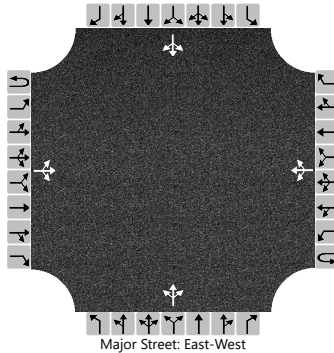
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Existing Conditions

Site Information

Intersection	Richville & Stump
Jurisdiction	Perry Twp, OH
East/West Street	Richville Drive
North/South Street	Stump Avenue/Creston Drive
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		20	340	160		10	300	10		140	10	10		10	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				11					182				34	
Capacity, c (veh/h)		1201				999					246				320	
v/c Ratio		0.02				0.01					0.74				0.11	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					5.2				0.4	
Control Delay (s/veh)		8.1	0.2	0.2		8.6	0.1	0.1			52.0				17.6	
Level of Service (LOS)		A	A	A		A	A	A			F				C	
Approach Delay (s/veh)	0.5				0.4				52.0				17.6			
Approach LOS	A				A				F				C			

HCS Two-Way Stop-Control Report

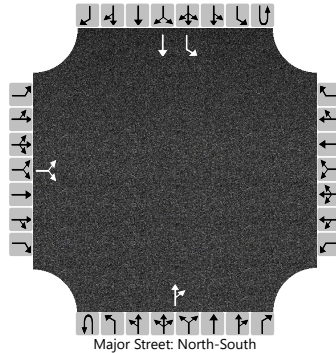
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & US30 EB
Jurisdiction	Massillon, OH
East/West Street	US30 EB Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	1	1	0
Configuration			LR									TR		L	T	
Volume (veh/h)		150		170							360	120		240	340	
Percent Heavy Vehicles (%)		3		3										3		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2										4.1		
Critical Headway (sec)		7.13		6.23										4.13		
Base Follow-Up Headway (sec)		3.5		3.3										2.2		
Follow-Up Headway (sec)		3.53		3.33										2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			360											270		
Capacity, c (veh/h)			205											1024		
v/c Ratio			1.76											0.26		
95% Queue Length, Q ₉₅ (veh)			24.8											1.1		
Control Delay (s/veh)			400.4											9.8		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)	400.4												4.0			
Approach LOS	F												A			

HCS Two-Way Stop-Control Report

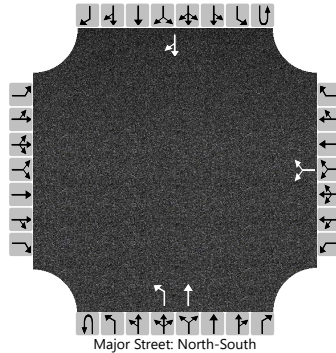
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & US30 WB
Jurisdiction	Massillon, OH
East/West Street	US30 Westbound Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	0
Configuration							LR			L	T					TR
Volume (veh/h)						110		270		170	370				460	100
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						422				189						
Capacity, c (veh/h)						351				954						
v/c Ratio						1.20				0.20						
95% Queue Length, Q ₉₅ (veh)						17.8				0.7						
Control Delay (s/veh)						148.7				9.7						
Level of Service (LOS)						F				A						
Approach Delay (s/veh)					148.7				3.1							
Approach LOS					F				A							

HCS Two-Way Stop-Control Report

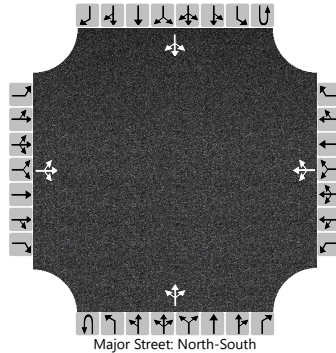
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Nave (S)
Jurisdiction	Massillon, OH
East/West Street	Nave Road/RG Drage
North/South Street	Richville Road
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		150	70	10		30	70	30		10	420	30		20	450	50
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

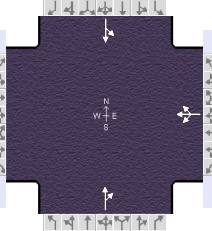
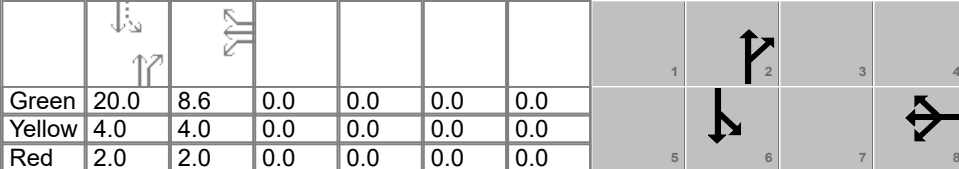
Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			253				143			11				22		
Capacity, c (veh/h)			134				200			1015				1064		
v/c Ratio			1.89				0.72			0.01				0.02		
95% Queue Length, Q ₉₅ (veh)			19.7				4.6			0.0				0.1		
Control Delay (s/veh)			484.5				58.5			8.6	0.1	0.1		8.5	0.3	0.3
Level of Service (LOS)			F				F			A	A	A		A	A	A
Approach Delay (s/veh)	484.5				58.5				0.3				0.6			
Approach LOS	F				F				A				A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.86									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Nave Road (North)		File Name		14_PM 45 RichvilleNaveN.xus													
Project Description		Existing Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							120	0	30		330	160	30	310					
Signal Information																			
Cycle, s	40.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.0	8.6	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2				6	
Case Number										12.0				8.0				8.0	
Phase Duration, s										14.6				26.0				26.0	
Change Period, (Y+R c), s										6.0				6.0				6.0	
Max Allow Headway (MAH), s										3.1				3.1				3.1	
Queue Clearance Time (g s), s										5.6				11.9				7.6	
Green Extension Time (g e), s										0.1				1.5				1.8	
Phase Call Probability										0.86				1.00				1.00	
Max Out Probability										0.25				0.18				0.04	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								174			570			395					
Adjusted Saturation Flow Rate (s), veh/h/ln								1724			1753			1769					
Queue Service Time (g s), s								3.6			9.9			0.0					
Cycle Queue Clearance Time (g c), s								3.6			9.9			5.6					
Green Ratio (g/C)								0.21			0.49			0.49					
Capacity (c), veh/h								365			863			968					
Volume-to-Capacity Ratio (X)								0.477			0.660			0.408					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								2.0			4.3			2.2					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00			0.00					
Uniform Delay (d 1), s/veh								14.0			7.7			6.6					
Incremental Delay (d 2), s/veh								0.4			1.5			0.1					
Initial Queue Delay (d 3), s/veh								0.0			0.0			0.0					
Control Delay (d), s/veh								14.4			9.2			6.7					
Level of Service (LOS)								B			A			A					
Approach Delay, s/veh / LOS				0.0				14.4		B		9.2		A		6.7		A	
Intersection Delay, s/veh / LOS				9.2												A			
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

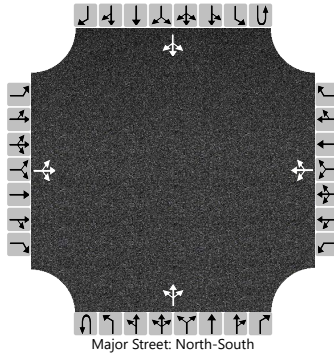
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Business Place
Jurisdiction	Massillon, OH
East/West Street	Business Place & Ohio State Drive
North/South Street	Richville Drive
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		40	0	30		20	10	10		60	290	10		10	280	80
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			75				43			65				11		
Capacity, c (veh/h)			355				327			1166				1232		
v/c Ratio			0.21				0.13			0.06				0.01		
95% Queue Length, Q ₉₅ (veh)			0.8				0.4			0.2				0.0		
Control Delay (s/veh)			17.9				17.7			8.3	0.6	0.6		7.9	0.1	0.1
Level of Service (LOS)			C				C			A	A	A		A	A	A
Approach Delay (s/veh)	17.9				17.7				1.8				0.3			
Approach LOS	C				C				A				A			

HCS Two-Way Stop-Control Report

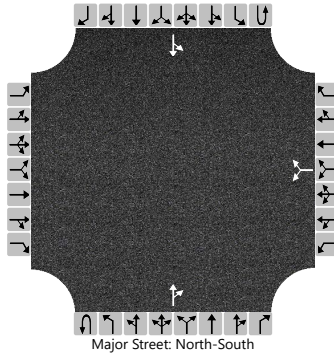
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Existing Conditions

Site Information

Intersection	Richville & Jackson
Jurisdiction	Massillon, OH
East/West Street	Jackson Avenue
North/South Street	Richville Drive
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						70		10			300	50		10	300	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

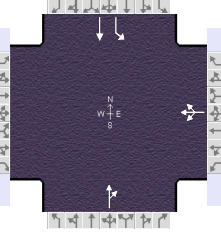
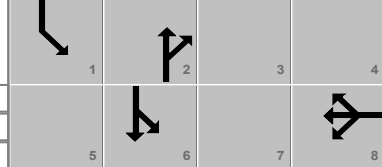
Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						88								11		
Capacity, c (veh/h)						417								1168		
v/c Ratio						0.21								0.01		
95% Queue Length, Q ₉₅ (veh)						0.8								0.0		
Control Delay (s/veh)						15.9								8.1	0.1	
Level of Service (LOS)						C								A	A	
Approach Delay (s/veh)					15.9								0.4			
Approach LOS					C								A			

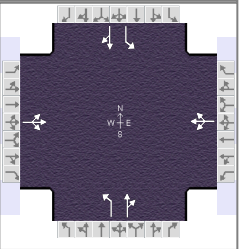
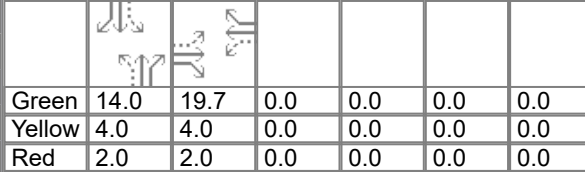
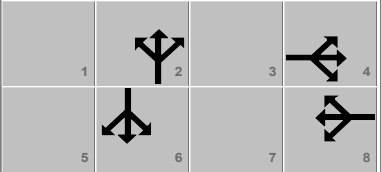
HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Southway Street		File Name		17_PM 45 RichvilleSouthway.xus													
Project Description		Existing Conditions																	
Demand Information						EB			WB			NB			SB				
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R		
Demand (v), veh/h									20	0	190		310	10	150	330			
Signal Information																			
Cycle, s	53.4	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.3	19.4	9.6	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2		1		6	
Case Number										12.0				8.3		1.0		4.0	
Phase Duration, s										15.6				25.4		12.3		37.7	
Change Period, (Y+R c), s										6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s										3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s										9.0				9.5		4.5		6.9	
Green Extension Time (g e), s										0.5				0.6		0.1		1.1	
Phase Call Probability										0.96				1.00		0.90		1.00	
Max Out Probability										0.00				0.00		1.00		0.01	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								219			333		156	344					
Adjusted Saturation Flow Rate (s), veh/h/ln								1589			1845		1767	1856					
Queue Service Time (g s), s								7.0			7.5		2.5	4.9					
Cycle Queue Clearance Time (g c), s								7.0			7.5		2.5	4.9					
Green Ratio (g/C)								0.18			0.36		0.52	0.59					
Capacity (c), veh/h								287			672		576	1103					
Volume-to-Capacity Ratio (X)								0.763			0.496		0.271	0.312					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								4.3			4.5		1.2	2.1					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00		0.20	0.00					
Uniform Delay (d 1), s/veh								20.8			13.2		7.8	5.4					
Incremental Delay (d 2), s/veh								1.6			0.2		0.1	0.1					
Initial Queue Delay (d 3), s/veh								0.0			0.0		0.0	0.0					
Control Delay (d), s/veh								22.4			13.4		7.8	5.4					
Level of Service (LOS)								C			B		A	A					
Approach Delay, s/veh / LOS				0.0				22.4		C		13.4		B		6.2		A	
Intersection Delay, s/veh / LOS				11.8										B					
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

Appendix M

Build Capacity Analysis Worksheets - 2045

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Navarre, OH		Time Period		AM Peak		PHF		0.84									
Urban Street		North Main Street		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Wooster Street		File Name		1_AM 45B MainWooster.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				130	50	10	10	60	20	10	350	20	10	280	20				
Signal Information																			
Cycle, s	45.7	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
Green	14.0	19.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Yellow	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Red	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				6.0				6.0	
Phase Duration, s						25.7				25.7				20.0				20.0	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.1	
Queue Clearance Time (g s), s						6.6				3.7				12.0				12.5	
Green Extension Time (g e), s						0.5				0.6				1.3				1.4	
Phase Call Probability						0.99				0.99				1.00				1.00	
Max Out Probability						0.00				0.00				0.06				0.02	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					226			107		12	440		12	357					
Adjusted Saturation Flow Rate (s), veh/h/ln					1437			1751		1016	1838		941	1834					
Queue Service Time (g s), s					2.9			0.0		0.5	10.0		0.5	7.7					
Cycle Queue Clearance Time (g c), s					4.6			1.7		8.2	10.0		10.5	7.7					
Green Ratio (g/C)					0.43			0.43		0.31	0.31		0.31	0.31					
Capacity (c), veh/h					752			842		298	563		240	562					
Volume-to-Capacity Ratio (X)					0.301			0.127		0.040	0.782		0.050	0.636					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					2.0			0.9		0.2	6.2		0.2	4.7					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00		0.02	0.00		0.05	0.00					
Uniform Delay (d 1), s/veh					8.6			7.9		17.2	14.5		19.3	13.7					
Incremental Delay (d 2), s/veh					0.1			0.0		0.0	0.9		0.0	0.4					
Initial Queue Delay (d 3), s/veh					0.0			0.0		0.0	0.0		0.0	0.0					
Control Delay (d), s/veh					8.7			7.9		17.2	15.4		19.3	14.1					
Level of Service (LOS)					A			A		B	B		B	B					
Approach Delay, s/veh / LOS				8.7	A		7.9	A		15.4	B		14.3	B					
Intersection Delay, s/veh / LOS				13.0						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

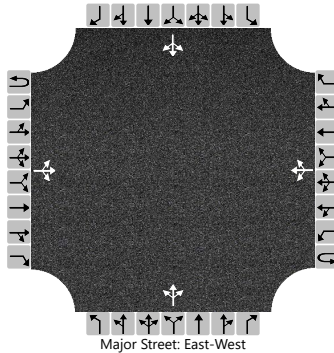
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Kemary & Fohl
Jurisdiction	Perry Twp, OH
East/West Street	Fohl Street
North/South Street	Kemary Avenue
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		30	70	10		10	120	40		10	50	10		20	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

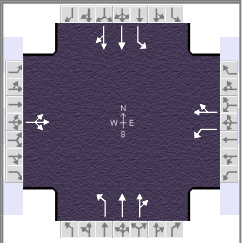
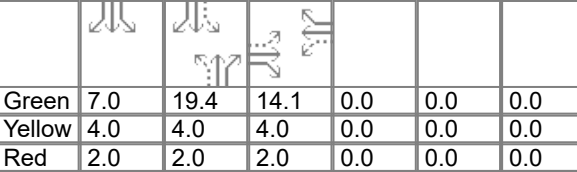
Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		34				11					80					45
Capacity, c (veh/h)		1387				1498					590					586
v/c Ratio		0.02				0.01					0.13					0.08
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					0.5					0.3
Control Delay (s/veh)		7.7	0.2	0.2		7.4	0.1	0.1			12.0					11.7
Level of Service (LOS)		A	A	A		A	A	A			B					B
Approach Delay (s/veh)	2.2				0.5				12.0				11.7			
Approach LOS	A				A				B				B			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon-Perry Twp		Time Period		AM Peak		PHF		0.94									
Urban Street		Erie Street		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		3_AM 45B NavarreMain.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	20	30	80	10	190	20	510	120	260	340	10				
Signal Information																			
Cycle, s	58.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	7.0	19.4	14.1	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2		1		6	
Case Number						8.0				6.0				6.3		1.0		4.0	
Phase Duration, s						20.1				20.1				25.4		13.0		38.4	
Change Period, (Y+R c), s						6.0				6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s						3.3				3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s						9.2				13.2				11.1		7.6		5.0	
Green Extension Time (g e), s						0.5				0.8				1.1		0.0		1.9	
Phase Call Probability						1.00				1.00				1.00		0.99		1.00	
Max Out Probability						0.18				0.00				0.10		1.00		0.02	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					85		85	213		21	345	325	277	187	186				
Adjusted Saturation Flow Rate (s), veh/h/ln					1127		1340	1585		1002	1856	1733	1767	1856	1837				
Queue Service Time (g s), s					0.2		3.5	6.9		0.9	9.0	9.1	5.6	2.9	3.0				
Cycle Queue Clearance Time (g c), s					7.2		11.2	6.9		0.9	9.0	9.1	5.6	2.9	3.0				
Green Ratio (g/C)					0.24		0.24	0.24		0.33	0.33	0.33	0.49	0.55	0.55				
Capacity (c), veh/h					360		275	387		453	613	573	467	1023	1013				
Volume-to-Capacity Ratio (X)					0.237		0.309	0.550		0.047	0.563	0.567	0.592	0.182	0.183				
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					1.5		1.9	4.1		0.3	5.9	5.6	3.3	1.5	1.5				
Queue Storage Ratio (RQ) (95 th percentile)					0.00		0.95	0.00		0.07	0.00	0.00	0.48	0.00	0.00				
Uniform Delay (d 1), s/veh					17.8		24.6	19.4		13.5	16.2	16.2	10.9	6.6	6.6				
Incremental Delay (d 2), s/veh					0.1		0.2	0.5		0.0	0.5	0.5	1.4	0.0	0.0				
Initial Queue Delay (d 3), s/veh					0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh					17.9		24.9	19.8		13.5	16.6	16.7	12.3	6.6	6.6				
Level of Service (LOS)					B		C	B		B	B	B	B	A	A				
Approach Delay, s/veh / LOS				17.9	B		21.3	C		16.6	B		9.0	A					
Intersection Delay, s/veh / LOS				14.6						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

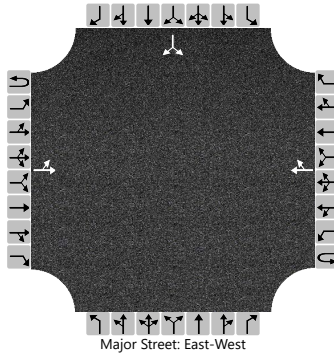
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Navarre & Millennium
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Millennium Boulevard
Peak Hour Factor	0.87
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		80	300				270	70						50		70
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		92													138	
Capacity, c (veh/h)		1162													434	
v/c Ratio		0.08													0.32	
95% Queue Length, Q ₉₅ (veh)		0.3													1.3	
Control Delay (s/veh)		8.4	0.8												17.1	
Level of Service (LOS)		A	A												C	
Approach Delay (s/veh)	2.4												17.1			
Approach LOS	A												C			

HCS Two-Way Stop-Control Report

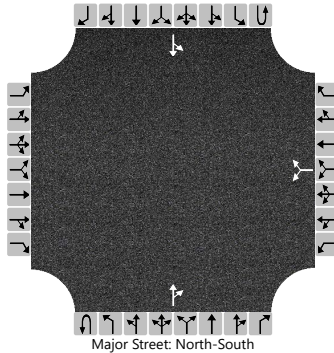
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Millennium & Prospect
Jurisdiction	Massillon, OH
East/West Street	Prospect Drive
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						90		10			60	30		10	20	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.43		6.23							4.13		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.53		3.33							2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							125								13		
Capacity, c (veh/h)							850								1471		
v/c Ratio							0.15								0.01		
95% Queue Length, Q ₉₅ (veh)							0.5								0.0		
Control Delay (s/veh)							10.0								7.5	0.1	
Level of Service (LOS)							A								A	A	
Approach Delay (s/veh)						10.0								2.5			
Approach LOS						A								A			

HCS Two-Way Stop-Control Report

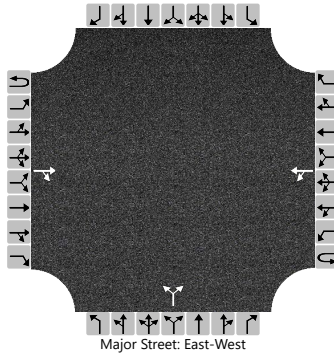
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Navarre & Sterilite
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Sterilite Street
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			200	130		100	230			70		100				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

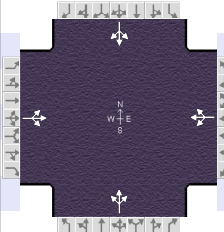
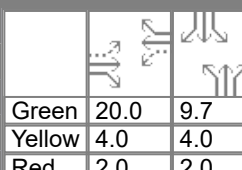
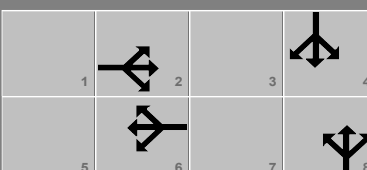
Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						125					213					
Capacity, c (veh/h)						1141					434					
v/c Ratio						0.11					0.49					
95% Queue Length, Q ₉₅ (veh)						0.4					2.6					
Control Delay (s/veh)						8.5	1.1				21.0					
Level of Service (LOS)						A	A				C					
Approach Delay (s/veh)					3.4				21.0							
Approach LOS					A				C							

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Perry Twp, OH		Time Period		AM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		8_AM 45B NavarreRichville.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	240	80	40	170	30	90	230	50	20	130	30				
Signal Information																			
Cycle, s	63.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On			Green	20.0	9.7	15.9	0.0	0.0	0.0							
Force Mode	Fixed	Simult. Gap N/S	On			Yellow	4.0	4.0	4.0	0.0	0.0	0.0							
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						2				6				8				4	
Case Number						8.0				8.0				12.0				12.0	
Phase Duration, s						26.0				26.0				21.9				15.7	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.1				3.1				3.0				3.0	
Queue Clearance Time (g s), s						13.4				9.0				15.1				8.3	
Green Extension Time (g e), s						0.8				1.2				0.7				0.3	
Phase Call Probability						1.00				1.00				1.00				0.96	
Max Out Probability						0.17				0.00				0.00				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				5	2	12	1	6	16	3	8	18	7	4	14				
Adjusted Flow Rate (v), veh/h				365			250			385			188						
Adjusted Saturation Flow Rate (s), veh/h/ln				1737			1695			1790			1792						
Queue Service Time (g s), s				2.3			0.0			13.1			6.3						
Cycle Queue Clearance Time (g c), s				11.4			7.0			13.1			6.3						
Green Ratio (g/C)				0.31			0.31			0.25			0.15						
Capacity (c), veh/h				606			598			451			273						
Volume-to-Capacity Ratio (X)				0.602			0.418			0.855			0.687						
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)				7.6			4.6			8.8			4.6						
Queue Storage Ratio (RQ) (95 th percentile)				0.00			0.00			0.00			0.00						
Uniform Delay (d 1), s/veh				18.9			17.4			22.8			25.6						
Incremental Delay (d 2), s/veh				1.2			0.2			1.8			1.2						
Initial Queue Delay (d 3), s/veh				0.0			0.0			0.0			0.0						
Control Delay (d), s/veh				20.1			17.6			24.6			26.8						
Level of Service (LOS)				C			B			C			C						
Approach Delay, s/veh / LOS				20.1		C		17.6		B		24.6		C		26.8		C	
Intersection Delay, s/veh / LOS				22.1										C					
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

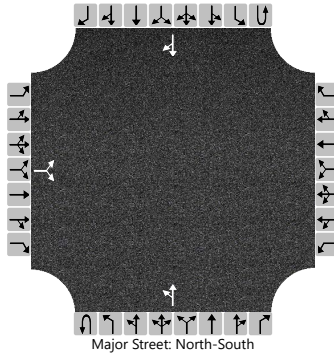
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Stump & Cincinnati
Jurisdiction	Perry Twp, OH
East/West Street	Stump Avenue
North/South Street	Cincinnati Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		40		10						10	200				80	40
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			53							11						
Capacity, c (veh/h)			692							1452						
v/c Ratio			0.08							0.01						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			10.6							7.5	0.1					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	10.6								0.4							
Approach LOS	B								A							

HCS Two-Way Stop-Control Report

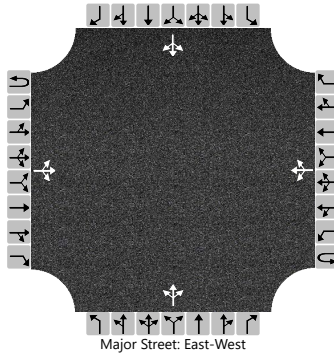
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Richville & Stump
Jurisdiction	Perry Twp, OH
East/West Street	Richville Drive
North/South Street	Stump Avenue/Creston Drive
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		10	150	100		10	290	10		210	10	10		10	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11				11					258					34
Capacity, c (veh/h)		1217				1276					393					463
v/c Ratio		0.01				0.01					0.66					0.07
95% Queue Length, Q ₉₅ (veh)		0.0				0.0					4.5					0.2
Control Delay (s/veh)		8.0	0.1	0.1		7.8	0.1	0.1			30.0					13.4
Level of Service (LOS)		A	A	A		A	A	A			D					B
Approach Delay (s/veh)	0.4				0.3				30.0				13.4			
Approach LOS	A				A				D				B			

HCS Two-Way Stop-Control Report

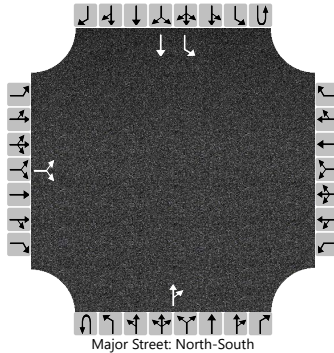
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & US30 EB
Jurisdiction	Massillon, OH
East/West Street	US30 EB Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	1	1	0
Configuration			LR									TR		L	T	
Volume (veh/h)		140		100							430	170		240	190	
Percent Heavy Vehicles (%)		3		3										3		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2										4.1		
Critical Headway (sec)		7.13		6.23										4.13		
Base Follow-Up Headway (sec)		3.5		3.3										2.2		
Follow-Up Headway (sec)		3.53		3.33										2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			247											247		
Capacity, c (veh/h)			226											957		
v/c Ratio			1.09											0.26		
95% Queue Length, Q ₉₅ (veh)			11.1											1.0		
Control Delay (s/veh)			133.4											10.1		
Level of Service (LOS)			F											B		
Approach Delay (s/veh)	133.4												5.6			
Approach LOS	F												A			

HCS Two-Way Stop-Control Report

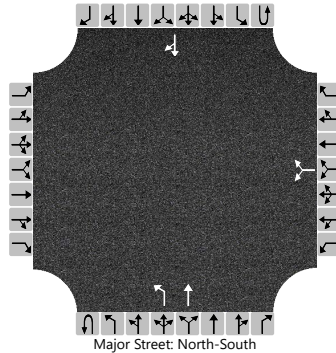
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & US30 WB
Jurisdiction	Massillon, OH
East/West Street	US30 Westbound Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.85
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	0
Configuration							LR			L	T					TR
Volume (veh/h)						70		290		220	370				360	110
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						424				259						
Capacity, c (veh/h)						398				1012						
v/c Ratio						1.06				0.26						
95% Queue Length, Q ₉₅ (veh)						14.3				1.0						
Control Delay (s/veh)						95.5				9.8						
Level of Service (LOS)						F				A						
Approach Delay (s/veh)					95.5				3.6							
Approach LOS					F				A							

HCS Two-Way Stop-Control Report

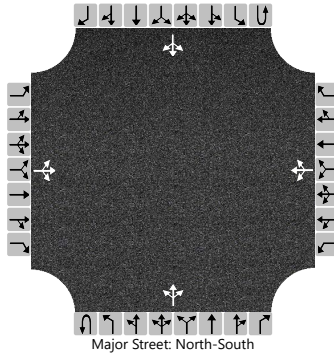
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Nave (S)
Jurisdiction	Massillon, OH
East/West Street	Nave Road/RG Drage
North/South Street	Richville Road
Peak Hour Factor	0.81
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		30	10	90		10	0	10		80	280	240		40	340	40
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

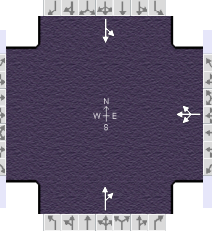
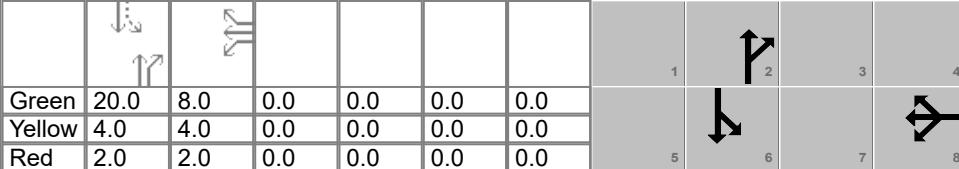
Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			160				25			99				49		
Capacity, c (veh/h)			298				159			1087				938		
v/c Ratio			0.54				0.15			0.09				0.05		
95% Queue Length, Q ₉₅ (veh)			3.0				0.5			0.3				0.2		
Control Delay (s/veh)			30.4				31.7			8.6	1.3	1.3		9.1	0.6	0.6
Level of Service (LOS)			D				D			A	A	A		A	A	A
Approach Delay (s/veh)	30.4				31.7				2.3				1.4			
Approach LOS	D				D				A				A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.84									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Nave Road (North)		File Name		14_AM 45B RichvilleNaveN.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							100	0	20		250	90	10	260					
Signal Information																			
Cycle, s	40.0	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	20.0	8.0	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2				6	
Case Number										12.0				8.0				8.0	
Phase Duration, s										14.0				26.0				26.0	
Change Period, (Y+R c), s										6.0				6.0				6.0	
Max Allow Headway (MAH), s										3.1				3.0				3.0	
Queue Clearance Time (g s), s										4.9				7.9				6.2	
Green Extension Time (g e), s										0.1				1.2				1.2	
Phase Call Probability										0.80				1.00				1.00	
Max Out Probability										0.10				0.01				0.01	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								143			405			321					
Adjusted Saturation Flow Rate (s), veh/h/ln								1731			1771			1837					
Queue Service Time (g s), s								2.9			5.9			0.0					
Cycle Queue Clearance Time (g c), s								2.9			5.9			4.2					
Green Ratio (g/C)								0.20			0.50			0.50					
Capacity (c), veh/h								345			887			1013					
Volume-to-Capacity Ratio (X)								0.415			0.456			0.317					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								1.6			2.1			1.6					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00			0.00					
Uniform Delay (d 1), s/veh								14.0			6.5			6.0					
Incremental Delay (d 2), s/veh								0.3			0.1			0.1					
Initial Queue Delay (d 3), s/veh								0.0			0.0			0.0					
Control Delay (d), s/veh								14.3			6.6			6.1					
Level of Service (LOS)								B			A			A					
Approach Delay, s/veh / LOS				0.0				14.3		B		6.6		A		6.1		A	
Intersection Delay, s/veh / LOS				7.7						A									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

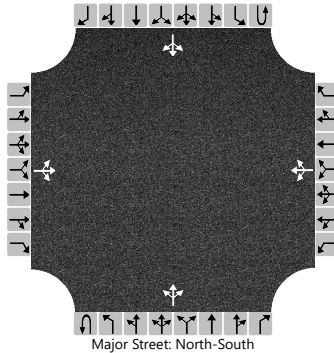
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Business Place
Jurisdiction	Massillon, OH
East/West Street	Business Place & Ohio State Drive
North/South Street	Richville Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		80	0	70		10	0	10		20	220	20		10	280	20
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			160				21				21				11	
Capacity, c (veh/h)			498				490				1235				1304	
v/c Ratio			0.32				0.04				0.02				0.01	
95% Queue Length, Q ₉₅ (veh)			1.4				0.1				0.1				0.0	
Control Delay (s/veh)			15.6				12.7				8.0	0.2	0.2		7.8	0.1
Level of Service (LOS)			C				B				A	A	A		A	A
Approach Delay (s/veh)	15.6				12.7				0.8				0.3			
Approach LOS	C				B				A				A			

HCS Two-Way Stop-Control Report

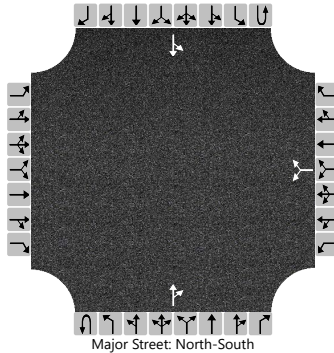
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Jackson
Jurisdiction	Massillon, OH
East/West Street	Jackson Avenue
North/South Street	Richville Drive
Peak Hour Factor	0.94
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						40		10			240	80		10	270	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

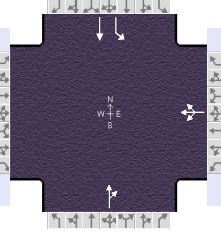
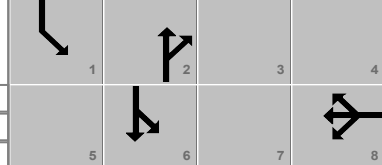
Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							53								11		
Capacity, c (veh/h)							492								1213		
v/c Ratio							0.11								0.01		
95% Queue Length, Q ₉₅ (veh)							0.4								0.0		
Control Delay (s/veh)							13.2								8.0	0.1	
Level of Service (LOS)							B								A	A	
Approach Delay (s/veh)						13.2								0.4			
Approach LOS						B								A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.80									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Southway Street		File Name		17_AM 45B RichvilleSouthway.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							10	0	120		210	10	170	200					
Signal Information																			
Cycle, s	53.4	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.7	19.6	9.1	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2		1		6	
Case Number										12.0				8.3		1.0		4.0	
Phase Duration, s										15.1				25.6		12.7		38.3	
Change Period, (Y+R c), s										6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s										3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s										7.1				7.9		5.4		5.3	
Green Extension Time (g e), s										0.1				0.4		0.1		0.8	
Phase Call Probability										0.91				1.00		0.96		1.00	
Max Out Probability										0.51				0.00		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								163			275		213	250					
Adjusted Saturation Flow Rate (s), veh/h/ln								1586			1840		1767	1856					
Queue Service Time (g s), s								5.1			5.9		3.4	3.3					
Cycle Queue Clearance Time (g c), s								5.1			5.9		3.4	3.3					
Green Ratio (g/C)								0.17			0.37		0.53	0.61					
Capacity (c), veh/h								270			676		637	1123					
Volume-to-Capacity Ratio (X)								0.601			0.407		0.334	0.223					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								3.0			3.6		1.6	1.3					
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00		0.27	0.00					
Uniform Delay (d 1), s/veh								20.5			12.6		7.4	4.8					
Incremental Delay (d 2), s/veh								0.8			0.1		0.1	0.0					
Initial Queue Delay (d 3), s/veh								0.0			0.0		0.0	0.0					
Control Delay (d), s/veh								21.3			12.7		7.5	4.9					
Level of Service (LOS)								C			B		A	A					
Approach Delay, s/veh / LOS				0.0				21.3		C		12.7		B		6.1		A	
Intersection Delay, s/veh / LOS				10.9						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

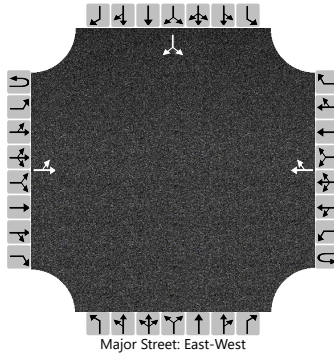
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	AM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Fohl & Sterilite
Jurisdiction	Perry Township, OH
East/West Street	Fohl Street
North/South Street	Sterilite Street
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		10	100				100	40						10		10
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

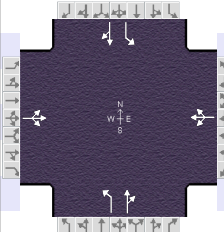
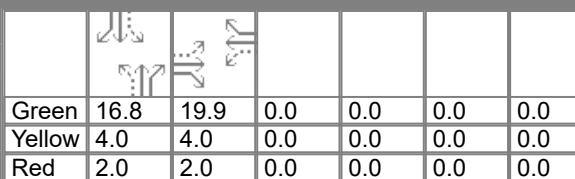
Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11													22	
Capacity, c (veh/h)		1422													806	
v/c Ratio		0.01													0.03	
95% Queue Length, Q ₉₅ (veh)		0.0													0.1	
Control Delay (s/veh)		7.6	0.1												9.6	
Level of Service (LOS)		A	A												A	
Approach Delay (s/veh)	0.7												9.6			
Approach LOS	A												A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Navarre, OH		Time Period		PM Peak		PHF		0.91									
Urban Street		North Main Street		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Wooster Street		File Name		1_PM 45B MainWooster.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				140	70	10	40	80	30	10	380	40	20	410	50				
Signal Information																			
Cycle, s	48.7	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	16.8	19.9	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				6.0				6.0	
Phase Duration, s						25.9				25.9				22.8				22.8	
Change Period, ($Y+R_c$), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.1	
Queue Clearance Time (g_s), s						7.5				4.9				14.9				14.3	
Green Extension Time (g_e), s						0.7				0.7				1.9				1.9	
Phase Call Probability						1.00				1.00				1.00				1.00	
Max Out Probability						0.00				0.00				0.02				0.04	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					242			165		11	462		22	505					
Adjusted Saturation Flow Rate (s), veh/h/ln					1443			1661		886	1824		923	1820					
Queue Service Time (g_s), s					2.6			0.0		0.6	10.8		1.0	12.3					
Cycle Queue Clearance Time (g_c), s					5.5			2.9		12.9	10.8		11.9	12.3					
Green Ratio (g/C)					0.41			0.41		0.34	0.34		0.34	0.34					
Capacity (c), veh/h					711			773		230	629		261	627					
Volume-to-Capacity Ratio (X)					0.340			0.213		0.048	0.734		0.084	0.806					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					2.5			1.6		0.2	6.6		0.4	7.6					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00		0.02	0.00		0.09	0.00					
Uniform Delay (d_1), s/veh					10.0			9.4		20.3	14.0		19.2	14.5					
Incremental Delay (d_2), s/veh					0.1			0.1		0.0	0.6		0.1	1.0					
Initial Queue Delay (d_3), s/veh					0.0			0.0		0.0	0.0		0.0	0.0					
Control Delay (d), s/veh					10.1			9.4		20.4	14.6		19.3	15.4					
Level of Service (LOS)					B			A		C	B		B	B					
Approach Delay, s/veh / LOS				10.1		B		9.4		A		14.8		B		15.6		B	
Intersection Delay, s/veh / LOS				13.7										B					
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

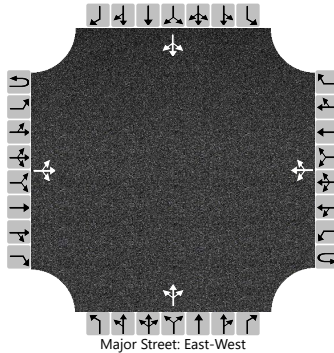
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Kemary & Fohl
Jurisdiction	Perry Twp, OH
East/West Street	Fohl Street
North/South Street	Kemary Avenue
Peak Hour Factor	0.86
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		20	150	10		10	120	30		10	30	10		50	50	20
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

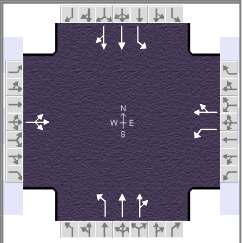
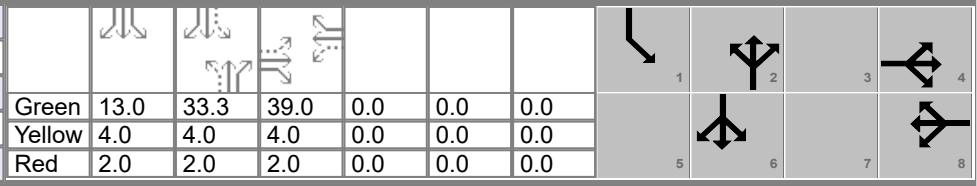
Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				12					58				140	
Capacity, c (veh/h)		1396				1382					539				538	
v/c Ratio		0.02				0.01					0.11				0.26	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					0.4				1.0	
Control Delay (s/veh)		7.6	0.1	0.1		7.6	0.1	0.1			12.5				14.0	
Level of Service (LOS)		A	A	A		A	A	A			B				B	
Approach Delay (s/veh)	1.0				0.5				12.5				14.0			
Approach LOS	A				A				B				B			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon-Perry Twp		Time Period		PM Peak		PHF		0.80									
Urban Street		Erie Street		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		3_PM 45B NavarreMain.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	20	50	170	30	320	20	630	120	250	700	10				
Signal Information																			
Cycle, s	103.3	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	13.0	33.3	39.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2		1		6	
Case Number						8.0				6.0				6.3		1.0		4.0	
Phase Duration, s						45.0				45.0				39.3		19.0		58.3	
Change Period, (Y+R c), s						6.0				6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s						3.3				3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s						26.2				36.1				26.9		14.0		18.4	
Green Extension Time (g e), s						1.8				1.8				4.0		0.0		4.0	
Phase Call Probability						1.00				1.00				1.00		1.00		1.00	
Max Out Probability						0.00				0.00				0.00		1.00		0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					125		213	438		25	482	455	313	445	443				
Adjusted Saturation Flow Rate (s), veh/h/ln					815		1299	1593		621	1856	1752	1767	1856	1846				
Queue Service Time (g s), s					2.5		16.5	25.2		3.0	24.9	24.9	12.0	16.4	16.4				
Cycle Queue Clearance Time (g c), s					24.2		34.1	25.2		3.0	24.9	24.9	12.0	16.4	16.4				
Green Ratio (g/C)					0.38		0.38	0.38		0.32	0.32	0.32	0.49	0.51	0.51				
Capacity (c), veh/h					350		340	598		275	621	586	339	951	946				
Volume-to-Capacity Ratio (X)					0.357		0.625	0.732		0.091	0.777	0.777	0.923	0.468	0.468				
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					3.7		8.9	14.3		0.8	16.2	15.5	11.9	10.7	10.7				
Queue Storage Ratio (RQ) (95 th percentile)					0.00		4.55	0.00		0.17	0.00	0.00	1.74	0.00	0.00				
Uniform Delay (d 1), s/veh					25.4		39.8	28.7		24.6	31.9	31.9	23.6	16.7	16.7				
Incremental Delay (d 2), s/veh					0.2		0.7	0.7		0.1	0.8	0.9	29.5	0.1	0.1				
Initial Queue Delay (d 3), s/veh					0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0				
Control Delay (d), s/veh					25.6		40.5	29.4		24.7	32.7	32.8	53.2	16.8	16.8				
Level of Service (LOS)					C		D	C		C	C	C	D	B	B				
Approach Delay, s/veh / LOS				25.6	C		33.0	C		32.6	C		26.3	C					
Intersection Delay, s/veh / LOS				29.8						C									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

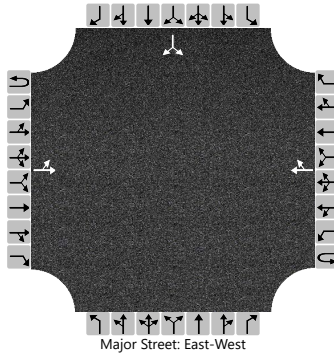
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Navarre & Millennium
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		30	400				380	10						40		70
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		38													138	
Capacity, c (veh/h)		1070													380	
v/c Ratio		0.04													0.36	
95% Queue Length, Q ₉₅ (veh)		0.1													1.6	
Control Delay (s/veh)		8.5	0.4												19.7	
Level of Service (LOS)		A	A												C	
Approach Delay (s/veh)	1.0												19.7			
Approach LOS	A												C			

HCS Two-Way Stop-Control Report

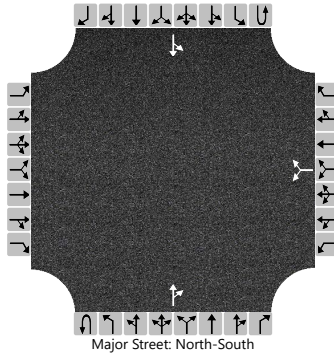
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Millennium & Prospect
Jurisdiction	Massillon, OH
East/West Street	Prospect Drive
North/South Street	Millennium Boulevard
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						10		10			20	10		10	100	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2							4.1		
Critical Headway (sec)						6.43		6.23							4.13		
Base Follow-Up Headway (sec)						3.5		3.3							2.2		
Follow-Up Headway (sec)						3.53		3.33							2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							25								13		
Capacity, c (veh/h)							904								1566		
v/c Ratio							0.03								0.01		
95% Queue Length, Q ₉₅ (veh)							0.1								0.0		
Control Delay (s/veh)							9.1								7.3	0.1	
Level of Service (LOS)							A								A	A	
Approach Delay (s/veh)						9.1								0.7			
Approach LOS						A								A			

HCS Two-Way Stop-Control Report

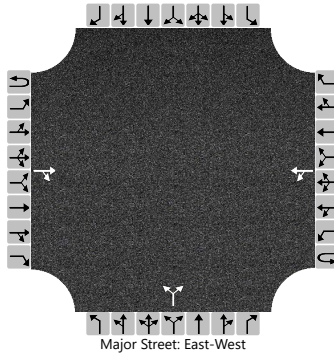
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Navarre & Sterilite
Jurisdiction	Massillon, OH
East/West Street	Navarre Road
North/South Street	Sterilite Street
Peak Hour Factor	0.83
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			310	60		50	260			140		120				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

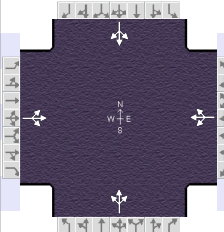
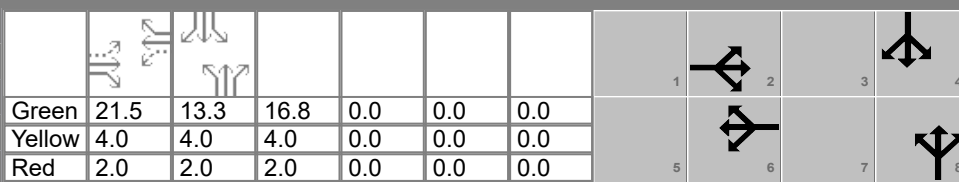
Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						60					313					
Capacity, c (veh/h)						1109					407					
v/c Ratio						0.05					0.77					
95% Queue Length, Q ₉₅ (veh)						0.2					6.4					
Control Delay (s/veh)						8.4	0.6				37.7					
Level of Service (LOS)						A	A				E					
Approach Delay (s/veh)					1.8				37.7							
Approach LOS					A				E							

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Perry Twp, OH		Time Period		PM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Navarre Road		File Name		8_PM 45B NavarreRichville.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				40	280	140	60	240	30	100	200	60	50	200	30				
Signal Information																			
Cycle, s	69.5	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	21.5	13.3	16.8	0.0	0.0	0.0	1		2		3		4		
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5		6		7		8		
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						2				6				8				4	
Case Number						8.0				8.0				12.0				12.0	
Phase Duration, s						27.5				27.5				22.8				19.3	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.0	
Queue Clearance Time (g s), s						20.4				15.5				16.1				12.9	
Green Extension Time (g e), s						1.0				1.0				0.6				0.4	
Phase Call Probability						1.00				1.00				1.00				1.00	
Max Out Probability						0.01				0.61				0.00				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				5	2	12	1	6	16	3	8	18	7	4	14				
Adjusted Flow Rate (v), veh/h				479			344			375			292						
Adjusted Saturation Flow Rate (s), veh/h/ln				1721			1515			1778			1805						
Queue Service Time (g s), s				4.9			0.0			14.1			10.9						
Cycle Queue Clearance Time (g c), s				18.4			13.5			14.1			10.9						
Green Ratio (g/C)				0.31			0.31			0.24			0.19						
Capacity (c), veh/h				588			529			429			345						
Volume-to-Capacity Ratio (X)				0.815			0.650			0.874			0.845						
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)				11.1			8.2			9.6			8.0						
Queue Storage Ratio (RQ) (95 th percentile)				0.00			0.00			0.00			0.00						
Uniform Delay (d 1), s/veh				22.9			20.9			25.4			27.2						
Incremental Delay (d 2), s/veh				1.4			2.2			2.6			2.2						
Initial Queue Delay (d 3), s/veh				0.0			0.0			0.0			0.0						
Control Delay (d), s/veh				24.3			23.1			28.0			29.4						
Level of Service (LOS)				C			C			C			C						
Approach Delay, s/veh / LOS				24.3		C		23.1		C		28.0		C		29.4		C	
Intersection Delay, s/veh / LOS				25.9										C					
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

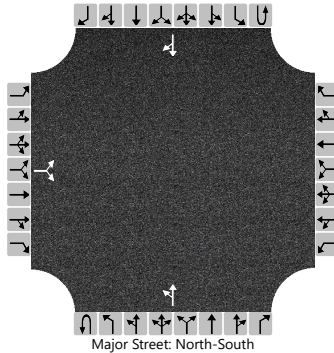
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Stump & Cincinnati
Jurisdiction	Perry Twp, OH
East/West Street	Stump Avenue
North/South Street	Cincinnati Drive
Peak Hour Factor	0.82
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		30		10						10	170				130	30
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			49							12						
Capacity, c (veh/h)			642							1372						
v/c Ratio			0.08							0.01						
95% Queue Length, Q ₉₅ (veh)			0.2							0.0						
Control Delay (s/veh)			11.1							7.6	0.1					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)	11.1								0.5							
Approach LOS	B								A							

HCS Two-Way Stop-Control Report

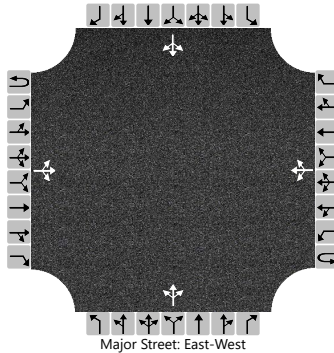
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Richville & Stump
Jurisdiction	Perry Twp, OH
East/West Street	Richville Drive
North/South Street	Stump Avenue/Creston Drive
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		20	340	170		10	300	10		160	10	10		10	10	10
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		23				11					205				34	
Capacity, c (veh/h)		1201				989					242				318	
v/c Ratio		0.02				0.01					0.84				0.11	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0					6.7				0.4	
Control Delay (s/veh)		8.1	0.2	0.2		8.7	0.1	0.1			67.6				17.7	
Level of Service (LOS)		A	A	A		A	A	A			F				C	
Approach Delay (s/veh)	0.5				0.4				67.6				17.7			
Approach LOS	A				A				F				C			

HCS Two-Way Stop-Control Report

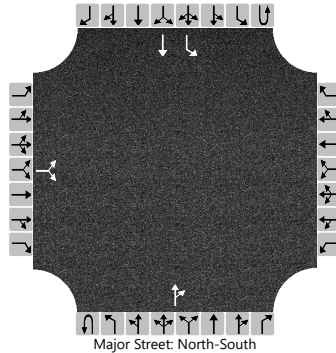
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & US30 EB
Jurisdiction	Massillon, OH
East/West Street	US30 EB Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.89
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	1	1	0
Configuration			LR									TR		L	T	
Volume (veh/h)		150		180							370	130		240	350	
Percent Heavy Vehicles (%)		3		3										3		
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2										4.1		
Critical Headway (sec)		7.13		6.23										4.13		
Base Follow-Up Headway (sec)		3.5		3.3										2.2		
Follow-Up Headway (sec)		3.53		3.33										2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			371											270		
Capacity, c (veh/h)			202											1005		
v/c Ratio			1.84											0.27		
95% Queue Length, Q ₉₅ (veh)			26.4											1.1		
Control Delay (s/veh)			434.7											9.9		
Level of Service (LOS)			F											A		
Approach Delay (s/veh)	434.7												4.0			
Approach LOS	F												A			

HCS Two-Way Stop-Control Report

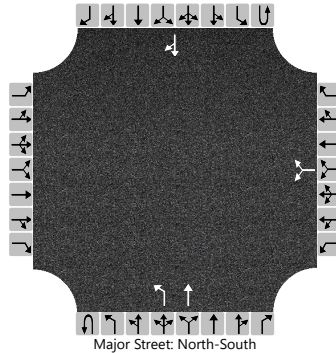
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & US30 WB
Jurisdiction	Massillon, OH
East/West Street	US30 Westbound Ramps
North/South Street	Richville Drive
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	1	1	0	0	0	1	0
Configuration							LR			L	T					TR
Volume (veh/h)						120		270		180	380				470	100
Percent Heavy Vehicles (%)						3		3		3						
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2		4.1						
Critical Headway (sec)						7.13		6.23		4.13						
Base Follow-Up Headway (sec)						3.5		3.3		2.2						
Follow-Up Headway (sec)						3.53		3.33		2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						433				200						
Capacity, c (veh/h)						309				945						
v/c Ratio						1.40				0.21						
95% Queue Length, Q ₉₅ (veh)						22.7				0.8						
Control Delay (s/veh)						232.5				9.8						
Level of Service (LOS)						F				A						
Approach Delay (s/veh)					232.5				3.2							
Approach LOS					F				A							

HCS Two-Way Stop-Control Report

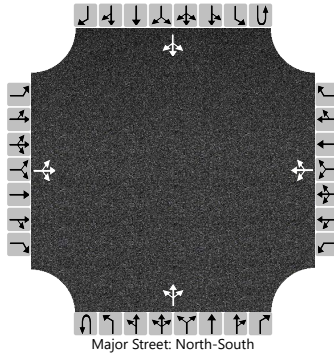
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Nave (S)
Jurisdiction	Massillon, OH
East/West Street	Nave Road/RG Drage
North/South Street	Richville Road
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		150	70	10		30	70	30		10	430	30		20	460	50
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

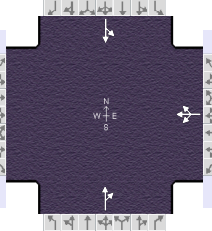
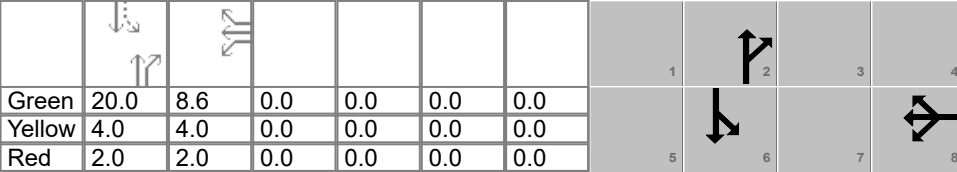
Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			253				143			11				22		
Capacity, c (veh/h)			127				192			1006				1054		
v/c Ratio			1.99				0.74			0.01				0.02		
95% Queue Length, Q ₉₅ (veh)			20.4				4.9			0.0				0.1		
Control Delay (s/veh)			529.5				64.0			8.6	0.1	0.1		8.5	0.3	0.3
Level of Service (LOS)			F				F			A	A	A		A	A	A
Approach Delay (s/veh)	529.5				64.0				0.3				0.6			
Approach LOS	F				F				A				A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information															
Agency		TMS Engineers, Inc.				Duration, h		0.250													
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other											
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.86											
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00											
Intersection		@ Nave Road (North)		File Name		14_PM 45B RichvilleNaveN.xus															
Project Description		Build Conditions																			
Demand Information						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h									120	0	30		340	160	30	320					
Signal Information																					
Cycle, s	40.6	Reference Phase	2																		
Offset, s	0	Reference Point	End																		
Uncoordinated	Yes	Simult. Gap E/W	On																		
Force Mode	Fixed	Simult. Gap N/S	On																		
						Green	20.0	8.6	0.0	0.0	0.0	0.0									
						Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
						Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results						EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase												8				2				6	
Case Number												12.0				8.0				8.0	
Phase Duration, s												14.6				26.0				26.0	
Change Period, (Y+R c), s												6.0				6.0				6.0	
Max Allow Headway (MAH), s												3.1				3.1				3.1	
Queue Clearance Time (g s), s												5.6				12.2				7.8	
Green Extension Time (g e), s												0.1				1.6				1.8	
Phase Call Probability												0.86				1.00				1.00	
Max Out Probability												0.25				0.21				0.05	
Movement Group Results						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement									3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h									174			581			407						
Adjusted Saturation Flow Rate (s), veh/h/ln									1724			1754			1770						
Queue Service Time (g s), s									3.6			10.2			0.0						
Cycle Queue Clearance Time (g c), s									3.6			10.2			5.8						
Green Ratio (g/C)									0.21			0.49			0.49						
Capacity (c), veh/h									365			864			968						
Volume-to-Capacity Ratio (X)									0.477			0.673			0.420						
Back of Queue (Q), ft/ln (95 th percentile)																					
Back of Queue (Q), veh/ln (95 th percentile)									2.0			4.5			2.3						
Queue Storage Ratio (RQ) (95 th percentile)									0.00			0.00			0.00						
Uniform Delay (d 1), s/veh									14.0			7.8			6.7						
Incremental Delay (d 2), s/veh									0.4			1.7			0.1						
Initial Queue Delay (d 3), s/veh									0.0			0.0			0.0						
Control Delay (d), s/veh									14.4			9.5			6.8						
Level of Service (LOS)									B			A			A						
Approach Delay, s/veh / LOS						0.0				14.4		B		9.5		A		6.8		A	
Intersection Delay, s/veh / LOS						9.3						A									
Multimodal Results						EB			WB			NB			SB						
Pedestrian LOS Score / LOS																					
Bicycle LOS Score / LOS																					

HCS Two-Way Stop-Control Report

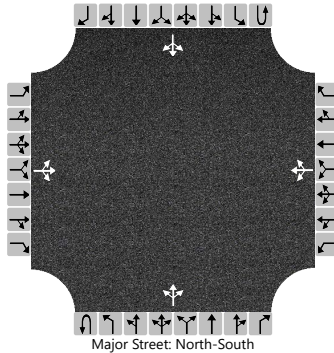
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Business Place
Jurisdiction	Massillon, OH
East/West Street	Business Place & Ohio State Drive
North/South Street	Richville Drive
Peak Hour Factor	0.93
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		40	0	30		20	10	10		60	300	10		10	290	80
Percent Heavy Vehicles (%)		3	3	3		3	3	3		3				3		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.13	6.53	6.23		4.13				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.53	4.03	3.33		2.23				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			75				43			65				11		
Capacity, c (veh/h)			344				316			1155				1220		
v/c Ratio			0.22				0.14			0.06				0.01		
95% Queue Length, Q ₉₅ (veh)			0.8				0.5			0.2				0.0		
Control Delay (s/veh)			18.4				18.2			8.3	0.6	0.6		8.0	0.1	0.1
Level of Service (LOS)			C				C			A	A	A		A	A	A
Approach Delay (s/veh)	18.4				18.2				1.8				0.3			
Approach LOS	C				C				A				A			

HCS Two-Way Stop-Control Report

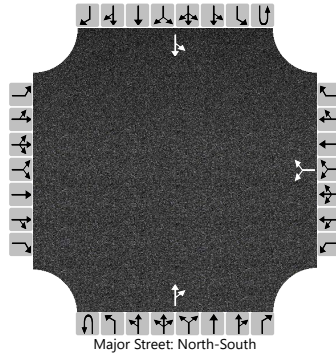
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	North-South
Project Description	Build Conditions

Site Information

Intersection	Richville & Jackson
Jurisdiction	Massillon, OH
East/West Street	Jackson Avenue
North/South Street	Richville Drive
Peak Hour Factor	0.91
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						70		10			310	50		10	310	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)					0											
Right Turn Channelized																
Median Type Storage	Undivided															

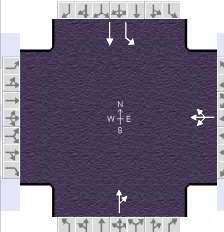
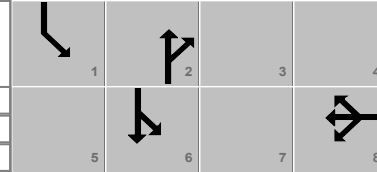
Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						88								11		
Capacity, c (veh/h)						405								1158		
v/c Ratio						0.22								0.01		
95% Queue Length, Q ₉₅ (veh)						0.8								0.0		
Control Delay (s/veh)						16.3								8.1	0.1	
Level of Service (LOS)						C								A	A	
Approach Delay (s/veh)					16.3								0.3			
Approach LOS					C								A			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.96									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Southway Street		File Name		17_PM 45B RichvilleSouthway.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							20	0	190		320	10	150	340					
Signal Information																			
Cycle, s	53.3	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	6.3	19.4	9.6	0.0	0.0	0.0									
				Yellow	4.0	4.0	4.0	0.0	0.0	0.0									
				Red	2.0	2.0	2.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2		1		6	
Case Number										12.0				8.3		1.0		4.0	
Phase Duration, s										15.6				25.4		12.3		37.7	
Change Period, (Y+R c), s										6.0				6.0		6.0		6.0	
Max Allow Headway (MAH), s										3.3				3.0		3.1		3.0	
Queue Clearance Time (g s), s										9.0				9.8		4.5		7.1	
Green Extension Time (g e), s										0.5				0.6		0.1		1.1	
Phase Call Probability										0.96				1.00		0.90		1.00	
Max Out Probability										0.00				0.00		1.00		0.01	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18		2	12	1	6					
Adjusted Flow Rate (v), veh/h								219			344			156	354				
Adjusted Saturation Flow Rate (s), veh/h/ln								1589			1845			1767	1856				
Queue Service Time (g s), s								7.0			7.8			2.5	5.1				
Cycle Queue Clearance Time (g c), s								7.0			7.8			2.5	5.1				
Green Ratio (g/C)								0.18			0.36			0.52	0.59				
Capacity (c), veh/h								287			671			568	1103				
Volume-to-Capacity Ratio (X)								0.763			0.512			0.275	0.321				
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)								4.2			4.7			1.2	2.1				
Queue Storage Ratio (RQ) (95 th percentile)								0.00			0.00			0.20	0.00				
Uniform Delay (d 1), s/veh								20.8			13.3			7.8	5.4				
Incremental Delay (d 2), s/veh								1.6			0.2			0.1	0.1				
Initial Queue Delay (d 3), s/veh								0.0			0.0			0.0	0.0				
Control Delay (d), s/veh								22.4			13.5			7.9	5.5				
Level of Service (LOS)								C			B			A	A				
Approach Delay, s/veh / LOS				0.0				22.4		C		13.5		B		6.2		A	
Intersection Delay, s/veh / LOS				11.8						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Two-Way Stop-Control Report

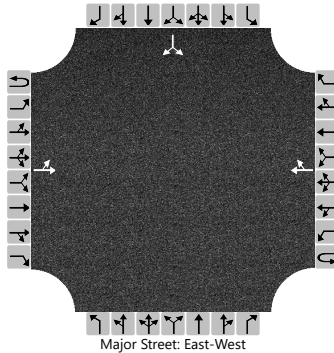
General Information

Analyst	ABC
Agency/Co.	TMS Engineers, Inc.
Date Performed	7/5/2022
Analysis Year	2045
Time Analyzed	PM Peak
Intersection Orientation	East-West
Project Description	Build Conditions

Site Information

Intersection	Fohl & Sterilite
Jurisdiction	Perry Township, OH
East/West Street	Fohl Street
North/South Street	Sterilite Street
Peak Hour Factor	0.92
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		10	140				130	20						40		10
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

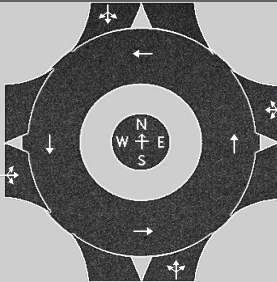
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		11													54	
Capacity, c (veh/h)		1410													696	
v/c Ratio		0.01													0.08	
95% Queue Length, Q ₉₅ (veh)		0.0													0.3	
Control Delay (s/veh)		7.6	0.1												10.6	
Level of Service (LOS)		A	A												B	
Approach Delay (s/veh)	0.6												10.6			
Approach LOS	A												B			

Appendix N

Build Capacity Analysis Worksheets - 2045 w/ Improvements

HCS Roundabouts Report

General Information			Site Information		
Analyst	ABC		Intersection	Richville & Stump/Creston	
Agency or Co.	TMS Engineers, Inc.		E/W Street Name	Richville Drive (SR 627)	
Date Performed	7/5/2022		N/S Street Name	Stump Avenue/Creston Road	
Analysis Year	2045		Analysis Time Period, hrs	0.25	
Time Analyzed	AM Peak		Peak Hour Factor	0.89	
Project Description	Build Conditions		Jurisdiction	Perry Township, OH	

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	10	150	100	0	10	290	10	0	210	10	10	0	0	0	10
Percent Heavy Vehicles, %	0	3	3	3	0	3	3	3	0	3	3	3	0	3	3	3
Flow Rate (V _{PCE}), pc/h	0	12	174	116	0	12	336	12	0	243	12	12	0	0	0	12
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway, s		4.9763			4.9763			4.9763			4.9763		
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087		

Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		302			360			267			12	
Entry Volume, veh/h		293			350			259			12	
Circulating Flow (v _c), pc/h	12			267			186			591		
Exiting Flow (v _{ex}), pc/h	186			591			36			128		
Capacity (C _{pce}), pc/h		1363			1051			1142			755	
Capacity (c), veh/h		1324			1020			1108			733	
v/c Ratio (x)		0.22			0.34			0.23			0.02	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		4.6			7.1			5.4			5.1	
Lane LOS		A			A			A			A	
95% Queue, veh		0.8			1.5			0.9			0.0	
Approach Delay, s/veh	4.6			7.1			5.4			5.1		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	5.8						A					

HCS Roundabouts Report

General Information			Site Information		
Analyst	ABC		Intersection	Richville & Stump/Creston	
Agency or Co.	TMS Engineers, Inc.		E/W Street Name	Richville Drive (SR 627)	
Date Performed	7/5/2022		N/S Street Name	Stump Avenue/Creston Road	
Analysis Year	2045		Analysis Time Period, hrs	0.25	
Time Analyzed	PM Peak		Peak Hour Factor	0.88	
Project Description	Build Conditions		Jurisdiction	Perry Township, OH	

Volume Adjustments and Site Characteristics																
Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	20	340	170	0	10	300	10	0	160	10	10	0	10	10	10
Percent Heavy Vehicles, %	0	3	3	3	0	3	3	3	0	3	3	3	0	3	3	3
Flow Rate (V _{PCE}), pc/h	0	23	398	199	0	12	351	12	0	187	12	12	0	12	12	12
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			
Proportion of CAVs	0															

Critical and Follow-Up Headway Adjustment													
Approach	EB			WB			NB			SB			
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	
Critical Headway, s		4.9763			4.9763			4.9763			4.9763		
Follow-Up Headway, s		2.6087			2.6087			2.6087			2.6087		

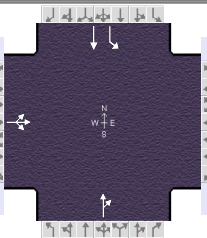
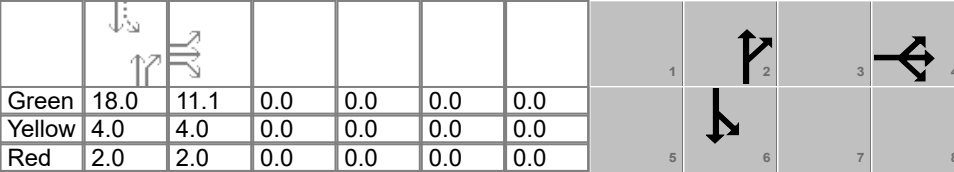
Flow Computations, Capacity and v/c Ratios												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v _e), pc/h		620			375			211			36	
Entry Volume, veh/h		602			364			205			35	
Circulating Flow (v _c), pc/h	36			222			433			550		
Exiting Flow (v _{ex}), pc/h	422			550			47			223		
Capacity (C _{pce}), pc/h		1330			1100			887			787	
Capacity (c), veh/h		1291			1068			861			765	
v/c Ratio (x)		0.47			0.34			0.24			0.05	

Delay and Level of Service												
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		7.5			6.8			6.7			5.2	
Lane LOS		A			A			A			A	
95% Queue, veh		2.5			1.5			0.9			0.1	
Approach Delay, s/veh	7.5			6.8			6.7			5.2		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh LOS	7.1						A					

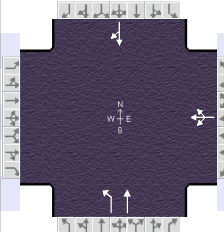
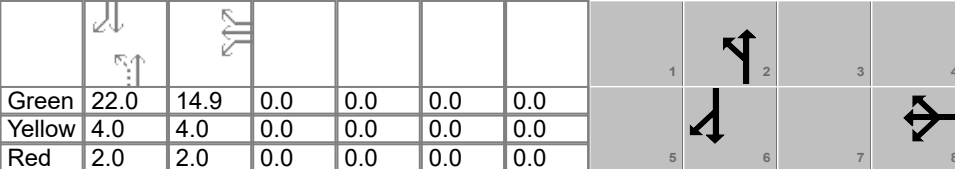
HCS Signalized Intersection Results Summary

General Information						Intersection Information															
Agency		TMS Engineers, Inc.				Duration, h		0.250													
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other											
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.97											
Urban Street		Richville Drive (SR 627)		Analysis Year		2045		Analysis Period		1> 7:00											
Intersection		@ US 30 EB Ramps		File Name		11_AM 45B Richville30EB.xus															
Project Description		Build Conditions																			
Demand Information						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h						140	0	100					430	170	240	190					
Signal Information																					
Cycle, s	30.5	Reference Phase	2																		
Offset, s	0	Reference Point	End																		
Uncoordinated	Yes	Simult. Gap E/W	On																		
Force Mode	Fixed	Simult. Gap N/S	On																		
						Green	12.3	6.1	0.0	0.0	0.0	0.0									
						Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
						Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results						EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase								4								2				6	
Case Number								12.0								8.0				6.0	
Phase Duration, s								12.1								18.3				18.3	
Change Period, (Y+R c), s								6.0								6.0				6.0	
Max Allow Headway (MAH), s								3.2								3.5				3.5	
Queue Clearance Time (g s), s								6.2								11.8				14.3	
Green Extension Time (g e), s								0.0								0.5				0.0	
Phase Call Probability								0.88								1.00				1.00	
Max Out Probability								1.00								1.00				1.00	
Movement Group Results						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement						7	4	14					2	12	1	6					
Adjusted Flow Rate (v), veh/h							247						619		247	196					
Adjusted Saturation Flow Rate (s), veh/h/ln							1680						1765		798	1856					
Queue Service Time (g s), s							4.2						9.8		2.5	2.1					
Cycle Queue Clearance Time (g c), s							4.2						9.8		12.3	2.1					
Green Ratio (g/C)							0.20						0.40		0.40	0.40					
Capacity (c), veh/h							339						714		303	750					
Volume-to-Capacity Ratio (X)							0.731						0.866		0.817	0.261					
Back of Queue (Q), ft/ln (95 th percentile)																					
Back of Queue (Q), veh/ln (95 th percentile)							2.7						6.2		4.6	0.8					
Queue Storage Ratio (RQ) (95 th percentile)							0.00						0.00		0.79	0.00					
Uniform Delay (d 1), s/veh							11.4						8.3		14.9	6.0					
Incremental Delay (d 2), s/veh							4.7						8.1		14.9	0.1					
Initial Queue Delay (d 3), s/veh							0.0						0.0		0.0	0.0					
Control Delay (d), s/veh							16.1						16.4		29.8	6.1					
Level of Service (LOS)							B						B		C	A					
Approach Delay, s/veh / LOS						16.1	B	0.0			16.4	B	19.3	B							
Intersection Delay, s/veh / LOS						17.3						B									
Multimodal Results						EB			WB			NB			SB						
Pedestrian LOS Score / LOS																					
Bicycle LOS Score / LOS																					

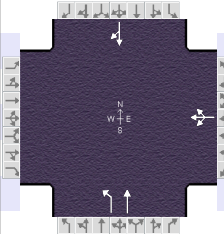
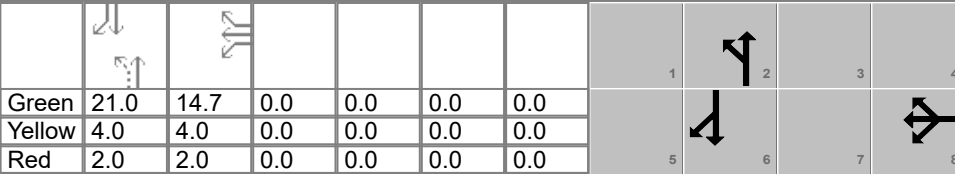
HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.89									
Urban Street		Richville Drive (SR 627)		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ US 30 EB Ramps		File Name		11_PM 45B Richville30EB.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				150	0	180					370	130	240	350					
Signal Information																			
Cycle, s	41.1	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	18.0	11.1	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4								2				6	
Case Number						12.0								8.0				6.0	
Phase Duration, s						17.1								24.0				24.0	
Change Period, (Y+R c), s						6.0								6.0				6.0	
Max Allow Headway (MAH), s						3.3								3.4				3.4	
Queue Clearance Time (g s), s						10.7								12.7				20.0	
Green Extension Time (g e), s						0.6								0.0				0.0	
Phase Call Probability						0.99								1.00				1.00	
Max Out Probability						0.03								1.00				1.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14					2	12	1	6					
Adjusted Flow Rate (v), veh/h					371						562		270	393					
Adjusted Saturation Flow Rate (s), veh/h/ln					1655						1773		842	1856					
Queue Service Time (g s), s					8.7						10.7		7.3	6.2					
Cycle Queue Clearance Time (g c), s					8.7						10.7		18.0	6.2					
Green Ratio (g/C)					0.27						0.44		0.44	0.44					
Capacity (c), veh/h					446						777		325	813					
Volume-to-Capacity Ratio (X)					0.832						0.723		0.830	0.483					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					4.8						6.0		6.5	3.0					
Queue Storage Ratio (RQ) (95 th percentile)					0.00						0.00		1.11	0.00					
Uniform Delay (d 1), s/veh					14.1						9.5		18.5	8.2					
Incremental Delay (d 2), s/veh					1.6						2.9		15.5	0.2					
Initial Queue Delay (d 3), s/veh					0.0						0.0		0.0	0.0					
Control Delay (d), s/veh					15.7						12.4		34.0	8.4					
Level of Service (LOS)					B						B		C	A					
Approach Delay, s/veh / LOS				15.7	B	0.0				12.4	B	18.8	B						
Intersection Delay, s/veh / LOS				15.8						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

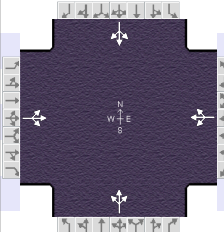
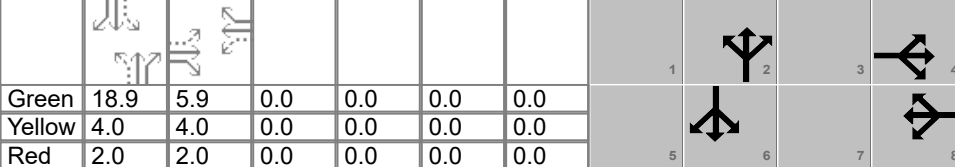
HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.85									
Urban Street		Richville Drive (SR 627)		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ US 30 WB Ramps		File Name		12_AM 45B Richville30WB.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h							70	0	290	220	370			360	110				
Signal Information																			
Cycle, s	48.9	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	22.0	14.9	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase										8				2				6	
Case Number										12.0				6.0				8.0	
Phase Duration, s										20.9				28.0				28.0	
Change Period, (Y+R c), s										6.0				6.0				6.0	
Max Allow Headway (MAH), s										3.3				3.4				3.4	
Queue Clearance Time (g s), s										14.2				24.0				14.1	
Green Extension Time (g e), s										0.8				0.0				0.0	
Phase Call Probability										1.00				1.00				1.00	
Max Out Probability										0.02				1.00				1.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement							3	8	18	5	2			6	16				
Adjusted Flow Rate (v), veh/h							424			259 435			553						
Adjusted Saturation Flow Rate (s), veh/h/ln							1607			848 1856			1781						
Queue Service Time (g s), s							12.2			9.9 8.2			12.1						
Cycle Queue Clearance Time (g c), s							12.2			22.0 8.2			12.1						
Green Ratio (g/C)							0.30			0.45 0.45			0.45						
Capacity (c), veh/h							489			319 835			801						
Volume-to-Capacity Ratio (X)							0.866			0.812 0.521			0.690						
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)							7.4			7.0 4.6			7.1						
Queue Storage Ratio (RQ) (95 th percentile)							0.00			1.20 0.00			0.00						
Uniform Delay (d 1), s/veh							16.1			21.2 9.7			10.7						
Incremental Delay (d 2), s/veh							3.3			13.7 0.3			2.1						
Initial Queue Delay (d 3), s/veh							0.0			0.0 0.0			0.0						
Control Delay (d), s/veh							19.4			34.8 9.9			12.8						
Level of Service (LOS)							B			C A			B						
Approach Delay, s/veh / LOS				0.0				19.4		B		19.2		B		12.8		B	
Intersection Delay, s/veh / LOS				17.2						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

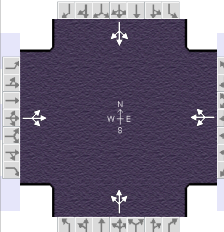
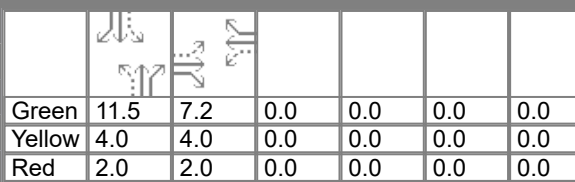
HCS Signalized Intersection Results Summary

General Information						Intersection Information															
Agency		TMS Engineers, Inc.				Duration, h		0.250													
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other											
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.90											
Urban Street		Richville Drive (SR 627)		Analysis Year		2045		Analysis Period		1> 7:00											
Intersection		@ US 30 WB Ramps		File Name		12_PM 45B Richville30WB.xus															
Project Description		Build Conditions																			
Demand Information						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h									120	0	270	180	380			470	100				
Signal Information																					
Cycle, s	47.7	Reference Phase	2																		
Offset, s	0	Reference Point	End																		
Uncoordinated	Yes	Simult. Gap E/W	On																		
Force Mode	Fixed	Simult. Gap N/S	On																		
Timer Results						EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase												8				2				6	
Case Number												12.0				6.0				8.0	
Phase Duration, s												20.7				27.0				27.0	
Change Period, (Y+R c), s												6.0				6.0				6.0	
Max Allow Headway (MAH), s												3.3				3.4				3.4	
Queue Clearance Time (g s), s												14.0				23.0				16.5	
Green Extension Time (g e), s												0.8				0.0				0.0	
Phase Call Probability												1.00				1.00				1.00	
Max Out Probability												0.02				1.00				1.00	
Movement Group Results						EB			WB			NB			SB						
Approach Movement						L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement									3	8	18	5	2			6	16				
Adjusted Flow Rate (v), veh/h										433		200	422			633					
Adjusted Saturation Flow Rate (s), veh/h/ln										1628		788	1856			1799					
Queue Service Time (g s), s										12.0		6.5	7.9			14.5					
Cycle Queue Clearance Time (g c), s										12.0		21.0	7.9			14.5					
Green Ratio (g/C)										0.31		0.44	0.44			0.44					
Capacity (c), veh/h										502		258	817			792					
Volume-to-Capacity Ratio (X)										0.864		0.775	0.517			0.800					
Back of Queue (Q), ft/ln (95 th percentile)																					
Back of Queue (Q), veh/ln (95 th percentile)										7.2		5.3	4.3			9.2					
Queue Storage Ratio (RQ) (95 th percentile)										0.00		0.90	0.00			0.00					
Uniform Delay (d 1), s/veh										15.6		22.1	9.7			11.5					
Incremental Delay (d 2), s/veh										2.9		12.6	0.3			5.4					
Initial Queue Delay (d 3), s/veh										0.0		0.0	0.0			0.0					
Control Delay (d), s/veh										18.5		34.7	9.9			16.9					
Level of Service (LOS)										B		C	A			B					
Approach Delay, s/veh / LOS						0.0				18.5		B		17.9		B		16.9		B	
Intersection Delay, s/veh / LOS						17.7						B									
Multimodal Results						EB			WB			NB			SB						
Pedestrian LOS Score / LOS																					
Bicycle LOS Score / LOS																					

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.				Duration, h		0.250											
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		AM Peak		PHF		0.81									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Nave Road/RG Drag...		File Name		13_AM 45B RichvilleNaveS.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				30	10	90	10	0	10	80	280	240	40	340	40				
Signal Information																			
Cycle, s	36.8	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	18.9	5.9	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				8.0				8.0	
Phase Duration, s						11.9				11.9				24.9				24.9	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.3				3.3				3.3				3.3	
Queue Clearance Time (g s), s						5.4				2.5				17.1				9.1	
Green Extension Time (g e), s						0.1				0.1				1.7				0.0	
Phase Call Probability						0.85				0.85				1.00				1.00	
Max Out Probability						1.00				0.29				0.15				1.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					160			25			741			519					
Adjusted Saturation Flow Rate (s), veh/h/ln					1575			1516			1603			1721					
Queue Service Time (g s), s					1.7			0.0			8.0			0.0					
Cycle Queue Clearance Time (g c), s					3.4			0.5			15.1			7.1					
Green Ratio (g/C)					0.16			0.16			0.51			0.51					
Capacity (c), veh/h					375			392			932			989					
Volume-to-Capacity Ratio (X)					0.428			0.063			0.794			0.524					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					1.8			0.3			4.9			2.6					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00			0.00			0.00					
Uniform Delay (d 1), s/veh					14.4			13.1			7.9			6.1					
Incremental Delay (d 2), s/veh					0.3			0.0			1.2			0.2					
Initial Queue Delay (d 3), s/veh					0.0			0.0			0.0			0.0					
Control Delay (d), s/veh					14.6			13.2			9.1			6.4					
Level of Service (LOS)					B			B			A			A					
Approach Delay, s/veh / LOS				14.6	B	13.2	B	9.1	A	6.4	A								
Intersection Delay, s/veh / LOS				8.8						A									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

HCS Signalized Intersection Results Summary

General Information						Intersection Information													
Agency		TMS Engineers, Inc.						Duration, h		0.250									
Analyst		ABC		Analysis Date		Jul 5, 2022		Area Type		Other									
Jurisdiction		Massillon, OH		Time Period		PM Peak		PHF		0.91									
Urban Street		Richville Drive		Analysis Year		2045		Analysis Period		1> 7:00									
Intersection		@ Nave Road/RG Drag...		File Name		13_PM 45B RichvilleNaveS.xus													
Project Description		Build Conditions																	
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				150	70	10	30	70	30	10	430	30	20	460	50				
Signal Information																			
Cycle, s	30.6	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On																
Force Mode	Fixed	Simult. Gap N/S	On																
				Green	11.5	7.2	0.0	0.0	0.0	0.0									
				Yellow	4.0	4.0	0.0	0.0	0.0	0.0									
				Red	2.0	2.0	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						4				8				2				6	
Case Number						8.0				8.0				8.0				8.0	
Phase Duration, s						13.2				13.2				17.5				17.5	
Change Period, (Y+R c), s						6.0				6.0				6.0				6.0	
Max Allow Headway (MAH), s						3.2				3.2				3.1				3.1	
Queue Clearance Time (g s), s						6.9				4.0				9.5				11.1	
Green Extension Time (g e), s						0.5				0.3				0.0				0.4	
Phase Call Probability						0.97				0.97				1.00				1.00	
Max Out Probability						0.01				1.00				1.00				1.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				7	4	14	3	8	18	5	2	12	1	6	16				
Adjusted Flow Rate (v), veh/h					253			143			516			582					
Adjusted Saturation Flow Rate (s), veh/h/ln					1450			1706			1822			1796					
Queue Service Time (g s), s					2.9			0.0			0.0			1.6					
Cycle Queue Clearance Time (g c), s					4.9			2.0			7.5			9.1					
Green Ratio (g/C)					0.23			0.23			0.37			0.37					
Capacity (c), veh/h					533			544			802			795					
Volume-to-Capacity Ratio (X)					0.474			0.263			0.644			0.733					
Back of Queue (Q), ft/ln (95 th percentile)																			
Back of Queue (Q), veh/ln (95 th percentile)					1.9			1.0			3.4			4.3					
Queue Storage Ratio (RQ) (95 th percentile)					0.00			0.00			0.00			0.00					
Uniform Delay (d 1), s/veh					10.8			9.8			8.3			8.8					
Incremental Delay (d 2), s/veh					0.2			0.1			1.4			2.3					
Initial Queue Delay (d 3), s/veh					0.0			0.0			0.0			0.0					
Control Delay (d), s/veh					11.1			9.9			9.7			11.1					
Level of Service (LOS)					B			A			A			B					
Approach Delay, s/veh / LOS				11.1	B		9.9	A		9.7	A		11.1	B					
Intersection Delay, s/veh / LOS				10.5						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS																			
Bicycle LOS Score / LOS																			

Appendix O

Traffic Signal Warrant Analysis Worksheets

2022 EXISTING CONDITIONS

TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 1 of 5

City: Massillon
County: Stark

Engineer: ABC
Date: July 5, 2022

Major Street: Richville Drive (SR 627)
Minor Street: US 30 EB Ramps

Lanes: 1 Critical Approach Speed: 40
Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No
- If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 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.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
	1		2 or more					8TH HIGHEST				
	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350 (280)	600 (480)	420 (336)				708				
Highest Approach on Minor Street	150 (120)	105 (84)	200 (160)	140 (112)				170				

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
	1		2 or more					8TH HIGHEST				
	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525 (420)	900 (720)	630 (504)				708				
Highest Approach on Minor Street	75 (60)	53 (42)	100 (80)	70 (56)				170				

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

2022 EXISTING CONDITIONS TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 5

City: Massillon Engineer: ABC
County: Stark Date: July 5, 2022
Major Street: Richville Drive (SR 627) Lanes: 1 Critical Approach Speed: 40
Minor Street: US 30 EB Ramps Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
 2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No
- If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

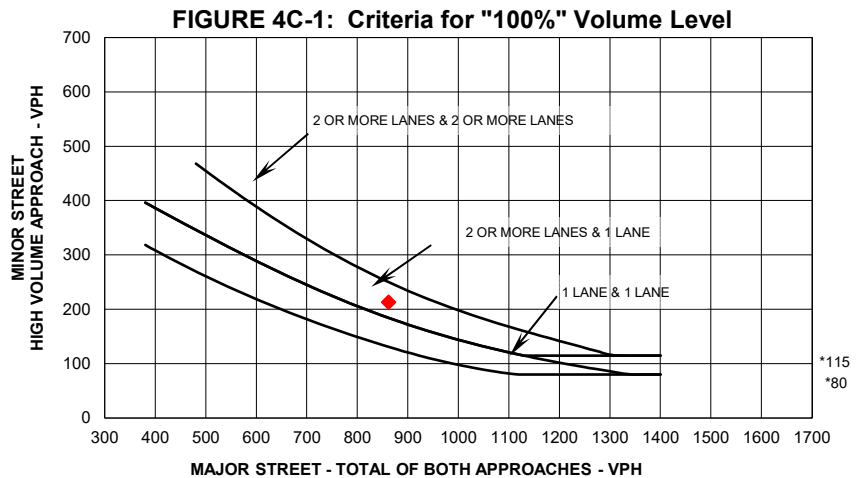
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

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

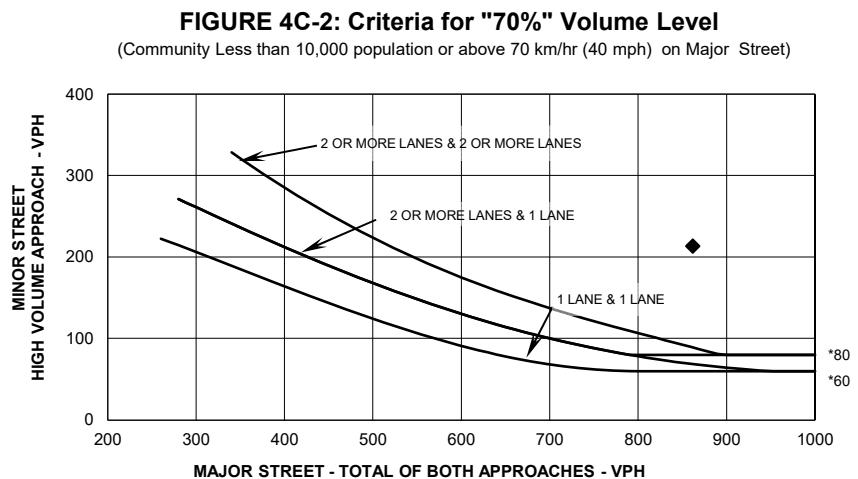
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

Four Highest Hours	Volumes	
	Major Street	Minor Street
4TH HIGHEST	862	213



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



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

2022 EXISTING CONDITIONS

TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 1 of 5

City: Massillon
County: Stark

Engineer: ABC
Date: July 5, 2022

Major Street: Richville Drive
Minor Street: US 30 WB Ramps

Lanes: 1 Critical Approach Speed: 40
Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No
- If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

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.

Condition A - Minimum Vehicular Volume

100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
	1		2 or more					8TH HIGHEST				
	100%	70%	100%	70%								
Both Approaches on Major Street	500 (400)	350 (280)	600 (480)	420 (336)				767				
Highest Approach on Minor Street	150 (120)	105 (84)	200 (160)	140 (112)				236				

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☒ Yes ☐ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
	1		2 or more					8TH HIGHEST				
	100%	70%	100%	70%								
Both Approaches on Major Street	750 (600)	525 (420)	900 (720)	630 (504)				767				
Highest Approach on Minor Street	75 (60)	53 (42)	100 (80)	70 (56)				236				

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

2022 EXISTING CONDITIONS TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 2 of 5

City: Massillon Engineer: ABC
County: Stark Date: July 5, 2022
Major Street: Richville Drive Lanes: 1 Critical Approach Speed: 40
Minor Street: US 30 WB Ramps Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No
If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 70% ☒ 100%

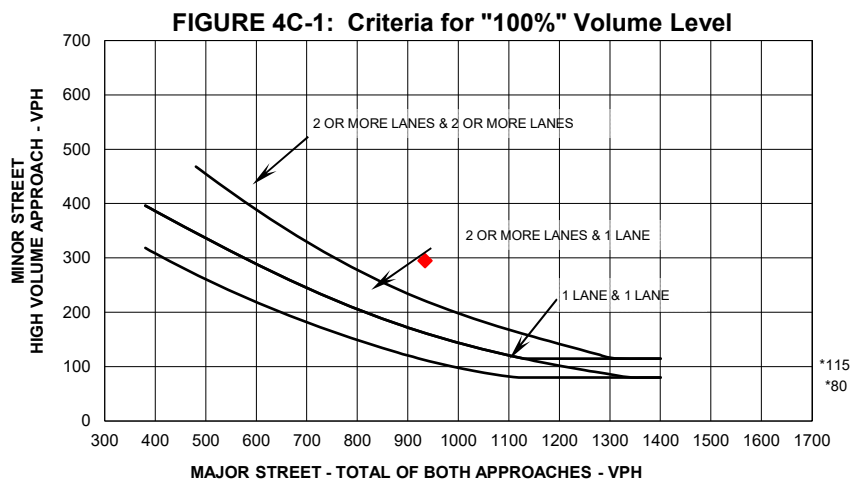
WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

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

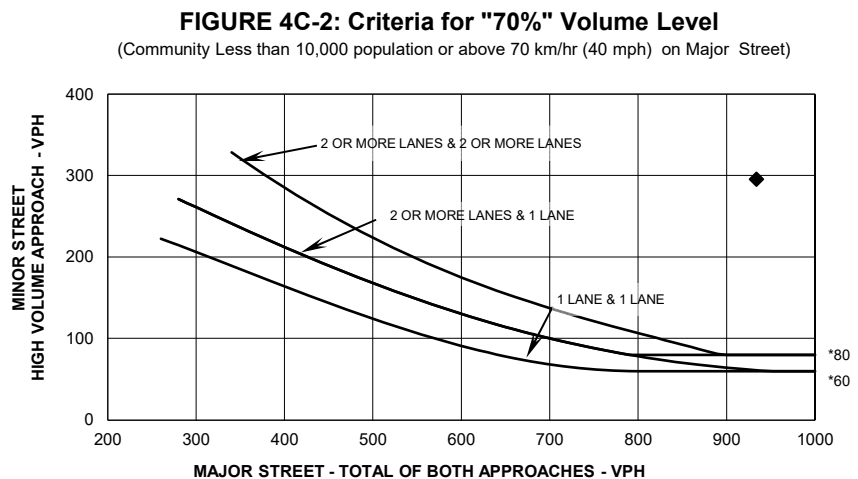
Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Plot four volume combinations on the applicable figure below.

Four Highest Hours	Volumes	
	Major Street	Minor Street
4TH HIGHEST	934	295



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



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

2022 EXISTING CONDITIONS

TRAFFIC SIGNAL WARRANT SUMMARY

Form 750-020-01
TRAFFIC ENGINEERING - 07/99
Page 1 of 5

City: Massillon
County: Stark

Engineer: ABC
Date: July 5, 2022

Major Street: Richville Drive
Minor Street: Nave Road/DG Drage Driveway

Lanes: 1 Critical Approach Speed: 40
Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic > 70 km/h (40 mph) ? ☐ Yes ☒ No
2. Is the intersection in a built-up area of isolated community of <10,000 population? ☐ Yes ☒ No
- If Question 1 or 2 above is answered "Yes", then use "70%" volume level ☐ 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.

Applicable: ☒ Yes ☐ No
Satisfied: ☒ Yes ☐ No

Condition A - Minimum Vehicular Volume

100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
	1		2 or more									
Approach Lanes												
Volume Level	100%	70%	100%	70%				8TH HIGHEST				
Both Approaches on Major Street	500 (400)	350 (280)	600 (480)	420 (336)				710				
Highest Approach on Minor Street	150 (120)	105 (84)	200 (160)	140 (112)				120				

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where the traffic volume is so heavy that traffic on the minor street suffers excessive delay.

Applicable: ☒ Yes ☐ No
Excessive Delay: ☒ Yes ☐ No
100% Satisfied: ☐ Yes ☒ No
80% Satisfied: ☒ Yes ☐ No

(volumes in veh/hr)	Minimum Requirements (80% Shown in Brackets)				Eight Highest Hours							
	1		2 or more									
Approach Lanes												
Volume Level	100%	70%	100%	70%				8TH HIGHEST				
Both Approaches on Major Street	750 (600)	525 (420)	900 (720)	630 (504)				710				
Highest Approach on Minor Street	75 (60)	53 (42)	100 (80)	70 (56)				120				

Record 8 highest hours and the corresponding volumes in boxes provided. Condition is 100% satisfied if the minimum volumes are met for eight hours. Condition is 80% satisfied if parenthetical volumes are met for eight hours.

